

LIST OF MATERIAL SPECIFICATIONS
Applicable ASTM Specifications

GROUP 1 MATERIALS		NOMINAL DESIGNATION STEEL		FORGINGS		CASTINGS		PLATES		BARS & SHAPES		TUBULAR PRODUCTS	
MATERIAL GROUP NO.		SPEC.	GR	NOTES	SPEC.	GR	NOTES	SPEC.	GR	NOTES	SPEC.	GR	NOTES
1.1	Carbon	A105 A350-LF2		(1) (3)	A216-WCB		(1)	A515-70 A516-70	(1) (1)	A105 A350-LF2 A675-70	(1) (3) (1) (8)	A155-KCF70 A155-KCF70	
1.2	C-Mn Si Carbon				A216-WCC		(1)	A387-C1.1				A106-C	(1)
	2-1/2 Ni				A352-LC2			A203-B					
	3-1/2 Ni	A350-LF3			A352-LC3			A203-E		A350-LF3			
1.3	Carbon				A352-LCB			A515-65 A516-65	(1) (1)	A675-65	(1) (8)	A155-KCF65 A155-KCF65	
	2-1/2 Ni							A203-A					
	3-1/2 Ni							A203-D					
1.4	Carbon	A350-LF1						A515-60 A516-60	(1)	A675-60 A350-LF1	(1)	A106-B A155-KCF60 A155-KCF60	(1)
1.5	C-1/2 Mo	A182-F1		(2)	A217-WC1 A352-LC1		(2) (4)	A204-A A204-B	(2) (2)	A182-F1	(2)	A155-CM70	
1.6	C-1/2 Mo											A335-F1 A369-FP1	(2) (2)
	1/2 Cr-1/2 Mo							A387-2 C1.1 A387-2 C1.2				A155-1/2CR	
	1 Cr-1/2 Mo							A387-12 C1.1					
1.7	C-1/2 Mo	A182-F2						A204-C	(2)	A182-F2		A155-CM75	
	1/2 Cr-1/2 Mo				A217-WC4		(4)						
	Ni-Cr-1/2 Mo				A217-WC5		(4)						
1.8	1 Cr-1/2 Mo							A387-12 C1.2				A155-1 CR A335-P12 A369-FP12	(4)
	1-1/4 Cr-1/2 Mo							A387-11 C1.1				A155-1/4 CR A335-P11 A369-FP11	
	2-1/4 Cr-1 Mo							A387-22 C1.1				A155-2/4 CR A335-P22 A369-FP22	
1.9	1 Cr-1/2 Mo	A182-F12		(4)						A182-F12	(4)		
	1-1/4 Cr-1/2 Mo	A182-F11		(4)	A217-WC6		(4)	A387-11 C1.2		A182-F11	(4)		
1.10	2-1/4 Cr-1 Mo	A182-F22			A217-WC9		(4)	A387-22 C1.2		A182-F22			
1.11	3 Cr-1 Mo	A182-F21						A387-21 C1.2		A182-F21			
	Mn-1/2 Mo							A302-A & B A302-C & D	(2) (2)				
	Mn-Si							A537-C1.2					
1.12	5 Cr-1/2 Mo	A182-F5						A387-5 C1.1 A387-5 C1.2		A182-F5		A155-5 CR A335-P5 A369-FP5	
1.13	5 Cr-1/2 Mo	A182-F5a			A217-C5		(4)			A182-F5a			
1.14	9 Cr-1 Mo	A182-F9			A217-C12		(4)			A182-F9			

General Notes:
(a) Materials shall not be used beyond temperature limits specified in the governing Code.
(b) For temperature limitations, see footnotes in Tables 2 and in Annex G.

Notes:

- (1) Upon prolonged exposure to temperatures above about 800° F (425°C), the carbide phase of carbon steel may be converted to graphite.
- (2) Upon prolonged exposure to temperatures above about 875° F (470°C), the carbide phase of carbon-molybdenum steel may be converted to graphite.
- (3) Only killed steel shall be used above 850° F (455°C).
- (4) Use normalized and tempered material only.

LIST OF MATERIAL SPECIFICATIONS(Continued)
Applicable ASTM Specifications

GROUP 2 MATERIALS		FORGINGS		CASTINGS		PLATES		BARS & SHAPES		TUBULAR PRODUCTS	
MATERIAL GROUP NO.	NOMINAL DESIGNATION STEEL	SPEC. —GR	NOTES	SPEC. —GR	NOTES	SPEC. —GR	NOTES	SPEC. —GR	NOTES	SPEC. —GR	NOTES
2.1	18Cr-8Ni	A182-F304 A182-F304H	(5)			A240-304	(5) (7)	A182-F304 A182-F304H A479-304 A479-304H	(5) (5) (7)	A312-TP304 A312-TP304H A358-304 A376-TP304 A376-TP304H A430-FP304 A430-FP304H	(5) (5) (5) (5) (5)
	18Cr-8Ni			A351-CF3 A351-CF8 A351-CF3A A351-CF8A	(5)						
2.2	16Cr-12Ni-2Mo	A182-F316 A182-F316H	(5)			A240-316	(5) (7)	A182-F316 A182-F316H A479-316 A479-316H	(5) (5) (7)	A312-TP316 A312-TP316H A358-316 A376-TP316 A376-TP316H A430-FP316 A430-FP316H	(5) (5) (5) (5) (5) (7)
	18Cr-13Ni-3Mo					A240-317	(5) (7)			A312-TP317	(5)
2.3	18Cr-9Ni-2Mo			A351-CF8M A351-CF8M	(6)			A182-F304L A479-304L		A312-TP304L	
	16Cr-12Ni-2Mo	A182-F316L				A240-316L		A182-F316L A479-316L		A312-TP316L	
2.4	18Cr-10Ni-Ti	A182-F321 A182-F321H	(5)			A240-321 A240-321H	(5) (7)	A182-F321 A479-321 A182-F321H A479-321H	(5) (5) (7)	A312-TP321 A312-TP321H A358-321 A376-TP321 A376-TP321H A430-FP321 A430-FP321H	(5) (5) (5) (5) (5) (7)
	18Cr-10Ni-Cb	A182-F347 A182-F347H A182-F348 A182-F348H	(5) (5)	A351-CF8C	(5)	A240-347 A240-347H A240-348 A240-348H	(5) (7) (5) (7)	A182-F347 A182-F347H A182-F348 A182-F348H A479-347 A479-347H A479-348 A479-348H	(5) (5) (5) (7) (5) (7) (5) (7)	A312-TP347 A312-TP347H A358-347 A376-TP347 A376-TP347H A430-FP347 A430-FP347H A312-TP348 A312-TP348H A376-TP348 A376-TP348H	(5) (5) (5) (5) (5) (7) (5) (5) (5)
2.6	25Cr-12Ni			A351-CH8 A351-CH20	(5) (5)						
	25Cr-12Ni					A240-309S	(5) (7)			A312-TP309 A358-309	(5)
2.7	25Cr-20Ni	A182-F310	(5) (9)	A351-CK20	(5)	A240-310S	(5) (7)	A182-F310 A479-310S	(5) (9) (5) (7)	A312-TP310 A358-310	(5) (9) (5) (9)

General Notes:
(a) Materials shall not be used beyond temperature limits specified in the governing Code.
(b) For temperature limitations, see footnotes in Tables 2 and in Annex G.

Notes:

- (5) At temperatures over 1000° F (540°C), use only when the carbon is 0.04 percent or higher.
- (6) For temperatures above 800° F (425°C), use only when the carbon content is 0.04 percent and above.
- (7) For temperatures above 1000° F (540°C), use only if the material is heat treated by heating it to a minimum temperature of 1900° F (1040°C) and quenching in water or rapidly cooling by other means.
- (8) For service temperatures above 850° F (455°C), it is recommended that killed steels containing not less than 0.10 percent residual silicon be used.
- (9) For service temperatures of 1050° F (566°C) and above, assurance must be provided that grain size is not finer than ASTM No. 6.

RATINGS FOR GROUP 1.1 MATERIALS

A105^(a)

A515-70^(a)

A155-KC70^(e)

A350-LF2^(d)

A216-WCB^(a)

A516-70^{(a)(g)}

A155-KCF70^(e)

A537-C1.1^(d)

A675-70

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	19.6	51.1	68.1	102.1	153.2	255.3	425.5	765.8
		50	19.2	50.1	66.8	100.2	150.2	250.4	417.3	751.1
		100	17.7	46.4	61.8	92.8	139.1	231.9	386.5	695.7
		150	15.8	45.2	60.3	90.5	135.7	226.1	376.9	678.4
		200	14.0	43.8	58.4	87.6	131.5	219.1	365.2	657.3
		250	12.1	41.7	55.6	83.4	125.2	208.6	347.7	625.8
		300	10.2	38.7	51.6	77.5	116.2	193.7	322.8	581.0
		350	8.4	37.0	49.3	73.9	110.9	184.8	308.0	554.4
		375	7.4	36.5	48.6	72.9	109.4	182.3	303.9	547.0
		400	6.5	34.5	46.0	69.0	103.5	172.5	287.5	517.5
		425	5.6	28.8	38.3	57.5	86.3	143.8	239.6	431.4
		450	4.7	20.0	26.7	40.1	60.1	100.2	166.9	300.5
		475	3.7	13.5	18.1	27.1	40.6	67.7	112.9	203.2
		500	2.8	8.8	11.7	17.6	26.4	44.0	73.3	131.9
		525	1.9	5.2	6.9	10.4	15.5	25.9	43.2	77.7
		540	1.3	3.3	4.3	6.5	9.8	16.3	27.2	48.9

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		50	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		100	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		150	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		200	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		250	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		300	19.1	49.9	66.5	99.7	149.6	249.3	415.5	747.9
		350	18.4	48.1	64.2	96.3	144.4	240.6	401.1	721.9
		375	18.1	47.2	63.0	94.5	141.7	236.2	393.6	708.5
		400	16.5	43.1	57.5	86.3	129.4	215.6	359.4	646.9
		425	13.8	35.9	47.9	71.9	107.8	179.7	299.6	539.2
		450	9.6	25.0	33.4	50.1	75.1	125.2	208.7	375.6
		475	6.5	16.9	22.6	33.9	50.8	84.7	141.1	254.0
		500	4.2	11.0	14.7	22.0	33.0	55.0	91.6	164.9
		525	2.5	6.5	8.6	12.9	19.4	32.4	53.9	97.1
		540	1.6	4.1	5.4	8.2	12.2	20.4	34.0	61.2

Notes:

(a) — permissible, but not recommended for prolonged usage above about 425°C.

(d) — not to be used over 343°C.

(e) — not to be used over 372°C.

(g) — not to be used over 455°C.

RATINGS FOR GROUP 1.2 MATERIALS

A216-WCC^(a)
A208-B^(a)

A208-E^(a)
A106-C^(f)

A350-LF3^(d)

A352-LC2^(d)
A352-LC3^(d)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		50	19.2	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		100	17.7	51.5	68.7	103.1	154.6	257.7	429.5	773.2
	150		15.8	50.2	66.9	100.4	150.6	251.0	418.3	752.9
	200		14.0	48.8	65.0	97.6	146.4	243.9	406.6	731.8
	250		12.1	46.3	61.8	92.7	139.0	231.7	386.1	695.0
	300		10.2	42.4	56.6	84.9	127.3	212.1	353.5	636.4
	350		8.4	40.2	53.6	80.5	120.7	201.2	335.3	603.5
	375		7.4	38.8	51.7	77.6	116.4	194.0	323.4	582.1
	400		6.5	34.5	46.0	69.0	103.5	172.5	287.5	517.5
	425		5.6	28.8	38.3	57.5	86.3	143.8	239.6	431.4
	450		4.7	20.0	26.7	40.1	60.1	100.2	166.9	300.5
	475		3.7	13.5	18.1	27.1	40.6	67.7	112.9	203.2
	500		2.8	8.8	11.7	17.6	26.4	44.0	73.3	131.9
	525		1.9	5.2	6.9	10.4	15.5	25.9	43.2	77.7
	540		1.3	3.3	4.3	6.5	9.8	16.3	27.2	48.9

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		50	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
		100	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	150		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	200		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	250		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	300		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	350		19.6	51.1	68.1	102.2	153.3	255.4	425.7	766.3
	375		18.5	48.3	64.4	96.6	144.8	241.4	402.3	724.2
	400		16.5	43.1	57.5	86.3	129.4	215.6	359.4	646.9
	425		13.8	35.9	47.9	71.9	107.8	179.7	299.6	539.2
	450		9.6	25.0	33.4	50.1	75.1	125.2	208.7	375.6
	475		6.5	16.9	22.6	33.9	50.8	84.7	141.1	254.0
	500		4.2	11.0	14.7	22.0	33.0	55.0	91.6	164.9
	525		2.5	6.5	8.6	12.9	19.4	32.4	53.9	97.1
	540		1.6	4.1	5.4	8.2	12.2	20.4	34.0	61.2

Notes:

(a) — permissible, but not recommended for prolonged usage above about 425°C.

(d) — not to be used over 343°C.

(f) — not to be used over 425°C.

RATINGS FOR GROUP 1.3 MATERIALS

A352-LCB^(d)
A208-A^(a)

A515-65^(a)
A516-65^{(a)(g)}

A675-65^(a)
A155-KC65^(a)

A155-KCF65^(e)
A208-D^(a)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	18.4	47.9	63.8	95.7	143.6	239.4	398.9	718.1
		50	18.1	47.3	63.1	94.6	141.9	236.5	394.2	709.6
		100	17.3	45.1	60.1	90.2	135.3	225.5	375.9	676.6
		150	15.8	44.0	58.6	87.9	131.9	219.8	366.3	659.3
		200	14.0	42.7	56.9	85.4	128.0	213.4	355.6	640.1
		250	12.1	40.6	54.1	81.2	121.8	202.9	338.2	608.8
		300	10.2	37.7	50.3	75.4	113.1	188.5	314.2	565.5
		350	8.4	36.0	48.0	71.9	107.9	179.8	299.7	539.5
		375	7.4	35.3	47.1	70.6	105.9	176.6	294.3	529.7
		400	6.5	32.4	43.2	64.8	97.2	162.0	270.0	486.1
		425	5.6	27.3	36.4	54.6	81.9	136.5	227.5	409.4
		450	4.7	19.8	26.4	39.6	59.4	99.0	165.0	297.1
		475	3.7	13.5	18.1	27.1	40.6	67.7	112.9	203.2
		500	2.8	8.8	11.7	17.6	26.4	44.0	73.3	131.9
		525	1.9	5.2	6.9	10.4	15.5	25.9	43.2	77.7
		540	1.3	3.3	4.3	6.5	9.8	16.3	27.4	48.9

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		50	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		100	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		150	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		200	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		250	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		300	18.3	47.9	63.8	95.7	143.6	239.3	398.8	717.8
		350	17.9	46.7	62.2	93.3	140.0	233.3	388.8	699.8
		375	17.3	45.1	60.1	90.2	135.3	225.5	375.9	676.6
		400	15.5	40.5	54.0	81.0	121.5	202.5	337.5	607.6
		425	13.1	34.1	45.5	68.2	102.4	170.6	284.3	511.8
		450	9.5	24.8	33.0	49.5	74.3	123.8	206.3	371.3
		475	6.5	16.9	22.6	33.9	50.8	84.7	141.1	254.0
		500	4.2	11.0	14.7	22.0	33.0	55.0	91.6	164.9
		525	2.5	6.5	8.6	12.9	19.4	32.4	53.9	97.1
		540	1.6	4.1	5.4	8.2	12.2	20.4	34.0	61.2

Notes:

- (a) — permissible, but not recommended for prolonged usage above about 425°C.
- (d) — not to be used over 343°C.
- (e) — not to be used over 372°C.
- (g) — not to be used over 455°C.

RATINGS FOR GROUP 1.4 MATERIALS

A106-B^(a)
A155-KC60^(e)

A155-KCF60^(e)
A675-60^{(a)(g)}

A350-LF1^(d)

A515-60^(a)
A516-60^{(a)(g)}

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	—29 TO	38	16.3	42.5	56.7	85.1	127.6	212.7	354.6	638.2
		50	16.0	41.7	55.6	83.4	125.2	208.6	347.7	625.8
		100	14.8	38.6	51.5	77.2	115.8	193.1	321.8	579.2
	150	14.5	37.7	50.3	75.4	113.1	188.6	314.3	565.7	
	200	14.0	36.6	48.8	73.1	109.7	182.8	304.7	548.4	
	250	12.1	34.7	46.3	69.4	104.1	173.6	289.3	520.7	
	300	10.2	32.3	43.1	64.6	96.9	161.5	269.1	484.4	
	350	8.4	30.9	41.2	61.9	92.8	154.6	257.7	463.9	
375	7.4	30.9	41.2	61.7	92.6	154.3	257.2	463.0		
400	6.5	30.3	40.4	60.6	90.9	151.5	252.5	454.6		
425	5.6	25.8	34.4	51.6	77.4	128.9	214.9	386.8		
450	4.7	19.6	26.1	39.2	58.7	97.9	163.2	293.7		
475	3.7	13.5	18.1	27.1	40.6	67.7	112.9	203.2		
500	2.8	8.8	11.7	17.6	26.4	44.0	73.3	131.9		
525	1.9	5.2	6.9	10.4	15.5	25.9	43.2	77.7		
540	1.3	3.3	4.3	6.5	9.8	16.3	27.2	48.9		

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	—29 TO	38	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
		50	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
		100	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	150	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0	
		200	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
		250	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	300	16.1	41.9	55.9	83.9	125.8	209.7	349.5	629.1	
		350	15.4	40.2	53.6	80.4	120.5	200.9	334.9	602.7
375		15.2	39.7	52.9	79.3	119.0	198.3	330.4	594.8	
400	14.5	37.9	50.5	75.8	113.6	189.4	315.7	568.2		
	425	12.4	32.3	43.1	64.6	96.9	161.5	269.1	484.4	
	450	9.4	24.5	32.6	48.9	73.4	122.4	203.9	367.1	
475	6.5	16.9	22.6	33.9	50.8	84.7	141.1	254.0		
	500	4.2	11.0	14.7	22.0	33.0	55.0	91.6	164.9	
	525	2.5	6.5	8.6	12.9	19.4	32.4	53.9	97.1	
540	1.6	4.1	5.4	8.2	12.2	20.4	34.0	61.2		

Notes:

- (a) — permissible, but not recommended for prolonged usage above about 425°C.
- (d) — not to be used over 343°C.
- (e) — not to be used over 372°C.
- (g) — not to be used over 455°C.

RATINGS FOR GROUP 1.5 MATERIALS

A182-F1^(b)
A155-CM70^(e)

A204-A^(b)

A204-B^(b)

A217-WC1^(b)
A352-LC1^(d)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		50	18.3	47.6	63.5	95.3	142.9	238.2	397.1	714.7
		100	17.7	46.6	62.1	93.2	139.8	233.0	388.3	698.9
	150	15.8	45.0	59.9	89.9	134.9	224.8	374.6	674.3	
	200	14.0	44.2	58.9	88.4	132.6	221.0	368.3	662.9	
	250	12.1	43.1	57.4	86.2	129.2	215.4	359.0	646.1	
	300	10.2	42.0	56.0	84.1	126.1	210.1	350.2	630.4	
	350	8.4	40.2	53.6	80.5	120.7	201.1	335.2	603.5	
375	7.4	38.8	51.7	77.6	116.4	194.0	323.4	582.1		
400	6.5	36.6	48.8	73.2	109.8	182.9	304.9	548.8		
425	5.6	35.1	46.8	70.2	105.3	175.5	292.5	526.4		
450	4.7	33.8	45.1	67.6	101.4	169.0	281.7	507.1		
475	3.7	31.7	42.2	63.3	95.0	158.3	263.8	474.8		
500	2.8	24.1	32.1	48.1	72.2	120.3	200.6	361.1		
525	1.9	15.0	20.1	30.1	45.1	75.2	125.4	225.7		
540	1.3	10.7	14.3	21.4	32.1	53.5	89.2	160.6		

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		50	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
		100	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2
	150	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2	
	200	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2	
	250	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2	
	300	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2	
	350	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2	
375	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2		
400	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2		
425	18.4	47.9	63.8	95.8	143.6	239.4	399.0	718.2		
450	18.0	46.9	62.5	93.8	140.7	234.4	390.7	703.3		
475	16.1	42.1	56.1	84.2	126.3	210.5	350.9	631.6		
500	11.5	30.1	40.1	60.2	90.3	150.4	250.7	451.3		
525	7.2	18.8	25.1	37.6	56.4	94.0	156.7	282.1		
540	5.1	13.4	17.8	26.8	40.2	66.9	111.5	200.8		

Notes:

(b) — permissible, but not recommended for prolonged usage above about 455°C.

(d) — not to be used over 343°C.

(e) — not to be used over 372°C.

RATINGS FOR GROUP 1.6 MATERIALS

A155-1/2Cr^(h)

A385-P1^{(a)(h)}
A369-FP1^{(a)(h)}

A387-2C1.1^(h)
A387-2C1.2^(h)

A387-12C1.1^(c)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN°C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	—29 TO 38	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
	50	15.5	40.4	53.9	80.8	121.3	202.1	336.8	606.3
	100	15.3	39.9	53.3	79.9	119.8	199.7	332.9	599.2
	150	14.7	38.4	51.2	76.9	115.3	192.2	320.3	576.5
	200	14.0	37.9	50.6	75.9	113.8	189.6	316.0	568.9
	250	12.1	36.9	49.3	73.9	110.8	184.7	307.9	554.2
	300	10.2	36.0	48.0	72.1	108.1	180.1	300.2	540.4
	350	8.4	35.0	46.7	70.0	105.0	175.1	291.8	525.2
	375	7.4	34.4	45.9	68.9	103.3	172.2	286.9	516.5
	400	6.5	32.4	43.2	64.7	97.1	161.8	269.7	485.5
	425	5.6	31.7	42.3	63.5	95.2	158.6	264.4	475.9
	450	4.7	31.1	41.5	62.2	93.3	155.4	259.1	466.3
	475	3.7	29.9	39.9	59.9	89.8	149.6	249.4	448.9
	500	2.8	23.0	30.7	46.1	69.1	115.2	192.1	345.7
	525	1.9	15.0	20.1	30.1	45.1	75.2	125.4	225.7
	550	1.3 ★	10.5	14.0	21.0	31.5	52.6	87.6	157.8
	575	1.3 ★	8.5	11.3	17.0	25.5	42.5	70.8	127.4
	600	1.3 ★	5.9	7.8	11.8	17.6	29.4	49.0	88.2
	625	1.2 ★	3.4	4.5	6.8	10.1	16.9	28.2	50.7
	650	1.1 ★	2.3	3.1	4.6	7.0	11.6	19.3	34.8

* For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
		50	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
		100	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
	150	150	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
		200	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
		250	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
	300	300	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
		350	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
		375	15.5	40.5	54.0	81.0	121.5	202.5	337.4	607.4
	400	400	15.5	40.5	53.9	80.9	121.4	202.3	337.1	606.9
		425	15.2	39.7	52.9	79.3	119.0	198.3	330.5	594.9
		450	14.9	38.9	51.8	77.7	116.6	194.3	323.8	582.9
	475	475	14.3	37.4	49.9	74.8	112.2	187.0	311.7	561.1
		500	11.0	28.8	38.4	57.6	86.4	144.0	240.1	432.2
		525	7.2	18.8	25.1	37.6	56.4	94.0	156.7	282.1
	550	550	5.0	13.1	17.5	26.3	39.4	65.7	109.6	197.2
		575	4.1	10.6	14.2	21.2	31.9	53.1	88.5	159.3
		600	2.8	7.4	9.8	14.7	22.1	36.8	61.3	110.3
625	625	1.6	4.2	5.6	8.5	12.7	21.1	35.2	63.4	
	650	1.1	2.9	3.9	5.8	8.7	14.5	24.1	43.4	

Notes:

(a) — permissible, but not recommended for prolonged usage above about 425°C.

(c) — permissible, but not recommended for prolonged usage above about 593°C.

(h) — not to be used over 540°C.

RATINGS FOR GROUP 1.7 MATERIALS

A155—CM75^(e)

A182—F2^(h)

A204—C^(g)

A217—WC4^(h)

A217—WC5⁽ⁱ⁾

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	—29 TO									
	38		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50		19.2	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100		17.7	51.5	68.7	103.1	154.6	257.7	429.5	773.2
	150		15.8	50.2	66.9	100.4	150.6	251.0	418.3	752.9
	200		14.0	48.8	65.0	97.6	146.4	243.9	406.6	731.8
	250		12.1	46.3	61.8	92.7	139.0	231.7	386.1	695.0
	300		10.2	42.4	56.6	84.9	127.3	212.1	353.5	636.4
	350		8.4	40.2	53.6	80.5	120.7	201.2	335.3	603.5
	375		7.4	38.8	51.7	77.6	116.4	194.0	323.4	582.1
	400		6.5	36.6	48.8	73.2	109.8	182.9	304.9	548.8
	425		5.6	35.1	46.8	70.2	105.3	175.5	292.5	526.4
	450		4.7	33.8	45.1	67.6	101.4	169.0	281.7	507.1
	475		3.7	31.7	42.2	63.3	95.0	158.3	263.8	474.8
	500		2.8	27.1	36.1	54.1	81.2	135.3	225.4	405.8
	525		1.9	18.8	25.1	37.6	56.4	94.0	156.6	281.9
	550		1.3★	13.9	18.6	27.9	41.8	69.7	116.1	209.0
	575		1.3★	12.4	16.6	24.9	37.3	62.2	103.7	186.6

★For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	—29 TO									
	38		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	150		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	200		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	250		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	300		20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	350		19.6	51.1	68.1	102.2	153.3	255.4	425.7	766.3
	375		19.4	50.5	67.3	101.0	151.5	252.5	420.8	757.5
	400		19.3	50.2	67.0	100.4	150.7	251.1	418.5	753.3
	425		19.0	49.7	66.3	99.4	149.1	248.3	414.1	745.4
	450		18.1	47.2	62.9	94.3	141.5	235.9	393.1	707.6
	475		16.4	42.8	57.0	85.5	128.3	213.8	356.4	641.4
	500		13.0	33.8	45.1	67.6	101.4	169.1	281.8	507.2
	525		9.0	23.5	31.3	47.0	70.5	117.5	195.8	352.4
	550		6.7	17.4	23.2	34.8	52.2	87.1	145.1	261.2
	575		6.0	15.6	20.7	31.1	46.7	77.8	129.6	233.3

Notes:

(e) — not to be used over 372°C.

(g) — not to be used over 455°C.

(h) — not to be used over 540°C.

(i) — not to be used over 566°C.

RATINGS FOR GROUP 1.8 MATERIALS

A155-1Cr^(c)
A155-1-1/4Cr^(c)
A155-2-1/4Cr^(c)

A335-P11^(c)
A335-P12^(c)
A335-P22^(c)

A369-FP11^(c)
A369-FP12^(c)
A369-FP22^(c)

A387-11 C1.1^(c)
A387-12 C1.2^(c)
A387-22 C1.1^(c)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	-29 TO 38	16.3	42.5	56.7	85.1	127.6	212.7	354.6	638.2
	50	16.1	41.9	55.8	83.7	125.6	209.4	349.0	628.1
	100	15.1	39.3	52.4	78.6	117.9	196.4	327.4	589.3
	150	14.6	38.1	50.9	76.3	114.4	190.7	317.9	572.2
	200	14.0	37.2	49.7	74.5	111.7	186.2	310.4	558.7
	250	12.1	36.6	48.8	73.2	109.8	182.9	304.9	548.8
	300	10.2	35.7	47.7	71.5	107.2	178.7	297.9	536.2
	350	8.4	34.1	45.4	68.1	102.2	170.3	283.8	510.9
	375	7.4	33.1	44.1	66.2	99.2	165.4	275.7	496.2
	400	6.5	32.3	43.1	64.6	97.0	161.6	269.4	484.9
	425	5.6	31.8	42.4	63.6	95.4	159.1	265.1	477.2
	450	4.7	30.9	41.3	61.9	92.8	154.7	257.9	464.2
	475	3.7	30.2	40.2	60.3	90.5	150.8	251.3	452.3
	500	2.8	27.4	36.6	54.8	82.3	137.1	228.5	411.3
	525	1.9	20.3	27.0	40.5	60.8	101.3	168.9	304.0
	550	1.3★	12.8	17.0	25.5	38.3	63.8	106.4	191.5
	575	1.3★	8.5	11.3	17.0	25.5	42.5	70.8	127.4
	600	1.3★	5.9	7.8	11.8	17.6	29.4	49.0	88.2
	625	1.3★	3.4	4.5	6.8	10.1	16.9	28.2	50.7
	650	1.1★	2.3	3.1	4.6	7.0	11.6	19.3	34.8

* For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
SPECIAL CLASS	-29 TO 38	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	50	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	100	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	150	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	200	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	250	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	300	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	350	16.9	44.1	58.8	88.1	132.2	220.3	367.2	661.0
	375	16.5	43.1	57.4	86.1	129.2	215.4	358.9	646.1
	400	16.1	42.1	56.1	84.2	126.3	210.4	350.7	631.3
	425	15.9	41.4	55.2	82.8	124.3	207.1	345.2	621.4
	450	15.4	40.3	53.7	80.6	120.9	201.5	335.8	604.4
	475	15.0	39.1	52.1	78.2	117.2	195.4	325.6	586.1
	500	13.3	34.7	46.3	69.5	104.2	173.7	289.6	521.2
	525	9.7	25.3	33.8	50.7	76.0	126.7	211.1	380.0
	550	6.1	16.0	21.3	31.9	47.9	79.8	133.0	239.4
	575	4.1	10.6	14.2	21.2	31.9	53.1	88.5	159.3
	600	2.8	7.4	9.8	14.7	22.1	36.8	61.3	110.3
	625	1.6	4.2	5.6	8.5	12.7	21.1	35.2	63.4
	650	1.1	2.9	3.9	5.8	8.7	14.5	24.1	43.4

Note:

(c) — permissible, but not recommended for prolonged usage above about 593°C.

RATINGS FOR GROUP 1.9 MATERIALS

A387-11 Cl.2^(c)

A182-F11^(c)

A182-F12^(c)

A217-WC6^(j)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.1	258.6	431.0	775.7
	50	19.2	51.1	68.2	102.3	153.4	255.7	426.2	767.2
	100	17.7	48.8	65.0	97.5	146.3	243.8	406.4	731.5
	150	15.8	46.4	61.8	92.7	139.1	231.9	386.4	695.6
	200	14.0	45.5	60.6	91.0	136.4	227.4	379.0	682.2
	250	12.1	44.5	59.3	88.9	133.4	222.3	370.6	667.0
	300	10.2	42.4	56.6	84.9	127.3	212.1	353.5	636.4
	350	8.4	40.2	53.6	80.5	120.7	201.2	335.3	603.5
	375	7.4	38.8	51.7	77.6	116.4	194.0	323.4	582.1
	400	6.5	36.6	48.8	73.2	109.8	182.9	304.9	548.8
	425	5.6	35.1	46.8	70.2	105.3	175.5	292.5	526.4
	450	4.7	33.8	45.1	67.6	101.4	169.0	281.7	507.1
	475	3.7	31.7	42.2	63.3	95.0	158.3	263.8	474.8
	500	2.8	27.8	37.1	55.6	83.4	139.0	231.6	417.0
	525	1.9	20.3	27.0	40.5	60.8	101.3	168.9	304.0
	550	1.3 ★	12.8	17.0	25.5	38.3	63.8	106.4	191.5
	575	1.3 ★	8.5	11.3	17.0	25.5	42.5	70.8	127.4
	600	1.3 ★	5.9	7.8	11.8	17.6	29.4	49.0	88.2
	625	1.3 ★	3.4	4.5	6.8	10.1	16.9	28.2	50.7
	650	1.1 ★	2.3	3.1	4.6	7.0	11.6	19.3	34.8

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
SPECIAL CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	150	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	200	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	250	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	300	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	350	18.8	49.2	65.5	98.3	147.5	245.8	409.7	737.4
	375	18.1	47.3	63.1	94.7	142.0	236.7	394.5	710.1
	400	17.5	45.7	61.0	91.5	137.2	228.7	381.1	686.0
	425	16.8	43.9	58.5	87.7	131.6	219.3	365.6	658.0
	450	16.2	42.3	56.3	84.5	126.8	211.3	352.1	633.8
	475	15.2	39.6	52.8	79.1	118.7	197.8	329.7	593.5
	500	13.3	34.7	46.3	69.5	104.2	173.7	289.6	521.2
	525	9.7	25.3	33.8	50.7	76.0	126.7	211.1	380.0
	550	6.1	16.0	21.3	31.9	47.9	79.8	133.0	239.4
	575	4.1	10.6	14.2	21.2	31.9	53.1	88.5	159.3
	600	2.8	7.4	9.8	14.7	22.1	36.8	61.3	110.3
	625	1.6	4.2	5.6	8.5	12.7	21.1	35.2	63.4
	650	1.1	2.9	3.9	5.8	8.7	14.5	24.1	43.4

Notes:

(c) — permissible, but not recommended for prolonged usage above about 593°C.

(j) — not to be used over 593°C.

RATINGS FOR GROUP 1.10 MATERIALS

A387-22 C1.2^(c)

A182-F22^(c)

A217-WCs^(j)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN°C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.1	258.6	431.0	775.7
	50	19.2	51.2	68.3	102.4	153.6	256.0	426.7	768.1
	100	17.7	49.0	65.4	98.1	147.1	245.2	408.7	735.7
	150	15.8	46.6	62.2	93.3	139.9	233.2	388.6	699.5
	200	14.0	44.8	59.8	89.7	134.5	224.2	373.7	672.7
	250	12.1	44.2	59.0	88.4	132.7	221.1	368.5	663.4
	300	10.2	42.4	56.6	84.9	127.3	212.1	353.5	636.4
	350	8.4	40.2	53.6	80.5	120.7	201.2	335.3	603.5
	375	7.4	38.8	51.7	77.6	116.4	194.0	323.4	582.1
	400	6.5	36.6	48.8	73.2	109.8	182.9	304.9	548.8
	425	5.6	35.1	46.8	70.2	105.3	175.5	292.5	526.4
	450	4.7	33.8	45.1	67.6	101.4	169.0	281.7	507.1
	475	3.7	31.7	42.2	63.3	95.0	158.3	263.8	474.8
	500	2.8	27.8	37.1	55.6	83.4	139.0	231.6	417.0
	525	1.9	21.9	29.2	43.8	65.8	109.6	182.7	328.9
	550	1.3★	16.4	21.8	32.7	49.1	81.8	136.4	245.4
	575	1.3★	11.7	15.6	23.4	35.1	58.5	97.5	175.6
	600	1.3★	7.6	10.2	15.3	22.9	38.2	63.6	114.5
	625	1.3★	6.6	8.8	13.3	19.9	33.2	55.3	99.5
	650	1.3★	3.7	4.9	7.3	11.0	18.3	30.4	54.8

* For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

	TEMPERATURE IN°C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
SPECIAL CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	150	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	200	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	250	19.5	51.0	68.0	102.0	153.0	255.0	425.0	765.0
	300	19.5	50.8	67.8	101.7	152.5	254.2	423.6	762.6
	350	19.5	50.8	67.7	101.5	152.3	253.8	423.1	761.5
	375	19.4	50.5	67.3	101.0	151.5	252.5	420.8	757.5
	400	19.3	50.2	67.0	100.4	150.7	251.1	418.5	753.3
	425	19.0	49.7	66.3	99.4	149.1	248.3	414.1	745.4
	450	18.1	47.2	62.9	94.3	141.5	235.9	393.1	707.6
	475	16.4	42.8	57.0	85.5	128.3	213.8	356.4	641.4
	500	13.7	35.7	47.6	71.4	107.1	178.5	297.5	535.6
	525	10.5	27.4	36.5	54.8	82.2	137.0	228.4	411.1
	550	7.8	20.5	27.3	40.9	61.4	102.3	170.4	306.8
	575	5.6	14.6	19.5	29.3	43.9	73.2	121.9	219.5
	600	3.7	9.5	12.7	19.1	28.6	47.7	79.5	143.1
	625	3.2	8.3	11.1	16.6	24.9	41.4	69.1	124.3
	650	1.7	4.6	6.1	9.1	13.7	22.8	38.0	68.5

Notes:

(c) — permissible, but not recommended for prolonged usage above about 593°C.

(j) — not to be used over 593°C.

RATINGS FOR GROUP 1.11 MATERIALS

A 182-F21^(c)A 302-A^{(b)(h)}
A 302-B^{(b)(h)}A 302-C^{(b)(h)}
A 302-D^{(b)(h)}A 387-21 C 1.2^(c)
A 537-C 1.2^(d)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50	19.2	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100	17.7	51.5	68.7	103.1	154.6	257.7	429.5	773.2
	150	15.8	50.2	66.9	100.4	150.6	251.0	418.3	752.9
	200	14.0	48.8	65.0	97.6	146.4	243.9	406.6	731.8
	250	12.1	46.3	61.8	92.7	139.0	231.7	386.1	695.0
	300	10.2	42.4	56.6	84.9	127.3	212.1	353.5	636.4
	350	8.4	40.2	53.6	80.5	120.7	201.2	335.3	603.5
	375	7.4	38.8	51.7	77.6	116.4	194.0	323.4	582.1
	400	6.5	36.6	48.8	73.2	109.8	182.9	304.9	548.8
	425	5.6	35.1	46.8	70.2	105.3	175.5	292.5	526.4
	450	4.7	33.8	45.1	67.6	101.4	169.0	281.7	507.1
	475	3.7	30.6	40.9	61.3	91.9	153.2	255.4	459.7
	500	2.8	23.1	30.8	46.2	69.2	115.4	192.3	346.2
	525	1.9	16.3	21.7	32.5	48.8	81.3	135.5	244.0
	550	1.3 *	13.0	17.3	26.0	39.0	65.0	108.4	195.1
	575	1.3 *	11.8	15.7	23.6	35.4	59.0	98.3	177.0
	600	1.3 *	8.7	11.6	17.4	26.2	43.6	72.7	130.8
	625	1.3 *	6.0	8.0	12.0	18.0	29.9	49.9	89.8
	650	1.3 *	3.4	4.6	6.9	10.3	17.2	28.6	51.5

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
SPECIAL CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	150	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	200	20.0	51.5	68.7	103.1	154.6	257.7	429.6	773.2
	250	19.5	50.9	67.9	101.9	152.8	254.7	424.5	764.2
	300	19.5	50.8	67.8	101.7	152.5	254.2	423.6	762.6
	350	19.5	50.8	67.7	101.5	152.3	253.8	423.1	761.5
	375	19.4	50.5	67.3	101.0	151.5	252.5	420.8	757.5
	400	19.3	50.2	67.0	100.4	150.7	251.1	418.5	753.3
	425	19.0	49.7	66.3	99.4	149.1	248.3	414.1	745.4
	450	18.0	46.9	62.6	93.8	140.8	234.6	391.0	703.9
	475	14.7	38.3	51.1	76.6	114.9	191.6	319.3	574.7
	500	11.1	28.8	38.5	57.7	86.5	144.2	169.5	432.7
	525	7.8	20.3	27.1	40.7	61.0	101.7	135.5	305.0
	550	6.2	16.3	21.7	32.5	48.8	81.3	122.9	243.8
	575	5.6	14.7	19.7	29.5	44.2	73.7	122.9	221.2
	600	4.2	10.9	14.5	21.8	32.7	54.5	90.8	163.5
	625	2.9	7.5	10.0	15.0	22.5	37.4	62.4	112.3
	650	1.6	4.3	5.7	8.6	12.9	21.5	35.8	64.4

Notes:

(b) — permissible, but not recommended for prolonged usage above about 455°C.

(c) — permissible, but not recommended for prolonged usage above about 593°C.

(d) — not to be used over 348°C.

(h) — not to be used over 540°C.

RATINGS FOR GROUP 1.12 MATERIALS

A155-5 Cr

A182-F5
A369-FP5

A335-P5
A335-P5b

A387-5 C1.1
A387-5 C1.2

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	-29 TO 38	16.3	42.5	56.7	85.1	127.6	212.7	354.6	638.2
	50	16.0	41.7	55.6	83.4	125.2	208.6	347.7	625.8
	100	14.8	38.5	51.3	77.0	115.5	192.5	320.8	577.4
	150	14.1	36.7	48.9	73.4	110.1	183.6	305.9	550.7
	200	13.5	35.2	46.9	70.4	105.5	175.9	293.2	527.7
	250	12.1	33.9	45.2	67.8	101.6	169.4	282.3	508.2
	300	10.2	32.7	43.6	65.4	98.1	163.5	272.5	490.6
	350	8.4	31.6	42.2	63.3	94.9	158.2	263.7	474.6
	375	7.4	31.2	41.5	62.3	93.5	155.8	259.6	467.3
	400	6.5	30.8	41.0	61.5	92.3	153.8	256.3	461.3
	425	5.6	30.0	40.0	60.0	90.0	149.9	249.9	449.8
	450	4.7	28.6	38.2	57.2	85.9	143.1	238.5	429.4
	475	3.7	25.4	33.9	50.8	76.2	127.0	211.7	381.0
	500	2.8	20.3	27.0	40.5	60.8	101.3	168.9	304.0
	525	1.9	15.4	20.6	30.8	46.3	77.1	128.5	231.3
	550	1.3*	11.7	15.6	23.4	35.0	58.4	97.3	175.2
	575	1.3*	8.8	11.7	17.6	26.4	44.1	73.4	132.2
	600	1.3*	6.5	8.7	13.1	19.6	32.6	54.4	97.9
	625	1.3*	4.5	6.0	9.0	13.5	22.5	37.5	67.5
	650	1.3*	3.0	4.0	6.0	9.0	15.0	25.1	45.1

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
SPECIAL CLASS	-29 TO 38	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	50	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	100	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	150	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	200	17.0	44.3	59.1	88.7	133.0	221.7	369.5	665.0
	250	16.5	43.1	57.5	86.2	129.4	215.6	359.4	646.8
	300	16.0	41.8	55.7	83.6	125.4	209.0	348.3	626.9
	350	15.4	40.3	53.7	80.6	120.8	201.4	335.7	604.2
	375	15.1	39.5	52.6	79.0	118.4	197.4	329.0	592.2
	400	14.8	38.7	51.6	77.4	116.1	193.4	322.4	580.3
	425	14.5	37.9	50.5	75.8	113.7	189.4	315.7	568.3
	450	13.7	35.8	47.8	71.7	107.5	179.2	298.7	537.7
	475	12.2	31.7	42.3	63.5	95.2	158.7	264.6	476.2
	500	9.7	25.3	33.8	50.7	76.0	126.7	211.1	380.0
	525	7.4	19.3	25.7	38.5	57.8	96.4	160.6	289.1
	550	5.6	14.6	19.5	29.2	43.8	73.0	121.7	219.0
	575	4.2	11.0	14.7	22.0	33.0	55.1	91.8	165.2
	600	3.1	8.2	10.9	16.3	24.5	40.8	68.0	122.4
	625	2.2	5.6	7.5	11.2	16.9	28.1	46.8	84.3
	650	1.4	3.8	5.0	7.5	11.3	18.8	31.3	56.4

RATINGS FOR GROUP 1.13 MATERIALS

A182-F5a

A217-C5

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50	19.2	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100	17.7	51.5	68.7	103.1	154.6	257.7	429.5	773.2
	150	15.8	50.2	66.9	100.4	150.6	251.0	418.3	752.9
	200	14.0	48.8	65.0	97.6	146.4	243.9	406.6	731.8
	250	12.1	46.3	61.8	92.7	139.0	231.7	386.1	695.0
	300	10.2	42.4	56.6	84.9	127.3	212.1	353.5	636.4
	350	8.4	40.2	53.6	80.5	120.7	201.2	335.3	603.5
	375	7.4	38.8	51.7	77.6	116.4	194.0	323.4	582.1
	400	6.5	36.6	48.8	73.2	109.8	182.9	304.9	548.8
	425	5.6	34.5	46.0	69.0	103.5	172.5	287.5	517.5
	450	4.7	30.9	41.2	61.8	92.7	154.5	257.6	463.6
	475	3.7	25.9	34.5	51.8	77.7	129.5	215.8	388.4
	500	2.8	20.3	27.0	40.5	60.8	101.3	168.9	304.0
	525	1.9	15.4	20.6	30.8	46.3	77.1	128.5	231.3
	550	1.3★	11.7	15.6	23.4	35.0	58.4	97.3	175.2
	575	1.3★	8.8	11.7	17.6	26.4	44.1	73.4	132.2
	600	1.3★	6.5	8.7	13.1	19.6	32.6	54.4	97.9
	625	1.3★	4.5	6.0	9.0	13.5	22.5	37.5	67.5
	650	1.3★	3.0	4.0	6.0	9.0	15.0	25.1	45.1

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
SPECIAL CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	150	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	200	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	250	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	300	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	350	19.6	51.1	68.1	102.2	153.3	255.4	425.7	766.3
	375	19.4	50.5	67.3	101.0	151.5	252.5	420.8	757.5
	400	18.1	47.1	62.8	94.2	141.3	235.6	392.6	706.7
	425	16.5	43.1	57.5	86.2	129.4	215.6	359.4	646.8
	450	14.8	38.6	51.5	77.3	115.9	193.2	322.0	579.5
	475	12.4	32.4	43.2	64.7	97.1	161.8	269.7	485.5
	500	9.7	25.3	33.8	50.7	76.0	126.7	211.1	380.0
	525	7.4	19.3	25.7	38.5	57.8	96.4	160.6	289.1
	550	5.6	14.6	19.5	29.2	43.8	73.0	121.7	219.0
	575	4.2	11.0	14.7	22.0	33.0	55.1	91.8	165.2
	600	3.1	8.2	10.9	16.3	24.5	40.8	68.0	122.4
	625	2.2	5.6	7.5	11.2	16.9	28.1	46.8	84.3
	650	1.4	3.8	5.0	7.5	11.3	18.8	31.3	56.4

RATINGS FOR GROUP 1.14 MATERIALS

A182-F9

A217-C12

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50	19.2	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100	17.7	51.5	68.7	103.1	154.6	257.7	429.5	773.2
	150	15.8	50.2	66.9	100.4	150.6	251.0	418.3	752.9
	200	14.0	48.8	65.0	97.6	146.4	243.9	406.6	731.8
	250	12.1	46.3	61.8	92.7	139.0	231.7	386.1	695.0
	300	10.2	42.4	56.6	84.9	127.3	212.1	353.5	636.4
	350	8.4	40.2	53.6	80.5	120.7	201.2	335.3	603.5
	375	7.4	38.8	51.7	77.6	116.4	194.0	323.4	582.1
	400	6.5	36.6	48.8	73.2	109.8	182.9	304.9	548.8
	425	5.6	35.1	46.8	70.2	105.3	175.5	292.5	526.4
	450	4.7	33.8	45.1	67.6	101.4	169.0	281.7	507.1
	475	3.7	31.7	42.2	63.3	95.0	158.3	263.8	474.8
	500	2.8	27.5	36.7	55.0	82.5	137.5	229.1	412.4
	525	1.9	22.6	30.1	45.2	67.8	113.0	188.3	339.0
	550	1.3 ★	17.0	22.6	34.0	50.9	84.9	141.5	254.7
	575	1.3 ★	11.2	15.0	22.5	33.7	56.2	93.6	168.5
	600	1.3 ★	7.2	9.6	14.4	21.5	35.9	59.8	107.7
	625	1.3 ★	5.0	6.6	9.9	14.9	24.9	41.4	74.6
	650	1.3 ★	3.5	4.6	7.0	10.4	17.4	29.0	52.2

★ For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
SPECIAL CLASS	-29 TO 38	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	50	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	100	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	150	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	200	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	250	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	300	20.0	51.7	69.0	103.4	155.2	258.6	431.0	775.9
	350	19.6	51.1	68.1	102.2	153.3	255.4	425.7	766.3
	375	19.4	50.5	67.3	101.0	151.5	252.5	420.8	757.5
	400	19.3	50.2	67.0	100.4	150.7	251.1	418.5	753.3
	425	19.0	49.7	66.3	99.4	149.1	248.5	414.1	745.4
	450	17.9	46.6	62.1	93.2	139.8	233.0	388.4	699.1
	475	15.5	40.5	54.0	81.0	121.5	202.4	337.4	607.3
	500	13.2	34.4	45.8	68.7	103.1	171.8	286.4	515.5
	525	10.8	28.3	37.7	56.5	84.8	141.3	235.4	423.8
	550	8.1	21.2	28.3	42.4	63.7	106.1	176.8	318.3
	575	5.4	14.0	18.7	28.1	42.1	70.2	117.0	210.7
	600	3.4	9.0	12.0	17.9	26.9	44.9	74.8	134.6
	625	2.4	6.2	8.3	12.4	18.6	31.1	51.8	93.2
	650	1.7	4.4	5.8	8.7	13.1	21.8	36.3	65.3

RATINGS FOR GROUP 2.1 MATERIALS

A182—F304
A182—F304H

A240—304
A358—304

A351—CF3^(f)
A351—CF3A^(d)

A351—CF8
A351—CF8A^(d)

A479—304
A479—304H
A430—FP304
A430—FP304H

A312—TP304
A312—TP304H
A376—TP304
A376—TP304H

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
	150	300	400	600	900	1500	2500	4500
—29 TO 38	19.0	49.6	66.2	99.2	148.9	248.1	413.5	744.3
50	18.4	47.8	63.8	95.7	143.5	239.2	398.6	717.5
100	15.7	40.9	54.5	81.8	122.6	204.4	340.7	613.2
150	13.9	36.3	48.4	72.7	109.0	181.7	302.8	545.0
200	12.6	32.8	43.7	65.5	98.3	163.8	273.0	491.4
250	11.7	30.5	40.7	61.1	91.6	152.7	254.5	458.1
300	10.2	29.1	38.7	58.1	87.2	145.3	242.1	435.8
350	8.4	28.1	37.4	56.1	84.2	140.3	233.8	420.9
375	7.4	27.8	37.0	55.5	83.3	138.8	231.3	416.4
400	6.5	27.5	36.6	54.9	82.4	137.3	228.9	411.9
425	5.6	27.2	36.2	54.3	81.5	135.8	226.4	407.5
450	4.7	26.9	35.8	53.7	80.6	134.3	223.9	403.0
475	3.7	26.6	35.4	53.1	79.7	132.8	221.4	398.5
500	2.8	26.1	34.7	52.1	78.2	130.3	217.2	390.9
525	1.9	23.9	31.8	47.8	71.6	119.4	199.0	358.2
550	1.3 ★	21.8	29.1	43.6	65.4	109.1	181.8	327.2
575	1.3 ★	20.1	26.8	40.1	60.2	100.4	167.3	301.1
600	1.3 ★	16.7	22.3	33.4	50.1	83.6	139.3	250.7
625	1.3 ★	13.1	17.4	26.2	39.2	65.4	109.0	196.2
650	1.3 ★	10.5	14.0	21.0	31.6	52.6	87.6	157.8
675	1.3 ★	7.8	10.3	15.5	23.3	38.8	64.6	116.3
700	1.3 ★	6.0	8.0	12.0	17.9	29.9	49.8	89.7
725	1.3 ★	4.6	6.2	9.3	13.9	23.1	38.5	69.4
750	1.3 ★	3.7	4.9	7.3	11.0	18.3	30.4	54.8
775	1.3 ★	2.8	3.7	5.6	8.4	14.0	23.3	42.0
800	1.0 ★	2.1	2.7	4.1	6.2	10.3	17.1	30.8

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
	150	300	400	600	900	1500	2500	4500
—29 TO 38	20.0	51.7	68.9	103.4	155.1	258.5	430.8	775.5
50	19.3	50.4	67.1	100.7	151.1	251.8	419.7	755.4
100	17.2	44.9	59.9	89.8	134.7	224.6	374.3	673.7
150	15.5	40.4	53.9	80.8	121.2	202.0	336.7	606.1
200	14.0	36.4	48.6	72.8	109.2	182.1	303.4	546.2
250	13.1	34.1	45.4	68.1	102.2	170.3	283.8	510.9
300	12.4	32.4	43.2	64.8	97.2	162.0	270.0	486.0
350	12.0	31.3	41.7	62.5	93.8	156.3	260.5	468.9
375	11.9	31.0	41.3	62.0	92.9	154.9	258.2	464.7
400	11.7	30.6	40.9	61.3	91.9	153.2	255.4	459.7
425	11.6	30.2	40.2	60.4	90.5	150.9	251.5	452.7
450	11.5	29.9	39.9	59.8	89.7	149.5	249.2	448.5
475	11.4	29.6	39.5	59.3	88.9	148.2	246.9	444.5
500	11.1	29.0	38.7	58.0	87.0	144.9	241.6	434.8
525	10.8	28.2	37.6	56.4	84.6	141.0	234.9	422.9
550	10.5	27.3	36.4	54.5	81.8	136.3	227.2	408.9
575	9.6	25.1	33.5	50.2	75.3	125.5	209.1	376.4
600	8.0	20.9	27.9	41.8	62.7	104.5	174.1	313.4
625	6.3	16.4	21.8	32.7	49.1	81.8	136.3	245.3
650	5.0	13.1	17.5	26.3	39.4	65.7	109.6	197.2
675	3.7	9.7	12.9	19.4	29.1	48.4	80.7	145.3
700	2.9	7.5	10.0	14.9	22.4	37.4	62.3	112.1
725	2.2	5.8	7.7	11.6	17.3	28.9	48.2	86.7
750	1.7	4.6	6.1	9.1	13.7	22.8	38.0	68.5
775	1.3	3.5	4.7	7.0	10.5	17.5	29.2	52.5
800	1.0	2.6	3.4	5.1	7.7	12.8	21.4	38.5

Notes:

(d) — not to be used over 343°C.

(f) — not to be used over 425°C.

RATINGS FOR GROUP 2.2 MATERIALS

A351-CF8M(g)
A351-CF8M

A182-F316
A182-F316H
A479-316H

A240-316
A240-317
A358-316

A479-316
A312-TP316
A312-TP316H
A312-TP317

A376-TP316
A376-TP316H
A430-FP316
A430-FP316H

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO									
	38		19.0	49.6	66.2	99.3	148.9	248.1	413.6	744.4
	50		18.4	48.1	64.2	96.3	144.4	240.6	401.0	721.9
	100		16.2	42.2	56.3	84.4	126.6	211.0	351.7	633.1
	150		14.8	38.5	51.3	77.0	115.5	192.5	320.9	577.5
	200		13.7	35.7	47.6	71.3	107.0	178.4	297.3	535.1
	250		12.1	33.4	44.5	66.8	100.2	166.9	278.2	500.8
	300		10.2	31.6	42.2	63.3	94.9	158.1	263.6	474.4
	350		8.4	30.4	40.6	60.8	91.3	152.1	253.8	456.3
	375		7.4	29.7	39.6	59.4	89.1	148.5	247.5	445.5
	400		6.5	29.1	38.8	58.2	87.3	145.6	242.6	436.7
	425		5.6	28.7	38.2	57.3	86.0	143.3	238.9	430.0
	450		4.7	28.1	37.4	56.2	84.2	140.4	234.0	421.2
	475		3.7	27.4	36.5	54.7	82.1	136.8	228.0	410.4
	500		2.8	26.8	35.8	53.7	80.5	134.1	223.6	402.4
	525		1.9	26.3	35.1	52.6	78.9	131.5	219.1	394.4
	550	1.3 *		25.0	33.3	49.9	74.9	124.8	208.0	374.4
	575	1.3 *		24.1	32.1	48.2	72.3	120.5	200.8	361.5
	600	1.3 *		21.4	28.6	42.9	64.3	107.2	178.6	321.5
	625	1.3 *		18.3	24.3	36.5	54.8	91.3	152.1	273.8
	650	1.3 *		14.1	18.8	28.2	42.4	70.6	117.1	211.8
	675	1.3 *		12.6	16.8	25.3	37.9	63.2	105.3	181.5
	700	1.3 *		9.9	13.3	19.9	29.8	49.7	82.9	149.2
	725	1.3 *		7.7	10.3	15.4	23.1	38.5	64.2	115.6
	750	1.3 *		5.9	7.8	11.0	17.6	29.4	49.0	88.2
	775	1.3 *		4.6	6.1	9.1	13.7	22.8	38.0	68.5
	800	1.0 *		3.5	4.7	7.0	10.5	17.5	29.2	52.5

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO									
	38		19.8	51.7	68.9	103.4	155.1	258.5	430.9	775.6
	50		19.4	50.7	67.6	101.4	152.1	253.4	422.4	760.3
	100		17.8	46.4	61.9	92.8	139.2	232.0	386.6	695.9
	150		16.1	41.9	55.9	83.9	125.8	209.6	349.4	628.9
	200		15.2	39.6	52.8	79.2	118.8	198.0	330.1	594.1
	250		14.2	37.1	49.5	74.3	111.4	185.6	309.4	556.9
	300		13.5	35.3	47.0	70.5	105.8	176.3	293.9	529.0
	350		13.0	33.8	45.1	67.7	101.5	169.2	282.1	507.7
	375		12.7	33.1	44.2	66.3	99.4	165.7	276.2	497.2
	400		12.5	32.5	43.3	65.0	97.5	162.5	270.8	487.4
	425		12.3	32.0	42.7	64.0	96.0	160.0	266.6	479.9
	450		12.0	31.3	41.8	62.7	94.0	156.7	261.2	470.1
	475		11.7	30.5	40.7	61.1	91.6	152.7	254.5	458.0
	500		11.5	29.9	39.9	59.9	89.8	149.7	249.5	449.1
	525		11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
	550		11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
	575		11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
	600		10.3	26.8	35.7	53.6	80.4	134.0	223.3	401.9
	625	8.1		22.8	30.4	45.6	68.5	114.1	190.1	342.3
	650	6.8		17.7	23.5	35.3	53.0	88.3	147.1	264.8
	675	6.1		15.8	21.1	31.6	46.9	78.9	131.6	236.8
	700	4.8		12.4	16.6	24.9	37.3	62.2	103.6	186.6
	725	3.7		9.6	12.8	19.3	28.9	48.2	80.3	144.5
	750	2.8		7.4	9.8	14.7	22.1	36.8	61.3	110.3
	775	2.2		5.7	7.6	11.4	17.1	28.5	47.5	85.6
	800	1.7		4.4	5.8	8.7	13.1	21.9	36.5	65.6

Note:

(g) - not to be used over 455°C.

RATINGS FOR GROUP 2.3 MATERIALS

A182—F316L
A182—F304L^(f)

A240—316L
A240—304L^(f)

A479—316L
A479—304L^(f)

A312—TP316L
A312—TP304L^(f)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	—29 TO	38	15.9	41.4	55.1	82.7	124.1	206.8	344.6	620.3
		50	15.3	40.0	53.3	79.9	119.9	199.8	333.0	599.4
		100	13.2	34.5	46.0	69.0	103.5	172.4	287.4	517.3
	150	12.0	31.2	41.6	62.5	93.7	156.1	260.2	468.4	
	200	11.0	28.7	38.3	57.4	86.1	143.5	239.1	430.4	
	250	10.2	26.7	35.6	53.4	80.1	133.5	222.5	400.6	
	300	9.7	25.2	33.7	50.5	75.7	126.2	210.4	378.7	
	350	8.4	24.0	32.1	48.1	72.1	120.2	200.4	360.7	
375	7.4	23.6	31.5	47.2	70.8	118.0	196.7	354.0		
400	6.5	23.2	30.9	46.3	69.5	115.8	192.9	347.3		
425	5.6	22.7	30.3	45.4	68.1	113.5	189.2	340.6		
450	4.7	22.3	29.7	44.5	66.8	111.3	185.5	333.9		

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS*	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	—29 TO	38	17.7	46.1	61.4	92.2	138.2	230.4	384.0	691.2
		50	17.1	44.5	59.4	89.1	133.6	222.7	371.2	668.1
		100	14.8	38.5	51.3	77.0	115.5	192.4	320.7	577.3
	150	13.3	34.8	46.4	69.6	104.4	174.1	290.1	522.2	
	200	12.3	32.0	42.7	64.0	96.1	160.1	266.8	480.3	
	250	11.4	29.8	39.7	59.6	89.4	149.0	248.4	447.1	
	300	10.8	28.2	37.6	56.4	84.5	140.9	234.8	422.6	
	350	10.3	26.8	35.7	53.5	80.3	133.8	223.0	401.3	
375	10.1	26.2	35.0	52.4	78.7	131.1	218.5	393.3		
400	9.9	25.7	34.3	51.4	77.1	128.5	214.2	385.5		
425	9.7	25.3	33.8	50.7	76.0	126.7	211.1	380.0		
450	9.5	24.8	33.1	49.7	74.5	124.2	207.0	372.6		

Note:

(f) — not to be used over 425°C.

RATINGS FOR GROUP 2.4 MATERIALS

A182—F321^(h)
A182—F321H
A479—321H

A240—321^(h)
A240—321H
A479—321^(h)
A358—321^(h)

A312—TP321^(h)
A312—TP321H

A376—TP321^(h)
A376—TP321H
A430—FP321^(h)
A430—FP321H

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	—29 TO	38	19.0	49.6	66.2	99.2	148.9	248.1	413.5	744.4
		50	18.4	48.0	64.0	96.0	143.9	239.9	399.8	719.7
		100	15.9	41.5	55.3	83.0	124.5	207.5	345.9	622.6
		150	14.4	37.5	50.0	75.0	112.5	187.5	312.5	562.5
		200	13.2	34.4	45.8	68.7	103.1	171.9	286.5	515.6
		250	12.1	32.1	42.7	64.1	96.2	160.3	267.2	480.9
		300	10.2	30.5	40.7	61.1	91.6	152.7	254.5	458.1
		350	8.4	29.3	39.1	58.7	88.0	146.7	244.5	440.1
		375	7.4	28.9	38.6	57.8	86.8	144.6	241.0	433.8
		400	6.5	28.6	38.2	57.3	85.9	143.1	238.6	429.4
		425	5.6	28.5	38.0	57.0	85.4	142.4	237.3	427.2
		450	4.7	28.2	37.6	56.4	84.6	141.0	234.9	422.9
		475	3.7	28.0	37.4	56.0	84.0	140.1	233.5	420.2
		500	2.8	27.8	37.1	55.6	83.4	139.0	231.6	417.0
		525	1.9	26.1	34.8	52.1	78.2	130.4	217.3	391.1
		550	1.3 ★	25.0	33.3	49.9	74.9	124.8	208.0	374.4
		575	1.3 ★	22.8	30.4	45.6	68.4	113.9	189.9	341.8
		600	1.3 ★	19.8	26.4	39.6	59.4	99.0	165.1	297.1
	625	1.3 ★	15.8	21.1	31.6	47.4	79.0	131.6	236.9	
	650	1.3 ★	12.5	16.6	25.0	37.4	62.4	104.0	187.2	
	675	1.3 ★	9.8	13.1	19.7	29.5	49.2	81.9	147.5	
	700	1.3 ★	7.7	10.2	15.4	23.0	38.4	64.0	115.2	
	725	1.3 ★	6.2	8.3	12.4	18.6	31.0	51.6	92.9	
	750	1.3 ★	4.8	6.4	9.6	14.4	24.0	40.0	72.0	
	775	1.3 ★	3.8	5.0	7.5	11.3	18.8	31.3	56.4	
	800	1.0 ★	3.0	4.0	6.1	9.1	15.2	25.2	45.4	

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN°C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	—29 TO	38	20.0	51.7	68.9	103.4	155.1	258.5	430.9	775.6
		50	19.4	50.7	67.6	101.3	152.0	253.3	422.2	760.0
		100	17.7	46.3	61.7	92.6	138.9	231.5	385.8	694.4
	150	15.9	41.6	55.5	83.2	124.8	208.0	346.7	624.0	
	200	14.7	38.3	51.1	76.7	115.0	191.7	319.5	575.2	
	250	13.7	35.8	47.7	71.6	107.3	178.9	298.2	536.7	
	300	13.0	33.9	45.2	67.9	101.8	169.6	282.7	508.9	
	350	12.5	32.7	43.6	65.3	98.0	163.3	272.2	490.0	
375	12.3	32.2	42.9	64.4	96.5	160.9	268.1	482.6		
400	12.2	31.9	42.5	63.8	95.7	159.5	265.9	478.6		
425	12.1	31.6	42.2	63.3	94.9	158.2	263.7	474.7		
450	12.0	31.4	41.8	62.8	94.1	156.9	261.5	470.7		
475	12.0	31.2	41.7	62.5	93.7	156.2	260.4	468.7		
500	11.9	31.1	41.5	62.2	93.3	155.5	259.2	466.5		
525	11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2		
550	11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2		
575	10.9	28.5	38.0	57.0	85.5	142.4	237.4	427.3		
600	9.5	24.8	33.0	49.5	74.3	123.8	206.4	371.4		
625	7.6	19.7	26.3	39.5	59.2	98.7	164.5	296.1		
650	6.0	15.6	20.8	31.2	46.8	78.0	130.0	234.0		
675	4.7	12.3	16.4	24.6	36.9	61.5	102.4	184.4		
700	3.7	9.6	12.8	19.2	28.8	48.0	80.0	144.0		
725	3.0	7.7	10.3	15.5	23.2	38.7	64.5	116.1		
750	2.3	6.0	8.0	12.0	18.0	30.0	50.0	90.0		
775	1.8	4.7	6.3	9.4	14.1	23.5	39.1	70.5		
800	1.4	3.8	5.0	7.6	11.3	18.9	31.5	56.7		

Note:

(h) — not to be used over 540°C

RATINGS FOR GROUP 2.5 MATERIALS

A182-F347^(h)
A182-F347H
A182-F348^(h)
A182-F348H

A351-CF8C
A358-347
A240-347^(h)
A240-347H
A240-348^(h)
A240-348H

A479-347^(h)
A479-348
A312-TP347^(h)
A312-TP347H

A376-TP347^(h)
A376-TP347H
A430-FP347^(h)
A430-FP347H
A479-347H

A312-TP348^(h)
A312-TP348H
A376-TP348^(h)
A376-TP348H
A479-348H

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

STANDARD CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	19.0	49.6	66.2	99.3	148.9	248.2	413.6	744.5
		50	18.5	48.4	64.5	96.8	145.1	241.9	403.2	725.7
		100	16.7	43.5	58.0	86.9	130.4	217.3	362.2	652.0
	150		15.5	40.5	54.0	81.0	121.5	202.5	337.5	607.6
	200		14.0	38.4	51.2	76.8	115.3	192.1	320.2	576.3
	250		12.1	36.2	48.3	72.4	108.6	181.0	301.7	543.0
	300		10.2	34.4	45.9	68.9	103.3	172.2	287.0	516.6
	350		8.4	32.9	43.9	65.8	98.7	164.5	274.2	493.6
	375		7.4	32.2	42.9	64.4	96.6	161.0	268.4	483.1
	400		6.5	31.8	42.4	63.5	95.3	158.8	264.7	476.5
	425		5.6	31.5	42.0	62.9	94.4	157.3	262.2	472.0
	450		4.7	30.8	41.0	61.5	92.3	153.8	256.3	461.3
	475		3.7	30.0	40.0	60.0	90.0	150.0	250.1	450.1
	500		2.8	27.8	37.1	55.6	83.4	139.0	231.6	417.0
	525		1.9	26.3	35.1	52.6	78.9	131.5	219.1	394.4
	550		1.3 *	25.0	33.3	49.9	74.9	124.8	208.0	374.4
	575		1.3 *	24.1	32.1	48.2	72.3	120.5	200.8	361.5
	600		1.3 *	21.4	28.6	42.9	64.3	107.2	178.6	321.5
	625		1.3 *	17.8	23.7	35.6	53.4	89.0	148.3	267.0
	650		1.3 *	11.6	15.4	23.2	34.7	57.9	96.5	173.7
	675		1.3 *	8.7	11.5	17.3	26.0	43.3	72.1	129.8
	700		1.3 *	6.7	9.0	13.5	20.2	33.7	56.1	101.1
	725		1.3 *	5.3	7.0	10.5	15.8	26.4	43.9	79.1
	750		1.3 *	4.0	5.4	8.0	12.1	20.1	33.5	60.3
	775		1.3 *	3.2	4.2	6.3	9.5	15.8	26.4	47.5
	800		1.0 *	2.6	3.5	5.2	7.5	13.1	21.9	39.4

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

SPECIAL CLASS	TEMPERATURE IN °C		GAGE WORKING PRESSURE IN bar BY CLASSES							
			150	300	400	600	900	1500	2500	4500
	-29 TO	38	20.0	51.7	68.9	103.4	155.1	258.5	430.9	775.5
		50	19.4	50.6	67.4	101.1	151.7	252.8	421.3	758.3
		100	17.7	46.1	61.4	92.2	138.3	230.4	384.0	691.3
	150		16.8	43.7	58.3	87.4	131.1	218.6	364.3	655.7
	200		16.2	42.4	56.5	84.8	127.2	211.9	353.2	635.8
	250		15.5	40.3	53.8	80.7	121.0	201.6	336.1	604.9
	300		14.7	38.4	51.2	76.8	115.2	192.1	320.1	576.2
	350		14.1	36.7	49.0	73.4	110.2	183.6	306.0	550.9
	375		13.8	35.9	47.9	71.9	107.8	179.7	299.5	539.2
	400		13.6	35.5	47.3	70.9	106.4	177.3	295.4	531.8
	425		13.5	35.1	46.8	70.2	105.4	175.6	292.7	526.8
	450		13.2	34.3	45.8	68.6	103.0	171.6	286.0	514.9
	475		12.8	33.5	44.7	67.0	100.5	167.5	279.1	502.4
	500		12.2	31.7	42.3	63.4	95.1	158.5	264.2	475.6
	525		11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
	550		11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
	575		11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
	600		10.3	26.8	35.7	53.6	80.4	134.0	223.3	401.9
	625		8.5	22.3	29.1	44.5	66.8	111.3	185.4	333.8
	650		5.6	14.5	19.3	29.0	43.4	72.4	120.7	217.2
	675		4.1	10.8	14.4	21.6	32.4	54.1	90.1	162.2
	700		3.2	8.4	11.2	16.8	25.3	42.1	70.2	126.3
	725		2.5	6.6	8.8	13.2	19.8	32.9	54.9	98.8
	750		1.9	5.0	6.7	10.0	15.1	25.1	41.9	75.3
	775		1.5	4.0	5.3	7.9	11.9	19.8	33.0	59.4
	800		1.3	3.3	4.4	6.6	9.8	16.4	27.3	49.2

Note:

(h) — not to be used over 540°C

RATINGS FOR GROUP 2.6 MATERIALS

A351—CH8
A351—CH20

A358—309

A240—309S

A312—TP310

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
	150	300	400	600	900	1500	2500	4500
—29 TO 38	17.8	46.3	61.8	92.7	139.0	231.6	386.1	694.9
50	17.4	45.3	60.4	90.7	136.0	226.6	377.7	679.9
100	15.9	41.4	55.2	82.8	124.2	207.1	345.1	621.2
150	15.0	39.2	52.2	78.4	117.5	195.9	326.5	587.7
200	14.0	36.9	49.3	73.9	110.8	184.7	307.9	554.2
250	12.1	35.1	46.8	70.2	105.3	175.6	292.6	526.7
300	10.2	33.4	44.6	66.9	100.3	167.2	278.7	501.7
350	8.4	32.0	42.6	63.9	95.9	159.8	266.3	479.3
375	7.4	31.4	41.8	62.7	94.1	156.8	261.3	470.3
400	6.5	30.8	41.0	61.5	92.3	153.8	256.3	461.3
425	5.6	30.0	40.0	60.0	90.0	150.0	250.1	450.1
450	4.7	29.4	39.2	58.8	88.2	147.0	245.0	441.0
475	3.7	28.8	38.4	57.6	86.4	144.0	240.1	432.1
500	2.8	27.8	37.1	55.6	83.4	139.0	231.6	417.0
525	1.9	25.4	33.8	50.8	76.1	126.9	211.5	380.7
550	1.3 ★	21.8	29.1	43.6	65.5	109.1	181.8	327.3
575	1.3 ★	18.5	24.6	37.0	55.5	92.4	154.1	277.3
600	1.3 ★	14.5	19.4	29.0	43.5	72.6	121.0	217.8
625	1.3 ★	11.4	15.2	22.8	34.3	57.1	95.2	171.4
650	1.3 ★	8.0	10.7	16.0	24.0	40.0	66.7	120.0
675	1.3 ★	7.0	9.3	14.0	21.0	34.9	58.2	104.8
700	1.3 ★	5.7	7.5	11.3	17.0	28.3	47.2	85.0
725	1.3 ★	4.4	5.8	8.8	13.2	21.9	36.6	65.8
750	1.3 ★	3.4	4.5	6.8	10.2	17.1	28.4	51.2
775	1.2 ★	2.6	3.4	5.1	7.7	12.8	21.4	38.4
800	0.9 ★	1.9	2.6	3.8	5.8	9.6	16.0	28.8

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
	150	300	400	600	900	1500	2500	4500
—29 TO 38	18.3	47.9	63.8	95.7	143.6	239.3	398.9	718.0
50	18.0	47.0	62.7	94.1	141.1	235.2	392.0	705.5
100	16.8	43.8	58.4	87.6	131.4	219.0	364.9	656.9
150	16.1	41.9	55.9	83.9	125.8	209.7	349.5	629.1
200	15.6	40.6	54.1	81.2	121.8	203.1	338.4	609.2
250	15.0	39.0	52.1	78.1	117.1	195.2	325.3	585.6
300	14.3	37.3	49.7	74.6	111.9	186.6	310.9	559.7
350	13.6	35.6	47.5	71.2	106.8	178.0	296.7	534.1
375	13.3	34.8	46.4	69.6	104.4	174.0	290.0	522.1
400	13.2	34.3	45.8	68.6	103.0	171.6	286.0	514.8
425	12.8	33.5	44.6	66.9	100.4	167.3	278.8	501.8
450	12.6	32.8	43.7	65.6	98.4	164.1	273.4	492.2
475	12.3	32.1	42.8	64.2	96.4	160.6	267.7	481.8
500	12.0	31.3	41.8	62.7	94.1	156.8	261.3	470.3
525	11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
550	10.4	27.3	36.4	54.5	81.8	136.4	227.3	409.1
575	8.9	23.1	30.8	46.2	69.3	115.6	192.6	346.7
600	6.9	18.1	24.2	36.3	54.4	90.7	151.2	272.2
625	5.5	14.3	19.0	28.6	42.8	71.4	119.0	214.2
650	4.3	11.1	14.8	22.2	33.4	55.6	92.7	166.9
675	3.3	8.7	11.6	17.5	26.2	43.6	72.8	131.0
700	2.7	7.1	9.4	14.2	21.2	35.4	59.0	106.2
725	2.1	5.5	7.3	11.0	16.5	27.4	45.7	82.3
750	1.6	4.3	5.7	8.5	12.8	21.3	35.6	64.0
775	1.2	3.2	4.3	6.4	9.6	16.0	26.7	48.1
800	0.9	2.4	3.2	4.8	7.2	12.0	20.0	36.0

RATINGS FOR GROUP 2.7 MATERIALS

A351—CK20
A358—310

A479—310S
A312—TP310^(k)

A182—F310^(k)
A240—310S^(k)

STANDARD CLASS VALVES, FLANGED AND BUTTWELDING END

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
STANDARD CLASS	—29 TO 38	17.8	46.3	61.8	92.7	139.0	231.6	386.1	694.9
	50	17.4	45.3	60.4	90.7	136.0	226.6	377.7	679.9
	100	15.9	41.4	55.2	82.8	124.2	207.1	345.1	621.2
	150	15.0	39.2	52.2	78.4	117.5	195.9	326.5	587.7
	200	14.0	36.9	49.3	73.9	110.8	184.7	307.9	554.2
	250	12.1	35.1	46.8	70.2	105.3	175.6	292.6	526.7
	300	10.2	33.4	44.6	66.9	100.3	167.2	278.7	501.7
	350	8.4	32.0	42.6	63.9	95.9	159.8	266.3	479.3
	375	7.4	31.4	41.8	62.7	94.1	156.8	261.3	470.3
	400	6.5	30.8	41.0	61.5	92.3	153.8	256.3	461.3
	425	5.6	30.0	40.0	60.0	90.0	150.0	250.1	450.1
	450	4.7	29.4	39.2	58.8	88.2	147.0	245.0	441.0
	475	3.7	28.8	38.4	57.6	86.4	144.0	240.1	432.1
	500	2.8	27.8	37.1	55.6	83.4	139.0	231.6	417.0
	525	1.9	25.9	34.5	51.8	77.7	129.5	215.8	388.4
	550	1.3★	23.6	31.5	47.2	70.8	118.0	196.7	354.0
	575	1.3★	22.0	29.3	43.9	65.9	109.9	183.1	329.6
	600	1.3★	19.4	25.8	38.7	58.1	96.8	161.3	290.4
	625	1.3★	16.6	22.2	33.3	49.9	83.1	138.6	249.4
	650	1.3★	14.1	18.8	28.1	42.2	70.3	117.2	211.0
	675	1.3★	11.3	15.1	22.6	33.9	56.5	94.1	169.5
	700	1.3★	8.7	11.6	17.5	26.2	43.6	72.7	130.9
	725	1.3★	6.2	8.2	12.4	18.5	30.9	51.5	92.6
	750	1.3★	4.4	5.8	8.8	13.1	21.9	36.5	65.7
	775	1.3★	3.1	4.2	6.3	9.4	15.7	26.2	47.2
	800	1.0★	2.2	2.9	4.4	6.6	10.9	18.2	32.8

*For welding end valves only. Flanged end ratings terminate at 540°C.

SPECIAL CLASS BUTTWELDING END VALVES ONLY

	TEMPERATURE IN °C	GAGE WORKING PRESSURE IN bar BY CLASSES							
		150	300	400	600	900	1500	2500	4500
SPECIAL CLASS	—29 TO 38	18.3	47.9	63.8	95.7	143.6	239.3	398.9	718.0
	50	18.0	47.0	62.7	94.1	141.1	235.2	392.0	705.5
	100	16.8	43.8	58.4	87.6	131.4	219.0	364.9	656.9
	150	16.1	41.9	55.9	83.9	125.8	209.7	349.5	629.1
	200	15.6	40.6	54.1	81.2	121.8	203.1	338.4	609.2
	250	15.0	39.0	52.1	78.1	117.1	195.2	325.3	585.6
	300	14.3	37.3	49.7	74.6	111.9	186.6	310.9	559.7
	350	13.6	35.6	47.5	71.2	106.8	178.0	296.7	534.1
	375	13.3	34.8	46.4	69.6	104.4	174.0	290.0	522.1
	400	13.2	34.3	45.8	68.6	103.0	171.6	286.0	514.8
	425	12.8	33.5	44.6	66.9	100.4	167.3	278.8	501.8
	450	12.6	32.8	43.7	65.6	98.4	164.1	273.4	492.2
	475	12.3	32.1	42.8	64.2	96.4	160.6	267.7	481.8
	500	12.1	31.5	42.0	62.9	94.4	157.4	262.3	472.1
	525	11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
	550	11.2	29.3	39.1	58.7	88.0	146.7	244.5	440.2
	575	10.5	27.5	36.6	54.9	82.4	137.3	228.9	412.0
	600	9.3	24.2	32.3	48.4	72.6	121.0	201.7	363.0
	625	8.0	20.8	27.7	41.6	62.4	103.9	173.2	311.8
	650	6.7	17.6	23.4	35.2	52.7	87.9	146.5	263.7
	675	5.4	14.1	18.8	28.2	42.4	70.6	117.7	211.8
	700	4.2	10.9	14.5	21.8	32.7	54.6	90.9	163.7
	725	3.0	7.7	10.3	15.4	23.2	38.6	64.3	115.8
	750	2.1	5.5	7.3	10.9	16.4	27.4	45.6	82.1
	775	1.5	3.9	5.2	7.9	11.8	19.7	32.8	59.0
	800	1.0	2.7	3.6	5.5	8.2	13.7	22.8	41.0

Note:

(k) — for service temperature of 566°C and above, assurance must be provided that grain size is not finer than ASTM No. 6.