

GP 03-06-01	Piping for Instruments	June 2001
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Piping for Instruments

GP 03-06-01

Scope

[I] This Global Practice (GP) covers the piping associated with field instrument installations and instrument air systems. Piping for sample transport and conditioning systems of process analyzers are covered by [GP 15-08-02](#).

[I] An asterisk (*) indicates that either a decision by the Owner's Engineer is required, that additional information is to be furnished by the Owner's Engineer, or that information for Owner's Engineer approval is to be supplied by Vendor or Contractor.

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1. Required References

[I] This Section lists Practices and Standards that are generically referenced and assumed to be a part of this document. Unless otherwise specified herein, use the latest edition.

1.1. Global Practices–ExxonMobil Engineering Practices

GP 03-06-02	Piping at Control and Protective System Valve Stations
GP 03-09-01	Winterizing and Protection Against Ambient Temperatures
GP 03-18-01	Piping Fabrication Shop or Field
GP 04-02-01	Auxiliary Structures for Operation and Maintenance
GP 14-03-01	Fireproofing
GP 15-01-03	Instruments for Storage Tanks and Vessels
GP 15-02-01	Temperature Instruments
GP 15-03-01	Pressure Instruments
GP 15-04-01	Flow Instruments
GP 15-05-01	Level Instruments

1.2. API–American Petroleum Institute

API MPMS 14.3.2	Manual of Petroleum Measurement Standards Chapter 14 - Natural Gas Fluids Measurement; Section 3 - Concentric, Square-Edged Orifice Meters; Part 2 - Specification and Installation Requirements
API MPMS 5.2	Manual of Petroleum Measurement Standards Chapter 5 - Liquid Metering Section 2 - Measurement of Liquid Hydrocarbons by Displacement Meters
API MPMS 5.3	Manual of Petroleum Measurement Standards Chapter 5 - Metering Section 3 - Measurement of Liquid Hydrocarbons by Turbine Meters
API MPMS 5.4	Manual of Petroleum Measurement Standards Chapter 5 - Metering Section 4 - Accessory Equipment for Liquid Meters
API RP 551	Process Measurement Instrumentation
API RP 552	Transmission Systems

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1.3. ASME–American Society of Mechanical Engineers

ASME B1.20.1	Pipe Threads, General Purpose (Inch)
ASME B16.36	Orifice Flanges
ASME SEC VIII D1	BPVC Section VIII - Rules for Construction of Pressure Vessels - Division 1

1.4. ASTM–American Society for Testing and Materials

ASTM A 269	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
ASTM B 16/B 16M	Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines
ASTM B 68	Standard Specification for Seamless Copper Tube, Bright Annealed
ASTM B 111	Standard Specification for Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock
ASTM D 1047	Standard Specification for Poly(Vinyl Chloride) Jacket for Wire and Cable

1.5. ISA–The Instrumentation, Systems, and Automation Society

ISA 7.0.01	Quality Standard for Instrument Air
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2. Additional Requirements

* [I] The following standard shall be used with this GP as specified by Purchaser.

2.1. ISO–International Standards Organization

ISO 5167-1	Measurement of Fluid Flow by Means of Pressure Differential Devices - Part 1: Orifice Plates, Nozzles and Venturi Tubes Inserted in Circular Cross-Section Conduits Running Full
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2.2. Other Requirements

- 1) [S] No fluids, except instrument air, potable water, and fresh air from a safe location, shall be piped into the control house. Instrument air that is backed up by nitrogen shall not be piped into control houses or other walk-in enclosed spaces.
- 2) [S] Downstream of the first isolation block valve, all piping, tubing, instruments, and instrument accessories in contact with the process or any purge medium shall have a suitable pressure/temperature rating and material for the service conditions.

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- 3) [S] Valves and their respective control cabling, tubing, and associated field equipment that are required to remain operable during a fire require fireproofing in accordance with [GP 14-03-01](#).
- 4) * [O] Leak testing of instrument pressure piping and air supply piping shall be in accordance with the requirements of the project specification. Leak testing of signal transmission systems shall be in accordance with ISA 7.0.01.

3. Mounting of Instruments and Access Requirements

- 1) [C], [O] The preferred instrument installation is close coupled (line mounted).
- 2) * [M], [S] All instruments, including thermocouples, shall be accessible for maintenance. Instrument process connections that require maintenance shall also be accessible, including accessories such as rod-out connections, condensate pots, and seal connections. Permanent platforms for instrument maintenance are preferred. In cases where personnel safety is not compromised, alternative methods of access may be approved by Owner's Engineer. All indicating instruments shall be installed to be readable from grade and/or the related operational area. Pressure and differential pressure instruments shall be supported by means other than the process connections.
- 3) [R] When piping or platforms are subject to process or equipment induced vibrations (e.g., fluid solids units, reciprocating compressors, lines in two-phase flow, hydraulic shock from rapid valve action) a more stable location for the instrument mounting shall be selected. In addition, piping/tubing bends shall be used to mitigate vibration.
- 4) [S] Insertion type instruments shall be equipped with a blowout prevention device, such as a mechanical stop or safety chain. This device must prevent the unintentional removal of the instrument while under process pressure. Insertion type instruments that are installed in a toxic or flammable service and rely on a non fire resistant elastomer seal (PTFE, for example) for process pressure containment, shall be equipped with a secondary seal that will prevent the process fluid from being released in the event that the instrument is subjected to a fire.
- 5) [M], [O] In addition to any vendor-supplied nameplate, each installed instrument shall be provided with an identification nameplate containing the tag number and the process service description. These nameplates shall be fabricated from a corrosion resistant material (16 U.S. gauge stainless steel or equivalent is preferred) and shall be permanently and securely fastened to the instrument by either stainless steel wire or drive screws. The identification nameplate shall be readable from grade or the associated maintenance platform. If any process connection is not viewable from its associated instrument, then a separate tag nameplate is required at each such process connection.
- 6) [R] Unless otherwise specified, flow meters shall be installed upstream of the associated control valve(s).

4. Take-Off Connections

- 1) [M] A gate valve shall be installed in each instrument take-off connection, and shall be located as close to the vessel or line as possible, consistent with manual opening and closing of the valve. In no case shall the valve outlet be a distance greater than 9 in. (225 mm) from the branch connection. The

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