SECTION 15060 - PIPE, TUBE, AND FITTING

PART 1 – GENERAL

1.1 SUMMARY

A. The requirements of the Division 15 sections govern the work specified in this section, where applicable.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Except for concrete, corrugated metal, hub-and-spigot, cast iron, and similar units of pipe, provide factory-applied plastic end-caps on each length of pipe and tube. Maintain end-caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube.

B. Where possible, store pipe and tube inside and protected from weather. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping.

C. Protect flanges and fittings from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

PART 2 – PRODUCTS

2.1 PIPING MATERIALS:

A. Provide pipe and tube of the type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Comply with current governing regulations and industry standards.

B. Hubless Cast-Iron Soil Pipe: CISPI 301; include coupling assembly, CISPI-310.

C. Cast-Iron Hub-and-Spigot Soil Pipe: ASTM A-74.

D. PVC Schedule 40 DWV Pipe and Fittings: ASTM D-2665 or ASTM F-891 (if permitted by local codes).

2.2 PIPE/TUBE FITTINGS:

A. Provide factory-fabricated fittings of the type, same materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve, or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

B. Cast-Iron Flanged Fittings: ANSI B16.1, Class 125, including bolting.

C. Threaded Pipe Plugs: ANSI B16.14.

D. Cast-Iron Threaded Drainage Fittings: ANSI B16.22.

E. Forged Branch-Connection Fittings: Except as otherwise indicated, provide the type as determined by the Installer to comply with installation requirements.

F. Cast-Iron Fittings: ANSI A21.12 or ANSI A21.51.

G. Hubless Cast-Iron Soil Pipe Fittings: CISPI 301-90; and complying with governing regulations.

H. Couplings: CISPI standard 310.

I. Cast-Iron Hub-and-Spigot Soil Pipe Fittings: Match soil pipe units; complying with same standards (ASTM A 74).

2.3 GROOVED PIPING PRODUCTS:

A. Except as otherwise indicated, provide products recommended by the manufacturer for use in the service indicated, as published in the manufacturer's product literature, and complying with one of the following:

B. Grooved-End Fittings: Fabricate from malleable iron.

C. Pipe Fittings: Comply with ANSI B16.1 for end-to-end and center-to-end dimensions.

D. Flanged Fittings: Comply with ANSI B16.1 for bolt-hole dimensioning, materials and flange-thickness.

2.4 MISCELLANEOUS PIPING MATERIALS/PRODUCTS:

A. Insulating (Dielectric) Unions: Provide standard products recommended by the manufacturer for use in the service indicated, and which effectively isolate ferrous from non-ferrous piping (electrical conductance), prevent galvanic action, and stop corrosion.

B. Welding Materials: Comply with Section 2-C, ASME Boiler Code for welding materials.

C. Soldering Materials:
1. Tin-Antimony Solder: ASTM B 32, Grade 95TA, 95/5 solder for copper water piping.
2. Silver Solder: ASTM B 32, Grade 96.5TS, for copper water piping.

D. Brazing Materials: Comply with Section 9, ASME Boiler Code for brazing materials.

E. Gaskets for Flanged Joints: ANSI B16.21; full-faced for cast-iron flanges; raised-face for steel flanges, unless otherwise indicated.

F. PVC Solvent Cements: ASTM D2564.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install pipe, tube and fittings in accordance with recognized industry practices which will achieve permanently leakproof piping systems, capable of performing each indicated service without piping failure. Install each run with a minimum of joints and couplings, but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections, within 1/16" misalignment tolerance.

B. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in the shortest route which does not obstruct usable space or block access for servicing the building and its equipment. Hold piping close to wall, overhead construction, columns and other structural and permanent-enclosure elements of the building; limit clearance to 0.5% where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1.0" clearance outside insulation. Wherever possible in finished and occupied spaces, conceal piping from view, by locating in column enclosures, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

C. Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical or electronic equipment spaces and enclosures.

D. Piping System Joints: Provide joints of the type indicated in each piping system.
1. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape, (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.

E. Weld pipe joints in accordance with ANSI B31.

F. Weld pipe joints in accordance with recognized industry practice and as follows:
   1. Weld pipe joints only when ambient temperature is above 0° F where possible.
   2. Bevel pipe ends at a 37.5 degree angle where possible, smooth rough cuts, and clean to remove slag, metal particles and dirt.
   3. Install welding rings for butt-welded joints.
   4. Use pipe clamps or tack-weld joints with 1.0" long welds; 4 welds for pipe sized to 10", 8 welds for pipe sizes up to 20".
   5. Build up welds with a stringer-bead pass, followed by a hot pass, followed by a cover or filler pass. Eliminate valleys at center and edges of each weld. Weld by procedures which will ensure elimination of unsound or unfused metal, cracks, oxidation, blow-holes and non-metallic inclusions.
   6. Do not weld-out piping system imperfections by tack-welding procedures; refabricate to comply with requirements.
   7. Install forged branch-connection fittings wherever branch pipe is of size smaller than main pipe is indicated, or install regular "T" fitting (at Contractor's option).

G. Flanged Joints: Match flanges within piping system, and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets.

H. Hubless Cast-Iron Joints: Comply with CISPI Standard HSN-75.

I. Grooved Pipe Joints: Comply with fitting manufacturer's instructions for making grooves in pipe ends. Remove burrs and ream pipe ends. Assemble joints in accordance with manufacturer's instructions.

J. Insulating (Dielectric) Unions: Comply with manufacturer's instructions for installing unions. Install unions in a manner which will prevent galvanic action and stop corrosion where the "joining of ferrous and non-ferrous piping" is indicated.

K. Install drainage piping (perforated, porous or tile) from lowest end of slope to highest, solidly bedded in filtering or drainage fill. Shape bed for bells of piping (if any). Place bells/hubs and grooved ends of units upstream. Lay perforated pipe with perforations down.

L. Solvent Weld (PVC): Waste discharge, drainage and general piping in accordance with National Sanitary Foundation Standards No. 14. Drinking or potable water systems shall be in accordance with National Sanitary Foundation Standards No. 61.

M. Pipe runs shall be of the same materials including fittings.

3.2 FIELD QUALITY CONTROL

A. Test pressure piping in accordance with ANSI B31.

B. Provide temporary equipment for testing, including pump gauges. Test piping system before insulation is installed wherever feasible, and remove control devices before testing. Test each natural section of each piping system independently, but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for the indicated pressure and time.

C. Required test period is 2 hours.

   1. Test long runs of Schedule 40 pipe at 150 psi, except where fittings are a lower Class or pressure rating.

   2. Test each piping system at 150% of operating pressure indicated, but not less than 25 psi test pressure.

   3. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5% of test pressure.

D. Repair piping systems sections which fail the required piping test, by disassembly and reinstallation, using new materials to the extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

E. Drain test water from piping systems after testing and repair work that has been completed.

3.3 CLEANING

A. Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any). Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.
   1. Inspect pressure piping in accordance with procedures of ANSI B31.

END OF SECTION 15060