SECTION 15010

GENERAL REQUIREMENTS FOR MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The General Requirements for mechanical work are intended to be complementary to the General Requirements of the Construction Contract.

B. Work Included: Provide complete mechanical systems where shown on the drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to the following summary of work:

1. Packaged terminal air conditioning units for guestrooms.
2. Roof top air conditioning for all support space.
3. 100% AC Units for fresh air supply to the facility.
4. Toilet Exhaust System
5. Fully functional plumbing system to accommodate the facility requirements.
6. Complete fire sprinkler system as required designed and installed by the sprinkler contractor.
7. Other items and services required to complete the systems.

1.2 QUALITY ASSURANCE AND APPLICABLE STANDARDS

A. Use adequate numbers of skilled workmen that are thoroughly trained and experienced in the necessary crafts and are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

C. Codes: Perform all work in accordance with the latest edition of the following codes:

1. State and city building, fire, plumbing and mechanical codes.
2. National Electrical Code.
3. National Fire Protection Association.
4. American with Disabilities Act (ADA)
5. Texas Accessibility Standards (TAS)
6. Texas Department of Criminal Justice Standards.
7. All authorities having jurisdiction.

When codes conflict, the more stringent requirements shall govern.

D. Where conflicts occur between drawings, specifications or code requirements, the most stringent requirement shall take precedence.

E. Standards: The specifications and standards of the following organizations are by reference made a part of these specifications. All work, unless otherwise indicated, shall comply with the requirements and recommendations wherever applicable:

American National Standards Institute (A.N.S.I.)
Air Conditioning and Refrigeration Institute (A.R.I.)
American Gas Association (A.G.A.)
American Society for Testing and Materials (A.S.T.M.)
American Society of Mechanical Engineers (A.S.M.E.)
American Society of Refrigeration, Heating and Air Conditioning Engineers (A.S.H.R.A.E.)
Electrical Testing Laboratories (E.T.L)
National Bureau of Standards (N.B.S)
National Electrical Manufacturer's Association (N.E.M.A.)
National Fire Protection Association (N.F.P.A.)
Sheet Metal and Air Conditioning National Association (S.M.A.C.N.A.)
Underwriters' Laboratories, Inc. (U.L.)

1.3 REQUIREMENTS OF REGULATORY AGENCIES

A. The requirements and recommendations of the latest edition of the Occupational Safety and Health Act are by reference made a part of these specifications. All work shall comply with the requirements and recommendations wherever applicable.

1.4 RELATED WORK SPECIFIED ELSEWHERE

A. All Other Sections of Divisions 15 and 16.

B. All other divisions of the contract documents. Refer to each division's specifications and drawings for all requirements

1.5 SUBMITTALS

A. Comply with pertinent provisions of Section 01340.

B. Product Data: Submit the following:

1. Materials list of items proposed to be provided under Division 15.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements. The term "Compliance" is understood to mean that the Contractor certifies that the submitted equipment will meet or exceed the contract document requirements. Items that do not clearly meet this definition should be identified and explained as required in the following paragraph.
3. Identify the difference between the specified item or function and the proposed. Explain with enough detail so that the Engineer/Owner can easily determine that the item complies with the functional intent. List any disadvantages or

advantages of the proposed item versus the specified item. Submit technical data sheets and/or pictures and diagrams to support and clarify. Organize in a clear and concise format. All substitutions shall be approved in writing by Architect. The Architect's decision shall be final.

4. Allow a minimum of ten (10) working days for the review of submittals and each re-submittal.

5. Compliance with the Contract documents shall be the sole responsibility of the Contractor. Items on equipment that are were not accepted by the Architect in writing as an approved equal shall be replaced or revised to comply with the contract documents at the Contractor's expense.
6. Manufacturer's recommended installation procedures which, when reviewed by the Architect, shall become the basis for accepting or rejecting actual installation procedures used on the work.
7. Sign the submittal as an indication of compliance with the contract documents. Any deviations from the contract documents, shall be indicated on the submittal prior to signing. Any deviations not indicated shall be cause for rejection and removal of the non-complying equipment at the Contractor's expense.

C. Submittals required of materials and equipment under this section include the following:

1. Piping and Accessories Materials:

   a. Clearly marked up manufacturer's data showing compliance with the specifications for:

      1) Piping material proposed for each system.
      2) Valves, cocks, and specialties.
      3) Test and measuring devices.
      4) Flexible connectors for piping.
      5) Flanges.

   b. l/8" scale (minimum) sanitary sewer, domestic hot and cold water, storm, and refrigerant piping shop drawings showing coordinated piping routing and arrangements with all equipment, accessories and system expansion and contraction compensation methods.

2. Vibration Isolation and Sound Control Materials:

   a. Submit shop drawings showing the structural design and details of inertia bases, steel beam bases, and other custom-fabricated work not covered by manufacturer's submitted data.
   b. Furnish layouts of templates to be furnished to fabricators of equipment bases, foundations, and other support systems, as needed for coordination of vibration isolation units with other work.
   c. Submit shop drawings indicating the scope of vibration isolation work,

locations of units and flexible connections. Include support isolation points for piping, air handling units, inertia bases, etc.

d. Include schedule of isolation units, showing size or manufacturer's part number, the weight supported and resulting deflection of each unit.
e. For spring isolation units, show wire size, spring diameter, free height, solid-compression height, operating height, fatigue characteristics and ratio of horizontal to vertical stiffness.
f. For spring-and-pad type isolation units, show the basis of spring rate selection for the range of loading weights.

3. Mechanical Identification Materials:

a. Clearly marked-up product literature or samples showing compliance with specified materials for:

1) Valve tagging.
2) Pipe marking.
3) Equipment marking.

4. Insulation:

a. Manufacturer's certified data on thermal performance.
b. Details, when required, of methods to be used in providing for unusual piping expansion and contraction.
c. Manufacturer's product data and application information on heat tracing system including all electrical requirements.
d. Manufacturer's data on any alternate insulation material of reduced thickness, including pre-insulated pipe.
e. Manufacturer's data on all jacketing materials, sealants and fasteners.

5. Pumps:

a. Provide factory certified performance curve clearly marked with the operating point of each pump.
b. Provide manufacturer's data on all panels, accessories, and specified factory options.
c. Provide all electrical characteristics.

6. Fire Protection System:

a. Provide hydraulic calculations for all areas.
b. Provide l/8" scale piping shop drawings showing coordinated piping routing and arrangements with all accessories.
c. Provide clearly marked-up manufacturer's data showing compliance with the specifications for:

1) All required system valves and switches.
2) Sprinkler heads for all areas and sprinkler cabinet.

3) Fire pump (if used) with jockey pump and controller.
4) Fire hoses, hose valves and cabinets.
5) Fire department connection.

d. Provide all electrical characteristics.
e. Submit all hydraulic calculations and drawings to be submitted to the Authority Having Jurisdiction and obtain stamp of approval prior to submission to the Architect/Engineer.

7. Plumbing Materials:

a. Clearly marked-up manufacturer's data showing compliance with the specifications on:

1) Fixtures, carriers and all accessories.
2) Plumbing equipment.
3) Water hammer arresters.
4) Backflow preventers.
5) Trap primers
6) Tempering valves.
7) Water heaters (see Heating below).

8. Heating:

a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications for:

1) Hot water heaters.
2) Unit heaters.

b. Provide all electrical characteristics.

9. Refrigeration:

a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications for:

1) D-X condensing units.
2) Ground mounted Rooftop units.
3) Through-the-wall air conditioning units.

b. Provide all electrical characteristics.

10. Air Handling:

a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications for:

1) Fan coil units.
2) Ventilation fans.
3) Filters.
4) Intake/relief hoods.
5) Wall louvers.

b. Provide all electrical characteristics.

11. Air Distribution Materials:

a. Provide clearly marked-up manufacturer's data showing compliance with scheduled values and specifications for:

1) Air devices.
2) 1/4" scale ductwork shop drawings for all systems showing equipment locations, detailed data such as bottom of duct elevations, airstream sizes, all duct accessories, and duct construction details showing compliance with SMACNA requirements for the specified duct pressure of each system.
3) Fire dampers, fire and smoke dampers.
4) Air terminals.

12. Controls and Instrumentation:

a. Provide detailed shop drawings showing all components, wiring, tubing, and accessories.
b. Provide comprehensive sequence of operation description of each control system.
c. Provide clearly marked-up manufacturer's data showing compliance with the specifications for all products proposed.
d. Provide all electrical characteristics of components.

13. Testing and Balancing:

a. List of instruments to be used with latest date of calibration test for each.
b. Brief description of test and balance contractor experience.

14. Variable Frequency Drives/Speed Controllers (VFD):

a. Provide clearly marked-up manufacturer’s data showing compliance with scheduled values and specifications. Provide electrical characteristic.

15. Record Documents: Reference the requirements detailed in this section.
16. Operation and Maintenance Data: Reference the requirements detailed in this

section.

D. Resubmittals of rejected submittals shall be limited to one (1) in number. Costs for processing subsequent resubmittals in excess of the first resubmittal, resulting from the Contractor's disregard of Architect/Engineer's primary submittal rejection comments, shall be borne by the Contractor. Costs shall be based on Architect/Engineer's hourly rates as published in their current professional fee schedules and shall also include reimbursable costs for delivery, mailing, and photocopies at direct cost plus ten percent (10%).

1.6 SUBSTITUTIONS

A. The use of manufacturers' names and catalog numbers followed by the phrase "or equal" is generally used to establish a standard of quality and utility for the specified items and to provide a dimensional reference for construction documents that are drawn to scale.

B. Submittals for "equal" items shall, where applicable, include the following data which are not necessarily required for specified items:

1. Performance characteristics.
2. Materials.
3. Finish.
4. Certification of conformance with specified codes and standards.
5. Manufacturer's specifications and other data needed to prove compliance with the specified requirements. The term "Compliance" is understood to mean that the Contractor certifies that the submitted equipment will meet or exceed the contract document requirements. Items that do not clearly meet this definition should be identified and explained as required in Paragraph 6 below.
6. Identify the difference between the specified item or function and the proposed. Explain with enough detail so that the Architect/ Engineer/Owner can easily determine that the item complies with the functional intent. List any disadvantages or advantages of the proposed item versus the specified item. Submit technical data sheets and/or pictures and diagrams to support and clarify. Include shop drawings for all piping and ductwork equipment per Paragraph 1.5 Submittals. Organize in a clear and concise format.

C. Submittals of "equal" components or systems may be rejected if:

1. The material or equipment would necessitate the alteration of any portion of the mechanical, electrical, architectural or structural design.
2. Dimensions vary from the specified material or equipment in such a manner that accessibility or clearances are impaired or the work of other trades is adversely affected.

D. Proposed substitutions for materials or equipment must be submitted ten (10) days prior to final bid date for consideration as approved equals. Otherwise, such substitutions will not be permitted. Proposals for substitutions shall be made only by the prime bidders. Manufacturers, distributors, and sub-contractors shall not make proposals to the Architect for substitutions.

E. No substitution shall be made unless authorized in writing by the Architect. Should a substitution be accepted, and should the substitute material prove defective or otherwise unsatisfactory for the service intended, and within the guarantee period, the Contractor shall replace this material or equipment with material or equipment specified, at his own expense, and to the satisfaction of the Architect.

F. Contractors submitting bids on substitute materials and equipment must also provide a written performance guarantee certifying that the substitute materials and equipment will produce the specified effects and meet the approval of the Architect.

1.7 ORDINANCES, PERMITS, METERS, UTILITIES AND ROYALTIES

A. Procure all permits and licenses necessary for completion of this project and pay all lawful fees required and necessary pursuant in obtaining said permits and licenses. All required certificates of approvals and inspections by local governing and regulating authorities shall be obtained and paid for by the Contractor.

B. Pay all fees required for the connection of water, gas and sewer to utility mains, and any meter fees if required.

C. Pay any royalty payments required or fees for the use of patented equipment or systems. Defend all law suits or claims for infringement of any patent rights and shall hold the Owner and/or Architect/Engineer harmless from loss as a result of said suits or claims.

1.8 COMPATIBILITY OF EQUIPMENT:

A. Assume full responsibility for satisfactory operation of all component parts of the mechanical systems to assure compatibility of all equipment and performance of the integrated systems in accordance with the requirements of the specifications. Should the Contractor consider any part of the specifications or drawings as rendering his acceptance of such responsibility impossible, prohibitive, or restrictive, he shall notify the Engineer before submitting his bid, and the bid shall be accompanied by a written statement of any objections or exceptions to the specifications and drawings.

1.9 EXISTING UTILITIES AND TEMPORARY SERVICES FOR CONSTRUCTION

A. Verify the location and capacity of existing utility services pertaining to work of Division 15. Relocate existing utilities unearthed by excavation as directed by the utility service companies affected.

B. Temporary Services for Construction:

1. Provide temporary services in strict accordance with the provisions of these specifications.

1.10 EXCAVATION AND BACKFILLING

A. Perform all excavation and backfilling necessary for the installation of the work. This shall include shoring and pumping in ditches to keep them in dry condition until the work has been installed. All shoring required to protect the excavation and safeguard employees shall be properly performed.

B. Perform excavation and backfilling in strict accordance with the provisions of these specifications including trench safety requirements.

C. All excavations shall be made to the proper depth, with allowances made for floor slabs, forms, beams, etc. Ground under piping shall be well compacted before piping is installed.

D. Backfilling shall be made with selected soil, free from rocks and debris and shall be pneumatically tamped with 6 inch layers to secure a field density ratio of 95 percent as defined by ASTM Designation D698-57T (Proctor Soil Compaction Test).

E. Excavated materials not suitable and not used in the backfill shall be removed from the site.

F. Field check and verify the locations of all underground utilities. Avoid disturbing these as far as possible. In the event existing utilities are damaged, they shall be repaired at no cost to Owner.

G. In a lime stabilized area, the lime stabilization shall be fully restored after the excavation is complete.

H. Replace concrete, curbs, paving and other surface improvements cut during excavation to their original condition.

1.11 JOBSITE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Include required work to correct conditions detrimental to the timely and proper completion of all Division 15 Work. Do not proceed until unsatisfactory conditions are corrected.

1.12 PREPARATION AND COORDINATION

A. Perform coordination work in strict accordance with provisions of these specifications and the following:

1. Coordinate as necessary with other trades to assure proper and adequate interface with all work.
2. Where ducts, pipes other mechanical items are shown in conflict with locations of structural members and other equipment, include labor and materials required for extensions, offsets and supports to clear the encroachment.
3. Although such work is not specifically indicated, furnish and install all

supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. Coordinate accepted equipment changes from those scheduled or specified with other trades affected. Additional compensation to other trades for equipment changes is the responsibility of the Contractor making the change.

B. The Mechanical Drawings are diagrammatic, but are required to be followed as closely as actual construction and work of other trades will permit. Duct and piping arrangement have been designed for maximum economy consistent with good practice and other considerations. Install the systems arranged as shown on the drawings, except as otherwise approved in advance by the Architect.

C. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will be governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.

D. Where items such as diffusers, thermostats, switches, and control panels are not specifically located on the Drawings, locate as determined in the field by the Architect. Where such items are installed without such specific direction, relocate as directed by the Architect and at no additional cost to the Owner.

E. Verify all dimensions and distances. No additional compensation will be allowed because of differences between work shown on the Drawings and actual dimensions and distances at the jobsite.

1.13 CONSTRUCTION REQUIREMENTS

A. The drawings show the arrangements of work. Should project conditions necessitate rearrangement, or if the materials or equipment can be installed to a better advantage in a different manner, the Contractor shall, before proceeding with the work, prepare and submit five copies of Drawings of the proposed arrangement for the Architect's review. Allow a minimum of ten (10) working days for review.

B. Should the Contractor propose to install equipment requiring space conditions other than those shown, or rearrange the equipment, he shall assume responsibility for the rearrangement of the space and shall have the Architect review the change before proceeding with the work. The request for such changes shall be accompanied by shop drawings of the space in question. Identify monetary credits proposed or other benefits of the change. Allow a minimum of ten (10) working days for review.

C. The Contractor shall be responsible for the proper location and size of all slots, holes or openings in the building structure pertaining to his work and for the correct location of pipe sleeves.

1.14 CUTTING AND PATCHING

A. Perform cutting and patching associated with the work in strict accordance with the provisions of Division 1 of these Specifications and the following:

1. Coordinate work to minimize cutting and patching work.
2. Request for Architect's consent:

    a. Prior to cutting or coring of the building structure, submit a written request to the Architect for permission to proceed with cutting. Include x-rays of any floor area where cutting or coring is proposed.
    b. Contractor is cautioned that concrete floor contain steel tendons which can not be cut or damaged.

3. Perform Architect-approved cutting and demolition by methods which will prevent damage to other portions of the work and provide proper surfaces to receive installation of new work and/or repair.
4. Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.
5. Provide all core drilling of holes. Where sleeves and/or blockouts are required, they shall be cut or provided at locations required. On completion of this work or as work progresses, make all repairs and do all patching required as a result of work under this Contract. All patching shall be performed in a manner that will restore the surrounding work to its original condition to the satisfaction of the Architect.
6. Assume responsibility for the proper size of all sleeves and/or blockouts in the building structure pertaining to the work and for providing the correct location of pipe sleeves and/or blockouts.
7. Where openings are cut through masonry walls, provide lintels or structural supports to protect the remaining masonry. Adequate support shall be provided during the cutting operation to prevent any damage to the affected masonry.

1.15 PROJECT RECORD DOCUMENTS

A. Provide the record documents associated with the work of Division 15 in strict accordance with the provisions of these specifications.

B. Throughout progress of the Division 15 Work, maintain an accurate record of changes in the Contract Documents that apply to work of Division 15. Changes shall include all addendums issued during bidding. Maintain an accurate record of the location of mechanical service lines and outlets and all outside utilities.

C. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff.

D. Accuracy of Records:

1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of drawings and other documents where such entry is required to show the change properly. Match the symbology and format of the base documents.
2. Accuracy of records shall be such that a future verification of items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

E. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the work and transfer of all recorded data to the final Project Record Documents.

F. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
2. Date all entries.
3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
4. In the event of overlapping changes, use different colors for the overlapping changes.
5. Make entries within 24 hours after receipt of information that the change has occurred.
6. Maintain the base drawing format and use the same symbology.
7. Convert field mark-ups to finished CADD record drawings when required in this section.

G. Conversion of Schematic Layouts:

1. In some cases on the drawings, arrangements of ductwork and piping and similar items are shown schematically and are not intended to portray precise physical layout. Determine final physical arrangement subject to the Architect's approval. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the drawings.
2. Show on the job set of record drawings, by dimension accurate to within one inch, the centerline of each run of items such as all sleeves and piping, etc., below grade, in walls, or in the concrete slab. A surface mounted device indicates the exact location:

    a. Clearly identify the item by accurate note such as "Sanitary Sewer " and the like.

    b. Show, by symbol or note, the vertical location of the item "under slab," "in ceiling plenum," "exposed," and the like.

    c. Make all identification sufficiently descriptive that it may be related reliably

to the specifications.

H. Final Project Record Documents:

1. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
2. Provide CADD Electronic files in .DWG format. Upon written request by the Contractor, the Engineer will provide AutoCADD electronic files of the base contract drawings in .DWG format at no cost to the Contractor. Engineer will also provide a list of drawing layers and names that shall be maintained in the record set prepared by the Contractor

1.16 OPERATION AND MAINTENANCE DATA

A. Submit two copies of a preliminary draft of the proposed manual or manuals to the Architect for review and comments. Allow a minimum of ten (10) working days for review.

B. Submit specified number copies of the approved manual to the Architect prior to indoctrination of operation and maintenance personnel.

C. Prepare in accordance with the following:

Format:

Size: 8½" x 11"

Paper: White bond, at least 20 lb. weight

Text: Neatly written or printed

Drawings: 11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.

Flysheets: Separate each section of the Manual with neatly prepared flysheets briefly describing contents of the ensuing section; flysheets may be in color.

Binding: Use heavy-duty plastic or fiber-board covers with binding mechanism concealed inside the manual; 3-ring binders will be acceptable; all binding is subject to the Architect's approval.

Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs, and cfm. Where items may be expected to be measured within ten years in accordance with metric

formulae, provide additional measurements in the "International System of Units" (SI).

D. Provide front and back covers for each manual, using durable material approved by the Architect, and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS

Name and Address of Work

Name of Contractor

General subject of this manual

Space for approval signature of the engineer and approval date

E. Contents: Include at least the following:

1. Neatly typewritten index near the front of the manual, giving immediate information as to location within the manual of all emergency information regarding the installation.
2. Complete instructions regarding operation and maintenance of all equipment provided including lubrication, disassembly, and reassembly.
3. Complete nomenclature of all parts of all equipment.
4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.
5. Copy of all guarantees and warranties issued.
6. Manufacturer's bulletins, drawings, and descriptive data, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
7. Such other data as required in other sections of these specifications.

1.17 EQUIPMENT FOUNDATIONS

A. Provide equipment foundations associated with the work in accordance with the provisions of these specifications.

B. Provide concrete bases for all pad or floor mounted equipment. Bases shall be four inches (4") high above finished floors or grades (unless otherwise noted) and shall protrude two inches (2") beyond all sides of equipment and shall have exposed chamfered edges. Construct bases from ready-mixed hardrock concrete, ASTM C94, reinforced with #3 rebars, ASTM A615, Grade 40, at 18" on center each way.

C. Field verify exact location of outdoor pad mounted equipment with the Architect. Supply necessary fill and grade site to provide natural drainage away from equipment.

1.18 PAINTING

A. All equipment shall be delivered to the job with suitable factory finish. Should the finish be damaged in transit or during the installation, it shall be finished to match appearance of original finish. All work shall be subject to approval by Architect.

1.19 TESTING AND INSPECTION

A. Provide personnel and equipment, make required tests, and secure required approvals from the Architect and governmental agencies having jurisdiction.

B. Make written notice to the Architect adequately in advance of each of the following stages of construction:

1. When all rough-in is complete, but not covered;
2. As specified in all Division 15 sections.
3. At the completion of the work of Division 15.

C. When material or workmanship is found to not comply with the specified requirements, remove the noncomplying items from the job site and replace them with items complying with the specified requirements at no additional cost to the Owner. This shall be performed within 3 days after receipt of written notice of noncompliance.

1.20 WARRANTY

A. Contractor shall warranty all equipment and workmanship for a period of one year after date of substantial completion and replace or repair any faulty equipment or installation at no cost to the Owner for such service during this period, all in accordance with requirements of Division 1.

B. This warranty shall not void specific warranties issued by manufacturers for greater periods of time. Nor shall it void any rights guaranteed to the Owner by law.

C. Warranties shall be in writing in a form satisfactory to the Owner, and shall be delivered to the Owner before final payment is made.

1.21 PROJECT COMPLETION

A. Upon completion of the work of Division 15, thoroughly clean all exposed portions of the mechanical installation, removing all traces of soil, labels, grease, oil and other foreign material and using only the type cleaner recommended by the manufacturer of the item being cleaned.

END OF SECTION 15010