

SECTION 235000

SUPPLEMENTARY CONDITIONS FOR MECHANICAL AND ELECTRICAL WORK

1.01 GENERAL

- A. Requirements set forth herein are in addition and shall be considered as complementary to the General and Additional ALL PRIME CONTRACTORS and SUB-CONTRACTORS shall familiarize themselves with said provisions.
- B. It is intent of Drawings and Specifications to call for finished work, tested and ready for operation. All materials, equipment and apparatus shall be new, of highest grade and quality and free from imperfections.
- C. Any apparatus, appliance, material or work not shown on Drawings, but mentioned in Specifications, or vice versa, or any incidental accessories or minor details now shown but to make work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be provided by Contractor without additional cost to Owner.
- D. With submission of Bid, Contractor shall give written notice to Architect of any materials, apparatus or omissions believed to be in violation of laws, ordinances, rules or regulations or authorities having jurisdiction. In absence of such written notice, it is mutually agreed that Contractor shall include cost of providing all systems in accordance with applicable regulations without additional cost to Owner.

1.02 EXAMINATION

- A. Contractor, before submitting Bid, shall examine site, building and existing facilities, Drawings and Specifications, become informed as to State and local codes and laws having jurisdiction, allow for licenses and fees to be paid as directed under the Contract and/or as required by law.
- B. Claims made for extra payment for the following reasons will not be allowed: Unfamiliarity with work to be performed by other trades, existing conditions at job site, local or State laws and codes and minor alterations due to field conditions.

1.03 CONTRACT DOCUMENTS

- A. Drawings and Specifications Drawings accompanying these Specifications are intended to show general arrangement and extent of work to be done. Work in all its details is subject to approval of Architect, whose decision on all points of difference shall be final and binding on Contractor. Any work or materials which are rejected must be immediately replaced by Contractor.
- B. Drawings and Specifications together mutually explain each other and indicate work to be done, and anything appearing in one and not in other shall be as if appearing in both. In case of disagreement between Drawings and Specifications or within either document itself as to better quality, greater quantity or more costly

work shall be included in contract price and matter referred to Engineer's attention for decision or adjustment.

1.04 EQUIPMENT LOCATIONS

- A. Location of equipment, outlets, etc., as indicated on Drawings shall be considered as reasonably correct, but it shall be understood that they are subject to modifications as may be found necessary or desirable at time of installation in order to meet any unforeseen or design conditions. Such changes shall be made by Contractor without additional cost to Owner.
- B. Locations of pipes, ducts, electrical raceways, switches, panels, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences anticipated and encountered. The Contractor shall determine the exact route location of each pipe, duct and electrical raceway prior to fabrication.
- C. Offsets, transitions and changes in direction in pipes, ducts and electrical raceways shall be made as required to maintain proper headroom and pitch of sloping lines, whether or not indicated on the Drawings. The Contractor shall provide for all trades, air vents, pull boxes, etc. as required to effect these offsets, transitions and changes in direction.
- D. Architect reserves right to relocate any outlet or equipment to a distance of five feet in any direction from that indicated or described; said changes, if any, will be requested prior to installation and shall be made without additional cost to Owner.

1.05 COOPERATION

- A. The Contractor shall compare the mechanical and electrical Drawings and Specifications with those for other trades and shall report any discrepancies between them to the Engineer and shall obtain from him written instructions for changes necessary in the mechanical and electrical work. The mechanical and electrical work shall be installed in cooperation with other trades installing interrelated work. Before installation, the Contractor shall make proper provision to avoid interference in a manner approved by the Architect. All changes required in the work of the Contractor caused by his neglect to do so shall be made by him at his own expense.
- B. Every effort shall be made not to damage, soil or scratch the work of other Contractors.
- C. In case of damage to work or materials of other Contractors, he shall be required to pay for such damage as may be incurred. Architect shall be sole arbitrator in this matter.

1.06 SPACE CONDITIONS

- A. Work shall be confined to space allowed for it. If space is not sufficient, Architect shall be notified. More space shall not be used unless authorized by Architect.

1.07 ACCESSIBILITY

- A. Contractor shall install all work so that all parts required are readily accessible for inspection, operation, maintenance and repair. Minor deviations from Drawings may be made to accomplish this, but changes of magnitude shall not be made without prior written approval from Architect.
- B. The Contractor shall install all mechanical and electrical work to permit removal (without damage to other parts) of coils, heat exchanger bundles, fan shafts and wheel, draw-out circuit breakers, filters, belt guards, sheaves and drives and all other parts requiring periodic replacement or maintenance. The Contractor shall arrange pipes, ducts, raceways, traps, starters, motors, control components to clear the openings of swinging doors and of access panels.

1.08 ACCESS DOORS

- A. Location: Access doors in building construction through which a man must pass to repair or operate valves and other apparatus will be provided by others. All other required access doors, panels, cabinets, etc. shall be furnished by Contractor requiring same, for access to equipment provided under his Contract. Access doors shall be provided for valves, cleanouts, air vents, dampers, and for adjustments of apparatus where necessary and required. Access doors shall be installed by General Contractor. Doors must be made at job site so as not to cause delay to other trades.
- B. Type: Access doors shall have angle frame, cold rolled steel, shaped to provide a rabbet on all sides to house door and confine wall. Frames shall be 16-gauge steel, doors 14 gauge to 29" dimension vertical or horizontal and 12 gauge for larger sizes. Hinges shall be concealed type permitting a door swing of 175°. Panels shall have prime coat of gray rust inhibitive paint. Access panels shall be similar to "Milcor" as manufactured by Inland Steel Products Company, Style "K" for plastered surfaces and Style "M" for masonry and tile surfaces. Panels must be available at job site, not to cause delay to other trades.

1.09 DRIP PANS

- A. Examine the drawings, and in cooperation with the Electrical Trade, confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan and arrange all overhead piping no closer than 2 feet from a vertical line to electric motors and controllers, switchboards, panelboards or similar equipment.
- B. Where the installation of piping does not comply with the requirements of foregoing paragraph, where feasible, the piping shall be relocated.
- C. Furnish galvanized steel gutters as follows:
 - 1. Provide and erect a gutter of 18 gauge galvanized steel under every pipe which is within 2'-0" of being vertically over any motor, electrical controllers, switchboards, panelboards, or the like.
 - 2. Each gutter shall be welded and made watertight, properly suspended and carefully pitched to a convenient point for draining. Provide a 3/4" drain, with valve as directed, to nearest floor drain or slop sink.

3. In lieu of such separate gutters, a continuous, adequately supported and braced, properly rimmed, pitched and drained, may be provided over any such motor, and extending 2'-0" in all directions beyond the motor, over which such piping has to run.

1.10 DAMAGE

- A. Each Contractor shall protect and leave in perfect condition materials, apparatus, fittings, fixtures and trim in scope of his Contract. Should any items be damaged or broken or workmanship molested, no matter by whom such damage is caused, work must be corrected and damaged items replaced with new units by Contractor at no additional cost to Owner. Work which needs redoing because of damage shall be done by skilled trade which originally performed such work.
- B. Any adjustments between Contractors relative to damage to work or materials shall not be responsibility of Owner, Architect or their representatives.

1.11 LAW ORDINANCES, PERMITS AND FEES

- A. The Contractor shall give all necessary notices, obtain all permits, pay all governmental taxes, fees and other costs in connection with his work, file for necessary approvals with the Town or Village and all other State governmental departments having jurisdiction, obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work.

1.12 CODES AND STANDARDS

- A. Contractor shall include in his Bid any labor, materials, services, apparatus, Drawings (in addition to Contract Documents), necessary to comply with all applicable codes, specifications, local ordinances, industry standards and utility company regulations.
- B. In case of difference between building codes, specifications, State laws, local ordinances, industry standards and utility company regulations and Contract Documents, most stringent shall govern. Contractor shall promptly notify Engineer in writing of any such difference.
- C. Noncompliance: Should Contractor perform any work that does not comply with requirements of applicable building codes, State local ordinances, industry standards and utility company regulations, he shall bear all costs arising in correcting deficiencies.
- D. Applicable codes and standards for material furnished and work installed shall include all State laws, local ordinances, utility company regulations, special requirements of Owner's insurance underwriters, requirements of governmental agencies having jurisdiction, and applicable requirements of following nationally accepted codes and standards:
- E. Codes:
 - 2020 Building Code of New York State

- 2020 Fire Safety Code of New York State
- 2020 Plumbing Code of New York State
- 2020 Mechanical Code of New York State
- 2020 Fuel Gas Code of New York State
- 2020 Energy Conservation Construction Code of New York State
- National Electric Code, Latest Edition

F. Industry Standards, Codes and Specifications:

- AIEE American Institute of Electrical Engineers
- ANSI American National Standards Institute
- ASHRAE American Society of Heating, Refrigeration & Air Conditioning Engineers
- ASME American Society of Mechanical Engineers
- ASTM American Society of Testing Materials
- AWWA American Water Works Association
- IPCEA Insulated Power Cable Engineers Association
- NBS National Bureau of Standards
- NEMA National Electrical Manufacturers Association
- NFPA National Fire Protection Association
- NEC National Electrical Code
- SMACNA Sheet Metal and Air Conditioning National Association
- UL Underwriters' Laboratories
- AGA American Gas Association

1.13 DEFINITIONS

- A. The term "Contractor" or "this Contractor" shall be interpreted to mean individual, partnership, or corporation to whom Contract has been awarded and their associated sub-contractor.
- B. Whenever the terms "provide" or "provided" are used in the specifications, they shall mean "furnish & install" or "furnished & Installed," "connect" or "connected", "apply" or "applied", "erect" or "erected," "construct" or "constructed," or similar terms, unless otherwise indicated in the specifications. Words in the singular shall also mean and include the plural wherever the context to indicates, and words in the plural mean the singular wherever the context so indicates.
- C. Wherever the terms "shown on drawings" are used in the specifications, they shall mean "noted", "indicated," "scheduled," "detailed," or any other diagrammatic or written reference made on the drawings.
- D. Wherever the terms "material" or "materials" are used in the specifications, they shall mean any "product," "equipment," "device," "assembly" or "item" required under the contract, as indicated by trade or brand name, manufacturer's name, 10 standard specification reference or other description. The terms "approved" or "approval" shall mean the written approval of the Engineer.
- E. The terms "specification" or "specifications" shall mean all information contained in the bound or unbound volume, including all "Contract Documents" defined therein, except for the drawings.

- F. The terms "directed," "required," "permitted," "ordered," "designated," "prescribed" and similar words shall mean the direction, requirement, permission, order, designation or prescription of the Engineer; the terms "approved," "acceptable," "satisfactory" and similar words shall mean approved by, acceptable or satisfactory to the Engineer; the terms "necessary," "reasonable," "proper," "correct" and similar words shall mean necessary, reasonable, proper or correct in the judgment of the Engineer.
- G. "Piping" includes, in addition to pipe or tubing, all fittings, flanges, unions, valves, strainers, drains, hangers and other accessories relative to such piping.
- H. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceiling, embedded in construction or in crawl spaces.
- I. "Exposed" means not installed underground or "concealed" as defined above.
- J. "Invert Elevations" means the inside bottom of pipe.
- K. "Wiring" includes, in addition to wire, all conductors, raceways, boxes, devices, supports, hangers and other accessories relative to such wiring.

1.14 CUTTING AND PATCHING

- A. Contractor must lay out his work in advance to minimize unnecessary cutting and patching.
- B. Cutting and patching of holes in walls, partitions, ceilings and floors and building in of chases, recesses or other openings that may be required shall be done by Contractor requiring same. All such patching and chases shall be finished to match existing adjacent finishes. Provide all new acoustic tile ceilings in areas where such ceilings are disturbed.
- C. Drilling and patching for expansion bolts, hangers, and other supports shall be done by Contractor requiring same, subject to review by Architect.
- D. Pavements, sidewalks, roads and curbs, planted areas, fences and all other site structures shall be cut, patched, repaired and/or replaced as required to permit installation of work of various trades and such cutting, patching, repairing and replacing shall be responsibility of, and paid for by, Contractor under Section of Specifications for trade requiring work. Work shall be done by Contractor normally employed for such work at expense of Contractor requiring same.
- E. Each Contractor shall bear expense of all cutting, patching, repairing or replacing of work of other trades required because of his negligence or tardiness or because of any damage caused by him.

1.15 REMOVALS AND RELOCATIONS

- A. Remove and/or relocate all existing equipment, fixtures, wiring, piping and ductwork not being incorporated into the new design or as required to accommodate Architectural changes. Removals shall be carefully phased so that existing portions of the building continue to be served while the first phase of the

new construction takes place. All existing equipment, fixtures, piping, ductwork, wiring not being reused in the new design shall be removed. Protect existing equipment, fixtures piping, ductwork, and wiring which is to remain. Existing equipment which is reused shall be checked for proper operation and cleaned.

- B. Extreme care shall be taken during removal of Mechanical/Electrical facilities so as not to damage architectural facilities.
- C. Where light fixtures are removed, lighting controls and switches not being reused shall also be removed.
- D. Coordinate removals work with that of other trades. Any existing equipment fixtures, piping, ductwork, etc., which is to be reused, shall be so identified to the other Contractors. Should it be damaged or removed, it shall be repaired or replaced. Responsibility for protecting, identifying, storing, repairing and replacing shall be by the Contractor who would normally provide the item.
- E. Removals shall be complete and include all trim, supports and accessories.
- F. Where raceways, piping or ductwork cannot be removed, cap and make safe behind finished construction.
- G. No disruption of existing services will be permitted without prior approval of the Owner.
- H. Wiring and piping for equipment which is to be relocated shall be disconnected, relocated and reconnected.
- I. During the course of removing existing and installation of all new service, equipment, fixtures, piping, ductwork and wiring, no interruption of existing facilities will be permitted without the consent of the Owner. All new wiring, piping, ductwork and equipment shall be installed, connected and made ready for final connections to existing systems before disrupting services. These final connections shall be made with such force as may be required to minimize time of shutdown or discontinuance of existing services. Prior to making final connections to existing services, schedule with Owner exact time and duration of discontinuance of service. A minimum of one (1) week notice shall be given to the Owner and other Contractors of any shutdown of services.
- J. Provide all piping, ductwork, wiring, raceways, equipment, appliances and labor required for temporary connections and bypasses necessary to permit continuous operating with minimum interruption of service.
- K. Disposition of equipment and fixtures being removed shall be reviewed with Owner. Equipment or fixtures which the Owner wishes to retain shall be carefully removed and set aside at a location designated by Owner. All other equipment, fixtures and trim shall be removed from site and properly disposed of.

1.16 USE OF PREMISES

- A. Each Contractor shall perform all work necessary to deliver, store, and protect his material and equipment and shall provide a locker for safe and orderly storing of

materials and tools. Location of such locker shall be with approval of Architect. Contractor shall change location thereof when so directed by Architect.

- B. The Contractor shall confine his apparatus, storage of materials and construction operations to the limits indicated by ordinances or permits or as may be directed by the Architect. He/she shall not unreasonably encumber the premises with materials.
- C. In the utilization of ground area, the protection of pavement, curbs, walks, structures, and other permanent improvements shall be installed and maintained.
- D. In storing materials within any structure, or when using structure as a shop, the Contractor shall consult with the Architect and Owner and shall restrict storage to spaces designated for such purposes. The Contractor will be held responsible for repairs, patching or cleaning arising from such use.
- E. Ground storage shall be similarly restricted.
- F. The Contractor shall not trespass or enter upon areas that are noted as being restricted.
- G. Plumbing fixtures shall not be used for emptying water from buckets, pails or other containers. Notwithstanding any approvals or instructions which must be obtained by the Contractor from the Owner in connection with use of premises, the responsibility for the safe working conditions at the site shall be the Contractor's and the Owner shall not be deemed to have any responsibility or liability in connection therewith.

1.17 CLEANING

- A. Each Contractor shall, while engaged in work, maintain everything used in conjunction therewith in an orderly and clean condition and shall periodically during progress of work, or when directed by Architect, clean up and remove from building rubbish accumulated from his work.
- B. Work areas shall be cleaned on a daily basis. Areas occupied by Owner shall be kept clean at all times.
- C. Before reporting for final inspection, preceding acceptance by Architect, Contractor shall thoroughly clean fixtures, and apparatus of dust, stains, grease, oil, etc., and touch up with enamel or paint any scratched or marred surfaces. Finish of all trim and equipment shall be in perfect condition.

1.18 MANUFACTURER'S REPRESENTATIVE

- A. Each Trade Contractor shall provide, at appropriate time or as directed by Architect, the services of a competent factory-trained Architect of particular manufacturer of equipment or item involved so as to inspect, adjust, and place in proper operating condition any and all items of manufacturer. No additional compensation will be allowed to Contractor for such services.

1.19 SUPERVISION AND LAYOUT

- A. Contractor shall have a competent English speaking, foreman in charge of the work for duration of the Contract. Dealings at site will be made with this person only.
- B. Contractor shall not employ on job unfit persons or anyone not skilled in work assigned, nor anyone considered detrimental to best interests of job.
- C. Contractor to supervise the work, lay out the work and do necessary measuring.
- D. All work shall be executed at and from as many different points, at such times and with such force as to meet completion schedules and/or as may be deemed necessary by Architect.

1.20 MATERIALS AND WORKMANSHIP - GENERAL REQUIREMENTS

- A. Guarantees of Performance: Contractor shall be held to have carefully examined and checked Drawings and Specifications before acceptance of Contract, starting any work, or purchasing any materials. Contractor shall inform Engineer of any changes or additions necessary to make possible fulfillment of any guarantees called for by this Specification, failing which, he shall be deemed to have accepted such guarantees and be bound thereby.
- B. Wherever hereinafter guarantees of durability, operating capacity, proper functioning or like are called for, or whenever it is specified that manufacturer shall furnish detail drawings, test certificates or performance curves, supervise installation of his apparatus, test or adjust it after installation, keep it in repair for a stated period, or render other similar services, Contractor will be held responsible for thorough performance or specific services under actual conditions of installation.
- C. Same shall apply in cases where special adjustment or other services are necessary to insure proper and efficient functioning of apparatus, even though not specifically called for. It is intended that entire plant be ready for satisfactory operation, and Contractor is hereby made responsible for this result.
- D. In every case where Contractor's own employees cannot adequately perform above-described services, he shall stipulate such performance in his Contract with subcontractors, manufacturers, etc., or else subsequently pay them any additional fees required therefore so that a satisfactory and ready plant will be secured without additional cost to Owner.

1.21 ABBREVIATIONS

- A. The following abbreviations shall apply:
 - GC - Contractor for General Construction
 - PC - Plumbing Contractor or Sub-Contractor
 - HC - Heating Contractor or Sub-Contractor
 - EC - Electrical Contractor or Sub-Contractor

1.22 JURISDICTIONAL DISPUTES

- A. Contractor shall assume responsibility for resolving jurisdictional disputes and resolving all claims arising from factory vs. field installation, etc.
- B. Wherever factory mounting, piping or wiring of controls and accessories, etc., are called for, Contractor shall ascertain at time of Bid that all work is in accord with local jurisdiction and shall allow for all costs to comply with. Extras arising out of jurisdictional disputes will not be permitted.

1.23 FOUNDATIONS AND SUPPORTS

- A. All piers, supports, shelving, foundations, anchor bolts, hangers, auxiliary steel, etc., unless specified under other Sections, required by Mechanical or Electrical Contractors for support or hanging of their equipment shall be provided by Contractor requiring same. All such work shall be done by Contractor requiring same. All such work shall be done in a manner approved by Architect.
- B. The anchoring of all equipment to the structure shall comply with all applicable requirements of the local governing codes.
- C. Support and fastening of all mechanical and electrical equipment shall be by the Trade Contractors. All equipment hung from overhead construction shall have weight of equipment distributed by use of structural iron supports, as necessary and approved, substantially fastened to structural support system. Any wall-mounted equipment, which cannot be supported from architectural or structural materials shall have its own independent support system furnished by the Contractor. Proposed installation method shall be reviewed by the Architect.

1.24 ESCUTCHEONS

- A. Contractor shall provide escutcheons on pipes wherever they pass through floors, ceilings, walls or partitions.
- B. Escutcheons for pipes passing through outside walls shall be Ritter Pattern and Casting Company No. 1 solid, cast brass, flat type, secured to pipe with a set screw.
- C. Escutcheons for pipes passing through floors shall be Ritter Pattern and Casting Company No. 3A split-hinged, cast brass chromium plated type.
- D. Piping passing through exterior walls, floors below grade, etc., shall be made watertight with caulking compound and pipe sleeves with wall collar located at the center of the wall extending 8" all around the pipe. Collar to be 1/8" thick steel welded to sleeve. Provide link seals, install per manufacturers guidelines.

1.25 PAINTING

- A. Painting and touching up shall be responsibility of Contractor installing equipment and/or materials.
- B. Galvanized and Copper Pipe: Uncovered piping shall be cleaned and left unpainted.

- C. Materials not Accessible: Hangers, metal supports, pipe, conduit and miscellaneous equipment, except copper and galvanized, which is above hung ceilings, in chases or areas not accessible when job is completed shall be given a prime coat of paint to prevent rusting or corroding of material.
- D. Exposed Material: Hangers, metal supports, pipe and conduit air handling units, tanks, electric fixture stems and canopies, and all material with exposed metal surfaces shall be finished as described above with prime and final coats of paint. Equipment which has factory enamel finished surfaces which has been slightly scratched or chipped shall be cleaned and at discretion of Engineer shall be touched up with factory paint. Equipment which is more than slightly rusted, scratched or chipped shall at discretion of Engineer be repainted in its entirety with a factory finish.
- E. All underground ductwork, piping and conduits shall be given two (2) coats of asphaltum.
- F. Finish painting of patched and damaged architectural finishes: provide all required preparation of surfaces, priming and finish painting of all patched or damaged areas to match existing adjacent finishes in color, texture and quality of paint.

1.26 EQUIPMENT START-UP AND TESTING

- A. Each Contractor shall furnish services of qualified men thoroughly familiar with job and installed work to operate and make adjustments so that equipment and work furnished under this Contract operates as required.
- B. Contractor shall consult Engineers in their offices during progress of job or in field during field inspections by Engineers regarding changes necessitated by job conditions, explanations of functions of equipment, controls, balancing, operations, etc.
- C. Contractor shall instruct Owner's operating personnel during start up and separate operating tests of each major item of equipment including pumps, boilers, burner, chillers, compressors, fire alarm, etc. During operating tests, Contractor shall prove operation of each item of equipment to satisfaction of Architect.
- D. At least seven (7) days' notice of equipment start-up and operating tests shall be given to Architect. See technical sections of these specifications for additional field tests, factory tests and certifications required.

1.27 INSTRUCTIONS AND LITERATURE

- A. Contractor is to thoroughly instruct building custodian or person/persons designated by Owner in proper care and operation of work furnished and installed by him. Contractor shall prepare for use by Owner a detailed brochure of instructions in non-technical terms describing maintenance and operation of all apparatus, valves, controls, switches, fixtures, etc., furnished and installed by him. Two (2) preliminary copies must be submitted for checking and approval, after which four (4) bound copies of corrected material shall be delivered to Architect

for turning over to Owner. Brochures shall contain copies of all finally corrected shop drawings of all equipment.

- B. At completion of instruction period, when Contractor and Owner are satisfied of Owner's knowledge to operate equipment, Contractor shall obtain in writing Owner's acceptance of instructions.

1.28 COORDINATION OF THE WORK

- A. Each Contractor or Sub-Contractor shall coordinate the work with that of the Contractor for General Construction and with Contractors or Sub-Contractors for the other Mechanical and Electrical trades. Work shall be scheduled in accordance with the project schedule so that all of the work will be installed at the proper time without delaying completion of the project.
- B. Each Contractor or Sub-Contractor shall check the Contract Drawings and Specifications for all of the other trades so as to become familiar with the various items of apparatus and equipment, which will be furnished or set under the different Contractors, that require connections or other coordination.
- C. Each Contractor or Sub-Contractor shall furnish to the Contractor for General Construction, detailed advance information regarding all the requirements related to work under other Divisions and/or Sections. Furnish sizes, accurate data, and location of any and all pads, chases, sleeves, and slots through floor slabs, walls, foundation, ceilings, roof, and other special openings required.
- D. Each Contractor or Sub-Contractor shall carefully check space requirements with other Contractors to ensure that piping, conduits, fixtures, equipment's, ducts, etc. can be installed in the spaces allotted for same.
- E. Wherever the work of the various Contractors or Sub-Contractors interconnects each Contractor or Sub-Contractor shall provide all information, as required for equipment, to the connecting Contractor or Sub-Contractor so that the connecting Contractor or Sub-Contractor will be able to properly provide all water and drain connections, electrical connections or general construction provisions.
- F. Each Contractor or Sub-Contractor shall check the Architectural Drawings for all ceiling height requirements.
- G. HC shall provide a copy of the ductwork shop drawings for trade coordination. Prior to circulating copies of these drawings, HC shall check and update with the latest structural drawings, architectural layouts, ceiling plans and ceiling heights. Each Contractor or Sub-Contractor shall mark up their equipment, piping, fixture, panel and conduit locations on the drawings and return them to the HC, who shall incorporate all information onto final coordination drawings. Coordination meetings shall be held at locations and at frequencies required to accomplish this. After HC has incorporated the data from all trades, a final coordination meeting shall be held where each Contractor or Sub-Contractor shall "sign-off" the coordination drawings. The "sign-off" shall be complete prior to the start of any work. An electronic copy of final coordination drawings shall be sent to the Architect and the Engineer.

1.29 RECORD DRAWINGS

- A. Contractor shall prepare and maintain a set of drawings on which a current record of any changes made so that at completion of work a complete record will be shown thereon of actual installation. At completion of work the changes recorded shall be entered on to the electronic file for the drawings by the Contractor and shall be turned over to Owner. They shall be certified and notarized to be complete and accurate. Owner shall be provided one disk copy and two (2) sets of prints. All electronic drawing files shall be prepared using the latest AutoCAD release.

1.30 SHOP DRAWINGS

- A. See individual Sections for items requiring submission of shop drawings. A minimum of six (6) copies of each shop drawing shall be submitted.
- B. The name of the manufacturer, model, accessories, size, etc. shall be clearly noted.
- C. Contractor shall review shop drawings prior to submission and all shop drawings shall be stamped by the Contractor indicating satisfactory review of same. Any deviations or changes to Contract Documents shall be clearly noted.
- D. Review of shop drawings by the Architect/Engineer shall not relieve the Contractor of the responsibility of furnishing materials in accordance with the Contract Documents.
- E. Contractor shall be responsible for quantities, physical sizes, electrical characteristics, etc. Any additional costs incurred due to the substitution of equipment (e.g., electrical, structural, etc.) shall be borne by the Contractor making the substitution.

1.31 GUARANTEE AND SERVICE

- A. Guarantee and service the entire installation for a period of one year from the date of substantial completion.
- B. The final acceptance will be made after Contractor has adjusted his equipment, balanced the various systems, demonstrated that it fulfills the requirement of the drawings and specifications, and has furnished all required certificates of inspection, drawings, instructions and approvals.
- C. Contractor shall, during the period of the guarantee, replace or repair at no cost to the Owner any piece of equipment and/or materials which is found to be defective. The replacement or repair shall be performed the same day of notification in an emergency fashion when notified by the Owner or authorized representative. Contractor shall also repair damage to surrounding work caused by the failure, repair or replacement of defective equipment.
- D. During guarantee period, Contractor shall provide at no additional cost to the Owner, full service and maintenance for all equipment and systems, including all necessary inspections, servicing, lubrication, adjustments, replacements and cleaning necessary to maintain equipment and systems in top working efficiency.

Included shall be a minimum of four (4) scheduled service visits for routine and preventive maintenance. Terms of service contract shall be submitted for review.

- E. Response time for emergency service shall be four (4) hours during business hours and six (6) hours on nights, weekends or holidays, and two (2) days for routine servicing.
- F. Refrigeration compressors shall have a factory guarantee including parts and labor for five (5) year's total. Certificates shall be turned over to the Owner.
- G. Refer to technical paragraphs for additional guarantee and servicing requirements for specific equipment and systems.

END OF SECTION