

SECTION 15000
MECHANICAL

PART 1: GENERAL

- 1.1 SCOPE
A. The work indicated in this division and on the Mechanical Drawings is subject to the requirements of the Instructions to Bidders.
B. Provide all required labor, materials, equipment and Contractor services necessary for the complete installation of equipment indicated herein and on the Drawings, complete with all related services.
C. All Work shall be performed by experienced personnel qualified to carry out the Work in accordance with manufacturer's recommendations, local codes and as specified herein.
D. Submit shop drawings for all items of mechanical equipment and specialties.

1.2 CONTRACT DOCUMENTS

- A. The Mechanical Drawings listed in the Drawing Index, together with these specifications, are an integral part of the Mechanical Contract. What is called for in one is as binding as if called for in both.

1.4 SUPERVISION

- A. Have a thoroughly competent superintendent in charge of the work at all times, experienced in the work to be done under this Contract. Replace anyone not deemed capable by the Engineer/Architect upon request immediately, by one who is satisfactory. A satisfactory superintendent, once assigned, is not to be removed without the consent of the Engineer/Architect.

1.5 MATERIALS AND EQUIPMENT

- A. Where "or approved equal" clause is indicated, it means material, apparatus, equipment and supplies having recognized standards of quality and performance which, in the judgment of the Engineer/Architect, will meet the design and specification requirements. Material and equipment by manufacturers, other than those listed in the Plans or Specifications, must be submitted for approval as outlined in the Instruction to Bidders.

1.6 SHOP DRAWINGS AND SUBMITTALS

- A. Provide all submittals as called for in Division 1 of the Specifications including shop drawings, samples, material lists, Schedule of Values, etc. SHOP DRAWINGS SHALL BE COMPLETELY REVIEWED AND APPROVED BY THE CONTRACTOR AND TRADE FURNISHING THE EQUIPMENT (INDICATED BY THE CONTRACTORS APPROVAL STAMP) PRIOR TO SUBMITTING TO THE ENGINEER/ARCHITECT.

1.7 PAINTING AND FINISHING

- A. Unless otherwise indicated in other Divisions of the Specifications, at no additional cost to the Owner, repaint all patched areas to match original finish where holes or chases have been cut to receive electrical work. Repaint patched areas with two (2) coats of paint to match surrounding areas; blend as required.

1.8 GUARANTEES AND WARRANTIES

- A. All labor, materials and equipment shall be guaranteed by the Contractor and warranted by the manufacturer for a period of one year from the date of final acceptance by the Owner, unless longer period is specified for specific equipment.
B. The Contractor shall make all necessary repairs and alterations during the guarantee period as may be required by the Owner or Architect for correct system operation and to comply with the Drawings and Specifications. These repairs and alterations shall be at no additional cost to the Owner.

1.9 MECHANICAL DEMOLITION

- A. Provide all labor, materials and necessary coordination for demolition work as called for by the Contract Documents. Removal shall be partial or complete as called for and shall be coordinated with other trades and new construction. Work shall also include miscellaneous items related to work indicated where not reused for new construction.
B. Drawings indicate only major system components and extends. Field verify existing systems and conditions and coordinate with new construction. Equipment, piping, hangers, etc. shall not be abandoned in place unless specifically approved by Owner and Engineer.
C. The condition of the site, buildings and surroundings shall be accepted as found. Responsibility for conditions are solely the responsibility of the Contractor.

- K. Turn over any personal property discovered during the demolition process to the Owner.
L. Debris shall be removed from the site on a regular basis. If debris remains after completion of demolition or is allowed to obstruct other operations the Owner and Engineer/Architect reserve the right to have material removed. All costs of said removal will be billed to the Contractor or charged against Contractor pay requests at the discretion of the Owner and Engineer/Architect. Leave site in a neat and orderly condition.
M. Dampen Work if necessary to control dust.
N. Protect areas to remain from weather. Weather damage shall be repaired by the Contractor at no additional cost to the Owner.
O. For systems that will remain active during or after construction, coordinate demolition to maintain or reconnect existing services effected by demolition work.

PART 2: PRODUCTS

2.1 PIPING

- A. Domestic Cold and Hot Water
1. Copper tubing, ASTM B88, type L or K, wrought copper solder joint fittings, ANSI B16.22, joined with lead-free solder.
B. Soil, Waste and Vent
1. Cast iron "no-hub", ANSI A122.5.1 and CISPI 301; hubless joints ANSI A122.5.1 and CISPI 310.
2. Cast iron hub and spigot, ANSI A112.5.1, coated service weight. For threaded connections, use threaded cast iron drainage fittings, ANSI B16.12.
3. PVC-DWV drain, waste and vent, ASTM D-2665, pipe and fittings (Schedule 40).
C. Refrigerant Piping
1. Tubing: Copper tubing shall be hard-drawn, type ACR. Joints shall be brazed. Fittings for brazed joints shall be wrought-copper or forged-brass sweat fittings. Cast sweat-type fittings will not be allowed for brazed joints. Line sets may be used with prior approval, however, Contractor shall install an additional layer of insulation over line set standard insulation on suction line.
D. Condensate Drain
1. CPVC, Schedule 40 with solvent weld or screwed fittings as required.
2. Copper tubing, ASTM B88, type L or K, wrought copper solder joint fittings, ANSI B16.22.
E. Natural Gas:
1. Pipe:
a. Black steel, ASTM A53 or A106, Schedule 40, furnace welded or seamless for above ground applications.

2.2 VALVES

- A. Valves shall be bronze body, stainless steel ball type, NIBCO or equal with extended operators to account for insulation thickness.

2.3 GAS STOP VALVES

- A. Plug type, AGA listed for natural gas service. Lever handle with check stops, McDonald 10701, Healey 45L or equal.
B. Ball type, brass or bronze, UL listed for low pressure natural gas shut-off. Apollo, Milwaukee or Nibco.

2.4 GAS SOLENOID VALVE

- A. Normally closed as required, UL and FM listed for gas service, aluminum body, resilient seating, ASCO Model 6215 or Red Hot equal. Refer to detail on Plans. Electrical Contractor shall wire interlock from valve to exhaust fan and/or kitchen hood fire protection system as required. Coordinate voltage and wiring with Electrical Plans.

2.5 INSULATION

- A. Fiberglass pipe insulation shall be complete with all service reinforced jacket.
B. Foamed plastic insulation shall be AR Armalex by Armstrong or equal.
C. Domestic, hot, cold and tepid water lines:
1. One inch (1") thick fiberglass or one half inch (1/2") thick foamed plastic.
D. Condensate piping:
1. Insulate in-wall and above ceiling condensate piping with 1" thick fiberglass.
E. Refrigerant Suction Piping:
1. One inch (1") thick insulation for one inch (1") and smaller pipe. One and one-half inch (1 1/2") thick insulation for one and one-quarter inch (1 1/4") and larger piping. Fiberglass insulation shall be complete with an all service jacket attached to the insulation with adhesive suitable for 35 deg. to 100 deg. F. service.

2.6 DUCTWORK

- A. All ductwork shall be rigid galvanized steel unless otherwise noted, in accordance with SMACNA requirements. Ductwork shall be SMACNA seal class B unless specifically approved otherwise.
B. Stainless steel ductwork shall be Type 304 with welded construction, 16 gauge minimum.
C. Flexible Ductwork - Factory insulated complete with vapor barrier. Knaf, Owens-Corning or Hart and Cooley equal. Use only where indicated or with permission of Engineer/Architect. Duct interior and exterior shall be FRK with 1 inch minimum fiberglass liner. Flexible ductwork shall be rated for not less than 4 inches WC static pressure and 4000 FPM velocity. Flexible ductwork may be used for supply air run-outs to grilles and diffusers, provided that outlet devices are fitted with rigid elbows or plenums, flex is well supported and in lengths not to exceed four feet (4'-0"), and only above accessible ceilings. Bending radius shall not be less than two times the duct diameter.
D. In all ductwork systems, furnish all dampers necessary for proper control and balancing of air distribution. Furnish dampers in all branches from trunk ducts with operating levers readily accessible. All multi-leaf dampers are opposed blade type. Some material as ductwork, rigid construction, free of all rattling and vibration, with edges crimped or creased for stiffness. All blank-off plates and transoms necessary to install smaller than duct size dampers are the responsibility of the Sheet Metal Subcontractor. Coordinate as required. Backdraft dampers shall have a free area, when open, of not less than 75% of the cross sectional area of the inlet duct leading to the exhaust fan for duct sizes up to 85 square inches. Free area shall be 80% of cross sections minimum for 86 to 425 square inches and 90% minimum over 425 square inches.

2.7 GRILLES AND DIFFUSERS

- A. Size, shape, pattern and location as indicated on Mechanical Drawings and Architectural Reflected Ceiling Plans. Grilles and Registers shall be removable core with key-operated, opposed blade, volume control where located in multiple inlet or outlet systems.
B. Dampers shall be adjustable without removing diffuser core. Diffusers shall be adjustable from the face of the diffuser with deflectors and opposed blade volume control.
C. Grilles, registers and diffusers as manufactured by Titus, Tuttle and Bailey, or Carnes equal. Titus Model numbers are used for identification purposes as noted on the Drawings.

2.8 PLUMBING FIXTURES

- A. Refer to Plumbing Fixture Schedule on the Drawings. Fixtures shall be provided with all necessary appurtenances including but not limited to traps, chrome finish shut-off valves, faucets, strainers, tail-pieces, etc. Protect fixtures as required during construction.

2.9 EQUIPMENT

- A. Roof exhausters to be by Penn Ventilator Company, Loren Cook, Power Line, or Carnes equal. Unit shall be of size and capacity indicated. Complete with curb, backdraft damper and disconnect switch where applicable. Kitchen hood fans to comply with UL 762. (Provide and install all required accessories.)
B. For all equipment furnished by this trade, furnish and install complete with all necessary appurtenances including thermostats, transformers, supports, controls, covers, access doors, shut-off valves, vents, drains, curbs, flashing, etc. for a complete and operating system.
C. Refer to Drawings for additional description of equipment.

2.10 ACCESS DOORS

- A. Minimum 16 gauge steel frame with 14 gauge door. At least 12"x 12" in size or as indicated. Fire rated with UL label when installed in fire rated walls or ceilings. Frame type shall be compatible with surrounding construction. Access doors shall have piano hinge on one side and concealed screw-operated latch unless directed otherwise. Baked on grey primer finish at walls, baked on off-white enamel finish at ceilings except that access doors shall be stainless steel in ceramic tile or clay block walls. Milcor, Miami-Carey, Bobcock-Davis or equal.

PART 3: EXECUTION

3.1 CODES, RULES AND REGULATIONS

- A. All work shall be in accordance with National, State and Local codes in force at time of bidding, including but not limited to the Indiana Construction Rules. In addition, the Contractor shall be responsible for obtaining all necessary permits and inspection approvals as the work progresses. Any work which is completed without these approvals shall be corrected by the Contractor at no additional cost or inconvenience to the Owner to the satisfaction of the Building Officials and Owner's representatives.

3.2 COORDINATION

- A. Coordinate routing of piping, ductwork, etc. prior to starting installation.
B. Coordinate exact placement of grilles and diffusers, etc. with architectural and electrical items before installation.
C. Mechanical trade shall coordinate roof and wall flashing with General Trade.
D. Mechanical trade shall provide all wall and roof openings.

3.3 INSTALLATION

- A. Field verify framing, ceiling heights, etc. before ordering or fabricating ductwork.
B. Field verify existing conditions before ordering or setting equipment, piping or venting.
C. All ductwork shall comply with SMACNA standards.
D. Where PVC piping penetrates fire rated walls or ceilings intumescent fire-stopping must be provided (as manufactured by 3M or equal).
E. Provide shut-off valves on supply piping to each fixture.
F. Set floor drains at elevations directed by Architect.
G. Provide over-rim water supplies to plumbing fixtures and equipment as required by Code.
H. Sanitary sewers within building shall have a minimum pitch of one-eighth inch (1/8") per foot.
I. Install all equipment per manufacturer's instructions. Notify Engineer/Architect if this information appears to conflict with the Drawings and Specifications prior to installation.

3.4 ACCESSIBILITY

- A. Maintain accessibility to all equipment for operation, maintenance and repair. Refer to manufacturer's requirements.

3.5 CUTTING AND PATCHING

- A. Lay out work carefully in advance, and where cutting, channeling, chasing or drilling of floors, walls, partitions, ceilings or other surfaces is necessary for the proper installation, support, or anchorage of mechanical equipment, the work is to be carefully done and any damage to the building, piping, or equipment repaired by skilled mechanics of the trades involved, at no additional cost to the Owner. This Contractor/Trade shall be responsible for all cutting and patching related to the Work of this Division of the Specifications.

3.6 RECORD DRAWINGS

- A. Maintain accurate records of all changes made during construction. Provide a neatly marked set of prints to the Engineer/Architect at completion of the project indicating all field changes.

3.7 WORKMANSHIP

- A. Install all materials and equipment in a neat and workmanlike manner and in accordance with the manufacturer's recommendations, as approved by the Engineer/Architect to conform with the Contract Documents.

3.8 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTION

- A. Provide two (2) bound sets of complete installation, Operating, and Maintenance Instructions. Manuals shall also include complete parts lists, operating instructions, copies of original shop drawings, Subcontractor Lists, Warranties, Warnings, etc. Generic instructions shall highlight applicable sections when needed to differentiate from non-relevant equipment.
B. Upon completion of the Work and at a designated time, provide instructions to the Owner's representative on Operation and Maintenance of all mechanical equipment. Notify Engineer/Architect of scheduled time and place.
C. Turn over to Owner all tools supplied with equipment.

3.9 TESTS

- A. After the installation is completed, and at such time as the Engineer/Architect may direct, the Contractor is to conduct an operating test for approval. Demonstrate equipment to operate in accordance with the requirements of this Specification. The Contractor is to furnish all instruments and personnel required for the tests.

3.10 TESTING AND BALANCING

- A. Provide complete testing and balancing for all air and water systems (including kitchen hood and make-up air systems) in accordance with the guidelines of ASHRAE or NEBS. Submit 3 copies of completed report for approval. Rebalance if required to achieve specified conditions. Substantial Completion may be denied if testing and balancing work is not completed and approved.

END OF SECTION

MECHANICAL LEGEND

Table with 2 columns: Symbol and Description. Includes items like AFF ABOVE FINISH FLOOR, CO CLEAN OUT, CW COLD WATER, EC COLD WATER, EXT'G EXISTING, FD FLOOR DRAIN, FS FLOOR SINK, GC GENERAL CONTRACTOR/TRADE, HW HOT WATER, LAV LAVATORY, MC MECHANICAL CONTRACTOR/TRADE, MH MOUNTING HEIGHT, RA RETURN AIR, RD ROOF DRAIN, SA SUPPLY AIR, TA TRANSFER AIR, TP TRAP PRIMER, TW TEPID WATER, TWR TEPID WATER RETURN, UR URINAL, WC WATER CLOSET, --- COLD WATER, --- HOT WATER, --- G NATURAL GAS, --- SANITARY VENT, --- SANITARY SEWER, --- D EQUIPMENT DRAIN LINES, --- RS REFRIGERANT SUCTION, --- RL REFRIGERANT LIQUID, --- TW TEPID WATER, --- TWR TEPID WATER RETURN, --- GATE VALVE, --- GAS COCK, --- GAS SOLENOID VALVE, --- SHUT OFF VALVE, --- HOSE BIBB OR SILLCOCK, --- FLOOR DRAIN, --- THERMOSTAT, --- # EXISTING ROOFTOP UNIT IDENTIFICATION, --- THERMOSTAT REMOTE ROOM SENSOR, --- # EXISTING ROOFTOP UNIT IDENTIFICATION, --- AIR INLET OR OUTLET LEGEND, --- A - DIFFUSER OR REGISTER SIZE, --- C - AIR PATTERN, --- D - CFM, --- E - TYPE (SEE GRILLE & DIFFUSER SCHEDULE), --- SUPPLY AIR DUCT RISER, --- RETURN, EXHAUST OR OUTSIDE AIR DUCT RISER, --- FLEX DUCT, --- MANUAL DUCT DAMPER, --- CONNECTION POINT, NEW TO EXISTING

GENERAL MECHANICAL NOTES

- 1. THE SUBMISSION OF A PROPOSAL WILL BE CONSIDERED AS EVIDENCE THAT THE CONTRACTOR HAS FAMILIARIZED HIMSELF WITH THE PLANS AND BUILDING SITE. CLAIMS MADE SUBSEQUENT TO THE PROPOSAL FOR MATERIALS AND LABOR BECAUSE OF DIFFICULTIES ENCOUNTERED WILL NOT BE RECOGNIZED IF THEY COULD HAVE BEEN FORESEEN HAD PROPER EXAMINATION BEEN MADE.
2. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR PROTECTION OF ALL EXISTING UTILITIES DURING CONSTRUCTION. ALL COSTS FOR LOCATING, REMOVING, REPLACING OR RELOCATING THESE UTILITIES SHALL BE INCIDENTAL TO CONSTRUCTION. ALL UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH LIKE MATERIAL AT NO ADDITIONAL COST TO THE OWNER.
3. MECHANICAL TRADE SHALL COORDINATE ROOF AND WALL FLASHING AND EXACT PENETRATION LOCATIONS.
4. DRAWINGS ARE DIAGRAMMATIC AND GENERALLY INDICATIVE OF THE WORK. PIPING AND SYSTEMS SHALL FOLLOW ARRANGEMENT AS MUCH AS POSSIBLE, HOWEVER, ACTUAL FIELD CONDITIONS SHALL DICTATE. PROVIDE NECESSARY MODIFICATIONS TO MEET FIELD CONDITIONS AND AVOID CONFLICT WITH OTHER TRADES. IF RESOLUTION CANNOT BE REACHED WITHOUT COMPROMISING THE DESIGN, THESE CONFLICTS SHALL BE PRESENTED TO THE ENGINEER FOR RESOLUTION. IN CONFLICT AREAS, COMPLETE ONLY WORK NOT AFFECTED BY THE CONFLICT PRIOR TO RESOLUTION.
5. THE FLOOR PLANS DO NOT SHOW ALL VALVES, FITTINGS, APPURTENANCES, DUCT TRANSITIONS, ACCESS PANELS, ELEVATION CHANGES, AND VARIOUS OTHER ITEMS CALLED FOR BY DETAILS AND SPECIFICATIONS. REFER TO DETAILS AND SPECIFICATIONS AND WHERE REQUIRED, THESE ITEMS SHALL BE PROVIDED WITHOUT ADDITIONAL COST FOR A COMPLETE AND OPERATING SYSTEM.
6. COORDINATE ROUTING OF PIPING, DUCTWORK, ETC. PRIOR TO STARTING INSTALLATION. MECHANICAL AND ELECTRICAL TRADES SHALL REVIEW AVAILABLE SPACE AND COORDINATE ALL SYSTEM ROUTING PRIOR TO INSTALLATION.
7. MECHANICAL CONTRACTOR SHALL PROVIDE ALL CUTTING AND/OR PATCHING OF EXISTING WALLS, CEILING AND FLOORS AS REQUIRED FOR NEW AND/OR DEMOLITION OF MECHANICAL WORK, EXCEPT WHERE STRUCTURAL SUPPORT IS REQUIRED OR WHERE WORK CAN BE COORDINATED WITH OTHER TRADES.
8. CONNECTIONS TO EQUIPMENT SHALL CONFORM TO MANUFACTURER'S SPECIFICATIONS.
9. ALL HANGER SYSTEMS FOR PIPING AND EQUIPMENT SHALL BE SECURED TO BUILDING STRUCTURAL SYSTEM.
10. ALL WORK AND MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE ORDINANCES AND REGULATIONS HAVING JURISDICTION.
11. PROVIDE SHUTOFF VALVES ON SUPPLY PIPING TO EACH FIXTURE AND AT ALL BRANCH LINES OFF MAIN. VALVES SHALL BE ACCESSIBLE. WHERE VALVES MUST BE CONCEALED IN BUILDING CONSTRUCTION, PROVIDE ACCESS PANELS. REFER TO ARCHITECTURAL DRAWINGS FOR ACCESS PANELS PROVIDED BY GENERAL TRADE AND PROVIDE ADDITIONAL AS REQUIRED, TYPICAL FOR ALL GAS AND WATER PIPING.
12. LOCATIONS OF EXISTING PIPING AND DUCTWORK INDICATED ON PLANS IS ONLY APPROXIMATE. WHERE CONNECTIONS OF NEW PIPING AND DUCTWORK TO EXISTING ARE REQUIRED, CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATION AND INCLUDE ALL COSTS IN BID.
13. MAINTAIN SAFE AND ORDERLY JOB CONDITIONS. PROTECT ALL AREAS. BARRICADE AND SEAL WORK AREAS FROM OCCUPIED AREAS TO PREVENT INJURIES, SPREAD OF DUST AND DIRT AND UNAUTHORIZED ACCESS. PROVIDE FIRE EXTINGUISHERS IN THE WORK AREA. PROVIDE LIGHTING AND SIGNAGE AS REQUIRED.

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M101
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MECHANICAL SPECIFICATIONS AND NOTES