PKvalve

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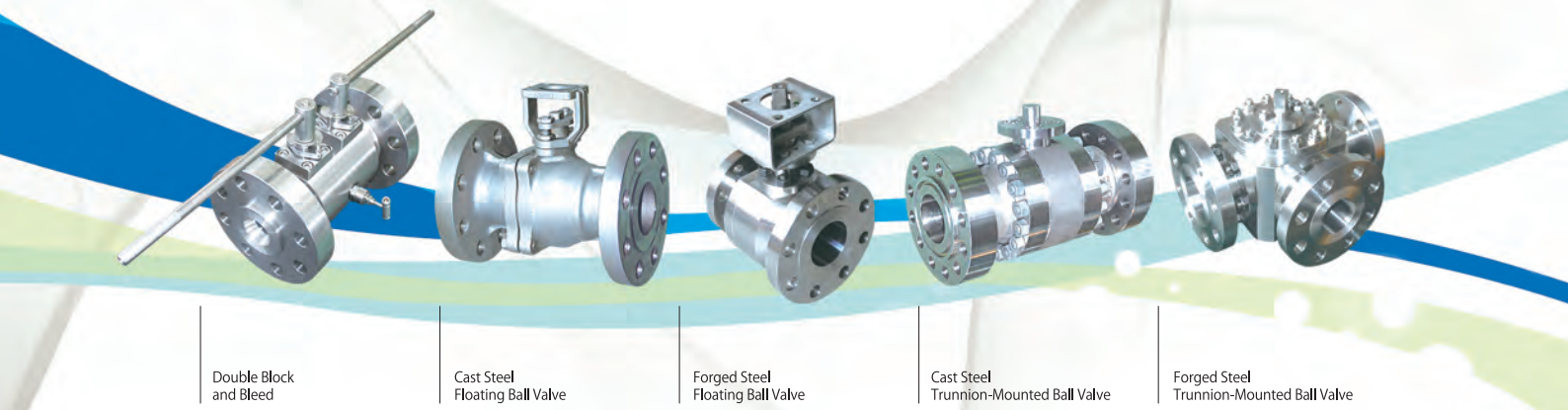


Double Block and Bleed

Cast Steel Floating Ball Valve

Forged Steel Floating Ball Valve

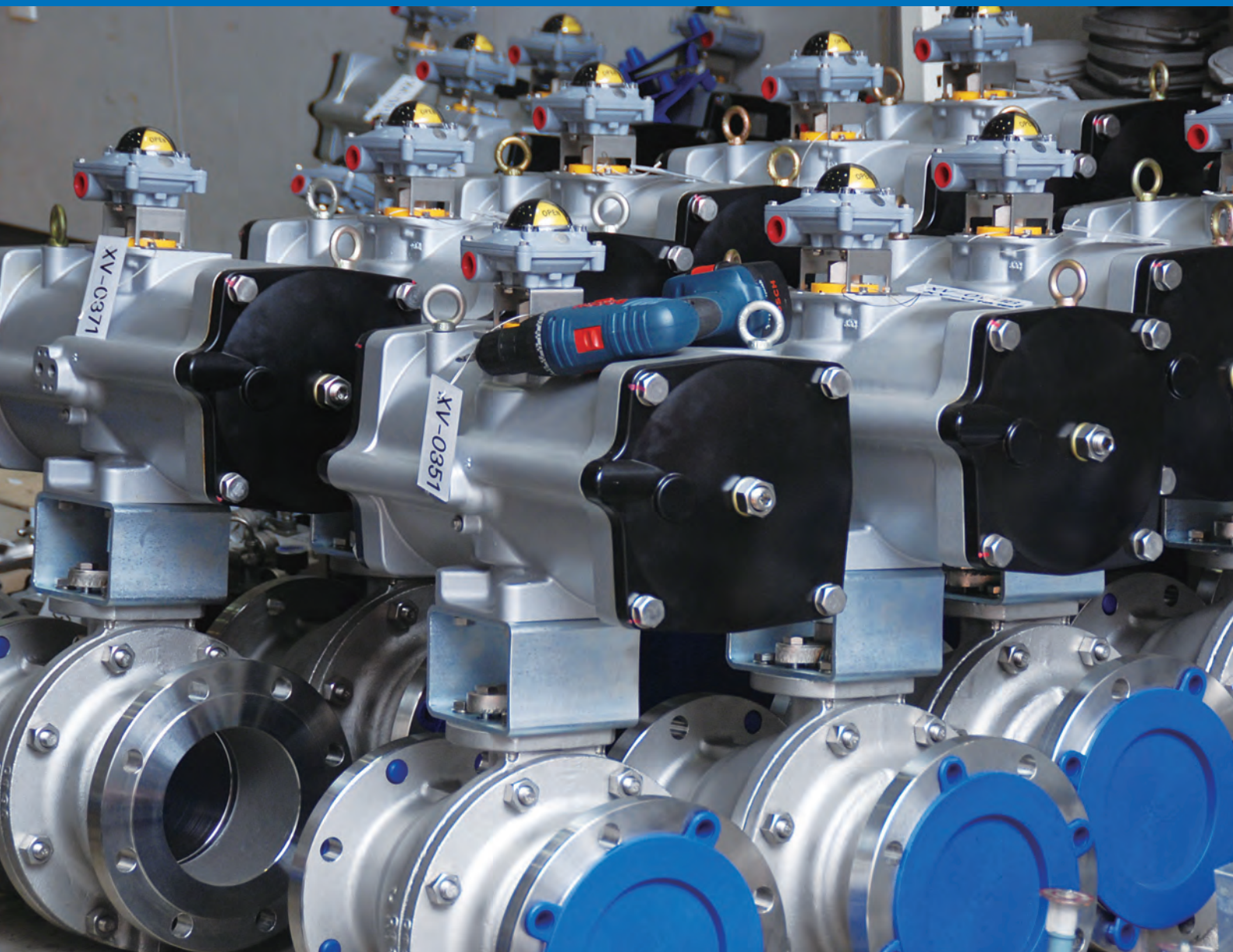
Cast Steel Trunnion-Mounted Ball Valve

Forged Steel Trunnion-Mounted Ball Valve

SINCE 1946

PKvalve supplies

ball valves for all kinds of industrial plants, and especially for oil & gas and petro-chemical markets.



With total valve solutions and service, PK Valve is a new leader in design, manufacturing and service of ball valves for all kinds of industries.

We are specialized in industrial valve applications with high pressure, extreme temperature, critical media and etc.

PK valve has solutions for special safety requirements.

Our comprehensive range of quality standards cater for most applications. We also provide engineering, development and manufacturing solutions for strict specifications.

Our valves for high-grade and general plants are made to highest safety standards. Specifications are subject to ongoing review incorporating technical advances.

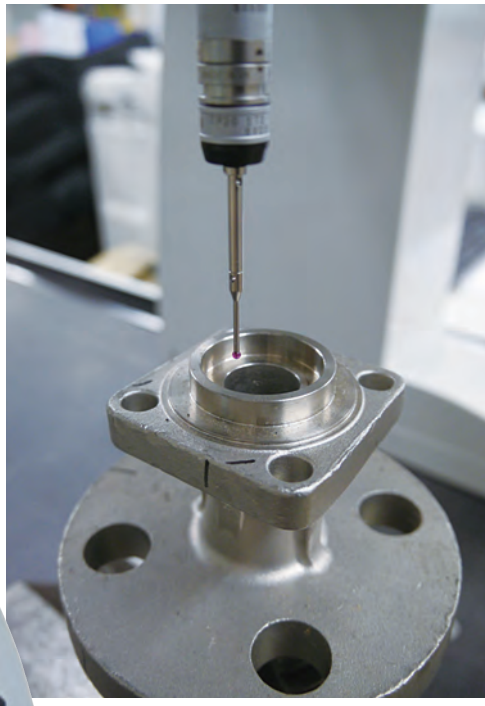
PK Valves play an important part in all processing stages of power plants, oil and gas, petrochemical plants and other processing applications.

We cooperate closely with planners, plant manufacturers, operators and investors for optimum cost effectiveness, technical perfection and durability.

Our aim is to be a good partners to our customers.

PK VALVE
A NEW LEADER

in design, manufacturing and support of various ball valves for all industries.



About the company

PK Valve has been inspiring our employees to think from outside of the box and to come up with innovative ideas.

When we first started this new business, we promised ourselves that we would create and produce products that all customers can trust. To continue this, we constantly need to be on the edge of ourselves and create high quality products that we can be proud of.

Technology

The goal for PK Valve is to put a quality product in every field.
We produce our Valves only with the highest quality materials, so that we can guarantee that all of our products will have a long sustainability.
We can offer a good competitive price to the market using our efficient technology and relationship with other collaborators.

Manufacturing

PK Valve is manufactured on modern machine tools and efficient production lines in order to offer high volume capacity.
Besides, we also put a genuine effort to assure the highest possible quality of the valves. In every step of the manufacturing processes, all our products are put through strict inspections according to ASME so that we can meet the very demanding requirements of our clients.

Trunnion-Mounted Ball Valve
Ball Valve Flow Coefficient Cv Specification Table

Size		Pressure Grade					
mm	in	150	300	600	900	1500	2500
15	1/2	25	25	22	20	20	24
20	3/4	55	55	47	44	44	53
25	1	94	94	78	74	74	92
40	1 1/2	260	260	260	188	188	211
50	2	441	406	376	351	351	283
80	3	1,103	973	933	883	833	600
100	4	2,012	1,762	1,687	1,642	1,562	1,160
150	6	3,721	3,719	3,396	3,841	3,635	2,590
200	8	7,061	6,876	6,381	7,253	6,759	4,795
250	10	11,476	11,266	10,281	11,801	10,860	7,410
300	12	17,027	16,722	15,527	17,407	15,512	10,433
350	14	20,836	20,196	19,316	21,032	19,490	
400	16	28,060	27,258	25,950	28,591	26,164	
450	18	36,253	35,638	33,798	37,718	34,973	
500	20	46,330	45,188	42,723	48,672	45,658	
550	22	56,388	56,378	55,788	40,184	35,860	
600	24	69,399	67,919	63,874	47,884	41,733	
650	26	59,012	59,012	59,012	56,076		
700	28	94,436	92,111	88,191	65,110		
750	30	110,672	108,047	102,562	74,610		
800	32	124,879	120,734	115,084	84,977		
850	34	101,307	101,307	101,307	96,020		
900	36	158,878	152,651	144,018	107,487		
1000	40	194,341	194,341	189,571			
1050	42	275,260	275,260	275,260			
1200	48	364,180	364,180	347,080			
1400	55	529,430	529,430	520,500			

Notes 1. All the sizes are in full port
2. Pressure ratings are according to API 6D

Method of Calculation Flow

The flow coefficient Cv of a valve is the flow rate of water(gallons/minute) through a fully opened valve with a pressure drop of 1 psi across the valve.
To find the flow of liquid through the valve from the valve from the Cv, use the following formulas.

Liquid Flow

$QL = Cv(P/G)^{1/2}$
△P=Differential pressure across the valve (psig)
QL = Flow rate of liquid(gal./min)
G = Specific gravity of liquid (for water, G=1)

Gas Flow

$Qg = 61Cv(P_2P/g)^{1/2}$ (For non-critical flow, $P_2/P<1.0$)
P_2 = Outlet pressure(psia)
QL = Flow rate of gas (CFH at STP)
G = Specific gravity of gas (for air, g=1.0)

Trunnion Mounted Ball Valves Main Features

Why Trunnion Mounted ball?

On a ball with a free floating ball, the ball is forced against the down-stream seat by the fluid pressure acting on the entire surface of the ball.

Since the resulting torque is a product of the friction force and the seat-ball contact radius, the break to open torque increases substantially with the increasing of the differential pressure and/or the size of the valve.

This means that above a certain size and/or a certain differential pressure the required break to open torque will be so high that it will be impossible to operate the valve.

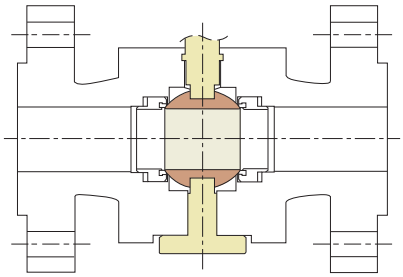
On a trunnion mounted ball valve, where the ball is fixed and the seat rings are floating, the fluid load due to the differential pressure acting on the surface of the ball is carried by the bearing, while the necessary seating action is obtained by the action of the fluid pressure on a relatively small annular area of the seat rings.

Therefore the resulting break to open torque is much smaller and can be controlled by increasing or decreasing the annular active area of the seat rings.

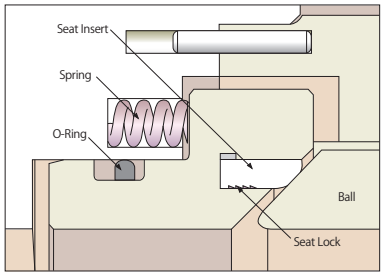
Regardless of size, pressure range and material, the design of PK Side entry, Top entry and welded body ball valves Provides a one piece forged solid ball mounted on trunnions.

Perfect machining and over-sizing of trunnions and trunnion housing in the valve body grant the perfect alignment of lower and upper trunnions.

The trunnions rotate on PTFE impregnated sleeve bearings, thus minimizing the friction caused by the side thrust resulting from the action of the line pressure on the ball.



Trunnion Mounted Ball



Seat Ring

Seat Rings

Two independent seat rings assure the required bi-directional tightness at every pressure in the pressure range of the valve.

The seat rings are spring loaded to grant the required tightness even at very low pressure.

“Self Relieving”, allowing any over pressure acting in the body cavity to be discharged in the line.

Single piston effect.

In the standard design of PK trunnion mounted ball valves, each seat ring performs the “Single Piston” action.

In this case the pressure acting on the external side of the seat ring results in a force pushing the same against the ball while the pressure acting on the internal side of the seat rings results in a force pushing the same away from the ball.

Therefore while both seat rings grant the required tightness when the pressure is applied on their external side, they are “Self Relieving”, allowing any over pressure acting in the body cavity to be discharged in the line as soon as the force caused by the pressure overcomes the one provided by the springs.

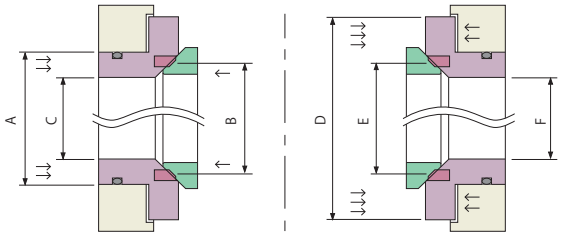
Double piston effect.

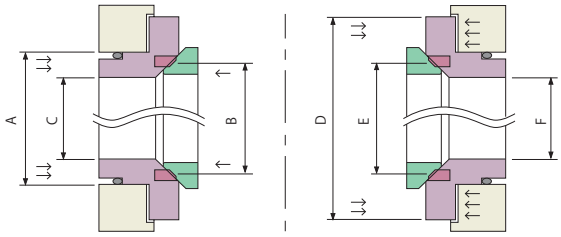
On request, the seat rings design may be modified to perform the “Double Piston Effect” action.

In this case the pressure acting on both the external and internal side of the seat rings, results in a force pushing the same against the ball.

Therefore each seat rings grants the required tightness even if the pressure is applied in the body cavity.

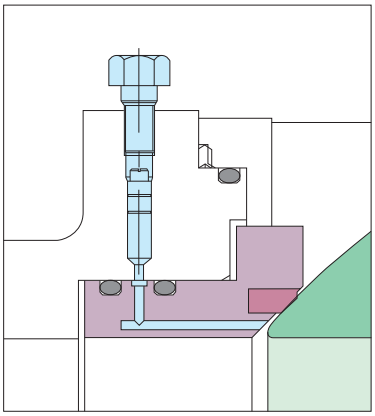
This feature adds an extra sealing feature to the valve, but to release the possible over pressure developed into the body cavity it is necessary to use an external safety relief valve.





Emergency sealant injection

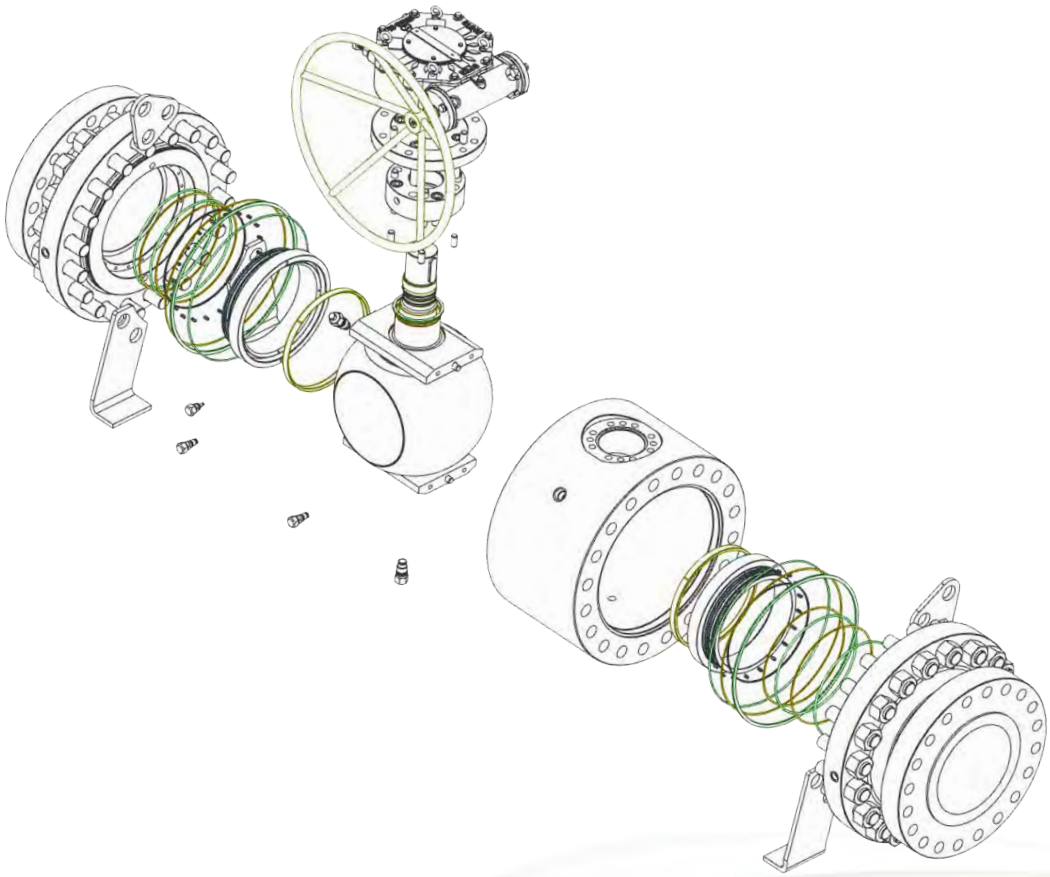
The design and the built-in quality of PK Trunnion Mounted ball valves do not require the use of a sealant injection to grant the perfect tightness, and therefore the provision for emergency grease injection in the seat sealing area is considered as an option available on customer request only.



Metal to metal seated valves

PK Trunnion mounted ball valves designed for abrasive service, feature a metal to metal sealing between the ball and seat rings, while the sealing between the seat and the seat housing shoulders is achieved by means of O-ring graphite gaskets lip seal O-ring or bellows seals depending on service conditions. The ball and the seat rings are hard-faced using different coating mediums such as Electroless Nickel, Chrome Carbide, Tungsten Carbide and Stellite depending on fluid to be handled.

A specially designed seat ring avoids the inclusion of sand or other debris in the spring recess. Special flushing systems for the seat pocket area are available on request for valves to be used in extremely “dirty” services.



Using CVD process to improve the wear life of metal components.

CVD(Chemical Vapor Deposition)

This is not for a simple coating on the material surface but for a surface penetration.
So, CVD treated material has no flaking which usually takes place in the coated material such as in Titanium Carbide and Tungsten Carbide Coating etc,.

CVD is a thermochemical surface treatment in which metal atoms are diffused into the surface of a workpiece to form CVD layer with the base material.

CVD has been proven to more than several the wear life of metal parts that were previously tungsten and titanium carbide coating, carburized, nitrided, nitrocarburized or hard chrome plated in numerous applications.

FEATURES

Excellent wear resistance from surface hardness of 1,700~2,300 HV achieved on steel and nickel, cobalt based alloys, tungsten carbide, titanium carbide.

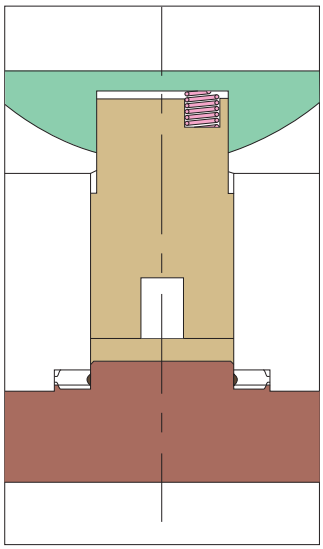
Hardness is retained at high service temperatures 650℃ and CVD increases acid corrosion resistance for hydrochloric, sulfuric and phosphuric acids in particular.

Anti blow-out stem

Stem-body joint is designed to assure the antiblowout condition of the stem.

Anti-static design

Electrical conductance continuity between all the metallic components of the trim and the body is granted by a spring loaded device.



PK Trunnion mounted ball valves have been designed to comply with the fire safety standards.

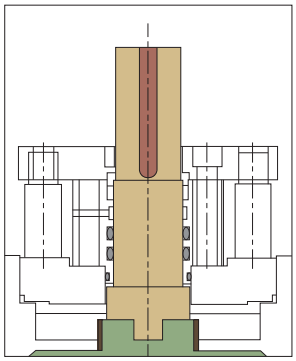
Fire safe design

PK Trunnion mounted ball valves have been designed to comply with the fire safety standards of API 6FA and API 607, fire safe qualification tests witnessed by independent inspection authorities covering all the production range.

Qualification tests to other fire safety standards may be performed on request.

Stem Sealing

The stem is separated from the ball, so that the stem itself is not affected by the side thrust created by the line pressure acting on the ball; this contributes to minimize the operational torque and eases the achievement of bubble tight sealing through the stem-body joint. The perfect sealing is granted by the use, as a standard feature, of two O-rings and a graphite gasket retained by the gland plate.



The stem is separated from the ball, so that the stem itself is not affected by the side thrust.

An emergency sealant injection facility is provided between the upper O-ring and the graphite gasket. The graphite gasket can be replaced with the valve in line and the ball in any position by removing the gland plate, after having released through the grease injection fitting hole, the possible pressure existing in the space between the upper O-ring and the graphite gasket. The stem seals can be replaced with the valve in line, providing that the ball is in the fully closed or fully open position and the pressure in the body cavity has been completely released.

Special stem sealing systems which require the use of lip seal O-rings or special gaskets are available for different service conditions.

The provision for emergency grease injection in the stem sealing area is supplied as a standard feature.

Body Sealing

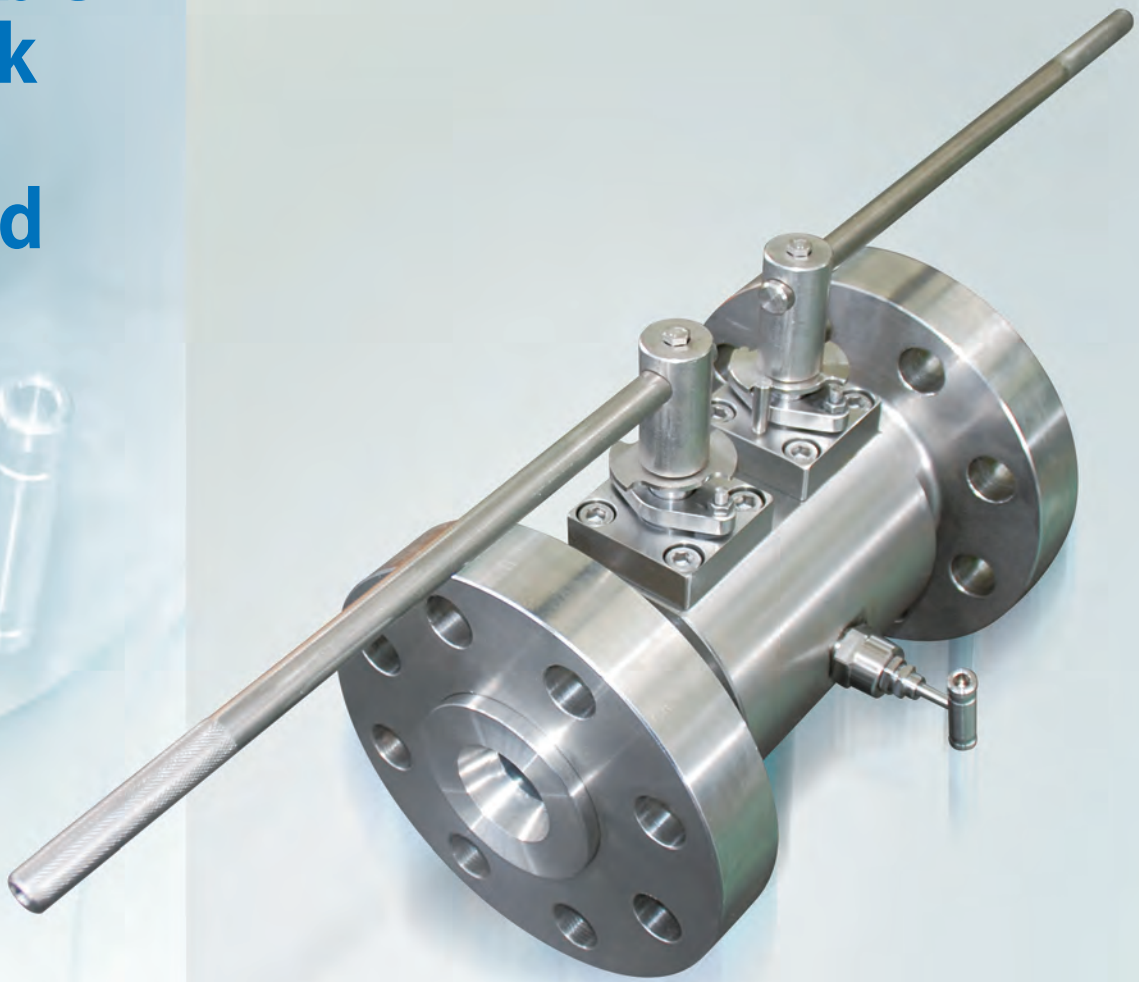
Perfect sealing and fire safe features are granted by the double sealing action of O-rings and graphite gaskets in all the static joints of the body components.

Materials

Description	Casting	Forging
Carbon Steel	A216 - WCB	A105 / A105N
Low Temp. Steel	A352 - LCB / LCC	A350 - LF2
Alloy Steel	A352 - LC3	A350 - LF3
	A217 - C5	A182 - F5A/F5
	A217 - C12A	A182 - F91
	A217 - WC6	A182 - F11
	A217 - WC9	A182 - F22
	A217 - C12	A182 - F9
Stainless Steel	A351 - CF8	A182 - F304
	A351 - CF3	A182 - F304L
	A351 - CF8M	A182 - F316
	A351 - CF3M	A182 - F316L
	A351 - CA15	A182 - F6A
	A351 - CF8C / CF8A	A182 - F347 / F347H
Duplex Steel	A351 - CG8M	A182 - F317
	A351 - CK3MCuN	A182 - F44
	A890 - 1A	A182 - F50
	A351 - CD3MN / A890 - 4A	A182 - F51
	A351 - CE8MN / A890 - 5A	A182 - F53
	A995 - CD3MWCuN / 6A	A182 - F55
Super Duplex	CN7M (4A)	ALLOY 20
Super Alloys	CW-6MC (2A)	INCONEL 625
	Cu5MCuC (6A)	INICONEL 825
	CX2MW	HASTELLOY C - 276
AL - BRONZE	B148 C95800	B150 C63000

PK Trunnion Mounted ball valves are available in a wide range of materials. Such as.

Double Block and Bleed



Double Block and Bleed Valves

Both in valves adopting the single piston effect or double piston effect seat design, PK Trunnion Mounted ball valves permit the body cavity to be bleed through the drain plug valve with the ball in the fully closed or fully open position.

This permits the checking of the seating integrity without the need to turn the ball in its fully closed position, this avoided out generating troubles for the operation of the line.

The range can be integrated with a range of pneumatic / electric actuators and complete flow control packages.

These valves service a wide spectrum of industries such as chemical, petrochemical, oil, gas and pharmaceutical industries and provide an easy and convenient way of providing 2 separate isolations and a visual confirmation of a tight seal.

Size Range	1/2" - 56" (DN 25 - DN 1400) Double Block and Bleed Valves
Design / Features	Gate Type, Ball Type, Floating &Trunnion Mounted, End Entry, Top Entry, Subsea, Full / Reduced Bore, Cryogenic, Firesafe Certified, Anti-static, Blow-out proof stems.
Design Codes	API 6D, API 6A, BS5351, BS 6755 / BS EN 12266, NACE MR 01 75, ANSI, ISO &API standards
End Connections	Flanged, Screwed, Butt Weld, Hub, SW
Pressure Class	ANSI 150 lbs - 4500 lbs
Seat Design	Soft Seated, Metal to Metal, Single &Double Piston effect.
Operator	Lever / Gear / Pneumatic / Hydraulic / Electric / Gas over Oil / Quarter Turn / Rack and Pinion / Scotch Yoke.

Why a Double Block and Bleed Valves?

The Double Block and Bleed Valve can perform the tasks of 3 separate valves (2 separate isolations and 1 drain valve) which apart from being hugely Space saving can also save on weight and time due to Installation and Maintenance practices requiring much less work and the operator being able to locate and operate all 3 valves in one location.

It has been customary for manifold systems and other process piping, where inter-contamination of products was undesirable, to position two valves back to back with a small bleed valve located between them. This is commonly referred to as a "Double Block and Bleed System" or "Block and Bleed Service." Using TFE or RTFE as a seat material has permitted the substitu-tion of a single valve for the two valves which made up the previ-ous system.

A bleed valve is required and is connected to the body cavity around the ball of the ball valve. A Double Block and Bleed application requires that both seats be tight and act as upstream seals when there is pressure on one or both sides of the valve, with the cavity around the ball being bled to atmosphere by open-ing the body drain valve. Design Features A special Block and Bleed seat design has been developed in valve sizes ¾" through 8" inclusive, which will act as an upstream seat without impairing its ability to act also as a downstream seat. Refer to Figure 3 (back) for a cross-sectional view of this design. In a standard floating ball type of valve such as the McCannaseal, it is always the downstream seat which is tight.

The line pressure provides the necessary seating force by pressing the ball

Fig. 1 Traditional Shutoff System

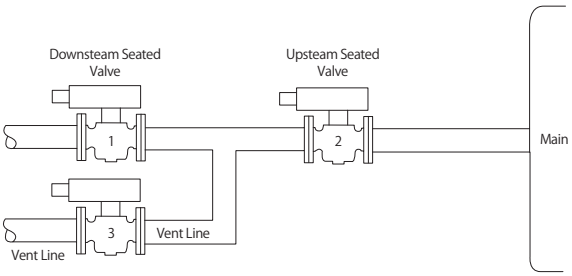
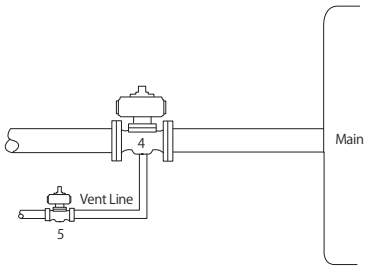
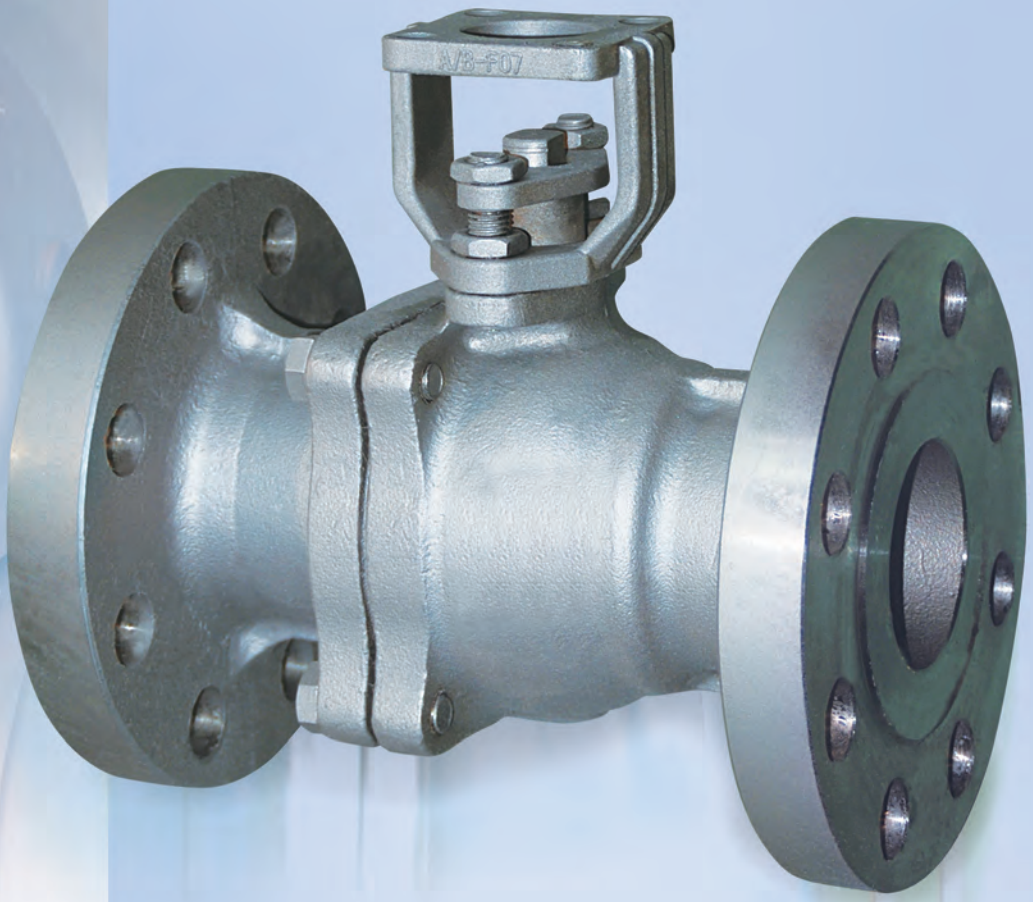


Fig. 2 PK Valves Shutoff System



Double block and bleed ball valve with upstream and downstream seats

Cast Steel Floating Ball Valve



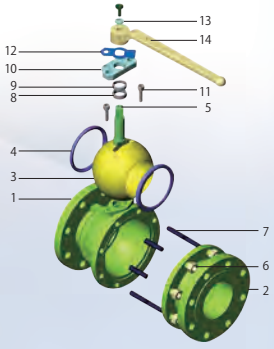
Technical Specification

- Design Standard : API 608
- Face to Face : ASME B 16.10
- Flanged Size : ASME B 16.5
- Test & Inspection : API598

Notes

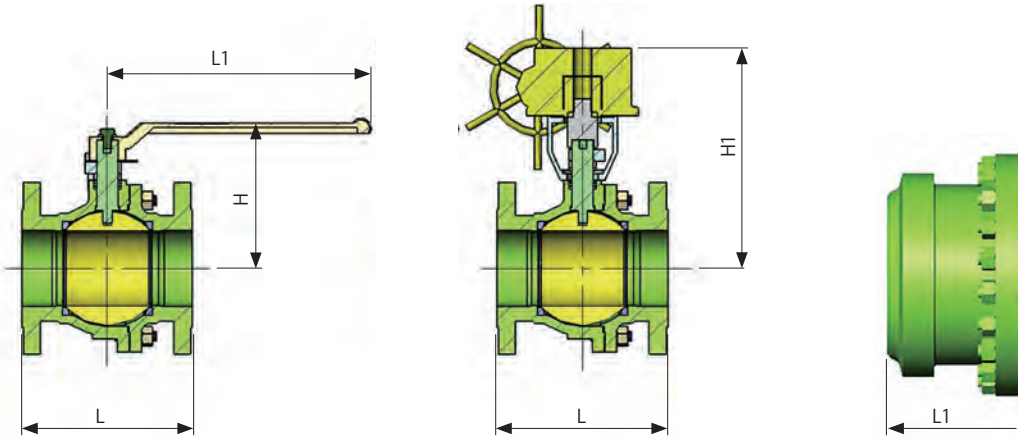
The sizes of serial valve connecting Flange and butt-welding terminal can be designed according to customer's requirement

Parts and Material List



No	Accessory Name	Material		
		Carbon Steel Series	Stainless Steel Series	Cryogenic Steel Series
1	Body	A216 - WCB	A351 - CF8, CF8M, CF3, CF3M	A352 - LCB, LCC
2	Bonnet	A216 - WCB	A351 - CF8, CF8M, CF3, CF3M	A352 - LCB, LCC
3	Ball	A105 + HCr/ENP	A351 - CF8, CF8M, CF3, CF3M	A352 - LCB, LCC + ENP
4	Seat	PTFE, RPTFE, Sintering carbon fibre, Metal + Rubber groupware		
5	Stem	A182 - F6a	A182 - F304, 316	A182 - F6a
6	Nut	A194 - 2H	A194 - 8M	A194 - 4
7	Stud	INCONEL 750		
8	Gasket	A182 - F6a	Flexible Graphite + Stainless Steel	A182 - F6a
9	Packing Gasket	Flexible Graphite, PTFE		
10	Gland	A216 - WCB	A351 - CF8, CF8M	A351 - CF8
11	Screw Nail	A193 - B7	A193 - B8, B8M	A320 - L7
12	Indicator	GB / T700 Q235A + Zn(Cr)		
13	Ring	A216 - WCB		
14	Lever	GB / T 1222 65Mn		

Notes
- **Ball** : The Material of this part about the anti-sulphur type valve is ASTM(A182-304+Ni.P)
- **Stem** : The material of this part about the anti-sulphur type valve is ASTM(A276-321) Major parts of the valve series and materials of sealing surface differ according to actual working condition and customer's special requirement.



Dimensions and Weights

PN1.6MPa CLASS 150

DN	mm	15	20	25	40	50	65	80	100	125	150	200
NPS	in	½	¾	1	1 ½	2	2 ½	3	4	5	6	8
Flange	L	108	117	127	165	178	190	203	229	356	394	457
Butt Welding	L1	140	152	165	190	216	241	282	305	381	403	419
Hand-Operated	H	59	63	75	95	108	142	152	178	252	272	342
	W	130	130	160	230	203	350	400	500	750	750	900
Worm Gear Operated	H										292	398
	W										400	600
	Type										A	B

PN2.5 4.0MPa CLASS 300

DN	mm	15	20	25	40	50	65	80	100	125	150	200
NPS	in	½	¾	1	1 ½	2	2 ½	3	4	5	6	8
Flange	L	140	152	165	190	216	241	282	305	381	403	502
Butt Welding	L1	140	152	165	190	216	241	282	305	381	403	502
Hand-Operated	H	59	63	75	95	167	142	152	178	252	272	342
	W	130	130	160	230	230	350	400	500	750	750	900
Worm Gear Operated	H										292	398
	W										400	600
	Type										A	B

PN10MPa CLASS 600

DN	mm	15	20	25	40	50	65	80	100	125	150	200
NPS	in	½	¾	1	1 ½	2	2 ½	3	4	5	6	8
Flange	L	165	190	216	241	292	330	356	406 (432)			
Butt Welding	L1	165	190	216	241	292	330	356	406 (432)			
Hand-Operated	H	59	63	75	95	167	180	198	198			
	W	160	160	230	400	400	650	650	1050			
Worm Gear Operated	H							292	398			
	W							400	600			
	Type							A	B			

Forged Steel Floating Ball Valve

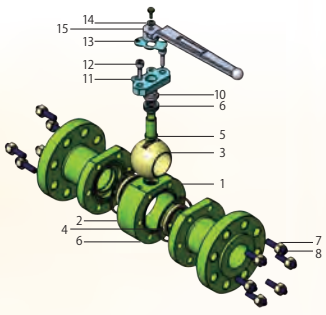
Technical Specification

- **Design Standard** : API 608
- **Face to Face** : ASME B 16.10
- **Flanged Size** : ASME B 16.5
- **Test & Inspection** : API598

Notes

The sizes of serial valve connecting Flange and butt-welding terminal can be designed according to customer's requirement

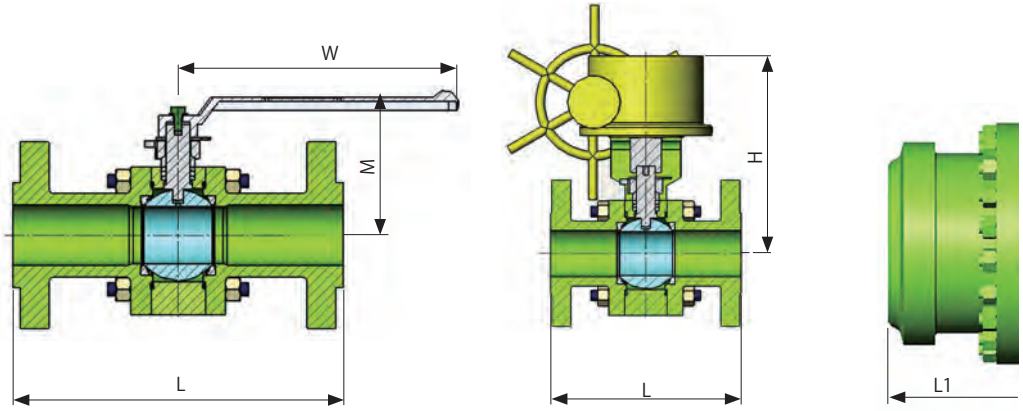
Parts and Material List



No	Accessory Name	Material
		ASTM
1	Body	A105
2	Bonnet	A105
3	Ball	A105+ENP
4	Seat	PTFE
5	Stem	A182-F6a
6	Gasket	Graphite+Stainless Steel
7	Nut	A194-2H
8	Stud	A193-B7

No	Accessory Name	Material
		ASTM
9	Gasket	PTFE
10	Packing	Graphite
11	Gland	A216-WCB
12	Bolt	A193-B7
13	Indicator	Carbon Steel
14	Ring	AISI 1566
15	Lever	Stainless Steel

Notes - **Ball** : The Material of this part about the anti-sulphur type valve is ASTM(A182-304+Ni.P)
- **Stem** : The material of this part about the anti-sulphur type valve is ASTM(A276-321) Major parts of the valve series and materials of sealing surface differ according to actual working condition and customer's special requirement.



Dimensions and Weights

PN1.6MPa CLASS 150

DN	mm	15	20	25	40	50	65	80	100	125	150	200
NPS	in	½	¾	1	1 ½	2	2 ½	3	4	5	6	8
Flange	L	108	117	127	165	178	190	203	229	356	394	457
Butt Welding	L1	140	152	165	190	216	241	282	305	381	403	419
Hand-Operated	H	73	78	86	102	130	142	191	200	226	242	285
	W	130	130	160	180	230	400	400	460	750	750	900
Worm Gear Operated	H										260	300
	W										400	600
	Type										A	B

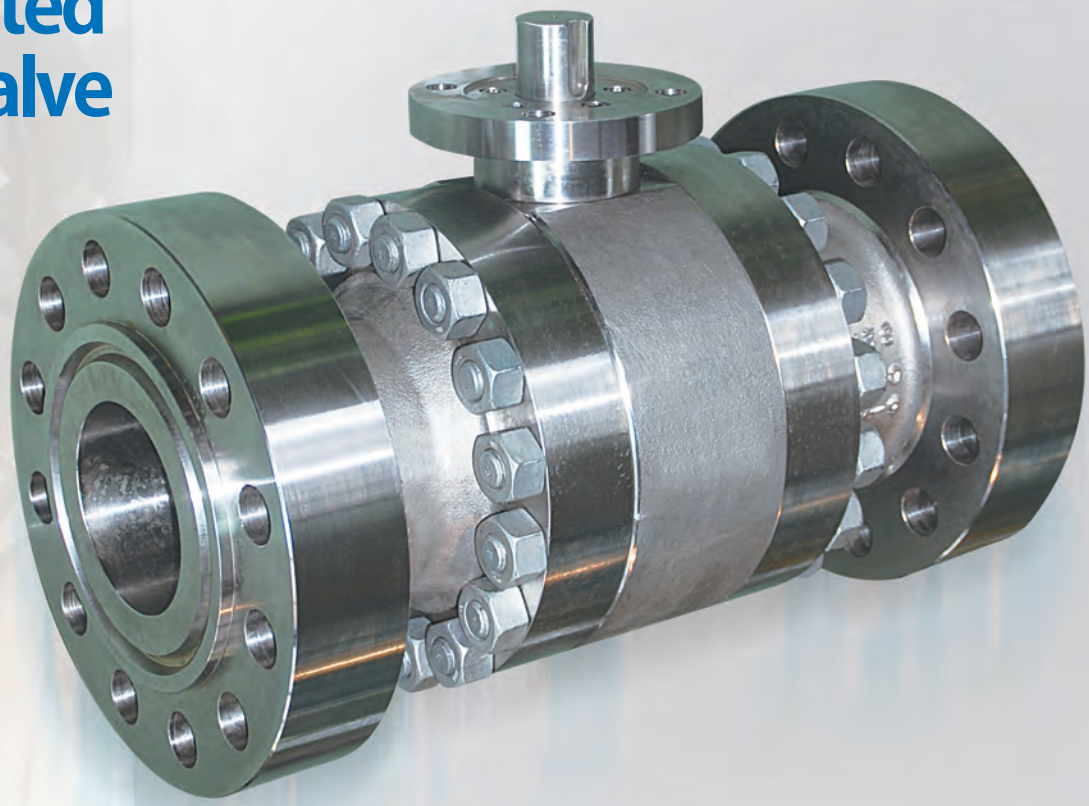
PN2.5 4.0MPa CLASS 300

DN	mm	15	20	25	40	50	65	80	100	125	150	200
NPS	in	½	¾	1	1 ½	2	2 ½	3	4	5	6	8
Flange	L	140	152	165	190	216	241	282	305	381	403	502
Butt Welding	L1	140	152	165	190	216	241	282	305	381	403	502
Hand-Operated	H	73	80	86	102	136	164	191	223	240	253	307
	W	140	140	180	230	240	400	400	750	750	900	1000
Worm Gear Operated	H										325	387
	W										400	600
	Type										A	B

PN10MPa CLASS 600

DN	mm	15	20	25	40	50	65	80	100	125	150	200
NPS	in	½	¾	1	1 ½	2	2 ½	3	4	5	6	8
Flange	L	165	190	216	241	292	330	356	406 (432)			
Butt Welding	L1	165	190	216	241	292	330	356	406 (432)			
Hand-Operated	H	73	80	86	110	142	171	185	220			
	W	160	160	230	400	400	650	650	800			
Worm Gear Operated	H							182	217			
	W							280	400			
	Type							O	A			

Cast Steel Trunnion-Mounted Ball Valve



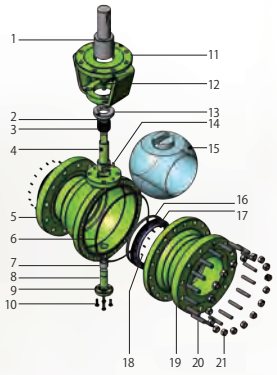
Technical Specification

- **Design Standard** : API 6D
- **Face to Face** : API 6D / ASME B 16.10
- **Flanged Size** : ASME B 16.5
  ASME B 16.47
- **Test & Inspection** : API598 / API 6D

Notes

1. The sizes of serial valve connecting flange ends can be designed according to customer's requirement.
2. DN>1000(40"), the design standard is accordance with 「Specification of the length pipe valve」

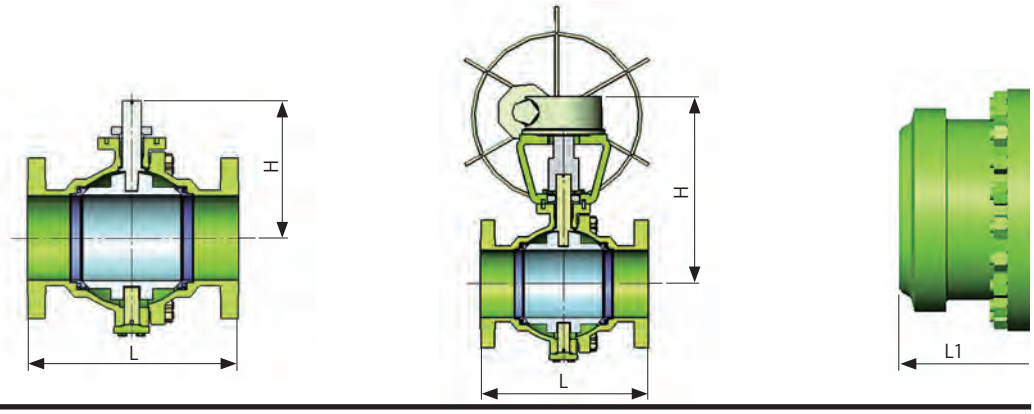
Parts and Material List



No	Accessory Name	Material
		ASTM
1	Connector	A182-F304L
2	Gland	A276-410
3	Packin	PTFE
4	Stem	A276-316
5	Body	A182-F304L
6	Gasket	Graphite
7	Sleeve	A276-410
8	Trunnion	A276-316
9	Trunnion Cover	A351-CF8M
10	Bolt	A193-B7
11	Yoke	A216-WCB

No	Accessory Name	Material
		ASTM
12	Bolt	A193-B7
13	Gland Flange	A351-CF8M
14	Pin	A581-303
15	Ball	A182-F316
16	O-Ring	Viton
17	Seat	PTFE
18	Spring	Inconel X-750
19	Connector	A182-F304L
20	Bolt	A193-B7
21	Nut	A194-7

Notes - **Ball** : The Material of this part about the anti-sulphur type valve is ASTM(A276-321)
- **Stem** : The material of this part about the anti-sulphur type valve is ASTM(A182-304, CF8+Ni,P)
Major parts of the valve series and materials of sealing surface differ according to actual working condition and customer's special requirement.



Dimensions and Weights

PN1.6MPa CLASS 150

DN	mm	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1050	1200	1400	1500
NPS	in	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	42	48	56	60
Flange	L	178	191	203	229	356	394	457	533	610	686	762	864	914	1067	1245	1372	1524	1721	1829	2180	2300	2400
Butt Welding	L1	216	241	283	305	381	457	521	559	635	762	838	914	991	1143	1346	1524	1727	1930	1689	2100	2250	2400
Hand-Operated	H	107	125	152	178	300	330																
	W	230	400	400	450	700	750																
Worm Gear Operated	H							398	495	580	625	670	698	840	1050	1100	1150	1230	1320	1480	1610	1780	1865
	W							600	600	800	800	800	800	800	800	800	800	800	800	800	800	800	800
	Type							B	B	C	C	D	D	D	DA	DA	DB	DB	DC	DC	DD	DH	HD

PN2.5 4.0MPa CLASS 300

DN	mm	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1050	1200	1400	1500
NPS	in	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	42	48	56	60
Flange	L	216	241	283	305	381	403	502	568	648	762	838	914	991	1143	1346	1524	1727	2083	2050	2180	2300	2400
Butt Welding	L1	216	241	283	305	381	457	521	559	635	762	838	914	991	1143	1346	1524	1727	2083	1960	2020	2250	2400
Hand-Operated	H	107	125	152	178	300	330																
	W	230	400	400	600	700	800																
Worm Gear Operated	H							398	495	580	625	670	698	840	1050	1100	1150	1230	1320	1480	1610	1780	1865
	W							600	600	800	800	800	800	800	800	800	800	800	800	800	800	800	800
	Type							B	B	C	C	D	D	DA	DB	DC	DC	DD	DD	DD	DH	DH	HD

PN10MPa CLASS 600

DN	mm	50	65	80	100	150	200	250	300	350	400	450	500	600	700	800	900	1000	1050	1200	1400	1500
NPS	in	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	28	32	40	42	48	56	60
Flange	L	292	330	356	432	559	660	787	838	889	991	1092	1194	1397	1549	1178	2083	2337	2100	2400	2400	2700
Butt Welding	L1	292	330	356	432	559	660	787	838	889	991	1092	1194	1397	1549	1178	2083	2337	2050	2180	2300	2400
Hand-Operated	H	108	155	197																		
	W	400	650	650																		
Worm Gear Operated	H				235	300	374	445	512	550	615	750	810	1050	1180	1250	1315	1420	1540	1680	1840	1915
	W				600	600	800	800	800	800	800	800	800	800	800	800	800	800	1000	1000	1000	1000
	Type				B	C	C	D	D	DA	DA	DB	DC	DD	DH	DH	DH	DH	DJ	DJ	DK	DK

PN15.0MPa CLASS 900

DN	mm	50	65	80	100	150	200	250	300	350	400	450	500	600	750	800	900	1000	1200
NPS	in	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	32	36	40	48
Flange	L	368	419	381	457	610	737	838	965	1092	1130	1219	1321	1549	1780	2050	2050	2180	2600
Butt Welding	L1	368	419	381	457	610	737	838	965	1092	1130	1219	1321	1549	1700	1780	1960	2100	2376
Hand-Operated	H	217	241	295															
	W	650	650	650															
Worm Gear Operated	H				297	364	394	502	572	675	762	866	894	965	1210	1290	1360	1480	1630
	W				600	800	800	800	800	800	800	800	800	800	800	1000	1000	1000	1000
	Type				B		C	D	D	DA	DB	DC	DD	DH	DH	DJ	DJ	DK	DK

PN25.0MPa CLASS 1500

DN	mm	50	65	80	100	150	200	250	300	350	400	450	500	600
NPS	in	2	2½	3	4	6	8	10	12	14	16	18	20	24
Flange	L	368	419	470	546	705	832	991	1130	1257	1384	1537	1664	2043
Butt Welding	L1	368	419	470	546	705	832	991	1130	1257	1384	1537	1664	2043
Hand-Operated	H	217	241	259										
	W	650	650	650										
Worm Gear Operated	H	217	241	259	297	364	475	578	696	761	831	900	950	1080
	W	600	600	600	600	800	800	800	800	800	800	800	800	800
	Type	A	A	B	B	C	D	D	DA	DB	DC	DD	DH	DH

PN45.0MPa CLASS 2500

DN	mm	50	80	100	150	200	250	300
NPS	in	2	3	4	6	8	10	12
Flange	L	451	578	673	914	1022	1270	1422
Butt Welding	L1	451	578	673	914	1022	1270	1422
Worm Gear Operated	H	220	275	325	360	480	550	615
	W	800	800	800	800	800	800	800

Forged Steel Trunnion-Mounted Ball Valve

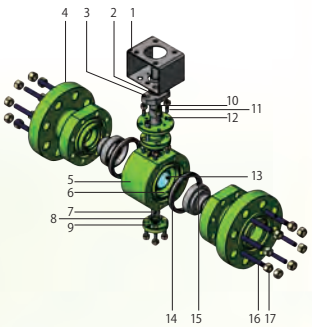
Technical Specification

- **Design Standard** : API 6D
- **Face to Face** : API 6D / ASME B 16.10
- **Flanged Size** : ASME B 16.5
  ASME B 16.47
- **Test & Inspection** : API598 / API 6D

Notes

1. The sizes of serial valve connecting flange ends can be designed according to customer's requirement.
2. DN>1000(40"), the design standard is accordance with 「Specification of the length pipe valve」

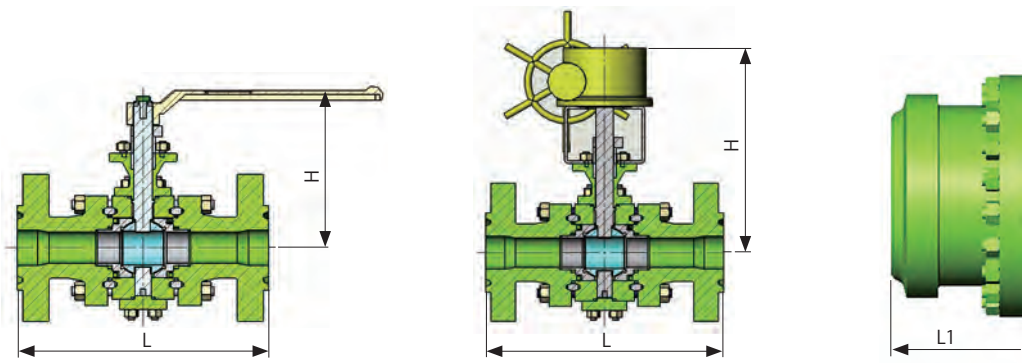
Parts and Material List



No	Accessory Name	Material
		ASTM
1	Mount Flange	A182-F304
2	Gland	A276-304
3	Gland Flange	A276-304
4	Connector	A182-F304L
5	Body	A182-F304L
6	Spring	Inconel X-750
7	Trunnion	A276-316
8	Gasket	Graphite
9	Trunnion Cover	A276-316

No	Accessory Name	Material
		ASTM
10	Stem	A276-316
11	Packing	Graphite
12	Gland Flange	A276-304
13	Ball	A276-316
14	Gasket	Graphite
15	Seat	A182-F304L + TC
16	Bolt	A193-B7
17	Nut	A194-7

Notes - **Ball** : The Material of this part about the anti-sulphur type valve is ASTM(A182-304+Ni.P)
- **Stem** : The material of this part about the anti-sulphur type valve is ASTM(A276-321) Major parts of the valve series and materials of sealing surface differ according to actual working condition and customer's special requirement.



Dimensions and Weights

PN1.6MPa CLASS 150

No	mm	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1050	1200	1400	1500
NPS	in	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	42	48	56	60
Flange	L	178	191	283	329	356	394	457	553	610	686	762	864	914	1067	1245	1372	1524	1721	1829	2180	2300	2400
Butt Welding	L1	216	241	283	305	381	457	521	559	635	762	838	914	991	1143	1346	1524	1727	1930	1689	2100	2250	2400
Hand-Operated	H	130	142	191	200	226	242																
	W	230	350	400	450	750	750																
Worm Gear Operated	H							337	385	414	447	545	545	585	663	723	923	986	1061	1420	1530	1640	1710
	W							600	600	800	800	800	800	800	800	800	800	800	800	800	800	800	800
	Type							B	B	C	C	D	D	D	DA	DA	DB	DB	DC	DC	DD	DH	HD

PN2.5 4.0MPa CLASS 300

No	mm	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1050	1200	1400	1500
NPS	in	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	28	32	36	40	42	48	56	60
Flange	L	216	241	283	305	381	403	502	568	648	762	838	914	991	1143	1346	1524	1727	2083	2050	2180	2300	2400
Butt Welding	L1	216	241	283	305	381	457	521	559	635	762	838	914	991	1143	1346	1524	1727	2083	1960	2020	2250	2400
Hand-Operated	H	136	164	191	223	240	253																
	W	240	400	400	600	750	800																
Worm Gear Operated	H							337	385	414	447	545	545	585	663	723	923	986	1061	1420	1530	1640	1710
	W							600	600	800	800	800	800	800	800	800	800	800	800	800	800	800	800
	Type							B	B	C	C	D	D	DA	DB	DC	DC	DD	DD	DD	DH	DH	HD

PN10MPa CLASS 600

No	mm	50	65	80	100	150	200	250	300	350	400	450	500	600	700	800	900	1000	1050	1200	1400	1500
NPS	in	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	28	32	40	42	48	56	60
Flange	L	292	330	356	432	559	660	787	838	889	991	1092	1194	1397	1549	1178	2083	2337	2100	2400	2400	2700
Butt Welding	L1	292	330	356	432	559	660	787	838	889	991	1092	1194	1397	1549	1178	2083	2337	2050	2180	2300	2400
Hand-Operated	H	136	164	191																		
	W	500	650	650																		
Worm Gear Operated	H				244	309	361	412	475	502	533	636	675	759	836	915	987	1212	1460	1600	1760	1845
	W				600	600	800	800	800	800	800	800	800	800	800	800	800	800	1000	1000	1000	1000
	Type				B	C	C	D	D	DA	DA	DB	DC	DD	DH	DH	DH	DH	DJ	DJ	DK	DK

PN15.0MPa CLASS 900

No	mm	50	65	80	100	150	200	250	300	350	400	450	500	600	750	800	900	1000	1200
NPS	in	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	32	36	40	48
Flange	L	368	419	381	457	610	737	838	965	1092	1130	1219	1321	1549	1780	2050	2050	2180	2600
Butt Welding	L1	368	419	381	457	610	737	838	965	1092	1130	1219	1321	1549	1700	1780	1960	2100	2376
Hand-Operated	H	148	191	216															
	W	650	650	650															
Worm Gear Operated	H				270	384	435	518	657	693	762	866	894	965	1160	1240	1310	1450	1530
	W				600	800	800	800	800	800	800	800	800	800	800	1000	1000	1000	1000
	Type				B		C	D	D	DA	DB	DC	DD	DH	DH	DJ	DJ	DK	DK

PN25.0MPa CLASS 1500

No	mm	50	65	80	100	150	200	250	300	350	400	450	500	600
NPS	in	2	2½	3	4	6	8	10	12	14	16	18	20	24
Flange	L	368	419	470	546	705	832	991	1130	1257	1384	1537	1664	2043
Butt Welding	L1	368	419	470	546	705	832	991	1130	1257	1384	1537	1664	2043
Hand-Operated	H	175	191	216										
	W	650	650	750										
Worm Gear Operated	H	175	91	216	247	329	492	428	640	670	700	755	830	952
	W	400	400	600	600	800	800	800	800	800	800	800	800	800
	Type	A	A	B	B	C	D	D	DA	DB	DC	DD	DH	DH

PN45.0MPa CLASS 2500

DN	mm	50	80	100	150	200	250	300
NPS	in	2	3	4	6	8	10	12
Flange	L	451	578	673	914	1022	1270	1422
Butt Welding	L1	451	578	673	914	1022	1270	1422
Worm Gear Operated	H	220	275	325	360	480	550	615
	W	800	800	800	800	800	800	800

Product System

- Chemical Plants
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- Breweries & Distilleries
- Electrical Component Plants
- Foundries
- Power Plant-Nuclear
- Coke By-Products Plants
- Food Processing Plants
- Paint & Paint Product Plants
- Textile Industry
- Steel & Other Metal Processing Plants
- Rubber & Synthetic Rubber Products Plants
- Petroleum Products & Handling Systems
- Pulp & Paper Plants
- Pharmaceutical Plants
- Water Treatment-Purification

※ The product is subject to change for technical development and quality improvement without prior notice.

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1. Customers


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bp


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cenovus
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KOGAS


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TOKYO GAS


HQCEC


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أدنوك
ADNOC
شركة بترول ابوظبي الوطنية


INPEX


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HEAVY INDUSTRIES CO.,LTD.


DSME


SAMSUNG


SK E&C


GS E&C


Hanwha
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DAELIM


posco


LOTTE
ENGINEERING &
CONSTRUCTION


JGC


CHIYODA
CORPORATION


TOYO
ENGINEERING


IHI


Kawasaki


CTCI
CORP

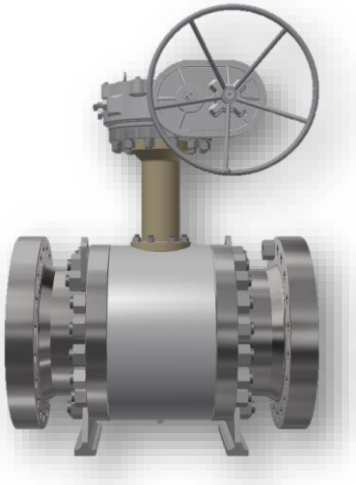
2. Manufacturing Items

Type	Class	150	300	600	900	1500	2500
Gate BB		2~56	2~48	2~36	2~24	2~16	2~8
Globe BB		2~30	2~30	2~30	2~14	2~10	2~8
Check	Swing	2~36	2~36	2~36	2~24	2~16	2~8
	Dual	2~36	2~36	2~12	2~6	2~6	
	Axial	2~36	2~36	2~36	2~32		
Ball	Floating	½ ~ 6	½ ~ 6	½ ~ 4	½ ~ 2	½ ~ 2	
	Trunnion	8~24	8~24	6~24	3~24	3~24	
	DBB (2 Ball)	½ ~ 6	½ ~ 6	½ ~ 4	½ ~ 2	½ ~ 2	
Butterfly		4~48	4~24	*UD			

*UD: Under Development

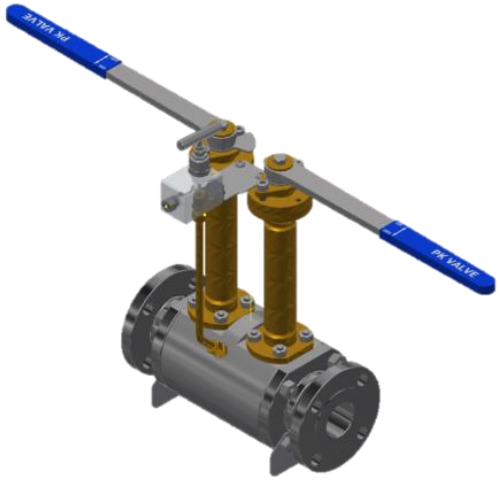
DIMENSION	STANDARD
DESIGN	ASME B16.34, API 600, API6D, API609, API 623, API 594 BS 1873, BS 1868, BS 6364
END FLANG	ASME B16.5/B16.47
FACE TO FACE	ASME B16.10
BUTT WELD ENDS	ASME B16.25
FIRE SAFE	API 607 / API 6FA / API 6FD
TEMPERATURE	-46 ℃ TO -254℃

2.1 Cryogenic Ball Valve



TRUNNION SIDE ENTRY

FLOATING SIDE ENTRY



DOUBLE BLOCK AND BLEED (DBB 2 Ball)

- Fire Safe Design
- Metal Seated
- Soft Seated
- ISO 15848 Qualified
- Super Fine Roundness
- Super Fine Sphereness
- Super Fine Surface Finish
- Double Seating mechanism using Seat gasket and Lip seal between cap and retainer

- Space, Weight and Cost Saving
- Less Leakage Points
- Installation and Maintenance Cost Saving
- Compact Design
- Reduced Stress from Loading and Vibration

2.2 Cryogenic Butterfly Valve

Double Offset Butterfly Valve

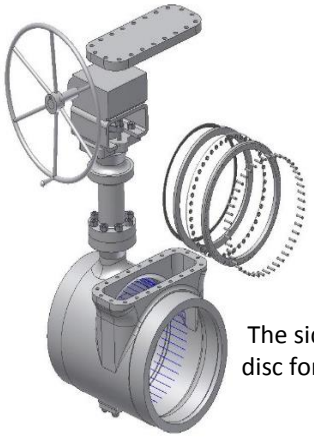
- Fire Safe Design
- In-Line Maintenance
- Bi-Directional

Double Offset Butterfly Valve

- DOBF 150#-48”
- ASTM A351-CF3
- Pneumatic Actuated

Triple Offset Butterfly Valve

- Fire Safe Design
- Metal Seated
- SIL Level 2



The side entry design allows easy and quick in-line maintenance through the side cover with free access to the Seat and disc for inspection or maintenance without disassembly of actuators. No special tools are required.

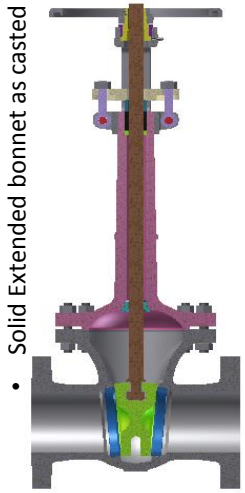
2.3 Cryogenic Gate, Globe and Check Valve

Cryogenic Gate Valve

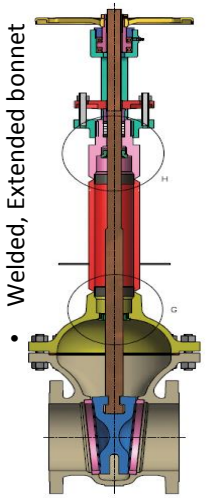
Cryogenic Globe Valve

Cryogenic Dual Plate Check Valve

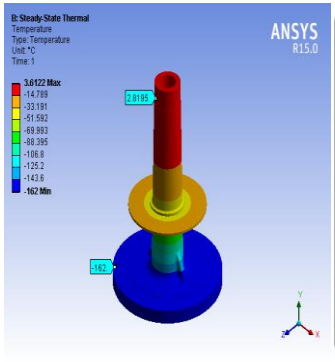
Cryogenic Axial Flow Non Slam Check Valve

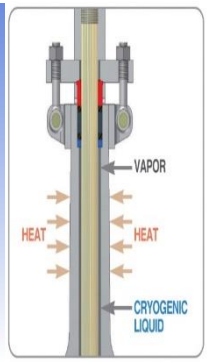


- Solid Extended bonnet as casted



- Welded, Extended bonnet





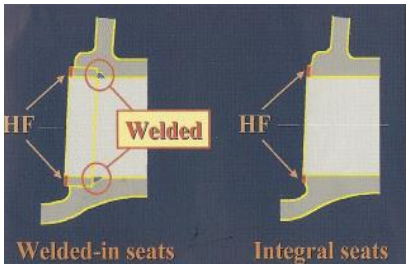
- Extended Bonnet Length with vapor column length according to BS 6364 (Cold Box & Non-Cold Box) / Customer specified length.
- Extended Bonnet Length according to Shell MESC 77/200
- Packing protected from cryogenic temperatures

2.4 Design Characteristics of Cryogenic Valves

- **Reliability** of quality valve depends on Design, Casting and Testing coming from rich experience and technics with 72 years history.

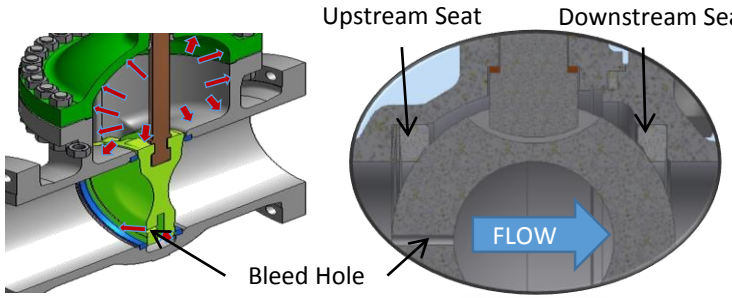
Gate Valve

Round Bonnet instead of Oval type makes less but even stress to the top Flange for Class 150 Gate Valve



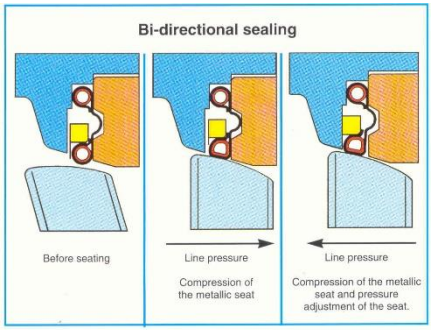
Gate & Globe Valve

Welded Seat Ring instead of Integral Seat has even thickness inducing even cooling and eventually more stable Seating performance.



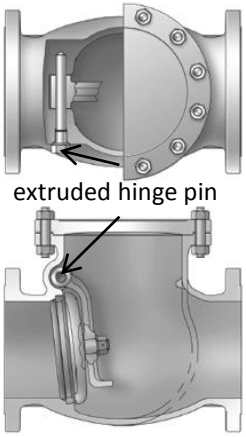
Gate & Ball Valve

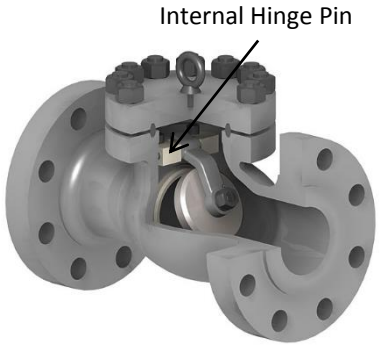
Anti Inner Pressure Build-Up by Bleed hole on the Disc of Gate Valve or Ball Valve



Butterfly Valve

Bi directional Sealing can be stably achieved by pressure assisted special design Seal ring





Swing Check Valve

Internal Hinge Pin design other than extruded pin eliminates possible leakage

3. Testing & Measuring Facilities

5 UNITS OF
TIME & TEMPERATURE RECORDER

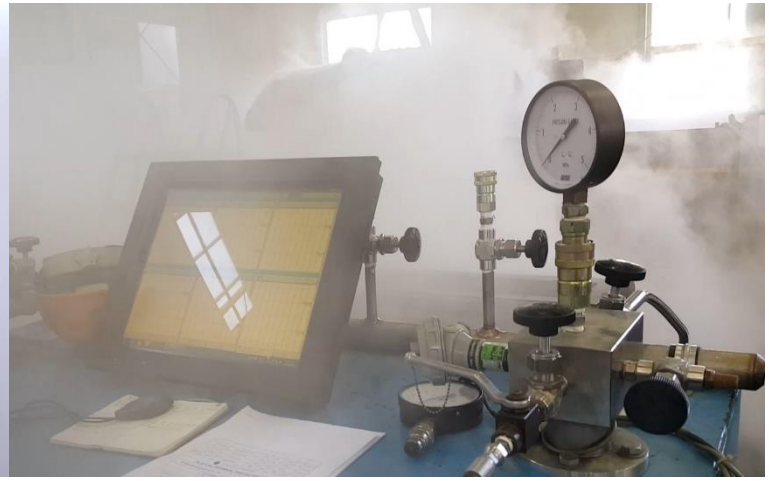
CRYOGENIC TEST BOX

CAPACITY	Q'TY
3070 X 2070 X 3000 MM	2 EA
2060 X 1970X 1600 MM	2 EA
1100 X 600 X 740 MM	6 EA
820 X 820 X 1100 MM	3 EA
450 X 180 X 450 MM	3 EA

3. Testing & Measuring Facilities

Helium Leak Detectors

Cryogenic Temperature & Time Monitoring & Recorder



4. Photo Gallery of Cryogenic Valve

36” 150# Cryogenic Butterfly Valve
Top Entry BW End

48” 150# Cryogenic Butterfly Valve
Domestic Boryeong LNG Terminal Project

30” 150# Cryogenic Butterfly Valve
Domestic Tongyoung LNG Terminal Project

36” 150# Cryogenic Gate Valve
Samsung Eng - Saudi Arabia Tasnee Project

14” 600# Cryogenic Dual Plate Check Valve
LNG Terminal China Project

20” 900# Cryogenic Axial Non Slam Check Valve
South Pars Gas Field Development Project

4. Photo Gallery of Cryogenic Valve

48” 300# Cryogenic Gate Valve

4. Photo Gallery of Cryogenic Valve

24” 900# Cryogenic Ball Valve

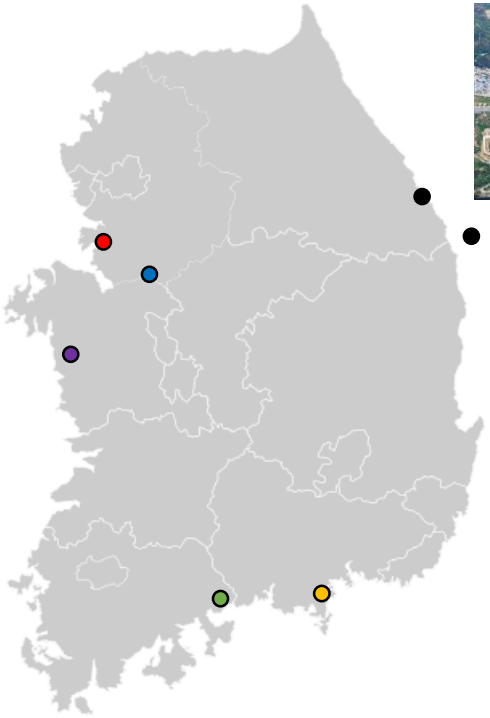
5. Supply Reference

5-1. Supply Reference (LNG Terminal) in Korea

Incheon LNG Terminal
- 2001 ~ 2013
- Gate, Globe, Check, Butterfly, Ball V/V
- Class 150 ~ 900, 1360 EA

PyengTaek LNG Terminal
- 2004 ~ 2012
- Gate, Globe, Check, Butterfly, Ball V/V
- Class 150 ~ 1500, 1652 EA

Boryeong LNG Terminal
- 2015 ~ 2018
- Gate, Globe, Check, Butterfly V/V
- Class 150 ~ 300, 66 EA



Jeju LNG Terminal
- 2018 ~ Ongoing
- Globe, Check, Butterfly
- Class 150 ~ 600, 213 EA

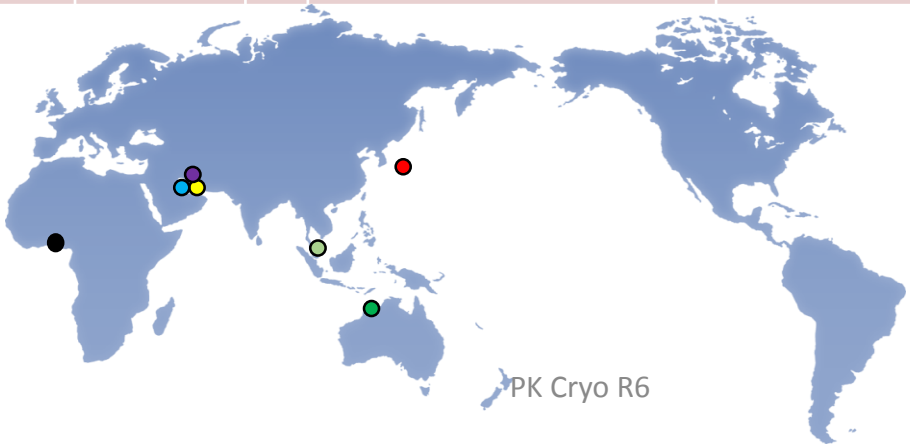
Samchuck LNG Terminal
- 2013 ~ ongoing
- Gate, Globe, Check, Butterfly
- Class 150 ~ 900, 846 EA

Tongyeong LNG Terminal
- 2001 ~ 2012
- Gate, Globe, Check, Butterfly, Ball V/V
- Class 150 ~ 150, 1599 EA

Gwangyang LNG Terminal
- 2005 ~ 2010
- Globe, Check, Butterfly
- Class 150 ~ 900, 31 EA

5-2. Supply Reference (Gas & LNG) onshore Liquefaction & Terminals

Owner's Name	Location		Short description of the Project	Consultant/Engineering Contractor	Size of Contract
EXXONMOBIL MIDDLE EAST GAS MARKETING LTD	QATAR	○	AL KHALEEJ GAS PROJECT PHASE 2 (AKG-2)	CHIYODA TECHNIP JOINT VENTURE	GATE, GLOBE, CHECK US$: 7 Millions
CHEVRON NIGERIA LIMITED	NIGERIA	●	ESCRAVOS GAS PROJECT PHASE 3 DEVELOPMENT	HYUNDAI HEAVY INDUSTRIES CO.,LTD.	GATE, GLOBE, CHECK US$: 2.2 Millions
QATAR LIQUEFIED GAS COMPANY LTD(II)	QATAR	○	QATARGAS II DEVELOPMENT PROJECT	CHIYODA TECHNIP JOINT VENTURE	GATE, GLOBE, CHECK US$: 15 Millions
QATAR GAS 3 & 4 PROJECT VENTURES	QATAR	○	QATARGAS 3 & 4 ONSHORE PROJECT	CHIYODA TECHNIP JOINT VENTURE	GATE, GLOBE, CHECK US$: 13 Millions
INPEX	Australia	●	Ichthys LNG Onshore	JKC (JGC, Chiyoda, KBR) Kawasaki Heavy Ind (Tank)	GATE, GLOBE, CHECK Q'ty : 10,200 pcs, Temp: -46 ~ 162°C
SAUDI ARAMCO	Saudi Arabia	●	KARAN GAS FACILITIES	HYUNDAI E & C	GATE, GLOBE, CHECK Q'ty : 2,072 pcs, Temp: -46 ~ 162°C
Tokyo Gas Corporation	JAPAN	●	Ogishima TL 22 LNG Inground Storage Tank	IHI Corporation	GATE, GLOBE, CHECK Size: Gate 600# 16", Q'ty : 47 pcs,
Tokyo Gas Corporation	JAPAN	●	Negishi LNG 3MP Terminal Expansion	Chiyoda Corporation	GATE, GLOBE, CHECK Size: Gate 900# 16"), Q'ty : 216 pcs
Tokyo Gas Corporation	JAPAN	●	Hitachi LNG Terminal	Chiyoda Corporation Kawasaki Heavy Ind (Tank)	GATE, GLOBE, CHECK Size: Gate 900# 22", Q'ty : 223 pcs
PTT Public Co., Ltd	Thailand	●	Gas Separation Plant 6 & Ethane Separation Plant Project	Samsung Engineering Co., Ltd.	GATE, GLOBE, CHECK US$: 8 Millions
Pars Oil and Gas Company	IRAN	●	Southpars 13, 22, 23, 24 Project	P.K.S.K. Co	GATE, GLOBE Size: Globe 600# 8", Q'ty : 264 pcs



5-3. Supply Reference (Offshore)

Owner's Name	Location	Short description of the Project	Consultant/Engineering Contractor	Size of Contract
Exxonmobil Development Co.	Nigeria	East Area EPC-1B	Hyundai Heavy Ind.	GLOBE VALVE
Exxonmobil Development Co.	Angola	Kizomba-A FPSO / Kizomba "B" TLP SWHP PJT	Hyundai Heavy Ind.	GATE, GLOBE, CHECK VALVE
BP Angola Block 18	Angola	Greater Plutonio (1656-FPSO)	Hyundai Heavy Ind.	GATE, GLOBE, CHECK VALVE
BP America Production Co., Ltd.	Mexico	BP Atlantis Semi-Submersible PQ PJT	DSME	GATE, GLOBE VALVE
CHEVRON	Angola	Mafumeira Sul Project - CPC / WHP	DSME	GLOBE, CHECK VALVE
Star Deep Water Petroleum Limited	Nigeria	Agbami FPSO TOP Side (P.6043)	DSME	GATE, GLOBE, CHECK VALVE
Woodside Australian Energy	Australia	Enfield FPSO TOP Sides FAB./Integration	Samsung Heavy Ind.	GATE, GLOBE, CHECK VALVE
Oil and Natural Gas Corp.	Indi	MSP Platform Pjt	Hyundai Heavy Ind.	GATE, GLOBE, CHECK VALVE
ADMA-OPCO	UAE	Umm Shaif Gas Injection Facilities	Hyundai Heavy Ind.	GLOBE VALVE
PTTEP	Thailand	BONGKOT 4A	Hyundai Heavy Ind.	GLOBE VALVE
ELF Nigeria Ltd.	Nigeria	AMENAM/KPONO "Unity" FSO	Hyundai Heavy Ind.	GATE, GLOBE, CHECK VALVE
Carigali Hess	Malaysia	Booster Compression Project	Hyundai Heavy Ind.	GATE, GLOBE, CHECK VALVE
Pardus Energy Limited	Malaysia	#2945 170K FSRU	Hyundai Heavy Ind.	CRYOGENIC BUTTERFLY 150# 4~20
Bumi Armada Berhad	Malaysia	MALTA FSU	FANAFLO	CRYOGENIC BUTTERFLY 150# 6~20
PT. Jaya Samudra Karunia	Indonesia	PT. Jaya Samudra Karunia 26K FSRU	GASENTEC	CRYOGNIC GATE, GLOBE, CHECK, BALL, BUTTERFLY 150# 1/2" ~ 10"

5-4. Supply Reference (LNG Carrier)

NO	EPC CONTRACTOR	AREA	PROJECT NAME	OWNER/CLIENT	CONTRACT RANGE
1	DSME	JAPAN	#2462 LNGC	MOL	CRYOGENIC DOULBE OFFSET BUTTERFLY 300# 8~16
2	DSME	KOREA	#2451 HYUNDAI 174K LNG CARRIER	HYUNDAI LNG SHIPPING	CRYOGENIC DOULBE OFFSET BUTTERFLY 150# 12~28 (HOV)
3	DSME	KOREA	#2452 HYUNDAI 174K LNG CARRIER	HYUNDAI LNG SHIPPING	CRYOGENIC DOULBE OFFSET BUTTERFLY 150# 12~28 (HOV)
4	SAMSUNG HEAVY NDUSTRIES CO., LTD.	KOREA	SN2233 KOGAS 7.5K LNGC	KOGAS	CRYOGENIC DOULBE OFFSET BUTTERFLY 150# 4~10
5	SAMSUNG HEAVY NDUSTRIES CO., LTD.	KOREA	SN2234 KOGAS 7.5K LNGC	KOGAS	CRYOGENIC DOULBE OFFSET BUTTERFLY 150# 4~12
6	SAMSUNG HEAVY NDUSTRIES CO., LTD.	MALAYSIA	SN2197s AET 113,000m3 COT	AET	CRYOGENIC DOULBE OFFSET BUTTERFLY 150# 4~6
7	SAMSUNG HEAVY NDUSTRIES CO., LTD.	MALAYSIA	SN2198s AET 113,000m3 COT	AET	CRYOGENIC DOULBE OFFSET BUTTERFLY 150# 4~6
8	HYUNDAI HEAVY NDUSTRIES CO., LTD.	KOREA	#8006 SOVCOMFLOT 174K LNGC	SOVCOMFLOT	CRYOGENIC DOULBE & TRIPLE OFFSET BUTTERFLY 150#,300# 6~28

DSME's LNG Carrier

Samsung's AET LNG Carrier

Hyundai's Sovcomflot LNG Carrier

5-5. Supply Reference (Drill Ship)

No.	CUSTOMER	PROJECT	VALVE TYPE	CLASS	SIZE
1	SAMSUNG HEAVY NDUSTRIES CO., LTD.	PRIDE #2 DIRILL SHIP (7067)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 10
2	SAMSUNG HEAVY NDUSTRIES CO., LTD.	PDC #1 (7068)	GATE, GLOBE & CHECK VALVE	CL150, 300	NPS 3/4 – 10
3	SAMSUNG HEAVY NDUSTRIES CO., LTD.	CARDIFF #1 (7070)	GATE, GLOBE & CHECK VALVE	CL150	NPS 1+1/2 – 10
4	SAMSUNG HEAVY NDUSTRIES CO., LTD.	CARDIFF #2 DRILL SHIP(7071)	GATE, GLOBE & CHECK VALVE	CL150	NPS 1 – 10
5	SAMSUNG HEAVY NDUSTRIES CO., LTD.	PDC #2 DRILL SHIP(7074)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 8
6	SAMSUNG HEAVY NDUSTRIES CO., LTD.	PRIDE #3 DIRILL SHIP (7073)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 6
7	SAMSUNG HEAVY NDUSTRIES CO., LTD.	PDC #3 DRILL SHIP(7077)	GATE, GLOBE & CHECK VALVE	CL150, 300	NPS 2
8	SAMSUNG HEAVY NDUSTRIES CO., LTD.	SCHAHIN(7079)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2
9	SAMSUNG HEAVY NDUSTRIES CO., LTD.	CARDIFF #3 DRILL SHIP(7076)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 8
10	SAMSUNG HEAVY NDUSTRIES CO., LTD.	PDC #4 DRILL SHIP(7081)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 10
11	SAMSUNG HEAVY NDUSTRIES CO., LTD.	CARDIFF #4 DRILL SHIP(7080)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 8
12	SAMSUNG HEAVY NDUSTRIES CO., LTD.	STENA #4 DRILL SHIP(7078)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 6
13	SAMSUNG HEAVY NDUSTRIES CO., LTD.	SCHAHIN #2(7082)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 8
14	SAMSUNG HEAVY NDUSTRIES CO., LTD.	ETESCO (7084)	GATE, GLOBE & CHECK VALVE	CL150, 300	NPS 2 – 8
15	SAMSUNG HEAVY NDUSTRIES CO., LTD.	PRIDE #4 DIRILL SHIP (7085)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 8
16	SAMSUNG HEAVY NDUSTRIES CO., LTD.	QGOG Drillship No.1(7086)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 8
17	SAMSUNG HEAVY NDUSTRIES CO., LTD.	QGOG Drillship No.2(7088)	GATE, GLOBE & CHECK VALVE	CL150	NPS 2 – 10

Samsung’s Etesco Drillship

Samsung’s Stena Drillship


Samsung’s Cardiff Drillship

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Fully Integrated, Yet Flexible

PKvalve

Since 1946

Fully Integrated, Yet Flexible

PKvalve

SINCE 1946

01. Entrance, Lounge 02. Main Office 03. Machinery Shop , Test Shop , Auditorium 04. Cryogenic Test Shop
05. Machinery Shop 06. Foundry Shop, Molding Shop, Heat Treatment Furnace, Test Shop 07. Foundry Office
08. Meterial R&D Center 09. Laboratory 10. Pattern Shop 11. Facility Maintenance Office 12. After Sales Service Shop
13. Lounge 14. New Foundry Shop 15. Pattern Warehouse 16. Painting Shop 17. Casting Warehouse
18. Health Clinic 19. Painting Shop 20. Test Shop 21. R&BD Center 22. Packaging Shop
23. Production Warehouse 24. Office , Cafeteria, Production Warehouse 25. Receiving Inspection Shop

• BP OCC Project / Canada

MANAGEMENT POLICY

On the basis of "Base on Reliability" as a fundamental management philosophy, all employees at PK Valve Co., Ltd. respect human life and worker's health care before all production activities, provide satisfactory products and services that meet the requirements of customers by means of management activities in harmony with environment and continuing technological development and quality innovations, and further make every effort to fulfill our social responsibilities and obligations with the realization of human happiness as our top priority, including the policies specified below.

• Recognize the Safety, Health, Environment & Quality (SHEQ) management as key factors in accomplishing our continuous stability and growth.we also comply with all legal and regulatory requirements, other applicable requirements as agreed and internal regulations that relate to safety, health, environment, and quality aspects.

• Improve and upgrade management system continuously through process improvement and technological development so that all the factors impeding safety, health, environment, and quality activities can be minimized.

• Establish and implement the management objectives and targets to accomplish our SHEQ management policy, and review and improve the continuing suitability of the management policy and system.

• Give careful consideration to safety, health, environment, and quality over the whole process ranging from product development, design, production, servicing, and disposal.

• Make every effort to prevent accidents by taking precautions to eliminate harmful and dangerous factors involving safety, health, and environment activities, and where an accident occur, take a proper measure

• Do our best to earn customer's trust and love by grasping accurately the quality requirements of customer and furnishing the best quality products that always satisfy customer's expectations and requests.

• Continuously give training to all PK Valve employees and other representatives who perform safety, health, environment, and quality related activities to inspire awareness and induce active participation.

- Valve Spec : WCB Parallel Slide Gate 150#-92" MOV
- End User : SWCC
- Contractor : Doosan Heavy Industries
- Project : Yanbu Power and Desalination Plant – phase 3
- Dimension : Weight 60 tons, height 11.5 m
- Project Period : 8 months
- Quantities : 4EA

COMPANY HISTORY

2017 • Expanded a manufacturing facility of Ball Valve in Sacheon-city.

2016 • Supplied Cryogenic Butterfly Valve for LNG Carrier (2451/2452 Hyundai 174K ME-GI)

2015 • Supplied Forged Gate Valve (A182-F91) CL 4500 NPS 20

2014 • Award 92" Parallel Slide Gate Valve
• Obtained SIL (Safety Integrity Level 2)
• Obtained Gost-R certificates

2013 • Expanded approval ranges to high pressure and cryogenic valve for Chevron

2012 • Awarded the Tower of $100 million Export

2011 • Established Material R & D Center
• Built a new R & BD Center
• Developed high Pressure forged steel Valve

2010 • Award 88" gate valve
• Constructed a new Production Office

2009 • Obtained ASME "N" & "NPT" certificates

2008 • Appointed as excellent company for productivity improvement by Government

2007 • Honored with "U$ 70 Millions Achievement Award" at the 44th Annual Trade Day
• Awarded by Government for " New Technology Practicality Promotion "
• Obtained the Patent of Live-loading Seat Supporting for Cryogenic Butterfly VALVE
• Carried out the QME-1 test for NSSS (Nuclear Steam Supply System) By Wyle Laboratories

2006 • Obtained NEP Mark for Cryogenic Metal Seated Butterfly Valve
• Changed company name and logo to PK Valve Co.,Ltd.&PK

2005 • Obtained ISO 14001, OHSAS 18001 by BVQI

2003 • Listed approved valve manufacturer by Saudi Aramco
• Joined NSSS(Nuclear Steam Supply System) for Motor Operated Valve as one of the Vendors

2002 • Listed approved valve manufacturer by ExxonMobil
• Listed approved valve manufacturer by Shell Chemical
• Obtained EM mark for Triple Offset Metal Seat Butterfly Valve

2001 • Selected as INNO-BIZ
• Obtained CE (Community of Europe PED 97/23/EC) certificate
• Obtained EM mark for high pressure Triple Offset Butterfly Valve

2000 • Developed Triple Offset Butterfly Valve

1999 • Developed Low Emission Packing for valve
• Developed Super Duplex Stainless Steel for casting

1998 • Obtained TUV certificate by TUV Rheinland
• Obtained EM (Excellent Machine, Mechanism and Material) mark for High-Pressure Metal Seat Tilting Check valve

1997 • Obtained Quality Assurance Qualification certificate by KEPIC

1996 • Developed Bellows Seal Gate & Globe valve
• Developed Metal Seat Ball valve
• Developed Wafer Tilting Check valve
• Started Low Fugitive Emission test

1994 • Approved API 600, API 603 & ASME / ANSI B16.34 Manufacturer by Mobil Research Development Corp

1993 • Listed as a manufacturer for installation of nuclear power plant at KEPCO / ANSI Ⅲ Motor Operated Valve
• Obtained ISO 9001 certificate by BVQI (Bureau Veritas Quality International)

1992 • Listed as a manufacturer for installation of nuclear power plant at KEPCO / ANSI B31.1 Motor Operated Valve

1989 • Listed as a manufacturer for installation of nuclear power plant at KEPCO / Safety Class ASME Ⅲ Valve
• Listed as a manufacturer for installation of thermal & hydroelectric power plant at KEPCO

1988 • Listed as a manufacturer for installation of nuclear power plant at KEPCO (Korea Electric Power Corporation) / Non-Safely Class ANSI B31.1 VALVE / Licence No.6
• Obtained certificate of manufacturer for Nuclear Valve by Ministry of Science and Technology, Republic of Korea
• Listed as manufacturer of Cryogenic Valve in KGC (Korea Gas Corporation) / List No.88-05

1987 • Approved Fire Safe Ball VALVE by AMTECH / API 607
• Developed Pressure Seal Type VALVE for high pressure and high temperature
• Obtained Type Approval of Fire Safe Ball Valve by DNV

1986 • Listed as specialized installation of power plant at KHIC (Korea Heavy Industries & Construction Co., Ltd.)/ List No.86-020
• Affiliated as member of KAIF (Korea Atomic Industrial Forum)
• Obtained Certificate of Manufacturer for Emergency Shutoff Ball Valve by Government
• Approved Steel Castings Manufacturer by BV (Bureau Veritas)

1985 • Developed Cryogenic VALVE

1983 • Approved Steel Casting Manufacturer by DNV (Det Norske Veritas)

1981 • Designated as specialized installation of Power plant by Ministry of Commerce and Industry, Republic of Korea
• Approved Steel Casting Manufacturer by NK (Nippon Kaiji Kyokai) / Licence No.81-49

1980 • Renamed to Pan-Korea Metal Ind.Co., Ltd.
• Approved Steel Casting Manufacturer by LR (Lloyd's Register of Shipping)

1979 • Expanded laboratory by installing SPECTROMETER and other equipment
• Obtained "KS" mark for Cast Bronze Valve / 2 Items (B2311, B2313)

1978 • Approved Steel Valve Manufacturer by API (American Petroleum Institute) / API 6D Pipe Line VALVE (Gate, Check, Ball, Plug)
• Approved Carbon Steel & Stainless Steel Castings Manufacturer by KR (Korean Register of Shipping)

1975 • Obtained "KS" mark for Cast Steel & Marine VALVE / 10 Items (B2361, B2363, B2365, B2367, V7311, V7313, V7314, V7323, V7324)

1974 • Removed all facilities and factory to Changwon Industrial Complex (Current Location)

1971 • Obtained "KS" (Korean Industrial Standard) mark for Bronze & Cast Iron VALVE / 5 Items (B2301, B2303, B2332, B2351, B2353)

1968 • Reorganized Busan Pokum Ind. Co., Ltd.

1946 • Established Busan Pokum Ind. Company in Busan, Korea

COMPANY OUTLINE

■ HEAD OFFICE

Products		Gate, Globe, Check, Butterfly Valve
Employee		320
Area	Premises size land	69,124 ㎡
	Work shop	35,892.9 ㎡

■ SACHEON OFFICE

Products	Ball, DBB, Mono Flage
Employee	70
Area	8,500 ㎡

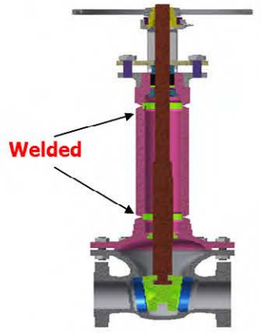
■ PRODUCTION CAPACITY (MONTHLY)

Materials	Ton
Carbon Steel Valve	850
Stainless Steel Valve	400
Total	1,250

CRYOGENIC SERVICE

PK Valve started research & development of cryogenic service valves in cooperation with KIMM (Korea Institute of Machinery and Material) under Korea Government in 1980s. Due to high stability requirement for Cryogenic service valves, it requires many restrictions for material selection and extend bonnet length selection. By considering the selection of material and optimized extension bonnet length determination to keep the temperature close to ambient of gland packing, PK Valve completed the development at 1985 and has been supplying to oversea and domestic customers for cryogenic industries including LNG liquefaction plant, receiving terminal and other gas plants for production, transportation and storage of liquefied gases such as oxygen, nitrogen, natural gas, hydrogen or helium.
These optimized lengths for different sizes are then subjected to thermal analysis using finite element method for evaluate the temperature at the gland packing area. The thermal analysis is done using ANSYS&MIDAS software. Along with material selection and optimized extension length, PK Valve has improved assembly, production and management method to keep the capability and quality.

Casted Extended Bonnet For Gate, Globe Valve



Welded Extended Bonnet For Gate,Globe Valve

Customized Extended Bonnet Length. Extended bonnet with vapour column length as per BS 6364 / customer requirement. Packing protected from cryogenic temperatures, efficiency not compromised

PRODUCTION RANGE

UNIT : NPS

TYPE \ CLASS	150	300	600	900	1500	2500
GATE	2-60	2-48	2-36	2-24	2-16	2-16
GLOBE	2-36	2-36	2-30	2-20	2-12	2-12
SWING CHECK	2-48	2-48	2-36	2-24	2-16	2-16
BALL	½-60	½-60	½-48	½-36	½-24	½-16
BUTTERFLY	3-52	3-30				

PRODUCTION MATERIALS

ASTM : A351-CF8, CF8M, CF3, CF3M or Equivalent

TABLE OF LIQUEFIED GASSES

TYPE	BOILING POINT	
	°F	℃
NATURAL GAS, LNG	-270	-168
METHANE, CH4	-258	-162
OXYGEN, O2	-296	-183
ARGON, AR	-303	-186
CARBON DIOXIDE, CO2	-314	-192
NITROGEN, N2	-320	-196
HYDROGEN, H2	-423	-253
HELIUM, HE	-452	-269

BUTTERFLY VALVE

PRODUCTION RANGE

UNIT : NPS

TYPE \ CLASS	150	300	600
TOB	3-96	3-82	3-48
DOB	3-144	3-144	

PRODUCTION MATERIALS

- Carbon Steel : ASTM A216-WCB or Equivalent
- Alloy Steel : ASTM A217-WC6,WC9,C5,C12,C12A, ASTM A182-F91 or Equivalent
- Stainless Steel : ASTM A351-CF8,CF8M,CF3,CF3M, CN7M or Equivalent
- Duplex Stainless Steel : ASTM A995-1A,2A,4A,5A or Equivalent
- Special Alloy Steel : Inconel 625, Incoloy 825, Hastelloy C, Monel, ASME SA designation material (e.g ASME SA217-WC6)

ADVANTAGES

- Bi-directional metal seal & zero leakage tightness
- Quarter turn operation & low operating torque
- Non-rubbing & long life cycle
- High temperature & cryogenic service
- Light weight
- Fire safety design

• Boryeong LNG Terminal / Cryogenic Butterfly Valve 150#-48"

BALL VALVE

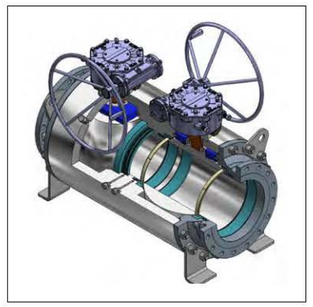
PRODUCTION RANGE

UNIT : NPS

Type \ Class	150	300	600	900	1500	2500
SOFT SEAT SIDE ENTRY	½"~60"	½"~60"	½"~60"	½"~48"	½"~36"	½"~24"
METAL SEAT SIDE ENTRY	½"~60"	½"~60"	½"~60"	½"~48"	½"~36"	½"~24"
SOFT SEAT TOP ENTRY	½"~60"	½"~60"	½"~60"	½"~48"	½"~36"	½"~24"
METAL SEAT TOP ENTRY	½"~60"	½"~60"	½"~60"	½"~48"	½"~36"	½"~24"
CRV SIDE ENTRY	½"~60"	½"~60"	½"~48"	½"~36"	½"~24"	½"~16"
CRV TOP ENTRY	½"~60"	½"~60"	½"~48"	½"~36"	½"~24"	½"~16"
3 - WAY	2"~24"	2"~24"	2"~24"	–	–	–
D.B.B	2"~16"	2"~16"	2"~16"	2"~16"	2"~16"	–

PRODUCTION MATERIALS

PARTS	MATERIALS
BODY , BONNET , BALL	• Carbon Steel : ASTM A216-WCB or Equivalent • Alloy Steel : ASTM A217-WC6,WC9,C5,C12,C12A, ASTM A182-F91 or Equivalent • Stainless Steel : ASTM A351-CF8,CF8M,CF3,CF3M, CN7M or Equivalent • Duplex Stainless Steel : ASTM A995-1A,2A,4A,5A or Equivalent • Special Alloy Steel : Inconel 625, Incoloy 825, Hastelloy C, Monel, ASME SA designation material (e.g ASME SA217-WC6)
TRIM	• Carbon steel+Hard Facning • Stainless steel • Duplex Stainless steel • Nickel Alloy
SEAT INSERTS	• PTFE • PEEK • Devlon • Viton • Metal

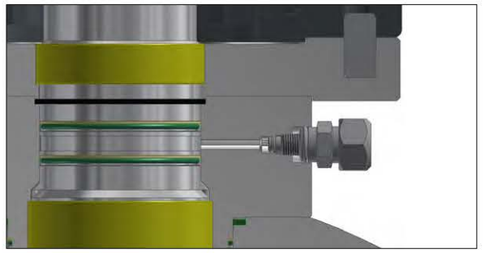


Double Block Bleed
(D.B.B.)

3-Way Ball Valve

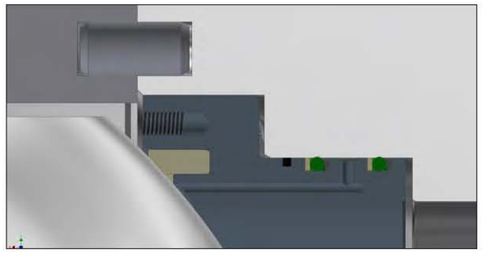
EMERGENCY SEALANT INJECTION SYSTEM

The sealant injection system located on the body can be utilized in case of emergencies, o-ring damage, or if stem leakage occurs.



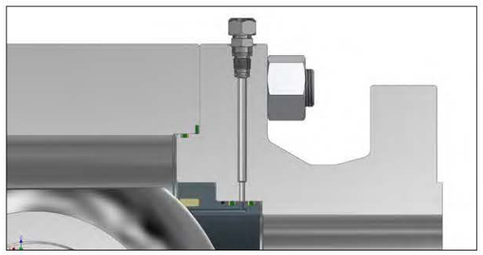
FIRE SAFE DESIGN

In case of fire accident inside the valve, seals and seat inserts are melted and then a metal to metal seat is made between the metallic seat and the ball ensuring degree internal sealing tightness. All o-ring are also disappeared and only graphite back-up rings remain in seats and valve stem, making the valve tight for leakages to the atmosphere



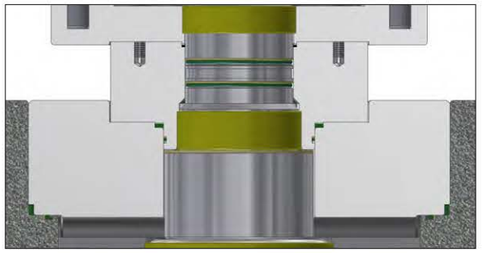
LUBRICANT / EMERGENCY SEAT SEAL

Special sealants may be injected into fittings that are located on the adapter flanges to restore sealing integrity if seat sealing surface is damaged.



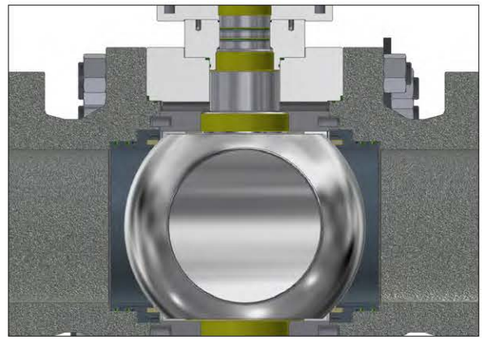
BLOW-OUT PROOF STEM

Stem is made separately from the ball, blow-out proof design. The lower end of the stem is designed with an integral collar to be blowout-proof.



HEAVY DUTY BEARINGS

Heavy duty bearings balance the pressure load on the ball by reducing friction between ball and seat resulting in smooth and easy operation of valve.



AUTOMATIC RELIEF CAVITY PRESSURE

The pressure-actuated seat construction, used in trunnion ball valve ensures positive relief of excess of valve central cavity pressure.If valve central cavity pressure exceeds a pre-set pressure in the seat, the seat assembly will automatically back – off to relieve the excess of pressure.

DBB, DOUBLE BLOCK AND BLEED (OPTIONAL)

Double block and bleed procedures can be performed.With the valve under pressure, the body cavity may be vented or drained to the atmosphere through the bleed valve.

CAST PRESSURE SEAL BONNET VALVE

DESIGN

Pressure seal valve are intended for high pressure and high temperature appilications in all types of fluid, except where severe coking may occur.
A selection of design and material would give an excellent service in nuclear steam generating stations, industrial/chemical plants and thermal power plants.
The pressure seal valve provide the most efficient use for flow passage and sealing, and result in significant weight saving and ease and simple installation and maintenance. Manufacturing and quality assurance procedures include extra controls of dimensional and non-destructive examinations and tests on critical areas such as gasket sealing, weld ends, or stellite sealing surfaces.

PRODUCTION RANGE

UNIT : NPS

CLASS / TYPE	600	900	1500	2500	4500
GATE	2 - 60	2 - 48	2 - 48	2 - 48	2 - 30
GLOBE	2 - 36	2 - 36	2 - 30	2 - 24	2 - 20
SWING CHECK	2 - 42	2 - 42	2 - 42	2 - 42	2 - 30
TILTING CHECK	2 - 42	2 - 42	2 - 42	2 - 42	2 - 30
Y-GLOBE	2 - 36	2 - 36	2 - 30	2 - 24	2 - 20
ANGLE GLOBE	2 - 30	2 - 30	2 - 24	2 - 24	2 - 20

PRODUCTION MATERIALS

- Carbon Steel : ASTM A216-WCB or Equivalent
- Alloy Steel : ASTM A217-WC6,WC9,C5,C12,C12A, ASTM A182-F91 or Equivalent
- Stainless Steel : ASTM A351-CF8,CF8M,CF3,CF3M, CN7M or Equivalent
- Duplex Stainless Steel : ASTM A995-1A,2A,4A,5A or Equivalent
- Special Alloy Steel : Inconel 625, Incoloy 825, Hastelloy C, Monel ASME SA designation material(e.g ASME SA217-WC6)

• Nuclear Power Plant NSSS / Gate Valve 1680#-16"

HIGH PRESSURE FORGED STEEL VALVE

PRODUCTION RANGE

CLASS / TYPE	800-4500(and above)
Gate Valve	½" ~ 24"
Y-Globe Valve	½" ~ 8"
Angle Valve	½" ~ 4"
Check Valve	½" ~ 2"

PRODUCTION MATERIALS

- Carbon Steel : A105, A350-LF2
- Stainless Steel : A182-F304, A182-F304L, A182-F316, A182-F316L
- Alloy Steel : A182-F5, A182-F91, A182-F11, A182-F22

END CONNECTION

- Socket welding, threaded, Butt welding

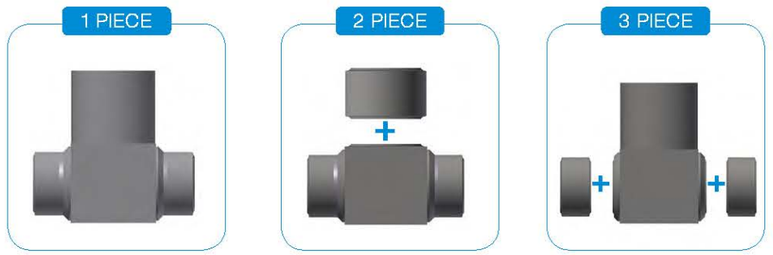
FEATURE

- DESIGN FOR LOW EMISSION
- OPERABILITY IMPROVEMENT
- EASY MAINTENANCE
- FORGINGS ARE STRONGER

• VT4 Power Plant / Forged Gate Valve 4500#-20"

FREE FORGING GATE VALVE

- Large size gate valves are manufactured with free forging(Above 8")
- There are 3 kinds of manufacturing method



C.B.D / I.B.D VALVE

C.B.D

Continuous BlowDown valve continuously bleeds off a low volume of water within the boiler as a means of ridding the boiler of dissolved impurities.

I.B.D

Intermittent BlowDown valve involves periodically opening valves in the drum to allow boiler pressure to force accumulated sludge out of the boiler

PRODUCT FEATURE

PRODUCT RANGE

CLASS	SIZE (Inch)					
	1	1 1/2	2	3	4	6
300	O	O	O	O	O	O
600	O	O	O	O	O	O
900	O	O	O	O	O	O
1500	O	O	O	O	O	O
2500	O	O	O	O	O	O

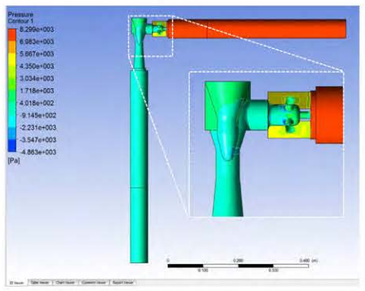
- Size : 1" ~ 6"
- Pressure Rating : ANSI #300 ~ #2500
- BB Type & PSB Type

EXPECTED PROBLEMS

- Difficult to Control
- Vibration
- High Velocity Erosion
- Cavitation
- Flashing

HOW TO SOLVE

- Fluid Simulation



• Power Plant /
Angle Needle Blowdown 1500# 2"

ACTUATED NON-SLAM CHECK VALVE

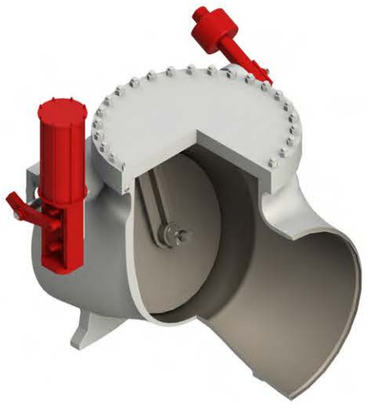
DESIGN FEATURES

- The important role of a Non-Return Valve as a protective device demands a high level of reliability.
- These features, along with a high grade of workmanship and materials, assure a superior and completely dependable valve.

ACTUATED NON-SLAM CHECK VALVE FEATURES

- Proven, Swinging Disc Design
- Wide, Flat, Non-jamming Seats for Tight Seal
- Closure Assisting or Double Acting Air Cylinder
- Smooth Flow Passages for Low Pressure Drop
- In Line Maintenance through Bolted Top Cover
- Inclined Seat for Short Travel & Quick Operation
- Rugged Construction
- Ability to Withstand Multiple Rapid Closures

• NRV Plant / Non-Slam Check 150# 54"



CAST STEEL VALVE

PRODUCTION RANGE

UNIT : NPS

Type \ Class	150	300	600	900	1500	2500
GATE	2-∞	2-80	2-48	2-48	2-30	2-30
GLOBE	2-64	2-64	2-36	2-36	2-24	2-24
SWING CHECK	2-64	2-64	2-48	2-36	2-30	2-30
TILTING CHECK	2-64	2-64	2-48	2-36	2-30	2-30
Y-GLOBE	2-60	2-48	2-36	2-36	2-24	2-24
ANGLE GLOBE	2-24	2-24	2-24	2-24	2-24	2-24

PRODUCTION MATERIALS

- Carbon Steel : ASTM A216-WCB or Equivalent
- Alloy Steel : ASTM A217-WC6, WC9, C5, C12, C12A or Equivalent
- Stainless Steel : ASTM A351-CF8, CF8M, CF3, CF3M, CN7M, or Equivalent
- Duplex Stainless Steel : ASTM A995-1A, 2A, 4A, 5A or Equivalent
- Special Alloy Steel : Inconel 625, Incoloy 825, Hastelloy C, Monel, AL-BRONZE
- ASME SA designation material(e.g ASME SA217-WC6)

BELLOWS SEAL VALVE

LOW FUGITIVE EMISSION VALVE

Low Fugitive emission Valve (LFV) is designed and manufactured to ensure leakage of less than 100 ppm of volatile organic compounds. PK Valve has established the test facilities and made its own procedures with Emission Defence Packing (EDP) for fugitive emission test. By using the test facilities and procedures, room temperature cycle and thermal cycle testing have been performed, establishing critical design parameters necessary to achieve low fugitive emissions.

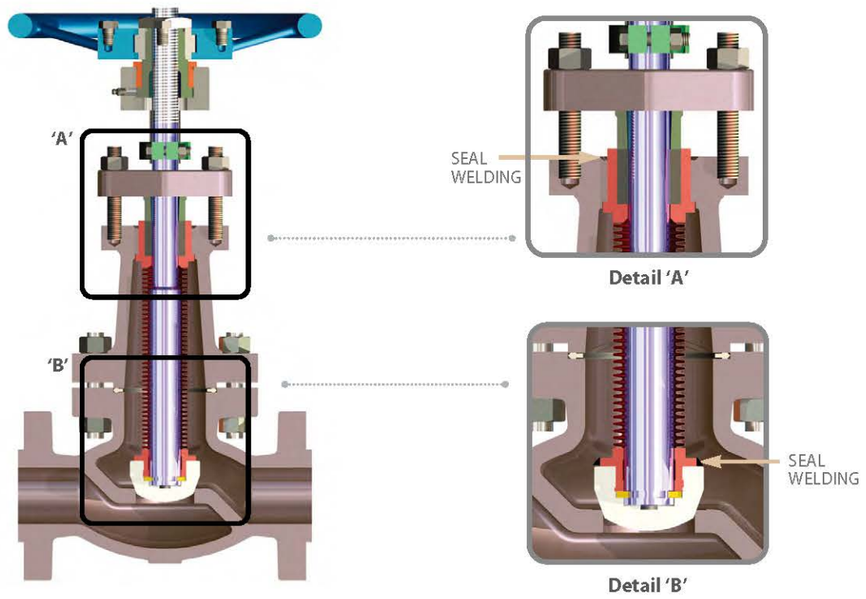
PRODUCTION RANGE

UNIT : NPS

TYPE \ CLASS	150	300	600
GATE	2-24	2-24	2-24
GLOBE	1/2-24	1/2-24	2-24

PRODUCTION MATERIALS

- Bellows Set : 321SS(Bellows) + 316SS(Holder)
- Carbon Steel : ASTM A216-WCB or Equivalent
- Stainless Steel : ASTM A351-CF8, CF8M, CF3, CF3M or Equivalent
- ASME SA designation material(e.g. ASME SA351-CF8M)



GLOBAL NETWORK

PK Valve operates world widely with dedicated support of local representatives.

- Representatives
- After-Sales Representatives
- Head Office

Fully Integrated, Yet Flexible
PKvalve
SINCE 1946

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More details of contact information on www.pkvalve.co.kr

MISSIONS

For our Customers

Harmony of labor and capital
Sustaining the reputation of the PK brand
Innovative research and leading technology
Maximizing potential in cooperation with customer

For the Future

Pioneering spirit
Sustainable growth and expansion
Financial and organizational stability
Leadership in the valve industry

WARRANTY

PK Valve offers a standard warranty period of one(1) year. The period commences from the date of delivery to the original purchaser. Each product will be free from defects in material and workmanship. Any defect caused from inappropriate installation, improper maintenance, or purchaser's exclusive remedy will not be subject to warranty.

Purchaser shall give notice to PK Valve when any defect may be found on the products. PK Valve may elect which remedy or combination of remedies to provide in its sole discretion.

The standard and limitation of warranty may be modified upon agreement between two parties, PK Valve and purchaser.

This catalog is for reference only. All information contained within this catalog is subject to change without notice.

SUPPLY RECORD

PK Valve Co.,Ltd.

NO.	OWNER or CLIENT	EPC CONTRACTOR	PROJECT	AREA
01	Sonatrach	JGC CORPORATION	HASSI R'MEL BOOSTING PROJECT	ALGERIA
		DAEWOO E&C	CAFC OIL PROJECT	
02	TOTAL	DSME	TOTAL PAZFLOR FPSO TOP (6045)	ANGOLA
			CLOV FPSO - HULL / TOP	
		HYUNDAI HEAVY INDUSTRIAL CO., LTD.	Moho Nord FPU	
			OFON PHASE II	NIGERIA
			AKPO Field Development	
			USAN DEEPWATER DEVELOPMENT - TOP / HULL SIDE	
03	INPEX	JKC JOINT VENTURE	ICHTHYS ONSHORE LNG FACILITIES PROJECT	AUSTRALIA
04	PETROBRAS	TOYO ENGINEERING CORPORTATION	CGP-Expansion Project(CGPEX)	BRAZIL
05	QGOG Constellation	SAMSUNG HEAVY INDUSTRIES CO.,LTD	QGOG Drillship No.1, 2 (7086/7088)	BRAZIL
06	Syncrude Canada Ltd.	KENTS E&C	SYNCRUDE - AURORA PROJECT	CANADA
07	PETRO-CANADA	COLT ENGINEERING	PETRO-CANADA/COLT.ENGG-McKAY RIVER SAGD	CANADA
		Kellogg, Brown & Root (Canada) Company	PETRO-CANADA/SULPHUR-in-GASOLINE	CANADA
08	BP	FLUOR CORPORATION	BP OCC WHITING PROJECT	CANADA
		HYUNDAI HEAVY INDUSTRIES CO., LTD.	Greater Plutonio(1656-FPSO)	ANGOLA
		DSME	BP Atlantis Semi-Submersible PQ PJT	MEXICO
09	CENOVUS ENERGY	CENOVUS ENERGY	CENOVUS CHRISTINA LAKE PHASE 1E	CANADA
			CENOVUS SOC	
10	HUSKY ENERGY	HUSKY ENERGY	HUSKY OIL CANADA	CANADA
11	ONGC	SAMSUNG ENGINEERING CO.,LTD.	ONGC(OPal DFCU & AU Project)	INDIA
12	NIOC	GS E&C	4th AROMATIC PJT.	IRAN
		TOYO ENGINEERING CORPORTATION	IRAN NPC/2050 TPD AMMONIA & 3250 UREA	
		PKSK, OIEC, IPMI, MAPNA, PETROPARS, ISOICO	South Pars Gas Field Development, Phases 12~22	
13	TOKYO GAS Co.,LTD.	CHIYODA CORPORATION	NEGISHI LNG TERMINAL	JAPAN
			HITACHI LNG RECEIVING TERMINAL PLANT FACILITIES CO	
14	KNPC	SK E&C	RECONSTRUCTION OF MAA REFINERY (KNPC)	KUWAIT
15	KUWAIT OIL COMPANY (KOC)	SK E&C	GC-24 (Building new gathering centre GC-24)	KUWAIT
			KOC New BS-132 & Enhancements BS-131	
		HANWHA E&C	UM AL-AISH LPG NEW FILLING PLANT	
		GS E&C	WARA PRESSURE MAINTENANCE	
16	QATARGAS	CTEP FZCO	AKG2 PROJECT	QATAR
		TROUVAY CAUVIN GULF	Plateau Maintenance Project(PMP)	
17	SABIC	SAMSUNG ENGINEERING CO.,LTD.	SAUDI NIC	SAUDI ARABIA
			IBN Zahr PPIII PROJECT	
			Ibn Zahr OCT	
			SAUDI KAYAN PP & PH PROJECT	
			Kayan Amines Facilities	
		FLUOR CORPORATION	SAUDI KAYAN PETROCHEMICAL COMPLEX (U&O)	
		DAELIM INDUSTRIAL Co.,Ltd.	Polycarbonates Facilities for Saudi KayanCracker	
		FLUOR CORPORATION	Amine Facilities Project - Saudi Kayan	

NO.	OWNER or CLIENT	EPC CONTRACTOR	PROJECT	AREA
18	SAUDI ARAMCO	SAMSUNG ENGINEERING CO.,LTD.	Maaden Ammonia	SAUDI ARABIA
			Ras Tanura DHT	
			JERP #3 Aromatics Units	
			Shaybah Increase Gas Handling Facilities(PKG4)	
			Shaybah NGL Power Generation PKG 3	
			Luberef Yanbu Refinery Expantion	
			Clean Transpotation Fuels at Riyadh Refinery(RCTF)	
			SHAYBAH CPFE(CENTER PROCESS FACILITY EXPENSION) PR	
		DAELIM INDUSTRIAL Co.,Ltd.	JUBAIL EXPORT REFINERY PKG 2B	
			YANBU EXPORT REFINERY EPC-3&4, (YERP-4)	
			Wasit SUR & Utilities PJT(WUC) Package #3	
			SAMAPCO CA/EDC PORT FACILTY	
			Rabigh Phase II Petrochemical CP1 & 2	
			Umm Wu'al EPC (Ma'aden Ammonia Plant)	
		SK E&C	YANBU EXPORT REFINERY EPC-2 & 3	
			Wasit Inlet & Gas Processing PJT(WGC) Package #1	
			Jubail Export Refinery Package 5B (Plant Utility)	
		GS E&C	Rabigh II Refining and Petrochemical	
		HYUNDAI E&C Co., Ltd.	KARAN GAS FACILITIES & DEVELOPMENT PROJECT	
		ENPPI	Yanbu Export Refinery Tank Farm (SP1) Project	
		JGC CORPORATION	JAZAN REFINERY AND TERMINAL PROJECT	
		C.A.T	MASTER GAS EXPANSION PHASE 1	
19	SWCC	Doosan Heavy Industries & Construction Co., Ltd.	Yanbu 2 POWER AND WATER PROJECT	SAUDI ARABIA
			RAS AZ ZAWR CCPP HRSG 2400MW, 10 units	
20	SEC(Saudi Electricity Company)	HYUNDAI HEAVY INDUSTRIAL CO., LTD.	JEDDAH SOUTH THERMAL POWER PLANT STAGE-I	SAUDI ARABIA
			SHUQAIQ STEAM POWER PLANT	
21	PTT	TOYO ENGINEERING CORPORTATION	PTTPE Ethane Cracker (PMEC)	THAILAND
		SAMSUNG ENGINEERING CO.,LTD.	ESP	
		SK E&C	THPP#3	
		HYUNDAI E&C Co., Ltd.	PTT Chem. Electrical Power and Steam(EPS)	
		POSCO ENGINEERING	PTTGC CONVERT HEAVY GAS TO OLEFINS FEED STOCK	
22	Emirates Nuclear Energy Corporation	KEPCO	BNPP (Barakah Nuclear Power Plant)	U.A.E
23	MOTIVA (SHELL + SAUDI ARAMCO)	Burns and Roe Group, Inc	MOTIVA CRUDE EXPANSION PROJECT	U.S.A
24	VALERO	FLUOR CORPORATION	VALERO UNIFIED HYDROCRACKER PROJECT	U.S.A
		Foster Wheeler	DIAMOND GREEN DIESEL PROJECT	
25	CHEVRON	CHEVRON	Chevron Lianzi Development Project	U.S.A
		DSME	Agbami FPSO TOP Side(P.6043)	NIGERIA
			Mafumeira Sul Project - CPC / WHP	ANGOLA
26	AES	Doosan Heavy Industries & Construction Co., Ltd.	Mong Duong 2 600 MW X 2 TPP - CMV	VIETNAM
27	PETRO VIETNAM	JGCS Consortium	NSRP Complex Project	VIETNAM
28	EVN	DAELIM INDUSTRIAL Co.,Ltd.	VIETNAM Thai Binh 2 Thermal Power Plant	VIETNAM
29	ADNOC Group	SAMSUNG ENGINEERING CO.,LTD.	UAE Borouge OCU	U.A.E
			Takreer Carbon Black & Delayed Coker	
			TAKREER RRE Utilities & Offfsites(Pkg#3)	
			FERTIL Expansion Project (FERTIL-2)	
		GS E&C	Green Diesel Project (GDP)	
		FLUOR CORPORATION	IGD Habshan-5 Process Plant Project	
		DAEWOO E&C	Inter Refineries Pipelines-II	
		HYUNDAI E&C Co., Ltd.	Borouge 3 XLPE	
		HYUNDAI HEAVY INDUSTRIAL CO., LTD.	Umm Shaif Gas Injection Facilities	
			IGD DAS PROJECT	
		LINDE ENGINEERING	LINDE / RUWAIS-3 PJ	
		HYUNDAI ENGINEERING	UONE / GROUP III Lube Base Oil Production Faciliti	
30	EXXONMOBIL	HYUNDAI HEAVY INDUSTRIAL CO., LTD.	KIZOMBA-"A", "B" FPSO	ANGOLA
		DSME	KIZOMBA-"A", "B" TLP SWHP	
		Foster Wheeler	SPT Olefins Furnaces Project	SINGAPORE
		MITSUBISHI HEAVY IND	SPT SME PROJECT	
		CHIYODA-JGC JOINT VENTURE	PNG LNG Plant Project	PAPUA NEW GUINEA
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