



# Project Manual

## **Coquina Beach**

## **Beach Side Restroom Renovation**

for

manatee county government  
bradenton, florida

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commission no.:        0920829

## **100% Construction Documents**

**Divisions 01 thru 26**

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**TITLE PAGE**

**COQUINA BEACH  
BEACH SIDE RESTROOM RENOVATION**

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PROCUREMENT AND CONTRACTING  
REQUIREMENTS GROUP





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SECTION 00 73 00  
SUPPLEMENTARY CONDITIONS

1 - GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

Add the following definitions or sentences to the General Conditions Section

Engineer – Engineer or Architect of record.

Engineering – Professional work done by either a registered Engineer or an Architect.

Work – (Add the following sentence to the end of the Subparagraph) "...The Contractor acknowledges and agrees that the Contract Documents are sufficient to provide for the completion of the Work and include Work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in accordance with applicable laws, codes, and customary standards of the construction industry."

Supplier –(Add the following sentence to the end of the Subparagraph) "... The term "supplier" as used herein, includes a firm or organization furnishing or delivering products directly to the jobsite, and because of such direct delivery, could be construed under the lien laws of the State in which the work is being performed as having lien rights against the funds due the Contractor. Suppliers of material and equipment, delivering to Contractor or Subcontractor on an open account basis and not having lien rights on the Work, will not be considered suppliers within the meaning of the Contract Documents.

1.2 MISCELLANEOUS DEFINITIONS

- A. The term "product" as use herein includes materials, systems, and equipment.
- B. A bidder selected to enter into a Contract with the Owner for Work included under the bidder's proposal is termed an "Awardee," until such time as he is awarded a Contract and becomes the Contractor.
- C. Where "complete" is used, it shall mean "complete with connections, supports, attachments and incidental items necessary for a finished and properly operating assembly or installation."
- D. The term "furnish" - to supply (only) to another party for their use of installation, including cost of delivery and unloading at the jobsite.
- E. The term "install" - to distribute, uncrate, assemble, and fix into the intended final positions, the installer to provide all miscellaneous hardware and supplies required to anchor and support securely, clean-up, and dispose of rubbish.
- F. The term "connect" - to bring service(s) to point of installation and make final connections to the service(s) to the installed equipment, and to provide miscellaneous auxiliary appurtenances necessary to make operable for its intended use.



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- G. The term "provide" - to furnish, install, and connect complete.
- H. The term "or equal" means an equal approved in writing by the Architect at least 10 days prior to bid receipt, and listed in an Addendum.

1.3 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

The intent of Contract Documents is to include all items necessary for the proper execution and completion of the Work by the contractor. The contract documents are complementary, and what is required by one shall be as binding as if required by all. If there should be a conflict between two or more of the Contract Documents, the following order of interpretation shall apply:

- A. The terms and conditions as set forth in the Bidding Requirements, including legal advertisement thereof, shall have full force and effect until such time as the Standard Form of Agreement between Owner and Contractor is executed between the Owner and the Awardee.
- B. Where there is a conflict between the Bidding Requirements and the Contract Documents, the Contract Documents shall govern.
- C. Where there is conflict between the requirements of the General Conditions of the Contract and the Supplementary Conditions, the requirements of the Supplementary Conditions shall govern, except where the requirements set forth in the Supplementary Conditions are contrary to law, in which case the legal requirements shall govern. The General Conditions of the Contract shall take precedence over other Contract Documents.
- D. Where there is conflict between the Drawings and Specifications and conflict within the Drawings or within the Specifications, the conflict, where applicable, shall be resolved by providing better quality or greater quantity as indicated in the Contract Documents.
- E. It is the intent of the Contract Documents to accomplish a complete and first-grade installation in which there shall be installed new products of the latest and best design and manufacturer, and workmanship shall be thoroughly first class, executed by competent and experienced workmen.
- F. Details of preparation, construction, installation, and finishing encompassed by the Contract Documents shall conform to the best practices of the respective trades, and that workmanship, construction methods, shall be of first class quality so as to accomplish a neat and first class finished job.
- G. Where specific recognized standards are mentioned in the Specifications, it shall be interpreted that such requirements shall be complied with.
- H. The intent of the Contract Documents is to include all labor, equipment, and materials necessary for the proper and timely execution and completion of the Work, even though such labor, equipment, materials are not expressly included in the Contract Documents.
- I. The Contract Documents are complimentary, and what is required by one will be as binding as if required by all.



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- J. The Contractor will be required to perform all parts of the Work, regardless of whether the parts of the Work are described in Sections of the Contract Documents applicable to other trades.

2 - OWNER

2.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

- A. Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing structures including those charges and costs related to zoning changes, environmental impact statements, and similar requirements related to use of the site."
- B. The Owner shall not be responsible for furnishing surveys (unless required for the execution of the Work and requested by the Contractor in writing) or other information as to the physical characteristics of, legal limitations of, or utility locations for the Project site, but as necessary for the Work, shall furnish or cause to be furnished to the Contractor a legal description of the project site, which shall not constitute one of the Contract Documents. The Contractor shall confirm the location of each utility; shall relocate or dispose of each on-site utility and shall cap each utility as required by the Work or the Specifications. The Contractor shall not be entitled to additional compensation resulting from its failure to confirm the location of the site utilities or existing structures prior to the opening of its bid.

3 - CONTRACTOR

3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

- A. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.
- B. Where there is a conflict in or between the Drawings and Specifications, the Contractor shall be deemed to have estimated on the more expensive way of doing the Work and the larger quantity required. Only changes or interpretations covered by Addenda or written from the Architect will be permitted during construction of the Work. The Contractor shall perform no portion of the Work at any time without Contract Documents or where required, received Shop Drawings, Product Data, or Samples for such portion of the Work.
- C. Because the Contract Documents are complimentary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to the portion of the Work, as well as the information furnished by the Owner as it applies to the scope of work. Contractor shall be responsible for field measurements and shall take notice of all site conditions effecting the project and project scope. Contractor shall inform the Owner and Architect of such observations and their impact on the project in its entirety. The Contractor shall promptly inform the Architect of any errors, omissions,



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or inconsistencies in the Contract Documents discovered through review, request for information, change orders, or any other means in a format that Architect defines with a clear description of the item and its impact on the project scope. Before ordering material or performing any Work, the contractor shall verify all measurements at the Project site. Any differences between dimensions on the Drawings and actual measurements shall be brought to the Architect's attention for consideration before the Work proceeds. Where actual measurements require more material and work than the Drawings call for, such material and Work shall be supplied at the cost of the Contractor. No extra compensation will be allowed because of difference between actual measurements and dimensions indicated on the Drawings. The Contractor shall assume full responsibility for accuracy of measurements obtained at the work site.

- D. If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information the Contractor shall make Claims per specifications and inform the Architect in writing. If the Contractor fails to perform this obligation in a timely manner adequate for a reasonable response and adjustments by the Architect/Owner, the Contractor shall pay for such costs of damages to the Owner.
- E. Mechanical and Electrical Drawings are diagrammatic only. Actual work involved shall be installed from received Shop Drawings with all measurements obtained at the Project Site by the Contractor.
- F. Dimensions which are lacking from the Drawings shall be obtained from the Architect or field verified. In no case will the Contractor assume that the Drawings are scaled.
- G. General contractor is responsible for securing all permits and for permit fees. Contractor is responsible for all permits, fees, licenses, and inspections by government agencies necessary for proper execution and completeness of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded. Certain permits have been obtained by the Owner, it is the responsibility of the Contractor to coordinate with the Owner and determine the outstanding permit requirements and balance of fees associated with the permits.

### 3.2 WARRANTY AND LABOR AND MATERIALS

- A. Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of Work.
- B. The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper conditions to receive subsequent Work. Architect shall reserve a right to inspection of construction to assure compliance to the Contract Documents. Contractor shall be responsible for Work compliance to the Contractor Documents.
- C. The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free of defects. In



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addition to any other warranties, guarantees, or obligations set forth in the Contract Documents or applicable as a matter of law and not in limitation of the terms of the Contract Documents, the Contractor warrants and guarantees that:

1. The Owner will have good title to the Work and materials and equipment incorporated into the Work will be new.
  2. The Work and materials and equipment incorporated into the Work will be free from defects, including defects in the workmanship or materials.
  3. The Work and equipment incorporated into the Work will be fit for the purpose for which they are intended.
  4. The Work and materials and equipment incorporated into the Work will be merchantable.
  5. The Work and materials and equipment incorporated into the Work will conform in all respects to the Contract Documents.
- D. The Contractor shall, upon completion of the Work, assign to the Owner all warranties obtained or obtainable by, the Contractor from manufacturers and suppliers of equipment and materials incorporated into the Work by written instrument of assignment in a form acceptable to the Owner.
- E. For a period of three years from the date of final completion and acceptance of the Work by the Owner, as evidenced by the date of the Substantial Completion, the Contractor warrants to the Owner all movable windows, apparatus, machinery, mechanical and electrical equipment. For the same period, the Contractor warrants to Owner to make good, at his own expense, any defects, shrinkages, warpages or other faults in Work required under this Contract arising out of defective materials or workmanship, ordinary wear and tear excepted.
- F. As part of the above warranty, it is expressly understood and agreed that the Contractor warrants that the Contractor's portion of the Work shall be waterproof and weatherproof in every respect for a period of three (3) years from the Date of Substantial Completion.
- G. The Contractor warrants and represents to the Owner that the Drawings and Specifications for the Work are suitable and adapted for said Work, and guarantees the sufficiency of said Drawings and Specifications for their intended purpose and agrees that it will perform said construction work and complete same to the entire satisfaction of the Owner and Architect.
- H. In addition to all of Contractor's warranties and obligations to correct defective Work provided by law or as set forth in any of the Contract Documents, the Contractor agrees, upon notice from Owner or Architect, immediately to repair, restore, correct and cure, at Contractor's expense, all defects and omissions in workmanship and materials and all failures to comply with the Contract Documents which appear within three (3) years from the Date of Substantial Completion. Contractor shall pay for, and if requested, correct, repair, restore and cure any damage or injury, whenever the same shall occur or appear, resulting from any defects, omissions or failure in workmanship and materials, and indemnify, hold harmless, and defend Owner against any and all claims, losses, costs, damages and expenses, including attorney's fees, suffered by Owner as a result of such damage or injury, whenever such damage or injury shall occur or appear.
- I. The foregoing guarantees and warranties shall not shorten any longer warranty or liability period provided for by law or in the plans, drawings or specifications or otherwise received



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from Contractor or any subcontractor, material supplier or manufacturer of Contractor nor supersede the terms of any liability for defective Work, but shall be in addition thereto, and shall be in addition to all manufacturer's and factory warranties.

- J. All guarantees or warranties upon any Work, labor, materials, or equipment by any subcontractor or material supplier of Contractor shall be deemed made by Contractor to Owner. All guarantees and warranties shall survive Owner's final acceptance of the Project. Neither the acceptance of any of the Work by Owner, in whole or in part, nor any payment, either partial or final, by Owner to Contractor, shall constitute a waiver by Owner of any claims against Contractor for defects in the Work, whether latent or apparent, and no such payment or acceptance of the Work by Owner shall release or discharge Contractor or Contractor's surety from any such claims for breach of such warranties.
- K. The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the project site during the performance of the Work. The superintendent shall represent the Contractor and communication given by the superintendent shall be as binding as if they were given by the Contractor. The Superintendent shall be satisfactory to the Architect and the Owner, and the Architect and Owner shall have the right to require the Contractor to remove a Superintendent and replace with a Superintendent who is satisfactory to the Architect and Owner. The Contractor shall not replace the Superintendent without the consent of the Architect and Owner, except with another Superintendent who is satisfactory to the Architect and Owner.
- L. The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to perform the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributed to corrections.
- M. All observed or uncovered conditions on site that differ than those anticipated by the Contract Documents shall be reported to the Architect for investigation and direction. The Contractor shall inform the Architect of such conditions no later than 21 days after the first observance of such conditions.
- N. The Contractor shall submit a schedule of Work to the Owner and Architect promptly after the contract award.
- O. The Contractor shall perform Work so as not to interfere with the Owner's ongoing activities and so as not to create any hazards to the Owner's employees or members of the public using the Owner's property.
- P. Upon notice of award, the Contractor shall immediately apply for all applicable permits not previously obtained by the Owner to do the work from the appropriate governmental agency or agencies. No work shall commence until all applicable permits have been obtained and copies delivered to the Engineer. The costs for obtaining all permits shall be borne by the Contractor.
- Q. Within 30 days of the date of Notice to Proceed, the Contractor shall submit to the Engineer and Owner a Hurricane Preparedness Plan. The plan should outline the



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necessary measures which the Contractor proposes to perform at no additional cost to the Owner in case of a hurricane warning.

- R. In the event of inclement weather, or whenever Engineer shall direct, Contractor shall insure that he and his Subcontractors shall carefully protect work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any portion of work or materials is damaged due to the failure on the part of the Contractor or Subcontractors to protect the work, such work and materials shall be removed and replaced at the expense of the Contractor.
- S. The Contractor shall do all groundwater pumping necessary to prevent flotation of any part of the work during construction operations with his own equipment. The Contractor shall pump out water and wastewater which may seep or leak into the excavations for the duration of the Contract and with his own equipment. He shall dispose of this water in an appropriate manner.
- T. The Contractor shall not create a public nuisance including but not limited to encroachment on adjacent lands, flooding of adjacent lands, excessive noise or dust. Sound levels must meet Manatee County Ordinance #87-34, (which amends Ordinance 81-3, The Manatee County Noise Control Ordinance) or latest edition of the ordinances. Sound levels in excess of such ordinance are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the Engineer or County f or excessive noise shall not relieve the Contractor of the other portions of this specification including, but not limited to contract time and contract price. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

### 3.3 PROTECTION OF PROPERTY AND PERSONS

- A. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Work under this Contract. The Contractor shall promptly remedy any damages and loss caused to the property or persons.
- B. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:
  - .1 employees on the Work and other persons who may be affected.
  - .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
  - .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of Construction.



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4 - ARCHITECT

4.1 GENERAL

- A. The term "Architect," "Architect/Engineer," or "Engineer" as used herein means the Architect or his authorized representative.
- B. To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the Work or any site safety responsibilities which are the responsibility of the Contractor. Contractor shall further indemnify the above agents from any unforeseen damages to the Work or materials due to accidental causes or natural causes. The Contractor shall also indemnify the above stated agents from all royalty and patent rights, all associated fees for royalty and patents shall be the responsibility of the Contractor.
- C. The Architect shall provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during the construction until the date the Architect issues the final Certificate For Payment. The Architect shall have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents. The Architect shall not be held responsible for construction means, methods, technique, sequences or procedures of any safety precautions.
- D. Based on the Architect's evaluations of the Contractor's Application for Payment, the Architect shall review and certify the amounts due to the Contractor and will issue Certificates for Payment in such amounts. See Submittals section in the specifications for more info on Certificates of Payment procedures.
- E. Architect has authority to reject Work that does not comply with the Contract Documents. Architect shall have the authority to require inspections or testing of the Work whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor or any other subcontractors, suppliers, installers or their agents or employees, or any entities performing portions of Work.
- F. Interpretations and decisions of the Architect will be consistent with the intent of the Construction Documents and will be made in writing or drawing format. The Architect will endeavor to secure faithful performance by both the Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

5 - SUBCONTRACTORS

5.1 AWARD OF SUBCONTRACTORS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

- A. The Contractor shall furnish to the Architect in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work, in accordance with the requirements under Specification Section 01300, Submittals, in a form acceptable to the Architect, for review by the Owner and the Architect.



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- B. The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objections to such substitution. The Owner may require the Contractor to change a Subcontractor or Sub-subcontractor previously approved, and, if at such time the Contractor is not in default under this Agreement, the Contract sum shall be increased or decreased by the difference in the cost resulting from the change.
- C. Any part of the Work performed for the Contractor by a Subcontractor or its Sub-subcontractor shall be pursuant to a written Subcontract between the Contractor and such Subcontractor (or the Subcontractor and its Sub-subcontractor at any tier). Architect will assume no responsibility for reviewing, monitoring, or verifying activities or relationships involving a Subcontractor or its Sub-subcontractor.

5.2 DELAYS AND EXTENSION OF TIME

- A. If the Contractor is delayed at any time in its progress of the Work by one of the delays for which an extension of time is permitted and gives the Architect written notice specifically describing the delay within 48 hours of its commencement, the date for the Substantial Completion of the Work will be extended by Change Order for such reasonable time as the Architect may determine. The failure to give such notice will constitute an irrevocable waiver of the contractor's right to seek an extension of the time for completion will be delays caused by the i) Architect, or the Owner, ii) physical damage to the Project over which the Contractor has no control, iii) labor disputes beyond the control of the Contractor, and iv) unusually severe weather conditions not reasonably anticipated (temperature, rain, or other precipitation within a range of twenty percent (20%) of normal amounts for the time of the year covered by the Agreement shall not be considered unusually severe weather conditions). Extensions of time will only be granted pursuant to the procedures for Change Orders set forth in the General Conditions. The Contractor agrees not to make claims for compensation for delays or acceleration in the performance of the Work resulting from acts or failure to act by the Owner, the Architect, or the employees, agents, or representatives of the Owner, or the Architect and agrees that such claim shall be fully compensated by an extension of time to complete the Work, regardless of when granted.
- B. If in the opinion of the Architect the Work is behind where it is supposed to be in the Project Time Schedule or it is likely that the Work will not be substantially complete by the applicable date for Substantial Completion, the Contractor upon written notice from the Architect and without additional cost or compensation will increase its work force and, if requested by the Architect, work such overtime to make up for the delay. Should the Contractor fail to increase its work force, work overtime, or proceed to make up for the delay to the satisfaction of the Architect or the Owner, the Architect or the Owner, in addition to other remedies under this Agreement and other Contract Documents, will have the right to cause other Contractors to work overtime and to take whatever other action is deemed necessary to avoid delay in the Substantial Completion of the Work and of the Project, and the cost and expense of such overtime and other action will be borne by the Contractor and may be set off against sums due the Contractor.



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6 - UNCOVERING AND CORRECTION OF WORK

6.1 CORRECTION OF WORK

- A. Within 48 hours after written notices from the Architect, or the Owner (except such period shall be 7 days when notice is given after final payment) that the work does not conform to the Contract Documents, or immediately upon oral notice, if the nonconformance constitutes a threat to the safety of persons or property, the Contractor, without waiting for the resolution of disputes that may exist i) shall commence to correct such nonconformance, ii) shall thereafter use its best efforts to where an extension of time is granted in writing by the Owner, shall complete necessary corrections so that the nonconformance is eliminated to the satisfaction of the Architect, and the Owner within 7 days of such notice. The Contractor shall bear all costs of correcting the nonconformance, including additional testing and inspections and additional service fees of the Architect. The notice provided for in this Subparagraph may be given at any time. It is the intent that the obligations under this Subparagraph shall continue to apply after final completion and final payment.
- B. If the Contractor fails to correct nonconforming Work the Owner may correct it in accordance with Contract. If the Subcontractor does not proceed with correction of such nonconforming Work as provided in the Contract, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense.

6.2 ACCEPTANCE OF NONCONFORMING WORK

- A. The acceptance of nonconforming Work by the Owner shall be by written Change Order, signed by the Owner's authorized representative. No person has authority to accept nonconforming work except pursuant to such written Change Order.

7 – CONTRACT CLOSEOUT

7.1 SUBSTANTIAL COMPLETION

- A. The Contractor shall submit the following items when the Contractor considers the work to be substantially complete:
1. A written notice that the work, or designated portion thereof, is substantially complete.
  2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, the Architect and Owner shall make an inspection to determine the status of completion.
- C. Project record documents and operations and maintenance manuals must be submitted before the project shall be considered substantially complete.
- D. If the Architect determines that the work is not substantially complete:



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1. The Architect shall notify the Contractor in writing, stating the reasons.
  2. The Contractor shall remedy the deficiencies in the work and send a second written notice of substantial completion to the Architect.
  3. The Architect shall re-inspect the work.
- E. When the Architect finds that the work is substantially complete:
1. He shall prepare and deliver to the Owner a tentative Certificate of Substantial Completion with a tentative list of the items to be completed or corrected before final payment.
  2. The Architect shall consider any objections made by the Owner as provided in Conditions of the Contract. When the Architect considers the work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

### 7.2 FINAL INSPECTION

- A. When the Contractor considered the work to be complete, he shall submit written certification stating that:
1. The Contract Documents have been reviewed.
  2. The work has been inspected for compliance with Contract Documents.
  3. The work has been completed in accordance with Contract Documents.
  4. The equipment and systems have been tested in the presence of the Owner's representative and are operational.
  5. The work is completed and ready for final inspection.
- B. The Architect shall make an inspection to verify the status of completion after receipt of such certification.
- C. If the Architect determines that the work is incomplete or defective:
1. The Architect shall promptly notify the Contractor in writing, listing the incomplete or defective work.
  2. The Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to Architect that the work is complete.
  3. The Architect shall re-inspect the work.
- D. Upon finding the work to be acceptable under the Contract Documents, the Engineer shall request the Contractor to make closeout submittals.



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- E. For each additional inspection beyond a total of three (3) inspections for substantial and final completion due to the incompleteness of the work, the Contractor shall reimburse the Owner for the Architect's fees.

### 7.3 CONTRACTOR'S CLOSOUT SUBMITTALS TO ARCHITECT

- A. Project Record Documents (prior to substantial completion).
- B. Operation and maintenance manuals (prior to substantial completion).
- C. Warranties and Bonds.
- D. Evidence of Payment and Release of Liens: In accordance with requirements of General and Supplementary Conditions.
- E. Certificate of Insurance for Products and Completed Operations.
- F. Final Reconciliation, Warranty Period Declaration, and Contractor's Affidavit.

### 7.4 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the Architect.
- B. Statement shall reflect all adjustments to the Contract Sum.
- C. Project Management shall prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.
- D. Final application for payment shall be made per contract document procedures.

END OF SECTION 00 73 00



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SECTION 00 80 00  
MEASUREMENT, PAYMENT AND COMPLETION

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 The scope of this section of the Contract Documents is to further define the items included in each Bid Item in the Bid Form section of the Contract Documents. Payment will be made based on the specified items included in the description in this section for each bid item.
- B. All contract prices included in the Bid Form section will be full compensation for all shop drawings, working drawings, labor, materials, tools, equipment and incidentals necessary to complete the construction as shown on the Drawings and/or as specified in the Contract Documents to be performed under this Contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in the manner set up for each item in this section of the Specifications. Payment for all items listed in the Bid Form will constitute full compensation for all work shown and/or specified to be performed under this Contract.
- C. The quantities shown are approximate and are given only as a basis of calculation upon which the award of the Contract is to be made. The Owner/Engineer docs not assume any responsibility for the final quantities, nor shall the Contractor claim misunderstanding because of such estimate of quantities Final payment will be made only for satisfactorily completed quantity of each item.
- D. No payment will be made for work constructed outside the authorized limits of work.
- E. Unless otherwise specified for the particular items involved, all measurements of distance shall be taken horizontally or vertically.
- F. Where payment for items is shown to be paid for on a lump sum basis, no separate payment will be made for any item of work required to complete the lump sum items. Lump sum contracts shall be complete, tested and fully operable prior to request for final payment. Contractor may be required to provide a break-down of the lump sum totals.

1.3 UNIT PRICE

- A. Separate payment will be made for the items of work described herein and listed on the Bid Form. Any related work not specifically listed, but required tor satisfactory completion of the work shall be considered to be included in the scope of the appropriate listed work items.



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- F. No separate payment will be made for the following items and the cost of such work shall be included in the applicable pay items of work. Final payments shall not be requested by the Contractor or made by the Owner until as-built (record) drawings have been submitted and approved by the Engineer.
1. Shop Drawings, Working Drawings.
  2. Clearing, grubbing and grading except as hereinafter specified.
  3. Trench excavation, including necessary pavement removal and rock removal, except as otherwise specified.
  4. Dewatering and disposal of surplus water.
  5. Structural fill, backfill, and grading.
  6. Replacement of unpaved roadways, and shrubbery plots.
  7. Cleanup and miscellaneous work.
  8. Foundation and borrow materials, except as hereinafter specified.
  9. Testing and placing system in operation.
  10. Any material and equipment required to be installed and utilized for the tests.
  11. Pipe, structures, pavement replacement, asphalt and shell driveways and/or appurtenances included within the limits of lump sum work, unless otherwise shown.
  12. Maintaining the existing quality of service during construction.
  13. Maintaining or detouring of traffic.
  14. Appurtenant work as required for a complete and operable system.
  15. Seeding and hydromulching.
  16. As-built Record Drawings.

### 1.4 BID ITEM DESCRIPTIONS

- A. Bid Items are described in a greater detail below.

**Bid Item No. 1: MOBILIZATION/DEMOBILIZATION:** Payment for all work under MOBILIZATION/DEMOBILIZATION shall be paid for at a lump sum price. The contract lump sum price paid for MOBILIZATION/DEMOBILIZATION shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work in this category. MOBILIZATION shall include but not be limited to: obtaining bonds, insurance and financing, movement of equipment, materials and personnel, supervision, field office, certificates, permits, submittals, utilities, site maintenance, cleanup, dust control and all other work incidental to the contract per drawings and specifications. The cost for MOBILIZATION/DEMOBILIZATION shall not exceed five (5) percent of the total bid for this project without documented justification and approval by the owner.

**Bid Item No. 2: TEMPORARY EROSION CONTROL:** Payment for all work under TEMPORARY EROSION CONTROL shall be paid for at a lump sum price. The contract lump sum price paid for TEMPORARY EROSION CONTROL shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals to install, maintain, and remove all required TEMPORARY EROSION CONTROL, including drainage inlet protection, fiber rolls, erosion control fencing, tree protection, construction entrances, and any other temporary erosion control measures as may be required by the Project permits or permitting agencies, as shown on the plans, as specified herein, and as directed by the Architect.



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**Bid Item No. 3: DEMOLITION** Payment for all work under DEMOLITION shall be paid for at a lump sum price. The contract price paid for DEMOLITION shall include all work and materials per plans and specifications. Sum shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in DEMOLITION. This sum shall be inclusive of entire project scope per plans and specifications for materials, installation/labor, storage, maintenance, testing and all other aspects of work associated with DEMOLITION. Scope shall include but not be limited to: all demolition, material removal, temporary shoring and temporary structure. See drawings and specifications for complete scope of work.

**Bid Item No. 4: SITE WORK - COMPLETE** Payment for all work under SITE WORK - COMPLETE shall be paid for at a lump sum price. The contract price paid for SITE WORK - COMPLETE shall include all work and materials per plans and specifications. Sum shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in SITE WORK - COMPLETE. This sum shall be inclusive of entire project scope per plans and specifications for materials, installation/labor, storage, maintenance, testing and all other aspects of work associated with SITE WORK - COMPLETE. Scope shall include but not be limited to: excavation, fences, gates, and miscellaneous concrete. See drawings and specifications for complete scope of work.

**Bid Item No. 5: LANDSCAPE AND IRRIGATION** Payment for all work under LANDSCAPE AND IRRIGATION shall be paid for at a lump sum price. The contract price paid for LANDSCAPE AND IRRIGATION shall include all work and materials per plans and specifications. Sum shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in LANDSCAPE AND IRRIGATION. This sum shall be inclusive of entire project scope per plans and specifications for materials, installation/labor, storage, maintenance, testing and all other aspects of work associated with LANDSCAPE AND IRRIGATION. See drawings and specifications for complete scope of work.

**Bid Item No. 6: BUILDING - COMPLETE** Payment for all work under BUILDING - COMPLETE shall be paid for at a lump sum price. The contract price paid for BUILDING - COMPLETE shall include all work and materials per plans and specifications. Sum shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in BUILDING - COMPLETE. This sum shall be inclusive of entire project scope per plans and specifications for material removal, labor, clean up, and all other aspects of work associated with BUILDING - COMPLETE. Scope shall include but not be limited to: all building systems and components as described in drawings and specifications, exterior envelope, roof, all interior components, painting, finishes, casework, and all other scope not covered by other bid sections. See drawings and specifications for complete scope of work.

**Bid Item No. 7: DISCRETIONARY WORK** Payment for all work under DISCRETIONARY WORK shall be made only at the Owner's discretion in order to satisfactorily complete the project in accordance with the Plans and Specifications.



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**Bid Item No. 8: HAZARDOUS MATERIAL REMOVAL** HAZARDOUS MATERIAL REMOVAL price shall be provided to the owner and shall not be part of the total bid price. This bid item is reserved to be used if any hazardous materials are discovered at the site and need to be mitigated in order to complete the Work per drawings and specifications. Contractor shall price 1 cubic yard or hazardous material removal and replacement of that material with a healthy material as needed to complete the Work as drawn and specified. Contractor shall price all work associated with removal and replacement of such material including but not limited to: all associated labor, equipment, transportation, healthy material replacement, and any associated price change in any work affected by this bid item as it pertains to completion of Work as drawn and specified. Contractor shall not add this price to the bid amount and shall use this unit price (CY) amount only if hazardous materials are discovered at the site. No work under this bid item shall be furnished without the written approval and agreement from the Owner. Contractor shall use this price for any (small or large) amount of work to be done under this bid item.

1.5 APPLICATIONS FOR PAYMENT

- A. Applications for payment shall be made at approximately 30 day intervals in accordance with the dates established in the Standard Form of Agreement Between Owner and Contractor. At least 15 days before each progress payments falls due, the Contractor shall submit to the Architect, in quintuplet, an itemized Application for Payment, supported by such data sustaining the Contractor's right to payment as the Owner, or the Architect may require. The form of Application for Payment shall be AIA Document G702 - Application and Certification for Payment, supported by AIA Document G703 - Continuation Sheet. No other forms of Application for Payment will be acceptable. Continuation Sheet G703 shall be prepared the same as in the Schedule of Values submitted by the Contractor. Contractor's payment will be made within forty five (45) days after the Contractor's payment application is approved by the Architect. The Contractor will only be paid as described in the Owner-Contractor Agreement.
- B. Contractor shall submit with each monthly Application for Payment, 1) an affidavit that payrolls, bills for materials and equipment, and other indeptness connected with the Work for which the previous Application, was submitted and the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, and 2) release or waivers of liens arising out of the Contract from each Subcontractor, materialmen, supplier, and laborer of the Contractor in the form of Partial Lien Waiver provided with the Contract Documents or such other form as may be approved by the Architect and Owner, and 3) County of Manatee Claims Form available from the city/county Clerk's office.
- C. For Schedule of Values requirements please see section 01 33 00.
- D. Unless otherwise indicated in Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site. If previously agreed upon by the Owner, payments may similarly be made for materials and equipment stored off the site at a location previously agreed upon in writing. Contractor shall comply with



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all conditions of off site storage agreement as indicated by the Owner prior to proceeding with arrangements for such conditions. Payment to Contractor for materials stored off site is discouraged. Where circumstances indicate that the Owner's best interest is served by off-site storage, the Contractor shall make written request to the Architect for approval to include such material costs in his next progress payment. The Contractor's request shall include the following information:

1. A list of the fabricated materials consigned to the project (which shall be clearly identified), giving the place of storage, together with copies of invoices and reasons why materials cannot be delivered to the site.
  2. Certification that items have been tagged for delivery to the project and that they will not be used for another purpose.
  3. A letter from the Bonding Company indicating agreement to the arrangements and that payment to the Contractor shall not relieve either party or their responsibility to complete the facility.
  4. Evidence of adequate insurance covering the material in storage, which shall name the Owner as additionally insured.
  5. Costs incurred by the Architect to inspect material in off-site storage shall be paid by the Contractor.
  6. Subsequent pay requests shall itemize the materials and their cost which were approved on previous pay requests and remain in off-site storage
- E. The Contractor warrants the title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment and is free and clear of all liens and encumbrances. The Contractor will indemnify the Owner and the Owner's property from any liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors or their Sub-subcontractors, regardless of tier, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials, equipment, services or supplies relating to the Work, and from all cost and expenses, including attorneys' and consultants' fees incurred by the Owner in evaluating or defending against such liens, claims, security interests or encumbrances. Partial payments to the Contractor for labor performed under either a unit or lump sum price Contract shall be made at the rate of 90 percent (90%) of the Contract Sum.
- F. When the payment is made on account of materials or equipment not yet incorporated into the Project, such materials and equipment will become the property of the Owner; provided that if such materials or equipment are stolen, destroyed, or damaged before being fully incorporated into the Project, the Contractor will be required to replace them at its own expense, if not covered by builder's risk policy.
- G. At the time the Work is seventy five percent (75%) complete, the Contractor may request that no further retainage be withheld from future progress payments. If such request is approved by the Owner, and if the manner of completion and the Work and its progress are and remain satisfactory to the Architect, and in the absence of good and sufficient reasons, the Architect will, on presentation by the Contractor of Consent of Surety (use AIA G707A), authorize any remaining partial payments to be paid in full."



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- H. Partial or full payment to the Contractor(s) for material, equipment, or work in place shall not start the warranty period, refer to Division 1, Specification Section 01600.

1.6 CERTIFICATES FOR PAYMENT

- A. The Architect will, within fifteen days, after receipt of the Contractor's Application for Payment, either issue to the owner a Certificate for Payment, with a copy to the Contractor, for such amounts as the Architect deems is properly due, or notify the Contractor and the Owner of the Architect's reason for withholding certification in whole or in part as provided in paragraph .1, section 3 of ARTICLE 6.
- B. The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment that to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated on the Application for Payment. The issuance of a Certificate for Payment will not be a representation that the Architect has (a) made exhaustive or continuous on site inspections to check the quality or quantity of the Work, (b) reviewed construction means, methods, techniques, sequences or procedures, (c) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (d) made examination to ascertain how or for what purpose the Contractor has used the money previously paid on account of the Contract Sum.

1.7 DECISIONS TO WITHHOLD CERTIFICATION

- A. The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in Architect's opinion the representation to the Owner required by the above section can not be made. If an Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as indicated above. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in specifications and because of:
  - 1. The Contractor is in default of the performance of any of its obligations under the Contract Documents, including, but not limited to: failure to provide sufficient skilled workers; work, including equipment or materials, which is defective or otherwise does not conform to the Contract Documents; failure to conform to the Project Time Schedule; or failure to follow the directions of or instructions from the Architect or Owner.
  - 2. The Contractor is in default of the performance of any of its obligations under



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another Contract, which it has with the Owner.

3. The filing of the third party claims or reasonable evidence that third party claims have been or will be filed.
  4. The Work has not proceeded to the extent set forth in the Application for Payment.
  5. Representations made by the Contractor are untrue.
  6. The failure of the Contractor to make payments to its Subcontractors, materialmen, or laborers.
  7. Damage to the Owner's property or the property of another Contractor or person.
  8. The determination by the Architect that there is a substantial possibility that the Work cannot be completed for the unpaid balance of the Contract Sum.
  9. Liens filed or reasonable evidence indicating the probable filing of such liens with respect to the Project.
- B. When the above reasons for withholding certifications are removed, certification will be made for the amounts previously withheld. If the Owner makes payments by joint check, the Owner shall notify the Architect in order to reflect such payments on the next Certification for Payment.
- C. Contractor's application for a payment shall reflect an equal percentage amount (within 2-3 percent) for labor and materials for Work completed. The Architect may adjust applications where labor exceeds materials or where materials exceed labor quantities in the Work completed columns.
- D. If the Contractor disputes a determination by the Architect with regard to Certificate of Payment, and during any related dispute resolution, litigation, or other proceeding, the Contractor nevertheless shall continue to execute the Work as described in the Contract Documents.

### 1.8 PROGRESS PAYMENTS

- A. After issuance of Certificate for Payment, Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall notify the Architect.
- B. The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall require each Subcontractor to make payments to Sub-subcontractors in a similar manner.
- C. The Owner has the right to request written evidence that the Contractor has paid all Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor. If the Contractor does not provide adequate evidence within seven days,



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Owner shall have the right to contact the Subcontractors and obtain the information required. Neither an Owner or Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law. Payments to material and equipment suppliers shall follow similar rules as stated above.

- D. A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work.

### 1.9 FAILURE OF PAYMENT

- A. If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within fourteen days after receipt, or if the Owner does not pay the contractor within fourteen days after the date established in the Contract the amount certified by the Architect the Contractor may upon fourteen additional days of written notice to the Owner and Architect stop the Work until payment of the owed amount is received. The Contract time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable cost of shut down, delay, start up, plus interest as provided for in the Contract.

### 1.10 SUBSTANTIAL COMPLETION

- A. Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents and when all required occupancy permits, if any, have been issued so that the Owner can occupy or utilize the Work for its intended use.
- B. When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work. The time fixed by the Architect for the completion of all items on the list accompanying the Certificate of Substantial Completion shall not be greater than 30 days. The Contractor shall complete items on the list within such 30 day period. If the Contractor fails to do so, the Owner in its discretion may perform the Work by itself or others and the cost thereof shall be charged against the Contractor. If more than one inspection by the Architect for the purpose of evaluating corrected work is required by the subject list of items to be completed or corrected, it will be performed at the Contractor's expense.
- C. Upon the receipt of the Contractor's list, the Architect will make an inspection and designate the Work qualified to be substantially complete. If any Work on the list or any additional Work required for utilization of the Work by the Owner is incomplete or not correct, the Contractor shall complete such Work before issuance of the Certificate of Substantial Completion. In such case the Contractor shall submit a request for another inspection by the Architect upon completion of the Work required for Substantial Completion.
- D. At the time the Architect commences the Substantial Completion Inspection, if the Architect discovers excessive additional items requiring completion or correction, the Architect may decline to continue the inspection, instructing the Contractor as to the



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general classification of deficiencies which must be corrected before the Architect will resume the Substantial Completion Inspection. If the Contractor fails to pursue the Work so as to make it ready for Substantial Completion Inspection in a timely fashion, the Architect shall, after notifying the Contractor, conduct inspections and develop a list of items to be completed or corrected. This list of items shall be furnished to the Contractor who shall proceed to correct such items within 7 days. The Architect will conduct additional inspections. The Architect will involve the Owner for 1) The cost of inspections between the termination of the initial Substantial Completion Inspection and the commencement of the satisfactory Substantial Completion Inspection, 2) The cost of inspection or review after the 7 day period established for the completion of the list by the Contractor. The Contractor shall reimburse the Owner for such cost, and the Owner may offset the amounts payable to the Architect for such services from the amounts due the Contractor under the Contract Documents.

- E. When the Work is designated portion thereof is substantially complete, the Architect shall prepare a Certificate of Substantial Completion that shall establish the date of Substantial completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the determine the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.
- F. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon acceptance, the Owner shall make payment of retainage applying to such Work or designated portion thereof.
- G. The Contractor shall fully complete all Work under its Contract within thirty (30) days of receiving a Certificate of Substantial Completion with attached list of items required to be completed or corrected. Failure to do so may serve as cause for the Owner to declare the Contractor in default and terminate the Contractor pursuant to ARTICLE 10 of these Supplementary General Conditions.

### 1.11 PARTIAL OCCUPANCY OR USE

- A. Owner shall have an option for partial occupancy or use upon a written agreement between the Contractor and Owner to determine the responsibilities of each party. Partial occupancy does not constitute acceptance of Work not complying with the requirements of the Contract Documents.
- B. Immediately prior to such partial occupancy or use, Owner, Architect, and Contractor shall inspect the area to be occupied to record the conditions of the Work.
- C. Agreements as to the acceptance of the Work not complying with the requirements of the Contract Documents shall be in writing.

### 1.12 FINAL COMPLETION AND FINAL PAYMENT



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- A. Upon receipt of Contractor's written notice that the Work is ready for final inspection and upon receipt of the final Application for Payment the Architect shall timely make such inspection determine if the Work is acceptable per Contract Documents. If the Work is acceptable, the Architect shall issue a final Certificate for Payment stating that to the Architect's best knowledge and presented information the work has been completed in accordance to the Contract Documents.
- B. Final payment and all remaining retainage shall become due only when the following items are submitted to the Architect:
1. An Affidavit that all payrolls, bills for all items connected with the Work, and any other indebtedness have been paid (less amount owed by the final Payment and retainage withheld by the Owner).
  2. Evidence in writing or a certificate that the required insurance by the Contract Documents will not be canceled or that the insurance will not expire until at least thirty (30) days written notice has been given to the Owner.
  3. Written notice that the Contractor knows of no potential reasons that the insurance will not be renewable to fulfill the Contract Document requirements.
  4. Consent of surety to final payment.
  5. Any other documents, releases and waivers of liens, claims, receipts, copies of the expenditure, or any other items required by the Owner to assure no legal problems shall follow the Completion of the Contract. If a subcontractor refuses to furnish such a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unresolved for the Owner after the payments have been made, the Contractor shall refund the Owner all money associated with resolution of such lien including all costs and reasonable attorney's fees.
- C. The Contractor shall furnish such evidence as may be necessary to show that any out-of-state subcontractor or supplier has fully met the requirements of payment of taxes as established in any law of the State or local subdivision thereof which may be in effect at the time of final payment. The Owner will require the submission of such proof or evidence before final payment will be approved or made. The following must be submitted to the Architect before approval of final payment:
1. Affidavit of payment as required under this Paragraph shall be in the form of AIA Document G706 - Contractor's Affidavit of Payment of Debt and Claims.
  2. Release of liens as required under this Paragraph shall be in the form of AIA Documents G706A - Contractor's Affidavit of Release of Liens, or as may otherwise be reasonably requested or required to comply with Indiana law.
  3. Consent of Surety as required under this Paragraph shall be in the form of AIA Document G707 - Consent of Surety Company to Final Payment.



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4. Submit releases and final unconditional waivers of lien from major subcontractor and supplier.
  5. Submit certification stating that no materials containing asbestos were incorporated into the Work.
  6. Submit certification that all punch list items have been completed.
- D. If upon Substantial Completion final completion is delayed through no fault of the Contractor or by issuance of change orders adjusting/affecting the final completion date and if the Architect confirms the conditions be eligible for payment for Work completed without termination of the Contract. Final Payment, constituting the unpaid balance of the Contract Sum, shall be paid to the Contractor in full, including retainage or escrowed principal and escrowed income by the escrow agent, no less than 61 days following the date of Substantial Completion. If at that time there are remaining uncompleted items, an amount equal to 200 percent of the value of each item as determined by the Architect shall be withheld until said items are completed, and a Final Certificate of Payment issued by the Architect.
- E. Making of the final payment shall constitute a waiver of claims by the Owner except those arising from liens, claims, security interest, failure to comply with the Contract Documents or terms of special warranties.

### 1.13 REQUEST FOR PAYMENT

- A. Submit Applications for Payment to the Project Manager or as directed at the pre-construct i on meeting, in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.
- B. Submit payment requests in the form provided by the Owner with itemized data typed in accordance with the Bid Form .
- C. Provide construction photographs in accordance with Contract Documents.
- D. Submit Applications for Payment to the Project Manager or as directed at the pre-construct i on meeting, in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.
- E. Submit three (3) copies of each application; all signed and certified by the Contractor. .

### 1.14 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information with a cover letter.
- B. Submit one copy of data and cover letter for each copy of application.

## PART 2 - PRODUCTS (NOT USED)



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PART 3 - EXECUTION (NOT USED)

END OF SECTION 00 80 00



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SECTION 00 80 10  
CHANGES IN THE WORK

PART 1 - GENERAL

- 1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order ordering a minor change in the Work, subject to the limitations as may be stated elsewhere in the Contract Documents.
- 1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect.
- 1.3 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:
  - .1 The change in the Work;
  - .2 The amount of the adjustment, if any, in the Contract Sum; and
  - .3 The extent of the adjustment, if any, in the Contract Time.
- 1.4 Upon receipt of a Change Order, the Contractor shall promptly proceed with the change in the Work involved.
- 1.5 A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately.
- 1.6 Unless otherwise provided elsewhere in the Contract Documents, costs for the purposes of Change Orders shall be limited to the following:
  - .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
  - .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
  - .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
  - .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
  - .5 Additional costs of supervision and field office personnel directly attributable to the change.
- 1.7 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.
- 1.8 The cost of the Contractors overhead and profit on any Change Order shall be:
  - .1 For extra Work completed by the Contractor with his own labor, 10 percent (10%) shall be added as the allowance for overhead and profit.
  - .2 For extra Work completed by Subcontractors of the Contractor, 10 percent (10%) shall be added as the allowance for overhead and profit.



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- .3 For Work deleted which would have been completed by Subcontractors of the Contractor, 10 percent (10%) shall be credited to the Owner as the allowance for overhead and profit.
  - .4 For Work deleted which would have been completed by Subcontractors of the Contractor, 5 percent (5%) shall be credited to the Owner by the Contractor as the allowance for overhead and profit."
- 1.9 When both additions and deletions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of net increase or decrease, if any.
- 1.10 In order to facilitate checking of quotations for extras or credits, proposals, (except those so minor that their propriety can be seen by inspection), shall be accompanied by a complete itemization of costs including labor, materials, and Subcontractors. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over \$500 be approved without such itemization. The Contractor shall submit same to the Architect within 14 days after receipt of proposal request.

END OF SECTION 00 80 10



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SECTION 00 80 50  
HAZARDOUS MATERIALS

PART 1 - GENERAL

- 1.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.
- 1.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.
- 1.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described herein and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.
- 1.4 The Owner shall not be responsible for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.
- 1.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations, except to the extent that the cost and expense are due to the Owner's fault or negligence.



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- 1.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

END OF SECTION 00 80 50



# **Division 01**

## General Requirements





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SECTION 01 10 05  
GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE AND INTENT

- A. Description: The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract.
- B. Work Included
1. The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, shop drawings, working drawings and other means of construction necessary or proper for performing and completing the work. He shall obtain and pay for all required permits necessary for the work, other than those permits such as the DEP permit and railroad permit which may have already been obtained. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.
  2. The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefor.
  3. The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his workmanship, materials and equipment, prior approval of the Engineer notwithstanding.
- C. Public Utility Installations and Structures
1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto whether owned or controlled by the Owner, other governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewage, drainage, water or other public or private property which may be affected by the work shall be deemed included hereunder.
  2. The Contractor shall protect all public utility installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor which are shown on the Plans or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as approved by the Engineer. No separate payment shall be made for such protection or repairs to public utility installations or structures.



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3. Public utility installations or structures owned or controlled by the Owner or other governmental body, which are required by this contract to be removed, relocated, replaced or rebuilt by the Contractor not identified in any separate bid item shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various contract items. No separate payment shall be made therefor.
4. Where public utility installations or structures owned or controlled by the Owner or other governmental body are encountered during the course of the work, and are not indicated on the Plans or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the Engineer, for the contractor to accomplish. If such work is accomplished by the utility having jurisdiction, it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be in accordance with the General and Supplemental General Conditions.
5. The Contractor shall give written notice to Owner and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the "Sunshine State One-Call of Florida, Inc. Call Center ("Call Sunshine") and per all requirements provided for in the Florida Underground Facilities Damage Prevention and Safety Act (Florida Statutes, Title XXXIII, Chapter 556).
6. The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the Engineer.

### 1.2 PLANS AND SPECIFICATIONS

- A. Plans: When obtaining data and information from the Plans, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.
- B. Copies Furnished to Contractor: The Contractor shall furnish each of the subcontractors, manufacturers, and material men such copies of the Contract Documents as may be required for their work. Additional copies of the Plans and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.
- C. Supplementary Drawings: When, in the opinion of the Engineer, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer and five paper prints thereof will be given to the Contractor.
- D. Contractor to Check Plans and Data: The Contractor shall verify all dimensions, quantities and details shown on the Plans, Supplementary Drawings, Schedules, Specifications or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such



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conditions at his own expense. He will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the Engineer, should such errors or omissions be discovered. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

- E. Specifications: The Technical Specifications consist of three parts: General, Products and Execution. The General Section contains General Requirements which govern the work. Products and Execution modify and supplement these by detailed requirements for the work and shall always govern whenever there appears to be a conflict.
- F. Intent
  - 1. All work called for in the Specifications applicable to this Contract, but not shown on the Plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Plans or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
  - 2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.
  - 3. The inclusion of the Related Requirements (or work specified elsewhere) in the General part of the specifications is only for the convenience of the Contractor, and shall not be interpreted as a complete list of related Specification Sections.

### 1.3 MATERIALS AND EQUIPMENT

#### A. Manufacturer

- 1. The names of proposed manufacturers, material men, suppliers and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Engineer for approval. Such approval must be obtained before shop drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.
- 2. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.
- 3. Any two or more pieces or material or equipment of the same kind, type or classification, and being used for identical types of services, shall be made by the same manufacturer.



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- B. Delivery: The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete the work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.
- C. Tools and Accessories
1. The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.
  2. Spare parts shall be furnished as specified.
  3. Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rating data.
- D. Installation of Equipment.
1. The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.
  2. Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the Engineer during installation. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.
  3. The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be as approved by the Engineer and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.
  4. The Contractor shall, at his own expense, furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations.
  5. Grout shall completely fill the space between the equipment base and the foundation. All metal surfaces coming in contact with concrete or grout shall receive a coat of coal tar epoxy equal to Koppers 300M.
- E. Service of Manufacturer's Engineer: The Contract prices for equipment shall include the cost of furnishing (as required by equipment specifications sections) a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation the equipment in conformity with the Contract Documents. After the equipment is placed in permanent operation by the Owner, such engineer or superintendent shall make all adjustments and tests required by the Engineer to prove that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the Owner in the proper operation and maintenance of such equipment.



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1.4 INSPECTION AND TESTING

A. General

1. Inspection and testing of materials will be performed by the Owner unless otherwise specified.
2. For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Three (3) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.
3. If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the Owner.
4. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.
5. The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the Owner formally takes over the operation thereof.

B. Costs

1. All inspection and testing of materials furnished under this Contract will be performed by the Owner or duly authorized inspection engineers or inspections bureaus without cost to the Contractor, unless otherwise expressly specified.
2. The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the Contract price.
3. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Owner for compliance. The Contractor shall reimburse the Owner for the expenditures incurred in making such tests on materials and equipment which are rejected for non-compliance.

C. Inspections of Materials: The Contractor shall give notice in writing to the Engineer, at least two weeks in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Engineer will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or he will notify the Contractor that inspection will be waived. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

D. Certificate of Manufacture: When inspection is waived or when the Engineer so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificates of



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Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

- E. Shop Tests of Operating Equipment
1. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the Engineer notifies the Contractor, in writing, that the results of such tests are acceptable.
  2. Five copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the Engineer for approval.
  3. The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.
- F. Preliminary Field Tests: As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests of equipment. If the preliminary field tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments and replacements required. The furnishing Contractor shall assist in the preliminary field tests as applicable.
- G. Final Field Tests
1. Upon completion of the work and prior to final payment, all equipment and piping installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.
  2. The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment and instruments necessary for all acceptance tests, at no additional cost to the Owner. The Supplier shall assist in the final field tests as applicable.
- H. Failure of Tests
1. Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make these corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees of specified requirements, the Owner, notwithstanding its partial payment for work, and materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.
  2. In case the Owner rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If he fails to do so, the Owner may, after the expiration of a period of thirty (30) calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under his Contract.



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- I. Final Inspection: During such final inspections, the work shall be clean and free from water. In no case will the final pay application be prepared until the Contractor has complied with all requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Document.

### 1.5 TEMPORARY STRUCTURES

- A. Temporary Fences: If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, if so ordered by the Engineer, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The Engineer shall be solely responsible for the determination of the necessity for providing a temporary fence and the type of temporary fence to be used.

### 1.6 TEMPORARY SERVICES

- A. First Aid: The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when people are employed on the work.

### 1.7 LINES AND GRADES

- A. Grade: All work under this Contract shall be constructed in accordance with the lines and grades shown on the Plans, or as given by the Owner/Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.
- B. Safeguarding Marks
  1. The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or removing without authorization such established points, stakes and marks.
  2. The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.
- C. Datum Plane: All elevations indicated or specified refer to the Mean Sea Level Datum of the NGVD 1929 Datum and/or NAVD 1988.

### 1.8 ADJACENT STRUCTURES AND LANDSCAPING

- A. Responsibility
  1. The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent



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public and private property and structures affected by the work, whether or not shown on the Plans, and the removal, relocation and reconstruction of such items called for on the Plans or specified shall be included in the various Contract Items and no separate payments will be made therefore. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Plans and when, in the opinion of the Engineer, additional work is deemed necessary to avoid interference with the work, payment therefore will be made as provided for in the General Conditions.

2. Contractor is expressly advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc. and related work adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the Work shall be performed by and be the responsibility of the Contractor.
3. Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the Owner and to the satisfaction of the Engineer. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the Engineer.
4. Prior to the beginning of any excavations, the Contractor shall advise the Engineer of all buildings or structures on which he intends to perform work or which performance of the project work will affect.

### B. Protection of Trees

1. All trees and shrubs shall be adequately protected by the Contractor with boxes and otherwise and in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season and at the sole expense of the Contractor.
2. Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.
3. The Owner may order the Contractor, for the convenience of the Owner, to remove trees along the line or trench excavation. If so ordered, the Owner will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for under the appropriate Contract Items.

C. Lawn Areas: Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed, and later replaced, or the area where sod has been removed shall be restored with new sod in the manner described in the Workmanship and Materials Paragraph in Section 02485, Seeding & Sodding.

D. Restoration of Fences: Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the Engineer. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract



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Item or items, or if no specific Item is provided therefore, as part of the overhead cost of the work, and no additional payment will be made therefore.

1.9 PROTECTION OF WORK AND PUBLIC

- A. Barriers and Lights: During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers and lights as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public, in accordance with state and local requirements.
- B. Smoke Prevention: A strict compliance with ordinances regulating the production and emission of smoke will be required. No open fires will be permitted.
- C. Noise
  - 1. Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all engines or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.
  - 2. Except in the event of an emergency, no work shall be done between the hours of 7:00 P.M. and 7:00 A.M., or on weekends. If the proper and efficient prosecution of the work requires operations during the night or weekends, the written permission of the Owner shall be obtained before starting such items of the work.
- D. Access to Public Services: Neither the materials excavated nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.
- E. Dust prevention: The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the roads and/or construction areas sprinkled with water at all times.

1.10 CUTTING AND PATCHING

- A. The Contractor shall do all cutting, fitting or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Plans and Specifications. The work must be done by competent workmen skilled in the trade required by the restoration.
- B. Refer to Section 01 10 45 for provisions on this subject.

1.11 CLEANING

- A. During Construction: During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris and rubbish



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as is practicable and shall remove the same from any portion of the site if, in the opinion of the Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable. The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops.

### B. Final Cleaning

1. At the conclusion of the work, all equipment, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.
2. The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished and new operating condition.

## 1.12 MISCELLANEOUS

### A. Protection Against Siltation and Bank Erosion

1. The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed water courses and drainage ditches.
2. The Contractor, at his own expense, shall remove any siltation deposits and correct any erosion problems as directed by the Engineer which results from his construction operations.

B. Protection of Wetland Areas: The Contractor shall properly dispose of all surplus material, including soil, in accordance with Local, State and Federal regulations. Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Florida Department of Environmental Protection or Southwest Florida Water Management District.

C. Existing Facilities: The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Special Provisions.

D. Use of Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 10 05



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SECTION 01 10 45  
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. The Contractor shall be responsible for all cutting, fitting and patching, including excavation and backfill, required to complete the work or to:
  - 1. Make its several parts fit together properly.
  - 2. Uncover portions of the work to provide for installation of ill-timed work.
  - 3. Remove and replace defective work.
  - 4. Remove and replace work not conforming to requirements of Contract Documents.
  - 5. Provide penetrations of non-structural surfaces for installation of piping and electrical conduit.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with specifications and standards for each specific product involved.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of work.
- C. Report unsatisfactory or questionable conditions to Engineer. Do not proceed with work until Engineer has provided further instructions.

3.2 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value to integrity of affected portion of work.
- B. Provide devices and methods to protect other portions of project from damage.
- C. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work and maintain excavations free from water.

3.3 PERFORMANCE

- A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.



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- B. Fit and adjust products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- C. Restore work which has been cut or removed; install new products to provide completed work in accordance with the requirements of the Contract Documents.
- D. Replace surfaces airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- E. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.

END OF SECTION 01 10 45



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SECTION 01 10 50  
FIELD ENGINEERING AND SURVEYING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. The Contractor shall provide and pay for field surveying service required for the project.
- B. The Contractor shall furnish and set all necessary stakes to establish the lines and grades as shown on the Contract Drawings and layout each portion of the Work of the Contract.
  - 1. All survey work required in execution of Project.
  - 2. All costs of construction layout shall be included in the unit and lump sum prices contained in the respective divisions of the Contract Bid Form.
  - 3. Civil, structural or other professional engineering services specified or required to execute Contractor's construction methods.

1.2 QUALIFICATION OF SURVEYOR AND ENGINEER

- A. All construction staking shall be conducted by or under the supervision of a Florida Registered Professional Surveyor and Mapper approved by the Owner. The Contractor shall be responsible for the layout of all such lines and grades, which will be subject to verification by the Engineer.

1.3 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the Project are designated on the Contract Drawings.
- B. Locate and protect all survey monumentation, property corners and project control points prior to starting work and preserve all permanent reference points during construction. All costs associated with the replacement of all survey monumentation, property corners and project control points shall be borne by the Contractor.

Make no changes or relocations without prior written notice to Engineer. Report to Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations. Require surveyor to replace project control points which may be lost or destroyed. Establish replacements based on original survey control.

1.4 PROJECT SURVEY REQUIREMENTS

- A. The Contractor shall establish temporary bench marks as needed, referenced to data established by survey control points.

1.5 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.



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- B. The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings per Section 01720.

### 1.6 SUBMITTALS

- A. Submit name and address of Professional Surveyor and Mapper to Engineer for Owner's approval.
- B. Submit certificate signed by the Professional Surveyor and Mapper certifying that elevations and locations of improvements are in conformance, or nonconformance, with Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 10 50



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SECTION 01 11 00  
SUMMARY OF WORK

PART 1 - GENERAL

1.1 PROJECT DESCRIPTION

- A. The Work consists of all items as indicated on the Drawings and as specified in the Project Manual and those items of construction not indicated but normal and necessary and usual in the construction industry for construction of a building project.

1.2 WORK UNDER SINGLE CONTRACT

- A. The intent of this Section to indicate the Work required by the Contractors and to provide information regarding the duties, responsibilities, and cooperation required by the Contractors, with similar requirements for the subcontractors and suppliers.
- B. Prime Contracts are defined to include the following contract described in the Schedule of Contract Responsibilities; and each is recognized to be a major part of project, with Work to be performed concurrently and in close coordination with Work of other Prime Contracts.
- C. The "Contract Documents," as defined in the General Conditions, include "the Drawings." Although Drawings are grouped and identified by classification of the Work, Contractors shall be responsible for their Work as specified herein and as indicated on the Drawings. Although the majority of the Drawings are "to scale," Contractors are directed to use indicated dimensions for determining material quantities and for other reasons. No additional monies will be allowed due to Contractors using "scale instruments" to determine material quantities or for other reasons.
- D. A single contract will be awarded as per the attached "Schedule of Contract Responsibilities" in this Section. Contractors shall include Work required by the Specifications and Drawings for each contract area defined in the Schedule.
- E. Work for the complete construction of the Project will be under a single contract with the Owner.

1.3 ADMINISTRATIVE RESPONSIBILITIES OF CONTRACTOR

- A. The Contractor shall be responsible for the maintenance of the Construction Schedule and the general supervision of every phase of the Work.
1. Requirements for a specific trade of contract will generally be described in that portion of the Specifications or Drawings related to that trade or contract. Such requirements may, however, be described in other Sections of the Contract Documents. Contractors will be held responsible for having carefully examined all Drawings and read all Divisions of the Specifications and all Contract Documents, to avoid omissions or duplications, and to ensure a complete job.
  2. Contractor must be fully informed about conditions relating to the construction of the Project and the employment of labor thereon. Failure to do so will not relieve a Contractor of his obligation to furnish all material and labor necessary to carry out the provisions of his Contract.



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3. Contractors shall cooperate with the Contractor in notifying him when the Work is at a stage to require the services of other contractors and shall notify the Contractor in the event that such other Contractors do not carry out their responsibilities in connection with such notification.
- B. Contractors shall cooperate with and assist the Contractor in the preparation of construction progress and procedures, schedule of product deliveries, and their effect on the overall project progress and completion. Other Contractors shall cooperate in getting their Work and the Work of their subcontractors completed according to the schedule as prepared and maintained by the Contractor. Contractor shall immediately notify the Contractor of a delay in delivery of products or the scheduled date of completion that may affect the total progress of construction.
- C. The Owner will furnish the topographical survey, either as a part of these Drawings or separately, giving the general topographical lines existing at the site and the property lines.
- D. Contractors required to make connections to existing utilities, especially sewerage where gravity flow occurs, shall verify grades and locations at points of such connections and shall notify the Architect of circumstances which would adversely affect the proper flow or connection to such facilities.

### 1.4 CONTRACTOR USE OF PREMISES

- A. Limit use of the premises to construction activities in areas indicated or as directed by the Project Manager or Owner's authorized representative.
  1. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
  2. Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
  3. Burial of Waste Materials: Prior to final grading and landscape development, the existing grade depression near the southwest corner of the site, as indicated, may be used for disposal of inert waste material from the construction process. Do not dispose of organic and hazardous material on site, either by burial or by burning.
  4. Off site storage should be kept to a minimum or eliminated altogether for fuel conservation.
- B. Contractor shall limit his use of the premises for work and for storage, to allow for work by other Contractors and Owner occupancy of adjacent buildings or building areas.
- C. Coordinate use of the premises, under direction of the Contractor.
- D. Contractor shall assume complete responsibility for the protection and safekeeping of products under this Contract, stored on the site.
- E. Contractor shall move his stored products that interfere with operation of the Owner or separate Contractor.



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- F. Contractor shall obtain and pay for the use of additional storage of work areas needed for operation.
  - 1. Off site storage should be kept to a minimum or eliminated altogether for fuel conservation.

1.5 TAXES

- A. Taxes, which the Contractor must pay, which are legally enacted at the time bids are received, whether or not effective, shall be paid by the Contractor.

1.6 PERMITS, FEES, AND NOTICES

- A. The Contractor will secure the general building permit for the Owner. Contractor shall secure and pay for other permits, governmental fees, and licenses necessary for the proper execution and completion of his Work, which are applicable at the time the bids are also received. Fees to relocate utilities on Owner's property shall be included in the bid of the Contractor doing the relocation. Contractor shall be responsible for contacting the local governing agency for such cost information and requirements.
- B. Utility Tie-Ins: Shall be arranged with local utility company and other involved parties for minimum interruption of service.
- C. Inspections of installed work shall be performed by the governing authority as arranged for by the Contractor. Work shall not be covered until approved.
- D. Contractor shall give notices and comply with laws, ordinances, rules, regulations, and orders of public authorities bearing on the performance of his Work. If a Contractor observes that the Contract Documents are at variance therewith, he shall promptly notify the Architect in writing, and necessary changes shall be adjusted by appropriate notification. If a Contractor performs Work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to the Architect, he shall assume full responsibility therefore and shall bear the costs attributable thereto.

1.7 LABOR AND MATERIALS

- A. Unless otherwise specifically noted, Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of his Work, whether temporary or permanent and whether or not incorporated or to be incorporated at the Work.
- B. Contractor shall enforce strict discipline and good working order among his employees or other persons carrying out Work of his Contract and shall not permit employment of unfit person or persons or anyone not skilled in the task assigned to them.



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1.8 PROJECT COORDINATION

- A. Contractor shall provide on-site supervision including a competent project coordinator and competent Superintendent to coordinate all aspects of his Work with other Contractors' Work. It shall be the full responsibility with all phases of Architectural, Structural, Mechanical (including Plumbing, Heating, Ventilation, and Sheet Metal Trades), Electrical Work, Site Work, Special Equipment, Kitchen Equipment, and other separate Contract Work. All Contractors shall fully cooperate with each other and the Contractor.
- B. Contractor shall coordinate the performance of his subcontractors in the utilization of the site, as well as in the actual performance of their contractual obligations to the Owner.
- C. Contractor shall cooperate with the Contractor and all other Contractors employed by the Owner.
- D. Contractor shall verify all dimensions shown on the Drawings and obtain all measurements required for proper execution of Work.
- E. Contractor shall see that sleeves and inserts for pipes, conduits, and similar items shall be correctly placed and kept in their proper positions in forms, walls, partitions, and floors, and not displaced by the placing of concrete or other construction work. All items shall be placed in ample time so as not to delay concrete operations or other work. Do not place sleeves so they pass vertically through beams, girders, and similar construction, unless locations are approved by the Architect. Locations of chases are indicated in the mechanical and electrical drawings. The separate Contractor and/or Subcontractor of the Work involved shall be responsible for inclusion of these items in the work, and shall advise the Contractor and Architect of all required changes.
- F. Before commencing work, Contractor shall examine all spaces, surfaces, and areas indicated on the Drawings to receive their Work. Report necessary corrections in writing immediately to the Contractor. Do not proceed until corrections (if any required) have been made. Commencing work signifies this Contractor's acceptance of said spaces, surfaces, and areas, and of job conditions.
- G. Temporary Omission of Work: If any materials and finish are of such nature that it is necessary to temporarily omit certain portions of work (as illustrated on Drawings or specified in Specifications) in order to make final installation, the Contractor whose work is involved shall omit such parts of this work or finish as necessary until other said work and/or materials have been installed and shall then return and install such omitted parts of his work as part of this Contract and without additional cost to the Owner.

1.9 VERIFICATIONS OF EXISTING DIMENSIONS

- A. When verification of existing dimensions is required, the Contractor requiring said verification for the construction or fabrication of his material shall be the Contractor responsible for procurement of the field information.



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1.10 PROJECT SECURITY

- A. The Contractor shall be responsible for developing and conducting a security program, specifically oriented for the protection of preventing damage, injury, or loss to the entire project site and other property at the site or adjacent thereto. This shall be acceptable to the Owner and Architect, and shall remain in effect through Substantial Completion of the Project.
- B. Contractor shall be responsible for securing his work and equipment at the close of each workday.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 11 00



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SECTION 01 13 40  
SHOP DRAWINGS, PROJECT DATA AND SAMPLES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. The Contractor shall submit to the Engineer for review and approval: working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this section called data), and material samples (hereinafter in this section called samples) as are required for the proper control of work, including, but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
- B. Within thirty (30) calendar days after the effective date of the Agreement, the Contractor shall submit to the Engineer, a complete list of preliminary data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items and the date on which each Shop Drawing shall be submitted. Review of this list by the Engineer shall in no way relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Specifications. This procedure is required in order to expedite final review of Shop Drawings.
- C. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and the Engineer. This log should include the following items:
  - 1. Submittal description and number assigned.
  - 2. Date to Engineer.
  - 3. Date returned to Contractor (from Engineer).
  - 4. Status of Submittal (No exceptions taken, returned for confirmation or resubmittal, rejected).
  - 5. Date of Resubmittal and Return (as applicable).
  - 6. Date material released (for fabrication).
  - 7. Projected date of fabrication.
  - 8. Projected date of delivery to site.
  - 9. Projected date and lead time so that product installation does not delay contact.
  - 10. Status of O&M manuals submitted.
- D. Related Section: Section 01 33 00 – Submittals.

1.2 CONTRACTOR'S RESPONSIBILITY

- A. It is the duty of the Contractor to check all drawings, data and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the contract Documents.
- B. Determine and verify:
  - 1. Field measurements.



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2. Field construction criteria.
  3. Catalog numbers and similar data.
  4. Conformance with Specifications and indicate all variances from the Specifications.
- C. The Contractor shall furnish the Engineer a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.
- D. The Contractor shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the Engineer, with No Exceptions Taken or Approved As Noted.
- E. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for checking and appropriate action from the time the Engineer receives them.
- F. The Contractor shall submit five (5) copies of descriptive or product data submittals to complement shop drawings for the Engineer plus the additional copies if the Contractor requires more than 1 being returned. The Engineer shall retain four (4) sets.
- G. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by Engineer of the necessary Shop Drawings.

### 1.3 ENGINEER'S REVIEW OF SHOP DRAWINGS AND WORKING DRAWINGS

- A. The Engineer's review of drawings, data and samples submitted by the Contractor shall cover only general conformity to the Specifications, external connections and dimensions which affect the installation.
- B. The review of drawings and schedules shall be general and shall not be construed:
1. As permitting any departure from the Contract requirements.
  2. As relieving the Contractor of responsibility for any errors, including details, dimensions and materials.
  3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the drawings or schedules as submitted describe variations and show a departure from the Contract requirements which the Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting any exception.
- D. When reviewed by the Engineer, each of the Shop and Working Drawings shall be identified as having received such review being so stamped and dated. Shop Drawings stamped "REJECTED" and with required corrections shown shall be returned to the Contractor for correction and resubmittal.
- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to



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revisions other than the corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.

- F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.
- G. The Engineer shall review a submittal/resubmittal a maximum of three (3) times after which cost of review shall be borne by the Contractor. The cost of engineering shall be equal to the Engineer's actual payroll cost.
- H. When the Shop and Working Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- I. No partial submittals shall be reviewed. Incomplete submittals shall be returned to the Contractor and shall be considered not approved until resubmitted.

### 1.4 SHOP DRAWINGS

- A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, drawings, setting drawings, schedule drawings, manufacturer's scale drawings and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.
- B. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval and original signature as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval and original signature shall be returned to the Contractor for resubmission.
- C. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:
  - 1. Number and title of the drawing.
  - 2. Date of Drawing or revision.
  - 3. Name of project building or facility.
  - 4. Name of contractor and subcontractor submitting drawing.
  - 5. Clear identification of contents and location of the work.
  - 6. Specification title and number.
- D. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility of executing the work in accordance with the Contract, even though such drawings have been reviewed.
- E. Data on materials and equipment shall include, without limitation, materials and



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equipment lists, catalog sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.

- F. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.
- G. All manufacturers or equipment suppliers who proposed to furnish equipment or products shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five installations where identical equipment has been installed and have been in operation for a period of at least one (1) year.
- H. Only the Engineer will utilize the color "red" in marking shop drawing submittals.

### 1.5 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's fabrication and erection drawings for structures such as roof trusses, steelwork, precast concrete elements, bulkheads, support of open cut excavation, support of utilities, groundwater control systems, forming and false work; underpinning; and for such other work as may be required for construction of the project.
- B. Copies of working drawings as noted above, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer and shall be submitted at least thirty (30) days (unless otherwise specified by the Engineer) in advance of their being required for work.
- C. Working drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the Owner and Engineer shall not have responsibility therefor.

### 1.6 SAMPLES

- A. The Contractor shall furnish, for the review of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until reviewed by the Engineer.
- B. Samples shall be of sufficient size and quantity to clearly illustrate:
  - 1. Functional characteristics of the product, with integrally related parts and attachment devices.



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2. Full range of color, texture and pattern.
  3. A minimum of two samples of each item shall be submitted.
- C. Each sample shall have a label indicating:
1. Name of product.
  2. Name of Contractor and Subcontractor.
  3. Material or equipment represented.
  4. Place of origin.
  5. Name of Producer and Brand (if any).
  6. Location in project.  
(Samples of finished materials shall have additional markings that will identify them under the finished schedules.)
  7. Reference specification paragraph.
- D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Review of a sample shall be only for the characteristics or use named in such and shall not be construed to change or modify any Contract requirements.
- E. Reviewed samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Reviewed samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the reviewed samples. If requested at the time of submission, samples which failed testing or were rejected shall be returned to the Contractor at his expense.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 13 40



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SECTION 01 14 10  
TESTING AND TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Owner shall employ and pay for the services of an independent testing laboratory to perform testing specifically indicated on the Contract Documents or called out in the Specifications. Owner may elect to have materials and equipment tested for conformity with the Contract Documents at any time.
  - 1. Contractor shall cooperate fully with the laboratory to facilitate the execution of its required services.
  - 2. Employment of the laboratory shall in no way relieve the Contractor's obligations to perform the work of the Contract.

1.2 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
  - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
  - 2. Approve or accept any portion of the Work.
  - 3. Perform any duties of the Contractor.

1.3 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel; provide access to Work and/or to Manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes which require control by the testing laboratory.
- D. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The Engineer may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor and no extra charge to the Owner shall be allowed on account of such testing and certification.
- E. Furnish incidental labor and facilities:
  - 1. To provide access to work to be tested.
  - 2. To obtain and handle samples at the project site or at the source of the product to be tested.
  - 3. To facilitate inspections and tests.



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4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
1. When tests or inspections cannot be performed due to insufficient notice, Contractor shall reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.
- G. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required for the Contractor's convenience and as approved by the Engineer.
- H. If the test results indicate the material or equipment complies with the Contract Documents, the Owner shall pay for the cost of the testing laboratory. If the tests and any subsequent retests indicate the materials and equipment fail to meet the requirements of the Contract Documents, the contractor shall pay for the laboratory costs directly to the testing firm or the total of such costs shall be deducted from any payments due the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 14 10



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SECTION 01 15 10  
TEMPORARY AND PERMANENT UTILITIES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

The Contractor shall be responsible for furnishing all requisite temporary utilities, i.e., power, water, sanitation, etc. The Contractor shall obtain and pay for all permits required as well as pay for all temporary usages. The Contractor shall remove all temporary facilities upon completion of work.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with Federal, State and Local codes and regulations and with utility company requirements.
- C. Comply with County Health Department regulations.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Materials for temporary utilities may be "used". Materials for electrical utilities shall be adequate in capacity for the required usage, shall not create unsafe conditions and shall not violate requirements of applicable codes and standards.

2.2 TEMPORARY ELECTRICITY AND LIGHTING

- A. Arrange with the applicable utility company for temporary power supply. Provide service required for temporary power and lighting and pay all costs for permits, service and for power used.

2.3 TEMPORARY WATER

- A. The Contractor shall arrange with Manatee County Utilities Customer Service office to provide water for construction purposes, i.e., meter, pay all costs for installation, maintenance and removal, and service charges for water used.
- B. The Contractor shall protect piping and fitting against freezing.

2.4 TEMPORARY SANITARY FACILITIES

- A. The Contractor shall provide sanitary facilities in compliance with all laws and regulations.
- B. The Contractor shall service, clean and maintain facilities and enclosures.



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PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall maintain and operate systems to assure continuous service.
- B. The Contractor shall modify and extend systems as work progress requires.

3.2 REMOVAL

- A. The Contractor shall completely remove temporary materials and equipment when their use is no longer required.
- B. The Contractor shall clean and repair damage caused by temporary installations or use of temporary facilities.

END OF SECTION 01 15 10



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SECTION 01 17 20  
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Contractor shall maintain at the site for the Owner one record copy of:
1. Drawings.
  2. Specifications.
  3. Addenda.
  4. Change Orders and other modifications to the Contract.
  5. Engineer's field orders or written instructions.
  6. Approved shop drawings, working drawings and samples.
  7. Field test records.
  8. Construction photographs.

1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in Contractor's field office apart from documents used for construction.
1. Provide files and racks for storage of documents.
  2. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with CSI format.
- C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and samples available at all times for inspection by the Engineer.

1.3 MARKING DEVICES

- A. Provide felt tip marking pens for recording information in the color code designated by the Engineer.

1.4 RECORDING

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information concurrently with construction progress.
- C. Do not conceal any work until required information is recorded.
- D. Drawings; Legibly mark to record actual construction:
1. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed



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- pipe material, class, etc. Locations of drainage ditches, swales, water lines and force mains shall be shown every 200 feet (measured along the centerline) or alternate lot lines, whichever is closer. Dimensions at these locations shall indicate distance from centerline of right-of-way to the facility.
2. Field changes of dimension and detail.
  3. Changes made by Field Order or by Change Order.
  4. Details not on original contract drawings.
  5. Equipment and piping relocations.
  6. Locations of all valves, fire hydrants, manholes, water and sewer services, water and force main fittings, underdrain cleanouts, catch basins, junction boxes and any other structures located in the right-of-way or easement, shall be located by elevation and by station and offset based on intersection P.I.'s and centerline of right-of-way. For facilities located on private roads, the dimensioning shall be from centerline of paving or another readily visible baseline.
  7. Elevations shall be provided for all manhole rim and inverts; junction box rim and inverts; catch basin rim and inverts; and baffle, weir and invert elevations in control structures. Elevations shall also be provided at the PVI's and at every other lot line or 200 feet, whichever is less, of drainage swales and ditches. Bench marks and elevation datum shall be indicated.
  8. Slopes for pipes and ditches shall be recalculated, based on actual field measured distances, elevations, pipe sizes, and type shown. Cross section of drainage ditches and swales shall be verified.
  9. Centerline of roads shall be tied to right-of-way lines. Elevation of roadway centerline shall be given at PVI's and at all intersections.
  10. Record drawings shall show bearings and distances for all right-of-way and easement lines, and property corners.
  11. Sidewalks, fences and walls, if installed at the time of initial record drawing submittal, shall be located every 200 feet or alternate lot lines, whichever is closer. Dimensions shall include distance from the right-of-way line and the back of curb and lot line or easement line.
  12. Sanitary sewer mainline wyes shall be located from the downstream manhole. These dimensions shall be provided by on-site inspections or televising of the sewer following installation.
  13. Elevations shall be provided on the top of operating nuts for all water and force main valves.
  14. Allowable tolerance shall be  $\pm 6.0$  inches for horizontal dimensions. Vertical dimensions such as the difference in elevations between manhole inverts shall have an allowable tolerance of  $\pm 1/8$  inch per 50 feet (or part thereof) of horizontal distance up to a maximum tolerance of  $\pm 2$  inch.
  15. Properly prepared record drawings on mylar, together with two copies, shall be certified by a design professional (Engineer and/or Surveyor registered in the State of Florida), employed by the Contractor, and submitted to the Owner/Engineer.
- E. Specifications and Addenda; Legibly mark each Section to record:
1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
  2. Changes made by field order or by change order.
- F. Shop Drawings (after final review and approval): Five sets of record drawings for each process equipment, piping, electrical system and instrumentation system.



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1.5 SUBMITTAL

- A. Prior to substantial completion and prior to starting the bacteria testing of water lines, deliver signed and sealed Record Documents and Record Drawings to the Engineer. These will be reviewed and verified by the inspector. If there are any required changes or additions, these shall be completed and the entire signed and sealed set resubmitted prior to final pay application.
- B. The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings. Record drawings shall be certified by the professional(s) (Engineer or Surveyor licensed in Florida), as stipulated by the Land Development Ordinance and submitted on signed and sealed paper drawings, signed and dated mylar drawings together with an AutoCAD version on a recordable compact disk (CD).
- C. The CD shall contain media in AutoCad Version 2004 or later, or in any other CAD program compatible with AutoCad in DWG or DXF form. All fonts, line types, shape files or other pertinent information used in the drawing and not normally included in AutoCad shall be included on the media with a text file or attached noted as to its relevance and use.
- D. Accompany submittal with transmittal letter, containing:
  - 1. Date.
  - 2. Project title and number.
  - 3. Contractor's name and address.
  - 4. Title and number of each Record Document.
  - 5. Signature of Contractor or his authorized representative.

Note: The data required to properly prepare these record drawings shall be obtained at the site, at no cost to the County by the responsible design professional or his/her duly appointed representative. The appointed representative shall be a qualified employee of the responsible design professional or a qualified inspector retained by the responsible design professional on a project-by-project basis.

PART 2 - STANDARDS

2.1 MINIMUM RECORD DRAWING STANDARDS FOR ALL RECORD DRAWINGS SUBMITTED TO MANATEE COUNTY

- A. Record drawings shall be submitted to at least the level of detail in the contract documents. It is anticipated that the original contract documents shall serve as at least a background for all record information. Original drawings in CAD format may be requested of the Engineer.
- B. Drawings shall meet the criteria of paragraph 1.04 D above.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 17 20



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SECTION 01 26 13  
REQUESTS FOR INFORMATION (RFI) PROCEDURES

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 Requests for Information (RFI) procedures.

1.3 DEFINITIONS

- A. Drawing/Plan Clarification: An answer from the Architect, on behalf of the Owner, in response to an inquiry from the contractor, intended to make some requirement(s) of the drawings or plans clearly understood. Drawing/plan clarifications may be sketches, drawings, or in narrative form and will not change any requirements of the drawings or plans. Responses to contractor inquiries shall be as outlined in "Requests for Information" as specified herein.
- B. Non-Conformance Notice: A notice issued by the Architect, on behalf of the Owner, documenting that the Work or some portion thereof has not been performed in accordance with the requirements of the Contract Documents. Payment shall not be made on any portion of the Work for which a Non-Conformance Notice has been issued and the Work not corrected to the satisfaction of the Architect and Owner.
1. Upon receipt of a Non-Conformance Notice, the Contractor shall provide a written Response to Non-Conformance Notice within five (5) working days after receipt of the Notice. The contractor's response shall detail either (a) why they believe that the work was performed in accordance with the contract documents or (b) what corrective action they intend to take, at their sole expense, to correct the non-conforming work.
  2. If the Contractor disputes the issuance of the Non-Conforming Notice, the Construction Manager or Architect, on behalf of the Owner, has five (5) working days to respond by either (a) withdrawing the Non-Conformance Notice or (b) directing the Contractor to correct such Work. Such determination by the Construction Manager or Architect, on behalf of the Owner, shall be final and conclusive.
  3. If directed to correct the Work, the Contractor shall do so within five (5) working days after receipt of such direction from the Construction Manager or Architect, on behalf of the Owner, or such other time as may be agreed to.
- C. Project Communications: Routine written communications between the Architect, Owner, and Contractor which are in letter, field memo, or fax format. Such communications shall not be identified as Requests for Information nor shall they substitute for any other written requirement pursuant to the provisions of these Contract Documents.



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- D. Requests for Information: A request from the Contractor or one of its subcontractors, to the Architect, on behalf of the Owner, seeking an interpretation or a clarification of some requirement of the Contract Documents. The contractor shall clearly and concisely set forth the issue for which it seeks clarification or interpretation and why a response is needed. The contractor shall, in the written request, set forth its interpretation or understanding of the contract's requirements along with reasons why it has reached such an understanding.
1. Responses from the Architect, on behalf of the Owner, will not change any requirements of the Contract Documents. Responses to RFI's will be as further defined herein.

1.4 REQUESTS FOR INFORMATION

- A. In the event the contractor or subcontractor, at any tier, determines that some portion of the drawings, specifications, or other contract documents requires clarification or interpretation, the contractor shall submit a Request for Information in writing. Requests for Information shall only be submitted by the Prime Contractor and shall only be submitted on the Request for Information form provided.
1. The contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed. In the Request for Information, the contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
- B. The Architect, on behalf of the Owner, will review all Requests for Information to determine whether they are Requests for Information as defined in the Contract Documents. If it is determined that the document is not an RFI, it will be returned to the contractor, unreviewed as to content, for resubmittal on the proper form in the proper manner.
- C. Responses to Requests for Information shall be issued within five (5) working days of receipt of the request from the contractor, unless the Architect determines that a longer time is needed to provide an adequate response. If a longer time is deemed necessary by the Architect, then the Architect shall, within five (5) working days of the receipt of the request, notify the contractor of the anticipated response time.
1. If the contractor submits a Request for Information on an activity with five (5) working days or less of float on the current project schedule, the contractor shall not be entitled to any time extension due to the time it takes the Architect, on behalf of the Owner, to respond to the request provided that the Architect responds within the five (5) working days set forth above.



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- D. Responses from the Architect, on behalf of the Owner, will not change any requirements of the Contract Documents. In the event that the contractor believes the response to a Request for Information will cause a change to the requirements of the Contract Documents, the contractor shall immediately give written notice that the contractor considers the response to be a Change Order. Failure to give such written notice immediately shall waive the contractor's right to seek additional time or cost under the provisions set forth in the General Conditions.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 26 13



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SECTION 01 26 14  
PROPOSAL REQUEST (PR) PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Conditions, and other Division-1 Specification Sections, apply to the Work of this Section and all Sections in the Project Manual whether or not specifically indicated.

1.2 SUMMARY

- A. This section includes administration and procedural requirements for proposal requests.
- B. Measurement and payment criteria applicable to work required.

1.3 DEFINITION

- A. A Proposal Request is a written direction in the form of an AIA Document from the Architect, Contractor and Owner used to document changes in Scope of work and to identify the cost impact of the change.

1.4 CAUSE FOR PROPOSAL REQUESTS

- A. Changes in Scope of work may be affected by:
  - 1. As a result of Design Changes that are cost related changes in order to complete or enhance the scope of the change in question and results in added value to the Owner.
  - 2. As an Owner requested change that is a cost related change in scope that is initiated by the Owner.
  - 3. As a unforeseen change that is a cost related change in scope that is most generally related to existing site conditions or existing facility that could not have been known at Bid time and clearly unidentifiable.
  - 4. As a value engineering change that is a cost related change that after identifying or solving techniques the required function at the lowest or lower cost achieved.
  - 5. As a construction change that is a cost related change that is closely related to a design change but is brought to the attention of the Architect due to installation means and method or construction clarification.

1.5 PROCEDURES

- A. The Architect shall issue written direction through a Proposal Request (AIA Document G-709) which will include detailed information, drawings or sketches and changes in scope of work to the Contract Document.



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- B. The Contractor shall review the Proposal Request and submit their cost Proposal for the cost related changes.
  - 1. Contractor shall indicate if the cost is an add to or deduct from the Contract Sum. Proposal requests may be issued for deduct cost items as well.
- C. The Contractor shall submit their cost proposal within ten (10) working days or state in writing when the Proposal will be returned based on the given circumstances. Each proposal shall include a material and labor breakdown for all work performed by their own forces, or subcontractor's forces. Any supporting time sheets for time and material work and subcontractors cost proposals shall be included in the Prime Contractors' Proposal. All of these items shall be included in deduct proposal requests as well.
- D. Each Proposal issued by the Contractor shall specifically address any required additional or deducted contract time. If no mention is made it is assumed that none is required. No consideration of additional time will be given for previously approved Proposals without specific written approval from the Owner or Architect.
- E. The maximum aggregate increased cost for combined overhead and profit shall be as noted in the General and Supplementary Conditions. This combined overhead and profit as specified shall be used in deduct proposal requests as well.
- F. The value of any scope of work change shall be determined by mutual acceptance of a lump sum, by unit prices or by time and material basis not to exceed plus the appropriate mark-up.
- G. The Architect shall review the contractors cost proposal and provide a recommendation to the Owner.
- H. The Owner reserves the right to reject the contractors cost proposal associated with the Proposal Request.
- I. The Owner shall review the recommendations of the Architect and if appropriate approve the contractors cost proposal. A memorandum shall be issued to the contractor notifying the contractor of approval with any clarifications.
- J. The approved Proposal Request shall become a part of the contract documentation when issued in a Change Order. The Owner reserves the right to include multiple Proposal Requests in one Change Order.
- K. For payment purposes, the Contractor may list each Change Order by number with a listing of each Proposal Request on the schedule of values submitted with each Pay Application. The Owner will pay for approved percentages of each Proposal Request until completed.
- L. The Contractor shall carry out the scope of work changes after notification of approval. Work related to the Proposal Request shall be carried out within a reasonable time in order to not delay other work or to cause increased cost because of other work. The Contractor shall have ten (10) working days in which to respond to Proposal Request or to notify the Architect in writing of the date on which the Proposal is anticipated. These requirements apply to deduct proposal requests as well.



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- M. If the contractor fails to respond to the Proposal Request or notify the Architect within (10) calendar days, this lack of action shall be construed as no additional cost for the Proposal Request.
- N. If the contractor's cost proposal is rejected by the Architect, all parties shall review the scope of work and cost proposal and agree to an acceptable cost.
- O. If the Contractor and Architect can not come to an agreement on an acceptable cost, the Contractor may be directed to proceed with the scope of work changes on a time and material basis not to exceed the Contractor's cost Proposal. The Contractor shall be required to submit daily time sheets for the Architect to review and approve. The Owner shall review and approve the final costs upon recommendation of the Architect.

### 1.6 CHANGE ORDERS

- A. The Architect shall assemble the Change Order by Proposal Request or by grouping a number of Proposal Requests.
- B. Two original copies of the Change Order shall be printed for signatures. Upon completion of the signature process an original copy will be forwarded to the Contractor.
- C. The Contractor shall provide a new non-collusion affidavit with the return of the Change Order after signing.
- D. Payment for the Change Order will be possible after signatures are obtained from the Architect, the Contractor and the Owner and upon acceptance by the Owner.

### 1.7 AS-BUILT DOCUMENTATION

- A. It is imperative that the Contractor update their as-built documents in the field for each and every Proposal Request that changes the content of the Document. The Owner reserves the right to inspect the Contractor's as-built document prior to each Pay Application. The status of the Contractors as-builts may result in withheld payment for that portion of the work.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 26 14



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SECTION 01 31 13  
PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
1. Coordination.
  2. Administrative and supervisory personnel.
  3. General installation provisions.
  4. Cleaning and protection.
- B. Field engineering is included in Section 01 10 50, Field Engineering and Surveying.
- C. Progress meetings, coordination meetings and pre-installation conferences are included in Section 01 31 19, Project Meetings.
- D. Requirements for the Contractor's Construction Schedule are included in Section 01 33 00, Submittals.

1.3 COORDINATION

- A. Coordination: Construction Manager shall coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
  2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.
- C. Administrative Procedures: Construction Manager shall coordinate scheduling and timing



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of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
  2. Installation and removal of temporary facilities.
  3. Delivery and processing of submittals.
  4. Progress meetings.
  5. Project Close-out activities.
- D. Conservation: Construction Manager shall coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

### 1.4 SUBMITTALS

- A. Coordination Drawings: Construction Manager shall prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components, and as may be directed or requested by the Architect.
1. Show the interrelationship of components shown on separate Shop Drawings.
  2. Indicate required installation sequences.
  3. Comply with requirements contained in Section 01 33 00, Submittals.
  4. Refer to Division-23 Section "Basic Mechanical Requirements," and Division-26 Section "Basic Electrical Requirements" for specific coordination Drawing requirements for mechanical and electrical installations.
- B. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION

#### 3.1 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.



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- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

### 3.2 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration before or at Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
  - 1. Excessive static or dynamic loading.
  - 2. Excessive internal or external pressures.
  - 3. Excessively high or low temperatures.
  - 4. Thermal shock.
  - 5. Excessively high or low humidity.
  - 6. Air contamination or pollution.



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7. Water or ice.
  8. Solvents.
  9. Chemicals.
  10. Light.
  11. Radiation.
  12. Puncture.
  13. Abrasion.
  14. Heavy traffic.
  15. Soiling, staining and corrosion.
  16. Bacteria.
  17. Rodent and insect infestation.
  18. Combustion.
  19. Electrical current.
  20. High speed operation,
  21. Improper lubrication,
  22. Unusual wear or other misuse.
  23. Contact between incompatible materials.
  24. Destructive testing.
  25. Misalignment.
  26. Excessive weathering.
  27. Unprotected storage.
  28. Improper shipping or handling.
  29. Theft.
  30. Vandalism.
  31. Mold.
  32. Mildew.
- D. Refer to Section 01 74 13 for additional construction cleaning requirements.

END OF SECTION 01 31 13



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SECTION 01 31 19  
PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 PRE-CONSTRUCTION CONFERENCE

- A. The Contractor shall schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 15 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 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.
    - a. Owner's requirements.
  - 10. Office, Work and storage areas.
  - 11. Equipment deliveries and priorities.
  - 12. Safety procedures.
  - 13. First aid.
  - 14. Security.
  - 15. Housekeeping.
  - 16. Working hours.



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1.3 COORDINATION MEETINGS

- A. The Contractor shall 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.

1.4 PROGRESS MEETINGS

- A. The Contractor shall conduct progress meetings at the Project site at regularly scheduled intervals. Notify the Owner and Architect 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, Contractor, 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.



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- I. 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 Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 19



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SECTION 01 33 00  
SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Work of this Section shall be included as a part of the Contract Documents of each Contractor on this Project.

1.2 SUBMITTAL PROCEDURES

- A. Submittals, including those specified herein to be submitted to the Architect, excluding those directed to a specific individual, shall be submitted directly to the Contractor for his review. Contractor will forward required submittals to the Architect for his review and approval.

1. **Contractors shall submit shop drawings in electronic format.** All electronic format drawing submittals shall be in Adobe Acrobat pdf format. All electronic format product data or other information shall be submitted in Adobe Acrobat pdf format. Coordinate with Architect prior to submitting.

- B. Contractors on this Project shall provide submittals in accordance with the requirements of this Section. Where a submittal is required by a Contractor but assistance from others, Contractors shall participate and cooperate to expedite each submittal.

- C. Where submission of samples, shop drawings, or other items are required from suppliers or subcontractors, it shall be the responsibility of the Contractor for whom the subcontractor is executing the Work to see that the submittal items required are complete and properly submitted, and corrected and resubmitted at the time and in the order required so as not to delay the progress of the Work. Submittals shall be made through the Contractor.

- D. The Contractor shall check all shop drawings, samples, and other submittals and submit them to the Architect with a letter of transmittal giving his approval, comments, and suggestions. Each transmittal shall include the following information:

1. Date Submitted.
2. Project title and number.
3. Contractor's name and address.
4. **Identification by Specification Section and quantity submitted for each submittal including name of subcontractors, manufacturer, or supplier.**
5. Notification of deviations from the Contract Documents for each submittal.
6. Contractor's written approval marked on each submittal. If contractor's submittals are not stamped and reviewed by the contractor prior to submitting for review, submittals will be sent back to the contractor.
7. If there is more than one building in the project, shop drawings are to be submitted and packaged for each building and submitted in packages for each separate building. Shop drawings not submitted in this fashion may be rejected.

- E. The Contractor shall prepare, review, and stamp with his approval and submit, with reasonable promptness or within the specified time periods and in orderly sequence so as



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to cause no delay in the Work or in the Work of another contractor, submittals required by these Contract Documents or subsequently required by modifications.

1. If the product is not as specified or approved by Addenda, it will be rejected by the Architect. Contractor shall not make submittals if the product manufacturer is not specified or listed in the Addenda. This will delay the submittal process and the contractor shall assume full responsibility for any delays caused by unapproved manufacturer submittals.
- F. The Contractor and Architect shall review and take action on submittals with reasonable promptness, so as to cause no delay in the progress. A reasonable period of time for review of and action taken on submittals shall be as specified herein, but in no case shall it be more than 14 calendar days from the time it is received by the Architect until the time the submittal is marked and forwarded or returned. Contractors shall allow sufficient mailing time for submittals.
- G. The same submittal will only be reviewed a maximum of two (2) times. If the same submittal is not correct within the two (2) submittal limit for the same item, the contractor will be charged for the additional reviews required. The Architect's additional time will be on an hourly basis, which amount will be deducted from the contractor's Contract Sum by Change Order.
- H. Identification of Submittals: Submittals, including re-submittals, shall be numbered with a Submittal Number. The Submittal Number shall consist of the applicable specification section number followed by a suffix number in consecutive order matching the numbers on the Submittal Log. The form of Submittals Numbers shall be as follows: ## ## ## - ### (example: 09 90 01-01).

### 1.3 REQUIRED SUBMITTALS

#### A. Construction Schedules

1. A linear bar chart time control schedule shall be provided by the Contractor.
  - a. Each Contractor shall work overtime nights, and weekends, if necessary to maintain his portion of the schedule at no additional cost to the Owner.
  - b. Each Contractor is responsible to expedite approvals and deliveries of material so as not to delay job progress.
  - c. Each Contractor shall begin each phase of his work as quickly as physically possible, but not to impede or jeopardize the Work of other Contractors.
  - d. Each Contractor shall cooperate fully with the Contractor in the coordination of the Work with other Contractors and the convenience of the Owner as indicated in the Specifications.
  - e. Each Contractor shall participate in the updating of the schedule on a bi-weekly basis during the entire life of his contract.
    - 1) Contractor's schedule shall be updated bi-weekly and submitted to the Architect and other involved parties at least 2 days prior to the bi-weekly progress meeting.



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- f. The Project Construction Schedule will be updated reflecting Contractor's revised schedule and progress meeting results.

### B. Schedule of Values

1. Contractor shall prepare and submit to the Architect a Schedule of Values for approval within 7 days after notice is given to proceed with Work. The Schedule of Values shall consist of a complete breakdown of the Contractor's contract sum showing the various items of the Work, divided so as to facilitate the approval of payments to the Contractor for Work completed. In addition to and conjunctive with the division of various items of work, the breakdown shall separate individual buildings within the Project, shall separate sitework from building(s) components and shall separate remodeling/renovation work from new construction work. The Schedule of Values shall be prepared on AIA Document G703, Continuation Sheet, showing the breakdown of items of Work and supported by such data to substantiate its correctness as the Architect may require.
2. Schedule of Values shall be coordinated with the Construction Schedules such that the percentages of Work completed closely relates to the values for the Work shown on the request for payments. At the beginning of the Project, each Contractor shall prepare a schedule of monthly progress payments showing the amount the Contractor may require for the Work proposed to be completed. The purpose of this schedule is to allow the Owner to determine what amounts of funds he will be required to have available each month during the progress of construction for progress payments.

### C. Project Use Site Plan

1. The Contractor, in cooperation with other Contractors on this Project, shall prepare a proposed project use of the site plan.
2. Contractors shall confine operations at the site to areas within the areas indicated and as approved on the use of the site plan, and as permitted by law, ordinances, and permits. Site shall not be unreasonably encumbered with materials, products, or construction equipment.

### D. Shop Drawings and Product Data

1. Shop drawings are drawings, diagrams illustrations, schedules, performance charts, brochures, and other data which are prepared by the Contractor or subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.
  - a. Advertising brochures will not be accepted as shop drawings.
  - b. Erection and setting drawings as referred to in these Specifications will be considered as shop drawings and shall be submitted along with detailed shop drawings.
  - c. Where schedules are required to indicate locations, they shall be submitted as part of the shop drawing package for that item.
  - d. Shop drawings and schedules shall repeat the identification shown on the Contract Drawings.



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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.
  - a. Clearly mark each copy to identify pertinent materials.
  - b. Show dimensions and clearance required.
  - c. Show performance and characteristics and capacities.
  - d. Show wiring diagrams and controls.
  - e. Note variances from the Contract Documents including manufacturer's recommended changes to sequencing and to piping and control diagrams.
3. Preparation of Submittals: Provide permanent marking on each submittal to identify project, date, Contractor, Subcontractor, submittal name, and similar information to distinguish it from other submittals. Show Contractor's executed review and approval marking and provide space for Architect's "Action" marking. Package each submittal appropriately for transmittal and handling. Submittals which are received from sources other than through the Contractor will be returned "without action", which does not mean approval.
4. By approving and submitting shop drawings, the Contractor thereby represents that he has determined and verified field measurements, field construction criteria, materials, catalog numbers, and similar data, and that he has checked and coordinated each shop drawing with the requirements of the Work and of the Contract Documents prior to submitting to the Architect.
5. The Contractor shall make corrections required by the Architect and shall resubmit the required number of corrected copies of shop drawings until approved. The Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections requested by the Architect on previous submissions.
6. The Architect will review shop drawings only for conformance with the design concept of the Project and with the information given in the Contract Documents. The Architect's review of a separate item shall not indicate review of an assembly in which the item functions.
7. The Architect's review of shop drawings shall not relieve the Contractor of responsibility for any deviation from the requirements or the Contracts documents unless the Contractor has informed the Architect in writing of such deviation at the time to submission and the Architect has given written approval to the specific deviation, nor shall the Architect's action relieve the Contractor from responsibility for errors or omissions in the shop drawings.
8. Notations and remarks added to shop drawings by the Architect are to insure compliance to Drawings and Specifications and do not imply a requested or approved change to contract cost.
9. Should deviations, discrepancies, or conflicts between shop and contract drawings and Specifications be discovered, either prior to or after review, Contract Documents shall control and be followed.
10. The following number of shop drawings and product data submittals shall be made on this Project. Where an insufficient number of copies are submitted, no action will be taken until proper number of copies have been received. Additional copies beyond the number required will be discarded.



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## Schedule of Required Shop Drawings and Product Data

11. Architectural/Structural/Mechanical/Electrical/Civil
  - a. Upload to ftp site as instructed by the Architect.
12. Shop drawings will be marked as follows: Contractors shall take the following action for each respective marking:
  - a. "REVIEWED AND RELEASED" - Copies will be distributed as indicated under above schedule.
  - b. "REVIEWED AND RELEASED WITH CORRECTIONS" - Contractor may proceed with fabrication, taking into account the necessary corrections. Corrected shop drawings shall be resubmitted before fabrication of this Work is completed. Only shop drawings marked "REVIEWED AND RELEASED" by Architect will be permitted on the project site.
  - c. "REVISE AND RESUBMIT" - Contractor will be required to resubmit shop drawings in their entirety. No fabrication or installation shall be started until shop drawings so marked have been completely revised, resubmitted, and marked by Architect according to preceding Paragraphs 1. or 2.
13. Where re-submittal is required, submittal and distribution shall be as specified in subparagraph 11 above.
14. One set of shop drawings marked by Architect "REVIEWED AND RELEASED" be filed on the project site at all times. Shop drawing file may be electronic and accessible by the Architect and Owner on the on-site project computer. No installation of equipment, materials, or products is to be incorporated into the Project until shop drawings marked by Architect "REVIEWED AND RELEASED" have been received on the Project.

### E. Samples

1. The Contractor shall submit to the Architect triplicate (3) samples to illustrate materials or workmanship, colors, and textures, and establish standards by which the Work will be judged. A complete list of required samples will be submitted to the Contractor for use as a check list.
2. By approving and submitting samples, the Contractor thereby represents that he has determined and verified materials, catalog numbers, and similar data, and that he has checked and coordinated each sample with the requirements of the Work and of the Contract Documents prior to submitting to the Architect.
3. The Contractor shall resubmit the required number of correct or new samples until approved. The Contractor shall direct specific attention in writing or on resubmitted samples to revisions other than the changes requested by the Architect on previous submissions.
4. The Architect will review samples but only for conformance with the design concept of the Project and with the information given in the Contract Documents. The Architect's approval of a separate item shall not indicate approval of an assembly in which the item functions.
5. The Architect's action shall not relieve the Contractor of responsibility for deviations from the requirements of the Contract Documents unless the



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Contractor has informed the Architect in writing of the deviation at the time of submission and the Architect has given written approval to the specific deviation, nor shall the Architect's action relieve the Contractor from responsibility for errors or omissions in the samples.

6. Unless otherwise specified, samples shall be in triplicate and of adequate size to show function, equality, type, color, range, finish, and texture of material. When requested, full technical information and certified test data shall be supplied.
  - a. Each sample shall be labeled, bearing material name and quality, the Contractor's name, date, project name, and other pertinent data.
  - b. Transportation charges to and from the Architect's office must be prepaid on samples forwarded. Approved samples shall be retained by the Architect until the Work for which they were submitted has been accepted.
7. Materials shall not be ordered until approval is received. Materials shall be furnished, equal in every respect to approved samples. Where color or shade cannot be guaranteed, the maximum deviation shall be indicated by the manufacturer. Work shall be in accordance with the approved samples.

### F. List of A.I.A. Documents (Contractors Source)

1. The following documents are required in the Project Manual to be furnished and executed by the Contractor(s) and submitted to the Architect at various stages of the Project Work. Refer to Supplementary Conditions and Division 1.
  - G702 - Application and Certification for Payment
  - G703 - Continuation Sheet
  - G705 - Certificate of Insurance
  - G706 - Contractor's Affidavit of Payment of Debt and Claims
  - G706A - Contractor's Affidavit of Release of Liens
  - G707 - Consent of Surety Company to Final Payment, if required
  - G707A - Consent of Surety to Reduction in or Partial Release of Retainage, if required.
2. Special documents, which may be required, will be furnished by the Architect.

### G. Operation and Maintenance Data

1. Typed or printed instruction covering the operation and maintenance of each item of equipment furnished, shall be prepared and placed in a notebook by the Contractor and submitted to the Architect for review and transmittal to the Owner. The instructions, as applicable, shall include the following:
  - a. Any schematic piping and wiring diagrams;
  - b. Any valve charts and schedules;
  - c. Any lubrication charts and schedules;
  - d. Guides for troubleshooting;
  - e. Pertinent diagrams of equipment with main parts identification;
  - f. Manufacturer's data on all equipment;
  - g. Operating and maintenance instructions for all equipment;



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- h. Manufacturer's parts list; and,
- i. Any testing procedures for operating tests.
  - 1) Three (3) copies of the above instruction books shall be furnished prior to Final Payment. The books shall describe the information to be covered clearly and in detail and shall be in form and content satisfactory to the Owner.
- 2. The Contractor shall instruct the Owner's operating personnel in the proper use, care and emergency repair of all equipment installed by it before Final Payment. The Contractor shall call particular attention to any safety measures that should be followed. The instruction shall be adequate to train the Owner's operating personnel in the proper use, care and emergency repair of such equipment.
- H. The work shall be furnished and installed in accordance with the Drawings, Specifications and as additionally required by the manufacturer's instructions, and where a conflict occurs between the Drawings or Specifications and the manufacturer's instructions, the contractor shall request clarification from the Architect prior to commencing the work and shall follow the interpretations given by the Architect.

### 1.4 MATERIAL SAFETY DATA SHEETS

- A. In compliance with the OSHA Hazard Communication Standard (1910.1200, 08-24-1987) contractors are required to have on the site, MSDS (Material Safety Data Sheets) for ALL products classified as hazardous that their firm has knowledge that they will be furnishing, using, or storing on the jobsite during the duration of this Project. MSDS sheets are not part of the shop drawing review process.
  - 1. The Contractor at completion of the Work shall provide the Owner with the MSDS sheets for the hazardous products used on the Project site during construction.

PART 2 - PRODUCTS (NOT USED).

PART 3 - EXECUTION (NOT USED).

END OF SECTION 01 33 00



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SECTION 01 42 19  
REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Contractual Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. "Reviewed": The term "reviewed," when used in conjunction with the Architect's/Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Architect's/Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- B. "Contractor": The term "contractor," "Contractor," "construction manager," or "Construction Manager " describes to entity who has a signed agreement with the Owner as the primary entity contracted to perform the Work. The terms are used interchangeably within this document.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "reviewed," "required," and "permitted" mean directed by the Architect/Engineer, requested by the Architect/Engineer, and similar phrases.
- D. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- E. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted", "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- F. "Install": The term "install" describes operations at the Project site including the actual unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- G. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, who performs a particular activity including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
- H. "Project site" is the space available to the Contractor for performing installation activities, either exclusively or in conjunction with others performing work as part of the Project.
- I. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- J. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the industry that control performance of the Work.
1. The term "experienced," when used with the term "installer," means having



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successfully completed a minimum of 5 previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

2. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

### 1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's "MasterFormat" system.
- B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
  2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
    - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

### 1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different but apparently equal to the Architect/Engineer for a decision before proceeding.



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1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect/Engineer for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in installation on the Project must be familiar with industry standards applicable to its installation activity. Copies of applicable standards are not bound with the Contract Documents.
  1. Where copies of standards are needed to perform a required installation activity, obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research Inc.'s "Encyclopedia of Associations," which is available in most libraries.

1.5 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 19



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SECTION 01 56 00  
TEMPORARY PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specified requirements for protection.
- B. Protection facilities required include, but are not limited to:
  - 1. Barricades, warning signs, lights.

1.2 QUALITY ASSISTANCE

- 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. Utility company regulations.
  - 4. Police, Fire Department and Rescue Squad rules.
  - 5. Environmental protection regulations.
- 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 each disconnected utility. Obtain required certifications and permits.

PART 2 -PRODUCTS

2.1 EQUIPMENT

- A. First Aid Supplies: Comply with governing regulations.
- B. 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 for NFPA recommended classes for the exposure.
  - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.



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PART 3 - EXECUTION

3.1 PROTECTION FACILITIES INSTALLATION

- A. Temporary Fire Protection: 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 on each floor at or near each usable stairwell.
  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.
- B. 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.
- C. 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.

END OF SECTION 01 56 00



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SECTION 01 70 00  
PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

- A. Closeout is hereby defined to include general requirements near the end of Contract Time in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner, and similar actions evidencing completion of the work. Specific requirements for individual parts of the Work are specified in Sections of Divisions 2 through 26. Time of closeout is directly associated to Date of Substantial Completion.

1.2 PREREQUISITES TO SUBSTANTIAL COMPLETION

- A. Prior to requesting Architect review for Certificate of Substantial Completion, (for either entire Work or portions thereof), complete the following and list known exceptions in request.
1. Advise Owner of pending insurance changeover requirements.
  2. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, agreements, final certifications, and other required closeout documents.
  3. Obtain and submit release enabling Owner's full and unrestricted use of the Work and access to services and utilities, including occupancy permits, operating certificates, and other similar required releases.
  4. Deliver tools, spare parts, extra stocks of materials, and similar physical items as specified to the Owner. Obtain receipts for deliveries.
  5. Make final changeover of locks and transmit keys to Owner and advise Owner's personnel of changeover in security provisions.
  6. Complete start-up testing of systems and instruction of Owner's operating/maintenance personnel. Discontinue and remove from project site temporary facilities and service, construction tools and facilities, mock-ups, and other construction elements.
  7. Complete final cleaning up requirements as specified in Section 01 74 13.

1.3 PREREQUISITES TO FINAL PAYMENTS

- A. Prior to requesting Architect final review for certification of final payment, complete the following:
1. Refer to the Supplementary Conditions.
  2. Submit final payment request with required closeout attachments.
  3. Submit copy of Architect's final punch list of itemized Work to be completed or corrected, stating that each and every item has been completed or otherwise resolved for acceptance.
  4. Submit record drawings, maintenance manuals, and similar final record information as specified.
  5. Submit certification of code compliance.
  6. Submit certification stating that no materials containing asbestos were incorporated into the Work.



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7. Plumbing Contractor shall submit certification stating that no flux or solder used for drinking water piping containing more than 0.2 percent lead, and that no pipe or fittings used for drinking water piping contained no more than 0.8 percent lead.

### PART 2 - PRODUCTS (NOT USED)

### PART 3 - EXECUTION

#### 3.1 PUNCH LIST

- A. Prior to the Architect's preparation of a Project Punch List, each Contractor shall prepare his own punch list and submit to the Architect and General Contractor, for use by the Architect to facilitate completion of the Work.
- B. The Contractor's inspection shall be as thorough as possible, in accordance with his aspiration to provide first-class workmanship and maintain good reputation and shall include Work under his Contract, including that of his subcontractors.
- C. The Architect shall observe the Work, providing that the Work on the Contractor's punch list has been completed, and prepare the Project Punch List for use by Contractors and their subcontractors to expedite proper completion of the Work.
- D. The Architect will only perform two (2) punch list inspections. The Architect will do the first inspection prior to issuing the Substantial Completion certificate and will do a second inspection within 30 days of the first inspection to verify that the contractor has completed the outstanding items on the first inspection punch list. Additional inspections above and beyond as specified herein are at additional cost to the Contractor and the cost of such additional inspections will be deducted from the Contract by Change Order.

#### 3.2 WARRANTY - CORRECTION OF THE WORK

- A. Architect will check to see if additional Work by the Contractor(s) is needed to make good the warranties. An itemized list will be furnished to the Contractor for corrective or replacement work.
  1. At approximately one month prior to the one year warranty expiration, the Owner, Architect, and a representative of the Contractor shall visit the site and prepare the warranty punch-list.
- B. This Work shall be completed immediately by the Contractor(s) after receiving notification.

#### 3.3 CERTIFICATION OF CODE COMPLIANCE

- A. Prior to final payment, the contractor indicated below shall submit to the Architect (in duplicate), letters of certification of code compliance as follows:
  1. The Subcontractor(s) for Division 22, 23, 24, Mechanical Work, shall submit a



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letter certifying that mechanical installations comply with current applicable Codes.

2. The Subcontractor(s) for Division 26, 27, 28 Electrical Work, shall submit letters certifying that electrical wiring complies with NEC current applicable editions.
3. The Subcontractor for Division 26, 27, 28, Electrical Work, shall submit letters certifying that alarm systems and smoke and heat detection systems comply with State of Indiana Codes and Regulations, current applicable conditions.

### 3.4 MAINTENANCE AND OPERATING MANUALS

- A. Prior to Date of Substantial Completion, and a requirement prior to receiving final payment, each Contractor shall submit to the Architect three (3) copies of a comprehensive Maintenance and Operating Manual presenting complete directions and recommendations for the proper care and maintenance of visible surfaces as well as maintenance and operating instructions for equipment items which he has provided. Operation and Maintenance Manuals shall include the following:
  1. Schematic and piping and wiring diagrams.
  2. Valve charts and schedules.
  3. Lubrication charts and schedules.
  4. Guides for troubleshooting.
  5. Pertinent diagrams of equipment with main parts identification.
  6. Manufacturer's data on all equipment.
  7. Operating and maintenance instructions for all equipment.
  8. Manufacturer's parts list.
  9. Any testing procedures for operating tests.
- B. Operating instructions shall include necessary printed directions for correct operations, adjustments, servicing, and maintenance of movable parts. Also included shall be suitable parts lists, approved shop drawings, and diagrams showing parts location and assembly.
- C. Upon Architect's approval and prior to issuance of final payment(s), each contractor shall submit three (3) corrected and completed copies of Operating and Maintenance Manuals to the Architect.
- D. Finished manuals shall be loose-leaf type with hardboard covers and titled tabs identifying each particular portion or item of the Work.
- E. For each titled item or portion of the Work, manual must provide the names, addresses, and phone numbers of the following parties:
  1. Contractor/installer
  2. Manufacturer
  3. Nearest dealer/supplier
  4. Nearest agency capable of supplying parts and service
- F. For each manual label on front cover or spine, indicate the following information:
  1. Project name and address



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2. Owner's name
  3. Name and address of Architect
  4. Name and address of all contractors and their contacts
  5. Date of submission
- G. The contractor(s) shall instruct the Owner's operating personnel in the proper use, care and emergency repair of all equipment installed before final payment. The contractor(s) shall call particular attention to any safety measures that should be followed. The instruction shall be adequate to train the Owner's operating personnel in the proper use, care, and emergency repair of such equipment.
- H. Refer to Section 01 30 00 for additional requirements.

### 3.5 CHARTS AND LOCATIONS OF CONCEALED WORK

- A. The contractor(s) for Mechanical Work shall prepare suitable charts identifying and locating each concealed control or other concealed item requiring repair, adjustment, and maintenance. Charts shall be mounted in suitable frames with glass covers secured to wall where directed.
- B. Charts shall list each item, together with its function, item number and location.
- C. Locations throughout the building shall be identified on the wall or ceiling by permanent, non-obstructive plates, labels, or other approved means secured in a permanent manner.
- D. Chart details, identification methods, locations, and methods of attachment shall be specified or approved by the Architect at the jobsite upon full submission of proposed procedures and proper execution of same.

END OF SECTION 01 70 00



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SECTION 01 74 13  
CONSTRUCTION CLEANING

PART 1 - GENERAL

1.1 RELATED WORK

- A. The Work of this Section shall be included as a part of the Contract Documents of each Contractor of this Project.

1.2 SUMMARY

- A. The Architect reserves the right to act on behalf of the Owner pertaining to the clean-up responsibilities that are a part of each Contractor's Work.

1.3 PURPOSE - DAILY CLEANING

- A. Define and emphasize the responsibility of each Contractor to remove his rubbish and debris from the construction site to guard against fire and safety hazards as well as to provide a more efficient construction operation for all Contractors. If this cleaning is not performed to the satisfaction of the Owner and the Architect, it will be performed for the Contractor at his expense.

1.4 PURPOSE - ROUTINE CLEANING

- A. Each Friday afternoon, and more often if necessary, each Contractor shall perform an overall cleanup of the entire site, including a broom cleaning of appropriate surfaces. The trades shall remove their rubbish and debris from the building site to the rubbish collection location promptly upon its accumulation and in no event later than the regular Friday general cleanup.

1.5 RUBBISH CONTAINER

- A. The General Contractor shall provide dumpster type rubbish container with lid, sized adequate for the Project waste, debris, and rubbish for the life of the Project.
- B. Dispose of container contents weekly or at more frequent intervals if required by inadequate container capacity.

1.6 SAFETY REQUIREMENTS

- A. Hazards Control (By each Contractor)
1. Store volatile wastes in covered metal containers, and remove from the premises daily.
  2. Prevent accumulation of wastes, which create hazardous conditions.
  3. Provide adequate ventilation during use of volatile or noxious substances.



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- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
  - 1. Do not burn or bury rubbish and waste materials on project site.
  - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
  - 3. Do not dispose of wastes into streams or waterways.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surface recommended by cleaning material manufacturer.

### PART 3 - EXECUTION

#### 3.1 DAILY CLEANING

- A. Each Contractor shall execute daily cleaning to ensure that building, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. Daily, during progress of work, clean site and public properties and dispose of waste materials, debris, and rubbish in dumpster type rubbish container provided under this Section.
- D. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
- E. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- F. Place no new work on dirty surfaces.

#### 3.2 ROUTINE CLEANING

- A. Employ experienced workmen for cleaning.
- B. Remove dirt, mud, and other foreign materials from sight exposed interior and exterior surfaces.
- C. Each Friday, or at more frequent intervals, if work activities justify same, perform the following cleaning. This includes all dirt, dust, and debris not identifiable as part of a Contract. Broom clean floor and paved surfaces; rake clean other surfaces of ground.



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- D. Maintain adjacent roads free from the accumulation of mud, rocks, rubbish, litter and debris resulting from construction activities.
- E. Remove litter, rubbish and debris from chases, whether the chases will be accessible or not.
- F. Maintain cleaning throughout the life of the Project.
- G. Should the Contractor fail in the performance of this Work, the Owner may perform such Work in accordance with Article 3 of the General Conditions.

3.3 FINAL CLEANING (Each Contractor)

- A. Each Contractor shall perform his respective final clean-up and shall leave the Work of the complete Project in clean, neat condition. The following are examples, but not by way of limitation, of cleaning levels required.
  - 1. Remove labels which are not required as permanent labels.
  - 2. Clean transparent materials, including mirrors and window/door glass, to a polished condition, removing substances which are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
  - 3. Clean exposed exterior and interior hard surfaces to a dirt free condition, free of dust, stains, films, and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
  - 4. Wipe surfaces of mechanical and electrical equipment clean; remove excess lubrication and other substances.
  - 5. Remove debris and surface dust from limited access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  - 6. Clean concrete floors in nonoccupied spaces broom clean.
  - 7. Vacuum clean carpeted surfaces and similar soft surfaces.
  - 8. Clean plumbing fixtures to a sanitary condition, free of stains, including those resulting from water exposure.
  - 9. Clean food service equipment to a condition, free of stains, including those resulting in water exposure.
  - 10. Clean light fixtures and lamps so as to function with full efficiency. Replace all lamps that are burnt out and/or flickering.
  - 11. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom clean condition; remove stains, petro-chemical spills, and other foreign deposits. Rake grounds which are neither planted nor paved to a smooth, even textured surface.

END OF SECTION 01 74 13



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**Division 02**  
Existing Conditions





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SECTION 02 41 13  
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Selective demolition work requires the selective removal and subsequent offsite disposal of the following kinds of elements:
  - 1. Portions of existing building indicated on drawings and as required to accommodate new construction.
  - 2. Removal of interior partitions.
  - 3. Removal of doors and frames.
  - 4. Removal of existing windows.
  - 5. Removal of roof system.
- B. Removal Work Specified Elsewhere: Cutting nonstructural concrete floors and masonry walls for piping, ducts, and conduits is included with the work of the respective plumbing, mechanical and electrical specification sections in Divisions 22, 23 and 26.

1.2 SUBMITTALS

- A. Submit in accordance with Division 01 requirements.
- B. Submit schedule indicating proposed sequence of operations for selective demolition work to Architect 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.
  - 1. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
- C. Submit a minimum of 24 digital photographs in JPEG format of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Architect prior to start of work.

1.3 PROJECT CONDITIONS

- D. Occupancy: Owner will not occupy the building areas during selective demolition.
- E. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
- F. 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.
- G. Damages: Promptly repair damages caused to adjacent facilities by demolition work.



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- E. 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.
- F. 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.
- G. 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.
- H. 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.
- I. Explosives: Use of explosives will not be permitted.

### PART 2 - PRODUCTS (NOT USED)

### PART 3 - EXECUTION

#### 3.1 DEMOLITION

- A. 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. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
  - 2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
  - 3. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
  - 4. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
  - 5. Completely fill below-grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel, or sand, free of trash and debris, stones over 6 inches in diameter, roots, or other organic matter.



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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 Architect in written, accurate detail. Pending receipt of directive from Architect, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

### 3.2 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 Federal, State, and local regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution. Stop work immediately and notify Architect.
  - 2. Burning of removed materials is not permitted on project site.

### 3.3 CLEANUP AND REPAIR

- A. 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 02 41 13



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**Division 03**  
Concrete





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SECTION 03 35 00  
CONCRETE FLOOR SEALERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish all necessary materials, labor and equipment required to provide and install the concrete floor sealer, as specified herein and as indicated on the Drawings.

1.2 SUBMITTAL

- A. Product Data: Submit manufacturer's specification or specific products of the concrete floor sealer, including physical properties and performance properties and all tests described herein and submit all Material Safety Data sheets. Each individual component of the system will be evaluated on the basis of these standards. For any of the tests not listed in the manufacturer's standard nationally published data, the manufacturer must supply the missing data from an independent test laboratory tested according to the referenced standard. Manufacturer's standard color chart shall also be submitted and must afford the Architect color selection from at least 12 standard colors.
- B. The concrete floor sealing specialist shall submit a 6" x 6" system sample for verification purposes and finish texture approval.
- C. Contractor Experience: The concrete floor sealing specialist shall furnish a list of three (3) projects using either specified material or another material pre-approved for this project that they have installed during the last five years. Information shall include: project name, square footage, contract name with owner's address and phone number. Also, the concrete floor sealer specialist shall furnish resumes detailing the experience of key project personnel including supervisors and technicians.
- D. Submit in accordance with Division 01 requirements.
- E. Submit warranty as specified herein.

1.3 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Obtain concrete floor sealer materials from a single manufacturer.
- B. Applicator's Qualifications: Installation shall be performed by an concrete floor sealer specialist with skilled mechanics having not less than three (3) years of satisfactory experience in the application of the type and complexity of system as specified in this section. The concrete floor sealer specialist shall be approved in writing by the manufacturer of the concrete floor sealer as specified herein.
- C. All products shall be V.O.C. compliant and shall meet the new EPA requirements effective September 13, 1999.



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- D. All concrete surfaces scheduled to receive the concrete floor sealer shall be free from curing membranes or bond breakers and clear of any debris or construction latents directly prior to application of concrete floor sealer.

#### 1.4 MATERIAL DELIVERY, HANDLING AND STORAGE

- A. Primary system materials shall be delivered in the manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the following:
  - 1. Product Name.
  - 2. Manufacturer's Name.
  - 3. Component designation (A or B, etc.).
  - 4. Ratio of component mixture.
- B. Provide equipment and personnel to handle the materials by methods which prevent damage.
- C. The concrete floor sealer specialist shall promptly inspect all direct jobsite deliveries to assure that quantities are correct and that materials comply with requirements and are not damaged.
- D. The concrete floor sealer specialist shall be responsible for all materials furnished by him, and he shall replace, at his own expense, all such material that is found to be defective in manufacturing or that has become damaged in transit, handling or storage.
- E. Store materials in strict accordance with manufacturer's instructions, with seals and labels intact and legible.
- F. Proper concrete protection from staining must be observed. Steel must not be placed on slab to avoid staining. Diaper hydraulic powered equipment to avoid oil and gasoline staining. Pipe cutting machines shall not be used on the concrete slabs where the clear sealers are scheduled. Any rubber tired traffic shall be kept at a minimum and shall be protected with drop cloths.

#### 1.5 JOB CONDITIONS

- A. The concrete floor sealer specialist shall visit the jobsite prior to beginning the application of the concrete floor sealer to evaluate substrate condition, including concrete moisture content, and the extent of repairs required, if any. Concrete floors shall be tested to verify that the moisture content of the substrate does not exceed that as recommended by the manufacturer.
- B. The concrete floor sealer specialist should exercise care during surface preparation and system application to protect surrounding substrates and surfaces, as well as in place equipment. The concrete floor sealer specialist shall use his discretion as to the physical means used for preparation and protection. Any costs incurred for resultant damage from negligence or inadequate protection shall be the sole responsibility of the concrete floor sealer specialist.



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- C. Job area shall be free of other trades during floor installation, and for a period of 24 hours upon completion.
- D. Where natural ventilation is inadequate, provide ventilation by use of fans or other devices.
- E. Do not install at temperatures below 35 degrees F.

1.6 WARRANTY

- A. The concrete floor sealer specialist shall furnish the manufacturer's standard warranty of the concrete floor sealer for a period of twenty (20) years after the Date of Substantial Completion.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: "Ashford Formula," Curecrete Chemical Company, Springville, Utah; [www.ashfordformula.com](http://www.ashfordformula.com).
  - 1. Products of the following manufacturers are approved provided compliance with all technical requirements as specified herein:
    - a. "Seal Hard," L & M Construction Chemicals, Omaha, Nebraska; [www.lmcc.com](http://www.lmcc.com)

2.2 MATERIALS

- A. Colorless, transparent, penetrating liquid.
- B. Contains no silicone.
- C. Highly resistant to oils, greases and acids.
- D. Technical Properties:
  - 1. Abrasion – Taber abrasion test: 30.7% increase in abrasion resistance.
  - 2. Bonding – per ASTM D3359, latest edition: 17% increase in epoxy adhesion. No change for polyurethane adhesion.
  - 3. Curing – 94% greater moisture loss from untreated samples during critical, initial 24 hour curing period.
  - 4. Hardening – per ASTM C42, latest edition: 40% increase in compressive strength at 7 days, 38% increase at 28 days over untreated samples. ASTM C805, latest edition, Schmidt hammer: 13.3% increased impact resistance.
  - 5. Permeability – The seepage rate using a 7 inch head of water on a 4.91 square inch area treated was 0.0083cc per hour.
  - 6. Weathering – per ASTM G23, latest edition: ultraviolet light and water spray exposure had no adverse effect.



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- E. Non-toxic, non-combustible, and non-flammable. Shall not harm lungs or hands. Shall comply with all V.O.C. regulations in effect at the time of manufacture.

**PART 3 - EXECUTION**

**3.1 SURFACE CONDITIONS**

- A. Examine concrete after wet curing a minimum of three (3) days and removal of any curing covering. Coordinate with Section 03 30 00, Cast-In-Place Concrete. Notify the Architect of any deficiencies prior to proceeding with the Work of this Section.

**3.2 INSTALLATION**

- A. Upon removal of curing cover, mechanically clean the concrete to remove contaminants, form oils, bond breakers, and staining from the wet cure operation. All cleaning compounds shall be removed in their entirety and the concrete surface shall be neutralized.
- B. Avoid contact with glass, aluminum, plant life, asphaltic concrete and finished surfaces.
- C. First Application:
  - 1. As soon as possible after curing cover removal, spray product with a low pressure sprayer at a rate of 200-250 square feet per gallon.
  - 2. Keep the entire surface wet for 30 to 40 minutes by re-spraying dry spots or moving material from wet areas to dry areas with nylon push brooms.
  - 3. When the wet product becomes slippery underfoot, lightly sprinkle the surface with water to aid penetration and prevent surface drying.
  - 4. As the product begins to dry into the surface and again becomes slippery underfoot, flush the surface with water and squeegee the surface dry, removing all excess product, water, alkali and other impurities from the surface.
- D. NOTE: Before turning the facility over to the Owner, aggressively soap and water clean the concrete to remove construction contaminants and prepare the floor for the final application.
- E. Finish Application:
  - 1. Apply sealer with a low pressure sprayer or drop sealer with a floor scrubbing machine at 50 – 600 square feet per gallon.
  - 2. Lambs wool or fine bristle broom the sealer evenly across the concrete surface or use a squeegee on the floor scrubbing machine to evenly spread a thin film.
- F. Final Polishing
  - 1. It is necessary that the floor sealer be applied adequately if the sheen is to come up. Therefore, if the floor does not shine when polished/burnished, the floor may need to have another standard treatment application of the concrete floor sealer specified herein.



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2. Prior to final inspection and date of substantial completion, all exposed concrete floors sealed with products specified in this Section, shall be polished as follows:
  - a. Step 1: Use high-speed propane polishing/burnishing equipped with an abrasive 3M Black stripping pad.
  - b. Step 2: "Buff" the surface by working the machine side to side and back to back so as to create a wax-like sheen.
  - c. Step 3: Repeat step 2 utilizing a 3M Red pad to increase the intensity of the sheen.
  
- G. Provide all items and accessories as required for a complete installation in every respect.

END OF SECTION 03 35 00



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# **Division 04**

Masonry





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SECTION 04 05 13  
MORTAR

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies the mortar for unit masonry materials specified in the following Sections:
1. Concrete masonry units, Section 04 20 00

1.2 SUBMITTALS

- A. Submit in accordance with Division 01 requirements.
- B. All required submittals shall be approved prior to the start of masonry construction.
- C. Approved manufacturer's published complete product data for proposed prepared masonry cement.
- D. Proposed mortar mix design(s) including complete identities and proportions of ingredients as well as adherence to standards where so specified.
- E. Test results from mortar cube breaks reporting compressive strength of mortar to be used.
- F. Contractor shall receive from supplier and provide to Architect certification, in writing, that materials meet requirements of ASTM C1142, latest edition.
- G. Samples for Verification: Accessories embedded in the masonry.
- H. Submit mortar test reports indicating mortar property requirements in accordance with ASTM C270, latest edition.

1.3 QUALITY ASSURANCE

- A. Codes and Specifications: Comply with the provisions of the latest editions for the following codes, specifications, and standards.
1. ACI 530/ASCE 5 Building Code Requirements for Masonry Structures.
  2. ACI 530.1/ASCE 6 Specifications for Masonry Structures.
  3. NCMA-TEK 20B Mortars for Concrete Masonry.
  4. ASTM C144, Aggregate for Masonry Mortar.
  5. ASTM C150, Portland Cement
  6. ASTM C207, Hydrated Lime for Masonry Purposes.
  7. ASTM C270, Mortar for Unit Masonry.
  8. ASTM E514, Standard Test Method for Water Penetration and Leakage Through Masonry.



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- B. Field Quality Control.
  - 1. Materials may require testing and re-testing, as directed by the Architect, during the progress of the Work. Allow free access to material stockpiles and facilities. Tests shall be performed at the Contractor's expense.
  - 2. Do not change source or brands of masonry mortar material during the course of the Work. If changes become necessary, resubmit data for material being changed and for tests of materials in which the changed material is and ingredient.
  - 3. Mortar properties shall comply with ASTM C270, latest edition.
- C. Submit a copy of certification that the integral water repellent admixture for the mortar was added in amounts according to the manufacturers written installation instructions.
- D. Source Limitations 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.

### 1.4 MATERIAL STORAGE, DELIVERY, AND HANDLING

- A. Store mortar materials off the ground, under cover, using tarpaulins, felt paper, or polyethylene sheets in a dry location.
- B. Deliver and store manufactured products in original unopened containers.
- C. Store cementitious ingredients in weather-tight enclosures and protect against contamination. Store on platforms, under cover, and in a dry location.
- D. Stock piles and handle aggregates to prevent contamination from foreign materials.
- E. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

### 1.5 TESTS FOR MORTAR

- A. Test for compressive strength by the methods of sampling and testing of ASTM C109 and ASTM C780, latest editions.
  - 1. Provide a minimum of one set of cubes of testing per 5,000 sq. ft. of masonry wall construction, maximum.
- B. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.



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- C. If the compressive strength tests fail to meet the minimum requirements specified, the mortar represented by such tests will be considered deficient in strength.
- D. Deficient mortar shall be removed and replaced by the Contractor without additional cost to the Owner.

### 1.6 PROJECT CONDITIONS

- A. To assure mortar temperatures between 40 degrees F and 120 degrees F until used heat mixing water or aggregates when air temperature is between 32 degrees F and 40 degrees F. When the air temperature is between 25 degrees F and 32 degrees F, heat both water and aggregate.
- B. Produce subsequent mortar batches within plus or minus 10 degrees of first batch.
- C. Do not heat water or sand above 160 degrees F.
- D. Stain Prevention: Prevent mortar and soil from staining the face of masonry to be left exposed or painted. Immediately remove mortar, and soil that come in contact with such masonry.
  - 1. Protect sills, ledges, and projections from mortar droppings.
  - 2. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 3. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. To assure mortar temperatures between 40 degrees F and 120 degrees F until used heat mixing water or aggregates when air temperature is between 32 degrees F and 40 degrees F. When the air temperature is between 25 degrees F and 32 degrees F, heat both water and aggregate.
- B. Produce subsequent mortar batches within plus or minus 10 degrees of first batch.
- C. Do not heat water or sand above 160 degrees F.

## PART 2 - PRODUCTS

- 2.1 MATERIALS - Comply with the provisions of the latest editions for the following codes, specifications, and standards:
  - A. Portland Cement: ASTM C150, Type I, non-staining, without air entertainment and of natural color or white, to produce the required color of mortar or grout.
  - B. Masonry Cement: Current ASTM C91, non-staining, with 12 to 22 percent air content by volume.



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- C. Hydrated Lime: ASTM C207, Type S.
- D. Aggregates: ASTM C144, except for joint less than 1/4 inch, use aggregate graded with 100 percent passing the No. 16 sieve.
- E. Water: Clean, free of deleterious materials which would impair strength or bond.
- F. Ready Mixed Mortar: ASTM C270, latest edition, Standard Specification for ready mixed mortar for unit masonry.

### 2.2 MORTAR MIXES

- A. Do not lower the freezing point of mortar by use of admixture or anti-freeze agents.
  - 1. Do not use calcium chloride in mortar.
- B. Mortar for Unit Masonry: Comply with ASTM C270, latest edition, Property Specification, Proportion Specifications, or ASTM C1142, latest edition.
  - 1. Type M: 2500 psi average compressive strength at 28 days for masonry in contact with the earth.
  - 2. Type S: 1800 psi average compressive strength at 28 days for other masonry conditions.
- C. Use gray (non-colored) mortar for interior and non-exposed concrete block masonry.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Refer to Section 04 20 00, Unit Masonry.

END OF SECTION 04 05 13



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SECTION 04 05 16  
MASONRY GROUT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies the masonry grout for unit masonry materials specified in the following Sections:
  - 1. Concrete masonry units, Section 04 20 00
- B. The types of masonry grout required include the following:
  - 1. Fine grout.
  - 2. Coarse grout.
- C. This Section also specifies the grout for use in hollow metal frames. Install in all hollow metal frames installed in concrete and CMU walls, interior and exterior.

1.2 SUBMITTALS

- A. Submit in accordance with Division 01 requirements.
- B. Approved manufacturer's published complete product data for:
  - 1. Proposed Portland cement.
- C. Proposed grout mix designs for both fine and coarse grouts including complete identities and proportions of ingredients as well as adherence to standards where so specified. All grout shall be plant-mix.
- D. Compression test results from an independent certified testing laboratory from grout samples made from the proposed grout mix design. Test reports may be from previous Projects within the previous 6 months.
- E. Submit grout test reports indicating grout compressive strength property requirements in accordance with ASTM C476, latest edition.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the latest edition for following codes, specifications, and standards, except as otherwise shown or specified:
  - 1. ACI 530/ASCE 5 Building Code Requirements for Masonry Structures.
  - 2. ACI 530.1/ASCE 6 Specifications for Masonry Structures.
  - 3. NCMA-TEK 23-A Grouting for Concrete Masonry Walls.
- B. Field Quality Control
  - 1. Materials may require testing and re-testing, as directed by the Architect, during



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the progress of the Work. Allow free access to material stockpiles and facilities. Tests will be performed at the Contractor's expense.

2. Do not change source or brand of masonry grout materials during the course of the Work. If changes become necessary, resubmit data for material being changed and for tests of materials in which the changed material is an ingredient.
  3. Provide grout in mock-ups as required in Section 04 20 00, Unit Masonry.
- C. Provide grout in mock-ups as required in Section 04 20 00, Unit Masonry.

### 1.4 MATERIAL STORAGE

- A. Store grout materials off the ground, under cover, using tarpaulin, felt paper, or polyethylene sheets and in a dry location.

### 1.5 TESTS FOR GROUT

- A. Gout for filling reinforced or un-reinforced concrete masonry cores or brick cavities test for compressive strength by methods as described in Section 04 05 16.
1. Provide a minimum of one set of 3 test specimens for testing per 5000 square feet of masonry wall construction, maximum.
- B. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, valves specified in the referenced specification for each material, specific location where material represented by sample is used and test results. Indicate whether or not material is acceptable for intended use.
- C. If the compressive strength tests fail to meet the minimum requirements specified, the grout represented by such tests shall be considered deficient in strength.
- D. Deficient grout shall be removed and replaced by the Contractor without additional cost to the Owner.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Masonry Cement: ASTM C 91.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Grout: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.
1. White Mortar Aggregates: Natural white sand or ground white stone



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- D. Water: Clean and potable.

## 2.2 GROUT MIXES

- A. Do not lower the freezing point of grout by use of admixtures or anti-freeze agents.
1. Do not use calcium chloride in grout.
- B. Grout for Unit Masonry and Hollow Metal Frames: Comply with ASTM C476, latest edition.
1. Fine Grout: 2000 psi average compressive strength at 28 days for 6 inches and smaller hollow concrete masonry units and between 2 wythes of masonry where space is less than 2 inches in width.
  2. Coarse Grout: 2000 psi average compressive strength at 28 days for 8 inches and larger hollow concrete masonry units and between 2 wythes of masonry where space is 2 inches in width or wider.
  3. Fine grout shall be used in hollow metal frames.
- C. Grout Proportions (by volume): Comply with Table 1, ASTM C476, latest edition.
1. Fine Grout: 1 part Portland cement, 0 to 1/10 part hydrated lime or lime putty, 2 ¼ to 3 parts fine aggregate.
  2. Coarse Grout: 1 part Portland cement, 0 to 1/10 part hydrated lime or lime putty, 2 ¼ parts fine aggregate, 1 to 2 parts coarse aggregate.
- D. Grout Slump: Properly proportioned grout shall have a slump of 8 to 11 inches as measured according to ASTM C 143.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Refer to Section 04 20 00, Unit Masonry.
- B. Install fine grout in all steel frames installed in concrete and CMU walls. Do not install until asphaltic emulsion coating is installed in frames and has dried. Refer to Section 08 11 00 for additional requirements.

### 3.2 SAMPLING AND TESTING

- A. Sampling and Testing of Grout: NCMA-TEK 107, latest edition.
1. Place a piece of wood 1-5/8 inch thick and 3 inches by 3 inches on a level surface. Four masonry units with permeable paper, such as absorptive paper toweling, taped to one face shell are placed around the wood block to form the mold. The resulting mold is approximately 3 inches square by 6 inches high. Pour grout into the mold in two layers. Rod each layer 25 times with a 1 x 2 wood



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puddling stick to eliminate air bubbles. Puddle the bottom layer throughout its depth. Distribute the strokes uniformly over the cross-section of the mold. For the upper layer, allow the stick to penetrate about ½ inch into the underlying layer. After the second lift has been puddled, level the top of the prism with a trowel and immediately cover the prism with wet burlap or similar material to keep it damp. Protect the prisms against extreme changes in temperature, and after 48 hours, remove the masonry units and carefully pack the samples for transport to the laboratory where they will be stored in a moist room until tested.

2. Cap the specimens in accordance with the applicable provisions of "Method of Capping Cylindrical Concrete Specimens," ASTM C617, latest edition. The sample should be tested in a damp condition in accordance with the applicable provisions of ASTM C39 "Methods of Test Compressive Strength of Molded Concrete Cylinders", latest edition.
3. Three test samples shall be made and tested for each type of grout to be used in the work.

END OF SECTION 04 05 16



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SECTION 04 05 23  
MASONRY ACCESSORIES

PART 1- GENERAL

1.1 SUMMARY

- A. This Section specifies the masonry accessories for unit masonry materials specified in the following Sections:
  - 1. Concrete masonry units, Section 04 20 00.
- B. The types of masonry accessories required include, but may not be limited to, the following:
  - 1. Continuous horizontal wire reinforcing and ties.
  - 2. Reinforcing bars in masonry lintel block and hollow metal door frame heads.
  - 3. Vertical bars for concrete masonry.
  - 4. Grouted anchor bolts.
  - 5. Preformed expansion joint material.
  - 6. Caging devices and centering clips

1.2 SUBMITTALS

- A. Submit in accordance with Division 01 requirements.
- B. All submittals shall be approved prior to the start of masonry construction.
- C. Approved manufacturer's published, complete product data, with particular items to be provided, clearly marked thereon, for:
  - 1. Proposed masonry joint reinforcement.
- D. Complete shop drawings by approved fabricator for:
  - 1. Proposed masonry lintel and wall reinforcement. Shop drawings shall conform to Section 03 20 00 requirements.
  - 2. Show reinforcing steel in masonry walls in elevation.
- E. Submit samples of all masonry accessories for verification.

1.3 QUALITY ASSURANCE

- A. Provide accessories in mock-ups as required in Section 04 20 00, Unit Masonry.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.





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load-bearing walls at 90 degrees shall be wire mesh wall ties made of 1/2 inch mesh by 16 gauge hot dip mill-galvanized wire, 1 inch less in width than width of wall.

- D. Caging Devices and Centering Clips
1. In hollow concrete masonry cores or brick cavities to be reinforced with vertical reinforcing steel bars and filled with grout, provide 9 gauge galvanized steel caging devices. The following products are acceptable:
    - a. Rebar Positioner AA239, AA Wire Products Company, Chicago, IL
    - b. Rebar Positioner 3400, Masonry Reinforcing of America, Charlotte, NC
    - c. Spider Type Rebar Positioner, National Wire Products Industries, Baltimore, MD
- E. Grouted Anchor Bolts
1. In hollow concrete masonry units: HILTI HIT C20 Renovation Anchors, Hilti, Inc., Tulsa, Oklahoma; <http://www.us.hilti.com>; or Architect approved equal.
  2. In solid or grouted masonry units: HILTI HIT HY150 Adhesive Anchor System, Hilti, Inc., Tulsa, Oklahoma; <http://www.us.hilti.com>; or Architect approved equal.
- F. Preformed Expansion Joint Material: Provide closed cell polyethylene expansion joints equal to "Expansion-Joint Filler" as manufactured by BASF The Chemical Company; [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com) or Architect approved equal.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. See Section 04 20 00, Unit Masonry, for installation of masonry accessories specified under this Section.

END OF SECTION 04 05 23



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SECTION 04 20 00  
UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide labor, materials, and equipment necessary for complete installation of unit masonry as shown on the Drawings and specified herein.
- B. Work installed under this Section, but materials or products furnished under the following Divisions or Sections:
  - 1. Masonry mortar furnished under the Work of Section 04 05 13.
  - 2. Masonry grout furnished under the Work of Section 04 05 16.
  - 3. Masonry accessories furnished under the Work of Section 04 05 23.
  - 4. Anchor bolts, steel plates, and steel lintels; refer to Structural Drawings.
  - 5. Wood blocking and nailing blocks in masonry construction; refer to Section 06 10 00.
- C. Cooperate with other trades requiring items of equipment or services to be installed within or in conjunction with Unit Masonry Work.
- D. Products installed, but not furnished, under this Section include the following:
  - 1. Hollow-metal frames in unit masonry openings, furnished under Division 8 Section "Steel Doors and Frames."

1.2 SUBMITTALS

- A. Submit in accordance with Division 1 requirements.
- B. Upon regular presentation within past 6 months of representative units by approved manufacturer, a test report from an independent laboratory showing resultant weight, compressive strength (based on net area), and water absorption properties, as well as adherances to standards where so specified, for:

Name of Manufacturer  
Date of Manufacture of Test Specimen  
Dimension Measurements (in.)  
Calculated Gross Area (sq.in.)  
Calculated Net Area (sq.in.)  
Total Load (lbs.)  
Net Unit Load (psi)  
Sample Weight (lbs.)  
Dry Weight (lbs.)  
Wet Weight (lbs.)  
Immersed Weight (lbs.)  
Density (pcf)  
Moisture Content (%)  
Absorption (%)



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- C. Letter from approved manufacturer certifying that provided units will meet or exceed qualities of tested representative units for:
  - 1. Each proposed type of concrete masonry unit.
- D. A test report from an independent testing laboratory showing compressive strength of concrete masonry prisms constructed from the concrete masonry units and mortar to be used in the masonry work for:
  - 1. Each proposed type and size of concrete masonry unit as required on the Reinforced Masonry Plans in the Drawings.
- E. Installer's examination report.
- F. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
- G. Shop Drawings: Show fabrication and installation details for the following:
  - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement", latest edition. Show elevations of reinforced walls.
- H. Samples for Verification: Any accessories embedded in the masonry.
- I. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
  - 1. Each type of masonry unit required.
  - 2. Include test data, measurements, and calculations establishing net-area compressive strength of masonry units.
  - 3. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
  - 4. Each combination of masonry unit type and mortar type. Include statement of net-area compressive strength of masonry units, mortar type, and net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602, latest editions.
  - 5. Each material and grade indicated for reinforcing bars.
  - 6. Each type and size of joint reinforcement.
  - 7. Each type and size of anchor, tie, and metal accessory.

### 1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the latest editions for the following codes, specifications, and standards, except as otherwise shown or specified:
  - 1. ACI 530/ASCE 5 Building Code Requirements For Masonry Structures.
  - 2. ACI 530.1/ASCE 6 Specifications for Masonry Structures.
  - 3. NCMA-TEK 70A Concrete Masonry Prism Strength.



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4. NCMA-TEK 132
  5. NCMA-TEK 23A Grouting for Concrete Masonry Walls.
  6. NCMA-TEK 65 Field Inspection of Engineered Concrete Masonry.
  7. ASTM C140 Standard Methods of Sampling and Testing Concrete Masonry Units.
  8. Comply with ALL NCMA-TEK Standards.
- B. Changes in the source or brand of masonry materials during construction will require resubmission and re-testing at the Contractor's expense.
- C. Concrete Masonry Inspection
1. Refer to Division 01 for additional requirements.
    - a. Masonry inspection is required for those masonry elements where it is imperative that construction produces elements which can attain high design strengths. These masonry elements include, but are not limited to, grout filled CMU walls, CMU bearing walls, and grout filled and vertically reinforced CMU walls, and other walls as may be indicated on the Drawings.
    - b. The Contractor responsible for this Section 04 20 00 of the Work, is responsible for the masonry inspections. Masonry inspections shall be by an independent laboratory as specified in Division 1. Submit reports as specified herein.
  2. Submit written reports for each section of wall inspected to include:
    - a. Project identification name and number.
    - b. Name of Masonry Contractor.
    - c. Name of inspecting service.
    - d. Date of report.
    - e. Specific location of work inspected.
    - f. Horizontal joint reinforcing size, type, spacing, and lap.
    - g. Preparation of cores and cavities to be grouted. Inspect every core and cavity.
    - h. Vertical reinforcing centering clip size, type, spacing, and proper alignment.
    - i. Size spacing and lap of vertical reinforcing and installation in centering clips.
    - j. Installation and vibration of grout in cores and cavities.
    - k. Remarks as to general conditions pertinent to the strength and quality of the masonry work.
  3. Inspection shall use NCMA-TEK 65 Field Inspection of Engineered Concrete Masonry and NCMA-TEK 132 Inspector's Guide for Concrete Masonry Construction as guidelines.
  4. The masonry inspection agency shall be selected prior to the pre-masonry conference and shall have the inspector who will inspect this project attend the conference.
  5. The contractor for the work of this Section shall be responsible for the masonry inspection to be performed by an independent testing laboratory.



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- D. Definitions:
  - 1. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.
  - 2. CMU: Concrete masonry unit.
- E. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units off the ground, 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 place until units are in an air-dried condition.
- C. Store cementitious materials off the ground, under cover, and in dry location.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.

### 1.5 TESTS OF CONCRETE MASONRY PRISMS

- A. For grout filled and reinforced or un-reinforced concrete masonry or brick masonry wall construction tests for the compressive strength of prisms as described in ASTM E 447, latest edition.
  - 1. Provide a minimum of one set of 3 masonry prisms for testing per each 5000 square feet of masonry wall construction as required on the Structural Masonry Plan in the Drawings.
- B. Submit written reports for each prism tested Provide the project identification name and number, date of report, name of Contractor, name of Testing service, name of material suppliers, specific location where masonry represented by the prism is used, test results, and values specified in the referenced specification. Indicate whether or not tested prism is acceptable for intended use.
- C. If the compressive strength tests fail to meet the minimum requirements specified, the concrete masonry represented by such tests shall be considered deficient in strength.
- D. Deficient masonry construction shall be removed and replaced by the Contractor without additional cost to the Owner. In lieu of removal and replacement, additional cores may be grouted as required and directed by the Architect without additional cost to the Owner.



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1.6 PROJECT CONDITIONS

- A. Protect partially complete masonry against weather, when Work is not in progress, by covering top of walls with strong, waterproof, non-staining membrane. Extend membrane at least 2 foot down both sides of walls and anchor securely in place.
- B. Protect partially complete masonry walls against wind damage by bracing as required until support of walls is integral with the building structure.
- C. Protect masonry against freezing when the temperature of the surrounding air is 40 degrees F and falling. Heat materials and provide temporary protection of complete portions of masonry work. Comply with the requirements of the governing code and with the "Construction and Protection Recommendations for Cold Weather Masonry Construction" of the Technical Notes of Brick and Tile Construction by the Brick Institute of America (BIA).
- D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.
- E. Hot-Weather Construction: Comply with referenced unit masonry standard.

1.7 MASONRY INSPECTION

- A. The Contractor for the Work of this Section is responsible for all masonry inspections and reports as specified herein.
- B. Provide masonry construction inspection of concrete masonry walls indicated as requiring inspection on the Masonry Plans to insure that masonry construction is in conformance with the Contract Documents. Masonry inspection is required for those masonry elements which must be constructed to attain high design strengths, such as, but not limited to, vertically reinforced grouted CMU walls, grouted CMU wall, and load-bearing CMU walls.
- C. Qualification of Inspection Agency: Refer to Division 1 requirements.
- D. Inspection shall use NCMA-TEK 65 Field Inspection of Engineered Concrete Masonry and NCMA-TEK 132 Inspector's Guide for Concrete Masonry Construction as guidelines.
- E. The individual or individuals who will perform the masonry inspection shall be present for the Pre-masonry Conference.



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- F. The masonry inspector shall prepare a written report or reports for each day of inspection.
- G. The masonry inspector shall be present and observe all grouting operations in walls requiring inspection. The masonry inspector shall be present at the project site within sufficient time, in advance of grouting operations, to inspect the construction to insure its conformance to the contract Documents and that grouting may proceed. Periodically, the masonry inspector shall be present during the placing of masonry units and reinforcement. No grouting shall be permitted unless the masonry inspector is present and has indicated that the masonry construction is properly prepared for the grouting operation.

### 1.8 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry from net-area compressive strengths of masonry units and mortar types according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602, latest edition.
- B. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry by testing masonry prisms according to ASTM C 1314, latest edition.
  - 1. For Concrete Unit Masonry: f'm = 1500 psi.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Comply with referenced unit masonry standard and other requirements specified in this Section applicable to each material indicated.

### 2.2 MASONRY UNITS

- A. Obtain masonry units from one manufacturer for uniform texture and color for each kind required, for each continuous area and visually related areas.
- B. Concrete Masonry Units (CMU) (NOTE: All CMU on this PROJECT to have minimum compressive strength of 1900 psi on net area.)
  - 1. Manufacturer: Shall be member of the National Concrete Masonry Association.
  - 2. Size: Manufacturer's standard units with face dimensions of 15-5/8 by 7-5/8 inches (actual).
  - 3. Special Shapes: Provide, where shown and where required, lintels, inside and outside corners, jambs, sash, control joints, headers, bond beams, bullnoses, and other special conditions.
    - a. Provide bullnose corners at all exposed external corners (except at heads), and sills.



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4. Hollow Load-Bearing (HL) CMU: Provide units complying with ASTM C90, latest edition, 2N Class Designation for the aggregates, with a minimum compressive strength of 1900 psi on the net section.
5. Normal Weight Units: ASTM C33, latest edition, concrete aggregates for a dry net weight of not less than 125 pounds per cu. ft. Strength shall be as indicated above.
6. Curing: Cure units in a non-moisture controlled atmosphere to comply with ASTM C90, latest edition, Type II.
7. Exposed Face: Manufacturer's standard color and texture. Smooth face.
8. All exterior CMU, fluted and smooth, shall contain integral color from L.M. Scofield, as selected by Architect and integral water repellent additive, "Dry-Block" by W.R. Grace; or Architect approved equal. Integral water repellent additive shall be as specified herein. 15. Provide masonry lintels at all openings greater than 1'-0" in width that occur in CMU walls.

### 2.3 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of trisodium phosphate (1/2-cup dry measure) and laundry detergent (1/2-cup dry measure) dissolved in one gallon of water.

### 2.4 SOURCE QUALITY CONTROL

- A. Concrete Masonry Unit Tests: For each type, class, and grade of concrete masonry unit indicated, units will be tested by qualified independent testing laboratory for strength, absorption, and moisture content per ASTM C 140, latest edition.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.
  1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of unit masonry.
- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.
- C. Do not proceed until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with referenced unit masonry standard and other requirements indicated applicable to each type of installation included in Project.



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- B. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.
- C. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.
- D. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.
- E. 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.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of new masonry with existing masonry.

### 3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4" in 10", or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story or 20' maximum, nor 1/2" in 40' or more. For vertical alignment of head joints do not exceed plus or minus 1/4" in 10', 1/2" maximum.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 1/2" in 40' or more. For top surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.
- C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.
- D. Variation in Cross-Sectional Dimensions: For columns and thicknesses of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".
- E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2". Do not exceed head joint thickness indicated by more than plus or minus 1/8"

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets.



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Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.

- B. Lay up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
  - 1. For the first and second block courses above and below apertures, run reinforcing continuous or extend two feet back from aperture edge. Refer to notes on Structural drawings.
- C. Lay-up walls plumb and true and with courses level, accurately spaced and coordinated with other work. Do not wedge partitions tight against structural ceiling or beams, but provide a caulk or insulation filled joint between top of masonry and the structural roof deck, structural steel framing or structural floor deck. Stop masonry a minimum of 1/2 inch from vertical, horizontal and sloped steel surfaces.
- D. Pattern Bond: Lay concrete masonry units in running bond.
- E. Weight Requirements for CMU Units: Normal Weight: All CMU.
- F. 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, wet clay masonry units lightly (if required), and remove loose masonry units and mortar prior to laying fresh masonry.
- G. Built-In Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
  - 1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
  - 2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
  - 3. Fill cores in hollow concrete masonry units with grout 3 courses (24 inches) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
  - 4. Install adjustable hollow metal frame anchors, locating anchors on jambs in horizontal bed courses near the top and bottom of each frame and at intermediate points not over 24 inches apart.
  - 5. Fill jambs and heads of all hollow metal door and window frames installed in CMU or concrete walls solid with grout.
  - 6. Rake joints around exterior side of exterior hollow metal door frames for sealant under Division 07.
  - 7. Where hollow metal frames do not wrap around masonry jambs and heads, rub exposed corners of block to remove sharp, irregular edges.
  - 8. Wash brick veneer prior to installing aluminum window units.
- H. Intersecting Masonry Walls: Where interior nonload-bearing masonry partition or wall intersects an exterior or interior load-bearing masonry wall at 90 degrees, stop horizontal joint reinforcing in interior partition 4 inches short of intersection. Horizontal joint reinforcing in exterior or interior load-bearing wall shall run continuous. In the same courses as horizontal reinforcing, install wire mesh extending 8 inches minimum into



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interior partition and projecting into the exterior wall to within 2 inches of exterior face of wall. Install wire mesh reinforcing in horizontal joints 16 inches o.c. vertically.

- I. Grout masonry walls where indicated on drawings.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer. Use water clear and free of deleterious materials which would impair the work. Each mortar batch is allowed only one retempering. Do not use mortar which has begun to set after the first re-tempering or if more than 2-1/2 hours has elapsed since initial mixing.
- B. Lay brick and other solid masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Butter ends of brick in hand and in the wall at closures. Do not slush head joints.
- C. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells; also bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout.
- D. Joints: Maintain joint widths shown, except for minor variations required, to maintain joint alignment. Lay walls with 3/8 inch joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials. For exposed masonry, provide joints as follows:
  1. All Exposed Joints: Concave tooled.
  2. All Concealed Joints: Struck flush.
- E. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jams to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

### 3.6 HORIZONTAL JOINT REINFORCEMENT

- A. Provide continuous horizontal joint reinforcing as shown and specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls and 1/2 inch at other locations. Lap reinforcement a minimum of 6 inches at ends of units. Do not bridge control and expansion joints with reinforcing. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturers for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
- B. Space continuous horizontal reinforcing as specified in Section 04 05 23.
- C. Reinforce masonry openings greater than 1 foot wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8 inches apart, both immediately above the lintel and immediately below the sill. Extend reinforcing a minimum of 2 foot beyond jambs of the opening except at control joints.



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- D. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- E. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### 3.7 LINTELS

- A. Install steel lintels where indicated and/or as required for masonry openings.
- B. Provide masonry lintels where shown and wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide formed-in-place masonry lintels. Temporarily support formed-in-place lintels.
  - 1. For hollow concrete masonry unit walls, use specially formed bond beam units with reinforcement bars placed as indicated and filled with coarse grout.
- C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.
- D. For all openings in non-load bearing CMU or brick, with lintels not shown on Structural Drawings, provide the following lintels:
  - 1. CMU Lintel: Use bond beam lintel block. Fill with concrete or grout. All lintel block shall be 8" nominal height by the wall thickness. Extend lintel 24" into wall on each side of opening. Concrete or grout shall have a minimum of  $f'c = 4000$  psi. Provide 2 - #5 rebar top and bottom. Lintel shall be shored in the center for 28 days. Maximum lintel clear span = 10'-0".

### 3.8 INSTALLATION OF REINFORCED UNIT MASONRY

- A. Install reinforced unit masonry to comply with requirements of referenced unit masonry standard.
- B. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction.
  - 1. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
- C. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
- D. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.



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3.9 VERTICAL REINFORCED CONCRETE MASONRY

- A. Where grout filled or steel reinforced concrete block masonry foundations or masonry walls are called for on the Drawings, they shall be reinforced and grouted in accordance with the Drawings and details. All cells to be grouted shall be clean and free of mortar protrusions and droppings in the cells.
- B. The low-lift grouting procedure shall be used as described in the Drawings and in NCMA-TEK 23A Grouting for Masonry Walls. Maximum height of grouting shall be 4 feet.
- C. 3000 psi grout (slump 8-9 inches) shall be installed in the block cavities so as to completely fill each cavity with homogenous grout, extending from the lowest course to the top of the reinforced portion of the foundation or wall. Concrete or mortar shall not be used as grout for CMU.
- D. After the grout is placed, it shall be consolidated with a small vibrator. The top of the grout filling shall be stopped 1-1/2 inches below the top of the concrete block, except for the top course in the wall where the grout shall be struck flush with the top. If highly absorptive masonry units are used, the grout shall be re-vibrated after it has begun to stiffen.
- E. Aggregate used in the grout shall be small enough not to interfere with placement and plasticity. Water-cement ratio shall be maintained so compressive strength at 28 days shall not be less than 3000 lbs. per sq.in.
- F. Caging devices and centering clips shall be spaced vertically such that every section of vertical reinforcing steel bar is restrained by 2 clips or devices, one near its top and one near its bottom.

3.10 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 and in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.
- C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by



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- covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
  5. Clean brick by means of bucket and brush hand-cleaning method described in BIA "Technical Note No. 20 Revised" using the following masonry cleaner:
    - a. Job-mixed detergent solution.
  6. Clean concrete masonry by means of cleaning method indicated in NCMA TEK 8-2A applicable to type of stain present on exposed surfaces.
  7. Clean all exposed concrete masonry of efflorescence in strict accordance with NCMA TEK 8-3A.
- D. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

END OF SECTION 04 20 00



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**Division 09**  
Finishes





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SECTION 09 29 00  
GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Moisture resistant gypsum board and accessories.
  2. Metal framing systems to support ceiling mounted gypsum board.

1.2 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C11 and GA-505 for definitions of terms related to gypsum board assemblies not defined in this Section or in other referenced standards.

1.3 SUBMITTALS

- B. Submit in accordance with Division 01 requirements.
- C. Product data for each type of product specified, including wall boards, metal studs, fasteners, and finishing materials.
- D. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.4 QUALITY ASSURANCE

- A. Materials or operations specified by reference to the published specifications of a manufacturer or other published standards shall comply with the latest editions of the standards listed.
1. Standards include ASTM C840 and GA216.
- B. Refer to "Recommended Specification on Levels of Gypsum Board Finish" as published by the Gypsum Association (and AWCI/CISCA/PDCA) for finish levels required herein.
- C. Fire-Test-Response Characteristics: Where fire-rated gypsum board assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119, latest edition, by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
1. Fire Resistance Ratings: As indicated by reference to GA File Numbers in GA-600 "Fire Resistance Design Manual", latest edition, or to design designations in UL "Fire Resistance Directory", latest edition, or in the listing of another nationally recognized testing and inspecting agency acceptable to authorities having jurisdiction.



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- D. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- E. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- F. Any board that has become wet at any point prior to the Date of Substantial Completion shall be replaced, including board that has been installed and finished.

### 1.5 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 panels flat to prevent sagging.
- C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

### 1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
- B. Room Temperatures: For non-adhesive 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 after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces, as required, for drying joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Steel Framing and Furring:
    - a. ClarkWestern Building Systems, Monroe, Ohio; [www.clarkwestern.com/](http://www.clarkwestern.com/)



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- b. Consolidated Systems, Inc., Columbia, SC; [www.csisteel.com/](http://www.csisteel.com/)
- c. Dietrich Metal Framing, Inc., Pittsburgh, PA; [www.dietrichindustries.com/](http://www.dietrichindustries.com/)
- d. Unimast, Inc., Schiller Park, Illinois; [www.unimast.com](http://www.unimast.com)
- e. United States Steel, Chicago, Illinois; [www.uss.com](http://www.uss.com)

### 2. Gypsum Board and Related Products:

- a. Georgia-Pacific Corp. Atlanta, Georgia; <http://www.gp.com/>
- b. Gold Bond Building Products Div., National Gypsum Co., Charlotte, North Carolina; <http://www.nationalgypsum.com/>
- c. Fry Reglet; Alpharetta, Georgia; <http://www.fryreglet.com/>
- d. Lafarge Gypsum, Herndon, Virginia; <http://www.lafargecorp.com/>
- e. Pittcon Industries, Riverdale, Maryland; <http://www.pittconindustries.com/>
- f. United States Gypsum Company <http://www.usg.com/>
- g. National Gypsum Co., Charlotte, NC; <http://www.nationalgypsum.com/>

## 2.2 STEEL FRAMING COMPONENTS FOR CEILINGS

- A. Provide components of sizes indicated but not less than that required to comply with ASTM C 754, latest edition, for conditions indicated.
- B. Steel Studs and Runners for Ceiling Framing: ASTM C 645, latest edition, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch wide minimum lip (return), 20 gage.

## 2.3 GYPSUM BOARD PRODUCTS

- A. Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end butt joints.
  1. Thickness: Provide gypsum board to comply with ASTM C840, latest edition, for application system and support spacing indicated.
- B. Gypsum Wallboard: ASTM C 36 and as follows:
  1. Type: Type X, moisture resistant gypsum board.
  2. Edges: Tapered.
  3. Thickness: 5/8 inch, unless otherwise noted.

## 2.4 TRIM ACCESSORIES

- A. Accessories for Interior Installation: Corner beads, edge trim, and control joints complying with ASTM C 1047, latest edition, and requirements indicated below:
  1. Material: Formed metal, complying with the following requirement:
    - a. Sheet steel zinc-coated by hot-dip process.



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2. Shapes indicated below by reference to Fig. 1 designations in ASTM C1047:
  - a. Cornerbead on outside corners, unless otherwise indicated.
  - b. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim unless otherwise indicated.
  - c. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
  - d. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.
  - e. One-piece control joint formed with V-shaped slot, with removable strip covering slot opening.

## 2.5 JOINT TREATMENT MATERIALS

- A. Provide joint treatment materials complying with ASTM C475, latest edition, and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
- B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.
- C. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
  3. Where setting-type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
  4. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
  5. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by the gypsum board manufacturer for this purpose.
  6. For topping compound, use sandable formulation.

## 2.6 MISCELLANEOUS MATERIALS

- A. Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.
- B. Steel drill screws complying with ASTM C1002, latest edition.
- C. Steel drill screws complying with ASTM C954, latest edition, for fastening gypsum board to steel members from 0.033 to 0.112 inch thick.
- D. Corrosion-resistant-coated steel drill screws of size and type recommended by board manufacturer for fastening cementitious backer units.



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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLING STEEL FRAMING, GENERAL

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. Do not bridge building expansion and control joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.
- C. Provide all required accessories for a complete installation in every respect.

3.3 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.
- B. Install ceiling board panels across framing to minimize the number of abutting end joints and avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position adjoining panels so that tapered edges abut tapered edges, and field-cut edges abut field-cut edges and ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions. Avoid joints at corners of framed openings where possible.
- E. Do not attach gypsum panels across the flat grain of wide-dimension lumber including floor joists and headers. Instead, float gypsum panels over these members using resilient channels or provide control joints to counteract wood shrinkage.
- F. 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 and immediately insert gypsum panels into frames.



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- G. Form control joints and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels. Provide vertical control joints spread not more than 30 feet on center in partitions.
1. Control Joint: Apply over face of gypsum board where specified. Cut to length with a fine-toothed hacksaw (32 teeth per inch). Cut end joints square, butt together and align to provide neat fit. Attach control joint to gypsum board with fasteners spaced 6 inches o.c. maximum along each flange. Remove plastic tape after finishing with joint compound or veneer finish.
    - a. Leave a ½ inch continuous opening between gypsum boards for insertion of surface-mounted joint.
    - b. Interrupt wood floor and ceiling plates with a ½ inch gap, wherever there is a control joint in the structure.
    - c. Do not attach gypsum board to steel studs on one side of control joint.
    - d. Provide separate supports for each control joint flange.
    - e. Provide an adequate seal and an additional layer of Type "X" gypsum board behind control joints where sound or fire ratings are prime considerations.
- H. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

### 3.3 GYPSUM BOARD APPLICATION METHODS

- A. Single-Layer Application: Install gypsum wallboard panels on metal ceiling studs.
- B. Single-Layer Fastening Methods: Fasten gypsum panels to supports with screws.

### 3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
- B. Install corner beads at external corners.
- C. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.
  1. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
  2. Install L-bead where edge trims can only be installed after gypsum panels are installed.
  3. Install U-bead where indicated or required.
- D. Install control joints at locations indicated, and where not indicated according to ASTM C 840, and in locations approved by Architect for visual effect.



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- E. All trim, accessories and corner beads shall be installed using screws. "Crimping" tool and staple attachment is not allowed.

3.5 FINISHING GYPSUM BOARD ASSEMBLIES

- A. 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 gypsum board surfaces for decoration and levels of gypsum board finish indicated.
- B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
- C. Apply joint tape over gypsum board joints and to trim accessories with concealed face flanges as recommended by trim accessory manufacturer and as required to prevent cracks from developing in joint compound at flange edges.
- D. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.
1. Level 0: No taping, finishing, or accessories required. This level of finish shall be used in temporary construction only.
  2. Level 4: Joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Prepare surface to be coated with a primer/sealer prior to the application of final finishes. This finish level shall be used where painted finishes are to be applied.

3.2 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner suitable to Installer that ensures gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 29 00





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SECTION 09 91 00  
PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide labor, materials, and equipment necessary for complete painting and finishing work as detailed on the Drawings and as specified herein, of surfaces as scheduled throughout the building.
- B. The type of material to be used and the number of coats to be applied are listed in the "Painting Schedule" in Part 3 of this Section. Also, refer to Room Finish Schedule and Finish Plans.
- C. The term "paint" as used herein, includes enamels, paints, sealers, stains, fillers, emulsions, and other coatings, whether used as prime, intermediate, or finish coats.
- D. The Architect shall not be limited in the number of colors selected for single space or for the complete Project.
- E. The intent is to provide a finished building, interior and exterior, whether or not specifically indicated. Some items may not be specifically indicated to be painted; however, all items shall be finished as directed by the Architect.

1.2 SUBMITTALS

- A. Materials List: Prior to the start of work and before paint materials are delivered to the site, submit a list of materials proposed and the equivalent specified item proposed.
  - 1. This shall in no way be construed as permitting substitution of materials for those specified or approved for this Work by the Architect.
- B. Color Chip Catalog: Provide a current color chip catalog from which colors may be selected. Manufacturers may fulfill this requirement by updating that Architect's office catalog.
- C. Stain Samples: Submit sample of specified wood species with selected stain applied to specified wood types to Architect for approval. Resubmit additional samples as necessary to obtain color desired by Architect.
- D. Manufacturer's Recommendations: In each case where material proposed is not the material specified or specifically described as an acceptable manufacturer, submit for review the current recommended method of application published by the manufacturer.
- E. Certification: Submit written certification from each coating manufacturer attesting that coatings provided under this specification section are specifically formulated and manufactured for the environmental conditions encountered in the State of Florida subtropical regions including factory mixed mildewcides and fungicides of type and quantity to inhibit fungus and mildew growth. Further certify that mildewcides and fungicides do not contain compounds of mercury, lead or other heavy metals.



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- F. Material Safety Data Sheets: Submit Material Safety Data Sheets (MSDS) for each coating product. In hazardous ingredient section of the MSDS form, write in type and quantity of mildewcide incorporated in the coating specified.

### 1.3 QUALITY ASSURANCE

- A. **Qualifications of Painters:** Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces. If installed painting is rejected, no allowance will be made for lack of mechanics skill.
- B. **Codes and Standards:** In addition to complying with pertinent codes and regulations, comply with "Standard (Type 1)" as defined by the Painting and Decorating Contractors of America in their "Modern Guide to Paint Specifications," current edition.

### 1.4 FIELD QUALITY CONTROL

- A. **Painting Contractor** shall completely paint and finish one complete room according to the Specifications, as designated by Architect, which will be used as quality standard for remainder of Project.

### 1.5 PRODUCT HANDLING

- A. **Delivery:** Deliver paint materials to the job site in their original unopened containers with labels intact and legible at time of use.
- B. **Protection**
1. Store only the approved materials at the job site and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
  2. Use means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.
  3. Use means necessary to protect paint materials before, during, and after application and to protect the installed work and materials of other trades.

### 1.6 EXTRA STOCK

- A. Upon completion of this portion of the Work, deliver to the Owner an extra stock of paint consisting of five gallons of each color used in each coating material used, with such extra stock tightly sealed in clearly labeled containers.

### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Conform to State and local V.O.C. (Volatile Organic Compound) Regulations. Notify Architect in writing if variations to Specifications are required.



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- B. Do not apply materials when the surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- C. Do not apply exterior coating during rain, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
  - 1. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

### PART 2 - PRODUCTS

#### 2.1 PAINTING MATERIALS MANUFACTURER

- A. Painting materials shall be the products of the following manufacturers, specified as the type, function, and quality of products to be provided. Paint materials and specification numbers listed herein, unless otherwise designated, are the products of Sherwin-Williams and Tnemec Company, Inc and require no further approval as to manufacturer or catalog number.
- B. Products of the following manufacturers are acceptable as equal to Sherwin-Williams Paint Company, providing their products equal or exceed the quality specified, and the material types and composition are the same; and subject to approval by the Architect of the materials list required to be submitted under preceding Part 1 of this Section.
  - 1. Porter Paint, Louisville, Kentucky
  - 2. Glidden, Cleveland, Ohio
  - 3. ICI Devoe, Cleveland, Ohio
  - 4. MAB Paints, M.A. Bruder & Sons, Inc., Broomall, Pennsylvania
  - 5. Benjamin Moore & Company, Montvale, New Jersey
- C. Products of the following manufacturers are acceptable as equal to Tnemec, providing their products equal or exceed the quality specified.
  - 1. Induron Protective Coatings, Birmingham, Alabama.
  - 2. Ameron Protective Coatings Group, Brea, California.

#### 2.2 COMPATIBILITY

- A. Paint materials selected for coating systems for each type of surface shall be the product of a single manufacturer.
- B. Paint materials and equipment shall be compatible in use; finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; tools and equipment shall be compatible with the coating to be applied.
- C. Thinners, when used, shall be only those thinners recommended for that purpose by the manufacturer of the material to be thinned.



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2.3 ACCEPTANCE OF SPECIFICATIONS

- A. By submitting a proposal, the Contractor has reviewed the bidding documents with the painting subcontractor and accepts the Specifications as sufficient to produce approved painting results. If the painting subcontractor contends that the materials or number of coats specified will not produce satisfactory results, he shall so notify the Architect directly or indirectly through a Bidding Contractor 10 days prior to receipt of bids for proper action.

2.4 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Prepare pigments:
1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
  2. For good flow and brushing properties.
  3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- C. Mildew Resistance: Provide coatings which are formulated and mixed at the point of manufacture with mildewcides and fungicides to inhibit growth of mildew as encountered in the subtropical regions of the State of Florida. Mildewcides and fungicides containing compounds of mercury, lead or other heavy metals are not acceptable.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which painting work is to be applied and notify the Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Starting of painting work will be constructed as Applicator's acceptance of surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint surface.
- D. Test shop applied primers for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the maximums as recommended, for the types of coatings to be used, by the manufacturer.



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3.2 SURFACE PREPARATION

A. General

1. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions, and as herein specified, for each particular substrate condition.
2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted or provide surface applied protection prior to surface preparation and painting operations; remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly painted surfaces.

B. Cementitious Materials

1. Prepare cementitious surfaces of concrete, concrete block, and cement plaster to be painted by removing efflorescence, chalk, dirt, grease, oils, and by roughening as required to remove glaze.
2. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
3. Clean concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid or other etching cleaner. Flush floor with clean water to neutralize acid and allow to dry before painting.

C. Wood

1. Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of priming coat. After priming fill holes and imperfections in finished surfaces with putty or plastic wood filler. Sandpaper smooth when dried.
2. Prime, stain, or seal wood required to be job painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, and paneling.
3. When transparent finish is required, use spar varnish for backpriming.

D. Ferrous Metals

1. Clean ferrous surfaces, which are not galvanized or shop coated, of oil, grease, dirt, loose mill scale, and other foreign substances by solvent or mechanical cleaning.



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2. Touch-up shop applied prime coats wherever damaged or bare, where required by other Sections or these Specifications. Clean and touch-up with same type shop primer.
- E. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.
- F. Aluminum Surfaces: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- G. Gypsum Board Surfaces: Fill minor defects with filler compound and spot prime defects after repair.

### 3.3 MATERIALS PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's direction.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir materials before application to produce a mixture of uniform density and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

### 3.4 APPLICATION

- A. Paint during weather conditions and Project status that will ensure the best possible results.
- B. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
  1. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint, until paint film is of uniform finish, color, and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.
  3. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, nonspecular black paint.
  4. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
  5. Finish exterior doors on tops, bottoms, and side edges same as exterior faces unless otherwise indicated.
  6. Sand lightly between each succeeding enamel or varnish coat.



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- C. Scheduling Painting: Apply first coat material to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
  - 1. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
  - 2. Slightly vary the color of succeeding coats.
- D. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate and as specified, to establish a total dry film thickness as indicated or, if not indicated, as recommended by the coating manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed to view in interior occupied spaces and exterior walls and roof. Mechanical rooms and electrical rooms are not considered occupied spaces unless specifically noted as such.
- F. Prime Coats: Apply prime coat of material which is required to be painted or finished and which has not been prime coated by others.
  - 1. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn through or other defects due to insufficient sealing.
  - 2. Coordinate manufacturer's prime coats with finish coats as specified herein. If compatibility is not ascertained during the bidding period, and verification submitted with the shop drawings, then prime coat paint system as specified herein shall be applied to the item prior to finish painting as specified herein.
- G. Pigmented (Opaque), Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- H. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surfaces imperfections.
- I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

### 3.5 CLEAN-UP AND PROTECTION

- A. Clean-Up: During progress of Work remove from site discarded paint materials, rubbish, cans, and rags at end of each work day.
- B. Upon completion of painting work clean window glass and other paint- spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.



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- C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct damage by cleaning, repairing or replacing and repainting, as acceptable to Architect.
- D. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
- E. At the completion of Work of other trades, touch-up and restore damaged or defaced painted surfaces.

### 3.6 PAINT TYPES AND NUMBER OF COATS

- A. The following painting schedules are intended to identify the type of finishes which are required for the various surfaces, and to identify the surfaces to which each finish is to be applied. Refer to Finish Schedule.
- B. To define requirements for quality, function, size, gages, textures, and color, the following list of materials designates the manufacturer's brand, types, and number of coats required; and other requirements that are to be furnished to conform to the requirements of this Project.
- C. Where specific finishes are called for on the Drawings and in the Finish Schedule by code designation, it shall specifically refer to the following identified types of coatings.
- D. The primer indicated under Material Identification is intended for the particular substrate surface specified. Where the same numbered finish is scheduled, but for another substrate, provide the proper primer compatible with substrate and the finish.
- E. Where the substrate has a compatible and satisfactory prime coat already on it, the prime coat specified for the numbered finish may be omitted. Test prime coat for compatibility before applying additional coats.

### 3.7 FIELD QUALITY CONTROL

- A. The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting:
  - 1. Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in the presence of the Contractor.
  - 2. Testing laboratory will perform appropriate tests for any or all of the following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.



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- B. If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

### 3.8 EXTERIOR PAINTING SCHEDULE

- A. Provide the following exterior paint systems based on Sherwin-Williams and Tnemec for substrates indicated.
- B. **Ferrous Metal:** Provide the following finish systems over exterior ferrous metal.
1. **High-Build Acrylic Polyurethane Enamel:**
    - a. **Primer:** Metal primer applied at spreading rate recommended by the manufacturer.
      - 1) Tnemec: "Poxiprime" Series 65
    - b. **Second Coat:** Epoxy intermediate coat applied at spreading rate recommended by the manufacturer.
      - 1) Tnemec: Series 66 Hi-Build Expoxoline
    - c. **Third Coat: Semigloss,** acrylic polyurethane enamel applied at spreading rate recommended by the manufacturer.
      - 1) Tnemec: Series 1075 Endura-Shield
    - d. Surfaces: Any miscellaneous steel fabrications, and all other exterior steel scheduled or indicated to painted or exposed to view.
    - e. Primer may not be required on shop primed items if compatibility is confirmed in writing with the manufacturer of the type of shop primer being applied. Contractor shall verify this during the bidding period, and if primer is not compatible, then primer shall be either field applied or shop applied with type as recommended by the finish coat manufacturer. Type of primer and surface preparation shall be as recommended by the painting materials manufacturer.
    - f. This paint system shall be spray applied only, brush application is not allowed.

### 3.9 INTERIOR PAINTING SCHEDULE

- A. Provide the following **interior** paint systems based on **Sherwin-Williams and Tnemec** for substrates indicated:
- B. **Concrete Masonry Units:** Provide the following finish systems over interior concrete masonry block units:



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1. **Epoxy:**
  - a. **Block Filler:** Waterborne epoxy polyamide.
    - 1) Sherwin-Williams: Loxon Block Surfacer A24W200, 1.6 mils DFT.
  - b. **First and Second Coats:** Semi-gloss, waterborne epoxy polyamide.
    - 1) Sherwin-Williams: Water Based Catalyzed Epoxy B70/B60V25 Semi-Gloss, 2.5 to 3 mils DFT.
  - c. Surfaces: New and existing masonry walls.
- C. **Gypsum Board:** Provide the following finish systems over interior gypsum board surfaces:
  1. **Epoxy:**
    - a. **Primer:** Waterborne epoxy polyamide.
      - 1) Sherwin-Williams: Moisture Vapor Barrier Primer B72W1, 1.8 to 2.4 mils DFT.
    - b. **First and Second Coats:** Semi-gloss waterborne epoxy polyamide.
      - 1) Sherwin-Williams: Water Based Catalyzed Epoxy B70/B60V25 Semi-Gloss, 2.5 to 3 mils DFT.
    - c. Surfaces: Gypsum board ceilings.
- D. **Ferrous Metal:** Provide the following finish systems over interior ferrous metal:
  1. **Acrylic Polymer Satin:**
    - a. **Primer:** Metal primer applied at spreading rate recommended by the manufacturer.
      - 1) Tnemec: "Tneme-Fascure" Series 161
      - 2) S-W: "Recoatable Epoxy Primer" B67 Series.
      - 3) Porter Paints: Porter Coatings "Porter Mastic 7000" Epoxy
    - b. **First and Second Coats: Semigloss,** acrylic polyurethane enamel applied at spreading rate recommended by the manufacturer.
      - 1) Tnemec: Series 75 Endura-Shield
      - 2) S-W: "Acrolon 218 HS" with SG Hardener, B65 Series
      - 3) Porter Paints: Porter Coatings "9200 PorterThane" Urethane
    - c. Surfaces: Hollow metal doors and frames, miscellaneous steel, etc. where scheduled, noted to be painted, or exposed to view.



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Note: When the manufacturing of paint supplied does not require or recommend a primer, and a single coat will provide required coverage, approval from the Architect must be obtained to delete second coat; and a credit shall be due the Owner.

END OF SECTION 09 91 00



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**Division 10**  
Specialties





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SECTION 10 21 16  
SOLID PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work of this Section includes toilet partitions, and accessories indicated on Drawings, schedules, and in these Specifications. Refer to Drawings for location, size, and quantity required.

1.2 SUBMITTALS

- A. Submit in accordance with Division 01 requirements.
- B. Product Data: Submit manufacturer's standard technical data for all required types of products. Include manufacturer's recommendations for cleaning and maintenance methods for indicated types of units.
- C. Complete Shop Drawings by approved manufacturer for proposed toilet compartments. Detail fabrication and installation drawings. Include appurtenances, cutouts, and all accessories. Provide template layouts and installation instructions for anchorage devices built into other work.
- D. Complete suitable color selection materials for components (actual samples) in triplicate quantity, for all available color groups.
- E. Sample warranty.
- F. Submit warranty as specified herein.

1.3 ACCESSIBILITY REQUIREMENTS

- A. Toilet compartments shall be provided to conform with the Americans With Disabilities Act Accessibility Guidelines (ADAAG) and State and Local Regulations. These requirements supersede Technical Specifications in this Section.

1.4 WARRANTY

- A. Manufacturer's Warranty: Toilet compartment manufacturer shall warrant plastic panels to remain free from warping, breaking, and from material and manufacturing defects for indicated period of time. Products which become defective during warranty period shall be repaired to eliminate all evidence of damage. If such repairs to completely eliminate all evidence of damage cannot be made, defective units shall be removed and replaced with new units that comply with indicated requirements.
  - 1. Warranty Period: Fifteen (15) years from the Date of Substantial Completion.



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## 1.5 FLORIDA ACCESSIBILITY CODE FOR BUILDING CONSTRUCTION

- A. Compartment system shall conform with the Accessibility Requirements Manual from the Florida Department of Community Affairs, Florida Board of Building Codes and Standards.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Basis of Design: Toilet compartments shall be the products of "Poly-Mar HD", solid one inch thick plastic as manufactured by Santana Products Company, Scranton, Pennsylvania; specified as the type, size, function, and quality of equipment; [www.hinyhider.com](http://www.hinyhider.com).
- B. Products of the following manufacturers are acceptable, providing their solid plastic toilet compartments equals or exceeds the quality specified; and they can provide equipment of the type, size, function, and arrangement required.
1. Accurate Partitions, Lyons, Illinois; [www.accuratepartitions.com](http://www.accuratepartitions.com)
  2. Comtec Industries, Inc., div. of Compression Polymers Group Corp., Moosic, Pennsylvania; [www.comtecindustries.com](http://www.comtecindustries.com)
  3. General Partitions Manufacturing Corp., Erie, PA; [www.genpartitions.com](http://www.genpartitions.com)
  4. Rockville Partitions, Inc, Rockville, Maryland; [www.rockvillepartitions.com](http://www.rockvillepartitions.com)
  5. Columbia Partitions by Partition Systems Incorporated of South Carolina, Columbia SC; [www.psisc.com](http://www.psisc.com)
  6. Sanymetal, Div. of Crane.
- C. Type: Floor supported with overhead top rail bracing, solid plastic compartments in colors as selected by the Architect.

### 2.2 MATERIALS

- A. Materials, panels, doors, pilasters, and screens shall be fabricated from polymer resins High Density Polyethylene (HDPE) containing a minimum of 75% recycled material manufactured under high pressure forming a single component section which is waterproof, corrosion-proof, impact resistant nonabsorbent, and has a self lubricating Poly-Glaze "280" surface that resists marking with pens, pencils, lipstick, and other writing or marking utensils.
1. Colors: As selected by Architect from manufacturer's full range.

### 2.3 CONSTRUCTION

- A. Partitions shall have edges machined to a radius of 0.250 inch and sharp corners removed. Dividing toilet partition panels and doors shall be 55 inches high and mounted 14 inches above finished floor.



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- B. Pilasters for the toilet partitions shall be 82 inches high and fastened to 3 inches high stainless steel shoes with theftproof stainless steel sex bolts.
  - 1. Pilaster Shoe: Formed, ASTM A167, latest edition, type 304 stainless steel with No. 4 finish, 3 inch high, with adjustable screw jack.
- C. Unless dimensioned otherwise on Drawings, toilet partitions are to be 60 inches deep and 36 inches wide.
  - 1. Outswinging doors (for handicapped) shall be 34 inches wide.
  - 2. Inswinging doors (for handicapped) are to be 34 inches wide (if compartment has side entry, minimum is 36 inches), and other (inswinging) doors to be either 24 inches or 26 inches wide for each run
- D. Provide internal reinforcement for all accessories.
- E. Refer to the Drawings for the heights and configurations of the toilet compartments.
- F. Properties:
  - 1. Dual component compression molded High Density Polyethylene (HDPE) of solid Poly-Mar HD, Poly-Marble HD, or Poly-Granite HD virgin resin materials in colors that extend throughout the surface; the panels, doors, and pilasters shall have combined recycled and/or virgin material (HDPE) as the core material.
  - 2. Doors, panels and pilasters shall be a minimum of 1 inch thick and all edges machined to a radius of 0.250 inch and all exposed surfaces to be free of saw marks.

### 2.4 TOILET PARTITION HARDWARE

- A. Door hardware shall be as follows:
  - 1. Hinges shall be stainless steel continuous hinges. Door closures to be factory set to accommodate all conditions and allow for a positive opening and closing action free of impediment.
  - 2. Each handicapped door to include: (1) stainless steel door pull (1) stainless steel wall stop.
  - 3. Door strike and keeper shall be fabricated from stainless steel with brushed satin finish with wrap around flange surface mounted and thru-bolted to pilaster with one-way sex bolts. Size of strike shall be 6 inches in length.
  - 4. Door latch housing shall be fabricated from stainless steel with brushed satin finish, surface mounted and thru-bolted to door with one-way sex bolts. Slide bolt and button shall be heavy aluminum with black anodized finish.
- B. Satin finish stainless steel pilaster shoes shall be anchored to finished floor with anchors and #14 x 1 ½ inch stainless steel Phillips head screws.
- C. Full length continuous wall brackets shall be satin finish stainless steel. Brackets shall be used for all panels to pilaster, pilasters to wall and panel to wall connections. Wall brackets shall be thru-bolted to panels and pilasters with one-way sex bolts. Attachment



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of brackets to adjacent wall construction shall be accomplished by #14 x 1 ½ inch stainless steel Phillips head screws anchored directly behind the vertical edge of panels and pilasters at 13 inch intervals along the full length of bracket and at each 13 inch interval alternately spaced between anchor connections.

- D. Headrail brackets shall be 18-gauge stainless steel.
- E. Stainless steel shall be Type 316 with satin finish.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install units as shown in true and plumb condition.
- B. Anchor brackets securely with fasteners indicated on approved Shop Drawings.
- C. Install in accordance with manufacturer's written installation instructions and approved Shop Drawings.
- D. All parts shall be erected in a substantial manner, straight, level, and plumb.
- E. No evidence of drilling, cutting, or patching shall be visible in the finished work.
- F. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed ¼ inch.
- G. Finished surfaces shall be cleaned after installation and left free of imperfections.
- H. Authorized factory installers to be utilized.
- I. Provide all items and accessories as required for a complete and total installation in every respect.

#### 3.2 ADJUSTMENT

- A. Doors are to be adjusted so that they are approximately 3 inches open when cubicle is unoccupied.
- B. Door at handicapped cubicles shall be easily removable from exterior side when locked.

#### 3.3 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.



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- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

END OF SECTION 10 21 16



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SECTION 10 28 13  
TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes toilet accessory items as scheduled and specified. Refer to the Toilet Accessory Schedule on the Drawings for product numbers.

1.2 SUBMITTALS

- A. Submit in accordance with Division 01 requirements.
- B. Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.
- C. Samples of each toilet accessory item to verify design, operation, and finish requirements. Acceptable full-size samples will be returned and may be used in the Work.
- D. Schedule indicating types, quantities, sizes, and installation locations (by room) for each toilet accessory item to be provided for project.
- E. Setting Drawings where cutouts are required in other Work, including templates, substrate preparation instructions, and directions for preparing cutouts and installing anchorage devices.
- F. Maintenance instructions including replaceable parts and service recommendations.
- G. Submit warranty as specified herein.

1.3 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish accessory Manufacturers' standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other Work to avoid delay.
- B. Single-Source Responsibility: Provide products of same Manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.

1.4 PROJECT CONDITIONS

- A. Coordination: Coordinate accessory locations, installation, and sequencing with other Work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.



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1.5 WARRANTY

- A. Toilet Accessory Warranty: Provide manufacturers one (1) year warranty from the Date of Substantial Completion, against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 TOILET ACCESSORY MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide toilet accessories by one of the following:
1. Basis of Design: Bobrick Washroom Equipment, Inc., Clifton Park, NY
  2. Bradley Corporation, Menomonee Falls, WI
  3. American Specialties, Inc., Yonkers, New York
  4. A&J Washroom Accessories, New Windsor, New York
- B. Products on the Toilet Accessory Schedule are based on Bobrick.

2.2 MATERIALS, GENERAL

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034-inch (22-gage) minimum thickness.
- B. Brass: Leaded and unleaded, flat products, ASTM B 19; rods, shapes, forgings, and flat products with finished edges, ASTM B 16; Castings, ASTM B 30.
- C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 0.04-inch (20-gage) minimum. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A 527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.
- F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.
- G. Stainless Steel Mirror Surfaces: Not less than 0.04-inch (20-gage) AISI Type 302/304 stainless steel sheet, stretcher-leveled with No. 8 polished mirror finish. Bond to 1/4-inch minimum hardboard backing.
- H. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of stainless steel where concealed.

2.3 FABRICATION

- A. No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of



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each accessory item either by a printed, waterproof label or a stamped nameplate indicating Manufacturer's name and product model number.

- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.
- C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Framed Mirror Units, General: Fabricate frames for glass mirror units to accommodate wood, felt, plastic, or other glass edge protection material. Provide mirror backing and support system that will permit rigid, tamperproof glass installation and prevent moisture accumulation, as follows:
  - 1. Provide galvanized-steel backing sheet, not less than 0.034 inch (22 gage) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- E. Mirror Unit Hangers: Provide system for mounting mirror units that will permit rigid, tamperproof, and theftproof installation, as follows:
  - 1. One-piece, stainless steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
  - 2. Heavy-duty wall brackets of stainless steel, equipped with concealed locking devices requiring a special tool to remove.
- F. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.

### 2.4 MOP HOLDERS WITH SHELF AND RAG HOOKS

- A. Surface mounted utility shelf with holders with spring loaded rubber cam holders to accommodate mop or broom handles. Bobrick No. B-224 X 30"

### 2.5 UTILITY HOOKS

- A. Surface-mounted utility hook shall be type-304 stainless steel satin finish. Flange shall be 22 gauge and equipped with concealed, 16 gauge mounting bracket that is secured to concealed, 16-gauge wall plate with locking set screw: Bobrick No. B-6707.

### 2.6 HAND DRYER

- A. Hand Dryer: XLERATOR Model XL-BW as manufactured by Excel Dryer, Inc., East Longmeadow, MA; [www.exceldryer.com](http://www.exceldryer.com).



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1. Warranty Period: 5 years; limited warranty.
2. Controls: Automatic, activated by infrared optical sensor. Operates while hands are under blower. Shut-off within 2 seconds when hands removed, or in 35 seconds if hands not removed.
3. Cover: One piece, vandal resistant, reinforced white thermoplastic (Bulk Molding Compound).
4. Wall Plate: Injection molded, rib reinforced plate with metal L brackets to attach cover, with ten 5/16 inch (8 mm) diameter holes for surface mounting to wall and three 7/8 inch (22 mm) diameter holes for electrical wiring; bottom hole suitable for surface conduit.
5. Power Source: See Electrical Drawings.
6. Combination Motor and Blower: Series commutated, through-flow discharge, vacuum type; 5/8 HP, 20,000 RPM. Air flow rate: 19,000 linear feet per minute (97 meters per second) at air outlet, 16,000 linear feet per minute (81 meters per second) at average hand position of 4 inches below air outlet.
7. Heater: Nichrome wire element, mounted inside blower housing to be vandal proof.
8. Heater Safeguard: Automatic resetting thermostat to open when air flow is restricted and close when air flow is resumed.
9. Air Temperature: 135 degrees F (55 degrees C) measured at average hand position of 4 inches below air outlet. Air Heater Output: 900 watts.
10. All metal parts coated according to Underwriters Laboratories, Inc. requirements.
11. Mount dryers at heights indicated on Drawings.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to Manufacturer's instructions for type of substrate involved.
- C. Install grab bars to withstand a downward load of at least 250 lbf, complying with ASTM F 446.
- D. Provide all items and accessories as required for a complete and total installation in every respect, whether or not specified or indicate don the Drawings.

#### 3.2 ADJUSTING AND CLEANING

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.



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3.3 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

END OF SECTION 10 28 13



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**Division 22**  
Plumbing





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SECTION 22 05 00  
COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Sleeves.
5. Escutcheons.
6. Grout.
7. Equipment installation requirements common to equipment sections.

1.2 DEFINITIONS

- A. Finished Spaces: Spaces other than plumbing and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and plumbing equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

- A. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."



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1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
  2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- C. Solvent Cements for Joining Plastic Piping:
  1. ABS Piping: ASTM D 2235.
  2. CPVC Piping: ASTM F 493.
  3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
  4. PVC to ABS Piping Transition: ASTM D 3138.

2.3 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- D. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.



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2.4 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.5 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
  - 1. Finish: Polished chrome-plated and rough brass.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
  - 1. Finish: Polished chrome-plated and rough brass.

2.6 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.
  - 3. Packaging: Premixed and factory packaged.



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PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
- M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
  - 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
  - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
  - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- O. Verify final equipment locations for roughing-in.



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- P. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

### 3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
1. Comply with ASTM F 402, for safe-handling practice of cleaners, primers, and solvent cements.
  2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
  3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
  4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
  5. PVC Nonpressure Piping: Join according to ASTM D 2855.
  6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- F. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- G. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.

### 3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
1. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
  2. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

### 3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.



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- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 22 05 00



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SECTION 22 05 23  
GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Brass ball valves.
2. Bronze ball valves.
3. Bronze swing check valves.

B. Related Sections:

1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.
2. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.2 SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.3 QUALITY ASSURANCE

- A. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
- B. NSF Compliance: NSF 61 for valve materials for potable-water service.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
1. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.



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- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
  - 1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- F. Valve-End Connections:
  - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
  - 2. Solder Joint: With sockets according to ASME B16.18.
  - 3. Threaded: With threads according to ASME B1.20.1.

## 2.2 BRASS BALL VALVES

- A. Two-Piece, Full-Port, Brass Ball Valves with Brass Trim:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Jenkins Valves.
    - c. Hammond Valve.
    - d. Milwaukee Valve Company.
    - e. NIBCO INC.
  - 2. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 150 psig.
    - c. CWP Rating: 600 psig.
    - d. Body Design: Two piece.
    - e. Body Material: Forged brass.
    - f. Ends: Threaded.
    - g. Seats: PTFE or TFE.
    - h. Stem: Brass.
    - i. Ball: Chrome-plated brass.
    - j. Port: Full.

## 2.3 BRONZE BALL VALVES

- A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Conbraco Industries, Inc.; Apollo Valves.
    - b. Crane Co.; Crane Valve Group; Crane Valves.
    - c. Hammond Valve.
    - d. Milwaukee Valve Company.
    - e. NIBCO INC.
    - f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.



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2. Description:
  - a. Standard: MSS SP-110.
  - b. SWP Rating: 150 psig.
  - c. CWP Rating: 600 psig.
  - d. Body Design: Two piece.
  - e. Body Material: Bronze.
  - f. Ends: Threaded.
  - g. Seats: PTFE or TFE.
  - h. Stem: Bronze.
  - i. Ball: Chrome-plated brass.
  - j. Port: Full.

2.4 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Crane Co.; Crane Valve Group; Crane Valves.
  - b. Crane Co.; Crane Valve Group; Jenkins Valves.
  - c. Crane Co.; Crane Valve Group; Stockham Division.
  - d. Hammond Valve.
  - e. Milwaukee Valve Company.
  - f. NIBCO INC.
  - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:
  - a. Standard: MSS SP-80, Type 3.
  - b. CWP Rating: 200 psig.
  - c. Body Design: Horizontal flow.
  - d. Body Material: ASTM B 62, bronze.
  - e. Ends: Threaded.
  - f. Disc: Bronze.

B. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Crane Co.; Crane Valve Group; Crane Valves.
  - b. Crane Co.; Crane Valve Group; Jenkins Valves.
  - c. Crane Co.; Crane Valve Group; Stockham Division.
  - d. Hammond Valve.
  - e. Milwaukee Valve Company.
  - f. NIBCO INC.
  - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:
  - a. Standard: MSS SP-80, Type 4.



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- b. CWP Rating: 200 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: PTFE or TFE.

PART 3 - EXECUTION

3.1 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

3.2 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
  - 1. Shutoff Service: Ball valves.
  - 2. Throttling Service: Ball valves.
  - 3. Pump-Discharge Check Valves:
    - a. NPS 2 and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
  - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
  - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
  - 3. For Steel Piping, NPS 2 and Smaller: Threaded ends.
  - 4. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.



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3.4 DOMESTIC COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze Angle Valves: Class 125, nonmetallic disc.
3. Ball Valves: Two piece, full port, brass or bronze with bronze trim.
4. Bronze Swing Check Valves: Class 125, nonmetallic disc.
5. Bronze Globe Valves: Class 125, nonmetallic] disc.

END OF SECTION 22 05 23



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SECTION 22 05 29  
HANGERS AND SUPPORTS FOR  
PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Steel pipe hangers and supports.
  - 2. Fastener systems.

1.2 DEFINITIONS

- A. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.3 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.4 SUBMITTALS

- A. Product Data: For the following:
  - 1. Steel pipe hangers and supports.
  - 2. Powder-actuated fastener systems.
- B. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers



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offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
  - 1. Bergen-Power Pipe Supports.
  - 2. B-Line Systems, Inc.; a division of Cooper Industries.
  - 3. Carpenter & Paterson, Inc.
  - 4. Empire Industries, Inc.
  - 5. ERICO/Michigan Hanger Co.
  - 6. Globe Pipe Hanger Products, Inc.
  - 7. Grinnell Corp.
  - 8. National Pipe Hanger Corporation.
  - 9. PHD Manufacturing, Inc.
  - 10. PHS Industries, Inc.
- C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.3 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  - 1. Manufacturers:
    - a. Hilti, Inc.
    - b. ITW Ramset/Red Head.
    - c. Masterset Fastening Systems, Inc.
    - d. MKT Fastening, LLC.
    - e. Powers Fasteners.
- B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  - 1. Manufacturers:
    - a. B-Line Systems, Inc.; a division of Cooper Industries.
    - b. Empire Industries, Inc.
    - c. Hilti, Inc.
    - d. ITW Ramset/Red Head.



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- e. MKT Fastening, LLC.
- f. Powers Fasteners.

2.4 MISCELLANEOUS MATERIALS

- A. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
  - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
  - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
  - 4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  - 5. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
  - 6. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
  - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.



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- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.
  7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.
    - b. Medium (MSS Type 32): 1500 lb.
    - c. Heavy (MSS Type 33): 3000 lb.
  8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- J. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

### 3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Fastener System Installation:
1. Install powder-actuated fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
  2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- C. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- D. Install lateral bracing with pipe hangers and supports to prevent swaying.
- E. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and



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larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

- F. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.

### 3.3 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

### 3.4 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 22 05 29



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SECTION 22 05 53  
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Equipment labels.
  2. Warning signs and labels.
  3. Pipe labels.

1.2 SUBMITTAL

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
  2. Letter Color: White.
  3. Background Color: Black.
  4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  7. Fasteners: Stainless-steel self-tapping screws.
  8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.



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2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Red.
- C. Background Color: White.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/2 inches high.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.



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3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Paint piping as specified.
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  - 1. Near each valve and control device.
  - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 5. Near major equipment items and other points of origination and termination.
  - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
  - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- C. Pipe Label Color Schedule:
  - 1. Domestic Water Piping:
    - a. Background Color: White.
    - b. Letter Color: Blue.
  - 2. Sanitary Waste and Storm Drainage Piping:
    - a. Background Color: White.
    - b. Letter Color: Green.

END OF SECTION 22 05 53



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SECTION 22 11 16  
DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
2. Escutcheons.
3. Sleeves and sleeve seals.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.

1.3 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic, potable domestic water piping and components. Include marking "NSF-pw" on piping.
- C. Comply with NSF 61 for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 CPVC PIPING

- A. CPVC Tubing System: ASTM D 2846/D 2846M, SDR 11, tube and socket fittings.

2.3 PVC PIPE AND FITTINGS

- A. PVC Pipe: ASTM D 1785, Schedule 40 and Schedule 80.



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1. PVC Socket Fittings: ASTM D 2466 for Schedule 40 and ASTM D 2467 for Schedule 80.

## 2.4 PIPING JOINING MATERIALS

- A. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.
  1. Use CPVC solvent cement that has a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
  1. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

## 2.5 SPECIALTY VALVES

- A. Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.
- B. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

## 2.6 TRANSITION FITTINGS

- A. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- B. Sleeve-Type Transition Coupling: AWWA C219.
- C. Plastic-to-Metal Transition Fittings:
  1. Description: CPVC or PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert and one solvent-cement-socket or threaded end.
- D. Plastic-to-Metal Transition Unions:
  1. Description: CPVC or PVC four-part union. Include brass threaded end, solvent-cement-joint plastic end, rubber O-ring, and union nut.



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2.7 ESCUTCHEONS

- A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.
- B. One Piece, Stamped Steel: Chrome-plated finish with setscrew or spring clips.
- C. Split Plate, Stamped Steel: Chrome-plated finish with concealed hinge, setscrew or spring clips.
- D. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

2.8 SLEEVES

- A. Cast-Iron Wall Pipes: Fabricated of cast iron, and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- D. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.

2.9 SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.
  - 1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 2. Pressure Plates: Stainless steel.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.10 GROUT

- A. Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.



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PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements for pressure gages, drain valves and strainers.
- C. Install shutoff valve immediately upstream of each dielectric fitting.
- D. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for pressure-reducing valves.
- E. Install domestic water piping level without pitch and plumb.
- F. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- G. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- H. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- I. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- J. Install piping adjacent to equipment and specialties to allow service and maintenance.
- K. Install piping to permit valve servicing.
- L. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.



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3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- E. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
  - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
  - 3. PVC Piping: Join according to ASTM D 2855.

3.4 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.

3.5 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
  - 1. NPS 1-1/2 and Smaller: Fitting-type coupling.
  - 2. NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.



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3.6 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.
  - 1. Vertical Piping: MSS Type 8 or 42, clamps.
  - 2. Individual, Straight, Horizontal Piping Runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install vinyl-coated hangers for CPVC piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1 and Smaller: 36 inches with 3/8-inch rod.
  - 2. NPS 1-1/4 to NPS 2: 48 inches with 3/8-inch rod.
- E. Install supports for vertical CPVC piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.
- F. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
  - 1. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.

3.8 ESCUTCHEON INSTALLATION

- A. Install escutcheons for penetrations of walls, ceilings, and floors.
- B. Escutcheons for New Piping:
  - 1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.



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2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, stamped steel with set screw or spring clips.
3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece or split plate, stamped steel with set screw.
4. Bare Piping in Unfinished Service Spaces: One piece, stamped steel with set screw or spring clips.
5. Bare Piping in Equipment Rooms: One piece, stamped steel with set screw or spring clips.
6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

### 3.9 SLEEVE INSTALLATION

- A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.
- B. Sleeves are not required for core-drilled holes.
- C. Permanent sleeves are not required for holes formed by removable PE sleeves.
- D. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.
- E. Install sleeves in new partitions, slabs, and walls as they are built.
- F. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.
- G. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.
- H. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals specified in this Section.
- I. Seal space outside of sleeves in concrete slabs and walls with grout.
- J. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated.
- K. Install sleeve materials according to the following applications:
  1. Sleeves for Piping Passing through Concrete Floor Slabs: Steel pipe.
  2. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Steel pipe.
    - a. Extend sleeves 2 inches above finished floor level.
    - b. For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Comply with requirements in Division 07 Section "Flashing and Sheet Metal" for flashing.
  3. Sleeves for Piping Passing through Gypsum-Board Partitions:



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- a. PVC pipe sleeves for pipes smaller than NPS 6.
  - b. Galvanized-steel sheet sleeves for pipes NPS 6 and larger.
  - c. Exception: Sleeves are not required for water supply tubes and waste pipes for individual plumbing fixtures if escutcheons will cover openings.
4. Sleeves for Piping Passing through Concrete Roof Slabs: Steel pipe.
  5. Sleeves for Piping Passing through Exterior Concrete Walls:
    - a. Steel pipe sleeves for pipes smaller than NPS 6.
    - b. Install sleeves that are large enough to provide 1-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.

3.10 SLEEVE SEAL INSTALLATION

- A. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building.
- B. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.11 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.
- B. Label pressure piping with system operating pressure.

3.12 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Piping Inspections:
  1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
  2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
    - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
    - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
  3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
  4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.



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C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.13 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
  - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
  - b. Fill and isolate system according to either of the following:
    - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
    - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
  - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
  - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.



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3.14 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Under-building-slab, domestic water, building service piping, NPS 3 and smaller, shall be the following:
  - 1. PVC, Schedule 40 pipe; PVC, Schedule 40 socket fittings; and solvent-cemented joints.
- D. Under-building-slab, domestic water piping, NPS 2 and smaller, shall be one of the following:
  - 1. PVC, Schedule 40 pipe; PVC, Schedule 40 socket fittings; and solvent-cemented joints.
- E. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:
  - 1. CPVC Tubing System: CPVC tube; CPVC socket fittings; and solvent-cemented joints.

3.15 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  - 1. Shutoff Duty: Use ball valves for piping NPS 2 and smaller.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 22 11 16



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SECTION 22 11 19  
DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following domestic water piping specialties:
  - 1. Vacuum breakers.
  - 2. Strainers.
  - 3. Hose bibbs.
  - 4. Wall hydrants.
  - 5. Water hammer arresters.
  
- B. See Division 22 Section "Water Fountains" for water filters for water coolers.

1.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig, unless otherwise indicated.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.
- C. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. NSF Compliance:
  - 1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
  - 2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

- A. Hose-Connection Vacuum Breakers:



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1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Arrowhead Brass Products, Inc.
  - b. Cash Acme.
  - c. Conbraco Industries, Inc.
  - d. Legend Valve.
  - e. MIFAB, Inc.
  - f. Prier Products, Inc.
  - g. Watts Industries, Inc.; Water Products Div.
  - h. Woodford Manufacturing Company.
  - i. Zurn Plumbing Products Group; Light Commercial Operation.
  - j. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1001.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: Rough bronze.

## 2.2 STRAINERS FOR DOMESTIC WATER PIPING

### A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum, unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or FDA-approved, epoxy coating and for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations, unless otherwise indicated.
5. Perforation Size:
  - a. Strainers NPS 2 and Smaller: 0.033 inch.
  - b. Strainers NPS 2-1/2 to NPS 4: 0.045 inch.
6. Drain: Factory-installed, hose-end drain valve.

## 2.3 HOSE BIBBS

### A. Hose Bibbs:

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral or field-installation, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Operating key.



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13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

## 2.4 WALL HYDRANTS

### A. Moderate-Climate Wall Hydrants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Josam Company.
  - b. MIFAB, Inc.
  - c. Prier Products, Inc.
  - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - e. Tyler Pipe; Wade Div.
  - f. Watts Drainage Products Inc.
  - g. Woodford Manufacturing Company.
  - h. Zurn Plumbing Products Group; Light Commercial Operation.
  - i. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.21.3M for concealed outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Inlet: NPS 3/4 or NPS 1.
6. Outlet: Concealed, with integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052; and garden-hose thread complying with ASME B1.20.7.
7. Box: Deep, flush mounting with cover.
8. Box and Cover Finish: Polished nickel bronze.
9. Operating Keys(s): Two with each wall hydrant.

### B. Vacuum Breaker Wall Hydrants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Arrowhead Brass Products, Inc.
  - b. Mansfield Plumbing Products LLC.
  - c. McDonald, A. Y. Mfg. Co.
  - d. Prier Products, Inc.
  - e. Smith, Jay. R. Mfg. Co.; Division of Smith Industries, Inc.
  - f. Watts Industries, Inc.; Water Products Div.
  - g. Woodford Manufacturing Company.
  - h. Zurn Plumbing Products Group; Light Commercial Operation.
2. Standard: ASSE 1019, Type A or Type B.
3. Type: Freeze-resistant, automatic draining with integral air-inlet valve.
4. Classification: Type A, for automatic draining with hose removed or Type B, for automatic draining with hose removed or with hose attached and nozzle closed.
5. Pressure Rating: 125 psig.
6. Operation: Loose key.



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7. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
8. Inlet: NPS 1/2 or NPS 3/4.
9. Outlet: Exposed with garden-hose thread complying with ASME B1.20.7.

## 2.5 WATER HAMMER ARRESTERS

### A. Water Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. AMTROL, Inc.
  - b. Josam Company.
  - c. MIFAB, Inc.
  - d. PPP Inc.
  - e. Sioux Chief Manufacturing Company, Inc.
  - f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - g. Tyler Pipe; Wade Div.
  - h. Watts Drainage Products Inc.
  - i. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Copper tube with piston.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install Y-pattern strainers for water on supply side of each control valve, water pressure-reducing valve, solenoid valve, and pump.
- C. Install water hammer arresters in water piping according to PDI-WH 201.
- D. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.

### 3.2 FIELD QUALITY CONTROL

- A. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

END OF SECTION 22 11 19



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SECTION 22 13 16  
SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following soil and waste, sanitary drainage and vent piping inside the building:
1. Pipe, tube, and fittings.
  2. Special pipe fittings.

1.2 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.3 SUBMITTALS

- A. Field quality-control inspection and test reports.

1.4 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; and "NSF-drain" for plastic drain piping.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Solid-Wall PVC Pipe: ASTM D 2665, solid-wall drain, waste, and vent.
1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.
  2. Solvent Cement and Adhesive Primer:
    - a. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
    - b. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).



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PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Special pipe fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.
- B. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- C. Aboveground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:
  - 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- D. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:
  - 1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

3.2 PIPING INSTALLATION

- A. Sanitary sewer piping outside the building as specified.
- B. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- D. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Wall penetration systems are specified in Division 22 Section "Common Work Results for Plumbing."
- E. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- F. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- G. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
  - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
  - 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
  - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.



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- H. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.
- I. Install underground PVC soil and waste drainage piping according to ASTM D 2321.
- J. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

### 3.3 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

### 3.4 HANGER AND SUPPORT INSTALLATION

- A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
  - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
  - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
- B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- E. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
  - 2. NPS 3: 48 inches with 1/2-inch rod.
  - 3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
- F. Install supports for vertical PVC piping every 48 inches.
- G. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

### 3.5 CONNECTIONS

- A. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.



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- B. Connect drainage and vent piping to the following:
1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
  2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
  3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code
  4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

3.6 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
  2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction.
1. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
  2. Prepare reports for tests and required corrective action.

3.7 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.8 PROTECTION

- A. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION 22 13 16



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SECTION 22 13 19  
SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following sanitary drainage piping specialties:

1. Cleanouts.
2. Floor drains.
3. Roof flashing assemblies.
4. Miscellaneous sanitary drainage piping specialties.
5. Flashing materials.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for grease interceptors.

1.3 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Exposed Cast-Iron Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Josam Company; Josam Div.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - d. Tyler Pipe; Wade Div.
  - e. Watts Drainage Products Inc.
  - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: as required to match connected piping.
5. Closure: Countersunk, brass plug.



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6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Cast-Iron Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Josam Company; Josam Div.
  - b. Oatey.
  - c. Sioux Chief Manufacturing Company, Inc.
  - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - e. Tyler Pipe; Wade Div.
  - f. Watts Drainage Products Inc.
  - g. Zurn Plumbing Products Group; Light Commercial Operation.
  - h. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for heavy-duty, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Adjustable housing.
5. Body or Ferrule: Cast iron.
6. Clamping Device: As Required.
7. Outlet Connection: Inside caulk.
8. Closure: Brass plug with straight threads and gasket.
9. Adjustable Housing Material: Cast iron with threads.
10. Frame and Cover Material and Finish: Polished bronze.
11. Frame and Cover Shape: Round.
12. Top Loading Classification: Heavy Duty.
13. Riser: ASTM A 74, Extra-Heavy Service class, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Josam Company; Josam Div.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - d. Tyler Pipe; Wade Div.
  - e. Watts Drainage Products Inc.
  - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: as required to match connected piping.
5. Closure: Countersunk or raised-head, plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.

## 2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:



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1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Commercial Enameling Co.
  - b. Josam Company; Josam Div.
  - c. MIFAB, Inc.
  - d. Prier Products, Inc.
  - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - f. Tyler Pipe; Wade Div.
  - g. Watts Drainage Products Inc.
  - h. Zurn Plumbing Products Group; Light Commercial Operation.
  - i. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: As required, see drawings.
6. Anchor Flange: As required, see drawings.
7. Clamping Device: As required, see drawings..
8. Outlet: Side.
9. Backwater Valve: Not required.
10. Coating on Interior and Exposed Exterior Surfaces: Not required.
11. Sediment Bucket: As required, see drawings.
12. Top or Strainer Material: Nickel bronze.
13. Top of Body and Strainer Finish: Nickel bronze.
14. Top Shape: Round.
15. Top Loading Classification: Heavy Duty.
16. Funnel: Not required.
17. Inlet Fitting: Gray iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
18. Trap Material: Cast iron.
19. Trap Pattern: Deep-seal P-trap.
20. Trap Features: Cleanout and trap-seal primer valve drain connection.

### 2.3 ROOF FLASHING ASSEMBLIES

#### A. Roof Flashing Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Acorn Engineering Company; Elmdor/Stoneman Div.
  - b. Thaler Metal Industries Ltd.

#### B. Description: Manufactured assembly made of 6.0-lb/sq. ft., 0.0938-inch- thick, lead flashing collar and skirt extending at least 10 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

1. Open-Top Vent Cap: Without cap.
2. Low-Silhouette Vent Cap: With vandal-proof vent cap.
3. Extended Vent Cap: With field-installed, vandal-proof vent cap.



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2.4 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Open Drains:

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping with increaser fitting of size indicated.

B. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.
  - a. NPS 2: 4-inch- minimum water seal.
  - b. NPS 2-1/2 and Larger: 5-inch- minimum water seal.

C. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 side inlet.

D. Sleeve Flashing Device:

1. Description: Manufactured, cast-iron fitting, with clamping device, that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 2 inches above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

E. Stack Flashing Fittings:

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
2. Size: Same as connected stack vent or vent stack.

F. Vent Caps:

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

2.5 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.
3. Burning: 6-lb/sq. ft., 0.0938-inch thickness.



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- B. Fasteners: Metal compatible with material and substrate being fastened.
- C. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- D. Solder: ASTM B 32, lead-free alloy.
- E. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.
- C. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
  - 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
  - 2. Locate at each change in direction of piping greater than 45 degrees.
  - 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
  - 4. Locate at base of each vertical soil and waste stack.
- D. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- E. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- F. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
  - 1. Position floor drains for easy access and maintenance.
  - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
    - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
    - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
    - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
  - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.



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4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- G. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- H. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- I. Assemble open drain fittings and install with top of hub 1 inch above floor.
- J. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- K. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
  1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
  2. Size: Same as floor drain inlet.
- L. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- M. Install vent caps on each vent pipe passing through roof.
- N. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- O. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

### 3.3 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
  1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
  1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
  2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.



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3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.
  - C. Set flashing on floors and roofs in solid coating of bituminous cement.
  - D. Secure flashing into sleeve and specialty clamping ring or device.
  - E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Division 07 Section "Flashing and Sheet Metal."
  - F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

3.4 LABELING AND IDENTIFYING

- A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.5 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19



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SECTION 22 42 13.13  
COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Water closets.
  2. Flushometer valves.
  3. Toilet seats.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 FLOOR-MOUNTED WATER CLOSETS

- A. Water Closets: Floor mounted, top spud.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Kohler Co.
  2. Bowl:
    - a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
    - b. Material: Vitreous china.
    - c. Type: Siphon jet.
    - d. Style: Flushometer valve.
    - e. Height: Standard.
    - f. Rim Contour: Elongated.
    - g. Water Consumption: 1.28 gal. per flush.
    - h. Spud Size and Location: NPS 1-1/2; top.
  3. Flushometer Valve: As scheduled on drawings.
  4. Toilet Seat: As scheduled on drawings.
  5. Support: Existing to be revised



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2.2 FLUSHOMETER VALVES

- A. Battery Powered Sensor, Piston Flushometer Valves:
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    - a. Hydrotek
  2. Standard: ASSE 1037.
  3. Minimum Pressure Rating: 125 psig.
  4. Features: Include integral check stop and backflow-prevention device.
  5. Material: Brass body with corrosion-resistant components.
  6. Exposed Flushometer-Valve Finish: Chrome plated.
  7. Style: Exposed.
  8. Consumption: 1.28 gal. per flush.
  9. Minimum Inlet: NPS 1.
  10. Minimum Outlet: NPS 1-1/4.

2.3 TOILET SEATS

- A. Toilet Seats:
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Kohler
  2. Standard: IAPMO/ANSI Z124.5.
  3. Material: Plastic.
  4. Type: Commercial (Heavy duty).
  5. Shape: Elongated rim, open front.
  6. Hinge: Self-sustaining, check.
  7. Hinge Material: Noncorroding metal.
  8. Seat Cover: Not required.
  9. Color: White.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Water-Closet Installation:
1. Install level and plumb according to roughing-in drawings.
  2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
  3. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.
- B. Flushometer-Valve Installation:
1. Install flushometer-valve, water-supply fitting on each supply to each water closet.
  2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.



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3. Install lever-handle flushometer valves for accessible water closets with handle mounted on open side of water closet.
  4. Install actuators in locations that are easy for people with disabilities to reach.
- C. Install toilet seats on water closets.
- D. Joint Sealing:
1. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
  2. Match sealant color to water-closet color.
  3. Comply with sealant requirements specified in Division 07 Section "Joint Sealants."

### 3.2 CONNECTIONS

- A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.
- B. Comply with water piping requirements specified in Division 22 Section "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Division 22 Section "Sanitary Waste and Vent Piping."
- D. Where installing piping adjacent to water closets, allow space for service and maintenance.

### 3.3 ADJUSTING

- A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.
- B. Adjust water pressure at flushometer valves to produce proper flow.

### 3.4 CLEANING AND PROTECTION

- A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.
- B. Install protective covering for installed water closets and fittings.
- C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 13.13



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SECTION 22 42 13.16  
COMMERCIAL URINALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Urinals.
  2. Flushometer valves.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 WALL-HUNG URINALS

- A. Urinals: Wall hung, back outlet, washout.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Kohler Co.
  2. Fixture:
    - a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
    - b. Material: Vitreous china.
    - c. Type: Washout with extended shields.
    - d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
    - e. Water Consumption: 0.5 gallons per flush.
    - f. Spud Size and Location: NPS 3/4, top.
    - g. Outlet Size and Location: NPS 2, back.
    - h. Color: White.
  3. Waste Fitting:
    - a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
    - b. Size: NPS 2.



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4. Support: ASME A112.6.1M, Type I, urinal carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture. Include rectangular, steel uprights.

## 2.2 URINAL FLUSHOMETER VALVES

- A. Battery-Powered, Solenoid-Actuator, Piston Flushometer Valves:
  1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    - a. Hydrotek
  2. Standard: ASSE 1037.
  3. Minimum Pressure Rating: 125 psig.
  4. Features: Include integral check stop and backflow-prevention device.
  5. Material: Brass body with corrosion-resistant components.
  6. Exposed Flushometer-Valve Finish: Chrome plated.
  7. Style: Exposed.
  8. Actuator: Solenoid complying with UL 1951; listed and labeled as defined in NFPA 70, by a qualified testing agency; and marked for intended location and application.
  9. Trip Mechanism: Battery-powered electronic sensor complying with UL 1951; listed and labeled as defined in NFPA 70, by a qualified testing agency; and marked for intended location and application.
  10. Consumption: 0.5 gal. per flush.
  11. Minimum Inlet: NPS 3/4.
  12. Minimum Outlet: NPS 1-1/4.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.
- B. Examine walls and floors for suitable conditions where urinals will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Urinal Installation:
  1. Install urinals level and plumb according to roughing-in drawings.
  2. Install wall-hung, back-outlet urinals onto waste fitting seals and attached to supports.
  3. Install wall-hung, bottom-outlet urinals with tubular waste piping attached to supports.
  4. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.
- B. Support Installation:



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1. Install supports, affixed to building substrate, for wall-hung urinals.
2. Use off-floor carriers with waste fitting and seal for back-outlet urinals.
3. Use carriers without waste fitting for urinals with tubular waste piping.
4. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.

C. Flushometer-Valve Installation:

1. Install flushometer-valve water-supply fitting on each supply to each urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.
4. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

D. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Division 22 Section "Escutcheons for Plumbing Piping."

E. Joint Sealing:

1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to urinal color.
3. Comply with sealant requirements specified in Division 07 Section "Joint Sealants."

### 3.3 CONNECTIONS

- A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.
- B. Comply with water piping requirements specified in Division 22 Section "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Division 22 Section "Sanitary Waste and Vent Piping."
- D. Where installing piping adjacent to urinals, allow space for service and maintenance.

### 3.4 ADJUSTING

- A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.
- B. Adjust water pressure at flushometer valves to produce proper flow.
- C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.



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3.5 CLEANING AND PROTECTION

- A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.
- B. Install protective covering for installed urinals and fittings.
- C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 13.16



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SECTION 22 42 16.13  
COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Lavatories.
2. Faucets.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include diagrams for power, signal, and control wiring of automatic faucets.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.
  1. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
    - a. Servicing and adjustments of automatic faucets.

PART 2 - PRODUCTS

2.1 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

- A. Lavatory: Vitreous china, wall mounted, with back.
  1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Kohler Co.
  2. Fixture:
    - a. Standard: ASME A112.19.2/CSA B45.1.
    - b. Type: For wall hanging.



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- c. Nominal Size: Rectangular, 21.5 by 18.25 inches.
- d. Faucet-Hole Punching: One holes.
- e. Faucet-Hole Location: Top.
- f. Color: White.
- g. Mounting Material: Chair carrier.
3. Faucet: Battery powered deck mounted sensor faucet. Faucet provide a single cold water supply, 0.5 gpm spray outlet.
4. Support: ASME A112.6.1M, Type II, concealed-arm lavatory carrier with escutcheons.

### 2.2 METAL CONSTRUCTION, BATTERY POWERED SENSOR FAUCETS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.
- B. Lavatory Faucets: Battery powered sensor-type, solid-metal valve.
  1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Hydrotek
  2. Standard: ASME A112.18.1/CSA B125.1.
  3. General: Coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
  4. Body Type: Centerset.
  5. Body Material: Commercial, solid metal.
  6. Finish: Polished chrome plate.
  7. Maximum Flow Rate: 0.5 gpm.
  8. Mounting Type: Deck, exposed.
  9. Valve Handle(s): Battery powered sensor.
  10. Spout: Rigid type.
  11. Spout Outlet: Aerator.

### 2.3 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Loose key.
- F. Risers:
  1. NPS 3/8.
  2. Chrome-plated, soft-copper flexible tube riser.



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2.4 WASTE FITTINGS

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/4 offset and straight tailpiece.
- C. Trap:
  - 1. Size: NPS 1-1/2 by NPS 1-1/4.
  - 2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated, brass or steel wall flange.
  - 3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch-thick stainless-steel tube to wall; and stainless-steel wall flange.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.
- B. Examine counters and walls for suitable conditions where lavatories will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lavatories level and plumb according to roughing-in drawings.
- B. Install supports, affixed to building substrate, for wall-mounted lavatories.
- C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.
- D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Division 22 Section "Escutcheons for Plumbing Piping."
- E. Seal joints between lavatories and counters and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Division 07 Section "Joint Sealants."
- F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Division 22 Section "Plumbing Piping Insulation."



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3.3 CONNECTIONS

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Division 22 Section "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Division 22 Section "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

- A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.
- C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

- A. After completing installation of lavatories, inspect and repair damaged finishes.
- B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed lavatories and fittings.
- D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 16.13



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SECTION 22 47 00  
WATER FOUNTAINS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Wall mounted barrier-free drinking fountain.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for fixtures for people with disabilities.
- B. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- C. ARI Standard: Comply with ARI's "Directory of Certified Drinking Water Coolers" for style classifications.

PART 2 - PRODUCTS

2.1 PRESSURE WATER FOUNTAINS

- A. Water Fountains:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Haws Corporation.
  - 2. Description: Accessible, Model 1119.14a pedestal drinking fountain.
    - a. Pedestal: 14 gauge stainless steel wall mount with stainless steel back plate.



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- b. Bubbler: Two, polished chrome-plated brass vandal-resistant bubbler head backed against a pedestal guard.
- c. Control: Push button.
- d. Supply: 1/2" with optional 1/2" stop assembly.
- e. Filter: Optional 12" x2" in-line lead removal element.

### PART 3 - EXECUTION

#### 3.1 APPLICATIONS

- A. Set wall mounted drinking fountains in locations shown on plans.
- B. Use chrome-plated brass or copper tube, fittings, and valves in locations exposed to view.

#### 3.2 INSTALLATION

- A. Install off-floor supports affixed to building substrate and attach wall-mounting fixtures, unless otherwise indicated.
- B. Install fixtures level and plumb. For fixtures indicated for children, install at height required by authorities having jurisdiction.
- C. Install water-supply piping with shutoff valve on supply to each fixture to be connected to water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- D. Install pipe escutcheons at wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding pipe fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."
- E. Seal joints between fixtures and walls and floors using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

#### 3.3 CONNECTIONS

- A. Connect fixtures with water supplies, traps, and risers, and with soil, waste, and vent piping. Use size fittings required to match fixtures.

#### 3.4 FIELD QUALITY CONTROL

- A. Water Fountain Testing: Test for compliance with requirements. Test and adjust controls and safeties.
  1. Remove and replace malfunctioning units and retest as specified above.
  2. Report test results in writing.



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3.5 ADJUSTING

- A. Adjust fixture flow regulators for proper flow and stream height.

END OF SECTION 22 47 00



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**Division 26**  
Electrical





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SECTION 26 05 00  
COMMON WORK RESULTS FOR ELECTRICAL CONSTRUCTION

PART 1 - GENERAL

1.1 The electrical work included in all other divisions are the responsibility of the contractor performing the Division 26 work unless noted otherwise.

1.2 PROJECT OVERVIEW

A. Provide power and lighting for the construction of a park building.

1.3 SCOPE

A. The work under this section includes basic electrical requirements, which are applicable to all Division 26 sections. This section includes information common to two or more technical specification sections or items that are of a general nature, not conveniently fitting into other technical sections. Included are the following topics:

B. Section Includes:

1. GENERAL

- a. Project Overview
- b. Scope
- c. Related Work
- d. Reference Standards
- e. Regulatory Requirements
- f. Quality Assurance
- g. Continuity of Existing Services and Systems
- h. Protection of Finished Surfaces
- i. Approved Electrical Testing Laboratories
- j. Sleeves for Raceways and Cables
- k. Sleeve Seals
- l. Grout
- m. Sealing
- n. Owner Furnished Equipment
- o. Work by Owner
- p. Provisions for Future Work
- q. Intent
- r. Omissions
- s. Submittals
- t. Project/Site Conditions
- u. Work Sequence and Scheduling
- v. Work by Other Trades
- w. Offsite Storage
- x. Request and Certificate for Payment
- y. Salvage Materials
- z. Certificates and Inspections



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- aa. Operating and Maintenance Data
- bb. Training of Owner Personnel
- cc. Record Drawings

## 2. PRODUCTS

- a. Access Panels and Doors
- b. Identification
- c. Sealing

## 3. EXECUTION

- a. Excavation and Backfill
- b. Concrete Work
- c. Cutting and Patching
- d. Building Access
- e. Equipment Access
- f. Coordination
- g. Sleeves: Installation for Electrical Penetrations
- h. Sealing
- i. Housekeeping and Clean Up

## 4. RELATED WORK

- a. Applicable provisions of Division 1 govern work under this Section.

## 5. REFERENCE STANDARDS

- a. Abbreviations of standards organizations referenced in this and other sections are as follows:
  - 1) ANSI American National Standards Institute
  - 2) ASTM American Society for Testing and Materials
  - 3) EPA Environmental Protection Agency
  - 4) ETL Electrical Testing Laboratories, Inc.
  - 5) IEEE Institute of Electrical and Electronics Engineers
  - 6) IES Illuminating Engineering Society
  - 7) ISA Instrument Society of America
  - 8) NBS National Bureau of Standards
  - 9) NEC National Electric Code
  - 10) NEMA National Electrical Manufacturers Association
  - 11) NESC National Electrical Safety Code
  - 12) NFPA National Fire Protection Association
  - 13) UL Underwriters Laboratories Inc.

## 6. REGULATORY REQUIREMENTS

- a. All work and materials are to conform in every detail to applicable rules and requirements of the National Electrical Code (ANSI/NFPA 70), other applicable National Fire Protection Association codes, the National Electrical Safety Code, and present manufacturing standards (including NEMA).
- b. All Division 26 work shall be done under the direction of a currently certified State of Florida Certified Master Electrician.



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### 7. QUALITY ASSURANCE

- a. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contract documents, the contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space and for obtaining the performance from the system into which these items are placed.
- b. Manufacturer references used herein are intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.
- c. All materials, except medium voltage equipment and components, shall be listed by and shall bear the label of an approved electrical testing laboratory. If none of the approved electrical testing laboratories has published standards for a particular item, then other national independent testing standards, if available, applicable, and approved by DSF, shall apply and such items shall bear those labels. Where one of the approved electrical testing laboratories has an applicable system listing and label, the entire system, except for medium voltage equipment and components, shall be so labeled.

### 8. CONTINUITY OF EXISTING SERVICES AND SYSTEMS

- a. No outages shall be permitted on existing systems except at the time and during the interval specified by the Owner and Architect. This will require written approval. Any outage must be scheduled when the interruption causes the least interference with normal institutional schedules and business routines. No extra costs will be paid to the Contractor for such outages which must occur outside of regular weekly working hours. If required by the serving utility, include these costs in bid.
- b. This Contractor shall restore any circuit interrupted as a result of this work to proper operation as soon as possible.

### 9. PROTECTION OF FINISHED SURFACES

- a. Furnish one can of touch-up paint for each different color factory finish furnished by the Contractor. Deliver touch-up paint with other "loose and detachable parts" as covered in the General Requirements.

### 10. APPROVED ELECTRICAL TESTING LABORATORIES

- a. The following laboratories are approved for providing electrical product safety testing and listing services as required in these specifications:
  - 1) Underwriters Laboratories Inc.
  - 2) Electrical Testing Laboratories, Inc.

#### 1.4 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.



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- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
  - 1. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
    - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

### 1.5 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
    - d. Pipeline Seal and Insulator, Inc.
  - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 3. Pressure Plates: Stainless steel. Include two for each sealing element.
  - 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### 1.6 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

### 1.7 SEALING

- 1. Sealing of sleeves/openings between conduits, cable trays, wireways, troughs, cablebus, busduct, etc. and the structural or partition opening shall be the responsibility of the contractor whose work penetrates the opening.

### 1.8 WORK BY OWNER

- A. Asbestos abatement and PCB equipment (other than light fixture ballasts) removal and disposal, if required, will be by the Owner under separate contract.
- B. Electrical testing not described in these contract documents will be by the Owner under separate contract.



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### 1.9 INTENT

- A. The Contractor shall furnish and install all the necessary materials, apparatus, and devices to complete the electrical equipment and systems installation herein specified, except such parts as are specifically exempted herein.
- B. If an item is either called for in the specifications or shown on the plans, it shall be considered sufficient for the inclusion of said item in this contract. If a conflict exists within the Specifications or exists within the Drawings, the Contractor shall furnish the item, system, or workmanship, which is the highest quality, largest, or most closely fits the Owners intent). Refer to the General Conditions of the Contract for further clarification.
- C. It must be understood that the details and drawings are diagrammatic. The Contractor shall verify all dimensions at the site and be responsible for their accuracy.
- D. All sizes as given are minimum except as noted.
- E. Materials and labor shall be new (unless noted or stated otherwise), first class, and workmanlike, and shall be subject at all times to the Owner's and Architect's inspections, tests and approval from the commencement until the acceptance of the completed work.
- F. Whenever a particular manufacturer's product is named, it is intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.

### 1.10 OMISSIONS

- A. No later than ten (10) days before bid opening, the Contractor shall call the attention of the Owner and Architect to any materials or apparatus the Contractor believes to be inadequate and to any necessary items of work omitted.

### 1.11 SUBMITTALS

- A. Submit for all equipment and systems as indicated in the respective specification sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number, as indicated in the contract documents. Failure to do this may result in the submittal(s) being returned to the Contractor for correction and resubmission. Failing to follow these instructions does not relieve the Contractor from the requirement of meeting the project schedule.
- B. On request from the Architect, the successful bidder shall furnish additional drawings, illustrations, catalog data, performance characteristics, etc.
- C. Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified. Include wiring diagrams of electrically powered equipment.
- D. The submittals must be approved before fabrication is authorized.
- E. Submit sufficient quantities of submittals to allow the following distribution:



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- |    |                                   |          |
|----|-----------------------------------|----------|
| 1. | Operating and Maintenance Manuals | 3 copies |
| 2. | Architect                         | 2 copies |
| 3. | Engineer                          | 1 copy   |

## 1.12 PROJECT/SITE CONDITIONS

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Owner and Architect before proceeding.
- C. Tools, materials and equipment shall be confined to areas designated by the Owner and Architect.

## 1.13 WORK SEQUENCE AND SCHEDULING

- A. Install work in phases to accommodate user Owner's occupancy requirements. During the construction period coordinate electrical schedule and operations with the Owner and Architect.

## 1.14 WORK BY OTHER TRADES

- A. Every attempt has been made to indicate in this trade's specifications and drawings all work required of this Contractor. However, there may be additional specific paragraphs in other trade specifications and addenda, and additional notes on drawings for other trades which pertain to this Trade's work, and thus those additional requirements are hereby made a part of these specifications and drawings.
- B. Electrical details on drawings for equipment to be provided by others are based on preliminary design data only. This Contractor shall lay out the electrical work and shall be responsible for its correctness to match equipment actually provided by others.

## 1.15 OFFSITE STORAGE

- A. No material will be accepted for offsite storage unless submittals for the material have been approved.

## 1.16 REQUEST AND CERTIFICATE FOR PAYMENT

- A. Within 10 days after Notice to Proceed, the successful bidder will submit to the Owner and Architect in a form prescribed below and by the General Conditions of the Contract, Scheduling and Coordination of Work, Reports, Records and Data, and Payments to Contractor, a cost breakdown of the proposed values for work performed which, if approved by the Owner, will become the basis for construction progress and monthly payments. The cost breakdown items shall reflect actual work progress stages as closely as feasible.



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- B. In addition, if payment will be requested for approved off-site stored material, then that material shall be listed as a line item and the Contractor may be compensated by the Owner.

### 1.17 SALVAGE MATERIALS

- A. No materials removed from this project shall be reused. All materials removed shall become the property of and shall be disposed of by the Contractor.

### 1.18 CERTIFICATES AND INSPECTIONS

- A. Obtain and pay for all required installation inspections.

### 1.19 OPERATION AND MAINTENANCE DATA

- A. Assemble material in three-ring or post binders, using an index at the front of each volume and tabs for each system or type of equipment. In addition to the data indicated in the General Requirements, include the following information:
  1. Copies of all approved submittals.
  2. Manufacturer's wiring diagrams for electrically powered equipment.
  3. Records of tests performed to certify compliance with system requirements.
  4. Certificates of inspection by regulatory agencies.
  5. Parts lists for manufactured equipment.
  6. Preventative maintenance recommendations.
  7. Warranties.
  8. Additional information as indicated in the technical specification sections.

### 1.20 RECORD DRAWINGS

- A. The Contractor shall maintain at least one copy each of the specifications and drawings on the job site at all times.
- B. The Owner will provide the Contractor with a suitable set of contract drawings on which daily records of changes and deviations from contract shall be recorded. Dimensions and elevations on the record drawings shall locate all buried or concealed piping, conduit, or similar items.
- C. The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted.
- D. At completion of the project, the Contractor shall submit the marked-up record drawings to the Owner and Architect prior to final payment.



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## PART 2 - PRODUCTS

### 2.1 IDENTIFICATION

- A. See Electrical section 260553 – Identification for Electrical Systems.

### 2.2 NON-RATED PENETRATIONS:

- A. Conduit Penetrations Through Below Grade Walls:

- 1. In exterior wall openings below grade, use a modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the uninsulated conduit and the cored opening or a water-stop type wall sleeve.

- B. Conduit and Cable Tray Penetrations:

- 1. At conduit and cable tray penetrations of non-rated interior partitions, floors and exterior walls above grade, use urethane caulk in annular space between conduit and sleeve, or the core drilled opening.

## PART 3 - EXECUTION

### 3.1 EXCAVATION AND BACKFILL

- A. Perform all excavation and backfill work to accomplish indicated electrical systems installation. Blasting will not be allowed.

### 3.2 CONCRETE WORK

- A. Confirm with the Construction Manager or General Contractor that the Division 3 Contractor will perform all cast-in-place concrete unless noted otherwise elsewhere. Provide all layout drawings, anchor bolts, metal shapes, and/or templates required to be cast into concrete or used to form concrete for the support of electrical equipment.

### 3.3 CUTTING AND PATCHING

- A. Refer to Division 1, General Requirements, Cutting and Patching.

### 3.4 BUILDING ACCESS

- A. Arrange for the necessary openings in the building to allow for admittance of all apparatus. When the building access was not previously arranged and must be provided by this contractor, restore any opening to its original condition after the apparatus has been brought into the building.



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### 3.5 EQUIPMENT ACCESS

- A. Install all piping, conduit, ductwork, and accessories to permit access to equipment for maintenance. Coordinate the exact location of wall and ceiling access panels and doors with the General Contractor, making sure that access is available for all equipment and specialties. Where access is required in plaster or drywall walls or ceilings, furnish the access doors to the General Contractor and reimburse the General Contractor for installation of those access doors.

### 3.6 COORDINATION

- A. The Contractor shall cooperate with other trades in locating work in a proper manner. Should it be necessary to raise or lower or move longitudinally any part of the electrical work to better fit the general installation, such work shall be done at no extra cost to the Owner, provided such decision is reached prior to actual installation. The Contractor shall check location of electrical outlets with respect to other installations before installing.
- B. The Contractor shall verify that all devices are compatible for the surfaces on which they will be used. This includes, but is not limited to light fixtures, panelboards, devices, etc. and recessed or semi-recessed units installed in/on architectural surfaces.
- C. Coordinate all work with other contractors prior to installation. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing contractor's expense.
- D. Verify system completion to the testing consultant. Demonstrate the starting, interlocking and control features of each system so the testing contractor can perform its work.
- E. Comply with NECA 1.
- F. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- G. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- H. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- I. Right of Way: Give to piping systems installed at a required slope.

### 3.7 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATION

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.



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- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
  - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- L. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.
- M. Pipe sleeves for conduits 6" in diameter and smaller, in new poured concrete construction, shall be schedule 40 steel pipe, plastic removable sleeve or sheet metal sleeve, all cast in place.
- N. In wet area floor penetrations, top of sleeve to be 2 inches above the adjacent floor. In existing wet area floor penetrations, core drill sleeve openings large enough to insert schedule 40 sleeve and grout the area around the sleeve. If a pipe clamp resting on the sleeve supports the pipe penetrating the sleeve, weld a collar or struts to the sleeve that will transfer weight to the existing floor structure. Wet areas for this paragraph are rooms or spaces containing air handling unit coils, converters, pumps, chillers, boilers, and similar waterside equipment.
- O. Pipe penetrations in existing concrete floors that are not in wet areas may omit the use of schedule 40 sleeve and use the core drilled opening as the sleeve.

### 3.8 SEALING

- A. Non-Rated Surfaces:



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1. When the opening is through a non-fire rated wall, floor, ceiling or roof the opening must be sealed using an approved type of material.
2. Use galvanized sheet metal sleeves in hollow wall penetrations to provide a backing for the sealant. Grout area around sleeve in masonry construction.
3. Install escutcheons or floor/ceiling plates where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces for this paragraph include only those rooms with finished ceilings and the penetration occurs below the ceiling.
4. In exterior wall openings below grade, assemble rubber links of mechanical seal to the proper size for the conduit and tighten in place, in accordance with the manufacturer's instructions. Install so that the bolts used to tighten the seal are accessible from the interior of the building or vault.
5. At interior partitions, conduit penetrations are required to be sealed for all clean rooms, laboratories, and most hospital spaces, computer rooms, dormitory rooms, tele/data/com rooms and similar spaces where the room pressure or odor transmission must be controlled. Apply sealant to both sides of the penetration in such a manner that the annular space between the conduit sleeve and the conduit is completely filled.

### 3.9 HOUSEKEEPING AND CLEAN UP

- A. The Contractor shall clean up and remove from the premises, on a daily basis, all debris and rubbish resulting from its work and shall repair all damage to new and existing equipment resulting from its work. When job is complete, this Contractor shall remove all tools, excess material and equipment, etc., from the site.

END OF SECTION 26 05 00



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SECTION 26 05 26  
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

**PART 1 - GENERAL**

1.1 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

1.4 RECEIVING, STORING AND PROTECTING

- A. Receive, store, and protect, and handle products according to NECA 1 Standard Practices for Good Workmanship in Electrical Construction.

**PART 2 - PRODUCTS**

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.



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7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

### 2.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Provide NRTL-listed THHN/THWN insulated copper wire.
- B. Use solid grounding conductors 10 AWG and smaller where not subject to vibration or repeated flexing.
- C. Use stranded grounding conductors for 8 AWG and larger.
- D. Use stranded grounding conductors where subject to vibration or repeated flexing. Use stranded grounding conductors in flexible conduit at motor connections.
- E. Color code grounding conductors as follows:
  1. Equipment ground:
    - a. Conductors 6 AWG and smaller: Green colored insulation.
    - b. Conductors 4 AWG and larger: Green colored insulation or black colored insulation with 3/4 inch wide band of water and oil-resistant green plastic adhesive tape.

### 2.3 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
  1. Pipe Connectors: Clamp type, sized for pipe.
- C. Exothermic Weld Grounding Connections:
  1. Provide molds and welding material for making exothermic weld connections.
  2. In interior locations and in vaults, use low smoke emission type welding material.
  3. Match mold and weld material to material types, shapes and sizes to be joined.
  4. Manufacturer: ERICO Cadweld
- D. Compression Grounding Connections:
  1. Use two-hole heavy-duty compression lugs for bolted connections to ground bars, ground plates, and equipment ground pads.
  2. Manufacturer: Burndy "Hyground"

### 2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel, 3/4 inch by 10 feet (19 mm by 3 m) in diameter.



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## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade.
- C. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
  - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
  - 4. Connections to Structural Steel: Welded connectors.

### 3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
  - 1. Feeders and branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
  - 4. Single-phase motor and appliance branch circuits.
  - 5. Flexible raceway runs.
  - 6. Armored and metal-clad cable runs.

### 3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
  - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Test Wells: Ground rod driven through drilled hole in bottom of handhole and shall be at least 12 inches deep, with cover.



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1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
  - D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
    1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
    2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
    3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
  - E. Grounding and Bonding for Piping:
    1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
    2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
  - F. Bonding Bushings:
    1. Install bonding bushings on metallic conduit containing circuits rated 100 amperes and higher.
    2. Install bonding bushings on metallic conduits entering enclosures through concentric, eccentric or oversize knockouts.
    3. Install bonding bushings on metallic conduits that terminate to a metallic enclosure without effective electrical connection such as locknuts or threaded bushings.
    4. Bond conduit bonding bushing lug to the equipment ground bar or ground lug in switchgear, panelboards, transformers, motor control centers, starters, disconnect switches, cabinets, etc. Size bonding jumpers in accordance with the NEC.
- ### 3.4 FIELD QUALITY CONTROL
- A. Attach grounds permanently before permanent building service is energized.
  - B. Perform the following tests and inspections and prepare test reports:
    1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
    2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells.
      - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural



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drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

- b. Perform tests by fall-of-potential method according to IEEE 81.
- C. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
  2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
  3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
  4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
- D. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 05 26



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SECTION 26 05 29  
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Hangers and supports for electrical equipment and systems.
  2. Construction requirements for concrete bases.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.
- E. Do not drill or otherwise compromise structural members.

1.3 SUBMITTALS

- A. Product Data: For steel slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
1. Shop Drawings: Submit shop drawings showing details of fabricated hangers, and supports. Provide detail drawings along with catalog cuts, templates, and erection and installation details, as appropriate. Submittals shall be complete in detail; shall indicate thickness, type, grade, class of metal, and dimensions; and shall show construction details, reinforcement, anchorage, and installation with relation to the building construction.
- C. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."



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- B. Comply with NFPA 70.

## PART 2 - PRODUCTS

### 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cooper B-Line, Inc.; a division of Cooper Industries.
    - b. ERICO International Corporation.
    - c. Thomas & Betts Corporation.
    - d. Unistrut; Tyco International, Ltd.
  2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  5. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Hilti Inc.
      - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      - 3) MKT Fastening, LLC.
      - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.



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2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
  - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
    - 2) Hilti Inc.
    - 3) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

### 2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

### 2.3 COATINGS

- A. Provide products for use indoors protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic.
- B. Provide products for use outdoors or in damp or corrosive indoor locations with hot-dip galvanized coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic.

### 2.4 RACEWAY SUPPORTING DEVICES

- A. Provide supports as described below for the installation of raceway systems.
- B. Use pressed steel, single bolt hangers to support individual RGS, IMC or EMT conduit runs from threaded rods or beam clamps. Manufacturer: Steel City "6H Series".
- C. For individual runs of EMT up to 1-inch trade size above accessible ceilings, use spring steel conduit clips with positive snap closure. Manufacturer: ERICO CADDY "M Series".



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- D. Use malleable iron conduit clamps to secure individual RGS, IMC or EMT conduit runs across, parallel, or perpendicular to beams, channels and angle supports. Manufacturer: Steel City "RC, EC, and PC Series".
- E. Use two-piece carbon steel riser clamps for individual vertical conduits passing through floors. Manufacturer: Kindorf "C-210 Series".
- F. Use snap-on type one-hole steel straps to secure individual conduits up to 2-inch trade size to flat, dry interior surfaces. Manufacturer: T&B "1210 Series" for RGS and IMC and "4100 Series" for EMT.
- G. Use one-hole malleable iron straps to secure individual conduits up to 4-inch trade size to flat, dry interior surfaces. Manufacturer: T&B "1275 Series".
- H. Use one-hole malleable iron straps and conduit spacers to secure individual conduits to flat exterior or damp flat interior surfaces. Manufacturer: T&B "1275 Series" straps with 1350 Series" spacers.
- I. Support multiple parallel horizontal conduits with trapeze hangers fabricated from framing channel materials specified below.

### 2.5 OUTLET BOX SUPPORTING DEVICES

- A. Provide pre-fabricated sheet steel brackets to support outlet boxes from metal studs in dry-wall construction.
- B. Provide brackets for single-outlet boxes that are inset to allow for dry-wall ring and have a far-side support leg. Manufacturer: ERICO CADDY "H Series".
- C. Provide brackets for multiple outlet boxes that are inset to allow for dry-wall rings and span from stud to stud. Manufacturer: ERICO CADDY "RBS Series".

### 2.6 FASTENERS

- A. Provide fasteners of the types, materials, and construction features as follows:
  - 1. Pre-set concrete inserts:
    - a. Continuous inserts: Design load 2000 lbs per ft of insert length with safety factor of five (5) in 3000 psi concrete. Manufacturer: B-Line "B221"
    - b. Spot inserts: NRTL-listed with design load of 1000 lb. Manufacturer: B-Line "B2506"
    - c. Metal deck bolts: Adjustable with bolt sizes from 3/8 inch to 3/4 inch. Manufacturer: B-Line "B3019"
  - 2. Expansion anchors: NRTL listed carbon steel wedge type studs. Manufacturer: Hilti "Kwik Bolt III". Note restrictions on use of expansion bolts in Part 3 of this Section.
  - 3. Toggle bolts: All steel-spring head type.
  - 4. Masonry screw anchors: Case hardened steel. Manufacturer: Hilti "Kwik-Con II".
  - 5. Powder-Driven Threaded Studs: Heat-treated steel, designed for the intended service. Note restrictions on use of powder-driven fasteners in Part 3 of this Section.



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6. Beam clamps: NRTL-listed, or compliant with Federal Specification WW-H-171E, or compliant with Manufacturers' Standardization Society SP-69 and SP-58.

### 2.7 FRAMING CHANNEL SYSTEMS

- A. Provide U-channel framing systems that conform to the Metal Framing Manufacturers' Association standards publication MFMA-4 and are fabricated using minimum 12-gage steel, with 9/16-inch-diameter holes, from 1-1/2 to 1-7/8 inches on center, in the surface opposite the "U" opening.
- B. Provide fittings and accessories that mate and match with U-channel and are of the same manufacturer. Use two-piece, single bolt type conduit straps on U-channel supports.
- C. Manufacturers: Unistrut, B-Line, Superstrut.

### 2.8 FABRICATED SUPPORTING DEVICES

- A. Provide shop- or field-fabricated supports or manufactured supports assembled from U-channel components.
- B. Provide steel brackets fabricated from angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

### 2.9 SLEEVES AND SEALS

- A. Provide pipe sleeves of one of the following:
  1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snap-lock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:
    - a. 3-inch and smaller: 20-gage.
    - b. 4-inch to 6-inch: 16-gage.
    - c. over 6-inch: 14-gage.
  2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe two pipe sizes larger than the penetrating raceway.
  3. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe two pipe sizes larger than the penetrating raceway.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Locate each item of rigid electrical equipment entirely on one side only of a building expansion joint.



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- B. Piping, cable trays, etc., which cross an expansion joint to rigid electrical equipment, shall have flexible joints that are capable of accommodating calculated thermal and seismic displacements.
- C. Conform to manufacturer's instructions and recommendations for selection and installation of hangers, and supports.
- D. Do not use wire or perforated strap for permanent electrical supports.
- E. Attach each item of electrical equipment as shown.
- F. Provide and install electrical conduit, busways, cable trays, etc. which cross an expansion joint to rigid electrical equipment, with flexible joints as shown.
- G. Do not support conduits, busways, cable trays, etc. from ceiling suspension wires.

### 3.2 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.
  - 2. Support three or more parallel runs of horizontal raceways together on trapeze hangers.
  - 3. Do not support conduits from ceiling suspension wires.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

### 3.3 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.



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- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
  2. To New Concrete: Bolt to concrete inserts.
  3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  4. To Existing Concrete: Expansion anchor fasteners.
  5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
  7. To Light Steel: Sheet metal screws.
  8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### 3.4 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

### 3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 09 for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29



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SECTION 26 05 33  
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

**PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Conduits and fittings
- B. Outlet boxes
- C. Pull and junction boxes
- D. Surface metal raceways
- E. Wireway

1.2 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.4 RECEIVING, STORING, AND PROTECTING

- A. Receive, store, and protect, and handle products according to NECA 1 – *Standard Practices for Good Workmanship in Electrical Construction*.

**PART 2 - PRODUCTS**

2.1 COATINGS

- A. Provide products with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic that is suitable for the environment in which the product will be installed and used.



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- 2.2 INTERMEDIATE METAL CONDUIT AND FITTINGS (IMC)
- A. Furnish intermediate metal conduit (IMC) that meets the requirements of UL1242 – *Intermediate Metal Conduit*, ANSI C80.6 – *Electrical Intermediate Metal Conduit (EIMC)*.
  - B. Furnish zinc-plated, threaded, malleable iron fittings and conduit bodies that meet the requirements of UL514B – *Fittings for Conduit and Outlet Boxes*, and ANSI/NEMA FB1 – *Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies*.
- 2.3 RIGID METAL CONDUIT AND FITTINGS (RMC)
- A. Furnish rigid metal conduit (RMC) that meets the requirements of UL6 – *Rigid Metal Electrical Conduit*, NEMA C80.1 – *Electrical Rigid Steel Conduit (ERSC)*.
  - B. Furnish zinc-plated, threaded, malleable iron fittings and conduit bodies that meet the requirements of UL514B and ANSI/NEMA FB1.
- 2.4 PLASTIC-COATED STEEL CONDUIT AND FITTINGS
- A. Furnish PVC exterior coated, urethane interior coated, RMC or IMC that meets the requirements of NEMA RN 1 – *PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit*.
  - B. Use factory-fabricated elbows.
  - C. Furnish 40 mil PVC exterior coated, urethane interior coated, zinc-plated, threaded, malleable iron fittings and conduit bodies meeting the requirements of UL514B – *Fittings for Conduit and Outlet Boxes* and NEMA RN 1 PVC.
- 2.5 RIGID NON-METALLIC CONDUIT AND FITTINGS (RNC)
- A. Furnish rigid non-metallic conduit (RNC) that meets the requirements of UL651 – *Schedule 40 and 80 Rigid PVC Conduit*, NEMA TC 2 – *Electrical Plastic Tubing and Conduit*.
  - B. Furnish non-metallic, solvent-welded socket fittings that meet the requirements of UL514C – *Non-Metallic Fittings for Conduit and Outlet Boxes*, and NEMA TC 3 – *PVC Fittings for Use with Rigid PVC Conduit and Tubing*.
- 2.6 ELECTRICAL METALLIC TUBING AND FITTINGS (EMT)
- A. Furnish galvanized electrical metallic tubing (EMT) that meets the requirements of UL797 – *Electrical Metallic Tubing*, NEMA C80.3 – *Steel Electrical Metallic Tubing (EMT)*.
  - B. Furnish compression or set-screw type fittings that meet the requirements of UL514B – *Fittings for Conduit and Outlet Boxes*, and ANSI/NEMA FB1 – *Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies*. Furnish insulated throat connectors.



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### 2.7 FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Furnish galvanized steel flexible metal conduit that meets the requirements of UL1 – *Flexible Metal Electrical Conduit*.
- B. Furnish zinc-plated malleable iron fittings that meet the requirements of UL514B – *Fittings for Conduit and Outlet Boxes*, and ANSI/NEMA FB1 – *Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies*. Furnish insulated throat connectors.

### 2.8 LIQUID-TIGHT FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Furnish liquid-tight flexible metal conduit that meets the requirements of UL360 – *Liquid-Tight Flexible Steel Conduit, Electrical*.
- B. Furnish zinc-plated malleable iron or zinc-plated steel liquid-tight fittings that meet the requirements of UL514B – *Fittings for Conduit and Outlet Boxes*, and ANSI/NEMA FB1 – *Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies*. Furnish insulated throat connectors.

### 2.9 INSULATING BUSHINGS

- A. Provide NRTL listed insulating bushings with 105 °C rated insulation.
- B. Manufacturer: O-Z/Gedney, Type IB.

### 2.10 GROUNDING BUSHINGS

- A. Provide NRTL listed, galvanized malleable iron, 150°C rated insulated throat grounding bushings with lay-in type ground cable lugs.
- B. Manufacturer: O-Z/Gedney, Type BLG.

### 2.11 EXPANSION FITTINGS

- A. Furnish NRTL listed expansion fittings with hot dipped galvanized malleable iron body, factory installed packing and a bonding jumper.
- B. Manufacturer: O-Z/Gedney, Type AX, TX or EXE with Type BJ bonding jumper.

### 2.12 CORROSION PROTECTION TAPE

- A. Furnish pressure-sensitive, 10 mil thick. PVC based tape for corrosion protection of metal conduit and fittings.
- B. Manufacturer: 3M, Type 50.



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### 2.13 RACEWAY MEASURING TAPE

- A. Furnish raceway measuring tape with permanently printed measurements in one-foot increments and minimum 1200 lb average breaking strength.
- B. Manufacturer: Greenlee "39243".

### 2.14 SURFACE METAL RACEWAY

- A. Furnish surface metal raceway that meets the requirements of UL5 – *Surface Metal Electrical Raceways and Fittings*.
- B. Furnish surface metal raceway fabricated from cold rolled galvanized steel with a thickness of not less than 0.040 inches and coated with a baked enamel finish.
- C. Furnish fittings required for a complete installation.
- D. Manufacturer: Wiremold "500" or "700" series.

### 2.15 OUTLET BOXES

- A. Provide outlet boxes selected for specific installations using the guidance in NEMA OS 3, *Selection and Installation Guidelines for Electrical Outlet Boxes*, and the requirements of this Section.
- B. For dry locations provide galvanized steel outlet boxes that comply with UL Standard 514-A – *Metallic Outlet Boxes* and ANSI/NEMA OS1 – *Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports*.
  - 1. For luminaire outlets use 4 inch x 1-1/2 inch deep octagonal boxes with fixture stud attachment as required to support luminaires.
  - 2. For flush outlets in stud walls or above-grade cast-in-place concrete walls use 4 inch square x 1-1/2 inch deep boxes; provide deeper boxes or multiple gang boxes as required to fit devices. Provide raised device covers that match the thickness of the wallboard and the number of devices. Provide supplemental box supports to prevent movement of the box.
  - 3. For flush outlets in above-grade masonry walls use masonry boxes with conduit knockouts. Provide boxes with depth suitable for the masonry unit size. Provide multiple gang boxes as required by the number of devices.
  - 4. For surface outlet boxes in EMT raceway systems, use 4 inch x 2-1/8 inch deep square boxes. Provide deeper boxes or multiple gang boxes as required to fit devices. Provide square surface covers that match the installed device and have not less than two holes for securing the device to the cover.
- C. For damp or wet locations and for surface-mounted RMC or IMC raceway systems, provide outlet boxes that comply with UL Standard 498 and 514, ANSI/NEMA FB1.
  - 1. For lighting fixture outlets use 4 inch x 2-1/16 inch deep round cast malleable iron boxes with threaded hubs.
  - 2. For flush or surface wall-mounted outlets, use 4-11/16 square, 2-11/16 inch deep cast malleable iron boxes with threaded hubs. Provide multiple gang boxes as required to fit devices. Provide gasketed cast malleable iron or cast copper-free aluminum covers that



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match the installed device and have not less than two holes for securing the device to the cover.

### 2.16 PULL AND JUNCTION BOXES

- A. For dry locations in clean, non-contamination environments use galvanized sheet steel pull and junction boxes that comply with UL Standard 50 Type 1 and the NEC as to size and construction. Use boxes not less than 4 inches square x 1-1/2 inches deep with screw-secured covers. Provide larger boxes as required by the number and size of conduits and conductors.
- B. For dry locations in dusty or possible contamination (e.g. beryllium, explosives, or uranium) environments use galvanized steel pull and junction boxes that comply with UL Standard 50 Type 12 and the NEC as to size and construction. Use boxes not less than 6 inches square x 4 inches deep with gasketed covers. Provide larger boxes as required by the number and size of conduits and conductors.
- C. For damp or wet, non-corrosive locations, in conduit runs up to 3/4 inch trade size, provide 4-11/16 inches square, 2-11/16 inches deep cast malleable iron pull and junction boxes with threaded hubs and gasketed cast malleable iron or cast copper-free aluminum covers.
- D. For damp or wet, non-corrosive locations, in conduit runs 1 inch trade size and larger, provide galvanized sheet-steel pull and junction boxes and covers that comply with UL 50 Type 3R.
- E. For damp or wet, non-corrosive locations that are subject to hose-directed water, provide pull and junction boxes and covers that comply with UL 50 Type 4.
- F. For damp or wet, corrosive locations provide pull and junction boxes and covers that comply with UL 50 Type 4X.
- G. For locations subject to occasional submersion provide pull and junction boxes and covers that comply with UL 50 Type 6.
- H. Provide connection points for equipment grounding conductors in each box.

### **PART 3 - EXECUTION**

#### 3.1 GENERAL

- A. Install complete systems of raceways and boxes for wiring systems.
- B. Install raceways and boxes according to NECA 1 Standard Practices for Good Workmanship in Electrical Construction, NECA 101 Standard for Installing Steel Conduits (Rigid, IMC, EMT), NECA 111 Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC), the NEC, the manufacturer's instructions, and requirements in this Section.
- C. Raceway termination points and box locations shown on the Drawings are in approximate locations unless dimensioned. Verify locations before rough-in.



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- D. Raceway routing is shown on the Drawings in approximate locations unless dimensioned. Coordinate routing with structure and with work of other trades. Route as required for a complete wiring system.
- E. Ground and bond raceways and boxes as required in Section 260526 Grounding and Bonding for Electrical Systems.
- F. Support raceways and boxes in accordance with the requirements of Section 260529 Hangers and Supports for Electrical Systems and the NEC.
- G. Identify raceways and boxes as required in Section 260553, Identification for Electrical Systems.
- H. Arrange raceway and boxes to maintain headroom and present neat appearance.
- I. Install knockout closures in unused openings in boxes or raceways.

### 3.2 CONDUIT INSTALLATION

- A. For low-voltage wiring systems (less than 600 volts) use conduit materials according to the NEC and the following:
  - 1. Outdoors - underground:
  - 2. Direct buried: Use RNC, plastic-coated RMC, tape-wrapped RMC, or tape-wrapped IMC. Do not use RNC where subject to physical damage. Install with 24 inches minimum cover from top of conduit to finished grade or top of paving.
    - a. Concrete encased: Use RNC, plastic-coated RMC, RMC, or IMC for concrete encased underground work. Install with 24 inches minimum cover from top of encasement to finished grade or paving.
  - 3. Outdoors - exposed: Use RMC or IMC.
  - 4. Outdoor corrosive locations (including cooling towers): Use plastic-coated RMC and fittings.
  - 5. Outdoors - concealed: Use RMC or IMC for concealed outdoor work. Do not use bare RMC or IMC in direct contact with earth. EMT may be used for concealed outdoor work where not in contact with earth, not encased in concrete, and where not exposed to deteriorating agents.
  - 6. Indoors – exposed outside of designated electrical rooms or telecommunications rooms:
    - a. Located less than 8 ft above the floor: Use RMC or IMC.
    - b. Exposed to severe physical damage: Use RMC or IMC.
    - c. Exposed to moisture: Use RMC or IMC.
    - d. Exposed to corrosives: Use plastic-coated RMC and fittings.
    - e. Located more than 8 ft above the floor, not exposed to deteriorating agents, and not subject to severe physical damage: Use RMC, IMC, or EMT.
  - 7. Indoors – concealed:
    - a. Within drywall partitions and above false ceilings: Use RMC, IMC, or EMT.
    - b. Within masonry or cast-in-place concrete walls or floors: Use RMC or IMC.
    - c. Direct-buried under building floor slabs on grade: Use RNC, plastic-coated RMC, tape-wrapped RMC, or tape-wrapped IMC. Locate top of conduits not less than 12 inches below the bottom of the concrete slab. Install warning tape approximately 6



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- inches above the conduits; install multiple warning tapes above parallel conduit runs wider than 18 inches.
- d. Concrete encased under building floor slabs on grade: Use RNC, plastic-coated RMC, RMC, or IMC. Locate top of concrete encasement not less than 12 inches below the bottom of the concrete slab. Install warning tape approximately 6 inches above the concrete encasement; install multiple warning tapes above concrete encasements wider than 24 inches.
8. Connection to vibrating equipment (including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment) - Use a minimum of 18 inches; maximum length as determined by the NEC:
    - a. Outdoors: Use liquidtight flexible metal conduit.
    - b. In mechanical rooms: Use liquidtight flexible metal conduit.
    - c. Wet, damp, or corrosive indoor locations: Use liquidtight flexible metal conduit.
    - d. Dry indoor locations: Use flexible metal conduit.
  9. Connections to luminaires: Use 3/8 inch flexible metal conduit or metal-clad cable in 6 foot maximum lengths for tap conductors to luminaires above suspended ceilings.
- B. Use 3/4-inch or larger conduit to enclose multiple conductors larger than 12 AWG.
- C. Conceal conduits, unless otherwise indicated on the Drawings, with finished walls, floors and ceilings. Unless otherwise indicated on the Drawings, install concealed conduits with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions.
- D. Position parallel underground conduits with not less than 7-1/2 inches center-to-center separation.
- E. Install expansion fittings where embedded conduits cross building expansion joints.
- F. Use conduit hubs to fasten conduit to boxes in damp and wet locations.
- G. Use sealing locknuts, hubs, or similar water-resistant fittings on conduits entering the top of switchgear, switchboards, motor control centers, panelboards, cabinets, pull boxes, and similar enclosures that are exposed in structures with automatic fire sprinkler systems.
- H. Install insulating bushings or connectors with an insulated throat to protect conductors or cables at conduit terminations.
- I. Install conduits with the following limits of bends and distance between pull points:
1. 50 ft with 3 equivalent 90 degree bends.
  2. 100 ft with 2 equivalent 90 degree bends.
  3. 150 ft with 1 equivalent 90 degree bend.
  4. 200 ft straight run with no bends.
  5. Provide large sweep radius elbows for 90 degree elbows (minimum) unless otherwise noted.
- J. Stub-Up Connections:



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1. Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs, and set flush with the finished floor or equipment pad.
  2. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches above the floor.
  3. Where equipment connections are not made under this Subcontract, install threaded insert plugs set flush with the floor.
- K. Install conduit sealing fittings according to the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with NRTL-listed conduit sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:
1. Where conduits enter or leave NEC Class I hazardous locations.
  2. Where conduits pass from warm locations to cold locations, such as the boundaries of refrigerated spaces and air-conditioned spaces.
  3. Where conduits go between areas where air pressure differential must be maintained.
  4. Where conduits enter an enclosure protected by a clean agent total flooding fire suppression system.
  5. Where otherwise required by the NEC.
- L. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduits dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- M. Install plastic-coated RMC and fittings according to the NEC and manufacturer's instructions. Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.
- N. Do not use RNC 90 degree elbows larger than 2 inch trade size; use plastic-coated RMC, tape-wrapped RMC, or tape-wrapped IMC for 2-1/2 inch trade size and larger 90 degree elbows.
- O. Maintain the following minimum clearances between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C):
1. 6" at perpendicular crossings.
  2. 12" between parallel runs.
- P. Avoid moisture traps in conduit system; provide junction boxes with drain fitting at low points in conduit system.
- Q. Install corrosion protection tape on metal conduits and fittings in contact with soil using half-lapped wrappings.
- R. Install grounding bushings at the following locations:
1. At every entry to enclosures on metallic conduits containing circuits rated 100 amperes and higher.
  2. On metallic conduits entering enclosures through concentric, eccentric or oversize knockouts.
  3. On metallic conduits that terminate to a metallic enclosure without effective electrical connection such as locknuts or threaded bushings.



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- S. Install conduit measuring tape in empty raceways. Leave not less than 12 inches of slack at each end of the tape. Secure each end of tape.
- T. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
  - 1. Run parallel or banked raceways together on common supports.
  - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- U. Join raceways with fittings designed and approved for that purpose and make joints tight.
  - 1. Use insulating bushings to protect conductors.
- V. Tighten set screws of threadless fittings with suitable tools.
- W. Terminations:
  - 1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
  - 2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- X. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where otherwise required by NFPA 70.
- Y. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

### 3.3 OUTLET BOX INSTALLATION

- A. Install outlet boxes with centers at the following heights unless noted otherwise on the Drawings:
  - 1. Receptacle, telephone and data outlets:
    - a. Common Areas (such as conference and break rooms): 18 inches above finished floor.
    - b. Offices and Workstations: 18 inches above finished floor.
  - 2. Receptacle, telephone and data outlets at lab benches and counters -- center 44 inches maximum above finished floor; coordinate locations to be above, or completely within, bench and counter backsplashes.
  - 3. Light switches: center 48 inches above finished floor and within 6 inches of door frame.



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4. Thermostats: center 48 inches above finished floor.
  5. Wall mounted emergency lights: 80 inches above finished floor or 12 inches below the ceiling; whichever is lower.
- B. Coordinate outlet box locations with modular furniture and associated hangers.
- C. Where the Drawings show outlets as adjacent, align outlet boxes with each other and group them symmetrically.
- D. Orient boxes to accommodate wiring devices oriented as specified in Section 262726 Wiring Devices.
- E. Install a multi-gang box where more than one device is mounted together. Do not use sectional type boxes.
- F. Install box with plaster ring for single or multiple device outlets.
- G. Use flush mounted outlet boxes in finished areas.
1. Install flush outlet boxes and fittings in walls and ceilings so that front edge is flush with the finished surface. Repair broken wall or ceiling surfaces so no gaps or open spaces exceed 1/8 inch at the edge of boxes or fittings.
  2. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
  3. Do not install flush mounting boxes back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.
  4. Secure flush mounting boxes to interior wall and partition studs. Accurately position to allow for surface finish thickness.
  5. Install stamped steel bridges to fasten multiple flush mounting outlet boxes between studs.
  6. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- H. Install adjustable steel channel fasteners for hung ceiling outlet box.
- I. Do not fasten boxes to ceiling support wires or other piping systems.
- J. Support boxes independently of conduit.
- K. Install partitions in boxes as follows:
1. Between 277 volt devices.
  2. Between 277 volt light switches devices and 120 volt devices.
  3. Between either 120 volt or 277 volt devices and low voltage control switches.
- L. Install a blank cover plate on each outlet box in which no device is installed.
- 3.4 PULL AND JUNCTION BOX INSTALLATION
- A. Install pull and junction boxes as shown on the Drawings and as required for splices, taps, wire pulling, and compliance with regulatory requirements.



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- B. Install indoor pull and junction boxes in accessible locations above accessible ceilings and in unfinished spaces. Position boxes so covers can be removed. Place boxes to maintain headroom.
- C. Install a concrete collar around handholes not placed in sidewalks or pavement.

### 3.5 WIREWAY INSTALLATION

- A. Install wireways at locations indicated on the Drawings.
- B. Mount plumb and level.

### 3.6 SURFACE METAL RACEWAY INSTALLATION

- A. Install surface metal raceway at locations indicated on the Drawings.
- B. Use flat-head screws, clips, and straps to fasten raceway channel to surfaces.
- C. Mount plumb and level.

### 3.7 ADJUSTING

- A. Adjust flush-mounted outlets to make front flush with finished floor, wall, or ceiling material.
- B. Install knockout closures in unused openings in boxes.

### 3.8 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
- C. Repair damage to paint or PVC finishes with matching touch-up coating recommended by the manufacturer.

### 3.9 FIELD QUALITY CONTROL

- A. Provide final protection and maintain conditions to ensure that coatings and finishes are without damage or deterioration at final inspection.

### 3.10 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.



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- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- G. Raceways Embedded in Slabs:
  - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
  - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
  - 3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- H. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- I. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 24 inches of slack at each end of pull wire.
- J. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where otherwise required by NFPA 70.
- K. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
  - 1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
    - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
    - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
    - c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
    - d. Attics: 135 deg F temperature change.
  - 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
  - 3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.



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- L. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

3.11 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified.
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified.
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
  - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
  - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

END OF SECTION 26 05 33



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SECTION 26 05 53  
IDENTIFICATION FOR ELECTRICAL SYSTEMS

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section Includes:
1. Identification for raceways.
  2. Identification of power and control cables.
  3. Identification for conductors.
  4. Warning labels and signs.
  5. Instruction signs.
  6. Equipment identification labels.
  7. Miscellaneous identification products.

1.2 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

**PART 2 - PRODUCTS**

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
1. Black letters on an orange field.
  2. Legend: Indicate voltage and system.



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- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Write-On Tags: Polyester tag, 0.015 inch (0.38 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

### 2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Colors for Raceways Carrying Circuits at 600 V and Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage and system.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

### 2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Write-On Tags: Polyester tag, 0.015 inch (0.38 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.



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- D. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

### 2.4 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- D. Write-On Tags: Polyester tag, 0.015 inch (0.38 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

### 2.5 FLOOR MARKING TAPE

- A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.
  - 1. Manufacturer: 3M Safety Stripe Tape 5700.

### 2.6 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Baked-Enamel Warning Signs:
  - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
  - 2. 1/4-inch grommets in corners for mounting.
  - 3. Nominal size, 7 by 10 inches.
- D. Metal-Backed, Butyrate Warning Signs:



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1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

### 2.7 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
1. Engraved legend with black letters on white face.
  2. Punched or drilled for mechanical fasteners.
  3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

### 2.8 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.
- B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- C. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

### 2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in Division 9 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.



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### 2.10 OUTLET LABELS

- A. See Section 262726, Part 3.2 for all device labeling details. Submit details to Engineer prior to placing order.
- B. Provide black, 10 point minimum size lettering on a white background.

## **PART 3 - EXECUTION**

### 3.1 INSTALLATION

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas. Color coding should be the same as the junction box color coding below.
- F. Painted Identification: Comply with requirements in Division 9 painting Sections for surface preparation and paint application.
- G. Install all signs and labels plumb and neatly on all equipment and wiring.
- H. Color Coding of Junction Boxes: Paint junction boxes inside and out before installation of the systems listed below:
  - 1. Apply the following colors to the systems listed below:
    - a. Fire Alarm System: Bright Red.
    - b. Intercom: Yellow.
    - c. TV: Green.
    - d. Security System: Orange
    - e. Emergency Power: Red
    - f. Telecommunication System: White
    - g. Energy Management System: Purple or as per Owner.
    - h. 480V Power: Blue
    - i. 208V Power: Black



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3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Install labels at 10-foot (3-m) maximum intervals.
- B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
  - 1. Emergency Power.
  - 2. Power.
  - 3. UPS.
- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
    - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
    - b. Colors for 208/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
    - c. Colors for 480/277-V Circuits:
      - 1) Phase A: Brown.
      - 2) Phase B: Orange.
      - 3) Phase C: Yellow.
    - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- E. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.



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- G. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metal-backed, butyrate warning signs.
  - 1. Comply with 29 CFR 1910.145.
  - 2. Identify system voltage with black letters on an orange background.
  - 3. Apply to exterior of door, cover, or other access.
  - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.
- I. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer or load shedding.
- K. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
  - 1. Labeling Instructions:
    - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
    - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label 4 inches (100 mm) high.
    - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

### 3.3 OUTLET LABELS

- A. Outlet label shall be visible on outside of device cover for each receptacle outlet and light switch (all device cover plates).

END OF SECTION 26 05 53



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SECTION 26 09 23  
LIGHTING CONTROL DEVICES

**PART 1 - GENERAL**

1.1 SUMMARY

- A. This Section includes the following lighting control devices:
  - 1. Outdoor photoelectric switches.
- B. See Division 262726 Section "Wiring Devices" for manual light switches.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.4 COORDINATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, and partition assemblies.

**PART 2 - PRODUCTS**

2.1 OUTDOOR PHOTOELECTRIC SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Area Lighting Research, Inc.; Tyco Electronics.
  - 2. Intermatic, Inc.
  - 3. Novitas, Inc.
  - 4. Watt Stopper (The).



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- B. Description: Solid state, with DPST dry contacts rated for 1800-VA tungsten or 1000-VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A.
1. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of photocell to prevent fixed light sources from causing turn-off.
  2. Time Delay: 15-second minimum, to prevent false operation.
  3. Surge Protection: Metal-oxide varistor, complying with IEEE C62.41.1, IEEE C62.41.2, and IEEE 62.45 for Category A1 locations.
  4. Mounting: Twist lock complying with IEEE C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.

**PART 3 - EXECUTION**

**3.1 SENSOR INSTALLATION**

- A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

**3.2 WIRING INSTALLATION**

- A. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- B. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- C. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

**3.3 IDENTIFICATION**

- A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."
1. Identify circuits or luminaries controlled by photoelectrics at each sensor.
- B. Label switches with a unique designation.

**3.4 FIELD QUALITY CONTROL**

- A. Perform the following field tests and inspections and prepare test reports:
1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.



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2. Operational Test: Verify operation of each lighting control device, and adjust time delays.
- B. Lighting control devices that fail tests and inspections are defective work.

END OF SECTION 26 09 23



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SECTION 26 27 26  
WIRING DEVICES

**PART 1 - GENERAL**

1.1 SUMMARY

- A. This Section includes the following:
1. Receptacles, receptacles with integral GFCI, and associated device plates.
  2. Wall-switches.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- C. Samples: One for each type of device and wall plate specified, in each color specified.
- D. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.4 RECEIVING, STORING, AND PROTECTING

- A. Receive, store, and protect, and handle products according to NECA 1, *Standard Practices for Good Workmanship in Electrical Construction*.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
  2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
  3. Leviton Mfg. Company Inc. (Leviton).
  4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).



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### 2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 5351 (single), 5352 (duplex).
    - b. Hubbell; HBL5351 (single), CR5352 (duplex).
    - c. Leviton; 5891 (single), 5352 (duplex).
    - d. Pass & Seymour; 5381 (single), 5352 (duplex).

### 2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; GF20.
    - b. Pass & Seymour; 2084.

### 2.4 WALL SWITCHES

1. Single and two pole: Provide hard, use specification grade, recess mounted single and two pole quiet toggle switches, 20 ampere, 120/277 volts ac. provide with mounting yoke insulated from mechanism, plaster ears, switch handle, and side-wired screw terminals.

### 2.5 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
1. Plate-Securing Screws: Metal with head color to match plate finish.
  2. Material for Finished Spaces: 0.035-inch- thick, satin-finished stainless steel.
  3. Material for Unfinished Spaces: Galvanized steel.
  4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover.

### 2.6 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.



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1. Wiring Devices Connected to Normal Power System: As selected by Architect, unless otherwise indicated or required by NFPA 70 or device listing.
2. Wiring Devices Connected to Emergency Power System: Red.
3. TVSS Devices: Blue.

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
  1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
  2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
  2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
  4. Existing Conductors:
    - a. Cut back and pigtail, or replace all damaged conductors.
    - b. Straighten conductors that remain and remove corrosion and foreign matter.
    - c. Pigtailling existing conductors is permitted provided the outlet box is large enough.
- D. Device Installation:
  1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
  2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
  4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
  5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
  6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.



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7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
10. Adjust devices and wall plates to be flush and level.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

### 3.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles, Switches and all other device cover plates: Identify panelboard and circuit number from which served. Use factory applied hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes. No field installation methods are permitted.

### 3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.

END OF SECTION 26 27 26



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SECTION 26 28 13  
FUSES

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section Includes: Cartridge fuses rated 600-V ac and less for use in control circuits, enclosed switches, panelboards, switchboards and enclosed controllers.
- B. SUBMITTALS
- C. Product Data: For each type of product indicated.
- D. Operation and maintenance data.

1.2 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA FU 1 for cartridge fuses.
- C. Comply with NFPA 70.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Cooper Bussmann, Inc.
  - 2. Edison Fuse, Inc.
  - 3. Ferraz Shawmut, Inc.
  - 4. Littelfuse, Inc.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.



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**PART 3 - EXECUTION**

3.1 FUSE APPLICATIONS

- A. Service Entrance: Class RK1, time delay.
- B. Feeders: Class RK1, fast acting.
- C. Motor Branch Circuits: Class RK5, time delay.
- D. Other Branch Circuits: Class J, fast acting.
- E. Control Circuits: Class CC, fast acting.

3.2 INSTALLATION

- A. Install fuses in fusible devices, not until equipment is ready to be energized. Arrange fuses so rating information is readable without removing fuse.

3.3 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block and holder.

END OF SECTION 26 28 13



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SECTION 26 51 00  
INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Interior lighting fixtures, lamps, and ballasts.
  - 2. Lighting fixture supports.
- B. See Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.2 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes.
- B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.
- C. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.
- D. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.4 RECEIVING, STORING AND PROTECTING

- A. Receive, store, and protect, and handle products according to NECA 1- Standard Practices for Good Workmanship in Electrical Construction.



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## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In Interior Lighting Fixture Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified on drawings.

### 2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.
- C. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.
- D. Metal Parts: Free of burrs and sharp corners and edges.
- E. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- G. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
1. White Surfaces: 85 percent.
  2. Specular Surfaces: 83 percent.
  3. Diffusing Specular Surfaces: 75 percent.
  4. Laminated Silver Metalized Film: 90 percent.
- H. Plastic Diffusers, Covers, and Globes:
1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
    - a. Lens Thickness: At least 0.125 inch minimum unless different thickness is indicated.
    - b. UV stabilized.
  2. Glass: Annealed crystal glass, unless otherwise indicated.



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### 2.3 BALLASTS

- A. Electronic Ballasts for Linear Fluorescent Lamps: Comply with ANSI C82.11; instant-start type, unless otherwise indicated, and designed for type and quantity of lamps served. Ballasts shall be designed for full light output unless dimmer or bi-level control is indicated.
1. Sound Rating: A.
  2. Total Harmonic Distortion Rating: Less than 10 percent.
  3. Transient Voltage Protection: IEEE C62.41, Category A or better.
  4. Operating Frequency: 20 kHz or higher.
  5. Lamp Current Crest Factor: 1.7 or less.
  6. BF: 0.85 or higher.
  7. Power Factor: 0.98 or higher.
- B. Ballasts for Compact Fluorescent Lamps: Electronic programmed rapid-start type, complying with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:
1. Lamp end-of-life detection and shutdown circuit.
  2. Automatic lamp starting after lamp replacement.
  3. Sound Rating: A.
  4. Total Harmonic Distortion Rating: Less than 20 percent.
  5. Transient Voltage Protection: IEEE C62.41, Category A or better.
  6. Operating Frequency: 20 kHz or higher.
  7. Lamp Current Crest Factor: 1.7 or less.
  8. BF: 0.95 or higher, unless otherwise indicated.
  9. Power Factor: 0.98 or higher.
  10. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for non consumer equipment.
- C. Electronic Ballast for Metal-Halide Lamps: Include the following features unless otherwise indicated:
1. Lamp end-of-life detection and shutdown circuit.
  2. Sound Rating: A.
  3. Total Harmonic Distortion Rating: Less than 15 percent.
  4. Transient Voltage Protection: IEEE C62.41, Category A or better.
  5. Lamp Current Crest Factor: 1.5 or less.
  6. Power Factor: .90 or higher.
  7. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for non consumer equipment.
  8. Protection: Class P thermal cutout.

### 2.4 LAMPS

- A. Low-Mercury Fluorescent Lamps: Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.
- B. T8 Rapid-Start low-mercury Fluorescent Lamps: Rated 25 W maximum, nominal length 48 inches (1220 mm), CRI 81 (minimum), color temperature 4100 K, and average rated life 20,000 hours, unless otherwise indicated.



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- C. T8 Rapid-Start low-mercury Fluorescent Lamps: Rated 17 W maximum, nominal length of 24 inches, 1300 initial lumens (minimum), CRI 81 (minimum), color temperature 4100 K, and average rated life of 20,000 hours, unless otherwise indicated.
- D. Compact Fluorescent Lamps: 4-Pin, low mercury, CRI 81 (minimum), color temperature 4100 K, average rated life of 10,000 hours at 3 hours operation per start, unless otherwise indicated.
  - 1. 13 W: T4, double or triple tube, rated 900 initial lumens (minimum).
  - 2. 18 W: T4, double or triple tube, rated 1200 initial lumens (minimum).
  - 3. 26 W: T4, double or triple tube, rated 1800 initial lumens (minimum).
  - 4. 32 W: T4, triple tube, rated 2400 initial lumens (minimum).
  - 5. 42 W: T4, triple tube, rated 3200 initial lumens (minimum).
  - 6. 55 W: T4, triple tube, rated 4300 initial lumens (minimum).
- E. Metal-Halide Lamps: ANSI C78.1372, with a minimum CRI 65, and color temperature 4000 K.
- F. Pulse-Start, Metal-Halide Lamps: Minimum CRI 65, and color temperature 4000 K.
- G. Ceramic, Pulse-Start, Metal-Halide Lamps: Minimum CRI 80, and color temperature 4000 K.

### 2.5 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 10 gage.
- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 10 gage.
- F. Rod Hangers: 1/4-inch minimum diameter, cadmium-plated, threaded steel rod.
- G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install interior lighting system in accordance with the NEC, manufacturer's instructions, approved shop drawings, and the following NECA National Electrical Installation Standards:



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1. NECA/IESNA 500, Recommended Practice for Installing Indoor Commercial Lighting Systems (ANSI)
  2. NECA/IESNA 502, Recommended Practice for Installing Industrial Lighting Systems (ANSI).
- B. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- C. Comply with NFPA 70 for minimum fixture supports.
- D. Suspended Lighting Fixture Support:
1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
  2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
  3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- E. Install in accordance with manufacturers instructions.
- F. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- G. Support all luminaires independent of ceiling framing.
- H. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- I. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prohibit movement.
- J. Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure.
- K. Install recessed luminaires to prevent removal from below.
- L. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- M. Install wall mounted luminaires, emergency lights, and exit signs at height as indicated on Drawings.
- N. Install accessories furnished with each luminaire.
- O. Connect luminaires, emergency lighting units and exit signs to branch circuit outlets.
- P. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions with luminaire.
- Q. Bond products and metal accessories to branch circuit equipment grounding conductor.
- R. Install specified lamps in each luminaire and exit sign.
- S. Fixtures are not to be used as a raceway unless stamped for use as raceway by Manufacturer. Single fixture in lay-in ceilings shall not be used for raceway and shall be connected to an outlet



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box located within 6'-0" of fixture with flexible 3/8" conduit or 3/8" MC cable. #14 THHN/THWN is acceptable for single fixture connections.

- T. Adjust aimable lighting fixtures to provide required light intensities.

### 3.2 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and re-transfer to normal.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

### 3.3 ADJUSTING AND CLEANING

- A. Align luminaires and clean lenses and diffusers at completion of work. Clean paint splatters, dirt, and debris from installed luminaires.
- B. Aim and adjust luminaires as indicated on Drawings or as directed by the A/E.
- C. Touch up luminaire finish at completion of work.

END OF SECTION 26 51 00