

DIVISION 15 - MECHANICAL

- 15-01. GENERAL:
1. Furnish all labor, materials, services equipment and appliances required for the complete furnishing and installing of the mechanical systems.
- 15-02. UTILITIES, LOCATIONS AND ELEVATIONS:
1. Locations and elevations of the various utilities, included within the scope of this contract, have been obtained from utility maps and/or other substantially reliable sources and are offered separate from the Contract Documents as a general guide only, without guarantee as to accuracy. Examine the site and verify the locations and elevations of all utilities relating to this work.
- 15-03. PERMITS AND APPROVALS:
1. All work done under this contract shall comply with all local and state codes having jurisdiction and with the requirements of the utility companies whose services may be used. All modifications required by these codes shall be made without additional charge. Where code requirements are less than those shown on the plans or in the specifications, the plans and specifications shall be followed. Where applicable, EPA, FDA, USDA, NFPA and Department of Health requirements shall be met.
2. Obtain all permits, inspections and approvals as required by all authorities having jurisdiction. All fees and costs of any nature whatsoever incidental to these permits, inspections and approvals must be assumed and paid for.
- 15-04. INTENT:
1. It is the intent of the plans and specifications to provide a complete installation which will operate satisfactorily. Any apparatus, appliance, material, appurtenance or labor that may be necessary to complete the work in accordance with the intent or purpose of these specifications shall be furnished and installed without extra cost, as if mentioned in the specification or shown on the drawings.
- 15-05. PIPING, VALVES AND ACCESSORIES:
1. Furnish and install, including all labor and material required, the various piping systems as specified, adhering to the general routing and methods of distribution shown on the drawings, including all required pipes, fittings, valves, hangers, sleeves, inserts, other items and appurtenances as may be required for the satisfactory operation of the various systems.
2. All exposed pipes passing through floors, ceilings, or walls in finished occupied areas shall be provided with nickel or chrome-plated floor and ceiling escutcheon plates of approved pattern.
3. Access doors shall be furnished and installed where valves are concealed. Doors shall be at least 12" by 12" in size, and shall be Milcor doors made by Inland Steel, Bilco, or Babcock-Davis. Type M doors shall be used in gypsum drywall, ceramic tile and masonry surfaces. All doors shall have screwdriver operated cam locks. Must be painted to match adj finish.
4. Individual hangers for overhead piping shall generally have adjustable sleeve pipe rings with suspended rods of ample strength, Grinnell No. 107 or 124. Such service pipes, as are practical, shall be placed at the same elevation and the various trades shall cooperate with each other and install multiple trapeze hangers whenever possible. "Clevis" type pipe hangers such as Eicon No. 12 will be acceptable. Size and spacing as per Grinnell.
5. Pipe hanger guards shall be provided for all insulated pipe. Hanger guards shall be constructed of No. 16 gauge galvanized sheet steel.
6. PIPE APPLICATIONS AND MATERIAL
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| A. Domestic Water Underground Piping Exterior and Under Slab: | Type K, ASTM B88, Soft Copper annealed temper. No lead solder. |
| B. Sanitary Waste and Vent within Building: | Cast Iron ASTM A14 soil pipe. |
| C. Gas Pipe: | Schedule 40 ASTM A53 black steel. |
| D. Exterior Sanitary Sewer and overflow | Schedule 40 ASTM D2665-13 PVC |
7. PIPE MATERIALS

3. Exterior sanitary sewer piping beyond 5'-0" of building, Schedule 40 PVC Drainage Pipe: Drainage piping shall be poly-vinyl chloride drainage waste and vent piping ASTM-D2665-13. Sanitary drainage pattern fitting shall be used throughout. Install in complete accordance with IAMF016 9-15.
4. Drainage Piping: Copper drainage pipe shall be Type DWV copper drainage tubing, ASTM-B-306 with cast bronze solder joint DWV fittings, Drainage pattern ANSI-B-1623. Solder material 50-50 tin lead ASTM-b-32.
5. Carbon Steel:
a. Steel pipe shall be black conforming to ASTM-A-120, A-135, or A-53, Grade B, 3/4" - 1 1/2" Type F and 2" - 24" Type E or S, or hot dipped Galvanized as indicated. Sizes 2" and smaller shall be threaded and joined with 150 pound malleable iron fittings conforming to ASTM A-41. Pipe shall be joined by using standard weight, factory fabricated fittings and weld on 2 1/2" and larger pipe. Galvanized steel pipe shall be joined by couplings. Welding and threading shall not be used to join galvanized pipe.
6. Weatherproofing: The annular space between a pipe and its sleeve in exterior walls or through floor to below grade shall be filled and made watertight with a permanent elastic compound. Seal surfaces of wall or floor.
7. Natural gas piping shall be schedule 40 black steel pipe with screwed malleable fittings.
- 15-06. SANITARY WASTE AND VENT SYSTEM:
1. All sanitary drainage lines (soil, waste, and vent) shall be ASTM A-14 service weight cast iron soil pipe and fittings, coated inside and out. Joints shall be fabricated by the use of dry oakum packing, forced into the annular space, and then the joint shall be filled with Ingot lead, poured in, with one pound of lead used for each 1" diameter of pipe. The joint shall then be well caulked and the lead shall be one inch minimum depth and brought to the top of the joint and faced. Compression type joints similar to Tyler acceptable if approved by Plumbing Inspector. "No-Hub" piping shall be limited to above ground installations. P.V.C. pipe shall be used if allowed by local governing authorities.
2. Vents shall be extended at least 15" above roof and then properly flashed with 4 pound lead with the base extending at least 10" in every direction from the stack. The vertical portion of the flashing shall extend upward the entire length of the vent pipe and shall be turned down inside the pipe at least 2" to provide a weather-tight joint. Furnish flashings to Roofing Contractor for installation.
3. Vents shall be extended at least 15" above roof and then properly flashed with 4 pound lead with the base extending at least 10" in every direction from the stack. The vertical portion of the flashing shall extend upward the entire length of the vent pipe and shall be turned down inside the pipe at least 2" to provide a weather-tight joint. Furnish flashings to Roofing Contractor for installation.
4. Floor drains and floor sinks shall be as scheduled. Cast iron drain with Nikaloy top, flashing clamp and deep seal P-trap. Manufacturer shall be Josan, Wade, Smith or approved equal.
5. Clean-outs shall be provided in waste lines at each change in direction, at the bottom of each stack, at the end of each branch in horizontal runs at intervals not exceeding 50 feet in lines within the building and intervals not exceeding 100 feet outside the building. The sizes of clean-outs shall be identical with the size of waste line in which they are placed, but no larger than 4" clean-outs shall be required. Clean-outs shall be easily accessible, identifiable and located in closets or other unfinished areas when possible. Exact location of each shall be approved by the Architect before installation. All clean-out threads shall be lubricated with "key-grease" for easy removal.
6. The building main shall have a double clean-out within 5 feet of the building. Outside clean-outs shall be encased in 14" by 14" by 6" concrete pads. Outside cleanouts not subject to traffic shall be equal to Josan 58490.
7. Floor clean-outs in finished areas shall have square satin Nikaloy tops with scoriated surface equal to Josan 56030. Floor clean-outs in unfinished areas and in sidewalks shall have round satin Nikaloy tops with scoriated surface equal to Josan 58400. Floor clean-outs in wheel traffic areas shall have heavy-duty access frame with ductile iron top equal to 58860-5.

- A. Copper Pipe: Type K, and L, and M Copper pipe shall be manufactured in accordance with ASTM B88.
B. Cast Iron Soil Pipe:
a. Cast iron soil pipe shall be service weight cast soft pipe ASTM-A-14 with neoprene gasket compression joints.
b. "No Hub" neoprene sleeve and stainless steel band and clamp type joints will be allowed for above slabs only.

DIVISION 16 - ELECTRICAL

- 16-01. GENERAL:
A. The work covered by this section of these specifications shall be performed in accordance with the respective drawings, information, or instructions to bidders and the general conditions of these specifications. Any supplementary conditions or directives which may be issued by the Owner or Architect, herewith, or otherwise shall be complied with in every respect.
B. The listing herein of an article or material, operation or method, requires that the contractor shall furnish and install each item listed, unless specified or noted to the contrary. The contractor shall furnish labor, materials, tools, equipment and related items required for complete installation of electrical systems, as indicated by the Contract Documents.
C. Examine the site and verify the locations and elevations of all utilities relating to this work.
- 16-02. SCOPE:
A. Drawings accompanying these specifications show extent of work to be performed. Contractor shall comply with every evident intent of these documents in every respect.
B. Examine Architects drawings and specifications for fixtures and finishes in connection with this work; determine general construction conditions and be familiar with all limitations caused by such conditions. Exact location and arrangement of parts shall be determined after equipment has been approved by Architect, as the work progresses, to conform in the best possible manner with surroundings, and as directed by Architect.
C. All work shall be performed with the highest quality of workmanship by skilled electricians and personnel. All work shall be installed per manufacturers suggested manner for a piece of equipment or per an acceptable practice current in the trade. No work shall be deemed satisfactory unless approved and accepted by the Architect and Owner.
- 16-03. CODES:
A. Meet the requirements of the Americans with disabilities Act (ADA) National Fire Prevention Association (NFPA), and the latest edition of National Electrical Code (NEC) local and state or national codes having jurisdiction. Codes and ordinances having jurisdiction over work shall be absolute minimum requirements. Should there be any conflicts between Contract Documents and codes or ordinances having jurisdiction, report these immediately to the Architect.
- 16-04. SUBMITTALS:
A. Contractor shall submit for approval data on all equipment to be installed. Contractor shall not install any equipment until approval has been granted by the Architect, Engineer and Owner.
- 16-05. PRODUCTS:
A. Products, materials and equipment shall meet requirements of Contract Documents, shall be free from defects, shall conform to published construction standards, and shall be UL listed and labeled where such requirements exist for a product.
B. Quality basis shall be interpreted to include material, workmanship, weight, finish, gauges of material, appearances, capacity and performance. Contractor shall be responsible to make all necessary adjustments in the work which may be affected as a result of an approved substitution at no additional cost to the owner.
- 16-06. INSPECTION OF SITE:
A. It shall be the responsibility of the Contractor to visit the site before submitting proposals and familiarize himself with site conditions. All proposals shall preclude that Contractor is familiar with job conditions and utility locations and the lack of specific information on the drawings shall not relieve the Contractor of any responsibility.
- 16-07. FEES AND PERMITS:
A. This Contractor shall secure and pay for all fees and permits which are required for the work under this section of the specifications. Permit fee must be paid at the time of the permit document submittal.

MEP - SPECIFICATIONS
SCALE: NTS

- 16-08. EQUIPMENT IDENTIFICATIONS
A. Label all conductors at all locations throughout the system with appropriate wire markers. Label all junctions and outlets with permanent markings for future identification.
- 16-09. RACEWAYS AND FITTINGS:
A. Rigid Metal Conduit: Use hot-dipped galvanized rigid steel conduit and fittings conforming to UL 6 and NEC 346. Use threaded fittings.
B. All conduit which is run in finished areas of the building shall be concealed. In unfinished areas, the conduit shall be run concealed where construction permits, otherwise it may be run exposed. All exposed conduit shall be run perpendicular to building lines and left in a ready to paint condition.
C. Minimum diameter of 1/2" conduit permitted.
- 16-10. WIRE AND CABLE:
A. All conductors shall be copper. Insulation shall be color coded throughout. Wire sizes #6 and larger shall be stranded with type THHN/THWN insulation. Branch circuit wiring shall be type THHN/THWN per Article 310 of NEC as allowed by local governing authorities.
- 16-11. PULL AND JUNCTION BOXES:
A. Use pull and junction boxes that comply with NEC 370 as to size and construction. Install boxes in accessible locations.
- 16-12. OUTLET BOXES:
A. All outlet boxes shall be boxes that comply with NEC 370 as to size and construction. For lighting fixture outlets use 4" x 1 1/2" deep octagonal boxes. For flush outlet boxes use 4" x 4" x 1 1/2" deep boxes to suit particular devices.
B. This contractor shall carefully check the architectural building plans and coordinate exact locations of all outlets before installation.
- 16-13. GROUNDING:
A. All electrical equipment installed on this project shall be properly grounded in strict accordance with Article 250 of the National Electrical Code. All grounding connections shall be by means of solderless high-pressure connectors.
- 16-14. LIGHTING FIXTURES:
A. Furnish and install a light fixture or fixtures, as designated, on each and every outlet as shown on the drawings. It shall be the Contractors responsibility to check and coordinate the architectural finishes and to purchase lighting fixtures with the proper trim, supports, etc., as required. Provide lamps for all fixtures as scheduled. At completion of project, Contractor shall clean and adjust all fixtures and replace damaged parts and test fixtures.
B. Fixtures shall be as indicated on the Lighting plans.
- 16-15. TESTS:
A. Before final acceptance of the job, the Contractor shall test all circuits for proper wiring. All loads shall be properly balanced on the phases of the systems. Contractor shall repair or replace any and all defective or faulty wiring.
- 16-16. TELEPHONE/DATA SYSTEM ROUGH-IN:
A. Furnish and install telephone outlets, conduits and telephone service as indicated on the drawings and as required by owner.
- 16-17. GUARANTEE:
A. Contractor shall guarantee all materials and workmanship for a period of one (1) year from the date of acceptance of the work. During this period, all parts found to be defective shall be replaced without costs to the owner.

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DATE 02.20.04
SHEET NUMBER MEP3