Flanged Steel Pressure-relief Valves

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Flanged Steel Pressure-relief Valves

1 Scope

This standard is a purchase specification for flanged steel pressure-relief valves. Basic requirements are given for direct spring-loaded pressure-relief valves and pilot-operated pressure-relief valves as follows:

— orifice designation and area;

— valve size and pressure rating, inlet and outlet;

— materials;

— pressure-temperature limits;

— center-to-face dimensions, inlet and outlet.

Nameplate nomenclature and requirements for stamping are detailed in Annex A.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Recommended Practice 520 (all parts), *Sizing, Selection, and Installation of Pressure-relieving Devices in Refineries*

API Standard 527, *Seat Tightness of Pressure Relief Valves*

ASME B16.5, *Pipe Flanges and Flanged Fittings*

ASME B16.34, *Valves-Flanged, Threaded and Welding End*

ASME Boiler and Pressure Vessel Code (BPVC), *Section VIII: Pressure Vessels, Division 1 and Division 2*

ASME BPVC, *Section II: Materials:*

ASME SA-216, *Carbon-Steel Castings Suitable for Fusion Welding for High-Temperature Service*

ASME SA-217, *Martensitic Stainless Steel and Alloy Steel Castings for Pressure-Containing Parts, Suitable for High-Temperature Service*

ASME SA-351, *Specification for Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts*

ASME SA-494, *Specification for Castings, Nickel and Nickel Alloy*

3 Terms and Definitions

Pressure-relief valve terminology is defined in API 520, Part I.

4 Responsibility

4.1 The purchaser is primarily responsible for the following:

a) selecting the type of pressure-relief valve and the required pressure-temperature ratings;

b) specifying materials that will satisfactorily resist corrosion from the process fluid and environmental conditions;

c) selecting the minimum required orifice area based upon relieving conditions derived from full knowledge of the pressure-relieving system and the requirements of the applicable codes and regulations;

d) providing data for sizing and selection.

4.2 The manufacturer is primarily responsible for the following:

a) designing and manufacturing pressure-relief valves to satisfy the requirements of this standard and the purchaser's specification;

b) publishing relieving capacities based upon certified test data;

c) advising the purchaser of any nonconformance to the purchaser's specification;

d) final sizing verification using the manufacturer's actual orifice area and certified coefficient of discharge.

5 Conflicting Requirements

Whenever the information included on the purchaser's specification sheet or purchase order conflicts with the provisions of this standard, the purchaser's specification sheet or purchase order shall govern. Where conflicting requirements exist, the manufacturer shall call them to the attention of the purchaser.

6 Orifice Areas and Designations

The standard effective orifice areas and the corresponding letter designations are listed in Table 1. These effective areas are valid only when used with the sizing equations contained in API 520, Part I.

7 Design

7.1 General

Pressure-relief valves discussed in this standard shall be designed and manufactured in accordance with the applicable requirements of ASME *BPVC*, Section VIII for pressure-relief devices.

7.2 Determination of Orifice Area

The minimum required effective orifice area shall be determined in accordance with API 520, Part I.

7.3 Valve Selection

For valves described in this standard, inlet and outlet flange sizes and pressure–temperature ratings shall conform to the data in Table 3 through Table 16 for spring-loaded valves and Table 17 through Table 30 for pilot-operated valves. Inlet and outlet pressure limits are governed by the flange pressure-temperature limits or by the manufacturer's design limits, whichever is lower.

Table 1—Standard Effective Orifice Areas and Letter Designations

Designation	Effective Orifice Area ($in.^2$)
D	0.110
E	0.196
F	0.307
G	0.503
H	0.785
J	1.287
K	1.838
L	2.853
M	3.60
N	4.34
P	6.38
Q	11.05
R	16.00
T	26.00

7.4 Dimensions

Center-to-face dimensions shall be in accordance with Table 3 through Table 16 for spring-loaded valves and Table 16 through Table 29 for pilot-operated valves, with tolerances of $\pm 1/16$ in. for valve inlet sizes up to and including 4 in., and $\pm 1/8$ in. for valve inlet sizes larger than 4 in.

Flange facings and dimensions shall be in accordance with ASME B16.5.

For some valve designs, the inlet raised face height may substantially exceed the nominal dimension specified in ASME B16.5. Consult the manufacturer for exact dimensions.

7.5 Lifting Levers

Lifting levers shall be provided when required by ASME *BPVC* or when designated on the purchaser's specification sheet.

As allowed by code for pilot-operated pressure-relief valves, means in lieu of lifting levers may be specified for connecting and applying adequate pressure to the pilot to verify that the moving parts critical to proper operation are free to move.

7.6 Special Construction Features

Construction features beyond the scope of this standard shall be provided as agreed upon by the manufacturer and the purchaser and shall be designated on the drawings provided to the purchaser.

7.7 Restricted Lift Pressure-Relief Valves

a) Table 1 shows a 21 % to 78 % increase in effective orifice area from one lettered orifice to the next lettered orifice. In some applications, the user may desire a smaller increase so that the resulting rated capacity is lower. A

reduction in the pressure relief valve rated capacity can be achieved by restricting the lift. A restricted lift pressure relief valve has a reduced flow area (reduced effective orifice area), resulting in a lower rated capacity for the valve. A lower rated capacity, based on the reduced lift, will lower the inlet and outlet piping pressure losses and reduce the acoustic effects.

b) The rated capacity for restricted lift valves shall be in accordance with ASME *BPVC*, Section VIII. Note that ASME prohibits restricting the lift to a value less than 30 % of the full rated lift, or less than 0.080 in. The restricted lift relief device shall meet all requirements of this document (e.g. face-to-face dimensions) for the standard valve with the exception of the restriction in lift.

c) The final relief device design shall meet the requirements in ASME *BPVC*, Section VIII. The restriction of the relief device lift shall only be performed by the valve Manufacturer or Assembler per ASME *BPVC*, Section VIII.

d) The nameplate on restricted lift relief devices shall be stamped to identify the reduced lift value and the rated capacity based on that reduced lift value.

e) Restricted lift versions of the pressure-relief valves in Table 3 through Table 30 may be specified by providing the manufacturer with a required capacity and the maximum desired rated capacity. The manufacturer shall determine the lift that will provide a rated capacity within these two values. Prior to making a final selection the purchaser shall confirm that the restricted lift relief device meets the design requirements (see example in Annex E).

8 Material

8.1 General

Materials generally used for construction are covered in this section. For special corrosion problems and applications beyond the pressure–temperature limits of this standard, construction materials shall be those agreed upon by the manufacturer and the purchaser.

8.2 Spring-loaded Pressure-relief Valves

The body and bonnet materials shall be in accordance with Table 3 through Table 16 for the required temperature range. The body and bonnet may be of different materials but must meet the minimum pressure–temperature requirement. The body and bonnet materials shall be equivalent to or better than the following types and grades:

— carbon steel, ASME SA-216, Grade WCB;

— austenitic stainless steel, ASME SA-351 Grade CF8M;

— chromium molybdenum steel, ASME SA-217, Grade WC6;

— nickel/copper alloy, ASME SA-494 Grade M35-1;

— alloy 20, ASME SA-351 Grade CN7M.

Materials for springs shall be selected per Table 2 on the basis of the operating temperature of the process fluid unless an analysis of the ambient or relieving conditions indicates a spring requiring a different material.

Material for the internal parts of the valve shall be in accordance with the manufacturer's standards for the temperature and service or as indicated on the purchaser's specification sheet.

Table 2—Spring Materials

Operating Temperature °F	Spring Material
–450 to –76	low-temperature alloy steel
–75 to 450	carbon steel or chrome alloy steel
451 to 1000	chrome alloy or high-temperature alloy steel

8.3 Pilot-operated Pressure-relief Valves

The body material shall be in accordance with Table 17 through Table 30 for the required temperature range. The body material shall be equivalent to or better than the following types and grades:

— carbon steel, ASME SA-216, Grade WCB;

— austenitic stainless steel, ASME SA-351, Grade CF8M;

— nickel/copper alloy, ASME SA-494 Grade M35-1;

— alloy 20, ASME SA-351 Grade CN7M.

Material for the pilot and internal parts of the valve shall be in accordance with the manufacturer's standards for the temperature and service or as indicated on the purchaser's specification sheet.

9 Inspection and Shop Tests

9.1 Inspection

The purchaser reserves the right to witness the shop tests and inspect the valves in the manufacturer's plant to the extent specified on the purchase order.

9.2 Set Pressure Test

All pressure-relief valves shall be adjusted to the specified set pressure in accordance with the ASME BPVC, the manufacturer's standard practice as published, or as designated by the purchaser. All set pressure adjustments shall be sealed.

9.3 Seat Leakage Test

All pressure-relief valves shall be seat leakage tested in accordance with API 527, or as agreed upon by the manufacturer and the purchaser.

10 Identification and Preparation for Shipment

10.1 Identification

Each pressure-relief valve shall have a corrosion-resistant nameplate permanently attached to the body or bonnet. This nameplate shall be stamped with the data specified in Annex A. Pilot-operated pressure-relief valves shall have an additional nameplate permanently attached to the pilot. The pilot nameplate shall be stamped with the manufacturer's name, pilot type, set pressure, and serial number. Each pressure-relief valve shall be tagged with the purchaser's valve number or other identification as specified on the purchase order. The data may be stamped on the nameplate or on a separate corrosion-resistant tag that is permanently attached to the valve.

10.2 Preparation for Shipment

Each pressure-relief valve shall be prepared for shipment as follows.

a) After test and inspection, all exterior surfaces, except flange facings, shall be painted as agreed upon by the manufacturer and the purchaser. Corrosion-resistant materials need not be painted. Flange facings shall be coated with a suitable corrosion inhibitor.

b) Threaded openings shall be plugged with suitable protective devices. Temporary plugs should be readily distinguishable from permanent metal plugs.

c) Inlet and outlet flanges shall be protected to prevent damage from or entrance of foreign material during shipment.

11 Pressure–temperature Tables

Table 3 through Table 30 provide flange and bellows pressure limits, materials and dimensions for pressure-relief valves. Table 3 through Table 16 are specific to spring-loaded pressure-relief valves, while Table 17 through Table 30 are specific to pilot-operated pressure-relief valves.

11.1 Materials

Materials for the body/bonnet and springs are indicated for spring-loaded pressure-relief valves. The material for the body is indicated for pilot-operated pressure-relief valves. For further description of body and bonnet materials see 8.2 for spring-loaded pressure-relief valves and 8.3 for pilot-operated pressure-relief valves. Other combinations of pressure, temperature, size and materials are outside the scope of this standard.

11.2 Temperature Ranges

Temperature ranges are provided to indicate distinct changes in body and/or spring material requirements.

11.3 Maximum Inlet Flange Pressure

The maximum inlet flange pressure is provided at specific temperatures. This represents the maximum set pressure for the temperature. The maximum inlet flange pressure values are per ASME B16.34 unless enclosed in parentheses. Values enclosed in parentheses are limited by this standard to a value less than the ASME B16.34 value. Inlet flange pressure values at other temperatures may be interpolated using the charts from Annex B or from tables in ASME B16.34, if these values do not exceed the limits in parentheses. The charts in Annex B are produced from ASME B16.34 with permission. Pressure changes within the temperature ranges above may not be linear.

11.4 Outlet Pressure Limit

11.4.1 Outlet Flange Limit

Outlet flange pressure limits are shown in the “Flange Rating” column and correspond to the ASME B16.34 value unless enclosed in parentheses. If the value is shown in parentheses, the value is less than that provided in ASME B16.34. The values in the “Flange Rating” column at 100 °F are the limit for this standard. Outlet flange pressure values at other temperatures may be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the value at 100 °F above. The charts in Annex B are produced from ASME B16.34 with permission. Pressure changes within the temperature ranges above may not be linear.

11.4.2 Bellows Limit

The bellows pressure limit is listed in the “Bellows Rating” column and represents the design pressure of the bellows at the outlet temperature of 100 °F. The bellows pressure values at other temperatures may be determined by multiplying the above pressure value at 100 °F by the factor from Annex C.

Table 3—Spring-loaded Pressure-relief Valves "D" Orifice [f] (Effective Orifice Area = 0.110 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76°F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	1D2	150	150			285	185	80		285	230	4 1/8	4 1/2
	1D2 [c]	300	150			(285)	(285)	(285)		285	230	4 1/8	4 1/2
	1D2	300	150			740	620	410		285	230	4 1/8	4 1/2
	1D2	600	150			1480	1235	825		285	230	4 1/8	4 1/2
	1 1/2D2	900	300			2220	1855	1235		(600)	500	4 1/8	5 1/2
	1 1/2D2	1500	300			3705	3090	2055		(600)	500	4 1/8	5 1/2
	1 1/2D3	2500	300			(6000)	5150	3430		740	500	5 1/2	7
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	1D2	300	150					510	215	290	230	4 1/8	4 1/2
	1D2	600	150					1015	430	290	230	4 1/8	4 1/2
	1 1/2D2	900	300					1525	650	(600)	500	4 1/8	4 1/2
	1 1/2D2	1500	300					2540	1080	(600)	500	4 1/8	4 1/2
	1 1/2D3	2500	300					4230	1800	750	500	5 1/2	7
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	1D2	150	150	275	275	275	180	80	20	275	230	4 1/8	4 1/2
	1D2 [c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	230	4 1/8	4 1/2
	1D2	300	150	720	720	720	495	420	365	275	230	4 1/8	4 1/2
	1D2	600	150	1440	1440	1440	990	845	725	275	230	4 1/8	4 1/2
	1 1/2D2	900	300	2160	2160	2160	1485	1265	1090	(600)	500	4 1/8	4 1/2
	1 1/2D2	1500	300	3600	3600	3600	2480	2110	1820	(600)	500	4 1/8	5 1/2
	1 1/2D3	2500	300	(4000)	6000	6000	4130	3520	3030	720	500	5 1/2	7
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	1D2	150	150			230	175	80	50	230	230	4 1/8	4 1/2
	1D2 [c]	300	150			(230)	(230)	(230)	(230)	230	230	4 1/8	4 1/2
	1D2	300	150			600	475	460	275	230	230	4 1/8	4 1/2
	1D2	600	150			1200	945	915	550	230	230	4 1/8	4 1/2
	1 1/2D2	900	300			1800	1420	1375	825	600	500	4 1/8	5 1/2
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	1D2	150	150			230	180			230	230	4 1/8	4 1/2
	1D2 [c]	300	150			(230)	(180)			230	230	4 1/8	4 1/2
	1D2	300	150			600	465			230	230	4 1/8	4 1/2
	1D2	600	150			1200	930			230	230	4 1/8	4 1/2
	1 1/2D2	900	300			1800	1395			600	500	4 1/8	5 1/2
	1 1/2D2	1500	300			3000	2230			600	500	4 1/8	5 1/2
	1 1/2D3	2500	300			5000	3880			600	500	5 1/2	7

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 4—Spring-loaded Pressure-relief Valves "E" Orifice [f] (Effective Orifice Area = 0.196 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	1E2	150	150			285	185	80		285	230	4 1/8	4 1/2
	1E2 [c]	300	150			(285)	(285)	(285)		285	230	4 1/8	4 1/2
	1E2	300	150			740	620	410		285	230	4 1/8	4 1/2
	1E2	600	150			1480	1235	825		285	230	4 1/8	4 1/2
	1 1/2E2	900	300			2220	1855	1235		(600)	500	4 1/8	5 1/2
	1 1/2E2	1500	300			3705	3090	2055		(600)	500	4 1/8	5 1/2
	1 1/2E3	2500	300			(6000)	5150	3430		740	500	5 1/2	7
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	1E2	300	150					510	215	290	230	4 1/8	4 1/2
	1E2	600	150					1015	430	290	230	4 1/8	4 1/2
	1 1/2E2	900	300					1525	650	(600)	500	4 1/8	5 1/2
	1 1/2E2	1500	300					2540	1080	(600)	500	4 1/8	5 1/2
	1 1/2E3	2500	300					4230	1800	750	500	5 1/2	7
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	1E2	150	150	275	275	275	180	80	20	275	230	4 1/8	4 1/2
	1E2 [c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	230	4 1/8	4 1/2
	1E2	300	150	720	720	720	495	420	365	275	230	4 1/8	4 1/2
	1E2	600	150	1440	1440	1440	990	845	725	275	230	4 1/8	4 1/2
	1 1/2E2	900	300	2160	2160	2160	1485	1265	1090	(600)	500	4 1/8	5 1/2
	1 1/2E2	1500	300	3600	3600	3600	2480	2110	1820	(600)	500	4 1/8	5 1/2
	1 1/2E3	2500	300	(4000)	6000	6000	4130	3520	3030	720	500	5 1/2	7
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	1E2	150	150			230	175	80	50	230	230	4 1/8	4 1/2
	1E2 [c]	300	150			(230)	(230)	(230)	(230)	230	230	4 1/8	4 1/2
	1E2	300	150			600	475	460	275	230	230	4 1/8	4 1/2
	1E2	600	150			1200	945	915	550	230	230	4 1/8	4 1/2
	1 1/2E2	900	300			1800	1420	1375	825	600	500	4 1/8	5 1/2
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	1E2	150	150			230	180			230	230	4 1/8	4 1/2
	1E2 [c]	300	150			(230)	(180)			230	230	4 1/8	4 1/2
	1E2	300	150			600	465			230	230	4 1/8	4 1/2
	1E2	600	150			1200	930			230	230	4 1/8	4 1/2
	1 1/2E2	900	300			1800	1395			600	500	4 1/8	5 1/2
	1 1/2E2	1500	300			3000	2330			600	500	4 1/8	5 1/2
	1 1/2E3	2500	300			5000	3880			600	500	5 1/2	7

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 5—Spring-loaded Pressure-relief Valves "F" Orifice [f] (Effective Orifice Area = 0.307 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	1 1/2F2	150	150			285	185	80		285	230	4 7/8	4 3/4
	1 1/2F2 [c]	300	150			(285)	(285)	(285)		285	230	4 7/8	4 3/4
	1 1/2F2	300	150			740	620	410		285	230	4 7/8	6
	1 1/2F2	600	150			1480	1235	825		285	230	4 7/8	6
	1 1/2F3	900	300			2220	1855	1235		740	500	4 7/8	6 1/2
	1 1/2F3	1500	300			3705	3090	2055		740	500	4 7/8	6 1/2
	1 1/2F3	2500	300			(5000)	(5000)	3430		740	500	5 1/2	7
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	1 1/2F2	300	150					510	215	290	230	4 7/8	6
	1 1/2F2	600	150					1015	430	290	230	4 7/8	6
	1 1/2F3	900	300					1525	650	750	500	4 7/8	6 1/2
	1 1/2F3	1500	300					2540	1080	750	500	4 7/8	6 1/2
	1 1/2F3	2500	300					4230	1800	750	500	5 1/2	7
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	1 1/2F2	150	150	275	275	275	180	80	20	275	230	4 7/8	4 3/4
	1 1/2F2 [c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	230	4 7/8	4 3/4
	1 1/2F2	300	150	720	720	720	495	420	365	275	230	4 7/8	6
	1 1/2F2	600	150	1440	1440	1440	990	845	725	275	230	4 7/8	6
	1 1/2F3	900	300	2160	2160	2160	1485	1265	1090	720	500	4 7/8	6 1/2
	1 1/2F3	1500	300	(2200)	3600	3600	2480	2110	1820	720	500	4 7/8	6 1/2
	1 1/2F3	2500	300	(3400)	(5000)	(5000)	4130	3520	3030	720	500	5 1/2	7
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	1 1/2F2	150	150			230	175	80	50	230	230	4 7/8	4 3/4
	1 1/2F2 [c]	300	150			(230)	(230)	(230)	(230)	230	230	4 7/8	4 3/4
	1 1/2F2	300	150			600	475	460	275	230	230	4 7/8	6
	1 1/2F2	600	150			1200	945	915	550	230	230	4 7/8	6
	1 1/2F3	900	300			1800	1420	1375	825	600	500	4 7/8	6 1/2
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	1 1/2F2	150	150			230	180			230	230	4 7/8	4 3/4
	1 1/2F2 [c]	300	150			(230)	(180)			230	230	4 7/8	4 3/4
	1 1/2F2	300	150			600	465			230	230	4 7/8	6
	1 1/2F2	600	150			1200	930			230	230	4 7/8	6
	1 1/2F3	900	300			1800	1395			600	500	4 7/8	6 1/2
	1 1/2F3	1500	300			3000	2330			600	500	4 7/8	6 1/2
	1 1/2F3	2500	300			5000	3880			600	500	5 1/2	7

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 6—Spring-loaded Pressure-relief Valves "G" Orifice[f] (Effective Orifice Area = 0.503 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	–450 °F to –76 °F	–75 °F to –21 °F	–20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a]	Bellows Rating Limit [a]	INLET	OUTLET
										100 °F	100 °F		
Temperature Range Inclusive –20 °F to 800 °F													
Carbon Steel	1 1/2G3	150	150			285	185	80		285	230	4 7/8	4 3/4
	1 1/2G3 [c]	300	150			(285)	(285)	(285)		285	230	4 7/8	4 3/4
	1 1/2G3	300	150			740	620	410		285	230	4 7/8	6
	1 1/2G3	600	150			1480	1235	825		285	230	4 7/8	6
	1 1/2G3	900	300			2220	1855	1235		740	470	4 7/8	6 1/2
	2G3	1500	300			3705	3090	2055		740	470	6 1/8	6 3/4
	2G3	2500	300			(3705)	(3705)	3430		740	470	6 1/8	6 3/4
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	1 1/2G3	300	150					510	215	290	230	4 7/8	6
	1 1/2G3	600	150					1015	430	290	230	4 7/8	6
	1 1/2G3	900	300					1525	650	750	470	4 7/8	6 1/2
	2G3	1500	300					2540	1080	750	470	6 1/8	6 3/4
	2G3	2500	300					(3705)	1800	750	470	6 1/8	6 3/4
Temperature Range Inclusive –450 °F to 1000 °F													
Austenitic Stainless Steel	1 1/2G3	150	150	275	275	275	180	80	20	275	230	4 7/8	4 3/4
	1 1/2G3 [c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	230	4 7/8	4 3/4
	1 1/2G3	300	150	720	720	720	495	420	365	275	230	4 7/8	6
	1 1/2G3	600	150	1440	1440	1440	990	845	725	275	230	4 7/8	6
	1 1/2G3	900	300	2160	2160	2160	1485	1265	1090	720	470	4 7/8	6 1/2
	2G3	1500	300	(2450)	3600	3600	2480	2110	1820	720	470	6 1/8	6 3/4
	2G3	2500	300	(2600)	(3600)	(3600)	(3600)	3520	3030	720	470	6 1/8	6 3/4
Temperature Range Inclusive –20 °F to 900 °F [d]													
Nickel/Copper Alloy [d]	1 1/2G3	150	150			230	175	80	50	230	230	4 7/8	4 3/4
	1 1/2G3 [c]	300	150			(230)	(230)	(230)	(230)	230	230	4 7/8	4 3/4
	1 1/2G3	300	150			600	475	460	275	230	230	4 7/8	6
	1 1/2G3	600	150			1200	945	915	550	230	230	4 7/8	6
	1 1/2G3	900	300			1800	1420	1375	825	600	470	4 7/8	6 1/2
Temperature Range Inclusive –20 °F to 300 °F [e]													
Alloy 20 [e]	1 1/2G3	150	150			230	180			230	230	4 7/8	4 3/4
	1 1/2G3 [c]	300	150			(230)	(180)			230	230	4 7/8	4 3/4
	1 1/2G3	300	150			600	465			230	230	4 7/8	6
	1 1/2G3	600	150			1200	930			230	230	4 7/8	6
	1 1/2G3	900	300			1800	1395			600	470	4 7/8	6 1/2
	2G3	1500	300			3000	2330			600	470	6 1/8	6 3/4
	2G3	2500	300			(3705)	(3705)			600	470	6 1/8	6 3/4

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 ºF above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 ºF above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 ºF, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a class 300 inlet flange is preferred over a class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F column are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F column are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 7—Spring-loaded Pressure-relief Valves "H" Orifice [f] (Effective Orifice Area = 0.785 in. 2)

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	1 1/2H3	150	150			285	185	80		285	230	5 1/8	4 7/8
	1 1/2H3 [c]	300	150			(285)	(285)	(285)		285	230	5 1/8	4 7/8
	2H3	300	150			740	620	410		285	230	5 1/8	4 7/8
	2H3	600	150			1480	1235	825		285	230	6 1/16	6 3/8
	2H3	900	150			2220	1855	1235		285	230	6 1/16	6 3/8
	2H3	1500	300			(2750)	(2750)	2055		740	415	6 1/16	6 3/8
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	2H3	300	150					510	215	290	230	5 1/8	4 7/8
	2H3	600	150					1015	430	290	230	5 1/8	4 7/8
	2H3	900	150					1525	650	290	230	6 1/16	6 3/8
	2H3	1500	300					2540	1080	750	415	6 1/16	6 3/8
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	1 1/2H3	150	150	275	275	275	180	80	20	275	230	5 1/8	4 7/8
	1 1/2H3 [c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	230	5 1/8	4 7/8
	2H3	300	150	720	720	720	495	420	365	275	230	5 1/8	4 7/8
	2H3	600	150	1440	1440	1440	990	845	725	275	230	6 1/16	6 3/8
	2H3	900	150	(1485)	2160	2160	1485	1265	1090	275	230	6 1/16	6 3/8
	2H3	1500	300	(1600)	(2750)	(2750)	2480	2110	1820	(600)	415	6 1/16	6 3/8
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	1 1/2H3	150	150			230	175	275	50	230	230	5 1/8	4 7/8
	1 1/2H3 [c]	300	150			(230)	(230)	(275)	(230)	230	230	5 1/8	4 7/8
	2H3	300	150			600	475	720	275	230	230	5 1/8	4 7/8
	2H3	600	150			1200	945	1440	550	230	230	6 1/16	6 3/8
	2H3	900	150			1800	1420	2160	825	230	230	6 1/16	6 3/8
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	1 1/2H3	150	150			230	180			230	230	5 1/8	4 7/8
	1 1/2H3 [c]	300	150			(230)	(180)			230	230	5 1/8	4 7/8
	2H3	300	150			600	465			230	230	5 1/8	4 7/8
	2H3	600	150			1200	930			230	230	6 1/16	6 3/8
	2H3	900	150			1800	1395			230	230	6 1/16	6 3/8
	2H3	1500	300			(2750)	2330			600	415	6 1/16	6 3/8

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 8—Spring-loaded Pressure-relief Valves "J" Orifice [f] (Effective Area = 1.287 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	2J3	150	150			285	185	80		285	230	5 3/8	4 7/8
	2J3[c]	300	150			(285)	(285)	(285)		285	230	5 3/8	4 7/8
	3J4	300	150			740	620	410		285	230	7 1/4	7 1/8
	3J4	600	150			1480	1235	825		285	230	7 1/4	7 1/8
	3J4	900	150			2220	1855	1235		285	230	7 1/4	7 1/8
	3J4	1500	300			(2700)	(2700)	2055		(600)	230	7 1/4	7 1/8
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	3J4	300	150					510	215	290	230	7 1/4	7 1/8
	3J4	600	150					1015	430	290	230	7 1/4	7 1/8
	3J4	900	150					1525	650	290	230	7 1/4	7 1/8
	3J4	1500	300					2540	1080	(600)	230	7 1/4	7 1/8
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	2J3	150	150	275	275	275	180	80	20	275	230	5 3/8	4 7/8
	2J3[c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	230	5 3/8	4 7/8
	3J4	300	150	(500)	720	720	495	420	365	275	230	7 1/4	7 1/8
	3J4	600	150	(625)	1440	1440	990	845	725	275	230	7 1/4	7 1/8
	3J4	900	150	(800)	2160	2160	1485	1265	1090	275	230	7 1/4	7 1/8
	3J4	1500	300	(800)	(2750)	(2750)	2480	2110	1820	(600)	230	7 1/4	7 1/8
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	2J3	150	150			230	175	80	50	230	230	5 3/8	4 7/8
	2J3[c]	300	150			(230)	(230)	(230)	(230)	230	230	5 3/8	4 7/8
	3J4	300	150			600	475	460	275	230	230	7 1/4	7 1/8
	3J4	600	150			1200	945	915	550	230	230	7 1/4	7 1/8
	3J4	900	150			1800	1420	1375	825	230	230	7 1/4	7 1/8
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	2J3	150	150			230	180			230	230	5 3/8	4 7/8
	2J3[c]	300	150			(230)	(180)			230	230	5 3/8	4 7/8
	3J4	300	150			600	465			230	230	7 1/4	7 1/8
	3J4	600	150			1200	930			230	230	7 1/4	7 1/8
	3J4	900	150			1800	1395			230	230	7 1/4	7 1/8
	3J4	1500	300			(2700)	2330			600	230	7 1/4	7 1/8

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 9—Spring-loaded Pressure-relief Valves "K" Orifice [f] (Effective Area = 1.838 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	3K4	150	150			285	185	80		285	150	6 1/8	6 3/8
	3K4[c]	300	150			(285)	(285)	(285)		285	150	6 1/8	6 3/8
	3K4	300	150			740	620	410		285	150	6 1/8	6 3/8
	3K4	600	150			1480	1235	825		285	200	7 1/4	7 1/8
	3K6	900	150			2220	1855	1235		285	200	7 13/16	8 1/2
	3K6	1500	300			(2220)	(2220)	2055		(600)	200	7 3/4	8 1/2
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	3K4	300	150					510	215	290	150	6 1/8	6 3/8
	3K4	600	150					1015	430	290	200	7 1/4	7 1/8
	3K6	900	150					1525	650	290	200	7 13/16	8 1/2
	3K6	1500	300					(2220)	1080	(600)	200	7 3/4	8 1/2
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	3K4	150	150	275	275	275	180	80	20	275	150	6 1/8	6 3/8
	3K4[c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	150	6 1/8	6 3/8
	3K4	300	150	(525)	720	720	495	420	365	275	150	6 1/8	6 3/8
	3K4	600	150	(600)	1440	1440	990	845	725	275	200	7 1/4	7 1/8
	3K6	900	150	(600)	2160	2160	1485	1265	1090	275	200	7 13/16	8 1/2
	3K6	1500	300	(750)	(2220)	(2220)	(2220)	2110	1820	(600)	200	7 3/4	8 1/2
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	3K4	150	150			230	175	80	50	230	150	6 1/8	6 3/8
	3K4[c]	300	150			(230)	(230)	(230)	(230)	230	150	6 1/8	6 3/8
	3K4	300	150			600	475	460	275	230	150	6 1/8	6 3/8
	3K4	600	150			1200	945	915	550	230	200	7 1/4	7 1/8
	3K6	900	150			1800	1420	1375	825	230	200	7 13/16	8 1/2
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	3K4	150	150			230	180			230	150	6 1/8	6 3/8
	3K4[c]	300	150			(230)	(180)			230	150	6 1/8	6 3/8
	3K4	300	150			600	465			230	150	6 1/8	6 3/8
	3K4	600	150			1200	930			230	200	7 1/4	7 1/8
	3K6	900	150			1800	1395			230	200	7 13/16	8 1/2
	3K6	1500	300			(2220)	(2220)			230	200	7 3/4	8 1/2

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 10—Spring-loaded Pressure-relief Valves "L" Orifice [f] (Effective Area = 2.853 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	3L4	150	150			285	185	80		285	100	6 1/8	6 1/2
	3L4[c]	300	150			(285)	(285)	(285)		285	100	6 1/8	6 1/2
	4L6	300	150			740	620	410		285	170	7 1/16	7 1/8
	4L6	600	150			(1000)	(1000)	825		285	170	7 1/16	8
	4L6	900	150			(1500)	(1500)	1235		285	170	7 3/4	8 3/4
	4L6	1500	150			(1500)	(1500)	(1500)		285	170	7 3/4	8 3/4
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	4L6	300	150					510	215	290	170	7 1/16	7 1/8
	4L6	600	150					(1000)	430	290	170	7 1/16	8
	4L6	900	150					(1500)	650	290	170	7 3/4	8 3/4
	4L6	1500	150					(1500)	1080	290	170	7 3/4	8 3/4
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	3L4	150	150	275	275	275	180	80	20	275	100	6 1/8	6 1/2
	3L4[c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	100	6 1/8	6 1/2
	4L6	300	150	(535)	720	720	495	420	365	275	170	7 1/16	7 1/8
	4L6	600	150	(535)	(1000)	(1000)	990	845	725	275	170	7 1/16	8
	4L6	900	150	(70)	(1500)	(1500)	1485	1265	1090	275	170	7 3/4	8 3/4
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	3L4	150	150			230	175	80	50	230	100	6 1/8	6 1/2
	3L4[c]	300	150			(230)	(230)	(230)	(230)	230	100	6 1/8	6 1/2
	4L6	300	150			600	475	460	275	230	170	7 1/16	7 1/8
	4L6	600	150			1200	945	915	550	230	170	7 1/16	8
	4L6	900	150			1800	1420	1375	825	230	170	7 3/4	8 3/4
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	3L4	150	150			230	180			230	100	6 1/8	6 1/2
	3L4[c]	300	150			(230)	(180)			230	100	6 1/8	6 1/2
	4L6	300	150			600	465			230	170	7 1/16	7 1/8
	4L6	600	150			1200	930			230	170	7 1/16	8
	4L6	900	150			(1500)	1395			230	170	7 3/4	8 3/4
	4L6	1500	150			(1500)	(1500)			230	170	7 3/4	8 3/4

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 11—Spring-loaded Pressure-relief Valves "M" Orifice [f] (Effective Area = 3.60 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	4M6	150	150			285	185	80		285	80	7	7 1/4
	4M6[c]	300	150			(285)	(285)	(285)		285	80	7	7 1/4
	4M6	300	150			740	620	410		285	160	7	7 1/4
	4M6	600	150			(1100)	(1100)	825		285	160	7	8
	4M6	900	150			(1100)	(1100)	(1100)		285	160	7 3/4	8 3/4
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	4M6	300	150					510	215	290	160	7	7 1/4
	4M6	600	150					(1000)	430	290	160	7	8
	4M6	900	150					(1100)	650	290	160	7 3/4	8 3/4
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	4M6	150	150	275	275	275	180	80	20	275	80	7	7 1/4
	4M6[c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	80	7	7 1/4
	4M6	300	150	(525)	720	720	495	420	365	275	160	7	7 1/4
	4M6	600	150	(600)	(1100)	(1100)	990	845	725	275	160	7	8
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	4M6	150	150			230	175	80	50	230	80	7	7 1/4
	4M6[c]	300	150			(230)	(230)	(230)	(230)	230	80	7	7 1/4
	4M6	300	150			600	475	460	275	230	160	7	7 1/4
	4M6	600	150			(1100)	945	915	550	230	160	7	8
	4M6	900	150			(1100)	(1100)	(1100)	825	230	160	7 3/4	8 3/4
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	4M6	150	150			230	180			230	80	7	7 1/4
	4M6[c]	300	150			(230)	(180)			230	80	7	7 1/4
	4M6	300	150			600	465			230	160	7	7 1/4
	4M6	600	150			(1100)	930			230	160	7	8
	4M6	900	150			(1100)	(1100)			230	160	7 3/4	8 3/4

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 12—Spring-loaded Pressure-relief Valves "N" Orifice [f] (Effective Area = 4.34 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	4N6	150	150			285	185	80		285	80	7 3/4	8 1/4
	4N6[c]	300	150			(285)	(285)	(285)		285	80	7 3/4	8 1/4
	4N6	300	150			740	620	410		285	160	7 3/4	8 1/4
	4N6	600	150			(1000)	(1000)	825		285	160	7 3/4	8 3/4
	4N6	900	150			(1000)	(1000)	(1000)		285	160	7 3/4	8 3/4
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	4N6	300	150					510	215	290	160	7 3/4	8 1/4
	4N6	600	150					(1000)	430	290	160	7 3/4	8 3/4
	4N6	900	150					(1000)	650	290	160	7 3/4	8 3/4
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	4N6	150	150	275	275	275	180	80	20	275	80	7 3/4	8 1/4
	4N6[c]	300	150	(275)	(275)	(275)	(275)	(275)	(275)	275	80	7 3/4	8 1/4
	4N6	300	150	(450)	720	720	495	420	365	275	160	7 3/4	8 1/4
	4N6	600	150	(500)	(1000)	(1000)	990	845	725	275	160	7 3/4	8 3/4
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	4N6	150	150			230	175	80	50	230	80	7 3/4	8 1/4
	4N6[c]	300	150			(230)	(230)	(230)	(230)	230	80	7 3/4	8 1/4
	4N6	300	150			600	475	460	275	230	160	7 3/4	8 1/4
	4N6	600	150			(1000)	945	915	550	230	160	7 3/4	8 3/4
	4N6	900	150			(1000)	(1000)	(1000)	825	230	160	7 3/4	8 3/4
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	4N6	150	150			230	180			230	80	7 3/4	8 1/4
	4N6[c]	300	150			(230)	(180)			230	80	7 3/4	8 1/4
	4N6	300	150			600	485			230	160	7 3/4	8 1/4
	4N6	600	150			(1000)	930			230	160	7 3/4	8 3/4
	4N6	900	150			(1000)	(1000)			230	160	7 3/4	8 3/4

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 13—Spring-loaded Pressure-relief Valves "P" Orifice [f] (Effective Area = 6.38 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	4P6	150	150			285	185	80		285	80	7 1/8	9
	4P6[c]	300	150			(285)	(285)	(285)		285	80	7 1/8	9
	4P6	300	150			(525)	(525)	410		285	150	8 7/8	10
	4P6	600	150			(1000)	(1000)	825		285	150	8 7/8	10
	4P6	900	150			(1000)	(1000)	(1000)		285	150	8 7/8	10
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	4P6	300	150					510	215	290	150	8 7/8	10
	4P6	600	150					(1000)	430	290	150	8 7/8	10
	4P6	900	150					(1000)	650	290	150	8 7/8	10
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	4P6	150	150	(175)	275	275	180	80	20	275	80	7 1/8	9
	4P6[c]	300	150	(175)	(275)	(275)	(275)	(275)	(275)	275	80	7 1/8	9
	4P6	300	150	(300)	(525)	(525)	495	420	365	275	150	8 7/8	10
	4P6	600	150	(480)	(1000)	(1000)	990	845	725	275	150	8 7/8	10
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	4P6	150	150			230	175	80	50	230	80	7 1/8	9
	4P6[c]	300	150			(230)	(230)	(230)	(230)	230	80	7 1/8	9
	4P6	300	150			(525)	475	460	275	230	150	8 7/8	10
	4P6	600	150			(1000)	945	915	550	230	150	8 7/8	10
	4P6	900	150			(1000)	(1000)	(1000)	825	230	150	8 7/8	10
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	4P6	150	150			230	180			230	80	7 1/8	9
	4P6[c]	300	150			(230)	(230)			230	80	7 1/8	9
	4P6	300	150			(525)	465			230	150	8 7/8	10
	4P6	600	150			(1000)	930			230	150	8 7/8	10
	4P6	900	150			(1000)	(1000)			230	150	8 7/8	10

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 14—Spring-loaded Pressure-relief Valves "Q" Orifice [f] (Effective Area = 11.05 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	6Q8	150	150			(165)	(165)	80		(115)	70	9 7/16	9 1/2
	6Q8[c]	300	150			(165)	(165)	(165)		(115)	70	9 7/16	9 1/2
	6Q8	300	150			(300)	(300)	(300)		(115)	115	9 7/16	9 1/2
	6Q8	600	150			(600)	(600)	(600)		(115)	115	9 7/16	9 1/2
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	6Q8	300	150					(165)	(165)	(115)	115	9 7/16	9 1/2
	6Q8	600	150					(600)	430	(115)	115	9 7/16	9 1/2
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	6Q8	150	150	(165)	(165)	(165)	(165)	80	20	(115)	70	9 7/16	9 1/2
	6Q8[c]	300	150	(165)	(165)	(165)	(165)	(165)	(165)	(115)	70	9 7/16	9 1/2
	6Q8	300	150	(250)	(300)	(300)	(300)	(300)	(300)	(115)	115	9 7/16	9 1/2
	6Q8	600	150	(300)	(600)	(600)	(600)	(600)	(600)	(115)	115	9 7/16	9 1/2
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	6Q8	150	150			(165)	(165)	80	50	(115)	70	9 7/16	9 1/2
	6Q8[c]	300	150			(165)	(165)	(165)	(140)	(115)	70	9 7/16	9 1/2
	6Q8	300	150			(300)	(300)	(300)	275	(115)	115	9 7/16	9 1/2
	6Q8	600	150			(600)	(600)	(600)	550	(115)	115	9 7/16	9 1/2
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	6Q8	150	150			(165)	(165)			(115)	70	9 7/16	9 1/2
	6Q8[c]	300	150			(165)	(165)			(115)	70	9 7/16	9 1/2
	6Q8	300	150			(300)	(300)			(115)	115	9 7/16	9 1/2
	6Q8	600	150			(600)	(600)			(115)	115	9 7/16	9 1/2

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 15—Spring-loaded Pressure-relief Valves "R" Orifice [f] (Effective Area = 16.00 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−21 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	6R8	150	150			(100)	(100)	80		(60)	60	9 7/16	9 1/2
	6R8[c]	300	150			(100)	(100)	(100)		(60)	60	9 7/16	9 1/2
	6R10	300	150			(230)	(230)	(230)		(100)	100	9 7/16	10 1/2
	6R10	600	150			(300)	(300)	(300)		(100)	100	9 7/16	10 1/2
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	6R8	300	150					(100)	(100)	(100)	100	9 7/16	9 1/2
	6R10	600	150					(300)	(300)	(100)	100	9 7/16	10 1/2
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	6R8	150	150	(55)	(100)	(100)	(100)	80	20	(60)	60	9 7/16	9 1/2
	6R8[c]	300	150	(55)	(100)	(100)	(100)	(100)	(100)	(60)	60	9 7/16	9 1/2
	6R10	300	150	(150)	(230)	(230)	(230)	(230)	(230)	(100)	100	9 7/16	10 1/2
	6R10	600	150	(200)	(300)	(300)	(300)	(300)	(300)	(100)	100	9 7/16	10 1/2
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	6R8	150	150			(100)	(100)	80		(60)	60	9 7/16	9 1/2
	6R8[c]	300	150			(100)	(100)	(100)		(60)	60	9 7/16	9 1/2
	6R10	300	150			(230)	(230)	(230)		(100)	100	9 7/16	10 1/2
	6R10	600	150			(300)	(300)	(300)		(100)	100	9 7/16	10 1/2
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	6R8	150	150			(100)	(100)			(60)	60	9 7/16	9 1/2
	6R8[c]	300	150			(100)	(100)			(60)	60	9 7/16	9 1/2
	6R10	300	150			(230)	(230)			(100)	100	9 7/16	10 1/2
	6R10	600	150			(300)	(300)			(100)	100	9 7/16	10 1/2

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 16—Spring-loaded Pressure-relief Valves "T" Orifice [f] (Effective Area = 26.00 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Inlet Flange (Set) Pressure Limit [a] (psig)						Outlet Pressure Limit [a] (psig)		Center-to-Face Dimensions (in.)	
				Conventional and Balanced Bellows Valves									
Body/ Bonnet	Inlet by Orifice by Outlet	INLET	OUTLET	−450 °F to −76 °F	−75 °F to −21 °F	−20 °F to 100 °F	450 °F	800 °F	1000 °F	Flange Rating Limit [a] 100 °F	Bellows Rating Limit [a] 100 °F	INLET	OUTLET
Temperature Range Inclusive −20 °F to 800 °F													
Carbon Steel	8T10 8T10[c] 8T10 8T10	150 300 300 300	150 150 150 150			(65) (65) (120) (300)	(65) (65) (120) (300)	(65) (65) (120) (300)		(30) (30) (60) (100)	30 30 60 100	10 7/8 10 7/8 10 7/8 10 7/8	11 11 11 11
Temperature Range Inclusive 801 °F to 1000 °F													
Chrome Molybdenum Steel	8T10 8T10	300 300	150 150					(120) (300)	100 (215)	(60) (100)	60 100	10 7/8 10 7/8	11 11
Temperature Range Inclusive −450 °F to 1000 °F													
Austenitic Stainless Steel	8T10 8T10[c] 8T10	150 300 300	150 150 150	(50) (50) (65)	(65) (65) (120)	(65) (65) (120)	(65) (65) (120)	(65) (65) (120)	(20) (65) (120)	(30) (30) (60)	30 30 60	10 7/8 10 7/8 10 7/8	11 11 11
Temperature Range Inclusive −20 °F to 900 °F [d]													
Nickel/ Copper Alloy [d]	8T10 8T10[c] 8T10	150 300 300	150 150 150			(65) (65) (120)	(65) (65) (120)	(65) (65) (120)	50 (65) (120)	(30) (30) (60)	30 30 60	10 7/8 10 7/8 10 7/8	11 11 11
Temperature Range Inclusive −20 °F to 300 °F [e]													
Alloy 20 [e]	8T10 8T10[c] 8T10	150 300 300	150 150 150		(65) (65) (120)	(65) (65) (120)				(30) (30) (60)	30 30 60	10 7/8 10 7/8 10 7/8	11 11 11

[a] Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limits for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using graphs from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. Bellows outlet pressure limits are the design pressure of the bellows at the outlet temperature of 100 °F, and pressure values at other temperatures may be determined from Annex C. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

[b] Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be use, as required for the service involved.

[c] Set pressure limited for low-pressure applications where a Class 300 inlet flange is preferred over a Class 150 flange.

[d] Materials limited to 900 °F. Pressure ratings indicated in the 1000 °F are limited to 900 °F.

[e] Materials limited to 300 °F. Pressure ratings indicated in the 450 °F are limited to 300 °F.

[f] Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 17—Pilot-operated Pressure-relief Valves "D" Orifice[d] (Effective Orifice Area = 0.110 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	1D2	150	150		285	170	285	4 1/8	4 1/2
	1D2	300	150		740	605	285	4 3/8	4 1/2
	1D2	600	150		1480	1205	285	4 3/8	4 1/2
	1D2	900	300		2220	1810	740	4 15/16	4 3/4
	1D2	1500	300		3705	3015	740	4 15/16	4 3/4
	1D2	2500	300		6170	5025	740	4 15/16	4 3/4
	1 1/2D2	150	150		285	170	285	4 7/8	4 3/4
	1 1/2D2	300	150		740	605	285	4 7/8	4 3/4
	1 1/2D2	600	150		1480	1205	285	4 7/8	4 3/4
	1 1/2D2	900	300		2220	1810	740	5 7/8	5 1/2
	1 1/2D2	1500	300		3705	3015	740	5 7/8	5 1/2
	1 1/2D2	2500	300		6170	5025	740	5 7/8	5 1/2
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	1D2	150	150	275	275	170	275	4 1/8	4 1/2
	1D2	300	150	720	720	480	275	4 3/8	4 1/2
	1D2	600	150	1440	1440	955	275	4 3/8	4 1/2
	1D2	900	300	2160	2160	1435	720	4 15/16	4 3/4
	1D2	1500	300	3600	3600	2390	720	4 15/16	4 3/4
	1D2	2500	300	6000	6000	3980	720	4 15/16	4 3/4
	1 1/2D2	150	150	275	275	170	275	4 7/8	4 3/4
	1 1/2D2	300	150	720	720	480	275	4 7/8	4 3/4
	1 1/2D2	600	150	1440	1440	955	275	4 7/8	4 3/4
	1 1/2D2	900	300	2160	2160	1435	720	5 7/8	5 1/2
	1 1/2D2	1500	300	3600	3600	2390	720	5 7/8	5 1/2
	1 1/2D2	2500	300	6000	6000	3980	720	5 7/8	5 1/2
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	1D2	150	150		230	170	230	4 1/8	4 1/2
	1D2	300	150		600	475	230	4 3/8	4 1/2
	1D2	600	150		1200	945	230	4 3/8	4 1/2
	1D2	900	300		1800	1420	600	4 15/16	4 3/4
	1 1/2D2	150	150		230	170	230	4 7/8	4 3/4
	1 1/2D2	300	150		600	475	230	4 7/8	4 3/4
	1 1/2D2	600	150		1200	945	230	4 7/8	4 3/4
	1 1/2D2	900	300		1800	1420	600	5 7/8	5 1/2
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	1D2	150	150		230	180	230	4 1/8	4 1/2
	1D2	300	150		600	465	230	4 3/8	4 1/2
	1D2	600	150		1200	930	230	4 3/8	4 1/2
	1D2	900	300		1800	1395	600	4 15/16	4 3/4
	1D2	1500	300		3000	2330	600	4 15/16	4 3/4
	1D2	2500	300		5000	3880	600	4 15/16	4 3/4
	1 1/2D2	150	150		230	180	230	4 7/8	4 3/4
	1 1/2D2	300	150		600	465	230	4 7/8	4 3/4
	1 1/2D2	600	150		1200	930	230	4 7/8	4 3/4
	1 1/2D2	900	300		1800	1395	600	5 7/8	5 1/2
	1 1/2D2	1500	300		3000	2330	600	5 7/8	5 1/2
	1 1/2D2	2500	300		5000	3880	600	5 7/8	5 1/2

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 18—Pilot-operated Pressure-relief Valves "E" Orifice[d] (Effective Orifice Area = 0.196 in.²)

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	1E2	150	150		285	170	285	4 1/8	4 1/2
	1E2	300	150		740	605	285	4 3/8	4 1/2
	1E2	600	150		1480	1205	285	4 3/8	4 1/2
	1E2	900	300		2220	1810	740	4 15/16	4 3/4
	1E2	1500	300		3705	3015	740	4 15/16	4 3/4
	1E2	2500	300		6170	5025	740	4 15/16	4 3/4
	1 1/2E2	150	150		285	170	285	4 7/8	4 3/4
	1 1/2E2	300	150		740	605	285	4 7/8	4 3/4
	1 1/2E2	600	150		1480	1205	285	4 7/8	4 3/4
	1 1/2E2	900	300		2220	1810	740	5 7/8	5 1/2
	1 1/2E2	1500	300		3705	3015	740	5 7/8	5 1/2
	1 1/2E2	2500	300		6170	5025	740	5 7/8	5 1/2
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	1E2	150	150	275	275	170	275	4 1/8	4 1/2
	1E2	300	150	720	720	480	275	4 3/8	4 1/2
	1E2	600	150	1440	1440	955	275	4 3/8	4 1/2
	1E2	900	300	2160	2160	1435	720	4 15/16	4 3/4
	1E2	1500	300	3600	3600	2390	720	4 15/16	4 3/4
	1E2	2500	300	6000	6000	3980	720	4 15/16	4 3/4
	1 1/2E2	150	150	275	275	170	275	4 7/8	4 3/4
	1 1/2E2	300	150	720	720	480	275	4 7/8	4 3/4
	1 1/2E2	600	150	1440	1440	955	275	4 7/8	4 3/4
	1 1/2E2	900	300	2160	2160	1435	720	5 7/8	5 1/2
	1 1/2E2	1500	300	3600	3600	2390	720	5 7/8	5 1/2
	1 1/2E2	2500	300	6000	6000	3980	720	5 7/8	5 1/2
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	1E2	150	150		230	170	230	4 1/8	4 1/2
	1E2	300	150		600	475	230	4 3/8	4 1/2
	1E2	600	150		1200	945	230	4 3/8	4 1/2
	1E2	900	300		1800	1420	600	4 15/16	4 3/4
	1 1/2E2	150	150		230	170	230	4 7/8	4 3/4
	1 1/2E2	300	150		600	475	230	4 7/8	4 3/4
	1 1/2E2	600	150		1200	945	230	4 7/8	4 3/4
	1 1/2E2	900	300		1800	1420	600	5 7/8	5 1/2
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	1E2	150	150		230	180	230	4 1/8	4 1/2
	1E2	300	150		600	465	230	4 3/8	4 1/2
	1E2	600	150		1200	930	230	4 3/8	4 1/2
	1E2	900	300		1800	1395	600	4 15/16	4 3/4
	1E2	1500	300		3000	2330	600	4 15/16	4 3/4
	1E2	2500	300		5000	3880	600	4 15/16	4 3/4
	1 1/2E2	150	150		230	180	230	4 7/8	4 3/4
	1 1/2E2	300	150		600	465	230	4 7/8	4 3/4
	1 1/2E2	600	150		1200	930	230	4 7/8	4 3/4
	1 1/2E2	900	300		1800	1395	600	5 7/8	5 1/2
	1 1/2E2	1500	300		3000	2330	600	5 7/8	5 1/2
	1 1/2E2	2500	300		5000	3880	600	5 7/8	5 1/2

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 19—Pilot-operated Pressure-relief Valves "F" Orifice[d] (Effective Orifice Area = 0.307 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	1F2	150	150		285	170	285	4 1/8	4 1/2
	1F2	300	150		740	605	285	4 3/8	4 1/2
	1F2	600	150		1480	1205	285	4 3/8	4 1/2
	1F2	900	300		2220	1810	740	4 15/16	4 3/4
	1F2	1500	300		3705	3015	740	4 15/16	4 3/4
	1F2	2500	300		6170	5025	740	4 15/16	4 3/4
	1 1/2F2	150	150		285	170	285	4 7/8	4 3/4
	1 1/2F2	300	150		740	605	285	4 7/8	4 3/4
	1 1/2F2	600	150		1480	1205	285	4 7/8	4 3/4
	1 1/2F2	900	300		2220	1810	740	5 7/8	5 1/2
	1 1/2F2	1500	300		3705	3015	740	5 7/8	5 1/2
	1 1/2F2	2500	300		6170	5025	740	5 7/8	5 1/2
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	1F2	150	150	275	275	170	275	4 1/8	4 1/2
	1F2	300	150	720	720	480	275	4 3/8	4 1/2
	1F2	600	150	1440	1440	955	275	4 3/8	4 1/2
	1F2	900	300	2160	2160	1435	720	4 15/16	4 3/4
	1F2	1500	300	3600	3600	2390	720	4 15/16	4 3/4
	1F2	2500	300	6000	6000	3980	720	4 15/16	4 3/4
	1 1/2F2	150	150	275	275	170	275	4 7/8	4 3/4
	1 1/2F2	300	150	720	720	480	275	4 7/8	4 3/4
	1 1/2F2	600	150	1440	1440	955	275	4 7/8	4 3/4
	1 1/2F2	900	300	2160	2160	1435	720	5 7/8	5 1/2
	1 1/2F2	1500	300	3600	3600	2390	720	5 7/8	5 1/2
	1 1/2F2	2500	300	6000	6000	3980	720	5 7/8	5 1/2
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	1F2	150	150		230	170	230	4 1/8	4 1/2
	1F2	300	150		600	475	230	4 3/8	4 1/2
	1F2	600	150		1200	945	230	4 3/8	4 1/2
	1F2	900	300		1800	1420	600	4 15/16	4 3/4
	1 1/2F2	150	150		230	170	230	4 7/8	4 3/4
	1 1/2F2	300	150		600	475	230	4 7/8	4 3/4
	1 1/2F2	600	150		1200	945	230	4 7/8	4 3/4
	1 1/2F2	900	300		1800	1420	600	5 7/8	5 1/2
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	1F2	150	150		230	180	230	4 1/8	4 1/2
	1F2	300	150		600	465	230	4 3/8	4 1/2
	1F2	600	150		1200	930	230	4 3/8	4 1/2
	1F2	900	300		1800	1395	600	4 15/16	4 3/4
	1F2	1500	300		3000	2330	600	4 15/16	4 3/4
	1F2	2500	300		5000	3880	600	4 15/16	4 3/4
	1 1/2F2	150	150		230	180	230	4 7/8	4 3/4
	1 1/2F2	300	150		600	465	230	4 7/8	4 3/4
	1 1/2F2	600	150		1200	930	230	4 7/8	4 3/4
	1 1/2F2	900	300		1800	1395	600	5 7/8	5 1/2
	1 1/2F2	1500	300		3000	2330	600	5 7/8	5 1/2
	1 1/2F2	2500	300		5000	3880	600	5 7/8	5 1/2

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 20—Pilot-operated Pressure-relief Valves "G" Orifice[d] (Effective Orifice Area = 0.503 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	1 1/2G3	150	150		285	170	285	5 1/8	4 7/8
	1 1/2G3	300	150		740	605	285	5 1/8	4 7/8
	1 1/2G3	600	150		1480	1205	285	5 1/8	4 7/8
	1 1/2G3	900	300		2220	1810	740	6 3/8	6 3/4
	1 1/2G3	1500	300		3705	3015	740	6 3/8	6 3/4
	1 1/2G3	2500	300		6170	5025	740	6 3/8	6 3/4
	2G3	150	150		285	170	285	5 3/8	4 7/8
	2G3	300	150		740	605	285	5 3/8	4 7/8
	2G3	600	150		1480	1205	285	5 3/8	4 7/8
	2G3	900	300		2220	1810	740	6 9/16	6 3/4
	2G3	1500	300		3705	3015	740	6 9/16	6 3/4
	2G3	2500	300		6170	5025	740	7	6 3/4
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	1 1/2G3	150	150	275	275	170	275	5 1/8	4 7/8
	1 1/2G3	300	150	720	720	480	275	5 1/8	4 7/8
	1 1/2G3	600	150	1440	1440	955	275	5 1/8	4 7/8
	1 1/2G3	900	300	2160	2160	1435	720	6 3/8	6 3/4
	1 1/2G3	1500	300	3600	3600	2390	720	6 3/8	6 3/4
	1 1/2G3	2500	300	6000	6000	3980	720	6 3/8	6 3/4
	2G3	150	150	275	275	170	275	5 3/8	4 7/8
	2G3	300	150	720	720	480	275	5 3/8	4 7/8
	2G3	600	150	1440	1440	955	275	5 3/8	4 7/8
	2G3	900	300	2160	2160	1435	720	6 9/16	6 3/4
	2G3	1500	300	3600	3600	2390	720	6 9/16	6 3/4
	2G3	2500	300	6000	6000	3980	720	7	6 3/4
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	1 1/2G3	150	150		230	170	230	5 1/8	4 7/8
	1 1/2G3	300	150		600	475	230	5 1/8	4 7/8
	1 1/2G3	600	150		1200	945	230	5 1/8	4 7/8
	1 1/2G3	900	300		1800	1420	600	6 3/8	6 3/4
	2G3	150	150		230	170	230	5 3/8	4 7/8
	2G3	300	150		600	475	230	5 3/8	4 7/8
	2G3	600	150		1200	945	230	5 3/8	4 7/8
	2G3	900	300		1800	1420	600	6 9/16	6 3/4
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	1 1/2G3	150	150		230	180	230	5 1/8	4 7/8
	1 1/2G3	300	150		600	465	230	5 1/8	4 7/8
	1 1/2G3	600	150		1200	930	230	5 1/8	4 7/8
	1 1/2G3	900	300		1800	1395	600	6 3/8	6 3/4
	1 1/2G3	1500	300		3000	2330	600	6 3/8	6 3/4
	1 1/2G3	2500	300		5000	3880	600	6 3/8	6 3/4
	2G3	150	150		230	180	230	5 3/8	4 7/8
	2G3	300	150		600	465	230	5 3/8	4 7/8
	2G3	600	150		1200	930	230	5 3/8	4 7/8
	2G3	900	300		1800	1395	600	6 9/16	6 3/4
	2G3	1500	300		3000	2330	600	6 9/16	6 3/4
	2G3	2500	300		5000	3880	600	7	6 3/4

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 21—Pilot-operated Pressure-relief Valves "H" Orifice[d] (Effective Orifice Area = 0.785 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	1 1/2H3	150	150		285	170	285	5 1/8	4 7/8
	1 1/2H3	300	150		740	605	285	5 1/8	4 7/8
	1 1/2H3	600	150		1480	1205	285	5 1/8	4 7/8
	1 1/2H3	900	300		2220	1810	740	6 3/8	6 3/4
	1 1/2H3	1500	300		3705	3015	740	6 3/8	6 3/4
	1 1/2H3	2500	300		6170	5025	740	6 3/8	6 3/4
	2H3	150	150		285	170	285	5 3/8	4 7/8
	2H3	300	150		740	605	285	5 3/8	4 7/8
	2H3	600	150		1480	1205	285	5 3/8	4 7/8
	2H3	900	300		2220	1810	740	6 9/16	6 3/4
	2H3	1500	300		3705	3015	740	6 9/16	6 3/4
	2H3	2500	300		6170	5025	740	7	6 3/4
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	1 1/2H3	150	150	275	275	170	275	5 1/8	4 7/8
	1 1/2H3	300	150	720	720	480	275	5 1/8	4 7/8
	1 1/2H3	600	150	1440	1440	955	275	5 1/8	4 7/8
	1 1/2H3	900	300	2160	2160	1435	720	6 3/8	6 3/4
	1 1/2H3	1500	300	3600	3600	2390	720	6 3/8	6 3/4
	1 1/2H3	2500	300	6000	6000	3980	720	6 3/8	6 3/4
	2H3	150	150	275	275	170	275	5 3/8	4 7/8
	2H3	300	150	720	720	480	275	5 3/8	4 7/8
	2H3	600	150	1440	1440	955	275	5 3/8	4 7/8
	2H3	900	300	2160	2160	1435	720	6 9/16	6 3/4
	2H3	1500	300	3600	3600	2390	720	6 9/16	6 3/4
	2H3	2500	300	6000	6000	3980	720	7	6 3/4
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	1 1/2H3	150	150		230	170	230	5 1/8	4 7/8
	1 1/2H3	300	150		600	475	230	5 1/8	4 7/8
	1 1/2H3	600	150		1200	945	230	5 1/8	4 7/8
	1 1/2H3	900	300		1800	1420	600	6 3/8	6 3/4
	2H3	150	150		230	170	230	5 3/8	4 7/8
	2H3	300	150		600	475	230	5 3/8	4 7/8
	2H3	600	150		1200	945	230	5 3/8	4 7/8
	2H3	900	300		1800	1420	600	6 9/16	6 3/4
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	1 1/2H3	150	150		230	180	230	5 1/8	4 7/8
	1 1/2H3	300	150		600	465	230	5 1/8	4 7/8
	1 1/2H3	600	150		1200	930	230	5 1/8	4 7/8
	1 1/2H3	900	300		1800	1395	600	6 3/8	6 3/4
	1 1/2H3	1500	300		3000	2330	600	6 3/8	6 3/4
	1 1/2H3	2500	300		5000	3880	600	6 3/8	6 3/4
	2H3	150	150		230	180	230	5 3/8	4 7/8
	2H3	300	150		600	465	230	5 3/8	4 7/8
	2H3	600	150		1200	930	230	5 3/8	4 7/8
	2H3	900	300		1800	1395	600	6 9/16	6 3/4
	2H3	1500	300		3000	2330	600	6 9/16	6 3/4
	2H3	2500	300		5000	3880	600	7	6 3/4

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 22—Pilot-operated Pressure-relief Valves "J" Orifice[d] (Effective Orifice Area = 1.287 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	2J3	150	150		285	170	285	5 3/8	4 7/8
	2J3	300	150		740	605	285	5 3/8	4 7/8
	2J3	600	150		1480	1205	285	5 3/8	4 7/8
	2J3	900	300		2220	1810	740	6 9/16	6 3/4
	2J3	1500	300		3705	3015	740	6 9/16	6 3/4
	2J3	2500	300		(4620)	(4620)	740	7	6 3/4
	3J4	150	150		285	170	285	6 1/8	6 3/8
	3J4	300	150		740	605	285	6 1/8	6 3/8
	3J4	600	150		1480	1205	285	6 3/8	6 3/8
	3J4	900	300		2220	1810	740	7 1/2	7 1/8
	3J4	1500	300		3705	3015	740	7 1/2	7 1/8
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	2J3	150	150	275	275	170	275	5 3/8	4 7/8
	2J3	300	150	720	720	480	275	5 3/8	4 7/8
	2J3	600	150	1440	1440	955	275	5 3/8	4 7/8
	2J3	900	300	2160	2160	1435	720	6 9/16	6 3/4
	2J3	1500	300	3600	3600	2390	720	6 9/16	6 3/4
	2J3	2500	300	(4495)	(4495)	3980	720	7	6 3/4
	3J4	150	150	275	275	170	275	6 1/8	6 3/8
	3J4	300	150	720	720	480	275	6 1/8	6 3/8
	3J4	600	150	1440	1440	955	275	6 3/8	6 3/8
	3J4	900	300	2160	2160	1435	720	7 1/2	7 1/8
	3J4	1500	300	3600	3600	2390	720	7 1/2	7 1/8
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	2J3	150	150		230	170	230	5 3/8	4 7/8
	2J3	300	150		600	475	230	5 3/8	4 7/8
	2J3	600	150		1200	945	230	5 3/8	4 7/8
	2J3	900	300		1800	1420	600	6 9/16	6 3/4
	3J4	150	150		230	170	230	6 1/8	6 3/8
	3J4	300	150		600	475	230	6 1/8	6 3/8
	3J4	600	150		1200	945	230	6 3/8	6 3/8
	3J4	900	300		1800	1420	600	7 1/2	7 1/8
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	2J3	150	150		230	180	230	5 3/8	4 7/8
	2J3	300	150		600	465	230	5 3/8	4 7/8
	2J3	600	150		1200	930	230	5 3/8	4 7/8
	2J3	900	300		1800	1395	600	6 9/16	6 3/4
	2J3	1500	300		3000	2330	600	6 9/16	6 3/4
	2J3	2500	300		(3750)	(3750)	600	7	6 3/4
	3J4	150	150		230	180	230	6 1/8	6 3/8
	3J4	300	150		600	465	230	6 1/8	6 3/8
	3J4	600	150		1200	930	230	6 3/8	6 3/8
	3J4	900	300		1800	1395	600	7 1/2	7 1/8
	3J4	1500	300		3000	2330	600	7 1/2	7 1/8

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 23—Pilot-operated Pressure-relief Valves "K" Orifice[d] (Effective Orifice Area = 1.838 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange Set Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	3K4	150	150		285	170	285	6 1/8	6 3/8
	3K4	300	150		740	605	285	6 1/8	6 3/8
	3K4	600	150		1480	1205	285	6 3/8	6 3/8
	3K4	900	300		2220	1810	740	7 1/2	7 1/8
	3K4	1500	300		3705	3015	740	7 1/2	7 1/8
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	3K4	150	150	275	275	170	275	6 1/8	6 3/8
	3K4	300	150	720	720	480	275	6 1/8	6 3/8
	3K4	600	150	1440	1440	955	275	6 3/8	6 3/8
	3K4	900	300	2160	2160	1435	720	7 1/2	7 1/8
	3K4	1500	300	3600	3600	2390	720	7 1/2	7 1/8
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	3K4	150	150		230	170	230	6 1/8	6 3/8
	3K4	300	150		600	475	230	6 1/8	6 3/8
	3K4	600	150		1200	945	230	6 3/8	6 3/8
	3K4	900	300		1800	1420	600	7 1/2	7 1/8
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	3K4	150	150		230	180	230	6 1/8	6 3/8
	3K4	300	150		600	465	230	6 1/8	6 3/8
	3K4	600	150		1200	930	230	6 3/8	6 3/8
	3K4	900	300		1800	1395	600	7 1/2	7 1/8
	3K4	1500	300		3000	2330	600	7 1/2	7 1/8

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 24—Pilot-operated Pressure-relief Valves "L" Orifice[d] (Effective Orifice Area = 2.853 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	3L4	150	150		285	170	285	6 1/8	6 3/8
	3L4	300	150		740	605	285	6 1/8	6 3/8
	3L4	600	150		(1425)	1205	285	6 3/8	6 3/8
	3L4	900	300		2220	1810	740	7 1/2	7 1/8
	3L4	1500	300		(3630)	3015	740	7 1/2	7 1/8
	4L6	150	150		285	170	285	7 3/4	8 1/4
	4L6	300	150		740	605	285	7 3/4	8 1/4
	4L6	600	150		1480	1205	285	7 3/4	8 1/4
	4L6	900	300		2220	1810	740	9 13/16	9 3/16
	4L6	1500	300		3705	3015	740	9 13/16	9 3/16
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	3L4	150	150	275	275	170	275	6 1/8	6 3/8
	3L4	300	150	720	720	480	275	6 1/8	6 3/8
	3L4	600	150	(1375)	(1375)	955	275	6 3/8	6 3/8
	3L4	900	300	2160	2160	1435	720	7 1/2	7 1/8
	3L4	1500	300	(3530)	(3530)	2390	720	7 1/2	7 1/8
	4L6	150	150	275	275	170	275	7 3/4	8 1/4
	4L6	300	150	720	720	480	275	7 3/4	8 1/4
	4L6	600	150	1440	1440	955	275	7 3/4	8 1/4
	4L6	900	300	2160	2160	1435	720	9 13/16	9 3/16
	4L6	1500	300	3600	3600	2390	720	9 13/16	9 3/16
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	3L4	150	150		230	170	230	6 1/8	6 3/8
	3L4	300	150		600	475	230	6 1/8	6 3/8
	3L4	600	150		(1150)	945	230	6 3/8	6 3/8
	3L4	900	300		1800	1420	600	7 1/2	7 1/8
	4L6	150	150		230	170	230	7 3/4	8 1/4
	4L6	300	150		600	475	230	7 3/4	8 1/4
	4L6	600	150		1200	945	230	7 3/4	8 1/4
	4L6	900	300		1800	1420	600	9 13/16	9 3/16
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	3L4	150	150		230	180	230	6 1/8	6 3/8
	3L4	300	150		600	465	230	6 1/8	6 3/8
	3L4	600	150		(1150)	930	230	6 3/8	6 3/8
	3L4	900	300		1800	1395	600	7 1/2	7 1/8
	3L4	1500	300		(2940)	2330	600	7 1/2	7 1/8
	4L6	150	150		230	180	230	7 3/4	8 1/4
	4L6	300	150		600	465	230	7 3/4	8 1/4
	4L6	600	150		1200	930	230	7 3/4	8 1/4
	4L6	900	300		1800	1395	600	9 13/16	9 3/16
	4L6	1500	300		3000	2330	600	9 13/16	9 3/16

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 25—Pilot-operated Pressure-relief Valves "M" Orifice[d] (Effective Orifice Area = 3.60 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 ºF to –21 ºF	–20 ºF to 100 ºF	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 ºF to 500 ºF									
Carbon Steel	4M6	150	150		285	170	285	7 3/4	8 1/4
	4M6	300	150		740	605	285	7 3/4	8 1/4
	4M6	600	150		1480	1205	285	7 3/4	8 1/4
	4M6	900	300		2220	1810	740	9 13/16	9 3/16
	4M6	1500	300		3705	3015	740	9 13/16	9 3/16
Temperature Range, –450 ºF to 500 ºF									
Austenitic Stainless Steel	4M6	150	150	275	275	170	275	7 3/4	8 1/4
	4M6	300	150	720	720	480	275	7 3/4	8 1/4
	4M6	600	150	1440	1440	955	275	7 3/4	8 1/4
	4M6	900	300	2160	2160	1435	720	9 13/16	9 3/16
	4M6	1500	300	3600	3600	2390	720	9 13/16	9 3/16
Temperature Range, –20 ºF to 500 ºF									
Nickel/Copper Alloy	4M6	150	150		230	170	230	7 3/4	8 1/4
	4M6	300	150		600	475	230	7 3/4	8 1/4
	4M6	600	150		1200	945	230	7 3/4	8 1/4
	4M6	900	300		1800	1420	600	9 13/16	9 3/16
Temperature Range, –20 ºF to 300 ºF									
Alloy 20 [c]	4M6	150	150		230	180	230	7 3/4	8 1/4
	4M6	300	150		600	465	230	7 3/4	8 1/4
	4M6	600	150		1200	930	230	7 3/4	8 1/4
	4M6	900	300		1800	1395	600	9 13/16	9 3/16
	4M6	1500	300		3000	2330	600	9 13/16	9 3/16

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than provided in ASME B16.34. The outlet flange values at 100 ºF above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 ºF above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 ºF. Pressure ratings indicated in the 500 ºF column are limited to 300 ºF.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 26—Pilot-operated Pressure-relief Valves "N" Orifice[d] (Effective Orifice Area = 4.34 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	4N6	150	150		285	170	285	7 3/4	8 1/4
	4N6	300	150		740	605	285	7 3/4	8 1/4
	4N6	600	150		1480	1205	285	7 3/4	8 1/4
	4N6	900	300		2220	1810	740	9 13/16	9 3/16
	4N6	1500	300		3705	3015	740	9 13/16	9 3/16
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	4N6	150	150	275	275	170	275	7 3/4	8 1/4
	4N6	300	150	720	720	480	275	7 3/4	8 1/4
	4N6	600	150	1440	1440	955	275	7 3/4	8 1/4
	4N6	900	300	2160	2160	1435	720	9 13/16	9 3/16
	4N6	1500	300	3600	3600	2390	720	9 13/16	9 3/16
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	4N6	150	150		230	170	230	7 3/4	8 1/4
	4N6	300	150		600	475	230	7 3/4	8 1/4
	4N6	600	150		1200	945	230	7 3/4	8 1/4
	4N6	900	300		1800	1420	600	9 13/16	9 3/16
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	4N6	150	150		230	180	230	7 3/4	8 1/4
	4N6	300	150		600	465	230	7 3/4	8 1/4
	4N6	600	150		1200	930	230	7 3/4	8 1/4
	4N6	900	300		1800	1395	600	9 13/16	9 3/16
	4N6	1500	300		3000	2330	600	9 13/16	9 3/16

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 ºF above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 ºF above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 ºF. Pressure ratings indicated in the 500 ºF column are limited to 300 ºF.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 27—Pilot-operated Pressure-relief Valves "P" Orifice[d] (Effective Orifice Area = 6.38 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	4P6	150	150		285	170	285	7 3/4	8 1/4
	4P6	300	150		740	605	285	7 3/4	8 1/4
	4P6	600	150		(1425)	1205	285	7 3/4	8 1/4
	4P6	600	300		1480	1205	740	9 13/16	9 3/16
	4P6	900	300		2220	1810	740	9 13/16	9 3/16
	4P6	1500	300		(3630)	3015	740	9 13/16	9 3/16
	4P6	1500	600		3705	3015	1480	9 13/16	10 3/8
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	4P6	150	150	275	275	170	275	7 3/4	8 1/4
	4P6	300	150	720	720	480	275	7 3/4	8 1/4
	4P6	600	150	(1375)	(1375)	955	275	7 3/4	8 1/4
	4P6	600	300	1440	1440	955	720	9 13/16	9 3/16
	4P6	900	300	2160	2160	1435	720	9 13/16	9 3/16
	4P6	1500	300	(3520)	(3520)	2390	720	9 13/16	9 3/16
	4P6	1500	600	3600	3600	2390	1440	9 13/16	10 3/8
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	4P6	150	150		230	170	230	7 3/4	8 1/4
	4P6	300	150		600	475	230	7 3/4	8 1/4
	4P6	600	150		(1150)	945	230	7 3/4	8 1/4
	4P6	900	300		1800	1420	600	9 13/16	9 3/16
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	4P6	150	150		230	180	230	7 3/4	8 1/4
	4P6	300	150		600	465	230	7 3/4	8 1/4
	4P6	600	150		(1150)	930	230	7 3/4	8 1/4
	4P6	600	300		1200	930	600	9 13/16	9 3/16
	4P6	900	300		1800	1395	600	9 13/16	9 3/16
	4P6	1500	300		(2940)	2330	600	9 13/16	9 3/16
	4P6	1500	600		3000	2330	1200	9 13/16	10 3/8

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 28—Pilot-operated Pressure-relief Valves "Q" Orifice[d] (Effective Orifice Area = 11.05 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	6Q8	150	150		285	170	285	9 7/16	9 1/2
	6Q8	300	150		740	605	285	9 7/16	9 1/2
	6Q8	600	150		(1450)	1205	285	9 11/16	9 1/2
	6Q8	600	300		1480	1205	740	9 11/16	10 7/16
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	6Q8	150	150	275	275	170	275	9 7/16	9 1/2
	6Q8	300	150	720	720	480	275	9 7/16	9 1/2
	6Q8	600	150	(1400)	(1400)	955	275	9 11/16	9 1/2
	6Q8	600	300	1440	1440	955	720	9 11/16	10 7/16
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	6Q8	150	150		230	170	230	9 7/16	9 1/2
	6Q8	300	150		600	475	230	9 7/16	9 1/2
	6Q8	600	150		(1170)	945	230	9 11/16	9 1/2
	6Q8	600	300		1200	945	600	9 11/16	10 7/16
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	6Q8	150	150		230	180	230	9 7/16	9 1/2
	6Q8	300	150		600	465	230	9 7/16	9 1/2
	6Q8	600	150		(1170)	930	230	9 11/16	9 1/2
	6Q8	600	300		1200	930	600	9 11/16	10 7/16

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 29—Pilot-operated Pressure-relief Valves "R" Orifice[d] (Effective Orifice Area = 16.00 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	6R8 6R8 6R8	150 300 600	150 150 150		285 740 (1020)	170 605 (1020)	285 285 285	9 7/16 9 7/16 9 11/16	9 1/2 9 1/2 9 1/2
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	6R8 6R8 6R8	150 300 600	150 150 150	275 720 (985)	275 720 (985)	170 480 955	275 275 275	9 7/16 9 7/16 9 11/16	9 1/2 9 1/2 9 1/2
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	6R8 6R8 6R8	150 300 600	150 150 150		230 600 (820)	170 475 (820)	230 230 230	9 7/16 9 7/16 9 11/16	9 1/2 9 1/2 9 1/2
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	6R8 6R8 6R8	150 300 600	150 150 150		230 600 (820)	180 465 (820)	230 230 230	9 7/16 9 7/16 9 11/16	9 1/2 9 1/2 9 1/2

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Table 30—Pilot-operated Pressure-relief Valves "T" Orifice[d] (Effective Orifice Area = 26.00 in.^{2})

Materials [b]	Valve Size	ASME Flange Class		Maximum Pressure Limits [a] (psig)				Center-to-Face Dimensions (in.)	
				Inlet Flange (Set) Pressure Limit			Outlet Pressure Limit [a]		
Body	Inlet by Orifice by Outlet	Inlet	Outlet	–450 °F to –21 °F	–20 °F to 100 °F	500 °F	100 °F	Inlet	Outlet
Temperature Range, –20 °F to 500 °F									
Carbon Steel	8T10 8T10 8T10	150 300 600	150 150 150		285 740 (985)	170 605 (985)	285 285 285	10 7/8 10 7/8 11 11/16	11 11 11
Temperature Range, –450 °F to 500 °F									
Austenitic Stainless Steel	8T10 8T10 8T10	150 300 600	150 150 150	275 720 (950)	275 720 (950)	170 480 (950)	275 275 275	10 7/8 10 7/8 11 11/16	11 11 11
Temperature Range, –20 °F to 500 °F									
Nickel/Copper Alloy	8T10 8T10 8T10	150 300 600	150 150 150		230 600 (795)	170 475 (795)	230 230 230	10 7/8 10 7/8 11 11/16	11 11 11
Temperature Range, –20 °F to 300 °F									
Alloy 20 [c]	8T10 8T10 8T10	150 300 600	150 150 150		230 600 (795)	180 465 (795)	230 230 230	10 7/8 10 7/8 11 11/16	11 11 11

a Inlet and outlet flange pressure limits correspond to the values in ASME B16.34 unless enclosed in parentheses. A value that is shown in parentheses is less than that provided in ASME B16.34. The outlet flange values at 100 °F above are the limit for this standard. Inlet and outlet flange pressure values at other temperatures may only be interpolated using charts from Annex B or from tables in ASME B16.34, if these values do not exceed the values in parentheses or the outlet flange values at 100 °F above. Pressure changes within the temperature ranges above may not be linear. User is cautioned to review the outlet temperature for possible cryogenic applications and select the appropriate materials.

b Materials given are minimum requirements for the pressure and temperature ratings. Other suitable materials may be used, as required for the service involved.

c Materials limited to 300 °F. Pressure ratings indicated in the 500 °F column are limited to 300 °F.

d Restricted lift pressure-relief valves, as described in paragraph 7.7, may be specified. The valves supplied shall have a reduction in effective area and meet the restricted lift requirements per ASME Section VIII.

Annex A
(normative)

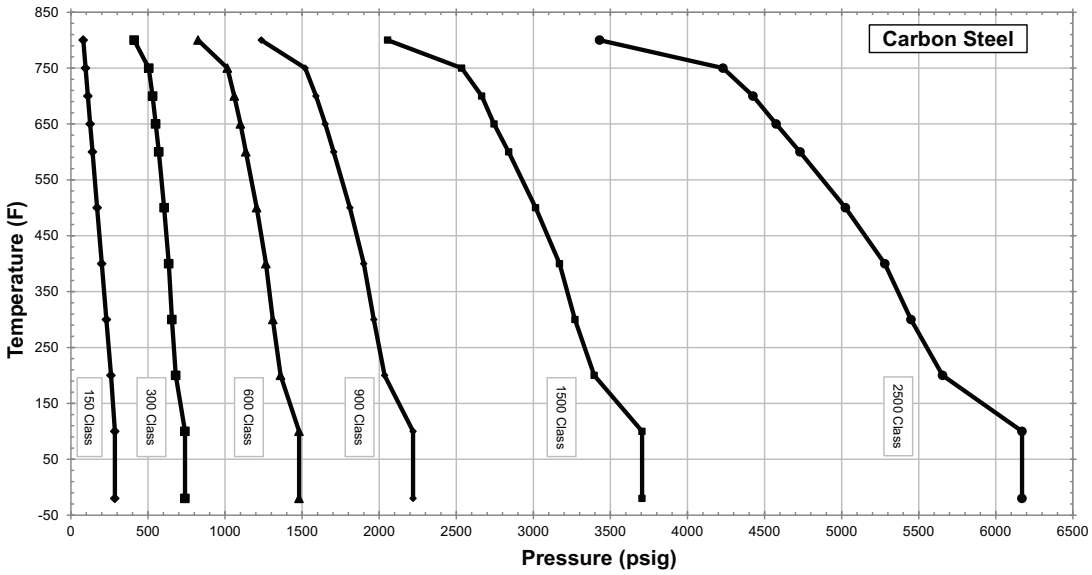
Pressure-relief Valve Nameplate Nomenclature

Table A.1—PRV Nameplate Nomenclature Table

Nomenclature	Description
Manufacturer's name or identifying trademark	Identification of manufacturer
Size	Nominal pipe size, inlet by outlet
Type, style, model, or figure no.	Manufacturer's designation
Orifice	Valve orifice size, standardized letter designations {for restricted lift orifice add “-RL” suffix (i.e. “P-RL”) or use the manufacturer's designation}
Capacity at 10 % overpressure	Pounds per hour of saturated steam, standard cubic feet per minute of air, at 60 °F and 14.7 psia or U.S. gallons per minute of water at 70 °F
Serial number or shop number	Manufacturer's identification
Set pressure, psig	Valve inlet pressure at which the pressure-relief valve is adjusted to open under service conditions
Back pressure, psig	Constant (e.g. 50 psig), variable (e.g. 0 psig to 50 psig)
Cold differential test pressure, psig	The pressure at which the pressure-relief valve is adjusted gauge (if applicable) to open on the test stand. The cold differential test pressure includes corrections to the set pressure for the service conditions of back pressure or temperature or both (see examples below)
Lift, inch, for restricted lift valves	See Section 7.7
Example 1—Conventional Valve	
Set pressure, psig	200
Back pressure, psig	Atmospheric (or 0)
Temperature, °F	400
Cold differential test pressure, psig	200 + manufacturer's recommended temperature correction
Example 2—Balanced Bellows Valve	
Set pressure, psig	200
Back pressure, psig	50, or 0 to 50
Temperature, °F	400
Cold differential test pressure, psig	200 + manufacturer's recommended temperature correction
Example 3—Conventional Valve	
Set pressure, psig	200
Back pressure, psig	50, constant superimposed
Temperature, °F	400
Cold differential test pressure, psig	200 – 50 + manufacturer's recommended temperature correction

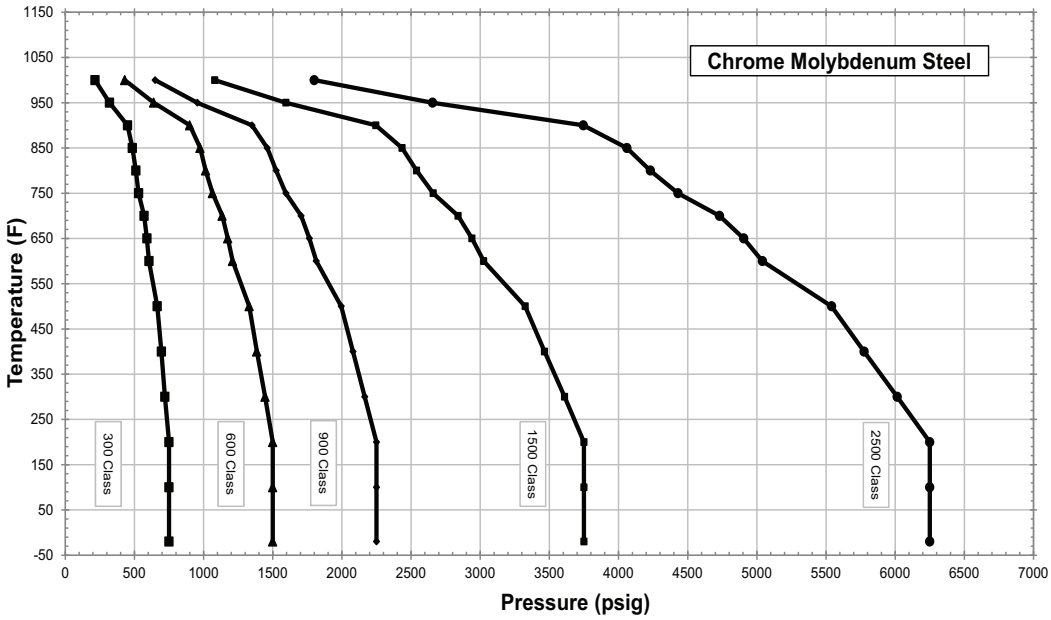
Annex B
(normative)

Pressure–temperature Rating Charts



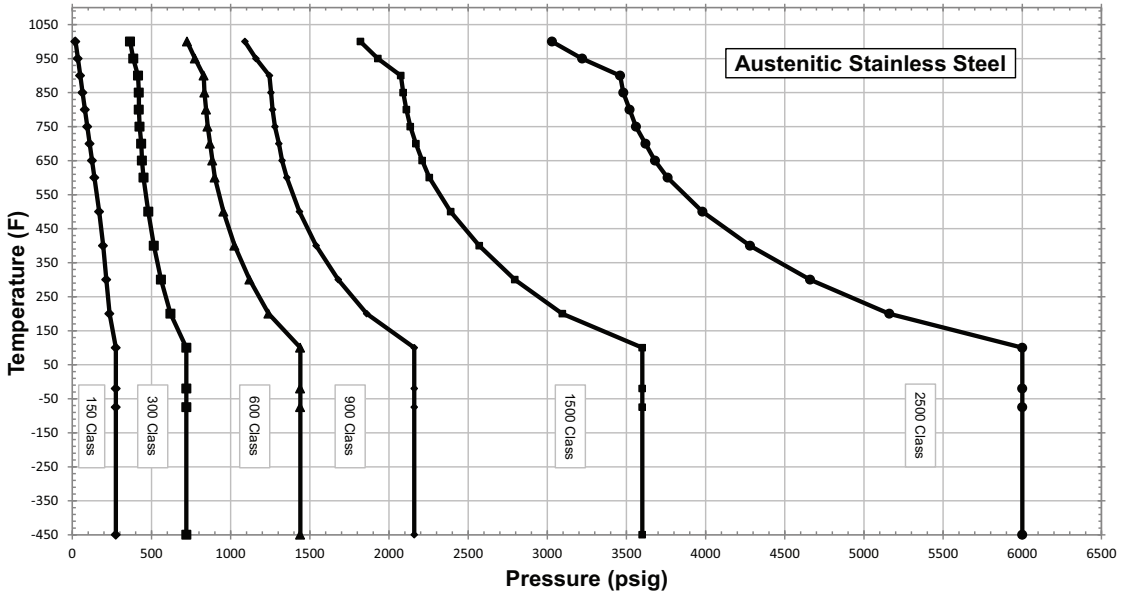
[1] Data derived from ASME B16.34-2013 Table VII-2-1.1. These values do not reflect the modifications made in Table 3 to Table 30 of this document. Printed with permission of The American Society of Mechanical Engineers. All rights reserved.

Figure B.1—Pressure–temperature Limits to be Used with Table 3 to Table 30 of This Standard



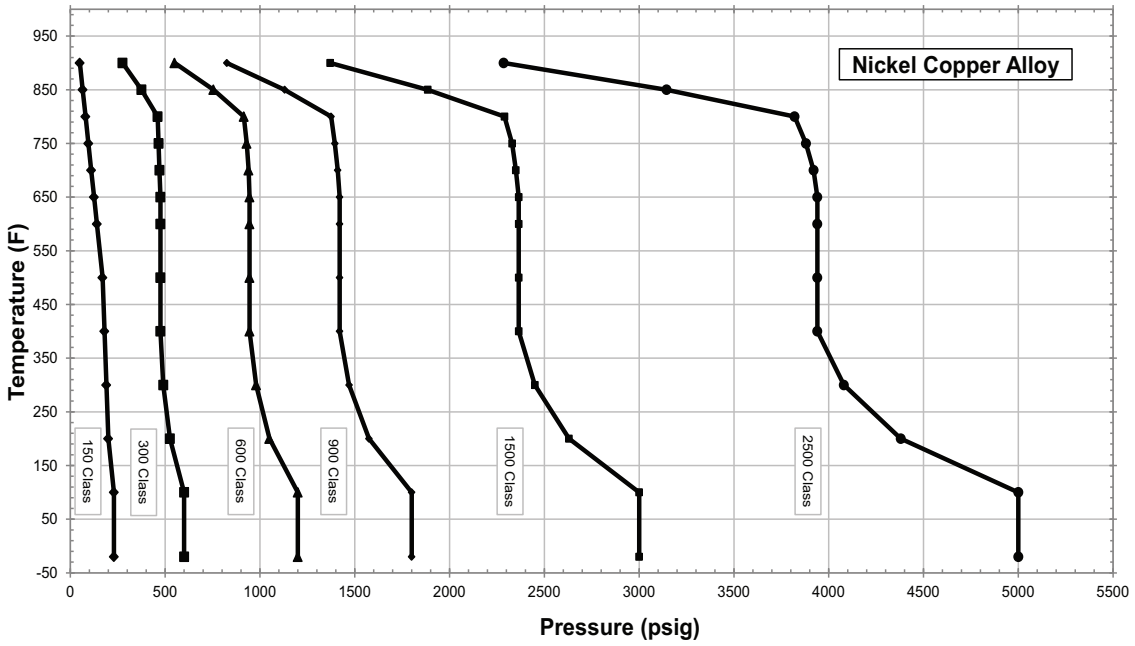
[1] Data derived from ASME B16.34-2013 Table VII-2-1.9. These values do not reflect the modifications made in Table 3 to Table 30 of this document. Printed with permission of The American Society of Mechanical Engineers. All rights reserved.

Figure B.2—Pressure–temperature Limits to be Used with Table 3 to Table 30 of This Standard



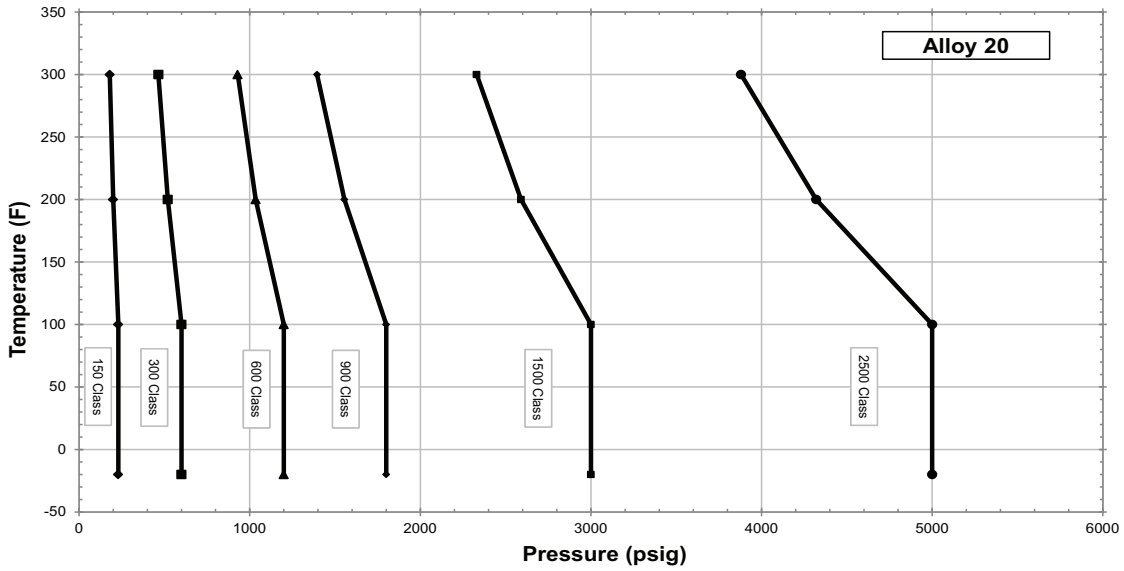
[1] Data derived from ASME B16.34-2013 Table VII-2-2.2. These values do not reflect the modifications made in Table 3 to Table 30 of this document. The Austenitic Stainless Steel figure has been extended down to -450 F. Printed with permission of The American Society of Mechanical Engineers. All rights reserved.

Figure B.3—Pressure–temperature Limits to be Used with Table 3 to Table 30 of This Standard



[1] Data derived from ASME B16.34-2013 Table VII-2-3.4. These values do not reflect the modifications made in Table 3 to Table 30 of this document. Printed with permission of The American Society of Mechanical Engineers. All rights reserved.

Figure B.4—Pressure–temperature Limits to be Used with Table 3 to Table 30 of This Standard



[1] Data derived from ASME B16.34-2013 Table VII-2-3.17. These values do not reflect the modifications made in Table 3 to Table 30 of this document. Printed with permission of The American Society of Mechanical Engineers. All rights reserved.

Figure B.5—Pressure–temperature Limits to be Used with Table 3 to Table 30 of This Standard

Annex C
(normative)

Bellows Pressure-temperature Requested Rating Factors

When the outlet pressure limit for the bellows is lower than the outlet pressure limit of the flange rating, it is the bellows that controls the suitability of the relief device for the specified backpressure and temperature.

The chart in this annex is to be used to modify the outlet pressure limit for spring-loaded bellows design pressure-relief valves for outlet temperatures other than 100 °F. This chart was prepared using data from ASME Section II, Part D.

The values of this chart are based on the bellows pressure rating being equal to the 100 °F rating of this standard. The pressure-relief valve manufacturer should be consulted for the actual pressure-temperature rating of the bellows.

The outlet pressure limit for spring-loaded bellows design pressure-relief valves is determined using the selected bellows design pressure-relief valve's outlet pressure limit, outlet temperature and bellows material as follows.

1) From the appropriate table for the selected valve (Table 3 through Table 16) note the "outlet pressure limit."

2) In the chart, locate the line for the bellows material.

3) Locate the outlet temperature on the x-axis and extend this point vertically to the intersection of the material chart line. At this intersection go horizontally to the y-axis and locate the factor.

4) Multiply the 100 °F outlet pressure limit by the factor from Item 3) above to determine the outlet pressure limit at the outlet temperature.

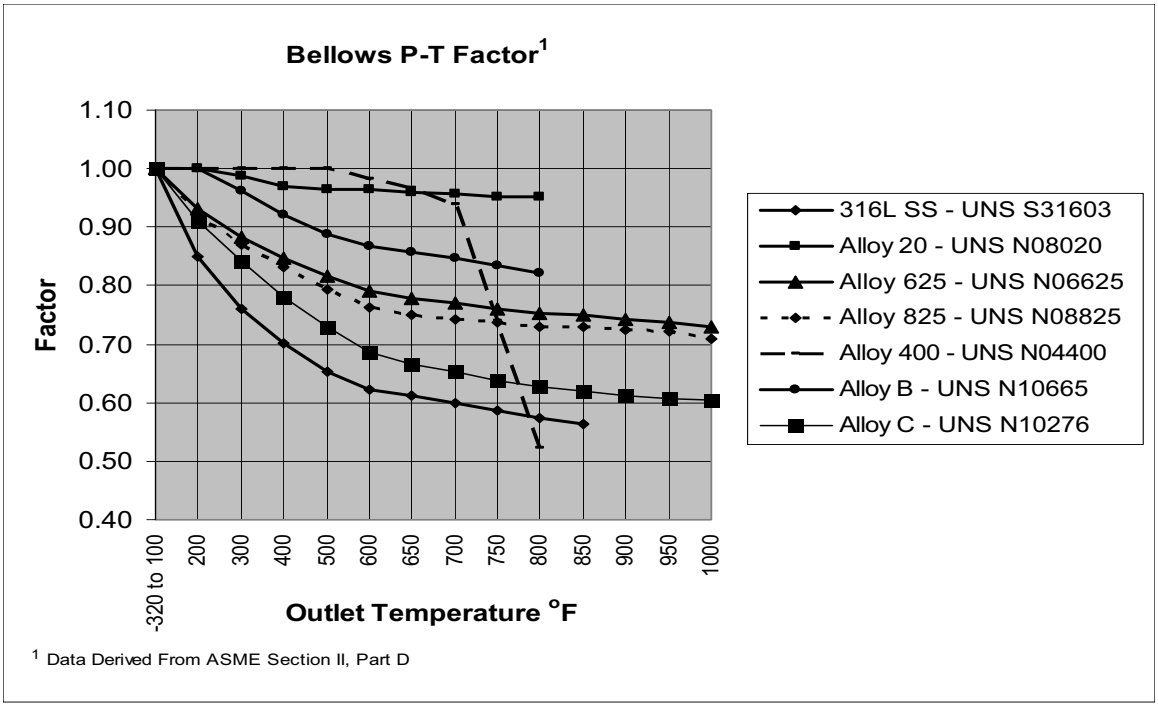


Figure C.1—Bellows Pressure-temperature Rating Factor

Annex D
(informative)

Valve Selection Examples

NOTE These examples were prepared to demonstrate the use of the charts of Annex B and Annex C. The values used in these examples may or may not be an example of an actual pressure-relief application.

EXAMPLE 1

Data:

Set Pressure: 600 psig
Back Pressure: 150 psig
Operating Temperature: 350 °F
Design Temperature: 450 °F
Outlet Temperature: 100 °F
Body/Bonnet Material: Carbon Steel
Orifice: F
Type: Bellows

Selection:

F Orifice: Use Table 5
Spring: Select Carbon Steel or Chrome Alloy Steel for –75 °F to 450 °F from Table 2
Valve Selection: Line 3, 1 1/2 F2 Class 300 Inlet x Class 150 Outlet (rated 615 psi @ 450 °F)
Bellows: Use Annex C, select any material (all materials are acceptable for 230 psi @ 100 °F)

EXAMPLE 2

Data:

Set Pressure: 60 psig
Total Back Pressure: 25 psig
Operating Temperature: 700 °F
Design Temperature: 850 °F
Outlet Temperature: 400 °F
Body/Bonnet Material: Chrome Molybdenum
Orifice: T
Type: Bellows, Alloy 625 Material

Selection:

T Orifice: Use Table 16
Spring: Select High Temperature Alloy Steel for 450°F to 1000 °F from Table 2
Valve Selection: 8T10 Class 300 Inlet x Class 150 Outlet (rated 120 psig @ 800 °F and 100 psig @ 1000 °F)
Bellows: Use Annex C (see example of Figure D.1)

1) Locate 400°F on outlet temperature axis;
2) move vertically to the intersection of the Alloy 625 curve;
3) from the intersection with the Alloy 625 curve, move horizontally and intersect the factor axis;
4) at the intersection with the factor axis, read the Bellows P–T Factor of 0.85;
5) bellows rating at 100 °F is 60 psig (see Table 16);

6) bellows rating at 400 °F 60 x 0.85 = 51.0 psig ≥ required 25 psig.

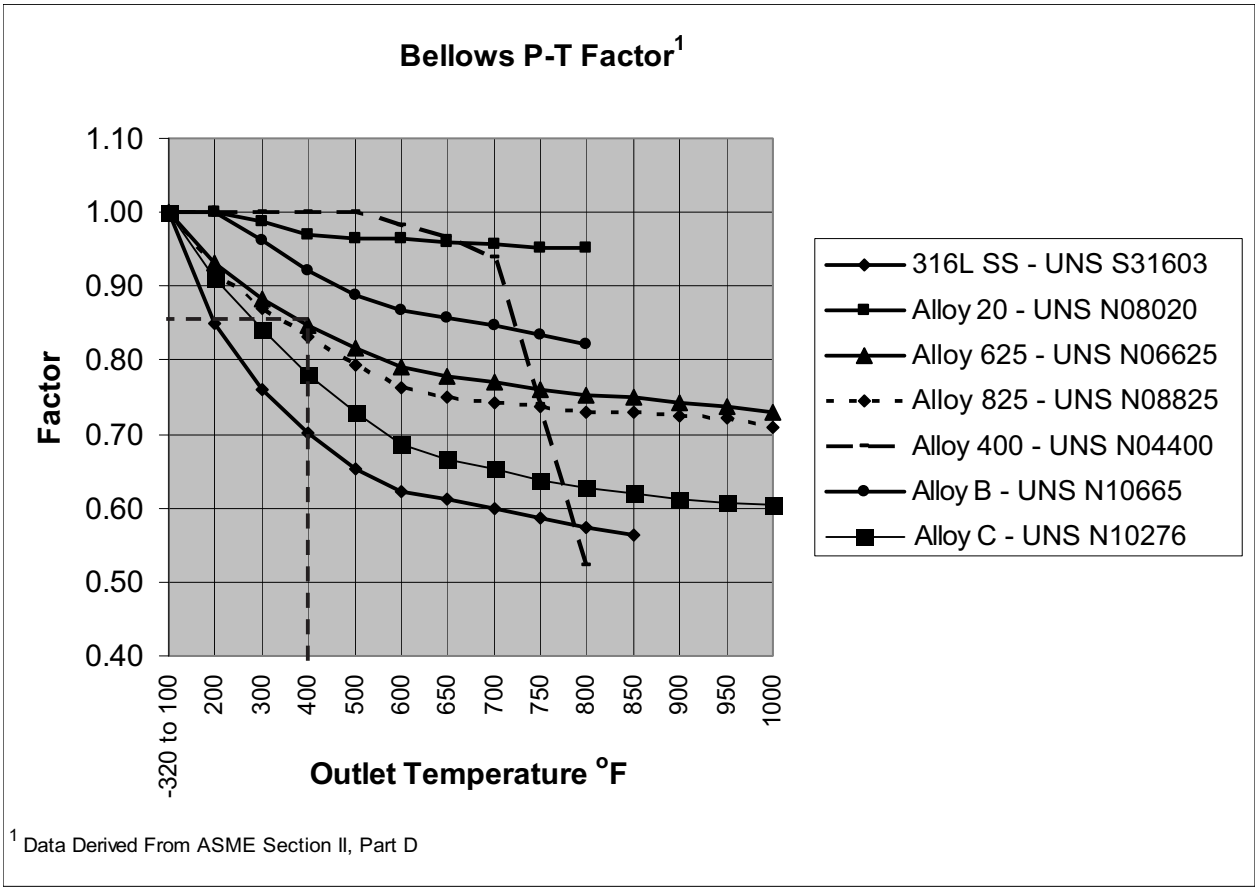


Figure D.1—Bellows Pressure–temperature Rating Factor for Example 2

EXAMPLE 3

Data:

Set Pressure: 1350 psig
Back Pressure: 25 psig
Operating Temperature: 700 °F
Design Temperature: 750 °F
Outlet Temperature: –250 °F
Body/Bonnet Material: Austenitic Stainless Steel
Orifice: F
Type: Conventional

Selection:

F Orifice: Use Table 5
Spring: Select Low Temperature Alloy Steel due to Outlet Temperature from Table 2
Valve Selection: 1 1/2 F3 Class 1500 Inlet Class 300 Outlet

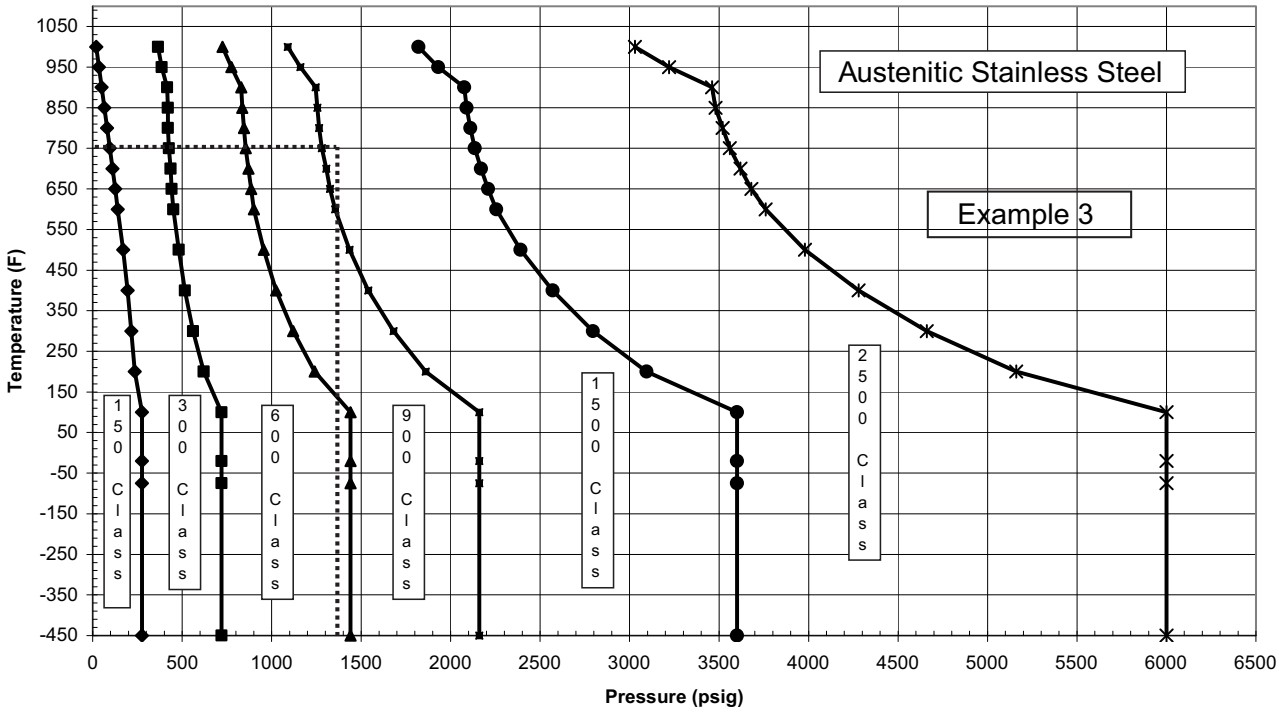
From Table 5 it cannot be determined if the 900 Class inlet is acceptable as the set pressure of 1350 psig exceeds the allowable pressure at 800 °F for austenitic stainless steel.

Referring the example of Figure D.2 below:

1) note that the set pressure (1350 psi) and temperature (750 °F) lies to the right of the 900 Class line;

2) therefore, the 1500 Class inlet is required. The user is advised to consult ASME B16.34 for more detailed pressure–temperature information.

Bellows: No selection required.



[1] Produced from data in ASME B16.34-2004, Table VII-2-2.2.

Figure D.2—Pressure–temperature Limits[1] for Example 3

Annex E
(informative)

Valve Selection Example: Restricted Lift

NOTE This example was prepared to demonstrate the use of the Restricted Lift option. The values used in this example may or may not be an example of an actual pressure-relief application.

Data:

Spring Operated Valve
Set Pressure: 600 psig
Back Pressure: 100 psig
Operating Temperature: 350 °F
Design Temperature: 450 °F
Outlet Temperature: 100 °F
Body/Bonnet Material: Carbon Steel
Orifice: Q
Size: 6 in. inlet × 8 in. outlet
Type: Bellows

Required capacity: 200,000 lbs/hr

In order to reduce the piping pressure losses, the user determines that the rated capacity shall be limited to a maximum value of 260,000 lbs/hr.

Selection:

Q Orifice: Use Table 14
Spring: Select Carbon Steel or Chrome Alloy Steel for −75 °F to 450 °F from Table 2
Valve Selection: Line 4, 6Q8 Class 600 Inlet × Class 150 Outlet (inlet rated 600 psi @ 450 °F)
Bellows: Use Annex C, select any material (all materials are acceptable for 100 psi @ 100 °F)

The following are specified on the datasheet:
- Orifice: Q-RL
- Required Capacity: 200,000 lbs/hr
- Maximum desired rated capacity (specified in the datasheet notes): 260,000 lbs/hr

The manufacturer stamps the nameplate to identify the reduced lift value and the rated capacity based on that reduced lift value. In this example, the nameplate is stamped with a rated capacity that is between 200,000 and 260,000 lbs/hr.

Bibliography

[1] ASME [1] *Boiler and Pressure Vessel Code* (*BPVC*), *Section II: Materials*

[2] ASME B16.34, *Valves—Flanged, Threaded, and Welding End*

[3] ASME B16.5, *Pipe Flanges and Flanged Fittings*

[4] NACE [2] MR 0103/ISO 17945, *Petroleum, petrochemical and natural gas industries – Metallic materials resistant to sulfide stress cracking in corrosive petroleum refining environments*

[5] NACE MR 0175/ISO 15156, *Petroleum and natural gas industries—Materials for use in H_2S-containing environments in oil and gas production*

[1] ASME International, 3 Park Avenue, New York, New York 10016, www.asme.org.

[2] NACE International (formerly the National Association of Corrosion Engineers), 1440 South Creek Drive, Houston, Texas 77218, www.nace.org.

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