Designation: F1508 – 96(Reapproved 2010)

An American National Standard

Standard Specification for Angle Style, Pressure Relief Valves for Steam, Gas, and Liquid Services[1]

This standard is issued under the fixed designation F1508; 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.

1. Scope

1.1 This specification covers spring-loaded, angle style, pressure relief valves for steam, gas, and liquid system applications (excluding boiler safety and hydraulic system relief valves).

1.2 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A105/A105M Specification for Carbon Steel Forgings for Piping Applications

A125 Specification for Steel Springs, Helical, Heat-Treated

A182/A182M Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service

A193/A193M Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications

A194/A194M Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both

A216/A216M Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service

A217/A217M Specification for Steel Castings, Martensitic Stainless and Alloy, for Pressure-Containing Parts, Suitable for High-Temperature Service

A227/A227M Specification for Steel Wire, Cold-Drawn for Mechanical Springs

A229/A229M Specification for Steel Wire, Quenched and Tempered for Mechanical Springs

A231/A231M Specification for Chromium-Vanadium Alloy Steel Spring Wire

A276 Specification for Stainless Steel Bars and Shapes

A313/A313M Specification for Stainless Steel Spring Wire

A351/A351M Specification for Castings, Austenitic, for Pressure-Containing Parts

A479/A479M Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels

A494/A494M Specification for Castings, Nickel and Nickel Alloy

A689 Specification for Carbon and Alloy Steel Bars for Springs

B21/B21M Specification for Naval Brass Rod, Bar, and Shapes

B61 Specification for Steam or Valve Bronze Castings

B62 Specification for Composition Bronze or Ounce Metal Castings

B148 Specification for Aluminum-Bronze Sand Castings

B164 Specification for Nickel-Copper Alloy Rod, Bar, and Wire

B637 Specification for Precipitation-Hardening and Cold Worked Nickel Alloy Bars, Forgings, and Forging Stock for Moderate or High Temperature Service

D5204 Classification System for Polyamide-Imide (PAI) Molding and Extrusion Materials

F467 Specification for Nonferrous Nuts for General Use

F468 Specification for Nonferrous Bolts, Hex Cap Screws, Socket Head Cap Screws, and Studs for General Use

2.2 *ANSI Standards:*[3]

ANSI B1.1 Unified Screw Threads

ANSI B16.5 Pipe Flanges and Flanged Fittings

ANSI B16.34 Valves—Flanged, Threaded, and Welding End

[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.

Current edition approved May 1, 2010. Published June 2010. Originally approved in 1996. Last previous edition approved in 2004 as F1508 – 96 (2004). DOI: 10.1520/F1508-96R10.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

2.3 *ASME Standard:*[4]
ASME Boiler and Pressure Vessel Code
2.4 *API Standards:*[5]
API 526 Flanged Steel Safety-Relief Valves
API RP 520, Part 1 Recommended Practice for the Design and Installation of Pressure-Relieving Systems in Refineries
2.5 *Federal Specifications:*[6]
QQ-N-281 Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forgings, and Structural and Special Shaped Sections
QQ-N-286 Nickel-Copper-Aluminum Alloy, Wrought (UNS N05500)
2.6 *Military Standards and Specifications:*[6]
MIL-STD-167-1 Mechanical Vibrations of Shipboard Equipment (Type I—Environmental and Type II—Internally Excited)
MIL-STD-1330 Cleaning and Testing of Shipboard Oxygen, Nitrogen and Hydrogen Gas Piping Systems
MIL-F-1183 Fittings, Pipe, Cast Bronze, Silver Brazing, General Specification for
MIL-F-20042 Flanges, Pipe and Bulkhead, Bronze (Silver Brazing)
MIL-P-46122 Plastic Molding Material and Plastic Extrusion Material, Polyvinylidene Fluoride Polymer and Copolymer
MIL-R-17131 Rods, Welding, Surfacing
MIL-S-901 Shock Tests, H.I. (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for
MS 16142 Boss, Gasket-Seal Straight Thread Tube Fitting, Standard Dimensions for
MS 51840 Plug, Machine Thread, O-ring
2.7 *Naval Sea Systems Command (NAVSEA):*[6]
Drawings:
803-1385884 Unions, Fittings and Adapters, Butt and Socket Welding, 6000 PSI, WOG IPS
803-1385943 Unions, Silver Brazing, 3000 PSI, WOG IPS, for UT Inspection
803-1385946 Unions, Bronze Silver Brazing, WOG, for UT Inspection

3. Terminology

3.1 *Definitions:*
3.1.1 *accumulation*—the increase in static pressure above the set pressure during discharge through the valve, when the valve passes the rated flow. Accumulation is expressed in pound-force per square inch or as a percent of the set pressure.

3.1.2 *accumulation pressure*—the set pressure plus the accumulation. Accumulation pressure is expressed in pound-force per square inch gage.

3.1.3 *blowdown*—the difference between the set pressure and the reseating pressure. Blowdown is expressed in pound-force per square inch or a percent of the set pressure. The accumulation and blowdown establish the operating band of the pressure relief valve at a particular set pressure.

3.1.4 *blowdown pressure*—the set pressure minus the blowdown. Blowdown pressure is expressed in pound-force per square inch gage.

3.1.5 *built-up backpressure*—the static discharge pressure at the outlet of a pressure relief valve caused by the pressure drop in the discharge piping while the valve is discharging.

3.1.6 *gagging device*—a device, normally a screw (also called test gag), used to prevent the pressure relief valve from opening during a hydrostatic pressure test of the equipment on which it is installed.

3.1.7 *inlet piping—when used in this specification*, refers to all piping and fittings between the source and the inlet connection to the pressure relief valve.

3.1.8 *instability (chatter, flutter)*—an unstable operation of the pressure relief valve characterized by rapid seating and unseating of the disk during discharge. This hammering of the disk on the seat can cause high loading forces, which can lead to damage and rapid failure of the seating and sliding surfaces.

3.1.9 *maximum system operating pressure*—the highest pressure that can exist in a system, vessel, or component under normal (noncasualty) operating conditions. This is a normal (noncasualty) pressure that the pressure relief valve is not intended to protect against. This pressure can be the result of influences such as pump or compressor shutoff pressure, pressure regulating valve lockup (no flow) pressure, and so forth.

3.1.10 *opening pressure*—the value of increasing inlet static pressure of a pressure relief valve at which there is a measurable lift, or at which the discharge becomes continuous by seeing, feeling, or hearing.

3.1.11 *outlet piping (or discharge piping)—when used in this specification*, refers to all piping and fittings between the pressure relief valve outlet connection and the main, tank, or atmosphere to which the pressure relief valve relieves.

3.1.12 *popping pressure*—the value of increasing inlet static pressure at which the disk moves in the opening direction at a faster rate as compared with the corresponding movement at higher or lower pressures. It generally applies to valves with compressible fluid service such as steam, gas, and so forth.

3.1.13 *pressure relief valve*—an automatic pressure relieving device actuated by the static pressure upstream of the valve and characterized by either rapid opening (pop action for gas, vapor, or steam) or gradual opening (for liquids).

3.1.14 *primary and secondary pressure zones of pressure relief valve—primary pressure zone* refers to all portions of the pressure-containing envelope subject to inlet pressure; *secondary pressure zone* refers to all portions of the pressure-containing envelope subject to outlet or discharge pressure (includes spring housing of nonvented valves).

3.1.15 *relieving capacity (also called flow capacity)*—the pressure relief valve is defined as the quantity of pressure

[4] Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990, http://www.asme.org.
[5] Available from American Petroleum Institute (API), 1220 L. St., NW, Washington, DC 20005-4070, http://www.api.org.
[6] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

medium relieving through the pressure relief valve at the accumulation pressure, such as pound per hour of steam, gallon per minute of water at 70°F, or SCFM (standard cubic feet per minute at 60°F and 14.7 psia) of air, as applicable.

3.1.16 *set pressure*—the value of increasing inlet static pressure at which a pressure relief valve displays one of the operational characteristics as defined under *opening pressure*, or *start-to-leak* pressure. Set pressure is expressed in pound-force per square inch gage.

3.1.17 *set pressure range*—the range over which the set pressure can be adjusted with the installed spring.

3.1.18 *set pressure tolerance*—the permissible plus or minus deviation from the specified set pressure. Set pressure tolerance is expressed in pound-force per square inch or as a percent of the set pressure.

3.1.19 *source—when used in this specification*, refers to the pressure container being protected from overpressure by the pressure relief valve, for example, piping main, pressure vessel or tank, casing, and so forth.

3.1.20 *start-to-leak pressure*—the value of increasing inlet static pressure at which the first bubble occurs when a pressure relief valve for compressible fluid service of the resilient disk design is tested by means of air under a specified water seal on the outlet.

3.1.21 *superimposed backpressure*—the static pressure on the discharge side of a pressure relief valve prior to the opening of the pressure relief valve. This pressure exists where the pressure relief valve discharges into a common pipeline shared with other pressure sources such as pressure relief valves, or into a pressurized or closed system. This pressure may have the effect of changing the set pressure of the pressure relief valve.

3.1.22 *top-guided valve*—this type of valve has all the guiding, rubbing, or contacting surfaces on the discharge side of the seat.

4. Classification

4.1 Pressure relief valves shall be of the following types and material grades:

4.1.1 *Type I—For Steam Service:*

4.1.1.1 *Grade A*—Alloy steel construction (for steam service temperatures up to 1000°F) (see Table 8).

4.1.1.2 *Grade B*—Carbon steel construction (for steam service temperatures up to 775°F) (see Table 8).

4.1.2 *Type II—For Air, Gas Service:*

4.1.2.1 *Grade C*—Bronze or stainless steel construction (for air, gas service excluding oxygen) (see Table 9).

4.1.2.2 *Grade D*—Ni-Cu alloy construction (for oxygen) (see Table 9).

4.1.3 *Type III—For Liquid Service (except hydraulic oil):*

4.1.3.1 *Grade E*—Ferrous construction (for noncorrosive liquids, such as fuel oil, water, steam condensate, and so forth) (see Table 9).

4.1.3.2 *Grade F*—Nonferrous construction (for corrosive liquids, such as seawater, and so forth) (see Table 9).

5. Ordering Information

5.1 Ordering documentation for valves under this specification shall include the following information, as required, to describe the equipment adequately.

5.1.1 ASTM designation and year of issue.

5.1.2 Valve specification code (see 6.2).

5.1.3 Quantity of valves.

5.1.4 Maximum inlet temperature.

5.1.5 Set pressure.

5.1.6 Required relieving capacity (flow) at the accumulation pressure.

5.1.7 Installation limitations data, if different than specified in 7.9.

5.1.8 Blowdown limits, if different than specified in 7.7.

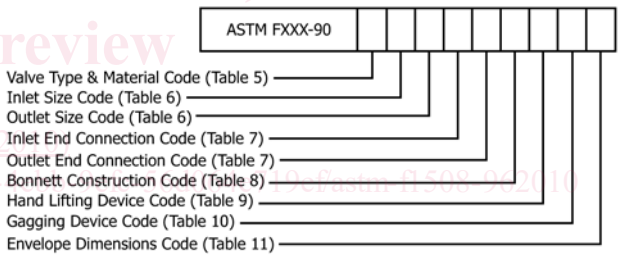
5.1.9 Envelope dimensions, if not covered in Table 13 and Table 14.

5.1.10 Supplementary requirements, if any (see S1 through S5).

6. Valve Coding and Construction

6.1 Valves shall incorporate the design features specified in 6.2 and 6.3.

6.2 *Valve Specification Coding*—Basic valve design features shall be specified and recorded using the following valve coding system. The valve specification code contains nine fields of information, which describe the construction features of the valve. Each of these nine fields are further assigned their respective codes in accordance with Tables 1-7.



6.3 *Construction*—Valve construction shall be in accordance with the requirements specified in 6.3.1 – 6.3.19.

6.3.1 The materials of construction for various valve components are detailed in Table 8 for Type I valves and Table 9 for Types II and III valves.

6.3.2 *General Requirements*—The valve shall be self-contained, single-seated, and spring-loaded where the inlet pressure is directly sensed under the spring-loaded disk. The valve shall incorporate only a single inlet and a single outlet connection.

TABLE 1 Valve Type and Material Code

Valve Classification		Valve Type and Material Code
Valve Type	Material Grade	
I	A	1
I	B	2
II	C	3
II	D	4
III	E	5
III	F	6
As specified	as specified	9

TABLE 2 Codes for Valve Inlet/Outlet Pipe Size

Nominal valve inlet or outlet pipe size, in. (NPS)	0.25	0.38	0.50	0.75	1.00	1.25	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	8.0	10.0	As specified
Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	W

TABLE 3 End Connection Codes for Valve Inlet and Outlet Ports

NOTE 1—Unless otherwise specified in the purchase order (Code W), all ANSI flanges shall have raised faces.

NOTE 2—Unless otherwise specified in the purchased order (Code W), all Navy flanges shall be plain and without preinserted rings.

Type of End Connection	Codes for Valves				
	Type I	Type II Valves		For Type III	
	Grades A and B	Grade C	Grade D	Grade E	Grade F
ANSI Flanged per ANSI B16.5 Class 150	A			A	
ANSI Flanged per ANSI B16.5 Class 300	B			B	
ANSI Flanged per ANSI B16.5 Class 600	C			C	
ANSI Flanged per ANSI B16.5 Class 900	D				
ANSI Flanged per ANSI B16.5 Class 1500	E				
SBU, per MIL-F-1183 (400 psi)		F			F
Union-End, per Drawing 803-1385946 (1500 psi)		G			
Union-End, per Drawing 803-1385943 (3000 psi)		H			
Union-End, per Drawing 803-1385884 (6000 psi)		I			
6–in. Long nipple welded (400 psi)			K		
6–in. Long nipple welded (1500 psi)			L		
6–in. Long nipple welded (3000 psi)			M		
6–in. Long nipple welded (6000 psi)			N		
Navy flanged, per MIL-F-20042, 150 lb					P
Navy flanged, per MIL-F-20042, 250 lb					R
Navy flanged, per MIL-F-20042, 400 lb					T
As specified	W	W	W	W	W

6.3.3 *Pressure-Temperature Ratings*—The pressure-temperature ratings of a pressure relief valve consist of ratings for the primary and secondary pressure zones.

6.3.3.1 *Pressure-Temperature Rating of the Primary Pressure Zone*—This shall correspond to the rating of the inlet end connection, and is given in Table 10.

6.3.3.2 *Pressure-Temperature Rating of the Secondary Pressure Zone*—The secondary pressure zone shall withstand the higher of the following:

(*1*) 150 % of maximum backpressure buildup specified in 7.9.

(*2*) 600 psig (for Type II, Grade C and Type III, Grade F valves only).

(*3*) ANSI B16.34, Class 150 pressure rating (for Type I, Grades A and B and Type III, Grade E valves only).

6.3.4 *Body Construction*—The valve shall be of the angle-body design. It shall be constructed so that the seat will not become distorted relative to the disk, and valve operation is not adversely affected by internal pressure and temperature.

6.3.5 *Bonnet Construction (Spring Housing):*

6.3.5.1 For Type I valves, the bonnet shall be attached to the body with bolted flanges. Type I, Grade A valves must have exposed spring bonnets—the discharge flow released through the open bonnet shall be minimal. For Type II and Type III valves, the bonnet shall be attached to the body with bolted flanges, or a threaded union connection.

6.3.5.2 For pressure-tight (nonvented) bonnet construction valves (for air/gas and liquid applications), there shall be no discharge of pressure medium into the atmosphere from the bonnet or from the body-to-bonnet joint.

6.3.5.3 Vented-bonnet construction valves shall incorporate a threaded vent hole in the bonnet for the discharge of pressure medium into the atmosphere. The discharge flow released through the vent hole shall be minimal. The vent hole shall be capable of attaching a pressure-tight MS straight-threaded tube fitting to divert the pressure relief to a distant location. The nominal tube fitting size shall be in accordance with Table 11. The vent hole shall be in accordance with MS 16142. Valves shall be furnished with a vent plug in accordance with MS 51840 to keep the dirt away and to allow hydro testing. A warning tag instructing the mandatory removal of the vent plug after valve installation must also be attached to the valve vent plug.

6.3.5.4 There shall be one bonnet for each valve body of a particular nominal inlet size and pressure-temperature rating. It shall be capable of housing any of the springs required to span the applicable set pressure ranges.

6.3.6 *Internal Trim:*

6.3.6.1 For Type I valves, valves shall be provided with a threaded seat ring, which shall be welded or nickel-brazed circumferentially to the body. The valve body shall have sufficient metal at the seat section to permit installation of a separate seat ring, if required as a service repair. When the seat ring is a part of the inlet flange raised face, such as in full nozzle valves, no welding or brazing is required.

6.3.6.2 For Types II and III valves, the valve shall have a replaceable seat ring. The seat ring shall be either threaded-in or retained by a cage construction and shall be easily replaceable, using hand tools, after extended service.

6.3.6.3 The valve disk to valve seat sealing must be metal to metal for Type I valves and metal to nonmetal for Type II and Type III valves.

6.3.6.4 The disk or the disk holder assembly shall be top-guided. Bottom-guided valves (also known as wing-guided valves), or other construction valves where all or part of the guiding surfaces are under the disk, are not permitted. Guiding surfaces (bushings and posts) shall have the proper hardness, finish, concentricity, parallelism, clearances, length, and rigidity to prevent binding or seizing and to ensure proper seating

TABLE 4 Bonnet Construction Codes

Type of Bonnet Construction	Code for Type I Valve		Code for Type II Valve		Code for Type III Valve	
	Grade A	Grade B	Grade C	Grade D	Grade E	Grade F
Vented bonnet	not applicable	A	A	A	A	A
Pressure-tight bonnet	not applicable	B	B	B	B	B
Open bonnet (exposed spring)	C	not applicable	not applicable	not applicable	not applicable	not applicable

TABLE 5 Hand-Lifting Device Codes

Is Hand-Lifting Device Required With the Valve?	Code for Type I Valves	Code for Type II Valves	Code for Type III Valves
Yes	1	1	1
No	not applicable	2	not applicable

TABLE 6 Gagging Device Codes

Is Gagging Device Required With the Valve?	Code for Type I Valves	Code for Type II Valves	Code for Type III Valves
Yes	1	1	1
No	2	2	2

TABLE 7 Valve Envelope Dimensions Code

Requirement to Meet Listed Envelope Dimensions	Code
The valve meets the envelope dimensions listed in Table 12 and Table 13.	1
The valve does not meet the envelope dimensions listed in Table 12 and Table 13.	2

TABLE 8 Materials of Construction for Type I Valves

Name of Part	Grade A	Grade B
Body, bonnet, and yoke	Specification A182/A182M Grade F11, F22	Specification A105/A105M Specification A182/A182M Grade F11, F22
	Specification A217/A217M Grade WC6, WC9	Specification A216/A216M Grade WCB Specification A217/A217M Grade WC1, WC6 Specification A351/A351M Grade CF3, CF3M, CF8, CF8M
Metallic disk and seat ring	Haynes 25 or Stellite (wrought Stellite 6B, cast)	Specifications A276, A479/A479M Types 302, 304, 316, 410, 430
	Stellite 6 or an inlay of Stellite not less than 3/32 in. thick. Where inlays are used, welding rod shall be in accordance with Type MIL-RCoCr-A of MIL-R-17131 and base materials shall be one of the following: Specification A351/A351M Grade CF3, CF3M, CF8, CF8M Specification A276 Types 302, 304, 316, 347	Specification A351/A351M Grades CF3, CF3M, CF8, CF8M QQ-N-281, QQ-N-286 Specification A494/A494M
Stem	Specifications A276, A479/A479M Types 302, 304, 316, 410, 430	Specifications A276, A479/A479M Types 302, 304, 316, 410, 430
Springs	Specification B637 (Inconel X750)	Specification A125[A] Specification A227/A227M[A] Specification A229/A229M[A] Specification A231/A231M[A] Specification A276 Specification A689[A] Specification A313/A313M Specification B637 (Inconel X750)
Body bolts and nuts	Specification A193/A193M Grade B16 Specification A194/A194M Grade 4	Specification A193/A193M Grade B7, B16 Specification A194/A194M Grade 2H, 4

[A] Electroless nickel plated (ENP) or zinc plated.

under all operating conditions. These alignment requirements shall be maintained with interchangeable parts and under any tolerance stackup.

6.3.7 *Interchangeability*—In no case shall the parts be physically interchangeable in a valve unless such parts are also interchangeable with regard to function, performance, and strength. Where machining is required after installation of a seat ring or guide to maintain critical concentricity or alignment dimensions, detailed instructions must be provided with each repair part.

6.3.8 *Spring*—The spring shall be designed so that the full lift spring compression shall be no greater than 80 % of the nominal solid deflection. The permanent set of the spring (defined as the difference between the free height and height measured 10 min after the spring has been compressed solid four times at room temperature) shall not exceed 0.5 % of the free height. Spring ends shall be squared and ground.

6.3.9 *Threads*—Threads shall conform to ANSI B1.1. Provisions shall be incorporated to prevent the accidental loosening of threaded parts. Pipe threads and lock-washers shall not be used.

6.3.10 *Bearing Surfaces*—Nut- and bolt-bearing surfaces and their respective mating surfaces on the valves shall be machine finished.

6.3.11 *Stem Packing*—A stuffing box, O-rings, or any other nonmetallic materials shall not be permitted on the stem/disk guiding surfaces.

6.3.12 *Hand-Lifting Device*—When specified (see 6.2), valves shall be provided with a hand-lifting device so that they may be operated by hand for testing purposes with an inlet pressure of 75 % of the set pressure. Type I and Type III valves must be furnished with a hand-lifting device. The necessary lever or tool shall be furnished as part of the valve. For valves

TABLE 9 Materials of Construction for Types II and III Valves

Name of Part	Type II, Grade C	Type II, Grade D	Type III, Grade E	Type III, Grade F
Body, bonnet, and yoke	Specification B61, B62 Specifications A276/A479/A479M Types 302, 304, 316, 410, 430 Specification A351/A351M Grade CF3, CF3M, CF8, CF8M	QQ-N-281, Specification A494/A494M	Specification A105/A105M Specification A216/A216M Grade WCB Specifications A276/A479/A479M Types 302, 304, 316, 410, 430 Specification A351/A351M Grade CF3, CF3M, CF8, CF8M	Specification B61, B62 Specification B148 Grade 958 QQ-N-281, Specification A494/A494M
Metallic disk and seat ring	Specifications B61, B62 QQ-N-281, QQ-N-286, Specification A494/A494M Specifications A276/A479/A479M Types 302, 304, 316, 410, 430 Specification A351/A351M Grade CF3, CF3M, CF8, CF8M	QQ-N-281, QQ-N-286 Specification A494/A494M	Specifications A276/A479/A479M Types 302, 304, 316, 410, 430 Specification A351/A351M Grade CF3, CF3M, CF8, CF8M	QQ-N-281, QQ-N-286 Specification A494/A494M
Stem	QQ-N-281, QQ-N-286 Specification B21/B21M Specifications A276/A479/A479M Types 302, 304, 316, 410, 430	QQ-N-281, QQ-N-286	Specifications A276/A479/A479M Types 302, 304, 316, 410, 430	QQ-N-281, QQ-N-286 Specification B21/B21M
Springs	Specification A125[A] Specification A227/A227M[A] Specification A229/A229M[A] Specification A231/A231M[A] Specifications A276, A313/A313M Specification A689[A]	QQ-N-281, QQ-N-286	Specification A125[A] Specification A227/A227M[A] Specification A229/A229M[A] Specification A231/A231M[A] Specifications A276, A313/A313M Specification A689[A]	QQ-N-281, QQ-N-286
Body bolts and nuts	Specifications A193/A193M, A194/A194M, B164 Specifications F467, F468	QQ-N-281, QQ-N-286 Specification B164	Specification A193/A193M Specification A194/A194M	QQ-N-281, QQ-N-286 Specifications B164, F467, F468
Diaphragm, gasket, and so forth	TFE or reinforced TFE, nitrile (Buna-N), fluorocarbon-rubber (viton)	TFE or reinforced TFE	TFE or reinforced TFE, nitrile (Buna-N), fluorocarbon-rubber	TFE or reinforced TFE, nitrile (Buna-N), fluorocarbon-rubber
Nonmetallic disk insert	TFE or reinforced TFE Plastic in accordance with MIL-P-46122 Plastic in accordance with Classification System D5204	TFE or reinforced TFE Plastic in accordance with MIL-P-46122 Plastic in accordance with Classification System D5204	TFE or reinforced TFE Plastic in accordance with MIL-P-46122 Plastic in accordance with Classification System D5204	TFE or reinforced TFE Plastic in accordance with MIL-P-46122 Plastic in accordance with Classification System D5204

[A] Electroless nickel plated (ENP).

TABLE 10 Pressure Temperature Ratings of Valve

End Connection Code (See Table 3)	Type of End Connection	Pressure-Temperature Rating (see 6.3.3)			
		Nominal Pressure, psi	Design Pressure, psig	Design Temperature, °F	Shell Test Pressure, psig
A thru E	ANSI Flanged	Refer to ANSI B16.5			
F	SBU, MIL-F-1183 (400 psi)				
G	Union-End, Drawing 803-1385946 (1500 psi)				
H	Union-End, Drawing 803-1385943 (3000 psi)				
I	Union-End, Drawing 803-1385884 (6000 psi)				
K	6-in. long nipple welded (400 psi)				
L	6-in. long nipple welded (1500 psi)	400	480	165	800
M	6-in. long nipple welded (3000 psi)	1500	1800	165	2250
N	6-in. long nipple welded (6000 psi)	3000	3600	165	4500
		6000	7200	165	9000
P, R, T	Navy flanged, MIL-F-20042	refer to MIL-F-20042			
W	as specified	as specified			

requiring pressure-tight (nonvented) bonnets, a stuffing box or a seal on the shaft of the hand-lifting device which will have no effect on the valve set pressure and the valve lift, shall be required.

6.3.13 *Gagging Device*—When specified for system test purposes (see 6.2), a gagging device shall be supplied with the valve. Valves shall be constructed to be gagged without alteration of the set point. The gagging screw shall be provided with a knurled or wing nut-type head to discourage the use of wrenches when gagging the valve. The gagging device shall be constructed to minimize the possibility of overlooking its removal after test and shall include a tag or other warning to this effect. The gagging device shall be designed to prevent the installation of a valve cap over the gagging device.