SECTION 22 0100

GENERAL CONDITIONS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 GENERAL CONDITIONS

A. Before submitting a proposal, Bidders shall examine all Drawings related to this work and shall become fully informed as to the extent and character of the work required and its relation to the other work in the building.

B. Before commencing work, the Contractor will examine all conditions of the project upon which his work is in any way dependent for perfect workmanship according to the intent of this Specification. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed by this Contractor and acceded to by the Owner's representative in writing before the Contractor begins any part of the work.

C. The Contractor will pay for all licenses, permits and inspection fees required by civil authorities having jurisdiction. Comply with all laws, ordinances, regulations, fire Underwriters requirements applicable to work herein specified without additional expense to the Owner. (Also, local building code requirements.).

D. It is specifically intended that anything (whether material or labor) which is usually furnished as a part of such equipment as is hereinafter called for (and which is necessary for the completion and proper operation) shall be furnished as part of this Contract without additional cost the Owner, whether or not shown in detail on the Drawings or described in the Specifications.

E. When Drawings and Specifications conflict or there is a question as to the proper intent of this Contract, the Contractor shall assume the more expensive method in his pricing. All questions shall be directed to the Architect/Engineer in writing only and only up to ten (10) days prior to bidding.

F. The Drawings indicate the general runs of the piping, ductwork, etc. systems and the location of equipment and apparatus, but is shall be understood that the right is reserved by the Architect/Engineer to change the location of piping work, ductwork, equipment and apparatus to a reasonable extent as building conditions may dictate, prior to their installation without extra cost to the Owner.

G. Small scale drilling through walls and floors which may contain asbestos shall be performed by a person with a “restricted asbestos handler allied trades certificate” and shall have a copy of it in his possession at all times while working on the project.

H. Any changes from the Drawings and Specifications and any interpretation thereof shall have the prior approval of the Architect/Engineer. The Contractor shall submit in writing, at the time of signing the Contract, any items of necessary labor and materials, which, in his opinion, are lacking in requirements of the Drawings and Specifications to insure a complete job in all respects. No consideration will be granted to alleged misunderstanding of materials to be furnished, work to be done, or conditions to be complied with, it being understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein or indicated on the accompanying Drawings.

END OF SECTION

SECTION 22 0125

SCOPE OF WORK

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 SCOPE OF WORK

A. The work under this section includes all labor, materials, equipment, tools, transportation, cutting and patching, excavation and backfill and the performance of all work necessary and required for the furnishing and installation complete of all Plumbing and Drainage work as shown on Contract Drawings, as specified herein and as otherwise required by job conditions or reasonably implied, including but not necessarily limited to the following:

1. Provide complete new and altered sanitary, storm, and vent piping from all new plumbing fixtures connecting to existing sanitary and vent system. See front end spec for bedding requirements.

2. Provide complete new and altered hot and cold water piping to all new plumbing fixtures, equipment, etc. as indicated.

3. Provide new and altered gas piping and removal of existing as indicated.

4. Provide all new plumbing fixtures where indicated, complete including traps, stops, drains, strainers, tailpieces, faucets, escutcheons, etc.

5. Provide complete new piping and final connections to equipment furnished under other Divisions.

6. Provide all demolition, removal disconnecting, capping, sealing of all existing plumbing piping, apparatus, equipment, fixtures, specialties, accessories, etc. which are not included or incorporated in the new layout.

7. Provide all required temporary connections to maintain all plumbing services without interruption.

8. Pipe insulation.

9. Tests and adjustments.

10. This Contractor shall obtain all permits, bonds, approvals, etc. at no additional cost to the Owner.

11. This Contractor shall provide shop drawings for all plumbing fixtures, piping, valves, insulation, equipment, etc.

12. Furnish minimum 18” x 18” access doors for all valves, cleanouts, etc. in all inaccessible walls, ceilings, etc. Installation by General Contractor.

13. Cutting and Patching: See Front End Specifications for Trade Responsibilities.

14. Excavation and Backfill: See Front End Specifications for Trade Responsibilities.

15. Fire stopping per FM/UL and NFPA. Refer to Division 1.

B. Coordination Drawings: Attention is directed to Division 1 for coordination drawing requirements for this project. These drawings are critical to the proper execution of the work and failure to honor these requirements may become the basis for denial of any and all claims for either or both “time” and “money”.

1.2 ALTERATION WORK

A. All equipment, piping, plumbing, fixtures, etc. to be removed, shall be disposed of or salvaged as directed by the Owner. They shall not be removed from the premises without Owners approval.

B. All piping to be removed shall be properly plugged or capped so that upon completion of all new work, all abandoned piping shall be concealed in finished areas.

C. No dead ends shall be left on any piping upon completion of job.

D. The existing systems shall be left in perfect working order upon completion of all new work.

E. Location and sizes of existing piping are approximate. Exact sizes and locations of all existing piping shall be verified on the job.

F. All removals shall be removed from the site.

END OF SECTION

SECTION 22 0130

WATER SUPPLY SYSTEM

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. Furnish and install a complete cold-water distribution system to supply water to all new fixtures, water consuming equipment, and valved outlets for the use of other trades and connect to existing piping.

B. The water supply system shall be complete with all pipe, fittings, valves, mains, risers, branches, shock absorbers, air chambers, hangers, anchors, expansion loops, connections to existing piping, covering, tests, etc. all as shown on the Drawings, as hereinafter specified.

C. Furnish and install a complete hot water distribution system to supply water to all new fixtures and equipment requiring heated water.

PART 2 - PRODUCTS

2.1 PIPING, FITTINGS AND MATERIALS

A. All components of water supply system shall confirm to all “No Lead” requirements including NSF/ANSI-372.

B. The domestic water systems shall be of the following material and shall be in accordance with the latest ASTM and ASME Standards.

C. Domestic water piping within the buildings shall be seamless drawn or extruded tubing type "L" copper. Both shall be of Chase, Anaconda, Revere, and approved equal, hard temper ASTM B88 with solder joint sweat end fittings. Fittings for use with copper tubing shall be cast brass of Muellers "Streamlin" pattern or approved equal.

D. Joints for copper tubing shall be made with 95-5 (lead and antimony free) solder. Flanges where required shall be cast brass. Provide dielectric adapters between ferrous and non-ferrous pipe joints.

2.2 VALVES

A. All shut-off valves 2” and smaller shall be ball valves equal to Apollo 70 Series or Milwaukee BA100 Series Valve. Bronze body with chrome plated trim

B. This Contractor shall furnish all valves as indicated on the Drawings, or as may be required for the proper control of the pipe lines installed under this Specification, so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the Facility.

C. All domestic water valves shall have a minimum working pressure of 125 psig, steam rated unless otherwise noted on the Drawings or specified herein. All valves shall be of one manufacture as manufactured by Milwaukee Valve or Hammond.

D. All gate valves within the buildings shall be wedge gauge valves with painted iron wheel handles, shall have gland followers in stuffing boxes, and shall be so constructed that they may be repacked while open and under pressure. All valves shall have the name of the manufacturer and working pressure cast or stamped thereon.

E. All gate valves shall be all bronze with sweat or screwed joint ends as required by the piping system in which they are installed.

F. Globe valves shall be of all bronze with composition disc, threaded or sweat joint ends as required by piping system in which they are installed.

G. Check valves shall be all bronze swing check type with threaded or sweat joint ends. Check valves 4 inch and larger shall be iron body bronze mountings and shall be provided with screwed or flanged joint ends as required by piping system in which they are installed.

H. Drain valves, at risers and at low points, shall be 3/4 inch heavy cast brass with composition washers with male thread for hose connections.

2.3 SHOCK ABSORBERS

A. Shock absorbers shall be similar and equal to J.R. Smith 5000 series or Zurn Z1700 series with stainless steel pressurized shell sized in accordance with P.D.I. Bulletin WH-201.

B. Provide shock absorbers on all fixtures and equipment having quick closing valves whether or not indicated on the Drawings.

C. Provide access doors where shock absorbers are concealed.

2.4 VACUUM BREAKERS

A. Provide vacuum breakers on water supply piping to each fixture and equipment with submerged inlets, and on faucets and outlets, within the facility to which hose can be, or is attached forming a submerged inlet.

B. Set vacuum breakers in exposed readily accessible locations at least four inches above floor rim level of fixture, or high point of equipment.

C. Vacuum breakers shall be chrome-plated brass. "Watts" or other approved.

D. Vacuum breakers under constant pressure shall be of the continuous pressure type No. 9 "Watts" or Wilkins BFP-8CH or approved equal.

2.5 EXPANSION JOINTS, ANCHORS AND GUIDES

A. The entire piping installation shall be installed with adequate provision for expansion. No rigid connections will be permitted. Refer to Drawings for locations of expansion joints and related guides and anchors. The joints, guides and anchors shall be as manufactured by Flexonics Products, Metraflex or Flex-weld.

B. Branches shall be of sufficient length and have three elbow swings to allow for pipe expansion.

C. Any breaks in the piping within the guarantee period due to improper provision for expansion must be replaced at the expense of this Contractor, and the conditions corrected to prevent future recurrence.

D. Any damages to surrounding areas and equipment due to this failure shall also be repaired and paid for at the expense of this Contractor.

E. Joints to have 150 psi rating, ANSI-B16.5 with liner and cover.

2.6 STERILIZATION

A. The entire domestic water piping system shall be thoroughly sterilized with chlorine before acceptance for domestic operation.

B. The amount of chlorine applied shall be such as to provide a dosage of not less than 50 parts per million for 24 hours or 200 p.p.m. for one hour. The chlorinating material shall be either liquid chlorine or sodium hypochlorite solution and shall be introduced into the system and drawn to all points of the system. If possible to do so, the lines shall be thoroughly flushed before introduction of the chlorinating material. After a contact period of not less than 24 hours, the system shall be flushed with clean water until the residual content is not greater than 0.2 parts per million. All valves in the lines being sterilized shall be opened and closed several times during the contact period.

C. Sterilization and tests for purity of water in the entire piping system shall be performed by the Contractor through an approved independent testing laboratory and a certificate shall be furnished to the Architect certifying the quality of purity.

D. Per ANSI/AWWA Standard C651-15.

PART 3 - EXECUTION

3.1 INSTALLATION

A. It is the intent that each part of the plumbing system shall be complete in all details and water lines provided with all control valves as indicated on Drawings, or as may be required for the proper control of the pipe lines under this Specification so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the facility.

B. This Contractor shall carefully examine the Architectural Drawings in detail and familiarize himself with all conditions relative to the installation of piping, particularly where same is concealed behind furring or in hung ceilings.

C. In no case shall this Contractor permit his pipes to be exposed beyond finished walls or ceilings unless specifically shown on Drawings. He shall consult with the Contractors of other trades in the building and install his piping in such a way as to least interfere with the installation of other trades.

D. The water piping shall all be installed so as to drain to a valve provided by this Contractor and branches shall not be trapped but shall have continuous pitch. Where necessary to raise or lower mains, the same shall be provided with a drip and shall be properly valved.

E. Piping shall be installed, whether indicated or not, so as to rise and/or drop to clear any and all conduits, lighting fixtures, ductwork and heating mains to maintain the desired clear heights. This Contractor shall consult with the Contractors of other trades and facilitate the erection of the equipment and piping.

F. Run piping straight and as direct as possible, in general forming right angles with or parallel to walls or other piping. Risers shall be erected plumb and true.

G. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.

H. No piping or work shall be concealed or covered until all required tests have been satisfactorily completed and work has been approved by the Architect.

I. All materials shall be new and installed in a first class manner.

J. In erecting pipe, friction wrenches and vises shall be used exclusively, and any pipe cut, dented or otherwise damaged shall be replaced by this Contractor.

K. All ferrous to non-ferrous pipe connections shall be made with approved dielectric pipe or flange unions isolating joints to prevent any electrolytic action between dissimilar materials.

L. Any piece of pipe 6 inches in length or less shall be considered a nipple. All nipples with unthreaded portion 1-1/2 inch and less shall be of weight corresponding to fitting connected. Only shoulder nipples shall be used, close nipples will not be accepted.

M. Revised water service shall be in accordance with the local water supply department requirements. All water lines are to be protected from freezing. Install new piping for water service below frost line and provide concrete separations when crossing other utilities. Provide concrete thrust mass at changes of pipe direction conforming to authorities having jurisdiction.

END OF SECTION

SECTION 22 0160

SANITARY AND STORM DRAINAGE SYSTEMS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. The work under this section includes all labor, materials, equipment and appliances necessary and required to completely install all drainage systems as required by the Drawings; code and as specified herein, including but not limited to the following:

B. Complete sanitary drainage and venting systems including connections to the existing sanitary drainage and venting systems.

C. Piping and final connections for equipment furnished under other Divisions.

D. Alterations and removals to existing sanitary and vent systems.

E. Tests.

1.2 QUALITY ASSURANCE

A. All Cast Iron soil pipe and fittings shall bear the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.

B. Hubless Couplings:
Standard, Stainless-Steel Shielded, Couplings: Standard Couplings shall conform to CISPI 310 and ASTM C 1277. Shield Assemblies shall consist of a stainless steel bi-directional corrugated shield; stainless-steel bands and tightening devices; and an ASTM C 564, rubber sleeve with integral center stop. Couplings shall bear the NSF Trademark, and be manufactured in the USA.

PART 2 - PRODUCTS

2.1 PIPING AND FITTING MATERIALS

A. All indoor underground storm soil, waste and vent piping shall be service weight cast iron with fittings of bell and spigot type. All exterior underground storm soil and waste piping shall be extra heavy cast iron. Each length shall have the size, weight per foot and the manufacturer's name clearly cast or stamped thereon. Weight shall be as defined by the Plumbing Code. Fittings and traps shall be similarly marked and of corresponding weights.

B. All above ground storm, soil, waste and vent piping and fittings 3" and larger shall be service weight and fittings of bell and spigot type as specified in paragraph above. Above ground waste and vent piping 2" and smaller shall be galvanized steel, fittings on waste piping shall be galvanized cast iron, recessed drainage pattern, fitting on vent piping shall be galvanized cast iron, beaded pattern, screwed joints shall be made up to be perfectly tight without the use of lead or filler of any kind, except oil or graphite. Nipples for galvanized pipe shall be shoulder type. No close nipples shall be permitted.

C. Joints shall be made with gasket or hemp or picked oakum and lead, at least 12 oz. of fine soft pig lead shall be used for each inch of diameter pipe used. Lead shall be run in one (1) pouring. All lead shall be pure and soft and of the best quality and shall be sufficiently heated to run joint full at one pouring without hardening. Dross shall not be allowed to accumulate in the melting pot. See 2.1, E. for joint options where permitted.

D. All galvanized pipe and fittings shall be galvanized with prime western spelter by hot drip process.

E. The Contractor has the option of using the following types of joints with hubless cast iron pipe only if approved by the governing agencies. These joints shall be used throughout the project. No mixing of joints shall be permitted.

1. Neoprene gasketed joints similar to Ty-Seal (for above and underground application).

2. Hubless cast iron pipe with neoprene gaskets and stainless steel clamps (by Clamp-All or equal) above ground only. All in accordance with Cast Iron Soil and Pipe Institute Standard 301 latest edition. Hangers and supports shall be in accordance with manufacturer's recommendations.

3. Copper DWV system with 50-50 tin antimony solder, DWV with solvent welded or screwed joints meeting CS-270-65.

F. Pump Discharge Piping

1. Piping: Galvanized steel pipe, Schedule 40 with marker’s name rolled into each length.

2. Fittings:

a. Threaded: Galvanized malleable iron with flat band steam pattern. Cast iron drainage pattern for waste piping.

b. Mechanical Joints: Victaulic couplings style 07 for grooved piping only, with gasket.

c. Bolted flange with gasket.

3. Joints: Teflon tape for threaded, Victaulic couplings for gasket for mechanical joint.

4. Application: Schedule 40 steel for sewage ejector and sump pump discharge.

2.2 CLEANOUTS

A. Provide easily accessible cleanouts where indicated at base of vertical stacks at ends of horizontal drainage lines and at intervals not exceeding 50 ft.; at each change of direction; on handholes of running traps, and where necessary to make entire drainage system accessible for rodding. Provide at least 18" clearance to permit access to cleanout plugs.

B. Cleanouts for cast iron pipe shall consist of tarpped extra heavy cast iron ferrule caulked into cast iron fittings and extra heavy brass tapered screw plug with solid hexagonal unit. Cleanouts for wrought iron pipe shall consist of extra heavy brass screw plug in drainage fitting.

C. Cleanouts turning out through walls and up through floors shall be made by long sweep ells or "Y" and 1/8 bends with plugs and face or deck plates to conform to Architectural finish in the room. Where no definite finish is indicated on the Architectural and/or Mechanical Drawings, wall plates shall be chrome plated cast brass and floor plates shall be nickel bronze.

D. Cleanouts shall be full size at the pipe up to 6" inclusive. On larger size piping 6" size plugs shall be used.

E. Cleanout fittings in vertical stacks shall consist of tapped tees capable of receiving a rough brass raised head cleanout plug, J.R. Smith S-4730, Zurn Z1445-A-BP or approved equal.

F. All cleanout plugs shall be brass lubricated with graphite before installation.

G. Cleanouts occurring in cast iron soil pipe above floor at change of direction of pipe run and at ends of horizontal runs shall be J.R. Smith S-4425, Zurn Z1441-A-BP or approved equal with cast iron ferrule for caulk connection and fitted with a straight threaded tapered bronze plug with raised hex head.

H. Cleanout deck plates for finished areas shall be similar and equal to J.R. Smith 4020 series, Zurn ZB1400-X or approved equal with cast iron ferrule, scoriated cutoff sections, brass cleanout plus collar with brass bolts for waterproofed slabs. In tile floor areas the cleanout deck plates shall be recessed to tile.

2.3 FLASHING

A. Provide 6 lb. lead flashing extending at least 10" beyond edge of all floor drains and vents through roof and all floor sleeves in floors with waterproofing or vapor barriers. Flashing shall be held securely in by clamping devices.

B. All floor drains shall be provided with flashing rings and 24" square 6 lb. sheet lead flashing, properly flashed into flashing ring of the drain.

2.4 SANITARY DRAINAGE

A. A complete system of drainage shall be provided as shown on the Drawings. The system shall include all drains, leaders, branches, house drains with all pipe fittings, hangers, anchors, etc. to make a complete sanitary drainage system. The systems shall extend through house drains and terminate as indicated on the Drawings.

B. Piping shall be sizes as indicated on the Drawings. The sanitary drains shall have a pitch of 1/8" per ft. minimum unless otherwise noted. Branch connections to stacks and house drains shall pitch a minimum of 1/8" per ft.

2.5 PIPING AND FITTINGS

A. Provide piping of one of the following materials, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING

A. The size of soil, waste and vent piping shall be as determined by the State codes, rules and regulations for plumbing and drainage, except where specifically noted to be larger by the Specifications or Drawings and all fixed rules of installation, as set forth in the codes, rules and regulations, shall be followed as part of the Specifications.

B. This Contractor shall carefully examine the Architectural plans in detail and familiarize himself with all conditions relative to the installation of piping, particularly where same is concealed behind furring or in hung ceilings.

C. In no case shall this Contractor permit his pipes to be exposed beyond finished plaster lines unless specifically shown on Drawings. He shall consult with the Contractors of other trades in the building and install his piping in such a way as to least interfere with the installation of other trades.

D. Piping shall be installed, whether indicated or not, so to rise and/or drop to clear any and all conduits, lighting fixtures, ductwork and heating mains to maintain the desired cleat heights. This Contractor shall consult with the Contractors of other trades and facilitate the erection of the equipment and piping.

E. Run piping straight and as direct as possible in general forming right angles with or parallel to walls or other piping. Risers and stacks shall be erected plumb and true. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.

F. No piping or work shall be concealed or covered until all required tests have been satisfactorily completed and work had been approved by the Architect and all other authorities having jurisdiction.

G. Branch connections shall be made with "Wye" and long "Tee-Wye" fittings, short 1/4 bends, common offsets and double hubs will not be permitted. Short "Tee-Wye" fittings are to be used in vertical piping only. All fittings shall conform to code requirements.

H. Cleanouts shall be provided at foot of all stacks, at changes of directions, at the ends of branch runs where shown and as required by code and shall be terminated as described under cleanouts.

I. The house drains must be run at a minimum grade of 1/8" per ft. downward in the direction of flow. Wherever possible, a 1/4" per ft. pitch shall be maintained. Branch connections to stacks from fixtures shall pitch 1/4" per ft. where possible. Attention is again called to the necessity of maintaining the ceiling heights established.

J. Furnish and install complete systems of vent pipes from the various plumbing fixtures and other equipment to which drainage connections are made. Vent pipes shall be connected to the discharge of each trap and shall be carried to a point above the ultimate overflow level of the fixture before connecting with any other vent pipe; in general, this will be approximately 3'-6" above the finished floor. Branches shall be arranged to pitch back to fixtures.

K. The individual vent pipes shall be collected together in branch vent lines and connected to existing vent connections through roof.

L. Any existing vents through roof, damaged, or if flashing on roof comes loose while connecting new vent to them shall be repaired and reflashed to the roof as required to maintain waterproofing the satisfaction of the Architect.

END OF SECTION

SECTION 22 0190

NEW GAS CONNECTIONS AND ASSOCIATED WORK

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. Furnish and install a gas piping system to boilers, hot water heater and other equipment as shown on Drawings.

B. All new piping shall be schedule 40 steel, standard weight threaded malleable iron fittings for sizes 2-1/2" and smaller. For sizes 3" and larger joints shall be welded.

C. All work in this section shall comply with NFPA-54.

PART 2 - PRODUCTS

2.1 REGULATOR REQUIREMENTS

A. Provide all additionally required regulators as per manufacturer's recommendations. Coordinate with other contractors.

PART 3 - EXECUTION

3.1 TESTING

A. Gas piping shall be tested with air using an air pump and mercury gauge. Tests shall be made by the Contractor with his equipment when directed by the Owner/Inspector/Construction Manager. Testing shall be done with 100 psig pressure (low pressure side) for a period of one hour and follow Utility Company procedures and all Plumbing Code requirements. Certify and submit written test results to Architect/Engineer. Indicate that system is functioning properly, and has been installed in accordance with NFPA, and all applicable codes.

B. Contactor is responsible for maintaining gas pressure in existing gas piping to remain in accordance with utility company requirements, whether valving off pilot lights, using bottled gas, etc. Utility fees and re-testing existing piping as required is Contractors responsibility.

END OF SECTION

SECTION 22 0300

PLUMBING FIXTURES AND EQUIPMENT

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. The work under this section shall consist of furnishing all labor, materials, equipment and appliances necessary and required to completely do all plumbing fixture work, as required by the Drawings and as specified herein, including but not limited to the following: plumbing fixtures, traps, fittings, trimmings, brackets, plates, anchor, chair carriers and supports.

B. Just before the Owner's taking over the work in the building, this Contractor shall thoroughly clean all fixtures furnished and set under this Contract, leaving every fixture in perfect condition and ready for use.

C. Submit shop drawings and roughing sheets for all equipment for checking and approval.

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES AND EQUIPMENT

A. All fixtures shall be free from imperfections, true as to line angles, curves and color, smooth, watertight, complete in every respect and practically noiseless in operation, Fixtures specified are given as the typical standard required as manufactured by American Standard and they or other similar approved fixtures as made by Kohler or Eljer Companies shall be furnished, set and connected in good substantial, neat workmanlike manner.

B. The letter designations hereinafter correspond with the schedule on the Drawings.

1. Self-Contained Eye Wash:
   Encon “Aquarion” model no. AQ100. Provide 11” x 17” sign.

2. Floor Drains:
   Josam series 30000A or Zurn Z415 type “B” coated cast iron, two piece body with double drainage flange, flashing collar, weepholes, bottom outlet and adjustable strainer.

3. Floor Drain Trap Seal:
   Zurn model Z1072 “Z-Shield” barrier trap seal device ASSE 1072.

4. Domestic Hot Water Circulator Pump CP-1 and CP-2
   Furnish and install domestic water circulator as indicated on Drawings; Grundfos model no. UP-43-75-BF, 22 gpm @ 15 ft. of head, 1/6 hp, stainless steel impeller, aluminum housing, bronze pump volute.

5. Sump Pump Duplex:
   Furnish and install as shown on Drawings, B&G model 2DWC, suspended wet pit sump pump unit. Pump shall have a non-clog impeller and stainless steel shaft. Motor shall have drip-proof enclosure with drip canopy. Pumps shall be controlled by an enclosed float switch actuated by copper float, brass rod and adjustable stops. Provide built-in overload protection. Provide custom support plate by Halliday Products with access door.

a. SP-1 pump shall be 50 gpm at 3500 rpm, 25 ft. of head and 1/2 hp, 208 volts, 3 phase, 60 hz.

b. Pumps shall be driven through a flexible coupling by a vertical mounted standard NEMA frame motor in an open, drip-proof housing.

c. Furnish and install a model A2D float switches. Furnish an auxiliary float switch to turn on pump if the float switch is inoperative. Each switch shall have a copper float with adjustable stops and "T" shaped float bracket. Furnish a compression tube type high water alarm actuator and a 4 inch, 110 volt alarm bell.

d. Furnish and install a magnetic starter for motor in a NEMA-1 general purpose enclosure with overload protection on each phase and a hand-off automatic selector switch in the cover.

e. Provide 2" lift out rail with 304 stainless steel pump adapter and guide bracket.

f. See detail on drawing for custom field fabricated basin, grate, etc.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All fixtures shown on Drawings shall be set, connected and tested by the Contractor. He shall also make all water; soil, waste, vent and other service connections to fixtures as shown on Drawings or as directed and shall set, furnish, connect and test all necessary fittings.

B. All pipes at fixtures passing into walls, floors or partitions shall be provided with heavy cast brass escutcheons and security (tamperproof) set screws finished to match the pipe. No "waiving" of this section will be permitted.

C. All fittings escutcheons, faucets, traps, exposed piping etc. shall be brass, chrome plated over nickel plate with polished finish. Any visible hanger nuts shall be security (tamperproof) type and shall likewise be chrome plated over nickel plate.

D. This Contractor shall be responsible for protecting all plumbing fixtures including in these Specifications against injury from the building materials, tools and equipment. Any fixtures damaged during the construction period shall be replaced new. After all fixtures are set, this Contractor shall carefully grout all around fixtures.

END OF SECTION

SECTION 22 0320

DOMESTIC HOT WATER GAS-FIRED HEATING EQUIPMENT

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. The work under this section shall consist of furnishing all labor, materials, equipment and appliances necessary and required to completely provide domestic hot water heater, as required by the Drawings and as specified herein, including but not limited to the following: equipment, fittings, trimmings, brackets, controls, carriers and supports.

B. Submit shop drawings for approval, which shall include dimension Drawings, catalog cuts, performance ratings and construction schedules.

PART 2 - PRODUCTS

2.1 GAS-FIRED HEATER

A. Water heaters shall be PVI-Conquest condensing type, or equal. Water heater(s) shall be gas-fired, equipped to burn natural gas and design certified by the American Gas Association (Canadian Gas Association) under Volume III tests for commercial heaters for delivery of 180 ^{0}F water, shall be approved by the National Sanitation Foundation and exceed requirements of ASHRAE 90.1. Heaters shall have an input rating of 199,000 and a recovery rating of 233 g.p.h. (based on 95% thermal efficiency obtained in an independent laboratory test) at a temperature rise of 100 ^{0}F with a storage capacity of 100 gallons. Maximum working pressure of 160 psi. Tank shall have ASME rating.

B. Water heater shall be equipped with an integrated control system consisting of a 180 ^{0}F adjustable thermostat with upper and lower sensing bulbs, which average the water temperatures at the top and bottom of the tank for maximum water temperature control. Heater shall be provided with a manual reset gas shutoff device, a gas pressure regulator set for the type of gas supplied, coated steel burners, an approved draft diverter, anodes for cathodic protection, flue damper and IID system. ASME rated pressure and temperature relief valve shall be furnished and installed by the factory. The heater shall be insulated with foam insulation or equal.

C. The outer jacket shall have a baked enamel finish over a bonderized undercoating. All internal surfaces of the heater exposed to water shall be glass-lined with an alkaline borosilicate, nickelous oxide composition that has been fused to steel by firing at a temperature range of 1400 degrees F to 1600 degrees F. Heater tank shall have a five (5) year limited warranty against corrosion as outlined in the written warranty. Heater shall include a fully illustrated instruction manual.

D. Provide operating thermostat, adjustable, submersed bulb, ASME pressure and temperature relief valve, temperature limiting device and a drain valve shall be factory installed.

E. Furnish and install domestic hot water circulators per Drawings and Specifications.

F. Gas-flue material and installation per manufacturer’s recommendations.

G. Provide induced draft fan on flue as recommended by manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All equipment shown on Drawings shall be set, connected and tested by the Contractor. He shall also make all water and other service connections to fixtures as shown on Drawings or as directed and shall set, furnish, connect and test all necessary fittings.

B. This Contractor shall be responsible for protecting all equipment included in these Specifications against injury from the building materials, tools and equipment. Any equipment damaged during the construction period shall be replaced new.

END OF SECTION

SECTION 22 0420

SUPPORTS, SLEEVES AND PLATES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. This Contractor shall furnish and install all plates, hangers and supports for his piping.

B. All piping shall be hung or supported from structural members only.

PART 2 - PRODUCTS

2.1 PIPING

A. All piping shall be supported from building structure in a neat and workmanlike manner wherever possible, parallel runs of horizontal piping shall be grouped together on trapeze hangers. Vertical risers shall be supported at each floor line with steel pipe clamps. Use of wire perforated metal to support pipes will not be permitted. Hanging pipes from other pipes will not be permitted.

B. Necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations shall be furnished and installed. In all cases where hangers, brackets, etc., are supported from concrete construction, care shall be taken not to weaken concrete or penetrate waterproofing.

C. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner that horizontal adjustment perpendicular to the run of piping supported may be made to accommodate displacement due to expansion. All such hangers shall be finally adjusted, both in the vertical and horizontal direction, when the supported piping is hot.

D. Pipe hangers shall be as manufactured by Grinnell, whose catalog numbers are given herein, or equivalent Carpenter and Paterson, or F&S Mfg. Co.

E. Piping shall be supported as follows unless otherwise indicated on the Drawings:

1. Piping: 1-1/2 inch and smaller Fig. #260 adjustable clevis hanger. 2 inch and larger Fig. #174 one-rod swivel roll hanger.

2. Two-rod hangers shall be used for piping close to the ceiling slab or where conditions prohibit use of other hanger types.

3. Anchors for hanger rods shall be Phillips "Red Head" self-drilling type. Anchors shall be placed only in vertical surfaces.

4. Spacing of pipe supports shall not exceed 6 feet for pipes up to 1-1/2 inch and 10 feet on all other piping.

5. Hangers shall pass around insulation and a 16 gauge steel protective band; 12 inch long shall be inserted between hangers and insulation.

6. All piping shall be supported to allow free movement where expanding or contracting. Pipe shall be anchored as required or directed.

7. All lateral runs of piping shall be securely supported on hangers, rolls, brackets, etc. and in a manner to allow for proper expansion and elimination of vibration.

8. 2 inch and smaller pipe, where run on walls, shall be supported on wrought iron "J" hook brackets with anchor bolts.

9. All horizontal pipe, where run overhead or on walls, shall be supported as follows unless otherwise indicated: On adjustable steel clevis type hangers suspended on hanger rods, pipe sizes up to and including 4 inch.

F. Space limitations in hung ceilings spaces and conditions in other locations may require use of other type of hangers than those specified above. Suitable and approved pipe hangers shall be provided for such job conditions.

G. All supports shall be fastened to structural members or additional steel supports furnished by this Contractor.

H. Hanger rods shall be steel, threaded with nuts and lock nuts, sizes in accordance with following schedule:

Pipe Size	Rod Size
3/4" to 2" inclusive	3/8”
2-1/2" and 3" inclusive	1/2”
4" and 5" inclusive	5/8”
6”	3/4”
8" to 12" inclusive	7/8”

I. Cast iron piping shall be supported at intervals of not more than (5) feet (at each hub) on straight runs.

PART 3 - EXECUTION

3.1 PIPING

A. Where pipes pass through masonry, concrete walls, foundations, or floors, this Contractor shall set sleeves as are necessary for passage of pipes. These sleeves shall be of sufficient size to permit insulation where required to be provided around pipe passing through. This Contractor shall be responsible for exact location of these sleeves.

B. Sleeves shall not be used in any portion of building where use of same would impair strength or construction features of the building. Inserts for supporting lateral pipes and equipment shall be placed and secured to form work, and all sleeves inserts locations shall be thoroughly checked with Architect so as not to conflict with other trades.

C. Where pipes pass through floor or walls, they shall be provided with chromium plated escutcheons.

D. Anchor horizontal piping where indicated and wherever necessary to localize expansion or prevent undue strain on branches. Anchors shall be heavy forged construction entirely separate from supports.

E. Anchor vertical piping wherever indicated and wherever necessary to prevent undue strains on offsets and branches. Anchors, unless otherwise noted shall be heavy steel clamps securely bolted and welded to pipes. Extension ends shall bear on building construction.

F. Auxiliary steel supports that may be required for all mechanical equipment shall be furnished and installed by this Contractor.

G. All operating equipment including pumps, piping, etc. shall be supported so as to produce minimum amount of noise transmission.

END OF SECTION

SECTION 22 0430

INSULATION

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. The work under this section shall consist of furnishing all labor, materials, equipment and appliances necessary and required to completely do all insulation work as required by the Drawings and as specified herein including but not limited to the following: Insulation, covering, bands, tie wire.

PART 2 - PRODUCTS

2.1 INSULATION

A. The materials as specified have been selected from the catalogs of Owens-Corning Fiberglass Corp. and Johns-Manville Sales Corporation and are representative of the quality, design and finish desired. Insulation as manufactured by Gustin Bacon Co., or other approved manufacturer may be submitted for approval provided the product meets fully in all respects (such as density, moisture absorption, alkalinity, thermal-conductivity, jackets) to the materials as delineated below.

B. All insulation shall be UL rated non-combustible type classified flame spread-25, smoke-developed-50.

2.2 PIPING, FITTINGS AND VALVES

A. All insulation thickness shall be in accordance with the latest edition of the New York State Energy Conservation Construction Code.

B. Minimum pipe insulation shall be:

1. Hot water piping up to 1-1/4” - 1” insulation and piping 1-1/2” and larger - 1-1/2” insulation.

2. Cold water piping up to 1-1/2” – 1/2” insulation and piping 1-1/2” and larger - 1” insulation.

C. Domestic cold, hot water hot water return indirect waste, storm and piping aboveground. All piping shall be insulated with sectional glass fiber insulation, Owens-Corning 2 piece ASJ/SSL. Joints between sections shall be sealed with factory supplied 3 inch wide sealing strips. Sealing by means of Owens Corning self-sealing lap will also be acceptable. Install (anti-sweat) vapor barriers on all cold water piping.

D. Domestic hot and cold water valves and fittings - Fittings, valves, etc. shall be insulated with flexible blanket insulation compressed to 1/2 its thickness, tied on with jute twine over which shall be applied a flood coat of Insul-Coustic IC-102 and 10-20 open weave glass cloth. Glass cloth to be finished within additional coat of IC-102. Insulation blanket shall be Owens-Corning wrap.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All insulation on pipes running through walls, floors, partitions and beams shall be continuous through sleeves and openings.

B. Insulation shall be installed only after all tests of the piping system have been completed.

C. All insulation shall fit snugly.

D. All surfaces shall be clean and dry when insulation is applied.

E. Longitudinal joints shall be on least conspicuous side off the pipe.

F. Valves shall be insulated up to the packing unit.

G. As specified hereinbefore, all horizontal runs of piping will be supported on adjustable clevis or group trapeze type hangers. Pipe hangers will be installed outside of the insulation. Where hangers occur, prefabricated insulation protective saddles shall be "Insul-Shield-Multi-Purpose-Saddle" as manufactured by Insul-Coustic Corp. or approved equal.

H. Hot and cold water branch piping extending through slab or knockout panels to serve equipment shall be insulated to a point 4 inch above the top of sleeve provided for pipe.

I. The use of staples shall not be permitted.

J. It is the intent of this Specification that all vapor barriers be continuous throughout. Reinstate existing piping at point of new pipe connections.

END OF SECTION

SECTION 22 0470

TESTS AND ADJUSTMENTS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 TESTS AND ADJUSTMENTS

A. The Contractor shall, at his own expense, during the progress of the work or upon its completion as ordered make such tests as are specified or as required by and in the presence of the Architects, Building Inspectors, etc. At least 48 hours' notice shall be given in advance of all tests.

B. The Contractors shall provide all apparatus, temporary work or other requirements necessary for all tests. He shall take all due precautions to prevent damage to the building, its contents or the work of the other Contractors, that may be incurred by all tests. This Contractors shall also be responsible for the work of other Contractors that may be damaged or disturbed by the tests or the repair or replacement of his work, and he shall without extra charges, restore to its original condition, any work of other Contractors to do the work of restoration.

C. Tests on the various systems may be conducted in sections as the work progresses or when the systems are completed.

D. No caulking of pipe joints to remedy leaks will be permitted except where joints are made with lead and oakum.

E. Each section of the sanitary, storm and vent piping tested shall have all openings tightly closed with screw plugs, or equal device. The drainage and vent systems shall be filled with water and proven tight under a 10'-0" head for a minimum of four (4) hours. Water level must remain constant through test without adding water.

F. Upon final completion of the sanitary systems and when all fixtures and appurtenances have been set and the systems are in complete working order, all traps in the systems shall be filled with water and a thick penetrating smoke shall be introduced into the entire system.

G. As smoke appears at the stack openings on the roof, such openings on the roof shall be tightly closed and a pressure equivalent to 1-1/2 inch of water shall be maintained during the test. Oils of peppermint shall be added at the smoke making machines so that any leakage is readily discernible.

H. Before any covering is applied to the domestic water piping systems, the entire domestic water piping systems shall be hydrostatically tested for eight (8) hours to a hydraulic pressure of 125 psig.

I. At the completion of the test, Contractor shall furnish the Owner with one (1) copy of test certificates as issued by the insurance company.

J. Adjustments: Tests and adjustments shall be repeated as often as necessary until the systems are tight and are to the entire satisfaction of the Plumbing Inspector, Engineers and any other authorities having jurisdiction.

1. Contractor is to thoroughly instruct the building custodian in the proper care and operation of the entire system. Contractor shall prepare for use by custodian, detailed brochures of instructions in non-technical terms, describing the maintenance and operation of all fixtures, apparatus, valves, controls etc. furnished by him.

2. Should any part of the work performed under this Contract fail to function because of cracked piping, obstructions, debris in piping, leaks in piping or any other cause, this Contractor shall disconnect, clean and reconstruct the work at his own expense and pay for any damages to adjoining work.

3. Water flow is to be balanced and adjusted to all flush valves, faucets, etc.

4. All parts of the plumbing system are to be thoroughly flushed until cleared of all grease and sediment and all dirt pockets cleaned. Repeat as often as necessary, open all cleanouts and reset in graphite.

5. All new motors shall be oiled as required.

6. All new valves are to have stuffing boxes packed and adjusted.

END OF SECTION

SECTION 22 0480

TAGS, CHARTS AND IDENTIFICATION

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 TAGS, CHARTS AND IDENTIFICATION

A. Every valve installed under this Contract shall be tagged or labeled as follows: Tag shall be etched brass securely fastened to valve handwheels with heavy brass "S" hooks, soldered closed. At lock shield and similar type valves, tags for same shall be securely wired to valve body.

B. Charts shall be provided for each piping system, as approved and shall consist of schematic diagrams of piping layouts showing and identifying each valve and piece of equipment etc., and its use. Upon completion one (1) copy of diagrams and valve charts suitably framed under glass, shall be furnished and mounted where directed. One (1) copy of diagrams and valve charts shall be delivered to Owner.

C. This Contractor shall provide on all piping, semi-rigid, wrap around plastic identification markers equal to Seton Snap-Around and/or Seton Strap-On pipe markers.

D. Each marker background is to be appropriately color coded with a clearly printed legend to identify the contents of the pipe. Directions of flow arrows are to be included on each marker.

E. Identification of all piping shall be adjacent to each valve, at each pipe passage through wall, floor and ceiling construction and at each branch and riser take-off.

F. Identification shall be on all horizontal pipe runs, marked every 15 ft. as well as at each inlet outlet of equipment at changes in direction.

END OF SECTION

SECTION 22 0490

GUARANTEE

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 GUARANTEE

A. The Contractor shall remove, replace and/or repair at his own expense and at the convenience of the Owner, any defects in workmanship, materials, ratings, capacities and/or characteristics occurring in the work within one (1) year or within such longer period as may be provided in the Drawings and/or Section of the Specifications, which guarantee period shall commence with the final acceptance of the entire Contract in accordance with provisions stated in the General Conditions, and the Contractor shall pay for all damage to the system resulting from defects in the work and all expenses necessary to remove, replace and/or repair and any other work which may be damaged in removing, replacing and/or repairing the work.

END OF SECTION