

1.1 SYSTEM DESCRIPTION

A. Provide new heating, ventilating, and cooling (HVAC) systems complete and ready for operation. HVAC systems include equipment, ducts, and piping which are located within, on, under and adjacent to building.

1.2 SUBMITTALS

A. Manufacturer's Catalog Data

1. Split-system air conditioning units
2. Exhaust fan
3. Diffusers, registers and grilles
4. Outside air intakes
5. Dampers
6. Thermostats and humidistats

B. Manufacturer's Instructions

1. Installation manual for each item of equipment.

D. Operation and Maintenance Manuals

1. Split-system air conditioning units
2. Exhaust fan

PART 2 PRODUCTS

2.1 SPLIT-SYSTEM AIR CONDITIONING UNITS

A. Provide units factory assembled, designed, tested, and rated in accordance with ARI 210/240 or ARI 340. Units shall be ARI certified or listed in ARI UD, "Unitary Air-Source Air Conditioners." Units shall include fans, evaporator coil, filters, and controls. Provide additional electric heating section. Outside unit shall include compressor and condenser. Insulate interior of inside unit casing with manufacturer's standard insulation. Provide guards to protect condenser from damage. Air handler and condensing units shall be Trane, Carrier, or York.

1. Filter section: Provide UL listed throwaway 2-inch thick fiberglass filters, standard dust-holding capacity, 350 fpm maximum face velocity. Provide gasketed access panel with quick opening latches at end of filter rack.
2. Safety controls: Provide low refrigerant pressure protection and pressure relief device. Provide compressor motor with thermal and overload protection, 5-minute anti-recycle timer and start capacity kit. Provide compressor with electrical crankcase heater and internal high-pressure protection. The above safety controls are not required when scroll compressors, 8 second time delay and discharge thermostats are provided.
3. Electric heater section: Provide UL or ETL listed electric resistance heaters including internal fusing integral with indoor unit; fan shall run until heater cools. Locate downstream of indoor coil. Provide controls to operate heater only when indoor thermostat is in heating mode and outdoor thermostat indicates outside temperature is below 35°F or unit balance point, whichever is higher.

B. Split systems shall have the capacities and characteristics as scheduled on the drawings.

2.2 EXHAUST FANS

A. Sound rating per AMCA 300; statically and dynamically balanced, with air capacities, brake horsepower, fan types, fan arrangement, sound power levels or loudness level, and static pressure, as indicated. Fan bearing life shall have a minimum average life of 200,000 hours at design operating conditions. Provide bird screens for outdoor inlets and outlets. Equip with automatic backdraft dampers. Have thermal overload protection in the operating disconnect switches within the building. Construct housings and fan wheels of aluminum, except as specified otherwise.

1. Provide fans with the capacities and characteristics as specified on the drawings.

2.3 ELECTRICAL

A. Electrical motors, controllers, contactors, and disconnects: Furnish with respective pieces of equipment. Motors, controllers, contactors and disconnects shall conform to electrical specifications. Provide controllers and contactors with maximum of 120-volt control circuits, and auxiliary contacts for use with controls furnished. When motors and equipment furnished are larger than sizes indicated, the cost of providing additional electrical service and related work shall be included under this section.

2.4 METAL DUCT SYSTEMS

A. Provide shop-fabricated, zinc-coated steel ducts conforming to ASTM A 525 or ASTM A 527/A 527M coating designation G60. Fabricate, construct, brace, reinforce, install, support, seal, and test ducts and accessories in accordance with SMACNA HVACDCS and SMACNA HVACALTM. Cover duct transverse joints with single component synthetic rubber type compound suitable for use with passivated coating on zinc-coated steel. Lap joints in direction of flow. Provide ducts straight and smooth on inside with neatly finished airtight joints. Provide air supply and return openings in ducts with air diffusers, registers or grilles.

1. Flexible Duct Connectors: Provide airtight flexible duct connectors at duct connections to each air-conditioning unit, air-handling unit, exhaust fan, and ventilating fan. Support connectors at each end with metal angle frame bands, securely bolt in place. Provide not less than 20-ounce glass fabric duct connectors coated on both sides with neoprene.
2. Turning Vanes: Provide fabricated tees and square elbows in accordance with SMACNA HVACDCS for vane elbows.
3. Dampers: Provide opposed blade adjustable manual dampers where indicated. Provide damper shafts with 2-inch standoffs to clear 2 inches of duct insulation with bearings at both ends of the shafts. Provide adjustment quadrant with indicator and locking devices. Provide galvanized steel dampers one gage heavier than duct in which dampers are installed.
4. Diffusers, Registers and Grilles: Provide factory-fabricated metal units with edges rolled or rounded where exposed to view, and factory primed with white enamel finish. Provide each unit with an adjustable air extractor located in duct to evenly distribute air over face area of unit, and to distribute the indicated quantity of air evenly over conditioned space. Provide each diffuser and register with factory-fabricated, group-operated, adjustable, opposed-blade, air-volume-control dampers, key or screwdriver operated from the face of unit. Provide each unit with rubber or plastic installation gaskets. Diffusers in same room shall have same face design.
  - a. All air devices shall be as scheduled on the drawings.
5. Outside Air Intakes: Intakes shall bear AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500 and AMCA 511. Maximum pressure drop shall be 0.1 inch W.G. unless indicated otherwise. Provide bird screen and roof curbs.
6. Flexible Round Ducts: UL 181 and NFPA 90A with factory-applied insulation, vapor barrier, and end connections. Fire hazard rating of duct assembly shall not exceed 25 for flame spread and 50 for smoke developed. Provide ducts designed for working pressures of 2 inches W.G. positive and 1.5 inches W.G. negative. Duct length shall not exceed 8 feet, unless indicated otherwise. Secure connections by applying adhesive for 2 inches over rigid duct, apply flexible duct 2 inches over rigid duct, apply metal clamp, and provide minimum of three No. 8 sheet metal screws through clamp and rigid duct.
  - a. Inner duct core: Flexible core shall be interlocking spiral or helically corrugated and constructed of zinc-coated steel, aluminum, or stainless steel; or shall be constructed of inner liner of continuous galvanized spring steel wire helix fused to continuous, fire-retardant, flexible vapor barrier film, inner duct core.
  - b. Insulation: Inner duct core shall be insulated with mineral fiber blanket type flexible insulation, minimum density of 1 pct, minimum of 1.5 inches thick. Insulation shall be covered on exterior with manufacturer's standard fire retardant vapor barrier jacket for flexible round duct.

2.5 DUCT INSULATION

A. Exterior ductwrap insulation shall be applied to the outside of all low-pressure rectangular supply, return and outside air ductwork. The ductwrap insulation shall be a flexible fiberglass blanket conforming to ASTM 553. The insulation shall have a minimum installed R-value of 6 @ 75°F. This shall be accomplished using either 2" thick one-and-a-half density insulation or 2-3/16" thick 3/4 pound density fiberglass. The ductwrap shall have a foil faced vapor proof jacket.

Install insulation in accordance with SMACNA, ASHRAE 90.1 and manufacturer's installation recommendations. Maximum allowable compression shall be 25%. Insulation shall have all seams sealed and shall provide 100% coverage to metal. Insulation vapor barrier shall provide a complete and continuous vapor tight system. All joints in installation shall be sealed 2" minimum on each side using mastic that is UL listed for that purpose.

2.6 PIPING SYSTEMS

A. Copper refrigerant piping: Provide ASTM B 280, Type ACR, cleaned, hydraulic and sealed. Provide ANSI B16.22 solder joint refrigerant fittings and hangers. Provide silver brazing alloy solder and silver brazing alloy flux. During brazing operations bleed a small amount of dry oil-free nitrogen continuously through the refrigerant tubing. Provide ASME B16.26 flare fittings.

2.7 DAMPERS

A. Fire dampers shall be furnished and installed with sleeves and double wall access doors where shown on plans. All dampers shall be UL approved and shall bear the UL seal of approval. Damper blades shall be held completely out of air stream similar to Ruskin Type 1BD2, Style B. Dampers shall be installed in accordance with SMACNA Fire Damper and Heat Stop Guide for Air Handling Systems.

PART 3 EXECUTION

3.1 INSTALLATION

A. HVAC System: Installation of HVAC system including equipment, materials, installation, workmanship, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with ASME B31.1, ASME B31.5, and NFPA 70.

3.2 PIPING

A. Inspect, test, and approve piping before burying, covering, or concealing. Provide fittings for changes in direction of piping and for connections. Make changes in piping sizes through tapered reducing fittings; bushings will not be permitted.

1. Threaded connections: Provide polytetrafluoroethylene (PTFE) pipe thread paste only on male threads. Do not thread metal pipe into plastic piping.
2. Pipe hangers and supports: Provide additional pipe hangers and supports at the concentrated loads in piping, such as for in-line water pumps and flanged valves.
3. Cleaning of piping: Keep interior and ends of new piping and existing piping affected by Contractor's operations, cleaned of water and foreign matter during installation by using plugs or other approved methods. When work is not in progress, securely close open ends of pipe and fittings to prevent entry of water and foreign matter. Inspect piping before placing into position.

3.3 ADJUSTMENTS

A. Adjust controls and equipment so as to give satisfactory operation. Adjust entire water temperature control system and place in operation so that water quantities circulated are as indicated. Air duct systems shall be adjusted and balanced so that air quantities at outlets are as indicated and so that distribution from supply outlets is free from drafts and has uniform velocity over the face of each outlet.

3.4 FIELD QUALITY CONTROL

A. Upon completion and before final acceptance of work, test each system in service to demonstrate compliance with the contract requirements. Adjust controls and balance systems for one year after final acceptance of completed systems. Test controls through every cycle of operation. Test safety controls to demonstrate performance of required function. Correct defects in work provided by Contractor and repeat tests.

1. Refrigerant Piping: Perform following when field piping connections are provided.
  - a. Pressure test: Test refrigerant piping with dry, oil-free nitrogen, and prove tight at 300 psig on high side and 150 psig on the low side. Maintain pressure for 2 hours with no leakage or reduction in gage pressure.
  - b. Evacuation: Use high vacuum pump and certified micron gage, reduce absolute pressure on both sides of system simultaneously to 300 microns. After reaching this pressure, charge system with proper refrigerant until pressure of 2 psig is obtained. Repeat evacuation-charging procedure two more cycles, resulting to three evacuation-charging cycles. On final evacuation, secure pump and maintain 300 microns for 2 hours before charging with required refrigerant.
2. Duct: Clean and test ducts in accordance with SMACNA HVACDCS and SMACNA HVACALTM, and obtain approval before applying insulation.
  - a. Equipment: Test equipment in operation for continuous period of not less than 24 hours under every condition of operation in accordance with manufacturer's recommendation.

4. Testing and Balancing: Refer to specification section 15200.



Express Oil Change & Tire Engineers  
Single Building Right Hand Oil Change  
Augusta, GA

FINAL

No.	Description	Date

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MECHANICAL SPECIFICATIONS

Project number 16031  
Date 03/29/17  
Drawn by JJH  
Checked by CJD

M002

Scale 12" = 1'-0"

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