SECTION 22 00 00

PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract apply to the work specified in DIVISION 22 - PLUMBING.

1.2 SCOPE

Provide labor, materials and equipment for complete and operating systems.

1.3 CUTTING AND PATCHING

A. Cutting and patching for the work of this Division shall be in accordance with the requirements of the General Conditions.

B. Work of this Division shall include providing information for any required openings to those responsible for concrete slabs and other concrete members. Openings associated with work of this Division not indicated or specified in other Divisions, shall be work of this Division.

C. Field cut openings shall be located to avoid the reinforcing. Locations shall be subject to approval of the Architect.

D. No structural members shall be field cut or pierced without the written approval of the Architect.

1.4 DRAWINGS

The drawings are diagrammatic and are intended to show the general arrangement and approximate physical sizes of equipment, piping and ductwork. Every nut, bolt, brace, hanger, piping or duct rise, drop, offset, etc., is not indicated or specified; each item required, necessary or incidental, for the proper and dependable operation of each system shall be provided under this Division whether specifically referred to or not. Refer to architectural drawings for necessary dimensions.

1.5 CODES AND PUBLICATIONS

A. Work shall be executed in accordance with the presently enforced Codes and Publications which shall include but shall not be limited to the following:

1. City of New Orleans Building Code

2. City of New Orleans Gas Code
3. City of New Orleans Mechanical Code

4. Sewerage & Water Board of New Orleans, Plumbing Code

5. Louisiana State Plumbing Code - 2000 Edition

6. ASPE Data Book

7. Louisiana State Fire Marshal Act

8. NFPA 101 - Safety to Life from Fire in Buildings and Structures Code

9. NFPA 70 - National Electrical Code

10. NFPA 54 - National Fuel Gas Code

B. Where the above are at variance with the drawings or specifications, the more stringent requirements shall be applicable.

1.6 REVIEWS, PERMITS AND INSPECTIONS

A. Apply for and pay for governmental and regulatory agency reviews, permits and inspections. Provide riser diagrams, sketches, etc. as required by regulatory agencies for permit issuance.

B. No work shall be concealed until approved by the governmental or regulatory agency inspectors and the Architect. Local regulations shall be adhered to.

C. Upon completion, a Certificate of Approval from the appropriate regulatory agencies shall be provided the Architect.

1.7 FEES AND DEPOSITS

A. Arrange for and pay inspection and service connection fees (sewer, drainage, water and gas).

1.8 VISITING SITE

The Bidder shall visit the site of proposed work so that he may understand the facilities, difficulties, and restrictions attending the execution of the Contract. No additional compensation will be allowed for failure to be so informed.

1.9 UTILITY CONNECTIONS

A. Coordinate connection of utilities which are work of this Divisions to utilities installed as work of other Divisions prior to starting any work. Verify connection points, inverts, valving, etc., prior to commencing any work.

B. Verify gas meter location with utility agency or company prior to installing piping to metering location.

C. No additional compensation will be allowed for conflicts that occur due to the lack of coordination.

1.10 WORK IN OTHER DIVISIONS

A. Prior to bidding the Contractor shall coordinate items of work referred to as **"work of other Divisions"** to insure items are not omitted or duplicated.

B. Utility connections (sewer, and water shall be provided as work of other Divisions.

C. Electrical work (wiring, raceways, and disconnect switches) associated with work of this Division, and not specified as work of DIVISION 26 - ELECTRICAL, shall be work of this Division.

D. Supports for work of this Division, except supports specifically indicated to be provided under other Divisions, shall be provided as work of this Division. Supports provided under other Divisions shall be checked and coordinated under this Division to ensure that they suit the work to be installed.

E. Painting, including painting of exposed insulation, exposed piping, and exposed ductwork not specified as work of other Divisions, shall be work of this Division. Damaged surfaces of factory finished items shall be repaired to the satisfaction of the Architect as the work of this Division. Nameplates shall be protected until painting has been accomplished. Protection shall be removed and nameplates cleaned prior to acceptance of equipment.

1.11 MANUFACTURER'S RECOMMENDATIONS

Equipment and materials provided under this Division of the specifications shall be installed according to manufacturer's recommendations. Each manufacturers' application and installation instructions shall be reviewed prior to ordering equipment or commencing with the work. If the drawings or specifications show or describe any deviations from the manufacturer's recommendations the Contractor shall request clarification, from the Architect and provide as directed at no additional cost to the Owner.

1.12 GUARANTEE AND SERVICE

A. The equipment, materials and workmanship shall be guaranteed for one year after beneficial use of a particular system, beneficial occupancy of the building or final acceptance of entire project. Where specifically indicated extended warranties shall be provided. Beginning date of guarantee will be established only after written request is received by the Architect from the Contractor, and agreed upon by the Architect, stating the date the systems were turned over to the Owner for beneficial use or occupancy.

B. During the one year period of guarantee, any defects in equipment, materials, or workmanship shall be promptly corrected without cost to the Owner. Mechanical and associated electrical equipment shall be serviced and adjusted without cost during the guarantee period. Servicing and adjusting shall include labor, material, parts, etc., required during the first year.

1.13 SPECIAL CONDITIONS

No piping, ducts or other mechanical equipment foreign to electrical equipment shall pass through or above spaces dedicated to electrical panelboards, electrical distribution panels, electrical switchboards, and motor control centers. Work shall conform with NFPA 70. Working clearances and dedicated spaces at electrical equipment shall be maintained per NFPA 70. Coordinate with all trades.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

Equipment and materials shall be new and shall be listed by Underwriters' Laboratories, Inc. (UL) or Factory Mutual (FM) in categories for which standards have been set by that agency. Methods of installation shall be in full accord with the latest and best engineering practices. Pressure vessels, as called for by respective codes, shall be stamped ASME and National Board Commission.

2.2 SUBSTITUTIONS

A. Names of manufacturers and catalog numbers indicated in the Contract Documents are to establish a standard as to design and quality. Other products similar in design and of equal quality may be used if submitted to the Architect and found acceptable. Refer to General Conditions for additional information.

B. When the Contractor elects to use an acceptable alternate manufacturers' equipment, the Contractor shall be responsible to coordinate the change with the trades affected. The Contractor shall also pay for any additional work required under this Division as well as any other Division if the alternate equipment is used.

C. If required by Architect because of substitutions, submit for review ¼" scale working drawings of equipment areas with plan and section views.

2.3 SUBMITTALS

A. Within 30 days after award of the Contract, and before executing any work, submit for review six copies of descriptive equipment literature or shop drawings **in one complete indexed and bound submittal** for the following items:

Access Doors	Cleanouts and Covers
Plumbing Valves and Cocks	Insulation

Plumbing Fixtures & Trim
Water Heaters

B. The same equipment manufacturer shall be provided for multiple items of similar equipment, regardless of capacities, on this project, unless prior written deviation is given by the Architect.

C. Where applicable, submissions shall include installation drawings and brochures showing locations, methods of anchoring, connections to work of others, wall conditions at each particular installation and special floor mounting conditions.

D. Submittals shall be identified with project name, equipment name and number as indicated on the drawings, and specification paragraph reference. Submittals shall be properly marked to show proposed model number and accessories being provided and shall have the Contractor's stamp certifying that he has reviewed the submittal and found it to be in accordance with the specifications and drawings.

E. Submittals which do not comply with the above will be returned without review, for resubmittal.

2.4 ENCLOSURES

A. Control equipment enclosures such as, but not limited to, starters, temperature control panels, etc., provided by the Contractor or provided as part of a packaged piece of equipment shall meet the following minimum standards unless specifically indicated otherwise.

B. Control equipment enclosures provided within the building shall be equivalent to or greater than NEMA 1 type construction.

C. Control equipment enclosures provided outside of the building, a non-enclosed area shall be equivalent to or greater than NEMA 3R type construction with drain and breather.

D. Where indicated on the drawings flush mounted enclosures shall be provided.

2.5 PREPARED OPENINGS

A. Piping and tubing installed through masonry walls, floor/ceiling assemblies, and floors above grade shall be installed through pipe sleeves.

B. Ducts, tubing and piping installed through floors of mechanical rooms shall have a 4" high concrete curb on each side to prevent water from leaking through openings.

C. Piping and tubing installed through partitions, walls, or floors which are smoke rated or have a fire rating of one hour or greater shall be installed through pipe sleeves.

D. Exposed piping installed through walls shall be fitted with chromium plated escutcheons on each side of the wall.

2.6 PIPE SLEEVES

A. Sleeves for tubing and piping installed through masonry walls shall be Schedule 40, galvanized steel pipe.

B. Sleeves for tubing and piping installed through fire or smoke rated dry wall partitions, floors, and floor/ceiling assemblies above grade shall be a minimum of Schedule 10, galvanized steel pipe.

2.7 SUPPORTS AND CLAMPS

A. Supports shall adequately support the weight of the pipe and material contained within. Supports shall be manufactured in accordance with MSS SP-58, ANSI B31.1 and UL 203.

B. Supports for piping above grade shall be as follows:

1. Cast iron or steel piping:

a. Interior:

1) Grinnell Figure 260 adjustable clevis hanger and rod, carbon steel construction, zinc plated finish.

2) Strut channels, supporting steel, and trapeze hangers, carbon steel with zinc plated finish.

b. Exterior:

1) Grinnell Figure 260 adjustable clevis hanger and rod, carbon steel construction, hot dipped galvanized finish.

2) Strut channels, supporting steel, and trapeze hangers, carbon steel with hot dipped galvanized finish.

2. Copper tubing:

Grinnell Figure CT-69 adjustable tubing ring and rod, carbon steel ring with copper finish and malleable iron adjusting nut.

3. Riser clamps:

a. Clamps, bolts and nuts for cast iron or steel piping shall be Grinnell Figure 261, carbon steel construction, hot dipped galvanized finish.

b. Clamps for copper tubing shall be Grinnell Figure 261c, black carbon steel construction, copper plated or with formed section plastic coated.

C. Acceptable manufacturers: Elcen Mfg. Co., Michigan Hanger Co., Grinnell, Persing & Co., or approved equal.

D. Hangers for piping under concrete slabs on grade or fill - Soil, waste and vent, greasy waste and vent, fire protection and domestic water piping shall be type 316 stainless steel rod wrapped around the pipe and lapped over the slab reinforcing steel. Hangers for any other piping shall be Type 316 stainless steel clevis type hanger and rod attached to slab reinforcing steel. See drawings for details.

2.8 UNIONS AND FLANGES

A. Unions:

1. Steel piping 2½" and smaller - Unions shall be ANSI B16.39 malleable iron, WOG, female pattern, threaded ends, brass seat, with ground joint.

2. Copper tubing 2½" and smaller - Cast copper unions shall have solder ends, with ground joint.

B. Flanges:

1. Steel piping 3" and larger:

a. Flanges shall be welding neck or slip-on type, flat or raised face, forged steel, ASTM A 181, Grade I, ANSI B16.5, Class 150 or 300 as required.

b. Bolts shall be ASTM A 307, Grade B8. Nuts shall be ASTM A 307, Grade 8.

2. Copper tubing 3" and larger - Flanges shall be ANSI Standard B16.24, Class 150, with solder joint ends.

3. Gaskets shall be 1/16" thick, similar to Garlock or Cranite, factory cut, one piece. Provide full-face gaskets for flat-face flanged joints, and ring gaskets for raised-face flanged joints.

2.9 DISSIMILAR METALS

A. 2" and smaller - Dielectrically isolated unions, couplings or nipples.

B. 2" and larger - Dielectrically isolated and gasketed flanges.

2.10 PIPE IDENTIFICATION

A. Identification of piping shall be by the use of colored, waterproofed, all-temperature, self-adhering pipe markers and directional arrows.

B. Acceptable manufacturers: Ready Mode, Seton Style RPM, MAPA Label Tabs, or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION OF VALVES

A. Valves shall be provided where indicated on the drawings or as hereinafter described.

B. Valves shall be installed so that the handle is accessible and operable. Where required due to space limitations, special short style handles may be provided on ball valves.

C. Valves located in walls, chases and above suspended, inaccessible ceilings shall be provided with access doors. Valves located above accessible acoustical tile ceilings shall have the location of each valve marked with a pressure sensitive colored dot applied to the T-bar. Color to be selected by the Architect.

D. Valves located above ceilings indicated to be used for drains, or for future use shall have a pipe plug or nipple and cap closure. Valves in equipment spaces indicated to be used for drains, blowdowns, etc., shall have hose threads for extensions to floor drains. Hose bibbs shall not be used.

E. Gate, globe and other style valves having packing glands shall have valve handles installed in the horizontal or vertical (down) position or any angle between to keep packing glands moist.

3.2 EXCAVATING AND BACKFILLING UNDER BUILDING SLABS

A. The Contractor shall do excavating, trenching and backfilling for the work of this Division. The Contractor shall work around or remove obstructions as necessary. Bottoms of trenches shall be tamped hard. Bell holes shall be excavated to insure that pipe rests on solid earth for its entire length.

B. Backfilling trenches for piping under structural pile supported slabs shall be done by hand. Fill shall be "walked" or hand tamped on each side of pipe to provide compaction that will hold the piping in alignment. The remainder of the trench may be backfilled by hand or approved mechanical means. Care shall be taken during tamping to keep piping in alignment.

C. The Contractor shall remove any water which may be found or may accumulate in the trenches and shall perform work necessary to keep them clear of water while the work is in progress, or as may be required for inspections.

3.3 DISPOSAL OF EXCESS EXCAVATED MATERIAL

Excess fill taken from excavations shall, unless otherwise provided, be regarded as the property of the Contractor, and shall be removed as soon as possible at his expense.

3.4 SHEETING AND SHORING

A. Sheeting and shoring shall be placed in excavations and trenches as required to suit the ground conditions and to properly and safely support the excavations and trench walls and any adjacent structures.

B. Placement of the sheeting and shoring in the trench shall not restrict the excavation and trench width specified in other Sections.

C. Sheeting and shoring for excavations and trenches less than five feet in depth may be of treated wood. Wood indicated to remain in excavations and trenches shall be treated type. Sheeting and shoring for excavations and trenches greater than five feet in depth shall be of steel construction.

D. Unless otherwise instructed by the Architect, wood sheeting, shoring and bracing shall be cut-off at an elevation of 24" below finished grade. The lower portion of the sheeting and bracing below grade shall remain in the ground. If instructed by the Architect to remove the wood or steel sheeting and shoring it shall not be removed until backfilling is completed.

3.5 OPERATING INSTRUCTIONS

A. Prior to the time scheduled for occupancy, the Contractor shall provide the services of a competent mechanic to instruct the Owner in the care and operation of equipment.

B. Before final acceptance, the Contractor shall prepare and deliver to the Architect three bound copies of operating instructions, which shall include:

1. Description of major components of systems, including the function of major items.

2. Detailed operating instructions and instructions for making routine minor adjustments.

3. Routine maintenance operations.

4. Manufacturer's catalog data, service instructions wiring diagrams, fabrication drawings and parts list for each piece of operating equipment.

5. Copies of equipment submittals and shop drawings, including review sheet, reviewed by and acceptable to the Architect.

6. Guarantee and Warranty Information.

7. Names and telephone numbers of subcontractors and suppliers.

C. Literature shall be contained in hard back loose leaf type binders and divided into a suitable number of volumes so as to permit convenient heavy usage.

3.6 ELECTRICAL WORK

A. Refer to schedules and electrical drawings for motor voltages.

B. Motors for mechanical equipment shall be provided under this Division. The work of this Division shall include setting and aligning integral drive motors in operating position.

C. Unless noted otherwise, combination magnetic starters for mechanical equipment shall be provided under this Division and installed and electrically connected under DIVISION 26 - ELECTRICAL.

D. Electrical work in connection with this Division and not indicated to be work of other Divisions shall be work of this Division. Control disconnects, control wiring and raceways, and electrical interlock and signaling wiring and raceways shall be work of this Division. The electrical work provided under this Division shall be installed by a licensed electrician.

E. Safety, signaling, and control devices such as thermostats, firestats, damper motors, valve operators, push buttons, pilot lights, control and/or monitoring panels, crank-case heaters, etc., shall be provided and wired under this Division in strict accordance with an approved wiring diagram.

F. Wiring and raceways installed under this Division shall comply with the requirements of DIVISION 26 - ELECTRICAL.

3.7 EQUIPMENT SUPPORTS

A. Unless otherwise specified, supports necessary for properly supporting the work and the equipment of this Division shall be provided under this Division. Additionally, provide isolation materials to prevent transmission of vibration to the building structure. Isolation of equipment as shown on drawings or specified is the minimum required, and any additional isolation required to prevent transmission of vibrations shall be provided under this Division, in accordance with the equipment manufacturer's recommendations

3.8 OPENINGS, GROUNDS AND CHASES

A. Openings, grounds, chases and lintels will be provided under other Divisions, as directed by this Division, to accommodate the piping, ductwork and equipment. Sleeves and prepared openings shall be accurately located in slabs or walls before pouring of concrete.

B. It shall be the responsibility of this Division to verify that openings and chases are properly located. Openings associated with work of this Division not indicated or specified in other Divisions, shall be work of this Division. Coordinate location of grease ducts through roof and arrange for roof framing to be relocated to avoid offsetting of ducts.

1. Holes through existing concrete shall be either core drilled or saw cut. Drilled or cut holes required shall have the approval of the Architect prior to cutting or drilling.

2. Sleeves set in openings cut in existing masonry walls or concrete slabs shall be one pipe size smaller in outside diameter than the cored hole. The sleeve shall be grouted in place with non-shrinking waterproof grout.

C. Where piping is installed through smoke and/or fire separations, fill annular space between sleeve and piping with safing or fire barrier material.

3.9 ACCESS DOORS

A. Equipment which may require constant or periodic operation or adjustment such as but not limited to valves, water hammer arresters, cleanouts, automatic smoke and fire dampers, damper operators, mixing boxes, variable volume equipment, steam traps, plumbing traps, plumbing fixture connections, etc., located in or above inaccessible ceilings, walls, or chases shall have hinged metal access doors as required by type of construction.

B. Minimum door size shall be 8" x 8". Doors shall be of sufficient size to adequately service, repair, replace or inspect the equipment.

C. Locations of access doors in ceilings shall be coordinated to avoid conflict with ceiling mounted devices (lighting fixtures, fire alarm devices, ceiling diffusers, sprinkler heads, etc.). Locations shall be approved by the Architect.

3.10 PIPE SLEEVES

A. Piping and tubing installed through masonry walls, concrete floors above grade, exterior metal wall panels, and smoke or fire rated partitions shall be installed through pipe sleeves as hereinbefore specified.

B. Sleeves are not required for soil, waste, vent, storm drainage, fire protection, or domestic water piping through slabs on grade or fill. Any other piping shall be provided with sleeves.

C. Sleeves shall be finished flush with both sides of wall. Sleeves through floors above grade shall project a minimum of 2" above finished floors. Sleeves through exterior metal wall panels shall be installed to prevent water from entering around perimeter of sleeve.

D. Diameter of sleeves shall be large enough to provide a 1/4" minimum annular space between pipe and sleeve or insulation and sleeve. Annular space shall be large enough to accommodate pipe movement due to expansion or contraction.

E. Where piping or tubing is installed through fire or fire/smoke rated separations, the annular space between the piping or tubing and sleeve shall be filled with UL Classified fire barrier material.

F. Where piping or tubing is installed through smoke rated separations, the annular space between the piping or tubing and sleeve shall be packed solid with safing material.

G. Annular space between pipe or tubing and sleeve installed through exterior walls shall be made waterproof by filling with a silicone type caulking compound on the exterior side only.

3.11 SUPPORTS

A. Hangers, guides, brackets and braces shall be adequately fastened to the structure by means of drilled expansion shields, drilled wedge type devices, bolts or beam clamps. Powder driven fasteners shall not be used.

B. Inserts in slabs and beams for fastening work shall be cast in place wherever possible. If additional inserts are required after concrete is placed, drilled type shall be used.

C. Where building construction consists of a metal roof supported by metal purlins, provide additional steel members to span between roof supports to provide supports for hanger rods.

3.12 GENERAL PIPING INSTRUCTIONS

A. Exposed and concealed horizontal lines of pipe and tube shall be carried on hangers and supports hereinbefore specified and properly spaced to maintain alignment. Install pipe and tubing true to line and grade.

B. Piping shall be concealed except where noted. Piping shall be installed above suspended ceilings and in furred partitions. Exposed piping shall be installed parallel to or at right angles with building walls, except where otherwise shown on drawings. Changes in elevation, to suit varying ceiling heights, shall be made so that piping will stay exposed.

C. Exposed pipe through walls, floors and ceilings shall be fitted with chromium plated escutcheons securely held in position with allowance for expansion. Escutcheons shall be large enough to fit the pipe, tubing or insulation and to cover openings around the sleeves through walls.

D. Wherever changes in sizes of piping occur, changes shall be made with reducing fittings. The use of bushings will not be permitted.

E. Minimum bury for exterior piping shall be 18" below finish grade, unless noted otherwise on drawings or in specifications. PVC water mains shall have 30" minimum cover.

F. Cutting and boring through structural members shall be done only when approved by and under supervision of the Architect.

G. Offsets in piping above slab shall be made with fittings. Bending of pipe shall not be permitted.

H. Automatic valves or traps shall be provided with unions and shut-off valves so that they can be removed for servicing. Valving shall also be arranged so as to eliminate the necessity of draining major parts or entire system while service or repairs are made.

3.13 CONNECTION OF COPPER TUBING

A. Copper tubing shall be cut with square ends, and burrs and fins removed. Tubing shall be handled and protected carefully and tubing cut, dented, or otherwise damaged shall be replaced. Ends of tubing and fittings shall be cleaned using sand or emery cloth.

B. Copper Water Tube: Apply a thin coat of flux to end of tube and solder cup. Insert tube into fitting full depth and apply heat. Apply solder until bead appears at end of fitting. Clean excess solder and flux from completed joint.

3.14 CONNECTION OF SCREW JOINTED PIPING

A. Piping shall be square cut and free from fins, burrs, die marks, etc. Threads shall be full cut to depth of die.

B. Apply approved lubricant or thread sealing tape on male threads only. Screw fitting and pipe together using pipe wrenches so that not more than three threads remain exposed on pipe. Clean excess joint material from completed joint.

C. Joints in galvanized piping systems shall be cleaned and sprayed with two coats of zinc rich rust inhibiting paint.

3.15 CONNECTION OF WELDED JOINT PIPING

Welded joints shall conform to the requirements of ANSI B31.1. Welders shall be qualified using shielded metal arc welding process or other approved process in accordance with the applicable provisions of the ASME Boiler and Pressure Vessel Code, Section IX. Prior to erection each length of pipe shall be held in an inclined position and repeatedly tapped to loosen any scale or foreign matter within the pipe. Each length of pipe shall be thoroughly swabbed prior to erection.

3.16 CONNECTION OF GROOVE JOINTED PIPING

A. Piping shall be inspected and verified free from indentations, projections, grooves, weld seams or roll marks on the exterior pipe surface over the entire gasket seating area to insure a leak-tight gasket seating. Pipe ends shall be square cut. Cut and roll grooves shall meet the manufacturer's criteria.

B. Gasket, pipe ends and coupling housing shall be properly lubricated per manufacturer's recommendations prior to seating and aligning.

3.17 SUPPORTS AND CLAMPS

A. Vertical support and bracing for risers shall be by use of riser clamps at every floor but not less than 15'-0" o.c.

B. Horizontal piping above grade shall have supports and rods adequate for size, material and service, and be supported at not more than the following intervals on straight runs of piping:

MAXIMUM SUPPORT SPACING - CAST IRON PIPING

PIPE DIAMETER	SUPPORT SPACING	MIN. HANGER ROD-DIAMETER
2"	5'-0" and at each Joint	⅜”
3"	5'-0" and at each Joint	½”
4"-5"	5'-0" and at each Joint	⅝”

MAXIMUM SUPPORT SPACING - OTHER PIPING

PIPE DIAMETER	SCREWED, SOLDERED & WELDED JOINTS	GROOVED JOINTS	MIN. HANGER ROD DIAMETER
½" to 1¼"	6'-6"	6'-6"	⅜"
1½" to 2"	10'-0"	7'-6"	⅜"
2½" to 3"	10'-0"	10'-0"	½"
4" to 6"	10'-0"	10'-0"	⅝"-¾

C. Unless otherwise detailed on the drawings, underground piping shall have hanger rod sizes as listed below to support the piping at not more than the following intervals on straight runs of piping:

PIPE DIAMETER	MAX. SUPPORT SPACING	MIN. SUPPORT ROD DIAMETER
½" to 6"	4'-0"	¼" *

** If allthread rod is used in lieu of smooth rod, allthread rod shall be one size larger.*

D. When interior support rods are over 12" in length, provide lateral bracing every fourth hanger or as required to prevent swaying. Offsets or bends in hanger rods or pipe hanging from pipe are not acceptable.

E. In securing rods and hangers to wood or metal, angle clips, beam clips or C-clamps shall be used. Angle clips must be attached to structure by means of large screws or bolts. Securing rods to concrete shall be as hereinbefore specified.

F. Trapeze supports with U-bolts, pipe straps or clamps may be used where two or more pipes run parallel at the same elevation.

G. Pipes must be installed so that they may contract or expand freely without damage to other work or injury to themselves.

H. Vibrations or movement developing in piping shall be eliminated or isolated by re-spacing of supports, anchoring or installation of spring supports as directed.

I. Insulated piping with a normal operating range of 55 degrees or less, provide a 20-gauge sheet metal saddle approximately 12" long and having 180-degrees of contact with insulation between the hanger or support and the insulation for each pipe. Insulated piping with a normal operating range of 56 degrees or greater may have the hanger installed between the pipe and the insulation.

J. Where individual pipe supports are installed outside of the insulation jacket or trapeze supports are used to support insulated pipes, a galvanized sheet metal saddle, as described above, shall be installed between the support and the insulation.

K. Piping shall be racked and handled in a manner to prevent entrance of dirt and foreign matter. Open pipe ends shall be plugged or capped during erection.

L. Perforated type strap hangers shall not be used.

M. Exterior pipe supports shall be hot dipped galvanized after fabrication.

N. Horizontal pipe shall be supported not over 1' from the fitting at each change in horizontal direction or vertical elevation of the piping.

O. Piping and fittings below pile supported slabs on grade or fill shall be supported as follows:

1. Piping shall be hung on 4' centers.

2. PVC piping and fittings shall have a PVC half-sleeve installed between the hanger and the pipe.

3. Additionally soil, waste, vent, fittings shall be hung as follows:

a. Vertical combinations, wye and eighth bends and up-right tees shall have two hangers.

b. Horizontal combinations, wye and eighth bends and tees shall have three hangers.

c. Horizontal double combinations, double wye and eighth bends and crosses shall have four hangers.

3.18 UNIONS OR FLANGES

Unions or flanges shall be provided at items of equipment to facilitate their easy maintenance, including tube bundle or coil removal, and/or cleaning. It shall not be necessary to remove any valve, strainer, or device to do the required maintenance. Piping connections at equipment shall be in accordance with the current engineering and installation practices. The requirements of this paragraph will be strictly enforced and if in the opinion of the Architect it is not adhered to, the Contractor will be required to re-pipe the equipment as directed.

3.19 GAS REGULATORS

Gas regulator and diaphragm type gas valve vents shall be piped individually through the exterior wall or roof of the building and terminated per NFPA 54. Vent piping shall be Type L, hard drawn, copper. Fittings shall be wrought copper. Joints shall be 95-5 soldered. Terminate vents 15'-0" from intake louvers and operable windows.

3.20 WORK RELATED TO EQUIPMENT NOT FURNISHED AS WORK OF THIS DIVISION

Unless specifically indicated otherwise, any required mechanical services for and required mechanical connections to items indicated on the drawings or in the specifications or items provided by the Owner shall be mechanically connected as work of this Division. The Contractor shall provide piping, valves, traps, etc., as required for complete operation of each piece of equipment.

3.21 DISSIMILAR METALS

A. Inert NSF/FDA lined dielectric nipples shall be provided between copper, bronze or brass piping material or valves and steel piping material or steel tanks. Dielectric nipples and brass or copper unions or flanges shall be provided at cast iron valves and equipment where hereinbefore specified for equipment maintenance.

B. Dissimilar metals shall be isolated from surface contact with each other by the use of a non-conductive material, tape, etc.

3.22 PROTECTION OF WORK

A. The Contractor shall protect equipment, fixtures, and work from damage. Damaged work will be rejected and replaced at the expense of the Contractor. Where possible, rooms containing new plumbing fixtures shall be kept locked until the building is turned over to the Owner. Immediately after installation of each plumbing fixture, it shall be covered with a fixture protector.

B. Mechanical equipment shall be protected from damage and from the weather. Provide adequate and proper storage facilities for items during the progress of the work.

3.23 CLEANING OF EQUIPMENT AND MATERIAL

A. Prior to acceptance, the Contractor shall clean equipment and remove grease, dirt and foreign matter. Pressure regulating assemblies, traps, flush valves and similar items shall be thoroughly cleaned. Remove and thoroughly clean and reinstall liquid strainer screens after the system has been in operation 10 days.

B. Natural gas piping shall be blown out with clean compressed air.

3.24 FRICTION LOSSES, ELECTRICAL RATINGS AND SPACE REQUIREMENTS

A. The values of air and water friction losses, electrical current ratings and space requirements for various pieces of equipment, as contained in these specifications or as scheduled, are estimated values and sizes and have been used in obtaining specifications for equipment and for sizing ducts, pipe, electric wiring and motor controls. Any necessary changes in any of these items resulting from values other than the estimated ones shown shall be the responsibility of the Contractor and shall be subject to the approval of the

Architect. The Contractor shall pay any costs for additional labor and material required including costs of any other Contractor involved.

B. Should substitute equipment require different requirements from that shown on the drawings, the Contractor shall be responsible for the cost of the changes. Any such changes must be approved by the Architect.

3.25 MARKING OF EQUIPMENT

Each piece of mechanical equipment shall be suitably identified by means of ¼" high letters cut in white laminated phenolic strip to show black letters. Mechanical equipment, such as but not limited to, boilers, air handling units, exhaust fans, starters, etc., shall be labeled. Strip shall be secured to interior equipment using self-adhesive backing and to exterior equipment by means of two brass bolts and nuts or screws.

3.26 IDENTIFICATION OF PIPING

A. Piping, whether insulated or not shall be identified. Identification may be omitted from piping in inaccessible chases and furring and where use is obvious, due to its connection to fixtures or equipment and where the appearance would be objectionable, as in finished rooms.

B. Identification shall be placed as follows:

1. Near each valve and branch connection.

2. Above accessible ceilings wherever piping emerges or disappears from view when viewed from the floor of the room in which it is installed.

3. Labels shall not be more than 10' apart.

3.27 CHANGES TO PIPING OR DUCTS

Should the Contractor desire to make changes in the routing or arrangement of piping or ducts, whether for his own convenience, to avoid conflict with the work of other trades, or to conform to local codes, such changes shall not be made without the prior approval of the Architect.

3.28 STARTING AND TESTING

A competent and experienced service and installation mechanic shall be employed by the Contractor to start test and adjust the equipment. The Architect reserves the right to require the test of any item of equipment or machinery. Such tests shall be conducted by the Contractor in the presence of the Architect.

3.29 PROJECT CLOSEOUT DOCUMENTS

A. Prior to the final acceptance of the project the Contractor shall deliver to the Architect, for review, the following in two three-ring binders:

1. Certificates of approval from local regulatory agencies.

2. Extended equipment warranties.

3. Operating instruction manuals which shall include copies of reviewed submittals and shop drawings including review sheet.

4. Results of potable water sterilization tests.

5. Mylar reproducible record drawings.

B. Final payment will be withheld until each applicable item has been provided to and is found satisfactory by the Architect.

- END OF SECTION -

SECTION 22 05 00

PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. Work under this Section shall include providing a complete and functioning interior plumbing system for the project and appurtenances indicated or necessary. Terminate each system 10 feet beyond the edge of structural pile supported slabs, unless otherwise on the drawings, for extension under other Divisions of the specifications

B. Items specified or required shall be provided for a complete and operating system as described in SECTION 220000 - MECHANICAL GENERAL PROVISIONS.

1.2 BACKING

Each plumbing fixture not specified to be installed on a concealed chair carrier shall be provided with proper backing within the wall. Such backing shall be provided under other Divisions as directed by this Division.

1.3 ELECTRICAL WORK

Electrical work in connection with work of this Section not indicated as work of DIVISION 26 - ELECTRICAL, including disconnect switches for control wiring, shall be work of this Section.

PART 2 - PRODUCTS

2.1 VALVES (Plumbing)

A. Valves shall be as listed below unless otherwise noted on the drawings:

1. Water shut-off valves above grade:

a. 2 1/2" and smaller - Nibco Series S-FP-600N or Watts Series B, full port ball valve; 400 psi ASTM B-283 bronze body, ASTM B-516 chrome plated brass ball and stem; PTFE seats, packing, and gaskets; solder ends; two piece construction with lever handle.

Acceptable manufacturers: Conbraco, Hammond, Red-White, Milwaukee, Nibco, Watts, or approved equal.

2. Gas cocks above grade:

a. DeZurik #425 or Homestead #611/612, 175 psi eccentric valve; cast iron body; UL listed #RS49 plug seals; bronze bearings; Buna packing seals; lever handle; threaded or flanged ends for ANSI standard 125 psi flanges as required.

Acceptable manufacturers: Crane, Homestead or approved equal.

B. Ball valves installed in insulated piping shall have factory furnished metal stem extensions suitable for the thickness of the insulation installed.

C. Each type of valve furnished for the project shall be the product of the same manufacturer; i.e., each ball valve or butterfly valve, unless prior written deviation is given by the Architect.

2.2 PIPE, FITTINGS, AND JOINTS

A. Soil, waste, greasy waste, and vent:

1. Pipe and fittings above grade:

a. Centrifugally spun and coated cast iron pipe, and drainage type fittings with plain or beaded ends, ASTM A 888 and CISPI 301; joints shall be neoprene elastomer sleeve with stainless steel shield and clamp assembly; sleeve shall bear the ASTM C 564 marking, clamp shall bear the CISPI 310 NO-HUB marking.

b. Horizontal waste arms between stacks and fixtures shall be hard drawn, copper drainage tube, type DWV, ASTM B 306, or seamless copper water tube, type L, ASTM B 88; fittings shall be wrought copper drainage type, ASME B16.29 or cast copper drainage fittings, ASME B16.23; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, Alloy grade 95A.

B. Domestic Water:

1. Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type, ASME B16.22 or cast copper pressure type, ASME B16.18; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, alloy grade 95A.

C. Gas Piping:

1. Pipe and fittings above grade:

a. Piping 1½" and smaller - ERW black carbon steel pipe, Schedule 40, ASTM A 53, Grade B; fittings shall be threaded black malleable iron, Class 150, ANSI B16.3; joints shall be threaded, ANSI B2.1.

b. Piping 2" and larger - ERW black carbon steel pipe, Schedule 40 ASTM A 53, Grade B; fittings shall be ANSI B16.9, standard weight, beveled end, black carbon steel, ASTM A 106, Grade B; joints shall be made by butt welding.

c. Where piping is exposed to the weather pipe and fittings shall be galvanized with threaded joints.

2.3 CLEANOUTS AND COVERS

A. Cleanout plugs installed in cast iron and copper piping systems shall be cast brass, flanged type with raised or countersunk square head, CSS301.

B. Cleanout plugs installed in plastic piping systems shall have raised or countersunk square head.

C. Covers installed outside the building shall be cast iron, 10" diameter, with a cast iron ring. Word "SEWER" shall be cast on the cover manufactured by
Tyler #2-101, Vulcan #VCO-1, or approved equal.

D. Covers installed inside the building in un-carpeted floors shall be cast nickel brass, 10" diameter, with a scoriated satin finish and brass ring manufactured by Josam #58610-10, Smith #4810, Wade, Zurn, or approved equal.

2.4 INSULATION

A. Insulation shall have a vapor barrier jacket or facing complying with NFPA 90A fire and smoke hazard rating as determined by Underwriters Laboratories procedure UL 723, ASTM E 84 and NFPA 255 not to exceed a flame spread of 25 and smoke developed of 50. Maximum jacket permeability (if jacketed) shall be 0.02 perms per ASTM E 96.

B. Accessories such as adhesives, mastics, cements, tapes, etc., shall have the same fire and smoke hazard rating as jacket or facing.

C. Fiberglass insulation:

1. Pre-formed, split type, fiberglass pipe insulation with an all service jacket having a maximum "k" factor per ASTM C 335 of 0.23 Btu×in/hr×ft²×°F at a mean temperature of 75 degrees F.

2. Domestic cold water piping - ½" thick.

3. Domestic hot water supply piping.

a. Piping 1" and smaller - 1" thick.

b. Piping 1 1/4" to 2 “ - 1 1/2" thick.

c. Piping 2 ½" and larger 2" thick.

Acceptable manufacturers: Certainteed 500 Snap-on, Owens-Corning 25 ASJ/SSL, or approved equal.

D. Fitting and valve insulation:

1. Fiberglass blanket insulation equal in thickness to the adjacent pipe insulation, field cut to fit fittings. Valves shall be insulated using oversized pipe insulation field cut to fit valves.

E. Accessories:

1. Fitting Covers - Preformed, one-piece, snap-on PVC jacket covers for fittings.

Acceptable manufacturers: Certainteed Snap-Form, Proto LoSmoke, Zeston, or approved equal.

2. PVC Jackets - Smooth white PVC, 0.02" thick with self-sealing strip.

Acceptable manufacturers: Proto LoSmoke or approved equal.

2.5 FIXTURES AND TRIM

A. Fixtures shall be provided with traps, set true and plumb, and securely fastened in place. Supply pipes to fixtures shall be fitted with stop valves. Exposed metal parts, trimmings, piping, fittings, valves, etc., shall be chromium plated brass. Heavy pattern cast iron floor flanges or threaded nipples with suitable gaskets to make joints gas and watertight shall be used on china fixtures.

B. China fixtures shall be white (unless otherwise noted) and shall be as manufactured by American Standard, Crane, Eljer, or Kohler.

C. Stainless steel sinks shall be as manufactured by Elkay or Just.

D. Electric water coolers shall be as manufactured by Elkay, Halsey Taylor, Haws, Oasis, or Sunroc.

E. Standard type brass supply fittings and trim shall be as manufactured by American Standard, Crane, Eljer, Kohler, Speakman, or Delta HDF. Hot and cold water valves on supply fittings shall be 1/4-turn cartridge type.

F. Flush valves shall be as manufactured by Delany, Sloan, or Zurn.

G. Drains shall be as manufactured by Josam, Smith, Wade, or Zurn.

H. Water closet seats shall be as manufactured by Beneke, Bemis, Church, Olsonite, or Centoco.

I. Terrazzo mop basins shall be as manufactured by Fiat or Stern-Williams.

J. Specialty type brass supply fittings and trim shall be as manufactured by Chicago Faucet, T&S Brass, Elkay or Zurn.

K. Shower valves and heads shall be as manufactured by Leonard or Powers.

L. Fixtures:

1. Water Closets:

a. (WC-1) American Standard Cadet #2898.012 or Kohler Wellworth #K-3422 floor mounted, gravity flush, 1.6 gpf siphon jet, elongated vitreous china bowl, with close coupled vitreous china tank, cover and bolt caps.

1) Church #9500SSC or Centoco #1500CCSS solid white plastic open front elongated seat with check hinge and stainless steel hinge posts.

2) Flexible chrome plated copper or brass supply riser with cone or flanged top, chrome plated wall extension and wheel handle compression stop.

b. (WC-2) American Standard Cadet #2998.012 or Kohler Highline #K-3427 floor mounted, gravity flush, 1.6 gpf siphon jet, 17" high ADAAG compliant elongated vitreous china bowl with close coupled vitreous china tank, left hand trip-lever, cover and bolt caps. Where required furnish tank with right hand trip-lever.

1) Church #9500SSC or Centoco #1500CCSS solid white plastic, open front elongated seat with check hinge and stainless steel hinge posts.

2) Flexible chrome plated copper or brass supply riser with cone or flanged top, chrome plated wall extension, and wheel handle compression stop.

2. Lavatories:

a. (L-1) American Standard Lucerne #0355.012 or Kohler Kingston #K-2005 lavatory with 4" drilling, wall hung, with wall hanger; vitreous china bowl with overflow and integral backsplash; size - 20"x18."

1) American Standard Heritage #5400.172H or Kohler Triton #K-7404-5A supply fitting, 4" spread, 1/4-turn wrist blade handles, 2½ gpm flow restrictor; grid waste and tailpiece.

2) 1¼"x1½" 17-gauge tubular brass slip joint type P-trap

3) Flexible chrome plated brass supply risers with cone or flanged top, chrome plated wall extensions, and wheel handle compression stops.

b. (L-2) American Standard Lucerne #0355.012 or Kohler Kingston #K-2005 lavatory with 4" drilling, wall hung, with wall hanger; vitreous china bowl with overflow and integral backsplash; size - 20"x18". Install at ADAAG height.

1) American Standard Heritage #5400.142H or Kohler Triton #K-7404-K all brass supply fitting, 4" spread, with 2½ gpm flow restrictor, 1/4-turn lever handles; grid waste and tailpiece.

2) 1¼"x1½" 17-gauge tubular brass, slip joint type P-trap.

3) Flexible chrome plated brass supply risers with cone or flanged tops, and wheel handle compression stops.

4) Truebro LavGuard or equal trap and pipe insulation.

3. Sinks:

a. (SAC) Sacristy Sink - Just #C-19014 or equal, 18-gauge type 302 stainless steel, wall hung, double compartment countertop bowl; three hole punching and hinged lockable cover (right side).

1) Just #JWF-100 or equal, two handle concealed mount mixing faucet spout, 1/4 turn lever handles, and aerator for three hole punching.

2) Just #J-35 and Just #JB-99 stainless steel strainers and chrome plated brass tailpiece.

3) (2) 1½" x 2" 17-gauge tubular brass, slip joint type P-traps.

4) Flexible copper or brass supply risers with cone or flanged tops and wheel handle 1/4 turn angle compression stops.

2.6 MOUNTING HEIGHTS OF PLUMBING FIXTURES

Fixture	**Standard Height**		**ADAAG Height**
W.C.	15" rim to floor	*	19" seat to floor
L.	31" rim to floor		29" bottom of apron to floor
U.	24" rim to floor		17" rim to floor
E.W.C.	40" rim to floor		36" spout outlet to floor
SAC.	_____		34" rim to floor

*Handle for flush valve in barrier-free stall shall be mounted to wide side of stall or room, refer to architectural drawings.

2.7 ELECTRICAL WORK

A. Materials shall be new and shall be Underwriters Laboratories labeled or listed.

B. Wiring shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 16 - ELECTRICAL.

C. Wiring for 115 volts and higher shall be copper #12 AWG or larger. Wiring type, insulation, etc. shall meet the requirements of DIVISION 16 - ELECTRICAL.

D. Wiring less than 115 volts shall be copper. Wire size, type and insulation shall be selected to suit the application.

PART 3 - EXECUTION

3.1 INSTALLATION OF UNDERGROUND PIPING

Underground piping shall be laid with bell ends pointing upgrade. Pipe shall be graded carefully, bell holes shall be separately excavated and each length of pipe supported firmly and uniformly at the proper elevation and grade. Adjacent lengths of piping shall be adjusted with reference to each other, marking or wedging between bell and spigot will not be permitted.

3.2 JOINTS

A. Cast iron compression joints - Joints shall have neoprene insert type gasket designed for use with plain end pipe and fittings. Gasket shall be folded and placed into hub so that retaining lip of gasket is properly seated. Approved gasket lubricant shall be applied to inside of gasket only. End of pipe or fitting shall be inserted into gasket and jacked into place using an approved jacking tool or lead maul and wood blocking per manufacturers recommendations.

B. Hubless joints - Joints shall be made using approved connectors as hereinbefore specified. Piping shall be inserted into sleeve until seated, install shield to completely cover sleeve, tighten clamps with torque wrench to specified pressure.

C. Cast iron to PVC joints - Joints shall be made using premolded adaptors.

D.

3.3 CLEANOUTS AND COVERS

A. Cleanouts shall be of the same size as pipes in which they are installed up to 8" in diameter.

B. Cleanouts shall be installed at the base of each stack and at each change of direction more than 45 degrees.

C. Cleanouts shall be installed not more than 50 feet apart in lines 3" and smaller; 75 feet apart in 4" lines and not more than 100 feet apart in lines 5" and larger. Cleanout plugs shall be within 3" of finished grade or building slab.

D. Covers shall be installed on each cleanout concealed underground and under slabs on fill or grade.

1. Cleanouts outside the building shall have the cover installed flush with the concrete paving or shall be set securely in a precast or reinforced concrete collar 12" larger than the diameter of the cast iron ring flange flush with finished grade.

2. Cleanouts in the floor inside buildings shall have the covers and ring set flush with the finished floor covering.

3.4 INSULATION

A. Pipe, fittings, valves, etc., shall be insulated as hereinafter specified unless otherwise noted.

B. Piping systems:

1. Domestic water piping, fittings and valves installed inside the building shall be insulated with pipe insulation as hereinbefore specified. Horizontal standpipe piping fittings, where noted to be heat traced, shall be insulated.

2. Fitting insulation shall be covered with jacket covers. Jacket cover joints shall be fastened using stainless steel tack fasteners, pressure sensitive tape, brushed-on vapor barrier mastic or any approved combination. Insulated piping and fittings in waste, water and fire systems exposed in parking area under second floor, shall have jacket covers.

3. Horizontal runs of soil and waste piping inside the building as well as the fittings shall be insulated.

a. Piping installed above suspended ceilings shall be wrapped with duct wrap as hereinbefore specified.

b. Exposed piping shall be insulated with split type pipe insulation as hereinbefore specified for water piping. Use oversized insulation on no-hub joints.

4. Floor drains and P-traps receiving air conditioning condensate and electric water cooler waste piping above the first floor slab, shall have the waste piping and fittings including the bottom of the floor drain insulated from the floor drain or P-trap to the waste stack.

C. Joints:

1. Fiberglass:

a. Transverse joints in exposed fiberglass insulation shall be secured by self-adhering butt strips.

b. Longitudinal joints in exposed fiberglass insulation shall be secured by self-adhering lap strips which are an integral part of the vapor barrier jacket.

c. Longitudinal joints in concealed fiberglass insulation shall be secured as specified for exposed insulation or may be stapled by using outward clinching staples.

d. If the self-adhering lap strips do not adhere firmly, the Contractor shall re-secure the defective lap strips by stapling as specified above.

D. Protective covering:

1. Where insulation is exposed to areas of physical abuse or damp and wet areas such as mechanical, and water heater rooms, etc., exposed insulation up to 6'-0" above the floor shall be covered with a PVC jacket.

3.5 INSTALLATION OF FIXTURES

A. General:

1. Each fixture shall be securely fastened to its supporting device (blocking, carrier, floor, or wall hanger).

2. Each fixture shall be installed level and plumb for proper operation.

3. Space between the finished wall and the top and sides of each fixture shall be caulked with flexible silicone based compound.

4. Water lines serving fixtures shall be securely anchored in wall to prevent undue movement.

5. Adjacent and similar fixtures shall be installed at the same elevation.

6. Where wall hangers are specified for fixtures being installed on metal stud walls, the Contractor shall, if required by the type of fixture, provide additional bracing to prevent wall from deflecting when 150 lbs. of pressure is applied to front edge of fixture.

7. Edges, tops and sides of fixtures requiring caulking or grout shall have joint finished flush with fixture.

B. Water Closets:

1. Floor mounted bowls shall be securely fastened to closet flanges. Base of bowl shall be set in a complete bed of waterproof grout. Annular space around hole in slab and pipe or closet flange shall also be filled with the waterproof grout. Floor flanges shall be caulked into position.

C. Lavatories and Sinks:

1. Wall hung bowls shall have the wall hanger securely fastened to the blocking within the wall. Fixtures having anchor screw holes shall have anchoring screws securely fastened to the blocking or the wall.

3.6 SANITARY SYSTEM

A. Horizontal soil and waste piping shall be graded not less than 1/8" per foot unless otherwise noted.

B. Changes in direction in the sanitary system shall be made by the appropriate use of 45 degree wyes, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings. Single or double sanitary tees and short quarter bends may be used only where the flow is from the horizontal to the vertical.

C. Fixtures not specified to be provided with traps as integral parts of their assembly shall have separate traps. Waste and vent lines shall be provided for each fixture and drain, as scheduled on the drawings.

D. Vent piping shall be connected at a height of not less than 12" above the flood level of the fixture served, and shall be graded to drip back into the soil, waste, or vent stack by gravity.

3.7 WATER SYSTEM

A. Branch lines from hot and cold water mains shall be provided and connected to fixtures, heaters, hose bibbs and outlets indicated. Shutoff valves shall be provided where shown, specified or noted and on each supply to each fixture not provided with a compression stop or auxiliary shutoff valve.

B. Provide valved make-up and/or quick-fill connections where indicated on the drawings for the chilled, hot and/or condenser water systems. Sizes shall be as indicated. Final connection will be made under SECTION 230500 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS.

C. Provide a pressure reducing valve set at 20 psi on the hot water supply line to each commercial dishwasher and clothes washer.

3.8 GAS SYSTEM

A. Gas piping shall be extended to outside the building line and connected to the gas meter. Arrange with Entergy to install a new gas meter and service where indicated. Provide a gas cock on the leaving side of the meter. Gas pressure shall be suitable for distribution on leaving side of meter at utilization pressure not to exceed the pressure indicated on the drawings. Branches from the main shall be provided to each piece of gas fired equipment and any other equipment requiring gas.

B. Gas piping shall be installed in accordance with the City of New Orleans Gas Code and NFPA 54.

C. Piping shall be installed free from traps and shall drain to drip legs. Drip legs shall be provided at the base of each riser and drop. Horizontal runs shall be graded at least ¼" in 15'-0" and slope away from equipment or appliance to drip legs.

D. Each piece of equipment shall be provided with a union and an individual gas cock, in addition to any cock furnished with the equipment. Pipe sizes indicated on the drawings shall be extended full size to within 1'-0" of the equipment connection. Gas cock may be the same size as the equipment inlet.

E. Gas piping serving equipment under the range hood shall include a manual reset solenoid valve which shall be interlocked with the range hood fire suppression system furnished under SECTION 230500 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS.

F. Joints in galvanized piping shall be painted with two coats of zinc rich rust inhibiting paint.

3.9 CLEANING AND FLUSHING

A. New and existing domestic water piping shall be cleaned and flushed prior to being placed in use and before final acceptance.

B. Water shall be allowed to flow at full main pressure through fixtures and outlets for a minimum of 15 minutes.

C. Prior to flushing, aerators shall be removed and shall be replaced after flushing.

3.10 DISINFECTION OF POTABLE WATER PIPING

A. New and existing potable water piping shall be disinfected prior to being placed in use and before final acceptance of the project.

B. Disinfection shall be in accordance with the Louisiana State Plumbing Code-2000, Paragraph 601.8.

C. New and existing water piping shall not be used until system is tested, disinfected and accepted by the Architect and the Division of Health, Louisiana Department of Health and Human Resources.

3.11 PROTECTION OF TUBING

A. Water piping installed through concrete slabs on grade or fill shall be protected by a 0.008 mm thick plastic sleeve, color coded (red for hot, blue for cold) and shall extend from 12" below slab to minimum of 6" above slab. Tubing shall be installed at least 3" clear of any reinforcing steel, conduits, etc.

B. Where copper tubing is installed through holes or notches studs, joists, etc., or through furring strips on hollow masonry walls, an approved steel plate shall be installed on each side of member to protect the tubing from damage by nails, screws, staples, etc.

3.12 TESTS OF PIPING

The tests described below shall be made in the presence of the Architect and a representative of the authority having jurisdiction, if required.

A. Soil, Waste, and Vent:

1. Piping shall be tested in sections not less than 10' nor more than 40' in height. Stacks shall be filled with water to the highest point and allowed to stand for 30 minutes without dropping.

B. Water:

1. Piping shall be subjected to a hydrostatic pressure test of 100 psi for one hour with no drop in pressure.

2. Piping systems installed above an existing ceiling system shall be tested with compressed air at 100 psi for one hour.

C. Gas:

1. Piping systems handling pressures not in excess of 0.5 psi shall be tested with compressed air or inert gas at a pressure of 3 psi or 6 inches of mercury for 10 minutes with no drop in pressure.

2. Test pressures shall be measured using a mercury manometer, slope gauge or other accurate, sensitive device with graduated variations of pressure that may be accurately read. Refer to NFPA 54 for additional information.

3.13 ELECTRICAL WORK

A. Control or signaling wiring shall not be installed in raceways with power wiring.

B. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1-phase, 60 hertz. Provide transformer where required.

C. Control and signaling wiring and raceways between equipment specified under this Section shall be work of this Section.

D. A source of power may be indicated under DIVISION 26 - ELECTRICAL for activating control devices where power for controls does not originate at the control transformer furnished with the starter or control panel. Work of this Section shall include wiring required for controls from this source. If additional 120 volt power is required it shall be obtained from spare breakers at a location approved by the Architect. The cost of installation of raceways, wiring, etc. shall be included as work of this Division. The Contractor shall review electrical drawings prior to bidding.

- END OF SECTION -