

Sizes 2" - 12"

Description

Used commonly where a minimum pressure drop is important. This cast steel gate valve offers efficient isolation of flow in either direction of the valve. Outside screw and yoke with rising stem for open / close indication. WCB heavy duty body with full port. The wedge disc is fully guided to ensure tight sealing. Bolted body construction with handwheel operation.

Design	: API 600 / API 6D / BS 1414
Shell Thickness	: API 600 / API 6D / BS 1414
Flanged Ends	: ANSI B16.5
Face to Face	: ANSI B16.10 / API 6D
Testing	: API 598 / EN12266-1

**Cast Steel Gate Valve API 600
ANSI Class 150 & 300**

- Bolted Bonnet Construction
- Outside Screw and Yoke
- Non-Rotating Rising Stem
- Handwheel Operated
- Renewable Threaded-in Backseat Bushing


Description

Designed to API 600 and pressure tested in accordance with API 598/EN12266-1. This heavy duty flanged gate valve with full port offers durability throughout a wide range of industrial applications, boiler plant and rugged environments. Handwheel operated and offered in both ANSI 150 and ANSI 300, offering minimum leakage and maximum service life.


Beschreibung

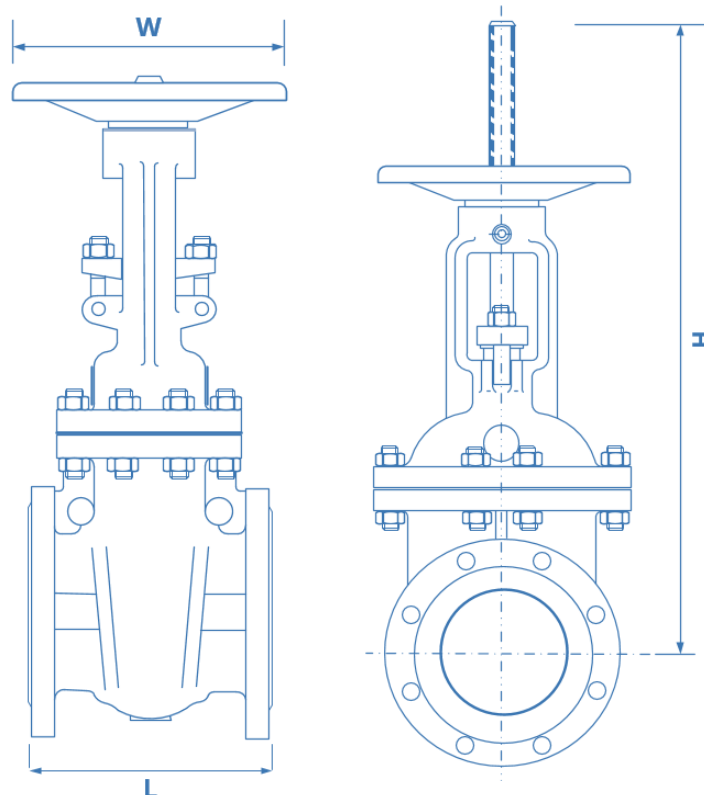
Entwickelt gemäß API 600 und drucktestgeprüft gemäß API 598/EN12266-1. bietet dieses Flanschventil mit vollem Durchgang und vollem Anschluss Haltbarkeit in einer Vielzahl von industriellen Anwendungen, Kesselanlagen und robusten Umgebungen. Das Handrad wird sowohl in ANSI 150 als auch in ANSI 300 betrieben und angeboten und bietet minimale Leckverluste und maximale Lebensdauer.


Descripción

Diseñada para API 600 y probada a presión de acuerdo con API 598/EN12266-1. Esta válvula de compuerta bridada de servicio pesado con puerto completo ofrece durabilidad en una amplia gama de aplicaciones industriales, plantas de calderas y entornos resistentes. El volante se maneja y se ofrece en ANSI 150 y ANSI 300, ofreciendo una fuga mínima y una vida útil máxima.


La description

Conçu selon la norme API 600 et soumis à des tests de pression conformément à la norme API 598/EN12266-1. Ce robinet-vanne à brides à passage intégral offre une durabilité dans un large éventail d'applications industrielles, de chaudières et d'environnements difficiles. Le volant est actionné et proposé dans les normes ANSI 150 et ANSI 300, offrant une fuite minimale et une durée de vie maximale.



Dimensions

Size	ANSI Class 150					ANSI Class 300				
	L	H	W	lb	kg	L	H	W	lb	kg
2"	178	338	200	40	18	216	424	200	53	24
3"	203	497	250	82	37	283	250	250	117	53
4"	229	585	250	119	54	305	250	250	168	76
6"	267	765	350	194	88	403	350	350	322	146
8"	292	964	350	318	144	419	400	400	481	218
10"	330	1155	400	434	197	457	450	450	776	352
12"	356	1386	450	657	298	502	550	550	1041	472

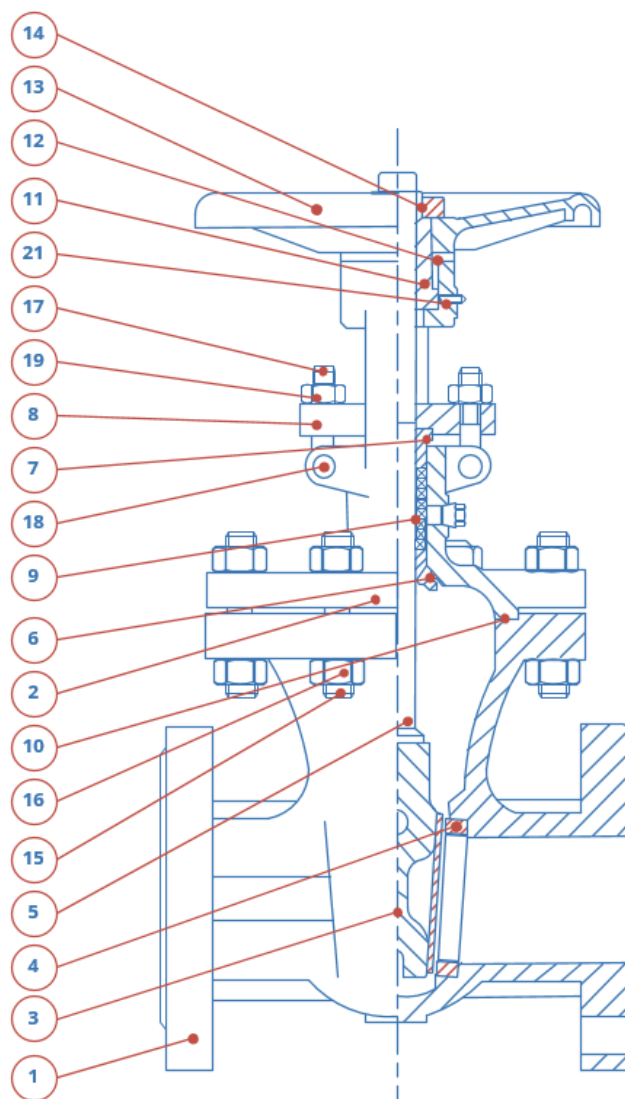
Design features

- Universal trim 13Cr stem, wedge in CA 15 or 13 Cr faced, seat API trim 8 suitable for applications up to 427°C.
- Heavy duty body with full port dia. And shell thickness to API / BS standards (where applicable).
- Seat Rings and Wedge Disc ground and lapped to a mirror finish to provide matching sealing surfaces.
- Wedge Disc fully guided and precision fitted to ensure tight sealing performance.
- Heat treated stainless steel STEM with precision machined ACME threads for long lasting service.
- Machined Backseat Bushing to provide a secondary metal-metal stem seal.

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DESCRIPTION OF PARTS

1	Body
2	Bonnet
3	Wedge Disc
4	Seat Ring
5	Stem
6	Backseat Bushing
7	Gland Bushing
8	Gland Flange
9	Packing
10	Gasket
11	Yoke Sleeve
12	Retainer Sleeve
13	Handwheel
14	Handwheel Nut
15/16	Stud Bolt / Hex Nut
17	Eyebolt
18	Pin
19	Hex Nut
21	Grease Fitting

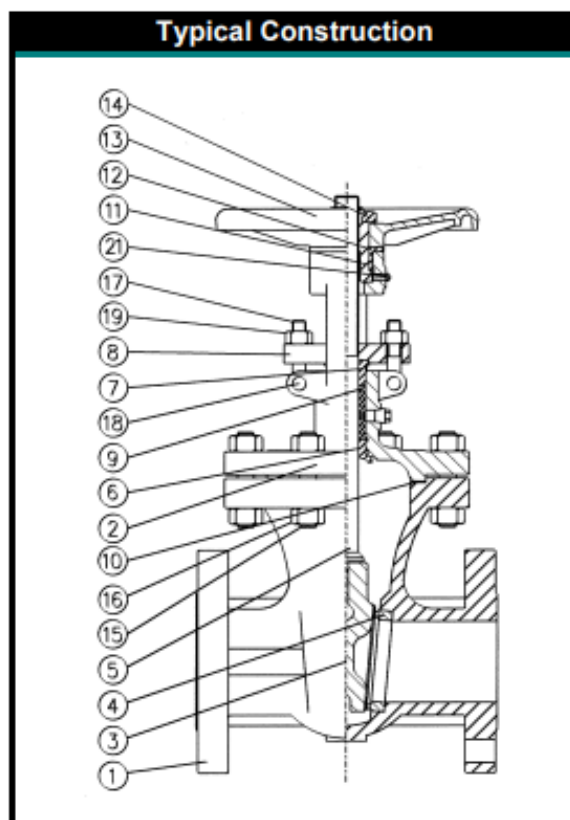


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GATE VALVE DESIGN FEATURES

- ◆ Plain or One-Piece Flexible Solid Wedge
- ◆ Bolted Bonnet Construction
- ◆ Outside Screw and Yoke
- ◆ Non-Rotating, Rising Stem
- ◆ Manual Operated, Actuation Available
- ◆ Renewable Threaded-In Backseat Bushing
- ◆ Renewable Threaded-In or Welded-In Seat Rings

- ◆ Design : API 600 / API 6D / BS 1414
- ◆ Shell Thickness : API 600 / API 6D / BS 1414
- ◆ Flanged Ends : ANSI B16.5 (Sizes ≤ 24")
MSS SP-44 (Sizes > 24")
API 605 (Sizes > 24")
- ◆ Face-to-Face : ANSI B16.10 / API 6D
- ◆ Testing : API 598 / EN12266-1



No.	Part Name
1	Body
2	Bonnet
3	Wedge Disc
4	Seat Ring
5	Stem
6	Backseat Bushing
7	Gland Bushing
8	Gland Flange
9	Packing
10	Gasket
11	Yoke Sleeve
12	Retainer Nut
13	Handwheel
14	Handwheel Nut
15 / 16	Stud Bolt / Hex Nut
17	Eyebolt
18	Pin
19	Hex Nut
21	Grease Fitting

Note: Weld end valves available upon request

- ◆ Heavy duty BODY with full port dia. and shell thickness to API / BS standards (where applicable)
- ◆ SEAT RINGS and WEDGE DISC ground and lapped to a mirror finish to provide matching sealing surfaces
- ◆ WEDGE DISC fully guided and precision fitted to ensure tight sealing performance
- ◆ Heat treated stainless steel STEM with precision machined ACME threads for long-lasting service
- ◆ Machined BACKSEAT BUSHING to provide a secondary metal-to-metal stem seal

- ◆ RISING STEM for open/close position indication
- ◆ Austenitic ductile iron YOKE SLEEVE to provide resistance to heat, corrosion and wear
- ◆ Two piece self-aligning GLAND BUSHING and GLAND FLANGE to prevent stem damage
- ◆ High strength alloy steel STUD BOLTS and heavy series HEX NUTS used
- ◆ Large diameter HANDWHEEL for easy operation
- ◆ Grease fitting for YOKE SLEEVE lubrication to minimize operating torque & stem wear

STANDARD MATERIALS OF CONSTRUCTION

Part	ANSI B16.34 Material Group				
	Carbon Steel	C-Mn Steel	Alloy Steel		
	1.1	1.2	1.9	1.10	1.13
Body / Bonnet	A216 Gr. WCB	A352 Gr. LCC	A217 Gr. WC6	A217 Gr. WC9	A217 Gr. C5
Gland Bushing	← 13% Chromium ASTM A182 Gr. F6a →				
Stud Bolts & Hex Nuts	B7 / 2H	L7 / 7	← ASTM A193 Gr. B16 / ASTM A194 Gr. 2H →		
Yoke / Gland Flange	← Carbon Steel →				
Yoke Sleeve	← Austenitic Ductile Iron ASTM A439 Type D2 →				
Retainer Nut	← Carbon Steel →				
Handwheel	← Ductile / Malleable Iron →				
Handwheel Nut	← Carbon Steel →				
Gland Eyebolts & Nuts	← Carbon Steel ASTM A307 Gr. B →				
Part	Corrosion Resistant Steel				
	2.1		2.2		3.17
	A351 Gr. CF8	A351 Gr. CF3	A351 Gr. CF8M	A351 Gr. CF3M	A351 Gr. CN7M
Body / Bonnet	A351 Gr. CF8	A351 Gr. CF3	A351 Gr. CF8M	A351 Gr. CF3M	A351 Gr. CN7M
Gland Bushing	304SS	304L SS	316SS	316L SS	Alloy 20
Stud Bolts & Hex Nuts	← Corrosion Resistant Steel ASTM A193 Gr. B8 / A194 Gr. 8 →				
Yoke / Gland Flange	← Corrosion Resistant Steel →				
Yoke Sleeve	← Austenitic Ductile Iron ASTM A439 Type D2 →				
Retainer Nut	← Carbon Steel →				
Handwheel	← Ductile / Malleable Iron →				
Handwheel Nut	← Carbon Steel →				
Gland Eyebolts & Nuts	← Corrosion Resistant Steel ASTM A193 Gr. B8 / ASTM A194 Gr. 8 →				

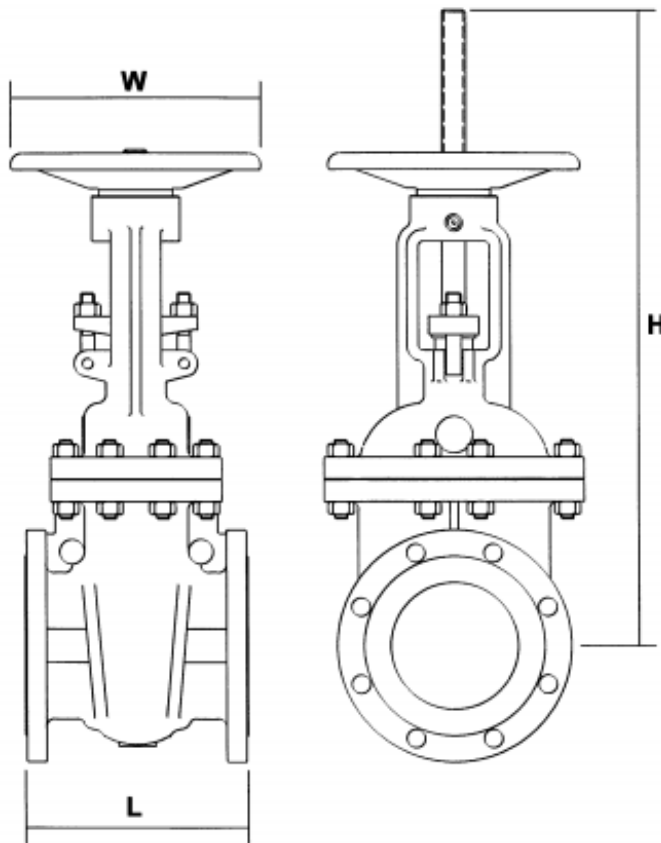
Note: Other materials available upon request.

Trim Materials

Part	API Trim No.										
	1	2	5	8	9	10	11	12	13	14	15
Wedge Disc	F6	304SS	HF	F6	Ni-Cu	316SS	Ni-Cu	316SS	Alloy 20	Alloy 20	HF
Seat Ring	F6	304SS	HF	HF	Ni-Cu	316SS	HF	HF	Alloy 20	HF	HF
Stem	F6	304SS	F6	F6	Ni-Cu	316SS	Ni-Cu	316SS	Alloy 20	Alloy 20	304SS
Backseat	F6	304SS	F6	F6	Ni-Cu	316SS	Ni-Cu	316SS	Alloy 20	Alloy 20	304SS
Part	API Trim No.			DPV Trim No.							
	16	17	18	A	B	C	D	E	F	G	H
Wedge Disc	HF	HF	HF	HF	Bronze	F6	304SS	316SS	Ni-Cu	Alloy 20	Bronze
Seat Ring	HF	HF	HF	HF	Bronze	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Stem	316SS	347SS	Alloy 20	Ni-Cu	Brass	F6	304SS	316SS	Ni-Cu	Alloy 20	Brass
Backseat	316SS	347SS	Alloy 20	Ni-Cu	Brass	F6	304SS	316SS	Ni-Cu	Alloy 20	Brass

Note: Trim will be supplied either as a base material equal to body with overlay or solid trim at manufacturer's option.

DIMENSIONS



DPV Figure Numbers

Material	ANSI Class	
	150	300
A216 Gr. WCB	1512F	3012F
A352 Gr. LCC	151CF	301CF
A217 Gr. WC6	1516F	3016F
A217 Gr. WC9	1519F	3019F
A217 Gr. C5	1515F	3015F
A351 Gr. CF8	1514F	3014F
A351 Gr. CF3	1514LF	3014LF
A351 Gr. CF8M	1513F	3013F
A351 Gr. CF3M	1513LF	3013LF
A351 Gr. CN7M	1517F	3017F

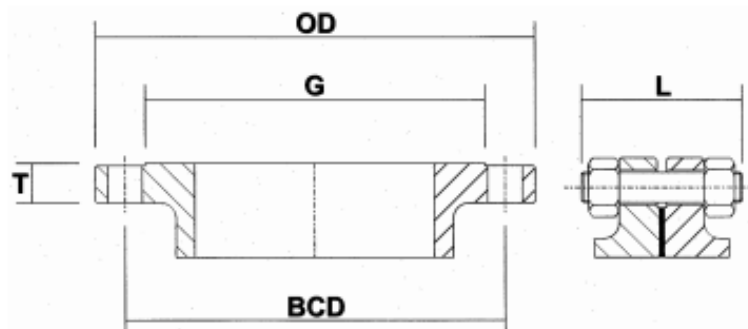
ANSI Class 150

Size	Dimensions (mm)			Approx. Wt.	
	L	H	W	(lb.)	(kg.)
2"	178	388	200	40	18
2½"	191	444	200	54	25
3"	203	497	250	82	37
4"	229	585	250	119	54
5"	254	677	300	157	71
6"	267	765	350	194	88
8"	292	964	350	318	144
10"	330	1,155	400	434	197
12"	356	1,386	450	657	298
14"	381	1,535	500	895	406
16"	406	1,811	600	1,155	524
18"	432	2,009	600	1,588	720
20"	457	2,230	680	2,007	910
24"	508	2,641	760	2,492	1,130
26"	559	2,775	800	3,142	1,425
28"	610	2,825	800	3,418	1,550
30"	610	3,175	800	4,300	1,950
36"	711	3,600	800	6,725	3,050

ANSI Class 300

Size	Dimensions (mm)			Approx. Wt.	
	L	H	W	(lb.)	(kg.)
2"	216	424	200	53	24
2½"	241	460	250	96	44
3"	283	535	250	117	53
4"	305	615	250	168	76
5"	381	770	300	203	92
6"	403	795	350	322	146
8"	419	1,012	400	481	218
10"	457	1,231	450	776	352
12"	502	1,450	550	1,041	472
14"	762	1,645	600	1,530	694
16"	838	1,845	600	2,315	1,050
18"	914	1,995	680	2,977	1,350
20"	991	2,208	750	3,649	1,655
24"	1,143	2,650	800	5,182	2,350
30"	1,397	3,270	800	9,041	4,100

END FLANGE DIMENSIONS (in.)



ANSI / ASME B16.5 Class 150 R.F. (1/16" Raised Face)

Size	OD	T		G	BCD	Bolt Hole Ø	No. of Bolt Holes	Stud Bolt Ø	L	Size
	Outside Ø	Companion Flange	Valve Flange	R.F. Ø	Bolt Circle Ø				Bolt Length	
2	6	3/4	5/8	3 5/8	4 3/4	3/4	4	5/8	3	2
2½	7	7/8	11/16	4 1/8	5 1/2	3/4	4	5/8	3 1/4	2½
3	7 1/2	15/16	15/16	5	6	3/4	4	5/8	3 3/4	3
4	9	15/16	15/16	6 3/16	7 1/2	3/4	8	5/8	3 3/4	4
5	10	15/16	15/16	7 5/16	8 1/2	7/8	8	3/4	4	5
6	11	1	1	8 1/2	9 1/2	7/8	8	3/4	4	6
8	13 1/2	1 1/8	1 1/8	10 5/8	12	7/8	8	3/4	4 1/4	8
10	16	1 3/16	1 3/16	12 3/4	14 1/4	1	12	7/8	4 3/4	10
12	19	1 1/4	1 1/4	15	17	1	12	7/8	4 3/4	12
14	21	1 3/8	1 3/8	16 1/4	18 3/4	1 1/8	12	1	5 1/4	14
16	23 1/2	1 7/16	1 7/16	18 1/2	21 1/4	1 1/8	16	1	5 1/2	16
18	25	1 9/16	1 9/16	21	22 3/4	1 1/4	16	1 1/8	6	18
20	27 1/2	1 11/16	1 11/16	23	25	1 1/4	20	1 1/8	6 1/4	20
24	32	1 7/8	1 7/8	27 1/4	29 1/2	1 3/8	20	1 1/4	6 3/4	24

MSS SP-44 / ASME B16.47 Series A Class 150 R.F. (1/16" Raised Face)

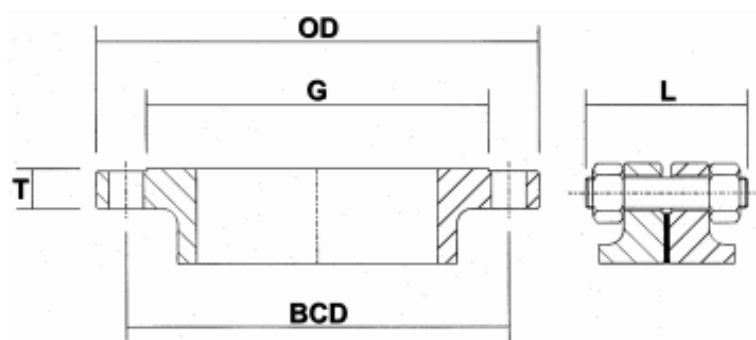
22	29 1/2	1 13/16	1 13/16	25 1/4	27 1/4	1 3/8	20	1 1/4	6 3/4	22
26	34 1/4	2 11/16	2 11/16	29 1/2	31 3/4	1 3/8	24	1 1/4	8 1/2	26
28	36 1/2	2 13/16	2 13/16	31 1/2	34	1 3/8	28	1 1/4	8 3/4	28
30	38 3/4	2 15/16	2 15/16	33 3/4	36	1 3/8	28	1 1/4	9	30
36	46	3 9/16	3 9/16	40 1/4	42 3/4	1 5/8	32	1 1/2	10 3/4	36

API 605 / ASME B16.47 Series B Class 150 R.F. (1/16" Raised Face)

26	30 15/16	1 5/8	1 5/8	28	29 5/16	7/8	36	3/4	5 1/2	26
28	32 15/16	1 3/4	1 3/4	30	31 5/16	7/8	40	3/4	5 3/4	28
30	34 15/16	1 3/4	1 3/4	32	33 5/16	7/8	44	3/4	5 3/4	30
36	41 5/8	2 1/16	2 1/16	38 1/4	39 3/4	1	44	7/8	6 1/2	36

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END FLANGE DIMENSIONS (in.)


ANSI / ASME B16.5 Class 300 R.F. (1/16" Raised Face)

Size	OD Outside Ø	T Flange Thickness	G R.F. Ø	BCD Bolt Circle Ø	Bolt Hole Ø	No. of Bolt Holes	Stud Bolt Ø	L Bolt Length	Size
2	6 1/2	7/8	3 5/8	5	3/4	8	5/8	3 1/2	2
2½	7 1/2	1	4 1/8	5 7/8	7/8	8	3/4	4	2½
3	8 1/4	1 1/8	5	6 5/8	7/8	8	3/4	4 1/4	3
4	10	1 1/4	6 3/16	7 7/8	7/8	8	3/4	4 1/2	4
5	11	1 3/8	7 5/16	9 1/4	7/8	8	3/4	4 3/4	5
6	12 1/2	1 7/16	8 1/2	10 5/8	7/8	12	3/4	4 3/4	6
8	15	1 5/8	10 5/8	13	1	12	7/8	5 1/2	8
10	17 1/2	1 7/8	12 3/4	15 1/4	1 1/8	16	1	6 1/4	10
12	20 1/2	2	15	17 3/4	1 1/4	16	1 1/8	6 3/4	12
14	23	2 1/8	16 1/4	20 1/4	1 1/4	20	1 1/8	7	14
16	25 1/2	2 1/4	18 1/2	22 1/2	1 3/8	20	1 1/4	7 1/2	16
18	28	2 3/8	21	24 3/4	1 3/8	24	1 1/4	7 3/4	18
20	30 1/2	2 1/2	23	27	1 3/8	24	1 1/4	8	20
24	36	2 3/4	27 1/4	32	1 5/8	24	1 1/2	9	24

MSS SP-44 / ASME B16.47 Series A Class 300 R.F. (1/16" Raised Face)

22	33	2 5/8	25 1/4	29 1/4	1 5/8	24	1 1/2	9	22
26	38 1/4	3 1/8	29 1/2	34 1/2	1 3/4	28	1 5/8	10 1/4	26
28	40 3/4	3 3/8	31 1/2	37	1 3/4	28	1 5/8	10 3/4	28
30	43	3 5/8	33 3/4	39 1/4	1 7/8	28	1 3/4	11 1/2	30
36	50	4 1/8	40 1/4	46	2 1/8	32	2	13	36

API 605 / ASME B16.47 Series B Class 300 R.F. (1/16" Raised Face)

26	34 1/8	3 1/2	29	31 5/8	1 3/8	32	1 1/4	10 1/4	26
28	36 1/4	3 1/2	31	33 3/4	1 3/8	36	1 1/4	10 1/4	28
30	39	3 11/16	33 1/4	36 1/4	1 1/2	36	1 3/8	10 3/4	30
36	46 1/8	4 1/16	39 3/4	42 7/8	1 3/4	32	1 5/8	12	36

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ANSI CLASS 150 PRESSURE-TEMP RATINGS

Temperature °F	Pressure (psig)										Temp. °C
	ANSI B16.34 Material Group										
	1.1	1.2	1.9	1.10	1.13	2.1		2.2		3.17	
	WCB ¹	LCC ²	WC6 ³	WC9 ³	C5 ³	CF8 ⁴	CF3 ⁵	CF8M ⁴	CF3M ⁶	CN7M ⁷	
-20 to 100	285	290	290	290	290	275	275	275	275	230	-29 to 38
200	260	260	260	260	260	230	230	235	235	200	93
300	230	230	230	230	230	205	205	215	215	180	149
350	215	215	215	215	215	198	198	205	205	170	177
400	200	200	200	200	200	190	190	195	195	160	204
450	185	185	185	185	185	180	180	183	183	155	232
500	170	170	170	170	170	170	170	170	170	150	260
550	155	155	155	155	155	155	155	155	155	145	288
600	140	140	140	140	140	140	140	140	140	140	316
650	125	125	125	125	125	125	125	125	125		343
700	110		110	110	110	110	110	110	110		371
750	95		95	95	95	95	95	95	95		399
800	80		80	80	80	80	80	80	80		427
850	65		65	65	65	65		65	65		454
900	50		50	50	50	50		50			482
950	35		35	35	35	35		35			510
1,000	20		20	20	20	20		20			538
1,050			20 ^a	20 ^a	20 ^a	20 ^a		20 ^a			566
1,100			20 ^a	20 ^a	20 ^a	20 ^a		20 ^a			593
1,150					20 ^a	20 ^a		20 ^a			621
1,200					15 ^a	20 ^a		20 ^a			649
1,250						20 ^a		20 ^a			677
1,300						20 ^a		20 ^a			704
1,350						20 ^a		20 ^a			732
1,400						20 ^a		20 ^a			760
1,450						15 ^a		20 ^a			788
1,500						10 ^a		20 ^a			816

¹ Upon prolonged exposure to temperatures above 800 °F (427 °C), the carbide phase of steel may be converted to graphite. Permissible, but not recommended for prolonged use above 800 °F (427 °C).

² Not to be used over 650 °F (343 °C).

³ Use normalized and tempered material only.

⁴ At temperatures over 1,000 °F (538 °C), use only when the carbon content is 0.04% or higher.

⁵ Not to be used over 800 °F (427 °C).

⁶ Not to be used over 850 °F (454 °C).

⁷ Use solution annealed material only.

^a For welding end valves only. Flanged end ratings terminate at 1,000 °F (538 °C).

ANSI CLASS 300 PRESSURE-TEMP RATINGS

Temperature °F	Pressure (psig)										Temp. °C
	ANSI B16.34 Material Group										
	1.1	1.2	1.9	1.10	1.13	2.1		2.2		3.17	
	WCB ¹	LCC ²	WC6 ³	WC9 ³	C5 ³	CF8 ⁴	CF3 ⁵	CF8M ⁴	CF3M ⁶	CN7M ⁷	
-20 to 100	740	750	750	750	750	720	720	720	720	600	-29 to 38
200	675	750	750	750	745	600	600	620	620	520	93
300	655	730	720	730	715	540	540	560	560	465	149
350	645	718	708	718	710	518	518	538	538	443	177
400	635	705	695	705	705	495	495	515	515	420	204
450	618	685	680	685	685	480	480	498	498	405	232
500	600	665	665	665	665	465	465	480	480	390	260
550	575	635	635	635	635	450	450	465	465	375	288
600	550	605	605	605	605	435	435	450	450	360	316
650	535	590	590	590	590	430	430	445	445		343
700	535		570	570	570	425	425	430	430		371
750	505		530	530	530	415	415	425	425		399
800	410		510	510	510	405	405	420	420		427
850	270		485	485	485	395		420	420		454
900	170		450	450	370	390		415			482
950	105		320	375	275	380		385			510
1,000	50		215	260	200	320		350			538
1,050			145 ^a	175 ^a	145 ^a	310 ^a		345 ^a			566
1,100			95 ^a	110 ^a	100 ^a	255 ^a		305 ^a			593
1,150					60 ^a	200 ^a		235 ^a			621
1,200					35 ^a	155 ^a		185 ^a			649
1,250						115 ^a		145 ^a			677
1,300						85 ^a		115 ^a			704
1,350						60 ^a		95 ^a			732
1,400						50 ^a		75 ^a			760
1,450						35 ^a		60 ^a			788
1,500						25 ^a		40 ^a			816

¹ Upon prolonged exposure to temperatures above 800 °F (427 °C), the carbide phase of steel may be converted to graphite. Permissible, but not recommended for prolonged use above 800 °F (427 °C).

² Not to be used over 650 °F (343 °C).

³ Use normalized and tempered material only.

⁴ At temperatures over 1,000 °F (538 °C), use only when the carbon content is 0.04% or higher.

⁵ Not to be used over 800 °F (427 °C).

⁶ Not to be used over 850 °F (454 °C).

⁷ Use solution annealed material only.

^a For welding end valves only. Flanged end ratings terminate at 1,000 °F (538 °C).

SHELL MATERIAL SPECIFICATIONS

Carbon and Alloy Steel Castings						
	Unit	A216 Gr. WCB	A352 Gr. LCC	A217 Gr. WC6	A217 Gr. WC9	A217 Gr. C5
C ¹	%	0.300 ³	0.250 ⁴	0.05-0.20	0.05-0.18	0.200
Si ¹	%	0.600				0.750
Mn ¹	%	1.000 ³	1.200 ⁴	0.50-0.80	0.40-0.70	
P ¹	%	0.040				
S ¹	%	0.045				
Cr ¹	%	0.500	0.500 ⁵	1.00-1.50	2.00-2.75	4.00-6.50
Ni ¹	%	0.500	0.500 ⁵	0.500		
Mo ¹	%	0.200	0.200 ⁵	0.45-0.65	0.90-1.20	0.45-0.65
Cu ¹	%	0.300	0.300 ⁵	0.500		
V ¹	%	0.030	0.030 ⁵	-		
T.S.	MPa	485-655				620-795
Y.S. ²	MPa	250	275			415
El. ²	%	22.0		20.0		18.0
R.A. ²	%	35.0				

Corrosion Resistant Steel Castings							
	Unit	A351 Gr. CF8	A351 Gr. CF8M	A351 Gr. CF3	A351 Gr. CF3M	A351 Gr. CN7M	
C ¹	%	0.08		0.03		0.07	
Si ¹	%	2.00	1.50	2.00	1.50		
Mn ¹	%	1.50					
P ¹	%	0.04					
S ¹	%	0.04					
Cr	%	18.0-21.0		17.0-21.0		19.0-22.0	
Ni	%	8.0-11.0	9.0-12.0	8.0-12.0	9.0-13.0	27.5-30.5	
Mo ¹	%	0.50	2.0-3.0	0.50	2.0-3.0		
Cu	%	-					3.0-4.0
T.S. ²	MPa	485					425
Y.S. ²	MPa	205					170
El. ²	%	35.0					

¹ Values listed are permitted maximums, unless otherwise stated.

² Values listed are required minimums, unless otherwise stated.

³ For each reduction of 0.01% below the specified maximum carbon content, an increase of 0.04% Mn above the specified maximum will be permitted up to a maximum of 1.28%.

⁴ For each reduction of 0.01% below the specified maximum carbon content, an increase of 0.04% Mn above the specified maximum will be permitted up to a maximum of 1.40%.

⁵ Specified Residual Elements - The total content of these elements is 1.00% maximum.

TRIM MATERIAL SPECIFICATIONS

Corrosion Resistant Alloys					
	Unit	A182 Gr. F6a	A182 Gr. F304	A182 Gr. F316	A182 Gr. F347 ³
C ¹	%	0.150	0.080		
Si ¹	%	1.000			
Mn ¹	%	1.000	2.000		
P ¹	%	0.040			
S ¹	%	0.030			
Cr	%	11.5-13.5	18.0-20.0	16.0-18.0	17.0-20.0
Ni ¹	%	0.500	8.0-11.0	10.0-14.0	9.0-13.0
Mo	%	-		2.0-3.0	-
N ¹	%	-	0.100		-
Tensile Str. ²	MPa	485	515 ⁴		
Yield Str. ²	MPa	275	205		
Elongation ²	%	18.0	30.0		
Reduc. of Area ²	%	35.0	50.0		
Hardness	HB	143-187	-		
Nonferrous Alloys				Bolting	
	Unit	Alloy 20 ⁵ B462 UNS N08020	Ni-Cu Alloy UNS N04400 B164	Alloy Steel A193 Gr. B7	Carbon Steel A194 Gr. 2H
C ¹	%	0.070	0.300	0.37-0.49	0.400 Min.
Si ¹	%	1.000	0.500	0.15-0.35	0.400
Mn ¹	%	2.000		0.65-1.10	1.000
P ¹	%	0.045	-	0.035	0.040
S ¹	%	0.035	0.024	0.040	0.050
Cr	%	19.0-21.0	-	0.75-1.20	-
Ni ²	%	32.0-38.0	63.0 ⁶	-	-
Mo ¹	%	2.0-3.0	-	0.15-0.25	-
Cu ¹	%	3.0-4.0	28.0-34.0	-	-
Fe ¹	%	Balance ⁶	2.500	-	-
Tensile Str. ²	MPa	551	480	860	-
Yield Str. ²	MPa	241	170	720	-
Elongation ²	%	30.0	35.0	18.0	-
Reduc. of Area ²	%	50.0	-	50.0	-

¹ Values listed are permitted maximums, unless otherwise stated.

² Values listed are required minimums, unless otherwise stated.

³ Shall have a columbium plus tantalum content of not less than ten times the carbon content and not more than 1.10%.

⁴ For sections over 5 inches in thickness, the minimum tensile strength shall be 485 MPa.

⁵ Shall have a columbium plus tantalum content of not less than eight times the carbon content and not more than 1.0%.

⁶ Shall be determined arithmetically by difference.

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