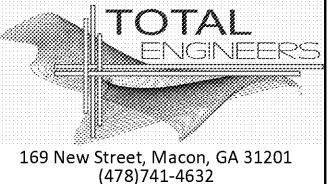


**MECHANICAL SPECIFICATIONS**

- 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.ga.state.gov/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. Seal all joints in ductwork with mastic sealant.
- 11) Flexible duct: Flexmaster; Atco UPC431(R-4.2); Atco UPC431(R-8) or Thermax, 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.
- 12) Indoor duct insulation: Full-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 wrap 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.
- 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 B260 Type ACR or ASTM B88 Type L drawn 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 white vinyl paint.
- 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) All supply, return and outside air ducts shall be insulated. Insulate the concealed tops of all ceiling mounted supply air diffusers. Insulation indoors shall be full-faced fiberglass, 1.5 #/cubic foot density, 2" thick.
- 19) 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.
- 20) Make all duct elbows right angle type with single -thickness turning vanes or construct with centerline radius 1-1/2 times the duct width.
- 21) Duct sizes shown on plans are clear, interior dimensions.
- 22) Do not cut into or reduce the size of any structural member without the permission of the Architect.
- 23) 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.
- 24) Support all HVAC units, ductwork, piping and other appurtenances from structure, provide vibration isolation at all fans. Do not screw or drive fasteners into non-structural components such as roof decks or non-load bearing walls.
- 25) Thoroughly clean all components and remove all dirt, scale, oil, and other foreign substances. Provide clean air filters for all equipment.
- 26) Perform all tests necessary to demonstrate the integrity of the complete installation to the approval of the Engineer and all 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) TAB 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 of each supply and exhaust fan. Test exhaust fans with room doors closed.
  - c) Motor speed, for multiple speed fans (e.g. high, medium, low).
  - d) Outside airflow rate to each HVAC unit and supply fan.
  - e) Motor current (and compare with nameplate data) at all motors.
  - f) Entering and leaving air dry-bulb and wet-bulb conditions at all coils.
- 28) The entire system shall be warranted for a period of one (1) year beginning with Owner's acceptance of the system. Compressors shall include a minimum of five (5) year warranty from the manufacturer. All 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) SUBMITTAL PROCEDURES:
  - a. Transmit each submittal electronically in PDF format.
  - b. Sequentially number submittal files and transmit from Review submittals with original number and a sequential alphabetic suffix. File names shall describe item included in file.
  - c. 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.
  - d. 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.
  - e. 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 necessary so would delay project progress. Data shall include capacities, complete installation instructions, dimensional data and electrical data, BHP, motor HP, operating weights, pressure distribution at operating points.
  - f. Deliver submittals electronically to the Architect and Engineer.
  - g. Schedule submittals to expedite the Project, and coordinate submission of related items.
  - h. Each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
  - i. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
  - j. Provide access to the Contractor and the Architect/ review stamps.
  - k. Upon review for submittal, identify all changes made since previous submission.
  - l. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
  - m. Submittals not requested will not be recognized or processed.
  - n. 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) Condensing Unit (CU-1): outdoor-mounted, air-cooled split system outdoor section suitable for rooftop installation, consisting of a hermetic compressor, an air-cooled coil, propeller-type blow-through outdoor fans, accumulator, full refrigerant charge, 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.
- 33) Provide a duct smoke detector on the supply duct of each air handling unit or rooftop unit with design airflows exceeding 2,000 CFM, and where smaller air handling units serve common areas and the sum of these air handling units' airflows exceed 2,000 CFM. Install detector in accordance with the International Mechanical Code with Georgia Amendments. 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. Provide contacts to automatically shut down all such fan motors when smoke is detected, to indicate detector status to the fire alarm system, and to require a manual reset of the shut-down relay.

- 34) Grilles, Registers and Diffusers: Grilles, registers, and diffusers as indicated on the drawings have been selected from the catalog of the manufacturer noted as the basis of design. Sizes, types, and performance of the devices to be provided must be coordinated to insure conformity with design basis. Sidewall supply grilles and registers shall have vertical front blades; sidewall return grilles shall have horizontal blades. Grilles and registers with borders shall have felt or rubber gaskets cemented to the back face and holding screws not over 18 inches on centers around the perimeter. Holding screws shall be counter-sunk to fit flush with face of grille or register. Grilles passing air through partitions shall be as described for wall return grilles, one for each side of partition. Register dampers shall be of the gang-operated, opposed blade type, operated through the face of the register. Operating mechanism shall not project through the register face. Mounting frame shall be coordinated with architectural reflected ceiling plans. Construction shall be of steel or aluminum as scheduled, with frame type to match ceiling construction. Sidewall supply grilles and registers shall be double-deflection type, with vertical front vanes. Construction shall be of steel, with 3/4 inch blade spacing. Return air registers, exhaust grilles, exhaust registers and transfer air grilles located in ceilings shall be constructed of aluminum with "egg-crate" design, with 1/2 inch x 1/2 inch x 1/2 inch grids. Frame style shall be compatible with ceiling construction. Install wall grilles and registers with horizontal edges parallel to ceiling. Concentric diffuser assemblies at roof top units shall have paint-ready exterior finish and 1-inch lined supply and return ducts that transition to diffuser size within 24 inches vertically of the bottom of roof top unit curb.
- 35) Basic motor requirements: basic requirements apply to mechanical equipment motors, unless otherwise indicated. Motors 1/2 hp and larger: Polyphase. 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.
- 36) Hangers and supports: Building attachments: concrete inserts or structural-steel fasteners appropriate for building materials, and beam clamps. Hanger materials: galvanized steel or rod, threaded steel rod. Hangers installed in corrosive atmospheres: electrogalvanized, oil-thread rod or galvanized rods with threads painted after installation. Straps and rod sizes: comply with SMACNA "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 clamping band screws compatible with duct materials. Trapeze and riser supports galvanized steel shapes and plates: steel shapes complying with ASTM A 36/A 36M.
- 37) Sealant 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 tapes with fabric strips and mastics. Joint and seam tape: 2 inches wide, glass-fiber fabric reinforced. Joint and seam sealant: one-part, nonsag, solvent-release-curing, polymer matrix sealant, formulated with a minimum of 75 percent solids. Flanged joint mastics: one-part, acid-curing, silicone, elastomeric joint sealants, complying with ASTM C 920, type S, grade NS, class 25, use 0.
- 38) Gravity Ventilators: Heavy gauge arched sheet aluminum with interlocking seams or spun aluminum with base for curb mounting. Provide matching pre-fabricated roof curb and bird screen. Provide normally closed gravity backdraft damper.
- 39) All HVAC equipment such as AH, CU, EF, AC, HP, and RTU shall have visible nameplates with their associated marks on them.
- 40) Energy Recovery Unit (ERV-1, ERV-2): Unit shall be fully assembled at the factory and consist of an insulated metal cabinet, a high efficiency energy wheel, motorized intake damper, motorized exhaust damper, curb assembly, service receptacle, filter assembly for intake and exhaust air, supply air blower assembly, exhaust air blower assembly and an electrical control center. Filters shall be MERV 8 or higher. All specified components and internal accessories factory installed and tested and prepared for single-point high voltage connection. Refer to schedule for layout basis. Substitutions shall match the features of specified model. Provide FIELD INSTALLED controls to interlock unit to operate when any system coil unit is operating.
- 41) REFRIGERANT CAPACITY MODULATION SYSTEM-1.5 TO 10 TONS
  1. Provide a hot gas/liquid mixing system to provide refrigerant capacity control in condensing unit without piping to the indoor unit. System shall modulate hot gas and liquid in condensing unit to maintain evaporator coil above 36 degrees F.
  2. Unit shall be designed for use with R-410a / R-32 refrigerant to verify type of refrigerant used on existing equipment and let engineer know if refrigerant charge is different from what engineer has scheduled.
  3. System shall consist of desuperheat chamber with thermostatic controls for liquid and hot gas injecting valves, each with temperature sensing bulbs. System shall mix liquid and hot gas to maintain superheat to coil at 12- 13 degrees F using liquid and hot gas from condensing unit.
  4. System shall be self-powered.
  5. Desuperheat chamber shall have schrader valve on bottom to allow pressure testing, evacuation and charging of system.
  6. Provide refrigerant gas valves in connection to liquid line, hot gas line and outlet connection. Valves shall be close when charging and during system start-up.
  7. Install unit in accordance with manufacturer's instructions and recommendations.
  8. Layout by: Rowal Devices, Inc. Woburn, MA. Website: [www.rowal.com](http://www.rowal.com) Phone: 1-800-727-6447.
- 47) Electric duct heater: Provide duct heaters with power voltage, phase, control voltage, wattage and duct size as per schedule. Heaters slip-in or flanged as required. Three phase heaters shall be balanced three phase step unless specified otherwise. All heaters to be ETL listed for zero clearance to combustible surfaces. All heaters shall meet the requirements of the latest National Electric Code. Control panel, element housing, and all formed metal shall be of heavy gauge galvanized steel. All element coils to be made of high grade nichel/chromium resistance wire. Element to be machine crimped to terminal box. All terminal hardware to be insulated by a two piece ceramic bushing from the heater terminal box. Modular construction with each module independently and easily removable from the terminal box control panel. Each module to contain no more than two layers of element coils. Any individual coil can be replaced easily. Blank or overheated areas are reduced by staggering ceramic spacing coil ends and angles. Element housing shall be minimum 18 gauge galvanized steel. Roll-formed construction with ribs for stiffness and rigidity. Racks to support element coils on max. 3.5" centers. Heaters shall be interchangeable for both vertical and horizontal mounting. Construction of control panel shall be heavy gauge galvanized steel. All boxes to have solid cover the same gauge as the control panel. Snap hinge on the longest side with latch and pull ring. Control panel shall have 1/2" insulation for vapor barrier attached to the back of enclosure. Element rack to be recessed for use in insulated ducts or air handling units. The element terminals are recessed to reduce overheating of terminations. Primary over temperature protection shall be provided by built-in disc type automatic reset thermal cutouts. Limit controls required and mounted per ETL specifications. Capillary type controls required for heaters exceeding 10' duct width. Secondary over temperature protection shall consist of a sufficient number of load carrying replaceable disc controls to de-energize the elements if the primary system fails. Fuse link type heat limiters shall not be acceptable. All manual safety devices shall be resettable thru the terminal box without removing the heater from the duct. All heater controls shall be factory mounted and wired. Provide 2-stage controller for the duct heater. A separate and complete wiring diagram shall be permanently attached to each heater. Typical diagrams are not allowed. Control and line terminals shall be marked identical to the wiring diagram.
- 48) Condensate pumps: Provide condensate pumps at each new air 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 Overflow Protector, Nylon Sump Pan, Control Float, check valve and Filter Screen. Manufacturer: Little Giant Model VDMA200LS or equivalent. Minimum 18 gallon per hour at 12 ft. head capacity. Wire safety high 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.
- 49) Duct DX Coil: Round seamless copper tubes are mechanically expanded into the fin collars of the secondary surface. The mechanical expansion shall provide a permanent metal-to-metal bond for efficient heat transfer. Tubes shall stagger in the direction of airflow and only return bends are used. Tube sizes shall be 5/8" O.D. x .020" wall thickness standard with optional wall thickness of .025) (.035) and (.049). Centerlines are 1.5" in the tube face and 1.299" between rows. 1/2" O.D. x .017" wall thickness standard with optional wall thickness of .025). Centerlines are 1.25" in the tube face and 1.063" between rows. Secondary surface shall be corrugated plate type fin that is die-formed. Fin collars are full-down to provide accurate control of fin spacing and maximum contact with tubes. Fin material shall be 5/8" tube aluminum .0008" thick. Headers shall be seamless copper with die-formed holes that are formed holes to the coil tube for strong brazing joints. Connections shall be Copper O.D. sweat interchangeable nozzle type refrigerant distributors. Standard coil has one distributor for an compressor circuit. An intermixed coil shall have two distributors that provide full-face control using two compressor circuits. Face split coil shall have two or more distributors for multiple compressor circuits. Coiling Materials shall be full G-90 galvanized steel standard with optional stainless, aluminum and copper. Coil casing shall be insulated. All coil assemblies are leak tested under water at 315 PSIG air. Coil Performance shall be certified under ARI Standard 410.
- 50) Acceptable Manufacturers are:
 

Air Handlers & Heat Pumps, Packaged Units:	Carrier, Trane, York.
Grilles, Registers & Diffusers:	Titus, Nalor, Price, Tuttle & Bailey (Color selection submitted to Architect)
Electric Heaters:	Warren, Markel, Q-Mark, Rowall
Louvers/Dampers/Fire Dampers:	United Erectech, Greenheck, Ruskin (Color selection submitted to Architect)
Controls:	Trane Tracer Summit ES or equal from, Carrier, Honeywell, Johnson Controls.



REGISTRATION SEAL

A NEW ADDITION TO  
**ROCKDALE COUNTY**  
**ANIMAL CONTROL**  
 1506 ROCKBRIDGE ROAD, CONYERS, GA 30012

MARK	DATE	DESCRIPTION
Δ	12/17/19	KENNEL LOCATIONS

DATE: 11-01-18 PROJECT NUMBER: 18-059

DRAWN BY: JWK & KMP CHECK BY: KMP

SHEET TITLE: MECHANICAL SPECIFICATIONS

**M0.1**