

SECTION 15050

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

- A. Labor, materials, tools, and services for a complete installation of equipment and system contained in the Contract Documents.
- B. Principal features of the work included are:
 - Heating, ventilating, air conditioning systems, controls, and mechanical system insulation.
 - Roof curbs for HVAC systems, intake hoods, louvers, supply fans, and relief vents furnished and set under this Division.
 - Refrigerant piping, connections, refrigerant and refrigerant charges.
 - Excavating and backfilling for mechanical work; coordinate with Section 02300.
 - Anchor bolts, sleeves, supports and similar items to be built into concrete or masonry.
 - Preparation for testing and balance of mechanical systems and correcting deficiencies.
 - Preparation and submittal of shop drawings and product data.
 - Maintaining a record set of blue-line prints and marking them to indicate locations of concealed items, and deviations made to suit conditions and production of mechanical as-built (record) drawings.

1.2 JOB CONDITIONS

- A. Submittal of bid implies bidder has read applicable paragraphs of the specifications and will be bound by their conditions.

1.3 LOCAL CONDITIONS

- A. Conform with local conditions. Coordinate with local utilities on size of utility services.

1.4 INTENT

- A. The contract documents (drawings and specifications) describe the mechanical work of this project. Any item mentioned in one part shall be as binding as though mentioned in both.
- B. The contract documents form a guide for a complete mechanical installation. Where an item is reasonably necessary but not specifically mentioned, such as duct hangers or transitions, piping offsets, drains, etc., for a complete system, provide same.

- C. Mechanical layouts indicated on drawings are diagrammatic only. Exact locations of ducts, pipes, and equipment shall be governed by the drawings of related trades and/or site specific conditions.

1.5 DEVIATIONS

- A. No deviations from specifications and drawings shall be made without full knowledge and written consent of Construction Manager.
- B. Should Contractor find, during progress of work, conditions which dictate the modification of any particular requirements, report such item promptly for decision or instructions. Modifications without approval of the Owner will be at Contractor's expense.

1.6 QUALITY ASSURANCE

- A. Comply with all applicable local, state and federal codes.
- B. Comply with all applicable requirements of recognized industry associations which promulgate Standards for the various trades. (See individual Sections of Division 15).
- C. Employ only qualified journeymen for this work. Employ competent, qualified mechanics to supervise the work.

1.7 CODES AND STANDARDS

- A. Perform work specified in Division 15 in accordance with all applicable codes and standards listed below, and such standards that may be specified in other sections. When these specifications are more stringent, they take precedence. In case of conflict, obtain a decision from the Construction Manager.
 - NFPA 54: National Fuel and Gas Code.
 - NFPA 90A: Air Conditioning and Ventilation Systems.
 - NFPA 101: Life Safety Code
 - Applicable State Building Code.
 - Applicable State Mechanical Code.
 - Applicable State Plumbing Code.
 - Handicapped Code ANSI A117.1 and ADA
 - Applicable State Energy Code.
 - AGA: American Gas Association
 - ANSI: American National Standards Institute.
 - ARI: American Refrigeration Institute.
 - ASHRAE: American Society of Heating, Refrigeration and Air Conditioning Engineers.
 - ASME: American Society for Mechanical Engineers.
 - ASTM: American Society for Testing and Materials.
 - MSS: Manufacturer's Standardization Society of the Valve and Fitting Industry.
 - NEMA: National Electrical Manufacturers' Association.
 - NFPA: National Fire Protection Association.
 - SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.
 - UL: Underwriters' Laboratories, Inc.

1.8 COORDINATION

- A. Carefully examine specifications and drawings to be thoroughly familiar with items which require plumbing or HVAC connections and coordination.
- B. Coordinate with other Divisions to leave proper chases and openings. Place outlets, anchors, sleeves, and supports prior to pouring concrete or installation of masonry work.

1.9 SUBMITTALS

- A. Submittals are only required for specific items of equipment or material listed in individual sections of these specifications.
- B. Within 15 days after award of contract for this work, submit a list of proposed manufacturers (of equipment or material to be used) for approval. Submit this list before submittal of shop drawings and product data, and obtain approval before submitting required items.
- C. Shop Drawings (Not required for Owner furnished equipment).

1.10 DELIVERY AND STORAGE

- A. Insofar as possible, deliver items in manufacturer's original unopened packaging. Where that is not practical, cover items with protective materials to keep them from being damaged. Use care in loading, transport, unloading, and storage to keep items from being damaged. Failure to protect items shall be subject at Contractor's expense as determined by Construction Manager.
- B. Store items in a clean, dry place, and protect from damage.

1.11 FIRE RATINGS

- A. Materials used anywhere in the work must have NFPA ratings as follows:
 - Flame Spread - Not over 25.
 - Smoke Developed - Not over 50.
 - Fuel Contributed - Not over 25.
- B. Materials shall be "Self-Extinguishing".

1.12 PERMITS AND FEES

- A. Obtain, pay for, and deliver permits, certification of inspection, and other such items required by the authorities having jurisdiction. Deliver certifications to the Construction Manager prior to Final Acceptance of the work. An inspection certificate for each class of work requiring inspection must be submitted prior to or with the final payment invoice. The responsible trade contractor must make application for the inspection, coordinate same and pay the required inspection fee.

1.13 EXTENDED WARRANTIES

- A. Work furnished under the Contract shall be warranted against defects in workmanship and (Contractor furnished) materials for a period of not less than one (1) year, or as otherwise specified from the date of final acceptance of the installation. Defects of workmanship developing during this period shall be remedied, and defective material replaced, without additional cost. When defects in a Trade Contractor's work causes damage to the work of other Trade Contractors', such damage shall be repaired by the Trade Contractor causing damage and work restored to its original condition, at the expense of the Trade Contractor that caused the damage.

PART 2 - PRODUCTS

- 2.1 MATERIALS AND EQUIPMENT
 - A. Within the Contract Documents, mechanical work, manufacturers' names, catalog numbers, and other proprietary references to materials and equipment are made. Such references are made to establish the standards of quality and type required, and to limit competition. Approved manufacturers of competitive products are listed in applicable sections as "approved equals". Reasonable requests for substitution or additions to "approved equals" will be considered by the Construction Manager will be the sole judge of the suitability of items proposed as substitutes. Failure to obtain Construction Manager's approval shall be at the Contractor's expense.

- B. Materials and equipment used in carrying out these specifications shall bear U.L. or other recognized testing laboratory label when such labels are available.

PART 3 - EXECUTION

3.1 LOCATIONS

- A. Mechanical layouts indicated on drawings are diagrammatic. Exact locations of ducts, pipes, and equipment may vary because of conflicts with work of other trades. Work out conflicts where relocations will not affect operation or appearance of systems.
- B. Locate equipment requiring periodic servicing so that it is readily accessible. Do not back up service sides to walls, nor place it too close to other equipment to make service impractical. Equipment service clearances shall meet minimum acceptable distances as recommended by equipment manufacturer.

3.2 UTILITIES EXCAVATING AND BACKFILLING

- A. Perform trenching, excavating, backfilling for mechanical work in accordance with Section 02300 and as set forth below:

- Perform work necessary for installation of mechanical/plumbing utilities.
- Depth of excavation to provide a minimum of 3' above top of pipe. Excavation to be carried to a depth of at least 6" below bottom of pipe elevation. Fill below pipe (6"), around pipe, and a minimum of 12" above pipe with sand or Class "B" crushed stone tamped firm and even. Separate topsoil during excavation. Final layer of dirt (12" minimum) to be topsoil. Trenches to be at least 18" wider than pipe with batterboards placed every 25'. Backfilling shall be done to exclude use of rock or stone above sand or crushed stone.

3.3 CUTTING AND PATCHING

- A. Repair or replace routine damage caused by cutting in performance of contract.
- B. Correct unnecessary damage caused due to installation of mechanical work.
- C. Perform repairs with materials which match existing and install in accordance with the appropriate section of these specifications.

3.4 CONNECTION OF EQUIPMENT

- A. Connect or install equipment shown on mechanical drawings that requires plumbing and/or mechanical hookups.

- Rough-in piping and connect equipment.
- Provide piping, shutoff valves, and unions required for a complete installation.

3.5 SERVICE OF SYSTEMS

- A. If equipment is placed in service prior to acceptance of the project by Construction Manager, operate equipment strictly in accordance with manufacturer's instructions.
- B. Employ competent, qualified personnel in operation of the equipment.
- C. Provide for proper operation and cleanliness.
- D. Open up equipment for inspection as directed by the Construction Manager.
- E. Lubricate equipment and perform such other maintenance as required by placing it in first class operating condition.

END OF SECTION

SECTION 15050

HEATING, VENTILATION, AND AIR CONDITIONING

PART 1 - GENERAL

1.1 SUMMARY OF WORK

Furnishing of all labor, materials, tools, transportation, services, and related items necessary to complete the installation of the HVAC system as illustrated on the drawings, together with all necessary auxiliaries and appurtenances.

- A. Items include but are not limited to the following:
 - Packaged rooftop unit.
 - Heat exchanger.
 - Refrigeration components.
 - Unit operating controls.
 - Air filters.
 - Roof curb.
 - Electrical power connections.
 - Operation and maintenance service.
 - Ductwork.
 - Ductwork specialties.
 - Access panels and doors.
 - Ductwork insulation.

- B. Submit Product Data.

- C. Submit Shop Drawings, including mounting and installation details for roof curbs and coordination with roofing system.

- D. References
 - ASHRAE 90.1, latest edition - Energy Standard for Buildings. Establishes minimum efficiencies for equipment.
 - NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems.
 - ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.
 - ARI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard. Applies to Gas/Electric Units above 135,000 BTU.
 - ANSI/ASHRAE 37 - Testing Unitary Air Conditioning and Heat Pump Equipment.
 - ANSI Z21.47/L1995 - Unitary Air Conditioning Standard for safety requirements.
 - ARI 210/240 - Unitary Air Conditioning Equipment and Air-Source Heat Pump Equipment. Applies to all units below 135,000 BTU.
 - ARI 270 - Sound Rating of Outdoor Unitary Equipment.
 - ARI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment.
 - ANSI/NFPA 70-1995 - National Electric Code.

- E. EER: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Building, except Low-Rise Residential Buildings."

1.3 NATIONAL ACCOUNT

- A. YUMI Brands, Inc. has entered into a national account agreement with Trane for furnishing the HVAC roof top units specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, contact Trane at number indicated on the drawings.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Install packaged units, as indicated in the Drawings, in accordance with the Manufacturer's instructions and requirements. Provide related products and accessories from one manufacturer. Store materials in accordance with manufacturer recommendation protecting from dirt, moisture, contaminants and weather.
- B. Codes and Standards: Perform all installations in accordance with the latest standards as recognized by ASHRAE, SMACNA and all applicable state and local codes and ordinances.
- C. Workmanship: Experienced, well-trained workers competent to complete the work as specified shall perform Labor in conformance with generally accepted trade standards. Install all equipment square and plumb allowing access for proper operation, adjustment and service.

1.5 STRUCTURAL AND SPACE CONDITIONS

- A. All work shall avoid obstructions and interference with other trades, preserve headroom and keep openings and passageways clear and free.

1.6 VIBRATION AND NOISE

- A. Install each of the various pieces of equipment to operate without objectionable vibration.

1.7 BALANCING AND TESTING

- A. Test and Balance shall be performed by a nationally recognized Test and Balance Company contracted directly to the Owner.
- B. Contractor shall coordinate testing with the Testing and Balance Company. All systems shall be fully operational prior to commencement of testing. Corrected deficiencies noted in the Testing and Balance Report within three days or prior to store operation.
- C. Assume responsibility for correcting all items determined to be the result of improper or incomplete installation.
- D. Contractor shall be responsible for providing test reports to the local jurisdiction as required for Certificate of Occupancy.

1.8 CLEAN-UP

- A. At the completion of the work, clean the area of all debris such that the Project is left in a neat and clean manner as deemed acceptable by the Owner.

1.9 WARRANTY

- A. In addition to honoring all Contractor supplied equipment manufacturers' warranties, the Contractor shall warrant and correct all defects in Contractor supplied material and all workmanship for a period of one (1) year after acceptance of Project by the Owner. Warranty costs shall include all labor and material associated with the correction of work covered under this Contract.

PART 2 - PRODUCTS

2.1 ROOF TOP AIR CONDITIONING UNITS, FANS AND AIR OUTLETS

- A. Equipment shall be as indicated on the Drawings. Air conditioning unit shall include hard-start kit for low ambient temperature operation.
- B. The manufacturer shall include the following items:
 - 5-year compressor warranty - parts only.
 - 10-year heat exchanger warranty - parts only.
 - Factory installed two-position motorized damper.
 - Factory installed hard start kit for low ambient to zero degree operation.
 - Factory installed hinged access panels.
 - Through the base gas and electrical connections to minimize roof penetrations.
 - Factory installed circuit breaker.
 - Factory installed unpowered convenience outlet.
 - Factory supplied/installed return air smoke detector.

- C. The contractor shall furnish manufacturer complete submittal wiring diagrams of the packaged unit as applicable for field maintenance and service.

2.2 DUCTWORK

- A. Rectangular Ducts Fabrication, General: Except as otherwise indicated, fabricate rectangular ducts with galvanized sheet steel, in accordance with SMACNA - HVAC Duct Construction Standards, Tables 1-3 through 1-19, including their associated details. Conform to the requirements in the referenced standard for metal thickness, reinforcing types and intervals, tie rod applications, and joint types and intervals.
- B. Kitchen Hood Exhaust Ducts Fabrication, General: Fabricated using 16-gage, carbon steel sheets for concealed ducts and 16-gage stainless steel for exposed ducts. Weld and flange seams and joints. Conform to NFPA Standard 96.
- C. Flexible Ductwork Fabrication, General:

- Factory preinsulated, spiral helix steel spring permanently bonded to an interior liner, and sheathed in an exterior reinforced laminated vapor barrier jacket.
- Precut lengths of flexible duct with continuous inner liner, factory installed female collars and fastening devices at each end.
- Provide spin-in extractor balancing damper assembly complete with a level position indicator and positive locking device, as indicated on the Drawings, round duct takeoffs from rectangular main ducts.

- D. Label entire assembly in accordance with UL 181 Class 1 air duct requirements and not have a flame and smoke spread rating in excess of 25/50 respectively.

2.3 DUCT ACCESS PANELS AND DOORS

- A. In sheet metal work, hollow core double construction of same or heavier gage material as duct in which installed, products by CESCO, Vent Products, Air Balance, or equivalent.

- Provide Ventlok or approved hinges and latches on all doors; 100 Series hinges and latches on low pressure system doors up to 18-inches maximum dimension, 200 Series on larger low pressure system doors and 333 Series on high pressure systems.
- Construct doors up to 18-inches maximum dimension with one inch overlap fit and gasket with 3/4-inch by 1/8-inch sponge rubber, fit larger doors against 1-1/2 inches by 1/8-inch flat stock or angle frame and gasket with 3/8-inch by 1/8-inch sponge rubber or felt.
- Door swing to be opposite airflow direction.

2.4 DUCTWORK SPECIALTIES

- A. Volume and Splitter Dampers
 - Galvanized sheet metal blade and frame with Ventfabrics Inc., Ventlok operating handle.
 - For accessible dampers, provide self-locking dial regulator and #644 self-locking air regulators for regulated dampers, #636 square end bearing, and #635 spring bearing application.
 - For inaccessible dampers, provide #666 or #677 concealed lock damper regulator with bearings as above. For static pressures above 3-inch W.G., provide #640 HiVel dial regulator and #609 HiVel end bearing for accessible dampers.

B. Multi-Louver Volume Dampers

- 16-gauge galvanized steel frame. Opposed, 6-inch wide, 16-gauge galvanized steel blades. Concealed linkage in frame.
- Titus #AG-35-B, Ruskin #CD35/OBD or equal.

C. Flexible Connections

- Provide flexible connectors at the discharge and inlet of fans, air handlers, rotating mechanical equipment, and where shown on the Drawings for proper vibration isolation. Neoprene impregnated glass cloth with 24-gauge galvanized metal frame. Minimum dimensions: 3-inch metal, 3-inch fabric, 3-inch metal.
- Duro Dyne #MFN4, Ventfabrics "Ventglas", Q Industries, Consolidated Kinetics, Eigen, or equal.

D. Backdraft Dampers

- Provide counterweight type complete with frame, end bearings, counterbalance assembly, blades, and linkage.
- Install at outside air intakes, exhaust outlets, and where shown on Drawings.
- Pacific Air Products #PRD-100AL, Ruskin #CBS-7 or equal by Swartwout, American Warning, or Vent Products.

2.5 DUCT INSULATION

- A. Acceptable Manufacturers: Provide products of the following manufacturers, complying with specified requirements. Equivalent products of other manufacturers will be considered in accordance with the "or equal" provision specified in Section 01000 - Supplemental General Requirements, and the Construction Contract.

- Owens-Corning Fiberglas Corp.
- Johns Manville Corp.
- Certainteed Corp.

- B. All insulation material shall comply with applicable energy conservation regulations for Project location.

- C. Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA 255) method.

- D. Provide staples, bands, wires, tape, anchors, corner angles and similar accessories as recommended by insulation manufacturer for applications indicated.
- E. Provide cements, adhesives, coatings, sealers, protective finishes and similar compounds as recommended by insulation manufacturer for applications indicated.

2.6 HVAC CONTROLS

- A. Shall be as indicated on the Drawings.
- B. Electric and electronic HVAC Controls: Components and operating features as indicated on the Drawings.

2.7 ROOF CURB

- A. Manufacturer's standard corrosion-resistant-coated, insulated curb with nailer strip, flashing and counterflashing and cadmium-plated hardware.

PART 3 - EXECUTION

3.1 HVAC SYSTEM INSTALLATION, GENERAL

- A. Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:

- Coordinate mechanical systems, equipment, and materials installation with other building components.
- Verify all dimensions by field measurements.
- Arrange for chases, slots, and openings in other building components during progress of, to allow for mechanical installations.
- Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
- Sequence, coordinate, and integrate installations of the mechanical materials and equipment for efficient flow of the work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
- Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

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JOB NO: BH, MJ, SO
DRAWN: AR, CF
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ACC #:

HVAC SPECIFICATIONS



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