

## SECTION 22 11 19 – PIPING AND TUBING SYSTEMS

### PART 1 - GENERAL

#### 1.1 THE REQUIREMENT

- A. The CONTRACTOR shall furnish and install all exposed piping and tubing as shown and specified, complete, including stainless steel pipe and tubing, fittings, valves, bolts, supports, insulating connections, manifolds, and such other specialties as required for a complete and operable piping system in accordance with the requirements of the Contract Documents.
- B. All items shall be manufactured from stainless steel.

#### 1.2 CONTRACTOR SUBMITTALS

- A. For the materials and equipment items supplied under the provisions of this Section, the CONTRACTOR shall submit copies of the manufacturer's product specifications and performance details according to the requirements of MASS Section 10.05 Article 5.6.

### PART 2 - PRODUCTS

#### 2.1 STAINLESS STEEL PIPE

- A. All mounting nipples for gauges, instruments and other appurtenances shall be stainless steel, Type 316 Schedule 80 threaded pipe conforming to ASTM A 312 with stainless steel threaded fittings.

#### 2.2 STAINLESS STEEL TUBING

- A. All instrument sensing lines shall be stainless steel tubing. Stainless steel tubing shall be seamless 316L stainless steel tubing meeting ASTM A213, ASME SA-213 specifications with a minimum wall thickness of 0.049 inches. All fittings shall be compression, guaranteed gas bubble-tight as Manufactured by **Swagelok**, or equal.

#### 2.3 ISOLATION VALVES

- A. All instrument isolation valves shall be ball valves, 316 stainless steel, **Swagelok 40 Series**, or equal.

#### 2.4 THREE VALVE INSTRUMENT MANIFOLDS

- A. All instrument manifolds shall be 316 stainless steel, **Swagelok V Series 3-Valve Manifold** or equal.

## **2.5 PIPE SUPPORTS**

- A. Pipe supports, hangers, anchors, and guides shall be compatible with the pipe or tubing materials.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Supports: Pipe and tubing systems shall be securely anchored and supported to prevent undue deflection or vibration in accordance with the applicable codes and standards. Provide all hangers, supports, guides, anchors, bolts, and mounting accessories as required for the installation. Maximum spacing between supports shall be 4 feet for all tubing.
- B. Piping: Individual tubes shall run parallel and near the surfaces from which they are supported. Bends shall be formed to uniform radii with the proper tool without deforming or thinning the walls of the tubing. Ends of tubing shall be square-cut and cleaned before being inserted in the fittings. Bulkhead fittings shall be provided at all panels requiring pipe or tubing entries.
- C. Isolation Valves: All instrument mounting nipples and sensing lines shall be provided with isolation valves at the pipe tap.
- D. Instrument Manifolds: All pressure transmitters shall be provided with instrument manifolds for testing and calibration. All manifolds shall be independently supported. Differential pressure elements shall have three valve manifolds.
- E. Piping Taps: All piping taps shall be made at the horizontal centerline of the pipe to minimize the introduction of air into the sensing lines. Instruments shall be mounted vertically. All taps shall include an isolation valve.
- F. Air Traps: All tubing shall be installed to avoid air traps and allow air to be bled off. In general, tubing shall be routed to provide a continuous rise from the tap to the instrument.
- G. Tubing Tags: All tubing lines shall be identified at the tap with a stamped, stainless steel tag wired to the tap.

**END OF SECTION 22 11 19**