

MECHANICAL SPECIFICATIONS

- 1) Provide all heating, ventilation and air conditioning items indicated on the drawings, described in this specification or required for a complete and proper installation.
2) Comply with all pertinent codes, ordinances and regulations. Refer to website for Dept. of community Affairs at http://www.dca.state.ga.us/development/constructioncodes/programs/codes2.asp, for current Codes Editions.
3) The contractor shall not attempt to precisely scale dimensions from these drawings to obtain construction dimensions and clearances. The contractor shall verify all actual dimensions and clearances. Although these plans are diagrammatic in nature, they shall be followed as closely as site conditions, new construction, and work by other trades shall permit. Deviations from these drawings, which are required to conform to the available space or the actual building construction, shall be made at no additional cost to the owner.
4) Furnish without extra charge, any additional material and labor required to comply with the above codes and standards, even though the work may not be described in the contract documents. Where the requirements of the contract documents exceed the requirements of the above codes and standards, the contract documents shall take precedence.
5) All equipment and material shall be new and of first quality. Equipment and material shall be the same or equal to the basis of design listed on these drawings and shall be UL listed.
6) Cooperate and coordinate with other trades in order that all systems in the work may be installed in the best arrangement.
7) Examine the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Notify Architect of any discrepancies. Do not proceed until unsatisfactory conditions have been corrected.
8) Avoid interference with structure, and with work of other trades. Install all equipment per manufacturer's instructions. Install accessible parts, including equipment, coils, valves, dampers, controls, and filters with adequate clearance for inspection, adjustments, repair and replacement.
9) All other materials not specifically described but required for a complete and proper installation shall be as selected by the contractor subject to acceptance by the Engineer.
10) All ductwork shall be fabricated from galvanized sheet metal duct and conform to SMACNA HVAC Duct Construction Standards--Metal and Flexible. Seal all joints in ductwork with mastic sealant.
11) Flexible duct: Flexmaster; Alco UPC430(R-4.2); Alco UPC431 (R-8) or Thermaflex, Type 3, insulated. 5'-0" Maximum length unless noted otherwise. Class 1 rating with R-value of 4.2 when located inside building insulation envelope and R-8 when located outside building insulation envelope. Install with no more than 135 degrees maximum of total bends per run. Maximum individual bend shall not exceed 45 degrees each. Support at five feet on centers with hangers having at least 2-inches of width at duct contact points. Flexible connectors shall not pass through any wall floor or ceiling weather rated or not. Provide 3/8-inches of metal duct at penetration of draft stops, fire walls and smoke walls
12) Duct Liner: Owens Corning Armatex Plus, or equivalent. Incombustible glass fiber complying with ASTM C 1071; flexible blanket; impregnated surface and edges coated with acrylic polymer shown to be fungus and bacteria resistant by testing to ASTM G 21. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F. Service Temperature: 250 degrees F. Density: 1.5 pounds/cubic foot. Install using adhesive (50% coverage) and galvanized steel fasteners with welded press-on head Thickness: 1-inch.
13) Condensate drain piping shall be ASTM D2665 PVC with solvent welded fittings. Drain piping shall be no smaller than the drain connection size on equipment. Slope at 1/8 inch per foot continuously toward drains. All indoor condensate drain piping shall be insulated with preformed flexible plastic cellular foam. All outdoor condensate drain piping shall be primed and painted with a coating system recommended by the piping manufacturer for protection against deterioration from weather and UV-light exposure. All piping shall be adequately supported to maintain proper slope and avoid sagging.
14) Refrigerant piping shall conform to manufacturer's recommendations and installation instructions. Refrigerant piping shall be ASTM B280 Type ACR or ASTM B88 Type L drain copper tubing with wrought copper fittings. Insulate suction line with 1/2" thick flexible foamed plastic cellular foam (Armatex or equivalent). All piping shall be adequately supported. Insulation installed outdoors shall be painted with two coats of Armacel WB coating or equivalent.
15) Thermostats: Provide 24 volt, programmable 24-hour, 7-day thermostat to control heating stages in sequence with delay between stages and supply fan to maintain temperature setting. For Heat Pumps include system selection switch heat-off-cool and fan control switch (auto-on), emergency heat switch (auxiliary/emergency heat indicator lights).
16) Provide fire and smoke rated flexible connections between fans and ducts. Material shall comply with NFPA 90A requirements for material in supply air stream.
17) Install all equipment in accordance with manufacturer's instructions and recommendations including clearances recommended for proper operation or service. All filters and serviceable parts shall be readily available.
18) Indoor duct insulation: Foil-faced fiberglass, Owens Corning type 75 or equal, 2" thick, unless the insulated duct is outside building insulation envelope (attic, crawlspace or unconditioned space) in which case the duct insulation thickness shall be 3" thick. Duct shall have a flame spread rating of not more than 25 and smoke developed rating of not more than 50. Glass-Fiber Insulation: All service duct wraps with foil scrim and having backing and a k-value of 0.30 at 75° F mean temperature and an average maximum density of 0.75 lb./cu. ft.
19) All supply, return and outside air ducts shall be insulated. Install acoustical duct liner on the interior surface of the first five (5) linear feet of supply duct downstream and the last five (5) linear feet of return duct upstream of all air handlers and rooftop units. Insulate the concealed tops of all ceiling mounted supply air diffusers with foil-faced fiberglass, 1.5#/cubic foot density, 2" thick. Seal edges to ceiling grid with foil faced tape to provide vapor tight seal.
20) All low-pressure duct branches shall contain manual balancing dampers. Manual balancing dampers shall also be installed in the continuation of the main, if the main duct is smaller or the same size as the branch duct, or if the continuation of the main serves only one device.
21) Make all duct elbows right angle type with single -thickness turning vanes or construct with centerline radius 1-1/2 times the duct width.
22) Duct sizes shown on plans are clear, interior dimensions. Duct sizes shown shall be enlarge to allow for liner at locations of interior liner.
23) Do not cut into or reduce the size of any structural member without the permission of the Architect.
24) Provide weather-proof flashing at all duct and pipe penetrations through the building walls and roof. As a minimum, flashings shall be designed and installed in accordance with SMACNA standards. Flashings shall be guaranteed weatherproof for the duration of the guarantee.
25) Support all HVAC units, ductwork, piping and other appurtenances from structure, provide vibration isolation at all jans which are not internally isolated. Provide hanger rod with built in rubber-in-shear isolator. Between drain pan and unit provide 4 each rubber-in-shear isolator. Do not attach vibration isolator to drain pan. Do not use screw or drive fasteners into non-structural components such as roof decks or non-load bearing walls.
26) Thoroughly clean all components and remove all dirt, scale, oil, and other foreign substances. Provide clean air filters for all equipment.
27) Perform all tests necessary to demonstrate the integrity of the complete installation to the approval of the Engineer and other authorities having jurisdiction. Make all adjustments necessary and balance the completed system in accordance with the data shown. Balance the systems in accordance with NEBB or AABC standards. Acceptable tolerances shall be minus ten percent to plus five percent of all measurements. Balancing shall be done by an independent licensed (by NEBB or AABC) RIB contractor. Make the following tests and submit reports to the Architect:
a) Airflow rate at each supply, return and exhaust outlet or inlet.
b) Total airflow rate and total static pressure for each supply and exhaust fan. Test exhaust fans with doors closed.
c) Motor speed, for multiple speed fans (e.g. high, medium, low).
d) For direct drive fans, provide speed settings and actual rpm, including ECM motor drive fans.
e) Provide fan and motor rpm for belt driven fans; provide drive shaft rpm.
f) Outside airflow rate to each HVAC unit and supply fan.
g) Motor current (and compare with manufacturer's data) on all motors.
h) Entering and leaving air dry-bulb and wet-bulb conditions at all supply coils.
i) Heat output capacity for unit heaters, heating devices or coils (HW or MBH).
j) Manufacturer, model and serial number for each piece of HVAC equipment scheduled on drawings.
k) Calibrate thermostats to be within one degree of actual temperature at thermostat.
l) Verify that all HVAC devices operate as scheduled or indicated (i.e. ON-OFF, 2-stage, variable output (SCR heaters), etc.
28) The entire system shall be warranted for a period of one (1) year beginning with Owner's acceptance of the work. Compressors shall include a minimum of five (5) year parts only warranty from the manufacturer. Labor and materials necessary to repair or replace the system or portions thereof, during that time shall be warranted for a period of one (1) year from the repair or replacement.
29) SUBMITTALS AND SUBMITTAL PROCEDURES:
a. Contractor shall review the submittal data and check for the purpose of compliance with safety requirements, verification of dimensions, contract documents and methods and means prior to submittal. Design professional. Contractor shall indicate approval by indicating such on the submittal.
b. Submit each submittal electronically in PDF format.
c. Sequentially number submittal files and transmittal form. Revise submittals with original number and a sequential alphabetic suffix. File names shall describe item included in file.
d. Identify Project, the Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy. Each file shall include an index of items included in file.
e. Apply the Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
f. Submittal data for all items in project shall be submitted at one time. Submittal shall be divided into groups with file sizes not exceeding 6 MB. If there is unavailable data such as control submittal, etc., these may be submitted later if not doing so would delay project progress. Data shall include capacities, complete installation instructions, dimensional data and electrical data, BHP, motor HP, operating weights and load distribution at mounting points.
g. Deliver submittals electronically to the Design Professional.
h. Schedule submittals to expedite the Project, and coordinate submission of related items.
i. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
j. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
k. Provide space for the Contractor and the Architect/ review stamps.
l. When revised for resubmission, identify all changes made since previous submission.
m. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
n. Submittals not requested will not be recognized or processed.
o. Provide files containing only related items (such as piping, equipment, air distribution, etc.)
30) Instruct Owner's representative in the operation of the systems, using the operation and maintenance manual as a teaching aid.

- 31) Provide an operation and maintenance manual. As a minimum, the manual shall contain:
a. A complete list of all equipment and appurtenances with equipment designations (per Drawings), manufacturers, and catalog numbers.
b. Copies of manufacturers' brochures and instructions for operation and maintenance of all mechanical equipment, including replacement parts lists.
c. Typed system operation and maintenance instructions, including inspection, lubrication, and service instructions and schedules.
d. List of names, addresses and phone numbers of distributors of all equipment and appurtenances.
e. Manufacturers' warranties.
32) Horizontal Air Handler unit: Indoor fan-coil unit shall be direct-expansion horizontal heat pump air handler with electric strip heat suspended from structure with auxiliary drip pan and condensate drain. Provide float switch in drip pan to shut down unit if pan begins to fill. Unit shall be complete with cooling coil, fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Cabinet shall be fully insulated for improved thermal and acoustic performance. Condensate pan shall have internal trap and auxiliary drip pan under coil header. Provide condensate trap recommended by manufacturer. Air filters shall be 1-inch thick glass fiber, disposable type arranged for easy replacement. Provide number of stages as scheduled. Provide condensate overflow switch (Rectorseal Safe-T-Switch Model SSI or equivalent) wired to shut unit down in case of condensate overflow.
33) Small Split Air Handler unit: Indoor unit shall be direct-expansion, suspended and ducted fan coil. Unit shall be complete with cooling coil, fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Unit shall be furnished with integral suspension hangers and mounting hardware. Units shall have rear piping inlet. Cabinet shall be fully insulated for thermal performance. Unit shall have a drip pan under the coil with built-in condensate pump accessory to remove condensate. Condensate pan shall have internal trap and auxiliary drip pan under coil header. Refer to Schedule on Drawings for additional specifications.
34) Small Split Condensing unit: Casing: House components in welded steel frame with galvanized steel panels with weather resistant, baked enamel finish. Mount contactors and controls on weatherproof panel provided with full opening access doors. Provide removable access doors or panels with quick fasteners. Compressor: Hermetically sealed, 3600 rpm maximum, readily mounted in position for lubrication and internal motor protection. Compressor: Hermetic reciprocating type or Hermetic scroll type. Condenser coils Coils: Aluminum fins mechanically bonded to seamless copper tubing for all aluminum fins and tube. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of refrigerant. Coil Guard: Louvered or PVC coated steel wire. Fans and motor: Direct drive propeller condenser fans with fan guard on discharge. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor with permanent lubricated ball bearings and built in thermal overload protection. Fan Guard: PVC coated steel wire. Refrigerant circuit: Provide: Filter dryer liquid line. Suction accumulator. Suction and liquid line service valves with gauges. Charging valve. Condenser pressure relief mechanism. Factory wired with single point power connection. Factory wired controls shall include contactor, high- and low-pressure cutouts, thermal limiting thermostat for compressor, control circuit transformer, non-cycling reset relay. Provide a surge capacitor and lightning arrester in unit cabinet for protection from power surges due to lightning and switching transients. Provide controls to permit operation down to 0 degrees F ambient temperature where scheduled to include: Crankcase heater with thermostat. Head pressure switch to cycle fan motors in response to refrigerant condensing pressure. Solid state control to vary speed of one condenser fan motor in response to refrigerant condensing pressure. Refer to Schedule on Drawings for additional specifications.
35) Air Source Heat Pumps (HP-1, 2, 3): outdoor-mounted, air-cooled split system outdoor section suitable for rooftop installation consisting of a hermetic compressor, an air-cooled coil, propeller-type blow-thru outdoor fans, accumulator, full refrigerant charge (R-410A), and control box. Unit shall function as the outdoor component of an air-to-air cooling system and used in a refrigeration circuit matched to the indoor unit. Unit construction shall comply with ANSI/ASHRAE 15, latest revision, the NEC, and UL standards. Unit shall be equipped with 2-stage compressors. Refer to Schedule on Drawings for additional specifications.
36) Provide a duct smoke detector on the supply duct of each air handling unit or rooftop unit with design airflow exceeding 2,000 CFM, and where smaller air handling units have common return ductwork or plenum and total air flow exceeds 2,000 CFM. Install detector in accordance with the International Mechanical Code Section 606 Smoke Detection Control System with Georgia Amendments 2014. Detectors shall be provided by the electrical/fire alarm subcontractor and shall be installed by the mechanical subcontractor. For other fans, such as exhaust fans with design airflows exceeding 2,000 CFM, coordinate with the electrical/fire alarm subcontractor to provide room or duct smoke detectors. Where fire alarm system is installed in building provide smoke detector, audio visual annunciator and trouble indicator in an approved location. Duct smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble. Provide contacts to automatically shut down all such fan motors when smoke is detected, to activate detector status to the fire alarm system, and to require a manual reset of the shut-down relay.
37) Condensate pumps: Provide condensate pumps at each rooftop handler. Provide discharge tubing connected to pump discharge and route along with refrigerant piping to discharge adjacent to outdoor unit. Pump shall include Safety Switch, 6 Ft. Power Cord, Thermal Overload Protector, Nylon Straps, Drain, Control Float, check valve and Filter Screen. Manufacturer: Little Giant Model VMA20JLS or equivalent. Minimum 18 gallon per hour at 12 ft. head capacity. Wire safety float level switch to stop unit if high water level condition occurs in sump. Provide 3/8" hard drawn copper for discharge at exposed location. Provide 3/8" vinyl tubing for discharge at concealed locations.
38) Grilles, Registers and Diffusers: Provide grills as indicated on the schedule on drawings.
39) Basic motor requirements: Motor requirements apply to mechanical equipment motors, unless otherwise indicated. Motors 1/2 hp and larger: Polyphase, unless otherwise scheduled. Motors smaller than 1/2 hp: single phase. Frequency rating: 60 Hz. Service factor: according to NEMA MG 1, general purpose continuous duty, design type "B." Enclosure: open drip-proof, unless otherwise indicated. Efficiency: motors shall have a higher efficiency rating than industry standard average motor as delineated in IEEE Standard 112, test method 13. Thermal protection: where indicated or required, internal protection automatically opens power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal protection device automatically resets when motor temperature returns to normal range, unless otherwise indicated.
40) Hangers and supports: Building attachments: concrete inserts or structural-steel fasteners appropriate for building materials, and beam clamps. Hanger materials: galvanized, sheet steel or round, three-eighths inch rod. Hangers installed in corrosive atmospheres: electrogalvanized, all-thread rod or galvanized rods with threads painted after installation. Straps and rod sizes: comply with SMACNA's HVAC Duct Construction Standards--Metal and Flexible" for sheet steel width and thickness and for steel rod diameters. Duct attachments: sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials. Trapeze and riser support galvanized steel shapes and plates: steel shapes complying with ASTM A 36/A 36M.
41) Sealing materials: joint and seam sealants, general: the term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics. Joint and seam tape: 2 inches wide, glass-fiber fabric reinforced. Joint and seam sealant: one-part, nonaop, solvent-release-curing, polymerized butyl sealant, formulated with a minimum of 75 percent solids. Flanged joint mastics: one-part, aod-curing, silicone, elastomeric joint sealants, complying with ASTM C 920, type S, grade NS, class 25, use 0.
42) All HVAC equipment such as AH, CU, EF, AC, HP, and RTU shall have visible nameplates with their associated marks on them.
43) Louver: 4" deep, 12 gauge (0.081) etched and 30-minute clear anodized extruded aluminum, drainable blades and frame; back mounted 1/2" mesh 19-gauge screen; flange frame. Louver shall be rated for no water carry-through at 900 face velocity, 0.15" maximum pressure drop for 4-foot square sample tested according to AMCA Standard 500, 1973. American Warming LE-33 (alum.); Ruskin [ELF-63750; Louvers & Dampers IEL-6; Industrial Louvers 653 alum.; Vent Products #4650; Shipman LE-33 (alum.); Arrow United EA615-D (alum.); Greenheck ESD-603. Provide adapter to match corrugations in metal panel.
44) Ceiling Ventilator shall have corrosion resistant galvanized steel housing with four-point mounting capability. It shall be ducted to a cap on wall using 6" round ductwork. Blower assembly shall be removable, have a centrifugal-type blower wheel and a permanently lubricated motor designed for continuous operation. Non-metallic damper/duct connector shall be included. Air delivery shall be no less than scheduled and sound level no greater than 0.3 sones. All air and sound ratings shall be certified by HV. Ceiling ventilator shall be Energy Star qualified and have an energy efficient permanent split capacitor motor.
45) Electric Wall Mount Heater: Heater shall be UL listed and labelled with terminal box and cover, and built-in controls. Heater shall be made in three pieces consisting of back enclosure, heater assembly and front panel. Front panel shall be attached with concealed fasteners. Heating Elements: Nickel-chromium heating element wire shall be encased in a steel or copper sheath. Aluminum fins shall be pressure bonded to the sheath. Enclosure shall be minimum 20-gauge painted steel for surface mounting. Front Panel: Bar grille type with down deflection toward floor. Finish shall be paint on steel bars. Grille shall be surrounded by decorative satin finished aluminum accent frame. Unit shall be fan forced type including fan motor, fan and controls with thermostat adjustment accessible through front grille. Unit shall also include thermal safety cutouts in the event of over temperature conditions. Refer to Schedule on Drawings for additional specifications.
46) Acceptable Manufacturers are:
Air Handlers & Heat Pumps, Packaged Units: Carrier, York, Lennox.
Small Split Units: Carrier, Daikin, Sanyo, Toshiba.
Grilles, Registers & Diffusers: Titus, Nallo, Price, Tuttle & Bailey (Color selection submitted to Architect)
Fans: Twin-City, Cook, Greenheck, PennBarry, Acme, American CoolAir
Electric Heaters: Markel, Q-Mark, Raywall
Louvers/Dampers/Free Dampers: United Enertech, Greenheck, Ruskin, Arrow United, Lloyd Industries (Color selection submitted to Architect)
Controls-provided with unit: Provide thermostats by same manufacturer as equipment



DUNWODY/BEELAND, architects, inc.

Website: www.dunwodybeeland.com
Address: 169 New Street, Macon, Georgia 31201
Phone: 478.742.5321
Fax: 478.743.0863

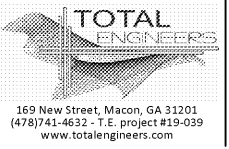
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A NEW RANGER STATION AT CLAYSTONE PARK FOR MACON-BIBB COUNTY
MOSLEY DIXON ROAD MACON, GEORGIA

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Sheet Title: RANGER STATION MECHANICAL SPECIFICATIONS

Project #: 1819 Date: 12/23/19



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