

FOR THE FUTURE WITH PASSION & CREATIVITY & CHALLENGE

SUN KOREA

VISION

*FOR THE FUTURE WITH
PASSION & CREATIVITY & CHALLENGE!*



SUN KOREA with DREAM & FUTURE

**FOR THE FUTURE WITH PASSION & CREATIVITY
& CHALLENGE, SUN KOREA CO.,LTD.**



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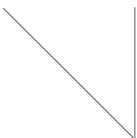
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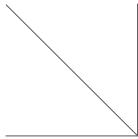


We comply with basic principle for business management and maintain a clean organization culture. Better working environment and welfare for employees can give more opportunities for self-development. We always care for the bigger performance-based on good compensation. Our employee has strong pride and good performance bring highest level of quality, continuous operational innovation and global competitiveness.

We always believe,
“Promise and practice is our pride.”
“Practical achievement is our life.”
“Innovative people are the most important asset.”
Don't forget “Customer's satisfaction is our heart.”

World, Stage of unlimited possibilities

We heartily welcome your attention to
“SUN KOREA CO., LTD.” catalogue and very honored to
have an opportunity of introducing our company.



We, “SUN KOREA CO., LTD.” have focused on items of shipbuilding parts, on/offshore oil & gas, chemical & petrochemical area accumulating wealth of experience & excellent reputation because of strong competitiveness such as high quality, reasonable price and on time delivery.

On the strength of our challenge and our willingness to achieve a satisfaction of our customer, will make our best efforts to place its highest priority on our customer’s satisfaction and grow further to ensure prosperity for all our business partner.

We will continue to take on new challenge and find new ways to improve our products and services. As we can instruct technical advice and control the quality for our customer’s demand with professional dealing experience in these items, we believe can find many ways to cooperate with you for our mutual benefit.

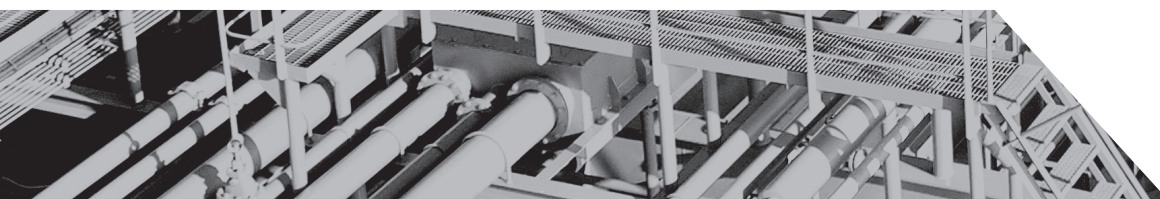
We also continue our best attention to satisfy customer’s demand with full of service and strongly want to develop long term business relationship on the basis of credit.

We look forward to your continued encouragement and support.
Always very appreciated for your kindly attention & cooperation !

Thanks & best regards

President

S.S LEE (James Lee) *James. Lee*



SUN KOREA CO., LTD

#498-65, DAEJEO 1 DONG, GANGSEO-GU, BUSAN, KOREA

SUN PRECISION CO., LTD

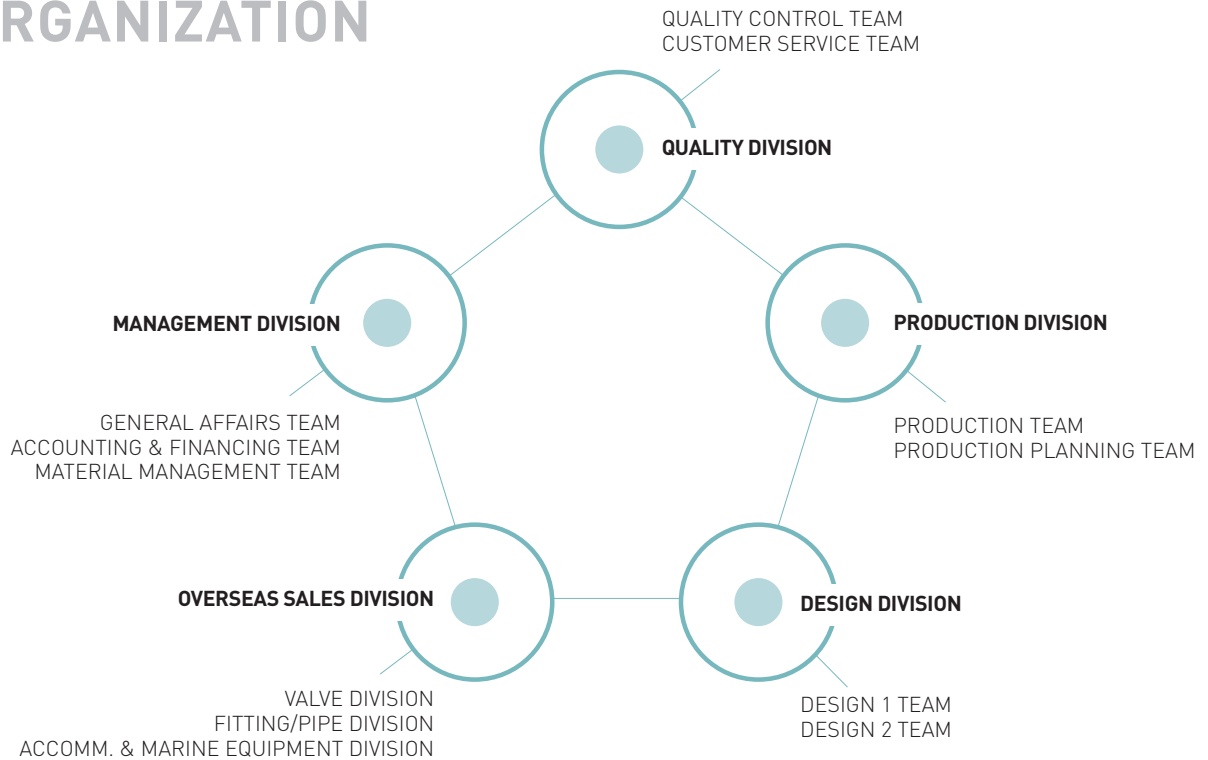
#498-67, DAEJEO 1 DONG, GANGSEO-GU, BUSAN, KOREA

SUN DESIGN CO., LTD

#492-2, DAEWOO EDEN PLAZA, HADAN-2 DONG, SAHA-GU, BUSAN, KOREA



ORGANIZATION



COMPANY HISTORY



- 2002 -
 - FEB.2002** THE COMPANY WAS ESTABLISHED UNDER THE NAME OF "SUN VALVE CO.,LTD"
 - MAR.2002** JOINED A MEMBERSHIP OF SHIPBUILDING EQUIPMENT BUSINESS.
 - MAY.2002** REGISTERED AT THE MINISTRY OF TRADE AND INDUSTRY AND ENERGY AS MANUFACTURER & TRADING COMPANY.
 - NOV.2002** GRANTED AS A MAKER BY KOREA SAFETY CORPORATION.

- 2003 -
 - APR.2003** FOUNDED QUALITY CONTROL DIVISION COMMITTEE
 - JUL.2003** CERTIFIED AS A MEMBER OF KOREA INTERNATIONAL TRADE ASSOCIATION.
 - SEP.2003** REGISTERED AS A BUSINESS PARTNER TO MUHIBBAH MARINE ENGINEERING SDN BHD.(MALAYSIA)

- 2004 -
 - JAN.2004** JOINED A MEMBERSHIP OF KOREA MACHINERY INDUSTRY ASSOCIATION.
 - AUG.2004** REGISTERED AS A BUSINESS PARTNER TO SEMBAWANG SHIPYARD PTE LTD (SSPL), (SINGAPORE)
 - SEP.2004** REGISTERED AS A BUSINESS PARTNER TO JURONG SHIPYARD PTE LTD. (SINGAPORE)

- 2005 -
 - FEB.2005** APPROVED AS OF SUPPLIER FOR WATER & FIRE POWER PLANT EQUIPMENT FROM KHI. (R.O.KOREA)
 - MAR.2005** REGISTERED AS A BUSINESS PARTNER TO UNITHAI SHIPYARD & ENGINEERING LTD. (THAILAND)
 - APR.2005** RENAMED THE COMPANY NAME INTO "SUN INTERNATIONAL CO.,LTD"
 - MAY.2005** REGISTERED AS A BUSINESS PARTNER TO DUBAI DRYDOCKS WORLD. (UAE)
 - AUG.2005** CERTIFIED THE CLEAN COMPANY BY THE MINISTER OF LABOR.
 - NOV.2005** REGISTERED AS A BUSINESS PARTNER TO ZAMIL OPERATION & MAINTENANCE CO.,LTD (FOR SHIPBUILDING) (SAUDI ARABIA)
 - DEC.2005** CONFORMATION CERTIFICATE OF VENTURE COMPANY.

- 2006 -
 - JAN.2006** REGISTERED AS A BUSINESS PARTNER TO PT PAL INDONESIA (INDONESIA)
 - MAR.2006** REGISTERED AS A BUSINESS PARTNER TO BOUSTEAD PENANG SHIPYARD SDN BHD. (MALAYSIA)
 - MAY.2006** REGISTERED AS A BUSINESS PARTNER TO COLOMBO DOCKYARD LTD. (SRI LANKA)
 - MAY.2006** REGISTERED AS A BUSINESS PARTNER TO KEPPEL SINGMARINE PTE LTD. (SINGAPORE)
 - AUG.2006** SELECTED AS A LEADING EXPORTER BY OFFICE OF KOREA INDUSTRIAL PROMOTION.
 - DEC.2006** INTRODUCED ERP (ENTERPRISE RESOURCE PLANNING) SYSTEM.

- 2007 -
 - FEB.2007** REGISTERED AS A BUSINESS PARTNER TO BHARATI SHIPYARD LTD. (INDIA)
 - MAY.2007** REGISTERED AS A BUSINESS PARTNER TO SAIGON SHIPYARD IND. (VIETNAM)
 - JULY.2007** REGISTERED AS A BUSINESS PARTNER TO COCHIN SHIPYARD LTD. (INDIA)
 - AUG.2007** REGISTERED AS A BUSINESS PARTNER TO PT DOK & PERKAPALAN KODJA BAHARI (PERSERO) (INDONESIA)
 - OCT.2007** REGISTERED AS A BUSINESS PARTNER TO SPF (STAINLESS PIPE & FITTINGS). (AUSTRALIA)
 - NOV.2007** REGISTERED AS A BUSINESS PARTNER TO TUONG AIK SHIPYARD SDN BHD. (MALAYSIA)
 - NOV.2007** MOVED AND EXPANDED OUR HEADQUARTER : 492-2, DAEWOO EDEN PLAZA, SAHA-GU, BUSAN, KOREA
 - DEC.2007** MADE BUSINESS RELATIONSHIP TO ABG SHIPYARD LTD. (INDIA)

2008

- JAN.2008** OPENED WAREHOUSE AT DAEJEO 1 DONG, GANGSEOGU, PUSAN, KOREA
REGISTERED AS A BUSINESS PARTNER TO ASIAN MARINE SERVICES PUBLIC COMPANY LIMITED. (THAILAND)
- MAR.2008** REGISTERED AS A BUSINESS PARTNER TO KLINGER DANMARK (DANMARK)
- APR.2008** REGISTERED AS A BUSINESS PARTNER TO CHOWGULE AND COMPANY PVT.LTD. (INDIA)
REGISTERED AS A BUSINESS PARTNER TO TO PT. BATAMEC (INDONESIA)
- MAY.2008** REGISTERED AS A BUSINESS PARTNER TO ITALTHAI MARINE LTD. (THAILAND)
- AUG.2008** REGISTERED AS A BUSINESS PARTNER TO NGV TECH SDN BHD.
REGISTERED CORPORATION COMPANY AS "SUN KOREA CO.,LTD"
- SEP.2008** OPENED 2ND WAREHOUSE IN 3686-7, DAEJEO 1 DONG, GANGSEOGU, PUSAN, KOREA
- NOV.2008** MADE NEW FACTORY AT NOKSAN INDUSTRIAL COMPLEX IN BUSAN.

2009

- APR.2009** REGISTERED AS A BUSINESS PARTNER TO ITS (STI INDUSTRIAL TECHNICAL SUPPLIES BV) (NETHERLANDS)
- AUG.2009** START BUSINESS COOPERATION FOR OVERSEAS MARKETING WITH "EUN KWANG INOTECH CO.,LTD"
- MAY.2009** REGISTERED AS A BUSINESS PARTNER TO MARINE TRADE (CROATIA)
- JULY.2009** OBTAINED THE CLEAN FACTORY FROM THE BUSAN REGIONAL MINISTRY OF KOREA.
- SEP.2009** REGISTERED AS A BUSINESS PARTNER TO PPL SHIPYARD PTE LTD (SINGAPORE)
- OCT.2009** REGISTERED AS A BUSINESS PARTNER TO DUBAI SHIPBUILDING & ENGINEERING L.L.C. (U.A.E.)
- DEC.2009** SELECTED AS A PROMISING MEDIUM ENTERPRISE BY INDUSTRIAL BANK OF KOREA.

2010

- APR.2010** REGISTERED AS A BUSINESS PARTNER TO EMAS OFFSHORE CONSTRUCTION & PRODUCTION (SINGAPORE)
- JUN.2010** REGISTERED AS A BUSINESS PARTNER TO TEBMA SHIPYARDS LTD (INDIA)
- AUG.2010** REGISTERED AS A BUSINESS PARTNER TO SHIN YANG SHIPYARD SDN.BHD. (MALAYSIA)
REGISTERED AS A BUSINESS PARTNER TO PIASAU SLIPWAYS SDN.BHD. (MALAYSIA)

2011

- FEB.2011** REGISTERED AS A BUSINESS PARTNER TO TRIYARDS SSY (VIETNAM)
REGISTERED AS A BUSINESS PARTNER TO TRIYARDS SOFEL (VIETNAM)
- OCT.2011** REGISTERED AS A BUSINESS PARTNER TO DUNG QUAT SHIPBUILDING INDUSTRY COMPANY LTD. (VIETNAM)
- DEC.2011** SELECTED AS A SUPERIORITY COMPANY BY KOREAN GOVERNMENT.

2012

- FEB.2012** REGISTERED AS A BUSINESS PARTNER TO TIMBLO DRYDOCKS PVT LTD. (INDIA)
- JUN.2012** REGISTERED AS A BUSINESS PARTNER TO DONG BAC SHIPYARD. (VIETNAM)
- DEC.2012** SELECTED AS A LEADING COMPANY IN TOTAL EXPORT VALUE BY KOREAN GOVERNMENT.

2013

- MAY.2013** REGISTERED AS A BUSINESS PARTNER TO SBM OFFSHORE (NETHERLAND)
- JUN.2013** REGISTERED AS A BUSINESS PARTNER TO KEPPEL FELS LIMITED. (SINGAPORE)
- OCT.2013** REGISTERED AS A BUSINESS PARTNER TO PETROVIETNAM MARINE SHIPYARD COMPANY. (VIETNAM)

2014

- MAY.2014** ESTABLISHED RESEARCH & DEVELOPMENT CENTER CERTIFIED.
(KOREA INDUSTRIAL TECHNOLOGY ASSOCIATION.)
- SEP.2014** MADE OUR AFFILIATE COMPANY "SUN PRECISION CO.,LTD"
#498-67, DAEJEO 1 DONG, GANGSEO-GU, BUSAN, KOREA
- NOV.2014** OPENED OUR NEW WAREHOUSE
#498-66, DAEJEO 1 DONG, GANGSEO-GU, BUSAN, KOREA
- DEC.2014** SELECTED AS A PROMISING MEDIUM ENTERPRISE BY WOORI BANK IN KOREA.

2015

- JAN.2015** MOVED AND EXPANDED OUR HEADOFFICE AND FACTORY.
#498-65, DAEJEO 1 DONG, GANGSEO-GU, BUSAN, KOREA

OUR PROMISE TO OUR CUSTOMERS

Based on respect for partnership with our relevant maker, **Sun Korea Co.,Ltd** will establish a creative and cooperative organizational culture and enhance the company's competitiveness.



WE ALWAYS WITH YOU!

Our philosophy is to always provide sincere and honest service to our customers. With our customer-oriented management, we hope to achieve greater customer satisfaction.

CUSTOMER ORIENTED VALUE

DEVELOP PRODUCTS AND SERVICES FOR CUSTOMER ORIENTED SATISFACTION



- TOP QUALITY PRODUCT
- CUSTOMER ORIENTED PRICES
- HIGH QUALITY SERVICES

BUILD SPEEDY

BASED ON THE SPEEDY MANAGEMENT, ENHANCE OUR COMPANY'S COMPETITIVENESS



- TIMELY
- EFFICIENCY
- RESPONSIBILITY

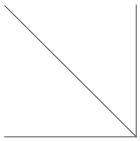
HUMAN RESOURCE MANAGEMENT

PROVIDE A FLEXIBLE AND CREATIVE COOPERATION CULTURE WITH OUR MANY RELEVANT MAKERS.



- FLEXIBLE
- CREATIVE
- COOPERATIVE

World, Stage of unlimited possibilities.



ON/OFFSHORE OIL & GAS

SUN KOREA CO., Ltd takes a major role providing proper valves & fittings on satisfying the technical specification and quality standards of oil & gas production.



CHEMICAL & PETROCHEMICAL AREA

SUN KOREA CO., Ltd takes a major role providing proper valves & fittings on satisfying the technical specification and quality standards of chemical & petrochemical.



SHIPBUILDING AREA

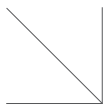
SUN KOREA CO., Ltd takes a major role providing proper valves & fittings on satisfying the technical specification and quality standards of shipbuilding.

Taking first priority for customer's satisfaction based on pursuing top quality, reasonable price, on time delivery with full of service.

Our dedication to progress is driven our enthusiasm.

- Quality of our products and services is a direct reflection of our continuous efforts and hard work.
- We will continue to take on new challenges and find new ways to improve our products and services.

SUN'S OVERSEAS MARKET AREA



AUSTRALIA / CHINA / DENMARK / EGYPT /
ENGLAND / GREECE / INDIA / INDONESIA / IRAN /
ITALY / JAPAN / MALAYSIA / PAKISTAN / PHILIPPINES /
ROMANIA / SAUDI ARABIA / SINGAPORE / SPAIN /
SRI LANKA / SWITZERLAND / THAILAND / TURKEY /
UAE / U.S.A / VIETNAM



PRODUCT INTRODUCTION

C O N T E N T S



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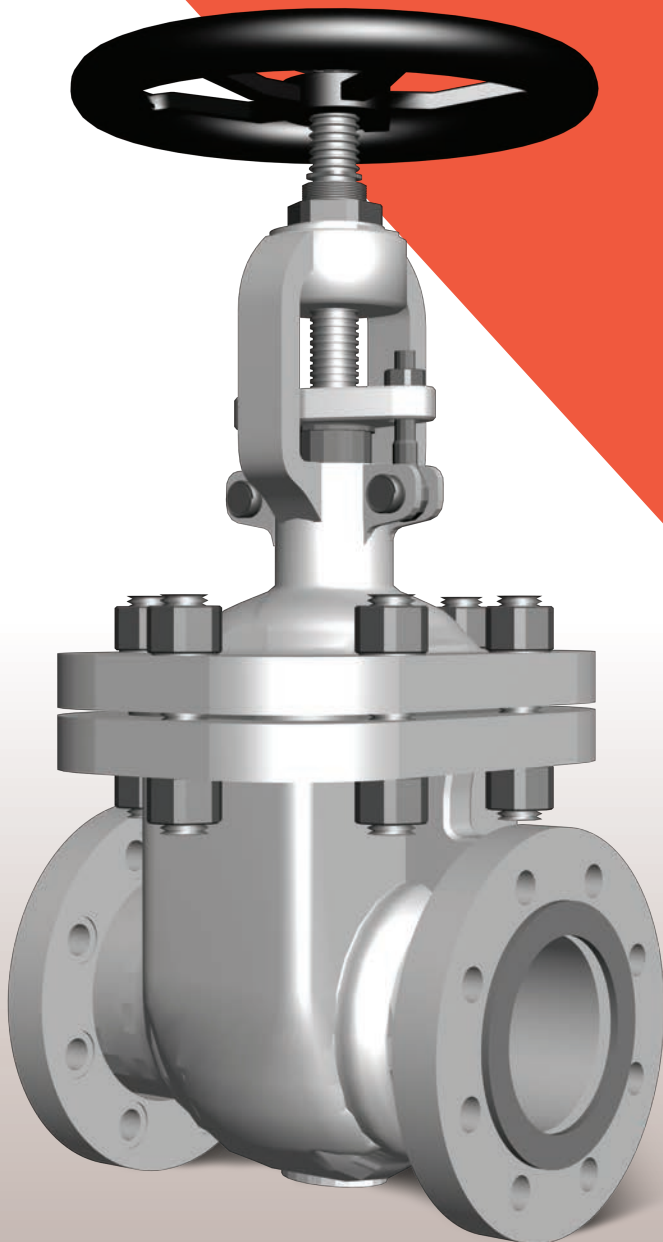
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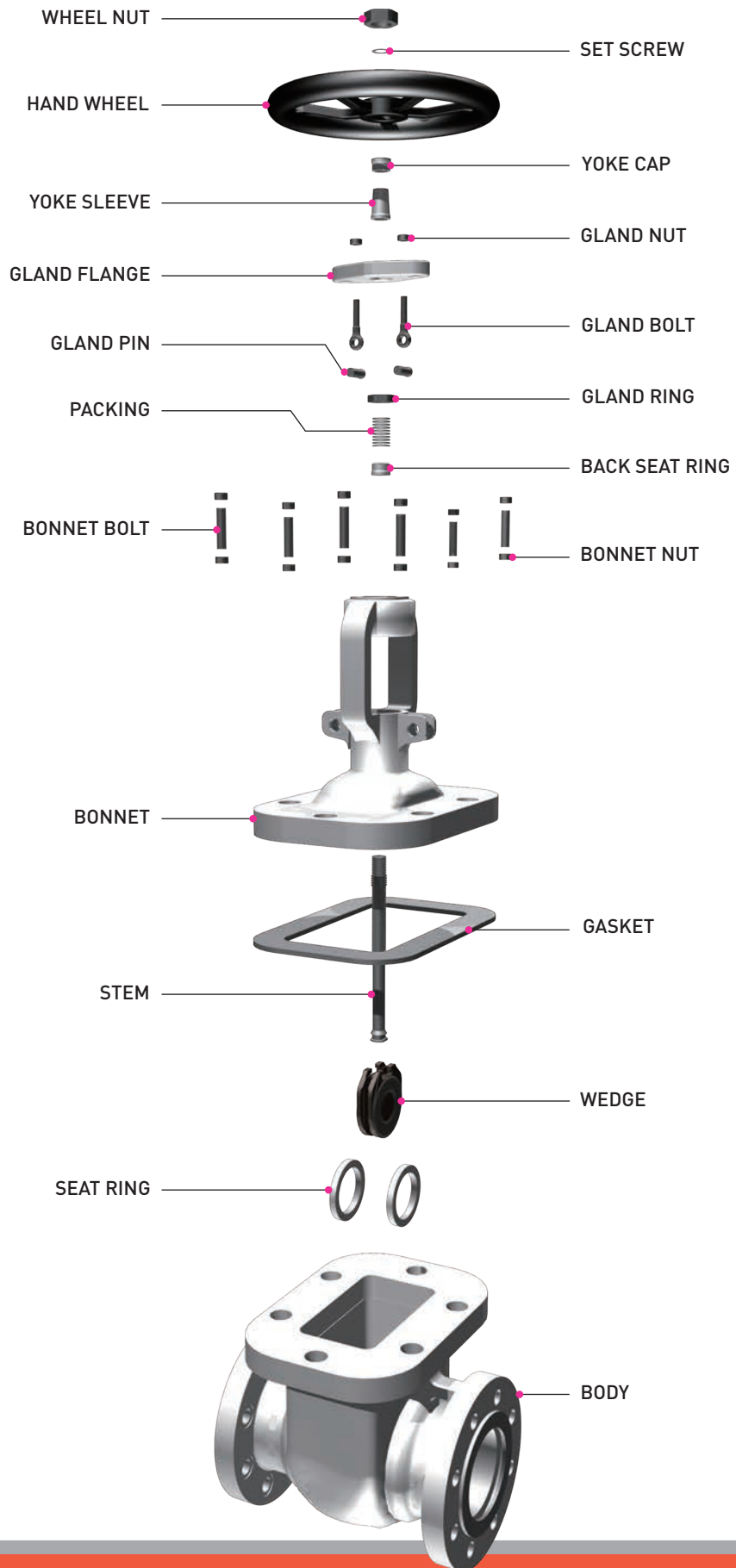
GATE VALVE

- PART LIST FOR GATE VALVE
- STANDARD MANUFACTURING PROCESS FOR GATE VALVE
- DIMENSION & WEIGHT LIST FOR GATE VALVE
 - CLASS 150 / 300 / 600 / 900 / 1500



GATE VALVE

PART LIST FOR GATE VALVE



STANDARD MANUFACTURING PROCESS FOR GATE VALVE

STANDARD PRODUCTION SPECIFICATION

→ DESIGN

SUN has two kinds of design with Heavy Wall Thickness Type based on BS 1414 & API 600 and Light Wall Thickness Type based on ANSI B16.34 & API 603.

→ SEAT RING & BACK SEAT RING

Seal welded seat ring and Threaded back seat ring type to be provided for cast steel valves.
Integral seat ring and back seat ring type to be provided for stainless steel valves.

→ TYPE OF WEDGE

1-1/2 inch & smaller size valves to be provided one piece plain solid wedges for light wall thickness type.
2 inch & larger size valves to be provided one piece flexible wedges for light wall thickness type.

→ BASE MATERIALS OF WEDGE

In case of Class 150 & 300 & 600 valves, 10 inch & smaller size valves to be provided wedge of casting materials equivalent with designating trim materials.
12 inch & larger size valves to be provided wedge of casting materials equivalent with designating body material.
In case of Class 900 & larger class valves, all size valves to be provided disc of casting material equivalent with designating body materials.

→ YOKE

12 inch and larger size valves to be installed. Yoke separately for Class 150 & 300.
10 inch and larger size valves to be installed. Yoke separately for Class 600 & Over.

→ YOKE CAP

In case of Light Wall thickness Type, 4 inch and smaller size of Class 150 & 300 valves not to be installed Yoke Cap.

→ GLAND FLANGE BOLT

Swing type gland bolts are provided easy service of the stuffing box.

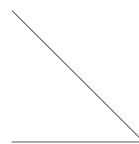
→ GASKET & PACKING FOR HEAVY WALL THICKNESS TYPE

Reinforced graphite flat metal (stainless steel) gasket to be provided Class 150 valves.
Spiral wound stainless steel hoop graphite filler gasket to be provided class 300 & 600 valves.
In case of Ring Joint Type, we shall provide soft steel ring gasket with oval section shape.
Anti-exclusion square-braiding graphite fiber top & bottom rings and pure graphite preformed packing to be provided all valves.

→ GASKET & PACKING FOR LIGHT WALL THICKNESS TYPE

PTFE sheet gasket to be provided Class 150.
Spiral wound stainless steel hoop PTFE filler gasket to be provided Class 300 & 600.
In case of Ring Joint Type, we shall provide stainless steel ring gasket with oval section shape.
Lattice-braiding pure PTFE fiber packing to be provided all valves.

* Everything can be replaced the one which is requested by customers' requirement.



GATE VALVE

STANDARD MANUFACTURING PROCESS FOR GATE VALVE

STANDARD DESIGN SPECIFICATION

APPLIED PART	SPECIFICATION
PRESSURE RATING	ANSI B16.34
FACE TO FACE (END TO END)	ANSI B16.10
FLANGE DIMENSION	ANSI B16.5
26" AND LARGER SIZE	ANSI B16.47 SER.A & B
TESTING	API 598 / MSS-SP-41
BONNET BOLT	ASTM A193 / ASTM A320
BONNET NUT	ASTM A194
MARKING SYSTEM	MSS-SP-25
LIGHT WALL THICKNESS	ANSI B16.34 / API 603
HEAVY WALL THICKNESS	API 600 / BS 1414
DESIGN	API 600 / API6D / EN ISO10434

STANDARD PRODUCTION RANGE

ANSI B16.34 / API 603 LIGHT WALL THICKNESS		BS 1414 / API 600 HEAVY WALL THICKNESS	
CLASS	SIZE	CLASS	SIZE
150	1/2" ~ 24"	150	2" ~ 48"
300	1/2" ~ 24"	300	2" ~ 48"
600	2" ~ 24"	600	2" ~ 42"
		900	2" ~ 24"
		1500	2" ~ 24"

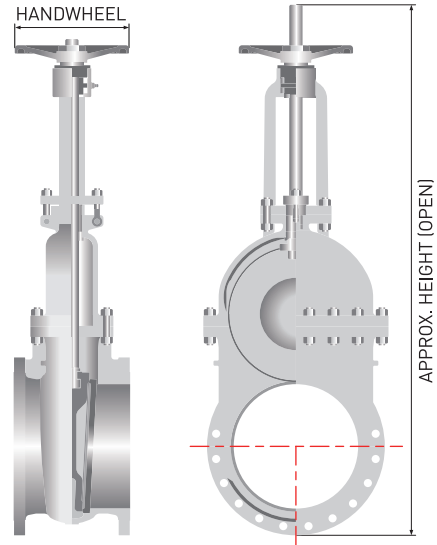
STANDARD MATERIALS SPECIFICATION

PART	CARBON STEEL VALVES			STAINLESS STEEL VALVES			SPECIAL STAINLESS STEEL VALVES		
	WCB	C5	LCB	CF8	CF8M	CF3M	CN7M	CD3MN	CE3MN
STANDARD TRIM	410 (HALF)	410 (HALF)	304 (HALF)	304	316	316L	N08020	S31803	S32750
BODY	A216-WCB	A217-C5	A352-LCB	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
SEAT RING	A105+STL	A479-410 +STL	A479-304 +STL	INTEGRAL			INTEGRAL		
WEDGE	A217-CA15	A217-CA15	A351 CF8	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
STEM	A479-410	A479-410	A479-304	A479-304	A479-316	A479-316L	UNS N08020	UNS S31803	UNS S32750
GASKET	SPIRAL WOUND / GRAPHITE +304 +304								
BONNET	A216 WCB	A217-C5	A352-LCB	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
BONNET BOLT	A193-B7	A193-B16	A320-L7	A193-B8			A193-B8		
BONNET NUT	A194-2H	A194-Gr.4	A194-4	A194-8			A194-8		
BACK SEAT RING	A479-410	A479-410	A479-304	INTEGRAL			INTEGRAL		
GLAND PACKING	GRAPHITE + GRAPHITE WITH INCONEL WIRE								
PACKING GLAND	A479-410	A479-410	A479-304	A479-304	A479-316	A479-316L	A351-CN7M	A890-CD3MN	A890-CE3MN
HINGE PIN	A576-1020			A479-304			A479-304		
GLAND BOLT	A307-B			A193-B8			A193-B8		
GLAND FLANGE	A105			A351-CF8			A351-CF8		
GLAND BOLT NUT	A563-B			A194-8			A194-8		
YOKE SLEEVE	A439-D2C			A439-D2C			A439-D2C		
YOKE CAP	A576-1020			A351-CF8			A351-CF8		
HANDWHEEL	A536			A536			A536		
HANDWHEEL NUT	A576-1020			A351-CF8			A351-CF8		
SET SCREW	STEEL			304SS			304SS		
GREASE NIPPLE	STEEL Plated Cr			STEEL Plated Cr			STEEL Plated Cr		

DIMENSION & WEIGHT LIST FOR GATE VALVE - 1

FIG NO. GA150F / GA150W / GA150J

The value of 26 inch and larger size have been applied with Bevel Gear operating type



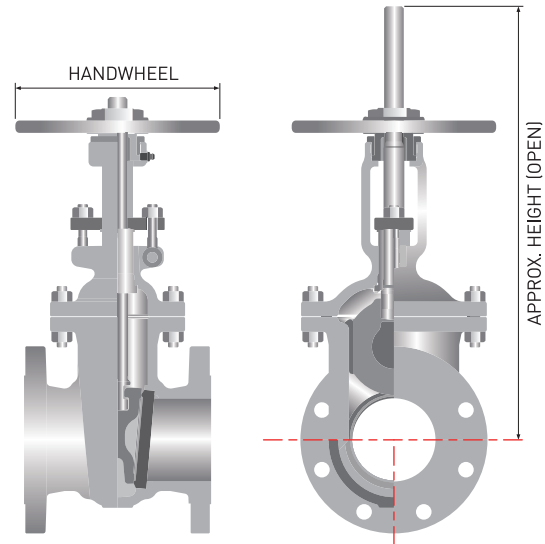
CLASS 150

Normal Bore Size		FACE TO FACE						API 600 (RF ENDS)						ANSI B16.34 / API 603(RF ENDS)					
		RF ENDS		BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL		WEIGHT		HEIGHT		HANDWHEEL		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	mm	inch	mm	inch	kg	lbs
15	1/2	108	4'1/4	108	4'1/4									190	7'1/2	120	4'5/7	4	8
20	3/4	118	4'5/8	118	4'5/8									205	8	120	4'5/7	4	9
25	1	127	5	127	5	140	5'1/2							230	9	120	4'5/7	6	14
40	1'1/2	165	6'1/2	165	6'1/2	178	7	346	13'5/8	200	7'7/8	17	37	302	11'8/9	140	5'1/2	11	23
50	2	178	7	216	8'1/2	191	7'1/2	391	15'2/5	200	7'7/8	20	44	333	13'1/9	180	7	13	28
65	2'1/2	190	7'1/2	241	9'1/2	203	8	398	15'2/3	200	7'7/8	27	60	365	14'3/8	180	7	20	44
80	3	203	8	282	11'1/8	216	8'1/2	463	18'2/9	250	9'5/6	35	76	410	16'1/7	200	7'7/8	23	50
100	4	229	9	305	12	241	9'1/2	566	22'2/7	300	11'4/5	50	111	498	19'3/5	250	9'5/6	42	93
150	6	267	10'1/2	403	15'7/8	279	11	778	30'5/8	350	13'7/9	82	181	683	26'8/9	300	11'4/5	65	144
200	8	292	11'1/2	419	16'1/2	305	12	981	38'5/8	400	15'3/4	131	289	920	36'2/9	350	13'7/9	97	213
250	10	330	13	457	18	343	13'1/2	1182	46'1/2	450	17'5/7	189	417	1100	43'1/3	400	15'3/4	155	343
300	12	356	14	502	19'3/4	368	14'1/2	1387	54'3/5	500	19'2/3	269	593	1194	47	450	17'5/7	215	475
350	14	381	15	572	22'1/2	394	15'1/2	1499	59	500	19'2/3	382	843	1355	53'1/3	500	19'2/3	322	711
400	16	406	16	610	24	419	16'1/2	1692	66'3/5	560	22	499	1100	1540	60'5/8	560	22	369	813
450	18	432	17	660	26	445	17'1/2	1878	74	560	22	677	1493	1910	75'1/5	560	22	560	1234
500	20	457	18	711	28	470	18'1/2	2110	83	630	24'4/5	819	1806	2143	84'3/8	630	24'4/5	725	1597
600	24	508	20	813	32	521	20'1/2	2485	97'5/6	630	24'4/5	1208	2662	2472	97'1/3	630	24'4/5	1012	2231
650	26	559	22	864	34			2970	117			1630	3593						
700	28	610	24	914	36			3120	122'5/6			2170	4785						
750	30	610	24	914	36			3340	131'1/2			2310	5093						
800	32	660	26	965	38			3650	143'5/7			2746	6053						
900	36	711	28	1016	40			4055	159'2/3			3048	6720						
1000	40	762	30	1067	42			4575	180'1/8			4661	10276						
1050	42	813	32	1092	43			4800	189			4988	10995						
1200	48	864	34	1168	46			5525	217'1/2			7842	17289						

DIMENSION & WEIGHT LIST FOR GATE VALVE - 2

FIG NO. GA300F / GA300W / GA300J

The value of 26 inch and larger size have been applied with Bevel Gear operating type



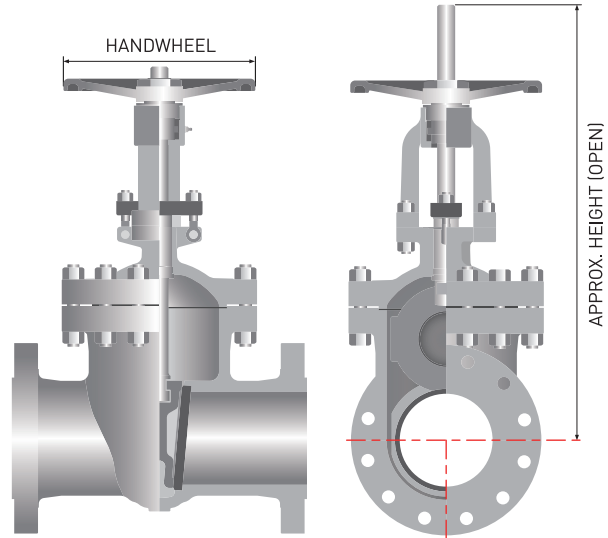
CLASS 300

Normal Bore Size		FACE TO FACE						API 600 (RF ENDS)				ANSI B16.34 / API 603(RF ENDS)							
		RF ENDS		BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL		WEIGHT		HEIGHT		HANDWHEEL		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	mm	inch	mm	inch	kg	lbs
15	1/2	140	5'1/2	151	6							208	8'1/5	208	8'1/5	120	4'5/7	6	13
20	3/4	152	6	165	6'1/2							211	8'1/3	211	8'1/3	120	4'5/7	8	17
25	1	165	6'1/2	178	7							303	12	303	12	180	7	11	23
40	1'1/2	190	7'1/2	203	8							349	13'3/4	349	13'3/4	200	7'7/8	17	37
50	2	216	8'1/2	232	9'1/8	391	15'2/5	200	7'7/8	26	58	390	15'1/3	390	15'1/3	200	7'7/8	24	53
65	2'1/2	241	9'1/2	257	10'1/8	432	17	200	7'7/8	37	81	432	17	432	17	200	7'7/8	35	76
80	3	282	11'1/8	299	11'3/4	463	18'2/9	250	9'5/6	44	97	491	19'1/3	491	19'1/3	250	9'5/6	42	93
100	4	305	12	321	12'5/8	567	22'1/3	300	11'4/5	79	174	588	23'1/7	588	23'1/7	300	11'4/5	64	141
150	6	403	15'7/8	419	16'1/2	800	31'1/2	400	15'3/4	152	336	809	31'6/7	809	31'6/7	400	15'3/4	112	248
200	8	419	16'1/2	435	17'1/8	1015	40	450	17'5/7	229	505	1002	39'4/9	1002	39'4/9	450	17'5/7	186	410
250	10	457	18	473	18'5/8	1191	46'8/9	450	17'5/7	306	674	1216	47'7/8	1216	47'7/8	450	17'5/7	286	630
300	12	502	19'3/4	518	20'3/8	1433	56'3/7	500	19'2/3	457	1007	1417	55'4/5	1417	55'4/5	500	19'2/3	438	965
350	14	762	30	778	30'5/8	1638	64'1/2	560	22	716	1579	1638	64'1/2	1638	64'1/2	560	22	630	1389
400	16	838	33	854	33'5/8	1758	69'1/5	560	22	966	2130	1784	70'1/4	1784	70'1/4	560	22	854	1882
450	18	914	36	930	36'5/8	1963	77'2/7	630	24'4/5	1246	2748	1972	77'2/3	1972	77'2/3	630	24'4/5	1029	2269
500	20	991	39	1010	39'3/4	2176	85'2/3	630	24'4/5	1692	3729	2200	86'3/5	2200	86'3/5	630	24'4/5	1661	3662
600	24	1143	45	1165	45'7/8	2528	99'1/2	800	31'1/2	2594	5718	2553	100'1/2	2553	100'1/2	630	24'4/5	2594	5718
650	26	1245	49			3100	122			3177	7005								
700	28	1346	53			3290	129'1/2			3733	8229								
750	30	1397	55			3520	138'4/7			4568	10070								
800	32	1524	60			3700	145'2/3			4830	10648								
900	36	1727	68			4205	165'5/9			7193	15857								
1000	40	1930	76			4784	188'1/3			8285	18264								
1050	42	1981	78			5032	198'1/9			9648	21271								
1200	48	2215	87'1/5			5650	224'4/9			13020	28704								

DIMENSION & WEIGHT LIST FOR GATE VALVE - 3

FIG NO. GA600F / GA600W / GA600J

The value of 20 inch and larger size have been applied with Bevel Gear operating type



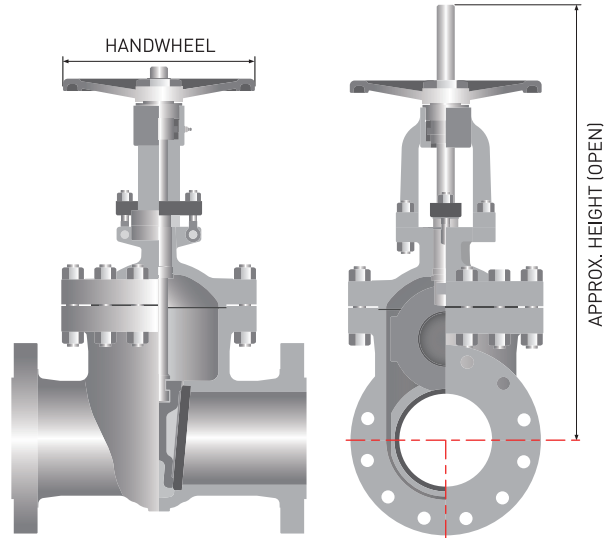
CLASS 600

Normal Bore Size		FACE TO FACE				API 600 (RF ENDS)						ANSI B16.34 / API 603 (RF ENDS)					
		RF&BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL		WEIGHT		HEIGHT		HANDWHEEL		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	mm	inch	mm	inch	kg	lbs
50	2	292	11'1/2	295	11'5/8	440	17'1/3	200	7'7/8	38	83	394	15'1/2	200	7'7/8	37	81
65	2'1/2	330	13	333	13'1/8	443	17'4/9	250	9'5/6	54	118	427	16'4/5	250	9'5/6	67	148
80	3	356	14	359	14'1/8	490	19'2/7	300	11'4/5	68	150	475	18'5/7	300	11'4/5	74	162
100	4	432	17	435	17'1/8	628	24'5/7	350	13'7/9	120	264	591	23'1/4	350	13'7/9	113	250
150	6	559	22	562	22'1/8	914	36	500	19'2/3	257	567	801	31'1/2	500	19'2/3	233	514
200	8	660	26	664	26'1/8	1072	42'1/5	500	19'2/3	393	866	1005	39'4/7	560	22	378	833
250	10	787	31	791	31'1/8	1266	49'5/6	560	22	659	1454	1192	47	560	22	643	1417
300	12	838	33	841	33'1/8	1490	58'2/3	630	24'4/5	945	2083	1490	58'2/3	630	24'4/5	1266	2792
350	14	889	35	892	35'1/8	1606	63'2/9	630	24'4/5	1266	2792	1620	63'7/9	630	24'4/5	1515	3340
400	16	991	39	994	39'1/8	1810	71'1/4	800	31'1/2	1481	3264	1810	71'1/4	750	29'1/2	1551	3420
450	18	1092	43	1095	43'1/8	1980	78	800	31'1/2	2329	5134	1980	78	750	29'1/2	2143	4724
500	20	1194	47	1200	47'1/4	2120	83'1/2			2952	6507	2230	87'4/5			2794	6159
600	24	1397	55	1407	55'3/8	2710	106'2/3			3807	8394	2710	106'2/3			4116	9074

DIMENSION & WEIGHT LIST FOR GATE VALVE - 4

FIG NO. GA900F / GA900W / GA900J & GA1500F / GA1500W / GA1500J

The value of 10 inch and larger size have been applied with Bevel Gear operating type

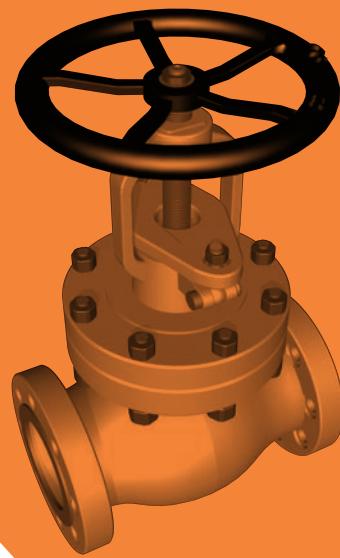
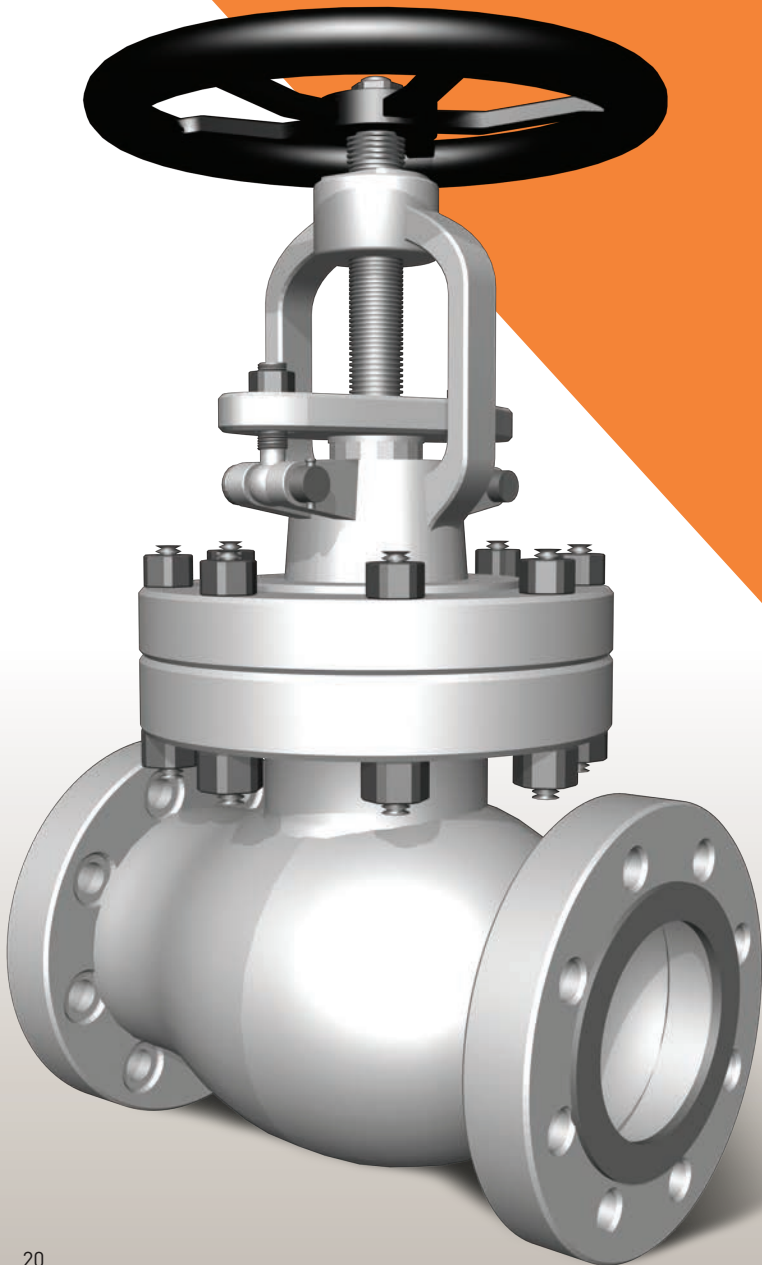


CLASS 900 & 1500

Normal Bore Size		FACE TO FACE				API 600 (RF ENDS)					
		RF&BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs
CLASS 900 <FIG NO. GA 900F>											
50	2	368	14'1/2	372	14'5/8	470	18'1/2	200	7'7/8	85	188
80	3	381	15	384	15'1/8	580	22'5/6	300	11'4/5	104	229
100	4	457	18	460	18'1/8	690	27'1/6	350	13'7/9	146	322
150	6	610	24	613	24'1/8	960	37'4/5	500	19'2/3	370	815
200	8	737	29	740	29'1/8	1300	51'1/6	500	19'2/3	636	1403
250	10	838	33	841	33'1/8	1400	55'1/8			1279	2819
300	12	965	38	968	38'1/8	1620	63'7/9			1518	3347
350	14	1029	40'1/2	1038	40'7/8	1750	68'8/9			1785	3935
400	16	1130	44'1/2	1140	44'7/8	1890	74'2/5			2415	5324
450	18	1219	48	1232	48'1/2	2197	86'1/2			3203	7060
CLASS 1500 <FIG NO. GA 1500F>											
50	2	368	14'1/2	372	14'5/8	561	22	300	11'4/5	85	188
80	3	470	18'1/2	473	18'5/8	662	26	400	15'3/4	149	329
100	4	546	21'1/2	549	21'5/8	754	29'2/3	450	17'5/7	252	556
150	6	705	27'3/4	711	28	1000	39'3/8	500	19'2/3	530	1169
200	8	832	32'3/4	841	33'1/8	1450	57	630	24'4/5	1205	2657
250	10	991	39	1000	39'3/8					1932	4259
300	12	1130	44'1/2	1146	45'1/8					3044	6711
350	14	1257	49'1/2	1276	50'1/4					3723	8208
400	16	1384	54'1/2	1407	55'3/8					6773	14931
450	18	1537	60'1/2	1559	61'3/8					8126	17914

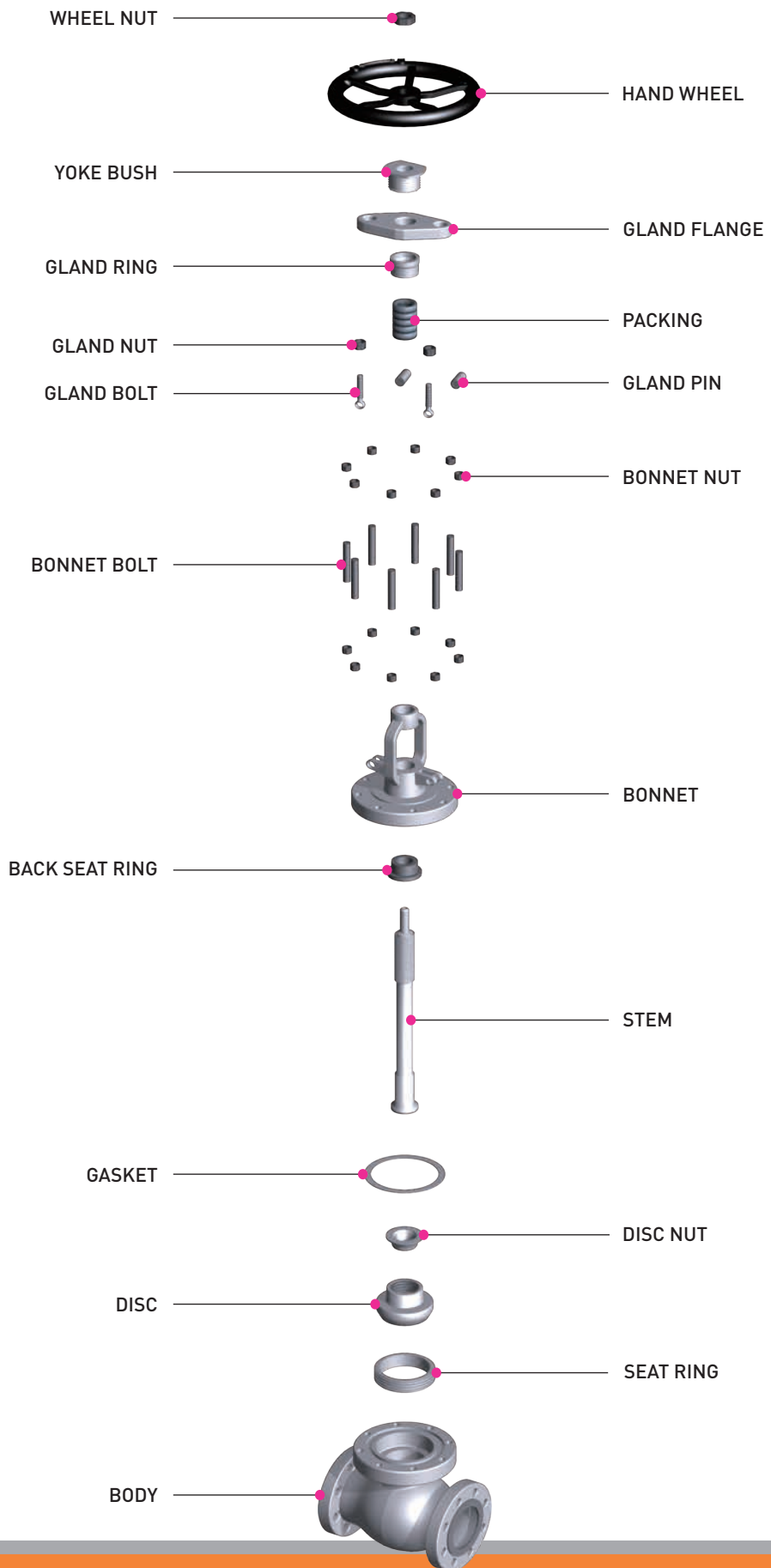
GLOBE VALVE

- PART LIST FOR GLOBE VALVE
- STANDARD MANUFACTURING PROCESS FOR GLOBE VALVE
- DIMENSION & WEIGHT LIST FOR GLOBE VALVE
 - CLASS 150 / 300 / 600 / 900 / 1500



GLOBE VALVE

PART LIST FOR GLOBE VALVE



STANDARD MANUFACTURING PROCESS FOR GLOBE VALVE

STANDARD PRODUCTION SPECIFICATION

→ DESIGN

SUN KOREA has two kinds of design with Heavy Wall Thickness Type based on BS 1873 & API 600 and Light Wall Thickness Type based on ANSI B16.34 & API 603.

→ SEAT RING & BACK SEAT RING

Integral seat ring and Threaded back seat ring type to be provided for cast steel valves.

Integral seat ring and back seat ring type to be provided for stainless steel valves.

→ BASE MATERIALS OF DISC

In case of Class 150 & 300 & 600 valves, 3 inch & smaller size valves to be provided disc of bar materials equivalent with designating trim materials.

From 4 to 10 inch size valves to be provided disc of casting materials with designating trim materials.

12 inch & larger size valves to be provided disc of casting materials equivalent with designating body materials.

In case of Class 900 & larger class valves, all size valves to be provided disc of casting material equivalent with designating body materials.

→ GLAND FLANGE BOLT

Swing type gland bolts are provided easy service of the stuffing box.

→ GASKET & PACKING FOR HEAVY WALL THICKNESS TYPE

Graphite Reinforced flat metal (stainless steel) gasket to be provided Class 150 valves.

Spiral wound stainless steel hoop graphite filler gasket to be provided class 300 & 600 valves.

In case of Ring Joint Type, we shall provide soft steel ring gasket with oval section shape.

Anti-exclusion square-braiding graphite fiber top & bottom rings and pure graphite preformed packing to be provided all valves.

→ GASKET & PACKING FOR LIGHT WALL THICKNESS TYPE

Flat PTFE sheet gasket to be provided Class 150.

Spiral wound stainless steel hoop PTFE filler gasket to be provided Class 300 & 600.

In case of Ring Joint Type, we shall provide stainless steel ring gasket with oval section shape.

Lattice-braiding pure PTFE fiber packing to be provided all valves.

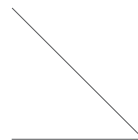
→ BOTTOM GUIDE

We shall provide Bottom Guide for 10 inch and larger size valves of Class 150 & 300, 8 inch and larger size valves of Class 600 & 900 and 6 inch and larger size valves of Class 1500.

→ HANDWHEEL

If it is not specified with gear operating, we shall provide Hammer Blow Handwheel for 10 inch and larger size valves of Class 150, 8 inch and larger size valves of Class 300, 6 inch and larger size valves of Class 600, 4 inch and larger size valves of Class 900 and 3 inch and larger size valves of Class 1500.

* Everything can be replaced the one which is requested by customers' requirement.



GLOBE VALVE

STANDARD MANUFACTURING PROCESS FOR GLOBE VALVE

STANDARD DESIGN SPECIFICATION

APPLIED PART	SPECIFICATION
PRESSURE RATING	ANSI B16.34
FACE TO FACE (END TO END)	ANSI B16.10
FLANGE DIMENSION	ANSI B16.5
TESTING	API 598 / MSS-SP-41
BONNET BOLT	ASTM A193 / ASTM A320
BONNET NUT	ASTM A194
MARKING SYSTEM	MSS-SP-25
LIGHT WALL THICKNESS	ANSI B16.34 / API 603
HEAVY WALL THICKNESS	BS 1873 / API 600
DESIGN	BS 1873

STANDARD PRODUCTION RANGE

ANSI B16.34 / API 603 LIGHT WALL THICKNESS		BS 1873 / API 600 HEAVY WALL THICKNESS	
CLASS	SIZE	CLASS	SIZE
150	1/2" ~ 14"	150	2" ~ 24"
300	1/2" ~ 12"	300	2" ~ 16"
600	2" ~ 12"	600	2" ~ 12"
		900	2" ~ 12"
		1500	2" ~ 12"

STANDARD MATERIALS SPECIFICATION

PART	CARBON STEEL VALVES			STAINLESS STEEL VALVES			SPECIAL STAINLESS STEEL VALVES		
	WCB	C5	LCB	CF8	CF8M	CF3M	CN7M	CD3MN	CE3MN
STANDARD TRIM	410 (HALF)	410 (HALF)	304 (HALF)	304	316	316L	N08020	S31803	S32750
BODY	A216-WCB	A217-C5	A352-LCB	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
SEAT-RING	INTEGRAL+STL			INTEGRAL			INTEGRAL		
DISC	A217-CA15	A217-CA15	A351 CF8	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
STEM	A479-410	A479-410	A479-304	A479-304	A479-316	A479-316L	UNS N08020	UNS S31803	UNS S32750
GASKET	SPIRAL WOUND / GRAPHITE +304 +304			SPIRAL WOUND / GRAPHITE +304 +304			SPIRAL WOUND / GRAPHITE +304 +304		
BONNET	A216-WCB	A217-C5	A352-LCB	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
BONNET BOLT	A193-B7	A193-B16	A320-L7	A193-B8			A193-B8		
BONNET NUT	A194-2H	A194-Gr.4	A194-4	A194-8			A194-8		
BACK SEAT-RING	A479-410	A479-410	A479-304	INTEGRAL			INTEGRAL		
GLAND PACKING	GRAPHITE + GRAPHITE WITH INCONEL WIRE			GRAPHITE + GRAPHITE WITH INCONEL WIRE			GRAPHITE + GRAPHITE WITH INCONEL WIRE		
PACKING GLAND	A479-410	A479-410	A479-304	A479-304	A479-316	A479-316L	UNS N08020	UNS S31803	UNS S32750
HINGE PIN	A576-1020			A479-304			A479-304		
GLAND BOLT	A307-B			A193-B8			A193-B8		
GLAND FLANGE	A105			A351-CF8			A351-CF8		
GLAND BOLT NUT	A563-B			A194-8			A194-8		
YOKE BUSH	A439-D2C			A439-D2C			A439-D2C		
HANDWHEEL	A536			A536			A536		
WASHER	A576-1020			A204-304			A204-304		
HANDWHEEL NUT	A563-B			A351-CF8			A351-CF8		
GREASE NIPPLE	STEEL			STEEL Plated Cr			STEEL Plated Cr		

10" & LARGER SIZE OF CLASS 150 & 300 / 8" & LARGER SIZE OF CLASS 600 & 900 / 6" & LARGER SIZE OF CLASS 1500

BOTTOM GUIDE	A216-WCB	A217-C5	A352-LCB	A351-CF8	A351-CF8M	A351-CF3M	A351-CF8M	A351-CF8	A351-CF3M
IMPACTOR BOSS	A576-1020			A204-304			A204-304		
H-WHEEL COVER	A563-B			A351-CF8			A351-CF8		
COVER BOLT	A576-1020			A204-304			A204-304		
SPLIT PIN	A563-B			A351-CF8			A351-CF8		

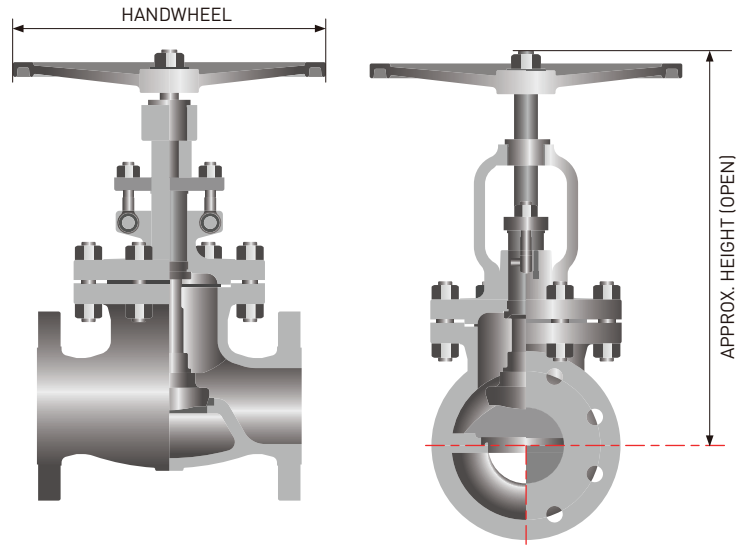
DIMENSION & WEIGHT LIST FOR GLOBE VALVE - 1

**FIG NO.
GL150F / GL150W / GL150J**

The value of 16 inch and larger size have been applied with Bevel Gear operating type

**FIG NO.
GL300F / GL300W / GL300J**

The value of 14 inch and larger size have been applied with Bevel Gear operating type



CLASS 150 & 300

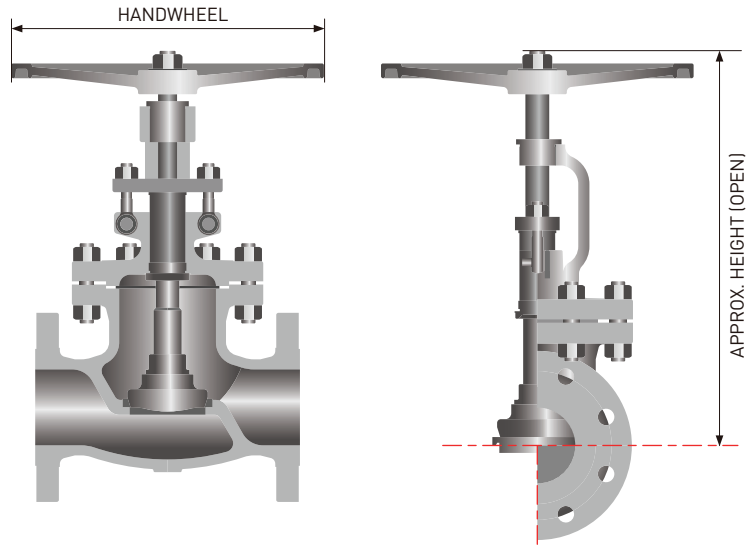
Normal Bore Size	FACE TO FACE					BS 1873 (RF ENDS)						ANSI B16.34 (RF ENDS)					
	RF & BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL		WEIGHT		HEIGHT		HANDWHEEL		WEIGHT		
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	mm	inch	mm	inch	kg	lbs
CLASS 150 <FIG NO. GL150F>																	
15	1/2	108	4'1/4									178	7	120	4'5/7	4	8
20	3/4	117	4'5/8									187	7'1/3	120	4'5/7	4	9
25	1	127	5	140	5'1/2							216	8'1/2	120	4'5/7	5	12
40	1'1/2	165	6'1/2	178	7							251	9'7/8	140	5'1/2	9	21
50	2	203	8	216	8'1/2	273	10'3/4	200	7'7/8	26	58	273	10'3/4	180	7	12	27
65	2'1/2	216	8'1/2	229	9	314	12'1/3	250	9'5/6	29	65	314	12'1/3	180	7	22	49
80	3	241	9'1/2	254	10	343	13'1/2	250	9'5/6	36	79	343	13'1/2	200	7'7/8	30	67
100	4	292	11'1/2	305	12	368	14'1/2	300	11'4/5	55	120	368	14'1/2	250	9'5/6	40	88
150	6	406	16	419	16'1/2	486	19'1/7	450	17'5/7	100	220	486	19'1/7	300	11'4/5	77	169
200	8	495	19'1/2	508	20	565	22'1/4	450	17'5/7	176	389	565	22'1/4	450	17'5/7	123	271
250	10	622	24'1/2	635	25	637	25	450	17'5/7	254	560	637	25	450	17'5/7	210	463
300	12	698	27'1/2	711	28	695	27'1/3	610	24	424	935	695	27'1/3	610	24	315	694
350	14	787	31	800	31'1/2	695	27'1/3	610	24	651	1435	695	27'1/3	610	24	441	972
400	16	914	36	927	36'1/2	1600	63			861	1898						
450	18	978	38'1/2	991	39	1600	63			1036	2285						
500	20	978	38'1/2	991	39	1650	65			1344	2963						
600	24	1295	51	1308	51'1/2	1650	65			2363	5208						
CLASS 300 <FIG NO. GL300F>																	
15	1/2	152	6	164	6'3/7							185	7'2/7	120	4'5/7	6	14
20	3/4	178	7	191	7'1/2							194	7'2/3	120	4'5/7	8	19
25	1	203	8	216	8'1/2							224	8'5/6	120	4'5/7	11	23
40	1'1/2	229	9	241	9'1/2							267	10'1/2	180	7	19	42
50	2	267	10'1/2	283	11'1/8	329	13	200	7'7/8	32	69	329	13	180	7	26	58
65	2'1/2	292	11'1/2	308	12'1/8	354	14	250	9'5/6	42	93	354	14	250	9'5/6	33	72
80	3	318	12'1/2	333	13'1/8	383	15	250	9'5/6	56	123	383	15	250	9'5/6	53	116
100	4	356	14	372	14'5/8	443	17'4/9	300	11'4/5	84	185	443	17'4/9	300	11'4/5	68	150
150	6	444	17'1/2	460	18'1/9	567	22'1/3	450	17'5/7	176	389	567	22'1/3	450	17'5/7	142	313
200	8	559	22	575	22'2/3	615	24'1/5	450	17'5/7	260	574	615	24'1/5	450	17'5/7	291	641
250	10	622	24'1/2	638	25'1/8	676	26'3/5	610	24	479	1056	676	26'3/5	610	24	410	903
300	12	711	28	727	28'5/8	740	29'1/7	610	24	638	1407	740	29'1/7	610	24	582	1282
350	14	864	34	778	30'5/8	1300	51'1/6			1213	2674						
400	16	978	38'1/2	879	34'3/5	1500	59			1785	3935						

DIMENSION & WEIGHT LIST FOR GLOBE VALVE - 2

FIG NO.
GL600F / GL600W / GL600J
The value of 12 inch and larger size have been applied with Bevel Gear operating type

FIG NO.
GL900F / GL900W / GL900J
The value of 10 inch and larger size have been applied with Bevel Gear operating type

FIG NO.
GL1500F / GL1500W / GL1500J
The value of 6 inch and larger size have been applied with Bevel Gear operating type



CLASS 600

<FIG NO. GL600F>

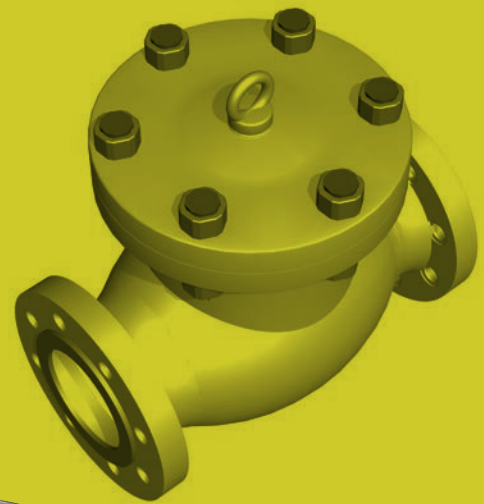
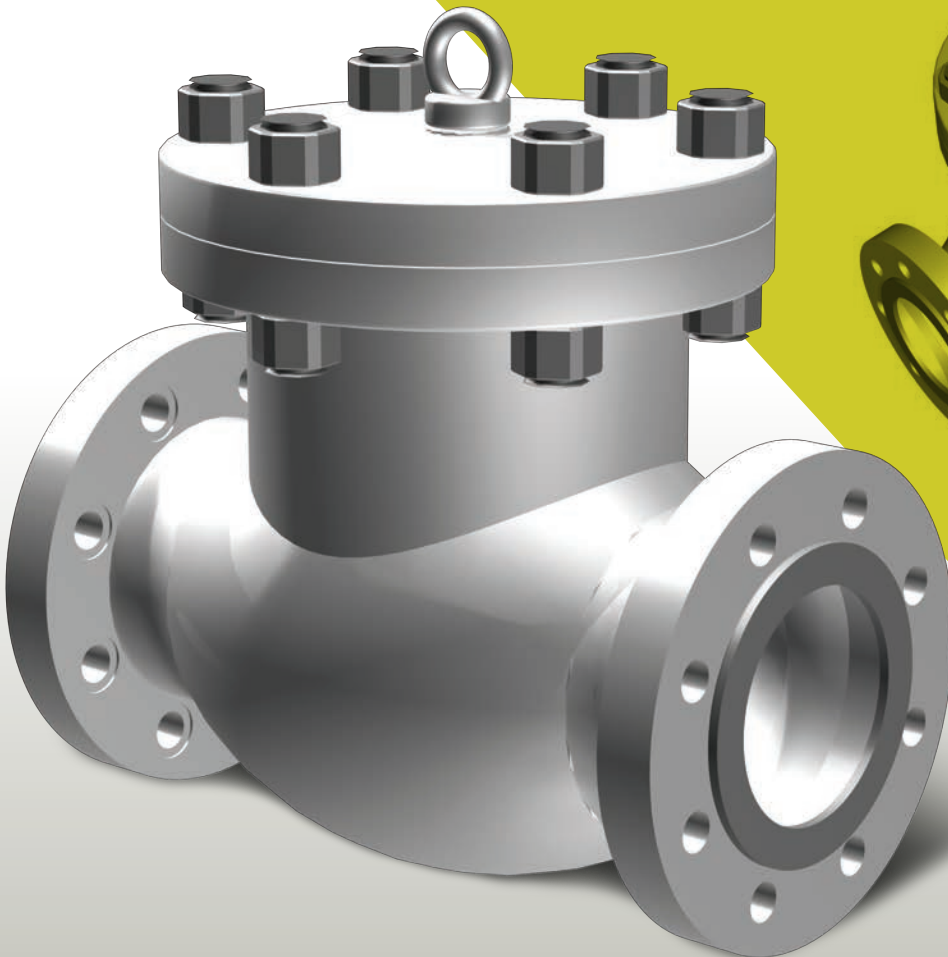
Normal Bore Size		FACE TO FACE				BS 1873 (RF ENDS)						ANSI B16.34 (RF ENDS)					
		RF&BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL		WEIGHT		HEIGHT		HANDWHEEL		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	mm	inch	mm	inch	kg	lbs
50	2	292	11 1/2	295.3	11 5/8	394	15 1/2	250	9 5/6	39	86	394	15 1/2	180	7	32	69
65	2 1/2	330	13	333.4	13 1/8	450	17 5/7	300	11 4/5	49	109	427	16 4/5	200	7 7/8	60	132
80	3	356	14	359	14 1/8	520	20 1/2	350	13 7/9	65	144	475	18 5/7	300	11 4/5	100	220
100	4	432	17	435	17 1/8	609	24	350	13 7/9	100	221	591	23 1/4	450	17 5/7	155	343
150	6	559	22	562	22 1/8	750	29 1/2	450	17 5/7	250	551	801	31 1/2	560	22	281	620
200	8	660	26	664	26 1/8	815	32	610	24	381	840	1005	39 4/7	610	24	532	1174
250	10	787	31	791	31 1/8	885	34 5/6	610	24	717	1581	1192	47	610	24	851	1875
300	12	838	33	841	33 1/8	955	37 3/5			945	2083	1490	58 2/3			1194	2632

CLASS 900 & 1500

Normal Bore Size		FACE TO FACE				API 600 (RF ENDS)							
		RF&BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL		WEIGHT			
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs		
CLASS 900												<FIG NO. GL900F>	
50	2	368	14 1/2	372	14 5/8	450	17 5/7	350	13 7/9	102	225		
80	3	381	15	384	15 1/8	535	21	450	17 5/7	186	410		
100	4	457	18	460	18 1/8	623	24 1/2	450	17 5/7	210	463		
150	6	610	24	613	24 1/8	785	31	610	24	438	965		
200	8	737	29	740	29 1/8	860	33 6/7	610	24	552	1218		
250	10	838	33	841	33 1/8	1350	53 1/7			1890	4167		
300	12	965	38	968	38 1/8	1500	59			2520	5556		
CLASS 1500												<FIG NO. GL1500F>	
50	2	368	14 1/2	372	14 5/8	500	19 2/3	350	13 7/9	102	225		
80	3	470	18 1/2	473	18 5/8	550	21 2/3	450	17 5/7	210	463		
100	4	546	21 1/2	549	21 5/8	615	24 1/5	450	17 5/7	368	810		
150	6	705	27 3/4	711	28	790	31 1/9			706	1556		
200	8	832	32 3/4	841	33 1/8	1150	45 2/7			1439	3171		
250	10	991	39	1000	39 3/8					2625	5787		
300	12	1130	44 1/2	1146	45 1/8					4200	9259		

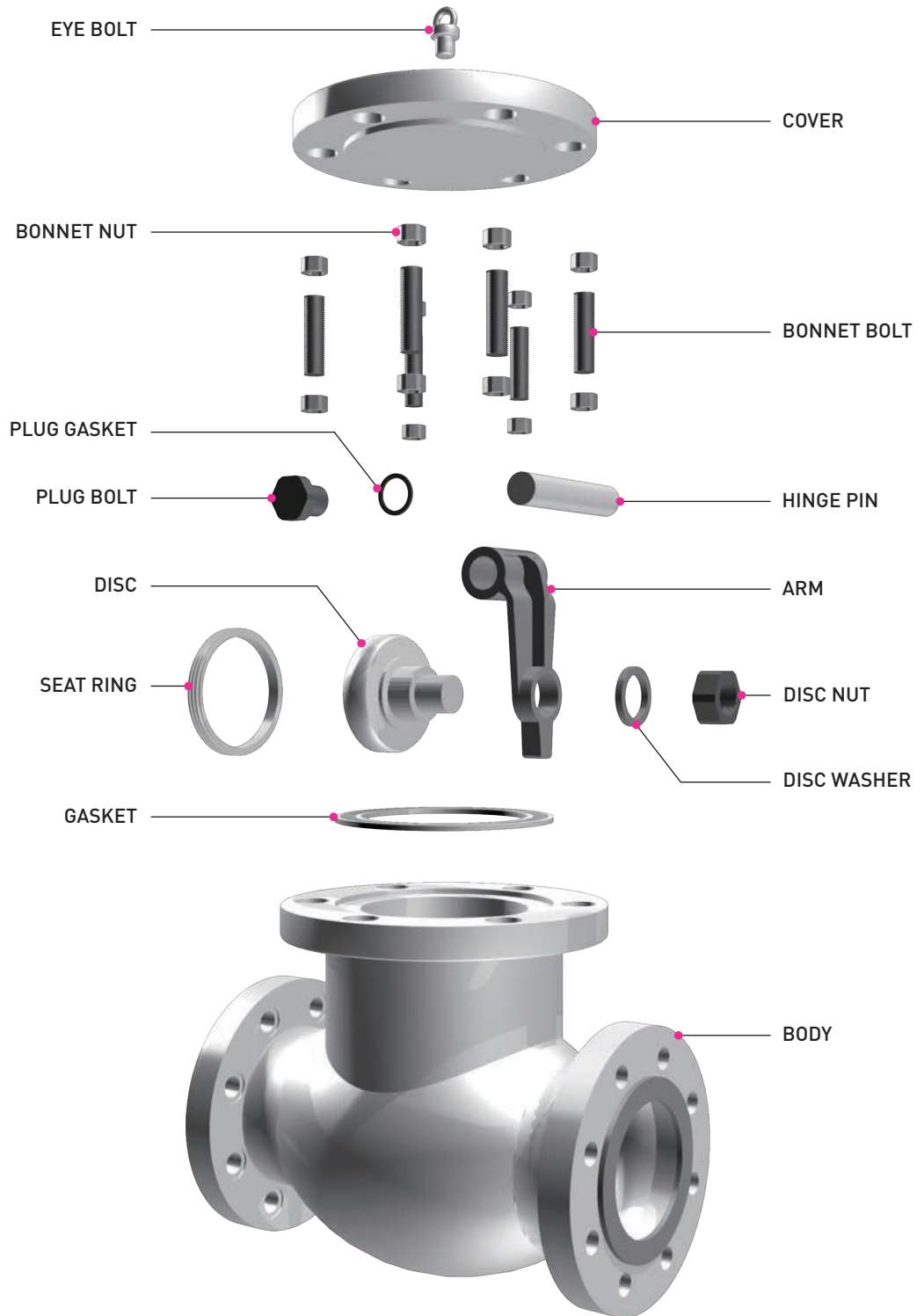
SWING CHECK VALVE

- PART LIST FOR SWING CHECK VALVE
- STANDARD MANUFACTURING PROCESS FOR SWING CHECK VALVE
- DIMENSION & WEIGHT LIST FOR SWING CHECK VALVE
- CLASS 150 / 300 / 600 / 900 / 1500



SWING CHECK VALVE

PART LIST FOR SWING CHECK VALVE



STANDARD MANUFACTURING PROCESS FOR SWING CHECK VALVE

STANDARD PRODUCTION SPECIFICATION

→ DESIGN

SUN KOREA has two design with Heavy Wall Thickness Type based on BS 1868 & API 600 and Light Wall Thickness Type based on ANSI B16.34 & API 603.

→ SEAT RING

Seal welded seat ring type to be provided for cast steel valves.

Integral seat ring type to be provided for stainless steel valves.

→ BASE MATERIALS OF DISC

In case of Class 150 & 300 & 600 valves, 1 inch & smaller size valves to be provided disc of casting or bar materials equivalent with designating trim materials for light wall thickness type.

From 1-1/2 to 6 inch size valves to be provided disc of casting materials equivalent with designating trim material 8 inch & larger size valves to be provided disc of casting materials equivalent with designating body material.

In case of Class 900 & larger class valves, all size valves to be provided casting material equivalent with designating body material.

→ ARM

In case of 150 & 300 valves for light wall thickness type, 4" and smaller size valves to be provided arm of investment casting equivalent with designating trim material.

→ DISC NUT & WASHER

In case of stainless steel body material, we provide the equivalent material of disc nut & washer with designating trim material. In case of carbon & alloy steel body material, it is A194-8 and A240-304.

→ GASKET FOR HEAVY WALL THICKNESS TYPE

Reinforced Graphite flat metal (stainless steel) gasket to be provided Class 150 valves.

Spiral wound stainless steel hoop graphite filler gasket to be provided class 300 & 600 valves.

In case of Ring Joint Type, we shall provide soft steel ring gasket with oval section shape.

→ GASKET FOR LIGHT WALL THICKNESS TYPE

Flat PTFE gasket to be provided Class 150.

Spiral wound stainless steel hoop PTFE filler gasket to be provided Class 300 & 600.

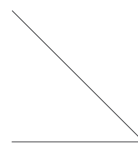
In case of Ring Joint Type, we shall provide stainless steel ring gasket with oval section shape.

→ PLUG BOLT & PLUG GASKET

In case of plug bolt, we shall provide the different materials of plug bolt as our body's material.

For plug gasket, serrated metal gasket is SUN KOREA's standard.

* Everything can be replaced the one which is requested by customers' requirement.



SWING
CHECK
VALVE

STANDARD MANUFACTURING PROCESS FOR SWING CHECK VALVE

STANDARD DESIGN SPECIFICATION

APPLIED PART	SPECIFICATION
PRESSURE RATING	ANSI B16.34
FACE TO FACE (END TO END)	ANSI B16.10
FLANGE DIMENSION	ANSI B16.5
TESTING	API 598 / MSS-SP-41
BONNET BOLT	ASTM A193
BONNET NUT	ASTM A194
MARKING SYSTEM	MSS-SP-25
LIGHT WALL THICKNESS	BS 1868 / ANSI B16.34
HEAVY WALL THICKNESS	BS 1868 / API 600
DESIGN	API 6D / BS 1868

STANDARD PRODUCTION RANGE

ANSI B16.34 / BS 1868 LIGHT WALL THICKNESS		BS 1868 / API 600 HEAVY WALL THICKNESS	
CLASS	SIZE	CLASS	SIZE
150	1/2" ~ 24"	150	2" ~ 30"
300	1/2" ~ 24"	300	2" ~ 30"
600	2" ~ 24"	600	2" ~ 24"
		900	2" ~ 16"
		1500	2" ~ 12"

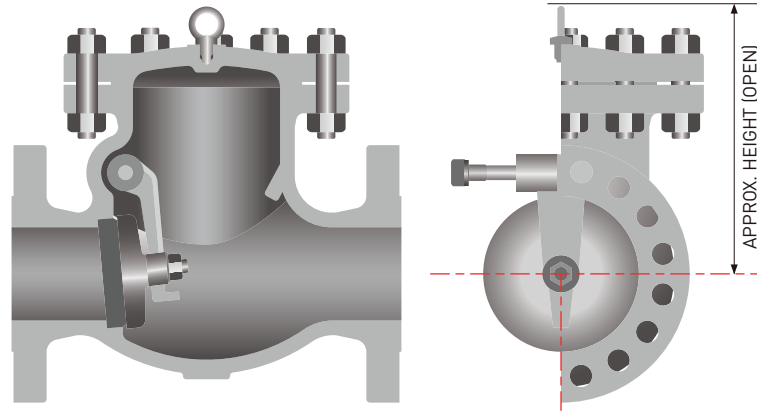
STANDARD MATERIALS SPECIFICATION

PART	CARBON STEEL VALVES			STAINLESS STEEL VALVES			SPECIAL STAINLESS STEEL VALVES		
	WCB	C5	LCB	CF8	CF8M	CF3M	CN7M	CD3MN	CE3MN
STANDARD TRIM	410 (HALF)	410 (HALF)	304 (HALF)	304	316	316L	N08020	S31803	S32750
BODY	A216-WCB	A217-C5	A352-LCB	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
SEAT-RING	A105+STL	A479-410 +STL	A479-304 +STL	INTEGRAL			INTEGRAL		
DISC	A217-CA15	A217-CA15	A351 CF8	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
ARM	A479-410	A479-410	A479-304	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
GASKET	SPIRAL WOUND / GRAPHITE+304+304			SPIRAL WOUND / GRAPHITE+304+304			AS ORDERED		
COVER	A216 WCB	A217-C5	A352-LCB	A351-CF8	A351-CF8M	A351-CF3M	A351-CN7M	A890-CD3MN	A890-CE3MN
DISC NUT	A194-8	A194-8	A194-8	A194-8	A194-8M	A479-316L	UNS N08020	UNS S31803	UNS S32750
WASHER	A240-304			A240-304	A240-316	A240-316L	UNS N08020	UNS S31803	UNS S32750
PIN	A479-410	A479-410	A479-304	A479-304	A479-316	A479-316L	UNS N08020	UNS S31803	UNS S32750
PLUG BOLT	A576-1020	A193-B8	A193-B8	A193-B8	A193-B8M	A479-316L	UNS N08020	UNS S31803	UNS S32750
PLUG GASKET	316SS METAL RING			316SS METAL RING			316SS METAL RING		
COVER BOLT	A193-B7	A193-B16	A320-L7	A193-B8			A193-B8		
COVER BOLT NUT	A194-2H	A194-Gr.4	A194-4	A194-8			A194-8		
EYE BOLT	A307-B			A193-B8			A193-B8		

DIMENSION & WEIGHT LIST FOR SWING CHECK VALVE - 1

FIG NO. CH150F / CH150W / CH150J

The value of 6 inch and larger size have been applied with Eye-Bolt Hanger.



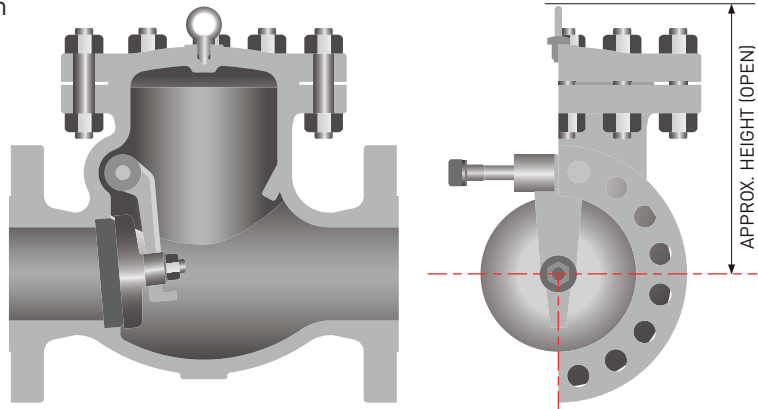
CLASS 150

Normal Bore Size		FACE TO FACE				BS 1868 (RF ENDS)				ANSI B16.34 (RF ENDS)			
		RF&BW ENDS		RTJ ENDS		HEIGHT		WEIGHT		HEIGHT		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	mm	inch	kg	lbs
15	1/2	108	4'1/4							85	3'1/3	3	7
20	3/4	117	4'5/8							89	3'1/2	4	9
25	1	127	5	140	5'1/2					102	4	5	12
40	1'1/2	165	6'1/2	178	7					120	4'5/7	8	19
50	2	203	8	216	8'1/2	153	6	18	39	138	5'3/7	12	25
65	2'1/2	216	8'1/2	229	9	155	6'1/9	23	51	155	6'1/9	22	48
80	3	241	9'1/2	254	10	175	6'8/9	33	72	160	6'2/7	23	50
100	4	292	11'1/2	305	12	202	8	53	116	201	8	40	88
150	6	406	16	368	14'1/2	291	11'1/2	86	190	248	9'3/4	69	152
200	8	495	19'1/2	508	20	327	12'7/8	143	315	293	11'1/2	120	264
250	10	622	24'1/2	635	25	360	14'1/6	205	451	330	13	173	382
300	12	698	27'1/2	711	28	417	16'3/7	299	660	354	14	273	602
350	14	787	31	800	31'1/2	478	18'5/6	441	972	387	15'1/4	336	741
400	16	914	36	876	34'1/2	516	20'1/3	525	1157	421	16'4/7	588	1296
450	18	978	38'1/2	991	39	554	21'4/5	672	1481	461	18'1/7	683	1505
500	20	978	38'1/2	991	39	620	24'2/5	819	1806	526	20'5/7	819	1806
600	24	1295	51	1308	51'1/2	670	26'3/8	1565	3449	568	22'1/3	1541	3398
650	26	1295	51			780	30'5/7	1813	3998				
700	28	1448	57			840	33	2153	4745				
750	30	1524	60			890	35	2310	5093				

DIMENSION & WEIGHT LIST FOR SWING CHECK VALVE - 2

FIG NO. CH300F / CH300W / CH300J

The value of 6 inch and larger size have been applied with Eye-Bolt Hanger.



CLASS 300

Normal Bore Size		FACE TO FACE				BS 1868 (RF ENDS)				ANSI B16.34 (RF ENDS)			
		RF&BW ENDS		RTJ ENDS		HEIGHT		WEIGHT		HEIGHT		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	mm	inch	kg	lbs
15	1/2	152	6	164	6'3/7					93	3'2/3	6	6
20	3/4	178	7	191	7'1/2					96	3'7/9	8	8
25	1	216	8'1/2	229	9					112	4'2/5	11	11
40	1'1/2	241	9'1/2	254	10					126	5	17	17
50	2	267	10'1/2	283	11'1/8	165	6'1/2	26	58	152	6	24	24
65	2'1/2	292	11'1/2	308	12'1/8	190	7'1/2	35	76	164	6'1/2	39	39
80	3	318	12'1/2	333	13'1/8	186	7'1/3	51	113	176	7	47	47
100	4	356	14	372	14'5/8	219	8'5/8	76	167	185	7'1/3	59	59
150	6	444	17'1/2	460	18'1/8	262	10'1/3	143	315	262	10'1/3	111	111
200	8	533	21	549	21'5/8	334	13'1/7	193	426	312	12'2/7	161	161
250	10	622	24'1/2	638	28'5/8	398	15'2/3	313	690	355	14	305	305
300	12	711	28	727	33'5/8	475	18'5/7	436	961	393	15'1/2	424	424
350	14	838	33	854	34'5/8	540	21'1/4	716	1579	440	17'1/3	747	747
400	16	864	34	880	39'1/8	605	23'5/6	785	1731	480	18'8/9	932	932
450	18	978	38'1/2	994	40'3/4	650	25'3/5	1111	2449	535	21	947	947
500	20	1016	40	1035	53'7/8	715	28'1/7	1271	2801	575	22'2/3	1119	1119
600	24	1346	53	1368		964	38	2012	4435	630	24'4/5	1834	1834
650	26	1346	53				0	2415	5324				
700	28	1499	59				0	2940	6482				
750	30	1594	62'3/4			1050	41'1/3	3570	7870				

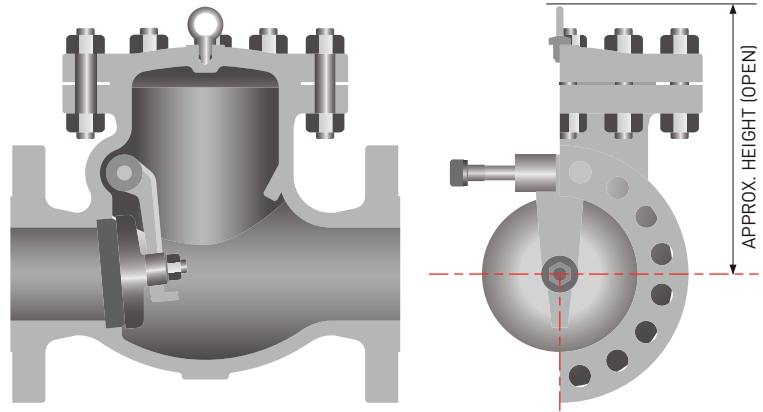
DIMENSION & WEIGHT LIST FOR SWING CHECK VALVE - 3

FIG NO. CH600F / CH600W / CH600J

The value of 4 inch and larger size have been applied with Eye-Bolt Hanger.

FIG NO. CH900F / CH900W / CH900J & CH1500F / CH1500W / CH1500J

The value of 3 inch and larger size have been applied with Eye-Bolt Hanger.



CLASS 600

Normal Bore Size		FACE TO FACE				BS1868 / API 600 (RF ENDS)				BS1868 / ANSI B16.34 (RF ENDS)			
		RF&BW ENDS		RTJ ENDS		HEIGHT		WEIGHT		HEIGHT		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	mm	inch	kg	lbs
CLASS 600 <FIG NO. CH 600F>													
50	2	292	11 1/2	295	11 5/8	187	7 1/3	34	74	187	7 1/3	29	65
65	2 1/2	330	13	333	13 1/8	200	7 7/8	53	116	200	7 7/8	47	104
80	3	356	14	359	14 1/8	210	8 1/4	62	137	210	8 1/4	84	185
100	4	432	17	435	17 1/8	256	10	118	259	256	10	113	250
150	6	559	22	562	22 1/8	329	13	226	498	329	13	214	472
200	8	660	26	664	26 1/8	364	14 1/3	404	891	364	14 1/3	336	741
250	10	787	31	791	31 1/8	464	18 1/4	644	1419	464	18 1/4	562	1238
300	12	838	33	841	33 1/8	486	19 1/7	914	2014	486	19 1/7	761	1678
350	14	889	35	892	35 1/8	515	20 2/7	985	2171	515	20 2/7	1059	2336
400	16	991	39	994	39 1/8	550	21 2/3	1418	3125	550	21 2/3	1460	3218
450	18	1092	43	1095	43 1/8	590	23 2/9	2121	4676	590	23 2/9	1913	4218
500	20	1194	47	1200	47 1/4	635	25	2510	5532	635	25	2402	5296
600	24	1397	55	1407	55 3/8	680	26 7/9	3017	6651	680	26 7/9	2714	5984

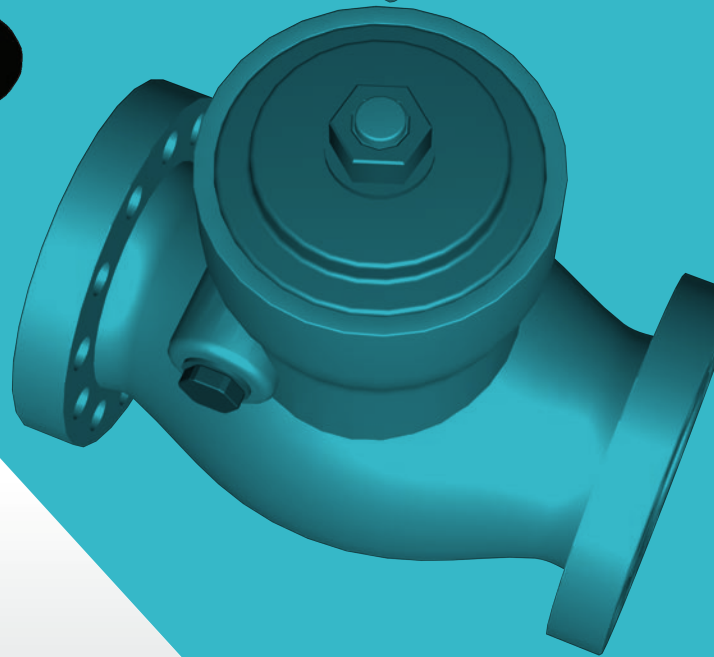
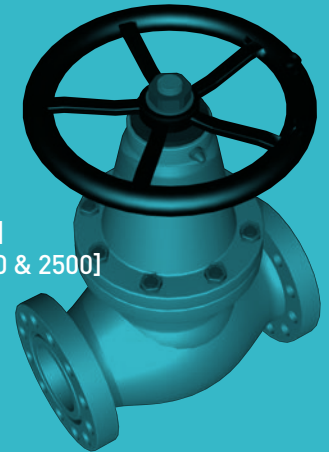
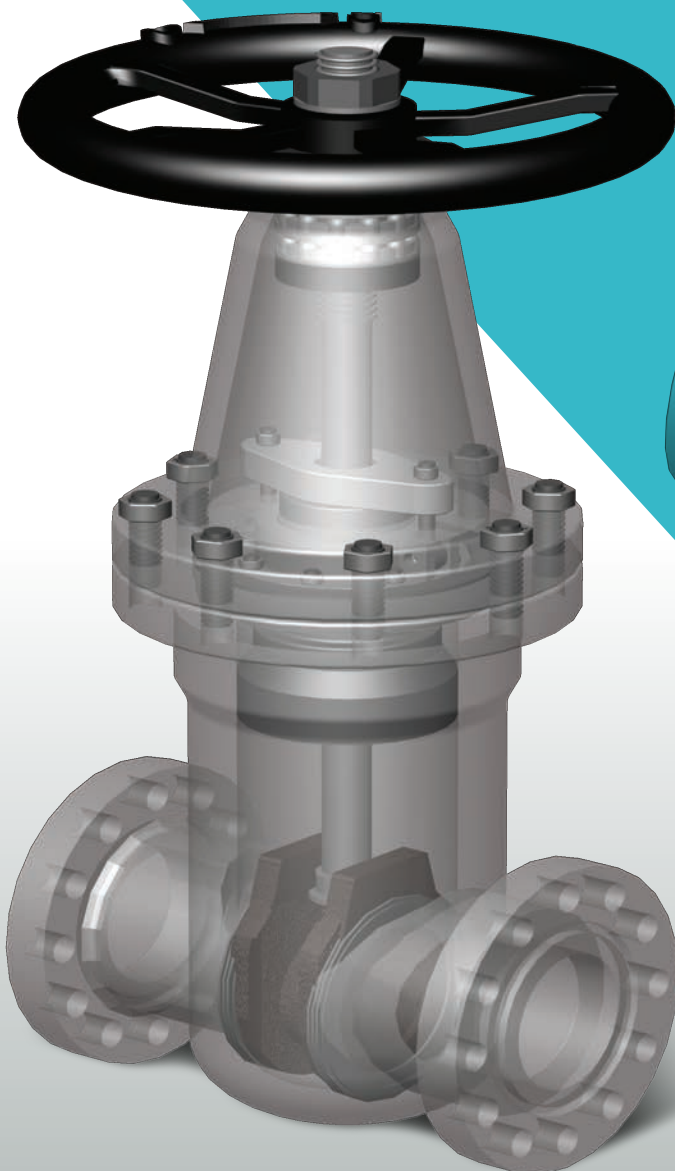
CLASS 900 & 1500

Normal Bore Size		FACE TO FACE				BS1868 / API 600 (RF ENDS)			
		RF&BW ENDS		RTJ ENDS		HEIGHT		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs
CLASS 900 <FIG NO. CH 900F>									
50	2	368	14 1/2	372	14 5/8	270	10 5/8	77	169
80	3	381	15	384	15 1/8	295	11 3/5	86	190
100	4	457	18	460	18 1/8	310	12 1/5	146	322
150	6	610	24	613	24 1/8	340	13 2/5	277	611
200	8	737	29	740	29 1/8	465	18 1/3	655	1444
250	10	838	33	841	33 1/8	510	20	1208	2662
300	12	965	38	968	38 1/8	580	22 5/6	1181	2604
350	14	1029	40 1/2	1038	40 7/8	665	26 1/6	1838	4051
400	16	1130	44 1/2	1140	44 7/8	750	29 1/2	2541	5602

Normal Bore Size		FACE TO FACE				BS1868 / API 600 (RF ENDS)			
		RF&BW ENDS		RTJ ENDS		HEIGHT		WEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs
CLASS 1500 <FIG NO. CH 1500F>									
50	2	368	14 1/2	372	14 5/8	290	11 3/7	77	169
80	3	470	18 1/2	473	18 1/8	315	12 2/5	131	289
100	4	546	21 1/2	549	21 5/8	380	15	223	491
150	6	705	27 3/4	711	28	490	19 2/7	508	1120
200	8	832	32 3/4	841	33 1/8	600	23 5/8	1250	2755
250	10	991	39	1000	39 3/8	730	28 3/4	1943	4282
300	12	1130	44 1/2	1146	45 1/8	850	33 1/2	3497	7708

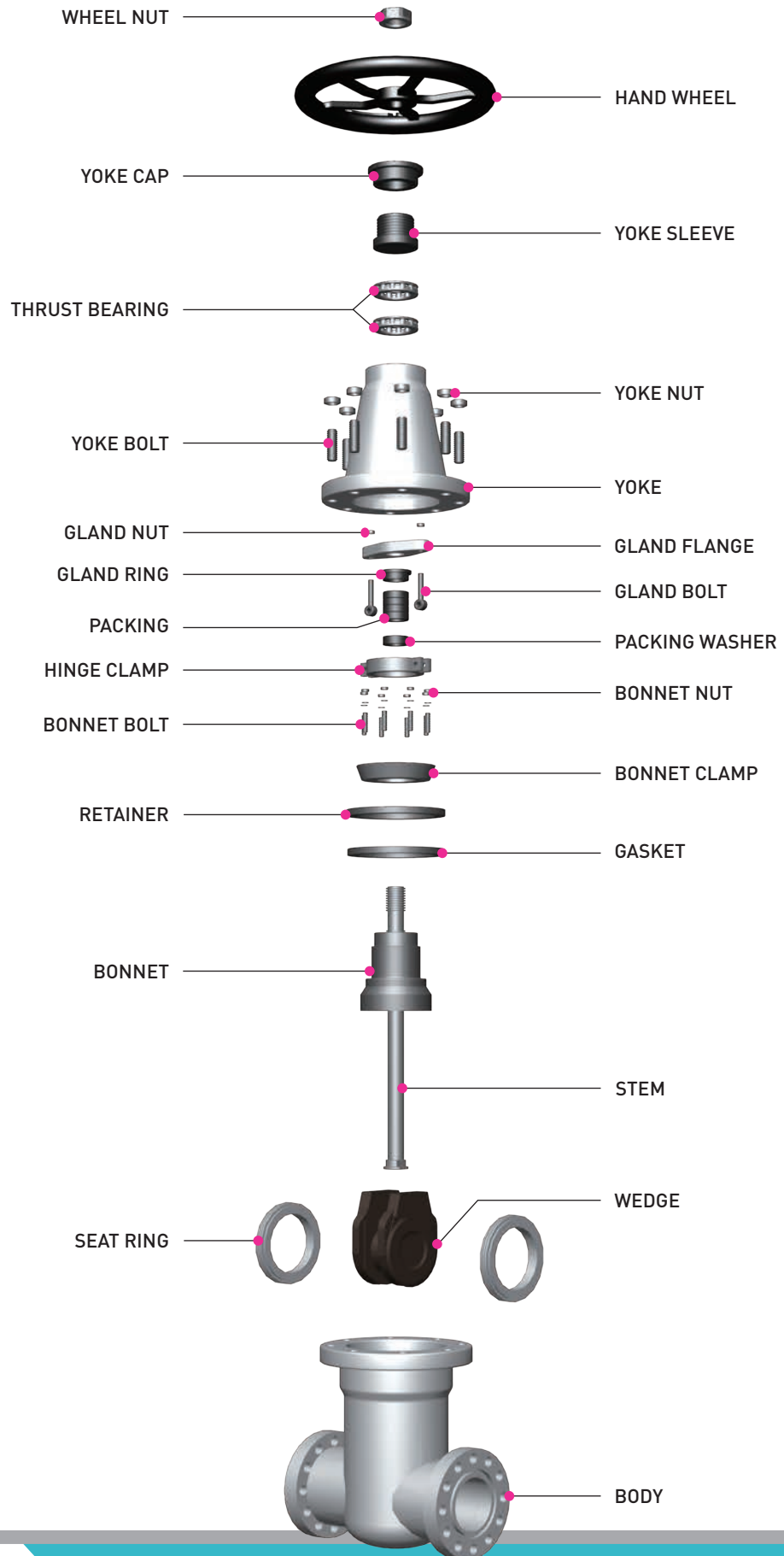
PRESSURE SEAL BONNET & COVER VALVE

- PART LIST FOR PSB GATE VALVE
- PART LIST FOR PSB GLOBE VALVE
- PART LIST FOR PSC SWING CHECK VALVE
- STANDARD MANUFACTURING PROCESS FOR PSB & PSC VALVE
- DIMENSION LIST FOR PSB & PSC VALVE
 - PRESSURE SEAL BONNET GATE VALVE [CLASS 900 & 1500 & 2500]
 - PRESSURE SEAL BONNET GLOBE VALVE [CLASS 900 & 1500 & 2500]
 - PRESSURE SEAL COVER SWING CHECK VALVE [CLASS 900 & 1500 & 2500]



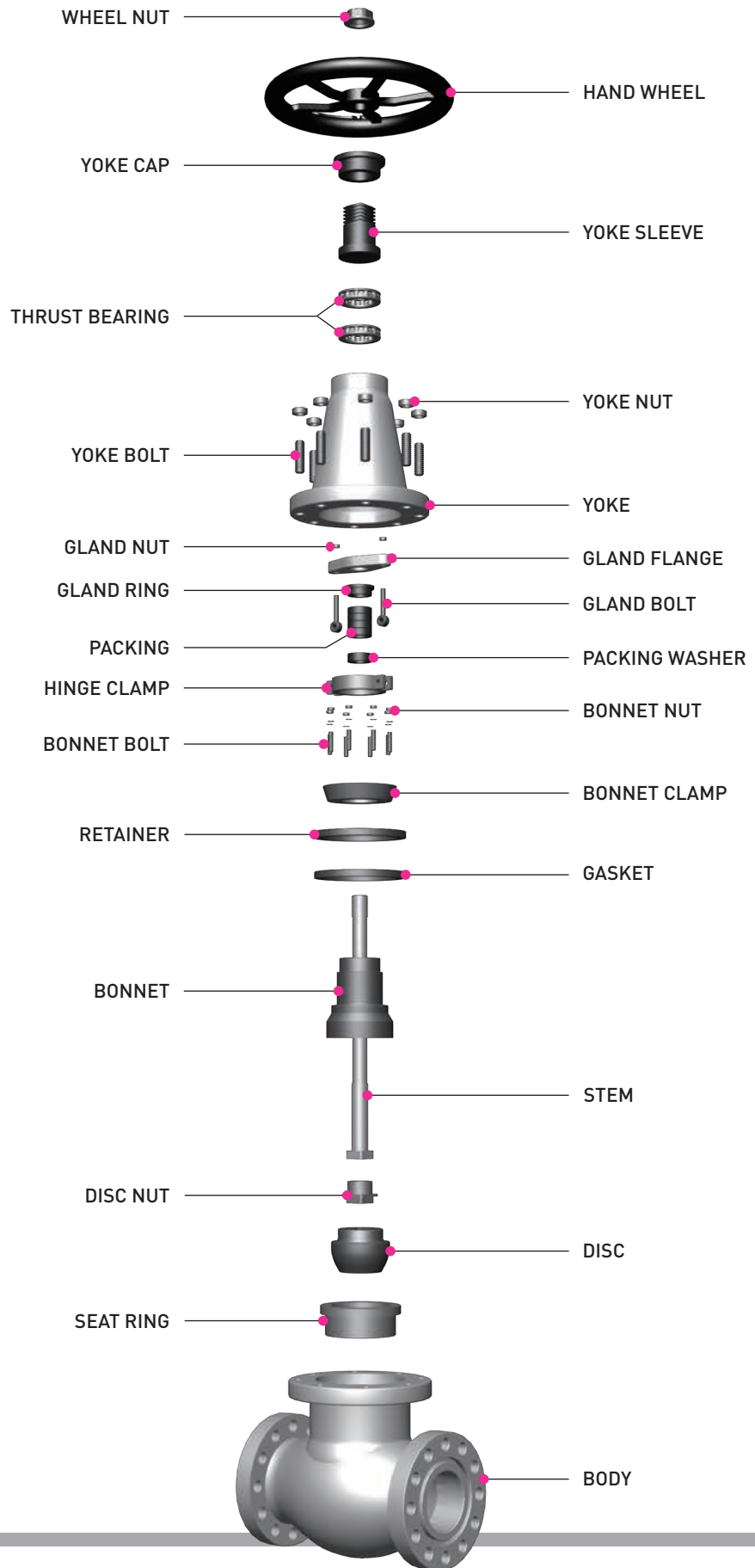
PART LIST FOR PSB GATE VALVE

PSP GATE VALVE



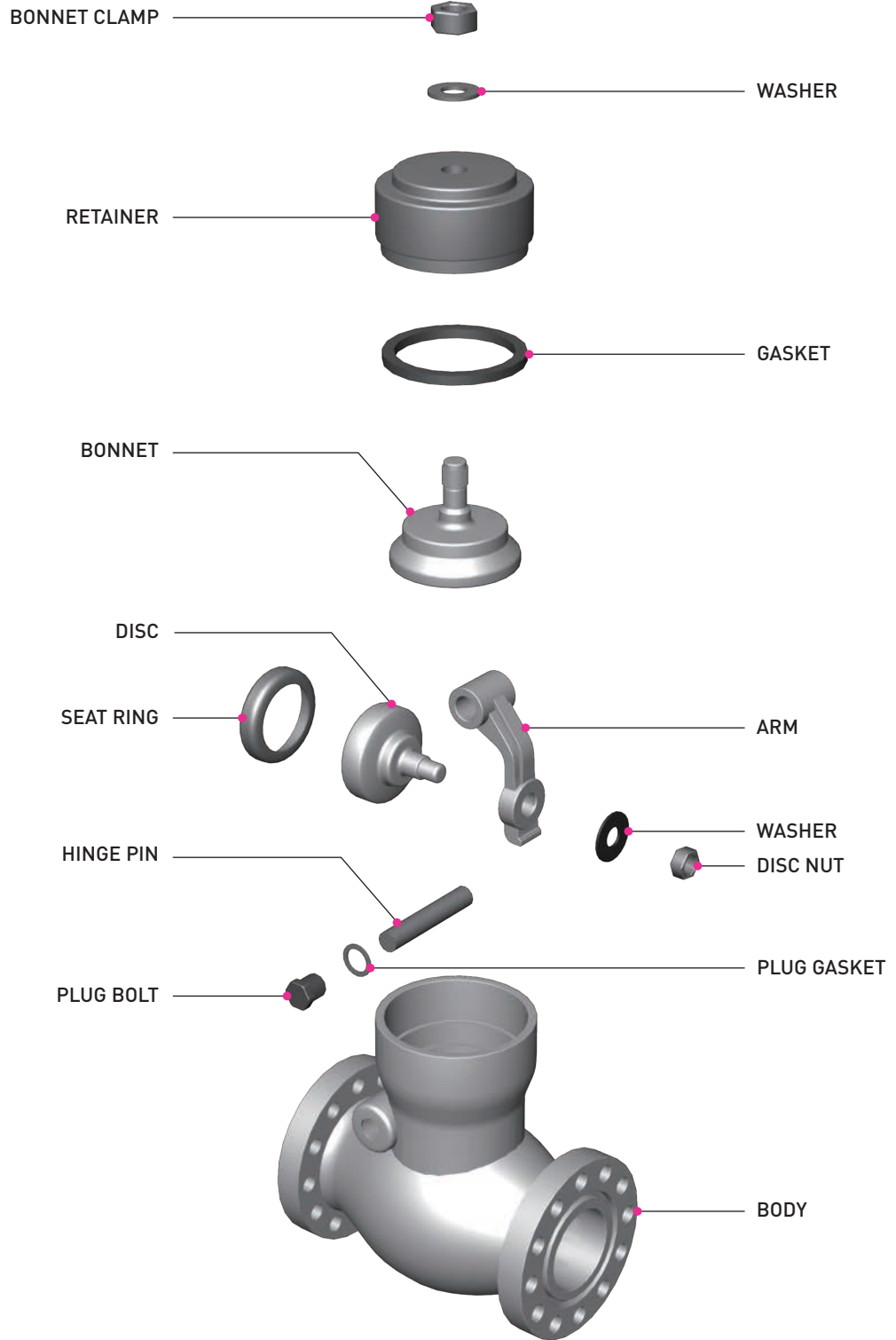
PSB GLOBE VALVE

PART LIST FOR PSB GLOBE VALVE



PRESSURE SEAL BONNET & COVER VALVE

PART LIST FOR PSC SWING CHECK VALVE



PSC SWING
CHECK VALVE

STANDARD MANUFACTURING PROCESS FOR PSB & PSC VALVE

STANDARD PRODUCTION SPECIFICATION

→ BODY

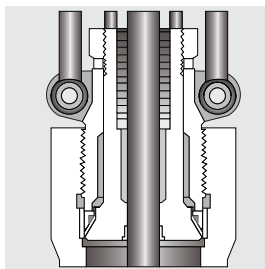
Body is designed not to have flow resistance. To prevent the possibility of leakage in gasket seal area, the area is overlaid Stainless Steel and is machined precisely.

→ SEAT RING & BACK SEAT RING

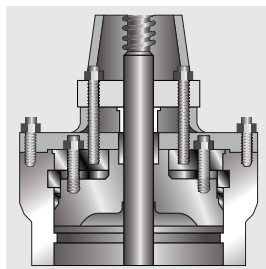
Basically, SUN KOREA is supplying seal welded seat ring type but it's possible with threaded seat ring type or integral seat ring type. In case of back seat ring, it is provided with Integral overlaid Stellite No. 6 to bonnet.

→ BONNET TYPE

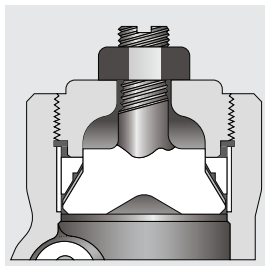
In case of Gate & Globe valves,
 Type 1-1 is applied for 4" and smaller size valves /
 Type 1-2 is applied for 6" and larger size valves.
 For stuffing box, it has enough depth to install lantern ring.
 In case of Swing Check valves,
 Type 2-1 is applied for 4" and smaller size valves /
 type 2-2 is applied for 6" and larger size valves.



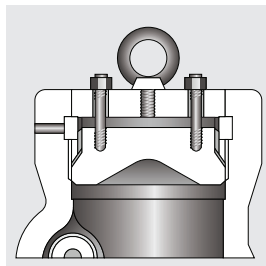
Type 1-1



Type 1-2



Type 2-1



Type 2-2

→ MOTHER MATERIALS OF WEDGE & DISC

As SUN KOREA's standard, all size valves to be provided wedge of casting materials equivalent with designating trim material or body materials. Surely seat surface is followed with trim materials. In case of Wedge with Gate, it's 1piece flexible form and have minimized the appearance of thermal binding and pipe load. The angle of wedge is 9 deg to make "Tight Sealing" and has a excellent sealing capacity in lower pressure.

→ GASKET

Basically, Soft Steel plated Silver is being supplied for Carbon Steel Valves. And it's shaped 30 deg wedge to be suitable for higher pressure.

→ PACKING

Anti-exclusion square-braiding graphite fiber top & bottom rings and pure graphite preformed packing to be provided all valves.

* Everything can be replaced the one which is requested by customers' requirement.

PSB &
 PSC
 VALVE

STANDARD MANUFACTURING PROCESS FOR PSB & PSC VALVE

STANDARD DESIGN SPECIFICATION

APPLIED PART	SPECIFICATION
PRESSURE RATING	ANSI B16.34
FACE TO FACE (END TO END)	ANSI B16.10
FLANGE DIMENSION	ANSI B16.5 / ANSI B16.25
TESTING	API 598 / MSS-SP-41
BONNET BOLT	ASTM A193
BONNET NUT	ASTM A194
MARKING SYSTEM	MSS-SP-25
HEAVY WALL THICKNESS	API 600
LIGHT WALL THICKNESS	ASME B16.34

STANDARD PRODUCTION RANGE

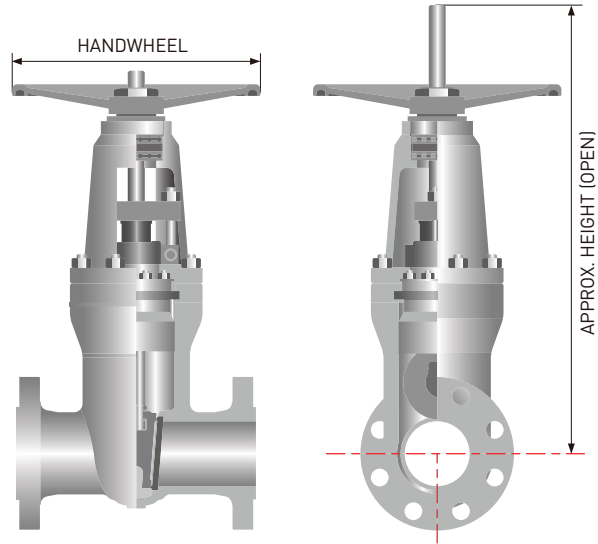
TYPE 1-1 & 2-1 PSB & PSC		TYPE 1-2 & 2-2 PSB & PSC	
CLASS	SIZE	CLASS	SIZE
900	2" ~ 4"	900	6" ~ 12"
1500	2" ~ 4"	1500	6" ~ 12"
2500	2" ~ 4"	2500	6" ~ 12"

STANDARD MATERIALS SPECIFICATION

PART	PSB GATE VALVES		PART	PSB GLOBE VALVES		PART	PSC SWING CHECK VALVES	
	MAIN	WCB		CF8M	MAIN		WCB	CF8M
STANDARD TRIM	410 (HALF)	316	STANDARD TRIM	410 (HALF)	316	STANDARD TRIM	410 (HALF)	316
BODY	A216-WCB	A351-CF8M	BODY	A216-WCB	A351-CF8M	BODY	A216-WCB	A351-CF8M
SEAT-RING	A105+STL	INTEGRAL	SEAT-RING	A105+STL	INTEGRAL	SEAT-RING	A105+STL	INTEGRAL
WEDGE	A216WCB+13CR	A351-CF8M	DISC	A216WCB+13CR	A351-CF8M	DISC	A216 WCB +13CR	A351-CF8M
STEM	A479-410	A479-316	DISC NUT	A479-410	A479-316	DISC NUT	A194-2H	A194-8
BONNET	A216 WCB	A351-CF8M	STEM	A479-410	A479-316	ARM	A216-WCB	A351-CF8M
BACK SEAT-RING	INTEGRAL	INTEGRAL	BACK SEAT-RING	INTEGRAL	INTEGRAL	COVER	A216 WCB	A351-CF8M
SEAL RING	SOFT STEEL+SILVER	SAME AS TRIM	SEAL RING	SOFT STEEL+SILVER	SAME AS TRIM	SEAL RING	SOFT STEEL+SILVER	A479-316
CLAMP WASHER	A576-1020	A479-304	CLAMP WASHER	A576-1020	A479-304	SPACE RING	A479-410	A479-304
BONNET CLAMP	A576-1020	A479-304	BONNET CLAMP	A576-1020	A479-304	RING RETAINER	A576-1020	A479-304
PACKING WASHER	A479-410	A479-316	PACKING WASHER	A479-410	A479-316	COVER RETAINER	A576-1020	A479-304
GLAND PACKING	SUN KOREA'S STANDARD WHEN NOT SPECIFIED		GLAND PACKING	SUN KOREA'S STANDARD WHEN NOT SPECIFIED		RETAINER BOLT	A193-B7	A193-B8
PACKING GLAND	A479-410	A479-316	PACKING GLAND	A479-410	A479-316	RETAINER BOLT NUT	A194-2H	A194-8
HINGE PIN	A576-1020	A479-304	HINGE PIN	A576-1020	A479-304	PIN	A479-410	A479-316
GLAND BOLT	A307-B	A193-B8	GLAND BOLT	A307-B	A193-B8	PLUG SEAL RING	SOFT STEEL+SILVER	A479-316
GLAND BOLT NUT	A307-B	A194-8	GLAND BOLT NUT	A307-B	A194-8	PLUG RETAINER	A479-410	A479-304
GLAND FLANGE	A105	A351-CF8	GLAND FLANGE	A105	A351-CF8	PLUG BOLT	A479-410	A479-304
YOKE	A216-WCB	A351-CF8	GUIDE PLATE	A576-1020	A479-304	PLUG BOLT NUT	A194-2H	A194-8
YOKE SLEEVE	A439-D2C	A439-D2C	YOKE SLEEVE	A439-D2C	A439-D2C			
THRUST BEARING	STEEL		THRUST BEARING	STEEL				
YOKE CAP	A576-1020	A351-CF8	YOKE CAP	A576-1020	A351-CF8			
HANDWHEEL	A536		HANDWHEEL	A536				
HANDWHEEL NUT	A576-1020	A351-CF8	HANDWHEEL NUT	A576-1020	A351-CF8			
SET SCREW	A307-B	A479-304	SET SCREW	A307-B	A479-304			
GREASE NIPPLE	STEEL		GREASE NIPPLE	STEEL				

DIMENSION LIST FOR PSB & PSC VALVE - 1

PRESSURE SEAL BONNET GATE VALVE



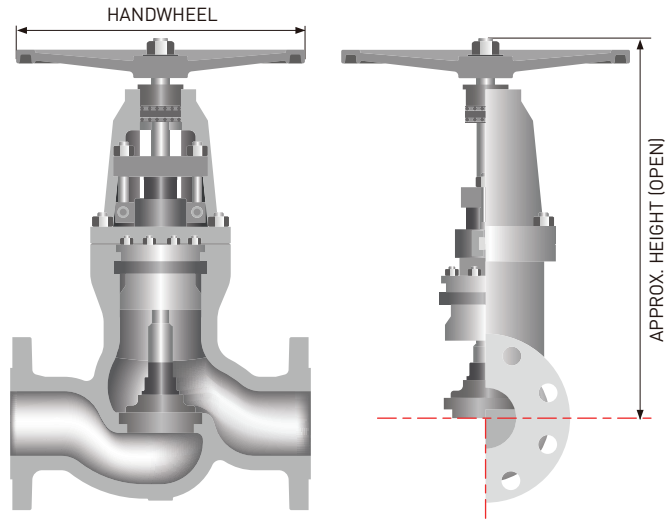
PRESSURE SEAL BONNET & COVER VALVE

CLASS 900 & 1500 & 2500

Normal Bore Size		FACE TO FACE						DIMENSION			
		RF ENDS		BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
CLASS 900						<FIG NO. PSB-GA 900F>					
50	2	368	14'1/2	216	8'1/2	372	14'5/8	590	23'2/9	300	11'4/5
80	3	381	15	305	12	384	15'1/8	725	28'1/2	350	13'7/9
100	4	457	18	356	14	460	18'1/8	800	31'1/2	400	15'3/4
150	6	610	24	508	20	613	24'1/8	1100	43'1/3	500	19'2/3
200	8	737	29	660	26	740	29'1/8	1195	47	630	24'4/5
250	10	838	33	787	31	841	33'1/8	1500	59	630	24'4/5
300	12	965	38	914	36	968	38'1/8	1800	70'6/7	800	31'1/2
CLASS 1500						<FIG NO. PSB-GA 1500F>					
50	2	368	14'1/2	216	8'1/2	372	14'5/8	590	23'2/9	300	11'4/5
80	3	470	18'1/2	305	12	473	18'5/8	725	28'1/2	350	13'7/9
100	4	546	21'1/2	406	16	549	21'5/8	770	30'1/3	400	15'3/4
150	6	705	27'3/4	559	22	711	28	1050	41'1/3	500	19'2/3
200	8	832	32'3/4	711	28	841	33'1/8	1195	47	630	24'4/5
250	10	991	39	864	34	1000	39'3/8	1500	59	800	31'1/2
300	12	1130	44'1/2	991	39	1146	45'1/8	1795	70'2/3	800	31'1/2
CLASS 2500						<FIG NO. PSB-GA 2500F>					
50	2	451	17'3/4	279	11	454	17'7/8	650	25'3/5	300	11'4/5
80	3	578	22'3/4	368	14'1/2	584	23	700	27'5/9	400	15'3/4
100	4	673	26'1/2	457	18	683	26'8/9	800	31'1/2	450	17'5/7
150	6	914	36	610	24	927	36'1/2	1050	41'1/3	630	24'4/5
200	8	1022	40'1/4	762	30	1038	40'6/7	1380	54'1/3	800	31'1/2
250	10	1270	50	914	36	1292	50'6/7	1600	63	800	31'1/2
300	12	1422	56	1041	41	1445	56'8/9	1750	68'8/9	800	31'1/2

DIMENSION LIST FOR PSB & PSC VALVE - 2

PRESSURE SEAL BONNET GLOBE VALVE

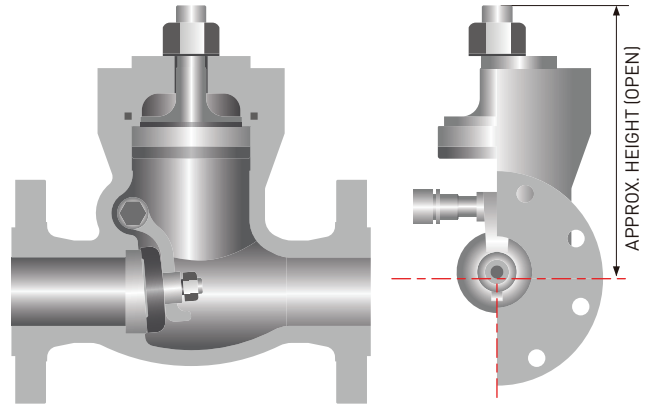


CLASS 900 & 1500 & 2500

Normal Bore Size		FACE TO FACE						DIMENSION			
		RF ENDS		BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
CLASS 900 <FIG PSB-GL 900F>											
50	2	368	14'1/2	216	8'1/2	372	14'5/8	420	16'1/2	300	11'4/5
80	3	381	15	305	12	384	15'1/8	640	25'1/5	400	15'3/4
100	4	457	18	356	14	460	18'1/8	710	28	500	19'2/3
150	6	610	24	508	20	613	24'1/8	960	37'4/5	560	22
200	8	737	29	660	26	740	29'1/8	1100	43'1/3	630	24'4/5
250	10	838	33	787	31	841	33'1/8	1250	49'1/5	800	31'1/2
300	12	965	38	914	36	968	38'1/8	1330	52'1/3	800	31'1/2
CLASS 1500 <FIG PSB-GL 1500F>											
50	2	368	14'1/2	216	8'1/2	372	14'5/8	530	20'6/7	300	11'4/5
80	3	470	18'1/2	305	12	473	18'5/8	680	26'7/9	400	15'3/4
100	4	546	21'1/2	406	16	549	21'5/8	750	29'1/2	500	19'2/3
150	6	705	27'3/4	559	22	711	28	1110	43'5/7	630	24'4/5
200	8	832	32'3/4	711	28	841	33'1/8	1200	47'1/4	800	31'1/2
250	10	991	39	864	34	1000	39'3/8	1420	56	800	31'1/2
300	12	1130	44'1/2	991	39	1146	45'1/8	1590	62'3/5	800	31'1/2
CLASS 2500 <FIG PSB-GL 2500F>											
50	2	450	17'3/4	279	11	454	17'7/8	570	22'4/9	500	19'2/3
80	3	578	22'3/4	368	14'1/2	584	23	700	27'5/9	560	22
100	4	673	26'1/2	457	18	683	26'8/9	780	30'5/7	630	24'4/5
150	6	914	36	610	24	927	36'1/2	1110	43'5/7	800	31'1/2
200	8	1022	40'1/4	762	30	1038	40'6/7	1420	56	800	31'1/2
250	10	1270	50	914	36	1292	50'6/7	1650	65	1000	39'3/8
300	12	1422	56	1041	41	1445	56'8/9	1740	68'1/2	1000	39'3/8

DIMENSION LIST FOR PSB & PSC VALVE - 3

PRESSURE SEAL COVER SWING CHECK VALVE



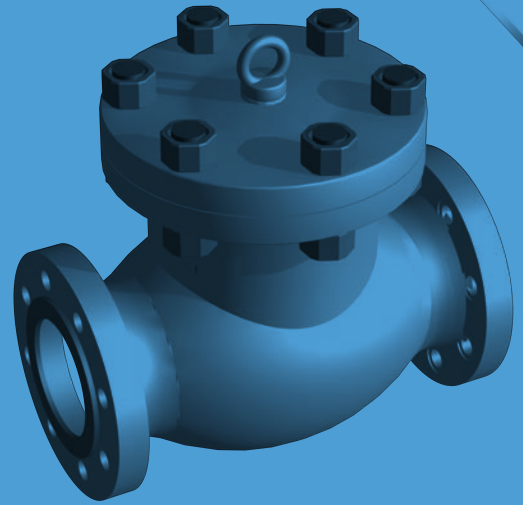
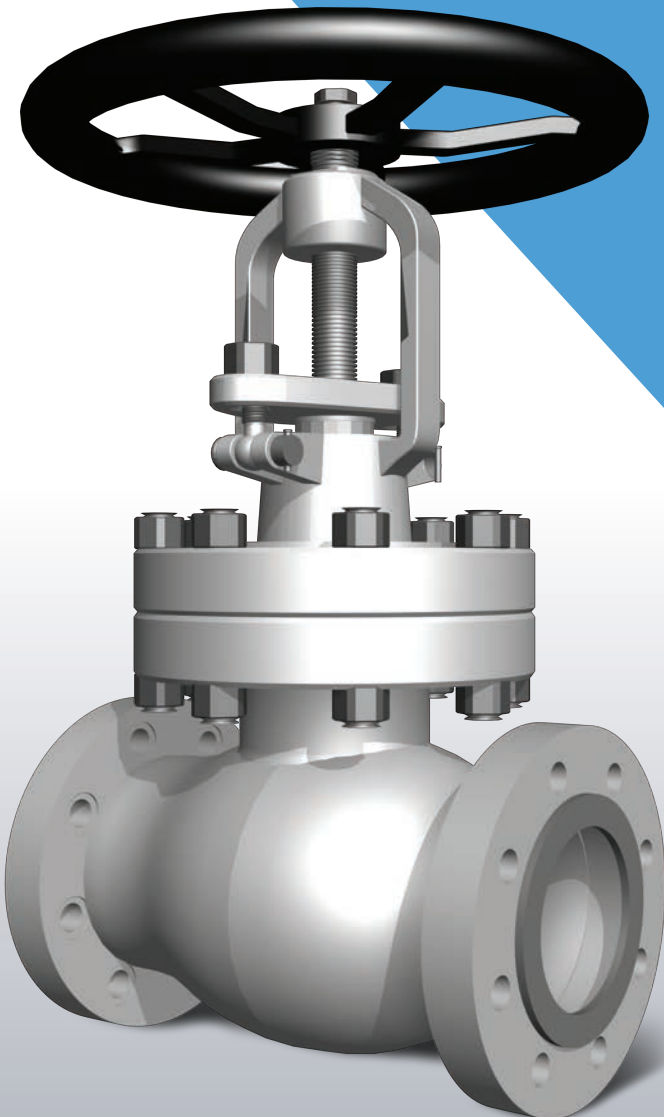
PRESSURE SEAL BONNET & COVER VALVE

CLASS 900 & 1500 & 2500

Normal Bore Size		FACE TO FACE						HEIGHT	
		RF ENDS		BW ENDS		RTJ ENDS			
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
CLASS 900 <FIG NO. PSC-CH 900F>									
50	2	368	14'1/2	216	8'1/2	372	14'5/8	240	9'4/9
80	3	381	15	305	12	384	15'1/8	255	10
100	4	457	18	356	14	460	18'1/8	290	11'3/7
150	6	610	24	508	20	613	24'1/8	350	13'7/9
200	8	737	29	660	26	740	29'1/8	420	16'1/2
250	10	838	33	787	31	841	33'1/8	500	19'2/3
300	12	965	38	914	36	968	38'1/8	592	23'1/3
CLASS 1500 <FIG NO. PSC-CH 1500F>									
50	2	368	14'1/2	216	8'1/2	372	14'5/8	240	9'4/9
80	3	470	18'1/2	305	12	473	18'5/8	255	10
100	4	546	21'1/2	406	16	549	21'5/8	300	11'4/5
150	6	705	27'3/4	559	22	711	28	405	16
200	8	832	32'3/4	711	28	841	33'1/8	480	18'8/9
250	10	991	39	864	34	1000	39'3/8	570	22'4/9
300	12	1130	44'1/2	991	39	1146	45'1/8	610	24
CLASS 2500 <FIG NO. PSC-CH 2500F>									
50	2	451	17'3/4	279	11	454	17'7/8	260	10'1/4
80	3	578	22'3/4	368	14'1/2	584	23	290	11'3/7
100	4	673	26'1/2	457	18	683	26'8/9	360	14'1/6
150	6	914	36	610	24	927	36'1/2	465	18'1/3
200	8	1022	40'1/4	762	30	1038	40'6/7	530	20'6/7
250	10	1270	50	914	36	1292	50'6/7	595	23'3/7
300	12	1422	56	1041	41	1445	56'8/9	690	27'1/6

CRYOGENIC SERVICE VALVE

- STANDARD MANUFACTURING PROCESS FOR CRYOGENIC SERVICE
- PART LIST FOR CRYOGENIC SERVICE GATE VALVE
 - STANDARD SPECIFICATION FOR CRYOGENIC SERVICE GATE VALVE
 - PART LIST FOR CRYOGENIC SERVICE GLOBE VALVE
 - STANDARD SPECIFICATION FOR CRYOGENIC SERVICE GLOBE VALVE
 - PART LIST FOR CRYOGENIC SERVICE SWING CHECK VALVE
 - STANDARD SPECIFICATION FOR CRYOGENIC SERVICE SWING CHECK VALVE
 - DIMENSION LIST OF GATE VALVE FOR CRYOGENIC SERVICE
 - CLASS 150 / 300 / 600 / 900 / 1500
 - DIMENSION LIST OF GLOBE VALVE FOR CRYOGENIC SERVICE
 - CLASS 150 / 300 / 600 / 900 / 1500
 - DIMENSION LIST OF SWING CHECK VALVE FOR CRYOGENIC SERVICE
 - CLASS 150 / 300 / 600 / 900 / 1500



STANDARD PRODUCTION SPECIFICATION

→ BODY

Body is made in cast and designed according to SUN KOREA's design program and relevant specifications. For cryogenic service, it's made in cast of Austenitic Stainless Steel to have higher impact strength, minimum heat loss and protection against corrosion.

→ SEAT SURFACE

Basically, SUN KOREA is supplying seal welded seat ring type with Stellite 6 overlay. But it's possible with integral seat overlaid Stellite 6. To prevent galling and seizing in low temperature, Stellite 6 overlay is recommended for Wedge seat surface. All base metal of seat ring and wedge or disc are followed trim material specified with Austenitic stainless steel. As requirement, it can be equipped with PTFE or other soft material insert seat type to have tight off.

→ BONNET TYPE

SUN KOREA is supplying extended bonnet type having enough height to protect gland packing so that it prevent any leakage from back seat when it's opened. In option, SUN KOREA is making Welded Pipe Connection Extended Bonnet type. The materials of pipe should be Austenitic Stainless Steel. You can make choice according to service.

→ BASE MATERIALS OF DISC FOR GLOBE VALVE

As SUN KOREA's standard, bar materials equivalent with designating trim material to provided for Class 150, 300 & 600 3 inch and smaller size valves. In case of other size, SUN KOREA is supplying casting materials equivalent with designating trim materials.

→ DESIGN

Basically, SUN KOREA's valves for cryogenic service is supplied with Heavy Wall Thickness Type based on API 600. This is to help valves have enough corrosion resistance and allowance compared with ANSI B16.34.

→ PACKING

Anti-exclusion square-braiding graphite fiber top & bottom rings and pure graphite preformed packing to be provided all valves. In other option, there is PTFE but we can supply other materials considering using in cryogenic service.

→ APPLICABLE LIQUIFIED GASES

GASES	BOILING POINT	
	°C	°F
CARBON DIOXIDE	-78.5	-109.0
METHANE (CH ₄)	-168.0	-270.0
NATURAL GAS (LNG)	-168.0	-270.0
OXYGEN(O ₂)	-182.9	-296.0
ARGON	-185.9	-303.0
NITROGEN(N ₂)	-195.8	-320.0

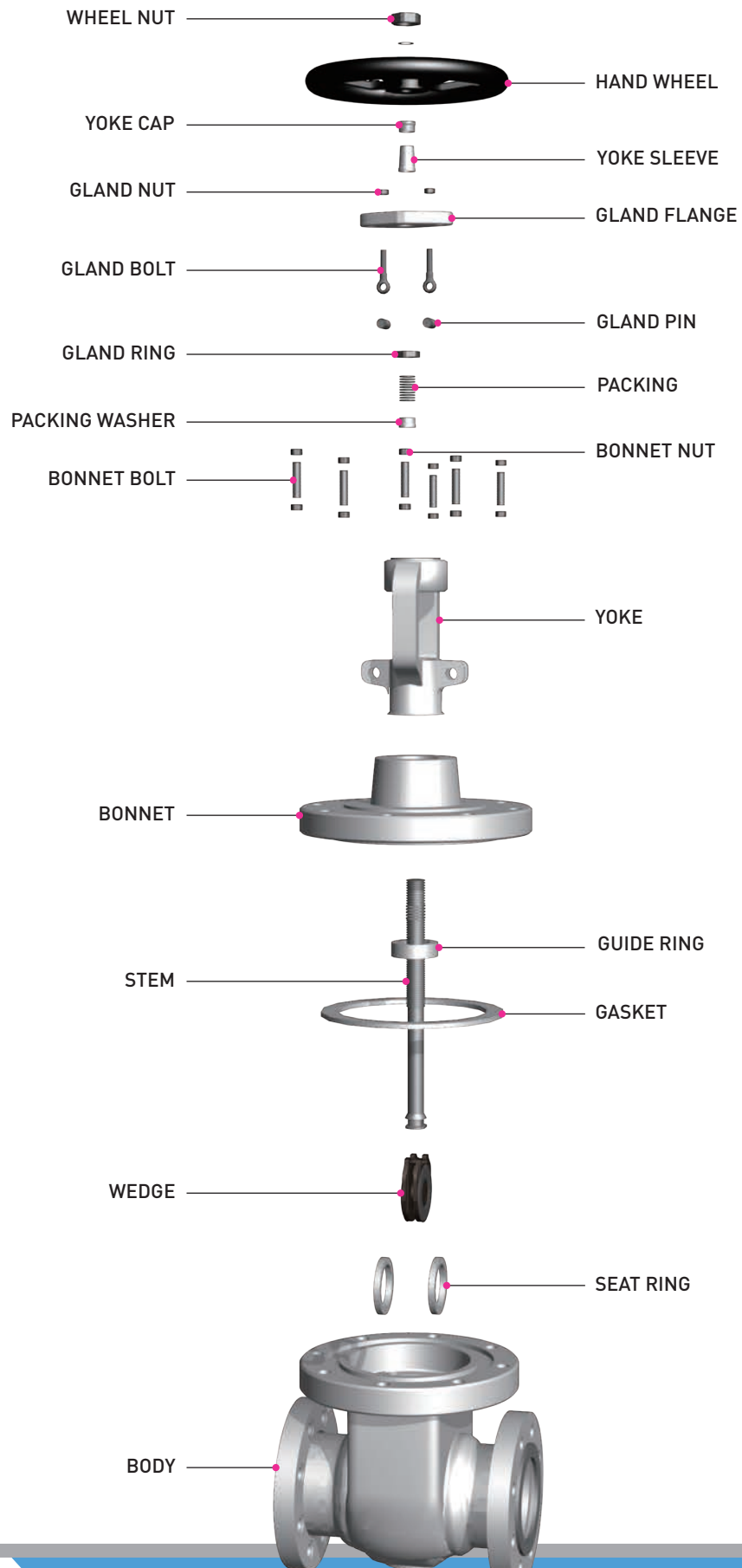
* Everything can be replaced the one which is requested by customers' requirement.



CRYOGENIC SERVICE VALVE

CRYOGENIC SERVICE GATE VALVE

PART LIST FOR CRYOGENIC SERVICE GATE VALVE



STANDARD SPECIFICATION FOR CRYOGENIC SERVICE GATE VALVE

STANDARD DESIGN SPECIFICATION

APPLIED PART	SPECIFICATION
PRESSURE RATING	ANSI B16.34
FACE TO FACE (END TO END)	ANSI B16.10
FLANGE DIMENSION	ANSI B16.5
TESTING	BS 6364
BONNET BOLT	ASTM A320
BONNET NUT	ASTM A194
MARKING SYSTEM	MSS-SP-25
WALL THICKNESS	HEAVY WALL AS PER EACH SPEC.

STANDARD PRODUCTION RANGE

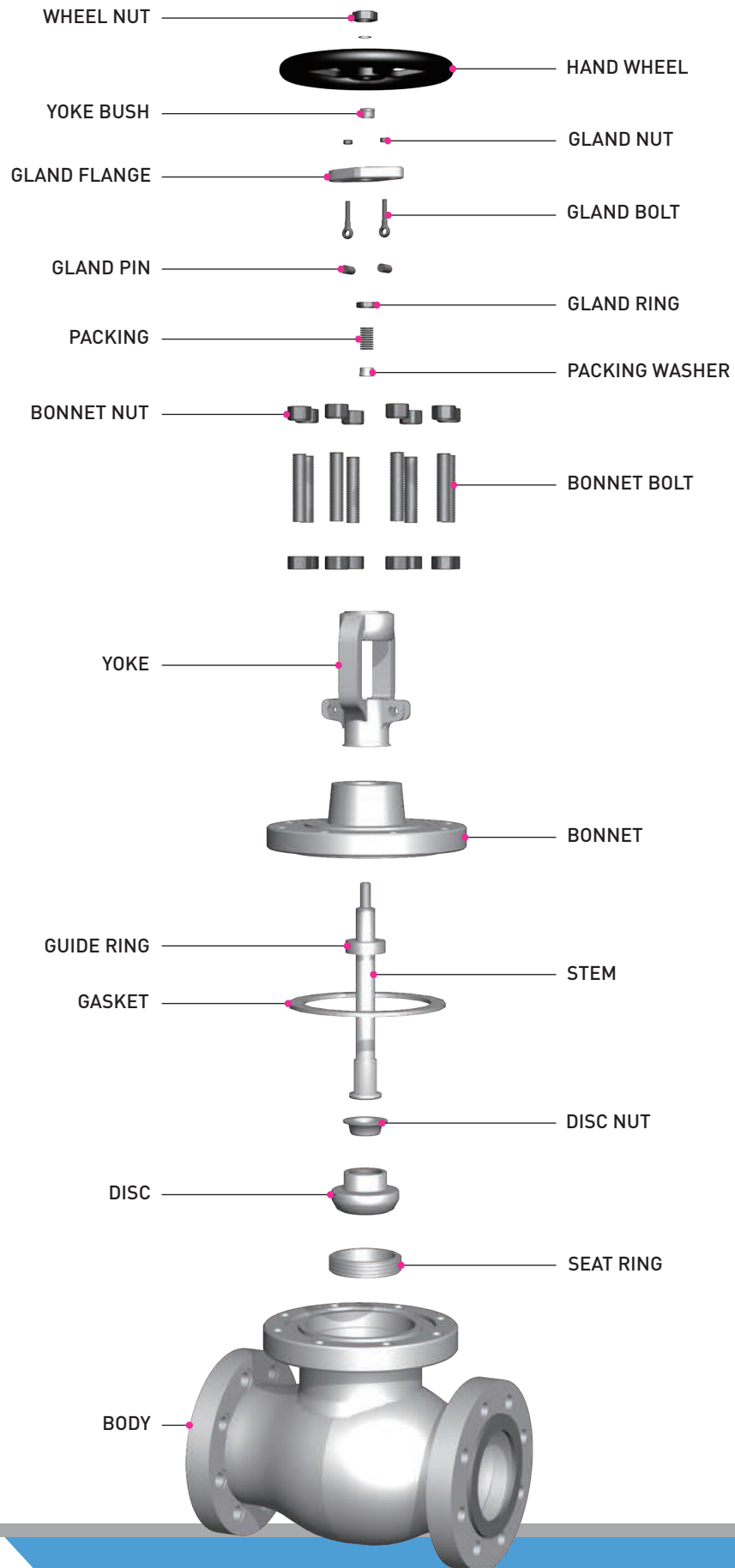
GATE VALVE	
CLASS	SIZE
150	2" ~ 24"
300	2" ~ 24"
600	2" ~ 24"
900	2" ~ 12"
1500	2" ~ 12"

STANDARD MATERIALS SPECIFICATION

PART	GATE VALVES			
	CF8	CF3	CF8M	CF3M
STANDARD TRIM	304	304L	316	316L
BODY	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
SEAT-RING	A479-304+STL	A479-304L+STL	A479-316+STL	A479-316L+STL
WEDGE	A351-CF8+STL	A351-CF3+STL	A351-CF8M+STL	A351-CF3M+STL
STEM	A479-304	A479-304L	A479-316	A479-316L
GASKET	AS ORDERED			
BONNET	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
BONNET BOLT	A320-B8			
BONNET NUT	A194-8			
BACK SEAT-RING	A479-304	A479-304L	A479-316	A479-316L
GLAND PACKING	AS ORDERED			
SPACE RING	A479-304	A479-304L	A479-316	A479-316L
PACKING GLAND	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
HINGE PIN	A479-304			
GLAND BOLT	A320-B8			
GLAND FLANGE	A351-CF8			
GLAND BOLT NUT	A194-8			
YOKE SLEEVE	A439-D2C			
THRUST BEARING	STEEL			
YOKE CAP	A351-CF8			
HANDWHEEL	A536			
HANDWHEEL NUT	A351-CF8			
SET SCREW	304SS			
GREASE NIPPLE	STEEL			
12" & LARGER SIZE OF CLASS 150 & 300 / 10" & LARGER SIZE OF CLASS 600 & OVER				
YOKE	A351-CF8			
YOKE BOLT	A320-B8			
YOKE NUT	A194-8			

CRYOGENIC SERVICE GLOBE VALVE

PART LIST FOR CRYOGENIC SERVICE GLOBE VALVE



STANDARD SPECIFICATION FOR CRYOGENIC SERVICE GLOBE VALVE

STANDARD DESIGN SPECIFICATION

APPLIED PART	SPECIFICATION
PRESSURE RATING	ANSI B16.34
FACE TO FACE (END TO END)	ANSI B16.10
FLANGE DIMENSION	ANSI B16.5
TESTING	BS 6364
BONNET BOLT	ASTM A320
BONNET NUT	ASTM A194
MARKING SYSTEM	MSS-SP-25
WALL THICKNESS	HEAVY WALL AS PER EACH SPEC.

STANDARD PRODUCTION RANGE

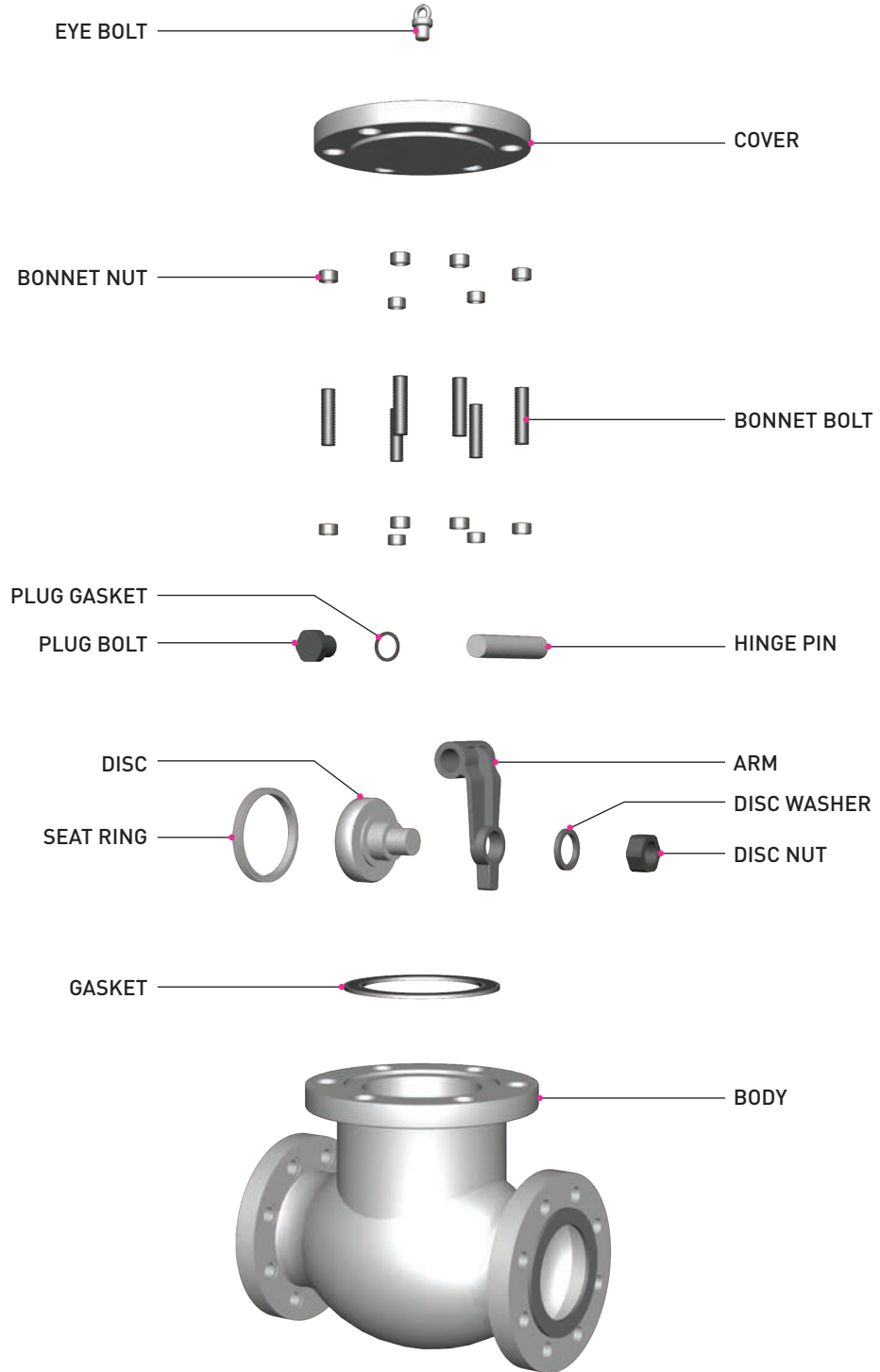
GLOBE VALVE	
CLASS	SIZE
150	2" ~ 12"
300	2" ~ 12"
600	2" ~ 12"
900	2" ~ 12"
1500	2" ~ 8"

STANDARD MATERIALS SPECIFICATION

PART	GLOBE VALVES			
	CF8	CF3	CF8M	CF3M
STANDARD TRIM	304	304L	316	316L
BODY	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
SEAT-RING	A479-304+STL	A479-304L+STL	A479-316+STL	A479-316L+STL
DISC	A351-CF8+STL	A351-CF3+STL	A351-CF8M+STL	A351-CF3M+STL
STEM	A479-304	A479-304L	A479-316	A479-316L
GASKET	AS ORDERED			
BONNET	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
BONNET BOLT	A320-B8			
BONNET NUT	A194-8			
BACK SEAT-RING	A479-304	A479-304L	A479-316	A479-316L
GLAND PACKING	AS ORDERED			
SPACE RING	A479-304	A479-304L	A479-316	A479-316L
PACKING GLAND	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
HINGE PIN	A479-304			
GLAND BOLT	A320-B8			
GLAND FLANGE	A351-CF8			
GLAND BOLT NUT	A194-8			
YOKE BUSH	A439-D2C			
HANDWHEEL	A536			
WASHER	A240-304			
HANDWHEEL NUT	A351-CF8			
GREASE NIPPLE	STEEL			
10" & LARGER SIZE OF CLASS 150 & 300 / 8" & LARGER SIZE OF CLASS 600 & 900 / 6" & LARGER SIZE OF CLASS 1500				
BOTTOM GUIDE	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
IMPACTOR BOSS	A216-WCB			
H-WHEEL COVER	A108-1020			
COVER BOLT	A193-B8			
SPLIT PIN	304SS			

PART LIST FOR CRYOGENIC SERVICE
SWING CHECK VALVE

CRYOGENIC SERVICE
SWING CHECK VALVE



STANDARD SPECIFICATION FOR CRYOGENIC SERVICE SWING CHECK VALVE

STANDARD DESIGN SPECIFICATION

APPLIED PART	SPECIFICATION
PRESSURE RATING	ANSI B16.34
FACE TO FACE (END TO END)	ANSI B16.10
FLANGE DIMENSION	ANSI B16.5
TESTING	BS 6364
BONNET BOLT	ASTM A320
BONNET NUT	ASTM A194
MARKING SYSTEM	MSS-SP-25
WALL THICKNESS	HEAVY WALL AS PER EACH SPEC.

STANDARD PRODUCTION RANGE

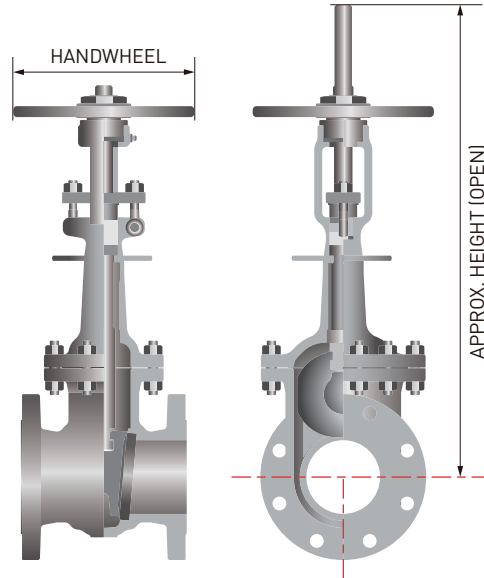
SWING CHECK VALVE	
CLASS	SIZE
150	2" ~ 24"
300	2" ~ 24"
600	2" ~ 24"
900	2" ~ 12"
1500	2" ~ 12"

STANDARD MATERIALS SPECIFICATION

PART	SWING CHECK VALVES			
	CF8	CF3	CF8M	CF3M
STANDARD TRIM	304	304L	316	316L
BODY	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
SEAT-RING	A479-304+STL	A479-304L+STL	A479-316+STL	A479-316L+STL
DISC	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
ARM	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
GASKET	AS ORDERED			
COVER	A351-CF8	A351-CF3	A351-CF8M	A351-CF3M
DISC NUT	A194-8	A194-8	A194-8M	A194-8M
WASHER	A240-316	A240-316	A240-316	A240-316
PIN	A479-304	A479-304L	A479-316	A479-316L
PLUG BOLT	A320-B8	A320-B8M	A320-B8M	A320-B8M
PLUG GASKET	SERRATED 316SS METAL RING			
COVER BOLT	A320-B8			
COVER BOLT NUT	A194-8			
EYE BOLT	A193-B8			

DIMENSION LIST OF GATE VALVE FOR CRYOGENIC SERVICE - 1

CRYOGENIC SERVICE GATE VALVE

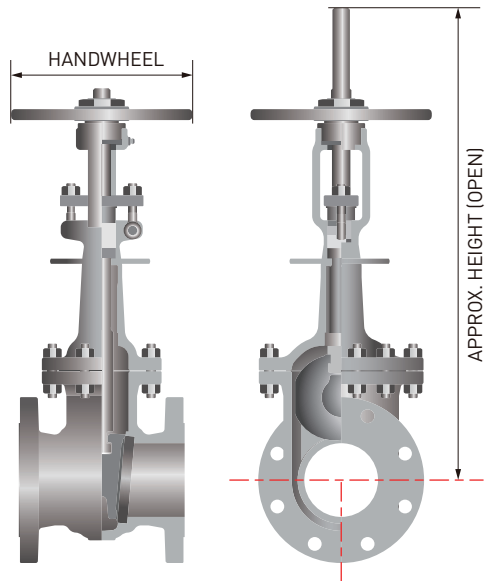


CLASS 150 & 300

Normal Bore Size		FACE TO FACE						API 600 (RF ENDS)			
		RF ENDS		BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
CLASS 150											
<FIG NO. CR-GA 150F>											
50	2	178	7	216	8'1/2	191	7'1/2	850	33'1/2	200	7'7/8
65	2'1/2	191	7'1/2	241	9'1/2	203	8	900	35'3/7	200	7'7/8
80	3	203	8	283	11'1/8	216	8'1/2	1010	39'3/4	250	9'5/6
100	4	229	9	305	12	241	9'1/2	1070	42'1/8	300	11'4/5
150	6	267	10'1/2	403	15'7/8	279	11	1250	49'2/5	350	13'7/9
200	8	292	11'1/2	419	16'1/2	305	12	1520	59'5/6	400	15'3/4
250	10	330	13	457	18	343	13'1/2	1750	68'8/9	450	17'5/7
300	12	356	14	502	19'3/4	368	14'1/2	1970	77'5/9	500	19'2/3
350	14	381	15	572	22'1/2	394	15'1/2	2130	83'6/7	500	19'2/3
400	16	406	16	610	24	419	16'1/2	2340	92'1/8	560	22
450	18	432	17	660	26	445	17'1/2	2560	100'4/5	560	22
500	20	457	18	711	28	470	18'1/2	2790	109'5/6	630	24'4/5
600	24	508	20	813	32	521	20'1/2	3110	122'4/9	630	24'4/5
Normal Bore Size		FACE TO FACE				API 600 (RF ENDS)					
		RF & BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL			
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch		
CLASS 300											
<FIG NO. CR-GA 300F>											
50	2	216	8'1/2	232	9'1/8	850	33'1/2	200	7'7/8		
65	2'1/2	241	9'1/2	257	10'1/8	900	35'3/7	200	7'7/8		
80	3	283	11'1/8	299	11'3/4	1010	39'3/4	250	9'5/6		
100	4	305	12	321	12'5/8	1070	42'1/8	300	11'4/5		
150	6	403	15'7/8	419	16'1/2	1260	49'3/5	400	15'3/4		
200	8	419	16'1/2	435	17'1/8	1550	61	450	17'5/7		
250	10	457	18	473	18'5/8	1750	68'8/9	450	17'5/7		
300	12	502	19'3/4	518	20'3/8	2010	79'1/7	500	19'2/3		
350	14	762	30	778	30'5/8	2260	89	560	22		
400	16	838	33	854	33'5/8	2400	94'1/2	560	22		
450	18	914	36	930	36'5/8	2630	103'1/2	630	24'4/5		
500	20	991	39	1010	39'3/4	2850	112'1/5	630	24'4/5		
600	24	1143	45	1165	45'7/8	3130	123'2/9	800	31'1/2		

DIMENSION LIST OF GATE VALVE FOR CRYOGENIC SERVICE - 2

CRYOGENIC SERVICE GATE VALVE



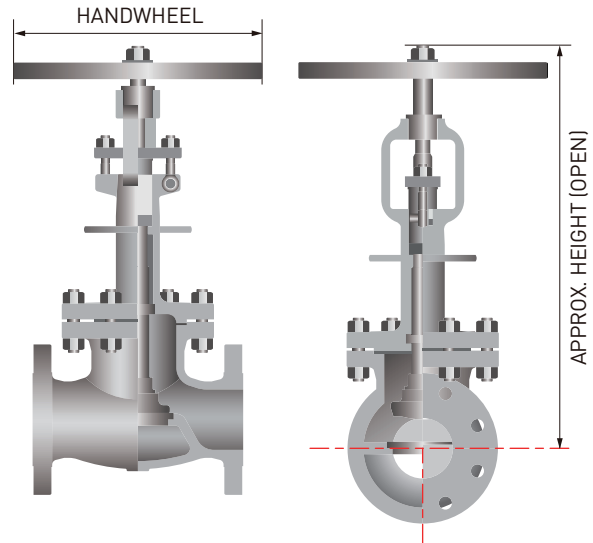
CRYOGENIC SERVICE VALVE

CLASS 600 & 900 & 1500

Normal Bore Size		FACE TO FACE				API 600 (RF ENDS)			
		RF & BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
CLASS 600 <FIG NO. CR-GA 600F>									
50	2	295	11'5/8	295	11'5/8	880	34'2/3	200	7'7/8
65	2'1/2	333	13'1/8	333	13'1/8	900	35'3/7	250	9'5/6
80	3	359	14'1/8	359	14'1/8	1020	40'1/6	300	11'4/5
100	4	435	17'1/8	435	17'1/8	1110	43'5/7	350	13'7/9
150	6	562	22'1/8	562	22'1/8	1370	54	500	19'2/3
200	8	664	26'1/8	664	26'1/8	1590	62'3/5	500	19'2/3
250	10	791	31'1/8	791	31'1/8	1820	71'2/3	560	22
300	12	841	33'1/8	841	33'1/8	2050	80'5/7	630	24'4/5
350	14	892	35'1/8	892	35'1/8	2240	88'1/5	630	24'4/5
400	16	994	39'1/8	994	39'1/8	2440	96	800	31'1/2
450	18	1095	43'1/8	1095	43'1/8	2640	104	800	31'1/2
500	20	1200	47'1/4	1200	47'1/4	2800	110'1/4	800	31'1/2
600	24	1407	55'3/8	1407	55'3/8	3350	131'8/9	900	35'3/7
CLASS 900 <FIG NO. CR-GA 900F>									
50	2	368	14'1/2	372	14'5/8	880	34'2/3	200	7'7/8
80	3	381	15	384	15'1/8	1070	42'1/8	300	11'4/5
100	4	457	18	460	18'1/8	1130	44'1/2	350	13'7/9
150	6	610	24	613	24'1/8	1420	56	500	19'2/3
200	8	737	29	740	29'1/8	1830	72	500	19'2/3
250	10	838	33	841	33'1/8	1960	77'1/6	630	24'4/5
300	12	965	38	968	38'1/8	2190	86'2/9	710	28
CLASS 1500 <FIG NO. CR-GA 1500F>									
50	2	368	14'1/2	372	14'5/8	970	38'1/5	300	11'4/5
80	3	470	18'1/2	473	18'5/8	1070	42'1/8	400	15'3/4
100	4	546	21'1/2	549	21'5/8	1200	47'1/4	450	17'5/7
150	6	705	27'3/4	711	28	1460	57'1/2	500	19'2/3
200	8	832	32'3/4	841	33'1/8	1970	77'5/9	630	24'4/5
250	10	991	39	1000	39'3/8			710	28
300	12	1130	44'1/2	1146	45'1/8			710	28

DIMENSION LIST OF GLOBE VALVE FOR CRYOGENIC SERVICE

CRYOGENIC SERVICE GLOBE VALVE



CLASS 150 & 300 & 600 & 900 & 1500

Normal Bore Size		FACE TO FACE				BS 1873 (RF ENDS)			
		RF & BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch

CLASS 150 <FIG NO. CR-GL 150F>									
50	2	203	8	216	8'1/2	750	29'1/2	200	7'7/8
65	2'1/2	216	8'1/2	229	9	790	31'1/9	250	9'5/6
80	3	241	9'1/2	254	10	900	35'3/7	250	9'5/6
100	4	292	11'1/2	305	12	900	35'3/7	300	11'4/5
150	6	406	16	419	16'1/2	990	39	450	17'5/7
200	8	495	19'1/2	508	20	1080	42'1/2	450	17'5/7
250	10	622	24'1/2	635	25	1210	47'2/3	450	17'5/7
300	12	699	27'1/2	711	28	1240	48'5/6	610	24

CLASS 300 <FIG NO. CR-GL 300F>									
50	2	267	10'1/2	283	11'1/8	800	31'1/2	200	7'7/8
65	2'1/2	292	11'1/2	308	12'1/8	800	31'1/2	250	9'5/6
80	3	318	12'1/2	333	13'1/8	930	36'3/5	250	9'5/6
100	4	356	14	372	14'5/8	980	38'4/7	300	11'4/5
150	6	445	17'1/2	460	18'1/9	1060	41'3/4	450	17'5/7
200	8	559	22	575	22'2/3	1120	44	450	17'5/7
250	10	622	24'1/2	638	25'1/8	1210	47'2/3	610	24
300	12	711	28	727	28'5/8	1290	50'4/5	610	24

Normal Bore Size		FACE TO FACE				BS 1873 (RF ENDS)			
		RF & BW ENDS		RTJ ENDS		HEIGHT		HANDWHEEL	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch

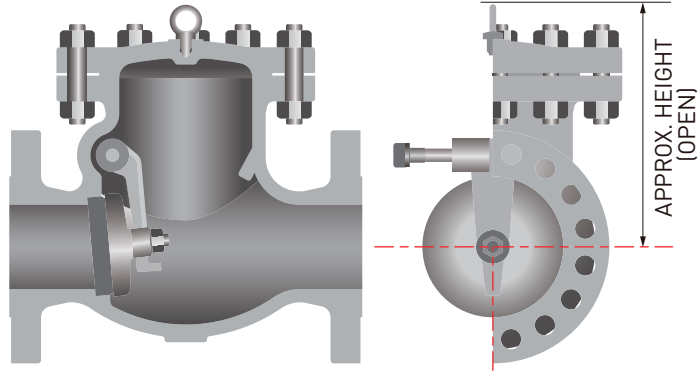
CLASS 600 <FIG NO. CR-GL 600F>									
50	2	292	11'1/2	295	11'5/8	850	33'1/2	250	9'5/6
65	2'1/2	330	13	333	13'1/8	930	36'3/5	300	11'4/5
80	3	356	14	359	14'1/8	1060	41'3/4	350	13'7/9
100	4	432	17	435	17'1/8	1060	41'3/4	350	17'5/7
150	6	559	22	562	22'1/8	1200	47'1/4	450	17'5/7
200	8	661	26	664	26'1/8	1250	49'1/5	610	24
250	10	787	31	791	31'1/8	1380	54'1/3	610	24
300	12	838	33	841	33'1/8	1420	56	610	24

CLASS 900 <FIG NO. CR-GL 900F>									
50	2	368	14'1/2	372	14'5/8	850	33'1/2	350	13'7/9
80	3	381	15	384	15'1/8	1060	41'3/4	450	17'5/7
100	4	457	18	460	18'1/8	1060	41'3/4	450	17'5/7
150	6	610	24	613	24'1/8	1230	48'3/7	610	24
200	8	737	29	740	29'1/8	1300	51'1/6	610	24
250	10	838	33	841	33'1/8	1790	70'1/2	900	35'3/7
300	12	965	38	968	38'1/8	1870	73'5/8	900	35'3/7

CLASS 1500 <FIG NO. CR-GL 1500F>									
50	2	368	14'1/2	372	14'5/8	970	35'5/6	350	13'7/9
80	3	470	18'1/2	473	18'5/8	1030	40'5/9	450	17'5/7
100	4	546	21'1/2	549	21'5/8	1050	41'1/3	450	17'5/7
150	6	705	27'3/4	711	28	1230	48'3/7	800	31'1/2
200	8	832	32'3/4	841	33'1/8	1590	62'3/5	900	35'3/7

DIMENSION LIST OF SWING CHECK VALVE FOR CRYOGENIC SERVICE - 1

CRYOGENIC SERVICE SWING CHECK VALVE



CRYOGENIC SERVICE VALVE

CLASS 150 & 300

Normal Bore Size		FACE TO FACE					
		RF & BW ENDS		RTJ ENDS		HEIGHT	
mm	inch	mm	inch	mm	inch	mm	inch
CLASS 150				<FIG NO. CR-CH 150F>			
50	2	203	8	216	8'1/2	153	6
65	2'1/2	216	8'1/2	229	9	155	6'1/9
80	3	241	9'1/2	254	10	175	6'8/9
100	4	292	11'1/2	305	12	202	8
150	6	356	14	368	14'1/2	291	11'1/2
200	8	495	19'1/2	508	20	327	12'7/8
250	10	622	24'1/2	635	25	360	14'1/6
300	12	699	27'1/2	711	28	417	16'3/7
350	14	787	31	800	31'1/2	478	18'5/6
400	16	864	34	876	34'1/2	516	20'1/3
450	18	978	38'1/2	991	39	554	21'4/5
500	20	978	38'1/2	991	39	620	24'2/5
600	24	1295	51	1308	51'1/2	670	26'3/8
CLASS 300				<FIG NO. CR-CH 300F>			
50	2	267	10'1/2	283	11'1/8	165	6'1/2
65	2'1/2	292	11'1/2	308	12'1/8	190	7'1/2
80	3	318	12'1/2	333	13'1/8	186	7'1/3
100	4	356	14	372	14'5/8	219	8'5/8
150	6	445	17'1/2	460	18'1/8	262	10'1/3
200	8	533	21	549	21'5/8	334	13'1/7
250	10	622	24'1/2	638	25'1/8	398	15'2/3
300	12	711	28	727	28'5/8	475	18'5/7
350	14	838	33	854	33'5/8	540	21'1/4
400	16	864	34	880	34'5/8	605	23'5/6
450	18	978	38'1/2	994	39'1/8	650	25'3/5
500	20	1016	40	1035	40'3/4	715	28'1/7
600	24	1346	53	1368	53'7/8	964	38

DIMENSION LIST OF SWING CHECK VALVE FOR CRYOGENIC SERVICE - 2

CLASS 600

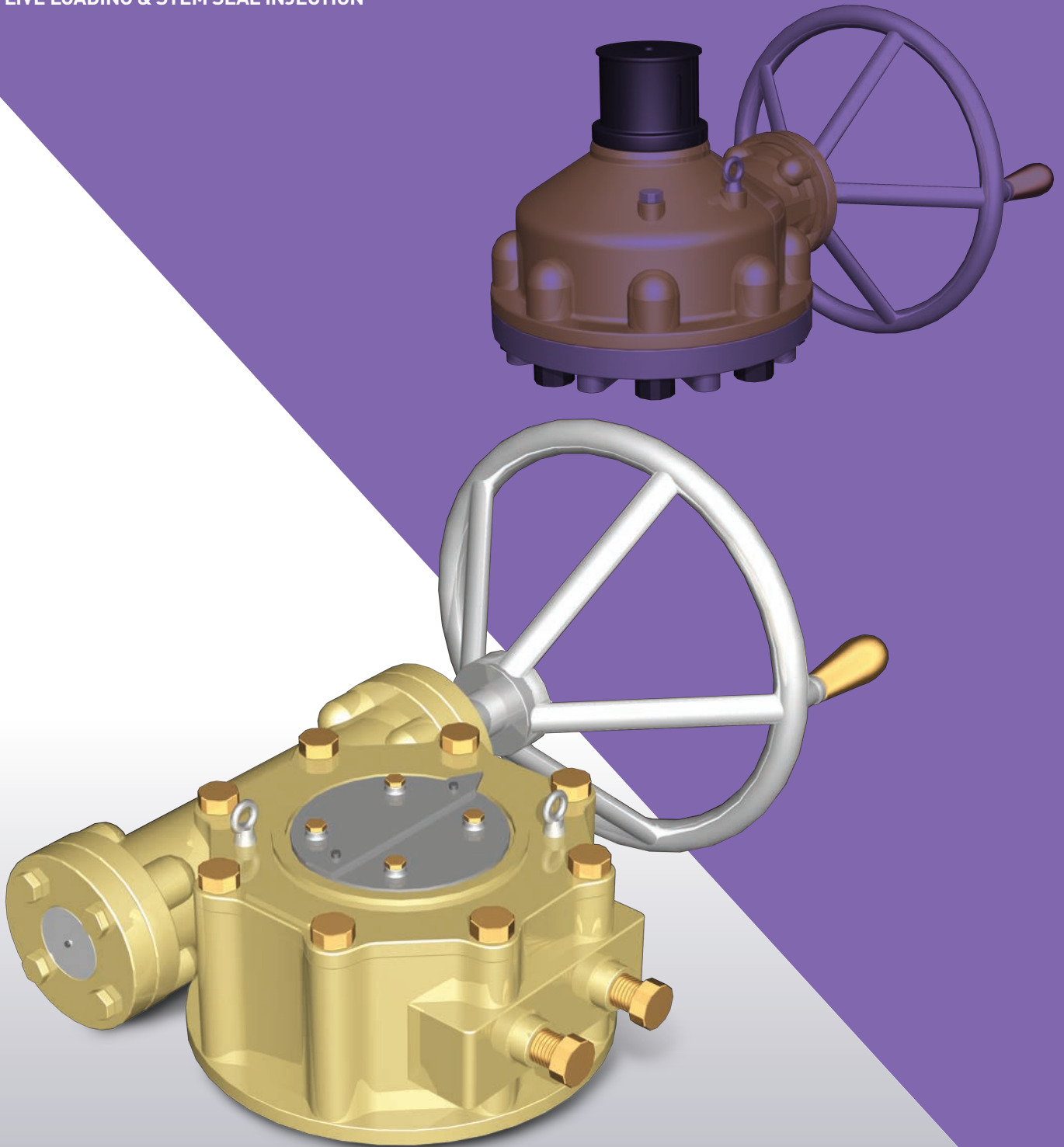
Normal Bore Size		FACE TO FACE						
		RF & BW ENDS		RTJ ENDS		HEIGHT		
mm	inch	mm	inch	mm	inch	mm	inch	
CLASS 600								<FIG NO. CR-CH 600F>
50	2	292	11'1/2	295	11'5/8	187	7'1/3	
65	2'1/2	330	13	333	13'1/8	200	7'7/8	
80	3	356	14	359	14'1/8	210	8'1/4	
100	4	432	17	435	17'1/8	256	10	
150	6	559	22	562	22'1/8	329	13	
200	8	660	26	664	26'1/8	364	14'1/3	
250	10	787	31	791	31'1/8	464	18'1/4	
300	12	838	33	841	33'1/8	486	19'1/7	
350	14	889	35	892	35'1/8	515	20'2/7	
400	16	991	39	994	39'1/8	550	21'2/3	
450	18	1092	43	1095	43'1/8	590	23'2/9	
500	20	1194	47	1200	47'1/4	635	25	
600	24	1397	55	1407	55'3/8	680	26'7/9	

CLASS 900 & 1500

Normal Bore Size		FACE TO FACE						
		RF & BW ENDS		RTJ ENDS		HEIGHT		
mm	inch	mm	inch	mm	inch	mm	inch	
CLASS 900								<FIG NO. CR-CH 900F>
50	2	368	14'1/2	372	14'5/8	270	10'5/8	
80	3	381	15	384	15'1/8	295	11'3/5	
100	4	457	18	460	18'1/8	310	12'1/5	
150	6	610	24	613	24'1/8	340	13'2/5	
200	8	737	29	740	29'1/8	445	18'1/3	
250	10	838	33	841	33'1/8	510	20	
300	12	965	38	968	38'1/8	580	22'5/6	
CLASS 1500								<FIG NO. CR-CH 1500F>
50	2	368	14'1/2	372	14'5/8	290	11'3/7	
80	3	470	18'1/2	473	18'5/8	315	12'2/5	
100	4	546	21'1/2	549	21'5/8	380	15	
150	6	705	27'3/4	711	28	490	19'2/7	
200	8	832	32'3/4	841	33'1/8	600	23'5/8	
250	10	991	39	1000	39'3/8	730	28'3/4	
300	12	1130	44'1/2	1146	45'1/8	850	33'1/2	

OPTIONAL ACCESSORIES

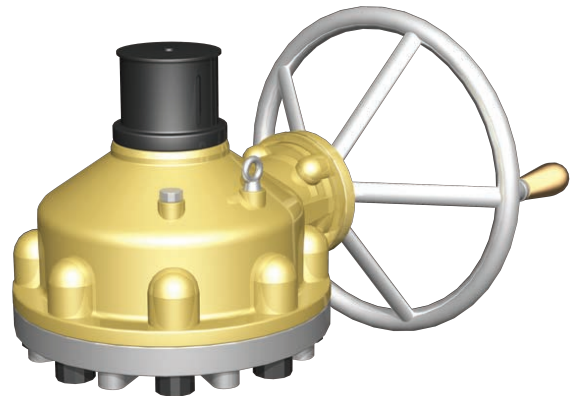
- ACTUATOR
- WEDGE & DISC
- EXTENSION STEM
- LIVE LOADING & STEM SEAL INJECTION



ACTUATOR

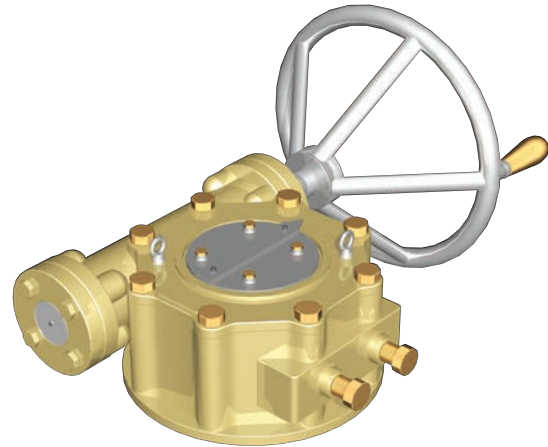
BEVEL GEAR ACTUATORS

NO.	GEAR RATIO	MAX TORQUE FOR STEM			MOUNTING FLANGE
		kgf-m	N-m	lb-ft	ISO 5210/1
BG1	2.5:1	22	216	159	F10
BG2	3.0:1	37	363	268	F12
BG3	3.3:1	60	588	434	F14
BG4	3.5:1	95	931	687	F16
BG5	4.0:1	152	1490	1099	F20
BG6	4.5:1	234	2293	1693	F25
BG7	5.0:1	347	3401	2510	F30
BG8	5.0:1	520	5096	3761	F30
BG9	6.0:1	780	7644	5642	F35
BG10	6.5:1	1270	12446	9186	F40
BG11	7.0:1	1760	17248	12730	F48
BG12	8.0:1	2600	25480	18806	F48



WORM GEAR ACTUATORS

NO.	GEAR RATIO	MAX TORQUE FOR STEM			MOUNTING FLANGE
		kgf-m	N-m	lb-ft	ISO 5210/1
WG1	38.0:1	22	216	159	F10
WG2	42.0:1	37	363	268	F12
WG3	48.0:1	60	588	434	F14
WG4	51.0:1	95	931	687	F16
WG5	56.0:1	152	1490	1099	F20
WG6	60.0:1	234	2293	1693	F25



HYDRAULIC OR PNEUMATIC ACTUATORS

SUN KOREA has another optional actuators. We can install several kinds of actuators. All brands are possible to be installed. It is possible to choose hydraulic or pneumatic actuators as per requirements.



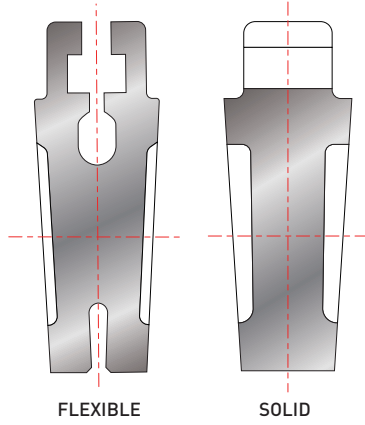
MOTOR ACTUATORS

Valve motor actuators are normally required for automotive operating. It is worked with air or electric motor type mainly. It helps making Open/Close Speed up and handling it at a long distance. By customer's requirement, motor actuators are installed with optional and it depends on 'Service condition' and 'Maker's specification'.

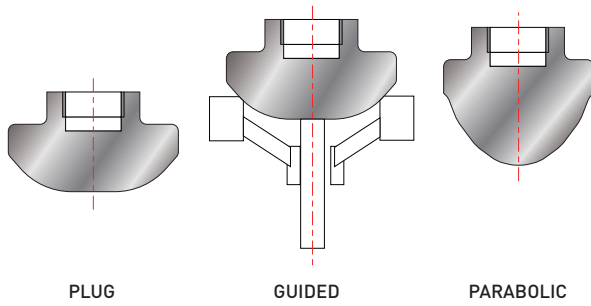


WEDGE & DISC

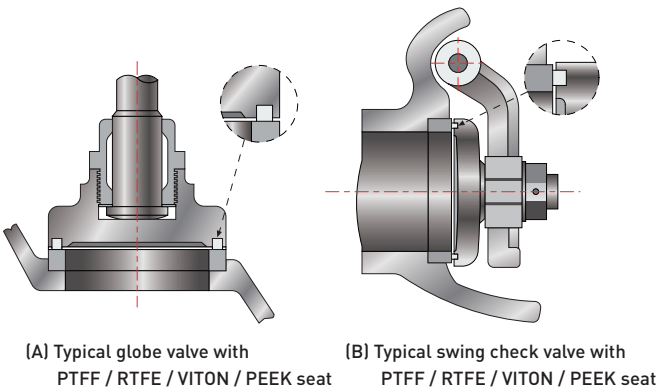
→ The Gate valves is normally supplied with a flexible wedge, on request with solid wedge as shown below. All the wedges are fully guided.



→ The Globe Valve is normally supplied with plug type disc. On request we produce guided discs, parabolic discs and equilibrated discs. Equilibrated discs are normally supplied when differential pressure is very high and the service is on-off. In this case the flow direction is over the disc.



→ If the customer require special type of disc like following figure. We can supply it as customers' requirement.



(A) Typical globe valve with PTFE / RTFE / VITON / PEEK seat

(B) Typical swing check valve with PTFE / RTFE / VITON / PEEK seat

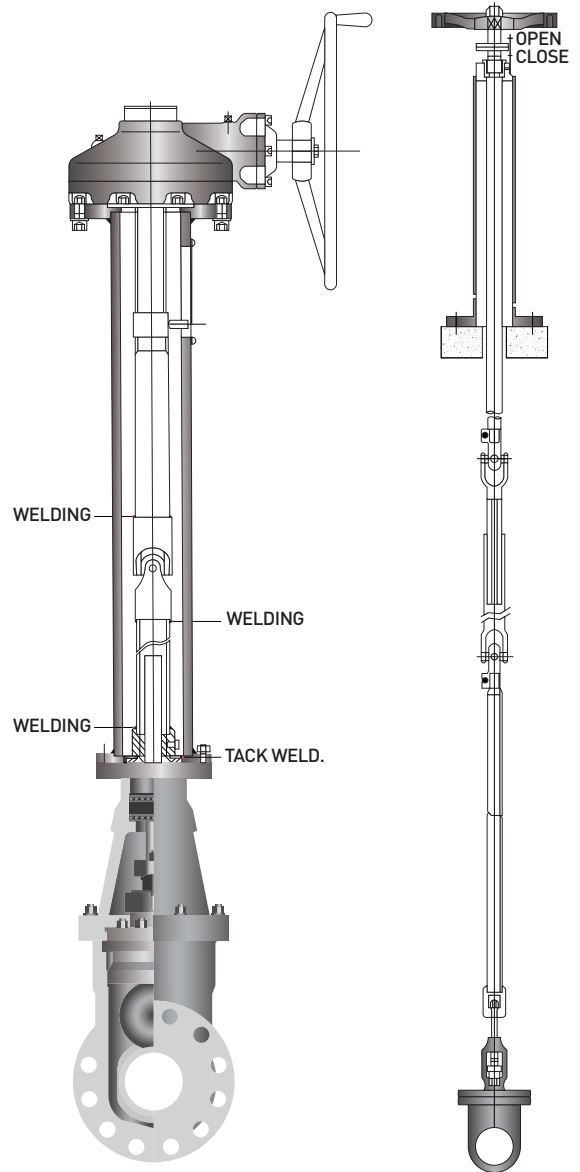
EXTENSION STEM

EXTENSION STEM

The extension stem is used when valve must be operated at a distance. The stems for steel valve are made of extra strong steel pipes.

The handwheel couplings and stem/yoke busing couplings are made out of high grade malleable iron.

The pins as a cold rolled steel are assembled easily into valve upon installation.



LIVE LOADING & STEM SEAL INJECTION

LIVE LOADING OPTIONAL

2sets of Belleville springs maintain a minimum permanent packing stress of 8,000 psi on Inconel Wire Reinforced Graphite Braided Packing or 5,000 psi on Graphoil Packing.

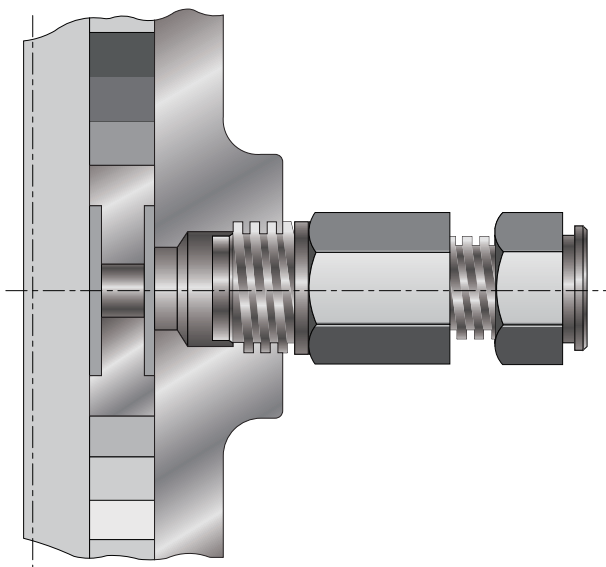
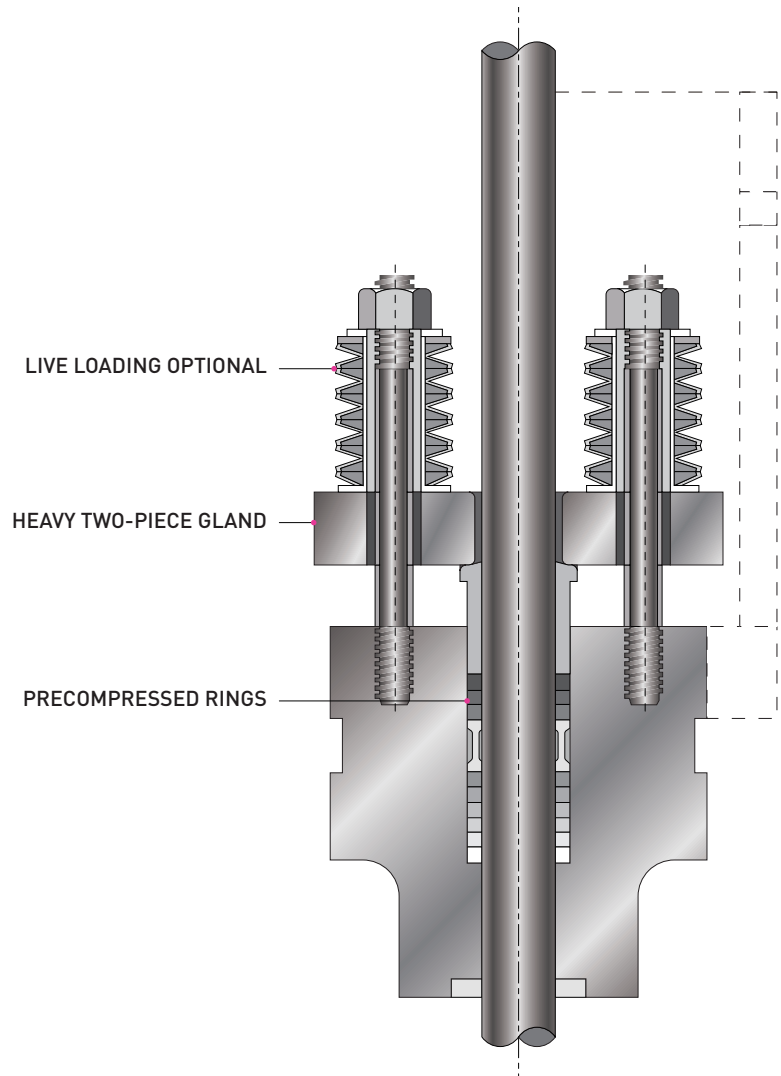
Live-loading extends the stem tightness for long periods of time without maintenance. Bolt torques control total spring load.

HEAVY TWO-PIECE GLAND

A heavy gland flange is required to carry the high stresses due to live-load.

PRECOMPRESSED RINGS

Each Inconel Wire Reinforced Graphite Braided Packing ring is precompressed at 15,000 psi (Graphoil at 5,000 psi) to ensure extreme tightness at high packing strain.

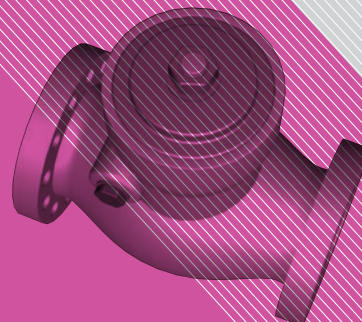
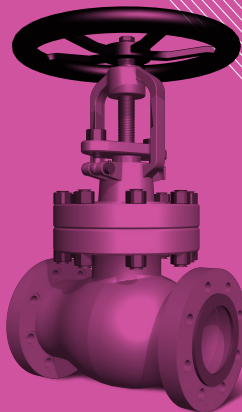
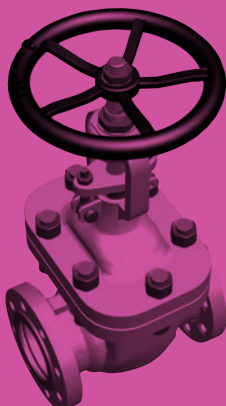
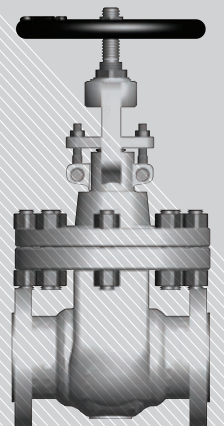
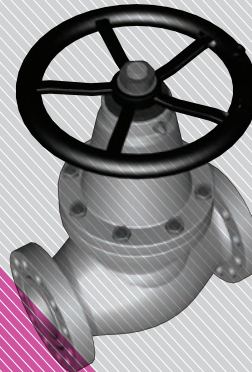
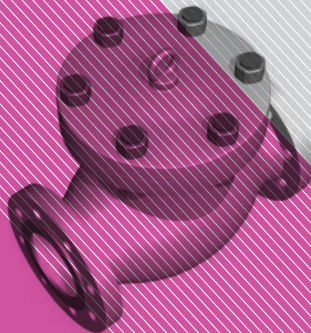
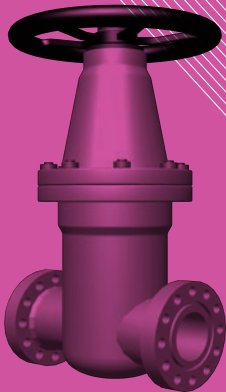
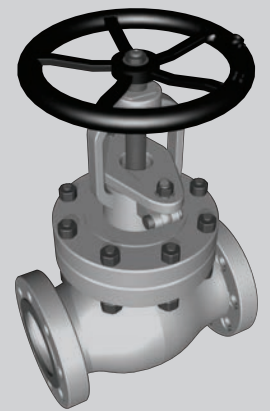
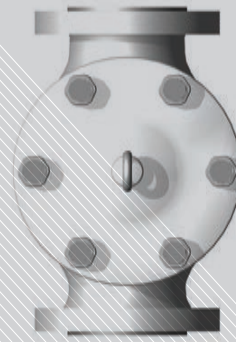
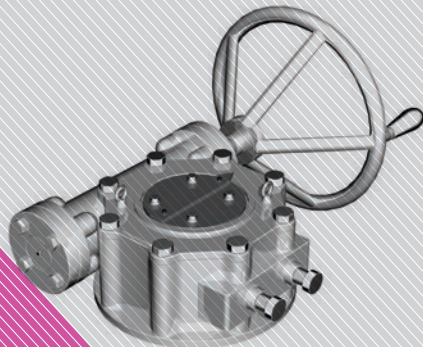
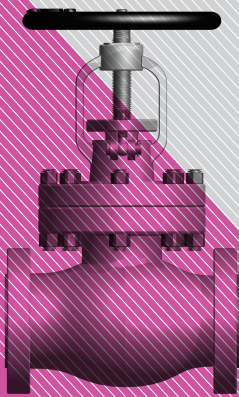


STEM SEAL INJECTION

Grease injector at lantern ring of gate or globe valve

TECHNICAL

- ALTERNATIVE MATERIALS
- COMPARISON TABLE FOR EQUIVALENT MATERIALS
- COMPARISON TABLE FOR BOLTING MATERIALS
- TRIM MATERIALS
- PRESSURE & TEMPERATURE
- TORQUE DATA LIST
- GUIDELINES FOR STORAGE, INSTALLATION, OPERATION & MAINTENANCE
- APPLYING SPECIFICATION LIST



ALTERNATIVE MATERIALS

NOMINAL DESIGNATION	GRADE TRADEMARK	UNS		ASTM		
		CASTING	BAR & FORGING	CASTING	BAR	FORGING
CARBON STEEL						
WCA	-	J02502	K03504	A216-WCA	-	A105
WCB	-	J03002	-	A216-WCB	-	A105
WCC	-	J02503	-	A216-WCC	-	-
ALLOYS STEEL FOR HIGH TEMPERATURE						
WC1	C-½Mo	J12520 / J12524	-	A217-WC1	-	A182-F1
WC6	1¼Cr-½Mo	J12072	K11797 / K12529	A217-WC6	A739-B11	A182-F11
WC9	2¼Cr-1Mo	J21890	K21390 / K21590	A217-WC9	A739-B22	A182-F22
C5	5Cr-½Mo	J42045	K41545 / K42544	A217-C5	-	A182-F5,F5a
C12	9Cr-1Mo	J82090	K90941	A217-C12	-	A182-F9
C12A	-	J84090	-	A217-C12A	-	A182-F91
13Cr	13Cr-Type410	J91150	S41000	A217-CA15	-	A182-F6,F6a
ALLOY STEEL FOR LOW TEMPERATURE						
LCB	-	J03003	K03009	A352-LCB	A696-C	A350-LF1
LCC	-	J02505	K03011	A352-LCC	-	A350-LF2
LC1	C-½Mo	J12522	-	A352-LC1	-	-
LC2	2½Ni	J22500	-	A352-LC2	-	-
LC3	3½Ni	J31500	K32025	A352-LC3	-	A350-LF3
STAINLESS STEEL						
304L	18Cr-8Ni-LoC	J92700	S30403	A351-CF3	A479-304L	A182-F304L
304	18Cr-8Ni	J92600	S30400	A351-CF8	A479-304	A182-F304
316L	18Cr-8Ni-2Mo-LoC	J92800	S31603	A351-CF3M	A479-316L	A182-F316L
316	18Cr-8Ni-2Mo	J92900	S31600	A351-CF8M	A479-316	A182-F316
316LN	18Cr-12Ni-2.5Mo-0.15N-LoC	J92804	S31653	A351-CF3MN	A479-316LN	A182-F316LN
347	18Cr-9Ni-Cb-0.06C	J92710	S34700	A351-CF8C	A479-347	A182-F347
304H	18Cr-8Ni-0.07C	J92950	S30409	A351-CF10	A479-304H	A182-F304H
316H	18Cr-12Ni-2.5Mo-0.07C	J92901	S31609	A351-CF10M	A479-316H	A182-F316H
309S	22Cr-12Ni-0.06C	J93400	S30908	A351-CH8	A479-309S	A182-F309S
309H	22Cr-12Ni-0.07C	J93401	S30909	A351-CH10	A479-309H	A182-F309H
309	22Cr-12Ni-0.07C	J93402	S30900	A351-CH20	A479-309	A182-F309
310	25Cr-20Ni-0.1C	J94202	S31000	A351-CK20	A479-310	A182-F310
316Cb	18Cr-13Ni-2Mo-Cb-0.06C	-	S31640	A351-CF10MC	A479-316Cb	A182-F316Cb
XM-19	22Cr-12Ni-5Mn-2Mo-Cb-V-N-0.04C	J93790	S20910	A351-CG6MMN	A479-XM-19	A182-XM-19
317	18Cr-12Ni-3.5Mo-0.06C	J93000	S31700	A351-CG8M	A479-317	A182-F317
CK3MCuN	20Cr-18Ni-6.5Mo-N-Cu-0.01C	J93254	S31254	A351-CK3MCuN	-	-
317L	18Cr-12Ni-3.5Mo-LoC	J92999	S31703	A351-CG3M	A240-317L	A182-F317L
DUPLEX STAINLESS STEEL						
1A	25Cr-5Ni-Mo-Cu	J93370	S32550	A890-CD4MCu	A479	-
1B	25Cr-5Ni-Mo-Cu-N	J93372	S32550	A890-CD4MCuN	A479	-
1C	25Cr-6Ni-Mo-Cu-N	J93373	S32550	A890-CD3MCuN	A479	-
2A	24Cr-10Ni-Mo-N	J93345	-	A890-CE8MN	-	-
3A	25Cr-5Ni-Mo-N	J93371	-	A890-CD6MN	-	-
4A(2205)	22Cr-5Ni-Mo-N(2205)	J92205	S31803	A890-CD3MN	A479	A182-F51
5A(SAF2507)	25Cr-7Ni-Mo-N(2507)	J93404	S32750	A890-CE3MN	A479	A182-F53
6A	25Cr-7Ni-Mo-N(zeron100)	J93380	S32760	A890-CD3MWCuN	A479	A182-F55
SPECIAL ALLOY						
ALLOY20	Carpenter 20Cb3	N08007	N08020	A351-CN7M	B473	B462
ALLOY 200	-	N02100	N02200	A494-CZ-100	B160	B316
ALLOY 400	Monel 400	N24135	N04400	A494-M35-1	B164	B564
M35-2	-	N04020	N04400	A494-M35-2	-	-
ALLOY B	Hastelloy - B	N06040	N10001	A494-N7M	B335	B564
ALLOY C	Hastelloy - C(276)	N30002	N10276	A494-CW12MW	B574	B564
ALLOY 600	Inconel 600	N06040	N06600	A494-CY40	B166	B564
ALLOY 625	Inconel 625	N26625	N06625	A494-CW6MC	B446	B564
ALLOY 800	Incoloy 800	-	N08800	-	B408	B564
ALLOY 825	Incoloy 825	N08826	N08825	A494-Cu5MCuC	B425	B425

COMPARISON TABLE FOR EQUIVALENT MATERIALS - 1

UNS NO.	CASTING				SERVICE TEMPERATURE (F)
	ASTM	JIS	DIN	BS	
CARBON STEEL					
J02502	A216-WCA	G5151-SCPH1	17245-GS-25	1504-161A	-
J03002	A216-WCB	G5151-SCPH2	G-31MN4	1504-161B	800
J02503	A216-WCC	G5102-SCW480	-	-	800
ALLOY STEEL FOR HIGH TEMPERATURE					
J12520/J12524	A217-WC1	G5151-SCPH11	17245-GS-22M04	1504-240	875
J12072	A217-WC6	G5151-SCPH21	17245-GS-17CRM055	1504-621	1100
J21890	A217-WC9	G5151-SCPH32	17245-GS-12CRM0910	1504-622	1100
J42045	A217-C5	G5151-SCPH61	17245-GS-12CRM0195	1504-625	1200
J82090	A217-C12	-	17245-G-X12CRM0101	1504-629	1200
J84090	A217-C12A	-	-	-	1200
J91150	A217-CA15	G5121-SCS1	1654-X10CR13	1504-410C21	1100
ALLOY STEEL FOR LOW TEMPERATURE					
J03003	A352-LCB	G5121-SCPL1	GS-CK24	1504-161B	650
J02505	A352-LCC	G5121-SCPL1	-	-	650
J12522	A352-LC1	G5121-SCPL11	-	-	650
J22500	A352-LC2	G5121-SCPL21	-	-	650
J31500	A352-LC3	G5121-SCPL31	GS-10NI14	1504-503	650
STAINLESS STEEL					
J92700	A351-CF3	G5121-SCS19A	17445-G-X2CRNI1911	1504-304C12	800
J92600	A351-CF8	G5121-SCS13A	17445-G-X6CRNI189	1504-304C15	1500
J92800	A351-CF3M	G5121-SCS16A	17445-G-X2CRNIMO1810	1504-316C12	850
J92900	A351-CF8M	G5121-SCS14A	17445-G-X6CRNIMO1810	1504-316C16	1500
J92804	A351-CF3MN	-	17445-G-X2CRNIMON7133	-	-
J92710	A351-CF8C	G5121-SCS21	17445-G-X10CRNICB189	1504-347C17	1500
J92950	A351-CF10	-	17445-G-X5CRNI1810	-	1500
J92901	A351-CF10M	-	17445-G-X6CRNIMO1713	-	1500
J93400	A351-CH8	-	17445-G-X7RNI2314	-	1500
J93401	A351-CH10	-	-	-	1500
J93402	A351-CH20	G5121-SCS17	-	-	1500
J94202	A351-CK20	G5121-SCS18	G-X15NI-CRSI2520	-	1500
-	A351-CF10MC	-	-	-	-
J93790	A351-CG6MMN	-	-	-	1100
J93000	A351-CG8M	-	-	1504-317C16	1000
J93254	A351-CK3MCuN	-	-	-	750
J92999	A351-CG3M	-	-	1504-317C12	1000

COMPARISON TABLE FOR EQUIVALENT MATERIALS - 2

UNS NO.	FORGING				SERVICE TEMPERATURE (F)
	ASTM	JIS	DIN	BS	
CARBON STEEL					
K03504	A105	G3202-SFVC2A	17155-19MN5	1503-151A	-
-	A105	G3202-SFVC2A	17155-19MN5	1503-161B	800
-	-	-	-	-	800
ALLOY STEEL FOR HIGH TEMPERATURE					
K12822	A182-F1	G3203-SFVAF1	16M05	1503-245-420	875
K11797(K11572)	A182-F11	G3203-SFVAF11A	17175-13CRM044	1503-621-460	1100
K21390(K11572)	A182-F22	G3203-SFVAF22A	17175-10CRM0910	1503-622-560	1100
K41545(K42544)	F5&F59	G3203-SFVAF5D	17175-12CRM0195	1503-625-520	1200
K90941	F5&F9	G3203-SFVAF9	-	1503-629	1200
-	F5&F91	-	-	-	1200
S41000	F6&F69	G4303-410	17440-G-X10CR13	1503-410S21	1100
ALLOY STEEL FOR LOW TEMPERATURE					
K03009	A350-LF1	G3205-SFL1	TT41	1503-221-430	650
K03011	A350-LF2	G3205-SFL2	TTTE36	1503-221-490	650
-	-	-	-	-	650
-	-	-	-	-	650
K32025	A350-LF3	-	17173-10NI14	1503-503-LT100	650
STAINLESS STEEL					
S30403	A182-F304L	G3214-SUSF304L	17440-X2CRNI189	1503-304S11	800
S30400	A182-F304	G3214-SUSF304L	17440-X5CRNI189	1503-304S31	1500
S31603	A182-F316L	G3214-SUSF316L	17440-X2CRNIMO1810	1503-316S11	850
S31600	A182-F316	G3214-SUSF316	17440-X5CRNIMO1810	1503-316S31	1500
S31653	A182-F316LN	-	17440-X2CRNIMO7133	-	-
S34700	A182-F347	G3214-SUSF347	17440-X10CRNIN6189	1503-347S31	1500
S30409	A182-F304H	G3214-SUSF304H	17440-X5CRNI1810	1503-304S51	1500
S31609	A182-F316H	G3214-SUSF316H	17440-X6CRNIMO1713	1503-316S51	1500
S30908	A182-F309S	G3214-SUSF309S	17440-X7CRNI2314	-	1500
S30909	A182-F309H	G3214-SUSF309H	-	-	1500
S30900	A182-F309	G3214-SUSF309	17440-X15CRNISI2012	-	1500
S31040	A182-F310S	G3214-SUSF310S	17440-X12CRNI2521	1503-310S31	1500
S31640	A182-F316CB	G3214-SUSF316CB	17440-X6CRNIMONB17122	-	-
S20910	A182-XM-19	-	-	-	1100
S31700	A182-F317	-	-	1503-317S16	1000
S31254	-	-	-	-	750
S31703	A182-F317L	-	-	1503-317S12	1000

COMPARISON TABLE FOR BOLTING MATERIALS

BODY MATERIALS ASTM	APPLYING BOLT MATERIALS				APPLYING NUT MATERIALS				SERVICE TEMP. BOLT & NUT
	ASTM	JIS	DIN	BS	ASTM	JIS	DIN	BS	
HIGH TEMPERATURE									
A216-WCB	A193-B7	G4107-SNB7	17200-42CrMo4	1506-621A	A194-2H	G4051-S45C	17240-C45	1506-162	550°C
A217-WC1									
A217-WC6									
A217-WC9	A193-B16	G4107-SNB16	17240-24CrMOV5 5	1506-661	A194-4	-	17240-24CrMo5	1506-240	600°C
A217-C5									
A217-C12									
A217-C12A									
A351-CF3	A193-B8	G4303-SUS304	17440-X5CrNi18 9	1506-801B	A194-8	G4303-SUS304	17440-X5CrNi18 9	1506-801B	800°C
A351-CF8									
A351-CF8C									
A351-CK20									
A351-CF3M	A193-B8M	G4303-SUS316	17440-X5CrNiMo18 10	1506-845	A194-8M	G4303-SUS316	17440-X5CrNiMo18 10	1506-845	800°C
A351-CF8M									
A351-CG8M									
A351-CF8C	A193-B8T	G4303-SUS321	17440-X10CrNiTi18 9	1506-821Ti	A194-8T	G4303-SUS321	17440-X10CrNiTi18 9	1506-821Ti	800°C
A351-CF8C	A193-B8C	G4303-SUS347	17440-X10CrNiNb18 9	1506-821Nb	A194-8C	G4303-SUS347	17440-X10CrNiNb18 9	1506-821Nb	800°C
LOW TEMPERATURE									
A352-LCB	A320-L7	-	17200-42CrMo4	1506-621A	A194-4	-	17240-24CrMo5	1506-240	-101°C
A352-LCC									
A351-CF3	A320-B8	G4303-SUS304	17440-X5CrNi18 9	1506-801B	A194-8	G4303-SUS304	17440-X5CrNi18 9	1506-801B	-196°C
A351-CF8									
A351-CF8C									
A351-CK20									
A351-CF3M	A320-B8M	G4303-SUS316	17440-X5CrNiMo18 10	1506-845	A194-8M	G4303-SUS316	17440-X5CrNiMo18 10	1506-845	-196°C
A351-CF8M									
A351-CG8M									
A351-CF8C	A320-B8T	G4303-SUS321	17440-X10CrNiTi18 9	1506-821Ti	A194-8T	G4303-SUS321	17440-X10CrNiTi18 9	1506-821Ti	-196°C
A351-CF8C	A320-B8C	G4303-SUS347	17440-X10CrNiNb18 9	1506-821Nb	A194-8C	G4303-SUS347	17440-X10CrNiNb18 9	1506-821Nb	-196°C

TRIM MATERIALS

COMBINATION NO.	MATERIAL TYPE	MATERIALS LIST						
		SEATING SURFACE MATERIALS					STEM MATERIALS	
		TYPICAL SPECIFICATION			MATERIALS DESCRIPTION		MATERIALS DESCRIPTION	
		BRINELL HARDNESS	CAST (ASTM)	WELDED (AWS)	BODY SEAT	WEDGE & DISC	BRINELL HARDNESS	BAR (ASTM)
1	13Cr	250 HB min	A217 CA15	A5.9 ER410	13Cr	13Cr	200HB min 275 HB max	A479-410
2	18Cr-8Ni	①	A351 CF8	A5.9 ER308	304	304	200HB min 275 HB max	A479-304
3	25Cr-20Ni	①	①	A5.9 ER310	310	310	200HB min 275 HB max	A479-310
4	Hard 13Cr	750HB min	①	①	Hard 13Cr	Hard 13Cr	200HB min 275 HB max	A479-410
5 & 5A	HF	350HB min	①	A5.13 E or R CoCrA ②	HF	HF	①	A479-410
6	13Cr Cu-Ni	250HB min 175HB min	A217 CA15 ①	A5.9 ER410 ①	13Cr	Cu-Ni	①	A479-410
7	13Cr Hard 13Cr	250HB min 750HB min	A217 CA15 ①	A5.9 ER410 ①	Hard 13Cr	13Cr	①	A479-410
8 & 8A	13Cr HF	250HB min 350HB min	A217 CA15 ①	A5.9 ER410 A5.13 E or R CoCrA ②	HF	13Cr	200HB min 275 HB max	A479-410
9	Ni-Cu alloy	①	①	①	Monel	Monel	①	B164-N04400
10	18Cr-8Ni-Mo	①	A351 CF8M	A5.9 ER316	316	316	①	A479-316
11 & 11A	Ni-Cu alloy HF	① 350HB min	① ①	① A5.13 E or R CoCrA ②	HF	Monel	①	B164-N04400
12 & 12A	316 and HF	① 350HB min	A351 CF8M ①	A5.9 ER316 A5.13 E or R CoCrA ①	HF	316	①	A479-316
13	19Cr-29Ni	①	A351 CN7M	A5.9 ER320	Alloy 20	Alloy 20	①	B473-N08020
14 & 14A	19Cr-29Ni HF	① 350HB min	A351 CN7M ①	A5.9 ER320 A5.13 E or R CoCrA	HF	Alloy 20	①	B473-N08020
15	HF	350HB min	①	A5.13 E or R CoCrA	HF	HF	①	A479-304
16	HF	350HB min	①	A5.13 E or R CoCrA	HF	HF	①	A479-316
17	HF	350HB min	①	A5.13 E or R CoCrA	HF	HF	①	A479-347
18	HF	350HB min	①	A5.13 E or R CoCrA	HF	HF	①	B473-N08020

NOTES

- ① Not specified or Not applicable.
- ② 5A & 8A & 11A & 12A is specified with A5.13 E or R CoCrA is replaced hardfacing with a maximum iron content of 25 percent.

1. Cr=Chromium ; Ni=Nickel ; Co=Cobalt ; Mo=Molybdenum
2. HF=Hardfacing using CoCr or NiCr welding alloy. The suffix A applies to NiCr
3. Free machining grades of 13Cr shall not be used.
4. For CN 1, a differential hardness of at least 50 Brinell points is required between mating surfaces.

PRESSURE & TEMPERATURE - 1

MATERIAL GROUP NO.1.1 A216 WCB

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING													
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C
150	psig	450	315	285	260	230	200	170	140	125	110	95	80	65	50	35	20
	kg/cm ²	32.0	23.0	20.0	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4
300	psig	1125	815	740	675	655	635	600	550	535	535	505	410	270	170	105	50
	kg/cm ²	80.0	58.0	52.0	47.5	46.1	44.6	42.2	38.7	37.6	37.6	35.5	28.8	19.0	12.0	7.4	3.5
600	psig	2225	1630	1480	1350	1315	1270	1200	1095	1075	1065	1010	825	535	345	205	105
	kg/cm ²	157.0	115.0	104.1	94.9	92.5	89.3	84.4	77.0	75.6	74.9	71.0	58.0	37.6	24.3	14.4	7.4
900	psig	3350	2445	2220	2025	1970	1900	1795	1640	1610	1600	1510	1235	805	515	310	155
	kg/cm ²	236.0	172.0	156.1	142.4	138.5	133.6	126.2	115.3	113.2	112.5	106.2	86.8	56.6	36.2	21.8	10.9
1500	psig	5575	4084	3705	3375	3280	3170	2995	2735	2685	2665	2520	2060	1340	860	515	260
	kg/cm ²	392.0	287.0	260.5	237.3	230.6	222.9	210.6	192.3	188.8	187.4	177.2	144.8	94.2	60.5	36.2	18.3
2500	psig	9275	6790	6170	5625	5470	5280	4990	4560	4475	4440	4200	3430	2230	1430	860	430
	kg/cm ²	653.0	478.0	433.8	395.5	384.6	371.2	350.8	320.6	314.6	312.2	295.3	241.2	156.8	100.5	60.5	30.2

MATERIAL GROUP NO.1.2 A216 WCC /A352 LC2 / A352 LC3

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING													
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C
150	psig	450	320	290	260	230	200	170	140	125	110	95	80	65	50	35	20
	kg/cm ²	32.0	23.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4
300	psig	1125	825	750	750	730	705	665	605	590	570	505	410	270	170	105	50
	kg/cm ²	80.0	59.0	52.7	52.7	51.3	49.6	46.8	42.5	41.5	40.1	35.5	28.8	19.0	12.0	7.4	3.5
600	psig	2250	1650	1500	1500	1455	1410	1330	1210	1175	1135	1010	825	535	345	205	105
	kg/cm ²	159.0	117.0	105.5	105.5	102.3	99.1	93.5	85.1	82.6	79.8	71.0	58.0	37.6	24.3	14.4	7.4
900	psig	3375	2475	2250	2250	2185	2115	1995	1815	1765	1705	1510	1235	805	515	310	155
	kg/cm ²	238.0	175.0	158.2	158.2	153.6	148.7	140.3	127.6	124.1	119.9	106.2	86.8	56.6	36.2	21.8	10.9
1500	psig	5625	4125	3750	3750	3640	3530	3325	3025	2940	2840	2520	2060	1340	860	515	260
	kg/cm ²	396.0	291.0	263.7	263.7	255.9	248.2	233.8	212.7	206.7	199.7	177.2	144.8	94.2	60.5	36.2	18.3
2500	psig	9375	6875	6250	6250	6070	5880	5540	5040	4905	4730	4200	3430	2230	1430	860	430
	kg/cm ²	660.0	484.0	439.4	439.4	426.8	413.4	389.5	354.4	344.9	332.6	295.3	241.2	156.8	100.5	60.5	30.2

MATERIAL GROUP NO.1.3 A352 LCB

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING													
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C
150	psig	400	295	265	250	230	200	170	140	125	110	95	80	65	50	35	20
	kg/cm ²	29.0	21.0	18.6	17.6	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4
300	psig	1050	765	695	655	540	620	585	535	525	520	475	390	270	170	105	50
	kg/cm ²	74.0	54.0	48.9	46.1	38.0	43.6	41.1	37.6	36.9	36.6	33.4	27.4	19.0	12.0	7.4	3.5
600	psig	2100	1530	1390	1315	1275	1235	1165	1065	1045	1035	945	780	535	345	205	105
	kg/cm ²	148.0	108.0	97.7	92.5	89.6	86.8	81.9	74.9	73.5	72.8	66.4	54.8	37.6	24.3	14.4	7.4
900	psig	3150	2295	2085	1970	1915	1850	1745	1600	1570	1555	1420	1175	805	515	310	155
	kg/cm ²	222.0	162.0	146.6	138.5	134.6	130.1	122.7	112.5	110.4	109.3	99.8	82.6	56.6	36.2	21.8	10.9
1500	psig	5225	3820	3470	3280	3190	3085	2910	2665	2615	2590	2365	1955	1340	860	515	260
	kg/cm ²	368.0	269.0	244.0	230.6	224.3	216.9	204.6	187.4	183.9	182.1	166.3	137.5	94.2	60.5	36.2	18.3
2500	psig	8700	6365	5785	5470	5315	5145	4850	4440	4355	4320	3945	3260	2230	1430	860	430
	kg/cm ²	612.0	448.0	406.7	384.6	373.7	361.7	341.0	312.2	306.2	303.7	277.4	229.2	156.8	100.5	60.5	30.2

PRESSURE & TEMPERATURE - 2

MATERIAL GROUP NO.1.5 A217 WC1 /A352 LC1

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING													
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C
150	psig	400	295	265	260	230	200	170	140	125	110	95	80	65	50	35	20
	kg/cm ²	29.0	21.0	18.6	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4
300	psig	1050	765	695	680	655	640	620	605	590	570	530	510	485	450	280	165
	kg/cm ²	74.0	54.0	48.9	47.8	46.1	45.0	43.6	42.5	41.5	40.1	37.3	35.9	34.1	31.6	19.7	11.6
600	psig	2100	1530	1390	1360	1305	1280	1245	1210	1175	1135	1065	1015	975	900	560	330
	kg/cm ²	148.0	108.0	97.7	95.6	91.8	90.0	87.5	85.1	82.6	79.8	74.9	71.4	68.6	63.3	39.4	23.2
900	psig	3150	2295	2085	2035	1955	1920	1865	1815	1765	1705	1595	1525	1460	1350	845	495
	kg/cm ²	222.0	162.0	146.6	143.1	137.5	135.0	131.1	127.6	124.1	119.9	112.1	107.2	102.7	94.9	59.4	34.8
1500	psig	5225	3820	3470	3395	3260	3200	3105	3025	2940	2840	2660	2540	2435	2245	1405	825
	kg/cm ²	368.0	269.0	244.0	238.7	229.2	225.0	218.3	212.7	206.7	199.7	187.0	178.6	171.2	157.8	98.8	58.0
2500	psig	8700	6365	5785	5660	5435	5330	5180	5040	4905	4730	4430	4230	4060	3745	2345	1370
	kg/cm ²	612.0	448.0	406.7	398.0	382.1	374.8	364.2	354.4	344.9	332.6	311.5	297.4	285.5	263.3	164.9	96.3

MATERIAL GROUP NO.1.7 A217 WC4 / A217 WC5

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING														
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C
150	psig	450	320	290	260	230	200	170	140	125	110	95	80	65	50	35	20	20*
	kg/cm ²	32.0	23.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4
300	psig	1125	825	750	750	720	695	665	605	590	570	530	510	485	450	315	200	160
	kg/cm ²	80.0	59.0	52.7	52.7	50.6	48.9	46.8	42.5	41.5	40.1	37.3	35.9	34.1	31.6	22.1	14.1	11.2
600	psig	2250	1650	1500	1500	1445	1385	1330	1210	1175	1135	1065	1015	975	900	630	405	315
	kg/cm ²	159.0	117.0	105.5	105.5	101.6	97.4	93.5	85.1	82.6	79.8	74.9	71.4	68.6	63.3	44.3	28.5	22.1
900	psig	3375	2475	2250	2250	2165	2080	1995	1815	1765	1705	1595	1525	1460	1350	945	605	475
	kg/cm ²	238.0	175.0	158.2	158.2	152.2	146.2	140.3	127.6	124.1	119.9	112.1	107.2	102.7	94.9	66.4	42.5	33.4
1500	psig	5625	4125	3750	3750	3610	3465	3325	3025	2940	2840	2660	2540	2435	2245	1575	1010	790
	kg/cm ²	396.0	291.0	263.7	263.7	253.8	243.6	233.8	212.7	206.7	199.7	187.0	178.6	171.2	157.8	110.7	71.0	55.5
2500	psig	9375	6875	6250	6250	6015	5775	5540	5040	4905	4730	4430	4230	4060	3745	2630	1685	1315
	kg/cm ²	660.0	484.0	439.4	439.4	422.9	406.0	389.5	354.4	344.9	332.6	311.5	297.4	285.5	263.3	184.9	118.5	92.5

MATERIAL GROUP NO. 1.9. A217 WC6

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																	
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C
150	psig	450	320	290	260	230	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	15*
	kg/cm ²	32.0	23.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.1
300	psig	1125	825	750	750	720	695	665	605	590	570	530	510	485	450	320	215	145	95	60	40
	kg/cm ²	80.0	59.0	52.7	52.7	50.6	48.9	46.8	42.5	41.5	40.1	37.3	35.9	34.1	31.6	22.5	15.1	10.2	6.7	4.2	2.8
600	psig	2250	1650	1500	1500	1445	1385	1330	1210	1175	1135	1065	1015	975	900	640	430	290	190	125	75
	kg/cm ²	159.0	117.0	105.5	105.5	101.6	97.4	93.5	85.1	82.6	79.8	74.9	71.4	68.6	63.3	45.0	30.2	20.4	13.4	8.8	5.3
900	psig	3375	2475	2250	2250	2165	2080	1995	1815	1765	1705	1595	1525	1460	1350	955	650	430	290	185	115
	kg/cm ²	238.0	175.0	158.2	158.2	152.2	146.2	140.3	127.6	124.1	119.9	112.1	107.2	102.7	94.9	67.1	45.7	30.2	20.4	13.0	8.1
1500	psig	5625	4125	3750	3750	3610	3465	3325	3025	2940	2840	2660	2540	2435	2245	1595	1080	720	480	310	190
	kg/cm ²	396.0	291.0	263.7	263.7	253.8	243.6	233.8	212.7	206.7	199.7	187.0	178.6	171.2	157.8	112.1	75.9	50.6	33.7	21.8	13.4
2500	psig	9375	6875	6250	6250	6015	5775	5540	5040	4905	4730	4430	4230	4060	3745	2655	1800	1200	800	515	315
	kg/cm ²	660.0	484.0	439.4	439.4	422.9	406.0	389.5	354.4	344.9	332.6	311.5	297.4	285.5	263.3	186.7	126.6	84.4	56.2	36.2	22.1

PRESSURE & TEMPERATURE - 3

MATERIAL GROUP NO. 1. 10 A217 WC9

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																	
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C
150	psig	450	320	290	260	230	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	15*
	kg/cm ²	32.0	23.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.1
300	psig	1125	825	750	750	730	705	665	605	590	570	530	510	485	450	375	260	175	110	70	40
	kg/cm ²	80.0	59.0	52.7	52.7	51.3	49.6	46.8	42.5	41.5	40.1	37.3	35.9	34.1	31.6	26.4	18.3	12.3	7.7	4.9	2.8
600	psig	2250	1650	1500	1500	1445	1410	1330	1210	1175	1135	1065	1015	975	900	755	520	350	220	135	80
	kg/cm ²	159.0	117.0	105.5	105.5	101.6	99.1	93.5	85.1	82.6	79.8	74.9	71.4	68.6	63.3	53.1	36.6	24.6	15.5	9.5	5.6
900	psig	3375	2475	2250	2250	2185	2115	1995	1815	1765	1705	1595	1525	1460	1350	1130	780	525	330	205	125
	kg/cm ²	238.0	175.0	158.2	158.2	153.6	148.7	140.3	127.6	124.1	119.9	112.1	107.2	102.7	94.9	79.5	54.8	36.9	23.2	14.4	8.8
1500	psig	5625	4125	3750	3750	3640	3530	3325	3025	2940	2840	2660	2540	2435	2245	1885	1305	875	550	345	205
	kg/cm ²	396.0	291.0	263.7	263.7	255.9	248.2	233.8	212.7	206.7	199.7	187.0	178.6	171.2	157.8	132.5	91.8	61.5	38.7	24.3	14.4
2500	psig	9375	6875	6250	6250	6070	5880	5540	5040	4905	4930	4430	4230	4060	3745	3145	2170	1455	915	570	345
	kg/cm ²	660.0	484.0	439.4	439.4	426.8	413.4	389.5	354.4	344.9	346.6	311.5	297.4	285.5	263.3	221.1	152.6	102.3	64.3	40.1	24.3

MATERIAL GROUP NO. 1. 13 A217 C5

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																	
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C
150	psig	450	320	290	260	230	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	15*
	kg/cm ²	32.0	23.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.1
300	psig	1125	825	750	745	715	705	665	605	590	570	530	510	485	370	275	200	145	100	60	35
	kg/cm ²	80.0	59.0	52.7	52.4	50.3	49.6	46.8	42.5	41.5	40.1	37.3	35.9	34.1	26.0	19.3	14.1	10.2	7.0	4.2	2.5
600	psig	2250	1650	1500	1490	1430	1410	1330	1210	1175	1135	1055	1015	965	740	550	400	290	200	125	70
	kg/cm ²	159.0	117.0	105.5	104.8	100.5	99.1	93.5	85.1	82.6	79.8	74.2	71.4	67.8	52.0	38.7	28.1	20.4	14.1	8.8	4.9
900	psig	3375	2475	2250	2235	2150	2115	1995	1815	1765	1705	1585	1525	1450	1110	825	595	430	300	185	105
	kg/cm ²	238.0	175.0	158.2	157.1	151.2	148.7	140.3	127.6	124.1	119.9	111.4	107.2	101.9	78.0	58.0	41.8	30.2	21.1	13.0	7.4
1500	psig	5625	4125	3750	3725	3580	3530	3325	3025	2940	2840	2640	2540	2415	1851	1370	995	720	495	310	170
	kg/cm ²	396.0	291.0	263.7	261.9	251.7	248.2	233.8	212.7	206.7	199.7	185.6	178.6	169.8	130.1	96.3	70.0	50.6	34.8	21.8	12.0
2500	psig	9375	6875	6250	6205	5965	5880	5540	5040	4905	4730	4400	4230	4030	3085	2285	1655	1200	830	515	285
	kg/cm ²	660.0	484.0	439.4	436.3	419.4	413.4	389.5	354.4	344.9	332.6	309.4	297.4	283.3	216.9	160.7	116.4	84.4	58.4	36.2	20.0

MATERIAL GROUP NO. 1.14 A217 C12

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																	
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C
150	psig	450	320	290	260	230	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	20*
	kg/cm ²	32.0	23.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.4
300	psig	1125	825	750	750	730	705	665	605	590	570	530	510	485	450	375	255	170	115	75	50
	kg/cm ²	80.0	59.0	52.7	52.7	51.3	49.6	46.8	42.5	41.5	40.1	37.3	35.9	34.1	31.6	26.4	17.9	12.0	8.1	5.3	3.5
600	psig	2250	1650	1500	1500	1455	1410	1330	1210	1175	1135	1065	1015	975	900	755	505	345	225	150	105
	kg/cm ²	159.0	117.0	105.5	105.5	102.3	99.1	93.5	85.1	82.6	79.8	74.9	71.4	68.6	63.3	53.1	35.5	24.3	15.8	10.5	7.4
900	psig	3375	2475	2250	2250	2185	2115	1995	1815	1765	1705	1595	1525	1460	1350	1130	760	515	340	225	155
	kg/cm ²	238.0	175.0	158.2	158.2	153.6	148.7	140.3	127.6	124.1	119.9	112.1	107.2	102.7	94.9	79.5	53.4	36.2	23.9	15.8	10.9
1500	psig	5625	4125	3750	3750	3640	3530	3325	3025	2940	2840	2660	2540	2435	2245	1885	1270	855	565	375	255
	kg/cm ²	396.0	291.0	263.7	263.7	255.9	248.2	233.8	212.7	206.7	199.7	187.0	178.6	171.2	157.8	132.5	89.3	60.1	39.7	26.4	17.9
2500	psig	9375	6875	6250	6250	6070	5880	5540	5040	4905	4730	4430	4230	4060	3745	3145	2115	1430	945	630	430
	kg/cm ²	660.0	484.0	439.4	439.4	426.8	413.4	389.5	354.4	344.9	332.6	311.5	297.4	285.5	263.3	221.1	148.7	100.5	66.4	44.3	30.2

PRESSURE & TEMPERATURE - 4

MATERIAL GROUP NO.2.1 A351 CF3 / A351 CF8

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																							
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F	200°F	300°F	400°F	500°F	600°F	650°F	700°F	750°F	800°F	850°F	900°F	950°F	1000°F	1050°F	1100°F	1150°F	1200°F	1250°F	1300°F	1350°F	1400°F	1450°F	1500°F
				-28 TO 38°C	93°C	149°C	204°C	260°C	316°C	343°C	371°C	399°C	427°C	454°C	482°C	510°C	538°C	566°C	593°C	621°C	649°C	677°C	704°C	732°C	760°C	788°C	816°C
150	psig	425	305	275	230	205	190	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	20*	20	20	20*	20*	15*	10*
	kg/cm²	30.0	22.0	19.3	16.2	14.4	13.4	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.1	0.7
300	psig	1100	800	720	600	540	495	465	435	430	425	415	405	395	390	380	320	310	255	200	155	115	85	60	50	35	25
	kg/cm²	78.0	57.0	50.6	42.2	38.0	34.8	32.7	30.6	30.2	29.9	29.2	28.5	27.8	27.4	26.7	22.5	21.8	17.9	14.1	10.9	8.1	6.0	4.2	3.5	2.5	1.8
600	psig	2175	1585	1440	1200	1080	995	930	875	860	850	830	805	790	780	765	640	615	515	400	310	225	170	125	95	70	55
	kg/cm²	153.0	112.0	101.2	84.4	75.9	70.0	65.4	61.5	60.5	59.8	58.4	56.6	55.5	54.8	53.8	45.0	43.2	36.2	28.1	21.8	15.8	12.0	8.8	6.7	4.9	3.9
900	psig	3250	2380	2160	1800	1620	1490	1395	1310	1290	1275	1245	1210	1190	1165	1145	965	925	770	595	465	340	255	185	145	105	80
	kg/cm²	229.0	168.0	151.9	126.6	113.9	104.8	98.1	92.1	90.7	89.6	87.5	85.1	83.7	81.9	80.5	67.8	65.0	54.1	41.8	32.7	23.9	17.9	13.0	10.2	7.4	5.6
1500	psig	5400	3960	3600	3000	2700	2485	2330	2185	2150	2125	2075	2015	1980	1945	1910	1605	1545	1285	995	770	565	430	310	240	170	135
	kg/cm²	380.0	279.0	253.1	210.9	189.8	174.7	163.8	153.6	151.2	149.4	145.9	141.7	139.2	136.8	134.3	112.8	108.6	90.3	70.0	54.1	39.7	30.2	21.8	16.9	12.0	9.5
2500	psig	9000	6600	6000	5000	4500	4140	3880	3640	3580	3540	3460	3360	3300	3240	3180	2675	2570	2145	1655	1285	945	715	515	400	285	230
	kg/cm²	633.0	465.0	421.9	351.6	316.4	291.1	272.8	255.9	251.7	248.9	243.3	236.2	232.0	227.8	223.6	188.1	180.7	150.8	116.4	90.3	66.4	50.3	36.2	28.1	20.0	16.2

MATERIAL GROUP NO.2.2 A351 CF3M / A351 CF8M / A351 CG8M

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																							
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F	200°F	300°F	400°F	500°F	600°F	650°F	700°F	750°F	800°F	850°F	900°F	950°F	1000°F	1050°F	1100°F	1150°F	1200°F	1250°F	1300°F	1350°F	1400°F	1450°F	1500°F
				-28 TO 38°C	93°C	149°C	204°C	260°C	316°C	343°C	371°C	399°C	427°C	454°C	482°C	510°C	538°C	566°C	593°C	621°C	649°C	677°C	704°C	732°C	760°C	788°C	816°C
150	psig	425	305	275	235	215	195	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	20*	20	20	20*	20*	20*	20*
	kg/cm²	30.0	22.0	19.3	16.5	15.1	13.7	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
300	psig	1100	800	720	620	560	515	480	450	445	430	425	420	420	415	385	350	345	305	235	185	145	115	95	75	60	40
	kg/cm²	78.0	57.0	50.6	43.6	39.4	36.2	33.7	31.6	31.3	30.2	29.9	29.5	29.5	29.2	27.1	24.6	24.3	21.4	16.5	13.0	10.2	8.1	6.7	5.3	4.2	2.8
600	psig	2175	1585	1440	1240	1120	1025	955	900	890	870	855	845	835	830	775	700	685	610	475	370	295	235	190	150	115	85
	kg/cm²	153.0	112.0	101.2	87.2	78.7	72.1	67.1	63.3	62.6	61.2	60.1	59.4	58.7	58.4	54.5	49.2	48.2	42.9	33.4	26.0	20.7	16.5	13.4	10.5	8.1	6.0
900	psig	3250	2380	2160	1860	1680	1540	1435	1355	1330	1305	1280	1265	1255	1245	1160	1050	1030	915	710	555	440	350	290	225	175	125
	kg/cm²	229.0	168.0	151.9	130.8	118.1	108.3	100.9	95.3	93.5	91.8	90.0	88.9	88.2	87.5	81.6	73.8	72.4	64.3	49.9	39.0	30.9	24.6	20.4	15.8	12.3	8.8
1500	psig	5400	3960	3600	3095	2795	2570	2390	2255	2220	2170	2135	2110	2090	2075	1930	1750	1720	1525	1185	925	735	585	480	380	290	205
	kg/cm²	380.0	279.0	253.1	217.6	196.5	180.7	168.0	158.5	156.1	152.6	150.1	148.4	146.9	145.9	135.7	123.0	120.9	107.2	83.3	65.0	51.7	41.1	33.7	26.7	20.4	14.4
2500	psig	9000	6600	6000	5160	4660	4280	3980	3760	3700	3620	3560	3520	3480	3460	3220	2915	2865	2545	1970	1545	1230	970	800	630	485	345
	kg/cm²	633.0	465.0	421.9	362.8	327.6	300.9	279.8	264.4	260.1	254.5	250.3	247.5	244.7	243.3	226.4	205.0	201.4	178.9	138.5	108.6	86.5	68.2	56.2	44.3	34.1	24.3

MATERIAL GROUP NO.2.5 A351 CF8C

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																							
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F	200°F	300°F	400°F	500°F	600°F	650°F	700°F	750°F	800°F	850°F	900°F	950°F	1000°F	1050°F	1100°F	1150°F	1200°F	1250°F	1300°F	1350°F	1400°F	1450°F	1500°F
				-28 TO 38°C	93°C	149°C	204°C	260°C	316°C	343°C	371°C	399°C	427°C	454°C	482°C	510°C	538°C	566°C	593°C	621°C	649°C	677°C	704°C	732°C	760°C	788°C	816°C
150	psig	425	305	275	255	230	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	20*	20	20	20*	20*	15*	15*
	kg/cm²	30.0	22.0	19.3	17.9	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.1	1.1
300	psig	1100	800	720	660	615	575	540	515	505	495	490	485	485	450	385	365	360	325	275	170	125	95	70	55	40	35
	kg/cm²	78.0	57.0	50.6	46.4	43.2	40.4	38.0	36.2	35.5	34.8	34.5	34.1	34.1	31.6	27.1	25.7	25.3	22.9	19.3	12.0	8.8	6.7	4.9	3.9	2.8	2.5
600	psig	2175	1585	1440	1320	1230	1145	1080	1025	1010	990	985	975	970	900	775	725	720	645	550	345	245	185	135	110	80	70
	kg/cm²	153.0	112.0	101.2	92.8	86.5	80.5	75.9	72.1	71.0	69.6	69.3	68.6	68.2	63.3	54.5	51.0	50.6	45.3	38.7	24.3	17.2	13.0	9.5	7.7	5.6	4.9
900	psig	3250	2380	2160	1980	1845	1720	1620	1540	1510	1485	1475	1460	1455	1350	1160	1090	1080	965	825	515	370	280	205	165	125	105
	kg/cm²	229.0	168.0	151.9	139.2	129.7	120.9	113.9	108.3	106.2	104.4	103.7	102.7	102.3	94.9	81.6	76.6	75.9	67.8	58.0	36.2	26.0	19.7	14.4	11.6	8.8	7.4
1500	psig	5400	3960	3600	3300	3070	2870	2700	2570	2520	2470	2460	2435	2425	2245	1930	1820	1800	1610	1370	855	615	465	345	275	205	170
	kg/cm²	380.0	279.0	253.1	232.0	215.9	201.8	189.8	180.7	177.2	173.7	173.0	171.2	170.5	157.8	135.7	128.0	126.6	113.2	96.3	60.1	43.2	32.7	24.3	19.3	14.4	12.0
2500	psig	9000	6600	6000	5500	5120	4780	4500	4280	4200	4120	4100	4060	4040	3745	3220	3030	3000	2685	2285	1430	1030	770	570	455	345	285
	kg/cm²	633.0	465.0	421.9	386.7	360.0	336.1	316.4	300.9	295.3	289.7	288.3	285.5	284.1	263.3	226.4	213.0	210.9	188.8	160.7	100.5	72.4	54.1	40.1	32.0	24.3	20.0

PRESSURE & TEMPERATURE - 5

MATERIAL GROUP NO.2.6 A351 CH20

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																							
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C	1250°F 677°C	1300°F 704°C	1350°F 732°C	1400°F 760°C	1450°F 788°C	1500°F 816°C
150	psig	400	295	260	230	220	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	20*	20	20	20*	20*	10*	10*
	kg/cm²	29.0	21.0	18.3	16.2	15.5	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.7	0.7
300	psig	1050	765	670	605	570	535	505	480	465	445	436	425	415	385	335	290	225	170	130	100	80	60	45	30	25	
	kg/cm²	74.0	54.0	47.1	42.5	40.1	37.6	35.5	33.7	32.7	32.0	31.3	30.7	29.9	29.2	27.1	23.6	20.4	15.8	12.0	9.1	7.0	5.6	4.2	3.2	2.1	1.8
600	psig	2100	1530	1345	1210	1140	1065	1010	955	930	910	895	870	850	830	775	670	585	445	345	260	200	160	115	90	60	50
	kg/cm²	148.0	108.0	94.6	85.1	80.2	74.9	71.0	67.1	65.4	64.0	62.9	61.2	59.8	58.4	54.5	47.1	41.1	31.3	24.3	18.3	14.1	11.2	8.1	6.3	4.2	3.5
900	psig	3150	2295	2015	1815	1705	1600	1510	1435	1395	1370	1340	1305	1275	1245	1160	1010	875	670	515	390	300	235	175	135	95	70
	kg/cm²	222.0	162.0	141.7	127.6	119.9	112.5	106.2	100.9	98.1	96.3	94.2	91.8	89.6	87.5	81.6	71.0	61.5	47.1	36.2	27.4	21.1	16.5	12.3	9.5	6.7	4.9
1500	psig	5225	3820	3360	3025	2845	2665	2520	2390	2330	2280	2230	2170	2125	2075	1930	1680	1460	1115	860	650	495	395	290	225	155	120
	kg/cm²	368.0	269.0	236.2	212.7	200.0	187.4	177.2	168.0	163.8	160.3	156.8	152.6	149.4	145.9	135.7	118.1	102.7	78.4	60.5	45.7	34.8	27.8	20.4	15.8	10.9	8.4
2500	psig	8700	6365	5600	5040	4740	4440	4200	3980	3880	3800	3720	3620	3540	3460	3220	2800	2430	1860	1430	1085	830	660	485	370	260	200
	kg/cm²	612.0	448.0	393.7	354.4	333.3	312.2	295.3	279.8	272.8	267.2	261.6	254.5	248.9	243.3	226.4	196.9	170.9	130.8	100.5	76.3	58.4	46.4	34.1	26.0	18.3	14.1

MATERIAL GROUP NO.2.7 A351 CH20

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																							
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C	1250°F 677°C	1300°F 704°C	1350°F 732°C	1400°F 760°C	1450°F 788°C	1500°F 816°C
150	psig	400	290	260	235	220	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	20*	20	20	20*	20*	10*	10*
	kg/cm²	29.0	21.0	18.3	16.5	15.5	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.7	0.7
300	psig	1025	740	670	605	570	535	505	480	470	455	450	435	425	420	385	345	335	260	190	135	105	75	60	45	35	25
	kg/cm²	73.0	53.0	47.1	42.5	40.1	37.6	35.5	33.7	33.0	32.0	31.6	30.6	29.9	29.5	27.1	24.3	23.6	18.3	13.4	9.5	7.4	5.3	4.2	3.2	2.5	1.8
600	psig	2025	1480	1345	1215	1140	1070	1015	960	935	910	900	875	855	835	775	685	670	520	375	275	205	150	115	90	65	50
	kg/cm²	143.0	105.0	94.6	85.4	80.2	75.2	71.4	67.5	65.7	64.0	63.3	61.5	60.1	58.7	54.5	48.2	47.1	36.6	26.4	19.3	14.4	10.5	8.1	6.3	4.6	3.5
900	psig	3025	2220	2015	1820	1705	1605	1520	1440	1405	1370	1345	1310	1280	1255	1160	1030	1010	780	585	410	310	225	175	135	100	75
	kg/cm²	213.0	157.0	141.7	128.0	119.9	112.8	106.9	101.2	98.8	96.3	94.6	92.1	90.0	88.2	81.6	72.4	71.0	54.8	41.1	28.8	21.8	15.8	12.3	9.5	7.0	5.3
1500	psig	5050	3700	3360	3035	2845	2675	2530	2400	2340	2280	2245	2185	2135	2090	1930	1720	1680	1305	945	685	515	375	290	225	165	130
	kg/cm²	356.0	261.0	236.2	213.4	200.0	188.1	177.9	168.7	164.5	160.3	157.8	153.6	150.1	146.9	135.7	120.9	118.1	91.8	66.4	48.2	36.2	26.4	20.4	15.8	11.6	9.1
2500	psig	8400	6160	5600	5060	4740	4460	4220	4000	3900	3800	3740	3640	3560	3480	3220	2865	2800	2170	1570	1145	855	630	485	370	275	215
	kg/cm²	591.0	434.0	393.7	355.8	333.3	313.6	296.7	281.2	274.2	267.2	263.0	255.9	250.3	244.7	226.4	201.4	196.9	152.6	110.4	80.5	60.1	44.3	34.1	26.0	19.3	15.1

MATERIAL GROUP NO.2.8 A351 CD4MCU / A890 CD4MCU / A890 CD3MN / A890 CE3MN

* This steel may become brittle after service at moderately elevated temperature. Not to be used over 600°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING								
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C
150	psig	350	255	290	260	230	200	170	140	125	110	95
	kg/cm²	25.0	18.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7
300	psig	900	660	750	720	665	615	575	555	550	540	530
	kg/cm²	64.0	47.0	52.7	50.6	46.8	43.2	40.4	39.0	38.7	38.0	37.3
600	psig	1800	1320	1500	1440	1330	1230	1150	1115	1100	1085	1065
	kg/cm²	127.0	93.0	105.5	101.2	93.5	86.5	80.9	78.4	77.3	76.3	74.9
900	psig	2700	1980	2250	2160	1995	1845	1730	1670	1650	1625	1595
	kg/cm²	190.0	140.0	158.2	151.9	140.3	129.7	121.6	117.4	116.0	114.3	112.1
1500	psig	4500	3300	3750	3600	3325	3070	2880	2785	2750	2710	2660
	kg/cm²	317.0	233.0	263.7	253.1	233.8	215.9	202.5	195.8	193.4	190.5	187.0
2500	psig	7500	5500	6250	6000	5540	5120	4800	4640	4580	4520	4430
	kg/cm²	528.0	387.0	439.4	421.9	389.5	360.0	337.5	326.2	322.0	317.8	311.5

PRESSURE & TEMPERATURE - 6

MATERIAL GROUP NO.3.1 A351 CN7M

* Used annealed material only

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING									
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C
150	psig	350	255	290	260	230	200	170	140	125	110	95	80
	kg/cm ²	25.0	18.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6
300	psig	900	660	750	720	715	675	655	605	590	570	530	510
	kg/cm ²	64.0	47.0	52.7	50.6	50.3	47.5	46.1	42.5	41.5	40.1	37.3	35.9
600	psig	1800	1320	1500	1440	1425	1345	1310	1210	1175	1135	1065	1015
	kg/cm ²	127.0	93.0	105.5	101.2	100.2	94.6	92.1	85.1	82.6	79.8	74.9	71.4
900	psig	2700	1980	2250	2160	2140	2020	1965	1815	1765	1705	1595	1525
	kg/cm ²	190.0	140.0	158.2	151.9	150.5	142.0	138.2	127.6	124.1	119.9	112.1	107.2
1500	psig	4500	3300	3750	3600	3565	3365	3275	3025	2940	2840	2660	2540
	kg/cm ²	317.0	233.0	263.7	253.1	250.7	236.6	230.3	212.7	206.7	199.7	187.0	178.6
2500	psig	7500	5500	6250	6000	5940	5610	5460	5040	4905	4730	4430	4230
	kg/cm ²	528.0	387.0	439.4	421.9	417.6	394.4	383.9	354.4	344.9	332.6	311.5	297.4

MATERIAL GROUP NO.3.2 NO2200(ALLOY200)

* Used annealed material only

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING					
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C
150	psig	225	155	140	140	140	140	140	140
	kg/cm ²	16.0	11.0	9.8	9.8	9.8	9.8	9.8	9.8
300	psig	550	400	360	360	360	360	360	360
	kg/cm ²	39.0	29.0	25.3	25.3	25.3	25.3	25.3	25.3
600	psig	1100	795	720	720	720	720	720	720
	kg/cm ²	78.0	56.0	50.6	50.6	50.6	50.6	50.6	50.6
900	psig	1625	1190	1080	1080	1080	1080	1080	1080
	kg/cm ²	115.0	84.0	75.9	75.9	75.9	75.9	75.9	75.9
1500	psig	2700	1980	1800	1800	1800	1800	1800	1800
	kg/cm ²	190.0	140.0	126.6	126.6	126.6	126.6	126.6	126.6
2500	psig	4500	3300	3000	3000	3000	3000	3000	3000
	kg/cm ²	317.0	232.0	210.9	210.9	210.9	210.9	210.9	210.9

MATERIAL GROUP NO. 3.4 NO4400(ALLOY400) / A494 M35-1(MONEL)

* Used annealed material only

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING											
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C
150	psig	225	155	230	200	190	185	170	140	125	110	95	80	65	50
	kg/cm ²	16.0	11.0	16.2	14.1	13.4	13.0	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5
300	psig	550	400	600	530	495	480	475	475	475	475	470	460	340	245
	kg/cm ²	39.0	29.0	42.2	37.3	34.8	33.7	33.4	33.4	33.4	33.4	33.0	32.3	23.9	17.2
600	psig	1100	795	1200	1055	990	955	950	950	950	950	935	915	680	495
	kg/cm ²	78.0	56.0	84.4	74.2	69.6	67.1	66.8	66.8	66.8	66.8	65.7	64.3	47.8	34.8
900	psig	1625	1190	1800	1585	1485	1435	1435	1435	1435	1435	1405	1375	1020	740
	kg/cm ²	115.0	84.0	126.6	111.4	104.4	100.9	100.9	100.9	100.9	100.9	98.8	96.7	71.7	52.0
1500	psig	2700	1980	3000	2640	2470	2390	2375	2375	2375	2375	2340	2290	1695	1235
	kg/cm ²	190.0	140.0	210.9	185.6	173.7	168.0	167.0	167.0	167.0	167.0	164.5	161.0	119.2	86.8
2500	psig	4500	3300	5000	4400	4120	3980	3960	3960	3960	3960	3900	3820	2830	2055
	kg/cm ²	317.0	232.0	351.6	309.4	289.7	279.8	278.4	278.4	278.4	278.4	274.2	268.6	199.0	144.5

PRESSURE & TEMPERATURE - 7

MATERIAL GROUP NO. 3.5 NO6600(ALLOY 600) / A494 CY40(INCONEL 600)

* For welding end valves only. Flanged end ratings terminate at 1000°F

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING310																	
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C
150	psig	450	320	290	260	230	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	20*
	kg/cm ²	32.0	23.0	20.4	18.3	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.4
300	psig	1125	825	750	750	730	705	665	605	590	570	530	510	485	450	325	215	140	95	70	60
	kg/cm ²	80.0	58.0	52.7	52.7	51.3	49.6	46.8	42.5	41.5	40.1	37.3	35.9	34.1	31.6	22.9	15.1	9.8	6.7	4.9	4.2
600	psig	2250	1650	1500	1500	1455	1410	1330	1210	1175	1135	1065	1015	975	900	655	430	280	185	135	125
	kg/cm ²	159.0	116.0	105.5	105.5	102.3	99.1	93.5	85.1	82.6	79.8	74.9	71.4	68.6	63.3	46.1	30.2	19.7	13.0	9.5	8.8
900	psig	3375	2475	2250	2250	2185	2115	1995	1815	1765	1705	1595	1525	1460	1350	980	650	415	280	205	185
	kg/cm ²	238.0	174.0	158.2	158.2	153.6	148.7	140.3	127.6	124.1	119.9	112.1	107.2	102.7	94.9	68.9	45.7	29.2	19.7	14.4	13.0
1500	psig	5625	4125	3750	3750	3640	3530	3325	3025	2940	2840	2660	2540	2435	2245	1635	1080	695	465	340	310
	kg/cm ²	396.0	290.0	263.7	263.7	255.9	248.2	233.8	212.7	206.7	199.7	187.0	178.6	171.2	157.8	115.0	75.9	48.9	32.7	23.9	21.8
2500	psig	9375	6875	6250	6250	6070	5880	5540	5040	4905	4730	4430	4230	4060	3745	2725	1800	1155	770	565	515
	kg/cm ²	660.0	484.0	439.4	439.4	426.8	413.4	389.5	354.4	344.9	332.6	311.5	297.4	285.5	263.3	191.6	126.6	81.2	54.1	39.7	36.2

MATERIAL GROUP NO.3.6 NO8800(ALLOY 800) / INCOLOY 800

* Used annealed material only

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																						
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C	1250°F 677°C	1300°F 704°C	1350°F 732°C	1400°F 760°C	1450°F 788°C
150	psig	425	305	275	255	230	200	170	140	125	110	95	80	65	50	35	20	20*	20*	20*	20*	20	20	20*	15*	10*
	kg/cm ²	30.0	22.0	19.3	17.9	16.2	14.1	12.0	9.8	8.8	7.7	6.7	5.6	4.6	3.5	2.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.1	0.7
300	psig	1100	795	720	660	625	600	580	575	570	565	530	505	485	450	385	365	360	325	275	205	130	60	50	35	30
	kg/cm ²	78.0	56.0	50.6	46.4	43.9	42.2	40.8	40.4	39.7	37.3	35.5	34.1	31.6	27.1	25.7	25.3	22.9	19.3	14.4	9.1	4.2	3.5	2.5	2.1	
600	psig	2175	1585	1440	1325	1250	1200	1155	1145	1140	1130	1065	1015	975	900	775	725	720	645	550	405	260	125	100	70	60
	kg/cm ²	153.0	112.0	101.2	93.2	87.9	84.4	81.2	80.5	80.2	79.5	74.9	71.4	68.6	63.3	54.5	51.0	50.6	45.3	38.7	28.5	18.3	8.8	7.0	4.9	4.2
900	psig	3275	2400	2180	1990	1870	1800	1735	1720	1705	1690	1595	1520	1460	1350	1160	1090	1080	965	825	610	390	185	150	100	95
	kg/cm ²	231.0	169.0	153.3	139.9	131.5	126.6	122.0	120.9	119.9	118.8	112.1	106.9	102.7	94.9	81.6	76.6	75.9	67.8	58.0	42.9	27.4	13.0	10.5	7.0	6.7
1500	psig	5400	3960	3600	3310	3120	3000	2890	2870	2845	2820	2660	2535	2435	2245	1930	1820	1800	1610	1370	1020	650	310	245	170	155
	kg/cm ²	380.0	279.0	253.1	232.7	219.4	210.9	203.2	201.8	200.0	198.3	187.0	178.2	171.2	157.8	135.7	128.0	126.6	113.2	96.3	71.7	45.7	21.8	17.2	12.0	10.9
2500	psig	9000	6600	6000	5520	5200	5000	4820	4780	4740	4700	4430	4230	4060	3745	3220	3030	3000	2685	2285	1695	1080	515	410	285	255
	kg/cm ²	633.0	464.0	421.9	388.1	365.6	351.6	338.9	336.1	333.3	330.5	311.5	297.4	285.5	263.3	226.4	213.0	210.9	188.8	160.7	119.2	75.9	36.2	28.8	20.0	17.9

MATERIAL GROUP NO. 3.8 N10001(ALLOY B) / A494 N-7M(HASTELLOY B) / N10276(ALLOY C) / A494 CW12MW(HASTELLOY C)

* Used annealed material only

CLASS	UNIT	TEST PRESSURE		TEMPERATURE-PRESSURE RATING																			
		SHELL	HIGH-PRESSURE CLOSURE	-20 TO 100°F -28 TO 38°C	200°F 93°C	300°F 149°C	400°F 204°C	500°F 260°C	600°F 316°C	650°F 343°C	700°F 371°C	750°F 399°C	800°F 427°C	850°F 454°C	900°F 482°C	950°F 510°C	1000°F 538°C	1050°F 566°C	1100°F 593°C	1150°F 621°C	1200°F 649°C	1250°F 677°C	1300°F 704°C
150	psig	425	305	290	290	290	290	285	275	270	265	265	265	260	230	180	160	160	155	130	90	75	55
	kg/cm ²	30.0	22.0	20.4	20.4	20.4	20.4	20.0	19.3	19.0	18.6	18.6	18.6	18.3	16.2	12.7	11.2	11.2	10.9	9.1	6.3	5.3	3.9
300	psig	1100	795	750	750	750	750	740	725	710	695	690	685	675	600	470	420	420	405	345	240	190	140
	kg/cm ²	78.0	56.0	52.7	52.7	52.7	52.7	52.0	51.0	49.9	48.9	48.5	48.2	47.5	42.2	33.0	29.5	29.5	28.5	24.3	16.9	13.4	9.8
600	psig	2175	1585	1500	1500	1500	1500	1485	1445	1420	1395	1380	1370	1350	1200	945	840	840	805	685	480	380	280
	kg/cm ²	153.0	112.0	105.5	105.5	105.5	105.5	104.4	101.6	99.8	98.1	97.0	96.3	94.9	84.4	66.4	59.1	59.1	56.6	48.2	33.7	26.7	19.7
900	psig	3275	2400	2250	2250	2250	2250	2225	2170	2130	2090	2075	2055	2025	1800	1415	1280	1280	1210	1030	725	575	420
	kg/cm ²	231.0	169.0	158.2	158.2	158.2	158.2	156.4	152.6	149.8	146.9	145.9	144.5	142.4	126.6	99.5	90.0	90.0	85.1	72.4	51.0	40.4	29.5
1500	psig	5400	3960	3750	3750	3750	3750	3710	3615	3550	3480	3455	3430	3375	3000	2360	2105	2105	2015	1715	1205	955	705
	kg/cm ²	380.0	279.0	263.7	263.7	263.7	263.7	260.9	254.2	249.6	244.7	242.9	241.2	237.3	210.9	165.9	148.0	148.0	141.7	120.6	84.7	67.1	49.6
2500	psig	9000	6600	6250	6250	6250	6250	6185	6025	5915	5805	5760	5715	5625	5000	3930	3505	3505	3360	2860	2010	1590	1170
	kg/cm ²	633.0	464.0	439.4	439.4	439.4	439.4	434.9	423.6	415.9	408.1	405.0	401.8	395.5	351.6	276.3	246.4	246.4	236.2	201.1	141.3	111.8	82.3

TORQUE DATA LIST

GATE VALVES

SIZE		1"1/2	2"	2"1/2	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
150	Kgf-m	0.7	1.1	1.2	1.8	2.8	5.1	8.8	13.5	19.7	30.5	40.0	52.7	67.9	109.3
LIGHT	N-m	6.9	10.8	11.8	17.6	27.4	50.0	86.2	132.3	193.1	298.9	392.0	516.5	665.4	1071.1
WALL	Lb-ft	5.1	8.0	8.7	13.0	20.3	36.9	63.7	97.7	142.5	220.6	289.3	381.2	491.1	790.6
150	Kgf-m	1.2	1.6	1.7	2.4	3.6	7.1	11.0	16.4	24.7	31.3	41.6	54.1	73.6	117.6
HEAVY	N-m	11.8	15.7	16.7	23.5	35.3	69.6	107.8	160.7	242.1	306.7	407.7	530.2	721.3	1152.5
WALL	Lb-ft	8.7	11.6	12.3	17.4	26.0	51.4	79.6	118.6	178.7	226.4	300.9	391.3	532.4	850.6
300	Kgf-m	1.9	2.2	2.5	3.7	6.0	14.0	23.6	38.1	55.7	70.9	94.2	127.9	167.2	281.2
	N-m	18.6	21.6	24.5	36.3	58.8	137.2	231.3	373.4	545.9	694.8	923.2	1253.4	1638.6	2755.8
	Lb-ft	13.7	15.9	18.1	26.8	43.4	101.3	170.7	275.6	402.9	512.8	681.4	925.1	1209.4	2033.9
600	Kgf-m		3.2	4.9	7.1	12.5	32.3	52.2	85.6	124.4	171.3	227.3	290.3	382.5	711.3
	N-m		31.4	48.0	69.6	122.5	316.5	511.6	838.9	1219.1	1678.7	2227.5	2844.9	3748.5	6970.7
	Lb-ft		23.2	35.4	51.4	90.4	233.6	377.6	619.1	899.8	1239.0	1644.1	2099.7	2766.6	5144.8
900	Kgf-m				11.7	18.7	46.4	80.2	136.9	196.7	244.1	357.4	499.0	738.7	1158.0
	N-m				114.7	183.3	454.7	786.0	1341.6	1927.7	2392.2	3502.5	4890.2	7239.3	11348.4
	Lb-ft				84.6	135.3	335.6	580.1	990.2	1422.7	1765.6	2585.1	3609.3	5343.0	8375.8
1500	Kgf-m		7.8	12.1	17.3	27.5	66.7	131.0	229.4	334.6	447.7	639.3	906.2	1257.0	2121.0
	N-m		76.4	118.6	169.5	269.5	653.7	1283.8	2248.1	3279.1	4387.9	6265.1	8880.8	12318.6	20785.8
	Lb-ft		56.4	87.5	125.1	198.9	482.4	947.5	1659.3	2420.2	3238.5	4624.1	6554.5	9091.9	15341.2

GLOBE VALVES

SIZE		1"1/2	2"	2"1/2	3"	4"	6"	8"	10"	12"
150	Kgf-m	1.4	1.6	2.4	3.6	6.2	12.2	21.3	32.4	45.3
	N-m	13.7	15.7	23.5	35.3	60.8	119.6	208.7	317.5	443.9
	Lb-ft	10.1	11.6	17.4	26.0	44.8	88.2	154.1	234.4	327.7
300	Kgf-m	19.1	19.1	22.2	25.4	28.6	34.9	41.3	44.5	47.6
	N-m	187.2	187.2	217.6	248.9	280.3	342.0	404.7	436.1	466.5
	Lb-ft	138.2	138.2	160.6	183.7	206.9	252.4	298.7	321.9	344.3
600	Kgf-m		25.4	28.6	31.8	38.1	50.8	57.2	57.2	57.2
	N-m		248.9	280.3	311.6	373.4	497.8	560.6	560.6	560.6
	Lb-ft		183.7	206.9	230.0	275.6	367.4	413.7	413.7	413.7
900	Kgf-m		28.6	31.8	34.9	38.1	50.8	57.2		
	N-m		280.3	311.6	342.0	373.4	497.8	560.6		
	Lb-ft		206.9	230.0	252.4	275.6	367.4	413.7		
1500	Kgf-m		28.6	31.8	34.9	38.1	50.8	57.2		
	N-m		280.3	311.6	342.0	373.4	497.8	560.6		
	Lb-ft		206.9	230.0	252.4	275.6	367.4	413.7		

GUIDELINES FOR STORAGE, INSTALLATION, OPERATION & MAINTENANCE

STORAGE

* SUNKOREA Valves are delivered after cleaning, removing fluids and rust totally.

1. The both ends of the valves are covered with plastic or wooden caps to keep clean inside. Do not remove the caps before installing.
2. All valves should be stored in a proper place to prevent contamination, dust, dampness and rain. When valves are stored for a long period, they should be treated with a light oil coating.

INSTALLATION

1. Make sure all piping components with valves are not dirty with rust, dust and so on.
2. Install valves as indicated direction according the of piping system.
3. Secure the enough space to allow easy install and operation.
4. Support the weight of the piping to be installed valves with hanger or proper things.
5. In case of welded connection with piping system, do it as the opened position of valves.

OPERATION

1. When valves are manually actuated, counterclockwise to open and clockwise to close.
2. In case of gate valves, we don't recommend it to modulate and throttle the flow. It should be fully opened or fully closed in flow system.

MAINTENANCE

1. Do periodic input of grease to smooth the operation of stem threads area.
2. If any seat leakage is happened, please keep the followed point.
 - 1st - Do not apply excessive force to close valves.
 - 2nd - Open the valve fully, then close again. This is to clean the seating surface.
 - 3rd - If the leakage is continued after 2nd method, wash inside the valves with high-pressure water spray or etc.
3. When valves are used in first time, it needs to adjust the gland packing. Please tighten the gland packing bolt and nut properly and uniformly to prevent leakage. Note that over tightening causes to the hard operation of handwheel.
4. If continual tightening cannot stop leakage, it should be considered repacking as soon as possible.

APPLYING SPECIFICATION LIST - 1

STANDARD PERTAINING TO VALVE ENDS

MSS SP-6	Standard finishes for contact faces of pipe flanges and connecting-end flanges of valves of fittings.
MSS SP-9	Spot facing for bronze, iron and steel flanges.
MSS SP-44	Steel Pipeline flanges.
MSS SP-51	Class 150 LW corrosion-resistant cast flanges and flanged fittings.
MSS SP-65	High-pressure chemical industry flanges and threaded stubs for use with lens gaskets.
MSS SP-84	Steel valves-socket welding and threaded ends.
API 6A	Specification for wellhead equipment (including flanges).
API 605	Large diameter carbon steel flanges.
ASME B1.20.1	Pipe threads, general purpose (inch).
ASME B1.20.3	Dryseal pipe threads (inch).
ASME B16.1	Cast iron pipe flanges and flanged fittings.
ASME B16.5	Pipe flanges and flanged fittings.
ASME B16.20	Ring joint gaskets and grooves for steel pipe flanges.
ASME B16.24	Bronze pipe flanges and flanged fittings.
ASME B16.25	Butt-welding ends.
BS 10	Flanges and bolting for pipes, valves, and fittings (obsolescent).
BS 21	Pipe threads for tubes and fittings where pressure-tight joints are made on the threads. (metric dimensions) Steel pipe flanges and flanged fittings (nominal size 1/2 in to 24 in) for the petroleum industry. Part 2 (1970), metric dimensions.
BS 3293	Carbon steel flanges (over 24 in nominal size) for the petroleum industry.
BS 4504	Flanges and bolting for pipes, valves, and fittings, metric series. Part, 1 (1969), ferrous. Part 2 (1974), copper alloy and composite flanges.

STANDARDS PERTAINING TO PARALLELED AND WEDGE GATE VALVES

MSS SP-42	Corrosion-resistant gate, globe, angle, and check valves with flanged and butt-weld ends.
MSS SP-45	Bypass and drain connection standard.
MSS SP-61	Hydrostatic testing of steel valves.
MSS SP-70	Cast iron gate valves, flanged and threaded ends.
MSS SP-80	Bronze gate, globe, and check valves.
MSS SP-81	Stainless steel, bonnetless, flanged, wafer, knife gate valves.
API 6D	Specification for pipeline valves, end closures, connectors, and swivels.
API RP 6F	Recommended practice for fire test for valves (tentative).
API 595	Cast iron gate valves, flanged ends.
API 597	Steel venturi gate valves, flanged or butt welding ends.
API 598	Valve inspection and test.
API 600	Steel gate valves, flanged and butt -welding ends, bolted and pressure seal bonnets.
API 602	Compact steel gate valves-flanged, threaded, welding, and extended-body ends.
API 603	Class 150, corrosion-resistant, flanged-end gate valves.
API 604	Ductile iron gate valves, flanged ends.
ASME B16.10	Face-to-face and end-to-end dimensions of ferrous valves.
ASME B16.34	Valves-flanged, threaded and welding end.
BS 1414	Steel wedge gate valves (flanged and buttwelding ends) for the petroleum, petrochemical and allied industries.
BS 2080	Face-to-face, center-to face, end-to-end, and center-to-end dimensions of flanged and buttwelding end steel valves for the petroleum, Petrochemical and allied industries.
BS 6755	Testing of valves.
Part 1	Specification for production pressure testing requirements.
Part 2	Specification for fire type testing requirements.
BS 5150	Cast iron wedge and double-disc gate valves, for general purposes.
BS 5151	Cast iron parallel slide gate valves, for general purposes.
BS 5154	Copper alloy globe, globe stop and check, and gate valves (including parallel slide type), for general purposes.
BS 5157	Steel parallel slide gate valves, for general purposes.
BS 5163	Double-flanged cast iron wedge gate valves for water works purposes.
BS 5352	Cast and forged steel wedge gate, globe, check, and plug valves, screwed and socket welding, sizes 50mm and smaller, for the petroleum, petrochemical, and allied industries.

APPLYING SPECIFICATION LIST - 2

STANDARD PERTAINING TO GLOBE VALVES

MSS SP-42	Class 150 corrosion-resistant gate, globe, angle, and check valves with flanged and butt-weld ends.
MSS SP-61	Pressure testing of steel valves.
MSS SP-80	Bronze gate, globe, angle, and check valves.
MSS SP-84	Steel valves - socket welding and threaded ends.
MSS SP-85	Cast iron globe and angle valves, flanged and threaded ends.
API RT 6F	Recommended practice for fire test for valves (tentative).
ASME B16.10	Face-to-face and end-to-end dimensions of ferrous valves.
ASME B16.34	Valves-flanged threaded and welding end.
BS 1873	Steel globe valves and stop and check valves (flanged and butt-welding ends), for the petroleum, petrochemical, and allied industries.
BS 2080	Face-to-face, center-to-face, end-to-end, and center-to-end dimensions of flanged and butt-welding end steel valves, for the petroleum, petrochemical, and allied industries.
BS 5352	Cast and forged steel wedge gate, globe, check, and plug valves, screwed and socket welding, sizes 50mm and smaller, for the petroleum, petrochemical, and allied industries.
BS 6755	Testing of valves.
Part 1	Specification for production pressure testing requirements.
Part 2	Specification for fire type testing requirements.
BS 5152	Cast iron globe and globe stop and check valves, for general purposes.
BS 5154	Copper alloy globe, globe stop and check, and gate valves (including parallel slide type), for general purposes.
BS 5160	Specification for flanged steel globe valves, globe stop and check valves, and lift-type check valves for general purposes.

STANDARDS PERTAINING TO CHECK VALVES

MSS SP-42	Class 150 corrosion-resistant gate, globe, and check valves with flanged and butt-weld ends.
MSS SP-61	Pressure testing of steel valves.
MSS SP-71	Cast iron swing check valves, flanged and threaded ends.
MSS SP-80	Bronze gate, globe, angle, and check valves.
MSS SP-84	Steel valves - socket welding and threaded ends.
API 6D	Specification for pipeline valves, end closures, connectors, and swivels.
API RP 6F	Recommended practice for fire test for valves (tentative)
API 594	Wafer-type check valves.
ASME B16.10	Face-to-face and end-to-end dimensions of ferrous valves.
ASME B16.34	Valves-flanged threaded and welding end.
BS 1868	Steel check valves (flanged and butt-welding ends) for the petroleum, petrochemical, and allied industries.
BS 2080	Face-to-face, center-to-face, end-to-end, and center-to-end dimensions for flanged and butt-welding end steel valves for the petroleum, petrochemical, and allied industries.
BS 6755	Testing of valves.
Part 1	Specification for production pressure testing requirements.
Part 2	Specification for fire type testing requirements.
BS 5152	Cast iron globe and globe stop and check valves, for general purposes.
BS 5153	Cast iron check valves for general purposes.
BS 5154	Copper alloy globe, globe stop check, check, and gate valves.
BS 5160	Specification for flanged steel globe valves, globe stop and check valves, and lift-type check valves, for general purposes.
BS 5352	Cast and forged steel wedge gate, globe, check, and plug valves, screwed and socket welding, sizes 50mm and smaller, for the petroleum, for the petroleum, petrochemical, and allied industries.



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