SECTION 220000-GENERAL PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Provisions of the General Conditions, Supplementary Conditions and Division 01 - General Requirements, and applicable provisions elsewhere in the Contract Documents apply to work of Division 22.

B. In case of disagreement between Drawings and Specifications, or within either document itself, obtain written clarification from the Mechanical Engineer through the Architect. Failure to obtain clarification prior to bid will result in the better quality and greater quantity being required during the construction phase without additional reimbursement.

1.2 DESCRIPTION OF SYSTEMS

A. The related work of Division 22 includes but is not limited to:

1. Section 220000 – General Plumbing Requirements.
2. Section 220010 – Plumbing Related Work.
5. Section 220700 – Plumbing Insulation.

1.3 DESCRIPTION OF WORK

A. Work Included: Unless specified otherwise, provide all supervision, labor, materials, transportation, equipment, hauling, and services necessary for a complete and operational mechanical system. Provide all incidental items such as offsets, fittings, etc. required as part of the work even though not specifically shown on Contract Drawings or Specifications.

B. Inspection: Inspect work proceeding or interfacing with work of Division 22 sections prior to submitting bid and report any known or observed defects that affect the Mechanical Design to the General Contractor. Do not proceed with the construction work until defects are corrected.

C. Existing Utilities are indicated as accurately as possible on the Drawings. If utilities are encountered and not indicated on Drawings, notify the Architect prior to proceeding with work.

1.4 UTILITIES, EXTENSIONS, CONNECTIONS AND FEES FOR WATER AND SEWER

A. Provide all services within the building to a point five (5) feet outside of building. Provide permanent marker at grade for other contractors’ location reference for connection purposes.

B. Provide all building services and connections to site utilities, as indicated on Drawings.
C. In the event that the serving utility company installs their own taps, service, meters, etc., all costs imposed by this action shall be paid for by the Owner. Extensions from termination points to connection with building services and systems will be the responsibility of the Division 22 Contractor.

D. Contractor shall be responsible for all pads, meter enclosures, valves and appurtenances, all in conformance with requirements of the serving utility company.

1.5 REFERENCES

A. General:

1. For products or workmanship specified by Association, Trade or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
2. The date of the standard is that which is in effect as of the date of the Contract Documents, except when a specific date is specified.

1.6 QUALITY CONTROL

A. Materials and apparatus required for the work shall be new and of first-class quality; to be furnished, delivered, erected, connected and finished in every detail; and to be so selected and arranged so as to fit properly into the building spaces.

B. Unless otherwise specifically indicated, equipment and materials shall be installed in accordance with the recommendations of the manufacturer. This includes the performance of tests as recommended by the manufacturer.

1.7 EXAMINATION OF CONTRACT DRAWINGS AND SPECIFICATIONS

A. The Mechanical Drawings show the general arrangement of piping, ductwork, mechanical equipment, and appurtenances, and shall be followed as closely as actual building construction and the work of other trades will permit.

B. The Architectural and Structural Drawings shall be considered part of the mechanical work insofar as these Drawings furnish this Division with information relating to design and construction of the building.

C. Field verify building dimensions governing mechanical work. Do not scale the Mechanical Drawings for dimensions. If field dimensions are not available take dimensions, measurements, locations, levels, etc. from the Architectural Drawings and the approved Shop Drawings submitted on the actual equipment to be furnished.

D. The Mechanical Contractor shall request of the Test and Balance (TAB) Contractor an early review of the Contract Documents for the purpose of identifying where proper balancing cannot be achieved. The report requirements are referred to in Division 23, Temperature Controls section, “Submittals.” Forward a copy of the report to the mechanical engineer for review. The Mechanical Contractor shall modify the system as recommended by the TAB Contractor or refer
unresolved issues to the Mechanical Engineer for resolution prior to ordering of ductwork and equipment. Unresolved balancing issues from untimely or incomplete application of these requirements will be the responsibility of the Mechanical Contractor to correct.

E. No extra compensation shall be claimed or allowed due to differences between the actual dimensions and those indicated on the Drawings.

F. Discrepancies: Examine Drawings and Specifications for other parts of the work, and if any discrepancies occur between the plans for the work of this Division and the plans for the work of others, report such discrepancies to the General Contractor and obtain written instructions for any changes necessary. Report any inconsistencies between the drawings and specifications and the installation requirements of equipment manufacturers.

G. Order of Precedence: The precedence of Mechanical Construction Documents is as follows:

1. Addenda and modifications to the Drawings and Specifications take precedence over the original Drawings and Specifications.
2. Should there be a conflict within the Specifications or within Drawings of the same scale, the more stringent or higher quality requirements shall apply.
3. In the Drawings, the precedence shall be figured dimensions over scaled dimensions and noted materials over graphic indications.
4. Should a conflict arise between the Drawings and the Specifications the most stringent shall have precedence.
5. Should there be a conflict in dimensions or locations between Mechanical Drawings and/or Architectural/Structural Drawings, the Architectural/Structural Drawings shall have precedence.

1.8 EXAMINATION OF PROJECT SITE

A. Examine site carefully to determine conditions to be encountered, work to be performed, equipment, materials to be transported, stored, furnished, and other features applicable to completion of the work.

B. Study Drawings and Specifications, report inconsistencies, errors, omissions or conflicts with codes and ordinances.

C. Submittal of bid will indicate satisfactory examination of the Documents have been made, and applicable allowances included in the bid.

1.9 REGULATORY REQUIREMENTS

A. Refer to Architectural Drawings and Division 01 specifications for a list of applicable codes.

B. Execute work per Underwriters, Public Utility, Local and State Codes, Ordinances and applicable regulations. Obtain and pay for required permits, inspections, and certificates. Notify Architect of items not meeting said requirements.

C. Comply with latest editions of all applicable codes, standards, ordinances and regulations in effect as of the date of the Contract Documents.
D. If discrepancies occur between the Contract Documents and any applicable codes, ordinances, acts, or standards, the most stringent requirements shall apply.

E. Where hourly fire and smoke ratings are indicated or required, whether or not shown, provide components and assemblies meeting requirements of the American Insurance Association, Factory Mutual Insurance Association and listed by Underwriters Laboratories, Inc.

1.10 COORDINATION

A. The Contractor shall plan all of his work in advance, and shall inform the General Contractor of the proposed construction schedule and anticipated completion date upon request. Contractor shall complete the entire installation as soon as the condition of the remaining building construction will permit.

B. Before purchase, fabrication, or installation of items, determine if the installation will properly fit and can be installed as contemplated without interference with structural elements or the work of other trades.

C. Locations of pipes, ducts, switches, panels, equipment, and fixtures, shall be adjusted to accommodate the work or interferences anticipated and encountered. Determine the exact route and location of each pipe and duct prior to fabrication.

D. Right of Way: Lines which pitch shall have the right-of-way over those which do not pitch. Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.

E. Offsets, transitions and changes in direction of pipes and ducts shall be made as required to maintain proper head room and pitch of sloping lines whether or not indicated on the Drawings.

F. Where major conflicts occur, contractor shall rely upon the Architect/Engineer to make final decision regarding priority of right-of-way. Contractor shall request written clarification from the Architect/Engineer prior to conflict reaching critical stage requiring removal of previously installed equipment or system components either by himself or by other trades involved.

G. When directed by the Architect/Engineer, submit Shop Drawings showing interrelationship of various portions of work and work of other trades. Failure to properly coordinate may result in removal and relocation at expense to the Contractor.


I. Coordinate all cutting & patching with General Contractor.

J. Utility Interruptions: Coordinate mechanical utility interruptions with the Owner and the Utility Company. Plan work so that duration of the interruption is kept to a minimum.

1.11 PROJECT CONDITIONS

A. Accessibility:
1. Contractor shall be responsible for the sufficiency of the size of shafts and chases and the adequate clearance in double partitions and hung ceilings for proper installation of work. Coordinate these requirements with the General Contractor. Such spaces and clearances shall be kept to the minimum size required.

2. Locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Furnish access doors for this purpose. Minor deviations from Drawings may be allowed to provide for better accessibility. Any changes shall be approved by the Architect prior to making the change.

3. Provide the General Contractor with the exact locations of access doors. Locations of these doors shall be submitted in sufficient time to be installed in the normal course of work.

4. Demonstration of access will be required prior to project completion. The contractor is responsible for providing reasonable and safe access for all system components. Contractor to arrange with an Owner’s Representative a time for the demonstration prior to the final punchlist.

B. Fabrication: Before installing and/or fabricating any lines of piping or ductwork the Contractor shall assure himself that they can be run as contemplated in cooperation with Contractors of other Divisions of the Work and the physical constraints of the Structural and Architectural Work.

C. Freeze Protection: Do not run pipes in outside walls, or locations where freezing may occur. Piping next to outside walls shall be in furred spaces with insulation between the piping and the outside wall. Insulation of piping shall not be considered freeze protection.

D. Scaffolding, Rigging and Hoisting: Provide scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

1.12 SUBMITTALS:

A. Within thirty days after award of the Contract, submit to Architect complete catalog data and/or Shop Drawings for each item of material and for every manufactured item of equipment to be used in the work. Such data shall include specific performance data, material description, rating, capacity, dimensions, and type for each item of material, each manufactured item, and all component parts utilized in final operating mechanical system. Applicable data shall be underlined and each applicable item identified in each catalog by the same identification acronyms used on the Drawings.

B. This Contractor shall submit to the Architect the number of copies required by the General and Special Conditions of Division 01, but in no case less than four (4) copies.

C. Each item submitted shall bear the Contractor's stamp, be dated and signed certifying that he has reviewed and approved the Submittal.

D. For each item scheduled on the Drawings, submit a replication of that schedule indicating actual data of the submitted equipment in the schedule.

E. The review comments of the Architect and/or Engineer do not in any case supersede the Drawings and Specifications, and shall not relieve the Contractor from responsibility for deviations from the Drawings or Specifications unless the Contractor has called to the attention of
the Architect and/or Engineer, in writing, such deviations at the time of submission, nor shall it relieve the Contractor from responsibility for errors of any sort in the items submitted.

F. Test Reports: Submit certified test reports as required by various Sections of Division 22 showing compliance in accordance with the General Conditions of the Contract.

G. Deviations: It is the contractors responsibility to indicate deviations from the Plans And Specifications. Approval shall not be considered acceptance of the deviation unless it has been explicitly indicated.

1.13 SITE OBSERVATION REPORTS

A. During the construction period the Engineer may issue periodic site observation reports. The contractor shall immediately address the issues and provide a written response identifying the “Responsible Contractor,” “Date,” “Corrective Action Taken,” and “Recommendations.”

B. The written response must be returned to the Architect no later than (5) working days after receipt of the site observation report.

1.14 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Substitutions: Comply with Division 01 & Instructions to Bidders.

B. Contractors desiring to use alternate equipment or materials and manufacturers or suppliers desiring to furnish alternate materials or equipment in lieu of those specified, shall submit requests for approval to the Engineer not less than seven (7) calendar days prior to scheduled closing date for receipt of proposals.

C. Materials and equipment are specified by manufacturer and catalog numbers. The manufacturers and catalog numbers are used to establish a degree of quality and style for such equipment and material.

D. When alternate or substitute materials and equipment are used, Contractor will be responsible for space requirement, configurations, performance, changes in bases, supports, structural members and openings in structure, electrical changes and other apparatus and trades that may be affected by their use. Contractor shall provide drawings for alternate/substitute equipment in detail equal to the construction documents.

1.15 PROJECT RECORD DOCUMENTS

A. General: Comply with Division 01.

B. Job Site Documents: Maintain at the job site, one record copy of the following:

1. Drawings
2. Specifications
3. Addenda
4. Reviewed Shop Drawings
5. Field Test Records
C. Do not use record documents for construction purposes. Maintain documents in clean, dry legible condition, apart from documents used for construction.

D. Record Information: Label each document "Record Document." Mark information with contrasting color using ink. Keep each record current. Do not permanently conceal any work until required information is recorded. Record the following information on drawings:

1. Horizontal and vertical location of underground utilities.
2. Location of internal utilities and appurtenances concealed in construction.
3. Field changes of dimension and detail.
4. Changes by change order or field order.
5. Details not on original Contract Drawings.

E. Contractor shall transfer all as-built information on to CAD files. Electronic copy will be provided upon request.

F. Record the following information on Specifications:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes by change order or field order.
3. Other matters not originally specified.

G. Shop Drawings: Maintain Shop Drawings as record documents recording changes made after review as specified for drawings above.

1.16 ELECTRIC WIRING AND SAFETY DEVICE WORK AND MATERIAL RESPONSIBILITIES

A. Unless otherwise indicated, all mechanical equipment motors and controls shall be furnished, set in place, and wired in accordance with the following schedule: MD = Mechanical Division, ED = Electrical Division, TD = Temperature Control Division, I = Installer of equipment requiring electrical service.

B. Note: If Temperature Control Division is a subcontract to the Mechanical Contractor, both MD and TD shall fall under the responsibility of MD. If no Temperature Control Contractor is under contract, Mechanical Division shall assume all Temperature Control responsibilities.

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<th>1. Other Equipment Motors/Starters</th>
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<th>Control Wired &amp; Connected Under</th>
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<td>2. Mechanical Equipment Motors</td>
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<td>3. Control Wiring Regardless of Voltage</td>
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<td>4. Thermowells in Piping</td>
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<td>5. Fused and Unfused Disconnect Switches &amp; Thermal Overload Switches</td>
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<td>6. Contactors</td>
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1. Footnote 1: It is the intention of this specification for all conduit and wiring which connects to control equipment or provides controls to mechanical equipment to be provided by the Temperature Control Contractor. Other portions of the specification which may be in conflict with this concept shall be brought to the attention of the engineer for clarification prior to bidding the project. The ED shall provide line voltage wiring conduit and junction boxes for the express purpose of temperature controls. It shall be the responsibility of the Temperature Control Contractor to coordinate the location of the junction boxes (if not otherwise shown on the Electrical Drawings) and to utilize these junction boxes for temperature control wiring. The Temperature Control Contractor shall extend line and/or low voltage wiring from junction boxes to all mechanical and control components which require control wiring.

2. Footnote 2: Unless furnished with equipment.

C. All temperature control conduit and wiring will be furnished and installed under temperature control subcontract. In the event that temperature control is not under separate contract, Mechanical Contractor shall assume all temperature control subcontract responsibilities.

D. Division 26 shall furnish and install all conduit and wiring required for power wiring carrying equipment full load amperage to all mechanical equipment unless shown otherwise.

E. Provide Division 26 with a complete summary list of all mechanical equipment and line voltage control requiring electric power within 30 days after award of contract. This list shall summarize equipment power loads, line voltage control requirements, quantities, and locations of equipment and connection points. If any mechanical equipment is required to run on emergency power, the list shall note that requirement along with the requirement for the building temperature controls systems to also be under emergency power.

F. All starters shall be furnished under Division 22.

1.17 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials and equipment in manufacturer's unopened containers fully identified with manufacturer's name, trade name, type, class, grade, size and color.

B. Protection: Make provisions for coordination with Owner and other Contractors for safe storage of materials and equipment. Store materials and equipment off the ground and under cover, protected from damage.

C. All items subject to moisture damage, such as controls, shall be stored in a dry, heated space.

D. Large Items: Make arrangements with other Contractors on the job for introduction into the building of equipment too large to pass through finished openings. Schedule delivery of large equipment requiring special openings as required for installation without delaying the work of other project trades.

E. Acceptance: Check and sign for materials to be furnished by Division 22 and other trades for installation under Division 22 upon delivery. Assume responsibility for the storage and safekeeping of such materials from time of delivery until final acceptance.

F. Inspection: Stored material shall be readily accessible for inspection by the Architect until installed.
1.18 Warranties

A. Warranty: In accordance with Division 01, provide a written warranty to the Owner covering the entire mechanical work to be free from defective materials, equipment and workmanship. If the warranty period is not defined in Division 01, the minimum warranty period will be for a period of two years after Date of Acceptance. Purchase of manufacturer’s extended warranty may be required to comply with the warranty period requirement. During this period provide labor and materials as required to repair or replace defects at no additional cost to the Owner. Provide certificates for such items of equipment which have warranties in excess of one year. Submit to the General Contractor.

B. This warranty will be in addition to the terms of any specific equipment warranties or warranty modifications resulting from use of equipment for temporary heat or ventilation.

1.19 Schedule of Testing

A. Provide testing in accordance with the General Conditions of the Contract. Make all specified tests on piping, ductwork and related systems as necessary. Demonstrate the proper operation of equipment installed under this project.

B. Equipment shall not be tested, or operated for any purpose until fully lubricated in accordance with manufacturer's instructions and until connections to fully operative systems have been accomplished.

C. A schedule of testing shall be drawn up by the Division 22 Contractor in such a manner that it will show areas tested, test pressure, length of test, date, time and signature of testing personnel. All testing must be performed in the presence of the General Contractor's representative; his signature for verification of the test must appear on the schedule. At completion of testing, the schedule shall then be submitted in triplicate to the Architect.

D. Make sure operational and performance tests are made on seasonal equipment.

E. Complete all tests required by Code Authorities, such as smoke detection, life safety, fire protection and health codes.

1.20 Demonstration of Access

A. The Contractor shall demonstrate to the Owner’s designated representative the access to all switches, valves, actuators, dampers, motors, lubrication lines, sensors and panels. Contractor shall correct deficiencies noted by the Owner. Refer outstanding issues to the Architect/Engineer for resolution. Contractor to be responsible for arranging the demonstration prior to final inspection.

1.21 Certificates and Keys

A. Certificates: Upon completion of the work, deliver to the General Contractor one copy of Certificate of Final Inspection.
B. Keys: Upon completion of work, submit keys for mechanical equipment, panels, etc. to the General Contractor.

1.22 OPERATING AND MAINTENANCE DATA

A. Submit three (3) typed and bound copies of the maintenance manual, 8-1/2" x 11" in size, to the Architect, for review and approval. These approved copies shall then be transmitted to the Owner.

B. The manual shall be enclosed in a stiff-back, three-ring binder and shall have:

1. Table of Contents, Equipment List with identification used in contract documents.
2. Alphabetical list of all system components including the name, address, and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
3. Operating instructions for complete system, including procedures for fire or failure of major equipment and procedures for normal starting/operating/shutdown and long-term shutdown.
4. Maintenance instructions, including valves, valve tag and other identified equipment lists, proper lubricants and lubricating instructions for each piece of equipment and necessary cleaning/replacing/adjusting schedules.
5. Manufacturer's data on each piece of equipment, including:
   a. Installation instructions.
   b. Drawings and Specifications (approved Shop Drawings).
   c. Parts lists.
   d. Complete wiring and temperature control diagrams. (Approved Shop Drawings).
   e. Completed and approved TAB report.

1.23 INSTRUCTIONAL SESSIONS

A. Be responsible for scheduling instructional meetings for maintenance personnel on the proper operation and maintenance of all mechanical systems, using the maintenance manual as a guide. These meetings must be scheduled through the Architect or General Contractor and with enough advanced notice that all personnel can be notified. Provide instructional sessions as required.

B. Video tape instructional sessions for Owner's future use.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 220000