

# TOTAL

## ENGINEERING Co.Ltd



**TOTAL**  
**ENGINEERING**

ООО «ТИ-СИСТЕМС» ИНЖИНИРИНГ И ПОСТАВКА ТЕХНОЛОГИЧЕСКОГО ОБОРУДОВАНИЯ

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# The Best Partner of Your Successful Business



**Hae Jin, Sung**  
President & CEO of Total Engineering

Total Engineering was launched in 1992 with the following management principles : Creativity, Respect, Trust and Best quality.

There were various valve manufactures in Korea, However, most of them were producing general valves and importing high quality special valves from overseas. In this respect, we, Total Engineering, saw opportunities to domestically design, develop and produce them for industrial applications and established manufacturing facilities.

We were primarily interested in manufacturing valves for petro chemical industry and have supplied our products to a number of customers at several petro chemical industrial sites. Since the end of 1994, we have been operating our own manufacturing plant located at Jangyu myun, Gimhae-si, Gyung-sangnam-do, Korea.

We have successfully designed and produced diverter valves, slide gate valves and ram type piston valves and supplied them to many companies which have favorably assessed the high quality and benefits of our products. Especially, the knife gate valves with no leakage function, whose design has been improved since 1997 for the ash handling at steam(thermo-electric) power plants, have been successfully installed at steam power plants.

We built the second plant in Juchon myeon, Gimhae-si, Gyung-sangnam-do, Korea in the year 2013 to satisfy customer's needs and requirements and deliver products just in time. We strive to be one of the best companies in terms of customer satisfaction and are working hard to improve and develop our products for customer satisfaction. Our goal is to produce the best quality valves.



# CERTIFICATION



# HISTORY

- JUNE, 1992** Established "TOTAL ENGINEERING" for manufacture, sale and development of special valve Registered to DAELIM IND.CO.,LTD.(Yeo-Su), as a company for localization of special valve.
- JUN. 1993** Registered as an authorized vendor for DAELIM IND.CO.,LTD.
- FEB. 1994** Got approval from LG PETROCHEMICAL Co., Ltd. For the quality of our valve.
- OCT. 1994** Supplied Special Slide gate valve to SAMSUNG ENGINEERING Go.,Ltd., for a project of plant by POSCO.
- DEC. 1994** Transferred the company to current location, and tripling the production capacity.
- APR. 1995** Obtained order from DAELIM for ISO Butane plant project.
- MAY. 1995** Localization of Ram Pistion Valve in DAELIM IND.CO.,LTD(Yeo-Su Plant).
- AUG. 1995** Opened branch office in Yeo-su, to cover customers within Yochon Petrochemical complex. Supplied Strainer to LG CHEMICAL Co., Ltd. for Oxo-Alcohol and 3AA project. Supplied of localization of Diverter valve for project Hanwa chemical Corp.
- JAN. 1996** Supplied Strainer to DAELIM Co., Ltd., for Incheon LNG plant project.
- APR. 1998** Supply Ram piston valve for P.P. and HDPE for Haldia project in India.
- JUN. 1998** Exported Knife gate valve to EL-BARD Co., Ltd. in Saudi Arabia.
- JUL. 1998** Exported Strainer to J.S.W ENGINEERUNG Co., Ltd. (Japan) for Sakaka project in Singapore.
- DEC. 1999** Obtained ISO 9002 certificate from BVQI.  
Awarded with ISO 9002 by BVQI
- MAR. 2000** Got a Utility Model Patent for Knife gate valve.
- JUN. 2000** Supplied Knife gate valve to KOREA HEAVY Ind. co., Ltd.  
Obtained Utility Model Patent for Knife Gate Valve.
- JAN. 2001** Exported Diverter valve to PT. POLYTAMA PROFINDO, in Indonesia.
- FEB. 2001** Exported Slide gate valve to REIMELT(GEMANY) for ABS project in Iran.  
Supplied Ram piston valve to S.K.Corp, for resin processing plant.
- MAR. 2001** Supplied Ram piston valve to SAMSUNG ENG' G. Co., Ltd. for 3P.P pilot plant.
- APR. 2001** Supplied Ram piston valve to LG-CALTEX Co., Ltd. for p.p pilot plant.  
Supplied Diverter, Slide gate, Ram piston valve for HONAM PETROCHEMICAL Co., Ltd.
- DEC. 2001** Up-grading the ISO 9002 to ISO 9001 by BVQI.
- APR. 2002** Supplied Kinfe gate valves to KEPCO.  
Taeam#5.6Ash Handling Equipment.
- JUN. 2003** Supplied Kinfe gate valves to Young Hung Power Plant for Ash Process Equipment.
- AUG. 2003** Supplied Kinfe gate valves to Samchunpo Power Plant.
- APR. 2005** Supplied Kinfe gate valves to OMAN POLYPROPYLENE LLD.
- DEC. 2005** Awarded with ISO 14001 by BVQI.
- JAN. 2007** Opened No.2 Factory.
- SEP. 2008** Obtained Utility Model PATENT for Bonnet Type Long Plate Knife Gate Valve.  
Opened Seoul Branch Office.
- SEP. 2010** Opened No.3 Factory for Cleaning Assembly Job.
- JAN. 2011** Incorporated of business
- SEP. 2012** Registered Hitachi (Japan) and POSCO (India)
- APR. 2013** Developed self lapping valves
- AUG. 2013** Succeeded in domestically producing change over valves (Supplied to Russia).
- MAR. 2014** Supplied 44" knife gate valve for Saudi Elastomer project.
- JUN. 2015** Supplied Special valves to TECNICAS REUNIDAS.
- OCT. 2015** Awarded with OHSAS 18001 by CreBIZQM.  
Awarded with a presidential commendation Award.



## APPLICATIONS

- **Pulp and paper**
- **Sugar industry**
  - Beet mixtures
  - Milk or line
  - Lime sludge
  - Syrups
  - Raw material lines
  - White water lines
  - Bleaching
  - Cooking
  - Slurry and sludge fluids
  - Paper machine
  - Power plants
- **Food processing - Agriculture**
  - All vegetables
  - Manure
  - Pig feedstuffs
  - Meat waste in water
  - Potato and other mash
  - Animal feedstuffs
- **Coal applications**
  - Pipelines
  - Burning : fine coal, oil mixed fuel
- Fluidized bed coal liquefying
- Fly ash lines, slurry
- **Textile industry**
- **Chemical industry**
  - Synthetic and other fibres
  - Waste water
  - Filter substances
  - Globules in water
  - Powdered aluminum
  - Chemical slurries
  - Crystals in liquid
  - Paint mixtures
  - Water glass
- **Steel industry**
  - Coal-water
  - Granulated ore in water
  - Ash, root, slurries
  - Water with soot particles
- **Petrochemical industries**
  - Powder& Solid
  - Polymer
  - Poly ethlene
  - Poly propylene
- Poly carbonate
- Pipelines
- Transition pumps
- Pool
- Sedimentation pools
- Aetation tanks
- Chlorine mixing
- Water treatment
- Sludge disposal
- Abatoir waste water
- Fish water
- Urea, parafin
- Crude tar with cake
- Crude and fuel oil
- Catalytic sludge
- Slurries
- Wax
- **Building industry**
  - Concrete slurry
  - Sand, gravel
  - Stone, marble dust in water

The Best Creativity & Quality Valves

# KNIFE GATE VALVE



METAL TO RUBBER CUSHION SEAT  
METAL TO METAL SEAT  
METAL TO ONE SIDE P.T.F.E SEAT

06

## FEATURE

### METAL TO METAL SEAT

#### ... USING DIRECTION

Inlet and outlet are respectively separated and sealing action is made only at unidirection. (The flow of fluid is only one direction)

#### ... USE SCOPE

It's use is for pulp and paper plant, especially suitable for fluid line of high viscosity.

#### ... SEALING

It has some leakage even when disc(blade) is closed, as it is structured as "Metal to Metal".

#### ... EXPLANATION

This type represents knife gate valve, thus having the lowest price and highest demand. However, this type is not suitable for fluid with dreg such as ash fluid, because it may occasionally bring about abrasion of seat surface and formation of sedimentation, due to the existence of "dead zone".

### METAL TO RUBBER CUSHION SEAT

#### ... USING DIRECTION

The sealing effect in this type occurs in the edge of the blade, so allowing use of bidirection.

#### ... USE SCOPE

This type is of possible use for any kind of fluid line. But, suitable selection of rubber is important, in accordance with the kind of fluid.

#### ... SEALING

This type guarantees almost perfect sealing effect.

#### ... EXPLANATION

Being covered by elasticity and cushion of rubber, this type perfectly protect seat face, thereby ensuring almost free abrasion of seat and deposition of fluid.

### METAL TO PTFE SEAT

#### ... USING DIRECTION

Inlet and outlet are respectively separated and sealing action is made only at unidirection.

#### ... USE SCOPE

This type is recommended for application under such condition of low pressure line, as in petrochemical plant.

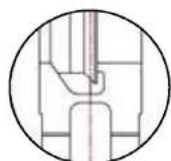
#### ... SEALING

This type is provides better sealing effect under the condition of low pressure line(0.5kg/cm<sup>2</sup>), while having the tendency of comparatively faster abrasion of seat.

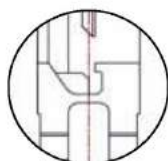
#### ... EXPLANATION

This type is of proper use under low pressure condition such as air fluid line, while not being proper for ash line, due to the properties of P.T.F.E.

## SEAT DESIGN



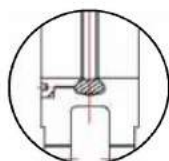
CLOSE



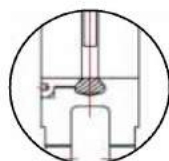
OPEN

### METAL OF METAL SEAT DESIGN

- Integral stainless seat
- Uni-directional flow
- Higher fluid pressure enhance sealing effect
- Conforming to MSS SP-81
- Full flow port area



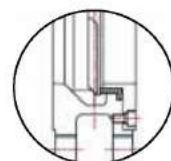
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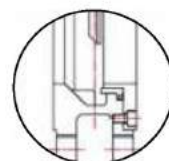
OPEN

### RUBBER RESILIENT SEAT DESIGN

- Bi-directional bubble-tight shutoff
- Rubber-encapsulated-seal with stainless wire inserted to prevent seat from being distorted and pulled out. Material of "EPDM" rubber is our standard.
- Other seat materials available upon customer's requirement.



CLOSE

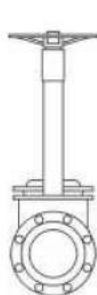


OPEN

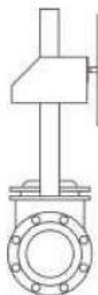
### PTFE P.T.F.E SEAT DESIGN for REPLACEMENT

- O-Ring energized P.T.F.E seat ring.
- Easily replaceable.
- Other material options available such as urethane and polyethylene or nylon .

## VALVE OPERATORS



HANDWHEEL



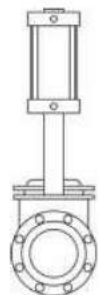
BEVEL GEAR

### HANDWHEEL

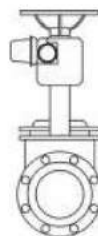
Valves are equipped with handwheels as basic for manual operation.

### BEVEL GEAR

Bevel gear operation is designed to minimize the effort to operate larger sized manual-operated valves which is out of reach.



CYLINDER



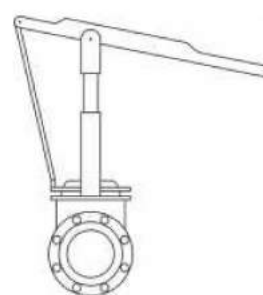
ELECTRIC  
& AIR MOTOR

### CYLINDER

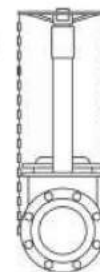
Valves can be available with air or hydraulic cylinder operator if remote operation is required.

### ELECTRIC & AIR MOTOR

Valves can be furnished with electric, pneumatic or hydraulic motor drives for remote, automatic or frequent operation.



LEVER



CHAIN WHEEL

### LEVER

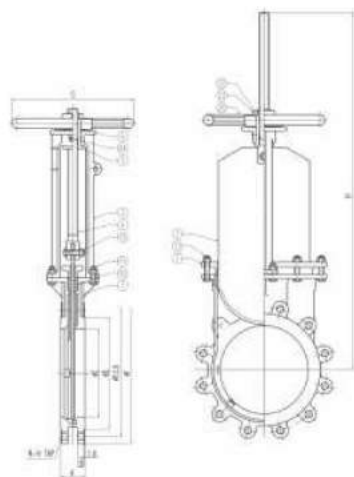
Where rapid valve operation is required, quick opening lever operators can be provided instead of handwheel.

### CHAIN WHEEL

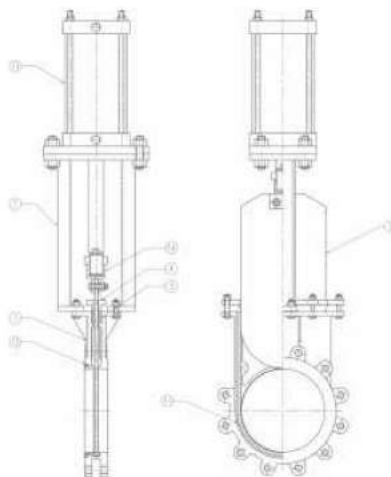
Chain wheel is an efficient means of operating the valves overhead and out-of-reach.



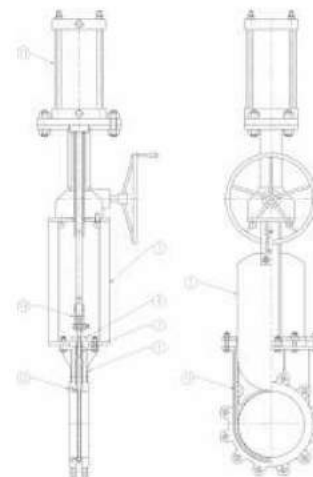
# KNIFE GATE VALVE GENERAL DRAWING



**HAND WHEEL TYPE**



**CYLINDER TYPE**



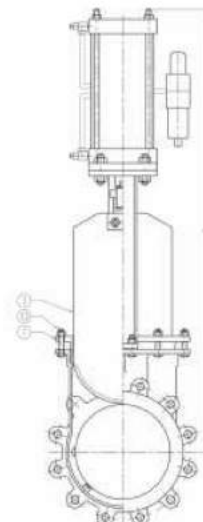
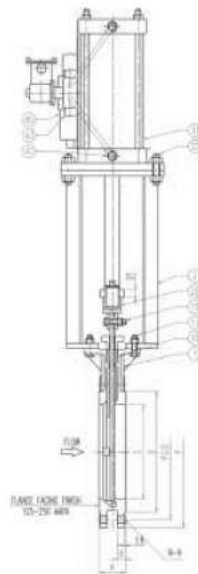
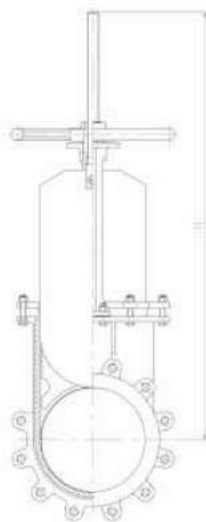
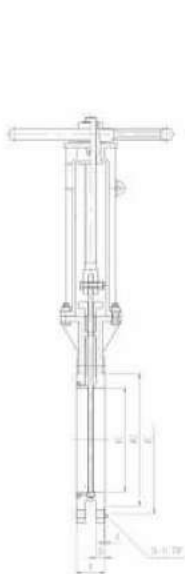
**CYLINDER WITH GEAR TYPE**

## REFERENCE STANDARD

- **BASIC DESIGN** : MSS SP-81
- **FACE TO FACE DIMENSIONS** : MSS SP-81
- **FLANGE DIMENSIONS** : MSS SP-81(ANSI B 16.5)
- **MATERIAL** : CF8(304), CF8M(316), CF3(304L), CF3M(316L), etc.
- **SIZES OVER 700MM** : According to manufacturer's standard

No	DESCRIPTION	MATERIAL	
		HAND WHEEL TYPE	CYLINDER TYPE
01	BODY	ASTM A351-CF8, CF8M, CF3M, CD4MCUN, ETC	
02	BLADE	304SS/316SS, HASTELLOY C-276, ETC	
03	PACKING	MANUFACTURE STANDARD	
04	GLAND FRANGE	304SS / 316SS ETC	
05	STEM	304SS	
06	YOKE SLEEVE	BRASS	-
07	YOKE	304SS	CARBON STEEL , 304SS
08	THRUST WASHER	BRASS	-
09	HAND WHEEL	ASTM A536	-
10	HAND WHEEL NUT	BRASS	-
11	SEAT	EPDM, VITON, NEOPRENE, PTFE	
12	INSERT	304SS / 316SS	
13	CYLINDER	-	MANUFACTURE STANDARD
14	KNUCKLE	-	304SS

## KNIFE GATE VALVE DIMENSION DATA



**HAND WHEEL TYPE**

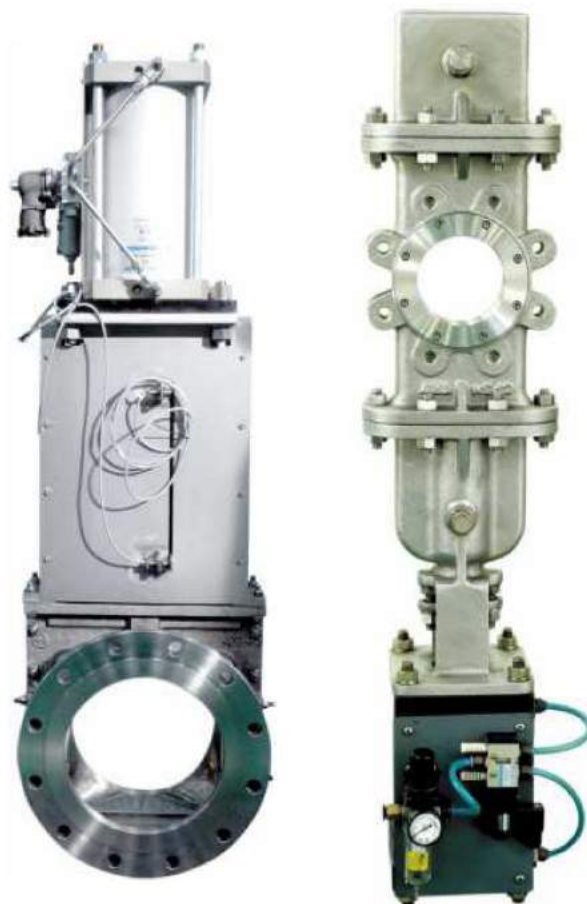
**CYLINDER TYPE**

### REFERENCE STANDARD

VALVE SIZE	A	B	C	D	E	H (HAND WHEEL TYPE)	H (CYLINDER TYPE)	N-H	K
2"	47.8	12.7	50.8	91.9	120.7	347.0	490.0	4-5/8"	1.6
3"	50.8	12.7	76.2	127.0	152.4	455.0	590.0	4-5/8"	1.6
4"	50.8	12.7	101.6	157.2	190.5	526.0	686.0	8-3/4"	1.6
5"	57.2	16.0	127.0	185.7	215.9	600.0	761.0	8-3/4"	1.6
6"	57.2	16.0	152.4	215.9	241.3	670.0	830.0	8-3/4"	1.6
8"	69.9	16.0	203.2	269.7	298.5	824.0	1004.0	8-3/4"	1.6
10"	69.9	19.1	254.0	323.9	362.0	1030.0	1186.0	12-7/8"	1.6
12"	76.2	19.1	304.8	381.0	431.8	1174.0	1354.0	12-7/8"	1.6
14"	76.2	20.6	336.6	412.8	476.3	1333.0	1528.0	12-1"	1.6
16"	88.9	22.4	387.4	469.9	539.8	1537.0	1688.0	16-1"	1.6
18"	88.9	23.9	438.0	533.4	577.9	1722.9	1890.0	16-11/8"	1.6
20"	114.3	25.4	489.0	584.2	635.0	1860.0	2150.0	20-11/8"	1.6
24"	114.3	25.4	591.0	692.2	749.3	2159.0	2590.0	20-11/4"	1.6
28"	140	35.0	692.2	800.1	863.6	2458.0	2904.0	28-11/4"	1.6

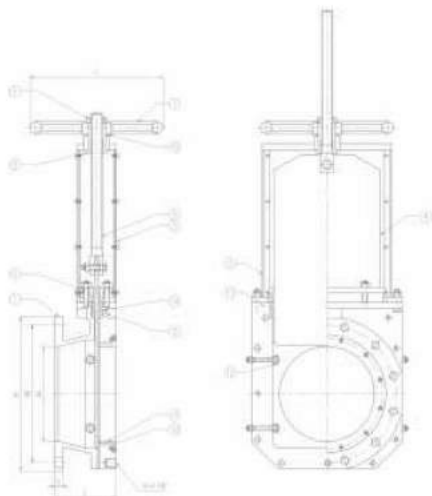
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# SLIDE & BONNET TYPE LONG KNIFE GATE VALVE

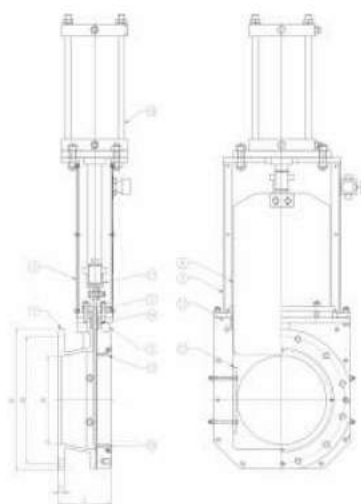


SLIDE GATE VALVE  
LONG KNIFE GATE VALVE

# SLIDE GATE VALVE



## HAND WHEEL TYPE



## CYLINDER TYPE

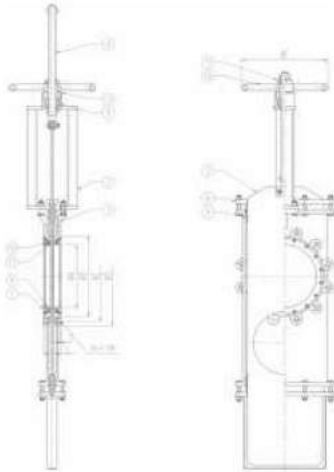
### REFERENCE STANDARD

- **BOLT CIRCLE DIAMETER** : ANSI B 16.5
- **VALVE FACE TO FACE DIMENSION** : Manufacturer Standard
- **PRESSURE RATING** : 150LB

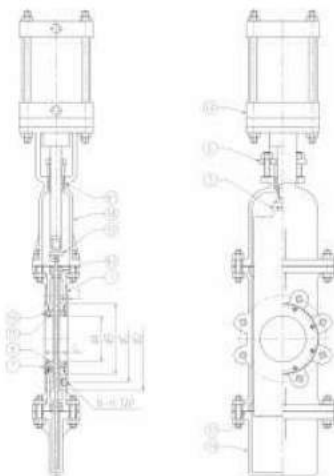
No	DESCRIPTION	MATERIAL	
		HAND WHEEL TYPE	CYLINDER TYPE
01	BODY	ASTM B26-356 OR CF8, CF8M, CF3M	
02	COVER	304 / 316	
03	YOKE/YOKE COVER	304SS	
04	BLADE	304SS	
05	GLAND FLANGE	304SS	
06	HAND WHEEL NUT	BRASS	-
07	HAND WHEEL	ASTM A536	-
08	YOKE SLEEVE	BRASS	-
09	STEM	304SS	
10	SEAT	P.T.F.E	
11	INSERT	304SS / 316SS	
12	GUIDE BAR	MC NYLON	
13	GASKET	P.T.F.E	
14	PACKING	MANUFACTURE STANDARD	
15	THRUST WASHER	BRASS	-
16	CYLINDER	-	MANUFACTURE STANDARD
17	KNUCKLE	-	304SS

VALVE SIZE	A	B	C	D	E	F	N-H
6"	150.0	241.3	279.4	16.0	99.0	300	8-7/8"
8"	203.0	298.5	342.9	20.0	160.0	350	8-7/8"
10"	250.0	362.0	406.4	20.0	160.0	400	12-1"
12"	300.0	431.8	482.4	20.0	180.0	450	12-1"
14"	336.0	478.3	533.4	22.0	180.0	550	12-1"

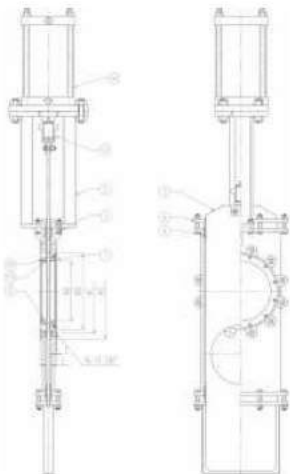
# LONG KNIFE GATE VALVE



## HAND WHEEL TYPE



## BONNET TYPE



## CYLINDER TYPE

### REFERENCE STANDARD

- **FLANGE** : MSS-SP-81
- **VALVE FACE TO FACE DIMENSION** : MSS SP-81
- **PRESSURE RATING** : 150LB

No	DESCRIPTION	MATERIAL	
		HAND WHEEL TYPE	CYLINDER TYPE
01	Body	ASTM A351-CF8, CF8M, CF3M, ETC	
02	Yoke	CARBON STEEL OR STAINLESS STEEL	
03	Blade	304SS, 316	
04	Stem	304SS	-
05	Yoke sleeve	BRASS	-
06	Gland flange	304SS	
07	Insert	304SS, 316	
08	Inner ring	316	316
09	Packing	MANUFACTURE STANDARD	
10	Hand wheel	ASTM A536	-
11	Hand wheel nut	BRESS	-
12	Knuckle	304SS	304SS
13	Sleeve gland	304SS	-
14	Cylinder	-	MANUFACTURE STANDARD
15	Seat ring	P.T.F.E or RTFE	
16	Spring	304SS, 316	
17	Gasket	Graphite sheet	-
18	Bonnet	ASTM A351-CF8,CF8M,CF3M ETC	
19	Cover	ASTM A351-CF8,CF8M,CF3M ETC	

### DIMENSIONS DATA

SIZE	FACE TO FACE	A	B	C	D	E	L	T	N-H
6"	57.0	152.4	215.9	241.3	279.4	300	57.2	1.6	8-3/4"
8"	70.0	203.2	269.8	298.5	342.9	350	69.9	1.6	8-3/4"
10"	70.0	254.0	323.9	362.0	406.4	400	69.9	1.6	12-17/8"
12"	76.0	304.8	381.0	431.8	482.6	450	76.2	1.6	12-17/8"
14"	76.0	338.8	412.8	478.3	533.4	550	76.2	1.6	12-1"
16"	89.0	387.4	469.9	539.8	596.9	550	88.9	1.6	16-1"
18"	89.0	438.2	533.4	577.9	635.0	550	88.9	1.6	18-11/8"
20"	114.0	489.0	584.2	635.0	698.5	600	114.3	1.6	20-11/8"
24"	114.0	590.8	692.2	749.3	812.8	650	114.3	1.6	20-11/4"

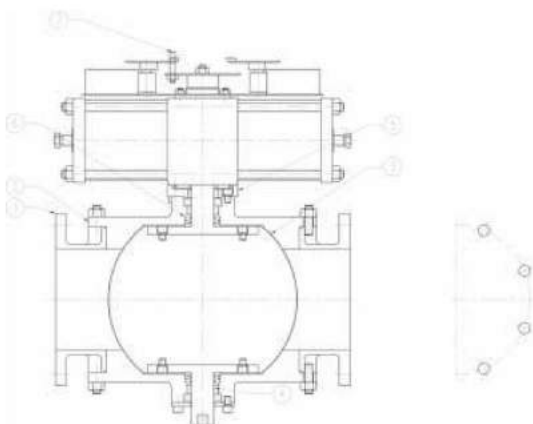
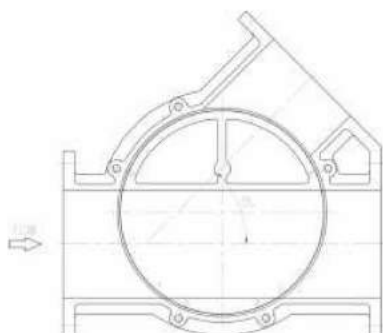
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# DIVERTER VALVE



FULL BORE BALL TYPE  
FULL BORE PLUG TYPE  
DIVERTER VALVE

# FULL BORE BALL TYPE



## REFERENCE STANDARD & OTHER INFORMATION

- **BASIC DESIGN** : Manufacturer's standard
- **FACE TO FACE DIMENSIONS** : Manufacturer's standard
- **FLANGE B.C.D DIMENSIONS** : ANSI B 16.5
- **MATERIAL** : Aluminum
- **PRESSURE RATING** : 150LB
- **ANGLE** : 22.5°, 30°, 45°, 60°, 90°, etc

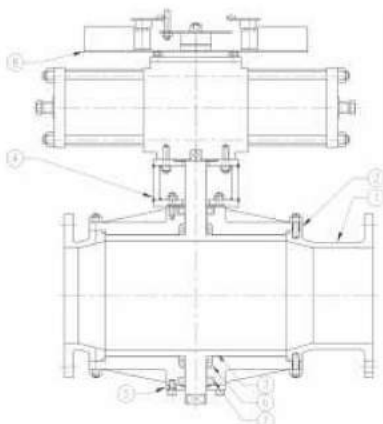
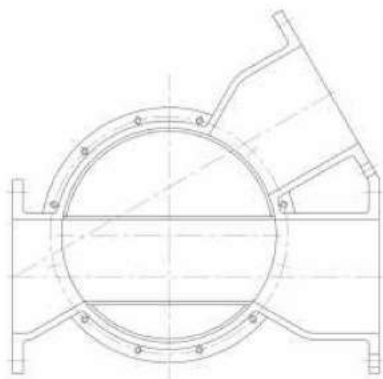
## FEATURE

- The weight of entire valve is minimized by adoption of aluminum material, except trim part.
- Adoption of "Full bore type(rotation angle : 135°)" gives an edge over "Reduced type" providing more efficient opening ratio.
- Installed indicator provides immediate confirmation of flow direction.
- The products with special angle not listed herein are also available upon request.
- Uniform mechanism of sealing minimizes possible leakage.

NO	DESCRIPTION	MATERIAL
1	BODY	ASTM B23-356 OR CF8.CF8M.CF3M
2	COVER	ASTM B23-356 OR CF8.CF8M.CF3M
3	BALL	A351-CF8, CF8M, CF3, CF3M or B26-356
4	SHAFT	304SS
5	CAP	304SS
6	BUSH	BRASS
7	INDICATOR	304SS

ACCESSORY PART	
ACTUATOR	AS PER PROJECT REQUIREMENT
TERMINAL BOX	AS PER PROJECT REQUIREMENT
LIMIT SWITCH	AS PER PROJECT REQUIREMENT
SPEED CONTROLLER	AS PER PROJECT REQUIREMENT
SILIENCER	AS PER PROJECT REQUIREMENT
SOLENOID VALVE	AS PER PROJECT REQUIREMENT
AIR SET	AS PER PROJECT REQUIREMENT
CYLINDER	AS PER PROJECT REQUIREMENT

## FULL BORE SQUARE PLUG TYPE



### REFERENCE STANDARD & OTHER INFORMATION

- **BASIC DESIGN** : Manufacturer's standard
- **FACE TO FACE DIMENSIONS** : Manufacturer's standard
- **FLANGE B,C,D DIMENSIONS** : ANSI B 16.5
- **MATERIAL** : Aluminum
- **PRESSURE RATING** : 150LB
- **ANGLE** : 22.5°, 30°, 45°, 60°, 90°, etc

### FEATURE

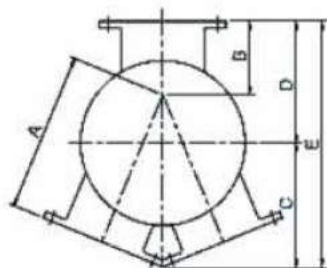
- The weight of entire valve is minimized by adoption of aluminum material, except trim part.
- Adoption of "Full bore type(rotation angle : 135°)" gives an edge over "Reduced type" providing more efficient opening ratio.
- Installed indicator provides immediate confirmation of flow direction.
- The products with special angle not listed herein are also available upon request.

NO DESCRIPTION MATERIAL			ACCESSORY PART	
1	BODY	ASTM B23-356 OR CF8,CF8M,CF3M	ACTUATOR	AS PER PROJECT REQUIRMENT
2	COVER	ASTM B23-356 OR CF8,CF8M,CF3M	TERMINAL BOX	AS PER PROJECT REQUIRMENT
3	PLUG	304SS	LIMIT SWITCH	AS PER PROJECT REQUIRMENT
4	YOKE	304SS	SPEED CONTROLLER	AS PER PROJECT REQUIRMENT
5	CAP	304SS	SILIENCER	AS PER PROJECT REQUIRMENT
6	BUSH	BRASS	SOLENOID VALVE	AS PER PROJECT REQUIRMENT
7	BEARING	-	AIR SET	AS PER PROJECT REQUIRMENT
8	PLATE	304SS	CYLINDER	AS PER PROJECT REQUIRMENT



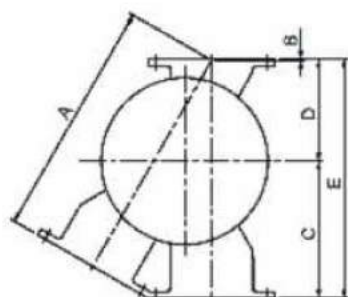
# DIVERTER VALVE

Table belows are commonly applied to plug, ball and blade type. Each table shows dimension at the point of each angle as indicated.

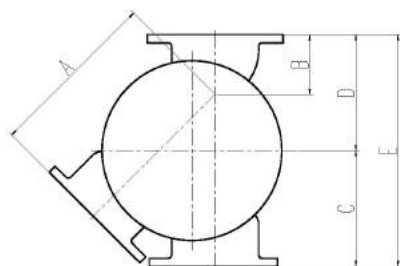


## DIMENSIONS DATA

VALVE SIZE	22.5°×2 GENERAL DIMENSION(MM)				
	A	B	C	D	E
2"	203.0	66.4	151.7	132.7	284.4
3"	253.8	69.2	173.5	168.8	342.3
4"	299.0	121.7	226.8	217.0	443.8
6"	353.0	122.0	262.0	242.0	504.0
8"	432.0	148.0	313.5	301.7	615.2
10"	512.6	167.4	368.0	354.2	722.2
12"	617.0	109.2	394.0	380.6	774.6



VALVE SIZE	30° GENERAL DIMENSION(MM)				
	A	B	C	D	E
2"	303.5	113.9	208.7	208.7	417.4
3"	356.0	86.0	251.0	191.0	442.0
4"	432.0	51.0	267.0	216.0	483.0
6"	523.5	9.5	292.0	241.0	533.0
8"	645.0	3.0	343.0	305.0	648.0
10"	760.0	97.0	425.0	432.0	857.0
12"	906.0	27.0	527.0	406.0	933.0



VALVE SIZE	45° GENERAL DIMENSION(MM)				
	A	B	C	D	E
2"	203.0	196.9	141.7	141.7	283.4
3"	253.9	80.0	178.8	187.8	375.7
4"	291.4	191.6	211.5	271.5	483.0
6"	354.0	126.0	240.0	240.0	480.0
8"	431.6	216.4	310.9	337.1	648.0
10"	512.4	247.6	380.0	380.0	760.0
12"	614.3	112.9	405.3	363.6	727.2

- **FLANGE DIMENSION DATA** : Reference Standard ANSI B16.5
- **REFERENCE PRESSURE** : 150LB

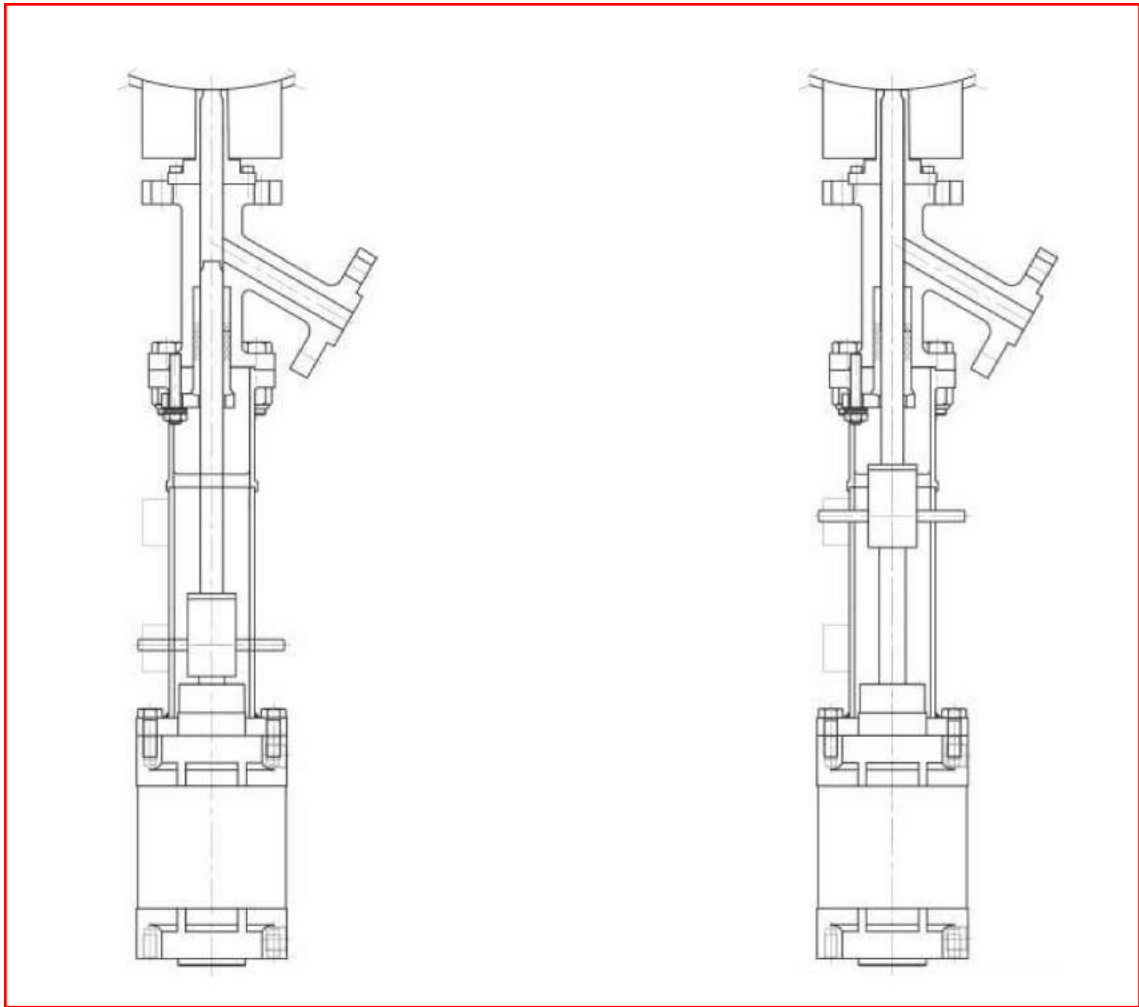
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# RAM PISTON VALVE



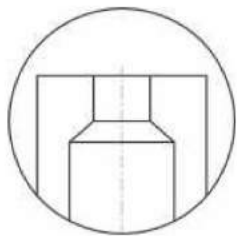
CASTING TYPE  
WELDING RAM PISTON VALVE

# END CONNECTION DETAIL DRAWING

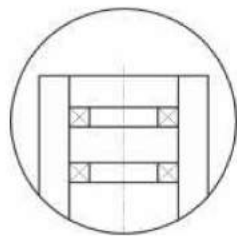


**OPEN**

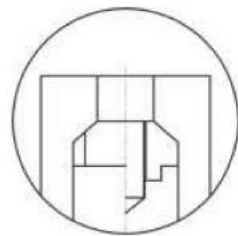
**CLOSE**



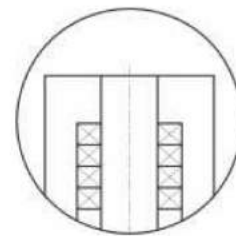
**METAL TO METAL SEAL**



**METAL TO O-RING SEAL**

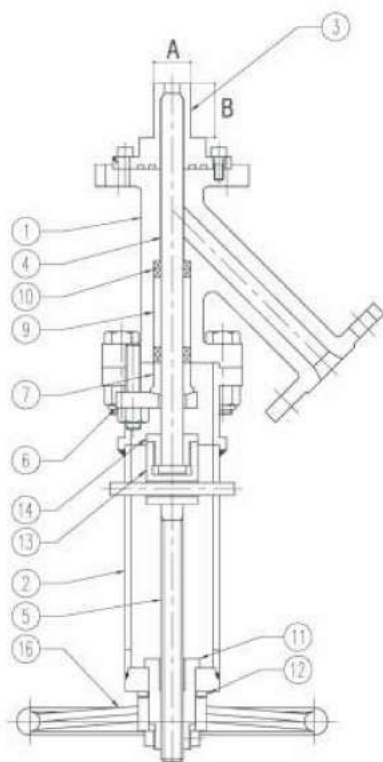


**METAL TO PEEK (PTFE) SEAL**



**METAL TO PACKING SEAL**

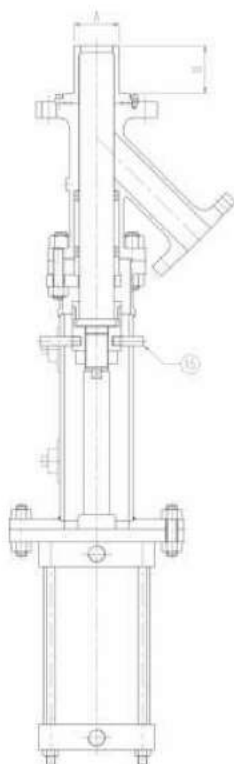
## CASTING TYPE



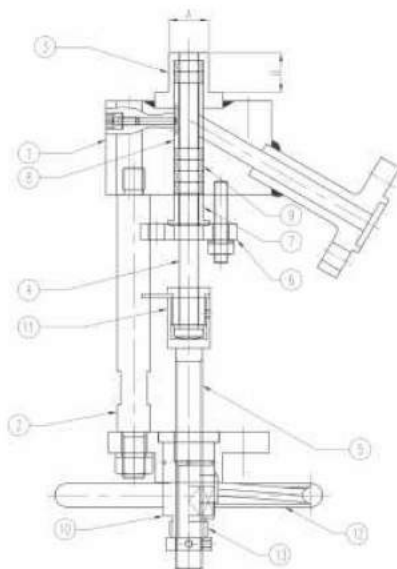
### REFERENCE STANDARD

- **FLANGE DIMENSIONS** : ANSI B 16.5
- **PRESSURE RATING** : 150LB, 300LB, 600LB, 900LB, 1500LB
- **ANGLE** : 45°, 60°
- **A,B DIMENSION** : Varied by customer's requisition.

No	DESCRIPTION	MATERIAL	
		HAND WHEEL TYPE	CYLINDER TYPE
01	BODY	ASTM A351-CF8, CF8M, CF3M, ETC	
02	YOKE	304SS	
03	ADAPTER	304 / 316SS	
04	PISTON	304 / 316SS	
05	STEM	304SS	
06	GLAND FLANGE	304SS	
07	PACKING GLAND	304SS	
08	CAGE	304 / 316SS	
09	BUSH	304 / 316SS	
10	PACKING	P.T.F.E / GRAPHITE	
11	YOKE SLEEVE	BRASS	-
12	THRUST WASHER	BRASS	-
13	JOINT	-	304SS
14	PISTON GLAND	304 / 316 + CHROMEPLATEDWITH STELLITE	
15	INDICATOR	304SS	
16	HANDWHEEL	ASTM A536	-



# WELDING RAM PISTON VALVE



### Reference standard & other information

- **FLANGE DIMENSIONS** : ANSI B 16.5
- **PRESSURE RATING** : 150LB, 300LB, 600LB, 900LB, 1500LB
- **ANGLE** : 45°, 60°
- **A, B DIMENSION** : Varied by customer's requisition.

No	DESCRIPTION	MATERIAL	
		HAND WHEEL TYPE	CYLINDER TYPE
01	BODY	ASTM A351-CF8, CF8M, CF3M, ETC	
02	YOKE	304SS	
03	ADAPTER	304SS OR 316SS WITH STELLITE	
04	PISTON	304 / 316 + CHROMEPLATED WITH STELLITE	
05	STEM	304SS	
06	GLAND FLANGE	304SS	
07	PACKING GLAND	304SS	
08	CAGE	304SS	
09	PACKING	P.T.F.E / GRAPHITE (VARIED BY DESIGN FACTORS)	
10	YOKE SLEEVE	BRASS	
11	PISTON GLAND	304SS OR 316SS	
12	HANDWHEEL	ASTM A536	
13	HANDWHEEL NUT	ASTM A194-8	

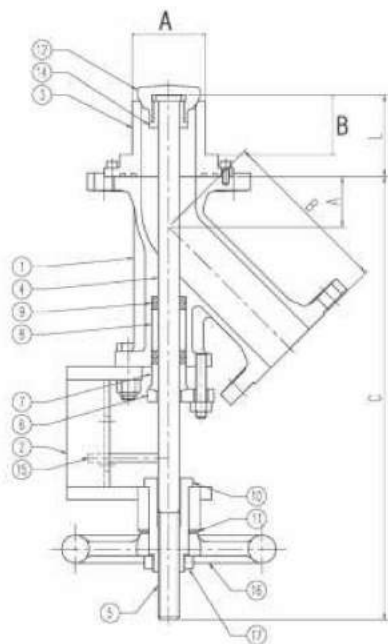
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# TANK BOTTOM FLUSH VALVE



TANK BOTTOM FLUSH VALVE

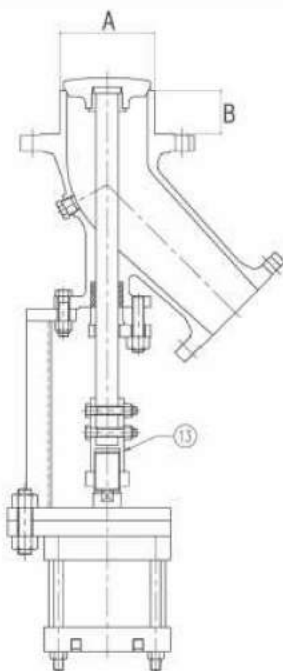
# TANK BOTTOM FLUSH VALVE (DOWN SEAT)



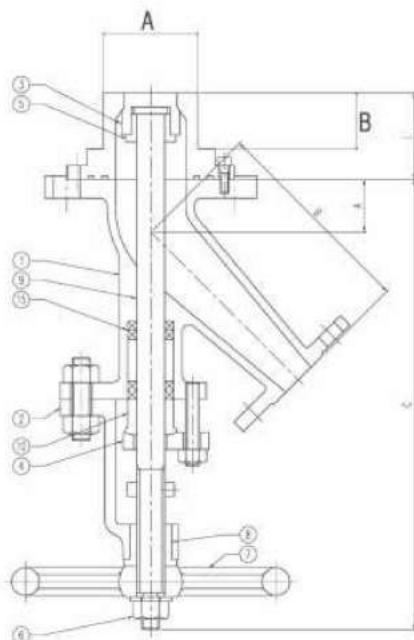
## REFERENCE STANDARD

- **FLANGE DIMENSIONS** : ANSI B 16.5
- **PRESSURE RATING** : 150LB, 300LB, 600LB, 900LB, 1500LB
- **ANGLE** : 45°, 60°
- **A,B DIMENSION** : Varied by customer's requisition.

No	DESCRIPTION	MATERIAL	
		HAND WHEEL TYPE	CYLINDER TYPE
01	BODY	ASTM A351-CF8, CF8M, CF3M, ETC	
02	YOKE	CARBON STEEL/ STAINLESS STEEL	
03	ADAPTER	304SS / 316SS	
04	PISTON	304 / 316 + CHROMEPLATED WITH STELLITE	
05	STEM	304SS	-
06	GLAND FLANGE	304SS	
07	PACKING GLAND	304SS	
08	BUSH	304SS / 316SS	
09	PACKING	P.T.F.E / GRAPHITE	
10	YOKE SLEEVE	BRASS	-
11	THRUST WASHER	BRASS	-
12	DISC	304SS OR 316SS	
13	JOINT	304SS	
14	DISC GLAND	304SS / 316SS	
15	INDICATOR	304SS	
16	HAND WHEEL	ASTM A536	
17	HAND WHEEL NUT	BRASS	



## TANK BOTTOM FLUSH VALVE(UPPER SEAT)



### REFERENCE STANDARD

- **FLANGE DIMENSIONS** : ANSI B 16.5
- **PRESSURE RATING** : 150LB, 300LB, 600LB, 900LB, 1500LB
- **ANGLE** : 45°, 60°, 90°
- **A,B DIMENSION** : Varied by customer's requisition.

No	DESCRIPTION	MATERIAL	
		HAND WHEEL TYPE	CYLINDER TYPE
01	BODY	ASTM A351-CF8, CF8M, CF3M, ETC	
02	YOKE	304SS	
03	DISC	304SS / 316SS	
04	GLAND FLANGE	304SS	
05	DISC GLAND	304SS / 316SS	
06	HAND WHEEL NUT		
07	HAND WHEEL	ASTM A536	
08	YOKE SLEEVE	BRASS	
09	STEM	304SS / 316SS	
10	PACKING GLAND	304SS	
11	CYLINDER	-	MANUFACTURE STANDARD
12	CONNECTOR	-	304SS
13	INDICATOR	304SS	304SS
14	GASKET	P.T.F.E	
15	PACKING	P.T.F.E	



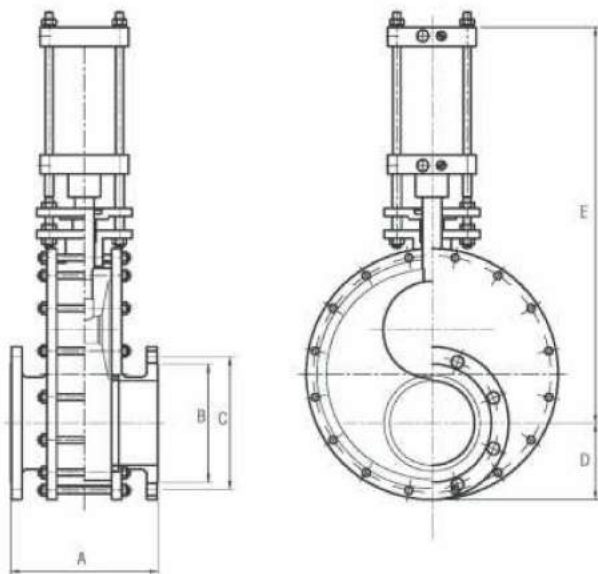
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# SELF LAPPING VALVE



SELF LAPPING VALVE

## FULL BORE SQUARE PLUG TYPE



### CODE & STANDARD

ANSI, ASME, API, MSS, JIS, BS, DIN, KS

### MATERIAL

ASTM A105, ASTM A182 F11, F22, ASTM A216 GR WCB, WCC, ASTM A217 Gr WC6, WC9, ASTM A240 Gr 304, 316, 304L, 316L, ASTM A351 Gr CF8, CF8M, CF8C, CG8M, CF3, CF3M, CG3M &, APPLICABLE ALL MATERIAL, SPECIAL MATERIAL, ALLOY, TITANIUM

### OPERATION TYPE

HAND WHEEL, CHAIN WHEEL, GEAR, LEVER, PNEUMATIC DOUBLE ACTING, PNEUMATIC SINGLE ACTING, ELECTRIC MOTOR, AIR MOTOR

NO	DESCRIPTION	MATERIAL
1	BODY	CF8, CF8M, CF3, CF3M, WCB
2	SEAT	AS PER CUSTOMER'S REQUIREMENT
3	DISC	AS PER CUSTOMER'S REQUIREMENT
4	DISC DRIVE	304SS
5	DISC SPRING	316SS
6	GASKET	PTFE
7	AIR CYLINDER	ALUMINUM

VALVE SIZE	A	B	C	D	E
2	179	91.9	120.7	76	442.1
3	210	127.0	152.4	95.5	518.7
4	248	157.2	190.5	114.5	612.6
5	267	185.7	215.9	127	659.5
6	267	215.9	241.3	139.5	722
8	343	269.7	298.5	171.5	847.2
10	381	323.9	362.0	203	941.1
12	381	381.0	431.8	241.5	941.1
14	381	412.8	476.3	266.5	941.1
16	420	469.9	539.8	298.5	1037.4
18	420	533.4	577.9	317.5	1037.4
20	500	584.2	635.0	349.5	1235
24	500	692.2	749.3	406.5	1235
18"	89.0	438.2	533.4	577.9	635.0
20"	114.0	489.0	584.2	635.0	698.5
24"	114.0	590.8	692.2	749.3	812.8

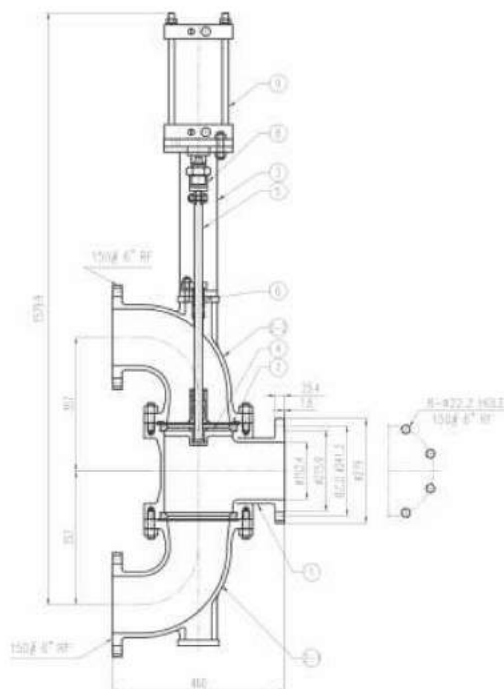
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# CHANGE-OVER VALVE



CHANGE-OVER VALVE

# CHANGE-OVER VALVE



## Change-over valves

Change-over Valves are used when a plant shutdown is impossible or undesirable for process engineering or commercial reasons. With change-over valves, it is possible to switch over between parallel safety valves without interrupting operation, so as, for example, to perform maintenance work. The design of the changeover valves ensures low pressure losses on discharge flow (3% criterion) adequate open passage in any position during the changeover process stable operation of the downstream safety valves The combination of TOTAL changeover and safety valves has been comprehensively tested on full flow test labs.

## Reference Standard & Information

- **BASIC DESIGN** : Manufacturer's standard
- **FACE TO FACE DIMENSIONS** : Manufacturer's standard
- **FLANGE DIMENSIONS** : ANSI B 16.5

## Applications

- Continuously Functioning Plant
- Bitumen refineries
- Oil Fields
- Ethylene plants
- Non-Drainable Systems
- Natural gas caverns
- Large storage facilities
- Storage tanks for technical gases
- (e.g. ethylene reservoirs)

NO	PART	MATERIAL
1	BODY1	A351-CF8/CF8M/CF3M
2-1	BODY2-1	A351-CF8/CF8M/CF3M
2-2	BODY2-1	A351-CF8/CF8M/CF3M
3	YOKE	CARBON STEEL
4	DISK	304SS/316/STELLITE
5	STEM	304SS/316
6	PACKING	PTFE
7	SEAT RING	PTFE
8	KNUCKLE	304SS
9	CYLINDER	-

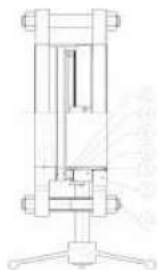
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# LINE BLIND VALVE



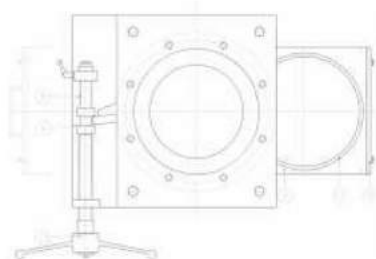
SLIDING TYPE  
SWING TYPE

# LINE BLIND VALVE

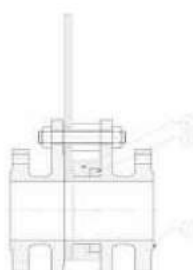


## REFERENCE STANDARD

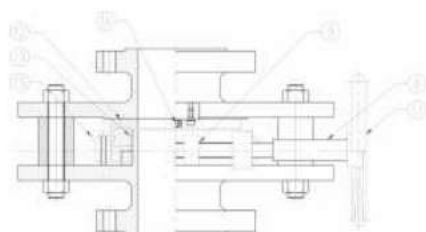
- **FLANGE DIMENSIONS** : ANSI B16.5
- **PRESSURE RATING** : 150LB, 300LB, 600LB



## SLIDING TYPE



VIEW "A-A"



## SWING TYPE

No	DESCRIPTION	MATERIAL(HAND WHEEL TYPE)	
		SQUARE TYPE	TRYANGLE TYPE
01	BODY A	*316LSS	*A351-CF8
02	BODY B	*316LSS	-
03	GEAR SET	316LSS	A240-304
04	BLIND PLATE	*316LSS	*A240-304
05	PIPE	316LSS	-
06	SEAT	316LSS	A240-304
07	BLIND PLATE GUIDE	POLY ACETAL	-
08	SCREW SHAFT	304SS	A479-304
09	TRAVELING NUT	304SS	A240-304
10	END PLATE	304SS	-
11	HAND WHEEL	A536	A126-B
12	PROXIMITY SENSOR	-	-
13	O-RING	*NBR	*VITON
14	O-RING	*NBR	*VITON
15	O-RING	*NBR	-
16	SEAT GUIDE	-	A479-304
17	FIXING PIN	-	A479-304

\*Trim Material to be applied as customer's requisition with various option.

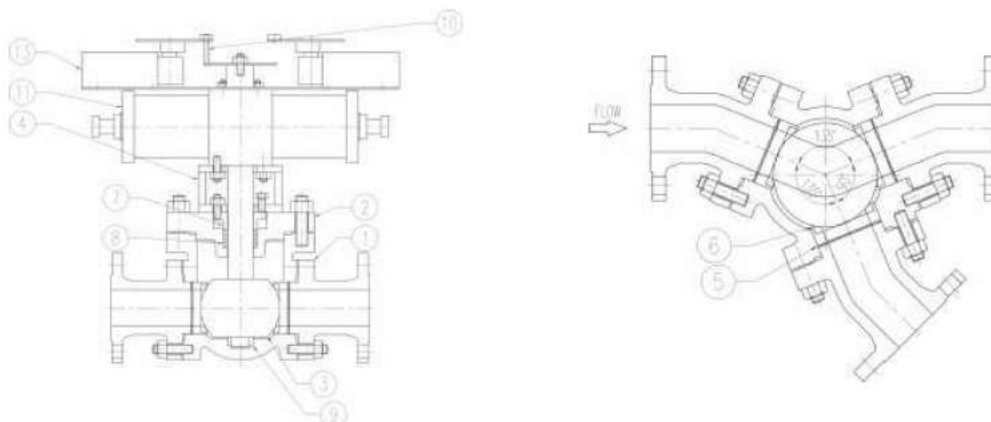
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# 3-WAY BALL VALVE



3-WAY VALVE

## 3-WAY Valve



### REFERENCE STANDARD

- **FLANGE DIMENSIONS** : ANSI B16.5
- **PRESSURE RATING** : 150LB, 300LB

No	DESCRIPTION	HAND WHEEL TYPE	SYLINDER TYPE
01	*BODY	A351-CF8	A351-CF8
02	*COVER	A351-CF8	A351-CF8
03	*BALL	A351-CF8	A351-CF8
04	YOKE	A240-304	A240-304
05	SPRING	304SS	304SS
06	SEATRING	PTFE	PTFE
07	PACKING GLAND	304SS	304SS
08	PACKING	PTFE	PTFE
09	BUSH		
10	INDICATOR	304SS	304SS
11	*INNER RING	A240-304	A240-304
12	CYLINDER		
13	LIMIT SWICH		

\*Trim Material to be applied as customer's requisition with various option.



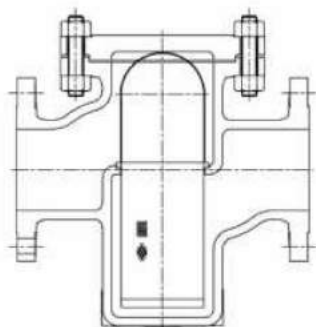
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# STRAINER & ENGINEERING DATA

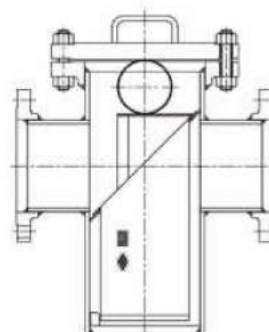


STRAINER & ENGINEERING DATA

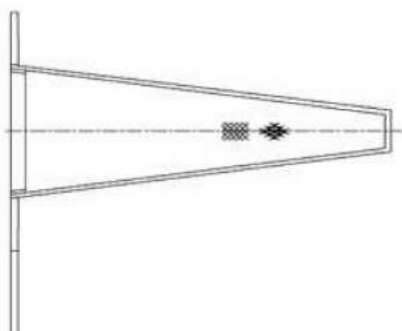
# STAINER & ENGINEERING DATA



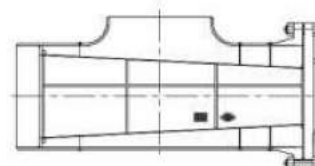
**BUCKET-TYPE (CASTING)**



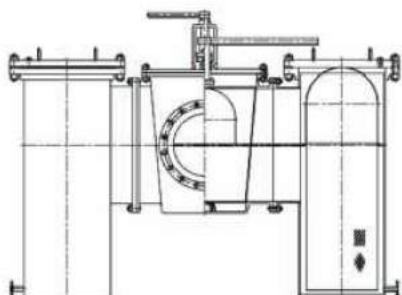
**BUCKET TYPE ( FABRICATION)**



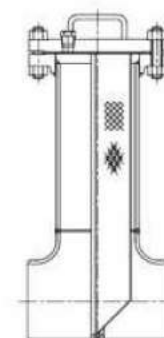
**C-TYPE**



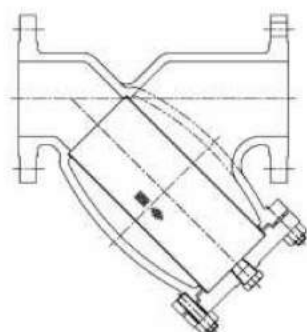
**T1-TYPE**



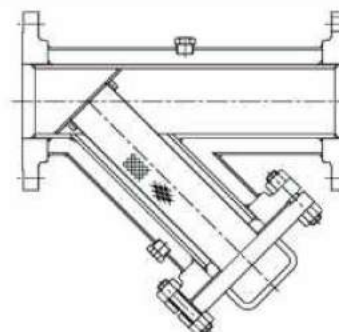
**DUPLEX**



**T2-TYPE**



**Y-TYPE (CASTING)**



**Y-TYPE (FEBRICATION, JACKET TYPE)**

GENERAL CLASSIFICATION	CASTINGS			FORGINGS		
	ASTM	JIS	BS	ASTM	JIS	BS
Cast iron	Class A	G5501-FC20	1452-14	-	-	-
	A126-Class B	G5501-FC25	1452-17	-	-	-
	A126-Class C	G5501-FC30	1452-20	-	-	-
Malleable iron	A197	G5702-FCMB28	310-B18/6	-	-	-
	A47-32510	G5702-FCMB35	310-B22/14	-	-	-
	A47-35018	G5702-FCMB37	-	-	-	-
Cast iron	A395	G5502-FCD40	-	-	-	-
	-	G5502-FCD45	-	-	-	-
	A536	G5502-FCD55	-	-	-	-
Carbon Steel	A216-WCA	G5151-SCPH1	-	A105	G3201-SF45	1503-161B
	-	G5101-SC46	1504-161	-	-	-
	A216-WCB	G5151-SCPH2	1504-B	A105	G3201-SF50	1503-161C
	WCC	-	-	-	-	-
-	G5101-SC55	1504-C	-	-	-	
Carbon-1/2Mo	A217-WC1	G5111-SCA41	1504-240	A182-F1	-	1503-240B
1/2Cr-1/2Mo-1/2Ni	A217-WC4	-	-	-	-	-
1Cr-1/2Mo-1/2Ni	A217-WC5	-	-	A182-F12	-	1503-620
1 1/4Cr-1/2Mo	A217-WC6	G5111-SCA51	1504-621	A182-F11	-	-
2 1/4Cr-1/2Mo	A217-WC9	-	1504-622	A182-F22	-	1503-622
3Cr-1Mo	-	-	-	A182-F21	-	-
5Cr-1/2Mo(C 0,15)	-	-	-	A182-F5	-	-
5Cr-1/2Mo(C 0,25)	A217-C5	G5111SCA52	1504-625	A182-F5a	-	1503-625
7Cr-1/2Mo	-	-	-	A182-F7	-	-
9Cr-1Mo	A217-C12	-	1504-629	A182-F9	-	-
Carbon steel for Low Temp	A352-LCB	-	4242-GRA	A182-LF1	-	-
Carbon-Si	-	-	-	A182-LF2	-	-
Carbon-1Mo for Low Temp	A352-LC1	-	-	-	-	-
2 1/2Ni	A352-LC2	-	-	-	-	-
3 1/2Ni	A352-LC3	-	-	A350-LF3	-	-
Cr-Ni-Cu-A1	-	-	-	A350-LF4	-	-
13Cr	A217-CA15	G5121-SCS1	-	A350-F6	G4303-SUS51B	1503-713
18Cr-8Ni(C 0,03)	A351-CF3	-	-	A182-F304L	G4303-SUS28B	-
18Cr-8Ni(C 0,08)	CF8	G5121-SCS13	-	A182-F304	G4303-SUS27B	1503-801
18Cr-8Ni(C 0,10)	-	-	1504-801	A182-F304H	-	-
18Cr-8Ni-2Mo(C 0,03)	A351-CF3M	G5121-SCS16	-	A182-F316L	G4303-SUS33B	-
18Cr-8Ni-2Mo(C 0,08)	A351-CF8M	G5121-SCS14	1631-GRC	A182-F316	G4303-SUS32B	1503-845B
18Cr-8Ni-2Mo(C 0,10)	-	-	-	A182-F316H	-	-
18Cr-8Ni-Ti(C 0,08)	-	-	-	A182-F321	G4303-SUS29B	-
18Cr-8Ni-Ti(C 0,10)	-	-	1504-821Ti	-	G4303-F321H	1503-82Ti
18Cr-8Ni-Cb(C 0,08)	A351-CF8C	-	-	A182-F347	G4303-SUS43B	1503-821Nb
18Cr-8Ni-Cb(C 0,10)	-	-	1504-821Nb	A182-F347H	-	-
18Cr-8Ni-Ta-Cb(C 0,08)	-	-	-	A182-F348	-	-
18Cr-8Ni-Ta-Cb(C 0,10)	-	-	-	A182-F348H	-	-
25Cr-20Ni(C 0,15)	-	-	-	A182-F310	-	-
22Cr-12Ni(C 0,08)	A351-CH18	-	-	-	-	-
22Cr-12Ni(C 0,10)	A351-CH10	-	-	-	-	-
22Cr-12Ni(C 0,20)	A351-CH20	-	-	-	-	-
23Cr-19Ni(C 0,20)	A351-CK20	-	-	-	-	-
23Cr-19Ni(C 0,35)	A351-HK30	-	-	-	-	-
23Cr-19Ni(C 0,45)	A351-HK40	-	-	-	-	-
13Cr-33Ni-Mo(C 0,35)	A351-HT30	-	-	-	-	-
15Cr-13Ni-2Mo-Cb(C 0,10)	CF 10MC	-	-	-	-	-
19Cr-27Ni-2Mo-3Cu(C 0,07)	CF CN7M	-	-	A-20	-	-
8Cr-20Ni-Mo(C 0,20)	-	-	-	A182-F10	-	-
HASTELLOY.B	A494-N-12M-1	-	-	-	-	-
HASTELLOY.C	A494CW-12M-1	-	-	-	-	-
NICKEL	A494/A296-C2-100	-	-	-	-	-
NICONEL	A494 Cy-40	-	-	-	-	-
MONEL	A296/A494 M-35	-	-	-	-	-

# STEEL PIPE SCHEDULE / ANSI B36.10

NOMINAL SIZE	NOMINAL O.D.(inch)	SCH 10		SCH 20		SCH 30		STD		SCH 40		SCH 50	
		MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH
1/8	0.405	-	-	-	-	-	-	1.73	0.058	1.73	0.068	-	-
1/4	0.540	-	-	-	-	-	-	2.24	0.065	2.24	0.068	-	-
3/8	0.675	-	-	-	-	-	-	2.31	0.091	2.31	0.091	-	-
1/2	0.840	-	-	-	-	-	-	2.77	0.109	2.77	0.109	-	-
3/4	1.050	-	-	-	-	-	-	2.87	0.113	2.87	0.113	-	-
1	1.315	-	-	-	-	-	-	3.38	0.133	3.38	0.133	-	-
1 1/4	1.660	-	-	-	-	-	-	3.56	0.140	3.56	0.140	-	-
1 1/2	1.900	-	-	-	-	-	-	3.68	0.145	3.68	0.145	-	-
2	2.375	-	-	-	-	-	-	3.91	0.154	3.91	0.154	-	-
2 1/2	2.875	-	-	-	-	-	-	5.16	0.203	5.16	0.203	-	-
3	3.500	-	-	-	-	-	-	5.49	0.216	5.49	0.210	-	-
3 1/2	4.000	-	-	-	-	-	-	5.74	0.226	5.74	0.226	-	-
4	4.500	-	-	-	-	-	-	6.02	0.237	6.02	0.237	-	-
5	5.563	-	-	-	-	-	-	6.55	0.258	6.55	0.258	-	-
6	6.625	-	-	-	-	-	-	7.11	0.280	7.11	0.280	-	-
8	8.625	-	-	6.35	0.250	7.04	0.277	8.18	0.322	8.18	0.322	10.31	0.406
10	10.750	-	-	6.35	0.250	7.80	0.307	9.27	0.385	9.27	0.365	12.70	0.500
12	12.750	-	-	6.35	0.250	8.38	0.330	9.53	0.375	10.31	0.406	14.27	0.562
14	14.000	6.35	0.250	7.92	0.312	9.53	0.375	9.53	0.375	11.13	0.438	15.09	0.594
16	16.000	6.35	0.250	7.92	0.312	9.53	0.375	9.53	0.375	12.70	0.500	16.66	0.656
18	18.000	6.35	0.250	7.92	0.312	11.13	0.438	9.53	0.375	14.27	0.562	19.05	0.750
20	20.000	6.35	0.250	9.53	0.375	12.70	0.500	9.53	0.375	15.06	0.594	20.52	0.812
22	22.000	6.35	0.250	9.53	0.375	12.70	0.500	9.53	0.375	15.85	-	22.22	0.875
24	24.000	6.35	0.250	9.53	0.375	14.27	0.562	9.53	0.375	17.45	0.687	24.61	0.969
26	26.000	7.92	0.312	12.70	0.500	-	-	9.53	0.375	-	-	-	-
28	28.000	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	-	-	-	-
30	30.000	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	-	-	-	-
32	32.000	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	17.45	0.688	-	-
34	34.000	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	17.45	0.688	-	-
36	36.000	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	19.05	0.750	-	-

XH		SCH 80		SCH 100		SCH 120		SCH 140		SCH 150		XXH	
MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH
2.41	0.095	2.41	0.095	-	-	-	-	-	-	-	-	-	-
3.02	0.119	3.02	0.119	-	-	-	-	-	-	-	-	-	-
3.20	0.126	3.20	0.126	-	-	-	-	-	-	-	-	-	-
3.73	0.147	3.73	0.147	-	-	-	-	-	-	4.78	0.188	7.74	0.294
3.91	0.154	3.91	0.154	-	-	-	-	-	-	5.56	0.219	7.82	0.308
4.55	0.179	4.55	0.179	-	-	-	-	-	-	6.35	0.250	9.09	0.358
4.85	0.191	4.85	0.191	-	-	-	-	-	-	6.35	0.250	9.70	0.382
5.08	0.200	5.08	0.200	-	-	-	-	-	-	7.14	0.281	10.15	0.400
5.54	0.218	5.54	0.218	-	-	-	-	-	-	8.74	0.344	11.07	0.406
7.01	0.276	7.01	0.276	-	-	-	-	-	-	9.53	0.375	14.02	0.552
7.62	0.300	7.02	0.300	-	-	-	-	-	-	11.13	0.438	15.24	0.600
8.06	0.318	8.08	0.318	-	-	-	-	-	-	-	-	-	-
8.56	0.337	8.56	0.337	-	-	11.13	0.438	-	-	13.49	0.531	17.12	0.674
9.53	0.375	9.53	0.375	-	-	12.70	0.500	-	-	15.88	0.625	19.05	0.750
10.97	0.432	10.97	0.432	-	-	14.27	0.562	-	-	18.26	0.719	21.95	0.884
12.70	0.500	12.70	0.500	0.594	0.594	18.26	0.719	20.62	0.812	23.01	0.906	22.23	0.875
12.70	0.500	15.09	0.594	0.719	0.719	21.44	0.844	25.40	1.000	28.58	1.125	25.40	1.000
12.70	0.500	17.48	0.688	0.844	0.844	25.40	1.000	28.58	1.125	33.32	1.312	25.40	1.000
12.70	0.500	19.05	0.750	0.938	0.938	27.79	1.094	31.75	1.125	35.71	1.406	-	-
12.70	0.500	21.44	0.844	1.031	1.031	30.96	1.219	36.53	1.438	40.49	1.594	-	-
12.70	0.500	23.83	0.938	1.156	1.156	34.93	1.375	39.67	1.562	45.24	1.781	-	-
12.70	0.500	26.19	1.031	1.281	1.281	38.10	1.500	44.45	1.750	50.01	1.969	-	-
12.70	0.500	28.58	1.125	1.375	1.375	41.28	1.625	47.63	1.875	53.98	2.125	-	-
12.70	0.500	30.96	1.129	1.531	1.531	48.02	1.812	52.37	2.062	59.54	2.344	-	-
12.70	0.500	-	-	-	-	-	-	-	-	-	-	-	-
12.70	0.500	-	-	-	-	-	-	-	-	-	-	-	-
12.70	0.500	-	-	-	-	-	-	-	-	-	-	-	-
12.70	0.500	-	-	-	-	-	-	-	-	-	-	-	-
12.70	0.500	-	-	-	-	-	-	-	-	-	-	-	-
12.70	0.500	-	-	-	-	-	-	-	-	-	-	-	-
12.70	0.500	-	-	-	-	-	-	-	-	-	-	-	-

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NAMHAE CHEMICAL CO.,LTD  
DOOSAN HEAVY INDUSTRIAL CO.,LTD  
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GS CALTEX OIL CO.,LTD  
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SAMSUNG FINE CHEMICAL CO.,LTD  
HALLA ENGINEERING & INDUSTRIAL  
SAMNAM PETROCHEMICAL CO.,LTD  
HANWHA ENGINEERING CO.,LTD  
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SK PETROCHEMICAL CO.,LTD  
HYOSUNG CO.,LTD  
SK CORPORATION  
HYUNDAI ENGINEERING CO.,LTD  
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KOREA ELECTRIC POWER CORPORATION  
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## OVER SEA CUSTOMER

### AUSTRALIA

- HY-PERFORMANCE VALVES

### CHILE

- CHILE VENTANAS PJT
- NUEVA VENTANAS POWER PLANT PROJECT

### CHINA

- SHANGHAI SINOPEC MITSHI CHEMICALS CO., LTD

### EGYPT

- EGYPTIAN POLYETHYLENE PROJECT

### GERMANY

- REIMELT

### INDIA

- HALDIA PETROCHEM CO., LTD
- OPAL HDPE

### INDONESIA

- PT.POLYTAMA PROFINDO

### JAPAN

- KOBE STEEL CO., LTD
- OKUMURA CO., LTD
- TOYO ENGINEERING CO., LTD
- JSW ENGINEERING CO., LTD

### KUWAIT

- SAHID TONGGOOLAN PETROCHEM
- KUWAIT OIL COMPANY., LTD

### LYBIA

- MISURATA COMBINED CYCLE

### MALAYSIA

- MALAYSIA TNB FAST TRACK 3A PJT

### MOROCCO

- MOROCCO FERTILIZER PROJECT
- SUPER ABSORBENT POLYMER PRJ

### NETHERLANDS

- NORON B.V

### OMAN

- SOHAR PROJECT
- OMAN SRIP PJT
- AL SUWADI POWER COMPANY SAOC
- AL BATINAH POWER COMPANT SAOC
- OMAN POLYPROPYLENE LLC
- OMAN EPCC
- OMAN MGP

### PHILIPPINES

- PETRON BATAAN REFINERY MASTER
- PLANT NO.2 (RMP-2)

### SAUDI ARBIA

- RABIGH 2 REFINING AND PETRO-
- CHEMICAL PROJECT
- SAUDI ELASTOMER PROJECT
- SAUDI SABIC PJT
- SAUDI KAYAN HDPE PJT
- SAUDI KAYAN NCP PJT
- SAUDI KAYAN PETROCHEMICAL CO
- SAUDI POLYMERS CO
- EL-BARD TRADING & CONT
- AL WAHA PETROCHEMICAL CO
- AL JUBAIL PETROCHEMICAL CO SABIC
- PETROKEMYA ABS PROJECT
- SABIC PP PROJECT

### SINGAPORE

- JNS INTERNATIONAL., LTD

### TAIWAN

- HSNTA POWER PLANT PROJECT
- GEODIS WILSON TAIWAN LTD
- CTCI
- CPC COPR

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- GHECO ONE POWER PLANT PROJECT
- PTT CHEM ELECTRICAL POWER AND STEAM
- THAI OIL COMPANY
- NPCX (HDPE)PROJECT
- BANGKOK POLYETHYLENE PUBLIC CO LTD
- MAP TA PHUT TANK TERMINAL CO, LTD
- HMC POLYME CORP

### TURKMENISTAN

- ETHANE CRACKER AND PE / PP PLANT
- TURKMENISTAN GAS DESULFURIZATION PLANT

### UNITED ARAB EMIRATES

- ABU DHAI OIL REFINING CO (TAKREER)
- T & C GULF
- SAMSUNG ENGINEERING CARBON
- BLACK & DELAYED COKER PROJECT

### UNITED KINGDOM

- HATTERSLEY NEWMAN HENDER LTD

### UZBEKISTAN

- UZBEKISTAN GAS TO LIQUID PROJECT
- UZ KOR GAS CHEMICAL LLC
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### VIETNAM

- THAI BINH 2 THERMAL POWER PLANT
- NGHI SON REFINERY AND PETRO-CHEMICAL PROJECT
- O MON THERMAL POWER PLANT UNIT No.2 CONSTRUCTION PROJECT
- VIETNAM PP UP GRADE PJT (VIETNAM PETROCHEM)