Designation: F 721 – 81 (Reapproved 1998)

An American National Standard

Standard Specification for Gage Piping Assemblies[1]

This standard is issued under the fixed designation F 721; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers details of gage piping assemblies for pressure gages with optional provisions for additional gages, pressure switches, transmitters, and so forth, for use with steam, steam drains, feed water, condensate, fresh water, salt water, compressed air, fuel oil, and lubricating oil systems.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:*

A 105/A105M Specification for Carbon Steel Forgings for Piping Applications[2]

A 106 Specification for Seamless Carbon Steel Pipe for High-Temperature Service[2]

A 108 Specification for Steel Bars, Carbon, Cold Finished, Standard Quality[3]

A 182/A182M Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service[2]

A 276 Specification for Stainless Steel Bars and Shapes[4]

A 335/A335M Specification for Seamless Ferritic Alloy-Steel Pipe for High-Temperature Service[2]

A 576 Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality[3]

B 16 Specification for Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines[5]

B 61 Specification for Steam or Valve Bronze Castings[5]

B 62 Specification for Composition Bronze or Ounce Metal Castings[5]

B 75 Specification for Seamless Copper Tube[5]

B 124 Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes[5]

B 453 Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Rod[5]

B 466/B 466M Specification for Seamless Copper-Nickel Pipe and Tube[5]

2.2 *American National Standard Institute Standards:*

B16.11 Forged Steel Fittings, Socket Weld, and Threaded[6]

B16.15 Cast Bronze Threaded Fittings[6]

2.3 *Federal Specifications:*

QQ-S-637 Steel Bar, Carbon, Cold Finished (Standard Quality, Free Machining)[7]

QQ-S-763 Steel Bars, Wire, Shapes, and Forgings, Corrosion-Resisting[7]

3. List of Assemblies

3.1 This specification incorporates 13 gage piping assemblies as described in Table 1.

4. General Requirements and Guidelines

4.1 Fig. 1 shows a typical piping assembly for bottom-connected gages and Fig. 2 a typical piping assembly for back-connected gages.

4.2 A siphon shall be used as shown in all gage applications for steam systems to maintain a protective water seal between the gage and the steam supply.

4.3 Each assembly includes a test connection beyond the gage valve which consists of a tee with a ¼-in. NPT threaded plug in the branch. The plug is removable for the purpose of installing a test gage for calibration. As an alternative, a gage valve that incorporates a built-in test connection integral with the valve may be substituted for the gage valve and test tee.

4.4 Root connections should be kept to a minimum by connecting other instruments at the tee between the root and gage valves. There is no limit to the number of dead-end-type instruments that can be served from a single root connection. However, each instrument should have its own shutoff valve and, if desired, a test tee may be fitted at each instrument.

4.5 Two shutoff valves are generally used in each assembly, a root valve and a gage cutout valve. The gage valve may be

[1] This specification is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.11 on Machinery and Piping Systems.

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[2] *Annual Book of ASTM Standards*, Vol 01.01.

[3] *Annual Book of ASTM Standards*, Vol 01.05.

[4] *Annual Book of ASTM Standards*, Vol 01.03

[5] *Annual Book of ASTM Standards*, Vol 02.01.

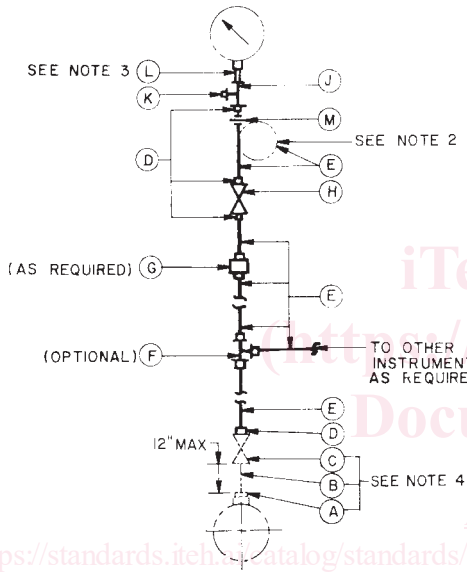
[6] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

[7] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

TABLE 1 Gage Piping Assemblies[A,B]

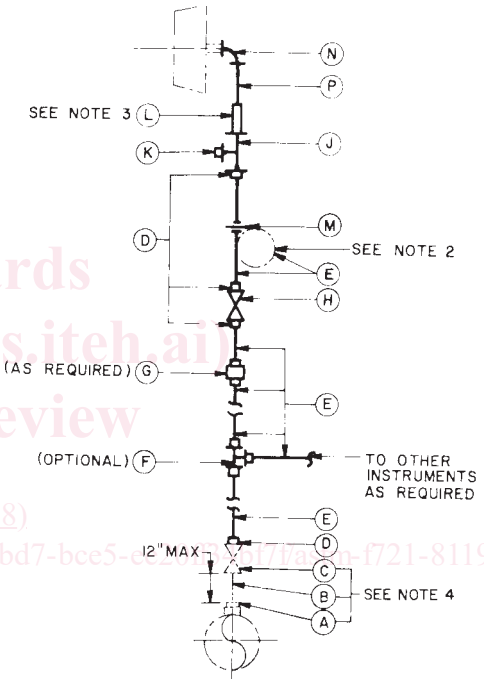
Assembly No.	Service	Maximum Pressure, psi (kPa)	Maximum Temperature, °F (°C)
1	Superheated steam	1125 (7757)	960 (516)
2	High-pressure desuperheated steam and high-pressure extractions	1100 (7584)	580 (304)
3	Low-pressure extractions, gland seal, auxiliary exhaust, and 150-psig (1034-MPa) steam	900 (6205)	563 (295)
4	Low-pressure steam	125 (861)	353 (178)
5	Boiler feed discharge	1500 (10 342)	450 (232)
6	Feed suction and condensate	165 (1138)	300 (149)
7	Compressed air above 165 psi (1.14 MPa)	900 (6205)	563 (295)
8	Compressed air	165 (1138)	300 (149)
9	Fresh and potable water	200 (1379)	150 (66)
10	Main and auxiliary salt water circulating, salt water service, and wet firemain	200 (1379)	150 (66)
11	Dry firemain and deck washdown	200 (1379)	150 (66)
12	Fuel oil and lube oil	900 (6205)	250 (121)
13	Diesel oil	900 (6205)	563 (295)

[A] For typical piping assemblies see Fig. 1 and Fig. 2.
[B] For materials required see Table 2 and Table 3.



NOTE 1—For material identification see Table 3.
NOTE 2—Use siphon for Assemblies 1 through 4.
NOTE 3—For pulsation dampener requirements see 4.6 and Table 3.
NOTE 4—Piping through the root valve is normally detailed on the piping arrangement drawings but is shown here as an aid in establishing material requirements.

FIG. 1 Typical Piping Assembly for Bottom-Connected Gages



NOTE 1—For material identification see Table 3.
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NOTE 3—For pulsation dampener requirements see 4.6 and Table 3.
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FIG. 2 Typical Piping Assembly for Back-Connected Gages

eliminated and a single shutoff valve may serve as both a root and gage valve provided the gage is within 6 ft (1.8 m) of the root connection and readily accessible and the single shutoff valve is fitted within 12 in. (300 mm) of the root connection.

4.6 Pulsation dampeners are shown for certain assemblies between the test tee and gage and should be used in other assemblies in which the gage may be subjected to pulsating pressures, as from a reciprocating pump, air compressor, quick-acting solenoid valves, and high-frequency vibrations of high-pressure feed pumps.

4.7 Isolation devices (diaphragm seals) should be installed where system fluid viscosity and fuel isolation is a consideration.

5. Services, Pressure/Temperature Limitations, and Material

5.1 Service and pressure/temperature limitations for each assembly are listed in Table 1 and materials are listed in Table 2 and Table 3. Other services, pressure/temperatures, and materials may be used provided the materials selected are compatible with the intended system media, and the pressure/temperature limitations do not exceed the limitations of the material chosen.