Forbes Marshall

Trusted Partners.
Innovative Solutions.

Gate Valve

Isolation Service

6D-1257 600-0147 Q1-1720

Forbes Marshall is a leader in the area of process efficiency and energy conservation for the process industry. We have sixty years of experience building steam engineering and control instrumentation solutions with focussed investments in manufacturing and research and development. We deliver quality solutions in 18 countries. Forbes Marshall is unique in having extensive expertise in both steam and control instrumentation. This dual expertise has allowed us to engineer industry specific systems that focus on energy efficiency, environment and process efficiency for diverse sectors.

Our teams are peopled by some of the finest engineers in the land. These highly trained professionals have developed innovative solutions and saved millions of rupees in process costs for our clients. Our business practices and processes have combined into a singular philosophy of being trusted partners who provide innovative solutions. It's a philosophy we are proud to live up to.

We have long standing partnerships with some of the best names in the control instrumentation industry such as Arca, Codel, Krohne and Shinkawa, to develop, design and supply innovative solutions for measurement and monitoring of process parameters. With a combination of specialist knowledge and the latest technology, we provide products and solutions to achieve optimum efficiency. Our products are a unique combination of hardware and software that make them reliable and accurate.

Gate Valves

'FM' Bi-directional Gate Valves are used for isolation services in Oil & Gas, Petrochemical, Fossil Fuel and Nuclear Power, Steel, Chemical, Fertilizer, Mining and Solar sectors offering excellent shut-off features and minimal pressure loss through the valve.

'FM' Gate Valves are also built versatile for Pneumatic, Gas, Electrical and Electronically controlled actuator, serving a host of process lines. Two wire control system with logic and programmability resulting in direct reduction of cable cost, simplified engineering, faster and easier commissioning can also be provided.


REGISTRATION NO. Q1-1720

Certificate of Registration

FORBES MARSHALL PVT. LTD.
A-34/35, MIDC Estate H Block, Pimpri
Pune, Maharashtra
India

API Specification Q1

Manufacture of Industrial Valves

No Exclusions Identified as Applicable

Effective Date: August 7, 2012
Expiration Date: August 7, 2015
Registered Since: August 7, 2012

Manager of Operations, APIQR

API Spec Q1 Registered


Certificate of Authority to use the Official API Monogram

License Number: 600-0147

FORBES MARSHALL PVT. LTD.
A-34/35, MIDC Estate H Block, Pimpri
Pune, Maharashtra
India

API Standard 600

600-0147

The scope of this license includes the following product: Bolted Bonnet Steel Gate Valves

QMS Exclusions: No Exclusions Identified as Applicable

Effective Date: AUGUST 7, 2012
Expiration Date: AUGUST 7, 2015

American Petroleum Institute


Certificate of Authority to use the Official API Monogram

License Number: 6D-1257

FORBES MARSHALL PVT. LTD.
A-34/35, MIDC Estate H Block, Pimpri
Pune, Maharashtra
India

API Spec 6D

6D-1257

The scope of this license includes the following products: Gate Valves; Ball Valves; Check Valves

QMS Exclusions: No Exclusions Identified as Applicable

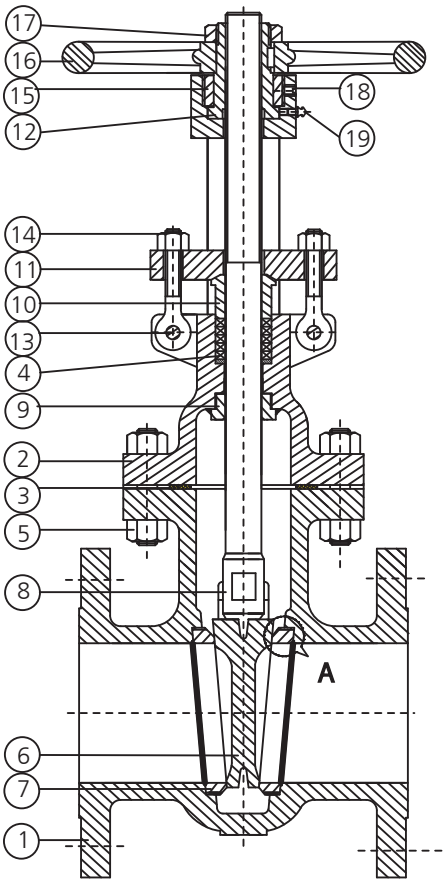
Effective Date: AUGUST 7, 2012
Expiration Date: AUGUST 7, 2015

American Petroleum Institute

Cast Steel Bolted Bonnet

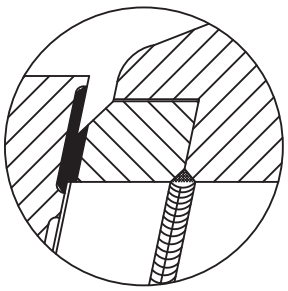
Features

- Outside screw and yoke construction
- Flanged end or buttwelding end
- Valves provided with back seating arrangement
- Solid, flexible, spilt wedge, double disc and parallel slide are available
- Specially designed die formed graphite packings, controlled clearance between steam gland and bonnet bushing for guaranteed low emissions.
  Meet 100 ppm maximum fugitive emission levels.
- Renewable seal welded seat ring or integral seat (cast S.S. only) available
- Deep stuffing box with Lantern ring optional
- Self aligning two piece gland
- Anti-friction ball thrust bearing in yoke sleeve for higher sizes and classes
- Locking arrangement optional
- Bi-directional shut off
- Optional gear, electric or pneumatic actuator.
- Meets design requirement of ASME B16.34 / API 600 / API 603 / API 6D / IBR and testing requirement of API 598 / B S EN 12266-1 / API 6D
- Flanged end dimensions conform to ASME B16.5 / API 605 / BS 3293
- Ring joint facings available in higher classes
- Buttwelding end dimensions conform to ASME B16.25
- Face to Face dimensions conform to ASME B16.10 / BS 2080
- Meets requirement of NACE MR-01-75



Materials

	Part Name	Material
19	Grease Nipple	Carbon Steel
18	Grub Screw	Carbon Steel
17	Hand Wheel Nut	Carbon Steel
16	Hand Wheel	Malleable Iron / Cast Steel / Ductile Iron / Fabricated Steel
15	Yoke Nut	Carbon Steel / SS 304
14	Eye Bolt and Nut	Forged Carbon Steel
13	Cross Bolt and Nut	Forged Carbon Steel
12	Yoke Sleeve	A 439-D2 / Al, Bronze, BS 1400, AB2C
11	Gland Flange	Carbon Steel / Equivalent to Body Material
10	Gland Bush	
09	Back Seat	
08	Spindle	See page 6
07	Seat Ring	Trim and Surface Material
06	Gate	



DETAIL - RENEWABLE SEALWELDED SEAT

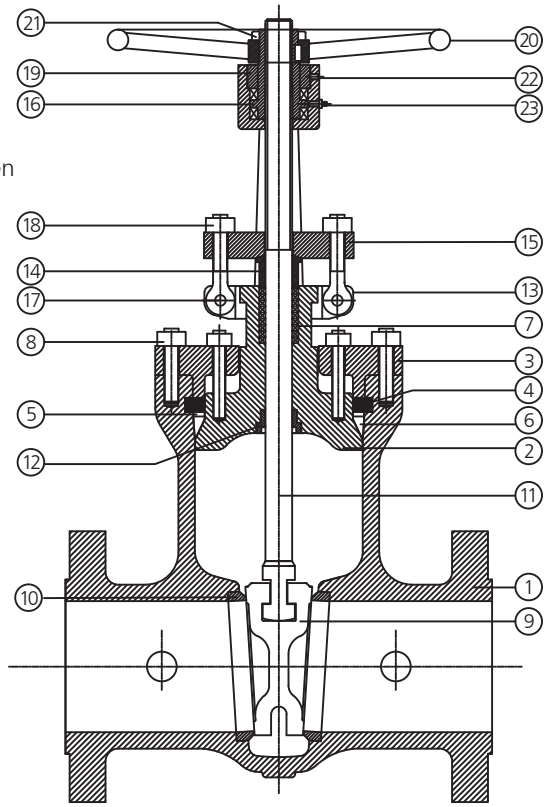
DETAIL - A

	Part Name	WCB	LCB	WC6	WC9
05	Stud and Nut	A 193 Gr B7/A194 Gr2H	A320 Gr L7/A194 Gr4	A93 Gr B16/A 194 Gr 4/7	A93 Gr B16/ A194 Gr 4/7
04	Gland packing	GRAFOIL	GRAFOIL	GRAFOIL	GRAFOIL
03	Gasket	Spiral Wound / Soft Iron	Spiral Wound / Soft Iron	Spiral Wound /SS304	Spiral Wound / SS 304
02	Bonnet	A216 Gr WCB	A352 Gr LCB	A217 Gr WC6	A217 Gr WC9
01	Body	A216 Gr WCB	A352 Gr LCB	A217 Gr WC6	A217Gr WC9
	Part Name	**C5**	**C12**	**CF8**	**CF8M**
05	Stud and Nut	A193 Gr B16/A194 Gr 4/7	A193 Gr/A194 Gr 4/7	A193 Gr B7/A194 Gr 2H	A93 Gr B7/ A194 Gr 2H
04	Gland Packing	GRAFOIL	GRAFOIL	GRAFOIL	GRAFOIL
03	Gasket	Spiral Wound / Soft Iron	Spiral Wound / Soft Iron	Spiral Wound / SS 304	Spiral Wound / SS 316
02	Bonnet	A217 Gr C5	A217 Gr C12	A351 Gr CF8	A351 Gr CF8M
01	Body	A217 Gr C5	A217 Gr C12	A351 Gr CF8	A351 Gr CF8M

Cast Steel Pressure Seal Bonnet

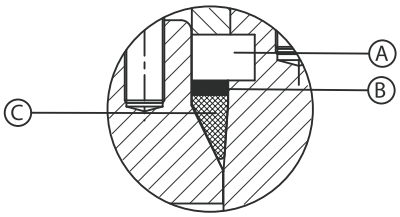
Features

- Outside screw and yoke construction
- Flanged end or buttwelding end
- Valves provided with back seating arrangement
- Solid, flexible, spilt wedge, double disc and parallel slide are available
- Specially designed die formed graphite packings, controlled clearance between stem gland and bonnet bushing for guaranteed low emissions.
  Meet 100 ppm maximum fugitive emission levels.
- Renewable seal welded seat ring or integral seat (cast S.S. only) available
- Deep stuffing box with Lantern ring optional
- Self aligning two piece gland
- Anti-friction ball thrust bearing in yoke sleeve for higher sizes and classes
- Locking arrangement optional
- Bi-directional shut off
- Optional gear, electric or pneumatic actuator available
- Meets design requirement of ASME B16.34 / API 600 / API 603 / API 6D / BS EN 10434 and testing requirement of API 598 / BS EN 12266-1 / API 6D
- Gasket design ensures self sealing under pressure
- Flanged end dimensions conform to ASME B16.5 / API 605 / BS 3293
- Ring joint facings available in higher classes
- Buttwelding end dimensions conform to ASME B16.10
- Face to Face dimensions conform to ASME B16.10 / BS 2080
- Meets requirement of NACE MR-01-75



Materials

	Part Name	Material
23	Grease Nipple	Carbon Steel
22	Grub Screw	Carbon Steel
21	Hand Wheel Nut	Carbon Steel
20	Hand Wheel	Malleable Iron / Cast Steel / Ductile Iron / Fabricated Steel
19	Yoke Nut	Carbon Steel / SS 304
18	Eye Bolt and Nut	Forged Carbon Steel
17	Cross Bolt and Nut	Forged Carbon Steel
16	Yoke Sleeve	A 439-D2 / Al, Bronze, BS 1400, AB2C
15	Gland Flange	Carbon Steel / Equivalent to Body Material
14	Gland Bush	
13	Clamp	
12	Back Seat	
11	Spindle	See page 6
10	Seat Ring	Trim and Surface Material
09	Gate / Wedge	



A Back Up Ring : Absorbs thrust applied by internal pressure

B Thrust Ring : Protects the Soft Metallic gasket from deformation

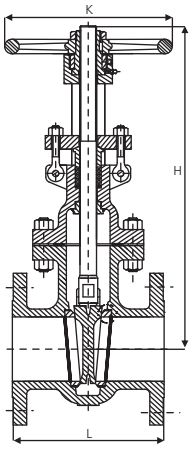
C Gasket : Unique angular design provides superior sealing

	Part Name	WCB	LCB	WC6	WC9
08	Stud and Nut	A 193 Gr B7/A194 Gr2H	A320 Gr L7/A194 Gr4	A93 Gr B16/A 194 Gr 4/7	A93 Gr B16/ A194 Gr 4/7
07	Gland packing	GRAFOIL	GRAFOIL	GRAFOIL	GRAFOIL
06	Gasket	Soft Iron	Soft Iron	SS304	SS 304
05	Bonnet	A217 Gr CA15	A351 Gr CF8	A217 Gr CA15	A217 Gr CA15
04	Back Up Ring	A217 Gr CA15	A351 Gr CF8	A217 Gr CA15	A217 Gr CA15
03	Yoke	A216 Gr WCB	A352 Gr LCB	A217 Gr WC6	A217 Gr WC9
02	Bonnet	A216 Gr WCB	A352 Gr LCB	A217 Gr WC6	A217 Gr WC9
01	Body	A216 Gr WCB	A352 Gr LCB	A217 Gr WC6	A217 Gr WC9
	Part Name	**C5**	**C12**	**CF8**	**CF8M**
08	Stud and Nut	A193 Gr B16/A194 Gr 4/7	A193 Gr/A194 Gr 4/7	A193 Gr B7/A194 Gr 2H	A93 Gr B7/ A194 Gr 2H
07	Gland Packing	GRAFOIL	GRAFOIL	GRAFOIL	GRAFOIL
06	Gasket	SS304	SS304	SS304	SS316
05	Thrust Ring	A217 Gr CA15	A217 Gr CA15	A351 Gr CF8	A351 Gr CF8M
04	Back Up Ring	A217 Gr CA15	A217 Gr CA15	A351 Gr CF8	A351 Gr CF8M
03	Yoke	A217 Gr CS	A217 Gr C12	A351 Gr CF8	A351 Gr CF8M
02	Bonnet	A217 Gr CS	A217 Gr C12	A351 Gr CF8	A351 Gr CF8M
01	Body	A217 Gr CS	A217 Gr C12	A351 Gr CF8	A351 Gr CF8M

Dimensions

Cast Steel Bolted Bonnet

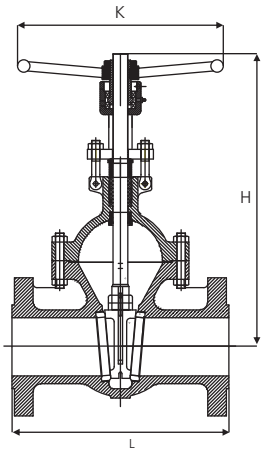
Class 150																		
Size	inch	2	21/2	3	4	5	6	8	10	12	14	16	18	20	24	26	28	30
L-RF	mm	178	191	203	228	254	267	292	330	355	381	406	432	457	508	559	609	609
L1-BW	mm	216	241	282	304	381	403	419	457	501	571	609	660	711	812	863	914	914
H	mm	425	435	535	600	705	800	1010	1250	1385	1575	1825	1950	2080	2425	2750	2825	3175
K	mm	200	200	250	250	280	300	350	450	500*	350*	350*	350*	400*	400*	450*	450*	500*
Wt. (approx)	kg	22	29	37	56	78	84	138	210	310	450	565	740	927	1125	1425	1550	1950



Class 150

Class 300																
Size	inch	2	21/2	3	4	5	6	8	10	12	14	16	18	20	24	26
L, L1-RF, BW	mm	216	241	282	305	381	403	419	457	502	762	838	914	990	1143	1244
H	mm	430	475	535	605	715	845	1075	1260	1425	1585	1845	1995	2175	2650	2850
K	mm	200	200	250	300	300	350	450	500	500	350*	400*	450*	450*	500*	500*
Wt. (approx)	kg	28	40	53	80	125	152	245	360	532	725	950	1350	1648	2350	2500

Class 600															
Size	inch	2	21/2	3	4	5	6	8	10	12	14	16	18	20	24
L, L1-RF, BW	mm	292	330	356	432	508	559	660	787	838	889	991	1092	1194	1397
H	mm	440	500	545	720	730	850	1200	1390	1580	1655	1905	2010	2275	2810
K	mm	250	250	300	350	400	500	600	600	400*	450*	450*	500*	500*	550*
Wt. (approx)	kg	38	61	68	123	178	225	430	730	850	1300	1750	2250	2450	4100



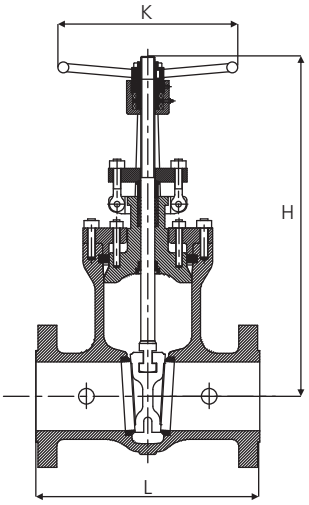
Class 300 & 600

Cast Steel Pressure Seal Bonnet

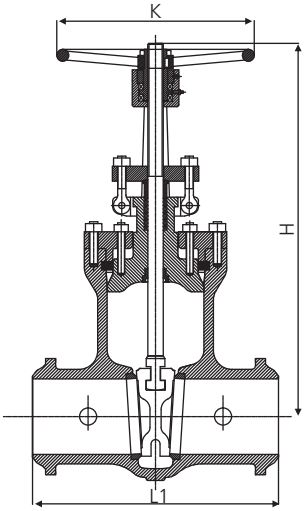
Class 900													
Size	inch	2	21/2	3	4	5	6	8	10	12	14	16	18
L, L1-RF, BW	mm	368	419	381	457	559	610	737	838	965	1029	1130	1219
H	mm	550	645	670	790	855	1075	1225	1500	1635	1830	2145	2300
K	mm	300	300	300	400	450	300*	350*	400*	400*	450*	500*	500*
Wt. (approx)	kg	75	90	96	136	225	275	490	825	1150	1500	2100	2750

Class 1500										
Size	inch	2	21/2	3	4	5	6	8	10	12
L, L1-RF, BW	mm	368	419	470	546	673	705	832	991	1130
H	mm	570	670	725	850	890	1125	1235	1520	1650
K	mm	300	300	300*	300*	300*	350*	350*	400*	400*
Wt. (approx)	kg	95	110	125	205	256	330	655	1200	2010

Class 2500										
Size	inch	2	21/2	3	4	5	6	8	10	12
L, L1-RF, BW	mm	451	508	578	673	794	914	1022	1270	1422
H	mm	600	695	740	890	970	1135	1350	1680	1750
K	mm	400	450	300*	350*	350*	350*	400*	450*	450*
Wt. (approx)	kg	110	130	140	225	295	495	825	1480	2400



Class 600, 900, 1500 & 2500



Class 600, 900, 1500 & 2500

• RF - Flanged • BW - Butt Weld
* Gear Operation suggested.

Nominal Seating Surface Materials

Trim No.	Nominal Trim	Seat Surface Hardness (HB, A Minimum)	Material Type	Cast	Typical Specification (Grade)	
					Forged	Welded
1	F6	C	13Cr	ASTM A217 (CA15)	ASTM A105 (F6a)	AWS A5.9 ER410
2	304	D	18Cr-8Ni	ASTM A351 (CF8)	ASTM A182 (F304)	AWS A5.9 ER308
3	F310	D	25Cr-20Ni		ASTM A182 (F310)	AWS A5.9 ER310
4	Hard F6	750 (E)	Hard 13Cr		F	
5	Hardfaced	350 (E)	Co-Cr A (G)			AWS A5.13 E or R CoCr-A
5A	Hardfaced	350 (E)	Ni-Cr			H
6	F6 and Cu-Ni	250 (I) and 175 (I)	13Cr and Cu-Ni	ASTM A217 (CA15)	ASTM A182 (F6a) J	AWS A5.9 ER410
7	F6 and Hard F6	250 (I) and 750 (I)	13Cr and Hard 13Cr	ASTM A217 (CA15)	ASTM A182 (F6a) F	AWS A5.9 ER410
8	F6 and Hardfaced	250 (I) and 350 (I)	13Cr and Co-Cr A (G)	ASTM A217 (CA15)	ASTM A182 (F6a)	AWS A5.9 ER410 / AWS A5.13 E or R CoCr-A
8A	F6 and Hardened	250 (I) and 350 (I)	13Cr and Ni-Cr	ASTM A217 (CA15)	ASTM A182 (F6a)	AWS A5.9 ER410 H
9	Monel	D	Ni-Cu Alloy		MFG Standard	
10	316	D	18Cr-8Ni	ASTM A351 (CF8M)	ASTM A182 (F316)	AWS A5.9 ER316
11	Monel and Hardfaced	D and 350 (I)	Ni-Cu alloy and Trim 5 or 5A		MFG Standard	See Trim 5 or 5A
12	316 and Hardfaced	D and 350 (I)	18Cr-8Ni-Mo Trim 5 and 5A	ASTM A351 (CF8M)	ASTM A182 (F316)	AWS A5.9 ER316 See Trim 5 or 5A
13	Alloy 20	D	19Cr-29Ni	ASTM A351 (CN7M)	ASTM B 473	AWS A15.9 ER320
14	Alloy 20 and Hardfaced	D and 350 (I)	19Cr-29Ni and Trim 5 and 5A	ASTM A351 (CN7M)	ASTM B 473	AWS A5.9 ER320 / See Trim 5 or 5A

Cr = Chromium, Ni = Nickel, Co = Cobalt, Cu = Copper

(A) HB (formerly BHN) is the symbol for Brinell hardness number as per ASMTM E 10.

(B) Free machining grade of 13Cr are prohibited

(C) Body and gate seat surfaces should be 250 HB minimum with a 50 HB minimum differential between the body and gate seat surfaces.

(D) Manufacturers standard hardness.

(E) Differential hardness between the body and gate seat surface is not required.

(F) Case hardened by Nitriding to a thickness of 0.13 mm (0.005 inch) minimum.

(G) This classification includes such trademarked material as Stellite 6 TM, Colmonoy TM, Stoody 6T TM and Wallex 6 TM.

(H) Manufacturers Standard hardfacing with a maximum iron content of 2.5 percent.

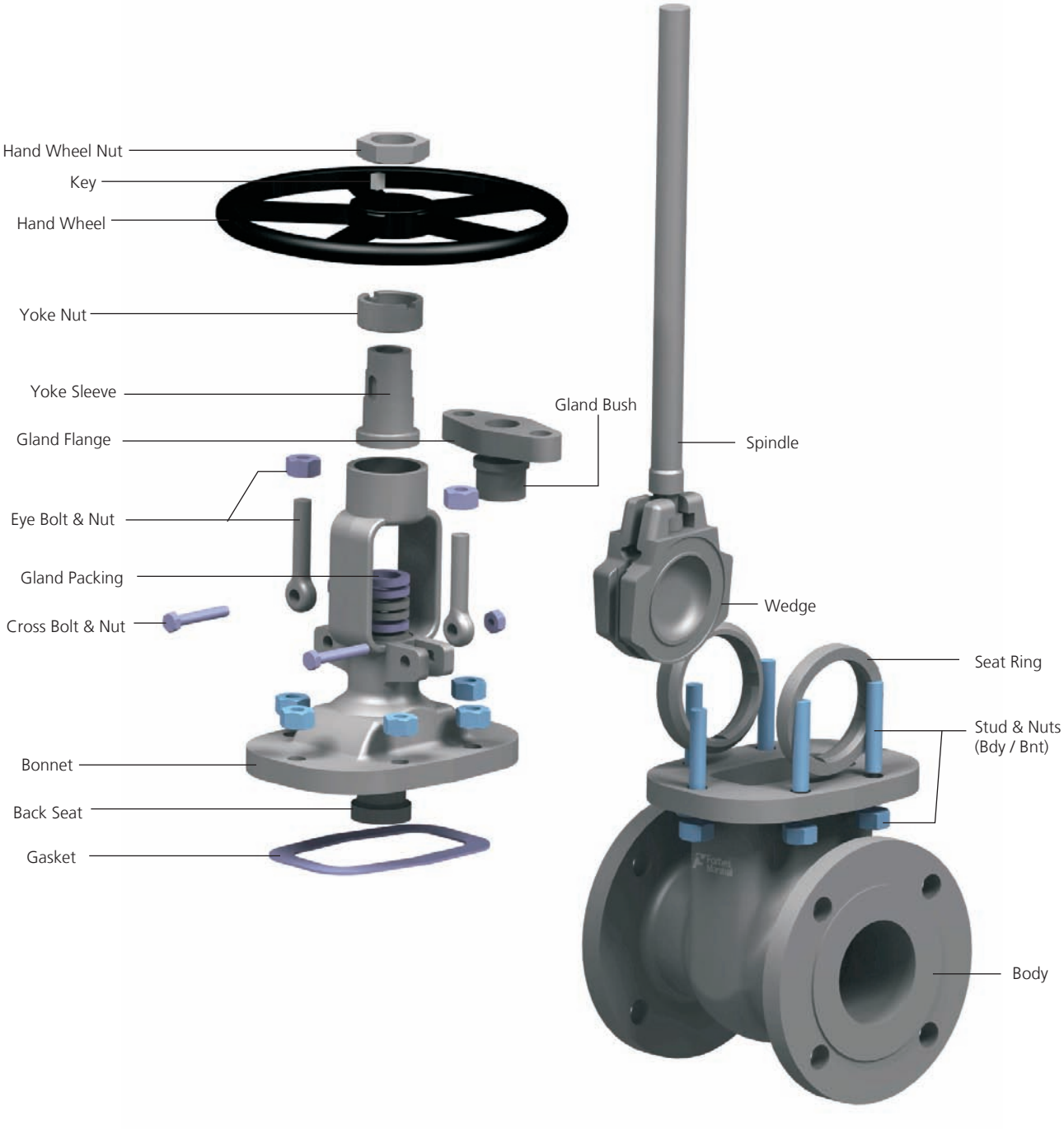
(I) Hardness differential between the body and gate seat surface shall be the Manufacturers standard.

(J) Manufacturers standard with 30 Ni minimum.

Range of Shell Material and Recommended Trim Material

Material Type	ASTM / BS	Service Condition and Temperature	Recommended Trim	
			Low Pressure	High Pressure
Carbon Steel	A216 Gr. WCB	Non corrosive water, oil and gas 30°C to 430°C (86°F to 806°F)		
Low Temperature Service		Cryogenic Service Low Temperature		
Carbon Steel	A352 Gr. LCB	-46°C to 343°C (-50.8°F to 649.4°F)	2 / 12	12 / 5
	A352 Gr. LC2	-73°C to 343°C (-99.4°F to 649.4°F)		
	A352 Gr. LC3	-101°C to 343°C (-149.8°F to 649.4°F)		
Alloy Steel	A217 Gr. WC1	Non corrosive water, oil and gas and steam (-29°C to 425°C) (-20°F to 797°F)		
1 1/4% Cr - 1/2% Mo	A217 Gr. WC6	Non corrosive water, oil and gas	1 / 5	5
2 1/4% Cr - 1% Mo	A217 Gr. WC9	-10° to 593°C (14°F to 1099.4°F)		
5% Cr - 1/2% Mo	A217 Gr. C5	Corrosive water, oil and gas	8 / 5	5
9% Cr - 1% Mo	A217 Gr. C12	-10° to 649°C (14°F tp 1200.2°F)		
Cast Stainless Steel		Corrosive high temperature service	10 / 12	5
18% Cr - 8% Ni	A351 Gr. CF8	-10° to 816°C (14°F to 1500.8°F)		
17% Cr - 8% Ni	A351 Gr. CF3	-10° to 427°C (14°F to 800.6°F)		
18% Cr - 9% Ni - 2% Mo	A351 Gr. CF8M	-10° to 649°C (14°F to 1200.2°F)		
17% Cr - 9% Ni - 2% Mo	A351 Gr. CF3M	-10° to 454°C (14°F to 849.2°F)		
18% Cr - 9% Ni-cb	A351 Gr. CF8C	-10° to 816°C (14°F to 1500.8°F)		
25% Cr - 5Ni - Mo - Cu (Duplex 1A)	A890 CD4MCu	-80° to 300°C (-112°F to 572°F)	Duplex 1A	Duplex 1A
24% Cr - 10Ni - Mo - N (Duplex 2A)	A890 CE8MN	-80° to 300°C (-112°F to 572°F)	Duplex 2A	Duplex 2A
25% Cr - 5Ni - Mo - N (Duplex 3A)	A890 CD6MN	-80° to 300°C (-112°F to 572°F)	Duplex 3A	Duplex 3A
22% Cr - 5Ni - Mo - N (Duplex 4A)	A890 CD3MN	-80° to 300°C (-112°F to 572°F)	Duplex 4A	Duplex 4A
25% Cr - 7Ni - Mo - N (Duplex 5A)	A890 CE3MN	-80° to 300°C (-112°F to 572°F)	Duplex 5A	Duplex 5A
25% Cr - 7Ni - Mo - N (Duplex 6A)	A890 CD3MWCuN	-80° to 300°C (-112°F to 572°F)	Duplex 6A	Duplex 6A
INCONEL 625	A494 CW6MC	-157° to 982°C (-250.6°F to 1799.6°F)	INCONEL 625	INCONEL 625
INCOLOY 825	A494 CU5MCuC	-253° to 540°C (-423.4°F to 1004°F)	INCOLOY 825	INCOLOY 825

Exploded view



Industry Spectrum

- Refineries
- Petrochemicals
- Power
- Sugar
- Paper
- Chemical
- Nuclear
- Oil and Gas
- Steel

and many more....

TÜV NORD
TÜV India Private Ltd.
ISO 9001

www.forbesmarshall.com

Forbes Marshall
Trusted Partners.
Innovative Solutions.

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