

**MACOMB COUNTY PURCHASING DEPARTMENT**  
**REQUEST FOR BID**

**BID ITEM NO. : 37-22**

**BID TITLE: Macomb County Executive**  
**Various Projects – Proposals A, B & C**

**PROPOSAL A:** Sanitary Replacement and Locker Room Renovations

**PROPOSAL B:** Mezzanine Barrier Mesh/Screen

**PROPOSAL C:** Cell Door Replacement – Floors 6 & 7 and Various Other Locations

**REQUEST FOR BID**

**The Macomb County Purchasing Department will be receiving sealed bids for the Macomb County Jail – Various Projects – Proposals A, B & C, (Project Number 221958).**

**The project consists of work at:**

**Macomb County Jail, 43565 Elizabeth Street, Mt. Clemens, MI 48043:**

- A. The Project consists of all necessary prep to perform the indicated work for the following Proposals:

**PROPOSAL A: Sanitary Replacement and Locker Room Renovations**

**Administration Areas**

1. Removal and replacement and/or reinstallation (where noted) of existing ceilings, lighting, ductwork and associated items to access and replace the designated overhead sanitary line serving the Jail Tower. Note: Male and female Locker Rooms and Evidence tech ductwork will be removed and replaced/reinstalled to gain access to replace the overhead sanitary line.

**Command Locker Rooms**

1. Renovation of the Sheriff's Command Locker Rooms  
Men's Locker Room:
  - a. Removal and replacement of existing finishes; toilet & shower partitions, toilet accessories, fixtures, lighting, ductwork, etc.
  - b. Temporary relocation of existing lockers to the Jail Annex. Lockers will be electrostatically painted (base bid) or replaced with new (Alternate).
  - c. Removal and replacement of existing exposed fireproofing to an intumescent paint.
  - d. Reinstallation of lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

### **Women's' Locker Room**

1. Removal and replacement of existing finishes, toilet & shower partitions, toilet accessories, fixtures. lighting, ductwork, etc.
2. Temporary relocation of lockers to the Jail Annex. Lockers will be electrostatically repainted (base bid) or replaced with new (Alternate)
3. Storage of Lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

### **Evidence Technician Room**

1. Removal and replacement of existing casework/millwork, installation of additional casework/millwork, finishes, fume hood, lighting, and new pull thru evidence lockers, ductwork, etc. in the Evidence Technician Room.
2. Demolition of existing wall as required for expansion of Evidence Technician Room.

### **Basement**

1. Installation of a secure welded wire partition system.

Note: Contractor shall carry an allowance of \$50,000.00 for temporary HVAC during construction.

### **PROPOSAL B: Mezzanine Barrier Mesh/Screen**

The Project consists of:

1. Installation of a barrier mesh system at the open perimeter of the Tower cell block mezzanine areas and portion of the connecting stairs.
2. Project includes demolition of existing mezzanine guard rail and associated patching of the concrete slab.
3. An Alternate is being solicited for: Camera relocation and procurement and installation of new cameras with associated material and equipment. Contractor shall use Motor City Electric Technologies (to maintain warranty) as the sub-contractor for this work. (See Alternate Section 01100 for additional information).

### **PROPOSAL C: Jail Tower Cell Door Replacement – Floors 6 & 7 and Various Other Locations**

1. The project consists of removal and replacement of existing deteriorated hollow metal secure doors on Floors 6 & 7 and various secure and hollow metal doors and frames where indicated on other floors.
2. Sliding doors or frames are not to be replaced.
3. Contractor shall provide and install new security glass as indicated for each door.
4. Contractor shall rewire the door position switch and solenoid operated dead latch for each opening, where frames are replaced.

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5. Repair/replace any damaged masonry (SGFT/CMU) during door frame replacement. Contractor shall include 192sf of 6" SGFT and 384sf of 6" CMU in their bid for patching. Unused SGFT and CMU shall become property of the Owner.
6. New frames shall be grouted.
7. Stenciled numbers shall be painted back on replaced doors and frames affected by this proposal.
8. All existing mechanical shaft hollow metal doors and frames on floors 6-7 and all existing secure hollow metal frames receiving new hollow metal doors and all new secure frames and hollow metal secure doors shall be repainted with Tnemec paint.

**GENERAL - ALL PROPOSALS:**

1. **Contractor shall supply one bid for all (3) Proposals.** Bids for individual proposal will not be considered.
  - a. For accounting purposes, the cost for each proposal is to be listed and the total cost for all (3) proposals with the contingency indicated shall equal the bid.
  - b. All personnel will be subject to a background check prior to entering the facility and performing any work (including deliveries). Those personnel not cleared in advance will be prevented from entering the facility.
  - c. The Jail Tower is comprised of pods: A, B, C, D, E and F. Each pod has (2) floors and contains (18) cells. Contractor will be able to work on (3) pods at a time (half a floor). There are (30) pods in the Jail Tower. Due to procurement items in the different proposals, the Contractor should plan on (25) mobilizations.
    1. Pods may not necessarily progress in a logical systematic pattern due to prisoner counts and classification of prisoners.
    2. After award of the contract, the schedule will be finalized with the successful bidder and the Macomb County Sheriff's Office. Work on the sanitary line replacement shall commence immediately upon award.
  - d. General Contractors shall have been in business minimum of (10) years and shall have performed work in a similar secure facility successfully in the past (5) years. A Contractor Qualification Statement indicating the above shall be submitted with the bid.

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**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**OBJECTIVE**

The purpose of this Request for Bid (RFB) is to select a vendor to provide renovations for the Macomb County Executive, Building Repairs at Administration Building Project. The goal is to select the most capable vendor offering the most competitive price. This proposal is in accordance with the Macomb County Procurement Policy.

**PROJECT DESCRIPTION**

**The project consists of work at:**

**Macomb County Jail, 43565 Elizabeth Street, Mt. Clemens, MI 48043:**

- A. The Project consists of all necessary prep to perform the indicated work for the following Proposals:

**PROPOSAL A: Sanitary Replacement and Locker Room Renovations**

Administration Areas

1. Removal and replacement and/or reinstallation (where noted) of existing ceilings, lighting, ductwork and associated items to access and replace the designated overhead sanitary line serving the Jail Tower. Note: Male and female Locker Rooms and Evidence tech ductwork will be removed and replaced/reinstalled to gain access to replace the overhead sanitary line.

Command Locker Rooms

1. Renovation of the Sheriff's Command Locker Rooms

Men's Locker Room:

- a. Removal and replacement of existing finishes; toilet & shower partitions, toilet accessories, fixtures, lighting, ductwork, etc.
- b. Temporary relocation of existing lockers to the Jail Annex. Lockers will be electrostatically painted (base bid) or replaced with new (Alternate).
- c. Removal and replacement of existing exposed fireproofing to an intumescent paint.
- d. Reinstallation of lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

Women's' Locker Room

1. Removal and replacement of existing finishes, toilet & shower partitions, toilet accessories, fixtures. lighting, ductwork, etc.
2. Temporary relocation of lockers to the Jail Annex. Lockers will be electrostatically repainted (base bid) or replaced with new (Alternate)
3. Storage of Lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

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Evidence Technician Room

1. Removal and replacement of existing casework/millwork, installation of additional casework/millwork, finishes, fume hood, lighting, and new pull thru evidence lockers, ductwork, etc. in the Evidence Technician Room.
2. Demolition of existing wall as required for expansion of Evidence Technician Room.

Basement

1. Installation of a secure welded wire partition system.

Note: Contractor shall include cost of (4) move and cool HVAC units in bid. Refer to Unit Pricing requested to add or subtract to this quantity

**PROPOSAL B: Mezzanine Barrier Mesh/Screen**

The Project consists of:

1. Installation of a barrier mesh system at the open perimeter of the Tower cell block mezzanine areas and portion of the connecting stairs.
2. Project includes demolition of existing mezzanine guard rail and associated patching of the concrete slab.
3. Painting of the system will utilize Tnemec coatings.
4. Unit pricing is being solicited for camera relocation and/or procurement of new. Contractor shall use Motor City Electric Technologies (to maintain warranty) as the sub-contractor for this work. Jail Administration and Facilities & Operations and Risk Management will determine if camera work is needed after the barrier mesh is installed.

**PROPOSAL C: Jail Tower Cell Door Replacement – Floors 6 & 7 and Various Other Locations**

1. The project consists of removal and replacement of existing deteriorated hollow metal secure doors on Floors 6 & 7 and various secure and hollow metal doors and frames where indicated on other floors.
2. Sliding doors or frames are not to be replaced.
3. Existing door pulls will be reused, remainder of hardware will be new as specified.
4. Contractor shall provide and install new security glass as indicated for each door.
5. Contractor shall rewire the door position switch and solenoid operated dead latch for each opening, where frames are replaced.
6. Repair/replace any damaged masonry (SGFT/CMU) during door frame replacement. Contractor shall include 192sf of 6" SGFT and 384sf of 6" CMU in their bid for patching. Unused SGFT and CMU shall become property of the Owner.
7. New frames shall be grouted.
8. Stenciled numbers shall be painted back on replaced doors and frames affected by this proposal.
9. All existing mechanical shaft hollow metal doors and frames on floors 6-7 and all existing secure hollow metal frames receiving new hollow metal doors and all new secure frames and hollow metal secure doors shall be repainted with Tnemec paint.

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**GENERAL - ALL PROPOSALS:**

1. **Contractor shall supply one bid for all (3) Proposals.** Bids for individual proposal will not be considered.
  - a. For accounting purposes, the cost for each proposal is to be listed and the total cost for all (3) proposals with the contingency indicated shall equal the bid.
  - b. All personnel will be subject to a background check prior to entering the facility and performing any work (including deliveries). Those personnel not cleared in advance will be prevented from entering the facility.
  - c. After award of the contract, the schedule will be finalized with the successful bidder and the Macomb County Sheriff's Office. Work on the sanitary line replacement shall commence immediately upon award.

**SUBMISSION PROCEDURES**

**Date Due: Tuesday, September 20, 2022 at 2:00 p.m. (local time)**

Bids will be publicly opened and read.

**DELIVER via FEDEX or UPS DIRECTLY TO 44900 Vic Wertz Drive, Clinton Township, MI 48036 PURCHASING DEPARTMENT BY DUE DATE & TIME.**

**If USPS is utilized for submissions, there is no guarantee of a timely delivery as the Post Office does not deliver to individual County Buildings.**

**NO LATE BIDS ACCEPTED.**

**Mail to:** Macomb County Purchasing  
Larry Lee, Purchasing Manager  
ATTN: Denise Mentzer  
44900 Vic Wertz Drive  
Clinton Township, MI 48036

**Return:** One (1) hard copy original  
Two (2) copies of the Bid.  
Clearly mark on the envelope **SEALED BID ITEM # 37-22 Macomb County Jail - Various Projects - Proposals A, B & C**  
Label all submission envelopes with the company name on the outside.  
**Complete and return all pages requiring vendor response.**

**Bid Opening Location: 44900 Vic Wertz Drive, Clinton Township, MI 48036**

All Bids must be submitted on the forms provided, properly executed and with all items filled out in ink or typed. Do not change or add words to the forms. Unauthorized conditions, limitations, or provisions on or attached to the forms may be cause for rejection of the Bid. Any Bidder information that is altered by erasure or by inter-lineation prior to submittal must be initialed and explained by notation above the signature of the Bidder.

**Macomb County vendors should be registered on the Michigan Inter-governmental Trade Network (MITN) website [www.mitn.info](http://www.mitn.info).**

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**QUESTIONS**

**Due:** Tuesday, September 13, 2022 at 12:00 p.m. (local time)  
**Submit to:** Email: [Denise.Mentzer@macombgov.org](mailto:Denise.Mentzer@macombgov.org)  
Fax: 586-469-6612

Questions regarding bid specifications may be directed in writing only, by email or fax. All questions or clarifications must be directed to the Purchasing Department. Any attempt to contact a County department, other than Purchasing, regarding current bids may be grounds for disqualification as a vendor. Answers will be posted to MITN after the question due dates.

**PRE-BID MEETING**

**Date:** Tuesday, September 6, 2022 at 10:00 AM (local time)  
**Location:** Main Lobby-Macomb County Jail, 43565 Elizabeth, Mt. Clemens, MI 48043

This is a Mandatory pre-bid meeting. No other site visit will be scheduled.

The purpose of this meeting is to review the project, and Bid Specifications.

Facility related questions will be answered at this meeting. Other questions related to the Bid specifications must be submitted in writing to the Purchasing Department.

**MODIFICATIONS**

Macomb County vendors should be registered on the Michigan Inter-governmental Trade Network (MITN) website [www.mitn.info](http://www.mitn.info). Clarifications, modifications, or amendments may be made to this document at the discretion of the Macomb County Purchasing Department prior to the opening of the solicitations. Should any such changes be made, an addendum will be issued and posted on the MITN website. It is the responsibility of each Bidder to check the website and verify that he/she has received all Addenda prior to submitting a Bid.

It is also the responsibility of each Bidder to verify that all sub-Bidders and material suppliers whose prices are incorporated in the Bidder's Bid are familiar with the Bidding Documents in their entirety, including all Addenda issued up to the time of the Bid opening. (See also *ERRORS, OMISSIONS, AND/OR DISCREPANCIES, below.*)

All addenda issued to Bidders prior to date of receipt of Bids shall become a part of these specifications, and all Bids are to include the Work therein described.

**DEFINITIONS**

- A. Bidding Documents include this Request for Bid, (including drawings, specifications and all Addenda issued prior to execution of the Contract) and the proposed Contract Documents.
- B. Addenda are written or graphic instruments issued by Macomb County prior to the execution of the Contract that modify or interpret the Bidding Documents.
- C. The Base Bid is the sum state in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted.
- D. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work as described in the Bidding Documents.



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- E. A Bidder is a person or entity who submits a Bid to Macomb County, and who meets the requirements set forth in the Bidding Documents.
- F. Default is the failure of the Bidder to fulfill the obligations of the contract, including but not limited to, failure to deliver on time or the unauthorized substitution of articles other than those quoted and specified on the contract; or failure to deliver specified quantities (repetitive shortages).
- G. Owner is the County of Macomb.
- H. Contractor is a person or business which provides goods or services to the County of Macomb under terms specified in a contract.

**BIDDING DOCUMENTS**

All Bidding Documents are available on the Michigan Inter-governmental Trade Network (MITN) website [www.mitn.info](http://www.mitn.info). Bidders shall use complete sets of Bidding Documents in preparing Bids. Macomb County assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

All Bidding Documents are the property of the Architect.

**EXAMINATION OF BIDDING DOCUMENTS AND SITE**

Before submitting a Bid, the Bidder shall carefully examine the drawings, read the specifications and all other Bidding Documents; and visit the site of the Work. Each Bidder shall inspect the site of the proposed Work to arrive at a clear understanding of the conditions under which the Work is to be performed. The Bidder shall fully inform himself/herself prior to bidding as to all existing conditions and limitations under which the Work is to be performed and he/she shall include in the Bid a sum to cover the cost of all items necessary to perform the Work as set forth in the Bidding Documents. No allowance will be made to the Bidder because of lack of such examination or knowledge. The submission of a Bid shall be construed as conclusive evidence that the Bidder has made such examination. Claims for extra payments based on lack of knowledge of existing circumstances will not be allowed.

**BIDDER'S QUALIFICATIONS**

Bidders must be properly licensed under the state laws governing their respective trades. Bidders shall meet qualifications indicated in the Bidding Documents. Macomb County may make such investigations as necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to Macomb County all such information and data for this purpose as Macomb County may request. Macomb County reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy Macomb County that such Bidder is not properly qualified to carry out the obligations of the Contract.

Submission of a Bid shall serve as evidence that the Bidder has confirmed that the Bidder is properly qualified to perform the work and is capable of obtaining the required bonds and insurance.

**COMPONENT/PRODUCT RESPONSIBILITY**

The successful Bidder will provide field instructions for Macomb County's operators, mechanics and/or supervisors. The successful Bidder shall be responsible to insure that all components delivered operate properly and with the intent and details of these specifications.

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**STATUS OF BIDDERS**

*Proprietors submitting Bids* shall indicate their status as proprietors.

*Bidders submitting Bids for partnerships* shall indicate their status as partners and shall submit, upon request of Macomb County within 24 hours following receipts of Bids, a certified copy of the power of attorney authorizing the executor of the Bid to bind the partnership.

*Bidders submitting Bids for corporations* shall indicate their status as corporations and shall submit, upon request of the Owner within 24 hours following receipt of Bids, a certified copy of the board of directors' authorization for the Bidder to bind the corporation and shall affix the corporate seal on the Bid.

Bidders shall provide, upon request of Macomb County, within 24 hours following receipt of Bids, the following:

1. Names and addresses of proprietors, of all members of a partnership, or of the corporation's officers.
2. Name of county or state where the partnership is registered or where the corporation is incorporated. Corporations must be licensed to do business in the project state at the time of executing the contract.

**ERRORS, OMISSIONS, AND/OR DISCREPANCIES**

Bidder shall not be allowed to take advantage of errors, omissions, and/or discrepancies found in the Bidding Documents. In the event a conflict or omission is discovered in the Bidding Documents after the issuing of the last addendum such that an interpretation cannot be issued by Macomb County prior to bidding, the Bidder is directed to estimate on and provide the quantity and quality of material and labor consistent with the overall represented work so as to provide all materials, equipment, labor, and services necessary for the completion of the Work.

**SUBSTITUTION OF MATERIALS AND EQUIPMENT**

Whenever a material, article or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided that the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance appearance and function.

To obtain approval to use unspecified products, Bidders shall submit written requests at least ten (10) days before the bid date. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability.

If the product is acceptable, the Architect will approve it in an Addendum which will be posted on the MITN website. The product shall not be purchased or installed by the Contractor without the Architect's written approval.

Voluntary alternates or qualifications contrary to the Contract requirements made by the Bidder in or accompanying his/her Bid as a condition for the acceptance of the Contract will not be considered in the award of the Contract and will cause the rejection of the entire Bid.

**TERMINATION**

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Macomb County reserves the right to terminate any award to the Bidder without any liability, upon a 30 day notice from Macomb County.

**DEFAULT (refer to Section: Definitions, Item F)**

If continued abuse of any/or all of the default conditions persist, Macomb County will notify the Contractor in writing. The Contractor will be given thirty (30) days to correct this default condition. Failure to correct within the specified period will result in Macomb County canceling the Contract and procuring the articles or services from other sources. The Contractor will be responsible for any excess costs occasioned thereby.

**RIGHT TO REJECT**

Macomb County reserves the right to reject any or all Bids in whole or in part and to waive any informalities therein, or accept any Bid it may deem in the best interest of the County.

Note: Past experience and performance may be a factor in making an award.

**MODIFICATION AND WITHDRAWAL OF BIDS**

A Bid may be withdrawn on personal requests received from Bidder prior to submission time. A Bid being withdrawn may be re-submitted up to submission time. Negligence or error on the part of the Bidder in preparing his/her Bid confers no right for withdrawal of the Bid after it has been opened.

**OFFER PERIOD**

Bids will remain firm for a period of **30 days** after official opening of Bids.

**BID BREAKDOWN CONSTRUCTION INFORMATION**

Upon notice from the Architect, the low Bidders shall submit a detailed cost breakdown of all work covered by the Bidding Documents. The breakdown shall show quantity of material and labor, units of material and labor, material cost, labor cost and total cost.

**EXECUTION OF CONTRACT**

Macomb County reserves the right to accept any and all Bids, or to negotiate contract terms with the various Bidders when such is deemed by Macomb County to be Macomb County's best interest.

**UNIT PRICES**

Unit prices shall include all charges applicable to the items including, but not limited to, materials, shoring, hauling removal, fee, layout, supervision and overhead (field and home office), labor, general expenses, transportation, taxes, insurance and profit. Single unit prices shall apply to additions to, or deductions from the Work.

**SCHEDULE - TIME OF COMPLETION**

Work is to commence on a date specified in a written "Notice to Proceed", and shall be substantially complete as soon as possible.

**BASIS OF BID**

A single lump sum Bid is being entertained for the Work of the Bid.

**SALES AND EXCISE TAXES**

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The County of Macomb, being a governmental unit, is exempt from sales and federal excise taxes. The price is to be net, exclusive of any taxes. All prices stated in the Bid response will include all Federal, State, County and Municipal taxes, including Michigan State Sales and Use Taxes, or contributions required by Bidder's business.

**PERMITS**

Any needed city permits and bonds will be required prior to award of Contract and commencement of Work.

**INDEMNIFICATION**

Macomb County will not be responsible for injury to Contractor's employees, Sub-Contractors, or to third parties caused by the Contractor's agents, servants or employees. Therefore, the Contractor agrees to incorporate the below hold harmless agreement into the required insurance and to be evidenced by being contained in the certificate of insurance. Further, the below listed indemnification is incorporated and is part of the subject contract.

The Contractor agrees to protect, defend, indemnify and hold the County of Macomb and its commissioners, officers, employees and agents free and harmless from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees, or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, legal fees, liens, demands, court costs, obligations, actions, proceedings or causes of action of every kind and character in connection with or arising directly or indirectly out of this agreement and/or the performance hereof. Without limiting the generality of the foregoing, any and all such claims, etc. relating to personal injury, death, damage to property, defects in materials or workmanship, or any actual or alleged violation of any applicable statute, ordinance, administrative order, rule or regulation, or decree of any court, shall be included in the indemnity hereunder.

The Contractor further agrees to investigate, handle, respond to, provide defense for and defend any such claims, etc. at his sole expense and agrees to bear all other costs and expenses related hereto, even if it (claims, etc.) is groundless, false or fraudulent. In any case in which this indemnification would violate legal prohibition, the foregoing provision concerning indemnification shall not be construed to identify the County for damage arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence of the County, its commissioners, officers, employees or agents.

**BID BOND/GUARANTEE**

All Bids must be accompanied by a certified check, cashier's check, or a satisfactory Surety Bid Bond in an amount not less than five percent (5%) of the total Bid price. Checks shall be made payable to County of Macomb. No Bid shall be considered unless it is accompanied by a certified check, cashier's check or a satisfactory Surety Bid Bond.

Checks will be returned to all except the three (3) lowest Bidders for each contract within five (5) days after the opening of the Bids, and the remaining checks will be returned promptly after Macomb County and the accepted Bidders have executed the Contract, or if no award has been made, within thirty (30) days after the date of the opening of the Bids, upon demand of the Bidder at any time thereafter, so long as he has not been notified of the acceptance of his/her Bid.

The Bid Bond/Guarantee may be forfeited to Macomb County, if the successful Bidder refuses to enter into a Contract within ten (10) days upon award of Contract from Macomb County.

Bid Bonds shall be accompanied by a Power-of-Attorney authorizing the signer of the bond to do so on behalf of the Surety Company.

**PERFORMANCE AND PAYMENT BOND**

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The successful Bidder will be required to furnish a satisfactory performance and payment bond each in an amount equal to 100 percent of the Contract Sum, within five (5) days after notification of intent to enter into Contract. Bonds, in the full amount of the contract, are required so that the County has a guarantee that the Contractor will faithfully perform the contract and the Contractor will make all payments for all labor and material costs or claims covered or furnished under the contract.

All bonds and policies or certificates of insurance must meet with the approval of Macomb County before the Contractor will be allowed to commence the Work. Failure or refusal to furnish bonds or insurance policies or certificates in a form satisfactory to Macomb County shall subject the Bidder(s) to forfeiture of Bid Bond.

**The Performance and Payment Bond must be from a surety company licensed to do business in the State of Michigan, and will be in Compliance with all the requirements of MCL 129.201 et seq.**

**CONTRACTS WITH SUB-CONTRACTORS**

All contracts made by the Bidder with Sub-Contractors shall be covered by the terms and conditions of the Contract. The Bidder shall inform all Sub-Contractors of these terms and conditions. Macomb County reserves the right to require of the Bidders tentatively selected for consideration in the awarding of the Contract, a list of the Sub-Contractors whom the Contractor intends to employ.

Macomb County reserves the right to disapprove the use of any proposed Sub-Contractor, and in such event, the Bidder submitting such Sub-Contractor shall submit another such Sub-Contractor in like manner within the time specified by Macomb County. Macomb County reserves the right to reject any proposal if such information required by Macomb County is not submitted as above indicated.

**INSURANCE**

***COMMERCIAL GENERAL LIABILITY INSURANCE***

Shall be written on an occurrence basis with limits of Liability of not less than \$1,000,000 (one million dollars) as combined single limit for each occurrence of bodily injury and personal injury with an annual aggregate of not less than \$2,000,000 (two million dollars). The policy shall include;

- a. Contractual Liability
- b. Products and Completed Operations
- c. Independent Contractors Coverage
- d. Broad Form General Liability Extensions or equivalent

***WORKERS' COMPENSATION***

Workers' Compensation Insurance meeting Michigan statutory requirements. Employer's Liability Insurance with minimum limits of \$500,000 each accident, \$500,000 bodily injury by disease policy limit, \$500,000 bodily injury by disease each employee.

***AUTOMOBILE LIABILITY INSURANCE***

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



Motor Vehicle Liability Insurance including Michigan NO-FAULT Coverage for all vehicles, owned and non-owned, leased and hired used in the performance of this contract with limits of \$1,000,000 (one million dollars) as the combined single limit for each occurrence for bodily injury and property damage.

***PROFESSIONAL LIABILITY/ERRORS & OMISSIONS***

Professional Liability Insurance with minimum limits of \$1,000,000 (one million dollars) each occurrence and \$2,000,000 (two million dollars) aggregate.

***INSURANCE INSTRUCTIONS***

All certificates of insurance and duplicate policies shall contain the following:

The County of Macomb shall be named additional insured on all policies (excluding Worker's Compensation) and the underwriters will have no right of recovery or subrogation against the County of Macomb including its agents, employees, elected and appointed officials and agencies. It being the intention of the parties that the insurance policy so effected will protect both parties in primary coverage for any and all losses covered by the subject policy. The insurance carrier(s) must have an A.M. Best rating of no less than an A-, VII.

The insurance company(s) issuing the policy or policies will have no recourse against the County of Macomb for payment of any premiums or for assessments under any form of policy.

The Contractor will assume any and all deductibles in the above any and all deductibles in the above-described insurance policies.

The term "INSURED" is used severally, not collectively, but the inclusion in this policy of more than one insured will not operate to increase the limit of the Owner's liability.

**FORMS**

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**INSTRUCTIONS**

All Bids must be submitted on the forms provided, properly executed and with all items filled out in ink or typed. Do not change or add words to the forms. Unauthorized conditions, limitations, or provisions on or attached to the forms may be cause for rejection of the proposal. Any Bidder information that is altered by erasure or by inter-lineation prior to submittal must be initialed and explained by notation above the signature of the Bidder.

**LIST**

The following is a list of forms that are to be completed and returned:

County Vendor Disclosure Form. . . .	Page 16
Non-Collusion Affidavit . . . . .	Page 18
Macomb County Preference . . . . .	Page 19
General Information . . . . .	Page 20
Work References . . . . .	Page 21
Federal E-Verify Program . . . . .	Page 22
Iran Economic Sanction Act . . . . .	Page 23
Bid Form . . . . .	Page 24
Bid Form Supplement . . . . .	Page 28
Vendor Certification Debarment . . . .	Page 33



**County of Macomb, Michigan**  
**VENDOR DISCLOSURE FORM**

The Macomb County ethics ordinance requires vendors of the County to complete and file a disclosure statement, the purpose of which is to disclose any financial relationships or other conflicts of interest that may exist between vendors and employees or elected officials (or their appointees) of the County. Once filed, the disclosure form does not need to be updated unless there is a change in circumstance that would cause the answer to any of the questions to change, at which time an amended disclosure form must be filed. Filing of the disclosure form is considered a condition of payment.

**PLEASE RETURN THE COMPLETED FORM TO:**  
Macomb County Purchasing Department  
ATTN: Vendor Disclosure  
120 North Main Street  
Mount Clemens MI 48043

VENDOR NAME: \_\_\_\_\_

1. Does the vendor currently employ a relative of any employee, elected official or appointee of an elected official of Macomb County? Relative is defined as husband or wife, father or mother, son or daughter, brother or sister, uncle or aunt, first cousin, nephew or niece, great uncle or great aunt, grandfather or grandmother, grandson or granddaughter, father-in-law or mother-in-law, son-in-law or daughter-in-law, brother-in-law or sister-in-law, stepfather or stepmother, stepson or stepdaughter, stepbrother or stepsister, half-brother or half-sister, the parents or grandparents of the individual's fiancée.

**YES**                       **NO**

If yes, please answer the following:

- A. Name of County employee or elected official (or appointee): \_\_\_\_\_
- B. County Position/Title: \_\_\_\_\_
- C. County Department or Agency: \_\_\_\_\_

2. Does any employee or elected official of Macomb County have an interest in the vendor organization in any of the following capacities, either compensated or non-compensated: director, officer, partner, beneficiary, trustee, member, employee or contractor.

**YES**                       **NO**

If yes, please answer the following:

- A. Name of County employee or elected official (or appointee): \_\_\_\_\_
- B. County Position/Title: \_\_\_\_\_
- C. County Department or Agency: \_\_\_\_\_
- D. Position/Title with Vendor: \_\_\_\_\_



**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



3. Does any current employee or elected official of Macomb County have legal or beneficial ownership of 10% or more of the outstanding stock of the vendor organization?

YES  NO

If yes, please answer the following:

- A. Name of County employee or elected official (or appointee): \_\_\_\_\_
- B. County Position/Title: \_\_\_\_\_
- C. County Department or Agency: \_\_\_\_\_
- D. % of Ownership of Vendor Organization: \_\_\_\_\_

4. In the last five calendar years, has the vendor failed to perform or otherwise deliver on the terms of a contract or agreement with Macomb County, or any other public entity, including suspensions or debarments?

YES  NO

If yes, please provide further explanation:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I hereby certify that the information included on this form is complete, true and accurate to the best of my knowledge and belief. I understand that either myself or the organization to which this form applies may be subject to sanctions and/or penalties as set forth in the ethics ordinance if any information has been falsified or omitted.

\_\_\_\_\_  
*Name (Please Print)*

\_\_\_\_\_  
*Title*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Date*

**NON-COLLUSION AFFIDAVIT**

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



Attachment "C4"

STATE OF )  
 ) ss  
COUNTY OF )

\_\_\_\_\_, being first duly sworn, deposes and says that he/she is authorized on behalf of \_\_\_\_\_ (Bidder Name) who is making the foregoing proposal(s) that:

- 1) Such proposals are genuine and not collusive or a sham.
- 2) This Bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder or person to submit a proposal which is a sham.
- 3) This Bidder has not in any manner agreed with any other persons or businesses to fix the proposed price, overhead, profit, or any cost element of the submitted proposal.
- 4) This Bidder has not attempted to secure any advantage against any other Bidders through collusion with any other Bidder or employees or representative of the County.
- 5) That the proposals submitted are true and accurate to the best of my knowledge and belief and are made in good faith.
- 6) This Bidder has not directly or indirectly submitted or disclosed its proposal or its contents or divulged information or data relative thereto to any association or to any member or agent of any other Bidder to this proposal.

Further, Affiant sayeth not.

\_\_\_\_\_

Subscribed and sworn to before me  
this \_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public  
County of \_\_\_\_\_,  
State of \_\_\_\_\_,  
My Commission Expires: \_\_\_\_\_

**BIDDER: THIS AFFIDAVIT MUST BE COMPLETED, SIGNED, NOTARIZED AND INCLUDED IN YOUR PROPOSAL SUBMISSION.**

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**MACOMB COUNTY BASED PREFERENCE – ATTACHMENT “C5”**

A local preference percentage credit from the following allowance table will be applied to the bid of any County-based Enterprise. This credit will be subtracted from the bid of the County-based Enterprise. In comparing bids, the bid of the County –based Enterprise after subtraction of the credit shall be considered the official bid. However, if the County-based Enterprise is awarded the Contract, the bid without the equalization percentage credit shall be the Contract price.

<u>Contract Amount</u>	<u>Local Preference Percentage</u>
Up to \$50,000.00	5
\$50,000.00 to \$200,000.00	3
\$200,000.00 and over	1

1. No business shall receive these credits unless it has been certified by the Purchasing Manager.
2. Any business who claims entitlement to any local preference credit shall disclose the records necessary to establish eligibility to the County.
3. After applying any local preference credits as provided above, the Contract shall be awarded to the lowest Responsible Bidder thus evaluated.

**IN ORDER TO DETERMINE IF YOUR BUSINESS IS ENTITLED TO RECEIVE A LOCAL PREFERENCE PERCENTAGE CREDIT PLEASE ANSWER THE FOLLOWING QUESTIONS:**

1. Is your business headquarters physically located within Macomb County, or has it been conducting business at a location with a permanent street address in the County of Macomb on an ongoing basis for not less than one taxable year prior to your bid or response to this Request for Proposal? **YES \_\_\_\_\_ NO \_\_\_\_\_**
2. Has your business paid property taxes on real or personal property within the past year on property which is ordinarily needed to perform the proposed contract? **YES \_\_\_\_\_ NO \_\_\_\_\_**
3. Are at least 50 percent of your regular full-time employees based at the County location to perform the proposed contract? **YES \_\_\_\_\_ NO \_\_\_\_\_**
4. Has your business been dealing for at least one year on a regular commercial basis in the kind of goods or services which are the subject of this bid or proposal? **YES \_\_\_\_\_ NO \_\_\_\_\_**

**Drug Screening**

To the extent not prohibited by law, all contracts for construction, repair, alteration, or rebuilding of a County building or other property shall include a provision requiring the contractor and any subcontractor providing services under the contract to conduct pre-hire screening for illegal drug use by their employees who provide services under the contract.

If applicable, is your business compliant with this requirement? **YES \_\_\_\_\_ No \_\_\_\_\_**

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**GENERAL INFORMATION**

In further description of this Bid, we desire to submit sheets marked as follows:

\_\_\_\_\_

Bidding under the name of: \_\_\_\_\_

DUNS Number: \_\_\_\_\_  
Federal Employer Identification Number: \_\_\_\_\_  
which is (check one of the following):

( ) Corporation, incorporated under the laws of the State of:  
\_\_\_\_\_

( ) Partnership, consisting of (list partners):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

( ) Assumed Name (Register No.) \_\_\_\_\_

( ) Individual

AUTHORIZED SIGNATURE: \_\_\_\_\_

Printed or typed signature: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City, State: \_\_\_\_\_

Date: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Email: \_\_\_\_\_

\*\*\*\*\*

When payment on such order or contract is to be directed to the same company at an address different from above, please list the address to be used below:

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**WORK REFERENCES**

BIDDER'S COMPANY NAME \_\_\_\_\_  
Please list at least three (3) companies or public agencies for which you have done similar work.

Macomb County reserves the right to reject low Bids for poor past performance or inadequate references.

NAME OF COMPANY \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

NAME OF COMPANY \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

NAME OF COMPANY \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

NAME OF COMPANY \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_



**FEDERAL E-VERIFY PROGRAM**  
**ATTACHMENT "C6"**

The Macomb County Board of Commissioners has established a policy regarding the Federal E-Verify Program. This policy states that future contracts (including both new and reviewing contracts) between Macomb County and contractors and vendors who provide services in excess of twenty-thousand dollars (\$20,000) shall require the contractors and vendors to register with, participate in, and utilize the E-Verify Program (or any successor program implemented by the federal Department of Homeland Security and Social Security Administration) when hiring their employees and require the County's Human Resources Department to utilize the E-Verify Program (or any successor program implemented by the federal Department of Homeland Security and Social Security Administration) when hiring new employees.

**For more information about E-Verify, go to [www.uscis.gov](http://www.uscis.gov).** Click on the E-Verify icon on the bottom left-hand corner of page.

**ACKNOWLEDGMENT OF MACOMB COUNTY'S POLICY**  
**REQUIRING PARTICIPATION IN THE FEDERAL E-VERIFY PROGRAM**  
**AND CERTIFICATION OF COMPLIANCE**

The undersigned hereby acknowledges receipt of a copy of the policy of the Macomb County Board of Commissioners requiring contractors, including those providing professional services, who provide services **in excess of \$20,000 a year** to the County to register and participate in the Federal E-Verify Program.

The undersigned hereby certifies that (he/she/it) will comply with this policy and will register with, participate in and utilize the E-Verify Program or any successor program implemented by the Federal Department of Homeland Security and Social Security Administration when hiring employees.

DATED: \_\_\_\_\_

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Printed or Typed Signature

\_\_\_\_\_  
Name of Company



**CERTIFICATION OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT**  
**ATTACHMENT “C7”**

**Michigan Public Act No. 517 of 2012**

The undersigned, the owner or authorized officer of the below-named Bidder \_\_\_\_\_, hereby certifies, represents and warrants that the Bidder, including its officers, directors and employees, is not an “Iran linked business” within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the “Act”), and that in the event Bidder is awarded a contract, the Bidder will not become an “Iran linked business” at any time during the course of performing any services under the contract.

BIDDER: \_\_\_\_\_  
Name of Bidder

By: \_\_\_\_\_

Its: \_\_\_\_\_

Date: \_\_\_\_\_

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**BID FORM**

**Bid Item No. 37-22  
Macomb County Jail  
Various Projects  
Proposals A, B & C  
Wakely Project #221958  
County of Macomb  
Mount Clemens, Michigan**

Bidder: \_\_\_\_\_  
*(print or type company name)*

OWNER \_\_\_\_\_  
*(Telephone Number)*

MACOMB COUNTY  
MT. CLEMENS, MICHIGAN 48043

WAKELY ASSOCIATES INC.  
30500 VAN DYKE AVENUE, SUITE 209  
WARREN, MI 48093

**GENERAL AGREEMENTS**

- A. The Bidder acknowledges that he/she has had the opportunity to examine the site and locality where the Work is to be performed and has become familiar with the legal requirements, laws, rules, regulations and conditions affecting the cost, progress and performance of the Work; and has made such independent investigations as Bidder deemed necessary to prepare the Bid. Further, Bidder hereby states that the Base Bid set forth in this Bid Response is true and correct.
- B. The Bidder agrees that this Bid shall not be withdrawn for a period of **(30) calendar days** after the scheduled closing time for receiving Bids.
- C. The Bidder declares that in preparing this Bid, Bidder is assured of the availability of all labor, materials and products to meet the substantial completion date.
- D. The Bidder acknowledges that the price stated below includes all taxes of whatever character or description.
- E. The Bidder agrees to execute a Contract for work covered by this Bid, provided that he/she be notified of its acceptance within thirty **(30) days** after the opening of Bids.

**SCHEDULE-TIME OF COMPLETION**

The undersigned agrees to commence the Work of the Contract Documents on a date specified in a written "Notice to Proceed" (anticipated September 2022), and shall fully complete the work in an expeditious manner as soon as possible.

**ACKNOWLEDGEMENT OF ADDENDA**

The Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

Addendum No. 1, dated \_\_\_\_\_, Addendum No. 3, dated \_\_\_\_\_

Addendum No. 2, dated \_\_\_\_\_, Addendum No. 4, dated \_\_\_\_\_



**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**BID FORM SUPPLEMENTS**

Attached to this Bid Form and incorporated herein are the following documents, completed in full by the undersigned:

Base Bid Form Supplement – Unit Prices/Supplemental Fees

**BASE BID**

The undersigned Bidder, having carefully examined the Bidding and Contract Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, all as issued by the Owner, and being familiar with all conditions and requirements of the Work, hereby proposes and agrees to furnish all material, labor, equipment, tools and supervision; and to furnish all services necessary to complete the Work required in accordance with the Bidding Documents for the following projects, in the following amount:

**\$ \_\_\_\_\_ BASE BID (PROPOSALS A, B & C)**

**CONTINGENCY:** (This amount, when unused, will be returned to the Owner. This contingency will only be used after written authorization of the Owner's representative).

- A. The undersigned acknowledges that they have included the sum of THREE HUNDRED FIFTY THOUSAND DOLLARS (\$350,000.00) in the base bid for use as a Construction Contingency. (Note: \$50,000.00 is for temporary HVAC in Proposal A).  
Note: Unused Contingency will be returned to Owner at the end of the project.

**PROPOSAL A: COST (For Accounting Purposes)**

\_\_\_\_\_ Dollars \$ \_\_\_\_\_  
*(Sum to be written out)*

**PROPOSAL B: COST (For Accounting Purposes)**

\_\_\_\_\_ Dollars \$ \_\_\_\_\_  
*(Sum to be written out)*

**PROPOSAL C: COST (For Accounting Purposes)**

\_\_\_\_\_ Dollars \$ \_\_\_\_\_  
*(Sum to be written out)*

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**ALTERNATES**

Three Alternates are being priced. As follows:

**Alternate No. 1:** New Lockers for first floor Men’s & Women’s Locker Rooms. PROPOSAL A

ALTERNATE NO. 1: \_\_\_\_\_

Dollars \$ \_\_\_\_\_ (sum to be written out)

**Alternate No. 2:** New Lockers for second floor Men’s & Women’s Locker Rooms.  
PROPOSAL A

ALTERNATE NO. 2: \_\_\_\_\_

Dollars \$ \_\_\_\_\_ (sum to be written out)

**Alternate No. 3:** Existing camera relocation, new camera installation and associated material and equipment . PROPOSAL B

ALTERNATE NO. 3: \_\_\_\_\_

Dollars \$ \_\_\_\_\_ (sum to be written out)

**VOLUNTARY ALTERNATES**

The following voluntary alternates are offered by the Bidder. The undersigned agrees that the amounts indicated below shall be added to or deducted from the Base Bid, as the case may be for each alternate which is accepted.

	Description of Voluntary Alternates	Add	Deduct
1.		\$ _____	\$ _____
2.	_____	\$ _____	\$ _____
3.	_____	\$ _____	\$ _____
4.	_____	\$ _____	\$ _____

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



Respectfully submitted this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

By: \_\_\_\_\_  
(Name of bidding firm or corporation)

Witness:

By: \_\_\_\_\_  
(Signature)

Attest: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Type or print name)

By: \_\_\_\_\_  
(Type or print name)

Title: \_\_\_\_\_  
(Owner/Partner/President/Vice Pres.)

Title: \_\_\_\_\_  
(Corporate Secretary or Assistant Secretary Only)

Address: \_\_\_\_\_  
Phone: \_\_\_\_\_

License: \_\_\_\_\_

Federal ID No.: \_\_\_\_\_

*(Affix Corporate Seal Here)*

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Company Representative

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**BID FORM SUPPLEMENT - UNIT PRICES/SUPPLEMENTAL FEES**

**This form is required to be attached to the Base Bid Form.**

**Bid Item No. 37-22  
Macomb County Jail  
Various Projects  
Proposals A, B & C  
Wakely Project #221958**

Bidder: \_\_\_\_\_  
*(print or type company name)*

County of Macomb  
Mount Clemens, Michigan

**UNIT PRICES**

Unit Prices shall include all charges applicable to the items including, but not limited to, materials, shoring, hauling removal, fee, layout, supervision and overhead (field and home office), labor, general expenses, transportation, taxes, insurance and profit. Single unit prices shall apply to additions to, or deductions from the Work.

In submitting this bid, the Bidder agrees that Work Item quantities are estimates and that the Owner may increase or decrease these quantities at the unit prices stated. Each bidder shall show below the amounts proposed to be added to or deducted from the Base Bid Total upon adjustment of the quantity given for the actual measurement of individual items of the Work. Reimbursement of the Contractor will be made strictly on the basis of a quantitative survey of extended material placed for the unit prices shown.

**Unit Price No. A1:**

Hourly rate for one journeyman to perform electrical demo beyond that shown on the documents including OH&P and bond.

ADD \_\_\_\_\_ Hourly Rate (\$ \_\_\_\_\_ /per hour)  
Sum to be written out

**Unit Price No. A2:**

Hourly rate for one apprentice to perform electrical demo beyond that shown on the documents including OH&P and bond.

ADD \_\_\_\_\_ Hourly Rate (\$ \_\_\_\_\_ /per hour)  
Sum to be written out

**Unit Price No. C1:**

Cost to procure and install door type G1 (price to include removal and disposal of existing door, new hardware based on Hardware Set SH.01 security glass and paint).

ADD \_\_\_\_\_ DOLLARS/DOOR (\$ \_\_\_\_\_ )  
Sum to be written out PER DOOR

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**Unit Price No. C2:**

Cost to procure and install door type G2 (price to include removal and disposal of existing door, new hardware based on Hardware Set SH.02 security glass and paint).

ADD \_\_\_\_\_ DOLLARS/DOOR (\$ \_\_\_\_\_ )  
Sum to be written out PER DOOR

**Unit Price No. C3:**

Cost to procure and install new secure door frame type 1 (price to include removal and disposal of existing door frame and painting of frame).

ADD \_\_\_\_\_ DOLLARS/FRAME (\$ \_\_\_\_\_ )  
Sum to be written out PER FRAME

**Unit Price No. C4:**

Cost to procure and install new secure door frame type 2 (price to include removal and disposal of existing door frame and painting of frame).

ADD \_\_\_\_\_ DOLLARS/FRAME (\$ \_\_\_\_\_ )  
Sum to be written out PER FRAME

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**SUPPLEMENTAL FEES**

For additional work performed upon instruction of Macomb County, by Sub-Contractors of the Undersigned, add to the Sub-Contractor's prices for such work a fee of \_\_\_\_\_%, which includes all the charges of the undersigned for overhead and profit.

Any additional work performed upon instruction of Macomb County by persons other than the Sub-Contractors of the undersigned, the charges will be actual cost of the labor, and materials, (less all discounts) plus the fee of \_\_\_\_\_%, which includes all the charges of the undersigned for overhead and profit, and to which shall be added the actual cost of insurance & taxes.

Each Bid covering extra work, shall be accompanied with complete itemized material & labor breakdowns.

For all revisions involving the deletion of contract work, it is agreed that the full credit shall be given Macomb County for such work deleted, including overhead and profit as quoted hereinbefore.

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



NEGOTIATION

The undersigned agrees that, should the overall cost exceed the funds available, he/she will be willing to negotiate with Macomb County and Architect; for the purpose of making further reductions in the Contract work, and shall agree to give full credit for all such reductions in the work requested by Macomb County, including full value of labor, materials, and Sub-Contract work and reasonable proportionate reductions in overhead and profit, thereby arriving at an agreed upon Contract price.

Submitted this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

By: \_\_\_\_\_  
(Name of bidding firm or corporation)

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Type or print name)

Title: \_\_\_\_\_  
(Owner/Partner/President/Vice Pres.)

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**BID FORM SUPPLEMENT - LIST OF SUB-CONTRACTORS**

All sealed bids for construction contracts shall provide a list of preferred sub-contractors and identify, with documentation, whether each subcontractor is a County-based Enterprise.

**NAME OF BIDDER:** \_\_\_\_\_

**NAME OF SUB-CONTRACTOR** \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

MACOMB COUNTY BASED ENTERPRISE (Y/N) \_\_\_\_\_

**NAME OF SUB-CONTRACTOR** \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

MACOMB COUNTY BASED ENTERPRISE (Y/N) \_\_\_\_\_

**NAME OF SUB-CONTRACTOR** \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

MACOMB COUNTY BASED ENTERPRISE (Y/N) \_\_\_\_\_

**NAME OF SUB-CONTRACTOR** \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

MACOMB COUNTY BASED ENTERPRISE (Y/N) \_\_\_\_\_





**COUNTY OF MACOMB  
VENDOR CERTIFICATION DEBARMENT  
ATTACHMENT "C8"**

All information requested in this section must be completed and the document notarized. Any information omitted, or erroneously reported, may result in disqualification for current or future bidding and supply on behalf of the County of Macomb.

The undersigned warrants and presents that they have full complete authority to make representations for and on behalf of the undersigned company and that their representations are fully binding upon the undersigned company.

1. The undersigned are not presently debarred, suspended, proposed for debarment, declared ineligible, or excluded from transactions by any federal department or agency, or any state, county or local municipality, department or agency.
2. The undersigned has not within a three (3) year period preceding this bid been convicted of, or had a civil judgment rendered against them for the commission of fraud, a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction, or a contract a public transaction, violation of federal or state antitrust statutes, or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
3. The undersigned are not presently indicted for or otherwise criminally or civilly charged by any governmental entity (federal, state or local) with commission of any of the offenses set forth in paragraph 2.
4. The undersigned have not within a three (3) year period preceding this bid, had one or more public transactions (federal, state or local) terminated or attempted to be terminated for cause or default.

**IF THE APPLICANT IS UNABLE TO CERTIFY TO ANY OF THE STATEMENTS IN THIS CERTIFICATION, CERTIFICATION AND EXPLANATION SHALL BE ATTACHED AND PRESENTED WITH THIS CERTIFICATION.**

**THE UNDERSIGNED CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED MADE ON BEHALF OF THE UNDERSIGNED BIDDER.**

Bidder: \_\_\_\_\_

Bidder Address: \_\_\_\_\_

Applicant/Bidder Representative: \_\_\_\_\_

Signature: \_\_\_\_\_  
(Print full name)

Subscribed and sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public  
County of \_\_\_\_\_,  
State of \_\_\_\_\_  
My Commission expires: \_\_\_\_\_

## **SPECIFICATIONS**

MACOMB COUNTY JAIL  
VARIOUS PROJECTS  
3 PROPOSALS  
PROJECT NUMBER: 221958  
MACOMB COUNTY BID ITEM #37-22  
AUGUST 26, 2022

## **PROJECT**

# **MACOMB COUNTY JAIL VARIOUS PROJECTS**

**PROPOSAL A: Sanitary Replacement and Locker Room  
Renovation**

**PROPOSAL B: Mezzanine Barrier Mesh/Screen**

**PROPOSAL C: Cell Door Replacement – Floors 6 & 7 and  
Various Other Locations**

## **OWNER**

Macomb County Office of the Executive  
Administration Building, 9<sup>th</sup> Floor  
1 South Main Street  
Mt. Clemens, MI 48043

## **ARCHITECT**

Wakely Associates, Inc.  
30500 Van Dyke Ave., Suite 209  
Warren, Michigan 48093

**SPECIFICATIONS**

PROJECT NUMBER 221958

**BID ITEM #37-22**

AUGUST 26, 2022

**PROJECT**

MACOMB COUNTY JAIL

VARIOUS PROJECTS

**PROPOSAL A:** SANITARY REPLACEMENT AND LOCKER ROOM RENOVATIONS

**PROPOSAL B:** MEZZANINE BARRIER MESH/SCREEN

**PROPOSAL C:** CELL DOOR REPLACEMENT - FLOORS 6 & 7 AND  
VARIOUS OTHER LOCATIONS

**OWNER**

MACOMB COUNTY OFFICE OF THE EXECUTIVE

ADMINISTRATION BUILDING

1 SOUTH MAIN - 8<sup>TH</sup> FLOOR

MT. CLEMENS, MI 48043

**ARCHITECT**

WAKELY ASSOCIATES, INC.

30500 VAN DYKE, SUITE 209

WARREN, MICHIGAN 48093

586-573-4100

MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

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MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

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MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

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MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

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MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

**PROPOSAL C**

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**DIVISION 3**

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**SPECS**

**FOR**

**PROPOSALS**

**A, B & C**



**MACOMB COUNTY PURCHASING DEPARTMENT  
REQUEST FOR BID**

**BID ITEM NO. : 37-22**

**BID TITLE: Macomb County Executive  
Various Projects – Proposals A, B & C**

**PROPOSAL A:** Sanitary Replacement and Locker Room Renovations

**PROPOSAL B:** Mezzanine Barrier Mesh/Screen

**PROPOSAL C:** Cell Door Replacement – Floors 6 & 7 and Various Other Locations

**REQUEST FOR BID**

**The Macomb County Purchasing Department will be receiving sealed bids for the Macomb County Jail – Various Projects – Proposals A, B & C, (Project Number 221958).**

**The project consists of work at:**

**Macomb County Jail, 43565 Elizabeth Street, Mt. Clemens, MI 48043:**

- A. The Project consists of all necessary prep to perform the indicated work for the following Proposals:

**PROPOSAL A: Sanitary Replacement and Locker Room Renovations**

**Administration Areas**

1. Removal and replacement and/or reinstallation (where noted) of existing ceilings, lighting, ductwork and associated items to access and replace the designated overhead sanitary line serving the Jail Tower. Note: Male and female Locker Rooms and Evidence tech ductwork will be removed and replaced/reinstalled to gain access to replace the overhead sanitary line.

**Command Locker Rooms**

1. Renovation of the Sheriff's Command Locker Rooms  
Men's Locker Room:
  - a. Removal and replacement of existing finishes; toilet & shower partitions, toilet accessories, fixtures, lighting, ductwork, etc.
  - b. Temporary relocation of existing lockers to the Jail Annex. Lockers will be electrostatically painted (base bid) or replaced with new (Alternate).
  - c. Removal and replacement of existing exposed fireproofing to an intumescent paint.
  - d. Reinstallation of lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

### **Women's' Locker Room**

1. Removal and replacement of existing finishes, toilet & shower partitions, toilet accessories, fixtures. lighting, ductwork, etc.
2. Temporary relocation of lockers to the Jail Annex. Lockers will be electrostatically repainted (base bid) or replaced with new (Alternate)
3. Storage of Lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

### **Evidence Technician Room**

1. Removal and replacement of existing casework/millwork, installation of additional casework/millwork, finishes, fume hood, lighting, and new pull thru evidence lockers, ductwork, etc. in the Evidence Technician Room.
2. Demolition of existing wall as required for expansion of Evidence Technician Room.

### **Basement**

1. Installation of a secure welded wire partition system.

Note: Contractor shall carry an allowance of \$50,000.00 for temporary HVAC during construction.

### **PROPOSAL B: Mezzanine Barrier Mesh/Screen**

The Project consists of:

1. Installation of a barrier mesh system at the open perimeter of the Tower cell block mezzanine areas and portion of the connecting stairs.
2. Project includes demolition of existing mezzanine guard rail and associated patching of the concrete slab.
3. An Alternate is being solicited for: Camera relocation and procurement and installation of new cameras with associated material and equipment. Contractor shall use Motor City Electric Technologies (to maintain warranty) as the sub-contractor for this work. (See Alternate Section 01100 for additional information).

### **PROPOSAL C: Jail Tower Cell Door Replacement – Floors 6 & 7 and Various Other Locations**

1. The project consists of removal and replacement of existing deteriorated hollow metal secure doors on Floors 6 & 7 and various secure and hollow metal doors and frames where indicated on other floors.
2. Sliding doors or frames are not to be replaced.
3. Contractor shall provide and install new security glass as indicated for each door.
4. Contractor shall rewire the door position switch and solenoid operated dead latch for each opening, where frames are replaced.

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



5. Repair/replace any damaged masonry (SGFT/CMU) during door frame replacement. Contractor shall include 192sf of 6" SGFT and 384sf of 6" CMU in their bid for patching. Unused SGFT and CMU shall become property of the Owner.
6. New frames shall be grouted.
7. Stenciled numbers shall be painted back on replaced doors and frames affected by this proposal.
8. All existing mechanical shaft hollow metal doors and frames on floors 6-7 and all existing secure hollow metal frames receiving new hollow metal doors and all new secure frames and hollow metal secure doors shall be repainted with Tnemec paint.

**GENERAL - ALL PROPOSALS:**

1. **Contractor shall supply one bid for all (3) Proposals.** Bids for individual proposal will not be considered.
  - a. For accounting purposes, the cost for each proposal is to be listed and the total cost for all (3) proposals with the contingency indicated shall equal the bid.
  - b. All personnel will be subject to a background check prior to entering the facility and performing any work (including deliveries). Those personnel not cleared in advance will be prevented from entering the facility.
  - c. The Jail Tower is comprised of pods: A, B, C, D, E and F. Each pod has (2) floors and contains (18) cells. Contractor will be able to work on (3) pods at a time (half a floor). There are (30) pods in the Jail Tower. Due to procurement items in the different proposals, the Contractor should plan on (25) mobilizations.
    1. Pods may not necessarily progress in a logical systematic pattern due to prisoner counts and classification of prisoners.
    2. After award of the contract, the schedule will be finalized with the successful bidder and the Macomb County Sheriff's Office. Work on the sanitary line replacement shall commence immediately upon award.
  - d. General Contractors shall have been in business minimum of (10) years and shall have performed work in a similar secure facility successfully in the past (5) years. A Contractor Qualification Statement indicating the above shall be submitted with the bid.



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**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**OBJECTIVE**

The purpose of this Request for Bid (RFB) is to select a vendor to provide renovations for the Macomb County Executive, Building Repairs at Administration Building Project. The goal is to select the most capable vendor offering the most competitive price. This proposal is in accordance with the Macomb County Procurement Policy.

**PROJECT DESCRIPTION**

**The project consists of work at:**

**Macomb County Jail, 43565 Elizabeth Street, Mt. Clemens, MI 48043:**

- A. The Project consists of all necessary prep to perform the indicated work for the following Proposals:

**PROPOSAL A: Sanitary Replacement and Locker Room Renovations**

Administration Areas

1. Removal and replacement and/or reinstallation (where noted) of existing ceilings, lighting, ductwork and associated items to access and replace the designated overhead sanitary line serving the Jail Tower. Note: Male and female Locker Rooms and Evidence tech ductwork will be removed and replaced/reinstalled to gain access to replace the overhead sanitary line.

Command Locker Rooms

1. Renovation of the Sheriff's Command Locker Rooms

Men's Locker Room:

- a. Removal and replacement of existing finishes; toilet & shower partitions, toilet accessories, fixtures, lighting, ductwork, etc.
- b. Temporary relocation of existing lockers to the Jail Annex. Lockers will be electrostatically painted (base bid) or replaced with new (Alternate).
- c. Removal and replacement of existing exposed fireproofing to an intumescent paint.
- d. Reinstallation of lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

Women's' Locker Room

1. Removal and replacement of existing finishes, toilet & shower partitions, toilet accessories, fixtures, lighting, ductwork, etc.
2. Temporary relocation of lockers to the Jail Annex. Lockers will be electrostatically repainted (base bid) or replaced with new (Alternate)
3. Storage of Lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



Evidence Technician Room

1. Removal and replacement of existing casework/millwork, installation of additional casework/millwork, finishes, fume hood, lighting, and new pull thru evidence lockers, ductwork, etc. in the Evidence Technician Room.
2. Demolition of existing wall as required for expansion of Evidence Technician Room.

Basement

1. Installation of a secure welded wire partition system.

Note: Contractor shall include cost of (4) move and cool HVAC units in bid. Refer to Unit Pricing requested to add or subtract to this quantity

**PROPOSAL B: Mezzanine Barrier Mesh/Screen**

The Project consists of:

1. Installation of a barrier mesh system at the open perimeter of the Tower cell block mezzanine areas and portion of the connecting stairs.
2. Project includes demolition of existing mezzanine guard rail and associated patching of the concrete slab.
3. Painting of the system will utilize Tnemec coatings.
4. Unit pricing is being solicited for camera relocation and/or procurement of new. Contractor shall use Motor City Electric Technologies (to maintain warranty) as the sub-contractor for this work. Jail Administration and Facilities & Operations and Risk Management will determine if camera work is needed after the barrier mesh is installed.

**PROPOSAL C: Jail Tower Cell Door Replacement – Floors 6 & 7 and Various Other Locations**

1. The project consists of removal and replacement of existing deteriorated hollow metal secure doors on Floors 6 & 7 and various secure and hollow metal doors and frames where indicated on other floors.
2. Sliding doors or frames are not to be replaced.
3. Existing door pulls will be reused, remainder of hardware will be new as specified.
4. Contractor shall provide and install new security glass as indicated for each door.
5. Contractor shall rewire the door position switch and solenoid operated dead latch for each opening, where frames are replaced.
6. Repair/replace any damaged masonry (SGFT/CMU) during door frame replacement. Contractor shall include 192sf of 6" SGFT and 384sf of 6" CMU in their bid for patching. Unused SGFT and CMU shall become property of the Owner.
7. New frames shall be grouted.
8. Stenciled numbers shall be painted back on replaced doors and frames affected by this proposal.
9. All existing mechanical shaft hollow metal doors and frames on floors 6-7 and all existing secure hollow metal frames receiving new hollow metal doors and all new secure frames and hollow metal secure doors shall be repainted with Tnemec paint.

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**GENERAL - ALL PROPOSALS:**

1. **Contractor shall supply one bid for all (3) Proposals.** Bids for individual proposal will not be considered.
  - a. For accounting purposes, the cost for each proposal is to be listed and the total cost for all (3) proposals with the contingency indicated shall equal the bid.
  - b. All personnel will be subject to a background check prior to entering the facility and performing any work (including deliveries). Those personnel not cleared in advance will be prevented from entering the facility.
  - c. After award of the contract, the schedule will be finalized with the successful bidder and the Macomb County Sheriff's Office. Work on the sanitary line replacement shall commence immediately upon award.

**SUBMISSION PROCEDURES**

**Date Due: Tuesday, September 20, 2022 at 2:00 p.m. (local time)**

Bids will be publicly opened and read.

**DELIVER via FEDEX or UPS DIRECTLY TO 44900 Vic Wertz Drive, Clinton Township, MI 48036 PURCHASING DEPARTMENT BY DUE DATE & TIME.**

**If USPS is utilized for submissions, there is no guarantee of a timely delivery as the Post Office does not deliver to individual County Buildings.**

**NO LATE BIDS ACCEPTED.**

**Mail to:** Macomb County Purchasing  
Larry Lee, Purchasing Manager  
ATTN: Denise Mentzer  
44900 Vic Wertz Drive  
Clinton Township, MI 48036

**Return:** One (1) hard copy original  
Two (2) copies of the Bid.  
Clearly mark on the envelope **SEALED BID ITEM # 37-22 Macomb County Jail - Various Projects - Proposals A, B & C**  
Label all submission envelopes with the company name on the outside.  
**Complete and return all pages requiring vendor response.**

**Bid Opening Location: 44900 Vic Wertz Drive, Clinton Township, MI 48036**

All Bids must be submitted on the forms provided, properly executed and with all items filled out in ink or typed. Do not change or add words to the forms. Unauthorized conditions, limitations, or provisions on or attached to the forms may be cause for rejection of the Bid. Any Bidder information that is altered by erasure or by inter-lineation prior to submittal must be initialed and explained by notation above the signature of the Bidder.

**Macomb County vendors should be registered on the Michigan Inter-governmental Trade Network (MITN) website [www.mitn.info](http://www.mitn.info).**



**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**QUESTIONS**

**Due:** Tuesday, September 13, 2022 at 12:00 p.m. (local time)  
**Submit to:** Email: [Denise.Mentzer@macombgov.org](mailto:Denise.Mentzer@macombgov.org)  
Fax: 586-469-6612

Questions regarding bid specifications may be directed in writing only, by email or fax. All questions or clarifications must be directed to the Purchasing Department. Any attempt to contact a County department, other than Purchasing, regarding current bids may be grounds for disqualification as a vendor. Answers will be posted to MITN after the question due dates.

**PRE-BID MEETING**

**Date:** Tuesday, September 6, 2022 at 10:00 AM (local time)  
**Location:** Main Lobby-Macomb County Jail, 43565 Elizabeth, Mt. Clemens, MI 48043

This is a Mandatory pre-bid meeting. No other site visit will be scheduled.

The purpose of this meeting is to review the project, and Bid Specifications.

Facility related questions will be answered at this meeting. Other questions related to the Bid specifications must be submitted in writing to the Purchasing Department.

**MODIFICATIONS**

Macomb County vendors should be registered on the Michigan Inter-governmental Trade Network (MITN) website [www.mitn.info](http://www.mitn.info). Clarifications, modifications, or amendments may be made to this document at the discretion of the Macomb County Purchasing Department prior to the opening of the solicitations. Should any such changes be made, an addendum will be issued and posted on the MITN website. It is the responsibility of each Bidder to check the website and verify that he/she has received all Addenda prior to submitting a Bid.

It is also the responsibility of each Bidder to verify that all sub-Bidders and material suppliers whose prices are incorporated in the Bidder's Bid are familiar with the Bidding Documents in their entirety, including all Addenda issued up to the time of the Bid opening. (See also *ERRORS, OMISSIONS, AND/OR DISCREPANCIES, below.*)

All addenda issued to Bidders prior to date of receipt of Bids shall become a part of these specifications, and all Bids are to include the Work therein described.

**DEFINITIONS**

- A. Bidding Documents include this Request for Bid, (including drawings, specifications and all Addenda issued prior to execution of the Contract) and the proposed Contract Documents.
- B. Addenda are written or graphic instruments issued by Macomb County prior to the execution of the Contract that modify or interpret the Bidding Documents.
- C. The Base Bid is the sum state in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted.
- D. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work as described in the Bidding Documents.

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



- E. A Bidder is a person or entity who submits a Bid to Macomb County, and who meets the requirements set forth in the Bidding Documents.
- F. Default is the failure of the Bidder to fulfill the obligations of the contract, including but not limited to, failure to deliver on time or the unauthorized substitution of articles other than those quoted and specified on the contract; or failure to deliver specified quantities (repetitive shortages).
- G. Owner is the County of Macomb.
- H. Contractor is a person or business which provides goods or services to the County of Macomb under terms specified in a contract.

**BIDDING DOCUMENTS**

All Bidding Documents are available on the Michigan Inter-governmental Trade Network (MITN) website [www.mitn.info](http://www.mitn.info). Bidders shall use complete sets of Bidding Documents in preparing Bids. Macomb County assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

All Bidding Documents are the property of the Architect.

**EXAMINATION OF BIDDING DOCUMENTS AND SITE**

Before submitting a Bid, the Bidder shall carefully examine the drawings, read the specifications and all other Bidding Documents; and visit the site of the Work. Each Bidder shall inspect the site of the proposed Work to arrive at a clear understanding of the conditions under which the Work is to be performed. The Bidder shall fully inform himself/herself prior to bidding as to all existing conditions and limitations under which the Work is to be performed and he/she shall include in the Bid a sum to cover the cost of all items necessary to perform the Work as set forth in the Bidding Documents. No allowance will be made to the Bidder because of lack of such examination or knowledge. The submission of a Bid shall be construed as conclusive evidence that the Bidder has made such examination. Claims for extra payments based on lack of knowledge of existing circumstances will not be allowed.

**BIDDER'S QUALIFICATIONS**

Bidders must be properly licensed under the state laws governing their respective trades. Bidders shall meet qualifications indicated in the Bidding Documents. Macomb County may make such investigations as necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to Macomb County all such information and data for this purpose as Macomb County may request. Macomb County reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy Macomb County that such Bidder is not properly qualified to carry out the obligations of the Contract.

Submission of a Bid shall serve as evidence that the Bidder has confirmed that the Bidder is properly qualified to perform the work and is capable of obtaining the required bonds and insurance.

**COMPONENT/PRODUCT RESPONSIBILITY**

The successful Bidder will provide field instructions for Macomb County's operators, mechanics and/or supervisors. The successful Bidder shall be responsible to insure that all components delivered operate properly and with the intent and details of these specifications.

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**STATUS OF BIDDERS**

Proprietors submitting Bids shall indicate their status as proprietors.

Bidders submitting Bids for partnerships shall indicate their status as partners and shall submit, upon request of Macomb County within 24 hours following receipts of Bids, a certified copy of the power of attorney authorizing the executor of the Bid to bind the partnership.

Bidders submitting Bids for corporations shall indicate their status as corporations and shall submit, upon request of the Owner within 24 hours following receipt of Bids, a certified copy of the board of directors' authorization for the Bidder to bind the corporation and shall affix the corporate seal on the Bid.

Bidders shall provide, upon request of Macomb County, within 24 hours following receipt of Bids, the following:

1. Names and addresses of proprietors, of all members of a partnership, or of the corporation's officers.
2. Name of county or state where the partnership is registered or where the corporation is incorporated. Corporations must be licensed to do business in the project state at the time of executing the contract.

**ERRORS, OMISSIONS, AND/OR DISCREPANCIES**

Bidder shall not be allowed to take advantage of errors, omissions, and/or discrepancies found in the Bidding Documents. In the event a conflict or omission is discovered in the Bidding Documents after the issuing of the last addendum such that an interpretation cannot be issued by Macomb County prior to bidding, the Bidder is directed to estimate on and provide the quantity and quality of material and labor consistent with the overall represented work so as to provide all materials, equipment, labor, and services necessary for the completion of the Work.

**SUBSTITUTION OF MATERIALS AND EQUIPMENT**

Whenever a material, article or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided that the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance appearance and function.

To obtain approval to use unspecified products, Bidders shall submit written requests at least ten (10) days before the bid date. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability.

If the product is acceptable, the Architect will approve it in an Addendum which will be posted on the MITN website. The product shall not be purchased or installed by the Contractor without the Architect's written approval.

Voluntary alternates or qualifications contrary to the Contract requirements made by the Bidder in or accompanying his/her Bid as a condition for the acceptance of the Contract will not be considered in the award of the Contract and will cause the rejection of the entire Bid.

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**TERMINATION**

Macomb County reserves the right to terminate any award to the Bidder without any liability, upon a 30 day notice from Macomb County.

**DEFAULT (refer to Section: Definitions, Item F)**

If continued abuse of any/or all of the default conditions persist, Macomb County will notify the Contractor in writing. The Contractor will be given thirty (30) days to correct this default condition. Failure to correct within the specified period will result in Macomb County canceling the Contract and procuring the articles or services from other sources. The Contractor will be responsible for any excess costs occasioned thereby.

**RIGHT TO REJECT**

Macomb County reserves the right to reject any or all Bids in whole or in part and to waive any informalities therein, or accept any Bid it may deem in the best interest of the County.

Note: Past experience and performance may be a factor in making an award.

**MODIFICATION AND WITHDRAWAL OF BIDS**

A Bid may be withdrawn on personal requests received from Bidder prior to submission time. A Bid being withdrawn may be re-submitted up to submission time. Negligence or error on the part of the Bidder in preparing his/her Bid confers no right for withdrawal of the Bid after it has been opened.

**OFFER PERIOD**

Bids will remain firm for a period of **30 days** after official opening of Bids.

**BID BREAKDOWN CONSTRUCTION INFORMATION**

Upon notice from the Architect, the low Bidders shall submit a detailed cost breakdown of all work covered by the Bidding Documents. The breakdown shall show quantity of material and labor, units of material and labor, material cost, labor cost and total cost.

**EXECUTION OF CONTRACT**

Macomb County reserves the right to accept any and all Bids, or to negotiate contract terms with the various Bidders when such is deemed by Macomb County to be Macomb County's best interest.

**UNIT PRICES**

Unit prices shall include all charges applicable to the items including, but not limited to, materials, shoring, hauling removal, fee, layout, supervision and overhead (field and home office), labor, general expenses, transportation, taxes, insurance and profit. Single unit prices shall apply to additions to, or deductions from the Work.

**SCHEDULE - TIME OF COMPLETION**

Work is to commence on a date specified in a written "Notice to Proceed", and shall be substantially complete as soon as possible.

**BASIS OF BID**

A single lump sum Bid is being entertained for the Work of the Bid.

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**SALES AND EXCISE TAXES**

The County of Macomb, being a governmental unit, is exempt from sales and federal excise taxes. The price is to be net, exclusive of any taxes. All prices stated in the Bid response will include all Federal, State, County and Municipal taxes, including Michigan State Sales and Use Taxes, or contributions required by Bidder's business.

**PERMITS**

Any needed city permits and bonds will be required prior to award of Contract and commencement of Work.

**INDEMNIFICATION**

Macomb County will not be responsible for injury to Contractor's employees, Sub-Contractors, or to third parties caused by the Contractor's agents, servants or employees. Therefore, the Contractor agrees to incorporate the below hold harmless agreement into the required insurance and to be evidenced by being contained in the certificate of insurance. Further, the below listed indemnification is incorporated and is part of the subject contract.

The Contractor agrees to protect, defend, indemnify and hold the County of Macomb and its commissioners, officers, employees and agents free and harmless from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees, or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, legal fees, liens, demands, court costs, obligations, actions, proceedings or causes of action of every kind and character in connection with or arising directly or indirectly out of this agreement and/or the performance hereof. Without limiting the generality of the foregoing, any and all such claims, etc. relating to personal injury, death, damage to property, defects in materials or workmanship, or any actual or alleged violation of any applicable statute, ordinance, administrative order, rule or regulation, or decree of any court, shall be included in the indemnity hereunder.

The Contractor further agrees to investigate, handle, respond to, provide defense for and defend any such claims, etc. at his sole expense and agrees to bear all other costs and expenses related hereto, even if it (claims, etc.) is groundless, false or fraudulent. In any case in which this indemnification would violate legal prohibition, the foregoing provision concerning indemnification shall not be construed to identify the County for damage arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence of the County, its commissioners, officers, employees or agents.

**BID BOND/GUARANTEE**

All Bids must be accompanied by a certified check, cashier's check, or a satisfactory Surety Bid Bond in an amount not less than five percent (5%) of the total Bid price. Checks shall be made payable to County of Macomb. No Bid shall be considered unless it is accompanied by a certified check, cashier's check or a satisfactory Surety Bid Bond.

Checks will be returned to all except the three (3) lowest Bidders for each contract within five (5) days after the opening of the Bids, and the remaining checks will be returned promptly after Macomb County and the accepted Bidders have executed the Contract, or if no award has been made, within thirty **(30) days** after the date of the opening of the Bids, upon demand of the Bidder at any time thereafter, so long as he has not been notified of the acceptance of his/her Bid.

The Bid Bond/Guarantee may be forfeited to Macomb County, if the successful Bidder refuses to enter into a Contract within ten (10) days upon award of Contract from Macomb County.

Bid Bonds shall be accompanied by a Power-of-Attorney authorizing the signer of the bond to do so on behalf of the Surety Company.

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**PERFORMANCE AND PAYMENT BOND**

The successful Bidder will be required to furnish a satisfactory performance and payment bond each in an amount equal to 100 percent of the Contract Sum, within five (5) days after notification of intent to enter into Contract. Bonds, in the full amount of the contract, are required so that the County has a guarantee that the Contractor will faithfully perform the contract and the Contractor will make all payments for all labor and material costs or claims covered or furnished under the contract.

All bonds and policies or certificates of insurance must meet with the approval of Macomb County before the Contractor will be allowed to commence the Work. Failure or refusal to furnish bonds or insurance policies or certificates in a form satisfactory to Macomb County shall subject the Bidder(s) to forfeiture of Bid Bond.

**The Performance and Payment Bond must be from a surety company licensed to do business in the State of Michigan, and will be in Compliance with all the requirements of MCL 129.201 et seq.**

**CONTRACTS WITH SUB-CONTRACTORS**

All contracts made by the Bidder with Sub-Contractors shall be covered by the terms and conditions of the Contract. The Bidder shall inform all Sub-Contractors of these terms and conditions. Macomb County reserves the right to require of the Bidders tentatively selected for consideration in the awarding of the Contract, a list of the Sub-Contractors whom the Contractor intends to employ.

Macomb County reserves the right to disapprove the use of any proposed Sub-Contractor, and in such event, the Bidder submitting such Sub-Contractor shall submit another such Sub-Contractor in like manner within the time specified by Macomb County. Macomb County reserves the right to reject any proposal if such information required by Macomb County is not submitted as above indicated.

**INSURANCE**

***COMMERCIAL GENERAL LIABILITY INSURANCE***

Shall be written on an occurrence basis with limits of Liability of not less than \$1,000,000 (one million dollars) as combined single limit for each occurrence of bodily injury and personal injury with an annual aggregate of not less than \$2,000,000 (two million dollars). The policy shall include;

- a. Contractual Liability
- b. Products and Completed Operations
- c. Independent Contractors Coverage
- d. Broad Form General Liability Extensions or equivalent

***WORKERS' COMPENSATION***

Workers' Compensation Insurance meeting Michigan statutory requirements. Employer's Liability Insurance with minimum limits of \$500,000 each accident, \$500,000 bodily injury by disease policy limit, \$500,000 bodily injury by disease each employee.

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*AUTOMOBILE LIABILITY INSURANCE*

Motor Vehicle Liability Insurance including Michigan NO-FAULT Coverage for all vehicles, owned and non-owned, leased and hired used in the performance of this contract with limits of \$1,000,000 (one million dollars) as the combined single limit for each occurrence for bodily injury and property damage.

*PROFESSIONAL LIABILITY/ERRORS & OMISSIONS*

Professional Liability Insurance with minimum limits of \$1,000,000 (one million dollars) each occurrence and \$2,000,000 (two million dollars) aggregate.

*INSURANCE INSTRUCTIONS*

All certificates of insurance and duplicate policies shall contain the following:

The County of Macomb shall be named additional insured on all policies (excluding Worker's Compensation) and the underwriters will have no right of recovery or subrogation against the County of Macomb including its agents, employees, elected and appointed officials and agencies. It being the intention of the parties that the insurance policy so effected will protect both parties in primary coverage for any and all losses covered by the subject policy. The insurance carrier(s) must have an A.M. Best rating of no less than an A-, VII.

The insurance company(s) issuing the policy or policies will have no recourse against the County of Macomb for payment of any premiums or for assessments under any form of policy.

The Contractor will assume any and all deductibles in the above any and all deductibles in the above-described insurance policies.

The term "INSURED" is used severally, not collectively, but the inclusion in this policy of more than one insured will not operate to increase the limit of the Owner's liability.

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**FORMS**

**INSTRUCTIONS**

All Bids must be submitted on the forms provided, properly executed and with all items filled out in ink or typed. Do not change or add words to the forms. Unauthorized conditions, limitations, or provisions on or attached to the forms may be cause for rejection of the proposal. Any Bidder information that is altered by erasure or by inter-lineation prior to submittal must be initialed and explained by notation above the signature of the Bidder.

**LIST**

The following is a list of forms that are to be completed and returned:

County Vendor Disclosure Form . . . .	Page 16
Non-Collusion Affidavit . . . . .	Page 18
Macomb County Preference . . . . .	Page 19
General Information . . . . .	Page 20
Work References . . . . .	Page 21
Federal E-Verify Program . . . . .	Page 22
Iran Economic Sanction Act . . . . .	Page 23
Bid Form . . . . .	Page 24
Bid Form Supplement . . . . .	Page 28
Vendor Certification Debarment . . . .	Page 33





**County of Macomb, Michigan**  
**VENDOR DISCLOSURE FORM**

The Macomb County ethics ordinance requires vendors of the County to complete and file a disclosure statement, the purpose of which is to disclose any financial relationships or other conflicts of interest that may exist between vendors and employees or elected officials (or their appointees) of the County. Once filed, the disclosure form does not need to be updated unless there is a change in circumstance that would cause the answer to any of the questions to change, at which time an amended disclosure form must be filed. Filing of the disclosure form is considered a condition of payment.

**PLEASE RETURN THE COMPLETED FORM TO:**  
Macomb County Purchasing Department  
ATTN: Vendor Disclosure  
120 North Main Street  
Mount Clemens MI 48043

VENDOR NAME: \_\_\_\_\_

1. Does the vendor currently employ a relative of any employee, elected official or appointee of an elected official of Macomb County? Relative is defined as husband or wife, father or mother, son or daughter, brother or sister, uncle or aunt, first cousin, nephew or niece, great uncle or great aunt, grandfather or grandmother, grandson or granddaughter, father-in-law or mother-in-law, son-in-law or daughter-in-law, brother-in-law or sister-in-law, stepfather or stepmother, stepson or stepdaughter, stepbrother or stepsister, half-brother or half-sister, the parents or grandparents of the individual's fiancée.
- YES  NO

If yes, please answer the following:

- Name of County employee or elected official (or appointee): \_\_\_\_\_
- B. County Position/Title: \_\_\_\_\_  
County Department or \_\_\_\_\_
- C. Agency: \_\_\_\_\_

2. Does any employee or elected official of Macomb County have an interest in the vendor organization in any of the following capacities, either compensated or non-compensated: director, officer, partner, beneficiary, trustee, member, employee or contractor.
- YES  NO

If yes, please answer the following:

- Name of County employee or elected official (or appointee): \_\_\_\_\_
- B. County Position/Title: \_\_\_\_\_
- C. County Department or Agency: \_\_\_\_\_
- D. Position/Title with Vendor: \_\_\_\_\_

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3. Does any current employee or elected official of Macomb County have legal or beneficial ownership of 10% or more of the outstanding stock of the vendor organization?

YES                       NO

If yes, please answer the following:

- A. Name of County employee or elected official (or appointee): \_\_\_\_\_
- B. County Position/Title: \_\_\_\_\_
- C. County Department or Agency: \_\_\_\_\_  
    % of Ownership of Vendor
- D. Organization: \_\_\_\_\_

4. In the last five calendar years, has the vendor failed to perform or otherwise deliver on the terms of a contract or agreement with Macomb County, or any other public entity, including suspensions or debarments?

YES                       NO

If yes, please provide further explanation:

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I hereby certify that the information included on this form is complete, true and accurate to the best of my knowledge and belief. I understand that either myself or the organization to which this form applies may be subject to sanctions and/or penalties as set forth in the ethics ordinance if any information has been falsified or omitted.

\_\_\_\_\_  
*Name (Please Print)*

\_\_\_\_\_  
*Title*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Date*

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MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**NON-COLLUSION AFFIDAVIT**  
Attachment "C4"

STATE OF                     )  
                                      ) ss  
COUNTY OF                 )

\_\_\_\_\_, being first duly sworn, deposes and says that he/she is authorized on behalf of \_\_\_\_\_ (Bidder Name) who is making the foregoing proposal(s) that:

- 1)    Such proposals are genuine and not collusive or a sham.
- 2)    This Bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder or person to submit a proposal which is a sham.
- 3)    This Bidder has not in any manner agreed with any other persons or businesses to fix the proposed price, overhead, profit, or any cost element of the submitted proposal.
- 4)    This Bidder has not attempted to secure any advantage against any other Bidders through collusion with any other Bidder or employees or representative of the County.
- 5)    That the proposals submitted are true and accurate to the best of my knowledge and belief and are made in good faith.
- 6)    This Bidder has not directly or indirectly submitted or disclosed its proposal or its contents or divulged information or data relative thereto to any association or to any member or agent of any other Bidder to this proposal.

Further, Affiant sayeth not.

\_\_\_\_\_

Subscribed and sworn to before me  
this \_\_\_ day of \_\_\_\_\_, 20\_\_\_.

\_\_\_\_\_  
Notary Public  
County of \_\_\_\_\_,  
State of \_\_\_\_\_,  
My Commission Expires: \_\_\_\_\_

**BIDDER: THIS AFFIDAVIT MUST BE COMPLETED, SIGNED, NOTARIZED AND INCLUDED IN YOUR PROPOSAL SUBMISSION.**

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**MACOMB COUNTY BASED PREFERENCE – ATTACHMENT “C5”**

A local preference percentage credit from the following allowance table will be applied to the bid of any County-based Enterprise. This credit will be subtracted from the bid of the County-based Enterprise. In comparing bids, the bid of the County –based Enterprise after subtraction of the credit shall be considered the official bid. However, if the County-based Enterprise is awarded the Contract, the bid without the equalization percentage credit shall be the Contract price.

<u>Contract Amount</u>	<u>Local Preference Percentage</u>
Up to \$50,000.00	5
\$50,000.00 to \$200,000.00	3
\$200,000.00 and over	1

1. No business shall receive these credits unless it has been certified by the Purchasing Manager.
2. Any business who claims entitlement to any local preference credit shall disclose the records necessary to establish eligibility to the County.
3. After applying any local preference credits as provided above, the Contract shall be awarded to the lowest Responsible Bidder thus evaluated.

**IN ORDER TO DETERMINE IF YOUR BUSINESS IS ENTITLED TO RECEIVE A LOCAL PREFERENCE PERCENTAGE CREDIT PLEASE ANSWER THE FOLLOWING QUESTIONS:**

1. Is your business headquarters physically located within Macomb County, or has it been conducting business at a location with a permanent street address in the County of Macomb on an ongoing basis for not less than one taxable year prior to your bid or response to this Request for Proposal? **YES \_\_\_\_\_ NO \_\_\_\_\_**
2. Has your business paid property taxes on real or personal property within the past year on property which is ordinarily needed to perform the proposed contract? **YES \_\_\_\_\_ NO \_\_\_\_\_**
3. Are at least 50 percent of your regular full-time employees based at the County location to perform the proposed contract? **YES \_\_\_\_\_ NO \_\_\_\_\_**
4. Has your business been dealing for at least one year on a regular commercial basis in the kind of goods or services which are the subject of this bid or proposal? **YES \_\_\_\_\_ NO \_\_\_\_\_**

**Drug Screening**

To the extent not prohibited by law, all contracts for construction, repair, alteration, or rebuilding of a County building or other property shall include a provision requiring the contractor and any subcontractor providing services under the contract to conduct pre-hire screening for illegal drug use by their employees who provide services under the contract.

If applicable, is your business compliant with this requirement? **YES \_\_\_\_\_ No \_\_\_\_\_**

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**GENERAL INFORMATION**

In further description of this Bid, we desire to submit sheets marked as follows:

\_\_\_\_\_

Bidding under the name of: \_\_\_\_\_

DUNS Number: \_\_\_\_\_

Federal Employer Identification Number: \_\_\_\_\_

which is (check one of the following):

( ) Corporation, incorporated under the laws of the State of:

\_\_\_\_\_

( ) Partnership, consisting of (list partners):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

( ) Assumed Name (Register No.) \_\_\_\_\_

( ) Individual

AUTHORIZED SIGNATURE: \_\_\_\_\_

Printed or typed signature: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City, State: \_\_\_\_\_

Date: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Email: \_\_\_\_\_

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When payment on such order or contract is to be directed to the same company at an address different from above, please list the address to be used below:

**BID ITEM # 37-22  
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**WORK REFERENCES**

BIDDER'S COMPANY NAME \_\_\_\_\_  
Please list at least three (3) companies or public agencies for which you have done similar work.

Macomb County reserves the right to reject low Bids for poor past performance or inadequate references.

NAME OF COMPANY \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

NAME OF COMPANY \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

NAME OF COMPANY \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

NAME OF COMPANY \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_



**FEDERAL E-VERIFY PROGRAM**  
**ATTACHMENT "C6"**

The Macomb County Board of Commissioners has established a policy regarding the Federal E-Verify Program. This policy states that future contracts (including both new and reviewing contracts) between Macomb County and contractors and vendors who provide services in excess of twenty-thousand dollars (\$20,000) shall require the contractors and vendors to register with, participate in, and utilize the E-Verify Program (or any successor program implemented by the federal Department of Homeland Security and Social Security Administration) when hiring their employees and require the County's Human Resources Department to utilize the E-Verify Program (or any successor program implemented by the federal Department of Homeland Security and Social Security Administration) when hiring new employees.

**For more information about E-Verify, go to [www.uscis.gov](http://www.uscis.gov).** Click on the E-Verify icon on the bottom left-hand corner of page.

**ACKNOWLEDGMENT OF MACOMB COUNTY'S POLICY**  
**REQUIRING PARTICIPATION IN THE FEDERAL E-VERIFY PROGRAM**  
**AND CERTIFICATION OF COMPLIANCE**

The undersigned hereby acknowledges receipt of a copy of the policy of the Macomb County Board of Commissioners requiring contractors, including those providing professional services, who provide services **in excess of \$20,000 a year** to the County to register and participate in the Federal E-Verify Program.

The undersigned hereby certifies that (he/she/it) will comply with this policy and will register with, participate in and utilize the E-Verify Program or any successor program implemented by the Federal Department of Homeland Security and Social Security Administration when hiring employees.

DATED: \_\_\_\_\_

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Printed or Typed Signature

\_\_\_\_\_  
Name of Company



**CERTIFICATION OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT**  
**ATTACHMENT "C7"**

**Michigan Public Act No. 517 of 2012**

The undersigned, the owner or authorized officer of the below-named Bidder \_\_\_\_\_, hereby certifies, represents and warrants that the Bidder, including its officers, directors and employees, is not an "Iran linked business" within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the "Act"), and that in the event Bidder is awarded a contract, the Bidder will not become an "Iran linked business" at any time during the course of performing any services under the contract.

BIDDER: \_\_\_\_\_  
Name of Bidder

By: \_\_\_\_\_

Its: \_\_\_\_\_

Date: \_\_\_\_\_



**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**BID FORM**

**Bid Item No. 37-22  
Macomb County Jail  
Various Projects  
Proposals A, B & C  
Wakely Project #221958  
County of Macomb  
Mount Clemens, Michigan**

Bidder: \_\_\_\_\_  
*(print or type company name)*

OWNER \_\_\_\_\_  
*(Telephone Number)*

MACOMB COUNTY  
MT. CLEMENS, MICHIGAN 48043

WAKELY ASSOCIATES INC.  
30500 VAN DYKE AVENUE, SUITE 209  
WARREN, MI 48093

**GENERAL AGREEMENTS**

- A. The Bidder acknowledges that he/she has had the opportunity to examine the site and locality where the Work is to be performed and has become familiar with the legal requirements, laws, rules, regulations and conditions affecting the cost, progress and performance of the Work; and has made such independent investigations as Bidder deemed necessary to prepare the Bid. Further, Bidder hereby states that the Base Bid set forth in this Bid Response is true and correct.
- B. The Bidder agrees that this Bid shall not be withdrawn for a period of **(30) calendar days** after the scheduled closing time for receiving Bids.
- C. The Bidder declares that in preparing this Bid, Bidder is assured of the availability of all labor, materials and products to meet the substantial completion date.
- D. The Bidder acknowledges that the price stated below includes all taxes of whatever character or description.
- E. The Bidder agrees to execute a Contract for work covered by this Bid, provided that he/she be notified of its acceptance within thirty **(30) days** after the opening of Bids.

**SCHEDULE-TIME OF COMPLETION**

The undersigned agrees to commence the Work of the Contract Documents on a date specified in a written "Notice to Proceed" (anticipated September 2022), and shall fully complete the work in an expeditious manner as soon as possible.

**ACKNOWLEDGEMENT OF ADDENDA**

The Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

Addendum No. 1, dated \_\_\_\_\_, Addendum No. 3, dated \_\_\_\_\_

Addendum No. 2, dated \_\_\_\_\_, Addendum No. 4, dated \_\_\_\_\_

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**BID FORM SUPPLEMENTS**

Attached to this Bid Form and incorporated herein are the following documents, completed in full by the undersigned:

Base Bid Form Supplement – Unit Prices/Supplemental Fees

**BASE BID**

The undersigned Bidder, having carefully examined the Bidding and Contract Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, all as issued by the Owner, and being familiar with all conditions and requirements of the Work, hereby proposes and agrees to furnish all material, labor, equipment, tools and supervision; and to furnish all services necessary to complete the Work required in accordance with the Bidding Documents for the following projects, in the following amount:

**\$ \_\_\_\_\_ BASE BID (PROPOSALS A, B & C)**

**CONTINGENCY:** (This amount, when unused, will be returned to the Owner. This contingency will only be used after written authorization of the Owner's representative).

- A. The undersigned acknowledges that they have included the sum of THREE HUNDRED FIFTY THOUSAND DOLLARS (\$350,000.00) in the base bid for use as a Construction Contingency. (Note: \$50,000.00 is for temporary HVAC in Proposal A).  
Note: Unused Contingency will be returned to Owner at the end of the project.

**PROPOSAL A: COST (For Accounting Purposes)**

\_\_\_\_\_ Dollars \$ \_\_\_\_\_  
*(Sum to be written out)*

**PROPOSAL B: COST (For Accounting Purposes)**

\_\_\_\_\_ Dollars \$ \_\_\_\_\_  
*(Sum to be written out)*

**PROPOSAL C: COST (For Accounting Purposes)**

\_\_\_\_\_ Dollars \$ \_\_\_\_\_  
*(Sum to be written out)*

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**ALTERNATES**

Three Alternates are being priced. As follows:

**Alternate No. 1:** New Lockers for first floor Men's & Women's Locker Rooms. PROPOSAL A

ALTERNATE NO. 1: \_\_\_\_\_

Dollars \$ \_\_\_\_\_ (sum to be written out)

**Alternate No. 2:** New Lockers for second floor Men's & Women's Locker Rooms. PROPOSAL A

ALTERNATE NO. 2: \_\_\_\_\_

Dollars \$ \_\_\_\_\_ (sum to be written out)

**Alternate No. 3:** Existing camera relocation, new camera installation and associated material and equipment . PROPOSAL B

ALTERNATE NO. 3: \_\_\_\_\_

Dollars \$ \_\_\_\_\_ (sum to be written out)

**VOLUNTARY ALTERNATES**

The following voluntary alternates are offered by the Bidder. The undersigned agrees that the amounts indicated below shall be added to or deducted from the Base Bid, as the case may be for each alternate which is accepted.

Description of Voluntary Alternates	Add	Deduct
1. _____	\$ _____	\$ _____
2. _____	\$ _____	\$ _____
3. _____	\$ _____	\$ _____
4. _____	\$ _____	\$ _____

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



Respectfully submitted this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

By: \_\_\_\_\_

(Name of bidding firm or corporation)

Witness:

By: \_\_\_\_\_

(Signature)

Attest: \_\_\_\_\_

(Signature)

\_\_\_\_\_

(Type or print name)

By: \_\_\_\_\_

(Type or print name)

Title: \_\_\_\_\_

(Owner/Partner/President/Vice Pres.)

Title: \_\_\_\_\_

(Corporate Secretary or Assistant Secretary Only)

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

License: \_\_\_\_\_

Federal ID No.: \_\_\_\_\_

*(Affix Corporate Seal Here)*

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Company Representative

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**BID FORM SUPPLEMENT - UNIT PRICES/SUPPLEMENTAL FEES**

**This form is required to be attached to the Base Bid Form.**

**Bid Item No. 37-22  
Macomb County Jail  
Various Projects  
Proposals A, B & C  
Wakely Project #221958**

Bidder: \_\_\_\_\_  
*(print or type company name)*

County of Macomb  
Mount Clemens, Michigan

**UNIT PRICES**

Unit Prices shall include all charges applicable to the items including, but not limited to, materials, shoring, hauling removal, fee, layout, supervision and overhead (field and home office), labor, general expenses, transportation, taxes, insurance and profit. Single unit prices shall apply to additions to, or deductions from the Work.

In submitting this bid, the Bidder agrees that Work Item quantities are estimates and that the Owner may increase or decrease these quantities at the unit prices stated. Each bidder shall show below the amounts proposed to be added to or deducted from the Base Bid Total upon adjustment of the quantity given for the actual measurement of individual items of the Work. Reimbursement of the Contractor will be made strictly on the basis of a quantitative survey of extended material placed for the unit prices shown.

**Unit Price No. A1:**

Hourly rate for one journeyman to perform electrical demo beyond that shown on the documents including OH&P and bond.

ADD \_\_\_\_\_ Hourly Rate (\$ \_\_\_\_\_ /per hour)  
Sum to be written out

**Unit Price No. A2:**

Hourly rate for one apprentice to perform electrical demo beyond that shown on the documents including OH&P and bond.

ADD \_\_\_\_\_ Hourly Rate (\$ \_\_\_\_\_ /per hour)  
Sum to be written out

**Unit Price No. C1:**

Cost to procure and install door type G1 (price to include removal and disposal of existing door, new hardware based on Hardware Set SH.01 security glass and paint).

ADD \_\_\_\_\_ DOLLARS/DOOR (\$ \_\_\_\_\_ )  
Sum to be written out PER DOOR

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**Unit Price No. C2:**

Cost to procure and install door type G2 (price to include removal and disposal of existing door, new hardware based on Hardware Set SH.02 security glass and paint).

ADD \_\_\_\_\_ DOLLARS/DOOR (\$ \_\_\_\_\_ )  
Sum to be written out PER DOOR

**Unit Price No. C3:**

Cost to procure and install new secure door frame type 1 (price to include removal and disposal of existing door frame and painting of frame).

ADD \_\_\_\_\_ DOLLARS/FRAME (\$ \_\_\_\_\_ )  
Sum to be written out PER FRAME

**Unit Price No. C4:**

Cost to procure and install new secure door frame type 2 (price to include removal and disposal of existing door frame and painting of frame).

ADD \_\_\_\_\_ DOLLARS/FRAME (\$ \_\_\_\_\_ )  
Sum to be written out PER FRAME

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**SUPPLEMENTAL FEES**

For additional work performed upon instruction of Macomb County, by Sub-Contractors of the Undersigned, add to the Sub-Contractor's prices for such work a fee of \_\_\_\_\_%, which includes all the charges of the undersigned for overhead and profit.

Any additional work performed upon instruction of Macomb County by persons other than the Sub-Contractors of the undersigned, the charges will be actual cost of the labor, and materials, (less all discounts) plus the fee of \_\_\_\_\_%, which includes all the charges of the undersigned for overhead and profit, and to which shall be added the actual cost of insurance & taxes.

Each Bid covering extra work, shall be accompanied with complete itemized material & labor breakdowns.

For all revisions involving the deletion of contract work, it is agreed that the full credit shall be given Macomb County for such work deleted, including overhead and profit as quoted hereinbefore.

**BID ITEM # 37-22**  
**MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



NEGOTIATION

The undersigned agrees that, should the overall cost exceed the funds available, he/she will be willing to negotiate with Macomb County and Architect; for the purpose of making further reductions in the Contract work, and shall agree to give full credit for all such reductions in the work requested by Macomb County, including full value of labor, materials, and Sub-Contract work and reasonable proportionate reductions in overhead and profit, thereby arriving at an agreed upon Contract price.

Submitted this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

By: \_\_\_\_\_  
(Name of bidding firm or corporation)

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Type or print name)

Title: \_\_\_\_\_  
(Owner/Partner/President/Vice Pres.)



**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**BID FORM SUPPLEMENT - LIST OF SUB-CONTRACTORS**

All sealed bids for construction contracts shall provide a list of preferred sub-contractors and identify, with documentation, whether each subcontractor is a County-based Enterprise.

**NAME OF BIDDER:** \_\_\_\_\_

**NAME OF SUB-CONTRACTOR**

CONTACT PERSON

ADDRESS

TELEPHONE NO.

MACOMB COUNTY BASED ENTERPRISE (Y/N)

**NAME OF SUB-CONTRACTOR**

CONTACT PERSON

ADDRESS

TELEPHONE NO.

MACOMB COUNTY BASED ENTERPRISE (Y/N)

**NAME OF SUB-CONTRACTOR**

CONTACT PERSON

ADDRESS

TELEPHONE NO.

MACOMB COUNTY BASED ENTERPRISE (Y/N)

**NAME OF SUB-CONTRACTOR**

CONTACT PERSON

ADDRESS

TELEPHONE NO.

MACOMB COUNTY BASED ENTERPRISE (Y/N)

**BID ITEM # 37-22  
MACOMB COUNTY EXECUTIVE, VARIOUS PROJECTS-3 PROPOSALS**



**COUNTY OF MACOMB  
VENDOR CERTIFICATION DEBARMENT  
ATTACHMENT "C8"**

All information requested in this section must be completed and the document notarized. Any information omitted, or erroneously reported, may result in disqualification for current or future bidding and supply on behalf of the County of Macomb.

The undersigned warrants and presents that they have full complete authority to make representations for and on behalf of the undersigned company and that their representations are fully binding upon the undersigned company.

1. The undersigned are not presently debarred, suspended, proposed for debarment, declared ineligible, or excluded from transactions by any federal department or agency, or any state, county or local municipality, department or agency.
2. The undersigned has not within a three (3) year period preceding this bid been convicted of, or had a civil judgment rendered against them for the commission of fraud, a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction, or a contract a public transaction, violation of federal or state antitrust statutes, or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
3. The undersigned are not presently indicted for or otherwise criminally or civilly charged by any governmental entity (federal, state or local) with commission of any of the offenses set forth in paragraph 2.
4. The undersigned have not within a three (3) year period preceding this bid, had one or more public transactions (federal, state or local) terminated or attempted to be terminated for cause or default.

**IF THE APPLICANT IS UNABLE TO CERTIFY TO ANY OF THE STATEMENTS IN THIS CERTIFICATION, CERTIFICATION AND EXPLANATION SHALL BE ATTACHED AND PRESENTED WITH THIS CERTIFICATION.**

**THE UNDERSIGNED CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED MADE ON BEHALF OF THE UNDERSIGNED BIDDER.**

Bidder: \_\_\_\_\_

Bidder Address: \_\_\_\_\_

Applicant/Bidder Representative: \_\_\_\_\_

Signature: \_\_\_\_\_  
(Print full name)

Subscribed and sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public  
County of \_\_\_\_\_,  
State of \_\_\_\_\_  
My Commission expires: \_\_\_\_\_

MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

SECTION 00851 - INDEX OF DRAWINGS

TITLE SHEET

The following drawings, dated August 26, 2022, issued for Macomb County Jail, Various Projects, Proposal A-Sanitary Replacement, Proposal B-Barrier Mesh/Screen and Proposal C-Cell Door Replacement, Bid Item #37-22, Mt. Clemens, MI 48043. Architect's Project Number 221958.

**SHEET INDEX**

**PROPOSAL A:**

ARCHITECTURAL DRAWINGS:

A0.1A COMPOSITE FLOOR PLAN - BASEMENT  
A0.2A COMPOSITE FLOOR PLAN - FIRST FLOOR  
A0.3A COMPOSITE FLOOR PLAN - SECOND FLOOR  
D1.1A ENLARGED DEMOLITION FLOOR PLANS - FIRST AND UPPER FLOOR  
D1.2A ENLARGED DEMOLITION FLOOR PLANS - FIRST AND SECOND FLOOR  
A1.1A ENLARGED BASEMENT, FIRST AND UPPER FLOOR NEW WORK PLANS  
A1.2A ENLARGED FIRST AND UPPER FLOOR NEW WORK PLANS - ALTERNATE NO. 1 AND 2  
A1.3A MEN'S AND WOMEN'S LOCKER ROOMS - ENLARGED FLOOR PLANS, INTERIOR ELEVATIONS AND DETAILS  
A2.0A ENLARGED BASEMENT, FIRST AND UPPER FLOOR REFLECTED CEILING PLANS  
A2.1A ENLARGED FIRST AND SECOND FLOOR REFLECTED CEILING PLANS  
A6.1A DOOR SCHEDULES AND DETAILS

MECHANICAL DRAWINGS:

M 0.0 MECHANICAL GENERAL INFORMATION  
FP1.1 FIRE PROTECTION PLAN  
MD1.0 MECHANICAL DEMOLITION PARTIAL BASEMENT PLAN  
MD1.1 MECHANICAL DEMOLITION PARTIAL FLOOR PLAN  
M1.0 MECHANICAL NEW WORK PARTIAL BASEMENT PLAN  
M1.1 MECHANICAL NEW WORK PARTIAL FLOOR PLAN  
M2.1 MECHANICAL SCHEDULES AND DETAILS

ELECTRICAL DRAWINGS:

E0.0 ELECTRICAL GENERAL INFORMATION  
E0.1 LIGHTING SCHEDULE AND CONTROLS MATRIX  
ED1.0 ELECTRICAL DEMOLITION PARTIAL BASEMENT PLAN  
ED1.1 ELECTRICAL DEMOLITION PARTIAL FIRST FLOOR PLAN

MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

ED1.2 ELECTRICAL DEMOLITION PARTIAL SECOND FLOOR PLAN  
E1.0 ELECTRICAL NEW WORK PARTIAL BASEMENT PLAN  
E1.1 ELECTRICAL NEW WORK PARTIAL FIRST FLOOR PLAN  
E1.2 ELECTRICAL NEW WORK PARTIAL SECOND FLOOR PLAN  
E2.1 ELECTRICAL SCHEDULES AND DETAILS

**PROPOSAL B:**

ARCHITECTURAL DRAWINGS:

A0.1B COMPOSITE FLOOR PLAN - BASEMENT  
A0.2B COMPOSITE FLOOR PLAN - FIRST FLOOR  
A0.3B COMPOSITE FLOOR PLANS - SECOND TO SIXTH FLOOR  
A0.4B COMPOSITE FLOOR PLANS - SEVENTH TO TWELFTH FLOOR  
A3.0B ENLARGED FLOOR PLANS AND DETAILS

**PROPOSAL C:**

ARCHITECTURAL DRAWINGS:

A0.1C COMPOSITE FLOOR PLAN - BASEMENT  
A0.2C COMPOSITE FLOOR PLAN - FIRST FLOOR  
A0.3C COMPOSITE FLOOR PLANS - SECOND TO SIXTH FLOOR  
A0.4C COMPOSITE FLOOR PLANS - SEVENTH TO TWELFTH FLOOR  
A6.1C DOOR SCHEDULE AND DETAILS

END OF SECTION 00851

SECTION 01010 - SUMMARY OF WORK

PART I - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this section.

1.02 PROJECT:

The Project consists of all necessary prep to perform the indicated work for the following Proposals:

**PROPOSAL A: Sanitary Replacement and Locker Room Renovations**

**Administration Areas**

- 1. Removal and replacement and/or reinstallation (where noted) of existing ceilings, lighting, ductwork and associated items to access and replace the designated overhead sanitary line serving the Jail Tower. Note: Male and female Locker Rooms and Evidence tech ductwork will be removed and replaced/reinstalled to gain access to replace the overhead sanitary line.

**Command Locker Rooms**

- 1. Renovation of the Sheriff's Command Locker Rooms
  - Men's Locker Room:
    - a. Removal and replacement of existing finishes; toilet & shower partitions, toilet accessories, fixtures, lighting, ductwork, etc.
    - b. Temporary relocation of existing lockers to the Jail Annex. Lockers will be electrostatically painted (base bid) or replaced with new (Alternate).
    - c. Removal and replacement of existing exposed fireproofing to an intumescent paint.
    - d. Reinstallation of lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

**Women's' Locker Room**

- a. Removal and replacement of existing finishes, toilet & shower partitions, toilet accessories, fixtures, lighting, ductwork, etc.
- b. Temporary relocation of lockers to the Jail Annex. Lockers will be electrostatically repainted (base bid) or replaced with new (Alternate)

MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

- c. Storage of Lockers temporarily relocated to the Annex and/or new lockers (refer to Alternates) installed in the renovated Locker Room.

**Evidence Technician Room**

1. Removal and replacement of existing casework/millwork, installation of additional casework/millwork, finishes, fume hood, lighting, and new pull thru evidence lockers, ductwork, etc. in the Evidence Technician Room.
2. Demolition of existing wall as required for expansion of Evidence Technician Room.

**Basement**

1. Installation of a secure welded wire partition system.

Note: Contractor shall carry an allowance of \$50,000.00 for temporary HVAC during construction.

**PROPOSAL B: Mezzanine Barrier Mesh/Screen**

The Project consists of:

1. Installation of a barrier mesh system at the open perimeter of the Tower cell block mezzanine areas and portion of the connecting stairs.
2. Project includes demolition of existing mezzanine guard rail and associated patching of the concrete slab.
3. An Alternate is being solicited for: Camera relocation and procurement and installation of new cameras with associated material and equipment. Contractor shall use Motor City Electric Technologies (to maintain warranty) as the sub-contractor for this work. (see Alternate Section 01100 for additional information).

**PROPOSAL C: Jail Tower Cell Door Replacement - Floors 6 & 7 and Various Other Locations**

1. The project consists of removal and replacement of existing deteriorated hollow metal secure doors on Floors 6 & 7 and various secure and hollow metal doors and frames where indicated on other floors.
2. Sliding doors or frames are not to be replaced.
3. Contractor shall provide and install new security glass as indicated for each door.
4. Contractor shall rewire the door position switch and solenoid operated dead latch for each opening, where frames are replaced.

MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

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5. Repair/replace any damaged masonry (SGFT/CMU) during door frame replacement. Contractor shall include 192sf of 6" SGFT and 384sf of 6" CMU in their bid for patching. Unused SGFT and CMU shall become property of the Owner.
6. New frames shall be grouted.
7. Stenciled numbers shall be painted back on replaced doors and frames affected by this proposal.
8. All existing mechanical shaft hollow metal doors and frames on floors 6-7 and all existing secure hollow metal frames receiving new hollow metal doors and all new secure frames and hollow metal secure doors shall be repainted with Tnemec paint.

**GENERAL - ALL PROPOSALS:**

1. **Contractor shall supply one bid for all (3) Proposals.** Bids for individual proposal will not be considered.
  - a. For accounting purposes, the cost for each proposal is to be listed and the total cost for all (3) proposals with the contingency indicated shall equal the bid.
  - b. All personnel will be subject to a background check prior to entering the facility and performing any work (including deliveries). Those personnel not cleared in advance will be prevented from entering the facility.
  - c. The Jail Tower is comprised of pods: A, B, C, D, E and F. Each pod has (2) floors and contains (18) cells. Contractor will be able to work on (3) pods at a time (half a floor). There are (30) pods in the Jail Tower. Due to procurement items in the different proposals, the Contractor should plan on (25) mobilizations.
    1. Pods may not necessarily progress in a logical systematic pattern due to prisoner counts and classification of prisoners.
    2. After award of the contract, the schedule will be finalized with the successful bidder and the Macomb County Sheriff's Office. Work on the sanitary line replacement shall commence immediately upon award.
  - d. General Contractors shall have been in business minimum of (10) years and shall have performed work in a similar secure facility successfully in the past (5) years. A Contractor Qualification Statement indicating the above shall be submitted with the bid.

1.03 SCHEDULE:

- A. Asbestos may be present and if found will be abated by the Owner. There will be no extra costs allowed due to the time required by the Owner for any abatement.

MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

B. All areas of the facility are to remain in operation during the construction period. Final Schedule and work operations must be coordinated with Macomb Jail Administration and the Macomb County Facilities and Operations.

1.04 ALLOWANCES:

A. The undersigned acknowledges that they have included the sum of THREE HUNDRED FIFTY THOUSAND DOLLARS (\$350,000.00) in the base bid for use as a Construction Contingency for all (3) Projects.

Note: the allowance for temporary HVAC is included in the above allowance.

PARTS 2 & 3 - PRODUCT AND EXECUTION

Not applicable

END OF SECTION 01010



SECTION 01041 - PROJECT COORDINATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to other Sections of Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION:

- A. Contractor shall provide the services of a full time Project Coordinator for the duration of the construction work.
  - 1. Employ someone with not less than five years experience performing coordination work on projects of similar size and scope.
  - 2. Submit name and qualifications to Architect, Owner and Sheriff's Dept.
    - a. Individual will be subject to and pass a background check by the Sheriff's Dept.
- B. Provide additional administrative and supervisory personnel as required for the performance of the work including coordination of the various subcontractors.

C. Related Requirements Specified in Other Sections:

- 1. Summary of Work: Section 01010.

1.03 PROJECT COORDINATOR'S DUTIES:

- A. Coordinate the work of the various subcontractors:
  - 1. For temporary utilities.
  - 2. With the work of trades specified in Division 2 through 16.
- B. Coordinate the schedules of subcontractors.
  - 1. Verify timely deliveries of products for installation by other trades.
  - 2. Verify that labor and materials are adequate to maintain schedules.

MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

C. Maintain conferences among subcontractors and other concerned parties, as necessary to:

1. Maintain coordination and schedules.
2. Resolve matters in dispute.

D. Participate in project meetings:

1. Report progress of work.
2. Recommend needed changes in schedule.

E. Temporary Utilities:

1. Coordinate installation, operation and maintenance, to verify compliance with project requirements and with Contract Documents.
2. Verify adequacy of service at required locations.

F. Shop Drawings, Product Data and Samples:

1. Prior to submittal, review for compliance with Contract Documents.
  - a. Check field dimensions and clearance dimensions.
  - b. Check relation to available space.
  - c. Review the effect of any changes on the work of other contracts or trades.
  - d. Check compatibility with equipment and work of other trades.

G. Coordination Drawings:

1. Prepare, as required to assure coordination of work or to resolve conflicts.
2. Submit for review and transmittal.
3. Reproduce and distribute approved copies to all concerned parties.

H. Observe required testing; maintain a record of tests:

1. Testing agency and name of inspector.
2. Subcontractor.
3. Manufacturer's representative present.
4. Date and time of testing.
5. Type of product or work.
6. Type of test and results.
7. Retesting required.

I. Verify that subcontractors maintain accurate record documents.

J. Substitutions and Changes:

1. Review proposals and requests.
  - a. Check for compliance with Contract Documents.
  - b. Verify compatibility with work and equipment of other trades.
2. Promptly report deficiencies or discrepancies to contractor.

K. Assemble documentation for handling of claims or disputes.

L. Equipment Start-Up:

1. Check to assure that utilities and specified connections are complete and that equipment is in operable condition.
2. Observe test, adjust and balance.
3. Record results, including time and date of start-up.

M. Inspection and Acceptance of Work:

1. Prior to inspection, check that work is complete and ready for acceptance
2. Assist Inspector: Prepare list of items to be completed or corrected.

MACOMB COUNTY JAIL-VARIOUS PROJECTS

**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

AUGUST 26, 2022

3. Should acceptance of work constitute the beginning of the specified guarantee period, prepare and transmit written notice to Contractor for the Owner.

N. Assemble record documents from subcontractors.

END OF SECTION 01041

SECTION 01045 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
- C. Demolition of selected portions of the building for alterations is included in Section "Selective Demolition."

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
  - 1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
  - 2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
  - 3. List products to be used and firms or entities that will perform Work.
  - 4. Indicate dates when cutting and patching is to be performed.
  - 5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

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6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.
7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.4QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1MATERIALS

- A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1INSPECTION

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

### 3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

### 3.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
  1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
  1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
  3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
  4. Comply with requirements of applicable Sections of Division-2 where cutting and patching requires excavating and backfilling.
  5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
  2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.
    - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken containing the patch, after the patched area has received primer and second coat.
  4. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.



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3.4 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

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SECTION 01090 - REFERENCE STANDARDS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Quality assurance.
- B. Schedule of references.

1.02 QUALITY ASSURANCE:

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date for receiving bids.
- C. Obtain copies of standards when required by Contract Documents.
- D. Maintain copy at job site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- F. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.04 SCHEDULE OF REFERENCE:

- AA Aluminum Association  
900 19<sup>th</sup> Street, N.W. - Suite 300  
Washington, DC 20006
- AABC Associated Air Balance Council  
1518 K Street N.W.  
Washington, DC 20005
- AASHTO American Association of State Highway  
and Transportation Officials  
444 North Capitol Street, N.W. - Suite 249  
Washington, DC 20001

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ACI American Concrete Institute  
P.O. Box 9094  
Farmington Hills, MI 48333-9094

ADC Air Diffusion Council  
1901 N. Roselle Rd., Suite 800  
Schaumburg, IL 60195

AF&PA American Forest & Paper Association  
1111 19<sup>th</sup> Street, NW, Suite 800  
Washington, DC 20036

AGC Associated General Contractors of America  
2300 Wilson Blvd., Suite 400  
Arlington, VA 22201

AI Asphalt Institute  
2696 Research Park Drive  
Lexington, KY 40511-8480

AIA American Institute of Architects  
1735 New York Avenue, N.W.  
Washington, DC 20006-5292

AISC American Institute of Steel Construction  
One East Wacker Drive  
Suite 3100  
Chicago, IL 60601-2001

AISI American Iron and Steel Institute  
1140 Connecticut Ave - Suite 705  
Washington, DC 20036

AITC American Institute of Timber Construction  
7012 S. Revere Parkway - Suite 140  
Englewood, CO 80112

AMCA Air Movement and Control Association  
30 West University Drive  
Arlington Heights, IL 60004

ANSI American National Standards Institute  
25 West 43<sup>rd</sup> Street, Fourth Floor  
New York, NY 10036

APA American Plywood Association  
Box 11700  
Tacoma, WA 98411-0700

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ARI Air Conditioning and Refrigeration Institute  
4100 North Fairfax Drive - Suite 200  
Arlington, VA 22203

ASHRAE American Society of Heating, Refrigeration and  
Air Conditioning Engineers  
1791 Tullie Circle, N.E.  
Atlanta, GA 30329

ASME American Society of Mechanical Engineers  
Three Park Avenue  
New York, NY 10016-5990

ASTM American Society for Testing and Materials  
100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959

AWI Architectural Woodwork Institute  
46179 Westlake Drive, Suite 120  
Potomac Falls, VA 20165

AWPA American Wood-Preservers' Association  
P.O. Box 5690  
Grandbury, TX 76049

AWS American Welding Society  
550 N.W. LeJeune Road  
Miami, FL 33126

AWWA American Water Works Association  
6666 West Quincy Avenue  
Denver, CO 80235

BIA Brick Institute of America  
1350 Centennial Park Drive, Suite 301  
Reston, VA 20191

CDA Copper Development Association  
260 Madison Avenue - 16th Floor  
New York, NY 10016

CLFMI Chain Link Fence Manufacturers Institute  
10015 Old Columbia Road, Suite B-215  
Columbia, MD 21046

CRSI Concrete Reinforcing Steel Institute  
933 Plum Grove Road  
Schaumburg, IL 60173-4758

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CSSB Cedar Shake and Shingle Bureau  
P.O. Box 1178  
Sumas, WA 98295-1178

DHI Door and Hardware Institute  
14150 Newbrook Drive, Suite 200  
Chantilly, VA 20151

EJCDC Engineers' Joint Contract Documents Committee  
American Council of Engineering Companies  
1015 15th Street, N.W., 8<sup>th</sup> Floor  
Washington, DC 20005

EJMA Expansion Joint Manufacturers Association  
25 North Broadway  
Tarrytown, NY 10591

FGMA Flat Glass Marketing Association  
3310 Harrison  
White Lakes Professional Building  
Topeka, KS 66611

FM Factory Mutual System  
Standards Laboratories Department  
1151 Boston-Providence Turnpike  
Norwood, MA 02062

FS Federal Specification  
General Services Administration  
Specifications and Consumer Information  
Distribution Section (WFSIS)  
1800 F Street, NW  
Washington, DC 20405

GA Gypsum Association  
810 First Street N.W. #510  
Washington, DC 20002-4268

ICC International Code Council  
5203 Leesburg Pike, Suite 600  
Falls Church, VA 22041

IEEE Institute of Electrical and Electronics Engineers  
345 East 47th Street  
New York, NY 10017

IMIAC International Masonry Industry All-Weather Council  
International Masonry Institute  
815 15th Street, N.W.  
Washington, DC 20005

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MBMA Metal Building Manufacturer's Association  
1300 Sumner Avenue  
Cleveland, OH 44115-2351

MFMA Maple Flooring Manufacturers Association  
60 Revere Drive  
Northbrook, IL 60062

MIL Military Specification  
Naval Publications and Forms Center  
700 Robbins Avenue, Building 4, Section D  
Philadelphia, PA 19111-5093

ML/SFA Metal Lath/Steel Framing Association  
Division of National Association of Architectural Metal  
Manufacturers (NAAMM MLIFSA)  
600 South Federal Street, Suite 400  
Chicago, IL 60605

NAAMM National Association of Architectural Metal  
Manufacturers  
800 Roosevelt Road, Building C, Suite 312  
Glen Ellyn, IL 60137

NCMA National Concrete Masonry Association  
2302 Horse Pen Road  
Herndon, VA 22071-3499

NEBB National Environmental Balancing Bureau  
8575 Grovement Circle  
Gaithersburg, MD 20877

NEMA National Electrical Manufacturers' Association  
1300 North 17<sup>th</sup> Street, Suite 1752  
Rosslyn, VA 22209

NFPA National Fire Protection Association  
#1 Battery March Park  
Quincy, MA 02269-9101

NSWMA National Solid Wastes Management Association  
4301 Connecticut Avenue, N.W., Suite 300  
Washington, DC 20008-2304

NTMA National Terrazzo and Mosaic Association  
201 North Maple, Suite 208  
Purcellville, VA 20132

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PCA Portland Cement Association  
5420 Old Orchard Road  
Skokie, IL 60077

PCI Precast Prestressed Concrete Institute  
175 W. Jackson Blvd.-Suite 1859  
Chicago, IL 60604-9773

PS Product Standard  
U.S. Department of Commerce  
1401 Constitution Avenue, N.W.  
Washington, DC 20230

RIS Redwood Inspection Service  
Division of California Redwood Association)  
405 Enfrente Drive  
Novato, CA 94949

SDI Steel Deck Institute  
P.O. Box 25  
Fox River Grove, IL 60021

SDI Steel Door Institute  
c/o Wherry Associates  
30200 Detroit Road  
Cleveland, OH 44145-1967

SIGMA Sealed Insulating Glass Manufacturers Association  
401 N. Michigan Avenue  
Chicago, IL 60611

SJI Steel Joist Institute  
3127 10<sup>th</sup> Avenue North  
Myrtle Beach, SC 29577-6760

SMACNA Sheet Metal and Air Conditioning Contractors'  
National Association  
4201 Lafayette Center Drive  
Chantilly, VA 20151-1209

SSPC Society for Protective Coatings  
40 24<sup>th</sup> Street, 6<sup>th</sup> Floor  
Pittsburgh, PA 15222-4656

TCNA Tile Council of North America, Inc.  
100 Clemson Research Blvd.  
Anderson, SC 29625

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TPI Turfgrass Producers International  
2 East Main Street  
East Dundee, IL 60118

UL Underwriters' Laboratories, Inc.  
333 Pfingston Road  
Northbrook, IL 60062-2096

WCLIB West Coast Lumber Inspection Bureau  
6980 S.W. Varns Road  
Tigard, OR 97223

WDMA Window & Door Manufacturers Associations  
1400 W. Touhy Avenue, Suite 470  
Des Plaines, IL 60018

WWPA Western Wood Products Association  
522 SW Fifth Avenue, Suite 500  
Portland, OR 97204-2122

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION 01090



SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
  - 1. Pre-Construction Conference.
  - 2. Pre-Installation Conferences.
  - 3. Coordination Meetings.
  - 4. Progress Meetings.
- B. Construction schedules are specified in Specification Section 01310.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. Schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than (14) days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: The Owner, Architect and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers, authorized representatives from the Sheriff's Dept. and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda: Discuss items of significance that could affect progress including such topics as:
  - 1. Tentative construction schedule.
  - 2. Critical work sequencing.
  - 3. Designation of responsible personnel.
  - 4. Procedures for processing field decisions and Change Orders.
  - 5. Procedures for processing Applications for Payment.

6. Distribution of Contract Documents.
7. Submittal of Shop Drawings, Product Data and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Office, Work and storage areas.
11. Equipment deliveries and priorities.
12. Safety procedures.
13. First aid.
14. Security.
15. Housekeeping.
16. Working hours.

1.4 PRE-INSTALLATION CONFERENCES

- A. Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect and Sheriff's Dept. of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
  - a. Contract Documents.
  - b. Options.
  - c. Related Change Orders.
  - d. Purchases
  - e. Deliveries.
  - f. Shop Drawings, Product Data and quality control Samples.
  - g. Possible conflicts.
  - h. Compatibility problems.
  - i. Time schedules.
  - j. Weather limitations.
  - k. Manufacturer's recommendations.
  - l. Compatibility of materials.
  - m. Acceptability of substrates.
  - n. Temporary facilities.
  - o. Space and access limitations.
  - p. Governing regulations.
  - q. Safety.
  - r. Inspection and testing requirements.
  - s. Required performance results.

- t. Recording requirements.
- u. Protection.
- 2. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner, Architect and Sheriff's Dept.
- 3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.5 COORDINATION MEETINGS

- A. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 PROGRESS MEETINGS

- A. Conduct progress meetings at the Project site at regularly scheduled intervals. Notify the Owner, Architect and Sheriff's Dept. of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
- B. Attendees: In addition to representatives of the Owner and Architect and Sheriff's Dept., each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  2. Review the present and future needs of each entity present, including such items as:
    - a. Interface requirements.
    - b. Time.
    - c. Sequences.
    - d. Deliveries.
    - e. Off-site fabrication problems.
    - f. Access.
    - g. Site utilization.
    - h. Temporary facilities and services.
    - i. Hours of Work.
    - j. Hazards and risks.
    - k. Housekeeping.
    - l. Quality and Work standards.
    - m. Change Orders.
    - n. Documentation of information for payment requests.
- D. Reporting: No later than (3) days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
1. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01200



# SUBSTITUTION REQUEST (During the Bidding Phase)

Project: \_\_\_\_\_ Substitution Request Number: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ From: \_\_\_\_\_  
 To: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_  
 Re: \_\_\_\_\_ A/E Project Number: \_\_\_\_\_  
 \_\_\_\_\_ Contract For: \_\_\_\_\_

Specification Title: \_\_\_\_\_ Description: \_\_\_\_\_  
 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Trade Name: \_\_\_\_\_ Model No.: \_\_\_\_\_

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: \_\_\_\_\_  
 Signed by: \_\_\_\_\_  
 Firm: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone: \_\_\_\_\_

**A/E's REVIEW AND ACTION**

- Substitution approved - Make submittals in accordance with Specification Section 01340.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01340.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: \_\_\_\_\_ Date: \_\_\_\_\_

Supporting Data Attached:  Drawings  Product Data  Samples  Tests  Reports  \_\_\_\_\_

**SUBSTITUTION  
REQUEST**  
(After the Bidding/Negotiating Phase)

Project: \_\_\_\_\_ Substitution Request Number: \_\_\_\_\_

\_\_\_\_\_ From: \_\_\_\_\_

To: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_ A/E Project Number: \_\_\_\_\_

Re: \_\_\_\_\_ Contract For: \_\_\_\_\_

Specification Title: \_\_\_\_\_ Description: \_\_\_\_\_

Section: \_\_\_\_\_ Page: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_

Trade Name: \_\_\_\_\_ Model No.: \_\_\_\_\_

Installer: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_

History:  New Product  1-4 years old  5-10 years old  More than 10 years old

Differences between proposed substitution and specified product: \_\_\_\_\_

\_\_\_\_\_

Point-by-point comparative data attached.

Reason for not providing specified item: \_\_\_\_\_

\_\_\_\_\_

Similar Installation:

Project: \_\_\_\_\_ Architect: \_\_\_\_\_

Address: \_\_\_\_\_ Owner: \_\_\_\_\_

\_\_\_\_\_ Date Installed: \_\_\_\_\_

\_\_\_\_\_

Proposed Substitution affects other parts of work:  No  Yes; explain \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Savings to Owner for accepting substitution: \_\_\_\_\_ (\$\_\_\_\_\_).

Proposed substitution changes Contract Time:  No  Yes [Add] [Deduct] \_\_\_\_\_ days.

\_\_\_\_\_

Supporting Data Attached:  Drawings  Product Data  Samples  Tests

Reports  \_\_\_\_\_

**SUBSTITUTION  
REQUEST**  
(After the Bidding/Negotiating Phase)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
  - Same warranty will be furnished for proposed substitution as for specified product.
  - Same maintenance service and source of replacement parts, as applicable, is available.
  - Proposed substitution will have no adverse effects on other trades and will not affect or delay progress schedule.
  - Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
  - Proposed substitution does not affect dimensions and functional clearances.
  - Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
  - Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.
- 

Submitted by: \_\_\_\_\_

Signed by: \_\_\_\_\_

Firm: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

Attachments: \_\_\_\_\_

\_\_\_\_\_

---

A/E's Review Action

- Substitution approved – Make submittals in accordance with Specification Section 01340.
- Substitution approved as noted – Make submittals in accordance with Specification Section 01340.
- Substitution rejected – Use specified materials.
- Substitution Request received too late – Use specified materials.

Signed by: \_\_\_\_\_ Date: \_\_\_\_\_

---

Additional Comments:  Contractor  Subcontractor  Supplier  Manufacturer  
 A/E  Other

---

SECTION 01310 - CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to other Sections of Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF REQUIREMENTS:

- A. General: This section specifies the particular administrative and procedural requirements for progress time scheduling and progress reporting for the performance of the work, as indicated in the General Conditions and elsewhere in the Contract Documents. Refer also to the General Conditions and to the "Contractor" for definition and specific dates of the Contract Time.
- B. Scheduling Responsibility: Submission of Contractor's progress schedule to the Owner or Architect shall not relieve the Contractor of his total responsibility for the requirements of the Contract Documents, including adverse effects such as delays resulting from ill-timed work; refer to General Conditions.

1.03 FORM OF SCHEDULES:

- A. Contractor shall prepare a "Plan of Operations and Progress Schedule" which shall show concisely the manner in which different phases of the work are to be started, methods and speed for the inter-relationship of the work under the various contracts, times upon which different phases of the work are to be started, methods and speed for progressing the different phases and dates upon which the certain subcontractors are dependent upon that under other subcontracts.
- B. The plan of operations and progress schedule shall be "weighed" to schedule each trade in proportion to the entire project, both physically and financially.
- C. In preparing the above plan of operations and progress schedule, the Contractor shall assure that the methods, dates and other pertinent matters are acceptable to the Architect and, when completed, he shall submit to and obtain approval from the Architect, Owner and Sheriff's Dept.



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- D. After approval of the above plan of operations and progress schedule, the Contractor shall be responsible for seeing that it is adhered to and for ascertaining that proper coordination is maintained between work of all Contracts.

1.04 PROGRESS REVISIONS:

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
  - 1. Major changes in scope.
  - 2. Activities modified since previous submission.
  - 3. Revised projections of progress and completion.
  - 4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
  - 1. Problem areas, anticipated delays, and the impact on the schedule.
  - 2. Corrective action recommended and its effect.
  - 3. The effect of changes on schedules of other contractors.

1.05 SUBMISSIONS:

- A. Submit initial schedules within (14) days after award of Contract.
  - 1. Architect, Owner and Sheriff's Dept. will review schedules and return review copy within (10) days after receipt.
  - 2. Resubmit within (10) days after return of review copy.
- B. Submit a revised and updated progress schedule and narratives with each application for payment, but not less than once a month until project is complete.

1.06 DISTRIBUTION:

- A. Distribute copies of the reviewed schedules and narratives to:
  - 1. Job site file.
  - 2. Subcontractors.
  - 3. Other concerned parties.
- B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

1.07 DAILY REPORTS:

- A. Contractor shall prepare a daily report, recording the following information concerning events at the site and submit duplicate copies to the Architect and Owner at regular intervals not exceeding weekly intervals.
  - 1. List of subcontractors at the site.
  - 2. List of separate contractors at the site.
  - 3. Count of personnel at the site.
  - 4. High/low temperatures, general weather conditions.
  - 5. Accidents (refer to accident reports).
  - 6. Meetings and significant decisions.
  - 7. Unusual events.
  - 8. Stoppages, delays, shortages, losses.
  - 9. Emergency procedures, field orders.
  - 10. Orders/requests by governing authorities.
  - 11. Change orders received, implemented.

PART 2 and 3 - PRODUCTS AND EXECUTION - Not Applicable

END OF SECTION 01310

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SECTION 01340 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to other Sections of Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION:

- A. Submit shop drawings, product data and samples as required by the Contract Documents. Individual submittal requirements are specified in applicable sections for each unit of work. Receive, check and coordinate all submittals of contractors as provided herein.

B. Definitions:

1. Shop Drawings are drawings, diagrams, schedules and other data specifically prepared for the Work by the Contractor or any subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
2. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.
3. Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the work will be judged.

1.03 SUBMITTAL REQUIREMENTS:

- A. Coordinate preparation and processing of submittals with performance of the work so that work will not be delayed by submittals. Coordinate and sequence different categories of submittals for the same work, and for interfacing units of work, so that one will not be delayed for coordination with another. No extension of time will be allowed because of failure to properly coordinate and sequence submittals.

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- B. Submit minimum one PDF version of each shop drawing, including fabrication, erection, layout and setting drawings and such other drawings as required under various sections of the Specifications, until final acceptance is obtained. Prepare drawings legible, drawing plans, elevations, sections and details in scales required and on drawing sheets not larger than 30" x 42" nor smaller than 11" x 17". Photo reproductions of contract documents are not an acceptable submittal. Submit copies of manufacturer's descriptive data including catalog sheets for materials, equipment and fixtures, showing dimensions, performance characteristics and capacities, wiring diagrams and controls, schedules, and other pertinent information as required. Where printed materials describe more than one product or model, clearly identify which is to be furnished.
- C. Shop drawings, product data and samples shall be dated including Contractor and Subcontractor dates of submittal and approval, and marked to show the names of the Project, Architect, Contractor, origination Subcontractor, manufacturer or supplier, and separate detailer if pertinent. Shop drawings shall completely identify Specification section and locations at which materials or equipment are to be installed. Reproductions of Contract Drawings are acceptable as Shop Drawings only when specifically authorized in writing by the Architect.
- D. Submission of shop drawings, product data and samples shall be accompanied by a copy of a transmittal letter containing Project name, Contractor's name, number of drawings, and samples, titles and other pertinent data. Transmittal shall bear signature of the Contractor as evidence he/she checked same and found them in conformance with the Contract Documents.
- E. The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.
- F. By approving and submitting Shop Drawings, Product Data and Samples, the contractor represents that he/she has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he/she has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

- G. The Contractor shall not be relieved of responsibility for the deviation from the requirements of the Contract Documents by the Architect's acceptance of Shop Drawings, Product Data or Samples under Paragraph 13.12 of the General Conditions, unless the Contractor has specifically informed the Architect in writing of such deviation at the time of sub-deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's acceptance thereof.
- H. The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Architect on previous submittals.
- I. No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been accepted by the Architect as provided in Paragraph 13.12 of the General Conditions. All such portions of the Work shall be in accordance with approved submittals.
- J. Architect will review Shop Drawings, Product Data and Samples as provided in Paragraph 13.12 of the General Conditions. He will mark each such submittal as follows:
1. Accepted - Where no comment made.
  2. Accepted as Noted - Where comments indicated on submittal qualifying, modifying, or otherwise changing it; however, submittal can be used for ordering, fabrication and erection at contractor's own risk until revised submittals have been made, reviewed and stamped approved.
  3. Revise & resubmit - Where comments indicated on submittal require revisions and resubmission prior to ordering and/or fabrication and erection.
  4. Rejected - Where proposed submittals do not conform to the contract documents.
- K. Contractor is responsible for obtaining and distributing required prints of shop drawings to his subcontractors and material suppliers; after as well as before final approval. Prints of reviewed shop drawings shall be made from transparencies which carry the Architect's appropriate stamp.

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- L. Obtain copies of all shop drawings, product data and samples submitted to date and accepted from other contractors.

PARTS 2 and 3 - PRODUCT AND EXECUTION

Not applicable.

END OF SECTION 01340

SECTION 01370 - SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Requirements, and to other Sections of Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. Submit to the Architect a Schedule of Values allocated to the various portions of the work, within ten (10) days after award of contract.
- B. Upon request of the Architect, support the values with data which will substantiate their correctness.
- C. The Schedule of Values, unless objected to by the Architect or Owner, shall be used only as the basis for the Contractor's Applications for Payment.

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES:

- A. Use AIA Forms G702 and G702A or forms provided by Owner.
- B. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- C. Follow the table of contents of Sections as the format for listing component items.
  - 1. Identify each line item with the number and title of the respective major section of the specifications.
- D. For each major line item list sub-values of major products or operations under the item.
  - 1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
- E. The sum of all values listed in the schedules shall equal the total Contract Sum.

PARTS 2 AND 3 - PRODUCTS AND EXECUTION - Not Applicable

END OF SECTION 01370

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION:

- A. Specific quality control requirements for the work are indicated throughout the contract documents. The term "Quality Control" includes, but is not necessarily limited to, inspection and testing and associated requirements. This section does not specify or modify Architect's duties relating to quality control and Contract enforcement.
- B. Coordinate quality control programs of separate contractors including submittals, conferences and on site programs.

1.03 RESPONSIBILITY:

- A. Residual Contractor Responsibility: Whatever required, inspection, testing and similar quality control provisions to be performed by independent agencies (not directly by the Contractor), and not indicated to be Owner's responsibility, shall be the Contractor's responsibility. The costs for those required services by independent testing laboratories are recognized to be included in Contract Sum.
- B. Contractor's General Responsibility: No failure of test agencies, whether engaged by Owner or Contractor, to perform adequate inspections or tests or to properly analyze or report results, shall relieve Contractor of responsibility for fulfillment of requirements of contract documents. It is recognized that required inspection and testing program is intended to assist the Contractor, Owner, Architect, and governing authorities in nominal determination of probable compliances with requirements for certain elements of work. The program is not intended to limit the Contractor's regular quality control program, as needed for general assurance of compliances.



1.04 QUALITY ASSURANCE:

- A. General Workmanship Standards: Comply with recognized workmanship quality standards within the industry as applicable to each unit of work, including ANSI standards where applicable. It is a requirement that each category of trades person or installer performing the work be prequalified, to the extent of being familiar with applicable and recognized quality standards for that category of work, and being capable of workmanship complying with those standards.
- B. Qualification of Quality Control Agencies: Except where another qualification standard is indicated, and except where it is specifically indicated that use of prime product manufacturer's test facilities is acceptable, engage independent testing laboratories complying with "Recommended Requirements for Independent Laboratory Qualifications" as published by American Council of Independent Laboratories, and specializing in type(s) of inspections and tests required.

1.05 SUBMITTALS:

- A. General: Refer to Section 01340, "Shop Drawings, Product Data and Samples" for requirements applicable to inspection and test reports, quality control samples, maintenance agreements, warranties, and similar documentation of quality compliances as required. Refer to individual work sections of Division 2 through 26 for specific certification and submittal requirements.
- B. Copies and Distribution: Where inspection and test reports and certifications are required by governing authorities, provide additional copies as required, and where required, send copies directly from inspection or testing agency to governing authority.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING:

- A. General: Handle, store and protect materials and products, including fabricated components, by methods and means which will prevent damage, deterioration and losses including theft (and resulting delays), thereby ensuring highest quality results as performance of the work progresses. Control delivery schedules so as to minimize unnecessary long-term storage at project site prior to installation.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION:

3.01 PREPARATION FOR INSTALLATION:

A. Pre-Installation Conferences: Well in advance of installation of every major unit of work which requires coordination with other work, meet at the project site with installers and representatives of manufacturers and fabricators who are involved in or affected by the unit of work, and in its coordination or integration with other work which has proceeded or will follow. Advise Architect, Owner and Sheriff's Dept. of scheduled meeting dates. At each meeting, review progress of other work and preparations for particular work under consideration, including requirements of contract documents, options, related change orders, purchases, deliveries, shop drawings, product data, quality control samples, possible conflicts, compatibility problems, time schedule, weather limitations, temporary facilities, space and access limitations, structural limitations, governing regulations, safety, inspection and testing requirements required performance results, recording requirements, and protection. Record significant discussions of each conference, and agreements and disagreements along with final plan of action. Distribute record of meeting promptly to everyone concerned, including Architect and Owner.

1. Do not proceed with the work if associated pre-installation conference cannot be concluded successfully. Instigate actions to resolve impediments to performance of the work, and reconvene conference at earliest date feasible.

B. Installer's Inspection of Conditions: Require Installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to the Contractor) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 COORDINATION OF TEST AGENCY WORK:

- A. Coordination with Owner's Agencies: Afford access and reasonable time in construction sequence for Owner's inspection and tests to be performed. Cooperate with agencies and provide incidental labor and services needed for the removal and delivery of test samples, and for inspections and taking measurements. Provide patching and restoration services where test samples have been removed, complying with individual technical sections of Divisions 2 through 11.
  - 1. Except for specialized laboratory sampling equipment, and except as otherwise indicated, supply and operate tools and construction equipment needed to obtain test samples from the work, including cutting devices for sawing, drilling, flame-cutting, coring and similar operations. Assist agencies in labeling and packing of test samples removed from the work.
  
- B. Coordination with Contractor's Independent Agencies: Except for required independent agency activities of inspection, measuring, testing, analyzing, reporting and similar activities, the assignment of labor, equipment, cutting, Patching and similar necessary activities associated therewith are Contractor's option recognizing that entire activity is Contractor's responsibility.
  
- C. Test Agency Responsibilities:
  - 1. Test agencies, regardless of whether engaged by Owner or Contractor, are not authorized to change or negate requirements of Contract Documents. Each agency shall coordinate its assigned work with construction schedule as maintained by Contractor, and shall perform its work promptly so as not to delay the work. Observances (by agencies) having a bearing on the work shall be reported to Architect in most expeditious way possible, and shall be recorded in writing by agency. Agency personnel shall not interfere with or assume duties of Contractor.
  
  - 2. Reports: The testing agency shall prepare reports of inspections and laboratory tests, including analysis and interpretation of test results where applicable. Properly identify each report and, where required, provide agency's certification of test results. Describe test methods used, and compliance with recognized test standards (if any). Complete and submit report at earliest possible date in each case.

3.03 INSTALLATION QUALITY CONTROL:

- A. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicate in contract documents.
- B. Inspect each item of materials or equipment, immediately prior to installation, and reject damaged and defective items.
- C. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances, if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual effect choices to Architect for final decision.
- D. Recheck measurements and dimensions of the work, as an integral step of starting each installation.
- E. Install work during conditions of temperature, humidity, exposed, forecasted weather, and status of project completion which will ensure best possible results for each unit of work, in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.
- F. Coordinate enclosure (closing-in) of work with required inspections and tests, so as to avoid necessity of uncovering work for that purpose.
- G. Mounting Heights: Except as otherwise indicated, mount individual units of work at industry-recognized standard mounting heights, for applications indicated. Refer questionable mounting height choices to Architect for final decision.
- H. Adjust, clean, lubricate, restore, marred finished, and protect newly installed work, to ensure that it will remain without damage or deterioration during the remainder of construction period.

END OF SECTION 01400

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SECTION 01500 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
- B. Temporary utilities required include but are not limited to:
  - 1. Not applicable.
- C. Temporary construction and support facilities required include but are not limited to:
  - 1. Waste disposal services.
  - 2. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities required include but are not limited to:
  - 1. Temporary fire protection.
  - 2. Barricades, warning signs, lights.
  - 3. Environmental protection.

1.3 SUBMITTALS

- A. Not Applicable.

1.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
  - 1. Building Code requirements.
  - 2. Health and safety regulations.
  - 3. Police, Fire Department and Rescue Squad rules.
  - 4. Environmental protection regulations.

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- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."
1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.
  2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5PROJECT CONDITIONS

- A. Conditions of Use: Keep facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.1MATERIALS

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood:
1. For safety barriers, and similar uses, provide minimum 5/8" thick fire retardant plywood.
- C. Water: Contractor may use Owners water service.

2.2EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.

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- B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Toilets: Contractor may use Owner's designated toilet facilities.
- G. First Aid Supplies: Comply with governing regulations.
- H. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
  - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

### 3.2 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

### 3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer as requested by the Architect.
- B. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
  - 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher at each area of work.
  - 2. Store combustible materials in containers in fire-safe locations.
  - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
  - 4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.



- C. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- D. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- E. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
  - 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- F. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

### 3.4 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.

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2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.
  2. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:
    - a. Replace air filters and clean inside of ductwork and housings.

END OF SECTION 01500

SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division O, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION:

- A. Material and equipment incorporated into the work:
  - 1. Conform to applicable specifications and standards.
  - 2. Comply with size, make, type and quality specified, or as specifically approved in writing by the architect.
  - 3. Manufactured and Fabricated Products:
    - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
    - b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
    - c. Two or more items of the same kind shall be identical, by the same manufacturer.
    - d. Products shall be suitable for service conditions.
    - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
  - 4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

1.03 MANUFACTURER'S INSTRUCTIONS:

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such, including three copies to Architect.
  - 1. Maintain one set of complete instructions at the job site during installation and until completion.

- B. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
  - 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Architect for further instructions.
  - 2. Do not proceed with work without clear instructions.
- C. Perform work in accord with manufacturer's instructions. Do not omit preparatory step or installation procedure unless specifically modified or exempted by contract documents.

1.04 TRANSPORTATION AND HANDLING:

- A. Arrange deliveries of products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.
  - 1. Immediately on delivery, inspect shipments to assure compliance with requirements of contract documents and approved submittals, and that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.05 STORAGE AND PROTECTION:

- A. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
  - 1. Store products subject to damage by the elements in weather tight enclosures.
  - 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
- B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
- C. Preparation After Installation:
  - 1. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

1.06 SUBSTITUTIONS AND PRODUCT OPTIONS:

A. Products List:

1. Within fourteen (14) days after contract date, submit to Architect a complete list of major products proposed to be used, with the name of the manufacturer and the installing subcontractor. Comply with provisions for Contractor's Options and Substitutions.

B. Contractor's Options:

1. For products specified only by reference standard, select any product meeting that standard.
2. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named, which complies with the specifications.
3. For products specified by naming one or more products or manufacturers and "or equal," Contractor must submit a request as for substitutions for any product or manufacturer not specifically named.
4. For products specified by naming only one product and manufacturer, there is no option.

C. Substitutions:

1. For a period of fourteen (14) days after contract date, Architect will consider written requests from Contractor for substitution of products.
2. Submit a separate request for each product, supported with complete data, with drawings and samples as appropriate, including:
  - a. Comparison of the qualities of the proposed substitution with that specified.
  - b. Changes required in other elements of the work because of the substitution.
  - c. Effect on the construction schedule.
  - d. Cost data comparing the proposed substitution with the product specified.

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- e. Any required license fees or royalties.
  - f. Availability of maintenance service, and source of replacement materials.
3. Architect shall be the judge of the acceptability of the proposed substitution except where a change in cost is involved.

D. Contractor's Representation:

- 1. A request for a substitution constitutes a representation that Contractor:
  - a. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
  - b. Will provide the same warranties or bonds for the substitution as for the product specified.
  - c. Will coordinate the installation of an accepted substitution into the work, and meet such other changes as may be required to make the work complete in all respects.
  - d. Waives all claims for additional costs, under his responsibility which may subsequently become apparent.

E. Architect will review requests for substitutions with reasonable promptness, and notify Contractor, in writing, of the decision to accept or reject the requested substitution.

PARTS 2 AND 3 PRODUCTS AND EXECUTION

Not applicable.

END OF SECTION 01600

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**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

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SECTION 01700 - PROJECT CLOSEOUT

PART ONE - GENERAL

1.01 CLEANING

- A. Prior to Final Acceptance of the entire work, and at such times as directed by the Owner's Representative, the Contractor shall thoroughly clean all exposed surfaces of the building relating to the Work of the Contract.
- B. Prior to such Final Acceptance, all protective coatings shall be removed from finish surfaces, and all glass of the work shall be washed and cleaned.
- C. The Contractor shall be held responsible for all damaged materials, which shall be replaced at completion at no cost to the Owner. Glass, tile, hollow metal, stainless steel and aluminum scratched through carelessness or improper cleaning shall be considered damaged and shall be replaced.

1.02 INSTALLATION AND MAINTENANCE INSTRUCTIONS

- A. The Contractor shall present to the Owner's Representative two (2) duplicate sets and one electrical copy in PDF format of the manufacturer's installation and maintenance instructions for each and every item furnished or erected.
- B. In each of these, the correct model number and the data for the model number shall be checked off in ink where the literature covers more than one model number.

1.03 ADJUSTMENTS

- A. The complete installation consisting of the several parts and systems and all equipment installed according to the requirements of the Specifications and as shown on the Drawings shall be adjusted as required and ready in all respects for use by the Owner at the time of Final Acceptance of the Work.

END OF SECTION 01700

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**PROPOSAL A-SANITARY REPLACEMENT**

**PROPOSAL B-BARRIER MESH/SCREEN**

**PROPOSAL C-CELL DOOR REPLACEMENT** 221958

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SECTION 01800 - GUARANTEE - WARRANTY

PART ONE - GENERAL

1.01 GUARANTEE PERIOD

- A. The General Contractor shall and hereby does guarantee and warrant that all work for this building, under this Contract, shall be free from defects or faulty labor and/or materials for a period of **two (2) years** from the date of Final Acceptance of same, except when longer periods are herein specified, which develop within any guarantee periods.

1.02 FINAL PAYMENT

- A. Final payment is contingent upon the Owner's Representative's receipt of such guarantees and/or warranties from the General Contractor.

END OF SECTION 01800



**SPECS**  
**FOR**  
**PROPOSAL A**

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SECTION 01100 - ALTERNATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. This section identifies each Alternate by number, and describes the basic changes to be incorporated into the work, only when the Alternate is made a part of the work by specific provisions in the Owner-Construction Manager Agreement.
- B. Alternate schedule below is part of the Bidding Documents and will be considered in selection of Contractors and awarding contracts.
- C. Unless otherwise provided, Owner will accept or reject alternates within thirty (30) days of date of contract. Owner reserves the right to reject any or all alternates.

1.03 ALTERNATES:

A. General:

- 1. The descriptions for each alternate listed in the schedule are primarily scope definitions, and do not necessarily detail the full range of materials and processes needed to complete the work as required.
- 2. Refer to applicable specification sections (Division 2 through 26), and to applicable drawings, for specific requirements of the work, regardless of whether references are so noted in description of each alternative.
- 3. Coordinate pertinent related work and modify surrounding work as required to properly integrate the work under each Alternate, and to provide the complete construction required by Contract Documents.
- 4. Referenced sections of specifications stipulate pertinent requirements for products and methods to achieve the work stipulated under each Alternate.

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B. Schedule:

1. **Alternate No. 1:** Provide new Lockers for first floor Men's & Women's Locker Rooms.
2. **Alternate No. 2:** Provide new Lockers for second floor Men's & Women's Locker Rooms.

END OF SECTION 01100

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SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section requires the selective removal and subsequent offsite disposal of the following (but not limited to):
  1. Removal of existing ceiling tile & grid, gypsum board ceiling and associated support structure, ductwork, piping and associated material as required to complete overhead sanitary line replacement or required for renovation/expansion of administrative locker rooms and/or evidence technician room.
  2. Removal of existing sanitary line and associated material as indicated on the drawings.
  3. Removal and salvage of existing light fixtures, strobes, motion sensors, fire detectors, grilles and diffusers and associated material in ceiling areas removed as required to complete the overhead sanitary line replacement or removed as part of locker room and evidence technician room renovation/expansion.
  4. Remove and salvage existing lockers, locker base wood benches and all associated material in administrative locker rooms as indicated on drawings, and temporarily relocate to the Jail Annex.
  5. Removal all locker room plumbing fixtures complete.
  6. Remove portions of existing floor construction as required for new floor drains and plumbing fixtures.
  7. Remove all toilet partitions and toilet accessories in administrative locker rooms. Remove and Salvage of existing half height toilet partitions in the Annex Toilet Areas.

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8. Removal of existing flooring and base as shown on drawings.
9. Removal of existing fumehood, countertops, casework/millwork, sink, workstations and associated material as indicated in evidence technician room.
10. Removal of existing walls as required to complete new construction.
11. Removal of existing "Blaze Shield" spray on fireproofing in upper level Locker Room and prep for new intumescent coating.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Schedule indicating proposed sequence of operations for selective demolition work to the Sheriff's Department and Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.
- C. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work.

1.4 JOB CONDITIONS

- A. Occupancy: Owner will occupy portions of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of (72) hours advance notice to Owner of demolition activities that will affect Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
  1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.

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- C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to the Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
1. Storage or sale of removed items on site will not be permitted.
- D. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel, inmates and general public from injury due to selective demolition work.
1. Provide protective measures as required to provide free and safe passage of Owner's personnel, inmates and general public to occupied portions of building.
  2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
  3. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
  4. Protect floors with suitable coverings when necessary.
  5. Construct temporary insulated one hour fire rated secure dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
  6. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
  7. Remove protections at completion of work.
- E. Damages: Promptly repair damages caused to adjacent facilities by demolition work.

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- F. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
  - 1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
  
- G. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
  
- H. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
  - 1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
  - 2. Maintain fire protection services during selective demolition operations.
  
- I. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.
  - 1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

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1. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
2. Cover and protect furniture, equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.
3. Erect and maintain secure dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
  - a. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct minimum one-hour secure dust-proof partitions of minimum 4-inch studs, 5/8-inch type 'x' drywall (joints taped) on occupied side, 1/2-inch fire-retardant plywood on demolition side. Fill partition cavity with sound-deadening insulation.
  - b. Provide weatherproof closures for exterior openings resulting from demolition work.
4. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
  - a. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of (72) hours advance notice to Owner and Sheriff's Department if shutdown of service is necessary during changeover.

3.2DEMOLITION

- A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
  1. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
  2. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.



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- B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.3SALVAGED MATERIALS

- A. Salvaged Items: Where indicated on Drawings as "Salvage" carefully remove indicated items, clean, securely store, and prep item for reinstallation.
- B. Salvaged Items: Where indicated on Drawings as "Salvage - Deliver to Owner," carefully remove indicated items, clean, store, and turn over to Owner and obtain receipt.
  - 1. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance, remain property of Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

3.4DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.
  - 1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
  - 2. Burning of removed materials is not permitted on project site.

3.5CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.

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1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02070

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SECTION 02925 - CLEANUP AND RESTORATION

PART 1 - GENERAL

- A. The Contractor shall restore areas disturbed by construction activities to a condition reasonably close to their condition before the project, unless shown otherwise on the plans. Restoration work should be performed as soon as possible after construction work is completed in a particular area.
- B. Upon the completion of work in an area, all excess materials, debris, equipment, and similar items shall be removed from the project area by the Contractor, and disposed of properly.

PART 2 - MATERIALS

Not Applicable.

PART 3 - EXECUTION

3.01 Restoration

- A. Unless otherwise provided; aggregate surfaces, bituminous pavements, and concrete pavements shall be restored by construction of similar replacement surfaces. Bituminous, concrete and aggregate surfaces shall be replaced with the materials and thicknesses to match existing.
- B. Turf areas shall be restored by re-establishing areas with sod.
  - 1. Installation of sod shall occur between the dates indicated in the current MDOT standard specifications for construction, unless written authorization is given by the owner or owner's representative.
  - 2. Sod shall be placed in areas where sod had existed prior to the project beginning.
  - 3. Stagger sod rolls so that seams alternate. Roll sod to eliminate air pockets.

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C. Mailboxes, fences, signs, ornaments, and similar items shall be replaced at the completion of construction. Posts shall be installed plumb. Items that are lost or stolen shall be repaired or replaced at the Contractor's expense. Repairs or replacements shall meet the Owner's approval.

3.02 Temporary Restoration of Driving Surfaces

A. Where a pavement or gravel surface is removed as a result of construction activities, a temporary surface shall be provided and maintained by the Contractor until the permanent surface is provided. Unless otherwise directed, the temporary surface shall be twelve inches of aggregate compacted to at least 95 percent of its maximum density (ASTM D1557) and graded to meet the adjacent, remaining surfaces. Aggregate shall meet the requirements of Series 23A as described in the 2003 Michigan Department of Transportation Specifications.

B. The Contractor shall regrade the temporary surface and add additional aggregate at intervals necessary to maintain them in a relatively smooth condition.

END OF SECTION 02925

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SECTION 03300 - BONDING AGENTS FOR CONCRETE

PART 1. GENERAL

1.01 SUMMARY

- A. This specification describes the use of a bonding bridge between new portland-cement mortar or concrete and hardened portland-cement mortar or concrete.

1.02 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall have in existence a recognized quality assurance program and be ISO 9001 Certified, a program of training, certifying and technically supporting a nationally-organized Approved Contractor Program with a re-certification program of its participants for a minimum of 5 years.
- B. Contractor qualifications: Contractor shall be an Approved Contractor of the manufacturer of the specified product, who has completed a program of instruction in the use of the specified coating material, and provides a certification from the manufacturer attesting to its Approved Contractor status.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer, or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.03 DELIVERY, STORAGE AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.04 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.

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- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified coating.

1.05 SUBMITTALS

- A. Submit PDF copy of manufacturer's literature, to include: Product Data Sheet, System Data Sheet, Application Guide, and appropriate Material Safety Data Sheets (MSDS).
- B. Submit copy of Certificate of Approved Contractor status by manufacturer.

1.06 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Sika Armatec 110 EpoCem, as manufactured by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071 is considered to conform to the requirements of this specification.

2.02 MATERIALS

- A. Epoxy resin/portland cement adhesive shall be Sika Armatec 110 EpoCem.
  - 1. Component "A" shall be an epoxy resin/water emulsion containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
  - 2. Component "B" shall be primarily a water solution of a polyamine.
  - 3. Component "C" shall be a blend of selected portland cements and sands.
  - 4. The material shall not contain asbestos.

2.03 PERFORMANCE CRITERIA

- A. Properties of the mixed epoxy resin/portland cement adhesive.
  - 1. Pot Life: 90 minutes @ 73°F.
  - 2. Contact Time:
    - 95°F (35°C) 6 hours
    - 68°F (20°C) 12 hours
    - 50°F (10°C) 16 hours
    - 40°F (5°C) 24 hours
  - 3. Color: Dark gray

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- B. Properties of the cured epoxy resin/portland cement adhesive.
1. Compressive Strength (ASTM C-109)
    - a. 3 day: 4500 psi (31.0 MPa)
    - b. 7 day: 6500 psi (44.8 MPa)
    - c. 28 day: 8500 psi (58.6 MPa)
  2. Splitting Tensile Strength (ASTM C-496)
    - a. 28 days: 600 psi (4.1 MPa)
  3. Flexural Strength (ASTM C-348)
    - a. 1250 psi (8.6 MPa)
  4. Bond Strength ASTM C-882 at 14 days
    - a. Wet on Wet, 0-hr. open time: 2800 psi (19.3 MPa)
    - b. 24-hr. open time: 2600 psi (17.9 MPa)
  5. Bond of Steel Reinforcement to Concrete (Pullout Test)
    - a. Sika Armatec 110 coated: 625 psi (4.3 MPa)
    - b. Epoxy coated: 508 psi (3.5 MPa)
    - c. Plain Reinforcement: 573 psi (3.95 MPa)
  6. The epoxy resin/portland cement adhesive shall not produce a vapor barrier.
  7. Material must be proven to prevent corrosion of reinforcing steel when tested under the procedures as set forth by the Federal Highway Administration Program Report No. FHWA/RD86/193. Proof shall be in the form of an independent testing laboratory corrosion report showing prevention of corrosion of the reinforcing steel.

Note: Tests above were performed with material and curing conditions at 73°F and 45-55% relative humidity.

PART 3 - EXECUTION

3.01 MIXING AND APPLICATION

- A. Mixing the epoxy resin: Shake contents of Components "A" and Component "B". Completely empty both components into a clean, dry mixing pail. Mix thoroughly for 30 seconds using a jiffy paddle with a low-speed (400-600 rpm) drill. Slowly add the entire contents of Component "C" while continuing to mix for 3 minutes until uniform with no lumps. Mix only that quantity that can be applied within its pot life.

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- B. Placement procedure for Bonding bridge:
  - 1. Apply to prepared surface with a stiff-bristle brush, broom or "hopper-type" spray equipment.
    - a. For hand-applied mortars-Place fresh, plastic concrete/mortar while the bonding bridge adhesive is "wet" or within open times indicated in section 2.03.A.2.
    - b. For machine-applied mortars-Apply while the bonding bridge adhesive is "wet" or within the open times indicated in section 2.03.A.2.
- C. Placement procedures for anti-corrosion coating:
  - 1. Apply to prepared steel surface with a stiff-bristle brush, or "hopper type" spray equipment at 20 mils minimum thickness. Properly coat the underside of the totally exposed steel. Allow to dry (approx 2-3 hours) then apply a second coat at 20 mils minimum thickness. Allow drying again before placing repair mortar.

\*During the anti-corrosion coating method, after applying the second coat Sika Armatec 110 EpoCem, a mortar can be applied to "wet" Sika Armatec 110 EpoCem or within open times indicated in section 2.03.A.2 to achieve the benefit of bonding bridge.

- D. Adhere to all limitations and cautions for the epoxy resin/portland cement adhesive in the manufacturer's current printed literature.

3.02 CLEANING

- A. The uncured epoxy resin/portland cement adhesive can be cleaned from tools with water. The cured epoxy resin/portland cement adhesive can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION 03300



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SECTION 03730 - CONCRETE REHABILITATION

PART 1. GENERAL

1.01 SUMMARY

- A. This specification describes the patching or overlay of overhead, vertical and horizontal surfaces with a polymer-modified, portland cement mortar/cement.

1.02 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.03 DELIVERY, STORAGE AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

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1.04 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 45°F (7°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified coating.

1.05 SUBMITTALS

- A. Submit PDF copy of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS).

1.06 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

PART 2. PRODUCTS

2.01 MANUFACTURER

- A. SikaTop 111 Plus, as manufactured by Sika Corporation, is considered to conform to the requirements of this specification.

2.02 MATERIALS

- A. Polymer-modified portland cement mortar:
  - 1. Component A shall be a liquid polymer emulsion of an acrylic copolymer base and additives.
    - a. pH: 4.5-6.5
    - b. Film Forming Temperature: 73°F max.
    - c. Tear Strength: 950-psi min.
    - d. Elongation at Break: 500% min.
    - e. Particle Size: less than 0.1 micron
  - 2. Component A shall contain an organic, penetrating corrosion inhibitor which has been independently proven to reduce corrosion via ASTM G3 (half-cell potential tests). The corrosion inhibitor shall not be calcium nitrite, and shall have a minimum of 5 years of independent field testing to document performance on actual construction projects.

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3. Component B shall be a blend of selected portland cements, specially graded aggregates, admixtures for controlling setting time, water reducers for workability, and an organic accelerator.
  4. The materials shall be non-combustible, both before and after cure.
  5. The materials shall be supplied in a factory-proportioned unit.
  6. The polymer-modified, portland cement mortar must be placeable from ½-in. to 1-in. in depth per lift for horizontal applications.
- B. To prepare a polymer-modified portland cement concrete: aggregate shall conform to ASTM C-33, The factory-proportioned unit shall be extended with 42-lb. max. of a 3/8 in. (No. 8 distribution per ASTM C-33, Table II) clean, well-graded, saturated surface dry aggregate, having low absorption and high density. Aggregate must be approved for use by the engineer.

2.03 PERFORMANCE CRITERIA

- A. Typical Properties of the mixed polymer-modified, portland cement mortar:
1. Working Time: Approximately 30 minutes.
  2. Finishing Time: 50-120 minutes
  3. Color: Concrete gray
- B. Typical Properties of the cured polymer-modified, portland cement mortar:
1. Compressive Strength (ASTM C-109 Modified)
    - a. 1 day: 2500 psi min. (17.2 MPa)
    - b. 7 day: 5500 psi (37.9 MPa)
    - c. 28 day: 7000 psi (48.3 MPa)
  2. Flexural Strength (ASTM C-293) @ 28 days: 1500 psi (10.3 MPa)
  3. Splitting Tensile Strength (ASTM C-496) @28 days 700 psi (4.8 MPa)
  4. Bond Strength (ASTM C-882 Modified) @ 28 days: 2500 psi (17.2 MPa)
  5. The portland cement mortar shall not produce a vapor barrier.
  6. Density (wet mix): 136 lbs./cu. ft. (2.18 kg/l)

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7. Permeability (AASHTO T-277 @ 28 days approximately 500 Coulombs)

Note: Tests above were performed with material and curing conditions at 71°F - 75°F and 45-55% relative humidity.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. Areas to be repaired must be clean, sound, and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Mechanically prepare the concrete substrate to obtain a surface profile of +/- 1/16" (CSP 5 or greater as per ICRI Guidelines) with a new exposed aggregate surface. Area to be patched shall not be less than 1/2" in depth.
- B. Where reinforcing steel with active corrosion is encountered, sandblast the steel to a white metal finish to remove all contaminants and rust. Where corrosion has occurred due to the presence of chlorides, the steel shall be high pressure washed after mechanical cleaning. Prime steel with 2 coats of Sika Armatec 110 EpoCem as directed by manufacturer. (See Spec Component SC-201-0699).

3.02 MIXING AND APPLICATION

- A. Mechanically mix in appropriate sized mortar mixer or with a Sika jiffy paddle and low-speed (400-600 rpm) drill. Pour approximately 4/5 gal Component A into the mixing container. Add Component B while continuing to mix. Mix to a uniform consistency for a maximum of 3 minutes. Add remaining Component A to mix if a more loose consistency is desired. Should smaller quantities be needed, be sure the components are measured in the correct ratio and that the Component B is uniformly blended before mixing the components together. Mix only that amount of material that can be placed in 30 minutes. Do not retemper material.
- B. Mixing of the polymer-modified portland cement concrete: Pour all (1-gal) of Component A into the mixing container. Add Component B while continuing to mix. Add correct amount of the pre-approved coarse aggregate, and continue mixing to a uniform consistency. Mixing time should be 3 minutes maximum.
- C. Placement Procedure: At the time of application, the substrate should be saturated surface dry with no standing water. Mortar and/or concrete must be scrubbed into substrate filling all pores and voids. While the

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scrub coat is still wet, force material against edge of repair, working toward center. If repair area is too large to fill while scrub coat is still wet use Sika Armatec 110 EpoCem in lieu of scrub coat (See Spec Component SC-200). After filling, consolidate, then screed. Allow mortar or concrete to set to desired stiffness, then finish with trowel, manual or power, for smooth surface. Broom or burlap for rough surface. Areas where the depth of the repair is less than 1-inch shall be repaired with polymer-modified portland cement mortar. In areas where the depth of the repair is greater than 1 inch, the repair shall be made with polymer-modified portland cement concrete.

- D. As per ACI recommendations for portland cement concrete, curing is required. Moist cure with wet burlap and polyethylene, a fine mist of water or a water-based\* compatible curing compound. Moist curing should commence immediately after finishing and continue for 48 hours. Protect newly applied material from rain, sun and wind until compressive strength is 70% of the 28-day compressive strength. To prevent from freezing cover with insulating material. Setting time is dependent on temperature and humidity.

\* Pretesting of curing compound is recommended.

- E. Adhere to all procedures, limitations and cautions for the polymer-modified portland cement mortar in the manufacturer's current printed technical data sheet and literature.

3.03 CLEANING

- A. The uncured polymer-modified portland cement mortar can be cleaned from tools with water. The cured polymer-modified portland cement mortar can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION 03730

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SECTION 04100 - MORTAR & GROUT

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification. Refer to Structural Drawings for additional information.

1.02 SECTION INCLUDES

- A. Work included in this section consists of furnishing all labor, materials, equipment, and incidentals required for complete installation of mortar and grout for masonry.
- B. Related work specified elsewhere:
  - 1. Section 04300 "Unit Masonry Work".

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Recommended Practices for Hot and Cold Weather Masonry Construction as published by the Masonry Industry Council.

PART 2. PRODUCTS

2.01 MATERIALS

- A. Portland Cement: ASTM C150, Type 1 provide natural color or white cement as required to provide mortar color indicated.
- B. Mortar Aggregate: ASTM C144, standard masonry type.
- C. Hydrated Lime: ASTM C207, Type 'S', or 'N'.
- D. Masonry Cement: ASTM C91.
- E. Premix Mortar: ASTM C387.
- F. Grout Aggregate: ASTM C404.
- G. Grout Fine Aggregate: ASTM C144, 100% passing #8 sieve, maximum 5-30% passing #50 sieve.

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- H. Water: Clean and potable.
- I. Integral water repellent additive meeting ASTM E-514.
- J. Plasticizer:
  - 1. SIKA Chemical Corporation "Intraplast Z".
  - 2. Euclid Chemical Co. "Eucon BK-S".
- K. Storage of all material shall prevent the intrusion of foreign matter. Store all masonry units on the ground, protected against damage and intrusion of excess moisture. No damaged or deteriorated materials shall be used.

2.02 MORTAR MIXES

- A. Mortar for exterior load bearing walls and all exterior masonry work below grade; ASTM C270, Type 'M' or 'S', using the property method unless noted otherwise on structural drawings. Use ASTM C270 Type 'N' above grade at exterior veneers.
- B. Mortar for interior non-load bearing walls and partitions: ASTM C270, Type 'M' or 'S', using the property method.
- C. Mortar for reinforced masonry ASTM C270, Type 'S', using the property method.
- D. Pointing mortar for masonry veneers ASTM C270, Type 'N', using the property method.
- E. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.

2.03 MORTAR MIXING

- A. Thoroughly mix mortar ingredients in approved type mixing machine in quantities needed for immediate use in accordance with ASTM C270 or C780. Discharge mixer completely before recharging.

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- B. All mortar exposed to moisture shall be fabricated with integral water repellent additive.
- C. Blend admixtures in accordance with manufacturer's instructions.
- D. Do not use anti-freeze compounds to lower the freezing point of mortar.

2.04 GROUT MIXES

- A. Bond beams, lintels, engineered masonry, reinforced masonry walls: min. 3000 psi strength at 28 days unless noted otherwise; 8-10 inches slump; pre-mixed grout in accordance with ASTM C94, or batch mixed in accordance with ASTM C476 for fine or course grout.

PART 3. EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Apply bonding agent to existing concrete surfaces.

3.02 INSTALLATION

- A. Install pre-mix mortar and grout in accordance with manufacturer's instructions.
- B. Work grout into masonry cores and cavities to eliminate voids. Do not displace reinforcement. Reinforcing shall be mechanically anchored in masonry cores to prevent displacement during grouting.

END OF SECTION 04100



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SECTION 04300 - UNIT MASONRY

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification.

1.02 SECTION INCLUDES

- A. Work included in this section consists of furnishing all labor, materials, equipment and incidentals required for new masonry walls and/or patching of concrete masonry resulting from wall removal including tuckpointing and repair or replacement of existing brick, SGFT and/or CMU including installation of reinforcement, anchorage and accessories.
- B. Related work specified elsewhere:
  - 1. Section 04100 - Mortar & grout.

1.03 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following installed compressive strengths (f'm) at 28 days.
  - 1. For concrete Unit Masonry: As follows, based on net area:
    - a. f'm = 1900 psi (13.05 MPa).

1.04 SUBMITTALS

- A. Provide data on concrete masonry units including proposed reinforcing.
- B. Shop drawing for stone trim including cutting and setting diagrams.
- C. If specifically requested by the Architect/Engineer, provide samples for verification as follows.

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1. Full-size units for each different exposed masonry unit required showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
2. Accessories embedded in the masonry.

1.05 QUALITY ASSURANCE

- A. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
- B. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.
- C. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Hot and Cold weather requirements: Recommended Practices for Hot or Cold Weather Masonry Construction as published by the Masonry Industry Council.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not install until they are in an air-dried condition.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location.

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- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

PART 2. PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete block (CMU): ASTM C90, normal weight ( $\geq 125$  pcf). Use for above and below grade, exterior or interior wall applications.
- B. Texture of exposed faces of block shall be uniform for all block used in this project. Solid units may be used for bearing under structural members. No units with exposed chipped surfaces will be permitted in areas where exposed.
- C. Provide shapes such as special units at pilaster blocks, bullnose all external corners, sash recesses, square ends, lintel blocks and other, as required by drawings or specifications.

2.02 REINFORCEMENT AND ANCHORAGE

- A. All single wythe joint reinforcement shall be ladder type wire reinforcing consisting of No. 9 gauge deformed side rods, with No. 9 gauge standard ladder type cross rods. All rods shall be hot-dip galvanized using ASTM A153, Class B-2 standards. Out to out spacing of side rods shall be approximately 2" less than the nominal wall thickness. Provide pre-fabricated corners and tee units as required.
- B. For anchorage to steel framing, provide manufacturer's standard anchors with crimped 1/4 inch (6.4 mm) diameter wire anchor section for welding to steel and triangular-shaped wire tie section sized to extend within 1 inch (25 mm) of masonry face and wire diameter of 0.25". Provide one tie on each side of framing where masonry abuts. Ties to be spaced at 16" o.c. vertical.

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C. Manufacturers:

1. AA Wire Products Co.
2. Dur-O-Wal.
3. National Wire.
4. Hohmann and Barnard, Inc.
5. Wire Bond
6. Other Architect Approved.

D. Reinforcing Steel: ASTM A615, 60-ksi-yield grade deformed steel bars unprotected finish.

2.05 ACCESSORIES

- A. Building Paper: 15# asphalt saturated felt.
- B. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials, recommended by masonry unit manufacturer.
- C. Column Wrap: Waxed corrugated cardboard or 15# asphalt saturated felt.

2.06 LINTELS

- A. Lintels shall be steel, precast or cast-in-place in accordance with details as shown or scheduled on the drawings.

PART 3. EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Verify that field conditions are acceptable and ready to receive work. Examine rough-in and built-in construction to verify locations prior to installation.
- B. Coordinate placement of anchors supplied to other sections.
- C. Employ skilled mechanics, experienced supervision. Lay masonry plumb, true to line, with level, accurately spaced courses. Break vertical joints unless otherwise indicated. Keep bond plumb. Rack courses, where necessary, without toothing. Lay out facing before setting, minimize cutting closures, jumping bond.

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- D. Do not wet concrete masonry. Lay masonry with complete bearing in full beds of mortar. Butter sides for full vertical joints. Shove units into place. Anchor walls not otherwise bonded with ties every 8", every four (4) courses.
- E. Mix units for exposed unit masonry from several pallets as they are placed to provide a uniform blend of colors and textures.

3.02 COURSING

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness. Lay out walls in advance for accurate spacing of openings, movement type joints, returns, etc. Avoid units of less than half size at corners and jambs.
- B. Block unit shall be laid in stack or running bond (match existing in field), unless indicated otherwise on the drawings with vertical joints aligned plumb, horizontal joints level. Joints in back-up work shall be worked out to provide bonding with facing masonry. Joints shall be uniform in width, thickness not to exceed 1/3". Exposed joints in finish work shall be tooled slightly concave, others shall be cut flush.
- C. Initial block course (first course above foundation) in walls (interior or exterior) shall be laid in full mortar beds on shells and cross webs; in other locations, units shall be laid in full mortar beds on shells only. Solid block units shall be laid in a full bed of mortar with full head joints. Vertical joints between units shall be filled with mortar between shell ends.
- D. All non-bearing walls and partitions shall terminate against beams, roof, or structural ceilings, unless otherwise shown on drawings, or as stated below. Build wall to within 3/8" of overhead structure on roof, fill top joint and all voids with non-combustible insulation board which has width of 1" less than wall, then caulk joints.

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- E. Both bearing and non-bearing masonry walls which enclose corridors, storage or mechanical rooms, shops, and other rooms requiring a rated separation from adjacent areas, must have the top joint as well as all voids at roof deck and elsewhere in or over these walls, filled with cement grout, mortar, or plaster bed of at least 2" in width. Where no ceilings occur in the room, said fill shall be troweled flush with the wall surface or surfaces on the exposed side of the wall.
- F. All interior and exterior block walls shall have control joints 20'-0" o.c. maximum for exterior and 25'-0" to 30'-0" at interior walls. Line up control joints with joints in foundation wall and joints in the veneer. Leave exposed faces on joints ready for caulking. Provide vertical reinforcing in grouted core on each side of exterior masonry control joints. Reinforcing to match vertical wall steel.
- G. Bond each course at corners and break vertical joints at least 2". Tee shaped or cross shaped intersecting walls shall have vertical continuous joint. These joints shall be caulked. Provide for continuity of joint reinforcing by providing pre-fabricated "T" shaped or "L" shaped units.
- H. Provide welded steel masonry reinforcing placed in every second horizontal course in all block walls with at least one layer below a window sill level and one layer above a lintel level. Lay reinforcing on wall and cover with mortar, bed unit as usual. Longitudinal wire shall be lapped not less than 32 diameters at splices. At corners, cut inside rod and bend to proper angle.
- I. Construct bond beams as indicated with concrete grout. Maintain accurate location of reinforcing steel during grout placement.
- J. Grout course solid (or use solid units immediately below window and door openings or other locations where masonry serves as a support for a sill.

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- K. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar prior to laying fresh masonry.

3.03 PLACING AND BONDING

- A. Isolate new masonry partitions from vertical structural framing members with a control joint as indicated.
- B. Isolate top joint of new masonry partitions from horizontal structural framing members and slabs or decks with fire rated compressible joint filler.

3.04 REPAIR OF AREAS AND OPENINGS DURING DEMOLITION BY MASON OR OTHERS

- A. All masonry openings sawcut by mason or by demolition work of other trades shall have new masonry units toothed in the existing adjacent masonry units to remain unless noted otherwise on the drawings. This includes all areas under construction or in the area of construction whether shown on the drawings or not.

3.05 REINFORCEMENT & ANCHORAGES - SINGLE WYTHE MASONRY

- A. Walls laid up with concrete block, including where used as back-up shall be reinforced with horizontal steel wall reinforcing as specified. Reinforcing shall be of proper width for block wythe, to have side wires over block shells. Place joint reinforcement at 16" o.c. vertical and continuous in first and second joint below top of walls.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum of 3'-0" beyond each side of opening.
- C. Terminate reinforcing each side of control joints; lap end joints 12", form corners by cutting and lapping inside wire, bending outside wire; form intersections by cutting and lapping reinforcing from one wall with other wall. Bed side wires completely in mortar.

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3.06 GROUTED COMPONENTS

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- B. Place and consolidate grout fill without displacing reinforcing.
- C. At beam bearing locations, fill masonry cores with grout for a minimum 12 inches either side of member and three courses vertical, unless otherwise noted.

3.07 ENGINEERED MASONRY

- A. Lay masonry units with core cells vertically aligned and cavities between wythes clear of mortar and unobstructed.
- B. Reinforce masonry unit cores and cavities with reinforcement bars and grout as indicated. Provide vertical bars in corners. Provide vertical bars at each side of all masonry openings. Vertical bars to continue at noted spacing above openings.
- C. Secure vertical reinforcement in position at top and bottom of cells and at intervals not exceeding 192 bar diameters. Splice reinforcement 48 bar diameters, minimum 12".
- D. Place mortar in masonry unit bed joints back 1/4 inch from edge of unit grout spaces; bevel back and upward. Permit mortar to cure 3 days before placing grout.
- E. Grout spaces less than 2 inches in width with fine grout using low lift grouting techniques. Grout spaces 2 inches or greater in width with coarse grout using high or low lift grouting techniques.
- F. When grouting is stopped for more than one hour, terminate grout 1-1/2 inch below top of upper masonry unit to form a positive key for subsequent grout placement.
- G. Low Lift Grouting: Place first lift of grout to a height of 60 inches maximum and consolidate by mechanical vibration. Place subsequent lifts in maximum 60 inch increments and vibrate grout for consolidation. Ensure



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mortar has gained sufficient strength to withstand pressure prior to grouting. "Puddling" may be used in lieu of mechanical vibration if grout lifts are limited to 12 inches maximum.

3.08 CONTROL AND EXPANSION JOINTS

- A. Do not extend horizontal joint reinforcement through control joints.
- B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the masonry unit. Fill the resultant elliptical core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.
- C. Form control joints where indicated on drawings as detailed.

3.09 BUILT-IN WORK

- A. As Work progresses, build in metal door and glazed frames, fabricated metal frames, borrowed HM frames, wood nailing strips, anchor bolts, plates, and other items to be built in the Work furnished by other Sections.
- B. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

3.10 POINTING AND CLEANING

- A. Point up all exposed existing SGFT, CMU, brick in area of work, fill all holes and joints; remove loose mortar, cut out defective joints, and repoint where necessary.

3.11 TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Variation from Level Coursing: 1/8 inch in 3 ft. and 1/4 inch in 10 ft.; 1/2 inch in 30 ft.

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3.12 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, grounds, and other items. Coordinate with other Sections of Work to provide correct size, shape, and location.
- B. Form slots, grooves, chases, recesses, other items required for other trades. Build in all required structural steel, miscellaneous metal, frame anchors, precast concrete anchors, other items. Bed in mortar to line and level. Check all requirements in advance to eliminate cutting.
- C. Do necessary cutting of masonry for installation of items not otherwise provided for. Patch walls, maintain structural stability, appearance, weather resistance.
- D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.13 REPAIRING, POINTING AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point-up joints, including corners, opening, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.
- C. Remove excess mortar and mortar smears.
- D. Clean soiled surfaces with cleaning solution.

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- E. On completion of pointing and re-pointing of all face brick and block work, interior and exterior, clean thoroughly with "Sure Klean 600", "Craft Klean" or similar prepared detergent, applied strictly according to the manufacturer's instructions with stiff fiber brushes. Drench with clean water immediately after cleaning. Do not use job mixed acid on this project. All cleaning shall be done prior to installation of any finished floor, wall mounted light fixtures, aluminum frames or items subject to damage. Protect hollow metal frames, other built-in items.

3.14 MASONRY WASTE DISPOSAL

- A. Recycling: Undamaged, excess masonry materials are Contractor's property and shall be removed from the Project site for his use.

END OF SECTION

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SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification.

1.02 SECTION INCLUDES

- A. Work included in this Section consists of furnishing all labor, materials, equipment and incidentals required for complete installation of all load and non-load bearing exterior structural steel studs, interior structural steel studs where indicated and joist framing, fasteners and accessories. Refer to Section 09250 for lightweight metal framing and furring. Refer to Structural Drawings for additional information.
- B. Related work specified elsewhere:
  - 1. Section 06100 - Rough Carpentry

1.03 SYSTEM DESCRIPTION

- A. Size components to withstand design live and dead loads per design drawings or as follows:
  - 1. Vertical Assembly: Exterior, 30 PSF (wind load) positive or negative; Interior 5 PSF positive or negative.
  - 2. Horizontal Assembly: 40 PSF live load.
- B. Maximum allowable deflection: Per Structural Drawings or 1/360 of span.
- C. Design wall system to provide for movement of components without damage. Contribution from sheathing shall not be considered for lateral deflection.

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- D. Design system to accommodate construction tolerances, deflection of building structural members, including metal deck and clearances of intended openings.

1.04 SUBMITTALS

- A. Shop Drawings: Indicate component details, framed openings, bearing required, loading, welds, type and location of fasteners and describe framing connections.
- B. Provide stud and joist layout.
- C. Product Data: Describe materials and finish, product criteria, and limitations.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this project and with a record of successful in-service performance, and who is a current member in good standing of the Steel Stud Manufacturer's Association (SSMA).
- B. AISI - American Iron and Steel Institute, Cold-Formed Steel Design Manual.
- C. ASTM A446 - Steel Sheet, Zinc Coated (Galvanized) by Hot-Dip Process, Physical (Structural) Quality.
- D. ASTM A525 - Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process.
- E. ASTM A570 - Hot-Rolled Carbon Steel Sheet and Strip Structural Quality.
- F. ASTM A611 - Steel, Cold-Rolled Sheet, Carbon, Structural.
- G. ASTM C955 - Load Bearing (Transverse and Axial) Steel Studs, Runners (Track) and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases.

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- H. AWCI (Association of Wall & Ceiling Industries) - Specification Guide for Cold-Formed Structural Members.
- I. AWS D1.1 - Structural Welding Code - steel.
- J. AWS D1.3 - Structural welding code - Sheet Steel.
- K. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
- L. MFMA (Metal Framing Manufacturers Association) - Guidelines for the Use of Metal Framing.

PART 2. PRODUCTS

2.01 FRAMING MATERIALS

A. Manufacturers

- 1. Clark Dietrich Building Systems
- 2. Jaimes Industries, Inc.
- 3. Marino/Ware
- 4. Other Architect approved current member in good standing of the SSMA.

B. Studs: ASTM A653, sheet steel 'C' channel shape, solid web, minimum 18-gage unless noted otherwise; (minimum 16-gage for studs serving as backup for brick veneer), size as noted on drawings, galvanized to G-90 coating class, complying with ASTM C955. Yield strength of 33,000 psi minimum. 22-gage studs are acceptable for interior applications unless noted otherwise.

C. Joists: ASTM A653, Grade 33, sheet steel 'C' channel shape, solid web, 18-gage or size as noted on drawings, galvanized to G-90 coating class.

D. Stud Track: Formed steel, channel shaped; same width and gage as stud, solid web, galvanized to G-90 coating class, complying with ASTM C955.

2.02 ACCESSORIES

A. Bracing, Furring, Bridging, Plates, Gussets, Kickers, Stiffeners, Clips: Formed steel, thickness, same as stud

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or determined for conditions encountered; same finish as framing members.

- B. Screws: ASTM A123, hot dip galvanized to 1.25-oz./sq. ft., self-drilling, self-tapping, #10 screws (minimum).
- C. Anchorage Devices: Power driven, power actuated or drilled expansion joint as required relative to substrate.
- D. Welding: In accordance with AWS D1.1 or D1.3.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 with dry film containing minimum of 94 percent zinc dust by weight.

2.03 FABRICATION

- A. Fabricate assemblies of sizes and profiles required; with framing members fitted, reinforced and braced.
- B. Fit and assemble in largest practical sections for delivery to site, ready for installation.
- C. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or distortion.

PART 3. EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Verify that substrate surfaces and building framing components are ready to receive work.
- B. Beginning of installation means acceptance of existing conditions and substrate.

3.02 ERECTION OF STUDDING

- A. Install components in accordance with manufacturer's instructions.

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- B. Align top and bottom tracks; locate to wall layout. Secure with fasteners at maximum 24-inches o.c.
- C. Place studs at 16-inches o.c. unless noted otherwise on drawings; not more than 2-inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method. Wire tying of framing members is not permitted.
- D. Construct corners using minimum three studs. Double stud each wall opening, door, and window jamb. Install intermediate studs above and below openings to match wall stud spacing.
- E. Erect load bearing studs one-piece full length. Splicing of studs is not permitted.
- F. Allow for deflection, directly below horizontal building framing, metal decking, etc., for non-load bearing framing.
- G. Attach cross studs and furring channels to studs for attachment of fixtures anchored to walls and for attachment of mechanical and electrical items within walls.
- H. Touch-up field welds and damaged prefinished surfaces with primer.
- I. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- J. Coordinate installation of all wood blocking for installation of items supplied by other trades.
- K. Coordinate installation of all framing to accommodate openings required by architectural, mechanical and electrical trades.

3.03 ERECTION OF JOISTS

- A. Install components in accordance with manufacturer's instructions.



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- B. Make provisions for erection stresses. Provide temporary alignment and bracing.
- C. Place joists at 16-inches o.c. unless noted otherwise on drawings; position not more than 2-inches from abutting walls. Connect joists to supports using fastener method. Fasten joists to both flanges of joist track.
- D. Set joists parallel with lateral bracing and bridging.
- E. Locate joist end bearing directly over load bearing studs or provide load-distributing member to top of stud track.
- F. Provide web stiffeners at reaction points.
- G. Touch up field welds and damaged prefinished surfaces with primer.

3.04 TOLERANCES

- A. Maximum variation from true position: 1/4-inch.
- B. Maximum variation of any member from plane: 1/4 inch.

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SECTION 05500 - METAL FABRICATIONS

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification.

1.02 SECTION INCLUDES

- A. Work included in this section consists of furnishing all labor, materials, equipment and incidentals required for complete installation of miscellaneous metal work shown on the drawings, as specified herein, and/or as needed for a complete and proper installation whether shown or not.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. Perform shop and/or field welding required in connection with the work of this Section in strict accordance with pertinent recommendations of the American Welding Society.
- C. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the work.
- D. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel," AWS D1.2 "Structural Welding Code-Aluminum," and AWS D1.3 "Structural Welding Code-Sheet Steel."
  - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

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1.04 SUBMITTALS

- A. Comply with pertinent provisions of Division 1.
- B. Product Data: Within thirty five (35) calendar days after the contractor has received the Owner's Notice to Proceed, submit:
  - 1. Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this section with the work of adjacent trades. Provide templates for anchors and bolts specified for installation under other sections.

1.05 PROJECT CONDITIONS

- A. Field Measurements: Check Actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
  - 1. Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2. PRODUCTS

2.01 MATERIALS

- A. In fabricating items which will be exposed to view, limit materials to those which are free from surface blemishes, pitting, rolled trade names, and roughness.
- B. Comply with following standards as pertinent:
  - 1. Steel plates, shapes and bars: ASTM A36.
  - 2. Steel plates to be bent or cold-formed: ASTM A283, Grade C.

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3. Steel tubing (hot-formed, welded, or seamless): ASTM A501 or ASTM A500.
4. Cold-finished steel bars: ASTM A108.
5. Cold-rolled carbon steel sheets: ASTM A336.
6. Galvanized carbon steel sheets: ASTM A526, with G90 zinc coating in accordance with ASTM A525.
7. Steel pipe: ASTM A53, Grade B, standard weight, black finish unless otherwise noted.
8. For exterior installations and where indicated, provide members with hot-dip galvanizing coat per ASTM A53.
9. Concrete inserts:
  - a. Threaded or wedge type galvanized ferrous castings of malleable iron complying with ASTM A27.
  - b. Provide required bolts, shims, and washers, hot-dip galvanized in accordance with ASTM A153.

2.02 FASTENERS

A. General:

1. For exterior use and where built into exterior walls, provide zinc-coated fasteners.
2. Provide fasteners of type, grade, and class required for the particular use.

B. Comply with following standards as pertinent:

1. Bolts and nuts: Provide hexagon-head regular type complying with ASTM A307, Grade A.
2. Lag bolts: Provide square-head type complying with Fed. Spec. FF-B-561.
3. Machine screws: Provide cadmium plated steel type complying with Fed. Spec. FF-S-111.
4. Washers:
  - a. Plain washers: Comply with Fed. Spec. FF-W-92, round, carbon steel.
  - b. Lock washers: Comply with Fed. Spec. FF-W-84, helical spring type carbon steel.
5. Toggle bolts: Provide type, class and style needed but complying with Fed. Spec. FF-B-588.
6. Anchorage devices: Provide expansion shield complying with Fed. Spec. FF-S-325.

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2.03 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by contractor subject to the approval of the Architect.

2.04 SHOP PAINT

- A. Primer: Use "10-99 Tnemec Primer" or Architect/Engineered equal product by Rustoleum.
- B. For repair of galvanizing, use a high zinc-dust content paint complying with SSPC-paint 20. Dry film containing not less than 94 percent zinc dust by weight.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.05 FABRICATION

- A. Except as otherwise shown on the drawings or the approved shop drawings, use materials of size, thickness, and type required to produce reasonable strength and durability in the work of this Section.
- B. Fabricate with accurate angles and surfaces which are true to the required lines and levels, grinding exposed welds smooth and flush, forming exposed connections with hairline joints, and using concealed fasteners wherever possible.
- C. Prior to shop painting or priming, properly clean metal surfaces as required for the applied finish and for the proposed use of the items.
- D. On surfaces inaccessible after assembly or erection, apply two coats of the specified primer. Change color of second coat to distinguish it from the first.
- E. Shear and punch metals cleanly and accurately. Remove burrs.
- F. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

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- G. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

2.06 MISCELLANEOUS METAL FABRICATIONS

A. Rough Hardware:

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork and for anchoring or securing woodwork to concrete or other structures.
2. Manufacture or fabricate items of sizes, shapes, and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

B. Loose Bearing and Leveling Plates:

1. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

C. Loose Steel Lintels:

1. Provide loose structural steel lintels for opening and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than 8" bearing at each side of openings, unless otherwise shown.
2. Size lintels as follows, unless otherwise indicated.
  - a. Up to 4'-0" span: One 3 1/2" x 4" x 5/16" steel angle supporting each 4" thick module of masonry.
  - b. Spans 4'-0" to 7'-0": One 5" x 3-1/2" x 5/16" steel angle supporting each 4" thick module of masonry.
  - c. Over 7'-0": Consult Architect if not indicated.

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3. Hot dip galvanized loose steel lintels to be installed in exterior walls.

D. Miscellaneous Framing and Supports:

1. Provide miscellaneous steel framing and supports as required to complete work.
2. Fabricate miscellaneous units to sizes, shapes, and profiles shown or, if not shown, or required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes, plates, and steel bars of welded construction using metered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
3. Hot dip galvanize exterior miscellaneous frames and supports.

PART 3. EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this section will be performed and notify the General Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

A. General:

1. Set work accurately into position, plumb, level, true and free from rack.
2. Anchor firmly into position.

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3. Where field welding is required, comply with AWS recommended procedures of manual-shielded metal-arc welding for appearance and quality of weld and for methods to be used in correcting welding work.
  4. Grind exposed welds smooth and touch up shop prime coats.
  5. Do not cut, weld, or abrade surfaces which have been hot-dip galvanized after fabrication and which are intended for bolted or screwed field connections.
- B. Immediately after erection, clean the field welds, bolted connections and abraded areas of shop priming. Paint the exposed areas with same material used for shop priming.

END OF SECTION 05500



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SECTION 06100 - CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of the carpentry work is shown on the Drawings.

1.03 QUALITY ASSURANCE:

- A. Lumber Standard: Comply with U.S. Department of Commerce Product Voluntary Standards PS 1-07, "Structural Plywood", PS 2-04 Performance Standard for "Wood based structural use panels" and PS 20-05 American Softwood Lumber Standard, except as otherwise indicated.
- B. Factory mark each piece of lumber and plywood with type, grade, mill, and grading agency: West Coast Lumber Assoc. (WBLC) or Western Wood Products Association (WWPA).

1.04 SUBMITTALS:

A. Wood Treatment Data:

- 1. Submit treatment manufacturer's instructions for proper use of each type of treated material.
  - a. Pressure Treatment: For each type specified, include certification by treating plant stating chemicals and process used, net amount of preservative retained, and conformance with applicable standards.
  - b. For water-borne preservatives, include statement that moisture content of treated materials was reduced to a maximum of 15% prior to shipment to project site.

B. Product Data:

- 1. Submit manufacturer's specifications and other data for each carpentry anchorage, fastening, and miscellaneous material. Provide material certificates for all lumber and plywood. Transmit a copy of each instruction to the Installer.

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1.05 PRODUCT HANDLING:

- A. Delivery and Storage: Keep materials dry during delivery and storage. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood and provide air circulation within stacks.

1.06 JOB CONDITIONS:

- A. Coordination: Fit carpentry work to other work, scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow proper attachment of other work.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Lumber - General:

- 1. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20-05, for the moisture content specified for each use. Use dressed lumber, surfaced four sides (SFS) seasoned with 19% maximum moisture content at time of dressing.

B. Framing Lumber (2" through 4" thick):

- 1. For light framing (less than 6" wide), provide Construction Grade Douglas Fir as graded by the West Coast Lumber Bureau (WCLB) or equivalent species and grade with minimum fiber stress rating (bending) of 1000 psi (Fb), and modulus of elasticity of 1,500,000 psi.
- 2. For structural framing (6" and wider and from 2" to 4" thick) provide dense No. 1 Grade Douglas Fir as graded by the West Coast Lumber Bureau (WCLB) or equivalent species and grade with minimum fiber stress rating (bending) of 1500 psi (Fb), and modulus of elasticity of 1,700,000 psi.

C. Boards (less than 2" thick):

- 1. Produce lumber of 19% maximum moisture content (S-DRY) and of the following species and grade.
  - a. Redwood Construction Common (RIS).
  - b. Southern Pine No. 2 Boards (SPIB).
  - c. Or any species graded construction Boards (WCLB or WWPA).

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D. Plywood:

1. Provide only Douglas Fir Plywood in accordance with grading requirements of the APA - The Engineered Wood Association as follows:
  - a. Treated non-combustible AC standard with exterior glue.

E. Anchorage and fastening Materials:

1. Select proper type, size, material, and finish for each application. Comply with the following:
  - a. Nails and Staples: FS FF-N-105.
  - b. Wood Screws: FS FF-S-111.
  - c. Bolts and Studs: FS FF-B-575.
  - d. Nuts: FS FF-N-836.
  - e. Washers: FS FF-W-92.
  - f. Lag Screws or Lag Bolts: FS FF-B-561.
  - g. Masonry Anchoring Devices: For expansion shields, nails, and drive screws, comply with FS FF-S-325.
  - h. Toggle Bolts: FS FF-B-588.
  - i. Bar or Strap Anchors: ASTM A 575 carbon steel bars.

2.02 WOOD TREATMENT:

- A. Preservation Treatment: Where lumber or plywood is indicated as "Treated" or is specified herein to be treated, comply with the applicable requirements of the American Wood Preservers Association (AWPA) AWPA P23-08, ASTM D-1625 and Federal Specification TT-W-50.
- B. Pressure-treat above-ground items with water-borne preservatives complying with AWPA P5-09, ASTM D-1760, and Federal Specification TT-W-571. After treatment, kiln-dry to a maximum moisture content of 19%. Treat indicated items and the following, except where fire retardant treated.

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1. Wood cants, nailers, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing members less than 12 inches above grade excepting timber.

C. Fire Retardant Treated:

1. Wood blocking and similar items installed within the building shall be pressure impregnation with retardant chemicals to achieve a flame spread rating of not more than 25 when tested in accordance with UL Test 723, ASTM E 84, or NFPA Test 355.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed and notify the General Contractor, in writing, of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 INSTALLATION:

A. General:

1. Discard units of material with defects which might impair the quality of the work, and units which are too small to fabricate the work with minimum joints or the optimum joint arrangement.
2. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
3. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required. Provide washers under bolt heads and nuts in contact with wood. Nail plywood in accordance with the recommendations of APA-The Engineered Wood Association.

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4. Use common wire nails, except as otherwise shown or specified herein. Use finishing nails for exposed work. Do not wax or lubricate fasteners that depend on friction for holding power. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required. Do not drive threaded friction type fasteners; turn into place. Tighten bolts and lag screws at installation and retighten as required for tight connections prior to closing in or at completion of work.

B. Wood Grounds, Nailers, Blocking and Sleepers:

1. Provide wherever shown and where required for screening or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
2. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to form work before concrete placement.
3. Provide permanent grounds of dressed, pressure preservative treated key-bevelled lumber not less than 1-1/2" wide and of the thickness required to bring face of ground to exact thickness of finished material involved. Remove temporary grounds when no longer required.

C. Wood Furring:

1. Install plumb and level with closure strips at all edges and openings. Shim with wood as required for tolerance of finished work.

D. Wood Framing:

1. Provide framing members of sizes and on spacings shown and frame openings as shown, or if not shown, comply with recommendations of "The Wood Frame Construction Manual" 2001 Ed. of the American Wood Council. Do not splice structural members between supports.

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2. Anchor and nail as shown, and comply with the  
"Recommended Nailing Schedule - Table I of the Manual  
for Housing Framing: and other recommendations of the  
N.F.P.A.

E. Installation of Plywood:

1. Comply with recommendations of the Engineered Wood  
Association (APA) for the installation of plywood.

END OF SECTION 06100

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SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Plastic laminate countertops/workstation (not associated with pre-manufactured laboratory metal casework cabinets).
- B. Related Sections: The following sections contain requirements that relate to this section:
  - 1. Division 6 Section 06100 "Carpentry" for furring, blocking, and other carpentry work that is not exposed to view.
  - 2. Division 8 Section 08210 "Flush Wood Doors" for doors specified by reference to architectural woodwork standards.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Specification Sections 01340 "Shop Drawings, Product Data & Samples".
- B. Product data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Fire-retardant treatment data for material impregnated by pressure process to reduce combustibility. Include certification by treating plant that treated materials comply with requirements.
- D. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

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1. Plastic laminate.
2. Factory-applied opaque finishes.

E. Samples for verification purposes of the following:

1. Lumber with or for transparent finish, 50 square inches, for each species and cut, finished on one side and one edge.
2. Veneer leaves representative of and selected from flitches to be used for transparent finished woodwork.
3. Lumber and panel products with factory-applied opaque finish, 8- 1/2 inches by 11 inches for panels and 50 square inches for lumber, for each finish system and color, with one half of exposed surface finished.
4. Laminate clad panel products, 8-1/2 inches, by 11 inches for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.

F. Product certificates signed by woodwork manufacturer certifying that products comply with specified requirements.

G. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm experienced in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Single-Source Responsibility: Arrange for production by a single firm of architectural woodwork with sequence matched wood veneers.
- C. Single-Source Manufacturing and Installation Responsibility: Engage a qualified Manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication, finishing, and installation.



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- D. Installer Qualifications: Arrange for installation of architectural woodwork by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this project.
- E. AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI) except as otherwise indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.
- B. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Obtain and comply with Woodwork Manufacturer's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.
- B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.
  - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with manufacture of woodwork without field measurements. Coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

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PART 2 - PRODUCTS

2.1 HIGH PRESSURE DECORATIVE LAMINATE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high pressure decorative laminates which may be incorporated in the work include but are not limited to the following:
- B. Manufacturer: Subject to compliance with requirements, provide high pressure decorative laminates of one of the following:
  - 1. Formica Corp.
  - 2. Laminart.
  - 3. Nevamar Corp.
  - 4. Wilsonart International
  - 5. Arborite - Div. of ITW Canada

2.2 MATERIALS

- A. General: Provide materials that comply with requirements of the AWI woodworking standard for each type of woodwork and quality grade indicated and, where the following products are part of woodwork, with requirements of the referenced product standards, that apply to product characteristics indicated:
  - 1. Hardboard: ANSI/AHA A135.4
  - 2. High Pressure Laminate: NEMA LD 3-2005.
    - a. Fire rated laminate: ASTM E84/UL723 and NEMA LD3-2005.
  - 3. Medium Density Fiberboard: ANSI A208.2.
  - 4. Particleboard: ANSI A208.1
  - 5. Softwood Plywood: PS 1.
  - 6. Formaldehyde Emission Levels: Comply with formaldehyde emission requirements of each voluntary standard referenced below:
    - a. Particleboard: NPA 8.
    - b. Medium Density Fiberboard: NPA 9.
    - c. Hardwood Plywood: HPM FE.

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- B. Fire-Retardant Particleboard: Where indicated, provide panels complying with the following requirements that have fire-retardant chemicals bonded to softwood particles at time of panel manufacture to achieve products identical to those tested for flame spread of 20 or less and for smoke developed of 25 or less per ASTM E 84 by UL or other testing and inspecting organization acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.
1. For 45-lb-density panels and thicknesses of 3/4 inch and less, comply with ANSI A208.1 for Grade 1-M-1 except that minimums for modulus of elasticity and screw-holding capacity on face and edge shall be 300,000 psi, 250 lb, and 225 lb, respectively.
  2. For 44-lb-density panels and thicknesses of 13/16 inch to 1-1/4 inch, comply with ANSI A208.1 for Grade 1-M-1 except that minimums for modulus of rupture, modulus of elasticity, internal bond, linear expansion, and screw-holding capacity on face and edge shall be 1300 psi, 250,000 psi, 60 psi, 0.50 percent, 250 lb, and 175 lb, respectively.
  3. Product: Subject to compliance with requirements, provide "Duraflake FR" by Duraflake Div.; Willamette Industries, Inc.

2.3 FABRICATION, GENERAL

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber in relation to relative humidity conditions existing during time of fabrication and in installation areas.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
  1. Edges of solid wood (lumber) members less than 1 inch in nominal thickness: 1/8 inch.
- C. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

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- D. Factory-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges of cutouts with a water-resistant coating.

2.4 FIRE-RETARDANT-TREATED LUMBER

- A. Low-Hygroscopic Formulation: Interior Type A per AWPA C20.
- B. Fire Performance Characteristics: Provide materials identical to those tested for the following fire performance characteristics per ASTM test methods indicated by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify treated lumber with classification marking of inspecting and testing organization in the form of separable paper label or, where required by authorities having jurisdiction, of imprint on lumber surfaces that will be concealed from view after installation.
  - 1. Surface Burning Characteristics: Not exceeding values indicated below, tested per ASTM E 84 for 30 minutes with no evidence of significant combustion.
    - a. Flame Spread: 25.
    - b. Smoke Developed: 50.
- C. Mill lumber after treatment, within limits set for wood removal that does not affect listed fire performance characteristics, using a woodworking plant certified by testing and inspecting organization.
- D. Kiln-dry woodwork after treatment to levels required for untreated woodwork. Maintain moisture content required by kiln drying before and after treatment.
- E. Discard treated lumber that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective lumber.
- F. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include but are not limited to the following:

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1. Koppers Company, Inc.
2. Osmose Wood Preserving, Inc.

2.5 ARCHITECTURAL CABINET TOPS (PLASTIC LAMINATE)

- A. Quality Standard: Comply with AWI Section 400 and its Division 400C.
- B. Type of Top: Solid surface complying with the following:
  1. Grade: Custom.
  2. Horizontal Surface:
    - a. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of solid surfaces complying with the following requirements:
      - 1) Match Architect's sample.
  3. Edge Treatment: 180 degrees

2.6 FASTENERS AND ANCHORS

- A. Screws: Select material, type, size, and finish required for each use. Comply with FS FF-S-111 for applicable requirements.
  4. For metal framing supports, provide screws as recommended by metal framing manufacturer.
- B. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
- C. Anchors: Select material, type, size, and finish required by each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.

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PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.
- C. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for same grade specified in Part 2 of this section for type of woodwork involved.
- B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 8'-0" for plumb and level (including tops) and with no variations in flushness of adjoining surfaces.
- C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer including those for adhesives where are used to install woodwork.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.
- F. Tops: Anchor securely to base units and other support systems as indicated.

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- G. Complete the finishing work specified in this section to whatever extent not completed at shop or before installation of woodwork.

3.3 ADJUSTMENT AND CLEANING

- A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean woodwork on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensures that woodwork is being without damage or deterioration at time of Substantial Completion.

3.5 HARDWARE SCHEDULE

- A. Grommets: Mockett 3" o.d. Black: MQEDP3BK with flip top tab. Provide (1) grommet for each work station. (Work station defined as countertop space between plastic laminate supports)
  - 1. Quantity ten (10). Field locate per Owner's direction.

END OF SECTION 06402

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SECTION 07200 - INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of thermal insulation work is shown on the drawings.
- B. The applications of thermal insulation specified in this section include the following:
  - 1. Board-type building insulation.
  - 2. Miscellaneous insulation.
- C. Related Work Specified Elsewhere:
  - 1. Section 07840 - Firestopping: For safing insulation
  - 2. Section 09250 - Gypsum Board: Acoustical batt insulation
  - 3. Division 21 - Fire Suppression
  - 4. Division 22 - Plumbing
  - 5. Division 23 - HVAC
  - 6. Division 26 - Electrical

1.03 QUALITY ASSURANCE:

- A. Thermal Conductivity: The thickness shown are for the thermal conductivity (k-value at 75%) specified for each material. Provide adjusted thicknesses as directed for the equivalent use of material having a different thermal conductivity.
- B. Fire Ratings: Comply with the fire-resistance and flammability ratings indicated, and comply with governing regulations as interpreted by authorities including:
  - 1. UL requirements for "Roof Deck Constructions" which are rated "Fire-Acceptable".



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1.04 SUBMITTALS:

A. Product Data:

1. Submit manufacturer's specifications and installation instructions for each type of insulation required. Include data substantiating that materials comply with specified requirements.

1.05 PRODUCT HANDLING:

- A. Protection from Deterioration: Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation. Protect plastic insulation from exposure to sunlight.
- B. Fire Hazard: Do not deliver plastic insulating materials to the project site ahead of installation time. Protect at all times against ignition. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 2, Grade 3, HCFC-free, glass-fiber mat facer on both major surfaces.
  1. Thickness: 2 layers on steel deck: both layers 2.5".
    - a. Atlas: AC foam II or architect approved equal.
  2. Miscellaneous Insulation: Shall be inorganic (nonasbestos) mineral wool insulation without facing, for the purpose of filling and stuffing openings in walls around pipes, structural components, windows, conduits, expansion joints to eliminate noise transfer and to insulate. Use to seal top of interior walls, except fire rated walls, between masonry and roof deck, where indicated. Use at expansion joints as detailed. Insulation shall have a flame spread rating of 15 or less, and a smoke development rating of 0; per ASTM E84.

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2.02 AUXILIARY INSULATING MATERIALS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated, securely in position indicated with self-locking washer in place; and complying with the following requirements:
1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches in diameter, length to suit depth of insulation indicated.
  3. Insulation-Retaining Washers: Self-locking washers formed from 0.016 inch thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
    - a. Where spindles will be exposed to human contact after installation, protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.
  4. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates.
  5. Products: Subject to compliance with requirements, provide one of the following:
    - a. Adhesively attached, spindle type anchors
      1. TACTOO Insul-Hangers; AGM Industries, Inc. Canton, MA
      2. Spindle Type Gemco Hangers; Gemco, Danville, IL
    - b. Insulation - Retaining Washers
      1. RC150; AGM Industries Inc, Canton, MA
      2. R150; Gemco, Danville, IL
    - c. Adhesive
      1. TACTOO Adhesive; AGM Industries, Inc. Canton, MA
      2. Tuff Bond Hanger Adhesive; Gemco, Danville, IL

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PART 3 - EXECUTION

3.01 INSPECTION:

- A. The Installer must examine the substrate and conditions under which the insulation work is to be performed, and notify the General Contractor in writing of unsatisfactory conditions. Do not proceed with the insulation work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSULATION:

A. General:

1. Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.
2. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.
3. Apply a single layer of insulation of the required thickness unless otherwise shown or required to make up the total thickness.

B. General Building Insulation:

1. Apply insulation units to the substrate by the method indicated, complying with the manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage, to provide permanent placement and support of units.
2. Set vapor barrier faced units with vapor barrier to warm side of construction, except as otherwise shown. Do not obstruct ventilation spaces, except for firestopping.
  - a. Tape joints and ruptures in vapor barriers, using adhesive tape of type recommended by insulation manufacturer, and seal each continuous area of insulation to surrounding construction so as to ensure vapor-tight installation of the units.

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3. Stuff loose mineral fiber insulation into miscellaneous voids and cavity spaces as indicated. Compact to approximately 40% of normal maximum volume (to a density of approximately 2.5 lbs. per cu. ft.).

END OF SECTION 07200

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SECTION 07810 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Intumescent paint fireproofing for structural steel.
2. Topcoat protective decorative finish.

B. Related Requirements:

1. Section 07840 - Firestopping: Products for closing openings and penetrations through fire-rated construction.

1.2 REFERENCE STANDARDS

A. Association of the Wall and Ceiling Industry:

1. AWCI 12-B - Standard Practice for the Testing and Inspection of Field Applied Thin Film Intumescent Fire-Resistive Materials.

B. Test Standards and Practices:

1. ANSI/UL 263 (ASTM E119) - Fire Tests of Building Construction and Materials
2. ASTM E84 (UL723, CAN/ULC-S102) - Surface Burning Characteristics of Building Materials. Flame Spread Maximum: 5 and Smoke Developed Maximum: 35
3. ASTM D2240 - Durometer Hardness (Shore D only) Minimum: 67 Shore D
4. ASTM D2794 - Impact Resistance. Intrusion minimum: 152 inch-lb. (17.17 Nm)
5. ASTM D4060 - Abrasion Resistance. Maximum 0.2600 grams/1000 cycles
6. ASTM D4541 - Bond Strength. Minum: 340 psi (2344 k Pa.)
7. ASTM E2924 - Standard Practice for Intumescent Coatings

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- C. Steel Structures Painting Council (SSPC) Surface Preparation Standards
- D. Material manufacturer's current published information including, but not limited to, application guide.
- E. U.L.
  - a. U.L. - Fire Resistance Directory

1.3 COORDINATION

- A. Section 01310 "Construction Schedules" and 01200 "Project Meetings" - Administrative Requirements: Requirements for coordination.

1.4 PREINSTALLATION MEETINGS

- A. Section 0200 "Project Meetings" Administrative Requirements: Requirements for preinstallation meeting.
- B. Convene minimum **one week** prior to commencing Work of this Section.

1.5 SEQUENCING

- A. Section 01200 "Project Meetings" - Summary: Requirements for sequencing.
- B. Sequence Work in conjunction with placement of **electrical components**.
- C. Do not apply spray-on fireproofing to underside of roof deck until roofing is completely installed and weathertight, penthouses are complete, rooftop mechanical units have been placed, and construction roof traffic has ceased.

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1.6 SUBMITTALS

- A. Section 01340 - "Shop Drawings, Product Data and Samples"  
- Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information indicating product characteristics, performance criteria, and limitations of use.
- C. Shop Drawings: Indicate types of fireproofing and fire-resistance ratings for floor, roof, and frame components.
- D. Samples: Submit **two** samples of **intumescent** fireproofing materials on each specified substrate, 3" x 3" in size, illustrating finished appearance of each fireproofed surface.
- E. Manufacturer's Certificates:
  - 1. Certify that applied fireproofing products meet or exceed specified requirements.
  - 2. Certify that applied fireproofing products contain no asbestos or other finely divided particulate matter that can be released as an airborne health hazard during or after application.
- F. Test and Evaluation Reports:
  - 1. Indicate following:
    - a. Compressive Strength: ASTM E761.
    - b. Dry Density: ASTM E605.
    - c. Bond Strength of Fireproofing: ASTM E736.
    - d. Bond Impact: ASTM E760.
    - e. Fire test reports of fireproofing application to substrate materials, including primers, similar to Project conditions, conducted according to ASTM E84 and ASTM E119.
    - f. Conformance to selected fire-rated assemblies by specified testing agency.
    - g. Air Erosion: ASTM E859.
    - h. Corrosion: ASTM E937.
    - i. Mold Resistance: ASTM C665 or ASTM G21.

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2. Intumescent Paint Fireproofing Systems Test Reports: Submit fire test reports of fireproofing application to substrate materials, including primers, similar to Project conditions and conducted according to ASTM E84 and ASTM E119.
  - G. Manufacturer Instructions: Submit information including special procedures and conditions requiring special attention.
  - H. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
  - I. Manufacturer Reports:
    1. Document field observations and environmental conditions under which fireproofing materials were applied.
    2. Certify that products have been applied according to manufacturer instructions.
  - J. Qualifications Statements:
    1. Submit qualifications for manufacturer and applicator.
    2. Submit manufacturer's approval of applicator.
  - K. Product shall possess a DECLARE label.
- 1.7 QUALITY ASSURANCE
- A. Fireproofing Assembly:
    1. 3 hour for primary structural frame and 1 ½ hour for roof construction and associated secondary members.
    2. Tested Rating: Determined according to ASTM E119.
  - B. Surface-Burning Characteristics: Maximum 0/20 flame-spread/smoke-developed index when tested according to ASTM E84.
  - C. Perform Work according to ASTM and AWCI standards.



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- D. Maintain one **copy** of each standard affecting Work of this Section on Site.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum **three** years' **documented** experience, and listed or meeting requirements of specified fire-resistance **assemblies**.
- B. Applicator: Company specializing in performing Work of this Section with minimum **three** years **documented** experience **and approved by manufacturer**.
- C. Independent Testing Laboratory: Submit documentation as specified in Section 01400 "Quality Control" - Quality Requirements.

1.9 MOCKUPS

- A. Section 01400 - Quality Requirements: Requirements for mockup.
- B. Size: Construct mockup, 36" **long by width of structural joist/beam**.
- C. Comply with Project requirements for fire ratings and density of application.
- D. Variances:
  - 1. Examine installation within one hour of application to determine variances from specified requirements due to shrinkage, temperature, and humidity.
  - 2. If shrinkage and cracking are evident, adjust mixture and method of application as necessary.
  - 3. Remove materials and reconstruct mockup.
- E. **Require presence of manufacturer's representative knowledgeable in application of fire protection during installation of mockup.**

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- F. Locate where **directed by Architect/Engineer.**
- G. Incorporate accepted mockup as part of Work.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - "Materials and Equipment" Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
  - 1. Deliver materials to the project in manufacturers unopened packages, fully identified as to trade name, type and other identifying data. Packaged materials shall bear the appropriate labels, seals and UL label (mark) for fire resistive ratings and shall be stored at temperatures in compliance with manufacturer instructions in a dry interior location away from direct sunlight. DO NOT FREEZE.
- D. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Provide additional protection according to manufacturer instructions.

1.11 AMBIENT CONDITIONS

- A. Section 01500 "Temporary Facilities": Requirements for ambient condition control facilities for product storage and installation.
- B. Minimum Conditions: Maintain ambient and substrate temperature of 50 deg. F during and for minimum 24 hours before, during, and after application of fireproofing, unless otherwise recommended by manufacturer.

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- C. Relative humidity shall not exceed 85% throughout the total period of application and drying for the intumescent fire resistive material, and must not exceed 85% throughout the application and drying for the protective decorative topcoat.
- D. Provide ventilation in areas to receive fireproofing during application, for minimum of 24 hours afterward, and until applied materials reach fully dried state.
  - 1. In enclosed areas, ventilation shall not be less than 4 complete air exchanges per hour until the material is dry.

1.12 WARRANTY

- A. Section 01700 "Project Closeout" Closeout Requirements: Requirements for warranties.
- B. Furnish two-year manufacturer's warranty for applied fireproofing.
- C. Furnish two-year applicator's warranty for applied fireproofing to remain free from cracking, spalling, blistering, or loss of adhesion from applied surfaces.

PART 2 - PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

- A. Applied (Spray-On) Fireproofing Systems:
  - 1. Provide fire-rated assemblies according to:
    - a. NFPA 101 code, 1997 edition.
    - b. 2015 Michigan Building Code for Type **I-A** construction.
  - 2. Provide fire-rated assemblies to hourly ratings as follows:

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- a. Primary Structural Frame: **3** hr.
  - b. **Exterior and Interior** Bearing Walls: **3** hr.
  - c. **Interior** Non-bearing Walls: 0 hr.
  - d. Floors and Floor Ceilings: **2** hr.
  - e. Roofs and Roof-Ceilings: **1-1/2** hr.
- B. Air Erosion: Maximum **0.025 g/sq. ft.** (0.25 g/sq. m) allowable weight loss of fireproofing when tested according to ASTM E859.
- C. Corrosion: No contribution to corrosion of steel test panels when tested according to ASTM E937.
- D. Mold Resistance: Material to show resistance to fungi growth when tested according to ASTM C665 requirements for fungi resistance of insulation, or ASTM G21.

2.2 INTUMESCENT PAINT FIREPROOFING

A. Manufacturers:

1. Cafco Spray Film WB3/isolatek type WB3.
2. Substitutions: **As specified in Section 01600 "Product Requirements"**.
3. Furnish materials according to ASTM standards.

B. Description:

1. Water-based, factory-mixed, asbestos-free, intumescent material blended for uniform texture.
2. Color: As selected.
3. Primer: As recommended by manufacturer.

C. Interior Intumescent Type:

1. Comply with following requirements:
  - a. Type: As recommended by manufacturer for interior applications.

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b. Bond Strength:

- 1) ASTM D4541.
- 2) 485 psi when set and dry.

c. Hardness:

- 1) Comply with ASTM D2240.
- 2) Minimum 67 Shore D.

d. Bond Impact:

- 1) Comply with ASTM D2794.
- 2) No cracking, flaking, or delamination.
- 3) 160 inch-lb @ 2mm

2. Topcoat:

- a. Type: Acrylic latex finish coat as recommended by manufacturer for interior application to comply with fire-resistance rating.
  - 1) Tnemec Enduratone semes 1029 semi-gloss
    - a) 2.0-3.0 mils DFT
    - b) Install per manufacturer's specs.

2.3 ACCESSORIES

- A. Primer **Bonding Agent and Coating:** As recommended by fireproofing manufacturer.
- B. **Overcoat and/or Sealer:** As recommended by manufacturer of fireproofing material.
- C. Water: Clean and potable.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01700 "Project Closeout" - Execution and Closeout Requirements: Requirements for application examination.
- B. Verify that surfaces are ready to receive fireproofing.
- C. Verify that clips, hangers, supports, sleeves, and other items that penetrate fireproofing are in place.
- D. Verify that ducts, piping, equipment, and other items that may interfere with application of fireproofing have not been installed.
- E. Verify that voids and cracks in substrate have been filled.
- F. Verify that projections have been removed where fireproofing will be exposed to view as finish material.
- G. Verify that roof traffic has ceased and that any new roof-mounted equipment is in place.

3.2 PREPARATION

- A. Section 01700 "Project Closeout" - Execution and Closeout Requirements: Requirements for application preparation.
- B. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.
- C. Remove incompatible materials affecting bond by scraping, brushing, scrubbing, or sandblasting.
- D. Prepare substrates to receive fireproofing.
- E. Apply fireproofing manufacturer's recommended bonding agent on primed steel.

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- F. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fallout, and dusting.
- G. Close off and seal duct work in areas where fireproofing is being applied.
- H. Provide temporary enclosure to prevent spray from contaminating air.

3.3 APPLICATION

A. Intumescent Paint Fireproofing:

- 1. Apply primer and fireproofing according to manufacturer instructions.
- 2. Apply fireproofing in sufficient thickness to achieve indicated fire rating with as many passes as necessary.
- 3. Installation Standards: Apply Work according to UL and ASTM standards.

3.4 FIELD QUALITY CONTROL

- A. Section 01400 "Quality Control" - Quality Requirements: Requirements for inspecting and testing.
- B. Section 01700 "Project Closeout" - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- C. Inspection:
  - 1. **Perform** inspection of mastic and intumescent fire-resistive coatings according to AWCI 12-B.
- D. **Manufacturers Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section to observe Site conditions, conditions of surfaces and installation, and quality of workmanship, and to initiate instructions if necessary.**

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3.5 CLEANING

- A. Section 01700 "Project Closeout" - Execution and Closeout Requirements: Requirements for cleaning.
- B. Remove excess material, overspray, droppings, and debris.
- C. Remove fireproofing from materials and surfaces not required to be fireproofed.
- D. At exposed fireproofing, clean surfaces that have become soiled or stained, using manufacturer's recommended procedures.

3.6 PROTECTION

- A. Section 01700 "Project Closeout" - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Protect fireproofing, according to advice of manufacturer and installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation, or using products and methods recommended by manufacturer to maintain required fire-resistance rating.

END OF SECTION 07810



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SECTION 07910 - JOINT FILLERS AND GASKETS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of each type of joint filler and gasket work is indicated on the drawings and by provisions of this section, and is hereby defined to include required fillers and gaskets not specified in other sections of these specifications.
- B. The required applications of joint fillers and gaskets include, but are not necessarily limited to, the following general types and locations:
  - 1. Isolation and expansion joint fillers in structural concrete.
  - 2. Floor construction/expansion joint fillers.
  - 3. Joint fillers around penetrations of equipment and services through walls, floors and roofs.

1.03 SUBMITTALS:

- A. Product Data:
  - 1. Submit manufacturer's specifications, installation instructions and recommendations for each type of material required.
- B. Samples:
  - 1. Submit three, 12 inches long samples of each joint filler or gasket.

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PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL:

- A. Size and Shape: Provide sizes and shapes of units as shown or, if not shown, as recommended by manufacturer for joint size and condition shown. Where joint movement is a factor in a determination of size, consult with Architect to determine nature and magnitude of anticipated joint movements for the temperature and condition of project at time of installation.
- B. Compressibility: Specified hardness and compressibilities are intended to establish requirements for normal or average conditions of installation and use. Where a range of hardness or compressibility is available for a product, comply with manufacturer's recommendations for specific condition of use.
- C. Color: Provide each concealed material in manufacturer's standard color which has best overall performance characteristics for application shown. Provide exposed materials in black, except where another color is indicated.
- D. Compatibility: Before purchase of each filler or gasket material, confirm that it is compatible with substrate, sealants and other materials in joint system.
- E. Adhesives: Pressure sensitive adhesives, compatible with each material in joint system may be applied (at installer's option) to one face of joint fillers and gaskets to facilitate installation and permanent anchorage. Do not allow adhesives to contaminate sealant bond surface (if any) in joint system.

2.02 CELLULAR/FOAM EXPANSION JOINT FILLERS:

- A. Closed-Cell PVC Joint Filler:
  - 1. Provide flexible expanded polyvinyl chloride complying with ASTM D 1667. Grade VE 41 BL (3.0 psi compression deflection); except provide higher compression deflection grades as may be necessary to withstand installation forces.
  - 2. Provide one of the following products:
    - a. FF2 PVC: Progress Unlimited, Inc.
    - b. Vinyl "U" 1000 Series: Williams Products, Inc.

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2.03 GASKETS:

A. Molded Neoprene Gasket:

1. Provide extruded neoprene or EPDM gaskets complying with ASTM D 2000, Designation 2BC 415 to 3BC 620, black (40 to 60 Shore A durometer hardness); of the profile shown or, if not shown, as required by the joint shape, size and movement characteristics to maintain a watertight and airtight seal.
2. Provide products by one of the following manufacturers:
  - a. D.S. Brown Company
  - b. Hohmann & Barnard, Inc.
  - c. Kirkhill Rubber Company
  - d. Progress Unlimited, Inc.
  - e. JD Russell
  - f. Williams Products, Inc.

2.04 MISCELLANEOUS MATERIALS:

A. Fire-Resistant Joint Filler:

1. Glass fiber or other inorganic non-combustible fiber formed with minimum of binder into resilient joint filler strips or blankets of sizes and shapes indicated, recommended by manufacturer specifically for increasing fire resistance or endurance of joint systems of type indicated, for service temperatures up to 2300 degrees F, 80% (min.) recovery 50% compression.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine joint surfaces of units to receive fillers or gaskets and conditions under which the work is to be performed and notify the General Contractor, in writing, of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.02 INSTALLATION:

- A. Comply with manufacturer's instructions and recommendations for installation of each type of joint filler or gasket required, unless more stringent requirements are shown or specified.

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- B. Set units at proper depth of position in joint to coordinate with other work, including installation of bond breakers, backer rods, and sealants. Do not leave voids or gaps between ends of joint filler units.
- C. Recess exposed edges or faces of gaskets and exposed joint filler slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.
- D. Bond ends of gaskets together with adhesive or by means as recommended by manufacturer to ensure continuous watertight and airtight performance. Miter-cut and bond ends at corners except where molded corner units are provided.

END OF SECTION 07910

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SECTION 07920 - SEALANTS AND CAULKING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of each type of sealant and caulking work is indicated on the drawings and by provisions of this section.
- B. The required applications of sealants and caulking include, but are not necessarily limited to, the following general locations:
  - 1. Interior sound-sealed and air-sealed joints.
  - 2. Isolation joints, between structure and other elements.
  - 3. Joints at penetrations of walls, decks and floors by piping and other services and equipment.
  - 4. Joints between dissimilar materials.

1.03 QUALITY ASSURANCE:

- A. Manufacturers: Firms with not less than 5 years of successful experience in production of types of sealants and caulking compounds required for this project.
  - 1. Obtain elastomeric sealants from a manufacturer which will, upon request, send a qualified technical representative to the project site for purpose of advising installer on proper procedures for use of products.
- B. Installer: A firm with a minimum of (5) years of successful experience in application of types of materials required.

1.04 SUBMITTALS:

- A. Product Data:
  - 1. Submit manufacturer's specifications, recommendations and installation and instructions for each type of sealant, caulking compound and associated miscellaneous material required.

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B. Samples:

1. Submit three, 12" long samples of each color required (except black) for each type of sealant and caulking compound exposed to view. Install sample between two strips of material similar to or representative of typical surfaces where compound will be used, held apart to represent typical joint widths.

1.05 JOB CONDITIONS:

- A. Pre-Installation Meeting: At General Contractor's direction, installer, sealant manufacturer's technical representative, and other trades involved in coordination with sealant work shall meet with the General Contractor at project site to review procedures and time schedule proposed for installation of sealants in coordination with other work. Review each major sealant application required on project.
- B. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended temperature range for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength. Where joint width is affected by ambient temperature variations, install elastomeric sealants only when temperatures are in lower third of the manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures. Coordinate time schedule with General Contractor to avoid delay of project.
- C. Statement of Non-Compliance: Where it is necessary to proceed with installation of sealants or caulking compound under conditions which do not fully comply with requirements (because of time schedule or other reasons which the General Contractor determines to be crucial to project), prepare written statement for Owner's record (with copy to Architect) indicating the nature of non-compliance, reasons for proceeding, precautionary measures taken to ensure best possible work and names of individuals concurring with decision to proceed with installation.

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1.06 SPECIAL PROJECT WARRANTY (GUARANTEE):

- A. Sealant Warranty: Provide written warranty, signed by the General Contractor/installer, agreeing to, within warranty period of (10) years (or maximum warranty provided by manufacturer for polyurethane sealants) after date of substantial completion, replace/repair defective materials and workmanship defined to include: Instances of significant leakage of water or air; failures in joint adhesion, material cohesion, abrasion resistance, strain resistance or general durability; failure to perform as required and the general appearance of deterioration in any other manner not clearly specified in manufacturer's published product literature as an inherent characteristic of the sealant material. Warranty includes responsibility for removal and replacement of other work (if any) which conceals or obstructs the replacement of sealants.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL:

- A. Colors: Provide black or other natural color where no other standard or custom color is available. Where material is not exposed to view, provide manufacturer's standard color which has best overall performance characteristics for application shown.
  - 1. Provide manufacturer's standard colors as selected by Architect from manufacturer's standard colors.
- B. Hardnesses shown and specified are intended to indicate general range necessary for overall performance. Consult manufacturer's technical representative to determine actual hardness recommended for conditions of installation and use. Upon request, Architect will furnish information concerning anticipated joint movement related to actual joint width and installation temperature. Except as otherwise indicated or recommended, provide compounds within the following range of hardness (Shore A, fully cured, at 75 degrees F.).
  - 1. 5 to 20 for high percentage of movement and minimum exposure to weather and abrasion (including no exposure to vandalism).

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2. 15 to 35 for moderate percentage of movement and moderate exposure to weather and abrasion.
  3. 30 to 60 for low percentage of movement and maximum exposure to weather and abrasion (including foot traffic on horizontal joints).
- C. Modulus of Elasticity: For joints subjected to movement, either thermal expansion or dynamic movement, select sealants from among available variations which have lowest modulus of elasticity which is consistent with exposure to abrasion or vandalism. For horizontal joints subject to traffic, select sealants with high modulus of elasticity as required to withstand indentation by stiletto heels. Comply with manufacturer's recommendations where no other requirements are indicated.
- D. Compatibility: Before selection and purchase of each specified sealant, investigate its compatibility with joint surfaces, joint fillers and other materials in joint system. Provide only materials (manufacturer's recommended variation of specified materials) which are known to be fully compatible with actual installation conditions as shown by manufacturer's published data or certification.

2.02 SEALANTS:

- A. One Part Elastomeric Sealant (Silicone)
1. One component elastomeric sealant, complying with ASTM C 920, Class 25, Type NS (nonsag), unless Type S (self-leveling) recommended by manufacturer for the application shown.
    - a. Acceptable Standard
      1. "Pecora 864 Architectural Silicone Sealant; Pecora Corp.
      2. Dow Corning 791; Dow Corning Corp.
      3. Silpruf; General Electric
      4. Omniseal; Sonneborn Building Products, Inc.
      5. Spectrem 2; Tremco Mfg. Co.
      6. Sikasil WS 295; Sika Corp.
  2. One Component high movement joints (+100/-50): Where locations of high movement are indicated.
    - a. Dow Corning 790; Dow Corning Corp.,
    - b. Spectrem 1; Tremco
    - c. Sikasil WS 290; Sika Corp.



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B. Elastomeric Sealant (Polyurethane)

1. One component polyurethane sealant, complying with ASTM C 920, Type S, Grade NS, Class 25 (nonsag).
  - a. Acceptable Standard
    1. MasterSeal NP 1; BASF Building Systems
    2. Dymonic; Tremco Mfg. Co.
    3. Dynatrol I; Pecora Corp.
    4. Vulkem 921; Mameco
    5. CS 2130; Hilti
    6. Sikaflex 1A; Sika Corp.
    7. Sikaflex 15LM; Sika Corp.
2. Two Component polyurethane sealant, complying with ASTM C 920, Type M, Grade NS, Class 25 (nonsag).
  - a. Acceptable Standard
    1. MasterSeal NP 2; BASF Building Systems
    2. Dymeric; Tremco Mfg. Co.
    3. Dynatrol II; Pecora Corp.
    4. Vulkem 922; Mameco
    5. Sikaflex 2cNSEZ; Sika Corp.

C. Security Sealant (Polyurethane)

1. One component or two component polyurethane sealant, complying with ASTM C 920, Grade NS, Class 12.5, with a Shore A Hardness of 55.
  - a. Acceptable Standard
    1. Dynaflex; Pecora Corp.
    2. MasterSeal CR195, BASF Corp. Building Systems

2.04 MISCELLANEOUS MATERIALS:

- A. Joint Cleaner: Provide type of joint cleaning compound recommended by sealant or caulking compound manufacturer, for joint surfaces to be cleaned.
- B. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer, for joint surfaces to be primed or sealed.
- C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

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- D. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer.
- E. Provide size and shape of rod which will control joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize possibility of sealant extrusion when joint is compressed.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. The installer must examine joint surfaces, backing and anchorage of units forming sealant rabbet and condition under which sealant work is to be performed and notify the General Contractor in writing of conditions detrimental to proper completion of the work and performance by sealants. Do not proceed with sealant work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 SELECTION OF MATERIAL

- A. Security sealant shall be used for interior nonmoving joints and at all locations accessible to inmates.
- B. One component elastomeric silicone sealants shall be used at exterior and interior joints, not accessible to inmates, where thermal or dynamic movement is anticipated including, but not limited to, the following locations:
  - 1. Metal to metal joints.
  - 2. Sheet metal flashing, preformed metal caps, fascias, extenders, trim and panels.
- C. One or two component elastomeric polyurethane sealants shall be used at exterior and interior joints, not accessible to inmates, where weatherproofing or waterproofing is required and at exterior joints between dissimilar materials including, but not limited to, the following locations:
  - 1. Exterior side of hollow metal frames to adjacent materials.

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2. Sealant in pipe sleeves where materials must perforate the floor slab.
3. Perimeter of floor slabs or concrete curbs which abut vertical surfaces.
4. Exterior joints between dissimilar materials where the joining of the two surfaces leaves a gap between the meeting materials or components as may be dictated by the various methods of construction to make watertight.
5. Interior joints between dissimilar materials where the joining of the 2 surfaces leave a gap between the meeting materials and components.

3.03 JOINT SURFACE PREPARATION:

- A. Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant or caulking compound.
- B. For elastomeric sealants, do not proceed with installation of sealant over joint surfaces which have been painted, lacquered, waterproofed or treated with water repellent or other treatment or coating unless a laboratory test for durability (adhesion), in compliance with paragraph 4.3.9. of FS TT-S-00227 has successfully demonstrated that sealant bond is not impaired by coating or treatment. If laboratory test has not been performed or shows bond interference, remove coating or treatment from joint surfaces before installing sealant.
- C. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.
- D. Roughen joint surfaces on vitreous coated and similar non-porous materials, where sealant manufacturer's data indicated lower bond strength than for porous surfaces. Rub with fine abrasive to produce a dull sheen.

3.04 INSTALLATION:

- A. Comply with sealant manufacturer's printed instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.

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- B. Prime or seal joint surfaces where shown or recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- C. Install sealant backer rod for liquid sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.
- D. Install bond breaker tape where shown and where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- E. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- F. Install sealants to depths as shown or if not shown as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of bead.
  - 1. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
  - 2. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in the range of 75% to 125% of joint width.
- G. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces or to migrate into voids of adjoining surfaces including exposed aggregate panels and similar rough textures. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces but either primer/sealer or the sealant/caulking compound.
- H. Remove excess and spillage of compounds promptly as the work progresses. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage without damage to adjoining surfaces or finishes.

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3.04 CURE AND PROTECTION:

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability. Do not cure in a manner which would significantly alter materials modulus of elasticity or other characteristics.
- B. Installer shall advise the General Contractor of procedures required for curing and protection of sealants and caulking compounds during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of Owner's acceptance.

END OF SECTION 07920

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SECTION 08112 - HOLLOW METAL WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of hollow metal work is shown on the drawings and schedules.
- B. This section includes hollow metal doors and pressed steel frames for doors and related openings.

1.03 QUALITY ASSURANCE:

- A. Provide doors and frames complying with ANSI A258.8-1998 (SDI-100) "Recommended Specifications for Standard Steel Doors and Frames" and as herein specified.
- B. Fire-rated door assemblies shall be Underwriter Laboratory.: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows", and have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests for Door Assemblies". All metal labels to be riveted to door and frames mylar labels not acceptable.

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications for fabrication and installation, including data substantiating that products comply with requirements.
- B. Shop Drawings: Submit shop drawings for the fabrication and installation of hollow metal work. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections.
  - 1. Provide a schedule of doors and frames using same reference numbers for details and openings as those on the contract drawings.

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1.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided the finish items are equal in all respects to new work and acceptable to the Architect; otherwise remove and replace damaged items as directed.
- C. Store doors and frames at the building site under cover. Place units on at least 4" high wood sills or on floors in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber. If the cardboard wrappers on doors become wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. ASTM A653/A653M - Standard Specification for sheet steel, zinc coated (galvanized) or zinc-iron alloy-coated (galvannealed) by the hot dip process (A60). .
- B. ASTM A924 - Specification for general requirements for steel sheet metallic coated by the hot dip process (A60).
- C. ASTM A 1009/A1008M - Standard specification for steel sheet, cold rolled, carbon, high strength low-alloy, high strength low alloy with improved formability, solution hardened, and bake hardenable.
- D. Supports and Anchors: Fabricate of not less that 16 gage sheet metal. Galvanize after fabrication units to be built into exterior walls, complying with ASTM A 153, Class B.
- E. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.
- F. Shop-Applied Paint: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as base for specified finish paints on steel surfaces.

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2.02 FABRICATION, GENERAL:

- A. Fabricate hollow metal units to be rigid, neat in appearance, and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment to assure proper assembly at the project site. Weld exposed joints continuously; grind, dress, and make smooth, flush, and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- B. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- C. Finish Hardware Preparation:
  1. Prepare hollow metal units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling, and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A 115 series specifications for door and frame preparation for hardware.
  2. Reinforce hollow metal units to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
  3. Locate finish hardware as shown on final shop drawings, or if not shown, in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.
- D. Shop Painting:
  1. Clean, treat and paint exposed surfaces of fabricated hollow metal units, including galvanized surfaces.
  2. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of paint.
  3. Apply pretreatment to cleaned metal surfaces, using cold phosphate solution (SSPC-PT-2), hot phosphate solution (SSPC-PT4) or basic zinc chromate-vinyl butyral solution (SSPC-PT3).



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4. Apply shop coat or prime paint within time limits recommended by pretreatment manufacturer. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 2.0 mils, comply with ANSI A250.18.

E. Manufacturer: Provide hollow metal work by one of the following:

1. Ceco Door Products
2. Amweld Building Products
3. Steelcraft (A Division of Ingersoll-Rand)

2.03 DOORS:

A. General:

1. Provide flush design doors, 1-3/4" thick, seamless hollow construction, unless otherwise indicated. Bevel both vertical edges 1/8" in 2".

B. Interior Doors:

1. Fabricate interior doors of two outer, cold-rolled, stretcher-leveled steel sheets not less than 14 gage. Construct doors with smooth, flush surfaces, without visible joints or seams on exposed faces or stile edges except around glazed or louvered panel inserts.
2. Reinforce inside of doors with vertical, hot-rolled, not less than 22 gage steel sections. Space vertical reinforcing 6" o.c. and extend full door height. Spot weld at not more than 5" o.c. to both face sheets.
  - a. Continuous truss-form inner core of 28 gage sheet metal reinforcing may be provided as inner reinforcement in lieu of above. Spot-weld truss-form reinforcement 3" o.c. vertically and horizontally over entire surface of both sides.
3. Reinforce tops and bottoms of doors with 14 gage, horizontal steel channels, welded continuously to outer sheets.

C. Finish Hardware Reinforcement: Reinforce doors for required finish hardware as follows:

1. Hinges: Steel plate 3/16" thick x 1-1/2" wide x 6" longer than hinge, secured by not less than 6 spot-welds.

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2. Mortise Locksets and Dead Bolts: 14 gage steel sheet, secured with not less than two spot-welds.
3. Cylinder Locks: 12 gage steel sheet, secured with not less than two spot-welds.
4. Flush Bolts: 12 gage steel sheet, secured with not less than two spot-welds.
5. Surface-Applied Closers: 12 gage steel sheet, secured with not less than six spot-welds.
6. Plush Plates and Bars: 16 gage steel sheet (except when through bolts are shown or specified), secured with not less than two spot-welds.
7. Surface Panic Devices: 14 gage sheet steel (except when through bolts are shown or specified), secured with not less than two spot-welds.

2.04 FRAMES:

- A. Provide hollow metal frames for doors, side-lights, borrowed lights, and other openings of sizes and profiles as indicated.
- B. Fabricate frames of full-welded unit construction with corners mitered, reinforced, continuously welded full depth and width of frame, unless otherwise indicated.
  1. Knock-down type frames are not acceptable.
- C. Form frames of galvanized steel sheets for exterior and either cold or hot-rolled sheet steel for interior.
  1. Gage: Not less than 14, for exterior openings up to and including 4'-0" wide.
  2. Gage: Not less than 14, for interior openings up to and including 4'-0" wide.
  3. For openings over 4'-0" wide: Not less than 12 gauge.
- D. Finish Hardware Reinforcement: Reinforce frames for required finish hardware as follows:
  1. Hinges and Pivots: Steel plate 3/16" thick x 1-1/2" wide x 6" longer than hinge, secured by not less than six spot-welds.
  2. Strike Plate Clips: Steel plate 3/16" thick x 1-1/2" wide x 3" long.

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3. Surface-Applied Closers: 12 gage steel sheet, secured with not less than six spot-welds.
  4. Concealed Closers: Removable steel access plate, 12 gage internal reinforcement of size and shape required, and enclosing housing to keep closer pocket free of mortar or other materials.
- E. Head Reinforcing: Where installed in masonry, leave vertical mullions in frames open at top for grouting.
- F. Jamb Anchors: Furnish jamb anchors as required to secure frames to adjacent construction, formed of not less than 18 gage galvanized steel.
1. Masonry Construction: Adjustable, flat, corrugated or perforated T-shaped to suit frame size, with leg not less than 2" wide by 10" long. Furnish at least three anchors per jamb up to 7'-6" height; four anchors up to 8'-0" jamb height; one additional anchor for each 24" or fraction thereof over 8'-0" height.
  2. Metal Stud Partitions: Insert type with notched clip to engage metal stud, welded to back of frames. Provide at least four anchors for each jamb for frames up to 7'-6" in height; five anchors up to 8'-0" jamb height; one additional anchor each 24" or fraction thereof over 8'-0" height.
  3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 3/8" concealed bolts into expansion shields or inserts at 6" from top and bottom and 26" o.c., unless otherwise shown. Reinforce frames at anchor locations. Apply removable stop to cover anchor bolts unless otherwise indicated.
- G. Floor Anchors: Provide floor anchors for each jamb and mullion which extends to floor, formed of not less than 14 gage galvanized steel sheet as follows:
1. Monolithic Concrete Slabs: Clip type anchors with two holes to receive fasteners, welded to bottom of jambs and mullions.
- H. Head Anchors: Provide two anchors at head of frames exceeding 42" wide for frames mounted in steel stud walls.

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- I. Head Strut Supports: Provide 3/8" x 2" vertical steel struts extending from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable bolted anchorage to frame jamb members.
- J. Structural Reinforcing Members: Provide as part of frame assembly, where indicated at mullions, transoms, or other locations which are to be built into frame.
- K. Head Reinforcing: For frames over 4'-0" wide in masonry wall openings, provide continuous steel channel or angle stiffener not less than 12 gage for full width of opening welded to back of frame at head.
- L. Spreader Bars: Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions.
- M. Rubber Door Silencers: Except on weatherstripped doors, drill stops to receive three silencers on single-door frames and four silencers on double door frames. Install plastic plugs to keep holes clear during construction.
- N. Plaster Guards: Provide 26 gage steel plaster guards or dust cover boxes, welded to frame at back of finish hardware cutouts where mortar or other materials might obstruct hardware installation.

2.05 STOPS AND MOLDINGS:

- A. Provide stops around glazed panels in hollow metal units and in frames to receive doors where indicated.
- B. Form fixed stops integral with frame, unless otherwise indicated.
- C. Provide removable stops and molds where indicated or required, formed of not less than 20 gage steel sheets matching steel on frames. Secure with countersunk machine screws spaced uniformly not more than 12 o.c.. Form corners with butted hairline joints.

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PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine substrate and conditions under which hollow metal work is to be installed and must notify the General Contractor, in writing, of any conditions detrimental to proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.02 INSTALLATION:

- A. Install hollow metal units and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Setting Masonry Anchorage Devices:
  1. Provide masonry anchorage devices where required for securing hollow metal frames to concrete or masonry construction.
  2. Set anchorage devices opposite each anchor location, in accordance with details on final shop drawings and anchorage device manufacturer's instructions. Leave drilled holes rough, not reamed, and free from dust and debris.
  3. Floor anchors may be set with powder-actuated fasteners instead of masonry anchorage devices and machine screws, if so indicated on final shop drawings.
- C. Placing Frames:
  1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After all construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
  2. Protective Coating: In masonry walls, protect inside (concealed) faces of door frames using fibered asphalt emulsion coating. Apply approximately 1/8" thick over shop primer and allow to dry before handling.

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3. In masonry construction, building-in of anchors and grouting of frames is included in Section 04300 "Unit Masonry Work" of these specifications.
4. Place frames at fire-rated openings in accordance with NFPA Standard No. 80.
5. Make field splices in frames as detailed on final shop drawings, welded and finished to match factory work.
6. Remove spreader bars only after frames or bucks have been properly set and secured.

D. Door Installation:

1. Fit hollow metal doors accurately in their respective frames with the following clearances:
  - a. Jambs and Head: 3/32".
  - b. Meeting Edges, Pairs of Doors: 1/8".
  - c. Bottom: 1/4" at threshold or carpet.
  - d. Bottom: 1/8" to threshold or tile.
  - e. Bottom: 1/8" to bottom of head.
2. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.
3. Finish Hardware installation is specified in Section 08710.

3.03 ADJUST AND CLEAN:

- A. Final Adjustments: Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper operating conditions. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.
- B. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

END OF SECTION 08112

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SECTION 08210 - FLUSH WOOD DOORS

PART 1. GENERAL

1.1 SECTION INCLUDES: Wood doors non-rated and fire-rated

- A. Solid core flush wood doors

1.2 RELATED SECTIONS

- A. Section 06100 - Carpentry
- B. Section 08112 - Hollow Metal Work
- C. Section 08710 - Finish hardware

1.3 REFERENCES AND REGULATORY REQUIREMENTS

- A. ASTM E152 - Methods of Fire Tests and Door Assemblies.
- B. NFPA 252 - Standard Methods for Fire Assemblies.
- C. UBC 7-2-1994
- D. UBC 7-2, 1997
- E. Michigan Building Code 2015
- F. UL 10 (c) - Fire Tests for Door Assemblies - Positive Pressure
- G. UL 10 (b) - Fire Tests for Door Assemblies - Neutral Pressure
- H. NFPA 80 - Fire Doors and Windows.
- I. Quality Standards:
  - 1. WDMA Industry Standard I.S. 1A-04
  - 2. ANSI A115. W Series, Wood Door Hardware Standards. (American National Standard Institute)
- K. Labeling Agencies
  - 1. Intertek Testing Services-Warnock Hersey (ITS-WH)
  - 2. Underwriters Laboratories (UL)

1.4 SUBMITTALS

- A. Shop drawings: Indicate location, size, and hand of each door; elevation of each kind of door; location and extent of hardware blocking; and other pertinent data.
  - 1. Indicate dimensions and locations of mortises and holes for hardware.
  - 2. Indicate dimensions and locations of cutouts.
  - 3. Indicate requirements for veneer matching.
  - 4. Indicate doors to be factory finished and finish requirements.
  - 5. Indicate fire ratings for fire doors.

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- B. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:
  - 1. Faces for Factory Finished doors: Show the full range of colors available for stained finishes.
- C. Samples for Verification:
  - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide one piece of the expected finished work.

1.5 QUALITY ASSURANCE

- A. Source limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality standard: Comply with WDMA I.S.1-A 04
- C. Fire-rated Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UBC 7-2-1997 (Positive Pressure)

1.6 DELIVERY STORAGE AND HANDLING AND SITE CONDITIONS

- A. Deliver, store, protect and handle products under provisions of WDMA.
- B. Package doors individually and wrap bundles of doors. Inspect for damage. Do not store in damp or wet areas. HVAC systems should be operating and balanced prior to arrival of doors. Acceptable humidity shall be no less than 25% nor greater than 55%.
- C. Certain wood species are light sensitive. Protect doors from exposure to natural and artificial light after delivery.

1.7 WARRANTY

- A. Provide manufacturer's warranty for Interior Solid Core Doors:
  - 1. Full Lifetime Warranty



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PART 2. PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
  - 1. Flush wood doors:
    - a. Algoma Marshfield By Masonite Architectural Door Systems, Aspiro Series (Basis of Design)
    - b. Eggers Industries
    - c. Poncraft Door Company
    - d. Graham Manufacturing Corporation
    - e. VT Industries
- B. Substitutions allowed only with written approval by architect prior to bid date.

2.2 DOOR CONSTRUCTION, GENERAL

- A. WORKMANSHIP
  - 1. Comply with WDMA I.S. 1A-04
- B. PERFORMANCE STANDARD
  - 1. Comply with WDMA I.S. 1A-04 Extra Heavy Duty
- C. DOORS FOR TRANSPARENT FINISH:
  - 1. Grade: Premium, with A Grade Faces
  - 2. Wood veneer Species and Cut:
    - a. Rift cut red oak.
  - 3. Match between veneer leaves: Book match
  - 4. Assembly of spliced veneers: Running
  - 5. Pair and Set match: Provide for doors hung in same opening or separated only by mullions.
  - 6. Door with Transom: Continuous match
- D. DOORS FOR OPAQUE FINISH:
  - 1. Medium Density Overlay
- E. Interior Veneer-faced doors:
  - 1. Five Plie Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

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- F. Rating: Positive pressure Category A (concealed intumescent).

2.3 SOLID-CORE DOORS

A. NON-FIRE RATED WOOD DOORS

1. Non-rated and 20-minute rated
  - a. Extra Heavy Duty Wood Based Particleboard Core LD-2 Particleboard, PC-5
2. Provide manufacturers standard laminated-edge construction with improved screw-holding capability and split resistance.
3. 20-minute rated pairs:
  - a. Provide with fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.
  - b. As required by manufacturer to permit positive pressure "S" label per Category H.

B. FIRE RATED WOOD DOORS

1. Manufacturer's standard mineral-core construction as needed to provide fire rating indicated.
2. Blocking: provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated as needed to eliminate through-bolting hardware for surface applied hardware.
3. Provide manufacturers standard laminated-edge construction with improved screw-holding capability and split resistance that are labeled and listed to provide fire rating indicated.
4. Pairs: Metal edges.

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2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
  - 1. WDMA prefit clearances for factory fit doors
  - 2. NFPA 80 for fire rated doors
  - 3. Manufacturers hardware templates
- B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, and hardware templates.
  - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standard for kind(s) of doors(s) required.
  - 1. Light openings: Trim openings with moldings of material and profile indicated.
  - 2. Louvers: Factory install louvers in prepared openings.
- D. Apply appropriate labels.

2.5 FACTORY FINISH

- A. General: Comply with WDMA finish requirements.
- B. Finish doors at factory.
- C. Transparent Finish:
  - 1. Finish: WDMA TR-8, UV- Cured Acrylated Polyester/urethane catalyzed polyurethane.
  - 2. Staining: Algoma/ Marshfield Aspiro Seriet custom color to match Marshfield Espresso 042-95. Submit sample for confirmation prior to ordering.
- D. Factory finished doors to be installed just prior to substantial completion.

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2.6 FACTORY GLAZING

- A. Glazing in wood doors to be installed by wood door manufacturer.

2.7 ACCESSORIES

A. GLAZING STOPS

1. Non-Rated:

- a. Wood, of the same species/compatible with door species.

2. Fire-Rated:

- a. Veneer wrapped rolled steel, of same species as door facing.

B. APPLIED MOLDINGS:

- 1. As selected from manufacturer's standard profiles and install as detailed.

- 2. Applied moldings to be affixed to the door without the use of nails or staples.

PART 3. EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed frames before hanging doors.
  - 1. Verify that frames comply with indicated requirements for type, size, location and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects prior to hanging.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, Refer to Division 8 Section 08710 "Finish Hardware."

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- B. Manufacturer's written instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
  - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Align all doors for uniform clearance at each edge.
- D. Factory finished doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Adjust all doors to swing and operate freely.

END OF SECTION 08210

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SECTION 08305 - ACCESS DOORS & PANELS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent, location and size of each type of access door required are shown on the drawings.
- B. Related work specified elsewhere:
  - 1. Division 21 - Fire Suppression
  - 2. Division 23 - Mechanical
  - 3. Division 26 - Electrical

1.03 QUALITY ASSURANCE:

- A. Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturer listed in Underwriters' Laboratories, Inc. "Classified Building Materials Index" for the rating shown.
  - 1. Provide UL label on each fire-rated access door.
- B. Size Variations: Obtain Architects' acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.
- C. Manufacturer: Provide access doors as manufactured by one of the following:
  - 1. Larsens
  - 2. Karp Associates Inc.
  - 3. Milcor
  - 4. Babcock Davis
- D. Inserts and Anchorages:
  - 1. Furnish inserts and anchoring devices which must be built into other work for the installation of access doors. Coordinate delivery with other work to avoid delay.

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1.04 SUBMITTALS:

A. Manufacturer's Data:

1. For information only, submit 2 copies of manufacturer's technical data and installation instructions for each type of access door assembly. Transmit copy of each instruction to the Installer.
  - a. Provide setting drawings, templates, instructions and directions for installation of anchorage devices.

PART 2 - PRODUCTS

2.01 MATERIALS & FABRICATION:

- A. General: Furnish access door assemblies manufactured as an integral unit, complete with all parts and ready for installation.
- B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of the type required to secure access panels to the types of support shown.
- C. Frames:
  1. Fabricate from 16 gauge steel. (Refer to model number specified).
  2. Fabricate frame with exposed flange approximately 1" wide around perimeter of frame for units installed in the following construction.
    - a. Drywall finish.
  3. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
- D. Flush Panel Doors:
  1. Fabricate from not less than 16 or 20 gauge (depending on model number specified) galvanized sheet steel with concealed spring hinges at fire rated openings. Finish with manufacturer's factory-applied prime paint.

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2. Provide flush panel doors, unless otherwise indicated.
3. For fire-rated units, provide manufacturer's standard insulated flush panel doors.

E. Locking Devices:

1. Interior: Mortise lock provided by access door manufacturer.

F. Schedule: Provide the following types of access panels.  
(basis of design is Larsens)

1. Wall Applications: Model L-DW - minimum size 24" x 24" unless noted otherwise on drawings with prep for cylinder lock provided by Larsens. Provide where indicated on mechanical/electrical/architectural drawings or required by code to access existing/new valves, junction boxes, etc. Provide with masonry anchor straps when installed in masonry walls.
  - a. At fire rated locations provide Model L-FR and prep for cylinder lock provided by Larsens. 24" x 24" minimum for wall applications. Rating shall be min. B label (1 ½ hour). Provide with masonry anchor straps when installed in masonry walls.
2. Ceiling Application: Drywall ceilings-Model L-DWB minimum size 24" x 24" with prep for cylinder lock provided by Larsens. Provide where indicated on mechanical/electrical drawings or required by code to access valves, junction boxes, etc.
  - a. Ceiling Application: For fire rated ceiling applications-Model L-FRC minimum size 24" x 24" with prep for cylinder lock provided by Larsens. Provide where indicated on mechanical/electrical drawings or required by code to access valves, junction boxes, etc.



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PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine the conditions under which access doors are to be installed and notify the General Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION:

- A. Comply with manufacturer's instructions for installation of access doors.
- B. Coordinate installation with work of other trades.
- C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- D. Adjust hardware and panels after installation for proper operation.
- E. Remove and replace panels or frames which are warped, bowed or otherwise damaged.

END OF SECTION 08305

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SECTION 08710 - FINISH HARDWARE

PART 1 - GENERAL

1.1 Refer to "General and Special Conditions", and "Instructions to Bidders", Division 1 of Specifications. Requirements of these Sections and the project drawings shall govern work in this section.

1.2 Work Included:

A. Furnish all items of Finish Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.

B. Related work:

1. Division 0 - Bidding and Contract Documents
2. Division 1 - General Requirements
3. Section 08112 - Hollow Metal Work
4. Section 08210 - Flush Wood Doors
5. Section 26 - Electrical

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:

1. Cabinet Hardware.
2. Wire mesh doors and gates
3. Access doors and panels

1.3 Quality Assurance

A. Requirements of Regulatory Agencies:

1. Furnish finish hardware to comply with the requirements of laws, codes, ordinances, and regulations of the governmental authorities having jurisdiction where such requirements exceed the requirements of the Specifications.

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2. Furnish finish hardware to comply with the requirements of the regulations for public building accommodations for physically handicapped persons of the governmental authority having jurisdiction and to comply with Americans with Disabilities Act.
3. Provide hardware for fire-rated openings in compliance with NFPA 80 and state and local building code requirements. Provide only hardware that has been tested and listed by UL for types and sizes of doors required and complies with requirements of door and door frame labels.

B. Hardware Supplier:

1. Shall be an established firm dealing in contract builders' hardware. He must have adequate inventory, qualified personnel on staff and be located within 100 miles of the project. The distributor must be a factory-authorized dealer for all materials required. The supplier shall be or have in employment an Architectural Hardware Consultant (AHC).

C. Electrified Door Hardware Supplier:

1. Shall be an experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.
2. Shall prepare data for electrified door hardware, including shop drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this project.
3. Shall have experience in providing consulting services for electrified door hardware installations.

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D. Pre-installation Meeting:

1. Before hardware installation, General Contractor will request a hardware installation meeting be conducted on the installation of hardware; specifically that of locksets, closers, exit devices, overhead stops and coordinators. Manufacturer's representatives of the above products, in conjunction with the hardware supplier for the project, shall conduct the meeting. Meeting to be held at job site and attended by installers of hardware for hollow metal work and wood doors. Meeting to address proper coordination and installation of hardware, per finish hardware schedule for this specific project, by using installation manuals, hardware schedule, templates, physical product samples and installation videos.
2. When any electrical or pneumatic hardware is specified this meeting shall also include the following trades/installers: Electrical, Security, Alarm systems and Architect.
3. Convene one week or more prior to commencing work of this Section.
4. The Hardware Supplier shall include the cost of this meeting in his proposal.

E. Manufacturer:

1. Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
2. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.

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1.4 Submittals:

A. Hardware Schedule

1. Submit number of Hardware Schedules as directed in Division 1.
2. Follow guidelines established in Door & Hardware Institute Handbook (DHI) Sequence and Format for the Hardware Schedule unless noted otherwise.
3. Schedule will include the following:
  - a. Door Index including opening numbers and the assigned Finish Hardware set.
  - b. Preface sheet listing category only and manufacturer's names of items being furnished as follows:

CATEGORY	SPECIFIED	SCHEDULED
Hinges	Manufacturer A	Manufacturer B
Lock sets	Manufacturer X	Manufacturer X
Kick Plates	Open	Manufacturer Z

- c. Hardware Locations: Refer to Article 3.1 B.2 Locations.
- d. Opening Description: Single or pair, number, room locations, hand, active leaf, degree of swing, size, door material, frame material, and UL listing.
- e. Hardware Description: Quantity, category, product number, fasteners, and finish.
- f. Headings that refer to the specified Hardware Set Numbers.
- g. Scheduling Sequence shown in Hardware Sets.
- h. Product data of each hardware item, and shop drawings where required, for special conditions and specialty hardware.
- i. Electrified Hardware system operation description.
- j. "Vertical" scheduling format only. "Horizontal" schedules will be returned "Not Approved."
- k. Typed Copy.

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- l. Double-Spacing.
- m. 8-1/2 x 11 inch sheets
- n. U.S. Standard Finish symbols or BHMA Finish symbols.

B. Product Data:

1. Submit, in booklet form Manufacturers Catalog cut sheets of scheduled hardware.
2. Submit product data with hardware schedule.

C. Samples:

1. Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample, if required, of each type of exposed hardware unit, finished as required and tagged with full description for coordination with schedule.
2. Samples will be returned to the supplier. Units, which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

D. Key Schedule:

1. Submit detailed schedule indicating clearly how the Owner's final keying instructions have been followed.
2. Submit as a separate schedule.

E. Electrified Hardware Drawings:

1. Submit elevation drawings showing relationship of all electrical hardware components to door and frame. Indicate number and gage of wires required.
  - a. Include wiring drawing showing point to point wire hook up for all components.
  - b. Include system operations descriptions for each type of opening; describe each possible condition.

F. Submit to General Contractor, the factory order acknowledgement numbers for the various hardware items to be used on the project. The factory order acknowledgement

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numbers shall help to facilitate and expedite any service that may be required on a particular hardware item. General Contractor shall keep these order acknowledgement numbers on file in the onsite construction office/trailer.

1.5 Product Delivery, Storage, and Handling:

- A. Label each item of hardware with the appropriate door number and Hardware Schedule heading number and deliver to the installer so designated by the contractor.

1.6 Existing Conditions:

- A. **Where existing doors, frames and/or hardware are to remain, conditions, preparations and functions shall be field verified to confirm compatibility with specified hardware. Where any incompatibility is discovered, notify the contractor or construction manager immediately and provide a suggested solution based on industry standard business practices.**

1.7 Warranties:

- A. Refer to Division 1 for warranty requirements.
- B. Special Warranty Periods:

1. Closers shall carry manufacturer's 30-year warranty against manufacturing defects and workmanship.
2. Locksets shall carry manufacturer's 3-year warranty against manufacturing defects and workmanship.
3. Exit Devices shall carry manufacturer's 3-year warranty against manufacturing defects and workmanship.
4. Continuous gear hinges shall carry manufacturer's lifetime warranty to be free from defects in material and workmanship.
5. Balance of items shall carry a manufacturer's 1-year warranty against manufacturing defects and workmanship.

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- C. During the warranty period, replace defective work, including labor, materials and other costs incidental to the work.

PART 2 - PRODUCT

2.1 Furnish each category with the products of only one manufacturer unless specified otherwise; this requirement is mandatory whether various manufacturers are listed or not.

2.2 Provide the products of manufacturer designated or if more than one manufacturer is listed, the comparable product of one of the other manufacturers listed. Where only one manufacturer or product is listed, it is understood that this is the owner's Building Standard and "no substitution" is allowed.

A. Hinges:

1. Furnish hinges of class and size as listed in sets or as required to match existing conditions.
2. Numbers used are Ives (IVE).
3. Equal products from Hager, McKinney and Stanley will be accepted.

B. Locksets and Latchsets - Mortise Type:

1. Locksets shall be manufactured from heavy gauge steel, minimum lockcase thickness 1/8", containing components of steel with a zinc dichromate plating for corrosion resistance.
2. Locks are to have a standard 2 3/4" backset with a full 3/4" throw two-piece stainless steel mechanical anti-friction latchbolt. Deadbolt shall be a full 1" throw, constructed of stainless steel.
3. Lockcase shall be easily handed without chassis disassembly by removing handing screw on lockcase and installing in opposite location on reverse side.



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Changing of door hand bevel from standard to reverse hand shall be done by removing the lockcase scalp plate, and pulling and rotating the latchbolt 180 degrees.

4. Lock trim shall be through-bolted to the door to assure correct alignment and proper operation. Lever trim shall have external spring cage mechanism to assist in support of the lever weight.
5. Function numbers are Schlage.
  - a. Schlage L9000
6. Lockset Trim:
  - a. Schlage 17N
7. Provide strikes with extended lips where required to protect trim from being marred by latch bolt. Provide strike lips that do not project more than 1/8" beyond door frame trim at single doors and have 7/8" lip to center at pairs of 1-3/4" doors.
8. Provide strikes as required to match existing conditions and preparations at existing openings.

C. Electric Strike:

1. Electric strikes shall provide remote release of latchbolts. They shall be designed for use with the type locks shown at each opening where required. Strikes will be UL Listed for Burglary-Resistant Electric Door Strike, and where required, shall be UL listed as electric strikes for Fire Doors or Frames. Faceplates shall be stainless steel with finish as specified for each opening. The locking components shall be stainless steel to resist damage and abuse.
2. Solenoids shall be of the continuous duty type for the voltage specified. Plug connectors will be furnished. Strikes shall have an adjustable backbox to compensate for misalignment of door and frame.
3. Numbers used in sets are Von Duprin.
  - a. Von Duprin 6000 series

D. Closers:

1. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.

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- Cylinder body shall be 1 ½" in diameter, and double heat treated pinion shall be 11/16" in diameter with double D slab drive arm connection.
2. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
  3. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
  4. All closers shall have solid forged steel main arms (and forged forearms for parallel arm closers).
  5. All surface mounted mechanical closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory.
  6. Closers will have Powder coating finish certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
  7. Refer to door and frame details and furnish accessories such as drop plates, panel adapters, spacers and supports as required to correctly install door closers. State degree of door swing in the hardware schedule.
  8. LCN Series as listed in sets.

E. Overhead Holders and Stops:

1. Type, function and fasteners must be same as Glynn-Johnson specified. Size per manufacturer's selector chart. Plastic end caps, hold open mechanisms and shock blocks are not allowed. End caps must be finished same as balance of unit.
2. Manufacture products using base material of Brass/Bronze for US3, US4, & US10B finished products and 300 Stainless Steel for US32 & US32D finished products.

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3. Type, function, and fasteners must be the same as Glynn-Johnson specified. Size per manufacturer's selector chart.
  - a. Glynn-Johnson

F. Kick Plates:

1. Furnish .050 inches thick, beveled four sides, countersunk fasteners, 10" high x door width less 2" at single doors and less 1" at pairs. Where glass or louvers prevent this height, supply with height equal to height of bottom rail less 2".
2. Any BHMA manufacturing product meeting above is acceptable.

G. Miscellaneous:

1. Furnish items not categorized in the above descriptions but specified by manufacturer's names in Hardware Sets.

H. Fasteners:

1. Furnish fasteners of the proper type, size, quantity and finish. Use machine screws and expansion shields for attaching hardware to concrete or masonry, and wall grip inserts at hollow wall construction. Furnish machine screws for attachment to reinforced hollow metal doors and frames and reinforced aluminum doors and frames. Furnish full thread wood screws for attachment to solid wood doors and frames. "TEK" type screws are not acceptable.
2. **Sex bolts will not be permitted on reinforced metal doors or wood doors where blocking is specified.**

2.3 Finishes:

- A. Generally, Satin Chrome, US26D / BHMA 626. Provide finish for each item as indicated in sets.

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2.4 Templates and Hardware Location:

- A. Furnish hardware made to template. Supply required templates and hardware locations to the door and frame manufacturers.
- B. Furnish metal template to frame/door supplier for continuous hinge.
- C. Refer to Article 3.1 B.2, Locations, and coordinate with templates.

2.5 Cylinders and Keying:

- A. All cylinders for this project will be supplied by one supplier regardless of door type and location.
- B. The Finish Hardware supplier will meet with Architect and/or Owner to finalize keying requirements and obtain keying instructions in writing.
  - 1. Supplier shall include the cost of this service in his proposal.
- C. Provide a cylinder for all hardware components capable of being locked.
- D. Provide cylinders master and grand master keyed to existing SFIC system according to Owner's instructions. Provide two change keys for each cylinder, master and grand master keys as required by Owner.

PART 3 - EXECUTION

3.1 Installation

A. General:

- 1. Install hardware according to manufacturers installations and template dimensions. Attach all items of finish hardware to doors, frames, walls, etc. with fasteners furnished and required by the manufacture of the item.

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- 2. Provide blocking/reinforcement for all wall mounted Hardware.
- 3. Reinforced hollow metal doors and frames will be drilled and tapped for machine screws.
- 4. Solid wood doors: full thread wood screws. Drill pilot holes before inserting screws.

B. Locations:

- 1. Dimensions are from finish floor to center line of items.
- 2. Include this list in Hardware Schedule.

CATEGORY

DIMENSION

Hinges	Door Manufacturer's Standard
Flush Bolt Levers	72" and 12"
Levers	Door Manufacturer's Standard
Exit Device Touchbar	Per Template
Wall Stops/holders	At Head

C. Field Quality Inspection:

- 1. Inspect material furnished, its installation and adjustment, and instruct the Owner's personnel in adjustment, care and maintenance of hardware.
- 2. Locksets and exit devices shall be inspected after installation and after the HVAC system is in operation and balanced, to insure correct installation and proper operation.
- 3. Closers shall be inspected and adjusted after the HVAC system is in operation and balanced, to insure correct installation and proper operation.
- 4. A written report stating compliance, and also locations and kinds of noncompliance shall be forwarded to the Architect with copies to the Contractor, hardware distributor, hardware installer and building owner.

D. Technical and Warranty Information:

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1. At the completion of the project, the technical and warranty information coalesced and kept on file by the General Contractor shall be given to the Owner or Owner's Agent. In addition to both the technical and warranty information, all factory order acknowledgement numbers supplied to the General Contractor during the construction period shall be given to the Owner or Owner's Agent. The warranty information and factory order acknowledgement numbers shall serve to both expedite and properly execute any warranty work that may be required on the various hardware items supplied on the project.
2. Submit to General Contractor/Construction Manager, two copies each of parts and service manuals and two each of any special installation or adjustment tools. Include for locksets, exit devices, door closers and any electrical products.

3.2 Hardware Sets:

Hardware Group No. MC.01

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINIS	MFR
			H	
1	EA	STOREROOM LOCK	L9080J 03N	626 SCH
1	EA	PRIMUS CORE	20-740	626 SCH
1	EA	ELECTRIC STRIKE	6400 FSE 12/24 VAC/VDC	630 VON
1	EA	ACCESS CONTROL	(BY SECURITY CONTRACTOR)	
			(BALANCE OF EXIST'G HDWE TO REMAIN)	

PRESENTING AN AUTHORIZED CREDENTIAL WILL ENERGIZE THE ELECTRIC STRIKE TO ALLOW ACCESS. FREE EGRESS IS ALWAYS ALLOWED. COORDINATE SYSTEM OPERATION AND COMPONENT LOCATIONS WITH THE OWNER, THE ARCHITECT AND ALL RELATED TRADES.

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Hardware Group No. MC.02

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINIS	MFR
			H	
3	EA HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA PUSH PLATE	8200 8" X 16"	630	IVE
1	EA PULL PLATE	8302 8" 4" X 16"	630	IVE
1	EA OH STOP	90S	630	GLY
1	EA SURFACE CLOSER	4011 MCSRI	689	LCN
1	EA KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA GASKETING	488SBK PSA	BK	ZER

Hardware Group No. MC.03

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINIS	MFR
			H	
3	EA HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA PUSH PLATE	8200 8" X 16"	630	IVE
1	EA PULL PLATE	8302 8" 4" X 16"	630	IVE
1	EA SURFACE CLOSER	4111 CUSH MC SRI	689	LCN
1	EA KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA GASKETING	488SBK PSA	BK	ZER

Hardware Group No. MC.04

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINIS	MFR
			H	
3	EA HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA STOREROOM LOCK	L9080J 03N	626	SCH
1	EA PRIMUS CORE	20-740	626	SCH
1	EA SURFACE CLOSER	4111 EDA MC SRI	689	LCN
1	EA KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA WALL STOP	WS33(X)	626	IVE
1	EA GASKETING	488SBK PSA	BK	ZER

END OF SECTION

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Area	Opening Number	HwSet
PROP A	A148A	MC.01
PROP A	B136C	MC.02
PROP A	E153A	MC.04
PROP A	E164A	MC.04
PROP A	G102A	MC.03
PROP A	G102B	MC.03
PROP A	G102C	MC.02
PROP C	601A	SH.01
PROP C	602A	SH.01
PROP C	603A	SH.01
PROP C	604A	SH.01
PROP C	605A	SH.02
PROP C	606A	SH.02
PROP C	607A	SH.01
PROP C	608A	SH.01
PROP C	609A	SH.01
PROP C	610A	SH.01
PROP C	611A	SH.01
PROP C	612A	SH.01
PROP C	613A	SH.02
PROP C	614A	SH.02
PROP C	615A	SH.01
PROP C	616A	SH.01

Area	Opening Number	HwSet
PROP C	617A	SH.01
PROP C	618A	SH.01
PROP C	625A	SH.01
PROP C	626A	SH.01
PROP C	627A	SH.01
PROP C	628A	SH.01
PROP C	629A	SH.02
PROP C	630A	SH.02
PROP C	631A	SH.01
PROP C	632A	SH.01
PROP C	633A	SH.01
PROP C	634A	SH.01
PROP C	635A	SH.01
PROP C	636A	SH.01
PROP C	637A	SH.02
PROP C	638A	SH.02
PROP C	639A	SH.01
PROP C	640A	SH.01
PROP C	641A	SH.01
PROP C	642A	SH.01
PROP C	647A	SH.01
PROP C	648A	SH.01
PROP C	649A	SH.01

Area	Opening Number	HwSet
PROP C	650A	SH.01
PROP C	651A	SH.02
PROP C	652A	SH.02
PROP C	653A	SH.01
PROP C	654A	SH.01
PROP C	655A	SH.01
PROP C	656A	SH.01
PROP C	657A	SH.01
PROP C	658A	SH.01
PROP C	659A	SH.02
PROP C	660A	SH.02
PROP C	661A	SH.01
PROP C	662A	SH.01
PROP C	663A	SH.01
PROP C	664A	SH.01
PROP C	805A	SH.02
PROP C	806A	SH.02
PROP C	813A	SH.02
PROP C	814A	SH.02
PROP C	829A	SH.02
PROP C	830A	SH.02
PROP C	837A	SH.02
PROP C	838A	SH.02



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Area	Opening Number	HwSet
PROP C	851A	SH.02
PROP C	852A	SH.02
PROP C	859A	SH.02
PROP C	860A	SH.02
PROP C	1005A	SH.02
PROP C	1006A	SH.02
PROP C	1013A	SH.02
PROP C	1014A	SH.02
PROP C	1029A	SH.02
PROP C	1030A	SH.02
PROP C	1037A	SH.02
PROP C	1038A	SH.02
PROP C	1051A	SH.02
PROP C	1052A	SH.02
PROP C	1059A	SH.02
PROP C	1060A	SH.02
PROP C	M701A	SH.01
PROP C	M702A	SH.01
PROP C	M703A	SH.01
PROP C	M704A	SH.01
PROP C	M705A	SH.01
PROP C	M706A	SH.01
PROP C	M707A	SH.01

Area	Opening Number	HwSet
PROP C	M708A	SH.01
PROP C	M709A	SH.01
PROP C	M710A	SH.01
PROP C	M711A	SH.01
PROP C	M712A	SH.01
PROP C	M713A	SH.01
PROP C	M714A	SH.01
PROP C	M715A	SH.01
PROP C	M716A	SH.01
PROP C	M717A	SH.01
PROP C	M718A	SH.01
PROP C	M725A	SH.01
PROP C	M726A	SH.01
PROP C	M727A	SH.01
PROP C	M728A	SH.01
PROP C	M729A	SH.01
PROP C	M730A	SH.01
PROP C	M731A	SH.01
PROP C	M732A	SH.01
PROP C	M733A	SH.01
PROP C	M734A	SH.01
PROP C	M735A	SH.01
PROP C	M736A	SH.01

Area	Opening Number	HwSet
PROP C	M737A	SH.01
PROP C	M738A	SH.01
PROP C	M739A	SH.01
PROP C	M740A	SH.01
PROP C	M741A	SH.01
PROP C	M742A	SH.01
PROP C	M747A	SH.01
PROP C	M748A	SH.01
PROP C	M749A	SH.01
PROP C	M750A	SH.01
PROP C	M751A	SH.01
PROP C	M752A	SH.01
PROP C	M753A	SH.01
PROP C	M754A	SH.01
PROP C	M755A	SH.01
PROP C	M756A	SH.01
PROP C	M757A	SH.01
PROP C	M758A	SH.01
PROP C	M759A	SH.01
PROP C	M760A	SH.01
PROP C	M761A	SH.01
PROP C	M762A	SH.01
PROP C	M763A	SH.01

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Area	Opening Number	HwSet
PROP C	M764A	SH.01

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SECTION 09250 - GYPSUM DRYWALL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

- A. Extent of each type of gypsum drywall construction required is indicated on Drawings.
- B. This Section includes the following types of gypsum board construction:
  - 1. Gypsum board screw-attached to wood framing and furring members.
  - 2. Surface mount stainless steel corner guard.

1.3 DEFINITIONS:

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this section or other referenced standards.

1.4 SUBMITTALS:

- A. Product data from manufacturers for each type of product specified.

1.5 QUALITY ASSURANCE:

- A. Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.
  - 1. Provide fire-resistance-rated assemblies identical to those indicated by reference to GA File No's. in GA-600 "Fire Resistance Design Manual" or to design designations in U.L. "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.

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- B. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
- C. All gypsum board drywall and associated materials shall be manufactured domestically in the United States, by a United States Company and shall conform to ASTM Standards listed herein. Gypsum board drywall and associated materials shall not be imported, rebranded or distributed from another country.

1.6 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.7 PROJECT CONDITIONS:

- A. Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
- B. Minimum Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously thereafter until drying is complete.
- C. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
  - 1. Steel Framing and Furring:
    - a. Clark Dietrich Framing.
    - b. Jaimes Industries, Inc.
    - c. Marino/Ware, Division of Ware Industries
  - 2. Gypsum Boards and Related Products:
    - a. Gold Bond Building Products Div., National Gypsum Co.
    - b. Georgia Pacific
    - c. Certainteed
    - d. United States Gypsum

2.2 GYPSUM BOARD:

- A. General: Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end joints.
  - 3. Thickness: Provide gypsum board in thicknesses indicated, or if not otherwise indicated, in either 1/2 inch or 5/8 inch thicknesses to comply with ASTM C 840 for application system and support spacing indicated.
- B. Gypsum Wallboard: ASTM C1396, and as follows:
  - 1. Type: Regular, unless otherwise indicated.
  - 2. Type: Foil-backed where indicated.
  - 3. Type: Type X for fire-resistance-rated assemblies.
  - 4. Edges: Tapered.
  - 5. Thickness: 5/8 inch.
  - 6. Products: Subject to compliance with requirements, provide one of the following products where Type X gypsum wallboard is indicated:
    - b. "Fire-Shield G"; Gold Bond Building Products Div., National Gypsum Co.
    - b. "SHEETROCK Brand FIRECODE 'C' Gypsum Panels"; United States Gypsum Co.

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- c. Type X gypsum board - Certainteed
  - d. Tough Rock Fireguard X gypsum board - Georgia Pacific
- C. Gypsum Backing Board for Multi-Layer Applications: ASTM C1396 or, where backing board is not available from manufacturer, gypsum wallboard, ASTM C1396, and as follows:
- 1. Type: Regular, unless otherwise indicated.
  - 2. Type: Foil-backed where indicated.
  - 3. Type: Type X for fire-resistance-rated assemblies.
  - 4. Edges: Manufacturer's standard.
  - 5. Thickness: 5/8 inch.
- D. Water-Resistant Gypsum Backing Board: ASTM C1396, and as follows:
- 1. Type: Regular, unless otherwise indicated.
  - 2. Type: Type X for fire-resistance-rated assemblies.
  - 3. Thickness: 5/8 inch, unless otherwise indicated.
  - 4. STC rated assemblies: For STC rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by independent testing agency.
  - 5. Manufacturers:
    - a. Gold Bond-Sound Break XP gypsum board - National Gypsum Company
    - b. Silent FX gypsum board - Certainteed
    - c. Tough Rock Sound Deadening Board - Georgia Pacific
  - 6. Install per manufacturers specifications with acoustical sealant meeting ASTM C919 and firestopping meeting ASTM E90. Install acoustic sealant at perimeter of boards and around all penetrations. Install putty pads at all receptacles and switch locations. Install fireproofing and fire sealant around all fire rated partitions.

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2.3 TRIM ACCESSORIES:

- A. Cornerbead and Edge Trim for Interior Installation:  
Provide corner beads, edge trim and control joints which comply with ASTM C 1047 and requirements indicated below:
1. Material: Formed metal, plastic or metal combined with paper, with metal complying with the following requirement:
    - a. Sheet steel zinc-coated by hot-dip process.
    2. Edge trim shapes indicated below by reference to designations of Fig. 1 in ASTM C 1047:
      - a. "LC" Bead, unless otherwise indicated.
      - b. "L" Bead where indicated.
      - c. "U" Bead where indicated.
    3. One-Piece Control Joint: Formed with vee-shaped slot per Fig. 1 in ASTM C 1047, with slot opening covered with removable strip.

B. Metal Cornerbead and Edge Trim for Exterior Ceilings:  
Comply with the following requirements:

    1. Edge trim complying with ASTM C 1047, formed from rolled zinc, shape "LC" Bead per Fig. 1, unless otherwise indicated.

C. All exterior gypsum corners shall have a cover guard.  
Provide surface mount stainless steel corner guard 3-1/2" x 3-1/2" X 48" high, 90° in type 304, satin finish, 16 gauge, cement on as mfr. by Inpro 1-800-222-5556

2.4 GYPSUM BOARD JOINT TREATMENT MATERIALS:

- A. General: Provide materials complying with ASTM C 475, ASTM C 840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.
- B. Joint Tape: Paper reinforcing tape, unless otherwise indicated.
1. Use pressure sensitive or staple-attached open-weave glass fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.

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- C. Setting-Type Joint Compounds: Factory-prepackaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
  - 1. Where setting-type joint compounds are indicated for use as taping and topping compounds, use formulation for each which develops greatest bond strength and crack resistance and is compatible with other joint compounds applied over it.
  - 2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
  - 3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer for this purpose.
- D. Drying-Type Joint Compounds: Factory-prepackaged vinyl-based products complying with the following requirements for formulation and intended use.
  - 1. Ready-Mix Formulation: Factory-premixed product.
  - 2. All-purpose compound formulated for use as both taping and topping compound.

2.5 MISCELLANEOUS MATERIALS:

- A. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.
- B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum boards.
- C. Spot Grout: ASTM C 475, setting-type joint compound of type recommended for spot grouting hollow metal door frames.
- D. Fastening Adhesive for Wood: ASTM C 557.
- E. Gypsum Board Screws: ASTM C 1002.
- F. Gypsum Board Nails: ASTM C 514.
- G. Concealed Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant complying with requirement specified in Division-7 section "Joint Sealers."



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- H. Sound Attenuation Blankets: Unfaced mineral fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with FS HH-1-521 for Type I with class 25 flame spread and as follows:
1. Mineral Fiber Type: Fibers manufactured from glass.
  2. Use in all partitions.
  3. Equal to USG thermafiber sound attenuation fire blankets (SAFB).

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

3.3 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL:

- A. Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840.
- B. Install sound attenuation blankets prior to gypsum board unless readily installed after board has been installed.
- C. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
- D. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.

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- E. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible.
- F. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.
- G. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
- H. Attach gypsum board to wood studs so that leading edge or end of each board is attached to open (unsupported) edge of stud first.
- I. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- J. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32 inches wide. Apply spot grout at each jamb anchor clip just before inserting board into frame.
- K. Form control joints and expansion joints at locations indicated, with space between edges of boards, prepared to receive trim accessories.
- L. Cover both faces of wood stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are braced internally.
  - 1. Except where concealed application is indicated or required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area, and may be limited to not less than 75 percent of full coverage.
  - 2. Fit gypsum board around ducts, pipes, and conduits.
- M. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.

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- N. At all drywall partitions, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.
- O. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.4 METHODS OF GYPSUM BOARD APPLICATION:

- A. Single-Layer Application: Install gypsum wallboard as follows:
  - 1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
  - 2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.
  - 3. On partitions/walls 8'-1" or less in height apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.
- B. Double-Layer Application: Install gypsum backing board for base layer and gypsum wallboard for face layer.
  - 1. On ceilings apply base layer prior to application of base layer on walls/partitions; apply face layers in same sequence. Offset joints between layers at least 10 inches. Apply base layers at right angles to supports unless otherwise indicated.
  - 2. On partitions/walls apply base layer and face layers vertically (parallel to framing) with joints of base layer over supports and face layer joints offset at least 10 inches with base layer joints.
- C. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:
  - 1. Fasten with screws.

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- D. Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:
  - 1. Fasten both base layers and face layers separately to supports with screws.
- E. Direct-Bonding to Substrate: Where gypsum board is indicated to be directly adhered to a substrate (other than studs, joists, furring members or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set.

3.5 INSTALLATION OF DRYWALL TRIM ACCESSORIES:

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install corner beads at external corners.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.
  - 1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
  - 2. Install "L" bead where edge trim can only be installed after gypsum board is installed.
  - 3. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
- D. Install plastic edge trim where indicated on wall panels at juncture with ceilings.
- E. Install control joints at locations indicated, or if not indicated, at spacings and locations required by referenced gypsum board application and finish standard, and approved by the Architect for visual effect.

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- F. Install corner guards with a bead of Inpro PL Premium Heavy Duty Adhesive in a zig zag pattern over the back of each wing of the corner guard. Position corner guard on the wall and apply pressure until a tight fit is achieved. Remove protective plastic covering at completion of project.

3.6 FINISHING OF DRYWALL:

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
- B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Finish interior gypsum to level indicated below and according to ASTM C840
  - 1. Provide level 4 gypsum board finish unless noted otherwise.
- E. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.7 PROTECTION:

- A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

END OF SECTION 09250

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SECTION 09300 - TILE WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of tile work is shown on drawings and in schedules.
- B. Finishing and edge-protection profiles for floors and corners (inside & outside).

1.03 QUALITY ASSURANCE:

- A. Qualifications of Installers:
  - 1. For installation of porcelain ceramic tile and mosaic tile, use only thoroughly trained and experienced personnel completely familiar with specified products, manufacturer's recommended methods of installation and requirements established for this work.
- B. Codes and Standards:
  - 1. Comply with recommendations of "Handbook for Ceramic Tile Installation" published by Tile Council of America, 2022 edition.
  - 2. Comply with ANSI and ASTM Standards listed within this Section.
- C. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer's instructions.

1.04 SUBMITTALS:

- A. Product Data:
  - 1. For information only, submit a PDF copy of manufacturer's technical information and install instructions for all materials required, except bulk materials. Include certifications and other data as may be required to show compliance with these specifications. Transmit a copy of each instruction to the Installer.

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2. Accompany materials list with a PDF copy of manufacturer's current recommended method of installation for each item. These recommendations, after review by Contractor and Architect/Engineer, shall form basis for acceptance or rejection of installed work.

B. Samples:

1. Submit three (3) samples of each type and color of tile required, not less than 12" square on plywood or hardboard backing and grouted. Submit samples of trim and 6" long sample of the marble threshold(s). Review will be for color, pattern and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

1.05 DELIVERY AND STORAGE:

- A. Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Porcelain Ceramic Floor Tile:

1. Shall meet requirements of TCA 137.1 and the requirements of this section.
2. Porcelain ceramic tile for Men's and Women's Locker Room Showers (refer to glazed mosaic floor tile 2.01B for Shower Stall areas) and toilet and sink area floors shall be:
  - a. Daltile, Portfolio Series
    1. Color: Ash Grey
    2. Size: 12 x 24
    3. Thickness: 5/16"
    5. Available at Daltile, 24640 Drake Road, Farmington Hills, MI 48335. Contact: Megan Erickson, Email: [megan.erickson@daltile.com](mailto:megan.erickson@daltile.com) Cell: 734-740-3078.

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B. Mosaic Ceramic Floor Tile:

1. Shall meet requirements of TCA 137.1 and the requirements of this section.
2. Glazed mosaic ceramic tile for Men's & Women's Locker Room Shower Stall floors shall be:
  - a. Daltile Portfolio
    1. Color: Ash Grey
    2. Size: 2" x 2"
    3. Thickness: ¼"
    4. Available at Daltile, 24640 Drake Road, Farmington Hills, MI 48335. Contact: Megan Erickson, Email: [megan.erickson@daltile.com](mailto:megan.erickson@daltile.com) Cell: 734-740-3078.

C. Porcelain Ceramic Wall Tile:

1. Shall meet requirements of TCA 137.1 and the requirements of this section.
2. Porcelain ceramic tile for Men's and Women's Locker Room Shower areas and toilet and sink area walls shall be:
  - a. Daltile Portfolio
    1. Color: Dove Grey
    2. Size: 12 x 24
    3. Thickness: 5/16"
    4. Provide with 6" x 12" cove base and all required trim pieces.
    5. Available at Daltile, 24640 Drake Road, Farmington Hills, MI 48335. Contact: Megan Erickson, Email: [megan.erickson@daltile.com](mailto:megan.erickson@daltile.com) Cell: 734-740-3078.

D. Mosaic Ceramic Accent Wall Tile:

1. Shall meet requirements of TCA 137.1 and the requirements of this section.
2. Mosaic ceramic wall tile for Men's and Women's Locker Room Shower stall accent strip shall be:
  - a. Daltile Portfolio - Random linear porcelain mosaic
    1. Color: Skyline Blend PF12
    2. Size: Random linear
    3. Thickness: 5/16"
    4. Shade Variation: V4 random
    5. Available at Daltile, 24640 Drake Road, Farmington Hills, MI 48335. Contact: Megan Erickson, Email: [megan.erickson@daltile.com](mailto:megan.erickson@daltile.com) Cell: 734-740-3078.



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- E. Marble Thresholds: Marble thresholds shall be 1/2" inch high with chamfered edges of a uniform, fine to medium grained white stone with gray veining and conform to ASTM C503 with a minimum abrasion resistance of ten (10) per ASTM C1353 or ASTM C241 and with a honed finish.
- F. Finish/Edge Protection Profiles
1. Provide profiles as indicated below and on drawings as manufactured by Schluter Systems L.P., 194 Pleasant Ridge Road, Plattsburgh, NY 12901-5841, 1-800-472-4588, fax 1-800-477-9783 [www.schluter.com](http://www.schluter.com)
    - a. Floor Transition
      1. Schluter SCHIENE - E: Profile with trapezoid perforated anchoring leg, with 5° sloped top flange and fillet at the anchoring leg/vertical section interface, in stainless steel type 304 (V2A)
    - b. Corner Guard
      1. Schluter ECK-E: Roll formed type 304 (V2A) steel V-shaped profile with 1-15/32 inch (37mm) wide exposed surfaces joined by a symmetrically rounded corner with integrated trapezoid-perforated anchoring legs.
      2. Provide full height of all wall and column outside corners receiving porcelain ceramic tile and/or mosaic ceramic tile.
    - c. Border Profile
      1. Schluter Quad-EC: Profile with square visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer in stainless steel type 304 (V2A).
      2. Provide between porcelain tile wall and existing masonry not receiving new porcelain ceramic tile and/or mosaic ceramic tile or HM/steel/aluminum surfaces.
      3. Provide separation (bituminous coating) between stainless steel and aluminum.

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2.02 SETTING MATERIALS

- A. MEDIUM SET MORTAR - for floor and wall installation unless noted otherwise.
1. Description: Factory prepared mortar and latex additive; complying with ANSI A118.4 and ISO standards C2TES1P1. Medium bed thickness; 3/4 inch min. thick floor installation.
    - a. Color: Gray
    - b. Acceptable Products:
      - i. MAPEI UltraFlex LFT, complies with ANSI A118.4
      - ii. Custom Building Products, MegaLite.
      - iii. Laticrete, 4XLT.
      - iv. R-C Ultimate Mortar
      - v. TEC, Ultimate large mortar
- B. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:
1. Mixture of Dry-Mortar Mix and Latex Additive: Mixture the prepackaged dry-mortar mix and liquid-latex additive complying with the following requirements:
    - a. Latex Additive: Acrylic resin.
  2. Provide one of the following products:
    - a. Mapei, Elk Grove Village, IL; Kerabond/Keralastic
    - b. Custom Building Products, Custom Blend/Custom Flex
    - c. Laticrete, Bethany, CT; Laticrete 272/333
    - d. TEC, Palatine, IL; Full set plus/Xtra Flex Additive
- C. Waterproofing and Crack Isolation Membrane: Provide materials complying with ANSI A118.10 and ANSI A118.12 and as specified below. Note: All tile to be installed on crack isolation membrane.:
1. Mapelastic AquaDefense as manufactured by MAPEI Corp.
  2. Custom building products RedGard waterproofing and crack prevention membrane.
  3. Hydroment ultra-set advanced as manufactured by Bostik, Inc.
  4. Hydro-Ban waterproofing/anti-fracture membrane as manufactured by Laticrete International, Inc., Bethany, CT.
  5. Hydraflex as manufactured by TEC. Ready to use, flexible, mold and mildew resistant waterproofing and crack isolation membrane for interior and exterior applications.

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2.03 GROUTING MATERIALS

A. Epoxy-modified Grout Admixture: Complying with ANSI A118.3.

1. Provide one of the following manufacturers:

- a. Mapei, Kerapoxy.
- b. Custom Building Products, 100 Solids Epoxy Grout
- c. TEC, EFX 100% Epoxy Grout (for walls color advanced performance grout)
- d. Laticrete, Bethany, CT, Spectralock Pro Grout.

B. Color: As selected by Architect.

2.04 MISCELLANEOUS MATERIAL

A. Latex Underlayment: Quick set type, as recommended by membrane manufacturer, as required to provide positive drainage to floor drains.

B. Shower pan membrane: Meeting ANSI A118.10, ASTM D4068 or D4551.

C. Sealants for control joints in floors and walls, use one part fungicidal silicone rubber to match grout:

1. Dow Corning 784
2. Laticrete LataSil silicone sealant meeting Fed. Spec. TT-S-001543, Class A or B.
3. TEC AccuColor 100, 100% silicone sealant low VOC ASTM C920.
4. Custom, commercial 100% silicone sealant.

PART 3 - EXECUTION

3.01 INSPECTION:

A. Installer must examine the areas and conditions under which tile work is to be installed and notify the General Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

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3.02 PREPARATION:

- A. Prepare substrate to receive setting bed and tile recommended both by the manufacturer of the tile and of the setting bed materials.
  - 1. Fill cracks, holes and depressions with trowelable leveling and patching compound according to tile setting material manufacturer's written instructions.
  - 2. Remove protrusions, bumps and ridges by sanding or grinding.
  - 3. Provide concrete substrates for tile floors that comply with flatness tolerances specified in ANSI A108.
- B. Clean substrate as required and recommended to achieve bond using cleaners, detergents, etc.
- D. Neutralize and seal substrates as recommended.

3.03 INSTALLATION:

- A. Tile Installation - General:
  - 1. Provide installation of ceramic tile in accordance with the latest edition of the Tile Council of America's "Handbook for Ceramic Tile Installation."
  - 2. Fit tile carefully against trim and around pipes, electrical boxes and other built-up fixtures so that escutcheons, plates and collars will completely overlap cut edges.
  - 3. Smooth exposed edges and clean tile before installation.
  - 4. Install porcelain ceramic tile with a 1/8" joint unless noted otherwise.
  - 5. Joint designs shall be symmetrical within room or area; border tile be not less than 1/2 normal width. Floor tile shall be set in straight line design, with wall joints in alignment with floor tile where possible.
  - 6. At junction of base tile and projections through tile and at junctions of tile to corner guards and similar equipment, leave joint ungrouted for sealing.
  - 7. When using tile sheets, minimize tearing sheets apart.

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3.04 SETTING METHODS

- A. Method and typical detailing for tile work shall be in accordance with the following TCNA alphanumeric method, listing from the "Handbook for Ceramic Tile Installation", latest edition, by the Tile Council of North America.
- B. Concrete Subfloors
  - 1. Slabs on grade (full set method): TCNA setting method F114-22 (provide with waterproof and crack isolation membrane) full set Portland cement mortar; epoxy grout A118.3 complying with tile installation specification ANSI A118.4 and epoxy grout installation specification ANSI A108.6. Install crack isolation membrane per manufacturer's specs.
  - 2. Shower areas: TCNA setting method B422-22 (provide with shower pan membrane/waterproof membrane full height of tile assembly, drainage fittings and crack isolation membrane), full set Portland; epoxy grout A118.3 complying with tile installation specification ANSI A118.4 and epoxy grout installation specification ANSI A108.6. Install crack isolation membrane per manufacturer's specs.
- C. Walls
  - 1. Over existing tile (where indicated) (cementitious bond method): TCNA setting method W243-22 and W021-22 (depending on substrate) (provide with waterproof and crack isolation membrane) with latex-portland cement mortar, ANSI A118.4 and epoxy grout ANSI A118.3 and complying with tile installation specification ANSI A108.5 and epoxy grout installation ANSI A108.6. Install crack isolation membrane per manufacturer's specs.

3.05 GROUTING

- A. Grouting shall be installed in accordance with ANSI A108.6 and the manufacturer's recommended procedures and precautions during application and cleaning.
- B. Rinse tilework thoroughly with clean water before and after using chemical cleaners.

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C. Base Installation:

1. Over concrete and masonry, install base using dry-set portland cement mortar in accord with ANSI A108.5. Grout in accordance with ANSI A108.6 using epoxy grout specified for related tile floor.

D. Jointing Pattern: Lay tile in pattern indicated. Layout tile work and enter tile fields both directions in such space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint width, unless otherwise shown.

E. Expansion and Control Joints: Provide as indicated on drawings and as recommended by TCA and by tile and setting bed and grouting material manufacturer and as follows:

1. Control Joints Locations: Comply with the Tile Council of America. (TCA) and where indicated.

a. Interior Locations (horizontal and vertical):

1. Over any expansion joint, control joint, cold joint or seismic joint in the building structure.
2. Expansion joints - max 25 feet in any direction.
3. Expansion joints - 8 feet to 12 feet where tile work located in direct sunlight or moisture locations.
4. Where tile abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceiling and where changes occur in backing materials.
5. Coordinate joint locations with the Architect and for other areas indicated or required.
6. Joint width shall be 1/4 inch, unless otherwise indicated, or required by tile manufacturer, but not less than 1/8".
7. Provide under-layment systems.
8. Install compatible sealant and color approved by the Architect.

F. Grout all tile using commercial epoxy grout as specified.

1. Temporarily protect tile as required to prevent staining.

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3.06 ADJUST AND CLEAN:

A. Cleaning:

1. Clean grout and setting materials from face of tile while materials are workable. Leave tile face clean and free of all foreign matter.
2. Tile may be cleaned with acid solutions only when permitted by the tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush the surface with clean water before and after cleaning.

B. Finished Tile Work:

1. Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

C. Protection:

1. Apply a protective coat of neutral protective cleaner to completed tile work.
2. Protect installed tile work with Kraft paper or other heavy covering during the construction period to prevent damage and wear.
3. Prohibit all foot and wheel traffic from using tiled floors for at least 3 days, preferably 7 days.
4. Before final inspection, remove protective coverings and rinse neutral cleaner from all tile surfaces.

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SECTION 09510 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of acoustical panel ceiling is shown on the drawings and in schedules.

1.03 QUALITY ASSURANCE:

- A. The installation of acoustical panel ceilings is to be by an experienced installation firm which is acceptable to the manufacturer of the acoustical units, as shown by current written statement from the manufacturer.
- B. Standard for Terminology and Performance: Applicable publications by the Acoustical and Insulating Materials Association (AIMA), including "Performance Data, Architectural Acoustical Materials."
- C. Fire Hazard Classification: UL tested, listed and labeled as Class 0.25.

1.04 SUBMITTALS:

A. Product Data:

- 1. For information only, submit a PDF copy of manufacturer's product specifications and installation instructions for each acoustical panel ceiling material required, and for suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications. Distribute one additional copy of each installation instruction to the Installer.
  - a. Include manufacturer's recommendations for cleaning and refinishing acoustical panel, including precautions against materials and methods which may be detrimental to finishes and acoustical performance.



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1.05 SAMPLES

1. Submit 3 sets of 12" square Samples for each acoustical panel required. In each set of samples show the full range of exposed color and texture to be expected in the completed work. Sample submittal and Architect's review will be for color and texture only. Compliance with other requirements is the exclusive responsibility of the Installer.
2. Submit 3, 12" long samples of exposed runner and molding. Architect's review will be for color and texture only. Compliance with other requirements is the exclusive responsibility of the Installer.

C. Maintenance Stock:

1. At the time of completing the installation, deliver stock of maintenance materials to the Owner. Furnish full size units matching the units installed, packaged with protective covering for storage and identified with appropriate labels. Furnish an amount equal to 5.0% of the amount installed.

1.06 JOB CONDITIONS:

- A. Space Enclosures: Do not install until interior acoustical panel ceilings unit space has been enclosed and is weather-tight, and until wet work in the space has been completed and is nominally dry and until work above ceilings has been completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.01 CEILING UNITS:

A. Acoustical Panels: (AT-1)

1. Provide 2 x 2 fiberglass units with a scrubbable vinyl film facing (UV protected), not less than 5/8" thick. NRC min. 0.55, CAC 35, light reflectance min. 0.86.
2. Acceptable Products:
  - a. USG: Item No. 5896 "Touchstone Clima Plus".
3. Install in 15/16" exposed tee grid.

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B. Acoustical Panels: (AT-2) NOT USED

C. Acoustical Panels: (AT-3) NOT USED

D. Acoustical Panels: (AT-4)

1. Provide 24" x 24" wet-formed high-density mineral fiber units not less than 5/8" thick. NRC 0.5, CAC 35, light reflectance 0.84, beveled tegular edge.
2. Acceptable Products:
  - a. Certainteed Item No.: " Schoolboard" FF5B-157
3. Install in 15/16" exposed tee grid.

E. Acoustical Panels: (AT-5)

1. Provide 24" x 24" x 3/4" wet formed mineral fiber units with a soil resistant polyester film, min. NRC 0.55, min. CAC 35, Class A, light reflectance over 79%, square lay-in.
2. Acceptable Products:
  - a. Armstrong: Item No. 1715 & 1720 "Clean Room FL Field & Border" panels.
  - b. Certainteed: Item No. 1222-RXS-1, Symphony m70Rx.
  - c. USG: Item No. 56060, "Clean Room Acoustical Panels".
3. Install in 15/16" exposed tee grid.

2.03 CEILING SUSPENSION MATERIALS:

A. General: Comply with ASTM C 635, as applicable to an intermediate duty suspension system. Coordinate with other work supported by or penetrating through the ceilings, including light fixtures and HVAC equipment.

B. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung.

1. Hanger Wires: Galvanized carbon steel, ASTM A 641, soft temper, prestretched, yield-stress load of at least 3 times design load but not less than 12 USWG.

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C. Exposed Suspension System: Exposed systems compatible with tiles specified and as follows:

1. 15/16" Systems
  - a. Armstrong - 15/16" Prelude XL exposed tee grid.
  - b. CertainTeed - 15/16" Classic Aluminum Capped Stab System.
  - c. Donn - DX24 System; USG Interiors
  - d. Chicago Metallic Corp: 1200 System.

Note: In areas of sanitary line replacement not requiring a completely new ceiling grid use Donn DX24; USG Interiors.

D. Edge Moldings: Manufacturer's standard channel molding for grid type used for edges and penetrations of ceiling, with a single flange of molding exposed, finish to match grid.

2.04 MISCELLANEOUS MATERIALS:

- A. Acoustical Sealant: A heavy-bodied, non-shrinking, non-drying, non-sag grade mastic compound intended for interior sealing of concealed construction joints.
- B. Tile Cement: As recommended by tile manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION WORK:

- A. Installer must examine the conditions under which the acoustical ceiling work is to be performed and notify the General Contractor, in writing, of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid the use of less-than-half widths units at borders, and comply with reflected ceiling plans wherever possible.

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3.02 INSTALLATION:

- A. General: Install material in accordance with manufacturer's printed instructions and comply with governing regulations as indicated, and industry standards applicable to the work.
- B. Install suspension systems to comply with ASTM C 636 with hangers supported only from building structural members as indicated. Locate hangers near each end and spaced 4' - 0' along direct-hung runners, unless otherwise indicated.
  - 1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for the substrate, and which will not deteriorate or fail with age or elevated temperatures.
- C. Install edge moldings at edges of each acoustical ceiling area and at locations where edge of units would otherwise be exposed after completion of the work, except where adhesively applied.
  - 1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed pm back of vertical leg before fastening to vertical surface.
  - 2. Secure moldings to building construction by fastening with screw-anchors into the substrate through holes drilled in not more than 16" o.c. along each molding.
  - 3. Level moldings with ceiling suspension system to level tolerance of 1/8" in 12' - 0".
  - 4. Miter corners of moldings accurately to provide hair-line joints, securely connected to prevent dislocation.
- D. Cope exposed flanges of intersection suspension system members so that flange faces will be flush (cope flange of member supported by other member) except as otherwise indicated.

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- E. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at penetrations.
- F. Install edge trim moldings where indicated and elsewhere as needed to conceal edges of acoustical units which would otherwise be exposed to view after completion of the work. Anchor with fasteners, or if not possible, secure in place with permanent adhesive.

3.03 CLEANING AND PROTECTION:

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and required to permanently eliminate evidence of damage.
- B. The Installer shall advise the General Contractor of required protection for the acoustical panel ceilings, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION 09510

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SECTION 09650 - RESILIENT FLOORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of resilient flooring and accessories is shown on the drawings and in schedule indicated as "LVT" for "Luxury Vinyl Tile Floor".

1.03 QUALITY ASSURANCE:

- A. Wherever possible, provide resilient flooring and accessories produced by a single manufacturer.
- B. Fire Test Performance: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.
  - 1. Critical Radiant Flux (CRF): Not less than 0.45 watts per sq. cm. per ASTM E 648.
  - 2. Flame Spread: Not more than 75 per ASTM E 84.
  - 3. Smoke Developed: Not more than 450 per ASTM E 84.
  - 4. Smoke Density: Not more than 450 per ASTM E 662.

1.04 SUBMITTALS:

- A. Product Data:
  - 1. For information only, submit a PDF copy of manufacturer's technical data and installation instructions for each type of resilient flooring and accessory. Transmit a copy of each installation instruction to the Installer.

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B. Samples:

1. Submit (3) three sets of samples of each type, color and finish of resilient flooring and accessory required. Provide full-size tile units and 6" long sample of accessory. Include full range of flooring color and pattern variation. Sample submittals will be reviewed for color, texture and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

C. Maintenance:

1. Submit a PDF copy and (2) two copies of manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring and accessories.

1.05 JOB CONDITIONS:

- A. Continuously heat areas to receive flooring to 70 degrees F. for at least 48 hours prior to installation, when project conditions are such that heating is required. Maintain 70 degrees F. temperature continuously during and after installation, as recommended by flooring manufacturer, but for not less than 48 hours.

1.06 EXTRA STOCK

- A. Deliver to the Owner, for his use in future modifications, an extra stock of approximately 10% of each color and pattern in each material installed under this Section, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

PART 2 - PRODUCTS

2.01 TILE FLOORING: (LVT Flooring)

- A. Mannington Commercial Amtico Signature Collection/Wood:
  1. Sizes: 6" x 36"
  2. Thickness: 0.098"
  3. Finish: Non-ortho phthalate
  4. Edge Treatment: Micro bevel
  5. Static Load: ASTM F970-passes, 2000 psi, residual indent  $\leq$  0.005"
  6. Slip Resistance: ASTM C1028: passes  $\geq$  0.5 leather, 0.6 rubber
  7. 25 year limited commercial wear warranty

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8. Recyclability: Contains 3% rapidly renewable resource content
9. Wear Layer: 40 mil (quantum guard elite)
10. Contact: Aaron Brown 248-930-0030
11. ASTM F1700 Class III, Type 'B'.
12. Color: Tranquil Grain (Arow 8300)
13. Adhesive: RP-18

2.02 ACCESSORIES:

A. Resilient Base:

1. Provide vinyl base (Johnsonite vinyl wall base CB) complying with ASTM F-1861, Type TS, rubber, as follows:
  - a. Height: 4" - refer to drawings for locations.
  - b. Thickness: 1/8"
  - c. Style: Standard top-set cove.
  - d. Provide with preformed inside and outside corners.
  - e. Roll length: Not less than 100 feet.
  - f. Install per manufacturers specs to maintain warranty.
  - g. Color: As selected by Architect.

B. Resilient Moulding/Reducer/Floor Finishing Accessories:

1. Provide vinyl nosings for resilient floor covering reducer strip for resilient floor covering, joiner for tile and carpet, or at junction between two dissimilar materials (new/new or new/existing), where shown on drawings and/or required.
  - a. Provide accessories as manufactured by Johnsonite, as follows:
    - i. Carpet to LVT: CTA-XX-D
2. LVT to PCT: Schluter Schiene-E
  - a. Color to be determined by Architect from manufacturer's standard colors.
  - b. Install per manufacturer's standard specifications to maintain warranty.

C. Adhesives (cements): As recommended by flooring contractor to suit material and substrate conditions.

D. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.



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PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine the areas and conditions under which resilient flooring and accessories are to be installed and notify the General Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 PREPARATION:

- A. Prior to laying flooring, broom clean or vacuum surfaces to be covered and inspect subfloor. Start of flooring installation indicates acceptance of subfloor conditions and full responsibility for completed work.
  - 1. Use leveling compound as recommended by flooring manufacturer for filling small cracks and depressions in subfloors.
  - 2. Perform moisture tests on concrete slabs to determine that concrete surfaces are sufficiently cured and ready to receive flooring.
  - 3. Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

3.03 INSTALLATION:

- A. General:
  - 1. Install flooring after finishing operations, including painting, have been completed and permanent heating system is operating. Moisture content of concrete slabs, building air temperature, and relative humidity must be within limits recommended by flooring manufacturer.
  - 2. Place flooring with adhesive cement in strict compliance with manufacturer's recommendations. Butt tightly to vertical surfaces, thresholds, nosing and edgings. Scribe around obstructions and produce neat joints, laid tight, even and straight. Extend flooring into toe spaces, door reveals and into closets and similar openings.

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3. Maintain reference markers, holes or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.
4. Maintain overall continuity of color and pattern with pieces of flooring installed in these covers. Tightly cement edges to perimeter of floor around covers and to covers.
5. Tightly cement flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks or other surface imperfections.

B. Tile Floors:

1. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of the room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.
2. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged. Cut tile neatly to around all fixtures. Broken, cracked, chipped or deformed tile are not acceptable.

C. Accessories:

1. Apply resilient base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in as long lengths as practicable, with preformed corner units or fabricated from base materials with mitered or coped inside corners. Tightly bond base to backing throughout the length of each piece, with continuous contact at horizontal and vertical surfaces.
  - a. On masonry surfaces or other similar irregular surfaces, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
2. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at all unprotected edges of flooring, unless otherwise shown.

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3. Apply resilient accessories at stair systems as indicated and in strict conformance to manufacturer's installation instructions.

3.04 CLEANING AND PROTECTION:

- A. Remove any excess adhesive or other surface blemishes, using neutral type cleaners as recommended by flooring manufacturer. Protect installed flooring from damage by covering.
- B. Finishing: After completion of project and just prior to final inspection of work, thoroughly clean floors and accessories.
- C. Apply sealant in compliance with flooring manufacturer's instructions.

END OF SECTION 09650

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SECTION 09970 - TNEMEC COATING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coating systems for concrete walls, concrete structure/precast concrete, interior masonry walls, new and previously painted interior steel (metal doors, frames, grilles, etc.) and gypsum board.

1.2 REFERENCES

- A. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer and Related Products.
- B. SSPC-SP 2 - Hand Tool Cleaning.
- C. SSPC-SP 3 - Power Tool Cleaning.
- D. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.
- E. SSPC-SP 11 - Power Tool Cleaning to bare metal.
- F. SSPC-SP 13/NACE 6 Surface Preparation of Concrete
- G. ICRI - Concrete Surface Preparation Standards

1.3 DEFINITIONS

- A. Definitions of Painting Terms: ASTM D 16, unless otherwise specified.
- B. Dry Film Thickness (DFT): Thickness of a coat of paint in fully cured state measured in mils (1/1000 inch).
- C. Concrete Surface Standard (CSP): Standard for roughness of the surface profile of the concrete measured 1-9 with 9 being the roughest measured with a visual mold.

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1.4 SUBMITTALS

- A. Comply with Section 01340 - "Shop Drawings, Product Data and Samples".
- B. Product Data: Submit manufacturer's product data for each coating, including generic description, complete technical data, surface preparation and application instructions.
- C. Color Samples: Submit manufacturer's color samples showing full range of standard colors.
- D. Manufacturer's Quality Assurance: Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
- E. Applicator's Quality Assurance: Submit list of a minimum of 5 completed projects of similar size and complexity to this Work. Include for each project:
  - 1. Project name and location.
  - 2. Name of owner.
  - 3. Name of contractor.
  - 4. Name of architect.
  - 5. Name of coating manufacturer.
  - 6. Approximate area of coatings applied.
  - 7. Date of completion.
- F. Warranty: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
  - 1. Specialize in manufacture of coatings with a minimum of 10 years successful experience.
  - 2. Able to demonstrate successful performance on comparable projects.
  - 3. Single Source Responsibility: Coatings and coating application accessories shall be products of a single manufacturer.
- B. Applicator's Qualifications:
  - 1. Experienced in application of specified coatings for a minimum of 5 years on projects of similar size and complexity to this Work.
  - 2. Applicator's Personnel: Employ persons trained for application of specified coatings.

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- C. Preapplication Meeting: Convene a pre-application meeting [2] two weeks before start of application of coating systems. Require attendance of parties directly affecting work of this section, including Contractor, Architect, applicator and manufacturer's representative. Review the following:
    - 1. Environmental requirements.
    - 2. Protection of surfaces not scheduled to be coated.
    - 3. Surface preparation.
    - 4. Application.
    - 5. Repair.
    - 6. Field quality control.
    - 7. Cleaning.
    - 8. Protection of coating systems.
    - 9. One-year inspection.
    - 10. Coordination with other work.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
    - 1. Coating or material name.
    - 2. Manufacturer.
    - 3. Color name and number.
    - 4. Batch or lot number.
    - 5. Date of manufacture.
    - 6. Mixing and thinning instructions.
  - B. Storage:
    - 1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.
    - 2. Keep containers sealed until ready for use.
    - 3. Do not use materials beyond manufacturer's shelf life limits.
  - C. Handling: Protect materials during handling and application to prevent damage or contamination.
- 1.7 ENVIRONMENTAL REQUIREMENTS
- A. Weather:
    - 1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.

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2. Surface Temperature: Minimum of 5 degrees F (3 degrees C) above dew point.
3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.

B. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with manufacturer's instructions.

C. Dust and Contaminants:

1. Schedule coating work to avoid excessive dust and airborne contaminants.
2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Tnemec Company Incorporated, 6800 Corporate Drive, Kansas City, Missouri 64120-1372. Toll Free (800) 863-6321. Phone (816) 483-3400. Fax (816) 483-3969. Web Site [www.tnemec.com](http://www.tnemec.com). Contact: Trent McNutt, cell (419)346-8795 office (614) 850-8160

2.2 CONCRETE WALLS/STRUCTURAL CONCRETE/PRECAST CONCRETE

A. Chemical Exposure, Physical Abuse:

1. System Type: Waterborne acrylic epoxy.
2. Surface Preparation: SSPC-SP 13/ICRI-CSP 2-3.
3. Prime Coat: Tnemec Series 113 H.B. tneme-tufcoat at 4.0 to 6.0 mils DFT.
4. Finish Coat: Tnemec Series 113 H.B. tneme-tufcoat at 4.0 to 6.0 mils DFT.

2.3 INTERIOR MASONRY WALLS

A. Chemical Exposure, Physical Abuse:

1. System Type: Waterborne cementitious acrylic/waterborne acrylic epoxy.
2. Surface Preparation: Clean and dry.
3. Prime Coat: Tnemec Series 130 envirofill at manufacturers recommended spreading rate.
4. Intermediate Coat: Tnemec Series 113 H.B. tneme-tufcoat at 4.0 to 6.0 mils DFT.
5. Finish Coat: Tnemec Series 113 H.B. tneme-tufcoat at 4.0 to 6.0 mils DFT.

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6.0 mils DFT.

2.4 PREVIOUSLY PAINTED INTERIOR STEEL (METAL DOORS, METAL FRAMES,  
GRILLES, ETC.)

A. Chemical Exposure, Physical Abuse:

1. System Type: Modified aromatic polyurethane/waterborne epoxy-amine adduct/ceramic modified waterborne aliphatic polyurethane.
2. Surface Preparation: SSPC-SP 2/3 hand/power tool cleaning.
3. Prime Coat: Tnemec Series 1 omnithane at 2.5 to 3.5 mils DFT.
4. Intermediate Coat: Tnemec Series 287 enviro-pox at 2.0 to 3.0 mils DFT.
5. Finish Coat: Tnemec Series 297 enviro-pox at 2.0 to 3.0 mils DFT.

2.5 NEW PAINTED INTERIOR STEEL (METAL DOORS, METAL FRAMES, ETC.)

A. Chemical Exposure, Physical Abuse:

1. System Type: Modified aromatic polyurethane/waterborne epoxy-amine adduct/ceramic modified waterborne aliphatic polyurethane.
2. Surface Preparation: Clean, dry and free of oil, grease and other contaminants.
3. Prime Coat: By manufacturer of doors and frames.
4. Intermediate Coat: Tnemec Series 297 enviro-glaze at 2.0 to 3.0 mils DFT.
5. Finish Coat: Tnemec Series 297 enviro-glaze at 2.0 to 3.0 mils DFT.

2.6 INTERIOR GYPSUM BOARD

A. Chemical Exposure, Physical Abuse, Impact:

1. System Type: 100% solids epoxy.
2. Surface Preparation:
3. Prime Coat: Tnemec Series 201, epoxoprime 6.0 to 8.0 mils DFT.
4. Intermediate Coat: Tnemec Series 270 stranlok, 25.0 to 40.0 mils DFT.
5. Finish Coat: Tnemec Series 280 tnome-glaze 6.0 to 8.0 mils DFT.
6. Total DFT: 37.0 to 56.0 mils.



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2.7 ACCESSORIES

A. Coating Application Accessories:

1. Accessories required for application of specified coatings in accordance with manufacturer's instructions, including thinners.
2. Products of coating manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which coating systems are to be applied. Notify the General Contractor in writing of areas or conditions not acceptable. Do not begin surface preparation or application until unacceptable areas or conditions have been corrected.

3.2 PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED

- A. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
- B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

3.3 SURFACE PREPARATION OF STEEL

- A. Prepare steel surfaces in accordance with manufacturer's instructions.
- B. Fabrication Defects:
1. Correct steel and fabrication defects revealed by surface preparation.
  2. Remove weld spatter and slag.
  3. Round sharp edges and corners of welds to a smooth contour.
  4. Smooth weld undercuts and recesses.
  5. Grind down porous welds to pinhole-free metal.
  6. Remove weld flux from surface.
- C. Ensure surfaces are dry.

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- D. Interior Steel Surfaces, Moderate to Severe Exposure: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter in accordance with SSPC-SP6.
- E. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.
- F. Primer: Prepare field primer to receive field coat in accordance with manufacturer's instructions.

3.4 SURFACE PREPARATION OF CONCRETE

- A. Prepare concrete surfaces in accordance with manufacturer's instructions.
- B. Defects
  - 1. Remove spalled or deteriorated areas.
  - 2. Remediate concrete surfaces per Section 03730 "Concrete Rehabilitation". Let remediated areas cure per manufacturers recommendations.
  - 3. Remove deteriorated mortar joints in masonry. Tuckpoint and cure per manufacturer's recommendations.
- C. Ensure surfaces are dry.
- D. Remove visible oil, grease, dirt, dust, rust stains, paint, and other foreign matter in accordance with SSPC - SP13/NACE 6 surface preparation of concrete.
- E. Primer: Prepare field primer to receive field coat in accordance with manufacturer's instructions.

3.5 SURFACE PREPARATION OF GYPSUM BOARD SURFACES

- A. Prepare gypsum materials in accordance with manufacturer's instructions.
- B. Defects: Repair drywall surfaces of nail holes, scratches, dents, holes and other surface imperfections per 09250 gypsum drywall. Sand joint compound smooth and feather edge.
- C. Ensure surfaces are dry and free of oil, grease, curing

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compounds/sealers, dirt, dust, and other contaminants.

- D. Primer: Prepare field primer to receive field coat in accordance with manufacturer's instructions.

3.6 APPLICATION

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions.
- C. Keep containers closed when not in use to avoid contamination.
- D. Do not use mixed coatings beyond pot life limits.
- E. Use application equipment, tools, pressure settings and techniques in accordance with manufacturer's instructions.
- F. Uniformly apply coatings at spreading rate required to achieve specified DFT.
- G. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.
- H. Stripe paint with brush critical locations on steel such as welds, corners and edges using specified primer.

3.7 REPAIR

- A. Materials and Surfaces Not Scheduled To Be Coated: Repair or replace damaged materials and surfaces not scheduled to be coated.
- B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture or color.
- C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

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3.8 FIELD QUALITY CONTROL

A. Inspector's Services:

1. Verify coatings and other materials are as specified.
2. Verify surface preparation and application are as specified.
3. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges.
4. Coating Defects: Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
  - a. Check for holidays on interior steel immersion surfaces using holiday detector.
5. Report:
  - a. Submit written reports describing inspections made and actions taken to correct nonconforming work.
  - b. Report nonconforming work not corrected.
  - c. Submit copies of report to Architect, Owner's Representative and General Contractor.

- B. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

3.9 CLEANING

- A. Remove temporary coverings and protection of surrounding areas and surfaces.

3.10 PROTECTION OF COATING SYSTEMS

- A. Protect surfaces of coating systems from damage during construction.

3.11 ONE-YEAR INSPECTION

- A. Owner will set date for one-year inspection of coating systems.
- B. Inspection shall be attended by Owner, Contractor, Architect and manufacturer's representative.
- C. Repair deficiencies in coating systems as determined by Architect in accordance with manufacturer's instructions.

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SECTION 10100 - MARKERBOARDS AND TACKBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of markerboards and tackboards is shown on the drawings.
- B. The types of boards required include the following:
  - 1. Vinyl-faced tackboards.
  - 2. Porcelain enamel dry markerboards.

1.03 QUALITY ASSURANCE:

- A. Fire Hazard Classification: Provide materials bearing UL label and marking indicating fire hazard classification of marking and tack surfaces, as determined by ASTM E 84, Class A and as follows.
  - 1. Flame spread not more than 25.
  - 2. Fuel contributed not more than 35.
  - 3. Smoke developed not more than 50.
- B. In addition to the requirements of these specifications, comply with manufacturer's instructions and recommendations for all phases of the work, including preparation of substrate, installation of grounds and anchors, and application of materials.
- C. Provide colors of material for marking markerboards and tackboards as selected by the Architect from manufacturer's standard colors.
- D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible to ensure proper fitting of the work. However, do not delay job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.

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1.04 SUBMITTALS:

A. Product Data:

1. For information only, submit a PDF of manufacturer's technical data and installation instructions for each material and component part. Include methods of installation for each type of substrate to receive units. Transmit copy of each instruction to the Installer.

B. Samples:

1. Submit (3) three sets of samples for each color of markerboard and tackboard, trim, and accessories required. Provide 12" square samples of sheet materials and 12" lengths of trim members. Architect's review of samples will be for color, pattern, and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

C. Shop Drawings:

1. Submit shop drawings for markerboard and tackboard units. Include full-scale sections of typical trim members and dimensioned elevations. Show anchors, ground reinforcement, accessories, and installation details.

PART 2 - PRODUCTS

2.01 TACKBOARD:

A. Balanced Laminated Three-ply Construction:

1. Vinyl Fabric: Claridge
  - a. Texture: Fabricork
  - b. Colors as selected by Architect.
2. Backing: Single layer 1/2" thick.
3. Wrap all edges.

B. Manufacturer: Provide tackboard produced by one of the following:

1. Alliance Wall Corp.
2. Claridge Products and Equipment, Inc. (Basis of Design)
3. Polyvision Corp.
4. Newline
5. Marsh Industries

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6. Provide (3) 4'-0"H x 3'-0"W tackboards to be field located as directed by the Sheriff's Department.

2.02 MARKERBOARD:

- A. LCS Liquid Chalk Porcelain Enamel Writing Surface.
  1. Porcelain enamel finish on 24 gauge steel.
  2. Core: 3/8" thick particle board core complying with ANSI A208.1 Grade 1-M-1.
  3. Backing Sheet: 0.015" aluminum sheet.
- B. Manufacturer:
  1. Claridge Products & Equipment, Inc. (Basis of Design)
  2. Polyvision
  3. Newline
  4. Marsh Industries

2.03 TRIM AND ACCESSORIES:

- A. General: Fabricate frames and trim of not less than 0.062" thick aluminum alloy, size as shown to suit type of installation. Provide straight, single-length units wherever possible and keep joints to a minimum. Miter corners to a neat, hairline closure. Furnish exposed aluminum trim, accessories, and fasteners with satin anodized finish AA-M31A31, unless otherwise indicated.
  1. Except as otherwise indicated, provide manufacturer's standard "narrow" trim units, approximately 1/2" wide.
  2. When structural support accessories are required for markerboards and tackboards in addition to normal trim, provide such additional support or modify trim as required to provide necessary support.
    - a. Provide snap-on trim with no visible screws or exposed joints.
- B. Chalktrough: Furnish continuous aluminum chalktrough for each markerboard unless otherwise indicated as follows:
  1. Solid extrusion, manufacturer's standard continuous box type, aluminum marker tray with slanted front and cast. Aluminum end closures for each markerboard.
- C. Map rails, map hooks (2 map hooks for every 48" of map rail), map rail end stops for all markerboards and tackboards.

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2.04 FABRICATION:

- A. Provide factory-assembled markerboards and tackboards.
- B. All boards are to be in sizes indicated on plans. Boards are to be wall mounted in a stationary position.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine the areas and conditions under which units are to be installed and notify the General Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION:

- A. Install new boards in locations and mounting heights as shown on the drawings and in accordance with the manufacturer's instructions. Provide all grounds, clips, backing materials, brackets, and anchors for a complete installation.
- B. Deliver factory-built new markerboard and new tackboard units completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length, as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit at the factory, disassemble for delivery, and make final joint at the site. Use splines at joints to maintain surface alignment and smooth joints.
- C. Install new units with concealed hangers plumb and level, in accordance with the manufacturer's printed instructions.
- D. Coordinate job-assembled units with grounds, trim, and accessories. Join all parts with neat, precision fit.

END OF SECTION 10100



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SECTION 10160 - TOILET PARTITIONS

PART 1 - GENERAL

1.01 SUBMITTALS:

- A. Plastic compartment work includes the following, where indicated:
  - 1. Floor mounted overhead-braced compartments.
- B. Furnish all labor and materials necessary for the completion of work in this section as shown on the contract drawings and specified herein.
- C. Work in this section shall include, but is not limited to:
  - 1. Toilet compartments, urinal screens, shower compartment panels and doors.
  - 2. Hardware for toilet/shower compartments and urinal screens.
  - 3. Shop drawings and working drawings.
  - 4. Manufacturer's guarantee/warranty.
- D. Related work specified elsewhere shall include accessories and anchorage/blocking for attachment of partitions.

1.02 PRODUCT:

- A. Submit a PDF of shop drawings and details for Architect's approval.
- B. Colors shall be selected from the manufacturer's full range of colors.
- C. Submit (3) three 6" square color samples of each color and hardware samples for approval by the Architect.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

- A. Provide toilet partitions and screens by one of the following manufacturer's:
  - 1. SCRANTON PRODUCTS 801 E. Corey Street, Scranton, PA, 570-343-0997.
  - 2. Bradley Corp., P.O. Box 309, Menomonee Falls, WI, 1-800-272-3539.
  - 3. ASI Global Partitions, 2171 Liberty Hill Road, Eastanollee, Georgia, 1-706-827-2700.

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2.02 MATERIALS:

- A. Doors, panels, pilasters and privacy screens and supports shall be 1" thick constructed from High-Density Polyethylene (HDPE) resins. Partitions and privacy screens shall be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.

2.03 CONSTRUCTION:

- A. Doors, panels, pilasters and privacy screens shall be 1" thick with all edges rounded to a ¼" radius.
- B. Doors and dividing panels shall be 55" high and mounted at 14" above the finished floor. Fasten an aluminum heat sink to the bottom edges.
- C. Pilasters shall be 82" high (standard) and fastened into a 3" high pilaster shoe with a stainless steel, torx head sex bolts.

2.04 HARDWARE:

- A. Door hardware shall be as noted:
  - 1. Hinges shall be integral, fabricated from the door and pilaster with no exposed metal parts, adjustable in 30 degree increments to hold door open up to 90 degrees.
  - 2. Door strike/keeper shall be 6" long and made of heavy-duty extruded aluminum (6436-T5 alloy) of either an anodized finish or a bright dipped anodized finish, with wrap around flanges and secured to the pilasters with stainless steel, torx head sex bolts. Bumper shall be made of extruded black vinyl.
  - 3. Latch and housing shall be made of heavy-duty extruded aluminum (6463-T5 alloy). The latch housing shall have either an anodized finish or a bright dipped anodized finish, and the slide bolt and button shall have a black anodized finish.
  - 4. Each door shall be supplied with one coat bumper/hook and (2) two door pulls made of chrome plated zamak. Outswing doors shall be supplied with a door stop made of chrome plated zamak.

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- B. Plaster shoes shall be 3" high (type 304, 20 gauge) stainless steel. Pilaster shoes shall be secured to the pilaster with a stainless steel, torx head sex bolt.
- C. Wall brackets for partitions and urinal screens shall be 1½" stirrup type made of heavy-duty aluminum (6463-T5 alloy) with either an anodized or a bright dipped anodized finish. Stirrup brackets shall be fastened to pilasters and panels with stainless steel, torx head sex bolts.
- D. Headrail shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with anti-grip design and integrated curtain track. The headrail shall have an anodized finish and shall be fastened to the headrail bracket by a stainless steel, torx head sex bolt, and fastened to the top of the pilasters with stainless steel, tamper resistant torx screws. (omit headrail at Shower compartments).
- E. Headrail brackets shall be of heavy duty extruded aluminum with an anodized finish or 20 gauge stainless steel with a satin finish, and secured to the wall with #14 stainless steel screws.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Examine areas to receive toilet and shower partitions/compartments and urinal screens for correct height and spacing of anchorage/bolting and plumbing fixtures that may affect installation of partitions/compartments. Report any discrepancies to the General Contractor.
- B. Take complete and accurate measurements of complete toilet and shower compartment locations.
- C. Start of work constitutes acceptance of job.

3.02 INSTALLATION:

- A. Install partitions rigid, straight, plumb, and level, with plastic laid out as shown on shop drawings and manufacturer's installation instructions.
- B. All doors and panels to be mounted at 14" above finished floor.

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- C. Clearances at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8".
- D. Clearances at pilasters and panels shall be uniform top to bottom and shall not exceed 1/2"
- E. Clearances between panels and walls shall be uniform top to bottom and shall not exceed 1".
- F. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- G. Finished surface shall be cleaned after installation and be left free of all imperfections.

3.03 WARRANTY:

- A. Submit manufacturer's standard guarantee for HDPE plastic against breakage, corrosion, and delamination under normal conditions for (15) years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. (Labor not included in warranty).

END OF SECTION 10160

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SECTION 10400 - IDENTIFICATION DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.02 SUMMARY

- A. Provide labor, materials, and equipment necessary for the complete installation of identifying devices as indicated, including:

- 1. Interior Signage

1.03 SUBMITTALS:

- A. Submit product data for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Submit Shop Drawings showing fabrication and erection of signs. Include plans, elevations, and large scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details.
- C. Signage shall have 2 colors, background and letters. Match sample provided by Architect.
- D. Provide samples for verification of color, pattern, and texture selected and compliance with requirements indicated:

- 1. Cast Acrylic Sheet: Provide a sample panel not less than 8-1/2 inches by 11 inches for each material, color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

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1.04 QUALITY ASSURANCE:

- A. Reference Codes and Specifications: Michigan Building Code, 2015 Edition.
- B. Signage shall be provided to conform with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and State and Local Regulations.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

- A. Manufacturers: (Interior Signage) Subject to compliance with requirements, provide signage by one of the following:
  - 1. ASI Sign Systems, Indianapolis, Indiana; Cincinnati, Ohio; Cleveland, Ohio
  - 2. Diskey Sign Corp. Fort Wayne, Indiana
  - 3. Roban, Lakemore, Ohio
  - 4. Best Signs, Montrose, Colorado
  - 5. J.L. Geisler, Inc. Michigan
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect's approval must be accompanied by the "Substitution Request Form" and complete technical data for evaluation. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.
  - 1. Refer to Section 01600 "Material & Equipment" for Substitution Requests and Sections 01251 "Substitution Request During Bidding" and 01252 "Substitution Request After Bidding/Negotiation Phase" for additional requirements.

2.02 MATERIALS:

- A. Cast Acrylic Sheet: Provide cast (no extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thicknesses indicated, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 degrees F and of the following general types:
  - 1. Thickness: 1/8 inch.
  - 2. Colors as selected from manufacturers full line.

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- B. Fasteners: Use concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface.
- C. Anchors and Inserts: Use nonferrous metal or hot dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete masonry work.
- D. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background color that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for the application intended.

2.03 INTERIOR SIGNAGE:

A. Signage, General:

- 1. Graphic Process; Raised letters and Braille shall be formed as an integral part of the sign face. Surface applied letters and Braille are not allowed.
- 2. Letters: Letters and numbers shall have width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Letters and numbers shall be raised 1/32 inch, uppercase, sans serif or simple sans serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be 5/8 inch high minimum and 2 inches high maximum.
- 3. Ease sign edge and radius corners 3/8 inch.
- 4. Material
  - a. Acrylic plastic

B. Toilet Room Handicapped Signs

- 1. Provide one sign depicting International Men/Women Symbol along with the words "Men's Lockers" or "Women's Lockers" indicated on the sign at each Locker Room, equipped with facilities for the handicapped as indicated on the Signage Schedule.

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- C. Interior Room Name and Number Signs
  - 1. Layout of room name and number shall be as directed by the Architect.
  - 2. Number of signs required:
    - a. One at each handicapped accessible Locker Room and one at Evidence/Technical. Refer to Signage Schedule.
  - 3. Provide signs with clear acrylic name plate as indicated on Signage Types.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. General: Located sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
  - 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- B. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the method indicated below:
  - 1. Mount with adhesive as recommended by manufacturer.
  - 2. Mount with nonremovable oval head screws, using plastic plugs where mounted on masonry.

3.02 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 10400



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SECTION 105000A - METAL LOCKERS (ALTERNATE NO. 1 AND 2)

PART 1 - GENERAL

1.1 Related documents

- A. Drawings and general provisions of the contract, including general and supplementary conditions and division 1 specification sections, apply to this section.

1.2 SUMMARY

- A. This section includes the following:

Personal storage lockers, personal storage lockers with built-in bench drawers, personal storage lockers with built-in external access drawers and metal shelving units.

- B. Related work, not furnished:

- 1. Finish floor covering material and installation.

Related sections:

- 2. Section 01100 Alternates
- 3. Section 09650 Resilient Flooring

1.3 REFERENCES

- A. American National Standards Institute (ANSI) Standards:  
Applicable standards for fasteners used for assembly.

- B. American Society for Testing and Materials (ASTM) Standards:  
Applicable Standards for Steel Sheet Materials used for  
Fabrication

Applicable Standards for the Testing of Electrostatically  
Applied Powder Coat Paint

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- C. American Institute of Steel Construction (AISC) Standards:  
Applicable Standards for Steel Materials used for  
Fabrication.

1.4 DESCRIPTION

- A. General: Welded Metal Lockers only with end-user reconfigurable interior. Specialized lances to provide the flexibility of on-site, end-user reconfiguration/addition of internal components anytime, anywhere, now or in the future.

B. Finishes:

Fabricated Metal Components and Assemblies: All components to be painted with an electro-statically applied Powder Coat paint that can meet or exceed test requirements set out by ASTM Standard D3451-06 Standard Guide for Testing Coating Powders and Powder Coatings.

C. Sizes :

Alternate No. 1:

Personal shelving units with adjustable shelving: nominal heights of 72" and nominal width of 13", 29" or 36" and nominal depth is 16" or 18" with (5) five adjustable metal shelves.

Personal storage lockers with built-in bench drawers: nominal heights of 74" or 80", built-in bench drawer nominal height is 18 inches and nominal width of 24" and nominal depth is 24" and 36 inches at the built in bench drawer.

Personal storage lockers: nominal heights of 76" or 84" and nominal width of 18" or 24" and nominal depth is 18" or 24".

Alternate No. 2:

Personal storage lockers: nominal heights of 80" and nominal width of 18" or 24" and nominal depth is 18" or 24".

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1.5 PERFORMANCE REQUIREMENTS

A. Design Requirements:

Limit overall width not to exceed specified nominal width;  
locker width designed for zero growth.

B. Seismic Performance: provide welded metal lockers capable of  
withstanding the effects of earthquake movement when required  
by applicable building codes.

1.6 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and  
installation instructions for each type of welded metal  
locker required. Include data substantiating that products  
to be furnished comply with requirements of the contract  
documents.

B. Shop drawings: show fabrication, assembly, and installation  
details, including descriptions of procedures and diagrams.  
Show complete locker installation layout, including  
quantities, locations and types of accessory units required.  
Include notations and descriptions of all installation items  
and components.

Show installation details at non-standard conditions, if any.  
Provide layout, dimensions, and identification of each unit,  
corresponding to sequence of installation procedures.

Provide installation schedule and procedures to ensure proper  
installation.

C. Samples: Provide (3) three of minimum 3 inches square example  
of each color and texture on actual substrate for each  
component to remain exposed after installation.

D. Color: Architect to select color from standard colors.

E. Warranty: Submit draft copy of proposed warranty for review  
by the architect.

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- F. Maintenance Data: Provide written documentation of the manufacturer's statement, claiming the maintenance free nature of the product.
- G. Reference List: Provide a list of recently installed welded metal lockers to be visited by owner, architect, and contractor. Intent of list is to aid in verifying the suitability of manufacturer's products and comparison with materials and product specified in this section. Include contact name, address, and phone numbers.

1.7 QUALITY ASSURANCE

- A. Manufacturer qualifications: engage an experienced manufacturer who is ISO 9001:2008 certified for the design, production, installation and service of welded metal lockers. Furnish certification attesting ISO 9001:2008 quality system registration.
- B. Installer Qualifications: Engage an experienced installer who is the manufacturer's authorized representative for the specified products for installing welded metal lockers.  
  
Minimum Qualifications: 1-year experience installing welded metal lockers of comparable size and complexity to specified project requirements.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Follow manufacturer's instructions and recommendations for delivery, storage and handling requirements.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify quantities of welded metal locker units before fabrication. Indicate verified measurements on shop drawings. Coordinate fabrication and delivery to ensure no delay in progress of the work.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating welded metal lockers units without

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field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.

1.10 SEQUENCING AND SCHEDULING

- A. Sequence welded metal lockers with other work to minimize possibility of damage and soiling, during remainder of construction period.
- B. Schedule installation of specified welded metal lockers after finishing operations, including painting, have been completed.
- C. Provide components, which must be built in at a time, which causes no delays in the general progress of the work.
- D. Pre-installation Conference: Schedule and conduct conference on project site to review methods and procedures for installing welded metal lockers including, but not limited to, the following:

Recommended attendees include:

- 1. Owner's Representative, Macomb County Facilities & Operations, and Sheriff's Department..
- 2. General Contractor.
- 3. The Architect.
- 4. Manufacturer's Representative.
- 5. Subcontractors or installers whose work may affect, or be affected by, the work of this section.

1.11 WARRANTY

- A. Provide a written warranty, executed by General Contractor, Installer, and Manufacturer, agreeing to repair or replace units, which fail in materials or workmanship within the established warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have under General Condition's provisions of the Contract Documents.

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- B. Limited Lifetime Warranty: Subject to the terms in the written warranty, warrant the original purchaser exclusively that the locker frames manufactured by it will be free from defects in materials and workmanship for the lifetime of the locker.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. General: FreeStyle™ Personal Storage with built-in bench drawers; based upon welded metal lockers manufactured by Spacesaver Corporation, 1450 Janesville Avenue, Fort Atkinson, Wisconsin 53538-2798. Contact Bart Spencer from The Casper Corporation (local Spacesaver Rep) 248-442-9000 ext. 15

2.2 BASIC MATERIALS

- A. General: Provide materials and quality of workmanship, which meets or exceeds established industry standards for products specified. Use furniture grade sheet metal, solid hardwood benches and fasteners for component fabrication unless indicated otherwise. Material thicknesses/gauges are manufacturer's option unless indicated otherwise.

2.3 LOCKER TYPES

ALTERNATE NO. 1:

- A. Personal Storage Lockers with built in bench drawer and slope tops (36" Depth at Built in Bench Drawer): F1: 24" x 24" x 72" H; and F2: 24" x 24" x 66" H. Provide personal lockers by Spacesaver Corporation. Qty: (59 total) - Men's Locker Room and (16 total) - Women's Locker Room. F7 (used for filler only): 24" x 24" x 72".
- B. Personal Storage Lockers with slope tops: F4: 24" x 24" x 72" H.; F5: 18" x 24" X 72" H.; F6: 24" x 18" x 72"H. Provide personal storage lockers by Spacesaver Corporation. Qty: (130 total) - Men's Locker Room - Upper Level.

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C. Metal Shelving: U1: 36" x 18" x 72"H; U2: 29" x 16" x 71<sup>3</sup>/<sub>4</sub>"; U3: 13" x 16" x 71<sup>3</sup>/<sub>4</sub>" by Spacesaver Corporation. Qty: (5 total or 1 of each) - Men's Locker Room. U4: 20" x 18" x 71<sup>3</sup>/<sub>4</sub>"; U5: 20" x 24" x 71<sup>3</sup>/<sub>4</sub>".

ALTERNATE NO. 2:

D. Personal Storage Lockers with sloped tops: F3: 18" x 24" x 72"H.; F8: 24" x 24" x 72" H.; F9: 24" x 18" x 72"H. No bottom drawer on all alternate no. 2 lockers (UPPER LEVEL LOCKERS ONLY). Qty: (130 total) - Men's Locker Room - Upper Level. (Quantity: 130 total).

E. Note:

1. All locker types to be equipped with the functionality of attaching a continuous sloped top.

2.4 MANUFACTURED COMPONENTS

A. Welded Frame:

1. The welded frame must consist of top, bottom, back, and sides constructed of a minimum of 18-gauge steel. All frame components shall be joined using resistance welding. Riveting of structural members will not be permitted.
2. Horizontal front flanges will be a minimum of 2 inches. Vertical front flanges will be a minimum of 1 inch. Horizontal and vertical flanges will overlap and be secured with a minimum two (2) resistance welds per corner.
3. Corner gussets shall be MIG and spot welded in each of the four front corners of the locker for increased stiffness and rigidity.
4. Provide side panel lances evenly spaced on 3 inch centers. Lances to provide the flexibility of on-site, end-user reconfiguration/addition of internal components anytime, anywhere, now or in the future.
5. Bench Housing for built-in bench drawer

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6. Welded frame construction shall consist of top, bottom, and side components joined by using resistance welding. Riveting of bench housing structural members will not be permitted.
7. Corner gussets shall be welded in the two (2) front bottom corners of the bench housing for increased stiffness and rigidity.
8. Horizontal front flanges will be a minimum of 1 inch.
9. Vertical front flanges will be a minimum of 1 inch.
10. Horizontal and Vertical front flanges will overlap and shall be secured with minimum of one (1) resistance weld per corner.
11. Side panels - Lances symmetric and evenly spaced to provide optimum component locations (standard based on 3 inch on center vertical placement to match mating locker lance design).
12. Return flanges on housing to securely fasten housing to welded frame of locker.
13. Base of bench housing shall include four (4) 3/8"-16 UNC threaded weld-nuts and corresponding leveling feet.
14. Top of bench housing shall include hole pattern for mating bench seat.
15. Sides of bench housing shall include mounting holes in the event lockers are ganged together.
16. Lockers with built-in bench drawer shall have intermediate base shelf with interlocking mechanism for securing drawer when locker door is closed.
17. Provide four (4) 0.875 inch diameter electrical knock-outs per locker, two (2) located on top of the locker in both right and left rear corners, and two (2) located in the back of locker centered at a distance no greater than 24 inches from the top and bottom. Knock-outs allow end-user flexibility of adding electrical capability to lockers.
18. Provide a minimum of four (4) duplex receptacle electrical knock-outs per locker; to be used with a UL listed manufactured electrical wiring system as



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required. This manufactured electrical wiring system is a simple, unique, flexible, and cost effective method of providing electrical capability to the lockers. This electrical system can be added in the future.

19. Top of the locker shall have four (4) duplex electrical knock-outs.
20. Top of locker shall have electrical duplex receptacle knock-outs located on both right and left side of locker.
21. Back panel of locker shall have a minimum of two (2) duplex electrical knock-outs.
22. Back of locker shall have electrical duplex receptacle knock-outs located on both right and left side of locker and no farther than 24 inches from the top of the locker.
23. Lockers shall be prepared with mounting holes for use with the continuous sloped top system.
24. Lockers shall be prepared with mounting holes for attaching necessary trim components
25. Locker shall be prepared with mounting holes for ganging lockers side-by-side
26. Base of lockers shall include four (4) 3/8"-16 UNC threaded weld-nuts and corresponding leveling feet.
27. Base shelf for lockers with built-in external access drawers and bench drawers shall have holes to accommodate double-door lock rod and door stop bracket. (only on 24 inch wide and larger)
28. End Panels: End Panels with no exposed fasteners shall be provided on the end of each locker run; thus providing a clean and aesthetically pleasing appearance.
29. All locker sizes and types to be specified by architect.

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30. Width:

- 1) Personal Storage Locker: 18,24 inches.
- 2) Personal Storage Locker with built-in bench drawer: 24 inches.
- 3) Personal Shelving with adjustable shelving: 13,29 or 36 inches

31. Height:

- 1) Personal Storage Locker: 76, 84 inches.
- 2) Personal Storage Locker with built in bench drawer: 74, 80 inches.
- 3) Personal Shelving with adjustable shelving: 72"

32. Depth:

- 1) All lockers 18 or 24 inches as indicated on drawings.
- 2) Bench drawers: 36 inches.
  - a) Bench seat depth 13.0 inches.
  - a) Leading edge of bench seat to extend 1.125 inches from front of bench drawer.
- 3) Personal Shelving with adjustable shelving: 16" or 18"

B. Drawers (for bench drawer for Alternate No. 1 only):

1. Drawer body wrapper shall have welded frame construction. Riveting of structural members will not be permitted.
2. Drawers for locker with built-in bench drawers and built-in external access drawers shall have box-formed drawer front.
3. Provide interlock system for securing drawer when main locker doors are closed and provide access only when main locker door/s is opened.
4. Built-in bench drawer shall have a nominal 36 inches depth.

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5. Provide a flush mounted pull handle.
6. Drawer Slides: Provide 200 lbs maximum load capacity and pass 50,000 cycle performance testing (Max. load, uniform distribution) (Test data to be provided by manufacturer upon request)
7. Drawer base minimum 21 inches drawer extension
8. Bench drawer minimum 26.5 inches drawer extension
9. Provide louvered air vents in drawer front when built-in bench drawer or built-in external access drawer models are required.

C. Bench Seat:

1. Provide 13.0 inches deep laminated kiln dried maple bench seat; material thickness 1.25 inches.
2. Front (leading edge) of bench seat to have .625 inch radius bull nose.
3. Finish of bench seat shall be sanded smooth and have two (2) coats of catalyzed varnish applied.

D. Single-Piece Welded Doors (Single and Double Door Models):

1. Shall be formed from two (2) pieces of minimum 18-gauge cold rolled steel box formed and welded together using modern GMAW techniques. Single-piece door with inner and outer door panels shall have a combined steel thickness of no less than 0.096 inches thick. Welded door design with inner panel optimizes structural integrity of locker door system over and above any single frame door design.
2. Exterior door panel shall be constructed with formed flanges and return flanges to add stiffness.
3. Internal door panel shall be constructed with formed flanges for added stiffness.
4. All inner door panel (except Multi-Tier) heights shall be minimum 70% of external door height.
5. Multi-Tier inner door panels shall be full height.

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6. Single-piece welded door frame shall consist of internal door panel nested inside exterior door panel and welded per the following requirements:
7. Top / bottom. Exterior and Interior panels to be welded in a minimum of three (3) places with weld spacing not to exceed 6 inches between adjacent welds and 1 inch from any corner.
8. Sides. Exterior and interior panels to be welded with spacing not to exceed 12 inches between adjacent welds and 1 inch from any corner.
9. Inner door panel to have peg board style hole pattern, allowing the attachment of Document Holder and any standard peg board accessory.
10. Inner door panel to have 4 inch rectangular slot centered towards the top of the locker.
11. External door panel shall have louvers to provide adequate air circulation throughout locker system.
12. Louvered air vents shall be located at the bottom of the locker door to enhance circulation of mechanically extracted air from the bottom of the locker out of the top.
13. Louvered air vents shall be approximately 3 inches in width and 0.75 inches in height and spaced on 1 inch.
14. Single door designs available in 24 inch locker widths
15. Double door designs shall consist of the following:
16. Design available in 24 inch locker widths
17. Primary door located on the right and the secondary door located on the left-hand side of the locker.
18. Secondary door locking mechanism shall consist of the following:
  - 1) Return flange for supporting primary door
  - 2) Catch bracket
  - 3) One lower lock rod
19. All doors shall have neoprene silencers on each door for noise reduction

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20. Diamond Perforated Pattern:
21. Single and Double door designs shall be available in diamond perforated pattern
22. Pattern is defined as 0.875 by 0.875 inch diamond perforations on 1.768 inch.
23. Door torsional deflection shall not exceed 0.1875 inch with a 20 lb point load. (Test data to be provided by manufacturer upon request)
24. Hinge:
  - a. Provide 16-gauge full length hinge for increased strength and security of locker system.
  - b. Hinges to be welded to door frame with spot welds not to exceed 6 inch separation.
25. Door assembly to be riveted to door frame on factory pre-established hole pattern.
26. Locking Mechanism.
27. Provide with protective stainless steel cover plate for durability and scratch resistance):
  - 1) For owners supplied locks/padlock hasp.

E. Interior/Accessory components:

1. All interior components must be constructed of minimum 18-gauge steel (unless otherwise clarified in specification).
2. For added security, internal component can be secured utilizing blind rivets, threaded fasteners, or bending specially designed tab.
3. All interior components available at time of order and as post-installation upgrades in the future.
4. Shelves (available all locker models)
  - a. Shelf with integral hanger bracket
    - 1) Size specified by locker width
    - 2) Hanger bracket designed with perforations on approximately 3 inch centers to insure clothing separation for optimum ventilation

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- 3) Performance: Uniform load rating 300 lbs.
5. Modular Shelf (4 each locker)
  - a. Provides storage compartment for smaller items
  - b. Approximate compartment size: 9 inches wide and 12 inches.
  - c. Modular shelves to have tabs to interlock with frame side panel lances
  - d. Modular shelves vertical sides to have lances that match with opposing side panel lances.
  - e. Modular shelves shall have two (2) locations on vertical side panel for attaching hooks, and one (1) location on bottom for attaching double hook accessories.
  - f. Shelf rear return flange stops approximately 1 inch short of locker back panel on order to allow air circulation throughout modular shelf.
  - g. Provide modular shelf with slots for connection with file dividers and shelf back stop. File dividers will aid in maintaining a neat and orderly locker system.
6. Provide lockable compartment for small valuables
  - a. Lockable compartment shall be integral to modular shelf accessory
  - b. Provide a 14-gauge padlock-able compartment door.
  - c. Provide 0.188 inch diameter zinc plated steel hinge rod.
  - d. Door to be mounted with zinc plated steel hinge rod and two shoulder washers for smooth, quiet operation.
  - e. Provide an 18-gauge hasp bracket for securing lockable compartment door.
7. Adjustable Shelf
  - a. Integral with modular shelf
  - b. Shelf to have tabs to interlock with frame side panel and modular shelf lances.

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- c. Shelf shall contain slots for file divider accessories as previously defined
- 8. Vinyl Mat (modular shelf)
  - a. Material - Vinyl
  - b. Color - Black
  - c. Type - longitudinal round corrugated ribs
- 9. Mirror
  - a. Material - 0.0625 inch thick plastic with mirror surface on one side
  - b. 0.0625 inch thick flexible magnet attached to non-mirrored side
  - c. Size - 3.875 inches height and 5.875 inches.
- 10. Boot Tray
  - a. Material - Rubber
  - b. Dimensions:
    - 1) Width - 12.90 inches.
    - 2) Depth - 19.90 inches.
    - 3) Height - 1.25 inches.
  - c. Manufactured from Natural rubber compounds, environmentally friendly, durable, water repellent easily cleaned with soap and water, resistant to alkalis and weak acids, mold, mildew, and dust mites.
- 11. Hooks
  - a. Double Hook - shall have the ability to attach a double hook to the underside of the Modular Shelf
  - b. Hook Bracket Hanger Assembly - shall have the ability to attach a three-hook bracket assembly to any lanced location on the side panels of the locker.

F. Locker Tag Numbers

- 1. Shall provide locker numbers on each locker per customer requirement

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G. Accessories:

1. Base: By others - refer to drawings.
2. Trim and Fillers: Provide manufacturer's standard.
3. Continuous Sloped Top. Provide manufacturers standard.

2.5 FABRICATION

- A. General: Coordinate fabrication and delivery to ensure no delay in progress of the work.

2.6 FINISHES

- A. Color: Blue Grey (25).
- B. Paint Finish: Textured (Standard) - Provide factory applied electrostatic powder coat paint. Meet or exceed specifications of the American Society for Testing and Materials (ASTM) Standards:

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine Lockers scheduled to receive accessories with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of specified accessory items.
- B. Proceed with accessory installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Follow manufacturer's written instructions for installation of each type of accessory item specified.



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3.3 FIELD QUALITY CONTROL

- A. Verify accessory unit alignment and plumb after installation. Correct if required, following manufacturer's instructions.
- B. Remove components that are chipped, scratched, or otherwise damaged and which do not match adjoining work. Replace with new matching units, installed as specified and in manner to eliminate evidence of replacement.

3.4 ADJUSTING

- A. Adjust all accessories to provide smoothly operating, visually acceptable installation.

3.5 CLEANING

- A. Immediately upon completion of installation, clean components and surfaces. Remove surplus materials, rubbish and debris, resulting from installation, upon completion of work and leave areas of installation in neat, clean condition.

3.6 DEMONSTRATION/TRAINING

- A. Schedule and conduct demonstration of installed accessory items and features with Owner's personnel.
- B. Schedule and conduct maintenance training with Owner's maintenance personnel. Training session should include lecture and demonstration of all maintenance and repair procedures that end-user personnel would normally perform.

3.7 PROTECTION

- A. Protect system against damage during remainder of construction period. Advise owner of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion.

END OF SECTION

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SECTION 10510 - METAL LOCKER REFURBISHING & ELECTROSTATIC PAINTING

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:

- 1. Electrostatic Painting and refurbishing of all existing metal lockers in Macomb County Jail (first & upper floor Locker Rooms).

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for initial selection: Submit paint samples representing manufacturer's full range of color.

PART 2. PRODUCTS

2.01 REPAIR MATERIALS

- A. Use repair materials and hardware identical to existing materials.
  - 1. If identical materials and hardware are unavailable, use materials and hardware that visually match existing to the fullest extent possible.
  - 2. Use materials and hardware whose installed performance equals or surpasses that of existing materials.

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2.02 ELECTROSTATIC PAINTING AND COATING MATERIAL

- A. Following the paint manufacturer's recommended surface preparation, all lockers shall be electrostatically refinished on all exterior surfaces (Doors, end panels, sloped tops, etc.), with a two part poly epoxy coating with a flash point over 100 degrees F.
- B. Paint exterior and leading edge of doors, tops, sides, fillers and interior sides & shelves of lockers. All bottoms will need to be sanded and primed.
- C. Acceptable Electrostatic Paint Manufacturers:
  - 1. Perfection Paint & Color Company
  - 2. Electro Glaze by Electro Painters
  - 3. Architect's Pre-approved equal
- D. Multiple colors to be selected by Architect from manufacturer's full range. Four (4) coats are required.
- E. Provide and install (verify location in the field) the following items for locker refurbishment:
  - 1. New number plates (1 per each locker).
  - 2. Number sequence as indicated on drawings (this will be confirmed with Sheriff's Dept prior to ordering)
- F. Quantities:
  - 1. The existing lockers for the Men's Room is 173 total. (14) fourteen of them are 12" x 12" x 82" with sloped tops. The remainder are 24" x 21" x 82" with sloped tops.
  - 2. The Women's Locker Room has (17) seventeen 24" x 21" x 82" with sloped tops.

PART 3. EXECUTION

3.01 EXAMINATION

- A. Survey existing lockers and itemize hardware and trim to be replaced. Include itemization of additional refurbishment work other than hardware and trim.
- B. Inventory and record the condition of items to be removed and reinstalled.

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3.02 PREPARATION - PAINTING

- A. All surrounding areas shall be protected as a safety measure against any accidental spillage or over spray of coating material with masking paper or drop clothes. Any metal in the vicinity of the lockers shall be protected against paint attraction. All areas of the locker surfaces, which do not receive a color coating, shall be masked and protected.
- B. All number plates, handles and locks shall be removed or masked prior to refinishing.
- C. All exterior locker surfaces to be painted, unless otherwise noted, shall be etched with sandpaper or an abrasive pad to insure proper paint adhesion. After etching, a chemical solvent compatible with refinishing coatings shall be used to remove all impurities that would inhibit proper finish of the coating.
  - 1. Accumulated floor wax shall be removed. All tape, sticker, and other material shall be removed.
- D. All rusted areas and scratches shall be sanded and primed with a rust inhibiting primer.
- E. All existing paint shall be tested for compatibility with epoxy coating. If incompatibility occurs (blistering, lifting, orange peeling and fish eye) a barrier primer shall be used on all lockers prior to refinishing or enamel paint depending on the compatibility.

3.03 LOCKER REPAIR

- A. Work shall include the repair or replacement of all missing, broken, or operationally defective coat hooks, door handles latches, surface molding strips, bumpers, silencers, etc.
- B. All units shall be securely attached (re-anchored as necessary) to and within the locker well area.

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- C. All doors shall be inspected, adjusted, aligned and repaired as necessary to confirm they open and close freely.
  - D. Refer to 2.02E Number Plates to be replaced.
  - E. As necessary, all nuts and bolts shall be tightened and where missing, shall be replaced with new.
- 3.04 NUMBER PLATES
- A. All existing number tags shall be removed prior to painting and replaced with new number tags following electrostatic painting. New numbering sequence shall be coordinated with Sheriff's Department.
  - B. Verify numbering sequence with Architect/Sheriff's Department prior to installation.
- 3.05 ELECTROSTATIC PAINTING AND COATING
- A. Paint applied shall be a smooth, non-textured, and 2 mils in thickness.
    - 1. Final finish will have a semi-gloss appearance that registers a reading of 40% to 60% on Garner 60 degree glossmeter.
  - B. Application of paint shall be through the Ransburg #2 electrostatic painting equipment. This process significantly reduces any mist or over spray on anything other than the surface being refinished. Suitable ground-to-building connection shall be secured to insure proper wrap of coating material so that the corners and undersides or otherwise inaccessible areas are covered.
- 3.06 CONTRACTOR REQUIREMENTS
- A. The Contractor shall provide all labor, material, and mobile electrostatic paint spraying equipment necessary to refinish the existing lockers at the designated indoor location.

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- B. The Contractor will be responsible for the legal disposal of all rubbish and unused material belonging to, used under the direction of, and in the area of, and disposal containers designated by the ordering agency or otherwise as the ordering agency's observer may direct.
- C. The disposal of hazardous waste shall conform to applicable federal, state, and local regulations.
- D. The floor surrounding work area shall be kept free of debris or fallen articles.
- E. Work area to be ventilated according to manufacturer's written instructions.
- F. The Contractor shall return the allocated workspace in the same condition received.

3.07 COLOR SCHEDULE

- A. All Locker Room lockers to be painted: Custom Color will be selected from Sherwin Williams or RAL color charts.

END OF SECTION 10510

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**SECTION 10513 - METAL EVIDENCE LOCKERS (STANDARD, PASS-THRU.)**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - Standard Pass-thru Evidence Lockers
- B. Related Work, Not Furnished:
  - 1. Section 09650 "Resilient Flooring" for finish floor covering materials and installation.

1.3 REFERENCES

- A. American National Standards Institute (ANSI) Standards:
  - Applicable standards for fasteners used for assembly.
- B. American Society for Testing and Materials (ASTM) Standards:
  - Applicable standards for steel sheet materials used for fabrication.
  - Applicable standards for the testing of electrostatically applied Powder Coat Paint
- C. American Institute Of Steel Construction (AISC) Standards:
  - Applicable standards for steel materials used for fabrication.

1.4 DESCRIPTION

- A. General: Metal Evidence Lockers

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B. Finishes:

Fabricated Metal Components and Assemblies: All components to be painted with an electrostatically applied Powder Coat paint that can meet or exceed test requirements set out by ASTM standard D3451-06 Standard Guide for Testing Coating Powders and Powder Coatings.

C. Sizes: 24"D x 36"W x 82"H (all nominal)

1.5 PERFORMANCE REQUIREMENTS

A. Design Requirements:

Limit overall width to 0.032 inches greater or less than the nominal specified width.

1.6 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and installation instructions for each type of evidence lockers required. Include data substantiating that products to be furnished comply with requirements of the contract documents.

B. Shop Drawings: Show fabrication, assembly, and installation details including descriptions of procedures and diagrams. Show complete extent of evidence lockers installation layout including quantities, locations and types of accessory units required. Include notations and descriptions of all installation items and components.  
Show installation details at non-standard conditions, if any.

Provide layout, dimensions, and identification of each unit corresponding to sequence of installation procedures.

Provide installation schedule and procedures to ensure proper installation.

C. Samples: Provide minimum 3 inch (76MM) square example of each color and texture on actual substrate for each component to remain exposed after installation.



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- D. Selection Samples: For initial selection of colors and textures, submit manufacturer's color charts consisting of actual product pieces, showing full range of colors and textures available.
- E. Warranty: Submit draft copy of proposed warranty for review by the Architect.
- F. Maintenance Data: provide written documentation of the manufacturer's statement claiming the maintenance free nature of the product.
- G. Reference List: Provide a list of recently installed evidence lockers to be visited by Sheriff's Dept., Architect, and Contractor. Intent of list is to aid in verifying the suitability of manufacturer's products and comparison with materials and product specified in this section.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage an experienced manufacturer who is ISO 9001 certified for the design, production, installation and service of evidence lockers. Furnish certification attesting ISO 9001 quality system registration.
- B. Installer Qualifications: Engage an experienced installer who is a manufacturer's authorized representative for the specified products for installing evidence lockers.  
  
Minimum Qualifications: 1-year experience installing evidence lockers of comparable size and complexity to specified project requirements.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Follow manufacturer's instructions and recommendations for delivery, storage and handling requirements.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify quantities of evidence lockers before fabrication. Indicate verified measurements on Shop

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Drawings. Coordinate fabrication and delivery to ensure no delay in progress of the Work.

- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating evidence lockers units without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.

1.10 SEQUENCING AND SCHEDULING

- A. Sequence evidence lockers units with other work to minimize possibility of damage and soiling during remainder of construction period.
- B. Schedule installation of specified evidence lockers after finishing operations; including painting have been completed.
- C. Provide components which must be built in at a time which causes no delays general progress of the Work.
- D. Pre-installation Conference: Schedule and conduct conference on project site to review methods and procedures for installing evidence lockers including, but not limited to the following:  
Recommended attendees include:
  - 1. Owner's Representative. (Macomb County Facilities & Operations and Macomb County Sheriff)
  - 2. Prime Contractor or representative.
  - 3. The Architect.
  - 4. Manufacturer's representative.
  - 5. Subcontractors or installers whose work may affect, or be affected by the work of this section.

1.11 WARRANTY

- A. Provide a written warranty executed by Contractor, Installer and Manufacturer, agreeing to repair or replace units which fail in materials or workmanship within the established warranty period. This warranty shall be in

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addition to and not a limitation of other rights the Owner may have under the General Conditions provisions of the Contract Documents.

- B. Limited Lifetime Warranty: Subject to the terms in the written warranty, warrant the original purchaser exclusively that the locker frames manufactured by it will be free from defects in materials and workmanship for the lifetime of the locker. Warrant the original purchaser exclusively that all moving parts manufactured by it will be free from defects in materials and workmanship for (5) years.
- C. Warrants that all refrigeration units shall be free from defects in materials and workmanship for one (1) year from the date of the customer's written acceptance of installation. During the (1) year warranty period, all parts are included at no cost for (1) year. Labor is included at no cost during the first year of the (1) year warranty period. After the first year of the (1) year warranty, all labor will be charged at the current rate.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. General: Products known as DSM Evidence Lockers are based upon evidence lockers manufactured by Spacesaver Corporation, 1450 Janesville Avenue, Fort Atkinson, Wisconsin 53538-2798. Telephone 866-276-0445. Contact Local Support Representative Bart Spencer 248-442-9000 from The Casper Corporation

2.2 BASIC MATERIALS

- A. General: Provide materials and quality of workmanship, which meets or exceeds established industry standards for products specified. Use furniture grade sheet metal and fasteners for component fabrication unless indicated otherwise. Material thicknesses/gauges are manufacturer's option unless indicated otherwise.

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2.3 LOCKER TYPES

- A. Pass-thru evidence lockers

2.4 EVIDENCE LOCKERS

- A. Welded Frame:

1. The welded frame is structural and shall consist of top, bottom, back and sides constructed of a minimum of 18 gage (1.21MM) steel. All frame components shall be joined using resistance welding. Riveting or bolting of structural members will not be permitted.
2. Horizontal and vertical outer front flanges will be a minimum of 1.5 inches (38MM). Horizontal and vertical flanges will overlap with a minimum of 2 resistance welds per corner.
3. Center vertical lock housing is structural and will run the full height and depth of the locker. All locks will be completely enclosed by a full height removable panel. Pass-thru rear release mechanisms will be completely enclosed by the lock housing and accessible only when the rear door is open. Provide engagement points for the anti-pry tabs that are on all front doors.
4. Exposed lock mechanisms that can snag evidence and be obstructed by stored articles will not be permitted.

- B. Welded Bases:

1. Each welded base shall be permanently affixed to each locker using modern Inert Gas Metal Arc Welding techniques for lateral unit stability. The base shall be a minimum of 14 gage (1.98MM) steel 4 inches (101MM) high with a 1.5 inch (38MM) return on the bottom for support.
2. Provide four 0.375 inch (9.5MM) mounting holes and four 0.375 inch (9.5MM) nuts welded in place for the mounting of floor levelers. Provide four appliance levelers per locker.
3. Provide removable access panels for access to mounting holes and leveling points.

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C. Shelves:

1. Shall be a single-piece formed from a minimum of 18-gage (1.21MM) cold rolled steel with a double 90-degree bend on the rear of the shelf and a double 90-degree bend on the front of the shelf. Shelf sides shall be turned up 90-degrees for ease of cleaning and to prevent debris from becoming caught between the shelf and the sidewall.
2. All shelves shall be welded into place. Rivets, screws, bolts or other loose fasteners will not be permitted for the fastening of shelves to the locker frame.

D. Locks:

1. Patent Pending. Lock shall be push button locking with a stainless steel push button and alignment bezel. Locks shall be a one-piece removable design. Locks will secure the door with the single push of a button with no other action required by the user.
2. Locks will be deadbolt type locks with multi-point engagement. Rotary latches or cam locks will not be tolerated.
3. Pass-thru locks will be reset from the rear of the locker when the rear door is in the open position only.
4. Locks shall be pre-lubricated with no maintenance required for the lifetime of the unit (estimated at 20 years).

E. One Piece Welded Doors:

1. Shall be formed from two pieces of minimum 18-gauge (1.2MM) cold rolled steel box formed and welded together using modern GMAW techniques. The one piece door with inner and outer door skins shall have a combined steel thickness of no less than 0.096 inches (2.4MM) thick.
2. Each door shall have a nickel plated, flush mounted door handle installed with fasteners visible only in the unlocked position.
3. Provide neoprene silencers on each door.

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4. Provide anti-pry tabs that engage with the Center Vertical Lock Housing when the door is locked.
5. Doors shall have no moving parts except the door and the hinge.
6. Provide stainless steel spring loaded hinges that are welded to prevent pin removal. Spring loaded hinges shall be capable of holding the door closed and flush with the door frame. Doors that hang ajar are a safety concern and will not be tolerated.

F. Rear Doors (Pass-thru lockers)

1. Shall be formed from two pieces of minimum 18-gauge (1.2MM) cold rolled steel box formed and welded together using modern Inert Gas Metal Arc Welding techniques. The one piece door with inner and outer door skins shall have a combined steel thickness of no less than 0.096 inches (2.4MM) thick.
2. Each locker module shall have one rear door each and allow evidence to be removed from all compartments at once.
3. Each rear door shall have multi-point engagement with a built-in L handle lock. Access to all lock mechanisms shall be hidden behind cover plates that are secured with tamperproof fasteners.

2.5 FABRICATION

- A. General: Coordinate fabrication and delivery to ensure no delay in progress of the Work.

2.6 FINISHES

- A. Colors: Selected from manufacturer's standard available colors.
- B. Paint Finish: Provide factory applied electrostatic powder coat paint. Meet or exceed specifications of the American Society for Testing and Materials (ASTM) standards.

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3.1 EXAMINATION

- A. Examine evidence lockers scheduled to receive accessories [with Installer present] for compliance with requirements for installation tolerances and other conditions affecting performance of specified accessory items.
- B. Proceed with accessory installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Follow manufacturer's written instructions for installation of each type of accessory item specified.

3.3 FIELD QUALITY CONTROL

- A. Verify accessory unit alignment and plumb after installation. Correct if required following manufacturer's instructions.
- B. Remove components that are chipped, scratched, or otherwise damaged and which do not match adjoining work. Replace with new matching units, installed as specified and in manner to eliminate evidence of replacement.

3.4 ADJUSTING

- A. Adjust all accessories to provide smoothly operating, visually acceptable installation.

3.5 CLEANING

- A. Immediately upon completion of installation, clean components and surfaces. Remove surplus materials, rubbish and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.

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3.6 DEMONSTRATION/TRAINING

- A. Schedule and conduct demonstration of installed accessory items and features with Owner's personnel.
- B. Schedule and conduct maintenance training with Owner's maintenance personnel. Training session should include lecture and demonstration of all maintenance and repair procedures that end user personnel would normally perform.

3.7 PROTECTION

- A. Protect system against damage during remainder of construction period. Advise Owner of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion.

END OF SECTION



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SECTION 10800 - TOILET ACCESSORIES

PART I - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION:

- A. The extent of each type of toilet accessory is shown on the drawings.

1.03 QUALITY ASSURANCE:

A. Inserts and Anchorages:

- 1. Furnish inserts and anchoring devices which must be built into masonry for the installation of toilet accessories. Coordinate delivery with other work to avoid delay.
- 2. See masonry sections of these specifications for installation of inserts and anchorage devices.

B. Products:

- 1. Provide products of the same manufacturer for units exposed in the same areas, unless otherwise acceptable to the Architect.
- 2. Stamped names or labels on exposed faces of units will not be permitted, except where otherwise indicated.
- 3. Provide locks where indicated, with the same keying for each type of accessory units in the project wherever possible. Furnish two keys for each lock.

- C. The specifications indicated specific products of one manufacturer to communicate design intent.

1.04 SUBMITTALS:

A. Product Data:

- 1. For information only, submit a PDF copy of manufacturer's technical data and installation instructions for each toilet accessory. Transmit copies of installation instructions to the Installer.

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B. Samples:

1. When requested, submit full-size samples of units to Architect for review of design and operation. Acceptable samples will be returned and may be used in the work. Compliance with all other requirements is the exclusive responsibility of the Contractor.

C. Setting Drawings:

1. Provide setting drawings, templates, instructions and directions for installation of anchorage devices in other work.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Stainless Steel: AISI, Type 302/304 with polished No. 4 finish, 0.034 inch (22 gauge) minimum thickness.
- B. Brass: Unleaded , flat products, ASTM B19; rods, shapes, forgings, and flat products with finished edges, ASTM B16; castings, ASTM B30.
- C. Sheet Steel: Cold rolled, commercial quality, ASTM A336, 0.04 inch (20 gauge) minimum. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC2.
- F. Mirror Glass: Nominal 6.0mm (0.23 inch) thick, conforming to ASTM C1036, Type I, Class 1, Quality q2, and with silvering electro-plated copper coating, and protective organic coating.
  1. Provide tempered glass, unless indicated otherwise.
- G. Galvanized Steel Mounting Devices: ASTM A153, hot-dip galvanized after fabrication.
- H. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

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2.02 MIRRORS

- A. Stainless Steel Framed Mirror: Mirror shall have a one piece, Type 304 stainless steel angle frame, 3/4 inch by 3/4 inch with continuous integral stiffener on all sides and beveled front to hold frame tightly against mirror; corners shall be heliarc welded, ground and polished smooth; all exposed surfaces shall have satin finish with vertical grain. Tempered glass mirror shall be guaranteed for 15 years against silver spoilage. All edges shall be protected by plastic filler strips and the back shall be protected by full size, shock absorbing, water resistant, nonabrasive, 1/8 inch thick polyethylene padding. Galvanized steel back shall have integral hanging brackets for mounting on concealed rectangular wall hanger(s). Mirror shall be secured to hanger(s) with concealed phillips head jocking screws located in bottom of frame.
1. Manufacturers: Subject to compliance with requirements, provide mirror unit by one of the following:
    - a. Bobrick: B-290 sizes as shown on drawings. Provide tempered glass.
    - b. Bradley: 781 Series sizes as shown on drawings. Provide tempered glass.
    - c. American Specialties, Inc.: 20650-sizes as shown on drawings. Provide tempered glass.

2.03 GRAB BARS

- A. Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05 inches and as follows:
1. Mounting: Concealed, manufacturer's standard flanges and anchorages.
  2. Clearance: 1-1/2 inch clearance between wall surface and inside face of bar.
  3. Gripping Surfaces
    - a. Satin finish with peened gripping surface, unless noted otherwise.
  4. Heavy Duty Size: Outside diameter of 1-1/2 inches minimum.
- B. Grab bar shall be constructed of Type 304 stainless steel with satin finish. Concealed mounting flanges shall be 1/8 inch thick stainless steel plate, 3-1/8 inch diameter, and each shall have 2 screw holes for attachment to wall. Flange covers shall be 22 gauge, 3-1/4 inch diameter by 1/2

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inch deep, and shall snap over mounting flange to conceal mounting screws. Ends of grab bars shall pass through concealed mounting flanges and be heliarc welded to form one structural unit. Grab bars shall comply with ADA Accessibility Guidelines for structural strength. Provide concealed anchor device or backing as specified or required in accordance with local building codes before wall is finished.

1. Manufacturers: Subject to compliance with requirements, provide grab bars by one of the following:

a. Handicap Toilet Compartments: Bobrick: B-5806.99 Series

1. Horizontal: B-5806.99 by 36"
2. Horizontal: B-5806.99 by 42"
3. Vertical: B-5806.99 by 18"

b. Handicap Toilet Compartments: Bradley: 812 Series

1. Horizontal: 36"
2. Horizontal: 42"
3. Vertical: 18"

c. Handicap Toilet Compartments: American Specialties, Inc.: 3800 Series.

1. Horizontal: 36"
2. Horizontal: 42"
3. Vertical: 18"

2.04 TOWEL HOOK (Provide min. two per Shower whether scheduled or not)

A. Surface mounted robe hook shall be constructed of stainless steel alloy 18-8 type 304 post shall be ½" x 1" rectangular tubing with formed mounting flange and bracket welded on end. Bow plate shall be 14 gauge, 4" x 1" with radiused corners and internally welded to outer end. Mounting plate shall be included and shall be 18 gauge. A stainless steel set screw shall be provided on bottom perimeter of flange to lock unit to mounting plate. Stain finish.

1. Bobrick: B6727
2. Bradley: 9124
3. American Specialties, Inc.: 7345

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2.05 SANITARY NAPKIN RECEPTACLE

- A. Surface mounted with self-closing door. Receptacle retained in cabinet with tumbler lock.
  - 1. Bobrick: B-254.
  - 2. Bradley: 4737-11
  - 3. American Specialties, Inc.: 0473-1A

2.06 TOILET TISSUE DISPENSERS

- A. Provided by Owner. Installed by Contractor.

2.07 SOAP DISPENSER

- A. Provided by Owner. Installed by Contractor.

2.08 TOILET SEAT COVER DISPENSER

- A. Satin-finish stainless steel surface mount toilet seat cover dispenser.
  - 1. Bobrick: B-4221
  - 2. Bradley: Model 5831
  - 3. American Specialties, Inc.: 20477-SM

2.09 STAINLESS STEEL SHELF

- A. Bobrick B-298 x 24"
- B. Bradley 7210 x 24"
- C. ASI 0692-824

2.10 SHOWER CURTAIN

- A. Bobrick B6107 w/B204-1 & B204-2
- B. Bradley SR953 w/9536 & 9537
- C. ASI 1214, with 1200-SHU & 120V

2.11 RECESSED SOAP DISH

- A. Bobrick B-4380
- B. Bradley 96401
- C. ASI 0401

2.12 GRAB BARS FOR H.C. SHOWER (configuration as shown on drawings)

- A. Bobrick B-5806.99 series
- B. Bradley 812 series
- C. ASI 3800 series

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2.13 REVERSIBLE SHOWER SEAT

- A. Bobrick B-5181
- B. Bradley 9569
- C. ASI 8206-L/8206-R (refer to drawings)

2.14 PAPER TOWEL DISPENSER (provided by Owner installed by Contractor)

2.15 WASTE RECEPTACLE

- A. Bobrick B-3644
- B. Bradley 334-11
- C. ASI 0458-CX

2.16 MISCELLANEOUS ACCESSORIES

A. Trap wrap

1. Provide trapwrap at all exposed lavatory piping in area of work.
2. Trapwrap to be as manufactured by Brocar Products Inc. or TrueBro.

B. Fasteners and Anchors

1. Provide mounting kits with stainless steel screws for accessories requiring same.
2. Mounting kits shall include toggle nuts for hollow walls and expansion shields for solid walls. Provide 2 fasteners at each mounting plate.
3. Provide 12 gauge, 3 inches wide, steel concealed anchor plates with tapped holes for installation of grab bars on walls constructed with metal studs.
4. Provide concealed anchors for installation of grab bars on solid walls. Anchor assembly shall consist of tapped 12 gauge anchor plate, 10 gauge back plate, and 3/8 inch diameter thru-wall bolt.

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PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine the areas and conditions under which toilet accessories are to be installed and notify the General Contractor in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION:

- A. Use concealed fastenings wherever possible.
- B. Provide anchors, bolts and other necessary anchorages and attach accessories securely to walls and partitions in locations as shown or directed.
- C. Install concealed mounting devices and fasteners fabricated of the same materials as the accessories, or of galvanized steel, as recommended by manufacturer.
- D. Install exposed mounting devices and fasteners finished to match the accessories.
- E. Provide theft-resistant fasteners for all accessory mountings.
- F. Secure toilet room accessories in accordance with the manufacturer's instructions for each item and each type of substrate construction.
- G. Schedule:
  - 1. As indicated on Drawings unless noted otherwise.
  - 2. Evidence/Technician
    - a. Paper towel dispenser (1)
    - b. Soap dispenser (1) per room

END OF SECTION 10800

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SECTION 10999 - MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of miscellaneous specialties is as shown on the drawings or schedules and includes the following:

- 1. Welded Wire Partitions

1.03 SUBMITTALS:

- A. Manufacturers Data:

- 1. Submit a PDF copy of manufacturer's specifications and installation instructions for each type of specialty required. Indicate by transmittal that copy of each instruction has been distributed to the Installer.

- B. Samples:

- 1. Submit three (3) samples of each color and finish of exposed materials and accessories required for each specialty. Architect's review of samples will be for color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

- C. Shop Drawings:

- 1. Submit shop drawings for fabrication and erection of specialties, including plans, elevations and large scale details, shop anchorages and accessory items. Provide location template drawings for items supported or anchored to permanent construction.



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PART 2 - PRODUCTS

2.01 PREFABRICATED PRODUCTS:

A. Welded Wire Partitions:

1. Qwik Fence as manufactured by: Folding Guard, 1-800-622-2214, Bedford Park, IL
  - a. Height: 8' unless noted otherwise.
  - b. Color: Black (powder coated) - all components
  - c. Panels: 8 gauge galvanized welded wire mesh with 1½" x 3" grid openings and 1" bends on top and bottom.
  - d. Posts: 2" x 2" x 14 gauge galvanized steel welded to a 7" x 2¼" mounting plate.
  - e. Provide with an 8 gauge welded wire mesh (with 1½" x 3" grid openings) hinged door, with built-in cylinder lock. Provide with all required hardware for a complete project. Door shall be single 4'w x 8'h.
  - f. Provide welded wire partition system with all required accessories required to complete wall and/or floor installation.

B. PREFABRICATED ADA SHOWER PACKAGE AND ACCESSORIES

1. Provide for Referee's bathroom as indicated on drawings.
2. Overall dimensions to be 38.625" x 38.438" x 79".
3. Provide model # APF3838BF4P.5 Freedom Transfer Shower, 188-77-947-7769.
4. Construction shall consist of full fiberglass encapsulated wood backing on walls with architectural subway pattern and ½" barrier free threshold and a texture slip resistant floor with a center drain location. System shall meet ADA, 2015 Michigan building code, 2015 Michigan Plumbing Code and ANSI 3124.2 standards for plastic shower.
5. Provide complete system with folder shower seat, ADA grab bars, shower rod and curtain, and surface mounted soap dish.
6. Install per manufacturer's specifications.
7. Color: white.

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PART 3 - EXECUTION

3.01 INSTALLATION:

- A. In addition to the requirements of these specifications, comply with manufacturer's instructions and recommendations for preparation of substrate, installation of anchors, and application of specialties. Coordinate with work of other trades for application of inserts of other integral equipment items.
- B. Installer must examine the substrates and conditions under which the specialties are to be installed, and notify the General Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- C. Install at the locations shown or scheduled, securely mounted with concealed fasteners, unless otherwise shown. Attach to substrates in accordance with the manufacturer's instructions, unless otherwise shown.
- D. Install level, plumb and at the proper height. Cooperate with other trades for installation in finish surface. Repair or replace damaged units as directed by the Architect.

END OF SECTION 10999

SECTION 11 5313 - LABORATORY FUME HOODS AND RELATED PRODUCTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Bench-top High-Performance Laboratory Fume Hoods.
2. Service fixtures (ie. water, gas, etc.) and electrical service fittings in fume hoods.
3. Piping and wiring within service fittings, light fixtures, switches, and other electrical devices.
4. Fume hood base support.
5. Work Surfaces within fume hoods.
6. Laboratory sinks and cup sinks in fume hoods.

B. Related Sections:

1. Division 22: Furnish and installation of plumbing utilities and final connections to fume hoods.
2. Division 23: Furnishing and installation of exhaust duct work and equipment, and final connection of hoods.
3. Division 26: Furnishing and installation of electrical utilities and final connections to hoods.

1.02 SCOPE AND CLASSIFICATION

- A. This specification covers the requirements for the purchase of bench mounted laboratory fume hoods for use with remote exhaust fans.
- B. Bench-mounted laboratory fume hood in 4-foot width, internal depth of 23.3-inches and external depth of 31.7-inches is required.
- C. This specification sets the intent for quality, performance and appearance.

1.03 REFERENCES

- A. The laboratory hoods must conform to the following regulations and standards.
1. SEFA 1, Scientific Equipment and Furniture Association, Recommended Practices for Laboratory Fume Hoods
  2. SEFA 8, Recommended Practices for Laboratory Grade Metal Casework, 8.0 Cabinet Surface Finish Tests
  3. NFPA 45, National Fire Protection Association, Fire Protection for Laboratories Using Chemicals
  4. ASTM E84-09C, ANSI 2.5, NFPA 255, UL 723, UBC 8-1 (42-1), Standard Test method for Surface Burning Characteristics of Building Materials
  5. ASHRAE 110, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Method of Testing Performance of Laboratory Fume Hoods
  6. ANSI/AIHA Z9.5, American Industrial Hygiene Association, Laboratory Ventilation
  7. Federal Register 29 CFR Part 1910, Occupational Safety & Health Administration, U.S. Department of Labor, Occupational exposures to hazardous chemicals in laboratories.
- B. The fume hoods must carry the ETL listed mark for the following.
1. UL 61010-1 (formerly 3101-1), Underwriters Laboratories Inc., Electrical Equipment for Laboratory Use
  2. UL 1805, Underwriters Laboratories Inc., Standard for Laboratory Hoods and Cabinets

1.04 PERFORMANCE REQUIREMENTS

- A. General Design Requirements

1. Fume hoods shall function as ventilated, enclosed workspaces, designed to capture, contain and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.
2. Fume hood shall be factory designed to function as a by-pass fume hood.
3. Structure and Materials of construction
  - a. Hoods are of double-wall construction
  - b. Powder-coated, cold rolled steel exterior
  - c. Galvanized steel support members
  - d. One-piece, monolithic, molded polyester resin liner
4. Baffles
  - a. One-piece, monolithic, molded polyester resin
  - b. Moving or adjustable baffles are not acceptable
5. Sash
  - a. Maximum opening is 28".
  - b. Unobstructed viewing height is 37.5".
  - c. Hood incorporates a perforated sash handle to bleed air into the hood chamber directing fume concentrations away from the user's breathing zone.
6. Airfoil:
  - a. Hoods are provided with an airfoil across the bottom of the sash area that allows airflow into the hood regardless of user's position.
7. Besides the exhaust blower, no additional blowers are required for specified containment.
8. Access for maintenance is from both the front and exterior sides of the hood.

9. Services:

- a. Hood manufacturer shall furnish and deliver all service outlets, accessory fittings, electrical receptacles and switches, as listed in these specifications, equipment schedules or as shown on drawings.
- b. Plumbing fittings mounted on the fume hood superstructures shall be pre-plumbed per section 2.03.
- c. Final plumbing and electrical connections are the responsibility of those contractors fulfilling requirements of Divisions 22, 23 and 26.
- d. All electrical services are pre-wired to a single point internal junction box at the top of the hood.

10. Hoods without service fixtures must pass through a 33" opening without disassembly.

B. Containment

1. The purpose of this section is to set a standard of performance for the bidder's laboratory fume hood before award of contract, and may not necessarily represent the operating conditions of the hoods after installation. Before or after award of contract, owner may require representative witness to said testing at their option, with failure to meet passing criteria as grounds for rejection of the bidder. Test data shall be provided at no cost to the owner.
2. Hood shall be tested to ASHRAE 110 modified test method as detailed below.
3. Fume hood sashes shall be placed in their full open position, at least 28" from the work surface, unless noted otherwise.
4. Ambient Temperature: 68 to 74 degrees F

5. Average Face Velocity: Face velocity average shall be 60 fpm, as noted below in subsection 8.d, parts 1 and 2, plus or minus 5%.
  - a. An imaginary grid is formed comprised of equal 12" by 12" squares, or smaller, across the face opening of the laboratory hood. Airflow velocity readings are taken at the intersections of these grids with calibrated hot wire anemometer over a twenty second period of time. Probes shall communicate readings to a computer data acquisition package, which will provide an average of each reading over the one-minute period and also an overall average upon completion of data acquisition. Face velocity shall be determined by averaging readings at the hood face.
  - b. Average face velocity must be achieved without exceeding the CFM noted in part C.
6. Tracer Gas Detection: Hood shall achieve a rating of 4.0AM0.00 maximum average and 4.0AM0.01 maximum spike (unless specifically otherwise noted), wherein:
  - a. = tracer gas release in liters/minute, AM = as manufactured, 0.01 = tracer gas in parts per million (PPM)
  - b. With the ejector body 6" from the rear of the sash plane, the test shall be conducted for each ejector position noted.
    - 1) Left position with ejector 12" from the left interior wall.
    - 2) Center position with ejector equidistant from the sidewalls.
    - 3) Right position with ejector 12" from the right interior wall.
  - c. Install mannequin positioned in front of the hood, centered on the ejector.

- d. Detector probes shall be placed 3" in front of the sash plane. The test shall be conducted for each detector probe position and corresponding face velocity.
- 1) Detector probe in the region of the nose and mouth of the mannequin. Test with average face velocity of 60 fpm.
  - 2) With the mannequin height reduced 4", place detector probe in the chest of the mannequin, and even with the height of the ejector. Test with average face velocity of 60 fpm.
- e. Open tracer gas valve, and collect readings with a computer data acquisition package, which is capable of monitoring and visually recording a minimum of one reading per second for a minimal five minute time period for each position.
- f. The single control rating of the fume hood shall be the results of the test position yielding the highest average levels of tracer gas in any of the six mannequin/ejector configurations.
- g. With the ejector and mannequin in the center position, detector probe in the region of the nose and mouth of the mannequin, average face velocity of 60 fpm, tracer gas released, and concentration recorded, open and close the sash in a smooth motion. Test to be repeated three times, with peak values of 0.01 PPM or less.
- h. With the mannequin removed, the periphery of the hood is traversed by the probe at 1" in front of the hood opening at a rate of 3 inches per second. The hood shall have a maximum perimeter reading of 0.03 PPM or less.

7. Flow Visualization:



- a. Test the operation of the lower air bypass airflow opening and hood periphery by introducing light smoke under the airfoil, and around the perimeter of the sash opening. If any smoke that enters the hood reverses directions and escapes from any of these locations, the hood fails this portion of the test and receives no rating.
- b. Introduce smoke along both walls and the hood floor in a line parallel to the hood face and 6 inches (152 mm) back into the hood. Define air movement toward the face of the hood as reverse airflow and define lack of movement as dead air space. All smoke should be carried to the back of the hood and out.
- c. Introduce a large volume of smoke at the work surface in the center of the hood, and 6" inside the plane of the sash. Define air movement toward the face of the hood as reverse airflow and define lack of movement as dead air space. All smoke should be carried to the back of the hood and out.
- d. All data on the above, including instrumentation and equipment, and test conditions shall be provided on a report, including the average face velocities, and a separate graph-type performance curve on all tracer gas tests for all required fume hood widths. Performance test data for a 6' representative hood shall be conducted by an independent testing agency and by a specific individual certified to perform such tests by the National Environmental Balancing Bureau (NEBB).

C. Efficiencies

1. The fume hood shall maintain constant volumetric rate (+/- 5 CFM) and static pressure losses (+/- 0.01" H<sub>2</sub>O) across all sash positions, unless the hood has a restricted by-pass for use with a variable air volume (VAV) system.

2. The fume hood shall demonstrate a minimization of the volumetric rate of air (CFM) requirement at any given face velocity. Required CFM to achieve desired face velocity shall not exceed that which is noted in the chart below.
3. The fume hood shall demonstrate a minimization of static pressure loss (inches of H<sub>2</sub>O) at any given CFM. Static pressure loss at desired face velocity, and corresponding CFM, shall not exceed that which is noted in the chart below.
  - a. \*There is not a written standard that would suggest a design face velocity below 60 fpm. This data is for informational purposes only.
- D. Noise Criterion: The hood shall have a Noise Criterion (NC) rating of less than 50; measured 36" in front of the hood with full open sash, at 100 fpm face velocity. NC is a factor of sound pressure level (dB) and frequency.
- E. Illumination: Shall be a minimum average of 80 foot-candles inside the work area. Work area is defined as the area inside the lined portion of the fume hood, from the face of baffle to sash plane, from interior left to interior right, and from the work surface to a height of 28 inches.
- F. Materials of Construction: Interior and Exterior materials of construction and finishes shall meet the requirements in Part 2 of this specification.

#### 1.05 QUALITY ASSURANCE

- A. Fume hoods shall be designed, including comprehensive engineering analysis, by a qualified, licensed Professional Engineer.
- B. Manufacturer's Qualifications
  1. ISO 9001 Certified manufacturing plant and processes.

2. Only hood manufacturers who have had fume hoods as a principal product for 30 years are considered.
- C. Fume hoods shall be Made in America
1. 95% or more of raw material and component suppliers shall be United States based.
  2. Stainless and cold rolled steel used in manufacturing shall be sourced from United States steel mills.
  3. Final product must be fabricated and assembled within the United States of America.
- D. Supply all equipment in accordance with this specification. Offering a product differing in materials, construction, or performance from this specification requires written approval obtained seven days or more before the proposal deadline.
- E. The owner/architect reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.
- F. Manufacturer's warranty against defects in material or workmanship on its fume hoods will be for 1 year from date of installation or 2 years from date of purchase, whichever is sooner, and includes replacement of parts (except lamps) and labor.

#### 1.06 SUBMITTALS

A. Action Submittals

1. Laboratory hood specification sheets and product manuals shall be submitted by the hood manufacturer upon request, and include safe and proper operation and maintenance information.
2. Shop Drawings: Include plans, elevations, sections, and details.

- a. Indicate details for anchoring fume hoods to permanent building construction including locations of blocking and other supports.
  - b. Indicate locations and types of service fittings together with associated service supply connection required.
  - c. Indicate duct connections, electrical connections, and locations of access panels.
  - d. Include roughing-in information for mechanical, plumbing, and electrical connections.
  - e. Provide face opening, volumetric rates, and static pressure drop data.
3. Submit a document detailing the information supplied on the Hood Safety Practices Label to verify compliance to specifications.

B. Informational Submittals

1. Product Test Reports: Showing compliance with specified performance requirements, including NEBB representative test report as defined previously.
2. Independent validation:
  - a. Written verification that the laboratory fume hoods carry the ETL listed mark for the following.
    - 1) UL 61010-1 (formerly 3101-1), Underwriters Laboratories Inc., Electrical Equipment for Laboratory Use
    - 2) CAN/CSA C22.2 No. 61010-1, Canadian Standards Association, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use
    - 3) UL 1805, Underwriters Laboratories Inc., Standard for Laboratory Hoods and Cabinets

- b. Written verification that 230 volt model fume hoods carry the CE conformity marking as required by the Council of European Communities.
  - c. Written verification from an outside testing agency confirming coating compliance to SEFA 8-2010, Recommended Practices for Laboratory Grade Metal Casework, 8.0 Cabinet Surface Finish Tests
- 3. Documentation of ISO 9001 Certified manufacturing plant and processes.
  - 4. Declaration of Made in America. Owner reserves the right to evaluate Made in America claims for compliance with the Bureau of Consumer Protection.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.
- B. Schedule delivery of equipment so that spaces are sufficiently complete that equipment can be installed immediately following delivery.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install fume hoods until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Labconco Protector Premier; for use with remote blower
- B. Other acceptable manufacturer:
  - 1. Hamilton Laboratory Solutions

2. Fisher Scientific

2.02 MATERIALS

A. Hood Interior Liner and Baffle

1. Liner material must comply with UL 1805, and be listed within NRTL test report as proof of compliance.

2. General Material Properties

a. Nonflammable, corrosion and chemical-resistant

b. Fiberglass reinforced polyester resin

c. Minimum thickness is 3/16"

d. Smooth, white finish

3. Method of Construction

a. Liner shall be one continuous molded component, and of monolithic construction, including the left and right side walls, rear, ceiling, and duct collar.

Liners that are bonded together, do not include the duct collar within the continuous structure, or are of panelized construction are not acceptable.

4. Flame and Smoke Characteristics

a. Flame retardant, self-extinguishing, with a flame spread rating of 25 or less in accordance with ASTM-E84

B. Sheet Steel

1. Side panels and access panels 20-gauge (or heavier) sheet steel.

2. Hood corner posts are 18-gauge sheet steel.

3. Ceiling enclosure panels are 18 gauge sheet steel.

4. Cold-rolled, commercial steel (CS) sheet, complying with ASTM A 1008/A 1008M.

C. Chemical Resistant Finish

1. General: Prepare, treat, and finish welded assemblies after welding. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling.
2. Chemical and Physical Resistance of Finish System:  
Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Third party validation required.
3. Powder-coat process required. Paint processes that release Volatile Organic Compounds (VOC) are not acceptable
4. Color for Fume Hood Finish:
  - a. As selected by architect from Manufacturer's full range

D. Safety Glass

1. Tempered
  - a. Clarity and temper test to be as specified in latest edition of Glass Tempering Association, Engineering Standards Manual, Section 8.1.
  - b. Surface and interior visible quality to be as specified per ASTM C 1036, Standard Specification for Flat Glass, Table 4, Quality level Q3.

2.03 CONSTRUCTION

A. Superstructure:

1. Self-supporting, rigid structural assembly, to support inner wall consisting of fume hood liner and outer wall of sheet metal exterior.
2. Fabricated from galvanized steel.

3. Space shall accommodate fume hood wiring and plumbing components for service fixtures.
4. Access to fixture valves concealed in wall provided by exterior removable access panels or through removable access panels on the front posts.

B. Exterior

1. Fabricate from steel sheet with component parts screwed together.
2. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.
3. Interchangeable side panels shall lift off without the use of tools to allow access to plumbing lines, service fittings, electrical wiring, counterbalance sash weights, and light fixtures. Exposed fasteners or hardware, and Velcro type fasteners, are not acceptable.
4. Corner posts
  - a. Pre-punched and plugged to accommodate up to 4 service fixtures per side
  - b. All services are accessible from the front of the hood.
  - c. Aerodynamic shape
  - d. Accommodate two electrical duplexes per side.
  - e. Right hand corner post includes electrical switches and pre-cut for Airflow monitor installation.
  - f. Un-used penetrations shall be plugged.
5. Top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.



6. Panel above header shall be removable without the use of tools to allow access to mechanical connection, electrical wiring, counterbalance sash weights, and light fixtures. Exposed fasteners or hardware, and "hook-and-loop" type fasteners, are not acceptable.

C. Dimensions

1. Overall exterior dimensions are as follows:
  - a. 4 foot nominal width: 48" w x 59" h x 31.7"d
2. Overall interior dimensions are as follows:
  - a. 4 foot nominal width: 38.1" w x 48" h x 23.3"d

D. Hood Liner

1. Adhere interior liner components to superstructure.
2. Stainless steel fasteners shall be used on the interior ceiling for structural integrity.
3. Fasteners exposed to chemical environment are not acceptable.
4. Punch fume hood lining side panels to receive four service fittings, for use with remote controls, per side. Provide removable plug buttons for holes not used for indicated fittings.

E. Hood Baffle

1. Baffle system shall be designed to capture a wide range of gaseous densities without adjustment or moving components.
2. Shall provide a continuous horizontal slot at the work surface, vertical openings running the interior height of the hood on the left and right sides, and an opening at the ceiling running left to right.
3. The baffle system shall be constructed with the same material as the fume hood liner.

4. The baffles shall be removable for cleaning.
5. Exposed components to be non-metallic. Metal components exposed to chemical environment are not acceptable.
6. Moving parts or adjustment of any kind is not acceptable.

F. Exhaust Connection

1. Fiberglass reinforced polyester resin, and a continuous component of the fume hood liner. Duct collars attached with fasteners, adhesive, or varying in material of construction from the liner are not acceptable.
2. 1" ID to accommodate any 12" nominal duct without the need for a transition adapter. 4, 5, and 6-foot hoods have one exhaust connection, Additional components required to accommodate 12" nominal mechanical system are not acceptable.
3. Ducting shall go inside the duct collar to ensure condensate travels into the hood and evaporates. Duct collars that allow duct connection over the collar are not acceptable.

G. Airfoil

1. 316 stainless steel with Chemical-Resistant Finish.
2. Airfoil shall have an aerodynamic radius to sweep the air into the hood with minimal turbulence. Airfoil directs airflow across work top to remove heavier-than-air gases.
3. Must have 5 rows of perforations to allow the air to bypass underneath and through the foil and sweep across the work surface to prevent any back flow of fumes escaping from the front of the hood opening. This airflow continues even if blocked by the presence of the operator.

4. Foil must extend back under the sash to prevent closure of the lower by-pass opening when the sash is in the fully closed position, directly on top of the airfoil.

#### H. Sash Assembly

1. Glass: Fully tempered safety glass with unobstructed, side-to-side view of fume hood interior and service fixture connections.
2. Dimensions: The full sash opening height is 28", the total unobstructed viewing height is 37.5" measured from the work surface.
3. Sash Tracks: Steel with Chemical Resistant Finish. Shall include bump stops for opening and closing.
4. Sash Handle: extruded aluminum with Chemical Resistant Finish. Sash handle includes a perforated air passage directly atop the handle to bleed air into the hood chamber and direct chemical fumes away from the user's breathing zone. The handle is ergonomic in design and is easy to grasp when operating
5. Sash guides: Corrosion resistant extruded poly-vinyl chloride.
6. Sash System
  - a. Vertical Sash (Cable and Pulley)
    - 1) Hoods have a single vertical sash counterbalanced by a single weight.
    - 2) Sash and weight to be connected via aircraft cable meeting MIL-W-83420 Military Specification.
    - 3) Rear pulleys shall be connected via timing shaft to prevent sash tilting and permit one finger operation at any point along full width sash handle. Maximum 7 pounds pull required to raise or lower sash throughout its full length of travel.

4) Design system to hold sash at any position without creep and to prevent sash drop in the event of cable failure.

5) Include a defeatable, and automatically resetting sash stop positioned for an 18" sash height.

## I. Electrical Components

### 1. Lighting

a. Provide UL Listed, high-efficiency, quick-start, T8 LED lighting systems, including bulbs.

1) 8 Foot Hoods - 4 each, 12-watt LED lamps

b. Vapor-Proof: all electrical components shall be outside of the contaminated air space. Lighting shall be located behind a laminated safety glass shield, sealed to the top of the hood liner.

c. The LED light assemblies shall be serviceable from outside the fume hood cavity, without the use of tools.

d. Light switch to be included on the lower right corner post, at heights compliant with the Americans with Disabilities Act (ADA).

### 2. Blower Switch

a. Hoods shall be provided with blower switch, on the lower right corner post, at heights compliant with the Americans with Disabilities Act (ADA).

### 3. Electrical Receptacles

a. The hoods shall accommodate two electrical receptacles. Options to include:

1) 115 volt, 60 Hz, three-wire polarized and grounded electrical duplex, with Ground Fault Circuit Interruption (GFCI)

b. Receptacles shall be individually wired to field wiring box, and each rated at 20 Amperes.

c. Cover plates shall be acid resistant thermoplastic.

4. Wiring

a. Every electrical component shall be individually wired to a single point internal field wiring box (including individual duplexes/receptacles).

b. Field wiring box to be 7" x 4" x 2.5", grounded, and have (12) 7/8" diameter knock out penetrations.

c. Final wiring and circuit dedication is to be by electrical trades.

d. Each receptacle circuit shall accommodate being wired to a dedicated building circuit rated at 20A, or the receptacles wired to a single circuit with the total load not exceeding 20 Amperes.

5. Fume hood to have third party validation of compliance to UL 1805 and UL 61010-1 by a Nationally Recognized Testing Laboratory (NRTL)

J. By-Pass Opening

1. The size of the by-pass opening is controlled by sash position for use with a constant volume mechanical system. The hood shall not have a change in static pressure or exhaust volume across all sash positions.

K. Corrosion resistant plate attached to the corner post of the fume hood with the following Hood Safety Practices:

1. For use with substances that produce hazardous levels of airborne chemicals: gas, fumes, vapors, dust

2. Do not put your head in the hood.

3. Minimize drafts and sudden movements in front of the hood.

4. Work a minimum of six inches inside the hood.
5. Elevate equipment above the work surface.
6. Keep sill and baffle unobstructed.
7. Do not use the hood for storage.
8. Adjust the sash to smallest opening possible when in use.
9. Close sash when unattended.
10. Do not remove any of the hood components.
11. Do not place flammable solvents near heat, flame or sparks.
12. Do not evaporate large amounts of flammable liquids.
13. Wipe up spills immediately.
14. Routinely validate airflow.
15. If the ventilation system malfunctions, or airflow alarm indicates unsafe condition, close sash and discontinue hood operation immediately-call for help.
16. Do not use with Biohazards or Perchloric Acid

L. Fume Hood Accessories

1. Service Fixtures: Color-coded hose nozzle outlets and valves mounted inside the fume hood and controlled from the exterior with color-coded index handles
  - a. Hose connectors located inside the fume hood cavity are chemically-resistant, glass-filled polypropylene with 6 serrations.
  - b. Service lines shall be factory installed from valve to outlet
    - 1) Copper tubing unless otherwise noted

- 2) Connections shall be made with quick-connect compression fittings on the inlet and outlet of the valve body, soldered and brazed connections not easily disassembled are not acceptable.
- 3) Services include a coil of tubing to be routed below the hood at time of installation

c. Valves

- 1) Extruded brass valve and rotating seat, TFE-coated silicone bronze stem and TFE packing.
  - 2) Fixture handles are plastic and color coded as well as labeled for the designated type of service.
  - 3) Fixtures are rated at maximum pressure of 200 psi.
  - 4) Coefficient of flow for the valve,  $C_v=0.43$ .
  - 5) Valves are front loaded, located on the fume hood corner post for remote use, and include:
    - (a) Cold tap water
2. Tissue Screen: Provide epoxy-coated, stainless-steel screen at bottom baffle opening to prevent paper from being drawn into the exhaust plenum behind baffles.
  3. Rear Finish Panel: Shall be the same materials and coating as the hood exterior.
  4. Distillation Grid: Include stainless steel rods and connectors for field installation, and factory drilled liner.
  5. Face Velocity Monitor/Alarm
    - a. Digital Airflow Monitor
      - 1) Provide audible and visual alarm in the event of an unsafe face velocity.

- 2) Alarm must sit flush with the fume hood corner post.
- 3) Based on a thermally compensated thermistor in the alarm module, and air passing through a separate airstream into the hood interior.
- 4) Velocity shall be displayed digitally on the user facing LCD in fpm or m/s.
- 5) LED lights display red for alarm, yellow for caution, and green for normal operation.
- 6) Must include external alarm and night setback functions.
- 7) Alarm mute shall be accessible from the front of the monitor; visual alarm must remain activated until alarm condition is corrected.
- 8) UL Listed electrical components
- 9) Calibration shall be through a menu driven step by step procedure.
- 10) Calibration is the responsibility of the owner, following a complete balancing of the mechanical system, and concurrently with As-Installed testing.

M. Work Surface

1. 1" thick, molded from solid modified epoxy resin, with smooth, non-specular, black finish.
2. One inch radius front edge for optimal fume hood performance.
3. 3/8" dished area to match the fume hood interior work space and form a water tight pan for spill containment.
4. Include a 2.5" diameter hole on each side for service pass-through and piping. Hole to be covered by hood superstructure upon installation.



5. Include two 1.5" diameter penetrations to accommodate base cabinet venting. Holes to be located outside of dished area and under the fume hood baffles. Include plugs.

6. Physical Properties:

a. Flexural Strength: Not less than 10,000 psi (70 MPa).

b. Modulus of Elasticity: Not less than 2,000,000 psi (1400 MPa).

c. Hardness (Rockwell M): Not less than 100.

d. Water Absorption (24 Hours): Not more than 0.02 percent.

e. Heat Distortion Point: Not less than 260 deg F (127 deg C).

f. Flame-Spread Index: 25 or less per ASTM E 84.

7. Cupsink

a. 3 x 6" dimension, polypropylene construction

b. Provide with strainers and tailpieces, NPS 1-1/2 (DN 40)

c. To sit flush with dished area of work surface

d. Cupsink(s) to be located

N. Supporting Base Cabinets

1. Base cabinets shall be in depths of 22", 48" width.

2. Construction requirements for all cabinets

a. Exterior construction is 18 gauge (or heavier) cold rolled sheet steel with Chemical Resistant Finish.

b. Hinges are 10 gauge (or heavier) plate with self-clinching pilot pin. Knuckle, bullet, or piano type

hinges are not accepted.

- c. The rear panel will feature a 12" x 8" removable plumbing access panel.
- d. Each cabinet includes four leveling feet.
- e. Capable of supporting up to 800 pounds.
- f. An 8" filler panel is required to increase the cabinet depth to 30".

3. Standard Storage

a. Overall exterior dimensions:

- 1) 48" w x 22" d x 35.5"-36.75"

b. Flush pull handles are ABS, low gloss black.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.
- B. Coordinate with other trades for the proper and correct installation of plumbing and electrical rough-in and for rough opening dimensions required for the installation of the hood.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install fume hoods according to shop drawings and manufacturer's written instructions.
- B. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework.

- C. Securely attach access panels, but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- D. Neighboring splash blocks shall not be attached directly to the hood.
- E. Install according to standards required by authority having jurisdiction.
- F. Sequence installations to ensure utility connections are achieved in an orderly and expeditious manner.
- G. Touch up minor damaged surfaces caused by installation. Replace damaged components as directed by Architect.

### 3.03 FIELD QUALITY CONTROL

- A. Field test installed fume hoods according to ASHRAE 110 to verify compliance with performance requirements.
  - 1. Adjust fume hoods, hood exhaust fans, building's HVAC system, and make other corrections until tested hoods perform as specified in fume hood schedule.
  - 2. After making corrections, retest fume hoods that failed to perform as specified.

### 3.04 ADJUSTING AND CLEANING

- A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.
- B. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Clean adjacent construction and surfaces that may have been soiled in the course of installation of work in this section.

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D. Provide all necessary protective measures to prevent exposure of equipment and surfaces from exposure to other construction activity.

E. Advise contractor of procedures and precautions for protection of material and installed equipment and casework from damage by work of other trades.

END OF SECTION 11 5313

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**SECTION 12350 - METAL LABORATORY CASEWORK**

**PART 1: DESCRIPTION OF WORK**

**1.00 SUMMARY AND SCOPE**

A. Section Includes:

Air Master Systems steel metal casework design, furnishing and installing all casework and work tops. Furnishing and installing all filler panels, knee space panels and scribes as shown on drawings.

B. Accessories:

1. Furnish and deliver all service outlets, accessory fittings, electrical receptacles and switches, as listed in these specifications, equipment schedules or as shown on drawings

C. Removal of all debris, dirt and rubbish accumulated as a result of the installation of the metal casework to an on-site container provided by others, leaving the premises clean and orderly.

D. Related Sections:

1. Section 06100 "Carpentry" for wood blocking in gypsum board walls.
2. Section 06402 "Interior Architectural Woodwork".
3. Section 09650 "Resilient Flooring" for finish floor covering materials and installation.

**1.01 BASIS OF WORK**

A. It is the intent of this specification to use Air Master Systems, Muskegon, MI, as the standard of construction for metal casework. The construction standards of the Air Master Systems Solution Series product line shall provide the basis for quality and functional installation.

B. Supply all equipment in accordance with this specification. The offering of a product differing in materials and construction from this specification requires written approval. This approval must be obtained seven (7) days before the proposal deadline.

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- C. General Contractors should secure a list of approved casework manufacturers from the architect as a protection against non-conformance to these specifications.
- D. The owner/architect reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.
- E. Shop Drawings: For metal laboratory casework. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Indicate locations of blocking and other supports required for install casework.
  - 2. Indicate locations and types of service fittings, together with associated service supply connection required.
  - 3. Include details of utility spaces showing supports for conduits and piping.
  - 4. Show adjacent walls, doors, windows, other building components, and other laboratory equipment. Indicate clearances from above items.
  - 5. Include coordinated dimensions for laboratory equipment specified in other Sections.

**1.02 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated without delaying the Work, as documented according to ASTM # 548.
- B. Source Limitations: Obtain laboratory casework, including tops, sinks, service fittings, and accessories, through one source from a single manufacturer.
  - 1. Obtain through same source from the same manufacturer as fume hoods specified in Section 115313 "Laboratory Fume Hoods".

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- C. Product Designations: Drawings indicate sizes and configurations of casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes, similar door and drawer configurations, and complying with the Specifications may be considered.
- D. Product Standard: Comply with SEFA 8M, "Laboratory Furniture-Casework, Shelving and Tables-Recommended Practices". Manufacturer shall have a listing in SEFA 8M in order to be considered for a substitution and have been a member of SEFA for 30 years.
- E. Manufacturers shall have at least (10) years' experience manufacturing projects of similar size and complexity.
- F. Product must have a 5 year warranty as standard and stated on manufacturer's website as such.

**1.03 DELIVERY, STORAGE AND HANDLING**

- A. Do not deliver laboratory casework until painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions" Article below.
- B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

**1.04 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels through remainder of construction period.

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**1.05 COORDINATION**

A. Coordinate layout and installation of metal framing and reinforcement in gypsum board assemblies for support of metal laboratory casework.

**PART 2 - PRODUCTS**

**2.00 MANUFACTURERS**

A. Manufacturers: Subject to compliance with requirements, provide products by the one of the following:

1. Metal Laboratory Casework:

- a. Air Master Systems Corp. 6480 Norton Center Dr.  
Muskegon, MI 49441  
Phone: 231-798-1111 [www.airmastersystems.com](http://www.airmastersystems.com)  
Local Rep. Bart Spencer from The Casper  
Corporation 248-442-9000 ex.15

**2.01 MATERIALS**

A. Metal: Commercial-quality, cold-rolled, carbon-steel sheet, complying with ASTM A 366; matte finish for sheet steel and ASTM A1008/1008M for cold rolled steel; suitable for exposed applications; and stretcher leveled or roller leveled to stretcher-leveled flatness.

B. Minimum Metal Thickness: Provide metal laboratory furniture components of the following minimum thicknesses:

1. Sides, ends, fixed backs, bottoms, tops, soffits, and items not otherwise indicated: 0.0478 inch (18 gauge). Except for flammable liquid storage cabinets, bottoms may be 0.0359 inch (20 gauge) if reinforced.
2. Back side panels, doors, drawer fronts and bodies, and shelves: 0.0359 inch (20 gauge). For back panels and doors for flammable storage cabinets, use 0.0478 (18 gauge) inch thick metal. For shelves more than 36 inches long, use 0.0478 (18 gauge) inch thick metal or provide suitable reinforcement.



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3. Intermediate horizontal rails, table aprons and cross rails, center posts, and top gussets: 0.0598 inch (16 gauge).
  4. Drawer runners, sink supports, and hinge reinforcements: 0.0747 inch (14 gauge).
  5. Leveling and corner gussets: 0.1046 inch (12 gauge).
- C. Acid Storage-Cabinet Lining: AMS Plascoat finish. No substitutions.

**2.02 FABRICATION**

- A. General: Complete assembly and finish work at point of manufacture. Perform assembly on precision jigs to provide units which are square; fully reinforced with angles, gussets, and channels; and integrally framed and welded to form a dirt and vermin-retardant enclosure. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch.
- B. Fabricate units on precision dies for interchangeability of like-size drawers, doors, and similar parts.
- C. Flush Doors: Outer and inner pans formed and telescoped into box formation, with channel reinforcement full height on center of each pan. Fill doors solid with noncombustible, sound-deadening material that is not made of Styrofoam. Material must be adhered to inside of doors and drawers to assure no wobbling of doors.
- D. Hinged Doors: Reinforce with formed angles on inner pans made with 1 piece of steel.
- E. Drawers: Assemble fronts from telescoping outer pans, designed to eliminate raw edge of steel at top. Fabricate sides, back, and bottom of one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal. Provide drawers with rubber bumpers, runners, and positive stops to prevent metal-to-metal contact or accidental removal.

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- F. Adjustable Shelves: Front, back, and ends formed down with returned lip at front and back.
- G. Toe Space: Provide metal toe space, fully enclosed, 4 inches high by 3 inches deep, with no open gaps or pockets are acceptable.
- H. Table Legs: Not less than 2x3" inch, electrically welded tubing. Provide leg stretchers where necessary to comply with structural performance requirements. Weld or bolt leg stretchers to legs and cross-stretchers. Securely bolt legs to table aprons. Provide leveling device welded to bottom of each leg.
- I. Leg Shoes: Vinyl or rubber, black, open-bottom type.
- J. Utilities: Provide space, cutouts, and holes for pipes, conduits, and fitting in cabinet bodies to accommodate utility services and their support-strut assemblies.
- K. Utility-Space Framing: Manufacturer's standard steel framing units consisting of 2 cold-rolled C-channel uprights, not less than 1-5/8 inches square by 0.10 inch thick, connected together at the top and bottom by U-shaped brackets made from 1-1/4-by-1/4-inch flat bars. Framing units may be made by welding C-channel material specified for uprights into rectangular frames instead of using U-shaped brackets.
- L. Base Molding: Extruded vinyl or rubber, black, 4 inches high. Provide on fronts and exposed ends and backs of floor-mounted casework.
- M. Filler Strips: Provide as needed to close space between cabinets and walls, ceilings, and indicated equipment. Fabricate from the same material and with the same finish as cabinets. Hem exposed edges.

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**2.03 FINISH FOR METAL LABORATORY CASEWORK**

- A. All Steel Laboratory Products shall utilize a dry powder coat paint process by means of electrostatically spray, providing high-transfer efficiency low waste generation. Liquid-applied coatings shall not be acceptable. Manufacturer shall supply documentation that waste generated during the painting process, is a solid, non-hazardous material.
1. Pretreatment: Finish process shall incorporate a phosphate conversion coating during the pretreatment/cleaning operation. Electrostatic application of dry powder shall follow. Coated parts shall pass through curing ovens, which shall cause the powder to melt, flow, gel, cure and bond onto the phosphatized steel substrate.
  2. Chemical Resistant Finish: Only highly chemically resistant, dry powder coated finishes that passes the SEFA 8 casework specifications for chemical and durability resistance, will be acceptable.
  3. Overspray Powder Paint: Shall be captured and re-sprayed. Efficiency shall be 99.8% effective in coating usage, reducing waste generation. A closed collection system shall be utilized for overspray that is not reused. Powder overspray, which cannot escape the facility, is collected in bulk, eliminating the need for daily replacement/disposal of filter media.
  4. VOC Emissions: Powder paint shall be sprayed and baked with a near zero (.29 lbs per gallon maximum) VOC (Volatile Organic Compounds) emissions.
  5. Off-gassing: After all steel powder coated parts have cooled from the curing ovens, the coating shall be firm and stable. No further emissions of "Off-gassing/Decomposition" vapors shall occur at room temperature.
- B. Chemical-Resistant Powder Coat Enamel Finish:  
Immediately after cleaning and pre-treating, apply manufacturer's standard 2-coat, chemical-resistant, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of 1 mil for topcoat and 2 mils for system.

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- C. Chemical and Physical Resistance of Finish System:  
Provide metal laboratory casework with finish system complying with the following requirements for chemical and physical resistance:
1. Chemical and Physical Resistance: capable of withstanding application of not less than 5 drops (0.25 ml) of the following reagents applied to finish surface; covered with a watch glass for 60 minutes, rinsed, and dried; with no permanent change in gloss, color, film hardness, adhesion, or film protection.
    - a. Acetic acid (98 percent).
    - b. Hydrochloric acid (37 percent).
    - c. Nitric acid (25 percent).
    - d. Phosphoric acid (75 percent).
    - e. Sulfuric acid (85 percent).
    - f. Acetone.
    - g. Benzene.
    - h. Carbon tetrachloride.
    - i. Ethyl acetate.
    - j. Ethyl alcohol.
    - k. Formaldehyde (37 percent).
    - l. Furfural.
    - m. Methyl ethyl ketone.
    - n. Phenol (85 percent).
    - o. Toluene.
    - p. Xylene.
    - q. Ammonium hydroxide (28 percent).
    - r. Potassium hydroxide (25 percent).
    - s. Potassium hydroxide (40 percent).
    - t. Sodium carbonate (saturated).
    - u. Sodium chloride (saturated).
    - v. Sodium hydroxide (25 percent).
    - w. Sodium sulfide (saturated).
    - x. Zinc chloride (saturated).
  2. Moisture Resistance: No visible effect when exposed to the following:
    - a. Hot water at a temperature of 190 to 205 deg F, trickled down the surface at a 45-degree angle for 5 minutes.
    - b. Constant moisture using a 2-by-3-by-1-inch cellulose sponge, soaked with water, in contact with surface for 100 hours.

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2. Cold Crack: No effect when subjected to 10 cycles of temperature change from 20 deg F for 60 minutes to 125 deg F for 60 minutes.
  3. Adhesion and Flexibility: No peeling or cracking or exposure of metal when metal is bent 180 degrees over a ½ inch diameter mandrel.
- D. Colors: Comply with the following requirements for colors of metal laboratory casework finish:
1. Color: Banker's Gray.

**2.04 CASEWORK HARDWARE**

- A. Hardware, General: Provide manufacturer's standard satin-finish, commercial quality, heavy-duty complying with requirements indicated for each type.
- B. Hinges: Stainless-steel, 5-knuckle hinges complying with BHMA 156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors less than 48 inches high and 3 for doors more than 48 inches high.
- C. Pulls: Solid aluminum, stainless-steel or zinc die cast, fastened from back with 2 screws. For sliding doors, provide plastic, or aluminum flush pulls. Provide 2 pulls for drawers more than 24 inches wide.
- D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches high.
- E. Drawer Guides: Steel Full Extension Ball Bearing Drawer Slide with Bright Zinc Finish, and complying with ANSI/BIFMA X5.5-2008, ANSI/KCMA A 161.1-2006, ANSI-BHMA A 156.9-2010, NSF/ANSI 2 Food Equipment, SEFA-8M-2020.
- F. Label Holders: Stainless-steel or chrome-plated, sized to receive standard label cards approximately 1 by 2 inches, attached with screws or rivets.
  1. Provide on all drawers.

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- G. Drawer and Cupboard Locks: Half-mortise or cylindrical type, 5-pin tumbler and dead bolt or cam, only cylinder exposed, brass with chrome-plated finish, complying with BHMA A156.11, Grade 1.
1. Provide minimum of 2 keys per lock and 6 master keys.
  2. Provide on all drawers and doors.
- H. Castors: For mobile casework, castors are replacing the toe kick height. Castors are 250# load capacity with 3" wheels, 4.25" load height and swivel radius of 2.75". Tread width 1.25". Must have tread brake and dust caps. Mobile cabinets must have an anti-tipping device.

**2.05 TOPS, SINKS, AND TROUGHS**

- A. Tops, General: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Make exposed edges and corners uniformly beveled. Provide front and end overhang of 1 inch over base cabinets, formed with continuous drip groove on underside ½ inch from edge.
- B. Sinks, General: Provide sizes indicated or manufacturer's closest standard size of equal or greater volume, as approved by Architect.
1. Outlets: 1-1/2-inch NPS outlets with strainers and tailpieces a minimum of 6 inches long, of the same material as sink, or as otherwise approved by CM.
  2. Overflows: For each sink, except cup sinks, provide overflow of standard beehive or open-top design and with separate strainer. Height 2 inches less than sink depth. Provide in the same material as sink.
- C. Epoxy Tops and Sinks: Factory molded of modified epoxy-resin formulation, uniform mixture throughout full-thickness with smooth, non-specular finish.
1. Physical Properties: Comply with the following minimum requirements:
    - a. Flexural strength: 15,000 psi.

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- b. Compressive strength: 30,000 psi.
  - c. Hardness (Rockwell M): 100
  - d. Water absorption (24 hours): 0.02 percent (maximum).
  - e. Heat distortion point: 350 deg. F
  - f. Thermal-shock resistance: Highly resistant.
2. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, test procedure 3.9.5:
- a. Acetone: Moderate effect.
  - b. Acetic acid (98 percent): No effect.
  - c. Hydrochloric acid (37 percent): No effect.
  - d. Nitric acid (70 percent): No effect.
  - e. Phosphoric acid (85 percent): No effect.
  - f. Sulfuric acid (33 percent): No effect.
  - g. Benzene: No effect.
  - h. Butyl alcohol: No effect.
  - i. Carbon tetrachloride: No effect.
  - j. Ethyl acetate: No effect.
  - k. Ethyl ether: No effect.
  - l. Formaldehyde: No effect.
  - m. Phenol (85 percent): No effect.
  - n. Xylene: No effect.
  - o. Ammonium hydroxide (28 percent): No effect.
  - p. Sodium hydroxide (50 percent): Moderate effect.
  - q. Zinc chloride: No effect.
3. Colors: Provide products that result in colors complying with the following requirements:
- a. Color: Black.
4. Top Fabrication Fabricate with factory cutouts for sinks and with plain butt-type joints assembled with epoxy adhesive and pre-fitted, concealed metal splines.
- a. Top Configuration: Square edge with drip groove and integral coved backsplash.
  - b. Top thick: 1-1/4-inches.
5. Sink Fabrication: Molded in one piece with surfaces smooth, corners coved and bottom sloped to outlet; 1/2-inch minimum thickness.

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- a. Provide sinks with ¼-inch-thick lip around perimeter of sink for drop-in installation.
- b. Bond epoxy sinks installed in epoxy tops to tops and finish to produce an integral unit with invisible joint line.

**2.06 SOLVENT STORAGE CABINETS**

- A. Top, bottom and sides: 18 gauge steel, double wall construction with 1-1/2" air space, removable access and back panels; all joints welded. Set bottom of door two inches above bottom of cabinet to create a two inch deep well to contain spillage of liquids.
  6. Provide non-venting cabinets.
- B. Hardware:
  1. 3 point latching device and lock.
  2. Full length piano hinge.
  3. Door operation: Manual.
  4. Self-closing door units must have ability to allow either door to close first.
- C. Cabinet grounding attachment: Screw at base of cabinet for firm attachment of grounding wire.
  1. Warning signs: Label cabinet: "FLAMMABLE - KEEP FIRE AWAY".

**2.07 ACCESSORIES**

- A. Reagent Racks: Single- or double-faced units as indicated, fabricated to suit type and composition of top.
  1. Wall Shelving: Provide wall shelving of materials as casework
  2. Adjustable Shelf Supports: Surface-type steel standard and steel shelf brackets, with epoxy powder-coated finish, complying with BHMA A156.9, Types B04102 and B04112.
  3. Wall shelving to be based on Air Master Systems Wall Rail design.



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4. For areas that require cantilever or suspended cabinets/cantilever, Air Master Systems Heavy Duty Wall Rail design shall be used.
  
- B. Upright Rod Assembly and Metal Crossbar: Aluminum or stainless steel. Two vertical rods and 1 horizontal crossbar,  $\frac{3}{4}$  inch diameter and 36 inches long, unless otherwise indicated; 2 flush socket receptacles and 2 crossbar clamps. Taper ends of vertical rods to fit receptacles; all other rod ends are rounded.
  
- C. Burette Rods: Aluminum or stainless-steel rods,  $\frac{1}{2}$  inch diameter and 18 inches long, threaded on 1 end to fit tapered plug adapter for flush socket receptacle. Provide with tapered plug adapter and receptacle.
  
- D. Lattice Assembly: Aluminum or stainless-steel, vertical and horizontal rod lattice assembly with  $\frac{3}{4}$  inch diameter rods at approximately 12 inches o.c. with 2 flush socket receptacles for mounting.
  1. Size: 36 inches wide by 36 inches high.
  
- E. Pegboards: Stainless-steel pegboards with polypropylene pegs and stainless-steel drip troughs.
  
- F. Cylinder Racks: Cylinder racks to be 2" square 12 gauge tubing with 200 lb. zinc plated carabiners and  $\frac{3}{8}$ "-16 threaded eyebolts. Racks to have holes on bottom for attaching to floor.

**2.08 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide metal laboratory casework capable of withstanding the following loads without permanent deformation, excessive deflection, or binding of drawers and doors.
  1. Shelves of Base, Wall, and Storage Cabinets: 200 lbs.
  2. Drawers: 150 lbs.
  3. Wall Cabinets: 150lbs/ft.

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4. Floor-Supported Base Cabinets: 100 lbs./ft/  
within cabinets, 75-lbs/ft. countertop.

**2.09 CASEWORK INSTALLATION - OTHER**

- A. Install plumb, level, and true; shim as required, using concealed shims. Where laboratory case work abuts other finished work, apply filler strips and scribes for accurate fit, with fasteners concealed where practical.
- B. Utility-Space Framing: Secure to floor with 2 fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.
- C. Base Cabinets: Set cabinets straight, plumb, and level. Adjust sub tops within 1/16 inch of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking or reinforcements in partitions with fasteners spaced 24 inches on center. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
  1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 24 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than 2 fasteners.
- D. Wall Cabinets: Hang cabinets straight, plumb, and level. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches on center. Align similar adjoining doors to a tolerance of 1/16 inch.

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- E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises, unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- F. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

**2.10 INSTALLATION OF TOPS**

- A. Field Jointing: Where possible, make in the same manner as shop jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Pre pare edges to be joined in shop so Project site processing of top and edge surfaces is not required. Locate field joins where shown on approved Shop Drawings.
- B. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection. Provided flush hairline joints in tops using clamping devices.
  - 1. Where necessary to penetrate tops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to top in chemical resistance, hardness, and appearance.
- C. Provide required holes and cutouts for service fittings.
- D. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- E. Provide scribe moldings for closures at junctures of top, curb, and splash as recommended by manufacturer for materials involved. Match materials and finish to adjacent casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.

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**2.11 INSTALLATION OF SINKS**

- A. Underside Installation: Use manufacturer's recommended adjustable support system for table-and cabinet-type installations.

**2.12 INSTALLATION OF ACCESSORIES**

- A. Install accessories according to approved Shop Drawings and manufacturer's written instructions.
- B. Securely fasten adjustable shelving supports, stainless-steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.
- C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.

**2.13 CLEANING AND PROTECTING**

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Construction Manager,
- C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at minimum of 48 inches on center.

**END OF SECTION 12350**

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**Section 17100 - Low Voltage Cable Infrastructure**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to other Sections of Division 1, General Requirements, which are hereby made a part of this Section.
- B. Related Specification Sections:
  - 1. 17000 - General Technology Requirements
  - 2. 17570 - Wireless Local Area Network (WLAN)

1.02 PROJECT SUMMARY

- A. Procure and install a new Low Voltage Cabling system at the following building:
  - a. **Macomb County Jail**
- B. Electrical systems, if required, will be provided by others.

1.03 SUBMITTALS

- A. Manufacturer's technical data, specification sheets, maintenance manuals, and material safety data sheets (as outlined in Section 01340) must be provided within the contractor's bid proposal for the products listed below:
  - 1. Wire and Cable
  - 2. Outlets, Termination Jacks, Faceplates, and Connectors
  - 3. Terminal Blocks and Patch Panels
  - 4. Enclosures, Racks and Equipment Housings
  - 5. Firestopping Material
- B. Bill of materials, noting long lead time items.
- C. Project schedule
  - 1. Contractors shall provide a detailed project schedule within their bid proposal, including all major work components that materially affect any other work within the project and projected building completion timeframes.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The following manufacturers are acceptable for the required equipment within this section.
1. Plenum Rated Cable Plant (Category 6, 4 pair, UTP Cable, Color - Various)
    - a. Commscope or approved equivalent.
  2. Patch Panels
    - a. Commscope Universal Patch Panels, Category 6 (24 or 48-port as required per wiring closet) or approved equivalent.
  3. Termination Jacks
    - a. Commscope Jacks, Category 6 (Color - Various) or approved equivalent.
  4. Patch Cables
    - a. Commscope Universal Patch Cables, Category 6 (Color - Various), non-sleeved ends, or approved equivalent.
  5. Faceplates
    - a. Commscope Uniprise Solutions, 2-Port or 4-Port Faceplate, Designer with labels, White in color, or approved equivalent.
    - b. Contractor shall furnish and install blank faceplates on any outlet provided by the electrical contractor for their potential technology use.
    - c. Contractor shall furnish and install blanks as required in each faceplate where ports are unused.
- B. The data cable shall contain numbers on the jacket illustrating the footage marks, at 10' intervals.
- C. All UTP cable, termination jacks, patch panels, and patch cords must be supplied from one manufacturer.
- D. Cabling Color Schema:
- 1. Blue - Data**
  - 2. Green - Wireless**
  - 3. Purple - Surveillance**

2.02 FIRESTOPPING MATERIALS

- A. Materials may be in the form of caulk, putty, strip, sheet, or devices that shall be specifically designed to fill holes, spaces, and voids at communications penetrations.

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- B. In addition, firestopping materials shall also provide adhesion to substrates and maintain fire and smoke seal under normal expected movements of substrates, conduits, and cables.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. The awarded contractor must perform a walkthrough of the job sites prior to beginning installation. The walkthrough will be completed in conjunction with the Owner and Technology Designer.

3.02 INSTALLATION

- A. All Category 6 cabling must meet the ANSI/TIA/EIA T568B cabling specifications. All layouts and preparation of shop drawings and installation supervision shall be performed by a certified cable installer of the proposed solution.
- B. All Category 6 cabling must be continuous from the telecommunication room to the end location. Any splices in data cabling are strictly prohibited.
- C. The contractor shall provide all necessary galvanized bridle rings and/or J-hooks. The bridle rings and J-hooks shall be connected to the building structure. Bridle rings and J-hooks should be placed no farther than four (4) feet apart.
- D. Category 6 cabling shall be installed above the ceiling. The data cable must be installed independently from the ceiling grid and/or other support systems.
- E. The Category 6 cable shall not be installed with a bend radius greater than the manufacturer's specifications.
- F. The contractor shall ensure that data cables are not kinked, bent, overloaded, crushed, etc.
- G. Data cables must be kept 5", at a minimum, from power lines and fluorescent lights.
- H. The contractor shall provide a 15' service loop at the end of each data cable.

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- I. Each data and voice cable shall be labeled with the following information: telecommunication room, patch panel, and port number. For example: IDF3-B-12 would reference telecommunication room 3, patch panel B, and port number 12.
- J. Patch panels shall be labeled sequentially.
- K. The awarded contractor is required to supply and install 1' Category 6 patch cables from the patch panel to the network switch.
- L. The awarded contractor is to provide and install cable tray or ladder rack in the IT Closet.

3.03 PROJECT DOCUMENTATION

- A. Submit three (3) copies of the following required items within one (1) month of the conclusion of the project:
  - 1. Approved shop drawings and submittals.
  - 2. Completed field installation drawings (in hard copy and electronic). These drawings should illustrate cable routes from telecommunication room to each location (as-built). In addition, each location shall indentify the telecommunication room, patch panel, and port number. For example: IDF3-B-12 would reference telecommunication room 3, patch panel B, and port number 12.
  - 3. The awarded contractor is responsible for updating the District's current set of as-built drawings. This includes the updates of Visio drawings for each cabinet, update of the CAD as-built drawings with cable pathways, and updating the spreadsheet indicating the information below.
  - 4. Electronic spreadsheet detailing the following information: location, telecommunication closet, data/voice panel #, data/voice port #, switch stack # ID, switch IP, and switch port #.
  - 5. Any system manuals that are provided by the manufacturer.
  - 6. Warranty documents for products listed within this section.
  - 7. Cable certification test results (in hard copy and electronic).



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3.04 WARRANTY

- A. Unless otherwise specified, unconditionally guarantee in writing the materials, equipment, and workmanship for a period of not less than **twenty (20) years** from date of Final Acceptance by the Owner. The Owner shall deem acceptance as beneficial use.
- B. Transfer manufacturer's warranties to the Owner in addition to the General System Guarantee. Submit these warranties on each item in list form with shop drawings. Detail specific parts within equipment that are subject to separate conditional warranty. Warranty proprietary equipment and systems involved in this contract during the guarantee period. Final payment shall not relieve the contractor of these obligations.

End of Section 17100

SECTION 21 0500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe, fittings, sleeves, escutcheons, seals, and connections for sprinkler systems.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 09 9123 - Interior Painting: Preparation and painting of interior fire protection piping systems.
- C. Section 21 1300 - Fire-Suppression Sprinkler Systems: Sprinkler systems design.

1.03 REFERENCE STANDARDS

- A. ASME A112.18.1 - Plumbing Supply Fittings 2018, with Errata.
- B. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
- C. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2020.
- D. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2021.
- E. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250 2021.
- F. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2018).
- G. ASTM A536 - Standard Specification for Ductile Iron Castings 1984, with Editorial Revision (2019).

- H. AWWA C606 - Grooved and Shouldered Joints 2015.
- I. NFPA 13 - Standard for the Installation of Sprinkler Systems Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. NFPA 14 - Standard for the Installation of Standpipe and Hose Systems 2019, with Amendment.
- K. UL (DIR) - Online Certifications Directory Current Edition.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
  - 1. NFPA 13 - Standard for the Installation of Sprinkler Systems
- B. Delegated Design: Engage a qualified Fire Protection professional engineer, as defined in Section 014000 "Quality Requirements," to design project sprinkler systems. Base calculations on results of fire-hydrant flow test. Flow test shall be performed within one year of construction start.
- C. Hydraulic Design Criteria: Sprinkler system design shall be approved by authorities having jurisdiction, Owner's Insurance Underwriter (where applicable) and shall be designed according to the following:
  - 1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers, or 10 psi, whichever is greater.
  - 2. Sprinkler Occupancy Hazard Classifications: Refer to Drawings.
  - 3. Minimum Density for Automatic-Sprinkler Piping Design: Refer to Drawings.

4. Maximum Protection Area per Sprinkler: According to the latest NFPA 13 standard, UL listing and as specified on Drawings.
5. Total Combined Hose-Stream Demand Requirement: According to latest NFPA 13 standard unless otherwise indicated on drawings.
6. Water velocity in the piping system shall not exceed the following:
  - a. Underground mains: 16 ft/sec.
  - b. Aboveground mains: 32 ft/sec.
  - c. Sprinkler branch lines: 20 ft/sec.
7. Water supply noted on the drawings. If not, Contractor shall make flow test to ascertain water flow.

#### 1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Delegated-Design Submittal: For all sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  1. Shop Drawings and Hydraulic Calculations:
    - a. Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals.
    - b. Indicate installation, layout, weights, mounting and support details, and piping connections.
    - c. Layout and name (or number) of each room repeated as shown on the Architect's/Engineer's plans.
    - d. Reflected ceiling plan for each area showing location of partition walls, ceiling grid lines,

ceiling light fixtures; proposed location of all fire sprinler heads; and size and location of all piping. Shop drawings shall clearly identify any areas proposed to be protected with "dry type" systems and "anti-freeze type" systems and shall identify sprinkler heads rated for discharge at temperatures other than 165 degrees F.

- e. Shop drawings shall be submitted to the Architect/Engineer, AHJ and Owner's Insurance Underwriter (where applicable) for review and approval.

C. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each fire-department or pump test header connection.
3. Grooved joint couplings and fittings shall be shown on drawings and product submittals, and be specifically identified with the applicable Victaulic style number.

D. Shop Drawings, Product Data and Hydraulic calculations shall be reviewed as one package; review of submittals shall not start until Engineer has all product data, hydraulic calculations and shop drawings.

#### 1.06 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Provide fire protection work per the mandatory code requirements, standards of NFPA, and the requirements of the Owner's Insurance Underwriter, where applicable, except where more stringent requirements are indicated, as modified and supplemented by the Contract Documents. The NFPA requirements include the appendices and

supplements.

2. The provisions and recommendations of the NFPA constitute mandatory minimum requirements for work specified herein. No payment will be made by the Owner for extra charges for work added in order to comply with NFPA Standards and Owner's Insurance Underwriter requirements, where applicable.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
1. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified Fire Protection engineer.
- D. All grooved couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
1. All castings used for couplings housings, fittings, or valve and specialty bodies shall be date stamped for quality assurance and traceability.
- E. Comply with UL (DIR) requirements.
- F. Valves: Bear UL (DIR) product listing label or marking. Provide manufacturer's name and pressure rating marked on valve body.
- G. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

H. Pipe: Each length of pipe shall be legibly identified at mill by paint, stenciling or raised symbols identifying manufacturer and class type or schedule of pipe. Copper pipe shall be identified at 3 foot intervals.

I. Fittings: To be identified by manufacturer by permanently attached tags, imprints or other approved means indicating class of wall thickened and material.

#### 1.07 DEVIATIONS FROM BASIS OF DESIGN MANUFACTURER

A. Should the Division 21 Contractors submit equipment by a Manufacturer other than that indicated as the Basis of Design on the Drawings, Contractor shall then be responsible for evaluating the impacts of the proposed Manufacturer's equipment, even if the Manufacturer is listed in the specifications as an approved equal. This includes the proposed Manufacturer's electrical, architectural and structural requirements and their subsequent impacts on the current design (roof openings, curbs, structural support, etc.) and coordination of any differing dimensions and clearances with all other trades.

#### 1.08 FIELD CONDITIONS - RENOVATION PROJECTS

A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:

1. Notify Architect & Construction Manager no fewer than five days in advance of proposed interruption of sprinkler service.

2. Do not proceed with interruption of sprinkler service without Architect's and Construction Manager's written permission.

#### 1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store valves in shipping containers, with labeling in place.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

PART 2 PRODUCTS

2.01 FIRE PROTECTION SYSTEMS

- A. Sprinkler Systems: Comply with NFPA 13.
- B. Welding Materials and Procedures: Comply with ASME BPVC-IX.

2.02 ABOVE GROUND PIPING

- A. Steel Pipe: ASTM A53 Schedule 40 or ASTM A135/A135M Schedule 10, black.
  - 1. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings and ASME B16.4, threaded fittings.
  - 2. Malleable Iron Fittings: ASME B16.3, threaded fittings and ASTM A47/A47M.
  - 3. Ductile iron Fittings: ASTM A536, Grade 65-45-12. In applicable sizes, fittings shall be short pattern, with flow equal to standard pattern fittings.
    - a. Basis of Design: Victaulic FireLock.
  - 4. Mechanical Grooved Couplings: Two ductile iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, ASTM A449 compliant steel bolts, nuts; galvanized for galvanized pipe.
    - a. Rigid Type: Housings cast with offsetting, angle-pattern, bolt pads to provide system rigidity and support and hanging in accordance with NFPA-13, fully installed at visual pad-to-pad offset contact.



Couplings that require exact gapping at specific torque ratings are not permitted.

- 1) Installation-Ready for complete installation without field disassembly.
  - 2) Basis of Design: Victaulic Style 009N and 107N.
- b. Flexible Type: For use in locations where vibration attenuation and stress relief are required.
- 1) Basis of Design: Victaulic Installation-Ready Style 177 or Style 77.
- c. Installation-Ready gaskets are center-leg, with pipe stop to ensure proper groove engagement, alignment, and pipe insertion depth.
5. Installation-Ready fittings for Schedule 40 & 10 grooved end steel piping in fire protection applications sizes NPS 1- $\frac{1}{4}$  thru 2 $\frac{1}{2}$  (DN 32 thru DN 65). Fittings shall consist of a ductile iron housing conforming to ASTM A-536, Grade 65-45-12, with Installation-Ready ends, orange enamel coated, red enamel coated or galvanized. Fittings complete with prelubricated Grade "E" EPDM Type 'A' gasket; and ASTM A449 electroplated steel bolts and nuts. System shall be UL listed for a working pressure of 300 psi (2065 kPa) and FM approved for working pressure 365 psi (2517kPa).
6. Mechanical Formed Fittings: Carbon steel housing with integral pipe stop and O-ring pocked and O-ring, uniformly compressed into permanent mechanical engagement onto pipe.

## 2.03 PIPE SLEEVES

### A. Vertical Piping:

1. Sleeve Length: 1 inch above finished floor.
2. Provide sealant for watertight joint.

- B. Plastic, Sheet Metal, or Moisture-Resistant Fiber: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.
- C. Pipe Passing Through Quarry Tile, Terrazzo, or Ceramic Tile Floors:
  - 1. Brass pipe.
  - 2. Connect sleeve with floor plate.
- D. Pipe Passing Through Concrete Beam Flanges, except where Brass Pipe Sleeves are Specified:
  - 1. Galvanized steel pipe or black iron pipe with asphalt coating.
  - 2. Connect sleeve with floor plate except in mechanical rooms.
- E. Pipe Passing Through Mechanical, Laundry, and Animal Room Floors above Basement:
  - 1. Galvanized steel pipe or black iron pipe with asphalt coating.
  - 2. Connect sleeve with floor plate except in mechanical rooms.
- F. Clearances:
  - 1. Provide allowance for insulated piping.
  - 2. Wall, Floor, Floor, Partitions, and Beam Flanges: 1 inch greater than external; pipe diameter.
  - 3. Rated Openings: Caulked tight with fire stopping material complying with ASTM E814 in accordance with Section 07 8400 to prevent the spread of fire, smoke, and gases.

#### 2.04 MANUFACTURED SLEEVE-SEAL SYSTEMS

- A. Modular/Mechanical Seal:

1. Synthetic rubber interlocking links continuously fill annular space between pipe and wall/casing opening.
2. Provide watertight seal between pipe and wall/casing opening.
3. Elastomer element size and material in accordance with manufacturer's recommendations.

## 2.05 ESCUTCHEONS

### A. Material:

1. Metals and Finish: Comply with ASME A112.18.1.

### B. Construction:

1. One-piece for mounting on chrome-plated tubing or pipe and one-piece or split-pattern type elsewhere.
2. Internal spring tension devices or setscrews to maintain a fixed position against a surface.

## 2.06 PIPE HANGERS AND SUPPORTS

- ### A. Supporting Elements: provide UL/FM components per NFPA 13, ANSI B 31.1 and MSS SP-58 except that "C" clamps or any modification thereof are unacceptable.

1. "C" clamps: With set screw, locknut and restraining strap are acceptable for piping up to 2-1/2".

- ### B. Furnish necessary piping and equipment supporting elements including; building structure attachments; supplementary steel; hanger rods, stanchions and fixtures; vertical pipe attachments; horizontal pipe attachments; anchors; guides.

- ### C. Center Loading Beam Clamps: For attachments to building structure as approved except piping supported from top of steel.

## 2.07 MECHANICAL COUPLINGS

### A. Manufacturers:

1. Tyco Fire Protection Products: [www.tyco-fire.com/#sle](http://www.tyco-fire.com/#sle).
2. Victaulic Company: [www.victaulic.com/#sle](http://www.victaulic.com/#sle).
3. Anvil/Gruvlok: [www.anvilintl.com](http://www.anvilintl.com)
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Rigid Mechanical Couplings for Grooved Joints:

1. Dimensions and Testing: Comply with AWWA C606.
2. Minimum Working Pressure: 300 psig.
3. Housing Material: Fabricate of ductile iron complying with ASTM A536.
4. Gasket Material: EPDM-HP suitable for operating temperature range from minus 30 degrees F to 250 degrees F.
5. Bolts and Nuts: Hot dipped galvanized or zinc electroplated steel.

C. Only use grooved coupling as permitted by NFPA 13 and NFPA 14.

PART 3 EXECUTION

3.01 FIRE SUPPRESSION PIPING APPLICATIONS

A. Standard-pressure, wet-pipe sprinkler system, NPS 2 (DN 50) and smaller, shall be one of the following:

1. Schedule 40, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Schedule 40, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3. Schedule 40, black-steel pipe with plain ends; steel welding fittings; and welded joints.
- B. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 (DN 65) and larger, shall be one of the following:
1. Schedule 40, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
  2. Schedule 40, black-steel pipe with plain ends; steel welding fittings; and welded joints.
  3. Schedule 10, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
  4. Schedule 10, black-steel pipe with plain ends; uncoated, plain-end-pipe fittings; and twist-locked joints.
  5. Schedule 10, black-steel pipe with plain ends; welding fittings; and welded joints.
- C. High-pressure, wet-pipe sprinkler system, shall be one of the following:
1. Schedule 40, black-steel pipe with plain ends; steel welding fittings; and welded joints.

### 3.02 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel or groove plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions. Unions or flanges for servicing and disconnect are not required in installations using grooved joint couplings.

### 3.03 INSTALLATION

- A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- C. Install piping to conserve building space, to not interfere with use of space and other work.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Pipe Hangers and Supports:
  - 1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 2. Place hangers within 12 inches of each horizontal elbow.
  - 3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
  - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 6. Provide copper plated hangers and supports for copper piping.
- G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- H. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and

apply one coat of zinc rich primer to welding.

I. Structural Considerations:

1. Do not penetrate building structural members unless indicated.

J. Provide sleeves when penetrating footings, floors, and walls. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.

K. Manufactured Sleeve-Seal Systems:

1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.

2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.

3. Locate piping in center of sleeve or penetration.

4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.

5. Tighten bolting for a water-tight seal.

6. Install in accordance with manufacturer's recommendations.

L. Escutcheons:

1. Install and firmly attach escutcheons at piping penetrations into finished spaces.

2. Provide escutcheons on both sides of partitions separating finished areas through which piping passes.

3. Use chrome plated escutcheons in occupied spaces and to conceal openings in construction.

M. When installing more than one piping system material, ensure system components are compatible and joined to

ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

- N. Grooved joints shall be installed in accordance with the manufacturer's latest published instructions. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service. Gaskets shall be molded and produced by the grooved coupling manufacturer. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Grooved coupling manufacturer's factory trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools, application of groove, and installation of grooved piping products. Factory trained representative shall periodically visit the jobsite to ensure best practices in grooved product installation are being followed. Contractor shall remove and replace any improperly installed products.
- O. Where pipes are in partitions, furred out spaces and chases, obtain information as to their exact location and size and install work so as to be entirely concealed in allotted space. If conflicts arise making this impossible, obtain instructions from Architect before proceeding with work.
- P. Where there is evidence that parts of fire protection work will interfere with other work, assist in working out space conditions and/or structure, make necessary adjustments to accommodate work.
- Q. Fire protection work installed before coordinating with other work so as to cause interference with other work to be changed to correct such condition without additional cost to Owner.
- R. Accessibility:



1. Install fire protection work to permit removal (without damage to other parts) of coils, heat exchangers, pumps, fan shafts and wheels, belt guards, sheaves and drives and other parts requiring periodic replacement or maintenance.
  2. Arrange pipes and equipment to permit ready access to valves, cocks, traps, starters, motors, dampers, control components and to clear openings of swinging and overhead doors and of access panels.
- S. When necessary to install "U"-shaped dip in a pipe due to a conflict with duct work or other building components, Contractor shall install a  $\frac{3}{4}$ " diameter hose nipple and cap pointing down at lowest point in pipe dip. Contractor shall try to arrange piping layout to avoid such dips; no such dip shall be installed without prior approval of Engineer. All such conditions shall be clearly located and noted on record drawings given to Owner.
- T. When necessary to install inverted "U" in branch piping to rise above an obstruction, Contractor shall install an upright  $\frac{3}{4}$ " diameter air vent nipple and cap at high point of inverted "U". Contractor shall try to arrange piping layout to avoid such high points; no such installation shall be made without approval of Engineer. All such conditions shall be clearly located and noted on record drawings given to Owner.
- U. Contractor shall provide Owner with at least 24 hours prior notice before commencing sprinkler installations. Owner shall be responsible for deactivating building alarm system and notifying local fire department or other agencies. Under no circumstances shall Contractor attempt to deactivate building alarm system or circumvent any valve tamper switch. Contractor shall perform all work during normal business hours. By the end of each working day, Contractor shall cap all pipe ends.
- V. Pressure test completed work in progress, repair any leaks and otherwise make the sprinkler system water tight so

that fire alarm and sprinkler protection system can be reactivated by Owner during non-business hours.

### 3.04 SOUND CONTROL

- A. Penetrations shall be maintained airtight to prevent sound transfer.
- B. Piping shall pass through sleeves. Pack sleeves tight with glass fiber or oakum and caulked on both sides with non-hardening acoustical sealant.

### 3.05 CLEANING

- A. Flush entire piping system of foreign matter in accordance with NFPA 13.
- B. Upon completion of work, clean all parts of the installation.
- C. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

### 3.06 TESTING AND ACCEPTANCE

- A. After completing branch system, Contractor shall test fire sprinkler piping hydrostatically for a period of two hours at not less than 200 psi or at 50 psi in excess of the maximum operating static pressure when the maximum static pressure exceeds 150 psi. Contractor shall check system for leakage of joints and measure hydrostatic pressure at low point of each system or zone being tested.
- B. The Contractor shall repair or replace piping and fittings as required to eliminate leakage (in accordance with NFPA standards for "little or no leakage") and retest as specified to demonstrate compliance.
- C. Upon satisfactory completion and testing of branch piping system, Contractor shall provide Owner with a letter certifying that branch piping system has been completed in accordance with NFPA 13 and is operational, complete and

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has no defects.

D. Test shall be witnessed by Architect/Owner and any  
authorities having jurisdiction who may so require.

END OF SECTION 21 0500

SECTION 21 1300 - FIRE-SUPPRESSION SPRINKLER SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wet-pipe sprinkler system.
- B. System design, installation, and certification.

1.02 RELATED REQUIREMENTS

- A. Section 21 0500 - Common Work Results for Fire Suppression: Pipe and fittings.

1.03 REFERENCE STANDARDS

- A. ITS (DIR) - Directory of Listed Products Current Edition.
- B. NFPA 13 - Standard for the Installation of Sprinkler Systems Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL (DIR) - Online Certifications Directory Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Sprinklers shall be referred to on drawings, submittals and other documentation, by the sprinkler identification or Model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.
  2. Extra Sprinklers: Type and size matching those installed, in quantity required by referenced NFPA design and installation standard.
  3. Sprinkler Wrenches: For each sprinkler type.
- E. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.

#### 1.05 QUALITY ASSURANCE

- A. Comply with UL (DIR) requirements.
- B. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- D. All grooved couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
  1. All castings used for couplings housings, fittings, or valve and specialty bodies shall be date stamped for quality assurance and traceability.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Sprinklers, Valves, and Equipment:
  1. Victaulic Company: [www.victaulic.com](http://www.victaulic.com)
  2. Viking Corporation: [www.vikinggroupinc.com/#sle](http://www.vikinggroupinc.com/#sle).

3. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 SPRINKLER SYSTEM

- A. Sprinkler System: Provide coverage for building areas noted.
- B. Occupancy: Refer to Schedule on Drawings.
- C. Water Supply: Determine volume and pressure from water flow test data.
- D. Interface system with building fire and smoke alarm system.

## 2.03 SPRINKLERS

- A. Sprinklers shall be glass bulb type, with hex shaped wrench boss integrally cast into the sprinkler body to reduce the risk of damage during installation.
  1. Wrenches shall be provided by the sprinkler manufacturer that directly engage the hex-shaped wrench boss integrally cast in the sprinkler body.
- B. Suspended Ceiling Type: Concealed pendant type with matching push on escutcheon plate.
  1. Response Type: Quick.
  2. Coverage Type: Standard.
  3. Fusible Link: Glass bulb type temperature rated for specific area hazard.
    - a. Basis of Design: Victaulic Model V38.
- C. Exposed Area Type: Pendant type with guard.
  1. Response Type: Quick.
  2. Coverage Type: Standard.

3. Fusible Link: Glass bulb type temperature rated for specific area hazard.
  - a. Basis of Design: Victaulic Model V27.
- D. Sidewall Type: Semi-recessed horizontal sidewall type with matching push on escutcheon plate.
  1. Response Type: Quick.
  2. Coverage Type: Standard.
  3. Fusible Link: Glass bulb type temperature rated for specific area hazard.
- E. Flexible Drop System: Stainless steel, multiple use, open gate type.
  1. Application: Use to properly locate sprinkler heads.
  2. Include all supports and bracing.
  3. Provide braided type tube as required for the application.
  4. The drop system shall consist of a braided type 304 stainless steel flexible tube, zinc plated steel Male threaded nipple or Victaulic FireLock IGS Groove Style 108 coupling for connection to branch-line piping, and a zinc plated steel reducer with a female thread for connection to the sprinkler head.
  5. The drop shall include a UL approved Series AH1 with 3" bend radius; AH2 or AH2-CC braided hose with a bend radius to 2" to allow for proper installation in confined spaces.
  6. The flexible drop shall attach to the ceiling grid using a one-piece open gate Series AB1 or AB2 bracket. The bracket shall allow installation before the ceiling tile is in place.
  7. Manufacturers:

- a. Victaulic Company; Victaulic VicFlex™ Multiple-Use Flexible Stainless Steel Sprinkler Drop System [with captured coupling Style 108].
  - b. Substitutions: See Section 01 6000 - Product Requirements.
8. In lieu of rigid connections to dry sprinkler heads, a Victaulic VicFlex™ dry sprinkler, Model VS1, may be used. The sprinkler shall provide a vertical or horizontal flexible connection with a bend radius to 2", and allow for up to 4 bends
  9. In lieu of rigid pipe offsets or return bends for sprinkler drops in wet, dry, and preaction systems in cold storage applications, the Victaulic VicFlex™ V33, V36, or V40 Dry Sprinkler with Integral AB6 Assembly may be used.
  10. In lieu of threaded steel piping systems, the Victaulic FireLock IGS System with "Installation-Ready™ fittings and couplings may be used for NPS 1 (DN 25) Schedule 10 and Schedule 40 carbon steel pipe in fire protection applications. System rated for a working pressure to 365 psi (2517 kPa).
    - a. Groove: IGS "Innovative Groove System" groove with shortened "A" dimension and tapered groove backside for ease of installation.
    - b. Grooving Tool: Victaulic RG2100, with IGS Confirmation Gauge.
    - c. Victaulic V9 sprinkler heads may be used in direct substitution where applicable.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Install in accordance with referenced NFPA design and installation standard.



- B. Install equipment in accordance with manufacturer's instructions.
- C. Place pipe runs to minimize obstruction to other work.
- D. Place piping in concealed spaces above finished ceilings.
- E. Center sprinklers in two directions in ceiling tile and provide piping offsets as required.
- F. Do not install sprinklers that have been dropped, damaged, show a visible loss of fluid, or a cracked bulb.
- G. The sprinkler bulb protector shall be removable by hand, without tools or devices that may damage the bulb.
- H. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.
- I. Flush entire piping system of foreign matter.
- J. Hydrostatically test entire system.
- K. Require test be witnessed by Fire Marshal.

### 3.02 INTERFACE WITH OTHER PRODUCTS

- A. Ensure required devices are installed and connected as required to fire alarm system.

END OF SECTION 21 1300

SECTION 22 0005 - BASIC PLUMBING REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. This section applies to all sections of Division 22.
- B. Drawings and general provisions of the contract, including Division 00 and Division 01 specification sections, apply to work of this section.
- C. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on drawings and/or herein, including all labor, materials, equipment and incidentals necessary and required for their completion.
- D. The items in this section are supplementary to the requirements set forth in other portions of the specifications as indicated under item "A" above.

1.02 APPLICATION

- A. This section applies to all plumbing work. The contractors involved shall check all sections of the specifications in addition to the particular section covering their specific trade. Each distinct section of the specifications aimed for one trade may have detailed information with regards to other trades, therefore, it is imperative that all sections be reviewed to get a complete picture of all other trades' functions and work required.
- B. The plumbing contractor is responsible for the installation and operation of the plumbing systems.
- C. The plumbing contractor is responsible for receiving, unloading and placement of all of the owner provided equipment.

1.03 INSPECTION OF SITE

- A. Each Contractor shall visit the site prior to bid submission to determine all existing conditions that may affect his work and shall make appropriate allowances for

such conditions in his bid. Failure to visit the site shall not be cause for a request for additional compensation later in the project during construction.

- B. The submitting of a proposal implies that the contractor has visited the site and understands the conditions under which the work must be conducted.
- C. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- D. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Owner before proceeding.

#### 1.04 ALTERNATES AND SUBSTITUTIONS

- A. Refer to Division 01 - General Requirements for procedures to submit products by a Manufacturer that is not listed as approved equal in the Specifications.

#### 1.05 **DEVIATIONS FROM BASIS OF DESIGN MANUFACTURER**

- A. Products identified within the schedules and details are used as the basis of design for laying out and coordinating with other trades such as structural, architectural, and electrical. Should Division 22 Contractor submit products by a manufacturer other than that indicated as Basis of Design in the Drawings, Contractor shall then be responsible for evaluating the impacts of the proposed Manufacturer's equipment, even if the Manufacturer is listed in the specifications as an approved equal. This includes the proposed Manufacturer's electrical, architectural and structural requirements and their subsequent impacts on the current design and coordination of any differing dimensions and clearances with all other trades. This evaluation shall be included as part of the proposed product submittal.

#### 1.06 MATERIALS

- A. Plumbing equipment is to be furnished with motors, electrical controls and protective devices, and integral operating devices which are normally included by the manufacturer or required by the Contract Documents.
- B. The Plumbing trades shall provide all control wiring, 120 volts and less, for the equipment and devices furnished under Division 22 of these specifications, including all wiring devices, transformers, conduit, etc. Any conduits used for control wiring shall meet the specifications as indicated in Division 26.
- C. Power wiring 120 volts and greater shall be by the Electrical Trades.

#### 1.07 CODES, PERMITS AND FEES

- A. Unless otherwise indicated, all required permits, licenses, inspections, approvals and fees for plumbing work shall be secured and paid for by the contractor. All work shall conform to all applicable codes, rules and regulations. Applicable publications listed in all sections of Division 22 shall be the latest issue, unless otherwise noted.
- B. Rules of local utility companies and municipalities shall be complied with. Check with the utility company and/or municipality supplying service to the installation and determine all devices including, but not limited to: meters, regulators, valves which will be required and include the cost of all such items in the proposal.
- C. All work shall be executed in accordance with the rules and regulations set forth in local and state codes.  
Prepare any detailed drawings or diagrams which may be required by the governing authorities. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern.

#### 1.08 MAINTENANCE

- A. Provide 8 hours of instruction to the owner's designated personnel in the maintenance and operation of equipment and systems.
- B. Provide complete maintenance and operating instructional manuals covering all mechanical equipment herein specified, together with parts lists. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable.  
Manuals shall be submitted in electronic format for review. When approved, four (4) bound hard copies and an indexed electronic PDF shall be provided to the owner. Maintenance and operating instructional manuals shall be provided when construction is approximately 75% complete.

#### 1.09 WARRANTY AND GUARANTEE

- A. Contractor shall guarantee all work installed by him or his subcontractors to be free from defect in material and workmanship for a period of one year from date of final acceptance of the work, unless a longer period is stipulated under specific headings. Contractor shall repair or replace at no additional cost to the owner, any material or equipment developing defects and shall also make good any damage caused by such defects or the correction of defects. Repairs or replacements shall bear additional guarantee, as originally called for, dated from the final acceptance of the repair or replacement. This requirement shall be binding even though it will exceed product guarantees normally furnished by some manufacturers. Contractor shall submit his own and each equipment manufacturers written certificates, warranting that each item of equipment furnished complies with all requirements of the drawings and specifications. Note that guarantee shall run from date of final acceptance of the work, not from date of installation of a device or piece of equipment.

#### 1.10 SUBMITTALS

- A. Shop drawings and samples shall be submitted in compliance with the Conditions of the Contract and Division 1 General Requirements.
- B. Contractor shall provide submittals where items are referred to by symbolic designation on the drawings. All submittals shall bear the same designation (plumbing piping, plumbing fixtures, etc.). Refer to other sections of the electrical specifications for additional requirements.
- C. Shop Drawings: Each piece of equipment shall be identified by the number shown in the schedules and by specification article number pertaining to the item. Shop drawings shall as a minimum be  $\frac{1}{4}$ " equals 1' 0" scale, and shall be newly prepared by the Contractor and not reproduced from the Architect's drawings. Layouts shall be made for all floor plans including all ductwork, piping, electrical distribution and other mechanical equipment. Layouts shall show clearances of piping, ducts, etc., above floor.
- D. Contractor shall obtain Engineer's approval on all the work before any equipment is purchased, or any work installed. Contractor shall also secure approval of the Governmental Authorities having jurisdiction on all equipment and on the layout of the complete system.
- E. The Engineer's review and approval of shop drawings is a gratuitous assistance and in no way does it relieve the Contractor from responsibility for errors or omissions which may exist on the shop drawings. Where such errors or omissions are discovered later, they must be made good by the Contractor, without any additional cost to the Owner, irrespective of any approval by the Engineer.
  1. The Contractor shall incorporate with his shop drawings, a letter indicating all deviations from the plans and/or specifications. If in the opinion of the Architect, the deviations are not equal, the Contractor will be required to furnish the item as specified and as indicated on the drawings.

2. Record documents shall be submitted in compliance with the requirements of the Specifications.

F. Engineer WILL NOT REVIEW:

1. Submittals not specified.
2. Submittals not reviewed by Contractor; including Contractor stamp with signature comments.
3. Submittals made after work is delivered to site and/or installed.
4. Submittal resubmissions unless resubmission is required by Architect/Engineer.

- G. Installation of any item that requires submittal approval by the engineer shall be installed at the contractors risk. The contractor, at his cost, shall remove all work installed prior to approval of the submittal.

- H. The engineer will not be responsible for errors in quantities, or dimensions required to fit the job condition, details of fabrication to insure proper assembly at the job, or for errors resulting from errors in submittals.

- I. For underground piping, record dimensions and invert elevations of all piping, including all offsets, fittings, cathodic protection and accessories. Locate dimensions from benchmarks that will be preserved after construction is complete.

1.11 RECORD DRAWINGS

- A. Refer to Division 01 - General Requirements for procedures. All literature shall be furnished in accordance with requirements listed in Division 01.
- B. Contractor shall provide the following record drawings as part of the Project closeout document process:
  1. Contract Documents, specifications and submittals, indicating "As-Built" conditions and actual products

selected for use.

2. Product and Maintenance manuals for all equipment listed within this specification manual and in Contract Documents. Provide with parts lists as applicable.

#### 1.12 QUALITY ASSURANCE

##### A. Other referenced standards:

1. Comply with referenced standards, guidelines, data sheets from various associations, including NFPA, ANSI, ASTM, ASME, ASHRAE.

### PART 2 PRODUCTS

#### 2.01 SLEEVES AND ESCUTCHEONS

- A. Provide sleeves wherever pipes pass through exterior wall and floors. Sleeves shall be schedule 40 steel pipe cut to length. Sleeves shall terminate flush with walls, partitions and ceilings in finished areas. All sleeves through floor shall extend 2" above floor. Provide cast brass nickel-plated escutcheons with positive catches on each visible sleeve penetration. Sleeves are to be sealed at each installation with a 3M approved sealant. The space between the inside of the sleeve and the outside of the pipe or conduit within the sleeve shall be sealed at each installation with a 3M approved sealant.

#### 2.02 DIELECTRIC UNIONS

- A. Dielectric unions shall be used to connect dissimilar metals (such as steel and copper) to prevent electrolytic action.
- B. Dielectric waterway fittings shall be a copper-silicon casting conforming to UNS C87850, and UL classified in accordance with ANSI / NSF-61 for potable water service.

#### 2.03 BUILDING ATTACHMENTS FOR PLUMBING WORK SUPPORTS

- A. General Requirements:



1. Provide building attachments required for supporting plumbing work, suitably selected and installed for the loads applied with a minimum additional safety factor of 3.
2. Where specified attachments are not suitable for conditions, submit to Engineer for approval, proposal for alternate building attachments.
3. If specially designed building attachments are required, retain the services of a licenced structural engineer to design such building attachments.
4. Approved Manufacturers: Grinnell, or equivalent products by Michigan Hanger and B-Line.
5. Provide supplemental trapeze supports where necessary. Design trapeze to support all trades. Coordinate loads, and supports with all trades. Size trapeze for maximum deflection of  $1/64$  of the span.

B. Attachments to Structural Steel:

1. Support plumbing work from building structural steel where possible and approved. No welding or bolting to structural steel is permitted unless authorized by Architect. C-clamps are not permitted.
  - a. Center beam clamp - for loads over 120 lb.:  
Malleable center hung Grinnell Fig. 228.
  - b. Side beam clamp with retaining clips - for loads up to 120 lb.

C. Cast in Place Concrete Inserts:

1. Provide inserts selected for applied load of present load plus 100% for future, and coordinated with concrete work. Except as detailed on drawings, inserts shall be Unistrut or Grinnell. Plan, lay out and coordinate setting of inserts prior to concrete pour. Use Grinnell Fig. 285 lightweight concrete insert for loads up to 400# or Grinnell Fig. 281 Wedge Type

concrete insert for loads up to 1200#

D. Drilled Insert Anchors:

1. Where plumbing work cannot be supported from structural steel, or cast in place concrete inserts, provide drilled concrete insert anchors. Submit for approval, project specific installation drawings for all loads over 100 lbs. Install inserts in web of beam if possible and approved. Insert depth shall not exceed two thirds the thickness of the concrete. Where existing concrete appears to be deteriorating, or where applied load at insert exceeds 1000 lbs., conduct test of concrete to determine derated capacity of insert. Anchors may be adhesive or expansion type up to 1000 lbs., and shall be adhesive type for loads over 1000 lbs.

PART 3 EXECUTION

3.01 GENERAL

- A. Existing piping: when encountered during the course of work, protect, brace and support existing piping where required for proper execution of the work.
- B. Interruption of existing active piping: when the course of work makes shut-down of services unavoidable, the plumbing contractor shall schedule the shut-down at such time as approved by the owners representative, which will cause least interference with established operating routine.
- C. Arrange work accordingly, providing such fittings as duct transitions traps, valves and accessories necessary to complete all construction in an orderly fashion.
- D. Install all equipment in strict accordance all directions and recommendations furnished by the manufacturer.

3.02 INTERPRETATION OF CONTRACT DOCUMENTS

- A. Should there be discrepancy or a question of intent, refer matter to Architect/Engineer for decision before ordering

any equipment or materials or before starting any related work.

- B. Drawings and Specifications are to be taken together. Work specified and not shown or work shown and not specified shall be performed or furnished as though mentioned in both Specifications and Drawings. If there is discrepancy between Drawings and Specifications as to quantity or quality to be provided, the greater quantity or better quality shall be provided.
- C. Minor items and accessories or devices reasonably inferable as necessary to complete and proper installation and operation of any system shall be provided by Contractor for such system whether or not specifically called for by Specifications or Drawings.
- D. Architect/Engineer may change location of any equipment 5' and any piping, ductwork, conduit, etc. 10' in any direction without extra charge, provided such changes are made before installation.
- E. Locations of items not definitely fixed by dimensions are approximate only and exact locations necessary to secure the best conditions and results shall be determined at the site and shall be subject to review and approval by Architect/Engineer.
- F. Follow drawings in laying out work, check drawings of other trades to verify spaces in which work will be installed, and maintain maximum headroom and space conditions at all points.
  - 1. Where headroom or space conditions appear inadequate, notify Architect or Owner's field representative before proceeding with installation.
  - 2. Pipe/duct rerouting and size changes shall be made at no additional cost to the Owner.
- G. Furnish advance information on locations and sizes of frames, boxes, sleeves and openings needed for the work,

and also furnish information and shop drawings necessary to permit installation of other work without delay.

- H. Where there is evidence that parts of the Work specified in Divisions 21, 22, and 23 will interfere with other work, assist in working out space conditions to make satisfactory adjustments, revise and submit coordinated shop drawings.
- I. After review and without additional cost to the Owner, make minor modifications in the work as required by structural interferences, by interferences with work of other sections or for proper execution of the work.
- J. Work installed before coordinating with other work so as to cause interference with other work shall be changed and corrected without additional cost to the Owner.
- K. Drawings are diagrammatic in nature and are a graphic representation of requirements and shall be followed as closely as actual building construction will permit. All changes from the plans necessary to make the work conform to the building as constructed and to fit the work of other trades or to conform to rules of the Governmental Authorities having jurisdiction, NFPA, OSHA and the Owner's Insurance Underwriters, shall be made by the Contractor without extra cost to the Owner.
- L. The layout of the piping, ductwork, equipment, etc., as shown on the drawings shall be checked and exact locations shall be determined by the dimensions of the equipment approved and the Contractor shall obtain approval for the revised layout before the apparatus is installed. The Contractor shall field measure or consult existing record Architectural and Structural Drawings if available for all dimensions, locations of partitions, locations and sizes of structural supports, foundations, etc.
- M. Omission in the Drawings and/or Specifications of any items necessary for the proper completion or operation of the work outlined in this specification shall not relieve

the Contractor from furnishing same without additional cost to the Owner.

- N. The Equipment Shop Drawings should be furnished to the installing Contractor by the purchasing Contractor before roughing in. Contractor shall not install any piping or ductwork for said equipment until he has received approved shop drawings for same.

### 3.03 ALTERATIONS IN PRESENT BUILDING AND SYSTEMS

- A. Contractor shall take particular note of the revisions and alterations to the existing systems, facilities and equipment due to the new construction as indicated on the Drawings and/or in Specification. Contractor shall remove, reroute or alter all services, ductwork, etc., as required or as indicated on the drawings.
- B. The Contractor shall maintain all services in the existing building. In case, where new service connections are to be made to existing services and service interruptions can in no way be avoided, the service interruptions shall be with the minimum of inconvenience to the Owner and the work shall be done at such time of any day, Saturday and Sunday included, and only as directed by the Owner or the Architect.

### 3.04 ACCESSIBILITY

- A. Do not locate traps, valves, controls, unions, cleanouts, etc. in any system at a location that will be inaccessible after construction is completed. Maintain accessibility for all components in plumbing systems.

### 3.05 ACCESS PANELS:

- A. Refer to Division 08 - Openings; Provide access doors in locations as required by applicable codes and as indicated below. Coordinate locations with architectural trades.
- B. Submit shop drawings for review before ordering panels. Where fire rating is required, furnish label doors compatible with fire rating of assembly.

- C. Contractor shall confer with other trades with respect to access panel locations, and shall wherever practical group valves, traps, dampers, etc. in such way as to be accessible from single panel and eliminate as many access panels as possible.
- D. Furnish access panels to access valves, traps, control valves or devices, dampers, damper motors, etc. Access panels shall be sized as necessary for ample access, or as indicated on drawings, but no smaller than 12" x 12" where devices are within easy reach of operator, and at least 24"x24" when operator must pass through opening in order to reach the devices. Architectural Trades shall install access panels coordinated with Mechanical Trades.
- E. Access panels in fire rated walls or ceiling must be U.L. labeled for intended use. Unless otherwise indicated on plans, access doors shall be hinged flush type steel framed panel, 14 gauge minimum for frame, and with anchor straps. Only narrow border shall be exposed. Hinges shall be concealed type. Locking device shall be flush type and screw driver operated. Metal surfaces shall be prime coated with rust-inhibitive paint. Panels shall be compatible with architectural adjacent materials.

### 3.06 PROTECTION OF ELECTRICAL EQUIPMENT

- A. Contractor shall furnish and install sheet metal drain pans beneath piping that is routed above electrical equipment and/or above the 3' access space in front of such equipment. Electrical equipment, for the purpose of addressing drain pan requirements, shall be defined as free-standing or wall-mounted switchgear, transformers, distribution boards or motor control centers.
  - 1. Drain pans shall be 20 gauge galvanized sheet metal with a minimum 4" high turned up edge. Bottom of drain pan shall slope to a single drainage point at  $\frac{1}{8}$ " per foot. A 1" diameter clear plastic tube shall allow collected fluid to drain to the nearest open site floor drain. Secure plastic tubing to building structure

only.

2. Drain pan shall be hung from building structure with angle iron trapeze hangers (no hanger shall penetrate the drain pan). Consider drain pan to be full of water for hanger load calculations.

3. Drain pans shall include liquid detectors with alarms only if noted on the drawings. Liquid detectors shall be specified in Section 22 10 06 Plumbing Piping Specialties.

B. Contractor shall include provisions to adjust the local lighting layout, at no extra cost to Owner, in order to accommodate any detrimental effect the drain pan has on the illumination of the electrical equipment and access space.

### 3.07 CUTTING, PATCHING AND DAMAGE TO OTHER WORK

A. Refer to Division 01 - General Requirements.

B. All cutting required shall be done by the contractor whose work is involved, without extra cost the owner. All patching and restoration including the furnishing and installation of access panels in ceiling, walls; etc. Within the building lines shall be done by the respective, responsible contractor. No cutting of structural steel, concrete, or wood shall be done without prior approval and explicit directions of the architect patched by the respective, responsible contractor.

C. The contractor, under whose jurisdiction the work may fall, shall provide labor, material, and tools required to cut, repair, protect, cap, or relocate existing pipes, conduits, or utilities interfering with or uncovered during work, per regulations of the authorities having jurisdiction.

### 3.08 EXCAVATION AND BACKFILLING

A. Provide all excavation, trenching, tunneling, removal of materials, de-watering and backfilling required for the

proper laying of pipes and plumbing work. Coordinate the work with other excavating and backfilling in same area.

### 3.09 ROUGH-IN FOR CONNECTION TO EQUIPMENT

- A. It shall be the responsibility of each contractor to study the architectural, structural, electrical, and mechanical drawings, conferring with the various trades involved and checking with the supplier of equipment in order to properly rough-in for all equipment.

### 3.10 MATERIAL AND EQUIPMENT

- A. All material and equipment shall be new and of the best quality used for the purpose in good commercial practice, and shall be the standard product of reputable manufacturers. The material and equipment must meet approval of state and local codes in the area it is being used. Roof decks shall not be used to support piping, conduit, equipment, devices, etc.

### 3.11 SEAL PENETRATIONS

- A. Seal the space around pipes in sleeves and around duct openings through walls, floors and ceilings. Provide adequate clearance to allow for proper sealing.

### 3.12 SOUND CONTROL

- A. Penetrations shall be maintained airtight to prevent sound transfer.
- B. Piping shall pass through sleeves. Pack sleeves tight with glass fiber or oakum and caulked on both sides with non-hardening acoustical sealant.

### 3.13 FIRESTOPPING

- A. Refer to Division 07 - Thermal and Moisture Protection for more information.
- B. Provide UL classified firestopping system for plumbing penetrations through rated walls and floors to maintain the fire rating.



### 3.14 CONTROL WIRING

- A. All control wiring for plumbing and electrical equipment, including motor starters, shall be 120 volt maximum and wired with one side of the coil grounded and the operating contacts in the north side of the circuit. All control wiring shall be installed in conduit.

### 3.15 CLEANING, FLUSHING, AND INSPECTING

- A. Refer to Division 01 - General Requirements; all plumbing equipment and components shall be cleaned as frequently as necessary through the construction process and again prior to project completion.
- B. Clean exterior surfaces of installed piping systems of superfluous materials and prepare for application of specified coatings (if any). Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.
- C. Sufficient flushing water shall be introduced into the mains to produce a velocity of not less than 4' per second and this flow rate shall be continued until the discharge is clean and clear and does not show evidences of silt or foreign matter when a sample is visually inspected.
- D. Inspect pressure piping in accordance with procedures of ASME B31.

### 3.16 DELIVERY, STORAGE AND PROTECTION OF EQUIPMENT AND MATERIALS

- A. Refer to Division 01 - General Requirements; all equipment and materials shall be delivered, stored and secured per manufacturer's recommendations.
- B. On-site storage shall be coordinated with Construction Manager/General Contractor and be performed in a manner as to avoid damage, deterioration and loss.
- C. Contractor shall provide temporary protection for installed equipment prior to project completion.

- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- E. All equipment shall be inspected prior to installation to assure that equipment is free from defect and damage.
- F. Protect plumbing fixtures and piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### 3.17 PIPING TESTS

- A. Test pressure piping in accordance with ASME B31.
- B. General: Provide temporary equipment for testing, including pump and gauges. Test piping systems before insulation is installed wherever feasible and remove control devices before testing. Test each natural section of each piping system independently, but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for indicated pressure and time.
  - 1. Test each piping system at 150% of operating pressure, or other pressure as required by Authority Having Jurisdiction, whichever is greater.
    - a. Domestic water systems and equipment vents shall be tested hydrostatically for minimum of four hours at 1½ times design pressure for that system, or 100 psig minimum, whichever is greater, unless otherwise specified.
    - b. Storm, soil, waste and vent piping shall be tested with water for minimum of 24 hours at 10 feet head.
    - c. Acid resistant waste and vent systems shall be tested as per manufacturer's recommendations.
  - 2. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5% of test pressure.

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- C. Repair piping systems sections which fail required piping test, by disassembly and re-installation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics or other temporary repair methods.
- D. Drain test water from piping systems after testing and repair work has been completed.

END OF SECTION 22 0005

SECTION 22 0505 - SELECTIVE DEMOLITION FOR PLUMBING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Demolition and extension of existing plumbing work.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, repairs.

1.03 SUMMARY

- A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the system of minor electrical demolition as described in this specification.
- B. The demolition documents plans and specification have been prepared from existing non-as built documents and cursory non-invasive field investigation.
- C. It is the contractors obligation to become familiar with the extent of demolition and the existing condition before submitting their bid.
- D. During demolition if the contractor discovers unforeseen significant non-code compliance conditions of the existing installation they shall notify the Architect and Engineer immediately in writing.
- E. The contractor shall become familiar with the drawings and scope of work of other trades as the work scope of those trades relates to mechanical equipment and connection requirements.

- F. During demolition the contractor shall record on site as-built all plumbing sanitary, waste and domestic hot, cold and hot water recirculation capped branches for reuse in renovated project space.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Materials and equipment for patching and extending work:  
As specified in individual sections.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that piping to be demolished serve only equipment and facilities within the demolition areas.
- B. Demolition drawings are based on casual field observation and existing record documents.
- C. Report discrepancies to Owner before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

### 3.02 PREPARATION

- A. Identify locations for capping plumbing piping before any demolition work commences.
- B. Coordinate utility service shut-downs with Utility Companies.
- C. Provide temporary connections to maintain existing systems in service during construction.
- D. Confirm isolation valve locations for domestic water piping. Repair leaking isolation valves or replace inoperable valves before commencing piping demolition.

### 3.03 DEMOLITION AND EXTENSION OF EXISTING PLUMBING WORK

- A. In general plumbing remodeling work is shown on Drawings but carefully study all drawings for all contracts for "demolition" and "remodeling" work in existing building and field check to verify locations where such work is being done to determine exact extent of work required. No extra will be allowed for additional work required because of demolition or remodeling whether or not work is specifically noted, itemized or shown on Drawings.
- B. Remove existing equipment and materials pertaining to contract as specified or as required, whether shown on Drawings or not, to prepare for new work of all contracts.
- C. Where necessary, reroute piping, ducts, etc. from within walls, floors, ceilings, etc. being removed. Contractor involved with interrupted service shall be responsible for accomplishing required work whether shown on Drawings or not.
- D. Remove, relocate, and extend existing plumbing piping to accommodate new construction.
- E. Remove domestic water piping back to main and provide isolation valve and cap. DEAD LEGS ARE NOT ALLOWED.
- F. Remove sanitary and waste piping to branch connection fitting to negate any dead legs.

### 3.04 CLEANING AND REPAIR

- A. Refer to Division 01 - General Requirements for procedures.
- B. Clean and repair existing materials and equipment that remain or that are to be reused.

END OF SECTION 22 0505

SECTION 22 0523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Applications.
- B. General requirements.
- C. Ball valves.
- D. Butterfly valves.
- E. Check valves.
- F. Manual balancing valves.
- G. Drain valves.

1.02 RELATED REQUIREMENTS

- A. Section 08 3100 - Access Doors and Panels.
- B. Section 22 0553 - Identification for Plumbing Piping and Equipment.
- C. Section 22 0719 - Plumbing Piping Insulation.
- D. Section 22 1005 - Plumbing Piping.

1.03 ABBREVIATIONS AND ACRONYMS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. PTFE: Polytetrafluoroethylene.
- E. TFE: Tetrafluoroethylene.

1.04 REFERENCE STANDARDS

- A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch 2013 (Reaffirmed 2018).

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- B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2020.
- C. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard 2020.
- D. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves 2022.
- E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- F. ASME B16.34 - Valves - Flanged, Threaded, and Welding End 2020.
- G. ASME B31.9 - Building Services Piping 2020.
- H. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
- I. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings 2004 (Reapproved 2019).
- J. ASTM A536 - Standard Specification for Ductile Iron Castings 1984, with Editorial Revision (2019).
- K. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings 2017.
- L. AWWA C606 - Grooved and Shouldered Joints 2015.
- M. MSS SP-67 - Butterfly Valves 2022.
- N. MSS SP-71 - Gray Iron Swing Check Valves, Flanged and Threaded Ends 2018.
- O. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves 2019.
- P. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .



Q. NSF 61 - Drinking Water System Components - Health Effects 2021.

R. NSF 372 - Drinking Water System Components - Lead Content 2022.

#### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

C. Grooved joint valves shall be referred to on drawings and product submittals, and be identified by the manufacturer's listed model or series designation.

#### 1.06 QUALITY ASSURANCE

A. Manufacturer:

1. Obtain valves for each valve type from single manufacturer.

B. Welding Materials and Procedures: Comply with ASME BPVC-IX.

C. Grooved end valves shall be of the same manufacturer as the adjoining couplings.

D. All castings used for valve bodies shall be date stamped for quality assurance and traceability.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

A. Use the following precautions during storage:

1. Maintain valve end protection and protect flanges and specialties from dirt.

a. Provide temporary inlet and outlet caps.

- b. Maintain caps in place until installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Provide the following valves for the applications if not indicated on drawings:

1. Shutoff: Ball or butterfly.

- a. Plug valves or ball valves can be used for natural gas shutoff.

2. Dead-End: Single-flange butterfly (lug) type.

3. Swing Check:

- a. 2 NPS and Smaller: Bronze swing check valves with bronze or nonmetallic disc.

- b. 2-1/2 NPS and Larger for Domestic Water: Iron swing check valves with closure control, metal or resilient seat check valves.

4. Spring Loaded Check: At pump discharge.

5. Manual Balancing Valves: As indicated and at hot water return pump discharge.

- B. Substitutions of valves with higher CWP classes or SWP ratings for same valve types are permitted when specified CWP ratings or SWP classes are not available.

- C. Required Valve End Connections for Non-Wafer Types:

1. Steel Pipe:

- a. 2 NPS and Smaller: Threaded ends.

- b. 2-1/2 NPS to 4 NPS: Grooved or flanged ends except where threaded valve-end option is indicated in valve schedules below.

c. Grooved-End Copper Tubing and Steel Piping: Grooved.

2. Copper Tube:

a. 2 NPS and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

b. 2-1/2 NPS to 4 NPS: Grooved or flanged ends except where threaded valve-end option is indicated in valve schedules below.

D. Domestic, Hot and Cold Water Valves:

1. 2 NPS and Smaller:

a. Bronze: Provide with solder-joint or threaded ends.

b. Ball: Two piece, full port, bronze with bronze or stainless steel trim.

1) Heat treated DZR brass valves by Jomar are allowed as specified below.

c. Bronze Swing Check: Class 125, bronze disc.

2. 2-1/2 NPS and Larger:

a. Iron, 2-1/2 NPS to 4 NPS: Provide with threaded or flanged ends.

b. Iron Ball: Class 150.

c. Iron Single-Flange Butterfly: 200 CWP, EPDM seat, aluminum-bronze disc.

d. Grooved End, Cast Brass Butterfly: 300 CWP, Fluoroelastomer pressure-responsive seat, aluminum-bronze disc.

2.02 GENERAL REQUIREMENTS

A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and

temperatures.

- B. Valve Sizes: Match upstream piping unless otherwise indicated.
- C. Valve Actuator Types:
  - 1. Gear Actuator: Quarter-turn valves 8 NPS and larger.
  - 2. Handwheel: Valves other than quarter-turn types.
  - 3. Hand Lever: Quarter-turn valves 6 NPS and smaller.
- D. Valves in Insulated Piping: With 2 NPS stem extensions and the following features:
  - 1. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
  - 2. Butterfly Valves: Extended neck.
  - 3. Memory Stops: Fully adjustable after insulation is installed.
- E. Valve-End Connections:
  - 1. Threaded End Valves: ASME B1.20.1.
  - 2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
  - 3. Pipe Flanges and Flanged Fittings 1/2 NPS through 24 NPS: ASME B16.5.
  - 4. Solder Joint Connections: ASME B16.18.
  - 5. Grooved End Connections: Copper-tube dimensions, similar to AWWA C606.
- F. General ASME Compliance:
  - 1. Ferrous Valve Dimensions and Design Criteria: ASME B16.10 and ASME B16.34.

2. Solder-joint Connections: ASME B16.18.

3. Building Services Piping Valves: ASME B31.9.

G. Valve Materials for Potable Water: NSF 61 and NSF 372.

H. Bronze Valves:

1. Fabricate from dezincification resistant material.

2. Copper alloys containing more than 15 percent zinc are not permitted.

I. Source Limitations: Obtain each valve type from a single manufacturer.

#### 2.03 BRONZE BALL VALVES

A. Two Piece, Full Port with Bronze or Stainless Steel Trim:

1. Comply with MSS SP-110.

2. SWP Rating: 150 psig.

3. CWP Rating: 600-1000 psig.

4. Body: Lead Free Bronze.

5. Ends: Threaded.

6. Seats: PTFE or TFE.

7. Manufacturers:

a. Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).

b. Nibco: [www.nibco.com](http://www.nibco.com)

8. Jomar Valves with heat treated DZR brass - CW511 alloy body and end connection and CW510L brass alloy ball and stem and TEA coated ball are allowed.

a. Substitutions: See Section 01 6000 - Product Requirements.

#### 2.04 IRON, SINGLE FLANGE BUTTERFLY VALVES

A. Lug type: Bi-directional dead-end service without use of downstream flange.

1. Comply with MSS SP-67, Type I.
2. CWP Rating: 200 psig.
3. Body: ASTM A126, cast iron or ASTM A536, ductile iron.
4. Stem: One or two-piece stainless steel.
5. Seat: EPDM.
6. Disc: Bronze or Stainless Steel.
7. Manufacturers:
  - a. Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
  - b. Jomar valves: [www.jomarvalve.com](http://www.jomarvalve.com).
  - c. Nibco: [www.nibco.com](http://www.nibco.com).
  - d. Substitutions: See Section 01 6000 - Product Requirements.

2.05 BRASS, GROOVED-END BUTTERFLY VALVES

A. Grooved Ends: Bi-directional dead-end service.

1. CWP Rating: 300 psig.
2. Body: Cast brass, UNS C87850.
3. Stem: Stainless steel, offset from the disc centerline to provide complete 360-degree circumferential seating.
4. Seat: Pressure responsive Fluoroelastomer.
5. Disc: Aluminum-bronze.
6. UL classified in accordance with NSF-61 for potable water service, and meets the lead requirements of NSF-372.
7. Manufacturer: Victaulic

2.06 BRONZE SWING CHECK VALVES

- A. Class 125: CWP Rating: 200 psig (1380 kPa).
  - 1. Comply with MSS SP-139, Type 3.
  - 2. Design: Horizontal flow.
  - 3. Body: Bronze, ASTM B62.
  - 4. Ends: Threaded or soldered as indicated.
  - 5. Disc: Lead Free Bronze ASTM B584.
  - 6. Manufacturers:
    - a. Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
    - b. Milwaukee: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
    - c. Jomar: [www.jomarvalve.com](http://www.jomarvalve.com).
    - d. Nobco: [www.nibco.com](http://www.nibco.com)
    - e. Substitutions: See Section 01 6000 - Product Requirements.

2.07 BRONZE SPRING LOADED CHECK VALVES

- A. Class 125: CWP Rating 200 psig (1380 kPa).
  - 1. Design: Vertical flow.
  - 2. Body: Bronze, ASTM B61 or ASTM B62
  - 3. Spring: Bronze
  - 4. Ends: Threaded or soldered as indicated.
  - 5. Disc: Nonmetallic
  - 6. Manufacturers:
    - a. Milwaukee: [www.milwaukeevalve.com](http://www.milwaukeevalve.com)
    - b. Apollo Valves[<>]: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).

- c. Substitutions: See Section 01 6000-Product Requirements.

## 2.08 IRON SWING CHECK VALVES WITH CLOSURE CONTROL

### A. Class 125 with Lever and Spring-Closure Control.

1. Comply with MSS SP-71, Type I.
2. Description:
  - a. CWP Rating: 200 psig.
  - b. Design: Clear or full waterway.
  - c. Body: ASTM A126, gray iron or ductile iron with bolted bonnet.
  - d. Ends: Flanged or threaded as indicated.
  - e. Spring: Stainless steel.
  - f. Trim: Bronze or stainless steel.
  - g. Gasket: Asbestos free.
  - h. Closer Control: Factory installed, exterior lever, and spring.
3. Manufacturers:
  - a. Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
  - b. Flomatic Valves: [www.flomatic.com/#sle](http://www.flomatic.com/#sle).
  - c. Nibco: [www.nibcoc.com](http://www.nibcoc.com).
  - d. Substitutions: See Section 01 6000 - Product Requirements.

## 2.09 MANUAL BALANCING VALVES

- ### A. Construction: Class 125, Lead free brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain,



calibrated nameplate with memory stop.

B. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi.

C. Manufacturers:

1. ITT Bell & Gossett: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
2. Jomar Valve: [www.jomarvalve.com](http://www.jomarvalve.com)
3. Caleffi; [www.caleffi.com](http://www.caleffi.com)
4. Nibco: [www.nibco.com](http://www.nibco.com)
5. Substitutions: See Section 01 6000 - Product Requirements.

## 2.10 DRAIN VALVES

A. Drain Valve with hose thread and chain and dust cap; chrome plated ball, blow-out-proof stem, and adjustable packing gland.

B. Manufacturers:

1. Hammond: [www.hammondvalve.com](http://www.hammondvalve.com)
2. Apollo valves: [www.apollovalves.com](http://www.apollovalves.com)
3. Nibco: [www.nibco.com/valves](http://www.nibco.com/valves)
4. Milwaukee: [www.milwaukeevalve.com](http://www.milwaukeevalve.com)
5. Substitutions: See Section 01 6000 - Product Requirements.

## PART 3 EXECUTION

### 3.01 INSTALLATION

A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.

- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
- C. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- D. Provide access where valves and fittings are not exposed.
- E. Install check valves where necessary to maintain direction of flow as follows:
  - 1. Spring Loaded Check: Install with stem plumb and vertical.
  - 2. Swing Check: Install horizontal maintaining hinge pin level.
- F. Install valves with stems upright or horizontal, not inverted.

END OF SECTION 22 0523

SECTION 22 0533 - HEAT TRACING FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Self-regulating parallel resistance electric heating cable.
- B. Cable outer jacket markings.
- C. Connection kits.
- D. Accessories.
- E. Controls.

1.02 RELATED REQUIREMENTS

- A. Section 22 0553 - Identification for Plumbing Piping and Equipment
- B. Section 22 0719 - Plumbing Piping Insulation.
- C. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- D. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- E. Section 26 0533.13 - Conduit for Electrical Systems.
- F. Section 26 0533.16 - Boxes for Electrical Systems.
- G. Section 26 0583 - Wiring Connections.

1.03 REFERENCE STANDARDS

- A. IEEE 515.1 - IEEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Commercial Applications 2012.
- B. ITS (DIR) - Directory of Listed Products Current Edition.
- C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All

Applicable Amendments and Supplements.

- D. UL (DIR) - Online Certifications Directory Current Edition.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with other trades to provide ground fault protection for electric heat tracing circuits as required by NFPA 70.

#### 1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate electric heat tracing layout, electrical terminations, thermostats, controls, and branch circuit connections.
- C. Manufacturer's Installation Instructions: Indicate installation instructions and recommendations.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions of equipment and controls, maintenance and repair data, and parts listings.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### 1.06 QUALITY ASSURANCE

#### 1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide two year manufacturer warranty for cables, connection kits, accessories, and controls.

### PART 2 PRODUCTS

#### 2.01 SELF-REGULATING PARALLEL RESISTANCE ELECTRIC HEATING CABLE

A. Manufacturers:

1. Chromalox, Inc: [www.chromalox.com/#sle](http://www.chromalox.com/#sle).
2. Pentair: [www.pentairthermal.com/#sle](http://www.pentairthermal.com/#sle).
3. Thermon Manufacturing Company: [www.thermon.com/#sle](http://www.thermon.com/#sle).

B. Provide products listed, classified, and labeled by UL (DIR), ITS (DIR), or testing firm acceptable to authorities having jurisdiction (AHJ).

C. Factory Rating and Testing: Comply with IEEE 515.1.

D. Heating Element:

1. Provide pair of parallel No.16 tinned or nickel coated stranded copper bus wires embedded in cross linked conductive polymer core with varying heat output in response to temperature along its length.
2. Terminations: Waterproof, factory assembled, non-heating leads with connector at one end and water-tight seal at opposite end.
3. Capable of crossing over itself without overheating.

E. Insulated Jacket: Flame retardant polyolefin.

F. Cable Cover: Provide tinned copper and polyolefin outer jacket with UV inhibitor.

G. Maximum Power-On Operating Temperature: 150 degrees F.

H. Maximum Power-Off Exposure Temperature: 185 degrees F.

I. Electrical Characteristics:

1. 6 W/lineal ft.
2. 120 volts, single phase, 60 Hz.

2.02 CABLE OUTER JACKET MARKINGS

- A. Name of manufacturer, trademark, or other recognized symbol of identification.
- B. Catalog number, reference number, or model.
- C. Month and year of manufacture, date coding, applicable serial number, or equivalent.
- D. Agency listing or approval.
- E. Any applicable warning/caution statements such as "WARNING: De-energize circuit before removing cover.

#### 2.03 CONNECTION KITS

- A. Provide power connection, splice/tee, and end seal kits compatible with the heating cable and without requiring cutting of the cable core to expose bus wires.
- B. Provide with NEMA 4X rating for prevention of corrosion and water ingress.

#### 2.04 ACCESSORIES

- A. Provide Accessories As Indicated or As Required for Complete Installation, Including but Not Limited To:
  - 1. High temperature, glass filament tape for attachment of heating cable to metal piping.
  - 2. Cable ties.
  - 3. Installation clips.
  - 4. Warning labels for attachment to exterior of piping insulation. Refer to Section 22 0553.

#### 2.05 CONTROLS

- A. Pipe Mounted Thermostats:
  - 1. Remote bulb unit with adjustable temperature range from 30 to 50 degrees F.

2. Remote bulb on capillary, resistance temperature device (RTD) or thermistor for direct sensing of pipe wall temperature.
- B. Provide minimum 30 ampere contactor to indicate operational status and on/off control.
- C. Line sensing high-limit temperature control and high-limit alarm.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that piping and equipment are ready to receive work.
- B. Verify field measurements are as indicated on shop drawings.
- C. Verify required power is available, in proper location, and ready for use.

#### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's written installation instructions.
- B. Comply with installation requirements of IEEE 515.1 and NFPA 70, Article 427.
- C. Apply heating cable linearly on pipe with fiberglass tape only after piping has successfully completed any required pressure testing.
- D. Comply with applicable local building codes and requirements of authorities having jurisdiction.
- E. Grounding: Refer to Section 26 0526.
- F. Identification:
  1. After thermal insulation installation, apply external pipeline decals to indicate presence of the thermal insulation cladding at intervals not to exceed 20 ft

including cladding over each valve or other equipment that may require maintenance.

G. Equipment Wiring: Refer to Section 26 0583.

H. Electrical Connections: Refer to Section 26 0519.

### 3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Perform start-up by factory technician or factory representative as per Owner's requirements.

C. Field Testing and Inspections:

1. Commission system in accordance with installation and operation manual.

2. Inspect for sources of water entry and proper sealing.

3. Inspect weather barrier to confirm that no sharp edges are contacting the trace heating.

4. Insulation Resistance: Greater than 20 megohms at a test voltage of 2500 VDC for polymer insulated trace heaters.

5. Test heating cable integrity with megohmmeter at the following intervals:

a. After cable has been installed onto the piping.

b. After the installation of thermal insulation onto the piping.

6. Measure voltage and current at each unit.

7. Controls:

a. Verify control parameters are set to the application requirements.

### 3.04 PROTECTION



MACOMB COUNTY JAIL

VARIOUS PROJECTS

PROPOSAL A, B, C

221958

August 26, 2022

A. Protect installed products from damage until Date of  
Substantial Completion.

END OF SECTION 22 0533

SECTION 22 0553 - IDENTIFICATION FOR PLUMBING PIPING AND  
EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Pipe markers.

1.02 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Piping: Pipe markers.
- B. Valves: Tags.

2.02 NAMEPLATES

- A. Manufacturers:
  - 1. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 2. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  - 3. Seton Identification Products: [www.seton.com/#sle](http://www.seton.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

- B. Description: Laminated three-layer plastic with engraved letters.

## 2.03 TAGS

### A. Manufacturers:

1. Brady Corporation: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
2. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
3. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
4. Seton Identification Products: [www.seton.com/#sle](http://www.seton.com/#sle).
5. Substitutions: See Section 01 6000 - Product Requirements.

- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

## 2.04 PIPE MARKERS

### A. Manufacturers:

1. Brady Corporation: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
2. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
3. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
4. Seton Identification Products: [www.seton.com/#sle](http://www.seton.com/#sle).
5. Substitutions: See Section 01 6000 - Product Requirements.

- B. Comply with ASME A13.1.

- C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

## PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
  - 1. Install in clear view and align with axis of piping.
  - 2. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 22 0553

SECTION 22 0719 - PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 22 1005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.
- B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement 2007 (Reapproved 2019).
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form 2020a.
- D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2022.
- E. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022.

- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

### PART 2 PRODUCTS

#### 2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

#### 2.02 GLASS FIBER

##### A. Manufacturers:

1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
2. Johns Manville Corporation: [www.jm.com/#sle](http://www.jm.com/#sle).
3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
4. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
5. Substitutions: See Section 01 6000 - Product Requirements.

##### B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.

1. K Value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

- C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- E. Vapor Barrier Lap Adhesive: Compatible with insulation.
  - 1. Vapor Barrier Lap Adhesive shall be compatible with the insulation and as recommended by the insulation manufacturer.
- F. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
- G. Indoor Vapor Barrier Finish:
  - 1. Vinyl emulsion type acrylic, compatible with insulation, white color.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
  - 1. Aeroflex USA, Inc: [www.aeroflexusa.com/#sle](http://www.aeroflexusa.com/#sle).
  - 2. Armacell LLC: [www.armacell.us/#sle](http://www.armacell.us/#sle).
  - 3. K-Flex USA LLC: [www.kflexusa.com/#sle](http://www.kflexusa.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
  - 1. Minimum Service Temperature: Minus 40 degrees F.
  - 2. Maximum Service Temperature: 220 degrees F.
  - 3. Connection: Waterproof vapor barrier adhesive.

- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

## 2.04 JACKETS

### A. PVC Plastic.

#### 1. Manufacturers:

- a. Johns Manville Corporation: [www.jm.com/#sle](http://www.jm.com/#sle).
- b. Proto Corporation: [www.protocorporation.com](http://www.protocorporation.com).
- c. Substitutions: See Section 01 6000 - Product Requirements.

#### 2. Jacket: One piece molded type fitting covers and sheet material, off-white color.

- a. Minimum Service Temperature: 0 degrees F.
- b. Maximum Service Temperature: 150 degrees F.
- c. Moisture Vapor Permeability: 0.02 per inch (0.029 ng/Pa s m), maximum, when tested in accordance with ASTM E96/E96M.
- d. Thickness: 10 mil.
- e. Connections: Brush on welding adhesive.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.



- B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. Glass fiber insulated pipes conveying fluids above ambient temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- G. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.

H. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

### 3.03 SCHEDULES

#### A. Plumbing Systems:

##### 1. Domestic Hot Water Supply & Recirculation:

a. Pipe Size Range: 1/2 to 1-1/4 inch

1) Thickness: 1 inch

b. Pipe Size Range: 1-1/2 to 8 inch

1) Thickness: 1-1/2 inch

2. Domestic Cold Water: 1 inch thick.

3. Roof Drain Bodies: 1/2 inch thick.

4. Roof Drainage Above Grade: 1/2 inch thick with PVC jacket.

5. Plumbing Vents Within 10 Feet of the Exterior: 1/2 inch thick with PVC jacket.

#### B. Cooling Systems:

1. Condensate Drains from Cooling Coils: 1 inch thick.

#### C. Other Systems:

1. Piping Exposed to Freezing with Heat Tracing: 1 inch or as recommended by heat tracing manufacturer.

END OF SECTION 22 0719

SECTION 22 1005 - PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe, pipe fittings, specialties, and connections for piping systems.
  - 1. Sanitary sewer.
  - 2. Chemical resistant sewer.
  - 3. Domestic water.
  - 4. Condensate drains.
  - 5. Flanges, unions, and couplings.
  - 6. Pipe hangers and supports.

1.02 RELATED REQUIREMENTS

- A. Section 22 0516 - Expansion Fittings and Loops for Plumbing Piping.
- B. Section 22 0553 - Identification for Plumbing Piping and Equipment.
- C. Section 22 0719 - Plumbing Piping Insulation.

1.03 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2021.
- C. ASME B31.9 - Building Services Piping 2020.
- D. ASTM B32 - Standard Specification for Solder Metal 2020.
- E. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2020.

- F. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.
- G. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube 2016.
- H. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings 2016.
- I. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings 2020a.
- J. ASTM D2846/D2846M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems 2019a.
- K. ASTM F437 - Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80 2021.
- L. ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40 2017.
- M. ASTM F439 - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80 2019.
- N. ASTM F442/F442M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR) 2020.
- O. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings 2020.
- P. AWWA C651 - Disinfecting Water Mains 2014, with Addendum (2020).
- Q. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2021.

- R. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2018.
- S. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
- T. NSF 61 - Drinking Water System Components - Health Effects 2021.
- U. NSF 372 - Drinking Water System Components - Lead Content 2022.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

#### 1.05 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

#### 1.07 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

## PART 2 PRODUCTS

### 2.01 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

### 2.02 SANITARY SEWER PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
  - 1. Fittings: Cast iron, all elbows shall be long sweep.
  - 2. Joints: ASTM C 1540, neoprene gaskets and heavy duty stainless steel clamp-and-shield assemblies.

### 2.03 CHEMICAL RESISTANT SEWER PIPING

- A. CPVC Pipe: ASTM D2846/D2846M, ASTM F441/F441M, or ASTM F442/F442M.
  - 1. Fittings: CPVC; ASTM D2846/D2846M, ASTM F437, ASTM F438, or ASTM F439.
  - 2. Joints: ASTM D2846/D2846M, solvent weld with ASTM F493 solvent cement.

### 2.04 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H). Type M (C) will not be accepted.
  - 1. Fittings:
    - a. ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
  - 2. Joints:
    - a. ASTM B32, solder.

3. Mechanical Press Sealed Fittings: Double-pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, nontoxic, synthetic rubber sealing elements.

a. Manufacturers:

- 1) Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
- 2) Viega LLC: [www.viega.us/#sle](http://www.viega.us/#sle).
- 3) Nibco: [www.nibco.com](http://www.nibco.com).
- 4) Substitutions: See Section 01 6000 - Product Requirements.

#### 2.05 CONDENSATE DRAINS SERVING INDIVIDUAL EQUIPMENT

A. Copper Tube: ASTM B88 (ASTM B88M), Tyle L (B), drawn; using one of the following joint types:

1. Solder joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

#### 2.06 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:

1. Ferrous Pipe: Class 150 malleable iron threaded unions.
2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over 1 Inch:

1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Unions or flanges for servicing and disconnect are not required in installations using grooved joint couplings.

D. No-Hub Couplings:

1. General: Comply with ASTM C 1540.
2. Gasket Material: Neoprene complying with ASTM C564.
3. Band Material: Stainless steel complying with ASTM A240.
4. Eyelet Material: Stainless steel.
5. Manufacturers:
  - a. MIFAB, Inc: [www.mifab.com/#sle](http://www.mifab.com/#sle).
  - b. Anaco-Husky: [www.anaco-husky.com](http://www.anaco-husky.com).
  - c. Substitutions: See Section 01 6000 - Product Requirements.

E. Dielectric Connections:

1. Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
2. Waterway Fitting: Copper-silicon casting conforming to UNS C87850, and UL classified in accordance with ANSI / NSF-61 for potable water service. Fittings shall have threaded ends, grooved ends, or a combination.

## 2.07 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.



3. Trapeze Hangers: Welded steel channel frames attached to structure.

4. Vertical Pipe Support: Steel riser clamp.

### PART 3 EXECUTION

#### 3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges, grooved joint couplings, or unions.

#### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions. Cast iron soil pipe installed in accordance to CISPI's Handbook.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- H. Provide access where valves and fittings are not exposed. Coordinate size and location of access door with Division 01.

- I. Establish elevations of buried piping outside the building to ensure not less than 4 ft of cover.
- J. Provide support for utility meters in accordance with requirements of utility companies.
- K. Install valves with stems upright or horizontal, not inverted. Refer to Section 22 0523.
- L. Install water piping to ASME B31.9.
- M. Slope water piping and arrange to drain at low points.
- N. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
- O. Sleeve pipes passing through partitions, walls, and floors.
- P. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- Q. In general, all piping, and similar items shall be installed concealed from view above ceiling, in partitions, shafts, chases, unless otherwise indicated.
- R. Where pipes are in partitions, furred out spaces and chases, obtain information as to their exact location and size and install work so as to be entirely concealed in allotted space. If conflicts arise making this impossible, obtain instructions from Architect/Engineer before proceeding with work.
- S. Where there is evidence that plumbing work will interfere with other work, assist in working out space conditions and/or structure, make necessary adjustments to accommodate work.

- T. Plumbing work installed before coordinating with other work so as to cause interference with other work to be changed to correct such condition without additional cost to Owner.
- U. Appliances and equipment to be installed and connected with best engineering practices and in accordance with manufacturer's instructions and recommendations. Piping, valves, connections and other like items recommended by manufacturer or as required for proper operation to be provided without additional cost to Owner.
- V. In no case will any pipe, conduit or duct be installed where it is supported on or suspended from another pipe, conduit or duct.

### 3.03 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

### 3.04 TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/8 inch per foot slope; 1/4 inch per foot slope for piping serving low flow fixtures.
- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

### 3.05 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed, and clean.
- B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

- C. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

END OF SECTION 22 1005

SECTION 22 1006 - PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Drains.
- B. Cleanouts.
- C. Hose bibbs.
- D. Hydrants.
- E. Washing machine boxes and valves.
- F. Ice machine valve and recessed box.
- G. Air admittance valves.
- H. Back water valves.
- I. Backflow preventers.
- J. Strainers.
- K. Water hammer arrestors.
- L. Sanitary waste interceptors.
- M. Mixing valves.
- N. Pump connectors.
- O. Air Vents.
- P. Trap seals.
- Q. Natural gas regulators.
- R. Leak detection systems.

1.02 RELATED REQUIREMENTS

- A. Section 22 1005 - Plumbing Piping.
- B. Section 22 3000 - Plumbing Equipment.

C. Section 22 4000 - Plumbing Fixtures.

#### 1.03 REFERENCE STANDARDS

- A. ASME A112.6.3 - Floor and Trench Drains 2019.
- B. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies 2021.
- C. NSF 61 - Drinking Water System Components - Health Effects 2021.
- D. NSF 372 - Drinking Water System Components - Lead Content 2022.
- E. PDI-WH 201 - Water Hammer Arresters 2017.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors, and other specialties applicable to project.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Loose Keys for Outside Hose Bibbs: One.

### PART 2 PRODUCTS

#### 2.01 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

## 2.02 DRAINS

### A. Manufacturers:

1. Jay R. Smith Manufacturing Company:  
www.jayrsmith.com/#sle.
2. Josam Company: www.josam.com/#sle.
3. Zurn Industries, LLC: www.zurn.com/#sle.
4. MIFAB: www.mifab.com.
5. Watts: www.watts.com
6. Substitutions: See Section 01 6000 - Product Requirements.

### B. Floor Drains:

1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, and reversible clamping collar.
2. Strainer: Refer to Plumbing Fixture Schedule for size, type and accessories.

## 2.03 CLEANOUTS

### A. Manufacturers:

1. Jay R. Smith Manufacturing Company:  
www.jayrsmith.com/#sle.
2. MIFAB, Inc: www.mifab.com/#sle.
3. Zurn Industries, LLC: www.zurn.com/#sle.
4. Substitutions: See Section 01 6000 - Product Requirements.

### B. Cleanouts at Exterior Surfaced Areas

1. Round cast nickel bronze access frame and non-skid cover.

C. Cleanouts at Exterior Unsurfaced Areas:

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.

D. Cleanouts at Interior Finished Floor Areas:

1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

E. Cleanouts at Interior Finished Wall Areas:

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

F. Cleanouts at Interior Unfinished Accessible Areas: Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.04 AIR ADMITTANCE VALVES

A. Manufacturers:

1. IPS Corporation: Studor; [www.ipscorp.com](http://www.ipscorp.com)
2. Sioux Chief: Turbo Vent; [www.siouxchief.com](http://www.siouxchief.com)
3. Oatey: Sure Vent; [www.oatey.com](http://www.oatey.com)
4. Substitutions: See Section 01 6000 - Product Requirements.

- B. Description: ASSE 1050 and 1051; Valve shall provide positive seal at 0 psi and under positive line pressure to prevent sewer gasses from entering the occupied space. ABS/PVC body with Schedule 40 adapter and actuating device.



- C. When device is located in a wall, provide with recessed access box with vented cover plate. Access box shall be fire rated when installing in fire rated walls. Refer to Architectural drawings.

## 2.05 BACKFLOW PREVENTERS

### A. Manufacturers:

1. Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
2. Watts Regulator Company, a part of Watts Water Technologies: [www.wattsregulator.com/#sle](http://www.wattsregulator.com/#sle).
3. Zurn Industries, LLC: [www.zurn.com/#sle](http://www.zurn.com/#sle).
4. Substitutions: See Section 01 6000 - Product Requirements.

### B. Reduced Pressure Backflow Preventers:

1. ASSE 1013; bronze body with bronze internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve that opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.
2. Provide with air gap fitting; pipe to adjacent floor drain receptor
3. Device shall be approved for vertical installation.

### C. Double Check Valve Backflow Preventers:

1. ASSE 1012; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

### D. Dual Check Valve Backflow Preventers:

1. ANSI/ASSE 1024 bronze body with two compact replaceable check modules with Buna "N" seals and stainless steel springs and one union with seal.

## 2.06 STRAINERS

### A. Manufacturers:

1. Armstrong International, Inc:  
[www.armstronginternational.com](http://www.armstronginternational.com)
2. Green Country Filter Manufacturing:  
[www.greencountryfilter.com](http://www.greencountryfilter.com)
3. WEAMCO: [www.weamco.com](http://www.weamco.com)
4. Substitutions: See Section01 6000-Product Requirements.

### B. Size 2 inches and Under:

1. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen. Lead free.

### C. Size 1-1/2 inch to 4 inches:

1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen. Lead free.

### D. Size 5 inch and Larger:

1. Class 125, flanged iron body, basket pattern with 1/8 inch stainless steel perforated screen. Lead free.

## 2.07 WATER HAMMER ARRESTORS

### A. Manufacturers:

1. Jay R. Smith Manufacturing Company:  
[www.jayrsmith.com/#sle](http://www.jayrsmith.com/#sle).
2. Watts Regulator Company, a part of Watts Water Technologies: [www.wattsregulator.com/#sle](http://www.wattsregulator.com/#sle).
3. Zurn Industries, LLC: [www.zurn.com/#sle](http://www.zurn.com/#sle).

4. Substitutions: See Section 01 6000 - Product Requirements.

B. Water Hammer Arrestors:

1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range 34 to 250 degrees F and maximum 150 psi working pressure.

2.08 MIXING VALVES

A. Thermostatic Mixing Valves:

1. Manufacturers:

- a. Acorn: [www.acorneng.com](http://www.acorneng.com)
- b. Powers: [www.powerscontrols.com](http://www.powerscontrols.com).
- c. Caleffi; [www.caleffi.com/usa/en-us](http://www.caleffi.com/usa/en-us)
- d. Substitutions: See Section 01 6000 - Product Requirements.

2. Point of Use Mixing Valve:

- a. The Thermostatic Mixing Valve shall be IAPMO lab certified to ASSE 1069, ASSE 1070 and CSA B125.3 standards and capable of meeting the control accuracy requirements of these standards at the manufacturer's listed minimum flow rates.
- b. Valve shall have an adjustable outlet temperature range of 90°F-115°F (32°C-46°C), factory set at 105°F (41°C).
- c. Valve shall be a solid brass body with a capacity of 12 GPM (45 LPM) at 45 PSI (310 kPa) differential and a maximum operating pressure of 125 PSIG (862 kPa). Supply pressure variation shall be up to 20%.
- d. Valve shall contain a copper encapsulated, paraffin-based thermal actuator.

## 2.09 AIR VENTS

### A. Manufacturers:

1. Cash Acme, a brand of Reliance Worldwide Corporation:  
www.cashacme.com/#sle.
2. ITT Bell & Gossett: www.bellgossett.com/#sle.
3. Taco, Inc: www.taco-hvac.com/#sle.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.

## 2.10 FLOOR DRAIN TRAP SEALS

### A. Manufacturers:

1. MIFAB, Inc: www.mifab.com/#sle.
2. JR Smith: www.jrsmith.com.
3. Zurn: www.zurn.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: Push-fit EPDM or silicone fitting with a one-way membrane. For use in floor drain outlets or the adjustable strainer throats to minimize evaporation of the trap seal.

C. Standard: Required flow rates per ASSE 1072.

D. Size: To match floor drain in which protection device is to be installed

E. Do not use in applications where the room/space has atmospheric pressure less than ambient pressure of the exterior of the room/space or building

## 2.11 LEAK DETECTION SYSTEMS

### A. Manufacturers:

1. RDT Floodmaster
2. Substitutions: See Section 01 6000 - Product Requirements.

### B. Description:

1. Leak detection system that will alarm when in contact with 1/16" of any non-flammable conductive liquid.
2. Audible (80 dB min.) alarm.
3. Unit shall come with dry contacts to alarm to BMS system.
4. Systems shall be plenum rated.
5. Systems shall consist of power supply, water sensor and receiver box. Provide additional sensors as necessary such that only one receiver is needed per location being protected.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate clean-out locations with Architect prior to installation.
- C. Extend cleanouts to finished floor or wall surface.  
Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- D. Encase exterior cleanouts in concrete flush with grade.
- E. Install floor cleanouts at elevation to accommodate finished floor.

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- F. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
- G. Pipe relief from backflow preventer to nearest drain.
- H. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to any fixture or equipment with quick closing valves..
- I. Coordinate all electrical and controls requirements of leak detection system with Division 26 an Temperature Controls Contractor.

END OF SECTION 22 1006

SECTION 22 4000 - PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water closets.
- B. Urinals.
- C. Lavatories.
- D. Sinks.
- E. Electric water coolers.
- F. Showers.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Owner-furnished fixtures.
- B. Section 22 1005 - Plumbing Piping.
- C. Section 22 1006 - Plumbing Piping Specialties.

1.03 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use 1997 (Reaffirmed 2017).
- C. ASME A112.18.1 - Plumbing Supply Fittings 2018, with Errata.
- D. ASME A112.19.2 - Ceramic Plumbing Fixtures 2018, with Errata.
- E. ASME A112.19.3 - Stainless Steel Plumbing Fixtures 2017, with Errata.
- F. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks 2017.

- G. ISFA 2-01 - Classification and Standards for Solid Surfacing Material 2013.
- H. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- I. NSF 61 - Drinking Water System Components - Health Effects 2021.
- J. NSF 372 - Drinking Water System Components - Lead Content 2022.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Flush Valve Service Kits: One for each type and size.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

#### 1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.



- B. Provide five year manufacturer warranty for electric water cooler.

## PART 2 PRODUCTS

### 2.01 GENERAL REQUIREMENTS

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

### 2.02 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for installation of plumbing systems.
- B. Perform work in accordance with local health department regulations.

### 2.03 FLUSH VALVE WATER CLOSETS

- A. Water Closets: Vitreous china, ASME A112.19.2, wall hung or floor mounted as indicated on Schedules, siphon jet flush action, china bolt caps.

1. Flush Valve: Exposed (top spud).

2. Flush Operation: Refer to Schedules.

3. Manufacturers:

a. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).

b. Kohler Company: [www.kohler.com/#sle](http://www.kohler.com/#sle).

c. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).

d. Sloan: [www.sloan.com](http://www.sloan.com).

e. Substitutions: See Section 01 6000 - Product Requirements.

B. Flush Valves: ASME A112.18.1, diaphragm type , complete with dual filtered by-pass, vacuum breaker stops and accessories.

1. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.

2. Manufacturers:

a. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).

b. Sloan Valve Company: [www.sloanvalve.com/#sle](http://www.sloanvalve.com/#sle).

c. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).

d. Kohler Company[<>]: [www.kohler.com/#sle](http://www.kohler.com/#sle).

e. Substitutions: See Section 01 6000 - Product Requirements.

C. Seats:

1. Manufacturers:

a. Bemis Manufacturing Company: [www.bemismfg.com/#sle](http://www.bemismfg.com/#sle).

b. Church Seat Company: [www.churchseats.com/#sle](http://www.churchseats.com/#sle).

c. Centoco: [www.centoco.com](http://www.centoco.com)

d. Manufacturer of Closet Bowl.

e. Substitutions: See Section 01 6000 - Product Requirements.

2. Solid white plastic, open front, extended back, self-sustaining hinge, brass bolts, without cover.

D. Water Closet Carriers For Wall Hung Closets:

1. Manufacturers:

a. Jay R. Smith MFG. Co: [www.jrsmith.com/#sle](http://www.jrsmith.com/#sle).

b. JOSAM Company: [www.josam.com/#sle](http://www.josam.com/#sle).

c. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).

d. Substitutions: See Section 01 6000 - Product Requirements.

2. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

#### 2.04 WALL HUNG URINALS

##### A. Wall Hung Urinal Manufacturers:

1. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).

2. Kohler Company: [www.kohler.com/#sle](http://www.kohler.com/#sle).

3. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).

4. Sloan: [www.sloan.com](http://www.sloan.com).

5. Substitutions: See Section 01 6000 - Product Requirements.

##### B. Urinals: Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.

1. Flush Valve: Exposed (top spud).

2. Flush Operation: Refer to Schedules.

3. Trap: Integral.

##### C. Flush Valves: ASME A112.18.1, diaphragm type , complete with dual filtered by-pass, vacuum breaker stops and accessories.

1. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.

2. Manufacturers:

- a. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
- b. Sloan Valve Company: [www.sloanvalve.com/#sle](http://www.sloanvalve.com/#sle).
- c. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
- d. Kohler Company[<>]: [www.kohler.com/#sle](http://www.kohler.com/#sle).
- e. Substitutions: See Section 01 6000 - Product Requirements.

D. Carriers:

1. Manufacturers:

- a. Jay R. Smith MFG. Co: [www.jrsmith.com/#sle](http://www.jrsmith.com/#sle).
- b. JOSAM Company: [www.josam.com/#sle](http://www.josam.com/#sle).
- c. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
- d. Substitutions: See Section 01 6000 - Product Requirements.

2. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

2.05 LAVATORIES

A. Lavatory Manufacturers:

1. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
2. Kohler Company: [www.kohler.com/#sle](http://www.kohler.com/#sle).
3. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
4. Sloan: [www.sloan.com](http://www.sloan.com).

5. Substitutions: See Section 01 6000 - Product Requirements.
  
- B. Vitreous China Basin: ASME A112.19.2; vitreous china wall hung or counter-top mounted as indicated on Schedules, with overflow.
  
- C. Supply Faucet Manufacturers:
  1. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
  2. Kohler Company: [www.kohler.com/#sle](http://www.kohler.com/#sle).
  3. Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
  4. Symmons: [www.symmons.com](http://www.symmons.com).
  5. Delta Faucet: [www.deltafaucet.com](http://www.deltafaucet.com)
  6. Sloan: [www.sloan.com](http://www.sloan.com)
  7. Substitutions: See Section 01 6000 - Product Requirements.
  
- D. Supply Faucet: ASME A112.18.1; chrome plated supply fitting with water economy aerator with maximum flow of 0.5 gallon per minute (low-flow), ADA compliant handles.
  
- E. Accessories:
  1. Lavatory P-trap shall be chrome plated cast brass adjustable ground joint swivel with cleanout, with 17-gauge seamless brass adjustable wall bend provided with deep bell flange. P-Trap to have 2" water seal and rough-in complete, adapter extensions are not allowed. P-Trap shall be certified by CSA or other recognized third-party testing authority and marked with manufacturer's name. No private label wholesale products will be allowed.
  2. Offset waste with perforated open strainer.

3. Screwdriver Loose key stops.
4. Lavatory supply kits shall include chrome plated all brass stops with brass stems, no plastic stems. Kits shall have 12" chrome plated copper risers and shallow brass flange. Inlet shall be 1/2" compression and outlet shall be 3/8" compression. Supply kit shall be certified by recognized independent third-party testing authority, will be marked with the manufacturer's name and comply with the SDWA (Safe Drinking Water Act) "No Lead" restrictions of ANSI NSF 61, Sec. 9. No private label wholesale products will be allowed.
5. All exposed lavatory and sink trim on wheelchair accessible fixtures shall be covered with a seamless antimicrobial vinyl insulating outer shell. Material shall be flame retardant and fungal and bacterial resistant. Insulating kits shall include covers for, drain tailpiece, all P-Trap components, and hot/cold water supplies.
6. Install with point of use thermostatic mixing valve. Refer to Section 22 1006.
7. Carrier for Wall Mounted Lavatories:
  - a. Manufacturers:
    - 1) Jay R. Smith MFG. Co: [www.jrsmith.com/#sle](http://www.jrsmith.com/#sle).
    - 2) JOSAM Company: [www.josam.com/#sle](http://www.josam.com/#sle).
    - 3) Zurn Industries, Inc: [www.zurn.com/#sle](http://www.zurn.com/#sle).
    - 4) Substitutions: See Section 01 6000 - Product Requirements.
  - b. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.

- c. Provide carrier with integral clearance for piping as required for installation as shown on plans.

## 2.06 SINKS

### A. Sink Manufacturers:

1. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
2. Elkay: [www.elkay.com](http://www.elkay.com).
3. Just Manufacturing: [www.justmfg.com](http://www.justmfg.com)
4. Substitutions: See Section 01 6000 - Product Requirements.

B. General: ASME A112.19.3, stainless steel, self rimming and undercoated.

C. Bowl Quantity and Size: Refer to Schedules.

### D. Faucet:

1. Gooseneck faucet with ADA wristblade handles
2. Flowrate: Refer to Schedules.
3. Manufacturers:
  - a. Kohler Company: [www.kohler.com/#sle](http://www.kohler.com/#sle).
  - b. Chicago Faucet: [www.chicagofaucets.com](http://www.chicagofaucets.com)
  - c. Delta Faucet: [www.deltafaucet.com](http://www.deltafaucet.com)
  - d. Substitutions: See Section 01 6000-Product Requirements.

### E. Accessories:

1. Drain:
  - a. Removable basket strainer.

2. Sink P-trap shall be chrome plated cast brass adjustable ground joint swivel with cleanout, with 17-gauge seamless brass adjustable wall bend provided with deep bell flange. P-Trap to have 2" water seal and rough-in complete, adapter extensions are not allowed. P-Trap shall be certified by CSA or other recognized third-party testing authority and marked with manufacturer's name. No private label wholesale products will be allowed.
3. Screwdriver, Loose key stops.
4. Lavatory supply kits shall include chrome plated all brass stops with brass stems, no plastic stems. Kits shall have 12" chrome plated copper risers and shallow brass flange. Inlet shall be 1/2" compression and outlet shall be 3/8" compression. Supply kit shall be certified by recognized independent third-party testing authority, will be marked with the manufacturer's name and comply with the SDWA (Safe Drinking Water Act) "No Lead" restrictions of ANSI NSF 61, Sec. 9. No private label wholesale products will be allowed.
5. All exposed lavatory and sink trim on wheelchair accessible fixtures shall be covered with a seamless antimicrobial vinyl insulating outer shell. Material shall be flame retardant and fungal and bacterial resistant. Insulating kits shall include covers for, drain tailpiece, all P-Trap components, and hot/cold water supplies.
6. Install with point of use thermostatic mixing valve, where noted in Schedules or where fixture must be ADA compliant. Refer to Section 22 1006.

## 2.07 SHOWERS

### A. Shower Valve:

1. Comply with ASME A112.18.1 and ASSE 1016.



2. Provide in wall diverter valve body with integral thermostatic mixing valve to supply shower head.
3. Shower Valve Manufacturers:
  - a. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
  - b. DXV by American Standard, Inc: [www.dxv.com/#sle](http://www.dxv.com/#sle).
  - c. Grohe America, Inc: [www.grohe.com/us/#sle](http://www.grohe.com/us/#sle).
  - d. Symmons
  - e. Substitutions: See Section 01 6000 - Product Requirements.

B. Shower Head:

1. ASME A112.18.1; chrome plated head with integral wall bracket, built-in flow control.
2. Shower Head Manufacturers:
  - a. American Standard, Inc: [www.americanstandard-us.com/#sle](http://www.americanstandard-us.com/#sle).
  - b. DXV by American Standard, Inc: [www.dxv.com/#sle](http://www.dxv.com/#sle).
  - c. Grohe America, Inc: [www.grohe.com/us/#sle](http://www.grohe.com/us/#sle).
  - d. Symmons
  - e. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.
- D. Examine floors and substrates and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer.
- E. Inspect fixtures and accessories that are to be removed and relocated. Damaged or blemished items shall be brought to Architect's/Engineer's attention before reinstalling.

### 3.02 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

### 3.03 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Install components level and plumb.
- C. Piping exposed to view shall be chrome plated.
- D. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

### 3.04 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
- B. Adjust or replace washers to prevent leaks at faucets and stops.

3.05 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 CLEANING

- A. Clean plumbing fixtures and equipment.

3.07 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.
- B. Do not permit use of fixtures by construction personnel.
- C. Repair or replace damaged products before Date of Substantial Completion.

3.08 FEILD QUALITY CONTROL

- A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.
- B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect/Engineer. Remove cracked or dented units and replace with new units.

END OF SECTION 22 4000

SECTION 23 0005 - BASIC HVAC REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. This section applies to all sections of Division 23.
- B. Drawings and general provisions of the contract, including Division 00 and Division 01 specification sections, apply to work of this section.
- C. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on drawings and/or herein, including all labor, materials, equipment and incidentals necessary and required for their completion.
- D. The items in this section are supplementary to the requirements set forth in other portions of the specifications as indicated under item "A" above.

1.02 APPLICATION

- A. This section applies to all mechanical work. The contractors involved shall check all sections of the specifications in addition to the particular section covering their specific trade. Each distinct section of the specifications aimed for one trade may have detailed information with regards to other trades, therefore, it is imperative that all sections be reviewed to get a complete picture of all other trades' functions and work required.
- B. The mechanical contractor is responsible for the installation and operation of the hvac systems and temperature control systems.
- C. The mechanical contractor is responsible for receiving, unloading and placement of all of the owner provided equipment.

1.03 INSPECTION OF SITE

- A. Visit the site, examine and verify the conditions under which the work must be conducted before submitting

proposal.

- B. The submitting of a proposal implies that the contractor has visited the site and understands the conditions under which the work must be conducted.

#### 1.04 ALTERNATES AND SUBSTITUTIONS

- A. Refer to Division 01 - General Requirements for procedures.

#### 1.05 DEVIATION FROM BASIS OF DESIGN MANUFACTURER

- A. Products identified within the schedules and details are used as the basis of design for laying out and coordinating with other trades such as structural, architectural, and electrical. Should the Division 23 Contractors submit equipment by a Manufacturer other than that indicated as the Basis of Design in the Drawings, Contractor shall then be responsible for evaluating the impacts of the proposed Manufacturer's equipment, even if the Manufacturer is listed in the specifications as an approved equal. This includes the proposed Manufacturer's electrical, architectural and structural requirements and their subsequent impacts on the current design (roof openings, curbs, structural support, etc.) and coordination of any differing dimensions and clearances with all other trades.

#### 1.06 MATERIALS

- A. Mechanical equipment is to be furnished with motors, electrical controls and protective devices, and integral operating devices which are normally included by the manufacturer or required by the Contract Documents.
- B. The Mechanical Trades shall provide all control wiring, 120 volts and less, for the equipment and devices furnished under Division 22, and 23 of these specifications, including all wiring devices, conduit, etc.

- C. Power wiring 120 volts and greater shall be by the Electrical Trades.

1.07 DRAWINGS

- A. The drawings are diagrammatic and show the general location and arrangement of all equipment, piping and related items. They shall be followed as closely as elements of the construction will permit.
- B. Examine the drawings of other trades and verify the conditions governing the work on the job site. The mechanical and electrical contractor shall check all documents including architectural, structural, plumbing, HVAC and electrical to avert possible installation conflicts. Arrange work accordingly, providing such fittings, traps, valves and accessories as may be required to meet such conditions.
- C. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect/Engineer.
- D. The architectural and structural drawings take precedence in all matters pertaining to the building structure, mechanical drawings in all matters pertaining to mechanical trades and electrical drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect/Engineer for resolution.
- E. Do not scale drawings for measurements.
- F. Field verifications of actual existing conditions are required by the contractor since actual locations, distances, and levels will be governed by actual field conditions. All measurements shall be verified at the site.

- G. If during field verification, the contractor identifies that there may require substantial changes from the original plans, the contractor shall notify the architect for agreement on necessary adjustment before the installation is started
- H. Discrepancies shown between plans, or between plans and actual field conditions, or between plans and specifications shall promptly be brought to the attention of the Architect/Engineer for a decision.
- I. Drawings and specifications are intended to cover the completed installation of systems to function as described. The omission of the expressed reference to any item of labor and material necessary to comply with practice codes, ordinances, etc., shall not relieve the contractor from providing such additional labor and material at no cost to Owner.

1.08 CODES, PERMITS AND FEES

- A. Unless otherwise indicated, all required permits, licenses, inspections, approvals and fees for mechanical work shall be secured and paid for by the contractor. All work shall conform to all applicable codes, rules and regulations. Applicable publications listed in all sections of Division 23 shall be the latest issue, unless otherwise noted.
- B. Rules of local utility companies and municipalities shall be complied with. Check with the utility company and/or municipality supplying service to the installation and determine all devices including, but not limited to: meters, regulators, valves which will be required and include the cost of all such items in the proposal.
- C. All work shall be executed in accordance with the rules and regulations set forth in local and state codes.  
Prepare any detailed drawings or diagrams which may be required by the governing authorities. Where the drawings and/or specifications indicate materials or construction

in excess of code requirements, the drawings and/or specifications shall govern.

#### 1.09 MAINTENANCE

- A. Provide 40 hours of instruction to the owner's designated personnel in the maintenance and operation of equipment and systems.
- B. Provide complete maintenance and operating instructional manuals covering all mechanical equipment herein specified, together with parts lists. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. Four (4) copies of all literature shall be furnished for owner and shall be bound in book or ring binder form.  
Maintenance and operating instructional manuals shall be provided when construction is approximately 75% complete.

#### 1.10 WARRANTY AND GUARANTEE

- A. Contractor shall guarantee all work installed by themselves or their subcontractors to be free from defect in material and workmanship for a period of one year from date of final acceptance of the work, unless a longer period is stipulated under specific headings. Contractor shall repair or replace at no additional cost to the owner, any material or equipment developing defects and shall also make good any damage caused by such defects or the correction of defects. Repairs or replacements shall bear additional guarantee, as originally called for, dated from the final acceptance of the repair or replacement.  
This requirement shall be binding even though it will exceed product guarantees normally furnished by some manufacturers. Contractor shall submit his own and each equipment manufacturers written certificates, warranting that each item of equipment furnished complies with all requirements of the drawings and specifications. Note that guarantee shall run from date of final acceptance of the work, not from date of installation of a device or piece of equipment.



1.11 SUBMITTALS

- A. Refer to Division 01 - General Requirements for procedures.
- B. Contractor shall provide submittals where items are referred to by symbolic designation on the drawings. All submittals shall bear the same designation (hvac equipment, piping equipment, etc.). Refer to other sections of the mechanical specifications for additional requirements.
- C. Engineer WILL NOT REVIEW:
  - 1. Submittals not specified.
  - 2. Submittals not reviewed by Contractor, including Contractor stamp with signature comments.
  - 3. Submittals made after work is delivered to site and/or installed.
  - 4. Submittal resubmissions unless resubmission is required by Architect/Engineer.
- D. Types of submittals include the following:
  - 1. Shop Drawings
  - 2. Product Data Sheets
  - 3. Samples
  - 4. Manufacturers Instructions
  - 5. Maintenance Data
  - 6. Warranty
- E. Installation of any item that requires submittal approval by the engineer shall be installed at the contractors risk. The contractor, at his cost, shall remove all work installed prior to approval of the submittal.

- F. The engineer will not be responsible for errors in quantities, or dimensions required to fit the job condition, details of fabrication to insure proper assembly at the job, or for errors resulting from mistakes in submittals.

#### 1.12 RECORD DRAWINGS

- A. Refer to Division 01 - General Requirements for procedures.
- B. Contractor shall provide the following record drawings as part of the Project closeout document process:
  - 1. Contract Documents, specifications and submittals, indicating "As-Built" conditions and actual products selected for use.
  - 2. Product and Maintenance manuals for all equipment listed within this specification manual and in Contract Documents. Provide with parts lists as applicable.
- C. Record drawings shall be maintained by the contractor up to date as the project progresses.
- D. Recording all deviations from the contract documents, indicate exact locations of all buried services both inside and outside of the building; include concealed piping and equipment in the entire contract. Final record drawings shall reflect the as-built conditions.

#### 1.13 QUALITY ASSURANCE

- A. Other referenced standards:
  - 1. Comply with referenced standards, guidelines, data sheets from various associations, including NFPA, ANSI, ASTM, ASME, ASHRAE

### PART 2 PRODUCTS

#### 2.01 SLEEVES AND ESCUTCHEONS

- A. Provide sleeves wherever pipes pass through exterior wall, and floors. Sleeves shall be schedule 40 steel pipe cut to length. Sleeves shall terminate flush with walls, partitions and ceilings in finished areas. All sleeves through floor shall extend 2" above floor. Provide cast brass nickel-plated escutcheons with positive catches on each visible sleeve penetration. Sleeves are to be sealed at each installation with a 3M approved sealant. The space between the inside of the sleeve and the outside of the pipe or conduit within the sleeve shall be sealed at each installation with a 3M approved sealant.

## 2.02 DIELECTRIC UNIONS

- A. Dielectric unions shall be used to connect dissimilar metals (such as steel and copper) to prevent electrolytic action.

## 2.03 FILTERS

- A. Provide and maintain filters in air handling systems throughout the construction period and prior to final acceptance of the building. Do not run air handling equipment without all prefilters and final filters as specified. Immediately prior to final building acceptance by the owner, contractor shall replace all disposable type air filters with new.

## 2.04 BUILDING ATTACHMENTS FOR MECHANICAL WORK SUPPORTS

### A. General Requirements:

1. Provide building attachments required for supporting mechanical work, suitably selected and installed for the loads applied with a minimum additional safety factor of 3.
2. Where specified attachments are not suitable for conditions, submit to Engineer for approval, proposal for alternate building attachments.
3. If specially designed building attachments are required, retain the services of a licenced structural

engineer to design such building attachments.

4. Approved Manufacturers: Grinnell, or equivalent products by Michigan Hanger and B-Line.
5. Provide supplemental trapeze supports where necessary. Design trapeze to support all trades. Coordinate loads, and supports with all trades. Size trapeze for maximum deflection of 1/64 of the span.

B. Attachments to Structural Steel:

1. Support mechanical work from building structural steel where possible and approved. No welding or bolting to structural steel is permitted unless authorized by Architect. C-clamps are not permitted.
  - a. Center beam clamp - for loads over 120 lb.:  
Malleable center hung Grinnell Fig. 228.
  - b. Side beam clamp with retaining clips - for loads up to 120 lb.

C. Cast in Place Concrete Inserts:

1. Provide inserts selected for applied load of present load plus 100% for future, and coordinated with concrete work. Except as detailed on drawings, inserts shall be Unistrut or Grinnell. Plan, lay out and coordinate setting of inserts prior to concrete pour. Use Grinnell Fig. 285 lightweight concrete insert for loads up to 400# or Grinnell Fig. 281 Wedge Type concrete insert for loads up to 1200#

D. Drilled Insert Anchors:

1. Where mechanical work cannot be supported from structural steel, or cast in place concrete inserts, provide drilled concrete insert anchors. Submit for approval, project specific installation drawings for all loads over 100 lbs. Install inserts in web of beam if possible and approved. Insert depth shall not exceed two thirds the thickness of the concrete. Where

existing concrete appears to be deteriorating, or where applied load at insert exceeds 1000 lbs., conduct test of concrete to determine derated capacity of insert. Anchors may be adhesive or expansion type up to 1000 lbs., and shall be adhesive type for loads over 1000 lbs.

2. Manufacturers: Hilti

### PART 3 EXECUTION

#### 3.01 GENERAL

- A. Existing piping and ductwork: when encountered during the course of work, protect, brace and support existing piping and ductwork where required for proper execution of the work.
- B. Interruption of existing active piping and ductwork: when the course of work makes shut-down of services unavoidable, the mechanical contractor shall schedule the shut-down at such time as approved by the owners representative, which will cause least interference with established operating routine.
- C. Arrange work accordingly, providing such fittings as duct transitions traps, valves and accessories necessary to complete all construction in an orderly fashion.
- D. Install all equipment in strict accordance all directions and recommendations furnished by the manufacturer.

#### 3.02 ACCESSIBILITY

- A. Do not locate valves, traps, controls, unions, dampers, etc. in any system at a location that will be inaccessible after construction is completed. Maintain accessibility for all components in mechanical, electrical, and plumbing systems.

#### 3.03 ACCESS DOORS AND PANELS

- A. Refer to Division 08 - Openings; Provide access doors in locations as required by applicable codes and as indicated below. Coordinate locations with architectural trades.
- B. Furnish access panels to access valves, traps, control valves or devices, dampers, damper motors, etc. Access panels shall be sized as necessary for ample access, or as indicated on drawings, but no smaller than 12" x 12" where devices are within easy reach of operator, and at least 24"x24" when operator must pass through opening in order to reach the devices. Architectural Trades shall install access panels coordinated with Mechanical Trades.
- C. Access panels in fire rated walls or ceiling must be U.L. labeled for intended use. Unless otherwise indicated on plans, access doors shall be hinged flush type steel framed panel, 14 gauge minimum for frame, and with anchor straps. Only narrow border shall be exposed. Hinges shall be concealed type. Locking device shall be flush type and screw driver operated. Metal surfaces shall be prime coated with rust-inhibitive paint. Panels shall be compatible with architectural adjacent materials  
Manufacturer: Milcor, Bilco.

### 3.04 CUTTING AND PATCHING

- A. Refer to Division 01 - General Requirements and Division 02 - Existing Conditions.
- B. All cutting required shall be done by the contractor whose work is involved, without extra cost the owner. All patching and restoration including the furnishing and installation of access panels in ceiling, walls; etc. Within the building lines shall be done by the respective, responsible contractor. No cutting of structural steel, concrete, or wood shall be done without prior approval and explicit directions of the architect patched by the respective, responsible contractor.
- C. The contractor, under whose jurisdiction the work may fall, shall provide labor, material, and tools required to

cut, repair, protect, cap, or relocate existing pipes, conduits, or utilities interfering with or uncovered during work, per regulations of the authorities having jurisdiction.

### 3.05 ROUGH-IN FOR CONNECTION TO EQUIPMENT

- A. It shall be the responsibility of each contractor to study the architectural, structural, electrical, and mechanical drawings, conferring with the various trades involved and checking with the supplier of equipment in order to properly rough-in for all equipment.

### 3.06 MATERIAL AND EQUIPMENT

- A. All material and equipment shall be new and of the best quality used for the purpose in good commercial practice, and shall be the standard product of reputable manufacturers. The material and equipment must meet approval of state and local codes in the area it is being used. Roof decks shall not be used to support piping, conduit, equipment, devices, etc.

### 3.07 SEAL PENETRATIONS

- A. Seal the space around pipes in sleeves and around duct openings through walls, floors and ceilings. Provide adequate clearance to allow for proper sealing.

### 3.08 SOUND CONTROL

- A. Penetrations shall be maintained airtight to prevent sound transfer.
- B. Piping, ductwork, etc. shall pass through sleeves. Pack sleeves tight with glass fiber or oakum and caulked on both sides with non-hardening acoustical sealant.

### 3.09 FIRESTOPPING

- A. Refer to Division 07 - Thermal and Moisture Protection for more information.

- B. Provide UL classified firestopping system for mechanical penetrations through rated walls and floors to maintain the fire rating.

### 3.10 DELIVERY, STORAGE AND HANDLING OF EQUIPMENT AND MATERIALS

- A. Refer to Division 01 - General Requirements; All equipment and materials shall be delivered, stored and secured per manufacturer's recommendations.
- B. On-site storage shall be coordinated with Construction Manager and be performed in a manner as to avoid damage, deterioration and loss.
- C. Contractor shall provide temporary protection for installed equipment prior to project completion.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- E. All equipment shall be inspected prior to installation to assure that equipment is free from defect and damage.
- F. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- G. Protect dampers, grilles, louvers from damage to operating linkages and blades.

### 3.11 CLEANING

- A. Refer to Division 01 - General Requirements; all mechanical equipment and components shall be cleaned as frequently as necessary through the construction process and again prior to project completion.

### 3.12 CONTROL WIRING

- A. All control wiring for mechanical and electrical equipment, including motor starters, shall be 120 volt maximum and wired with one side of the coil grounded and the operating contacts in the north side of the circuit. All control wiring shall be installed in conduit.



MACOMB COUNTY JAIL  
VARIOUS PROJECTS  
PROPOSAL A, B, C

221958

August 26, 2022

END OF SECTION 23 0005

SECTION 23 0505 - SELECTIVE DEMOLITION FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Demolition and extension of existing mechanical work.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, repairs.

1.03 SUMMARY

- A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the system of minor electrical demolition as described in this specification.
- B. The demolition documents plans and specification have been prepared from existing non-as built documents and cursory non-invasive field investigation.
- C. It is the contractors obligation to become familiar with the extent of demolition and the existing condition before submitting their bid.
- D. During demolition if the contractor discovers unforeseen significant non-code compliance conditions of the existing installation they shall notify the Architect and Engineer immediately in writing.
- E. The contractor shall become familiar with the drawings and scope of work of other trades as the work scope of those trades relates to mechanical equipment and connection requirements.

- F. During demolition the contractor shall record on site as-built all hydronic system piping capped branches, capped supply air, return air and exhaust ducts for reuse in renovated project space.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Materials and equipment for patching and extending work:  
As specified in individual sections.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that piping and ductwork to be demolished serve only equipment and facilities within the demolition areas.
- B. Demolition drawings are based on casual field observation and existing record documents.
- C. Report discrepancies to Owner before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

### 3.02 PREPARATION

- A. Identify locations for capping piping and ductwork before any demolition work commences.
- B. Confirm isolation valve locations for hydronic piping.  
Repair leaking isolation valves or replace inoperable valves before commencing piping demolition.
- C. Cap and seal air-tight supply, return and exhaust air ductwork at shaft walls before commencing sheet metal demolition

### 3.03 DEMOLITION AND EXTENSION OF EXISTING MECHANICAL WORK

- A. Remove, relocate, and extend existing mechanical piping or sheet metal work to accommodate new construction.

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B. Remove hydronic water piping back to isolation valve.

C. Remove all supply, return and exhaust air ductwork back to main connection.

### 3.04 CLEANING AND REPAIR

A. Refer to Division 01 - General Requirements for procedures.

B. Clean and repair existing materials and equipment that remain or that are to be reused.

END OF SECTION 23 0505

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SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.

PART 2 PRODUCTS

2.01 NAMEPLATES

A. Manufacturers:

1. Seton Identification Products, a Tricor Direct Company:  
www.seton.com/#sle.
2. Brady Corporation: www.bradycorp.com.
3. Champion America, Inc: www.champion-america.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Letter Color: White.

C. Letter Height: 1/4 inch.

D. Background Color: Black.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Identify fans, equipment, etc. with nameplates. Small devices, such as inline pumps, may be identified with tags.

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C. Identify control panels and major control components  
outside panels with nameplates.

D. Identify thermostats relating to terminal boxes or valves  
with nameplates.

END OF SECTION 23 0553

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Measurement of final operating condition of HVAC systems.

1.02 RELATED REQUIREMENTS

- A. Section 23 0005 - Basic HVAC Requirements.

1.03 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition 2016.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems 2008, with Errata (2019).
- C. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems 2015, with Errata (2017).
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing 2002.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
  - 1. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Owner

and Engineer and for inclusion in operating and maintenance manuals.

2. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
3. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
4. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
5. Include the following on the title page of each report:
  - a. Name of Testing, Adjusting, and Balancing Agency.
  - b. Address of Testing, Adjusting, and Balancing Agency.
  - c. Telephone number of Testing, Adjusting, and Balancing Agency.
  - d. Project name.
  - e. Project location.
  - f. Report date.

D. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
  1. AABC (NSTSB), AABC National Standards for Total System Balance.
  2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating,



Ventilation, Air-Conditioning, and Refrigeration  
Systems.

3. SMACNA (TAB).
  - B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
  - C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
  - D. TAB Agency Qualifications:
    1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
    2. Certified by one of the following:
      - a. AABC, Associated Air Balance Council:  
[www.aabc.com/#sle](http://www.aabc.com/#sle); upon completion submit AABC National Performance Guaranty.
      - b. NEBB, National Environmental Balancing Bureau:  
[www.nebb.org/#sle](http://www.nebb.org/#sle).
      - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute:  
[www.tabbcertified.org/#sle](http://www.tabbcertified.org/#sle).
  - E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.
  - F. Approved TAB Agencies:
    1. Baromatic.
    2. Enviroaire.
    3. Controls Solutions Inc. (CSI).

4. Environmental Testing Services.
5. Substitutions must be approved by Engineer during Bid Phase.

### 3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  1. Systems are started and operating in a safe and normal condition.
  2. Temperature control systems are installed complete and operable.
  3. Proper thermal overload protection is in place for electrical equipment.
  4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
  5. Duct systems are clean of debris.
  6. Fans are rotating correctly.
  7. Fire and volume dampers are in place and open.
  8. Air coil fins are cleaned and combed.
  9. Access doors are closed and duct end caps are in place.
  10. Air outlets are installed and connected.
  11. Duct system leakage is minimized.
  12. Hydronic systems are flushed, filled, and vented.
  13. Pumps are rotating correctly.
  14. Proper strainer baskets are clean and in place.
  15. Service and balance valves are open.
- B. Beginning of work means acceptance of existing conditions.

### 3.03 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

### 3.04 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

### 3.05 FUME HOOD TESTING (ON SITE)

- A. General: Test fume hoods as installed to assess airflow velocity, airflow visualization, and level of containment. Perform tests with static mode (set sash position) conditions. Conduct testing as outlined below for 100% of the hoods provided in the Project.
- B. Testing to be performed by firm certified by National Environmental Balancing Bureau - NEBB (FHT).

C. Preparation: Visit the project site to confirm that construction activities related to the fume hood system(s) and equipment are complete. Review design documents and Contractor's submittals. Verify that mechanical ventilation systems serving the space are functioning and operating in the normal mode. Notify Owner in writing, if conditions exist which preclude proper fume hood testing. Starting of testing constitutes acceptance of site conditions.

D. Testing Requirements:

1. Perform the following tests, in order:
  - a. Airflow Velocity Test.
  - b. Airflow Visualization Test.
2. Airflow Velocity Test: Comply with Section 9 of NEBB (FHT) Fume Hood Testing Standard - current edition.
3. Airflow Visualization Test: Comply with Section 10 of NEBB (FHT) Fume Hood Testing Standard - current edition.
4. Reporting Requirements: Comply with Section 5 of NEBB (FHT) Fume Hood Testing Standard - current edition. Organize and include, at a minimum, the following information:
  - a. Report Title.
  - b. Report Certification.
  - c. Table of Contents.
  - d. Report Summary/ Remarks.
  - e. Appropriate Forms.
  - f. Instrument Calibration.
  - g. List of Abbreviations Used.

h. A room layout drawing for each tested item.

Identify: walls; doors; fume hood(s); other present environmental enclosures (e.g. biological safety cabinet(s), laminar flow hood(s), canopy hood(s), etc.); location and airflow pattern of all air supply, return, and exhaust grilles, registers and diffusers.

### 3.06 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.
- M. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.
- N. On fan powered VAV boxes, adjust air flow switches for proper operation.
- O. For fans with variable pitch sheaves: Sheaves in equipment provided by manufacturer are for final belt and sheave sizing ONLY. TAB contractor shall be responsible for providing and installing final sheave and belt for fan.

### 3.07 SCOPE

- A. Test, adjust, and balance the following:
  - 1. Fans.
  - 2. Fume Hoods - new and existing
  - 3. Air Inlets and Outlets.
  - 4. Airflow measuring stations.

### 3.08 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
  - 1. Manufacturer.
  - 2. Model/Frame.

3. HP/BHP.
4. Phase, voltage, amperage; nameplate, actual, no load.
5. RPM.
6. Service factor.
7. Starter size, rating, heater elements.
8. Sheave Make/Size/Bore.

B. V-Belt Drives:

1. Identification/location.
2. Required driven RPM.
3. Driven sheave, diameter and RPM.
4. Belt, size and quantity.
5. Motor sheave diameter and RPM.
6. Center to center distance, maximum, minimum, and actual.

C. Air Moving Equipment:

1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Arrangement/Class/Discharge.
6. Air flow, specified and actual.
7. Return air flow, specified and actual.
8. Outside air flow, specified and actual.
9. Total static pressure (total external), specified and actual.

10. Inlet pressure.
11. Discharge pressure.
12. Sheave Make/Size/Bore.
13. Number of Belts/Make/Size.
14. Fan RPM.

D. Exhaust Fans:

1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Sheave Make/Size/Bore.
10. Number of Belts/Make/Size.
11. Fan RPM.

E. Duct Traverses:

1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.



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7. Test air flow.
8. Duct static pressure.
9. Air temperature.

F. Air Distribution Tests:

1. Air terminal number.
2. Room number/location.
3. Terminal type.
4. Terminal size.
5. Area factor.
6. Design velocity.
7. Design air flow.
8. Test (final) velocity.
9. Test (final) air flow.
10. Percent of design air flow.

END OF SECTION 23 0593

SECTION 23 0713 - DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Duct insulation.
- B. Duct liner.

1.02 RELATED REQUIREMENTS

- A. Section 23 0005 - Basic HVAC Requirements.
- B. Section 23 3100 - HVAC Ducts and Casings: Glass fiber ducts.

1.03 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form 2020a.
- C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).
- D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).
- E. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation 2020.
- F. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material) 2019.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.

- H. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022.
- I. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- J. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

#### 1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified in this section and approved by manufacturer.

### PART 2 PRODUCTS

#### 2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

#### 2.02 GLASS FIBER, FLEXIBLE

A. Manufacturer:

1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
2. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
4. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
5. Substitutions: See Section 01 6000 - Product Requirements.

B. Insulation: ASTM C553; flexible, noncombustible blanket.

1. K value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Water Vapor Absorption: 5.0 percent by weight.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

E. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter.

2.03 GLASS FIBER, RIGID

A. Manufacturer:

1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
2. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).

4. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).

5. Substitutions: See Section 01 6000 - Product Requirements.

B. Insulation: ASTM C612; rigid, noncombustible blanket.

1. K Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.

2. Maximum Service Temperature: 450 degrees F.

3. Maximum Water Vapor Absorption: 5.0 percent.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.

3. Secure with two coats of vapor barrier mastic and glass tape.

D. Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

#### 2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturers:

1. Aeroflex USA, Inc: [www.aeroflexusa.com/#sle](http://www.aeroflexusa.com/#sle).

2. Armacell LLC: [www.armacell.us/#sle](http://www.armacell.us/#sle).

3. K-Flex USA LLC: [www.kflexusa.com/#sle](http://www.kflexusa.com/#sle).

4. Substitutions: See Section 01 6000 - Product Requirements

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.

1. Minimum Service Temperature: Minus 40 degrees F.

2. Maximum Service Temperature: 180 degrees F.

3. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

D. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

## 2.05 DUCT LINER

A. Manufacturers:

1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).

2. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).

3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).

4. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).

5. Substitutions: See Section 01 6000 - Product Requirements.

B. Note: Choose the liner type - Elastomeric Foam or Glass Fiber.

C. Elastomeric Foam Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.

1. Minimum Service Temperature: Minus 40 degrees F.

2. Maximum Service Temperature: 180 degrees F.

3. Connection: Waterproof vapor barrier adhesive.

D. Glass Fiber Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; rigid board and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer.

1. Fungal Resistance: No growth when tested according to ASTM G21.
2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
3. Service Temperature: Up to 250 degrees F.
4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.
5. Minimum Noise Reduction Coefficients:
  - a. 1 inch Thickness: 0.45.

E. Adhesive: Waterproof, fire-retardant type, ASTM C916.

F. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

#### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Ducts Conveying Air Below Ambient Temperature:
  1. Provide insulation with vapor barrier jackets.

2. Finish with tape and vapor barrier jacket.
  3. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.
- E. Slope exterior ductwork to shed water.
- F. External Duct Insulation Application:
1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
  2. Secure insulation without vapor barrier with staples, tape, or wires.
  3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
  4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
  5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
- G. Duct and Plenum Liner Application:
1. Adhere insulation with adhesive for 90 percent coverage.
  2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
  3. Seal and smooth joints. Seal and coat transverse joints.



4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for air-flow. Increase duct size to allow for insulation thickness.

### 3.03 SCHEDULES

#### A. Exhaust and Relief Ducts Within 10 ft of Exterior Openings:

1. Flexible Glass Fiber Duct Insulation: 1-1/2 inches thick.

#### B. Outside Air Intake Ducts:

1. Flexible Glass Fiber Duct Insulation: 1-1/2 inches thick.

#### C. Plenums:

1. Flexible Glass Fiber Duct Insulation: 1-1/2 inches thick.
2. Rigid Glass Fiber Duct Insulation: 1-1/2 inches thick.

#### D. Return Air Ducts:

1. Duct Liner: 1 inch thick. First 10 feet from equipment only.

#### E. Supply Ducts:

1. Duct Liner: 1 inch thick. First 10 feet from equipment only.
2. Located in plenum or unconditioned space:
  - a. Flexible Glass Fiber Duct Insulation: 1-1/2 inches thick.
3. Located exposed in conditioned space:
  - a. No insulation required.

#### F. Transfer Ducts:

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1. Duct Liner: 1 inch thick. First 10 feet from equipment only.

G. Ducts Exposed to Outdoors:

1. Flexible Elastomeric Duct Insulation: 2 inches thick
2. Cover finished insulation with field applied a glass cloth jacket embedded in Foster No. 60-90 fire resistive mastic or a self-adhesive bitumen weather and vapor barrier (similar to Flexclad or Alumaguard).

END OF SECTION 23 0713

SECTION 23 3100 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single-wall rectangular ducts and fittings.
- B. Single-wall round ducts and fittings.
- C. Sheet metal materials.
- D. Sealants and gaskets.
- E. Hangers and supports.

1.02 RELATED REQUIREMENTS

- A. Section 23 0005 - Basic HVAC Requirements
- B. Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.
- C. Section 23 0713 - Duct Insulation: External insulation and duct liner.
- D. Section 23 3300 - Air Duct Accessories.
- E. Section 23 3700 - Air Outlets and Inlets.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.

- E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.
- G. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations 2021.
- H. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.
- I. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors current edition, including all revisions.
- J. UL 1978 - Grease Ducts Current Edition, Including All Revisions.
- K. UL 2221 - Tests of Fire Resistive Grease Duct Enclosure Assemblies Current Edition, Including All Revisions.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

#### 1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 - General Requirements for submittal procedures.

- B. Product Data: Provide data for duct materials and duct connections.

#### 1.06 REGULATORY REQUIREMENTS

- A. Construct ductwork to SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 1995, Second Edition with Addendum No. 1.

### PART 2 PRODUCTS

#### 2.01 SINGLE-WALL RECTANGULAR DUCT AND FITTING ASSEMBLIES

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct

Construction Standards - Metal and Flexible."

## 2.02 SINGLE-WALL ROUND DUCT AND FITTING ASSEMBLIES

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## 2.03 MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other

imperfections.

- B. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G90/Z275 coating.
- C. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  - 1. Galvanized Coating Designation: G90.
  - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- D. Galvanealed Sheet Steel (FOR EXPOSED, PAINTED DUCTWORK): Comply with ASTM A653-09; hot dipped zinc iron coated steel, annealed, coating designation "A" (A60, A40)
- E. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- F. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
  - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

#### 2.04 SEALANTS AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 3 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant
6. Maximum Static-Pressure Class: 10-in wg, positive and negative
7. Service: Indoor and outdoor
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.



6. VOC: Maximum 75 g/L (less water).
  7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  8. Service: Indoor or outdoor.
  9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Flanged Joint Sealant: Comply with ASTM C 920.
1. General: Single-component, acid-curing, silicone, elastomeric.
  2. Type: S.
  3. Grade: NS.
  4. Class: 25.
  5. Use: O.
  6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

## 2.05 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible, "Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
  - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
  - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
  - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

## 2.06 DUCTWORK FABRICATION

- A. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Provide turning vanes in all mitered elbows.
- C. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.

- D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- E. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).
- F. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.
- G. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

## 2.07 MANUFACTURED DUCTWORK AND FITTINGS

- A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Flexible Ducts: Black polymer film supported by helically wound spring steel wire.
  - 1. UL labeled.
  - 2. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
  - 3. Pressure Rating: 4 inches WG positive and 0.5 inches WG negative.
  - 4. Maximum Velocity: 4000 fpm.
  - 5. Temperature Range: Minus 20 degrees F to 175 degrees F.
- C. Fume Hood Exhaust: Minimum 21 gage, 0.0344 inch thick, single wall, Type 304 stainless steel.

1. Single wall, factory built general use vent system.
2. Designed, fabricated, and installed to be liquid tight preventing exhaust leakage into the building.
3. Joints to be sealed during installation with factory supplied overlapping V-bands and sealant.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- D. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- E. Install round ducts in maximum practical lengths.
- F. Install ducts with fewest possible joints.
- G. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- H. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- I. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

- J. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- K. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- L. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- M. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.
- N. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."
- O. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- P. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- Q. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- R. Use double nuts and lock washers on threaded rod supports.

### 3.02 HANGERS AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
1. Where practical, install concrete inserts before placing concrete.
  2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
  3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
  4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
  5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

### 3.03 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

### 3.04 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
  - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  - 2. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
  - 3. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
  - 4. Unconditioned Space, Exhaust Ducts: Seal Class C.

5. Unconditioned Space, Return-Air Ducts: Seal Class B.
6. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
7. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
8. Conditioned Space, Exhaust Ducts: Seal Class B.
9. Conditioned Space, Return-Air Ducts: Seal Class C.
10. All locations, Fume Hood Exhaust Ducts: Seal Class A.

### 3.05 SCHEDULES

#### A. Supply Ducts:

1. Ducts Connected to Terminal Units:
  - a. Pressure Class: Positive 1-inch wg.
  - b. Minimum SMACNA Seal Class: C.
  - c. SMACNA Leakage Class for Rectangular: 12
  - d. SMACNA Leakage Class for Round and Flat Oval: 6.
2. Ducts Connected to Variable-Air-Volume Air-Handling Units:
  - a. Pressure Class: Positive 4-inch wg.
  - b. Minimum SMACNA Seal Class: A.
  - c. SMACNA Leakage Class for Rectangular: 6.
  - d. SMACNA Leakage Class for Round and Flat Oval: 3.

#### B. Return Ducts:

1. Ducts Connected to Air-Handling Units:
  - a. Pressure Class: Positive or negative 4-inch wg.
  - b. Minimum SMACNA Seal Class: A.



c. SMACNA Leakage Class for Rectangular: 6.

d. SMACNA Leakage Class for Round and Flat Oval: 3.

C. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

a. Pressure Class: Negative 2-inch wg.

b. Minimum SMACNA Seal Class: C if negative pressure, and A if positive pressure.

c. SMACNA Leakage Class for Rectangular: 24.

d. SMACNA Leakage Class for Round and Flat Oval: 12.

2. Ducts Connected to Fans Exhausting Laboratory and Process (ASHRAE 62.1, Class 3 and 4) Air:

a. Type 304, stainless-steel sheet.

1) Exposed to View: No. 4 finish.

2) Concealed: No. 2D finish.

b. Pressure Class: Positive or negative 6-inch wg.

c. Minimum SMACNA Seal Class: A.

d. SMACNA Leakage Class: 3.

D. Intermediate Reinforcement:

1. Stainless-Steel Ducts:

a. Exposed to Airstream: Match duct material.

b. Not Exposed to Airstream: Match duct material.

E. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

- a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
  - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
- a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
    - 1) Radius-to Diameter Ratio: 1.5.
  - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
  - c. Round Elbows, 14 Inches and Larger in Diameter: Welded.

F. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
  - a. Rectangular Main to Rectangular Branch: 45-degree entry.
  - b. Rectangular Main to Round Branch: Spin in.
    - 1) Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle

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taps are permitted in existing duct.

c. Velocity 1500 fpm or lower: Conical tap.

d. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 3100

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SECTION 23 3423 - HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof exhausters.
- B. Cabinet exhaust fans.
- C. Kitchen hood upblast roof exhausters.
- D. Laboratory and fume exhaust.

1.02 RELATED REQUIREMENTS

- A. Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
- B. Section 23 3300 - Air Duct Accessories: Backdraft dampers.
- C. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program 2015.
- B. AMCA 99 - Standards Handbook 2016.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans 2020.
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating 2016.
- E. AMCA 211 - Certified Ratings Program Product Rating Manual for Fan Air Performance 2022.
- F. AMCA 260 - Laboratory Methods of Testing Induced Flow Fans for Rating 2020.
- G. AMCA 300 - Reverberant Room Method for Sound Testing of Fans 2014.

- H. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data 2014.
- I. AMCA 311 - Certified Ratings Program Product Rating Manual for Fan Sound Performance 2016.
- J. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

#### 1.04 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 - General Requirements for submittal procedures.
- B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.

#### 1.05 FIELD CONDITIONS

- A. Permanent ventilators may not be used for ventilation during construction.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Greenheck Fan Corporation: [www.greenheck.com](http://www.greenheck.com).
- B. Loren Cook Company: [www.lorencook.com](http://www.lorencook.com).
- C. PennBarry, Division of Air System Components:  
[www.pennbarry.com](http://www.pennbarry.com).

#### 2.02 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: AMCA 204 - Balance Quality and Vibration Levels for Fans.
- B. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.

- C. Sound Ratings: AMCA 301, tested to AMCA 300 and bearing AMCA Certified Sound Rating Seal.
- D. Fabrication: Comply with AMCA 99.
- E. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.03 CABINET EXHAUST FANS

- A. Centrifugal Fan Unit: V-belt or direct driven with galvanized steel housing, resilient mounted motor, gravity backdraft damper in discharge.
- B. Disconnect Switch: Cord and plug in housing for thermal overload protected motor and wall mounted switch.
- C. Grille: Molded white plastic.

2.04 KITCHEN HOOD UPBLAST ROOF EXHAUSTERS

2.05 LABORATORY AND FUME EXHAUST

- A. General Requirements:
  - 1. Provide fan types tested in accordance with AMCA 210, AMCA 260 (Induced Flow Fans) and AMCA 300 in an AMCA-accredited laboratory.
  - 2. Provide fan units rated in accordance with AMCA 211 and AMCA 311.
- B. Fan Assemblies:
  - 1. Provide unit suitable for maintaining structural integrity and operation in 125 mph wind without external guy-wires or supplemental supports when mounted on manufacturer-supplied roof curbs.
- C. Belt Drive Fan:
  - 1. Fan Wheel:

- a. Type: Non-overloading, backward inclined centrifugal.
- b. Material: steel with 2-stage lab coat corrossions protection.
2. Statically and dynamically balanced.
3. Motors:
  - a. Open drip-proof (ODP).
  - b. Heavy duty ball bearing type.
  - c. Mount on vibration isolators or resilient cradle mounts, out of air stream.
  - d. Fully accessible for maintenance.
4. Housing:
  - a. Construct of heavy gage steel with 2-stage lab coat corrosion protection including curb cap, windband, and motor compartment.
  - b. Rigid internal support structure.
  - c. One-piece fabricated or fully welded curb-cap base to windband for leak proof construction.
  - d. Construct drive frame assembly of heavy gage steel, mounted on vibration isolators.
  - e. Provide breather tube for fresh air motor cooling and wiring.
- D. Shafts and Bearings:
  1. Fan Shaft:
    - a. Ground and polished steel with anti-corrosive coating.
    - b. First critical speed at least 25 percent over maximum cataloged operating speed.

2. Bearings:

- a. Permanently sealed or pillow block type.
- b. Minimum L10 life in excess of 100,000 hours (equivalent to L50 average life of 500,000 hours), at maximum cataloged operating speed.
- c. 100 percent factory tested.

E. Drive Assembly:

1. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower.
2. Belts: Static free and oil resistant.
3. Fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.
4. Motor pulley adjustable for final system balancing.
5. Readily accessible for maintenance.

F. Disconnect Switches:

1. Factory mounted and wired.
2. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
  - a. Outdoor Locations: Type 3R.
3. Finish for Painted Steel Enclosures: Provide manufacturer's standard unless otherwise indicated.
4. Positive electrical shutoff.
5. Wired from fan motor to junction box installed within motor compartment.

G. High Plume Discharge Nozzle:



1. Provide a discharge nozzle that develops a maximum discharge air velocity of 9,500 fpm.
  2. Provide drain connection at lowest point of housing.
- H. Roof Curb: 16 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips, insulation and curb bottom, and factory installed nailer strip.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.
- C. Extend ducts to roof exhausters into roof curb.  
Counterflash duct to roof opening.
- D. Hung Cabinet Fans:
  1. Install fans with resilient mountings and flexible electrical leads. Refer to Section 22 0548.
  2. Install flexible connections specified in Section 23 3300 between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.
- E. Provide sheaves required for final air balance.
- F. Install backdraft dampers on inlet to roof and wall exhausters.
- G. Provide backdraft dampers on outlet from cabinet and ceiling exhauster fans and as indicated.

END OF SECTION 23 3423

SECTION 23 3700 - AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Registers/grilles:

1. Wall-mounted, supply register/grilles.
2. Wall-mounted, exhaust and return register/grilles.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project procedural and administrative requirements.
- B. Division 09 - Finishes: Painting of ducts and visible behind outlets and inlets.
- C. Section 09 9123 - Interior Painting: Painting of ducts visible behind outlets and inlets.

1.03 REFERENCE STANDARDS

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating 2012 (Reapproved 2015).
- B. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets 2006 (Reaffirmed 2021).

1.04 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 - General Requirements for submittal procedures.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.05 QUALITY ASSURANCE

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- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Test and rate louver performance in accordance with AMCA 500-L.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Krueger-HVAC: [www.krueger-hvac.com](http://www.krueger-hvac.com).
- B. Price Industries: [www.price-hvac.com](http://www.price-hvac.com).
- C. Titus, a brand of Air Distribution Technologies:  
[www.titus-hvac.com](http://www.titus-hvac.com).

2.02 WALL SUPPLY REGISTERS/GRILLES

- A. Type: Streamlined and individually adjustable blades, 3/4 inch minimum depth, 3/4 inch maximum spacing with spring or other device to set blades, vertical face, single deflection.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
- C. Fabrication: Steel with 20 gage, 0.0359 inch minimum frames and 22 gage, 0.0299 inch minimum blades, steel and aluminum with 20 gage, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D. Color: To be selected by Architect from manufacturer's standard range.
- E. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

2.03 WALL EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with spring or other device to set blades, vertical face.

- B. Frame: 1-1/4 inch margin with countersunk screw mounting.
- C. Fabrication: Aluminum extrusions, with factory baked enamel finish.
- D. Color: To be selected by Architect from manufacturer's standard range.
- E. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9123.

END OF SECTION 23 3700

SECTION 26 0005 - BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. This section applies to all sections of Division 26 and Division 28.
- B. Drawings and general provisions of the contract, including Division 00 and Division 01 specification sections, apply to work of this section.
- C. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on drawings and/or herein, including all labor, materials, equipment and incidentals necessary and required for their completion.
- D. The items in this section are supplementary to the requirements set forth in other portions of the specifications as indicated under Item "A" above.

1.02 DRAWINGS

- A. The drawings show the location and general arrangement of equipment, electrical systems and related items. They shall be followed as closely as elements of the construction will permit.
- B. Examine the drawings of other trades and verify the conditions governing the work on the job site. Arrange work accordingly, providing such fittings, conduit, junction boxes and accessories as may be required to meet such conditions.
- C. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect/Engineer.
- D. The architectural and structural drawings take precedence in all matters pertaining to the building structure,

mechanical drawings in all matters pertaining to mechanical trades and electrical drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect/Engineer for resolution.

#### 1.03 INSPECTION OF SITE

- A. Visit the site, examine and verify the conditions under which the work must be conducted before submitting proposal.
- B. The submitting of a proposal implies that the contractor has visited the site and understands the conditions under which the work must be conducted.

#### 1.04 TEMPORARY FACILITIES

- A. Provide and remove upon completion of the project, in accordance with the general conditions, a complete temporary electrical and telephone service during construction.

#### 1.05 ALTERNATES

- A. Refer to Division 01 - General Requirements for procedures.

#### 1.06 GUARANTEE

- A. Contractor guarantees that the installation is free from defects and agrees to replace or repair, any part of this installation which becomes defective within a period of one year following final acceptance, unless noted otherwise, provided that such failure is due to defects in the equipment, material or installation or to follow the specifications and drawings. File with the Owner any and all guarantees from the equipment manufacturers.

#### 1.07 CODES, PERMITS AND FEES

- A. Unless otherwise indicated, all required permits, licenses, inspections, approvals and fees for electrical work shall be secured and paid for by the contractor. All work shall conform to all applicable codes, rules and regulations. Applicable publications listed in all sections of Division 26 shall be the latest issue, unless otherwise noted.
  
- B. Rules of local utility companies shall be complied with. Check with the utility company supplying service to the installation and determine all devices including, but not limited to, all current and potential transformers, meter boxes, C.T. cabinets and meters which will be required and include the cost of all such items in proposal.
  
- C. All work shall be executed in accordance with the rules and regulations set forth in local and state codes. Prepare any detailed drawings or diagrams which may be required by the governing authorities. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern.

1.08 STANDARDS OF MATERIAL AND WORKMANSHIP:

- A. All materials shall be new, unless noted otherwise. The electrical and physical properties of all materials, and the design, performance characteristics, and methods of construction of all items of equipment, shall be in accordance with the latest issue of the various, applicable standard specifications of the following recognized authorities:
  - 1. A.N.S.I. - American National Standards Institute
  - 2. A.S.T.M. - American Society for Testing Materials
  - 3. I.C.E.A. - Insulated Cable Engineers Association
  - 4. I.E.E.E. - Institute of Electrical and Electronics Engineers
  - 5. N.E.C. - National Electrical Code (NFPA 70)

6. N.E.C.A. - National Electrical Contractors Association
  7. N.E.M.A. - National Electrical Manufacturer's Association
  8. N.F.P.A. - National Fire Protection Association
  9. U.L. - Underwriters Laboratories, Inc.
- B. Perform all work in a first class and workmanlike manner, in accordance with the latest accepted standards and practices for the Trades involved.
- C. All equipment of the same or similar systems shall be by the same manufacturer.

#### 1.09 RECORD DRAWINGS

- A. Refer to Division 01 - General Requirements for procedures. All literature shall be furnished in accordance with requirements listed in Division 01.
- B. Contractor shall provide the following record drawings as part of the Project closeout document process:
1. Contract Documents, specifications and submittals, indicating "As-Built" conditions and actual products selected for use.
  2. Product and Maintenance manuals for all equipment listed within this specification manual and in Contract Documents. Provide with parts lists as applicable.

#### 1.10 SUBMITTALS

- A. Refer to Division 01 - General Requirements for procedures.
- B. Contractor shall provide submittals where items are referred to by symbolic designation on the drawings. All submittals shall bear the same designation (light fixtures, wiring devices, etc.). Refer to other sections of the electrical specifications for additional requirements.



C. Engineer WILL NOT REVIEW:

1. Submittals not specified.
2. Submittals which do not indicate optional equipment being provided.
3. Submittals not reviewed by Contractor; including Contractor stamp with signature comments.
4. Submittals made after work is delivered to site and/or installed.
5. Submittal resubmissions unless resubmission is required by Architect/Engineer.

1.11 MANUFACTURERS LISTED

- A. The listing of specific manufacturers does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed are not relieved from meeting these specifications in their entirety.
- B. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer five (5) days prior to bid date.

1.12 USE OF EQUIPMENT

- A. The use of any equipment, or any part thereof for purposes other than testing even with the Owner's consent, shall not be construed to be an acceptance of the work on the part of the Owner, nor be construed to obligate the Owner in any way to accept improper work or defective materials.
- B. Do not use Owner's light fixtures for temporary lighting except as allowed and directed by the Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

### 3.01 INSTALLATION OF EQUIPMENT

- A. Install all equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the drawings and specifications, report such conflicts to the Architect/Engineer for resolution.
- B. Equipment location shall be as close as practical to locations shown on the drawings.
- C. Working clearances shall not be less than specified in NFPA 70 (National Electric Code).

### 3.02 COORDINATION

- A. Install work to avoid interference with work of other trades including, but not limited to, architectural and mechanical trades. Remove and relocate any work that causes an interference at Contractor's expense. Disputes regarding the cause of an interference will be resolved by the Construction Manager or Architect/Engineer.

### 3.03 CUTTING, PATCHING AND DAMAGE TO OTHER WORK

- A. Refer to Division 01 - General Requirements and Division 02 - Existing Conditions.
- B. All cutting, patching and repair work shall be performed by the contractor through approved, qualified subcontractors. Contractor shall include full cost of same in bid.

### 3.04 EXCAVATION AND BACKFILLING

- A. Provide all excavation, trenching, tunneling, dewatering and backfilling required for the electrical work.  
Coordinate the work with other excavating and backfilling in the same area.
- B. Where conduit is installed less than 30" below the surface of pavement, provide concrete encasement, 4" minimum coverage, all around or as shown on the electrical

drawings.

- C. Backfill all excavations inside building, under drives and parking areas with well-tamped granular material.

Backfill all excavations under wall footings with lean mix concrete up to underside of footings and extend concrete within excavation a minimum of four (4) feet each side of footing. Granular backfill shall be placed in layers not more than 8 inches in thickness, 95 percent compaction throughout with approved compaction equipment.

Tamp, roll as required. Excavated material shall not be used.

- D. Backfill outside building with granular material to a height 12 inches over top of pipe compacted to 95 percent compaction as specified above. Backfill remainder of excavation with unfrozen, excavated material in such a way to prevent settling. Tamp, roll as required.

### 3.05 EQUIPMENT FOUNDATION AND SUPPORTS

- A. Shall be as required or as shown on plans or specified.
- B. Provide concrete house keeping bases 4" above finished floor, with leveling channels, where noted, for floor-mounted equipment. Coordinate requirements with Division 03 - Concrete.
- C. For equipment suspended from ceilings or walls, furnish and install all inserts, rods, structural steel frames, brackets and platforms required.

### 3.06 EQUIPMENT CONNECTIONS

- A. Make connections to equipment, motors, lighting fixtures, and other items included in the work in accordance with the approved shop drawings and rough-in measurements furnished by the manufacturers of the particular equipment furnished. All additional connections not shown on the drawings, but called out by the equipment manufacturer's shop drawings shall be provided.

### 3.07 ACCESS DOORS AND PANELS

- A. Refer to Division 08 - Openings; Provide access doors in locations as required per N.E.C. Coordinate locations with architectural trades.

### 3.08 CLEANING

- A. Refer to Division 01 - General Requirements; All equipment shall be cleaned as frequently as necessary through the construction process and again prior to project completion.
- B. Final cleanup shall include, but not be limited to, washing of fixture lenses or louvers, switchboards, substations, motor control centers, panels, etc. Fixture reflectors and lenses or louvers shall be left with no water marks or cleaning streaks.

### 3.09 DELIVERY, STORAGE AND PROTECTION OF EQUIPMENT AND MATERIALS

- A. Refer to Division 01 - General Requirements; All equipment and materials shall be delivered, stored and secured per manufacturer's recommendations.
- B. On-site storage shall be coordinated with Construction Manager and be performed in a manner as to avoid damage, deterioration and loss.

### 3.10 DRAWINGS AND MEASUREMENTS

- A. Electrical drawings are not intended to be scaled for rough-in measurements nor to serve as submittals. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement shall be taken by the Contractor.

END OF SECTION 26 0005

SECTION 26 0505 - SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition and extension of existing electrical work.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements.
- C. Section 26 0005 - Basic Electrical Requirements.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work:  
As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.
- B. Demolition drawings are based on casual field observation and existing record documents.
- C. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.

- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
  - 2. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Notify Owner before partially or completely disabling system.
  - 2. Notify local fire service.
  - 3. Make notifications at least 24 hours in advance.
  - 4. Make temporary connections to maintain service in areas adjacent to work area.

### 3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
  - 1. PCB-containing electrical equipment, including transformers, capacitors, and switches.
  - 2. PCB- and DEHP-containing lighting ballasts.

3. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

### 3.04 CLEANING AND REPAIR

- A. See Division 01 - General Requirements.
- B. Clean and repair existing materials and equipment that remain or that are to be reused.
- C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

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D. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION 26 0505



SECTION 26 0519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND  
CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Metal-clad cable.
- C. Wiring connectors.
- D. Electrical tape.
- E. Heat shrink tubing.
- F. Oxide inhibiting compound.
- G. Wire pulling lubricant.
- H. Cable ties.
- I. Firestop sleeves.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, and repairs.
- C. Section 07 8400 - Firestopping.
- D. Section 26 0005 - Basic Electrical Requirements.
- E. Section 26 0505 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- F. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

- G. Section 26 0536 - Cable Trays for Electrical Systems:  
Additional installation requirements for cables installed in cable tray systems.
- H. Section 26 0553 - Identification for Electrical Systems:  
Identification products and requirements.
- I. Section 28 4600 - Fire Detection and Alarm: Fire alarm system conductors and cables.
- J. Division 31 - Earthwork: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft 2011 (Reapproved 2017).
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation 2004 (Reapproved 2020).
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- F. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable 2018.
- G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy 2021.
- H. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.
- I. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All

Applicable Amendments and Supplements.

- J. UL 44 - Thermoset-Insulated Wires and Cables Current Edition, Including All Revisions.
- K. UL 83 - Thermoplastic-Insulated Wires and Cables Current Edition, Including All Revisions.
- L. UL 486A-486B - Wire Connectors Current Edition, Including All Revisions.
- M. UL 486C - Splicing Wire Connectors Current Edition, Including All Revisions.
- N. UL 486D - Sealed Wire Connector Systems Current Edition, Including All Revisions.
- O. UL 1569 - Metal-Clad Cables Current Edition, Including All Revisions.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

##### A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### 1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.

#### 1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### 1.07 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

### PART 2 PRODUCTS

#### 2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Underground feeder and branch-circuit cable is not permitted.
- E. Service entrance cable is not permitted.
- F. Armored cable is not permitted.
- G. Metal-clad cable is permitted only as follows:
  - 1. Where not otherwise restricted, may be used:

a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.

1) Maximum Length: 6 feet.

b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.

H. Manufactured wiring systems are not permitted.

## 2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductor Material:

1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.

2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.

3. Tinned Copper Conductors: Comply with ASTM B33.

H. Minimum Conductor Size:

1. Branch Circuits: 12 AWG.

a. Exceptions:

- 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
- 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
- 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.

I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

J. Conductor Color Coding:

1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction.  
Maintain consistent color coding throughout project.
2. Color Coding Method: Integrally colored insulation.
3. Color Code:

a. 480Y/277 V, 3 Phase, 4 Wire System:

- 1) Phase A: Brown.
- 2) Phase B: Orange.
- 3) Phase C: Yellow.
- 4) Neutral/Grounded: Gray.

b. 208Y/120 V, 3 Phase, 4 Wire System:

- 1) Phase A: Black.
- 2) Phase B: Red.
- 3) Phase C: Blue.
- 4) Neutral/Grounded: White.

c. Equipment Ground, All Systems: Green.

d. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.

## 2.03 SINGLE CONDUCTOR BUILDING WIRE

### A. Manufacturers:

#### 1. Copper Building Wire:

a. Cerro Wire LLC: [www.cerrowire.com](http://www.cerrowire.com).

b. Encore Wire Corporation: [www.encorewire.com](http://www.encorewire.com).

c. General Cable Technologies Corporation:  
[www.generalcable.com](http://www.generalcable.com).

d. Southwire Company: [www.southwire.com](http://www.southwire.com).

B. Description: Single conductor insulated wire.

### C. Conductor Stranding:

#### 1. Feeders and Branch Circuits:

a. Size 10 AWG and Smaller: Stranded.

b. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

### E. Insulation:

1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

## 2.04 METAL-CLAD CABLE

### A. Manufacturers:

1. AFC Cable Systems Inc: [www.afcweb.com/#sle](http://www.afcweb.com/#sle).

2. Encore Wire Corporation: [www.encorewire.com/#sle](http://www.encorewire.com/#sle).

3. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
  1. Size 10 AWG and Smaller: Stranded.
  2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Provide oversized neutral conductors where indicated or required.
- G. Grounding: Full-size integral equipment grounding conductor.
- H. Armor: Steel, interlocked tape.

## 2.05 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 26 0526.
- C. Wiring Connectors for Splices and Taps:
  1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
  2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:



1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
  2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
  3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
  4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
- E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
- H. Mechanical Connectors: Provide bolted type or set-screw type.
- I. Compression Connectors: Provide circumferential type or hex type crimp configuration.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.

- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### 3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

### 3.03 INSTALLATION

#### A. Circuiting Requirements:

1. Unless dimensioned, circuit routing indicated is diagrammatic.
2. When circuit destination is indicated without specific routing, determine exact routing required.
3. Arrange circuiting to minimize splices.
4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.

8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
9. Provide oversized neutral/grounded conductors where indicated and as specified below.
  - a. Provide 200 percent rated neutral for feeders fed from K-rated transformers.
  - b. Provide 200 percent rated neutral for feeders serving panelboards with 200 percent rated neutral bus.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install metal-clad cable (Type MC) in accordance with NECA 120.
- E. Installation in Raceway:
  1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  2. Pull all conductors and cables together into raceway at same time.
  3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

- G. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- H. Terminate cables using suitable fittings.
  - 1. Metal-Clad Cable (Type MC):
    - a. Use listed fittings.
    - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- I. Install conductors with a minimum of 12 inches of slack at each outlet.
- J. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- M. Make wiring connections using specified wiring connectors.
  - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
  - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
  - 3. Do not remove conductor strands to facilitate insertion into connector.

4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- O. Insulate ends of spare conductors using vinyl insulating electrical tape.
- P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07.
- Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

### 3.04 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
- C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION 26 0519

SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Ground rod electrodes.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, repairs.
- C. Section 26 0005 - Basic Electrical Requirements
- D. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- E. Section 26 0536 - Cable Trays for Electrical Systems: Additional grounding and bonding requirements for cable tray systems.
- F. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- G. Section 26 5600 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.
- H. Division 31 - Earthwork: Excavating, trenching and fill.

1.03 REFERENCE STANDARDS

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System 2012.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings 2017.
- D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.
- E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 467 - Grounding and Bonding Equipment Current Edition, Including All Revisions.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

##### A. Coordination:

- 1. Verify exact locations of underground metal water service pipe entrances to building.
- 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
- 3. Notify Strategic Energy Solutions, Inc. of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

##### B. Sequencing:

- 1. Do not install ground rod electrodes until final backfill and compaction is complete.

#### 1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.

- B. Project Record Documents: Record actual locations of grounding electrode system components and connections.

## PART 2 PRODUCTS

### 2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. Grounding System Resistance:
  - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
  - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
  - 3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.
- F. Grounding Electrode System:



1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
  - a. Provide continuous grounding electrode conductors without splice or joint.
  - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
2. Metal Underground Water Pipe(s):
  - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
  - b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
  - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
3. Concrete-Encased Electrode:
  - a. Provide connection to concrete-encased electrode consisting of not less than 20 feet of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
4. Ground Ring:
  - a. Provide a ground ring encircling the building or structure consisting of bare copper conductor not less than 2 AWG in direct contact with earth,

installed at a depth of not less than 30 inches.

- b. Where location is not indicated, locate ground ring conductor at least 24 inches outside building perimeter foundation.
  - c. Provide ground enhancement material around conductor.
  - d. Provide connection from ground ring conductor to:
    - 1) Perimeter columns of metal building frame.
    - 2) Ground rod electrodes located as indicated.
5. Ground Rod Electrode(s):
- a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
  - b. Space electrodes not less than 10 feet from each other and any other ground electrode.
  - c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
6. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
7. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
- a. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.

b. Where ground bar location is not indicated, locate in accessible location as near as possible to service disconnect enclosure.

c. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.

G. Bonding and Equipment Grounding:

1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

H. Cable Tray Systems: Also comply with Section 26 0536.

I. Pole-Mounted Luminaires: Also comply with Section 26 5600.

## 2.02 GROUNDING AND BONDING COMPONENTS

### A. General Requirements:

1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

### B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:

1. Use insulated copper conductors unless otherwise indicated.
  - a. Exceptions:
    - 1) Use bare copper conductors where installed underground in direct contact with earth.
    - 2) Use bare copper conductors where directly encased in concrete (not in raceway).

### C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
4. Manufacturers - Mechanical and Compression Connectors:
  - a. Advanced Lightning Technology (ALT): [www.altfab.com](http://www.altfab.com)
  - b. Burndy LLC: [www.burndy.com](http://www.burndy.com)

c. Harger Lightning & Grounding: [www.harger.com](http://www.harger.com)

d. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com)

5. Manufacturers - Exothermic Welded Connections:

a. Burndy LLC: [www.burndy.com](http://www.burndy.com)

b. Cadweld, a brand of Erico International Corporation:  
[www.erico.com](http://www.erico.com)

c. thermOweld, subsidiary of Continental Industries;  
division of Burndy LLC: [www.thermoweld.com](http://www.thermoweld.com)

D. Ground Bars:

1. Description: Copper rectangular ground bars with mounting brackets and insulators.

2. Size: As indicated.

3. Holes for Connections: As indicated or as required for connections to be made.

4. Manufacturers:

a. Advanced Lightning Technology (ALT): [www.altfab.com](http://www.altfab.com)

b. Erico International Corporation: [www.erico.com](http://www.erico.com)

c. Harger Lightning & Grounding: [www.harger.com](http://www.harger.com)

d. thermOweld, subsidiary of Continental Industries;  
division of Burndy LLC: [www.thermoweld.com](http://www.thermoweld.com)

E. Ground Rod Electrodes:

1. Comply with NEMA GR 1.

2. Material: Copper-bonded (copper-clad) steel.

3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.

4. Where rod lengths of greater than 10 feet are indicated or otherwise required, sectionalized ground rods may be used.

5. Manufacturers:

a. Advanced Lightning Technology (ALT):

[www.altfab.com/#sle](http://www.altfab.com/#sle).

b. Erico International Corporation: [www.erico.com/#sle](http://www.erico.com/#sle).

c. Galvan Industries, Inc:

[www.galvanelectrical.com/#sle](http://www.galvanelectrical.com/#sle).

d. Harger Lightning & Grounding: [www.harger.com/#sle](http://www.harger.com/#sle).

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.

- D. Make grounding and bonding connections using specified connectors.
1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
  4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 26 0553.

### 3.03 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.13.
- C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION 26 0526

SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, and cutting and patching requirements.
- C. Division 03 - Concrete: Concrete equipment pads.
- D. Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.
- E. Section 26 0005 - Basic Electrical Requirements
- F. Section 26 0533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- G. Section 26 0536 - Cable Trays for Electrical Systems: Additional support and attachment requirements for cable tray.
- H. Section 26 0533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
- I. Section 26 5100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
- J. Section 26 5600 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

1.03 REFERENCE STANDARDS



- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
- D. MFMA-4 - Metal Framing Standards Publication 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 5B - Strut-Type Channel Raceways and Fittings Current Edition, Including All Revisions.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

##### A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Division 03.

1.05 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
  - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
  - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or

ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.

2. Conduit Clamps: Bolted type unless otherwise indicated.

3. Manufacturers:

a. Cooper Crouse-Hinds, a division of Eaton Corporation: [www.cooperindustries.com](http://www.cooperindustries.com)

b. Erico International Corporation: [www.erico.com](http://www.erico.com)

c. HoldRite, a brand of Reliance Worldwide Corporation: [www.holdrite.com](http://www.holdrite.com)

d. O-Z/Gedney, a brand of Emerson Electric Co: [www.emerson.com](http://www.emerson.com)

e. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com)

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

1. Manufacturers:

a. Cooper Crouse-Hinds, a division of Eaton Corporation: [www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).

b. Erico International Corporation: [www.erico.com/#sle](http://www.erico.com/#sle).

c. HoldRite, a brand of Reliance Worldwide Corporation: [www.holdrite.com/#sle](http://www.holdrite.com/#sle).

d. O-Z/Gedney, a brand of Emerson Electric Co: [www.emerson.com/#sle](http://www.emerson.com/#sle).

- e. Thomas & Betts Corporation: [www.tnb.com/#sle](http://www.tnb.com/#sle).
- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
  - 1. Comply with MFMA-4.
  - 2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
  - 3. Manufacturers:
    - a. Cooper B-Line, a division of Eaton Corporation:  
[www.cooperindustries.com](http://www.cooperindustries.com)
    - b. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com)
    - c. Unistrut, a brand of Atkore International Inc:  
[www.unistrut.com](http://www.unistrut.com)
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
  - 1. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2 inch diameter.
    - b. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
    - c. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
    - d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
    - e. Outlet Boxes: 1/4 inch diameter.
    - f. Luminaires: 1/4 inch diameter.
- F. Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that

rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.

1. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
2. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
3. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
4. Manufacturers:
  - a. Cooper B-Line, a division of Eaton Corporation:  
www.cooperindustries.com
  - b. Erico International Corporation: www.erico.com
  - c. PHP Systems/Design: www.phpsd.com
  - d. Unistrut, a brand of Atkore International Inc:  
www.unistrut.com

G. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other

systems.

- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
  - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  - 4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 4 inch high concrete pad constructed in accordance with Division 03.
  - 5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Conduit Support and Attachment: Also comply with Section 26 0533.13.
- I. Cable Tray Support and Attachment: Also comply with Section 26 0536.
- J. Box Support and Attachment: Also comply with Section 26 0533.16.

K. Secure fasteners according to manufacturer's recommended torque settings.

L. Remove temporary supports.

3.02 FIELD QUALITY CONTROL

A. See Division 01 - General Requirements for additional requirements.

B. Inspect support and attachment components for damage and defects.

C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION 26 0529

SECTION 26 0533.13 - CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Aluminum rigid metal conduit (RMC).
- C. Flexible metal conduit (FMC).
- D. Electrical metallic tubing (EMT).
- E. Rigid polyvinyl chloride (PVC) conduit.
- F. Conduit fittings.
- G. Accessories.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, and repairs.
- C. Division 07 - Thermal and Moisture Protection: Firestopping.
- D. Section 07 8400 - Firestopping.
- E. Section 26 0005 - Basic Electrical Requirements
- F. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- G. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- H. Section 26 0529 - Hangers and Supports for Electrical Systems.
- I. Section 26 0533.16 - Boxes for Electrical Systems.



- J. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- K. Section 28 4600 - Fire Detection and Alarm: Fire alarm wiring in conduit.
- L. Division 31 - Earthwork: Excavating, trenching and fill.
- M. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

#### 1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) 2020.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S) 2020.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT) 2020.
- E. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit 2004.
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) 2017.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
- H. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit 2018.
- I. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit 2020.
- J. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing 2021.

- K. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. UL 1 - Flexible Metal Conduit Current Edition, Including All Revisions.
- M. UL 6 - Electrical Rigid Metal Conduit-Steel Current Edition, Including All Revisions.
- N. UL 514B - Conduit, Tubing, and Cable Fittings Current Edition, Including All Revisions.
- O. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings Current Edition, Including All Revisions.
- P. UL 797 - Electrical Metallic Tubing-Steel Current Edition, Including All Revisions.

## PART 2 PRODUCTS

### 2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
  - 1. Under Slab on Grade: Use galvanized steel rigid metal conduit or rigid PVC conduit.
  - 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit or rigid PVC conduit.

3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit or rigid PVC conduit.
  4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
  5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
- D. Embedded Within Concrete:
1. Within Slab on Grade (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit or rigid PVC conduit.
  2. Within Slab Above Ground (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, or rigid PVC conduit.
- E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).

- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
- K. Exposed, Exterior: Use galvanized steel rigid metal conduit or PVC-coated galvanized steel rigid metal conduit.
- L. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.
- M. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
  - 1. Maximum Length: 6 feet.
- N. Connections to Vibrating Equipment:
  - 1. Dry Locations: Use flexible metal conduit.
  - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
  - 3. Vibrating equipment includes, but is not limited to:
    - a. Transformers.
    - b. Motors.
- O. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

## 2.02 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
  - 1. Branch Circuits: 3/4 inch (21 mm) trade size.
  - 2. Flexible Connections to Luminaires: 3/8 inch (12 mm) trade size.
  - 3. Underground, Interior: 1 inch (27 mm) trade size.
  - 4. Underground, Exterior: 1 inch (27 mm) trade size.
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:

- 1. Allied Tube & Conduit: [www.alliedeg.com](http://www.alliedeg.com)
- 2. Republic Conduit: [www.republic-conduit.com](http://www.republic-conduit.com)
- 3. Wheatland Tube, a Division of Zekelman Industries:  
[www.wheatland.com](http://www.wheatland.com)

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:

- 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
- 2. Material: Use steel or malleable iron.
- 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 FLEXIBLE METAL CONDUIT (FMC)

A. Manufacturers:

1. AFC Cable Systems, Inc: [www.afcweb.com](http://www.afcweb.com)
2. Electri-Flex Company: [www.electriflex.com](http://www.electriflex.com)
3. International Metal Hose: [www.metalhose.com](http://www.metalhose.com)

B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

C. Fittings:

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.

2.05 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:

1. Allied Tube & Conduit: [www.alliedeg.com](http://www.alliedeg.com)
2. Republic Conduit: [www.republic-conduit.com](http://www.republic-conduit.com)
3. Wheatland Tube, a Division of Zekelman Industries:  
[www.wheatland.com](http://www.wheatland.com)

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.
3. Connectors and Couplings: Use compression (gland) or set-screw type.

a. Do not use indenter type connectors and couplings.

4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

5. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

## 2.06 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

### A. Manufacturers:

1. Cantex Inc: [www.cantexinc.com](http://www.cantexinc.com)

2. Carlon, a brand of Thomas & Betts Corporation:  
[www.carlon.com](http://www.carlon.com)

3. JM Eagle: [www.jmeagle.com](http://www.jmeagle.com)

B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

### C. Fittings:

1. Manufacturer: Same as manufacturer of conduit to be connected.

2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

## 2.07 ACCESSORIES

A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.

B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

- C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
- D. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- E. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.
- F. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- G. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.



E. Conduit Routing:

1. Unless dimensioned, conduit routing indicated is diagrammatic.
2. When conduit destination is indicated without specific routing, determine exact routing required.
3. Conceal all conduits unless specifically indicated to be exposed.
4. Conduits in the following areas may be exposed, unless otherwise indicated:
  - a. Electrical rooms.
  - b. Mechanical equipment rooms.
5. Unless otherwise approved, do not route conduits exposed:
  - a. Across floors.
  - b. Across roofs.
  - c. Across top of parapet walls.
  - d. Across building exterior surfaces.
6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
7. Arrange conduit to maintain adequate headroom, clearances, and access.
8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.

10. Group parallel conduits in the same area together on a common rack.

F. Conduit Support:

1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use conduit strap to support single surface-mounted conduit.
  - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
7. Use of wire for support of conduits is not permitted.

G. Connections and Terminations:

1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.

3. Use suitable adapters where required to transition from one type of conduit to another.
4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

H. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.

8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07.

I. Underground Installation:

1. Provide trenching and backfilling in accordance with Division 31.

J. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):

1. Secure conduits to prevent floating or movement during pouring of concrete.

K. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Division 03 with minimum concrete cover of 2 inches on all sides unless otherwise indicated.

L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
3. Where conduits are subject to earth movement by settlement or frost.

M. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:

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1. Where conduits pass from outdoors into conditioned interior spaces.
2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- N. Provide grounding and bonding in accordance with Section 26 0526.
- O. Identify conduits in accordance with Section 26 0553.

### 3.03 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION 26 0533.13

SECTION 26 0533.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 03 - Concrete: Concrete.
- C. Division 07 - Thermal and Moisture Protection: Firestopping.
- D. Division 08 - Openings: Access Doors.
- E. Section 08 3100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- F. Section 26 0005 - Basic Electrical Requirements.
- G. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- H. Section 26 0529 - Hangers and Supports for Electrical Systems.
- I. Section 26 0533.13 - Conduit for Electrical Systems:
  - 1. Conduit bodies and other fittings.
  - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- J. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

K. Section 26 2726 - Wiring Devices:

1. Wall plates.

L. Section 26 2813 - Fuses: Spare fuse cabinets.

#### 1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports 2013 (Reaffirmed 2020).

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. SCTE 77 - Specifications for Underground Enclosure Integrity 2017.

H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.

I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.

J. UL 508A - Industrial Control Panels Current Edition, Including All Revisions.

K. UL 514A - Metallic Outlet Boxes Current Edition, Including All Revisions.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and



underground boxes/enclosures.

1. Underground Boxes/Enclosures: Include reports for load testing in accordance with SCTE 77 certified by a professional engineer or an independent testing agency upon request.

C. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Keys for Lockable Enclosures: Two of each different key.

## PART 2 PRODUCTS

### 2.01 BOXES

#### A. General Requirements:

1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.

2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.

3. Provide products listed, classified, and labeled as suitable for the purpose intended.

4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use suitable concrete type boxes where flush-mounted in concrete.
4. Use suitable masonry type boxes where flush-mounted in masonry walls.
5. Use raised covers suitable for the type of wall construction and device configuration where required.
6. Use shallow boxes where required by the type of wall construction.
7. Do not use "through-wall" boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
- 10.Boxes for Supporting Luminaires and Ceiling Fans:  
Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
- 11.Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
- 12.Wall Plates: Comply with Section 26 2726.

13.Manufacturers:

- a. Cooper Crouse-Hinds, a division of Eaton Corporation: [www.cooperindustries.com](http://www.cooperindustries.com)
- b. Hubbell Incorporated; Bell Products: [www.hubbell-rtb.com](http://www.hubbell-rtb.com)
- c. Hubbell Incorporated; RACO Products: [www.hubbell-rtb.com](http://www.hubbell-rtb.com)
- d. O-Z/Gedney, a brand of Emerson Electric Co:  
[www.emerson.com](http://www.emerson.com)
- e. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com)

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:

1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. NEMA 250 Environment Type, Unless Otherwise Indicated:
3. Junction and Pull Boxes Larger Than 100 cubic inches:
  - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
  - b. Boxes 6 square feet and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
  - a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
  - b. Back Panels: Painted steel, removable.
  - c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide separate boxes for emergency power and normal power systems.
- E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- H. Box Locations:
  - 1. Locate boxes to be accessible. Provide access panels in accordance with Division 08 as required where approved by the Architect.
  - 2. Unless dimensioned, box locations indicated are approximate.

3. Locate boxes as required for devices installed under other sections or by others.
  4. Locate boxes so that wall plates do not span different building finishes.
  5. Locate boxes so that wall plates do not cross masonry joints.
  6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
  7. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
    - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
  8. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0533.13.
- I. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
  2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- J. Install boxes plumb and level.
- K. Flush-Mounted Boxes:

1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
  2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
  3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- L. Install boxes as required to preserve insulation integrity.
- M. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- N. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- O. Close unused box openings.
- P. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- Q. Provide grounding and bonding in accordance with Section 26 0526.

### 3.03 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION 26 0533.16

SECTION 26 0533.23 - SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface raceway systems.
- B. Wireways.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements.
- C. Section 26 0005 - Basic Electrical Requirements.
- D. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- E. Section 26 0529 - Hangers and Supports for Electrical Systems.
- F. Section 26 0533.13 - Conduit for Electrical Systems.
- G. Section 26 0533.16 - Boxes for Electrical Systems.
- H. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- I. Section 26 2726 - Wiring Devices: Receptacles.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NEMA PRP 5 - Installation Guidelines for Surface Nonmetallic Raceway 2021.

- D. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings Current Edition, Including All Revisions.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

##### A. Coordination:

1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate rough-in locations of outlet boxes provided under Section 26 0533.16 and conduit provided under Section 26 0533.13 as required for installation of raceways provided under this section.
3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

##### B. Sequencing:

1. Do not install raceways until final surface finishes and painting are complete.
2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

#### 1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.



PART 2 PRODUCTS

2.01 RACEWAY REQUIREMENTS

- A. Provide all components, fittings, supports, and accessories required for a complete raceway system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.02 SURFACE RACEWAY SYSTEMS

A. Manufacturers:

- 1. Hubbell Incorporated: [www.hubbell.com](http://www.hubbell.com)
- 2. MonoSystems, Inc: [www.monosystems.com](http://www.monosystems.com)
- 3. Wiremold, a brand of Legrand North America, Inc: [www.legrand.us](http://www.legrand.us)

2.03 WIREWAYS

A. Manufacturers:

- 1. Cooper B-Line, a division of Cooper Industries: [www.cooperindustries.com](http://www.cooperindustries.com)
- 2. Enduro Composites: [www.endurocomposites.com](http://www.endurocomposites.com)
- 3. Hoffman, a brand of Pentair Technical Products: [www.hoffmanonline.com](http://www.hoffmanonline.com)
- 4. Schneider Electric; Square D Products: [www.schneider-electric.us](http://www.schneider-electric.us)

B. Description: Lay-in wireways and wiring troughs with removable covers; listed and labeled as complying with UL 870.

C. Wireway Type, Unless Otherwise Indicated:

- D. Where wireway size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.
- C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.
- D. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Surface Nonmetallic Raceways: Install in accordance with NEMA PRP 5.
- D. Install raceways plumb and level.
- E. Arrange wireways and associated raceway connections to comply with NFPA 70, including but not limited to requirements for deflected conductors and wireways used as pullboxes. Increase size of wireway where necessary.
- F. Secure and support raceways in accordance with Section 26 0529 at intervals complying with NFPA 70 and manufacturer's requirements.
- G. Close unused raceway openings.

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H. Provide grounding and bonding in accordance with Section  
26 0526.

END OF SECTION 26 0533.23

SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Underground warning tape.
- F. Floor marking tape.
- G. Warning signs and labels.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 09 - Finishes: Interior and Exterior Painting.
- C. Section 09 9113 - Exterior Painting.
- D. Section 09 9123 - Interior Painting.
- E. Section 26 0005 - Basic Electrical Requirements
- F. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- G. Section 26 0536 - Cable Trays for Electrical Systems: Additional identification requirements for cable tray systems.
- H. Section 26 0573 - Power System Studies: Arc flash hazard warning labels.
- I. Section 26 2726 - Wiring Devices: Device and wallplate finishes; factory pre-marked wallplates.

### 1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 969 - Marking and Labeling Systems Current Edition, Including All Revisions.

### 1.04 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

## PART 2 PRODUCTS

### 2.01 IDENTIFICATION REQUIREMENTS

- A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.
- B. Identification for Equipment:
  - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
    - a. Panelboards:
      - 1) Identify ampere rating.
      - 2) Identify voltage and phase.
      - 3) Identify power source and circuit number. Include location when not within sight of equipment.
      - 4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
      - 5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

b. Transformers:

- 1) Identify kVA rating.
- 2) Identify voltage and phase for primary and secondary.
- 3) Identify power source and circuit number. Include location when not within sight of equipment.

c. Enclosed switches, circuit breakers, and motor controllers:

- 1) Identify voltage and phase.
- 2) Identify power source and circuit number. Include location when not within sight of equipment.
- 3) Identify load(s) served. Include location when not within sight of equipment.

d. Transfer Switches:

- 1) Identify voltage and phase.
- 2) Identify short circuit current rating based on the specific overcurrent protective device type and settings protecting the transfer switch.

2. Service Equipment:

- a. Use identification nameplate to identify each service disconnecting means.

3. Emergency System Equipment:

- a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.
- b. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.

4. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
5. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.
6. Use field-painted floor markings, floor marking tape, or warning labels to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.
  - a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches wide, painted in accordance with Section 09 9123 and 09 9113.
7. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
  - a. Service equipment.
  - b. Industrial control panels.
  - c. Motor control centers.
  - d. Elevator control panels.
  - e. Industrial machinery.

C. Identification for Conductors and Cables:

1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

D. Identification for Raceways:

1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet.
2. Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet.
  - a. Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches wide.
    - 1) Color Code:
      - (a) Emergency Power System: Red.
      - (b) Fire Alarm System: Red.
    - 2) Field-Painting: Comply with Section 09 9123 and 09 9113.
    - 3) Vinyl Color Coding Electrical Tape: Comply with Section 26 0519.
3. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
4. Use underground warning tape to identify underground raceways.
5. Use voltage markers to identify highest voltage present for wireways at maximum intervals of 20 feet.

E. Identification for Cable Tray: Comply with Section 26 0536.

F. Identification for Boxes:

1. Use voltage markers to identify highest voltage present.



2. Use voltage markers or color coded boxes to identify systems other than normal power system.

a. Color-Coded Boxes: Field-painted in accordance with Division 09 per the same color code used for raceways.

G. Identification for Devices:

1. Wiring Device and Wallplate Finishes: Comply with Section 26 2726.

2. Use identification label to identify fire alarm system devices.

a. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.

3. Use identification label to identify serving branch circuit for all receptacles.

a. For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.

H. Identification for Luminaires:

1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:

1. Materials:

a. Indoor Clean, Dry Locations: Use plastic nameplates.

b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.

2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:

1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Caution and Warning Messages:

1. Minimum Size: 2 inches by 4 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/2 inch.
5. Color: Black text on yellow background unless otherwise indicated.

D. Format for Receptacle Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Power source and circuit number or other designation indicated.

3. Text: All capitalized unless otherwise indicated.

4. Minimum Text Height: 3/16 inch.

5. Color: Black text on clear background.

E. Format for Fire Alarm Device Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.

2. Legend: Designation indicated and device zone or address.

3. Text: All capitalized unless otherwise indicated.

4. Minimum Text Height: 3/16 inch.

5. Color: Red text on white background.

2.03 VOLTAGE MARKERS

A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

C. Minimum Size:

1. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.

2. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.

3. Markers for Junction Boxes: 1/2 by 2 1/4 inches.

D. Legend:

1. Markers for Voltage Identification: Highest voltage present.

2. Markers for System Identification:

a. Emergency Power System: Text "EMERGENCY".

- E. Color: Black text on orange background unless otherwise indicated.

#### 2.04 UNDERGROUND WARNING TAPE

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- B. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.
- C. Legend: Type of service, continuously repeated over full length of tape.
- D. Color:
  - 1. Tape for Buried Power Lines: Black text on red background.
  - 2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

#### 2.05 FLOOR MARKING TAPE

- A. Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlamine, 3 inches wide, with alternating black and white stripes.

#### 2.06 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
  - 1. Materials:
    - a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
    - b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
  - 2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.

3. Minimum Size: 7 by 10 inches unless otherwise indicated.

C. Warning Labels:

1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
  1. Surface-Mounted Equipment: Enclosure front.
  2. Flush-Mounted Equipment: Inside of equipment door.
  3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
  4. Elevated Equipment: Legible from the floor or working platform.
  5. Branch Devices: Adjacent to device.

6. Interior Components: Legible from the point of access.
  7. Conduits: Legible from the floor.
  8. Boxes: Outside face of cover.
  9. Conductors and Cables: Legible from the point of access.
  - 10.Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
  - D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
  - E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
  - F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.
  - G. Secure rigid signs using stainless steel screws.
  - H. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION 26 0553

SECTION 26 2416 - PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Power distribution panelboards.
- B. Lighting and appliance panelboards.
- C. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, and repairs.
- C. Division 03 - Concrete: Concrete equipment pads.
- D. Section 26 0005 - Basic Electrical Requirements.
- E. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- F. Section 26 0529 - Hangers and Supports for Electrical Systems.
- G. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- H. Section 26 0573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.
- I. Section 26 2200 - Low-Voltage Transformers: Small power centers with integral primary breaker, transformer, and panelboard.
- J. Section 26 2813 - Fuses: Fuses for fusible switches and spare fuse cabinets.

K. Section 26 4300 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service 2013e (Amended 2017).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards 2015.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- E. NEMA PB 1 - Panelboards 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less 2013.
- G. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.
- H. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- K. UL 67 - Panelboards Current Edition, Including All Revisions.
- L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures Current Edition, Including All Revisions.



- M. UL 869A - Reference Standard for Service Equipment Current Edition, Including All Revisions.
- N. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.
- O. UL 1699 - Arc-Fault Circuit-Interrupters Current Edition, Including All Revisions.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

##### A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### 1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor

terminal information, and installed features and accessories.

1. Include documentation of listed series ratings as indicated in Section 26 0573.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Panelboard Keys: Two of each different key.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. ABB/GE: [www.geindustrial.com](http://www.geindustrial.com)

B. Eaton Corporation: [www.eaton.com](http://www.eaton.com)

C. Schneider Electric; Square D Products: [www.schneider-electric.us](http://www.schneider-electric.us)

D. Siemens Industry, Inc: [www.usa.siemens.com](http://www.usa.siemens.com)

E. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

### 2.02 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

1. Altitude: Less than 6,600 feet.
2. Ambient Temperature:
  - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
  - b. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.
- C. Short Circuit Current Rating:
  1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
  1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
  1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
    - a. Indoor Clean, Dry Locations: Type 1.

- b. Outdoor Locations: Type 3R.
- 2. Boxes: Galvanized steel unless otherwise indicated.
  - a. Provide wiring gutters sized to accommodate the conductors to be installed.
  - b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
- 3. Fronts:
  - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
  - b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
- 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- K. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 4300, list and label panelboards as a complete assembly including surge protective device.
  - 1. Provide Surge Protective Devices internally mounted within all panels which are specified as part of the Emergency distribution power system.
- L. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.
- M. Load centers are not acceptable.

## 2.03 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
  - 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
  - 1. Phase and Neutral Bus Material: Aluminum.
  - 2. Ground Bus Material: Aluminum.
- D. Circuit Breakers:
  - 1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
- E. Enclosures:
  - 1. Provide surface-mounted enclosures unless otherwise indicated.
  - 2. Fronts: Provide trims to cover access to load terminals, wiring gutters, and other live parts, with exposed access to overcurrent protective device handles.
  - 3. Provide clear plastic circuit directory holder mounted on inside of door.

#### 2.04 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:

1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
2. Main and Neutral Lug Type: Mechanical.

C. Bussing:

1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
2. Phase and Neutral Bus Material: Aluminum.
3. Ground Bus Material: Aluminum.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:

1. Provide surface-mounted or flush-mounted enclosures as indicated.
2. Provide clear plastic circuit directory holder mounted on inside of door.

2.05 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:

1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
  - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated.
  - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short

circuit current rating indicated.

3. Conductor Terminations:
  - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Provide the following circuit breaker types where indicated:
  - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
  - b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.
  - c. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
  - d. 100 Percent Rated Circuit Breakers: Listed for application within the panelboard where installed at 100 percent of the continuous current rating.
7. Do not use tandem circuit breakers.
8. Do not use handle ties in lieu of multi-pole circuit breakers.
9. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
10. Provide the following features and accessories where indicated or where required to complete installation:

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 26 0529.
- F. Install panelboards plumb.
- G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.
- H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into



accessible space above ceiling and below floor.

J. Provide grounding and bonding in accordance with Section 26 0526.

K. Install all field-installed branch devices, components, and accessories.

L. Provide filler plates to cover unused spaces in panelboards.

M. Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads where indicated. Also provide for the following:

1. Fire detection and alarm circuits.

2. Intrusion detection and access control system circuits.

3. Video surveillance system circuits.

### 3.03 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Fusible Switches: Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than [\_\_\_\_\_] amperes. Tests listed as optional are not required.

D. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.

E. Test GFCI circuit breakers to verify proper operation.

F. Test AFCI circuit breakers to verify proper operation.

G. Correct deficiencies and replace damaged or defective panelboards or associated components.

### 3.04 ADJUSTING

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- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.
- C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 26 2416

SECTION 26 2726 - WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Wall plates.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, and repairs.
- C. Section 26 0005 - Basic Electrical Requirements.
- D. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- E. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- F. Section 26 0533.16 - Boxes for Electrical Systems.
- G. Section 26 0533.23 - Surface Raceways for Electrical Systems: Surface raceway systems, including multioutlet assemblies.
- H. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- I. Section 26 0583 - Wiring Connections: Cords and plugs for equipment.
- J. Section 26 0953 - Distributed Digital Lighting Controls

1.03 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for 2014h, with Amendments (2017).
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification) 2014g, with Amendment (2017).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices 1999 (Reaffirmed 2020).
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications 2016.
- G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 20 - General-Use Snap Switches Current Edition, Including All Revisions.
- I. UL 498 - Attachment Plugs and Receptacles Current Edition, Including All Revisions.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.
- L. UL 1310 - Class 2 Power Units Current Edition, Including All Revisions.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

##### A. Coordination:

- 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other

sections or by others.

2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
5. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
6. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

B. Sequencing:

1. Do not install wiring devices until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.

- D. Provide tamper resistant receptacles for receptacles installed in areas listed below:
  - 1. All 15 and 20-ampere 125 and 250-volt nonlocking type receptacles in the areas listed below shall be listed tamper-resistant receptacles, unless otherwise excluded in NEC.
    - a. Dwelling units in all areas specified in NEC 210.52 and 550.13.
    - b. Business offices, corridors, waiting rooms and the like in clinics, medical and dental offices and outpatient facilities.
- E. Provide GFCI protection for receptacles installed within 6 feet of sinks.
- F. Provide GFCI protection for receptacles installed in kitchens.
- G. Provide GFCI protection for receptacles serving electric drinking fountains.
  - 1. Outlet shall be readily accessible.
- H. Provide GFCI protection for outlets serving vending machines. Outlets shall be readily accessible.

## 2.02 WIRING DEVICE FINISHES

- A. Provide wiring device finishes as described below unless otherwise indicated.
- B. Wiring Devices, Unless Otherwise Indicated: White with gray stainless steel wall plate.
- C. Wiring Devices Connected to Emergency Power: Red with stainless steel wall plate factory engraved "Emergency".

## 2.03 WALL SWITCHES

- A. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy

contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

## 2.04 RECEPTACLES

### A. Manufacturers:

1. Hubbell Incorporated: [www.hubbell.com](http://www.hubbell.com)
2. Leviton Manufacturing Company, Inc: [www.leviton.com](http://www.leviton.com)
3. Lutron Electronics Company, Inc; Designer Style:  
[www.lutron.com](http://www.lutron.com)
4. Pass & Seymour, a brand of Legrand North America, Inc:  
[www.legrand.us](http://www.legrand.us)

### B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

### C. Convenience Receptacles:

1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
2. Tamper Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; single or duplex as indicated on the drawings.

3. Tamper Resistant and Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type and as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.

D. GFCI Receptacles:

1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
  - a. Provide test and reset buttons of same color as device.
2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.
4. Tamper Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as tamper resistant type.

E. USB Charging Devices:

1. USB Charging Devices - General Requirements: Listed as complying with UL 1310.
  - a. Charging Capacity - Two-Port Devices: 2.1 A, minimum.
2. USB Charging/Tamper Resistant Receptacle Combination Devices: Two-port (Type A) USB charging device and



receptacle, commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; rectangular decorator style.

## 2.05 WALL PLATES

### A. Manufacturers:

1. Hubbell Incorporated: [www.hubbell-wiring.com](http://www.hubbell-wiring.com)
2. Leviton Manufacturing Company, Inc: [www.leviton.com](http://www.leviton.com)
3. Lutron Electronics Company, Inc: [www.lutron.com](http://www.lutron.com)
4. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us](http://www.legrand.us)
5. Source Limitations: Where wall controls are furnished as part of lighting control system, provide accessory matching receptacles and wallplates by the same manufacturer in locations indicated.

### B. Wall Plates: Comply with UL 514D.

1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
2. Size: Standard.
3. Screws: Metal with slotted heads finished to match wall plate finish.

### C. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.

### D. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.

### E. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and

identified as extra-duty type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.

1. Mounting Heights: Unless otherwise indicated, as follows:
  - a. Wall Switches: 48 inches above finished floor.
  - b. Receptacles: 18 inches above finished floor or 6 inches above counter.
2. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
3. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

- I. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- J. Install wall switches with OFF position down.
- K. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- L. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- N. Identify wiring devices in accordance with Section 26 0553.

### 3.04 FIELD QUALITY CONTROL

- A. Inspect each wiring device for damage and defects.
- B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- C. Test each receptacle to verify operation and proper polarity.
- D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- E. Correct wiring deficiencies and replace damaged or defective wiring devices.

END OF SECTION 26 2726

SECTION 26 2816.16 - ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Enclosed safety switches.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Section 26 0005 - Basic Electrical Requirements.
- C. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- D. Section 26 0529 - Hangers and Supports for Electrical Systems.
- E. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 0573 - Power System Studies: Additional criteria for the selection of equipment and associated protective devices specified in this section.
- G. Section 26 2813 - Fuses.
- H. Section 26 3600 - Transfer Switches: Automatic and non-automatic switches listed for use as transfer switch equipment.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum) 2013.

- D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.
- E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- H. UL 98 - Enclosed and Dead-Front Switches Current Edition, Including All Revisions.
- I. UL 869A - Reference Standard for Service Equipment Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. ABB/GE: [www.geindustrial.com](http://www.geindustrial.com)
- B. Eaton Corporation: [www.eaton.com](http://www.eaton.com)
- C. Schneider Electric; Square D Products: [www.schneider-electric.us](http://www.schneider-electric.us)
- D. Siemens Industry, Inc: [www.usa.siemens.com](http://www.usa.siemens.com)

2.02 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
  - 1. Altitude: Less than 6,600 feet.
  - 2. Ambient Temperature: Between -22 degrees F and 104 degrees F.
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
  - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- G. Enclosed Safety Switches Used for Service Entrance:
  - Listed and labeled as suitable for use as service equipment according to UL 869A.

- H. Provide with switch blade contact position that is visible when the cover is open.
- I. Conductor Terminations: Suitable for use with the conductors to be installed.
- J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- K. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
  - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
    - a. Indoor Clean, Dry Locations: Type 1.
    - b. Outdoor Locations: Type 3R.
- L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- M. Heavy Duty Switches:
  - 1. Comply with NEMA KS 1.
  - 2. Conductor Terminations:
    - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  - 3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.
    - a. Provide means for locking handle in the ON position where indicated.

PART 3 EXECUTION

3.01 INSTALLATION



- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 26 0526.
- H. Identify enclosed switches in accordance with Section 26 0553.

3.02 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

END OF SECTION 26 2816.16

SECTION 26 5100 - INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Ballasts and drivers.
- D. LED emergency power supply units.
- E. Emergency Lighting Control Units (Transfer Switches)
- F. Accessories.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, repairs.
- C. Section 26 0005 - Basic Electrical Requirements.
- D. Section 26 0533.13 - Conduit for Electrical Systems.
- E. Section 26 0529 - Hangers and Supports for Electrical Systems.
- F. Section 26 0533.16 - Boxes for Electrical Systems.
- G. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- H. Section 26 0935 - Distributed Digital Lighting Control System: Devices for automatic control of lighting, including occupancy sensors, daylighting controls, networked control stations and motion sensors.
- I. Section 26 2726 - Wiring Devices: Manual wall switches and wall dimmers.

J. Section 26 5600 - Exterior Lighting.

1.03 REFERENCE STANDARDS

- A. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code) 2013 (Corrigendum 2019).
- B. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits 2002 (Corrigendum 2012).
- C. IES LM-63 - Approved Method: IES Standard File Format for the Electronic Transfer of Photometric Data and Related Information 2019.
- D. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products 2019.
- E. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources 2021.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- G. NECA/IESNA 500 - Standard for Installing Indoor Lighting Systems 2006.
- H. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems 1999 (Reaffirmed 2006).
- I. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts 2020.
- J. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility 2012 (Reaffirmed 2018).
- K. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable

Amendments and Supplements.

- M. UL 924 - Emergency Lighting and Power Equipment Current Edition, Including All Revisions.
- N. UL 1598 - Luminaires Current Edition, Including All Revisions.
- O. UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits Current Edition, Including All Revisions.
- P. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products Current Edition, Including All Revisions.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

##### A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

#### 1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:

a. Include estimated useful life, calculated based on IES LM-80 test data.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70 and NFPA 101.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70 and NFPA 101.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s), light engines, drivers and all sockets, ballasts, reflectors, lenses, housings and other

components required to position, energize and protect the lamp and distribute the light.

- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- G. Recessed Luminaires:
  - 1. Ceiling Compatibility: Comply with NEMA LE 4.
  - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
  - 3. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.
  - 4. Air-Handling Recessed Fluorescent Luminaires: Suitable for air supply/return, heat removal, or combination as indicated.
- H. LED Luminaires:
  - 1. Components: UL 8750 recognized or listed as applicable.
  - 2. Tested in accordance with IES LM-79 and IES LM-80.
  - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

## 2.03 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
  - 1. Sealed maintenance-free lead calcium unless otherwise indicated.
  - 2. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

#### 2.04 BALLASTS AND DRIVERS

- A. Ballasts/Drivers - General Requirements:
  - 1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
  - 2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
  - 3. Electronic Ballasts/Drivers: Inrush currents not exceeding peak currents specified in NEMA 410.
- B. Dimmable LED Drivers:
  - 1. Dimming Range: Continuous dimming from 100 percent to 10 percent relative light output unless dimming capability to lower level is indicated, without flicker.

2. Control Compatibility: Fully compatible with the dimming controls to be installed.

C. Dimmable LED Drivers: Comply with Section 26 0935 - Distributed Digital Lighting Control System.

## 2.05 LED EMERGENCY POWER SUPPLY UNITS

### A. Manufacturers:

1. Iota Engineering, LLC: [www.iotaengineering.com/#sle](http://www.iotaengineering.com/#sle).
2. Lithonia Lighting: [www.lithonia.com/#sle](http://www.lithonia.com/#sle).
3. Philips Emergency Lighting/Bodine: [www.bodine.com/#sle](http://www.bodine.com/#sle).
4. Manufacturer Limitations: Where possible, for each type of luminaire provide emergency power supply units produced by a single manufacturer.
5. Where a specific manufacturer or model is indicated elsewhere in the luminaire schedule or on the drawings, substitutions are not permitted unless explicitly indicated.

B. Description: Self-contained emergency power supply units suitable for use with indicated luminaires, complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

C. Operation: Upon interruption of normal power source, solid-state control automatically switches connected lamp(s) to the emergency power supply for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

D. Battery: Sealed maintenance-free high-temperature nickel cadmium unless otherwise indicated.

E. Diagnostics: Provide accessible and visible multi-chromatic combination test switch/indicator light to display charge, test, and diagnostic status and to manually activate emergency operation.



- F. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status and field selectable audible alert.

2.06 EMERGENCY LIGHTING CONTROL DEVICES (TRANSFER DEVICES)

A. Manufacturers:

- 1. Philips Emergency Lighting Bodine:  
[www.philips.com/bodine](http://www.philips.com/bodine)
- 2. Iota Engineering: [www.iotaengineering.com](http://www.iotaengineering.com)
- 3. Engineer pre-approved equal

B. General Requirements:

- 1. The emergency lighting control device shall work in conjunction with an auxiliary generator or a central inverter system to power light fixtures for egress lighting regardless of fixture wall switch position.
- 2. All units shall be UL924 listed and approved.

C. Operation:

- 1. Device shall sense loss of normal power and switch the AC driver input power connected to an unswitched generator (or central inverter) supplied lighting circuit.
- 2. The device shall be capable of bypassing the wall switch when the auxiliary generator (or central inverter) powers.
- 3. Unit shall be capable of 120/277 volt operation.

D. Equipment:

- 1. Emergency Lighting Control Device - 3 Amp
  - a. For use within a single luminaire. Device shall be suitable for indoor and damp locations and capable

of being used with fluorescent or LED lighting loads. Device shall be UL listed for installation inside, on top of or remote from the fixture. Shall include power loss sensing, UL924 listed and approved.

2. Emergency Lighting Control Device - 20 Amp

a. For use adjacent to local switching means. Device shall be suitable for indoor and damp locations and capable of being used with incandescent, fluorescent and LED lighting loads. Shall include power loss sensing, UL 924 listed and approved.

3. Branch Circuit Emergency Lighting Transfer Switch

a. Mounted onto junction box type, verify with field conditions. Device shall be suitable for indoor, damp and plenum (UL 2043) locations and capable of being used with incandescent, fluorescent and LED lighting loads. Shall include power loss sensing, UL 924 listed and approved.

2.07 MICRO AND MINI INVERTERS

A. Manufacturers:

1. Philips Emergency Lighting Bodine:  
[www.philips.com/bodine](http://www.philips.com/bodine)

2. Iota Engineering: [www.iotaengineering.com](http://www.iotaengineering.com)

3. Engineer pre-approved equal.

B. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

C. Operation: Upon interruption of normal power source, solid-state control automatically switches connected lamp(s) to the emergency power supply for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

D. Battery:

1. Hightemperature rechargable, replaceable nickel-cadmium.
2. Battery shall be sized to supply all connected lamps where indicated.

E. Diagnostics: Unit shall include test switch and charge indicator light.

F. Unit shall be sine wave output capable with dual voltage input and output capabilities.

G. Provide with low-voltage battery disconnect.

H. Installation locations shall be coordinated with selected manufacturer's requirements and said manufacturer's distance limitations.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- B. Verify that suitable support frames are installed where required.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.
- B. Install products in accordance with manufacturer's instructions.

- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Suspended Ceiling Mounted Luminaires:
  - 1. Do not use ceiling tiles to bear weight of luminaires.
  - 2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
  - 3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
  - 4. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
  - 5. See appropriate Division 09 section where suspended grid ceiling is specified for additional requirements.
- G. Recessed Luminaires:
  - 1. Install trims tight to mounting surface with no visible light leakage.
  - 2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
  - 3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.
- H. Suspended Luminaires:

1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
  2. Install canopies tight to mounting surface.
- I. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
- J. Install accessories furnished with each luminaire.
- K. Bond products and metal accessories to branch circuit equipment grounding conductor.
- L. Emergency Lighting Units:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- M. Exit Signs:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- N. LED Emergency Power Supply Units:
1. For field-installed units, install inside luminaire unless otherwise indicated. Where installation inside luminaire is not possible, install on top of luminaire.
- O. Identify luminaires connected to emergency power system in accordance with Section 26 0553.
- P. Install lamps in each luminaire.
- 3.03 FIELD QUALITY CONTROL
- A. Inspect each product for damage and defects.

MACOMB COUNTY JAIL

VARIOUS PROJECTS

PROPOSAL A, B, C

221958

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B. Operate each luminaire after installation and connection to verify proper operation.

C. Test self-powered exit signs, emergency lighting units, and emergency power supply units to verify proper operation upon loss of normal power supply.

END OF SECTION 26 5100

**SPECS**  
**FOR**  
**PROPOSAL B**

MACOMB COUNTY JAIL

**PROPOSAL B**

MEZZANINE BARRIER

MESH/SCREEN

221958

AUGUST 26, 2022

SECTION 01100 - ALTERNATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. This section identifies each Alternate by number, and describes the basic changes to be incorporated into the work, only when the Alternate is made a part of the work by specific provisions in the Owner-Construction Manager Agreement.
- B. Alternate schedule below is part of the Bidding Documents and will be considered in selection of Contractors and awarding contracts.
- C. Unless otherwise provided, Owner will accept or reject alternates within thirty (30) days of date of contract. Owner reserves the right to reject any or all alternates.

1.03 ALTERNATES:

A. General:

- 1. The descriptions for each alternate listed in the schedule are primarily scope definitions, and do not necessarily detail the full range of materials and processes needed to complete the work as required.
- 2. Refer to applicable specification sections (Division 2 through 26), and to applicable drawings, for specific requirements of the work, regardless of whether references are so noted in description of each alternative.
- 3. Coordinate pertinent related work and modify surrounding work as required to properly integrate the work under each Alternate, and to provide the complete construction required by Contract Documents.
- 4. Referenced sections of specifications stipulate pertinent requirements for products and methods to achieve the work stipulated under each Alternate.



B. Schedule:

1. **Alternate No. 1:** Provide camera relocation and procurement and installation of new cameras with associated material and equipment. Contractor shall use Motor City Electric Technologies (to maintain warranty) as the sub-contractor for this work.

Alternate shall consist of the following:

- a. Existing camera relocation (In Tower Dayrooms associated with barrier mesh)
  - Relocate thirty (30) existing cameras to a new location within 5ft of the current location.
  - Add Category 6 Network Jacks and Patch cords where required.
  - Add additional electrical boxes and conduit raceway to each location.
  - Test and check of the existing cameras.
- b. Additional camera installation (In Tower Dayrooms associated with barrier mesh)
  - Furnish and install thirty (30) additional Pelco 1MP Dome Style Cameras for additional coverage.
  - Furnish and install one (1) Category 6 Network Cable to each additional camera utilizing the existing low voltage conduit raceway system.
  - Furnish and install additional conduit raceway as required to each new camera from the existing conduit raceway system.
  - Test and check of each network cable.
  - Programming of each camera into new server.
- c. Additional Storage Server installation (Tower Floors 2, 6 or 10 IDF Rooms)
  - Furnish and install one (1) Pelco VX Enterprise 216TB Storage Server.
  - Furnish and install one hundred (100) Pelco VX Enterprise 3-Year SUP Licenses.
  - Programming and Commissioning of the new server in the storage cluster.
  - Test and Check of the System.

END OF SECTION 01100

**PROPOSAL B**

SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section requires the selective removal and subsequent offsite disposal of the following:

- 1. Removal of existing guardrails at all the existing mezzanine levels and alteration of the stairs guardrail/handrail in cell blocks A, B, C, D, E and F on second to the eleventh floor as shown on the drawings.

- B. Related work specified elsewhere:

- 1. Remodeling construction work and patching are included within the respective sections of specifications, including removal of materials for reuse and incorporation into remodeling or new construction.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.
- C. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work.

**PROPOSAL B**

1.4 JOB CONDITIONS

- A. Occupancy: Owner will occupy portions of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities that will affect Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
  - 1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
  - 1. Storage or sale of removed items on site will not be permitted.
- D. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel and inmates from injury due to selective demolition work.
  - 1. Provide protective measures as required to provide free and safe passage of Owner's personnel, inmates to occupied portions of building.
  - 2. Protect from damage existing finishes that is to remain in place and becomes exposed during demolition operations.
  - 3. Protect floors with suitable coverings when necessary.
  - 4. Construct temporary insulated dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.

**PROPOSAL B**

5. Protect existing cameras and conduit at all times during construction associated with barrier mesh system.
6. Remove protections at completion of work.
- E. Damages: Promptly repair damages caused to adjacent facilities by demolition work.
- F. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
  1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- G. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
- H. Utility Services: Maintain all existing utilities in service and protect them against damage during demolition operations.
  1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
  2. Maintain fire protection services during selective demolition operations.
- I. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.
  1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

**PROPOSAL B**

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Cover and protect furniture, equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.
  - 1. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to personnel or inmate occupied portions of the building.
    - a. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct fire-rated dust-proof partitions of minimum 4-inch studs, 5/8-inch drywall (joints taped) on occupied side, 1/2-inch fire-retardant plywood on demolition side. Fill partition cavity with sound-deadening insulation.
- B. Provide air scrubbers during construction operations.

3.2 DEMOLITION

- A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
  - 1. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
- B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

**PROPOSAL B**

3.3 SALVAGED MATERIALS

- A. Salvaged Items: Where indicated on Drawings as "Salvage - Deliver to Owner," carefully remove indicated items, clean, store, and turn over to Owner and obtain receipt.
  - 1. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance, remain property of Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.
  - 1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
  - 2. Burning of removed materials is not permitted on project site.

3.5 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
  - 1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02070

**PROPOSAL B**

**SECTION 03730 - CONCRETE REHABILITATION**

**PART 1. GENERAL**

**1.01 SUMMARY**

- A. This specification describes the patching or overlay of overhead, vertical and horizontal surfaces with a polymer-modified, portland cement mortar/cement.

**1.02 QUALITY ASSURANCE**

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of (5) five years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

**1.03 DELIVERY, STORAGE AND HANDLING**

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

**PROPOSAL B**

**1.04 JOB CONDITIONS**

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 45°F (7°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified coating.

**1.05 SUBMITTALS**

- A. Submit a PDF copy of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS).

**1.06 WARRANTY**

- A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

**PART 2. PRODUCTS**

**2.01 MANUFACTURER**

- A. SikaTop 111 Plus, as manufactured by Sika Corporation, is considered to conform to the requirements of this specification.

**2.02 MATERIALS**

- A. Polymer-modified portland cement mortar:
  - 1. Component A shall be a liquid polymer emulsion of an acrylic copolymer base and additives.
    - a. pH: 4.5-6.5
    - b. Film Forming Temperature: 73°F max.
    - c. Tear Strength: 950-psi min.
    - d. Elongation at Break: 500% min.
    - e. Particle Size: less than 0.1 micron
  - 2. Component A shall contain an organic, penetrating corrosion inhibitor which has been independently proven to reduce corrosion via ASTM G3 (half-cell potential tests). The corrosion inhibitor shall not be calcium nitrite, and shall have a minimum of 5 years of independent field testing to document performance on actual construction projects.



**PROPOSAL B**

3. Component B shall be a blend of selected portland cements, specially graded aggregates, admixtures for controlling setting time, water reducers for workability, and an organic accelerator.
  4. The materials shall be non-combustible, both before and after cure.
  5. The materials shall be supplied in a factory-proportioned unit.
  6. The polymer-modified, portland cement mortar must be placeable from ½-in. to 1-in. in depth per lift for horizontal applications.
- B. To prepare a polymer-modified portland cement concrete: aggregate shall conform to ASTM C-33, The factory-proportioned unit shall be extended with 42-lb. max. of a 3/8 in. (No. 8 distribution per ASTM C-33, Table II) clean, well-graded, saturated surface dry aggregate, having low absorption and high density. Aggregate must be approved for use by the engineer.

**2.03 PERFORMANCE CRITERIA**

- A. Typical Properties of the mixed polymer-modified, portland cement mortar:
1. Working Time: Approximately 30 minutes.
  2. Finishing Time: 50-120 minutes
  3. Color: Concrete gray
- B. Typical Properties of the cured polymer-modified, portland cement mortar:
1. Compressive Strength (ASTM C-109 Modified)
    - a. 1 day: 2500 psi min. (17.2 MPa)
    - b. 7 day: 5500 psi (37.9 MPa)
    - c. 28 day: 7000 psi (48.3 MPa)
  2. Flexural Strength (ASTM C-293) @ 28 days: 1500 psi (10.3 MPa)
  3. Splitting Tensile Strength (ASTM C-496) @28 days 700 psi (4.8 MPa)
  4. Bond Strength (ASTM C-882 Modified) @ 28 days: 2500 psi (17.2 MPa)
  5. The portland cement mortar shall not produce a vapor barrier.

**PROPOSAL B**

6. Density (wet mix): 136 lbs./cu. ft. (2.18 kg/l)
7. Permeability (AASHTO T-277 @ 28 days approximately 500 Coulombs)

Note: Tests above were performed with material and curing conditions at 71°F - 75°F and 45-55% relative humidity.

**PART 3 - EXECUTION**

**3.01 SURFACE PREPARATION**

- A. Areas to be repaired must be clean, sound, and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Mechanically prepare the concrete substrate to obtain a surface profile of +/- 1/16" (CSP 5 or greater as per ICRI Guidelines) with a new exposed aggregate surface. Area to be patched shall not be less than ½" in depth.
- B. Where reinforcing steel with active corrosion is encountered, sandblast the steel to a white metal finish to remove all contaminants and rust. Where corrosion has occurred due to the presence of chlorides, the steel shall be high pressure washed after mechanical cleaning. Prime steel with 2 coats of Sika Armatec 110 EpoCem as directed by manufacturer. (See Spec Component SC-201-0699).

**3.02 MIXING AND APPLICATION**

- A. Mechanically mix in appropriate sized mortar mixer or with a Sika jiffy paddle and low-speed (400-600 rpm) drill. Pour approximately 4/5 gal Component A into the mixing container. Add Component B while continuing to mix. Mix to a uniform consistency for a maximum of 3 minutes. Add remaining Component A to mix if a more loose consistency is desired. Should smaller quantities be needed, be sure the components are measured in the correct ratio and that the Component B is uniformly blended before mixing the components together. Mix only that amount of material that can be placed in 30 minutes. Do not retemper material.
- B. Mixing of the polymer-modified portland cement concrete: Pour all (1-gal) of Component A into the mixing container. Add Component B while continuing to mix. Add correct amount of the pre-approved coarse aggregate, and continue mixing to a uniform consistency. Mixing time should be 3 minutes maximum.

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- C. Placement Procedure: At the time of application, the substrate should be saturated surface dry with no standing water. Mortar and/or concrete must be scrubbed into substrate filling all pores and voids. While the scrub coat is still wet, force material against edge of repair, working toward center. If repair area is too large to fill while scrub coat is still wet use Sika Armatec 110 EpoCem in lieu of scrub coat (See Spec Component SC-200). After filling, consolidate, then screed. Allow mortar or concrete to set to desired stiffness, then finish with trowel, manual or power, for smooth surface. Broom or burlap for rough surface. Areas where the depth of the repair is less than 1-inch shall be repaired with polymer-modified portland cement mortar. In areas where the depth of the repair is greater than 1 inch, the repair shall be made with polymer-modified portland cement concrete.
- D. As per ACI recommendations for portland cement concrete, curing is required. Moist cure with wet burlap and polyethylene, a fine mist of water or a water-based\* compatible curing compound. Moist curing should commence immediately after finishing and continue for 48 hours. Protect newly applied material from rain, sun and wind until compressive strength is 70% of the 28-day compressive strength. To prevent from freezing cover with insulating material. Setting time is dependent on temperature and humidity.
- Note: Pretesting of curing compound is recommended.
- E. Adhere to all procedures, limitations and cautions for the polymer-modified portland cement mortar in the manufacturer's current printed technical data sheet and literature.

**3.03 CLEANING**

- A. The uncured polymer-modified portland cement mortar can be cleaned from tools with water. The cured polymer-modified portland cement mortar can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

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SECTION 05120 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes structural steel.

1.02 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.03 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.
  - 1. Select and complete connections using schematic details indicated in AISC 360.
  - 2. Design incorporates Allowable Stress Design (ASD); data is given at service-load level.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
- C. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

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1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and Fabricator.
- B. Welding certificates.
- C. Mill test reports for structural steel, including chemical and physical properties.
- D. Source quality-control reports.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or have an equivalent quality assurance program as certified by a qualified independent testing agency.
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE, or have an equivalent quality assurance program as certified by a qualified independent testing agency.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Comply with applicable provisions of the following specifications and documents:
  - 1. AISC 303.
  - 2. AISC 360.
- E. Preinstallation Conference: Conduct conference at Project site.

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PART 2 - PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Channels, Angles, Miscellaneous Shapes: ASTM A 36.
- C. Plate and Bar: ASTM A 36.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53, Type E or S, Grade B.
- F. Welding Electrodes: Comply with AWS requirements.

2.02 PRIMER

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.03 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

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2.04 SHOP CONNECTIONS

- A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.07 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
  - 2. Surfaces to be field welded.
  - 3. Surfaces to be high-strength bolted with slip-critical connections.
  - 4. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  - 1. SSPC-SP 3, "Power Tool Cleaning."
  - 2. SSPC-SP6, "Commercial Blast Cleaning" for galvanized surfaces.
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.08 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.

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2.09 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage an independent testing and inspecting agency in conjunction with Spec Section 01400 "Quality Control" to perform shop tests and inspections and prepare test reports.
  - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
  - 1. Liquid Penetrant Inspection: ASTM E 165.
  - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
  - 3. Ultrasonic Inspection: ASTM E 164.
  - 4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.



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3.02 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.03 FIELD CONNECTIONS

- A. Weld Connections: Comply with AWS D1.1 and AWS D1.8/ for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency in conjunction with Spec Section 01400 "Quality Control" (Special Inspector, refer to Structural drawings for additional information) to inspect field welds, and, high-strength bolted connections.
- B. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
  - 1. In addition to visual inspection, full penetration field welds will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

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- c. Ultrasonic Inspection: ASTM E 164.
- d. Radiographic Inspection: ASTM E 94.

C. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

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SECTION 09970 - TNEMEC COATING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coating systems for touching up mezzanine existing concrete curbs with decorative chips, previously painted interior steel of the mezzanine stairs (stringers, pans, guardrail/handrail-but not the top of the treads or top riser face).

1.2 REFERENCES

- A. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer and Related Products.
- B. SSPC-SP 2 - Hand Tool Cleaning.
- C. SSPC-SP 3 - Power Tool Cleaning.
- D. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.
- E. SSPC-SP 11 - Power Tool Cleaning to bare metal.
- F. SSPC-SP 13/NACE 6 Surface Preparation of Concrete
- G. ICRI - Concrete Surface Preparation Standards

1.3 DEFINITIONS

- A. Definitions of Painting Terms: ASTM D 16, unless otherwise specified.
- B. Dry Film Thickness (DFT): Thickness of a coat of paint in fully cured state measured in mils (1/1000 inch).
- C. Concrete Surface Standard (CSP): Standard for roughness of the surface profile of the concrete measured 1-9 with 9 being the roughest measured with a visual mold.

1.4 SUBMITTALS

- A. Comply with Section 01340 - "Shop Drawings, Product Data and Samples".

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- B. Product Data: Submit manufacturer's product data for each coating, including generic description, complete technical data, surface preparation and application instructions.
- C. Color Samples: Submit manufacturer's color samples showing full range of standard colors.
- D. Manufacturer's Quality Assurance: Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
- E. Applicator's Quality Assurance: Submit list of a minimum of 5 completed projects of similar size and complexity to this Work. Include for each project:
  - 1. Project name and location.
  - 2. Name of owner.
  - 3. Name of contractor.
  - 4. Name of architect.
  - 5. Name of coating manufacturer.
  - 6. Approximate area of coatings applied.
  - 7. Date of completion.
- F. Warranty: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
  - 1. Specialize in manufacture of coatings with a minimum of 10 years successful experience.
  - 2. Able to demonstrate successful performance on comparable projects.
  - 3. Single Source Responsibility: Coatings and coating application accessories shall be products of a single manufacturer.
- B. Applicator's Qualifications:
  - 1. Experienced in application of specified coatings for a minimum of (5) five years on projects of similar size and complexity to this Work.
  - 2. Applicator's Personnel: Employ persons trained for application of specified coatings.
- C. Preapplication Meeting: Convene a pre-application meeting (2) two weeks before start of application of coating systems. Require attendance of parties directly affecting work of this section, including Contractor, Architect, applicator and manufacturer's representative. Review the following:

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1. Environmental requirements.
2. Protection of surfaces not scheduled to be coated.
3. Surface preparation.
4. Application.
5. Repair.
6. Field quality control.
7. Cleaning.
8. Protection of coating systems.
9. One-year inspection.
10. Coordination with other work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
  1. Coating or material name.
  2. Manufacturer.
  3. Color name and number.
  4. Batch or lot number.
  5. Date of manufacture.
  6. Mixing and thinning instructions.
- B. Storage:
  1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.
  2. Keep containers sealed until ready for use.
  3. Do not use materials beyond manufacturer's shelf life limits.
- C. Handling: Protect materials during handling and application to prevent damage or contamination.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Weather:
  1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.
  2. Surface Temperature: Minimum of 5 degrees F (3 degrees C) above dew point.
  3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.
  4. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog or mist.
  5. Wind: Do not spray coatings if wind velocity is above manufacturer's limit.

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B. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with manufacturer's instructions.

C. Dust and Contaminants:

1. Schedule coating work to avoid excessive dust and airborne contaminants.
2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Tnemec Company Incorporated, 6800 Corporate Drive, Kansas City, Missouri 64120-1372. Toll Free (800) 863-6321. Phone (816) 483-3400. Fax (816) 483-3969. Web Site [www.tnemec.com](http://www.tnemec.com).

2.2 COATING SYSTEMS FOR EXISTING CONCRETE FLOORS (DECORATIVE CHIP)

A. Chemical Exposure, Physical Abuse:

1. System Type: Modified polyamine epoxy.
2. Surface Preparation: SSPC-SP 13/ICRI-CSP 3-5.
3. Prime Coat: Tnemec Series 281 tne-me-glaze at 8.0 to 10.0 mils DFT with complete broadcast to refusal of Tnemec Series 224C decorative flake.
4. Intermediate Coat: Tnemec Series 284 deco-clear at 8.0 to 10.0 mils DFT.
5. Finish Coat: Tnemec Series 284 deco-clear at 8.0 to 10.0 mils DFT.
6. Color: Tnemec 507
  - a. 1C 224-0507 Deco-Fleck
  - b. 2C 284-0000 Deco-Clear

2.3 PREVIOUSLY PAINTED INTERIOR STEEL OF THE MEZZANINE STAIRS (STRINGERS, PANS, GUARDRAIL/HANDRAIL - BUT NOT THE TOP OF TREADS OR TOP RISER FACE)

A. Chemical Exposure, Physical Abuse:

1. System Type: Modified aromatic polyurethane/waterborne epoxy-amine adduct/ceramic modified waterborne aliphatic polyurethane.
2. Surface Preparation: SSPC-SP 2/3 hand/power tool cleaning.
3. Prime Coat: Tnemec Series 1 omnithane at 2.5 to 3.5 mils DFT.

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4. Intermediate Coat: Tnemec Series 287 enviro-pox at 2.0 to 3.0 mils DFT.
5. Finish Coat: Tnemec Series 297 enviro-pox at 2.0 to 3.0 mils DFT.
6. Color: Tnemec Light Gray 5297 32GRA Enviro-Glaze.

2.4 ACCESSORIES

A. Coating Application Accessories:

1. Accessories required for application of specified coatings in accordance with manufacturer's instructions, including thinners.
2. Products of coating manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which coating systems are to be applied. Notify the General Contractor in writing of areas or conditions not acceptable. Do not begin surface preparation or application until unacceptable areas or conditions have been corrected.

3.2 PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED

- A. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
- B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

3.3 SURFACE PREPARATION OF STEEL

- A. Prepare steel surfaces in accordance with manufacturer's instructions.
- B. Fabrication Defects:
1. Correct steel and fabrication defects revealed by surface preparation.
  2. Remove weld spatter and slag.
  3. Round sharp edges and corners of welds to a smooth contour.
  4. Smooth weld undercuts and recesses.
  5. Grind down porous welds to pinhole-free metal.
  6. Remove weld flux from surface.

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- C. Ensure surfaces are dry.
- D. Interior Steel Surfaces, Moderate to Severe Exposure: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter in accordance with SSPC-SP6.
- E. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.
- F. Primer: Prepare field primer to receive field coat in accordance with manufacturer's instructions.

3.4 SURFACE PREPARATION OF CONCRETE

- A. Prepare concrete surfaces in accordance with manufacturer's instructions.
- B. Defects
  1. Remove spalled or deteriorated areas.
  2. Remediate concrete surfaces per Section 03730 "Concrete Rehabilitation". Let remediated areas cure per manufacturers recommendations.
  3. Remove deteriorated mortar joints in masonry. Tuckpoint and cure per manufacturer's recommendations.
- C. Ensure surfaces are dry.
- D. Remove visible oil, grease, dirt, dust, rust stains, paint, and other foreign matter in accordance with SSPC - SP13/NACE 6 surface preparation of concrete.
- E. Primer: Prepare field primer to receive field coat in accordance with manufacturer's instructions.

3.5 APPLICATION

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions.
- C. Keep containers closed when not in use to avoid contamination.
- D. Do not use mixed coatings beyond pot life limits.



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- E. Use application equipment, tools, pressure settings and techniques in accordance with manufacturer's instructions.
- F. Uniformly apply coatings at spreading rate required to achieve specified DFT.
- G. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.
- H. Stripe paint with brush critical locations on steel such as welds, corners and edges using specified primer.

3.6 REPAIR

- A. Materials and Surfaces Not Scheduled To Be Coated: Repair or replace damaged materials and surfaces not scheduled to be coated.
- B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture or color.
- C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

3.7 FIELD QUALITY CONTROL

- A. Inspector's Services:
  - 1. Verify coatings and other materials are as specified.
  - 2. Verify surface preparation and application are as specified.
  - 3. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges.
  - 4. Coating Defects: Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
    - a. Check for holidays on interior steel immersion surfaces using holiday detector.

**PROPOSAL B**

5. Report:

- a. Submit written reports describing inspections made and actions taken to correct nonconforming work.
- b. Report nonconforming work not corrected.
- c. Submit copies of report to Architect, Owner's Representative and General Contractor.

B. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

3.8 CLEANING

A. Remove temporary coverings and protection of surrounding areas and surfaces.

3.9 PROTECTION OF COATING SYSTEMS

A. Protect surfaces of coating systems from damage during construction.

3.10 ONE-YEAR INSPECTION

A. Owner will set date for one-year inspection of coating systems.

B. Inspection shall be attended by Owner, Contractor, Architect and manufacturer's representative.

C. Repair deficiencies in coating systems as determined by Architect in accordance with manufacturer's instructions.

END OF SECTION 09970

MACOMB COUNTY JAIL

**PROPOSAL B**

MEZZANINE BARRIER

MESH/SCREEN

221958

AUGUST 26, 2022

SECTION 11193 - GALVANNEALED STEEL BARRIER MESH/SCREEN

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK

- A. The barriers shown on the plans and herein specified are the products of Kane Innovations, Erie, Pennsylvania. This manufacturer's name and products have been used to establish the standards of construction and quality of workmanship required for this project. Manufacturers bidding on this project must be actively engaged in the fabrication of specified items for a minimum of (5) five years prior to the bid date. Manufacturers requesting approval to bid their products as equal must submit to the Architect full-size drawings, including details of construction and a complete operating barrier sample, ten (10) days prior to bid date.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 05120 "Structural Steel Framing".

1.04 QUALITY ASSURANCE:

- A. Pre-galvanized steel shall meet low carbon ASTM A641.
- B. Welders shall be currently qualified under AWS B2.1 to perform the type of work required.
- C. All welding requires complete penetration and fusion welds must remove parent materials when tested to failure. Refer to welding standards as defined in AWS D1.3 and RWMA, Resistance Welding Manual.
- D. Security Barrier Mesh/Screen Manufacturers shall have at least 5 years of experience and 3 jobs of equal complexity which have been completed and occupied within the last 5 years. References shall include, but not be limited to, the following:
  - 1. Name and location of project, date of occupancy and Contract value.

**PROPOSAL B**

2. Name, address and telephone number of the Owner's operations supervisor, Owner's maintenance supervisor, Architect, and General Contractor. Specific references regarding manufacturer's ability to coordinate with Security hardware installation are required.
3. Manufacturer shall provide documentation of labeling ability as required on specific assemblies.
4. Manufacturer shall provide documentation of any and all pending litigation as well as an audited financial statement for the most recently completed fiscal year.
5. Manufacturer shall provide actual samples as well as any other information requested by the Architect.

- E. Cut and form joints to hairline measurements. Make all exposed joints smooth and invisible. Grind all exposed welds smooth and flush.

1.05 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's data for fabrication and installation instructions.
- B. Manufacturer shall submit shop drawings, showing details of attachment to surround materials and elevations showing scope of the project.
- C. Samples of materials as may be requested without cost to Owner; frame sections, woven rod panel, fasteners, mullion section, corner section, etc.

1.06 DELIVERY, STORAGE AND HANDLING:

- A. Deliver security barrier mesh cartoned or crated to provide protection during transit and job storage.
- B. Inspect security barrier mesh upon delivery for damage. Minor damages may be repaired provided the finish items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.
- C. Store security barrier mesh and associated frames at the building site under cover. Place units on at least 4" high wood sills or on floors in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber. Provide a ¼" space between stacked frames to promote air circulation.

**PROPOSAL B**

1.07 WARRANTY:

- A. The operation of the barrier supplied by Kane Innovations on the designated project is warranted for one (1) year against any proven defective material or parts, as called for in the specifications and approved shop drawings. this warranty does not cover abuse by others.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Kane Innovations, Erie, PA  
1. (800) 773-2439

2.02 MAIN FRAME

- A. The main frame shall be built-up tubular type, measuring 1-3/4" [44.45] x 2-1/2" [63.5], with fixed concealment plates. The open channel frame members shall be formed of not less than 12-gauge A60 galvanized sheet steel and shall have individual slots along the inner edges to support the woven rod panel. The corners of the main frame shall be notched for self-aligning and robotically welded. Braces, which are similar to the frame, shall be furnished when required.
- B. Concealment plates of 12-gauge A60 galvanized steel shall be welded to the back of the main frame approximately 8" [203.2] on center to complete the tubular shape.
- C. Braces shall be built-up tubular type, measuring 1-1/4" [31.75] x 2-1/2" [63.5], with fixed concealment plates. Braces shall be formed of not less than 12-gauge sheet steel and furnished when required.

2.03 PERIMETER CHANNEL

- A. Perimeter channel shall be a formed channel 1-3/4" [44.45] x 2-1/16" [52.39] x 1-3/4" [44.45] of not less than 12-gauge A60 galvanized sheet steel. Channels provided in stock lengths with factory punched 1/4" [6.35] diameter holes approximately 12" [304.8] on center for attachment to structure.

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2.04 RODS

- A. Woven rod panels shall be fabricated from double crimped, low carbon, ASTM A641, pre galvanized steel 3/8" [9.52] diameter rods, woven with 2" [50.8] open space.

2.05 ROD ATTACHMENT

- A. Woven rod panels shall be installed symmetrically into the slotted main frame. Slots shall be centered according to the rod pattern. Each rod shall penetrate into each slot where it contacts the main frame. Every other rod shall be welded into the slot at both ends where it penetrates the main frame.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Verify that openings fit allowable tolerances are plumb, level, provide a solid anchoring surface and comply with approved shop drawings.

3.02 INSTALLATION:

- A. Install in accordance with approved shop drawings and specifications.
- B. Plumb and align faces in a single plane and erect barriers square and true, adequately anchored to structure.
- C. After completion of installation, barriers shall be adjusted, in working order and clean.

END OF SECTION 11193

**SPECS**  
**FOR**  
**PROPOSAL C**

MACOMB COUNTY JAIL

**PROPOSAL C**

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SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section requires the selective removal and subsequent offsite disposal of the following:
  - 1. Portions of existing building indicated on drawings and as required to accommodate new construction.
  - 2. Removal of doors and frames indicated "remove."
  - 3. Removal and protection of existing hardware, materials, and equipment items indicated "salvage."
- B. Related work specified elsewhere:
  - 1. Remodeling construction work and patching are included within the respective sections of specifications, including removal of materials for reuse and incorporation into remodeling or new construction.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Schedule indicating proposed sequence of operations for selective demolition work to the Sheriff's Department and Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.
- C. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work.



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1.4JOB CONDITIONS

- A. Occupancy: Owner will occupy portions of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of (72) hours advance notice to Owner of demolition activities that will affect Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
  - 1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to the Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
  - 1. Storage or sale of removed items on site will not be permitted.
- D. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel, inmates and general public from injury due to selective demolition work.
  - 1. Provide protective measures as required to provide free and safe passage of Owner's personnel, inmates and general public to occupied portions of building.
  - 2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
  - 3. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
  - 4. Protect floors with suitable coverings when necessary.

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5. Construct temporary insulated one hour fire rated secure dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
  6. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
  7. Remove protections at completion of work.
- E. Damages: Promptly repair damages caused to adjacent facilities by demolition work.
- F. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- G. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
- H. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
  2. Maintain fire protection services during selective demolition operations.

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- I. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.
  1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.
  1. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
  2. Cover and protect furniture, equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.
  3. Erect and maintain secure dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
    - a. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct minimum one-hour secure dust-proof partitions of minimum 4-inch studs, 5/8-inch type 'x' drywall (joints taped) on occupied side, 1/2-inch fire-retardant plywood on demolition side. Fill partition cavity with sound-deadening insulation.
    - b. Provide weatherproof closures for exterior openings resulting from demolition work.

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4. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
  - a. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of (72) hours advance notice to Owner and Sheriff's Department if shutdown of service is necessary during changeover.

3.2 DEMOLITION

- A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
  1. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
  2. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
- B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.3 SALVAGED MATERIALS

- A. Salvaged Items: Where indicated on Drawings as "Salvage - Deliver to Owner," carefully remove indicated items, clean, store, and turn over to Owner and obtain receipt.
  1. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance, remain property of Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

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3.4DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.
  - 1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
  - 2. Burning of removed materials is not permitted on project site.

3.5CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
  - 1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02070

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SECTION 02925 - CLEANUP AND RESTORATION

PART 1 - GENERAL

- A. The Contractor shall restore areas disturbed by construction activities to a condition reasonably close to their condition before the project, unless shown otherwise on the plans. Restoration work should be performed as soon as possible after construction work is completed in a particular area.
- B. Upon the completion of work in an area, all excess materials, debris, equipment, and similar items shall be removed from the project area by the Contractor, and disposed of properly.

PART 2 - MATERIALS

Not Applicable.

PART 3 - EXECUTION

3.01 Restoration

- A. Unless otherwise provided; aggregate surfaces, bituminous pavements, and concrete pavements shall be restored by construction of similar replacement surfaces. Bituminous, concrete and aggregate surfaces shall be replaced with the materials and thicknesses to match existing.
- B. Turf areas shall be restored by re-establishing the turf as described in the specification for turf establishment. All areas disturbed by construction that are not to be surfaced with aggregate or pavement shall be restored with turf, unless otherwise directed.
- C. Mailboxes, fences, signs, ornaments, and similar items shall be replaced at the completion of construction. Posts shall be installed plumb. Items that are lost or stolen shall be repaired or replaced at the Contractor's expense. Repairs or replacements shall meet the Owner's approval.

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3.02 Temporary Restoration of Driving Surfaces

- A. Where a pavement or gravel surface is removed as a result of construction activities, a temporary surface shall be provided and maintained by the Contractor until the permanent surface is provided. Unless otherwise directed, the temporary surface shall be twelve inches of aggregate compacted to at least 95 percent of its maximum density (ASTM D1557) and graded to meet the adjacent, remaining surfaces. Aggregate shall meet the requirements of Series 23A as described in the 2003 Michigan Department of Transportation Specifications.
  
- B. The Contractor shall regrade the temporary surface and add additional aggregate at intervals necessary to maintain them in a relatively smooth condition.

END OF SECTION 02925

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SECTION 03300 - BONDING AGENTS FOR CONCRETE

PART 1. GENERAL

1.01 SUMMARY

- A. This specification describes the use of a bonding bridge between new portland-cement mortar or concrete and hardened portland-cement mortar or concrete.

1.02 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall have in existence a recognized quality assurance program and be ISO 9001 Certified, a program of training, certifying and technically supporting a nationally-organized Approved Contractor Program with a re-certification program of its participants for a minimum of 5 years.
- B. Contractor qualifications: Contractor shall be an Approved Contractor of the manufacturer of the specified product, who has completed a program of instruction in the use of the specified coating material, and provides a certification from the manufacturer attesting to its Approved Contractor status.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer, or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.03 DELIVERY, STORAGE AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.



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1.04 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified coating.

1.05 SUBMITTALS

- A. Submit PDF copy of manufacturer's literature, to include: Product Data Sheet, System Data Sheet, Application Guide, and appropriate Material Safety Data Sheets (MSDS).
- B. Submit copy of Certificate of Approved Contractor status by manufacturer.

1.06 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Sika Armatec 110 EpoCem, as manufactured by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071 is considered to conform to the requirements of this specification.

2.02 MATERIALS

- A. Epoxy resin/portland cement adhesive shall be Sika Armatec 110 EpoCem.
  - 1. Component "A" shall be an epoxy resin/water emulsion containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
  - 2. Component "B" shall be primarily a water solution of a polyamine.
  - 3. Component "C" shall be a blend of selected portland cements and sands.
  - 4. The material shall not contain asbestos.

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2.03 PERFORMANCE CRITERIA

- A. Properties of the mixed epoxy resin/portland cement adhesive.
  - 1. Pot Life: 90 minutes @ 73°F.
  - 2. Contact Time:
    - 95°F (35°C) 6 hours
    - 68°F (20°C) 12 hours
    - 50°F (10°C) 16 hours
    - 40°F (5°C) 24 hours
  - 3. Color: Dark gray
- B. Properties of the cured epoxy resin/portland cement adhesive.
  - 1. Compressive Strength (ASTM C-109)
    - a. 3 day: 4500 psi (31.0 MPa)
    - b. 7 day: 6500 psi (44.8 MPa)
    - c. 28 day: 8500 psi (58.6 MPa)
  - 2. Splitting Tensile Strength (ASTM C-496)
    - a. 28 days: 600 psi (4.1 MPa)
  - 3. Flexural Strength (ASTM C-348)
    - a. 1250 psi (8.6 MPa)
  - 4. Bond Strength ASTM C-882 at 14 days
    - a. Wet on Wet, 0-hr. open time: 2800 psi (19.3 MPa)
    - b. 24-hr. open time: 2600 psi (17.9 MPa)
  - 5. Bond of Steel Reinforcement to Concrete (Pullout Test)
    - a. Sika Armatec 110 coated: 625 psi (4.3 MPa)
    - b. Epoxy coated: 508 psi (3.5 MPa)
    - c. Plain Reinforcement: 573 psi (3.95 MPa)
  - 6. The epoxy resin/portland cement adhesive shall not produce a vapor barrier.
  - 7. Material must be proven to prevent corrosion of reinforcing steel when tested under the procedures as set forth by the Federal Highway Administration Program Report No. FHWA/RD86/193. Proof shall be in the form of an independent testing laboratory corrosion report showing prevention of corrosion of the reinforcing steel.

Note: Tests above were performed with material and curing conditions at 73°F and 45-55% relative humidity.

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PART 3 - EXECUTION

3.01 MIXING AND APPLICATION

- A. Mixing the epoxy resin: Shake contents of Components "A" and Component "B". Completely empty both components into a clean, dry mixing pail. Mix thoroughly for 30 seconds using a jiffy paddle with a low-speed (400-600 rpm) drill. Slowly add the entire contents of Component "C" while continuing to mix for 3 minutes until uniform with no lumps. Mix only that quantity that can be applied within its pot life.
- B. Placement procedure for Bonding bridge:
  - 1. Apply to prepared surface with a stiff-bristle brush, broom or "hopper-type" spray equipment.
    - a. For hand-applied mortars-Place fresh, plastic concrete/mortar while the bonding bridge adhesive is "wet" or within open times indicated in section 2.03.A.2.
    - b. For machine-applied mortars-Apply while the bonding bridge adhesive is "wet" or within the open times indicated in section 2.03.A.2.
- C. Placement procedures for anti-corrosion coating:
  - 1. Apply to prepared steel surface with a stiff-bristle brush, or "hopper type" spray equipment at 20 mils minimum thickness. Properly coat the underside of the totally exposed steel. Allow to dry (approx 2-3 hours) then apply a second coat at 20 mils minimum thickness. Allow drying again before placing repair mortar.

\*During the anti-corrosion coating method, after applying the second coat Sika Armatec 110 EpoCem, a mortar can be applied to "wet" Sika Armatec 110 EpoCem or within open times indicated in section 2.03.A.2 to achieve the benefit of bonding bridge.

- D. Adhere to all limitations and cautions for the epoxy resin/portland cement adhesive in the manufacturer's current printed literature.

3.02 CLEANING

- A. The uncured epoxy resin/portland cement adhesive can be cleaned from tools with water. The cured epoxy resin/portland cement adhesive can only be removed mechanically.

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- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION 03300

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SECTION 03730 - CONCRETE REHABILITATION

PART 1. GENERAL

1.01 SUMMARY

- A. This specification describes the patching or overlay of overhead, vertical and horizontal surfaces with a polymer-modified, portland cement mortar/cement.

1.02 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.03 DELIVERY, STORAGE AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

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1.04 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 45°F (7°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified coating.

1.05 SUBMITTALS

- A. Submit PDF copy of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS).

1.06 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

PART 2. PRODUCTS

2.01 MANUFACTURER

- A. SikaTop 111 Plus, as manufactured by Sika Corporation, is considered to conform to the requirements of this specification.

2.02 MATERIALS

- A. Polymer-modified portland cement mortar:
  - 1. Component A shall be a liquid polymer emulsion of an acrylic copolymer base and additives.
    - a. pH: 4.5-6.5
    - b. Film Forming Temperature: 73°F max.
    - c. Tear Strength: 950-psi min.
    - d. Elongation at Break: 500% min.
    - e. Particle Size: less than 0.1 micron
  - 2. Component A shall contain an organic, penetrating corrosion inhibitor which has been independently proven to reduce corrosion via ASTM G3 (half-cell potential tests). The corrosion inhibitor shall not be calcium nitrite, and shall have a minimum of 5 years of independent field testing to document performance on actual construction projects.

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3. Component B shall be a blend of selected portland cements, specially graded aggregates, admixtures for controlling setting time, water reducers for workability, and an organic accelerator.
  4. The materials shall be non-combustible, both before and after cure.
  5. The materials shall be supplied in a factory-proportioned unit.
  6. The polymer-modified, portland cement mortar must be placeable from  $\frac{1}{2}$ -in. to 1-in. in depth per lift for horizontal applications.
- B. To prepare a polymer-modified portland cement concrete: aggregate shall conform to ASTM C-33, The factory-proportioned unit shall be extended with 42-lb. max. of a  $\frac{3}{8}$  in. (No. 8 distribution per ASTM C-33, Table II) clean, well-graded, saturated surface dry aggregate, having low absorption and high density. Aggregate must be approved for use by the engineer.

2.03 PERFORMANCE CRITERIA

- A. Typical Properties of the mixed polymer-modified, portland cement mortar:
1. Working Time: Approximately 30 minutes.
  2. Finishing Time: 50-120 minutes
  3. Color: Concrete gray
- B. Typical Properties of the cured polymer-modified, portland cement mortar:
1. Compressive Strength (ASTM C-109 Modified)
    - a. 1 day: 2500 psi min. (17.2 MPa)
    - b. 7 day: 5500 psi (37.9 MPa)
    - c. 28 day: 7000 psi (48.3 MPa)
  2. Flexural Strength (ASTM C-293) @ 28 days: 1500 psi (10.3 MPa)
  3. Splitting Tensile Strength (ASTM C-496) @28 days 700 psi (4.8 MPa)
  4. Bond Strength (ASTM C-882 Modified) @ 28 days: 2500 psi (17.2 MPa)
  5. The portland cement mortar shall not produce a vapor barrier.
  6. Density (wet mix): 136 lbs./cu. ft. (2.18 kg/l)

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7. Permeability (AASHTO T-277 @ 28 days approximately 500 Coulombs)

Note: Tests above were performed with material and curing conditions at 71°F - 75°F and 45-55% relative humidity.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. Areas to be repaired must be clean, sound, and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Mechanically prepare the concrete substrate to obtain a surface profile of +/- 1/16" (CSP 5 or greater as per ICRI Guidelines) with a new exposed aggregate surface. Area to be patched shall not be less than 1/2" in depth.
- B. Where reinforcing steel with active corrosion is encountered, sandblast the steel to a white metal finish to remove all contaminants and rust. Where corrosion has occurred due to the presence of chlorides, the steel shall be high pressure washed after mechanical cleaning. Prime steel with 2 coats of Sika Armatec 110 EpoCem as directed by manufacturer. (See Spec Component SC-201-0699).

3.02 MIXING AND APPLICATION

- A. Mechanically mix in appropriate sized mortar mixer or with a Sika jiffy paddle and low-speed (400-600 rpm) drill. Pour approximately 4/5 gal Component A into the mixing container. Add Component B while continuing to mix. Mix to a uniform consistency for a maximum of 3 minutes. Add remaining Component A to mix if a more loose consistency is desired. Should smaller quantities be needed, be sure the components are measured in the correct ratio and that the Component B is uniformly blended before mixing the components together. Mix only that amount of material that can be placed in 30 minutes. Do not retemper material.
- B. Mixing of the polymer-modified portland cement concrete: Pour all (1-gal) of Component A into the mixing container. Add Component B while continuing to mix. Add correct amount of the pre-approved coarse aggregate, and continue mixing to a uniform consistency. Mixing time should be 3 minutes maximum.
- C. Placement Procedure: At the time of application, the substrate should be saturated surface dry with no standing water. Mortar and/or concrete must be scrubbed into substrate filling all pores and voids. While the



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scrub coat is still wet, force material against edge of repair, working toward center. If repair area is too large to fill while scrub coat is still wet use Sika Armatec 110 EpoCem in lieu of scrub coat (See Spec Component SC-200). After filling, consolidate, then screed. Allow mortar or concrete to set to desired stiffness, then finish with trowel, manual or power, for smooth surface. Broom or burlap for rough surface. Areas where the depth of the repair is less than 1-inch shall be repaired with polymer-modified portland cement mortar. In areas where the depth of the repair is greater than 1 inch, the repair shall be made with polymer-modified portland cement concrete.

- D. As per ACI recommendations for portland cement concrete, curing is required. Moist cure with wet burlap and polyethylene, a fine mist of water or a water-based\* compatible curing compound. Moist curing should commence immediately after finishing and continue for 48 hours. Protect newly applied material from rain, sun and wind until compressive strength is 70% of the 28-day compressive strength. To prevent from freezing cover with insulating material. Setting time is dependent on temperature and humidity.

\* Pretesting of curing compound is recommended.

- E. Adhere to all procedures, limitations and cautions for the polymer-modified portland cement mortar in the manufacturer's current printed technical data sheet and literature.

### 3.03 CLEANING

- A. The uncured polymer-modified portland cement mortar can be cleaned from tools with water. The cured polymer-modified portland cement mortar can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION 03730

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SECTION 04100 - MORTAR & GROUT

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification. Refer to Structural Drawings for additional information.

1.02 SECTION INCLUDES

- A. Work included in this section consists of furnishing all labor, materials, equipment, and incidentals required for complete installation of mortar and grout for masonry.
- B. Related work specified elsewhere:
  - 1. Section 04300 "Unit Masonry Work" (If Patching is required).

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Recommended Practices for Hot and Cold Weather Masonry Construction as published by the Masonry Industry Council.

PART 2. PRODUCTS

2.01 MATERIALS

- A. Portland Cement: ASTM C150, Type 1 provide natural color or white cement as required to provide mortar color indicated.
- B. Mortar Aggregate: ASTM C144, standard masonry type.
- C. Hydrated Lime: ASTM C207, Type 'S', or 'N'.
- D. Masonry Cement: ASTM C91.
- E. Premix Mortar: ASTM C387.
- F. Grout Aggregate: ASTM C404.

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- G. Grout Fine Aggregate: ASTM C144, 100% passing #8 sieve, maximum 5-30% passing #50 sieve.
- H. Water: Clean and potable.
- I. Integral water repellent additive meeting ASTM E-514.
- J. Plasticizer:
  - 1. SIKA Chemical Corporation "Intraplast Z".
  - 2. Euclid Chemical Co. "Eucon BK-S".
- K. Storage of all material shall prevent the intrusion of foreign matter. Store all masonry units on the ground, protected against damage and intrusion of excess moisture. No damaged or deteriorated materials shall be used.

2.02 MORTAR MIXES

- A. Mortar for exterior load bearing walls and all exterior masonry work below grade; ASTM C270, Type 'M' or 'S', using the property method unless noted otherwise on structural drawings. Use ASTM C270 Type 'N' above grade at exterior veneers.
- B. Mortar for interior non-load bearing walls and partitions: ASTM C270, Type 'M' or 'S', using the property method.
- C. Mortar for reinforced masonry ASTM C270, Type 'S', using the property method.
- D. Pointing mortar for masonry veneers ASTM C270, Type 'N', using the property method.
- E. Mortar Pigments: Natural and synthetic milled, blended iron oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.
  - 1. Provide colored mortar pigments: Color shall be as selected by Architect from SGS concentrated A, H and X Series mortar colors as manufactured by Solomon Colors, Springfield, IL 800-624-0261.

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- a. Carbon added for darker colors shall not exceed 4%.
  - b. Mix shall produce uniform and consistent color.
  - c. Inert, stable to atmospheric conditions, sun fast, weather resistant, alkali resistant, water insoluble, lime proof and non bleeding.
  - d. Free of deleterious fillers and extenders.
  - e. Practice size: 95 to 99% minus 325 mesh.
  - f. pH: 6.5 to 9.0.
  - g. Shall be tested per ASTM C91 and ASTM C270. Exceed 1800 psi at 28 days strength requirement.
- F. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.
- 2.03 MORTAR MIXING
- A. Thoroughly mix mortar ingredients in approved type mixing machine in quantities needed for immediate use in accordance with ASTM C270 or C780. Discharge mixer completely before recharging.
  - B. All exterior above grade mortar exposed to moisture shall be fabricated with integral water repellent additive.
  - C. Blend admixtures in accordance with manufacturer's instructions.
  - D. Do not use anti-freeze compounds to lower the freezing point of mortar.

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2.04 GROUT MIXES

- A. Bond beams, lintels, engineered masonry, reinforced masonry walls: min. 3000 psi strength at 28 days unless noted otherwise; 8-10 inches slump; pre-mixed grout in accordance with ASTM C94, or batch mixed in accordance with ASTM C476 for fine or course grout.

PART 3. EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Apply bonding agent to existing concrete surfaces.

3.02 INSTALLATION

- A. Install pre-mix mortar and grout in accordance with manufacturer's instructions.
- B. Work grout into masonry cores and cavities to eliminate voids. Do not displace reinforcement. Reinforcing shall be mechanically anchored in masonry cores to prevent displacement during grouting.

END OF SECTION 04100

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SECTION 04300 - UNIT MASONRY

PART 3. GENERAL

3.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification.

3.02 SECTION INCLUDES

- A. Work included in this section consists of furnishing all labor, materials, equipment and incidentals required for patching of concrete masonry resulting from door/frame replacement including tuckpointing and repair or replacement of existing brick, SGFT and/or CMU including installation of reinforcement, anchorage and accessories.
- B. Related work specified elsewhere:
  - 1. Section 04100 - Mortar & grout.

3.03 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following installed compressive strengths (f'm) at 28 days.
  - 1. For concrete Unit Masonry: As follows, based on net area:
    - a. f'm = 1900 psi (13.05 MPa).

3.04 SUBMITTALS

- A. Provide data on concrete masonry units including proposed reinforcing.
- B. Shop drawing for stone trim including cutting and setting diagrams.
- C. If specifically requested by the Architect/Engineer, provide samples for verification as follows.

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1. Full-size units for each different exposed masonry unit required showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
2. Accessories embedded in the masonry.

3.05 QUALITY ASSURANCE

- A. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
- B. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.
- C. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

3.06 ENVIRONMENTAL REQUIREMENTS

- A. Hot and Cold weather requirements: Recommended Practices for Hot or Cold Weather Masonry Construction as published by the Masonry Industry Council.

3.07 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not install until they are in an air-dried condition.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location.

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- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

PART 4. PRODUCTS

4.01 CONCRETE MASONRY UNITS

- A. Concrete block (CMU): ASTM C90, normal weight ( $\geq 125$  pcf). Use for above and below grade, exterior or interior wall applications.
- B. Texture of exposed faces of block shall be uniform for all block used in this project. Solid units may be used for bearing under structural members. No units with exposed chipped surfaces will be permitted in areas where exposed.
- C. Provide shapes such as special units at pilaster blocks, bullnose all external corners, sash recesses, square ends, lintel blocks and other, as required by drawings or specifications.

4.02 REINFORCEMENT AND ANCHORAGE

- A. All single wythe joint reinforcement shall be ladder type wire reinforcing consisting of No. 9 gauge deformed side rods, with No. 9 gauge standard ladder type cross rods. All rods shall be hot-dip galvanized using ASTM A153, Class B-2 standards. Out to out spacing of side rods shall be approximately 2" less than the nominal wall thickness. Provide pre-fabricated corners and tee units as required.
- B. For anchorage to steel framing, provide manufacturer's standard anchors with crimped 1/4 inch (6.4 mm) diameter wire anchor section for welding to steel and triangular-shaped wire tie section sized to extend within 1 inch (25 mm) of masonry face and wire diameter of 0.25". Provide one tie on each side of framing where masonry abuts. Ties to be spaced at 16" o.c. vertical.



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C. Manufacturers:

1. AA Wire Products Co.
2. Dur-O-Wal.
3. National Wire.
4. Hohmann and Barnard, Inc.
5. Wire Bond
6. Other Architect Approved.

D. Reinforcing Steel: ASTM A615, 60-ksi-yield grade deformed steel bars unprotected finish.

2.05 ACCESSORIES

- A. Building Paper: 15# asphalt saturated felt.
- B. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials, recommended by masonry unit manufacturer.
- C. Column Wrap: Waxed corrugated cardboard or 15# asphalt saturated felt.

2.06 LINTELS

- A. Replacement of (if required) lintels shall be steel, precast or cast-in-place in accordance with details as shown or scheduled on the drawings.

PART 3. EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Verify that field conditions are acceptable and ready to receive work. Examine rough-in and built-in construction to verify locations prior to installation.
- B. Coordinate placement of anchors supplied to other sections.
- C. Employ skilled mechanics, experienced supervision. Lay masonry plumb, true to line, with level, accurately spaced courses. Break vertical joints unless otherwise indicated. Keep bond plumb. Rack courses, where necessary, without toothing. Lay out facing before setting, minimize cutting closures, jumping bond.

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- D. Do not wet concrete masonry. Lay masonry with complete bearing in full beds of mortar. Butter sides for full vertical joints. Shove units into place. Anchor walls not otherwise bonded with ties every 8", every four (4) courses.
- E. Mix units for exposed unit masonry from several pallets as they are placed to provide a uniform blend of colors and textures.

3.02 COURSING

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness. Lay out walls in advance for accurate spacing of openings, movement type joints, returns, etc. Avoid units of less than half size at corners and jambs.
- B. Block unit shall be laid in stack or running bond, as indicated on drawings with vertical joints aligned plumb, horizontal joints level. Joints in back-up work shall be worked out to provide bonding with facing masonry. Joints shall be uniform in width, thickness not to exceed 1/3". Exposed joints in finish work shall be tooled slightly concave, others shall be cut flush.
- C. Initial block course (first course above foundation) in walls (interior) shall be laid in full mortar beds on shells and cross webs; in other locations, units shall be laid in full mortar beds on shells only. Solid block units shall be laid same as brick. Vertical joints between units shall be filled with mortar between shell ends.
- D. All non-bearing walls and partitions shall terminate against beam soffits, roof, or structural ceilings, unless otherwise shown on drawings, or as stated below. Build wall to within 3/8" of overhead structure on roof, fill top joint and all voids with non-combustible insulation board which has width of 1" less than wall, then caulk joints.

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- E. Both bearing and non-bearing masonry walls which enclose corridors, storage or mechanical rooms, shops, and other rooms requiring a rated separation from adjacent areas, must have the top joint as well as all voids at roof deck and elsewhere in or over these walls, filled with cement grout, mortar, or plaster bed of at least 2" in width. Where no ceilings occur in the room, said fill shall be troweled flush with the wall surface or surfaces on the exposed side of the wall.
- F. Bond each course at corners and break vertical joints at least 2". Tee shaped or cross shaped intersecting walls shall have vertical continuous joint. These joints shall be caulked. Provide for continuity of joint reinforcing by providing pre-fabricated "T" shaped or "L" shaped units.
- G. Provide welded steel masonry reinforcing placed in every second horizontal course in all block walls with at least one layer below a window sill level and one layer above a lintel level. Lay reinforcing on wall and cover with mortar, bed unit as usual. Longitudinal wire shall be lapped not less than 32 diameters at splices. At corners, cut inside rod and bend to proper angle.
- H. Construct bond beams as indicated with concrete grout. Maintain accurate location of reinforcing steel during grout placement.
- I. Grout course solid (or use solid units immediately below window and door openings or other locations where masonry serves as a support for a sill).
- J. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar prior to laying fresh masonry.

3.03 PLACING AND BONDING

- A. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

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- B. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with fire rated compressible joint filler.

3.04 REPAIR OF AREAS AND OPENINGS DURING DEMOLITION BY MASON OR OTHERS

- A. All masonry openings sawcut by Contractors Trades shall have new masonry units toothed in the existing adjacent masonry units to remain unless noted otherwise on the drawings. This includes all areas under construction or in the area of construction whether shown on the drawings or not.

3.05 REINFORCEMENT & ANCHORAGES - SINGLE WYTHE MASONRY

- A. Walls laid up with concrete block, including where used as back-up shall be reinforced with horizontal steel wall reinforcing as specified. Reinforcing shall be of proper width for block wythe, to have side wires over block shells. Place joint reinforcement at 16" o.c. vertical and continuous in first and second joint below top of walls.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum of 3'-0" beyond each side of opening.
- C. Terminate reinforcing each side of control joints; lap end joints 12", form corners by cutting and lapping inside wire, bending outside wire; form intersections by cutting and lapping reinforcing from one wall with other wall. Bed side wires completely in mortar.

3.06 GROUTED COMPONENTS

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- B. Place and consolidate grout fill without displacing reinforcing.
- C. At beam bearing locations, fill masonry cores with grout for a minimum 12 inches either side of member and three courses vertical, unless otherwise noted.

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3.07 ENGINEERED MASONRY

- A. Lay masonry units with core cells vertically aligned and cavities between wythes clear of mortar and unobstructed.
- B. Reinforce masonry unit cores and cavities with reinforcement bars and grout as indicated. Provide vertical bars in corners. Provide vertical bars at each side of all masonry openings. Vertical bars to continue at noted spacing above openings.
- C. Secure vertical reinforcement in position at top and bottom of cells and at intervals not exceeding 192 bar diameters. Splice reinforcement 48 bar diameters, minimum 12".
- D. Place mortar in masonry unit bed joints back 1/4 inch from edge of unit grout spaces; bevel back and upward. Permit mortar to cure 3 days before placing grout.
- E. Grout spaces less than 2 inches in width with fine grout using low lift grouting techniques. Grout spaces 2 inches or greater in width with coarse grout using high or low lift grouting techniques.
- F. When grouting is stopped for more than one hour, terminate grout 1-1/2 inch below top of upper masonry unit to form a positive key for subsequent grout placement.
- G. Low Lift Grouting: Place first lift of grout to a height of 60 inches maximum and consolidate by mechanical vibration. Place subsequent lifts in maximum 60 inch increments and vibrate grout for consolidation. Ensure mortar has gained sufficient strength to withstand pressure prior to grouting. "Puddling" may be used in lieu of mechanical vibration if grout lifts are limited to 12 inches maximum.

3.08 CONTROL AND EXPANSION JOINTS

- A. Do not extend horizontal joint reinforcement through control joints.

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- B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the masonry unit. Fill the resultant elliptical core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.
- C. Form control joints where indicated on drawings as detailed.

3.09 BUILT-IN WORK

- A. As Work progresses, build in metal door and glazed frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates, and other items to be built in the Work furnished by other Sections.
- B. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

3.10 POINTING AND CLEANING

- A. Point up all exposed existing masonry, where required, fill all holes and joints; remove loose mortar, cut out defective joints, and repoint where necessary.

3.11 TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Variation from Level Coursing: 1/8 inch in 3 ft. and 1/4 inch in 10 ft.; 1/2 inch in 30 ft.

3.12 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, grounds, and other items. Coordinate with other Sections of Work to provide correct size, shape, and location.
- B. Form slots, grooves, chases, recesses, other items required for other trades. Build in all required structural steel, miscellaneous metal, frame anchors, precast concrete anchors, other items. Bed in mortar

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to line and level. Check all requirements in advance to eliminate cutting.

- C. Do necessary cutting of masonry for installation of items not otherwise provided for. Patch walls, maintain structural stability, appearance, weather resistance.
- D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.13 REPAIRING, POINTING AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, and completely fill with mortar. Point-up joints, including corners, opening, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.
- C. Remove excess mortar and mortar smears.
- D. Clean soiled surfaces with cleaning solution.
- E. On completion of pointing and re-pointing of all block work, clean thoroughly with "Sure Klean 600", "Craft Klean" or similar prepared detergent, applied strictly according to the manufacturer's instructions with stiff fiber brushes. Drench with clean water immediately after cleaning. Do not use job mixed acid on this project. All cleaning shall be done prior to installation of any finished floor, or items subject to damage. Protect hollow metal frames, existing light fixtures and other built-in items.

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3.14 MASONRY WASTE DISPOSAL

- A. Recycling: Undamaged, excess masonry materials are Owner's property and shall be removed from the Project site and moved to 'Old Central Receiving' warehouse as the Jail Campus as directed by the Owner.

END OF SECTION



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SECTION 05500 - METAL FABRICATIONS

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification.

1.02 SECTION INCLUDES

- A. Work included in this section consists of furnishing all labor, materials, equipment and incidentals required for complete installation of miscellaneous metal work shown on the drawings, as specified herein, and/or as needed for a complete and proper installation whether shown or not.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. Perform shop and/or field welding required in connection with the work of this Section in strict accordance with pertinent recommendations of the American Welding Society.
- C. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the work.
- D. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel," AWS D1.2 "Structural Welding Code-Aluminum," and AWS D1.3 "Structural Welding Code-Sheet Steel."
  - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

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1.04 SUBMITTALS

- A. Comply with pertinent provisions of Division 1.
- B. Product Data: Within (35) calendar days after the contractor has received the Owner's Notice to Proceed, submit:
  - 1. Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this section with the work of adjacent trades. Provide templates for anchors and bolts specified for installation under other sections.

1.05 PROJECT CONDITIONS

- A. Field Measurements: Check Actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
  - 1. Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2. PRODUCTS

2.01 MATERIALS

- A. In fabricating items which will be exposed to view, limit materials to those which are free from surface blemishes, pitting, rolled trade names, and roughness.
- B. Comply with following standards as pertinent:
  - 1. Steel plates, shapes and bars: ASTM A36.
  - 2. Steel plates to be bent or cold-formed: ASTM A283, Grade C.
  - 3. Steel tubing (hot-formed, welded, or seamless): ASTM A501 or ASTM A500.

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4. Cold-finished steel bars: ASTM A108.
5. Cold-rolled carbon steel sheets: ASTM A336.
6. Galvanized carbon steel sheets: ASTM A526, with G90 zinc coating in accordance with ASTM A525.
7. Steel pipe: ASTM A53, Grade B, standard weight, black finish unless otherwise noted.
8. For exterior installations and where indicated, provide members with hot-dip galvanizing coat per ASTM A53.
9. Concrete inserts:
  - a. Threaded or wedge type galvanized ferrous castings of malleable iron complying with ASTM A27.
  - b. Provide required bolts, shims, and washers, hot-dip galvanized in accordance with ASTM A153.

2.02 FASTENERS

A. General:

1. For exterior use and where built into exterior walls, provide zinc-coated fasteners.
2. Provide fasteners of type, grade, and class required for the particular use.

B. Comply with following standards as pertinent:

1. Bolts and nuts: Provide hexagon-head regular type complying with ASTM A307, Grade A.
2. Lag bolts: Provide square-head type complying with Fed. Spec. FF-B-561.
3. Machine screws: Provide cadmium plated steel type complying with Fed. Spec. FF-S-111.
4. Washers:
  - a. Plain washers: Comply with Fed. Spec. FF-W-92, round, carbon steel.
  - b. Lock washers: Comply with Fed. Spec. FF-W-84, helical spring type carbon steel.
5. Toggle bolts: Provide type, class and style needed but complying with Fed. Spec. FF-B-588.
6. Anchorage devices: Provide expansion shield complying with Fed. Spec. FF-S-325.

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2.03 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by contractor subject to the approval of the Architect.

2.04 SHOP PAINT

- A. Primer: Use "10-99 Tnemec Primer" or Architect/Engineered equal product by Rustoleum.
- B. For repair of galvanizing, use a high zinc-dust content paint complying with SSPC-paint 20. Dry film containing not less than 94 percent zinc dust by weight.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.05 FABRICATION

- A. Except as otherwise shown on the drawings or the approved shop drawings, use materials of size, thickness, and type required to produce reasonable strength and durability in the work of this Section.
- B. Fabricate with accurate angles and surfaces which are true to the required lines and levels, grinding exposed welds smooth and flush, forming exposed connections with hairline joints, and using concealed fasteners wherever possible.
- C. Prior to shop painting or priming, properly clean metal surfaces as required for the applied finish and for the proposed use of the items.
- D. On surfaces inaccessible after assembly or erection, apply two coats of the specified primer. Change color of second coat to distinguish it from the first.
- E. Shear and punch metals cleanly and accurately. Remove burrs.
- F. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

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- G. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

2.06 MISCELLANEOUS METAL FABRICATIONS

A. Rough Hardware:

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork and for anchoring or securing woodwork to concrete or other structures.
2. Manufacture or fabricate items of sizes, shapes, and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

B. Loose Bearing and Leveling Plates:

1. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

C. Loose Steel Lintels:

1. Provide loose structural steel lintels for opening and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than 8" bearing at each side of openings, unless otherwise shown.
2. Size lintels as follows, unless otherwise indicated.
  - a. Up to 4'-0" span: One 3 1/2" x 4" x 5/16" steel angle supporting each 4" thick module of masonry.
  - b. Spans 4'-0" to 7'-0": One 5" x 3-1/2" x 5/16" steel angle supporting each 4" thick module of masonry.
  - c. Over 7'-0": Consult Architect if not indicated.

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3. Hot dip galvanized loose steel lintels to be installed in exterior walls.

D. Miscellaneous Framing and Supports:

1. Provide miscellaneous steel framing and supports as required to complete work.
2. Fabricate miscellaneous units to sizes, shapes, and profiles shown or, if not shown, or required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes, plates, and steel bars of welded construction using metered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
3. Hot dip galvanize exterior miscellaneous frames and supports.

PART 3. EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this section will be performed and notify the General Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

A. General:

1. Set work accurately into position, plumb, level, true and free from rack.
2. Anchor firmly into position.

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3. Where field welding is required, comply with AWS recommended procedures of manual-shielded metal-arc welding for appearance and quality of weld and for methods to be used in correcting welding work.
  4. Grind exposed welds smooth and touch up shop prime coats.
  5. Do not cut, weld, or abrade surfaces which have been hot-dip galvanized after fabrication and which are intended for bolted or screwed field connections.
- B. Immediately after erection, clean the field welds, bolted connections and abraded areas of shop priming. Paint the exposed areas with same material used for shop priming.

END OF SECTION 05500

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SECTION 07840 - FIRESTOPPING

PART I - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this section.

1.02 DESCRIPTION OF WORK:

- A. Provide labor and materials necessary for complete installation of firestopping materials and systems. Section includes firestopping for the following:
  - 1. Penetrations through fire resistance rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
  - 2. Penetrations through fire resistance rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits and other penetrating items.
  - 3. Penetrations through smoke barriers and construction enclosing compartmentalized area involving both empty openings and openings containing penetrating items.
  - 4. Sealant joints in fire resistance rated construction.

1.03 SUBMITTALS:

- A. Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL or other nationally recognized independent testing laboratories firestop systems to be used and manufacturer's installation instructions.
  - 1. Submit material safety data sheets (MSDS) provided with product delivered to jobsite.



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- B. Product certificates signed by manufacturers of firestopping products certifying that their products and installation comply with specified requirements. Certification shall be signed by the Installer.

1.04 QUALITY ASSURANCE:

- A. Conform to applicable governing codes, including local governing authorities, but not limited to the following:
  - 1. NFPA 101 2012 Life Safety Code
  - 2. 2015 MBC
- B. Meet requirements of ASTM E814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated and other ASTM Standards as applicable for the installation.
  - 1. ASTM E84 "Test Method for Surface Burning Characteristics of Building Materials".
  - 2. ASTM E119 "Test Methods for Fire Tests of Building Construction and Materials".

PARTS 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with through-penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products by one of the following:
  - 1. Hilti Construction Chemicals, Tulsa, OK
  - 2. Specified Technologies Inc. (STI) Sommerville, NJ
  - 3. 3M Fire Protection Products, St. Paul, MN
  - 4. The Rectorseal Corp., Houston, TX
  - 5. Tremco, Inc. Beachwood, OH

2.02 FIRESTOPPING, GENERAL

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

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1. All materials shall comply with ASTM E814 or E119 (UL 1429) and shall be manufactured of non-toxic, non-hazardous, asbestos free materials, and unaffected by water or moisture when cured.
  2. Primers: Conform to manufacturer's recommendations for primers required for various substrate and conditions.
  3. Backup materials: Backup materials, supports, and anchoring devices shall be provided as required by UL testing.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated system. Accessories include but are not limited to the following items:
1. Permanent forming/damming/backing materials must be noncombustible and may include the following:
    - a. Semirefractory fiber (mineral wool) insulation.
    - b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
    - c. Joint fillers for joint sealants.
  2. Temporary forming materials.
  3. Substrate primers.
  4. Collars.
  5. Steel sleeves.

2.03 FIRE STOPPING, MATERIALS

- A. Use only firestopping products that have been UL 1479 or ASTM E814 tested for specific fire rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire rating involved for each separate instance.
- B. For penetrations by noncombustible items including steel pipe, copper pipe, rigid steel conduit, and electrical metallic tubing (EMT), the following materials are acceptable:

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1. Hilti FAS 601 Elastomeric Firestop Sealant
  2. STI SpecSeal Sealant SSS 100
  3. 3M Fire Barrier CP25
  4. The RectorSeal Corp. Metacaulk 1000, 950, 835, Putty, & Mortar.
  5. Fyre-Sil, Tremco, Inc.
  6. Biofireshield K10 and K2 Mortar, Biostop 500+, Biootherm 100/22200 & Biostop Putty, The RectorSeal Corp.
- C. For penetrations by combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe (closed piping systems) the following materials are acceptable:
1. STI Wrap Strip SSW12
  2. Hilti FS One Intumescent Firestop Sealant
  3. 3M Fire Barrier FS-195 Wrap Strip
  4. Metacaulk Wrap Strip, Firestop Collars, Metacaulk 1000, 950 & 835.
  5. Biostop Wrap Strip, Collar, and Biostop 500+.
- D. For large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following materials are acceptable:
1. STI SpecSeal lightweight mortar SSM22B or putty
  2. Hilti FS635 Trowelable Firestop Compound
  3. 3M Fire Barrier FS-195 Composite Sheet
  4. Biofireshield K-10 & K2 mortar
  5. Metacaulk Firestop Mortar
- E. For fire-rated construction joints and other gaps with movement, the following materials are acceptable:
1. Hilti FS 601 Elastomeric Firestop Sealant
  2. STI Pensil 300
  3. 3M (Dow Corning Fire Stop Sealant 2000)
  4. Fyre-Sil, Tremco, Inc.
  5. Biofireshield, Biostop 700, Biostop 500+
  6. Metacaulk 1000 & 1100
- F. Provide a firestopping system with an "F" rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
  - 1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
  - 2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form release agent from concrete.

3.03 INSTALLING THROUGH-PENETRATION FIRESTOPS

- A. General: Comply with the manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designate through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

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1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
2. Apply materials so they contact and adhere to substrate formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 INSTALLING FIRE RESISTIVE JOINT SEALANTS

- A. General: Comply with the manufacturer's installation instructions and drawings pertaining to products and application indicated.

3.05 CLEANING

- A. Clean off excess fill materials and sealant adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

END OF SECTION 07840

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SECTION 07910 - JOINT FILLERS AND GASKETS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of each type of joint filler and gasket work is indicated on the drawings and by provisions of this section, and is hereby defined to include required fillers and gaskets not specified in other sections of these specifications.
- B. The required applications of joint fillers and gaskets include, but are not necessarily limited to, the following general types and locations:
  - 1. Isolation and expansion joint fillers in structural concrete.
  - 2. Floor construction/expansion joint fillers.
  - 3. Joint fillers around penetrations of equipment and services through walls, floors and roofs.

1.03 SUBMITTALS:

- A. Product Data:
  - 1. Submit manufacturer's specifications, installation instructions and recommendations for each type of material required.
- B. Samples:
  - 1. Submit three, 12 inches long samples of each joint filler or gasket.

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PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL:

- A. Size and Shape: Provide sizes and shapes of units as shown or, if not shown, as recommended by manufacturer for joint size and condition shown. Where joint movement is a factor in a determination of size, consult with Architect to determine nature and magnitude of anticipated joint movements for the temperature and condition of project at time of installation.
- B. Compressibility: Specified hardness and compressibilities are intended to establish requirements for normal or average conditions of installation and use. Where a range of hardness or compressibility is available for a product, comply with manufacturer's recommendations for specific condition of use.
- C. Color: Provide each concealed material in manufacturer's standard color which has best overall performance characteristics for application shown. Provide exposed materials in black, except where another color is indicated.
- D. Compatibility: Before purchase of each filler or gasket material, confirm that it is compatible with substrate, sealants and other materials in joint system.
- E. Adhesives: Pressure sensitive adhesives, compatible with each material in joint system may be applied (at installer's option) to one face of joint fillers and gaskets to facilitate installation and permanent anchorage. Do not allow adhesives to contaminate sealant bond surface (if any) in joint system.

2.02 CELLULAR/FOAM EXPANSION JOINT FILLERS:

- A. Closed-Cell PVC Joint Filler:
  - 1. Provide flexible expanded polyvinyl chloride complying with ASTM D 1667. Grade VE 41 BL (3.0 psi compression deflection); except provide higher compression deflection grades as may be necessary to withstand installation forces.

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2. Provide one of the following products:

- a. FF2 PVC: Progress Unlimited, Inc.
- b. Vinyl "U" 1000 Series: Williams Products, Inc.

2.03 GASKETS:

A. Molded Neoprene Gasket:

1. Provide extruded neoprene or EPDM gaskets complying with ASTM D 2000, Designation 2BC 415 to 3BC 620, black (40 to 60 Shore A durometer hardness); of the profile shown or, if not shown, as required by the joint shape, size and movement characteristics to maintain a watertight and airtight seal.
2. Provide products by one of the following manufacturers:
  - a. D.S. Brown Company
  - b. Hohmann & Barnard, Inc.
  - c. Kirkhill Rubber Company
  - d. Progress Unlimited, Inc.
  - e. JD Russell
  - f. Williams Products, Inc.

2.04 MISCELLANEOUS MATERIALS:

A. Oakum Joint Filler:

1. Provide untreated hemp or jute fiber rope, free of oil, tar and other compounds which might stain surfaces, contaminate joint walls or not be compatible with sealants.

B. Fire-Resistant Joint Filler:

1. Glass fiber or other inorganic non-combustible fiber formed with minimum of binder into resilient joint filler strips or blankets of sizes and shapes indicated, recommended by manufacturer specifically for increasing fire resistance or endurance of joint systems of type indicated, for service temperatures up to 2300 degrees F, 80% (min.) recovery 50% compression.



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PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine joint surfaces of units to receive fillers or gaskets and conditions under which the work is to be performed and notify the General Contractor, in writing, of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.02 INSTALLATION:

- A. Comply with manufacturer's instructions and recommendations for installation of each type of joint filler or gasket required, unless more stringent requirements are shown or specified.
- B. Set units at proper depth of position in joint to coordinate with other work, including installation of bond breakers, backer rods, and sealants. Do not leave voids or gaps between ends of joint filler units.
- C. Recess exposed edges or faces of gaskets and exposed joint filler slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.
- D. Bond ends of gaskets together with adhesive or by means as recommended by manufacturer to ensure continuous watertight and airtight performance. Miter-cut and bond ends at corners except where molded corner units are provided.

END OF SECTION 07910

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SECTION 07920 - SEALANTS AND CAULKING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of each type of sealant and caulking work is indicated on the drawings and by provisions of this section.
- B. The required applications of sealants and caulking include, but are not necessarily limited to, the following general locations:
  - 1. Interior sound-sealed and air-sealed joints.
  - 2. Isolation joints, between structure and other elements.
  - 3. Joints at penetrations of walls, decks and floors by piping and other services and equipment.
  - 4. Joints between dissimilar materials.

1.03 QUALITY ASSURANCE:

- A. Manufacturers: Firms with not less than 5 years of successful experience in production of types of sealants and caulking compounds required for this project.
  - 1. Obtain elastomeric sealants from a manufacturer which will, upon request, send a qualified technical representative to the project site for purpose of advising installer on proper procedures for use of products.
- B. Installer: A firm with a minimum of (5) years of successful experience in application of types of materials required.

**PROPOSAL C**

1.04 SUBMITTALS:

A. Product Data:

1. Submit manufacturer's specifications, recommendations and installation and instructions for each type of sealant, caulking compound and associated miscellaneous material required.

B. Samples:

1. Submit three, 12" long samples of each color required (except black) for each type of sealant and caulking compound exposed to view. Install sample between two strips of material similar to or representative of typical surfaces where compound will be used, held apart to represent typical joint widths.

1.05 JOB CONDITIONS:

- A. Pre-Installation Meeting: At General Contractor's direction, installer, sealant manufacturer's technical representative, and other trades involved in coordination with sealant work shall meet with the General Contractor at project site to review procedures and time schedule proposed for installation of sealants in coordination with other work. Review each major sealant application required on project.

- B. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended temperature range for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength. Where joint width is affected by ambient temperature variations, install elastomeric sealants only when temperatures are in lower third of the manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures. Coordinate time schedule with General Contractor to avoid delay of project.

- C. Statement of Non-Compliance: Where it is necessary to proceed with installation of sealants or caulking compound under conditions which do not fully comply with requirements (because of time schedule or other reasons which the General Contractor determines to be crucial to project), prepare written statement for Owner's record

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(with copy to Architect) indicating the nature of non-compliance, reasons for proceeding, precautionary measures taken to ensure best possible work and names of individuals concurring with decision to proceed with installation.

1.06 SPECIAL PROJECT WARRANTY (GUARANTEE):

- A. Sealant Warranty: Provide written warranty, signed by the General Contractor/installer, agreeing to, within warranty period of (10) years (or maximum warranty provided by manufacturer for polyurethane sealants) after date of substantial completion, replace/repair defective materials and workmanship defined to include: Instances of significant leakage of water or air; failures in joint adhesion, material cohesion, abrasion resistance, strain resistance or general durability; failure to perform as required and the general appearance of deterioration in any other manner not clearly specified in manufacturer's published product literature as an inherent characteristic of the sealant material. Warranty includes responsibility for removal and replacement of other work (if any) which conceals or obstructs the replacement of sealants.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL:

- A. Colors: Provide black or other natural color where no other standard or custom color is available. Where material is not exposed to view, provide manufacturer's standard color which has best overall performance characteristics for application shown.
  - 1. Provide manufacturer's standard colors as selected by Architect from manufacturer's standard colors.
- B. Hardnesses shown and specified are intended to indicate general range necessary for overall performance. Consult manufacturer's technical representative to determine actual hardness recommended for conditions of installation and use. Upon request, Architect will furnish information concerning anticipated joint movement related to actual joint width and installation temperature. Except as otherwise indicated or recommended, provide compounds within the following range of hardness (Shore A, fully cured, at 75 degrees F.).

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1. 5 to 20 for high percentage of movement and minimum exposure to weather and abrasion (including no exposure to vandalism).
  2. 15 to 35 for moderate percentage of movement and moderate exposure to weather and abrasion.
  3. 30 to 60 for low percentage of movement and maximum exposure to weather and abrasion (including foot traffic on horizontal joints).
- C. Modulus of Elasticity: For joints subjected to movement, either thermal expansion or dynamic movement, select sealants from among available variations which have lowest modulus of elasticity which is consistent with exposure to abrasion or vandalism. For horizontal joints subject to traffic, select sealants with high modulus of elasticity as required to withstand indentation by stiletto heels. Comply with manufacturer's recommendations where no other requirements are indicated.
- D. Compatibility: Before selection and purchase of each specified sealant, investigate its compatibility with joint surfaces, joint fillers and other materials in joint system. Provide only materials (manufacturer's recommended variation of specified materials) which are known to be fully compatible with actual installation conditions as shown by manufacturer's published data or certification.

2.02 SEALANTS:

- A. One Part Elastomeric Sealant (Silicone)
1. One component elastomeric sealant, complying with ASTM C 920, Class 25, Type NS (nonsag), unless Type S (self-leveling) recommended by manufacturer for the application shown.
    - a. Acceptable Standard
      1. "Pecora 864 Architectural Silicone Sealant; Pecora Corp.
      2. Dow Corning 791; Dow Corning Corp.
      3. Silpruf; General Electric
      4. Omniseal; Sonneborn Building Products, Inc.
      5. Spectrem 2; Tremco Mfg. Co.
      6. Sikasil WS 295; Sika Corp.

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2. One Component high movement joints (+100/-50):  
Where locations of high movement are indicated.
  - a. Dow Corning 790; Dow Corning Corp.,
  - b. Spectrem 1; Tremco
  - c. Sikasil WS 290; Sika Corp.

B. Elastomeric Sealant (Polyurethane)

1. One component polyurethane sealant, complying with ASTM C 920, Type S, Grade NS, Class 25 (nonsag).
  - a. Acceptable Standard
    1. MasterSeal NP 1; BASF Building Systems
    2. Dymonic; Tremco Mfg. Co.
    3. Dynatrol I; Pecora Corp.
    4. Vulkem 921; Mameco
    5. CS 2130; Hilti
    6. Sikaflex 1A; Sika Corp.
    7. Sikaflex 15LM; Sika Corp.
2. Two Component polyurethane sealant, complying with ASTM C 920, Type M, Grade NS, Class 25 (nonsag).
  - a. Acceptable Standard
    1. MasterSeal NP 2; BASF Building Systems
    2. Dymeric; Tremco Mfg. Co.
    3. Dynatrol II; Pecora Corp.
    4. Vulkem 922; Mameco
    5. Sikaflex 2cNSEZ; Sika Corp.

C. Security Sealant (Polyurethane)

1. One component or two component polyurethane sealant, complying with ASTM C 920, Grade NS, Class 12.5, with a Shore A Hardness of 55.
  - a. Acceptable Standard
    1. Dynaflex; Pecora Corp.
    2. MasterSeal CR195, BASF Corp. Building Systems

2.04 MISCELLANEOUS MATERIALS:

- A. Joint Cleaner: Provide type of joint cleaning compound recommended by sealant or caulking compound manufacturer, for joint surfaces to be cleaned.
- B. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer, for joint surfaces to be primed or sealed.

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- C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
- D. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer.
- E. Provide size and shape of rod which will control joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize possibility of sealant extrusion when joint is compressed.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. The installer must examine joint surfaces, backing and anchorage of units forming sealant rabbet and condition under which sealant work is to be performed and notify the General Contractor in writing of conditions detrimental to proper completion of the work and performance by sealants. Do not proceed with sealant work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 SELECTION OF MATERIAL

- A. Security shall be used for interior nonmoving joints and at all locations accessible to inmates.
- B. One component elastomeric silicone sealants shall be used at exterior and interior joints, not accessible to inmates, where thermal or dynamic movement is anticipated including, but not limited to, the following locations:
  - 1. Metal to metal joints.
  - 2. Sheet metal flashing, preformed metal caps, fascias, extenders, trim and panels.

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- C. One or two component elastomeric polyurethane sealants shall be used at exterior and interior joints, not accessible to inmates, where weatherproofing or waterproofing is required and at exterior joints between dissimilar materials including, but not limited to, the following locations:
1. Exterior side of hollow metal frames to adjacent materials.
  2. Sealant in pipe sleeves where materials must perforate the floor slab.
  3. Perimeter of floor slabs or concrete curbs which abut vertical surfaces.
  4. Exterior joints between dissimilar materials where the joining of the two surfaces leaves a gap between the meeting materials or components as may be dictated by the various methods of construction to make watertight.
  5. Interior joints between dissimilar materials where the joining of the 2 surfaces leave a gap between the meeting materials and components.

3.03 JOINT SURFACE PREPARATION:

- A. Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant or caulking compound.
- B. For elastomeric sealants, do not proceed with installation of sealant over joint surfaces which have been painted, lacquered, waterproofed or treated with water repellent or other treatment or coating unless a laboratory test for durability (adhesion), in compliance with paragraph 4.3.9. of FS TT-S-00227 has successfully demonstrated that sealant bond is not impaired by coating or treatment. If laboratory test has not been performed or shows bond interference, remove coating or treatment from joint surfaces before installing sealant.
- C. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.



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- D. Roughen joint surfaces on vitreous coated and similar non-porous materials, where sealant manufacturer's data indicated lower bond strength than for porous surfaces. Rub with fine abrasive to produce a dull sheen.

3.04 INSTALLATION:

- A. Comply with sealant manufacturer's printed instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.
- B. Prime or seal joint surfaces where shown or recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- C. Install sealant backer rod for liquid sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.
- D. Install bond breaker tape where shown and where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- E. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- F. Install sealants to depths as shown or if not shown as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of bead.
  - 1. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
  - 2. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in the range of 75% to 125% of joint width.

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- G. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces or to migrate into voids of adjoining surfaces including exposed aggregate panels and similar rough textures. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces but either primer/sealer or the sealant/caulking compound.
- H. Remove excess and spillage of compounds promptly as the work progresses. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage without damage to adjoining surfaces or finishes.

3.04 CURE AND PROTECTION:

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability. Do not cure in a manner which would significantly alter materials modulus of elasticity or other characteristics.
- B. Installer shall advise the General Contractor of procedures required for curing and protection of sealants and caulking compounds during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of Owner's acceptance.

END OF SECTION 07920

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SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.1 Refer to "General and Special Conditions", and "Instructions to Bidders", Division 1 of Specifications. Requirements of these Sections and the project drawings shall govern work in this section.

1.2 Work Included:

A. Furnish all items of Finish Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.

B. Related work:

1. Division 00 - Bidding and Contract Requirements
2. Division 01 - General Requirements
3. Division 11 - Equipment - Section 11193-Security Hollow Metal Doors and Frames

1.3 Quality Assurance

A. Requirements of Regulatory Agencies:

1. Furnish finish hardware to comply with the requirements of laws, codes, ordinances, and regulations of the governmental authorities having jurisdiction where such requirements exceed the requirements of the Specifications.
2. Furnish finish hardware to comply with the requirements of the regulations for public building accommodations for physically handicapped persons of the governmental authority having jurisdiction and to comply with Americans with Disabilities Act.
3. Provide hardware for fire-rated openings in compliance with NFPA 80 and state and local building code requirements. Provide only hardware that has been tested and listed by UL for types and sizes of doors

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required and complies with requirements of door and door frame labels.

B. Hardware Supplier:

1. Shall be an established firm dealing in contract builders' hardware. He must have adequate inventory, qualified personnel on staff and be located within 100 miles of the project. The distributor must be a factory-authorized dealer for all materials required. The supplier shall be or have in employment an Architectural Hardware Consultant (AHC).

C. Electrified Door Hardware Supplier:

1. Shall be an experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.
2. Shall prepare data for electrified door hardware, including shop drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this project.
3. Shall have experience in providing consulting services for electrified door hardware installations.

D. Pre-installation Meeting:

1. Before hardware installation, General Contractor will request a hardware installation meeting be conducted on the installation of hardware; specifically that of locksets, closers, exit devices, overhead stops and coordinators. Manufacturer's representatives of the above products, in conjunction with the hardware supplier for the project, shall conduct the meeting. Meeting to be held at job site and attended by installers of hardware for aluminum, hollow metal and wood doors. Meeting to address proper coordination and installation of hardware, per finish hardware

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schedule for this specific project, by using installation manuals, hardware schedule, templates, physical product samples and installation videos.

2. When any electrical or pneumatic hardware is specified this meeting shall also include the following trades/installers: Electrical, Security, Alarm systems and Architect.
3. Convene one week or more prior to commencing work of this Section.
4. The Hardware Supplier shall include the cost of this meeting in his proposal.

E. Manufacturer:

1. Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
2. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.

1.4 Submittals:

A. Hardware Schedule

1. Submit number of Hardware Schedules as directed in Division 1.
2. Follow guidelines established in Door & Hardware Institute Handbook (DHI) Sequence and Format for the Hardware Schedule unless noted otherwise.
3. Schedule will include the following:
  - a. Door Index including opening numbers and the assigned Finish Hardware set.
  - b. Preface sheet listing category only and manufacturer's names of items being furnished as follows:

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CATEGORY	SPECIFIED	SCHEDULED
Hinges	Manufacturer A	Manufacturer B
Lock sets	Manufacturer X	Manufacturer X
Kick Plates	Open	Manufacturer Z

- c. Hardware Locations: Refer to Article 3.1 B.2 Locations.
- d. Opening Description: Single or pair, number, room locations, hand, active leaf, degree of swing, size, door material, frame material, and UL listing.
- e. Hardware Description: Quantity, category, product number, fasteners, and finish.
- f. Headings that refer to the specified Hardware Set Numbers.
- g. Scheduling Sequence shown in Hardware Sets.
- h. Product data of each hardware item, and shop drawings where required, for special conditions and specialty hardware.
- i. Electrified Hardware system operation description.
- j. "Vertical" scheduling format only. "Horizontal" schedules will be returned "Not Approved."
- k. Typed Copy.
- l. Double-Spacing.
- m. 8-1/2 x 11 inch sheets
- n. U.S. Standard Finish symbols or BHMA Finish symbols.

B. Product Data:

- 1. Submit, in booklet form Manufacturers Catalog cut sheets of scheduled hardware.
- 2. Submit product data with hardware schedule.

C. Samples:

- 1. Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample, if required, of each type of exposed hardware

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unit, finished as required and tagged with full description for coordination with schedule.

2. Samples will be returned to the supplier. Units, which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

D. Key Schedule:

1. Submit detailed schedule indicating clearly how the Owner's final keying instructions have been followed.
2. Submit as a separate schedule.

E. Electrified Hardware Drawings:

1. Submit elevation drawings showing relationship of all electrical hardware components to door and frame. Indicate number and gage of wires required.
  - a. Include wiring drawing showing point to point wire hook up for all components.
  - b. Include system operations descriptions for each type of opening; describe each possible condition.

- F. Submit to General Contractor, the factory order acknowledgement numbers for the various hardware items to be used on the project. The factory order acknowledgement numbers shall help to facilitate and expedite any service that may be required on a particular hardware item. General Contractor shall keep these order acknowledgement numbers on file in the construction trailer.

1.5 Product Delivery, Storage, and Handling:

- A. Label each item of hardware with the appropriate door number and Hardware Schedule heading number, and deliver to the installer so designated by the contractor.

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1.6 Existing Conditions:

- A. Where existing frames and/or hardware are to remain, conditions, preparations and functions shall be field verified to confirm compatibility with specified hardware. Where any incompatibility is discovered, notify the contractor immediately and provide a suggested solution based on industry standard business practices.

1.7 Warranties:

- A. Refer to Division 1 for warranty requirements.

- B. Special Warranty Periods:

- 1. Closers shall carry manufacturer's 30-year warranty against manufacturing defects and workmanship.
- 2. Locksets shall carry manufacturer's 3-year warranty against manufacturing defects and workmanship.
- 3. Exit Devices shall carry manufacturer's 3-year warranty against manufacturing defects and workmanship.
- 4. Continuous gear hinges shall carry manufacturer's lifetime warranty to be free from defects in material and workmanship.
- 5. Balance of items shall carry a manufacturer's 1-year warranty against manufacturing defects and workmanship.

- C. During the warranty period, replace defective work, including labor, materials and other costs incidental to the work.

PART 2 - PRODUCT

- 2.1 Furnish each category with the products of only one manufacturer unless specified otherwise; this requirement is mandatory whether various manufacturers are listed or not.



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2.2 Provide the products of manufacturer designated or if more than one manufacturer is listed, the comparable product of one of the other manufacturers listed. Where only one manufacturer or product is listed, it is understood that this is the owner's Building Standard and "no substitution" is allowed.

A. Detention Hinges:

1. Unless specified otherwise in sets furnish hinges of class and size as follows:
2. Furnish class 4 1/2FM and size 4-1/2 x 4-1/2 inches.
3. Numbers used are Southern Steel/Folger Adam.

B. Maximum Security Deadlatch:

1. Southern Steel/Folger series as specified. Include strike and all mounting plates required to mount in specified door and frame type.

C. Closers

1. Refer to door and frame details and furnish accessories such as drop plates, panel adapters, spacers and supports as required to correctly install door closers. State degree of door swing in the hardware schedule.
2. Acceptable manufacturers and types:
  - a. LCN

D. Maximum Security Door Stop:

1. Ives FS11 series

E. Thresholds:

1. Furnish full wall opening width when frames are recessed.
2. Cope in front of mullions if thresholds project beyond door faces.
3. Furnish with non-ferrous Stainless Steel Screws and Lead Anchors.

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- a. Zero as listed in sets
- b. Equal of NGP or Reese

F. Door Position Switches:

- 1. Coordinate voltage requirements with Electrical Drawings and Specifications.
- 2. Numbers used are Southern Steel/Folger Adam
  - a. Concealed ASSW-105A

G. Miscellaneous:

- 1. Furnish items not categorized in the above descriptions but specified by manufacturer's names in Hardware Sets.

H. Fasteners:

- 1. Furnish fasteners of the proper type, size, quantity and finish. Use machine screws and expansion shields for attaching hardware to concrete or masonry, and wall grip inserts at hollow wall construction. Furnish machine screws for attachment to reinforced hollow metal doors and frames. "TEK" type screws are not acceptable. Furnish security fasteners for all exposed fasteners.
- 2. **Sex bolts will not be permitted on reinforced metal doors.**

2.3 Finishes:

- A. Generally, Dull Chrome, US26D / BHMA 626. Provide finish for each item as indicated in sets.

2.4 Templates and Hardware Location:

- A. Furnish hardware made to template. Supply required templates and hardware locations to the door and frame manufacturers.
- B. Furnish metal template to frame/door supplier for continuous hinge.

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- C. Refer to Article 3.1 B.2, Locations, and coordinate with templates.

2.5 Cylinders and Keying:

- A. All cylinders for this project will be supplied by one supplier regardless of door type and location.
- B. The Finish Hardware supplier will meet with Architect and/or Owner to finalize keying requirements and obtain keying instructions in writing.
  - 1. Supplier shall include the cost of this service in his proposal.
- C. Provide a cylinder for all hardware components capable of being locked.
- D. Provide cylinders master and grand master keyed to designated system according to Owner's instructions. Provide change keys, master keys and grand master keys as required by Owner.
- E. Provide cylinders with construction cores or keying for use during the construction period. When so directed, and in the presence of the Owner's security department or representative, convert construction cores or keying to the final system.
  - 1. Supplier shall include the cost of this service in his proposal.

PART 3 - EXECUTION

3.1 Installation

- A. General:
  - 1. Install hardware according to manufacturers installations and template dimensions. Attach all items of finish hardware to doors, frames, walls, etc. with fasteners furnished and required by the manufacture of the item.

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2. Provide blocking/reinforcement for all wall mounted Hardware.
3. Reinforced hollow metal doors and frames will be drilled and tapped for machine screws.

B. Locations:

1. Dimensions are from finish floor to center line of items.
2. Include this list in Hardware Schedule.

CATEGORY

DIMENSION

Hinges	Door Manufacturer's Standard
Levers	Door Manufacturer's Standard
Pulls	42"
Wall Stops/holders	At Head

C. Field Quality Inspection:

1. Inspect material furnished, its installation and adjustment, and instruct the Owner's personnel in adjustment, care and maintenance of hardware.
2. Locksets and exit devices shall be inspected after installation and after the HVAC system is in operation and balanced, to insure correct installation and proper operation.
3. Closers shall be inspected and adjusted after the HVAC system is in operation and balanced, to insure correct installation and proper operation.
4. A written report stating compliance, and also locations and kinds of noncompliance shall be forwarded to the Architect with copies to the Contractor, hardware distributor, hardware installer and building owner.

D. Technical and Warranty Information:

1. At the completion of the project, the technical and warranty information coalesced and kept on file by the General Contractor shall be given to the Owner or Owner's Agent. In addition to both the technical and

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warranty information, all factory order acknowledgement numbers supplied to the General Contractor during the construction period shall be given to the Owner or Owner's Agent. The warranty information and factory order acknowledgement numbers shall serve to both expedite and properly execute any warranty work that may be required on the various hardware items supplied on the project.

2. Submit to General Contractor, two copies each of parts and service manuals and two each of any special installation or adjustment tools. Include for locksets, exit devices, door closers and any electrical products.

**3.2 Hardware Sets:**

Hardware Group No. SH.01

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINIS	MFR
3	EA HINGE	NW645FMST	630	NSH
2	EA FOOD PASS HINGE	3FP	600	FAD
1	EA LOCK	(RE-USE EXISTING)	⚡	FAD
1	EA FOOD PASS DOOR & LATCH	17 X 17-4-FPD	600	FAD
1	EA RAISED PULL	NW601	630	NSH
1	EA RECESSED PULL	NW602	630	NSH

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Hardware Group No. SH.02

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINIS	MFR
			H	
3	EA HINGE	NW645FMST	630	NSH
4	EA FOOD PASS HINGE	3FP	600	FAD
1	EA LOCK	(RE-USE EXISTING)	⚡	FAD
2	EA FOOD PASS DOOR & LATCH	17 X 17-4-FPD	600	FAD
1	EA RAISED PULL	NW601	630	NSH
1	EA RECESSED PULL	NW602	630	NSH

END OF SECTION

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Area	Opening Number	HwSet
PROP A	A148A	MC.01
PROP A	B136C	MC.02
PROP A	E153A	MC.04
PROP A	E164A	MC.04
PROP A	G102A	MC.03
PROP A	G102B	MC.03
PROP A	G102C	MC.02
PROP C	601A	SH.01
PROP C	602A	SH.01
PROP C	603A	SH.01
PROP C	604A	SH.01
PROP C	605A	SH.02
PROP C	606A	SH.02
PROP C	607A	SH.01
PROP C	608A	SH.01
PROP C	609A	SH.01
PROP C	610A	SH.01
PROP C	611A	SH.01
PROP C	612A	SH.01
PROP C	613A	SH.02
PROP C	614A	SH.02
PROP C	615A	SH.01
PROP C	616A	SH.01

Area	Opening Number	HwSet
PROP C	617A	SH.01
PROP C	618A	SH.01
PROP C	625A	SH.01
PROP C	626A	SH.01
PROP C	627A	SH.01
PROP C	628A	SH.01
PROP C	629A	SH.02
PROP C	630A	SH.02
PROP C	631A	SH.01
PROP C	632A	SH.01
PROP C	633A	SH.01
PROP C	634A	SH.01
PROP C	635A	SH.01
PROP C	636A	SH.01
PROP C	637A	SH.02
PROP C	638A	SH.02
PROP C	639A	SH.01
PROP C	640A	SH.01
PROP C	641A	SH.01
PROP C	642A	SH.01
PROP C	647A	SH.01
PROP C	648A	SH.01
PROP C	649A	SH.01

Area	Opening Number	HwSet
PROP C	650A	SH.01
PROP C	651A	SH.02
PROP C	652A	SH.02
PROP C	653A	SH.01
PROP C	654A	SH.01
PROP C	655A	SH.01
PROP C	656A	SH.01
PROP C	657A	SH.01
PROP C	658A	SH.01
PROP C	659A	SH.02
PROP C	660A	SH.02
PROP C	661A	SH.01
PROP C	662A	SH.01
PROP C	663A	SH.01
PROP C	664A	SH.01
PROP C	805A	SH.02
PROP C	806A	SH.02
PROP C	813A	SH.02
PROP C	814A	SH.02
PROP C	829A	SH.02
PROP C	830A	SH.02
PROP C	837A	SH.02
PROP C	838A	SH.02

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Area	Opening Number	HwSet
PROP C	851A	SH.02
PROP C	852A	SH.02
PROP C	859A	SH.02
PROP C	860A	SH.02
PROP C	1005A	SH.02
PROP C	1006A	SH.02
PROP C	1013A	SH.02
PROP C	1014A	SH.02
PROP C	1029A	SH.02
PROP C	1030A	SH.02
PROP C	1037A	SH.02
PROP C	1038A	SH.02
PROP C	1051A	SH.02
PROP C	1052A	SH.02
PROP C	1059A	SH.02
PROP C	1060A	SH.02
PROP C	M701A	SH.01
PROP C	M702A	SH.01
PROP C	M703A	SH.01
PROP C	M704A	SH.01
PROP C	M705A	SH.01
PROP C	M706A	SH.01
PROP C	M707A	SH.01

Area	Opening Number	HwSet
PROP C	M708A	SH.01
PROP C	M709A	SH.01
PROP C	M710A	SH.01
PROP C	M711A	SH.01
PROP C	M712A	SH.01
PROP C	M713A	SH.01
PROP C	M714A	SH.01
PROP C	M715A	SH.01
PROP C	M716A	SH.01
PROP C	M717A	SH.01
PROP C	M718A	SH.01
PROP C	M725A	SH.01
PROP C	M726A	SH.01
PROP C	M727A	SH.01
PROP C	M728A	SH.01
PROP C	M729A	SH.01
PROP C	M730A	SH.01
PROP C	M731A	SH.01
PROP C	M732A	SH.01
PROP C	M733A	SH.01
PROP C	M734A	SH.01
PROP C	M735A	SH.01
PROP C	M736A	SH.01

Area	Opening Number	HwSet
PROP C	M737A	SH.01
PROP C	M738A	SH.01
PROP C	M739A	SH.01
PROP C	M740A	SH.01
PROP C	M741A	SH.01
PROP C	M742A	SH.01
PROP C	M747A	SH.01
PROP C	M748A	SH.01
PROP C	M749A	SH.01
PROP C	M750A	SH.01
PROP C	M751A	SH.01
PROP C	M752A	SH.01
PROP C	M753A	SH.01
PROP C	M754A	SH.01
PROP C	M755A	SH.01
PROP C	M756A	SH.01
PROP C	M757A	SH.01
PROP C	M758A	SH.01
PROP C	M759A	SH.01
PROP C	M760A	SH.01
PROP C	M761A	SH.01
PROP C	M762A	SH.01
PROP C	M763A	SH.01



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Area	Opening Number	HwSet
PROP C	M764A	SH.01

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SECTION 08805 - SECURITY GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of security glass and glazing work is indicated on the drawings.

1.03 SUBMITTALS:

- A. Manufacturer's Data, Glass: Submit copies of manufacturer's specifications and installation instructions for each type of glass required. Include test data substantiating that glass complies with specified requirements.
- B. Manufacturer's Data, Glazing Materials: Submit copies of manufacturer's specifications, and installation instructions for each type of glazing sealant and compound, gasket and associated miscellaneous material required. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.
- C. Samples, Glass: Submit 12" square samples of each type of glass required. Architect's review of samples will be for color, texture, and pattern only. Compliance with other requirements is the exclusive responsibility of the Contractor. Insulating glass samples need not be hermetically sealed, but edge construction must be included.
- D. Guarantee, Laminated Glass: Submit copies of written guarantee, agreeing to replace laminated glass which fails in lamination within 5 years of the date of substantial completion. Failure in lamination is defined to include (but not necessarily limited to) evidence of delamination, loss of transparency, change in color or light transmittance, deterioration of concealed glass coatings or plastic sheet coatings, and other forms of deterioration due to defective materials or workmanship in the laminated glass.

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1.04 JOB CONDITIONS:

- A. The Contractor must examine the framing and glazing channel surfaces, backing, removable stop design, and the conditions under which the glazing is to be performed, and notify the Architect in writing of any conditions detrimental to the proper and timely completion of the work.
- B. Weather Conditions: Do not proceed with installation of liquid sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

PART 2 - PRODUCTS

2.01 GLASS (FIRE RATED - DETENTION) - WHERE NOTED

- A. Provide 1" clear inferno-lite 1CGCP1216QWW90 security glazing as manufactured by Global Security Glazing, Selma, Alabama, 1-800-633-2513.
  - 1. Thickness: 1" nominal.
  - 2. Construction: ¼" baroque wire, .050" urethane interlayer, 1/8" polycarbonate, .025 urethane interlayer, ¼" polycarbonate, .050" urethane interlayer, ¼" baroque wire.
  - 3. Weight: 10.81 pounds/square foot.
  - 4. Performance Testing:
    - a. Attack resistance: ASTM F-1 915 Grade 2, 40 minute containment rated HP white level IV-TP-0500.03 WMFL level III-30 minute physical attack
  - 5. Max Opening: Any size up to 10" x 33". 330 square inches of clear opening maximum.
  - 6. Applicable standards:
    - a. ANSI Z97.1
    - b. CPSC 16 CFR 1201 (CH 1 & 11)
    - c. ASTM C1036
    - d. ASTM C1349
    - e. UL9
    - f. UL10C

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2.02 GLASS (NON-FIRE RATED - DETENTION-ALL AREAS UNLESS NOTED OTHERWISE):

- A. Provide 1" clear Secur-Tem + Poly SP028 security glazing as manufactured by Global Security Glazing, Selma, Alabama, 1-800-633-2513.
  - 1. Thickness: .970" nominal/1".
  - 2. Construction: Symmetrical glass clad polycarbonate with heat strengthened or chemically strengthened glass on both exposed surfaces.
  - 3. Weight: 7.70 pounds/square foot.
  - 4. Performance Testing:
    - a. Attack resistance: ASTM F-1 915 Grade 1, HP white level IV-TP-0500.02  
WMFL level II-60 minute physical attack
  - 5. Max Opening: Any size up to 60" x 96".
  - 6. Applicable standards:
    - a. ANSI Z97.1
    - b. CPSC 16 CFR 1201 (CH 1 & 11)
    - c. ASTM C1036
    - d. ASTM C1349
    - e. ASTM C1422
    - f. ASTM C1048

2.03 GLAZING SEALANTS/TAPES:

- A. General: Glazing sealants and tapes for use with laminated type glass shall be as recommended by the specific glass manufacturer for use with their product and framing assembly into which it is to be installed.

2.04 MISCELLANEOUS GLAZING MATERIALS:

- A. Setting Blocks: Neoprene, 70-90 durometer hardness, with proven compatibility with sealants used.
- B. Spacers: Neoprene, 40-50 durometer hardness, with proven compatibility with sealants used.
- C. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

PART 3 - EXECUTION

3.01 STANDARDS AND PERFORMANCE:

- A. Protect glass from edge damage at all times during handling, installation and operation of the building.

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- B. Glazing channel dimensions as shown are intended to provide for necessary minimum bite on the glass, minimum edge clearance and adequate sealant thicknesses, with reasonable tolerances. The Glazier is responsible for correct glass size for each opening, within the tolerances and necessary dimensions established.
- C. Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are shown or specified, and except where manufacturer's technical representative direct otherwise.
- D. Comply with the latest editions of the GANA "Glazing Manual" and the GANA "Sealant Manual" by the "Glass Association of North America" except as shown and specified otherwise, and except as specifically recommended otherwise by the manufacturers of the glass and glazing materials.
- E. Inspect each piece of glass immediately before installation, and eliminate any which have observable edge damage or face imperfections.
- F. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other piece.

3.02 PREPARATION OF GLAZING:

- A. Clean the glazing channel, or other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to the substrate. Remove lacquer from metal surfaces wherever elastomeric sealants are used.
- B. Apply primer or sealer to joint surfaces wherever recommended by sealant manufacturer.
- C. Clean glass edges and faces to be in contact with sealant or glazing compounds with solvent to remove all traces of cutting oils or other contaminates.

3.03 GLAZING:

- A. Install setting blocks of proper size at quarter points of sill rabbet. Set blocks in thin course of the heel-bead compound, if any.

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- B. Provide spacers inside and out, and of proper size and spacing, for all glass sizes larger than 50 united inches. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Do not attempt to cut, seam, nip or abrade glass which is tempered, heat strengthened, or coated.
- D. Glazing tapes shall not be lapped at corners. Weld corners together by butting tapes. Recess 3/16 inch below stops.
- E. Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

3.04 CURE AND PROTECTION:

- A. Cure glazing sealants in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength, and surface durability.
- B. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during the construction period, including pieces damaged through natural causes, accidents and vandalism.

END OF SECTION 08805

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SECTION 09970 - TNEMEC COATING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coating systems for new secure steel doors and frames.

1.2 REFERENCES

- A. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer and Related Products.
- B. SSPC-SP 2 - Hand Tool Cleaning.
- C. SSPC-SP 3 - Power Tool Cleaning.
- D. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.
- E. SSPC-SP 11 - Power Tool Cleaning to bare metal.
- F. SSPC-SP 13/NACE 6 Surface Preparation of Concrete
- G. ICRI - Concrete Surface Preparation Standards

1.3 DEFINITIONS

- A. Definitions of Painting Terms: ASTM D 16, unless otherwise specified.
- B. Dry Film Thickness (DFT): Thickness of a coat of paint in fully cured state measured in mils (1/1000 inch).
- C. Concrete Surface Standard (CSP): Standard for roughness of the surface profile of the concrete measured 1-9 with 9 being the roughest measured with a visual mold.

1.4 SUBMITTALS

- A. Comply with Section 01340 - "Shop Drawings, Product Data and Samples".

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- B. Product Data: Submit manufacturer's product data for each coating, including generic description, complete technical data, surface preparation and application instructions.
- C. Color Samples: Submit manufacturer's color samples showing full range of standard colors.
- D. Manufacturer's Quality Assurance: Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
- E. Applicator's Quality Assurance: Submit list of a minimum of 5 completed projects of similar size and complexity to this Work. Include for each project:
  - 1. Project name and location.
  - 2. Name of owner.
  - 3. Name of contractor.
  - 4. Name of architect.
  - 5. Name of coating manufacturer.
  - 6. Approximate area of coatings applied.
  - 7. Date of completion.
- F. Warranty: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
  - 1. Specialize in manufacture of coatings with a minimum of 10 years successful experience.
  - 2. Able to demonstrate successful performance on comparable projects.
  - 3. Single Source Responsibility: Coatings and coating application accessories shall be products of a single manufacturer.
- B. Applicator's Qualifications:
  - 1. Experienced in application of specified coatings for a minimum of 5 years on projects of similar size and complexity to this Work.
  - 2. Applicator's Personnel: Employ persons trained for application of specified coatings.
- C. Preapplication Meeting: Convene a pre-application meeting [2] two weeks before start of application of coating systems. Require attendance of parties directly affecting work of this section, including Contractor, Architect, applicator and manufacturer's representative. Review the following:



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1. Environmental requirements.
2. Protection of surfaces not scheduled to be coated.
3. Surface preparation.
4. Application.
5. Repair.
6. Field quality control.
7. Cleaning.
8. Protection of coating systems.
9. One-year inspection.
10. Coordination with other work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
  1. Coating or material name.
  2. Manufacturer.
  3. Color name and number.
  4. Batch or lot number.
  5. Date of manufacture.
  6. Mixing and thinning instructions.
- B. Storage:
  1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.
  2. Keep containers sealed until ready for use.
  3. Do not use materials beyond manufacturer's shelf life limits.
- C. Handling: Protect materials during handling and application to prevent damage or contamination.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Weather:
  1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.
  2. Surface Temperature: Minimum of 5 degrees F (3 degrees C) above dew point.
  3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.

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- B. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with manufacturer's instructions.
- C. Dust and Contaminants:
  - 1. Schedule coating work to avoid excessive dust and airborne contaminants.
  - 2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Tnemec Company Incorporated, 6800 Corporate Drive, Kansas City, Missouri 64120-1372. Toll Free (800) 863-6321. Phone (816) 483-3400. Fax (816) 483-3969. Web Site [www.tnemec.com](http://www.tnemec.com).

2.2 NEW PAINTED INTERIOR STEEL (METAL DOORS, METAL FRAMES, ETC.)

- A. Chemical Exposure, Physical Abuse:
  - 1. System Type: Modified aromatic polyurethane/waterborne epoxy-amine adduct/ceramic modified waterborne aliphatic polyurethane.
  - 2. Surface Preparation: Clean, dry and free of oil, grease and other contaminants.
  - 3. Prime Coat: By manufacturer of doors and frames.
  - 4. Intermediate Coat: Tnemec Series 297 enviro-glaze at 2.0 to 3.0 mils DFT.
  - 5. Finish Coat: Tnemec Series 297 enviro-glaze at 2.0 to 3.0 mils DFT.

2.3 NEW PAINTED EXTERIOR STEEL (METAL DOORS, METAL FRAMES, ETC.)

- A. Chemical Exposure, Physical Abuse:
  - 1. System Type: Modified aromatic polyurethane/waterborne epoxy-amine adduct/ceramic modified waterborne aliphatic polyurethane.
  - 2. Surface Preparation: Clean, dry and free of oil, grease and other contaminants.
  - 3. Prime Coat: By manufacturer of doors and frames.
  - 4. Intermediate Coat: Tnemec Series 27 F.C. Typoxy at 3.0 to 4.0 mils DFT.
  - 5. Finish Coat: Tnemec Series Tnemec Series 1094 (Gloss)/Series 1095 Semi-Gloss at 2.0 to 3.0 mils DFT.

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2.4 ACCESSORIES

A. Coating Application Accessories:

1. Accessories required for application of specified coatings in accordance with manufacturer's instructions, including thinners.
2. Products of coating manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which coating systems are to be applied. Notify the General Contractor in writing of areas or conditions not acceptable. Do not begin surface preparation or application until unacceptable areas or conditions have been corrected.

3.2 PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED

- A. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
- B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

3.3 SURFACE PREPARATION OF STEEL

- A. Prepare steel surfaces in accordance with manufacturer's instructions.
- B. Fabrication Defects:
1. Correct steel and fabrication defects revealed by surface preparation.
  2. Remove weld spatter and slag.
  3. Round sharp edges and corners of welds to a smooth contour.
  4. Smooth weld undercuts and recesses.
  5. Grind down porous welds to pinhole-free metal.
  6. Remove weld flux from surface.
- C. Ensure surfaces are dry.

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- D. Interior Steel Surfaces, Moderate to Severe Exposure: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter in accordance with SSPC-SP6.
- E. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.
- F. Primer: Prepare field primer to receive field coat in accordance with manufacturer's instructions.

3.4 APPLICATION

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions.
- C. Keep containers closed when not in use to avoid contamination.
- D. Do not use mixed coatings beyond pot life limits.
- E. Use application equipment, tools, pressure settings and techniques in accordance with manufacturer's instructions.
- F. Uniformly apply coatings at spreading rate required to achieve specified DFT.
- G. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.
- H. Stripe paint with brush critical locations on steel such as welds, corners and edges using specified primer.

3.5 REPAIR

- A. Materials and Surfaces Not Scheduled To Be Coated: Repair or replace damaged materials and surfaces not scheduled to be coated.

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- B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture or color.
  
- C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

3.6 FIELD QUALITY CONTROL

- A. Inspector's Services:
  - 1. Verify coatings and other materials are as specified.
  - 2. Verify surface preparation and application are as specified.
  - 3. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges.
  - 4. Coating Defects: Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
    - a. Check for holidays on interior steel immersion surfaces using holiday detector.
  - 5. Report:
    - a. Submit written reports describing inspections made and actions taken to correct nonconforming work.
    - b. Report nonconforming work not corrected.
    - c. Submit copies of report to Architect, Owner's Representative and General Contractor.
  
- B. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

3.7 CLEANING

- A. Remove temporary coverings and protection of surrounding areas and surfaces.

3.8 PROTECTION OF COATING SYSTEMS

- A. Protect surfaces of coating systems from damage during construction.

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3.9 ONE-YEAR INSPECTION

- A. Owner will set date for one-year inspection of coating systems.
- B. Inspection shall be attended by Owner, Contractor, Architect and manufacturer's representative.
- C. Repair deficiencies in coating systems as determined by Architect in accordance with manufacturer's instructions.

END OF SECTION 09970

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SECTION 11193 - SECURITY HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK

- A. Security hollow metal doors, and steel frames for doors and side lites, as indicated on drawings.
- B. Metal trim and closures used in conjunction with security hollow metal work.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Finish Hardware is specified on the drawings.
- B. Security Glazing is specified on the drawings.

1.04 QUALITY ASSURANCE:

- A. Security Hollow Metal (SHM) Standard: Comply with ANSI/NAAMM HMMA 863.04 except as otherwise indicated.
- B. Provide Security Hollow Metal Work manufactured by a single firm specializing in the production of this type of work. Doors and frames shall come from the same manufacturer.
- C. Welders shall be currently qualified under AWS B2.1 to perform the type of work required.
- D. All welding requires complete penetration and fusion welds must remove parent materials when tested to failure. Refer to welding standards as defined in AWS D1.3 and RWMA, Resistance Welding Manual.
- E. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 and have been tested, listed, and labeled in accordance with ASTM E 152 by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction. Where fire-rated door or frame assemblies are indicated or required but essential detention features such as security

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glazing or accessories do not meet the criteria for labeling, manufacturer shall provide equivalent construction and "Certificate of Equivalence" along with specific documentation of why each door or frame assembly does not meet labeling criteria in the shop drawing submittal.

- F. Equivalent Construction: Where fire-rated door assemblies call for equivalent construction, manufacturer shall provide specific documentation of why each door assembly does not meet labeling criteria as well as documentation describing equivalent construction and certification that doors called for have been provided with equivalent construction.
- G. The Contractor shall designate, in writing, a quality control representative for installation of all frames. This organization shall be reviewed at the Security Coordination Meeting. The quality control representative shall personally check and verify each frame opening for tolerances specified. The tabular verification for masonry installation shall indicate check at setting, masonry half up and masonry completed around frame. The Contractor shall verify the final check. The frames will not be accepted unless verifications have been properly submitted and reviewed by Architect for Contract compliance. The frame shall be installed in strict accordance with tolerances for plumbness, squareness, alignment, and twist as defined in NAAMM Hollow Metal Manual, latest publication. The Contractor shall be responsible for providing quality control of the installation.
- H. Security Hollow Metal Manufacturers shall have at least 5 years of experience and 3 jobs of equal complexity which have been completed and occupied within the last 5 years. References shall include, but not be limited to, the following:
1. Name and location of project, date of occupancy and Contract value.
  2. Name, address and telephone number of the Owner's operations supervisor, Owner's maintenance supervisor, Architect, and General Contractor. Specific references regarding manufacturer's ability to coordinate with Security hardware installation are required.
  3. Manufacturer shall provide documentation of labeling ability as required on specific assemblies.
  4. Manufacturer shall provide documentation of any and all pending litigation as well as an audited financial statement for the most recently completed fiscal year.



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5. Manufacturer shall provide actual samples as well as any other information requested by the Architect.

I. Cut and form joints to hairline measurements. Make all exposed joints smooth and invisible. Grind all exposed welds smooth and flush. Form all arrises sharp and true. Miter all face joints.

1.05 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's data for fabrication and installation instructions.
- B. Shop Drawings: Submit shop drawings for the fabrication and installation of security hollow metal work. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, locations and installation requirements of finish hardware and reinforcements, and details of joints and connections.
- C. Provide a schedule of doors and frames using same reference numbers for details and openings as those on the contract drawings.
- D. Submit to Architect an independent testing laboratory report, certifying minimum performance data as stated above for a typical flush security door panel. Test report shall indicate all gauges of component parts and shall describe construction methods.
- E. Submit samples of the security doors and frames, including typical construction of frame joinery, lock edges, and reinforcements, door construction at top, bottom core and welds, and reinforcements at hinge.

1.06 DELIVERY, STORAGE AND HANDLING:

- A. Deliver security hollow metal work cartoned or crated to provide protection during transit and job storage.
- B. Inspect security hollow metal work upon delivery for damage. Minor damages may be repaired provided the finish items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.

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- C. Store security hollow metal and steel work at the building site under cover. Place units on at least 4" high wood sills or on floors in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber. Provide a ¼" space between stacked doors and panels to promote air circulation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide security hollow doors and frames by one of the following:
  - 1. Habersham Metal Products Co., Cornelia, GA
  - 2. Overly Manufacturing Co.
  - 3. Equal approved by Architect

2.02 SECURITY HOLLOW METAL FRAMES

- A. Construction: Frames shall be combination type with integral trim fabricated of cold rolled, or hot rolled, pickled and oiled steel sheets with clean, smooth surfaces. Joints shall be full welded unit type construction with contract edges closed tight and welds on exposed surfaces depressed smooth and flush. Fabricate molded members straight and true, with corner joints well formed and in true alignment and fastenings concealed where practicable. Frames for exterior openings shall be made of commercial grade steel conforming to ASTM A366. Frames for interior openings shall be either commercial grade cold rolled steel conforming to ASTM A366 or commercial grade hot rolled and pickled steel conforming to ASTM A569. Metal thickness for all frames shall be 12 gauge unless otherwise indicated in the schedule. Frames shall have fully mitered joints, excluding stops (stops shall be buttered or mitered), and shall be continuously welded (stitch welding is not equal) inside the miter across the full depth and width of the frame. Jambs, head, and sill shall be prepared to be firmly secured to walls and fully grouted. Mullions shall be provided with additional reinforcing as required or specified herein and shall be blocked off to prevent spillage of mortar or grout.
- B. Galvanizing: All exterior frames, and any other frames specifically designated in the schedule shall be galvanized. Frames specified as galvanized shall be zinc coated carbon steel in accordance with ASTM A526/A, 526M, G60 or A60 zinc coating, mill phosphatized.

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- C. Frames for Multiple or Special Openings: Shall have mullion and/or rail members which are closed tubular shapes, having no visible seams or joints on the faces. All joints between faces of abutting members shall be securely welded and finished smooth. Jambs, head, and sill shall be prepared to be firmly secured to walls and fully grouted. Mullions shall be provided with additional reinforcing as required or specified herein and shall be blocked off to prevent spillage of mortar or grout.
- D. Field Splicing: Frames shall be shipped as a complete unit where possible. When shipping limitations so dictate, frames for large openings shall be fabricated in smaller sections and designed for splicing in the field. Factory prepared splices shall be field assembled and welded by the installer. Exposed faces of all welded joints shall be dressed smooth. Components of frames shall be sheared, stamped, drilled or cut with a saw. Burning with a torch is not acceptable in the field or in the shop.
- E. Reinforcing: Frames shall be mortised, reinforced, drilled and tapped at the factory for templated mortised hardware in accordance with the approved hardware schedules and templates provided by the subcontractor for that section. Where surface mounted hardware is to be applied, frames shall have reinforcing plates installed and shall be drilled and taped in the field by the hardware installer.
1. Hinges: For mortise butts, provide a minimum 7 gauge x 1 ½" x 10" long reinforcing plate, offset at each hinge location and factory drilled and tapped. A 12 gauge by 1 ½" x 1 ½" x 2" long angle reinforcement shall be welded in place between the center of the reinforcement and the inside trim face of the frame to prevent deformation of the hinge reinforcement under door load. A mortar guard shall be welded in place on the back of the reinforcement, and filled with a urethane foam or otherwise made grout tight through proven performance, to prevent grout from entering the screw holes prior to hardware installation. For continuous hinges, provide ¼" thick piece of styrofoam backing, full height of door, behind hinge side of frame to protect field drills.
  2. Strike Plate: Shall have a 7 gauge reinforcement plate behind it that is securely welded to the frame 1" on four sides. The lock bolt shall engage in a punched opening in the reinforcing that matches the cut-out in the strike plate. Protect cut out with a pressed steel mortar guard on the inside of the frame.

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3. Lock, push button, and any other cutouts: Shall be reinforced and in accordance with the recommendation of the hardware manufacturer. Reinforcements shall be not less than 7 gauge steel. All cutouts shall be protected with pressed steel mortar guards on the inside of the frame. Holes for silencers shall be protected with mortar guards. The push button shall have no exposed fasteners and shall be recessed in the frame with a punched opening for the button only. The push button shall be accessible from the lock pocket.
- F. Floor Anchors: Where required in the Contract Documents, shall be formed or not less than 12 gauge steel and shall be securely welded at the bottom of each jamb. Adjustable floor anchors shall extend down to below the finish floor and provide not less than 2" height adjustment.
- G. Anchors in Masonry:
1. Jamb Anchors: Shall be adjustable anchors for the strap and stirrup type made from the same gauge steel as frame. Strap shall be no less than 2" x 10" in size, corrugated and/or perforated. The number of anchors provided on each jamb shall be as follows:
    - a. Frames up to 7'-6" height - 4 anchors evenly spaced
    - b. Frames from 7'-6" to 8'-0" height - 5 anchors evenly spaced
    - c. Frames over 8'-0" height - 1 anchor @ 16" o.c.
  2. Loose "T" anchors: Shall be provided at 16" o.c. at the heads of all masonry openings greater than 4'-0". "T" anchors shall be made from the same gauge steel as frame and shall be perforated to engage rebar in masonry lintels.
- H. Strap Bracing: Shall be 1 ½" wide and of the same gauge material as the frame in which it occurs. It shall be spot welded inside the throat of the frame. Locate As shown on the Drawings and required to prevent deformation of frame and provide additional anchoring when frame is grouted.
- I. Stiffeners: All frames shall be provided with steel spreader angles, temporarily attached to the bottom of both jambs, one on each side of the opening to serve as a brace during shipping and handling. The steel spreaders shall be removed by the Contractor prior to setting frames.

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- J. Removable Security Glazing Stops: In addition to meeting performance test requirements, the removable glazing stop shall consist of a 1 ¼" x 1 ¼" 10 gauge angle securely fastened to the frame using machine screws ¼"-28 or ¼"-20, Grade #8, 6 inches on center, a maximum of 3 inches from the corners. All exposed screw heads shall be round, pan, or oval, torx drive with center pin. The finished glass stop shall be tight fitting and mitered or notched to achieve a tight seam at the corner joints. Mortar guards covering all glazing stop screws shall be installed on all frames. Glazing stop shall provide for a minimum 1" glass engagement.
- K. Electrical Conduit: EMT shall be provided in mullions or other inaccessible locations of the frame to accommodate requirements of security Hardware Sets, Electronic Security items, and/or other items as shown on the Drawings or the schedules. Flexible conduit may be provided at locations with special installation requirements. All factory installed wireways should utilize permanent type plastic screw in "Chafe" bushings. Where wireways are created on assembly in the field, screw in "chafe" bushings shall also be used.
- L. Grout Access Holes: Shall be provided in all frames where access to the top of the frame will be obstructed during installation to prevent grouting from the top. The hole shall consist of a 1 ¼" x 1 ¼" cut out in the frame. A 1 ¾" x 3" 12 gauge back up plate with a 1 1/8" diameter circular cut-out shall be welded behind the frame cut-out. A 1 3/16" x 1 3/16" 12 gauge closer piece shall be provided with the frame for field welding after frame has been grouted solid. Installer shall field weld closer pieces. Field welds shall be cleaned, dressed smooth and primed so that location of grout access holes is not apparent after finishing. Location of grout access holes shall be as recommended by the manufacturer and Installer to achieve the requirements for grouting all heads, jambs and sill solid and shall be clearly shown on the shop drawings for review.
- M. Device Cut-outs: Devices shall be recessed in all frames where they are shown on the frame elevations or called out in the schedule. Face plates shall be secured with ¼"-20 torx type security screws. Device shall be protected in a mortar box which also prevents access to lock or locking devices. Conduit shall be separate from any locking or other monitoring device conduit. Templates shall be provided by the Electronic Security Contractor.

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- N. Electrical (and/or Electronic Security) Pocket, Cut-out and Closer Plate: Electrical devices shall be recessed in all frames where indicated on the frame elevation or called out in the schedule. Security closer plate, prepped to receive a nylon face plate mounted to it, shall be provided and the pocket shall be protected from grout. Cut-out shall be an 8" x 8" opening. A 9" x 9" 7 gauge back up plate with a 6" x 6" cut-out in its center shall be welded to the back of the cut-out in the frame. An 8" x 8" 12 gauge closer plate shall be provided with the frame. The closer plate shall be prepped to receive the electrical data access port or receptacle, outlet box and nylon face plate specified in Division 16 and 17. The Division 16 and Division 17 Contractors shall provide templates and physical samples of the device(s) to be used. Any exposed fasteners shall be torx type security screws with center pins. Security closer plate and backup plate shall be drilled and tapped to receive four (4) ¼-20 F.H. torx type security screws with center pins. Security closer plate cut-outs and locations of receptacles shall be coordinated with the Division 16 and Division 17 Contracts and shall be clearly shown on the Shop Drawings for review.
- O. Finish: After fabrication, all tool marks and surface imperfection shall be removed. Galvanize frames shall have all welds and ground areas touched up to match original galvanized material. Exposed faces of all welded joints shall be dressed smooth. Frames shall receive appropriate preparation to insure maximum adhesion and shall be coated on all surfaces with a shop coat of rust inhibitive primer which is fully cured prior to shipment and meets or exceeds test requirements specified.
1. Shop Primer for Ferrous Metal : Alkyd or Modified Alkyd Rust Inhibitive primer with VOC content not exceeding 340 grams/litre or 2.8 lbs/gallon, lead and chromate free, recommended by manufacturer for exterior exposure on iron or steel substrates and compatible with alkyd, latex and acrylic top coats. Series AK01 Shop Primer applied at 2.0-3.0 mils DFT.
  2. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, having VOC content not exceeding 340 grams/litre or 2.8 lbs/gallon and complying with SSPC-Paint-20 except containing no lead or chromate.

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2.03 SECURITY HOLLOW METAL DOORS

- A. General: Doors shall be of type and size as schedule, fabricated of cold rolled, pickled and oiled stretcher leveled steel sheets with clean smooth surfaces. Finished work shall be rigid, neat in appearance, and free of defects. Form molded members shall be straight and true, with joints coped or mitered, well formed, and in true alignment. Welded joints on exposed surfaces shall be dresses smooth, to be invisible.
1. All doors shall be custom made full flush design, internally reinforced, sound deadened and insulated. Doors shall receive security hardware of the types and sizes shown on the approved Shop Drawings and schedules.
  2. Door thickness shall be 2" unless otherwise indicated in the schedule. Manufacturer shall coordinate frame dimensions with the thickness of the doors.
- B. Galvanizing: All exterior doors, and other doors specifically designated in the schedule are to be galvanized. Doors specified as galvanized shall be zinc coated carbon steel sheet in accordance with ASTM A526, G60 zinc coating, mill phosphatized.
- C. Construction: Doors shall have mild steel face sheets continuously welded on edges and finished smooth so that there are no visible seams. The door shall be stiffened by continuous vertical formed steel Sections which, upon assembly, shall span the full thickness of the interior space between door faces. The stiffener shall be 16 gauge minimum, spaced so that the vertical interior webs shall be no more than 4" o.c. and securely fastened to both face sheets by spotwelds spaced a maximum of 3" o.c. vertically. Spaces between stiffeners shall be filled with mineral rock wool batt type material of three pound density. Vertical stiffeners shall be no more than 3" from edge of door and shall be full length between top and bottom edge channels. Cope at reinforcement plates.
- D. Edge Construction: Both vertical door edges shall be beveled 1/8" in 2" and shall be reinforced by continuous steel channels, not less than 10 gauge, extending the full length of the door welded (3" on center maximum) inside both faces. Top and bottom door edges shall be closed with continuous recessed 10 gauge channels extending the full width of the door and welded (3" on center maximum) inside both faces and continuously welded to the vertical door edge channels to form a continuous single perimeter frame inside the door

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with no cut-outs. At doors with jamb mounted locks, provide a punched opening only to receive the lock bolt (and roller bolt where required). Do not cut the edge channel to receive the entire lock strike or keeper.

- E. Closer Channel: The top and bottom recessed channel shall be fitted with an additional flush closer channel of not less than 16 gauge. The flush closer channel shall be welded in place at the corners and at the center. Installation of the closer channel using screws, security or otherwise, is not acceptable. The edge channel and flush closer channel shall be installed so that they are permanent and non-removable.
- F. Door Faces: Shall be of commercial quality leveled cold rolled steel conforming to ASTM A366 or hot rolled pickled and oiled steel conforming to ASTM A569 and shall be free of scale, pitting or other surface defects. Face sheet shall be 12 gauge unless otherwise indicated in the schedule.
- G. Appearance: All doors shall be strong, rigid and neat in appearance, free from warp, wind or buckle. All bends shall be true and straight and of minimum radius based on the gauge on metal used.
- H. Hardware Installation: Door edges shall be mortised and accurately cut, reinforced, drilled and tapped to receive templated mortised hardware in accordance with the approved hardware schedule and the hardware manufacturer's recommendations for the proper installation of all hardware and accessories. Where surface mounted hardware is to be applied, the manufacturer shall provide reinforcement plates only, drilling and tapping shall be done in the field by the hardware installer.
- I. Removable Security Glazing Stops: In addition to meeting performance test requirements, the removable glazing stop shall consist of a 1 1/4" x 1 1/4" 10 gauge angle securely fastened to the frame using machine screws 1/4"-28 or 1/4"-20, Grade #8, 6 inches on center, a minimum of 3 inches from the corners. All exposed screw heads shall be round, pan, or oval, torx drive with center pin. The finished glass stop shall be tight fitting and mitered or notched to achieve a tight seam at the corner joints. Glazing stop shall provide for a minimum 1" glass engagement.
- J. Finish: After fabrication, all tool marks and surface blemishes shall be filled and sanded as required to make both faces and both vertical edges smooth and free of irregularities. Galvanized doors shall have all welds and



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ground areas touched up to match original galvanized material. After appropriate preparation to insure maximum adhesion, all exposed surfaces shall receive a shop coat of rust inhibitive primer which is full cured prior to shipment and meets or exceeds test requirements specified.

1. Shop Primer for Ferrous Metal: Alkyd or Modified Alkyd Rust Inhibitive primer with VOC content not exceeding 340 grams/litre or 2.8 lbs/gallon, lead and chromate free, recommended by manufacturer for exterior exposure on iron or steel substrates and compatible with alkyd, latex and acrylic top coats. Tnemec Series AK01 Shop Primer applied at 2.0-3.0 mils DFT.
2. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, having VOC content not exceeding 340 grams/litre or 2.8 lbs/gallon and complying with SSPC-Paint-20 except containing no lead or chromate.
3. All exposed surfaces shall receive two shop coats of a rust inhibitive primer which meets or exceeds ASTM B 117 salt spray for 150 hours, and ASTM D 1735 water fog test for organic coatings for 200 hours, and which is full cured prior to shipment.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install security hollow metal units and accessories in accordance with the final shop drawings, manufacturer's data, and as herein specified.
- B. Set all work accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
- C. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

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E. Make field splices in frames as detailed on final shop drawings, welded and finished to match factory work.

F. Door Installation:

1. Fit security hollow metal doors accurately in their respective frames, with the following clearances:
  - a. Jams and Head: 1/8"
  - b. Meeting edges, pairs of doors: 1/8"
  - c. Bottom: 3/4", where no threshold.
  - d. Bottom: Over threshold 1/4"

3.02 ADJUST AND CLEAN:

A. Final Adjustments: Check and re-adjust operating finish hardware items in security hollow metal work just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

B. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

END OF SECTION 11193