

12. Catalogue

3Z



3Z[®]

www.3Zvalve.com



The Solution For The Valve Problems
3Z[®] Plug Valves

The Solution For The Valve Problems

3Z[®] Plug Valves

**DBB
Group**

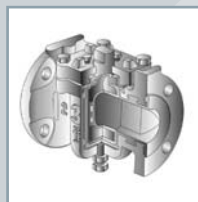


**Double Block &
Bleed Valves 5**

**Soft Seated
Group**



Sleeved Valves 23



Lined Valves 41



Worldwide Experiences

For over 30 years and across 50 countries, the 3Z valves have supplied and contributed to the outstanding performance for the processes of companies, Whether it is for a new constructions or MRO job, 3Z valves are there for the benefits of our customers.

Metal Seated Group



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Ball Valves**

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3Z[®]



Double Block & Bleed Plug Valve
The Solution For The Valve Problems

3Z[®] Plug Valves



3Z Standards Twin Slip Double Block and Bleed Valve

Figure # 124, 324, 624, 924, 1524

- Rating : ANSI Class 150/300/600/900/1500
- Size : 2" ~ 24"
- Temperature Range : -20°F(-29°C) TO + 350°F(+176.7°C)
- Connections : Flanged, Screwed, Welded (Butt, Socket)
- Wrench, enclosed gear operated or actuated

3Z Full Bore Twin Slip Double Block and Bleed Valves

- Rating : ANSI Class 150/300/600/900/1500
- Size : 2" ~ 24"
- Temperature Range : -20°F(-29°C) TO + 350°F(+176.7°C)
- Connections : Flanged, Screwed, Welded (Butt, Socket)
- Hand wheel, enclosed gear operated or actuated

3Z 4-Way Twin Slip Double Block and Bleed Valves

- Rating : ANSI Class 150/300/600/900/1500
- Size : 2" ~ 24"
- Temperature Range : -20°F(-29°C) TO + 350°F(+176.7°C)
- Connections : Flanged, Screwed, Welded (Butt, Socket)
- Hand wheel, enclosed gear operated or actuated

Materials of construction

Body	Carbon Steel	ASTM A216 WCB Chrome Plated
Top Cover	Carbon Steel	ASTM A216 WCB or ASTM A283D Plated
Bottom Cover	Carbon Steel	ASTM A216 WCB or ASTM A283D Plated
Wedge	Carbon Steel	ASTM A216 WCB Electroless Nickel Plated
Slips	Ductile Iron	ASTM A536-65-45-12
Gland	Stainless Steel	ASTM A276 410SS
Packing	Graphite Type	-
O-Ring & Slip	Viton	-
Studs / Nuts	Carbon Steel	ASTM A193 B7 / ASTM A194 2H

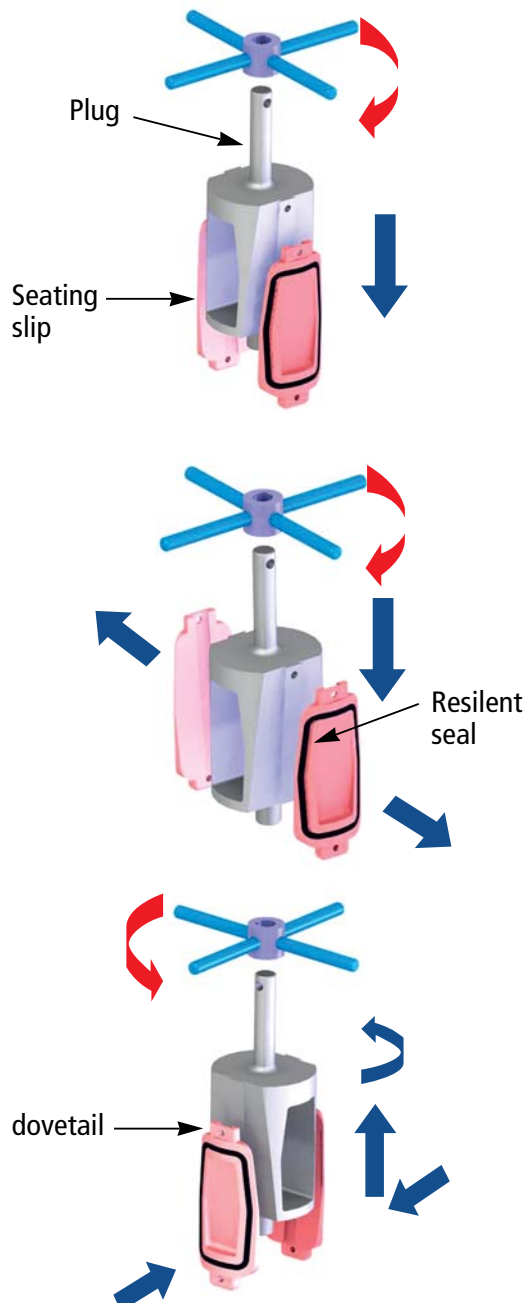




3Z Double Block & Bleed (DBB) Valve

Designed to meet Oil & Gas transmission, loading, unloading needs. Line sealing is achieved by body and wedges cut from each side of the plug with or without the assistance of soft seat rings.

The sealing is positively made on each side of the plug (double block), and the media kept in the plug port area can be bled into upstream or to the container to prevent from explosion. The Valve can be used for assuring metering accuracy and SCADA systems.



1. Closing

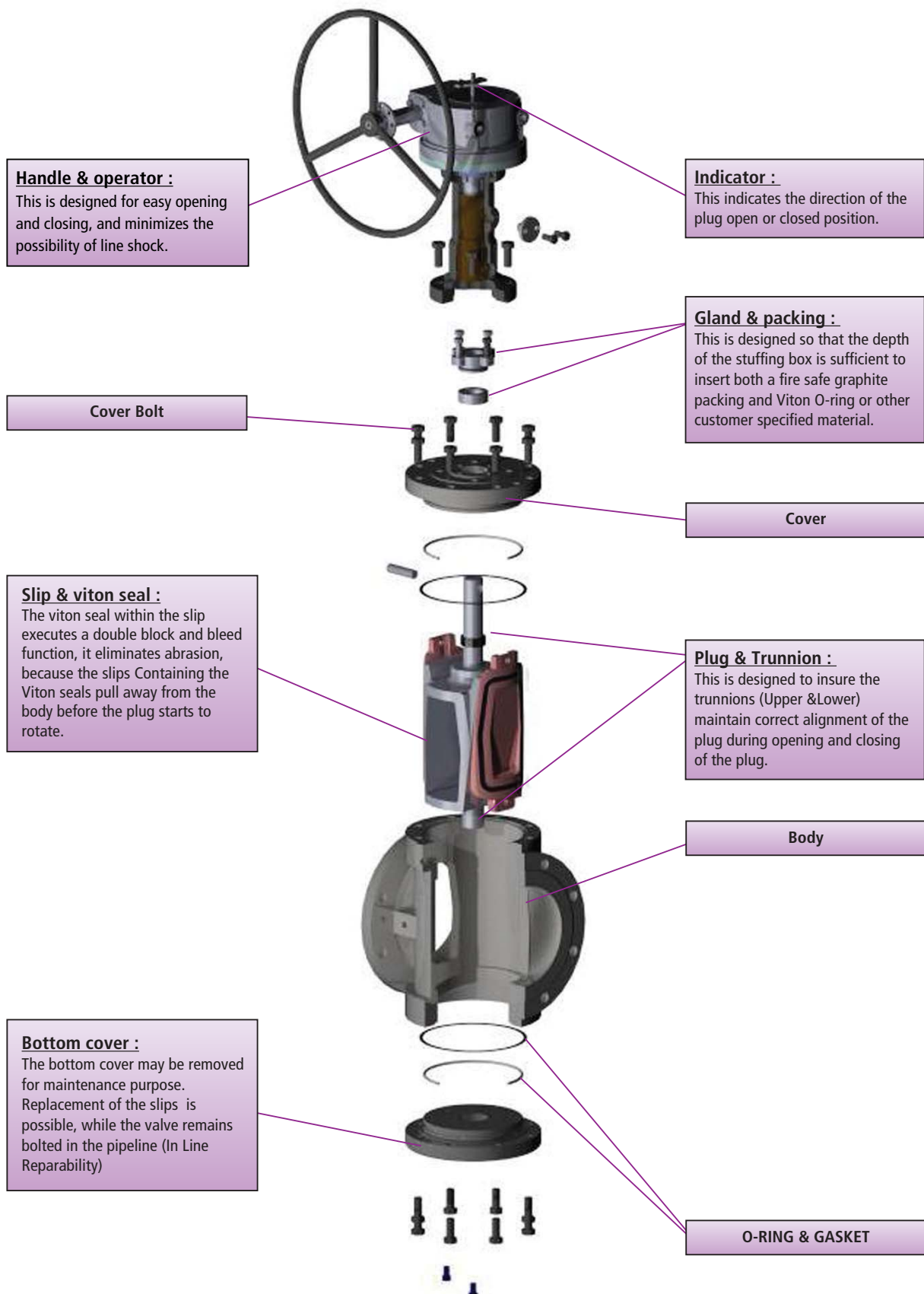
The small size Double Block and Bleed valves are handwheel operated and the larger sizes are equipped with waterproof of gearing but operate in the same manner, proportionately requiring more turns. Turning the handwheel rotates the wedge 90 degrees, aligning the seating slips. The elastomer seal rings are integrally bonded within the machined grooves of each slip.

2. Compressing

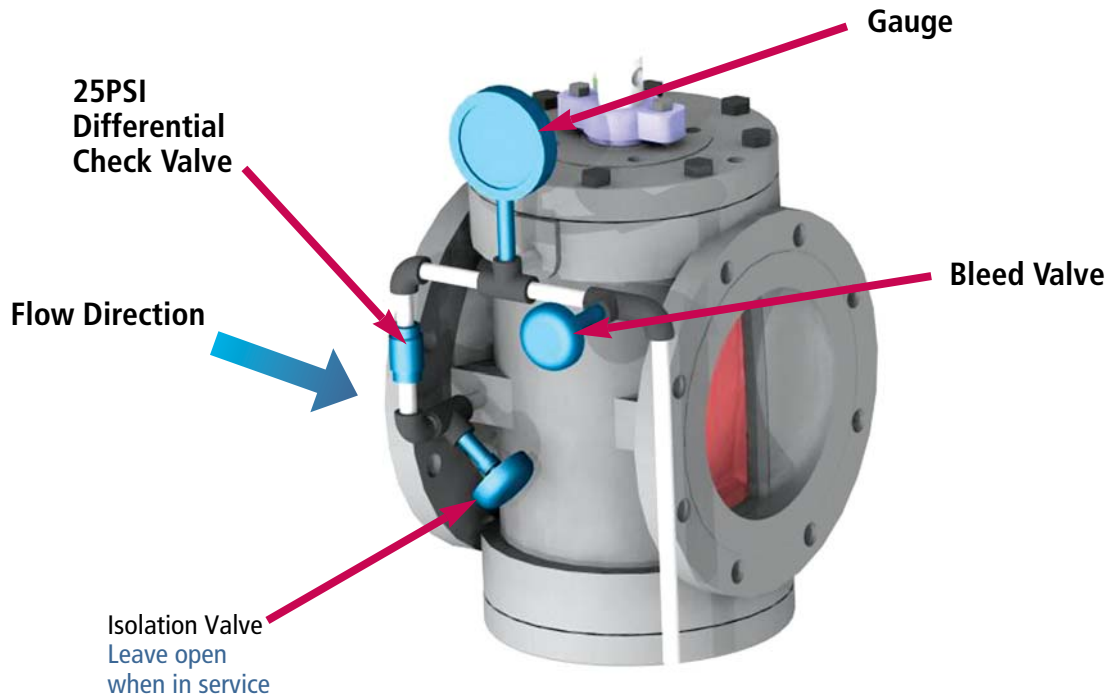
As the wedge lowers, it force the seating slips outwards, pushing the seals against the body and compressing them with in the grooves. With the slips solidly against the body, a secondary metal-to metal seat is formed on both sides of each seal, providing double protection. The wedging forces the seating slips outwards against the valve body and is perpendicular to the seats and the body. This eliminates all scraping and rubbing forces on the seals.

3. Opening

When opening, the wedge moves upwards and the dove-tailed (slips) are pulled away from the body. The wedge is guided by an upper and lower trunnion, and the wedge is rotated 90 degrees, aligning the seating slips. In the open position, the seals are completely out of the flow. Again, This action eliminates all scraping and rubbing forces on the seals.

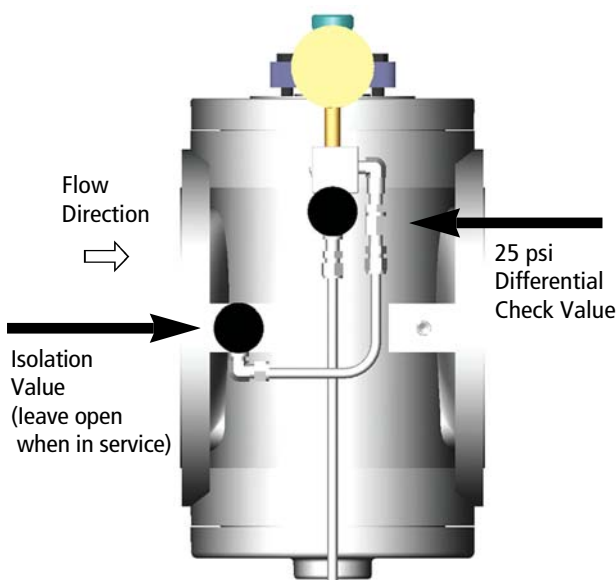


Bleeding Systems



The above system is designed to relieve any excess rise in pressure, within the body cavity, due to terminal expansion of the liquid within the cavity, when the valve is in the closed position. The relief valve is set to open at 25PSI or above and bleeds excess pressure to the upstream side.

Note : System will only function when valve is closed and the isolation valve is open.



Automatic Body Bleed Valve to Atmosphere or Upstream (Customer Option)

The check valve is operated by a plunger that opens the bleed valve by a coupling cam, during the closing of the valve. The valve may be operated by hand or an actuator.

This system incorporates a complete automatic system by removing the need for human intervention. An isolation valve is fixed in the open position to prevent the need for checking the seal.

Zero Leakage

Valves selection is very important in the petroleum industry. An incorrect valve may cause loss of income, pollution of product, and increase of product line maintenance costs. Multi-product system valves should be designed to withstand frequent cycling and provide a tight seal shut off. The double block and bleed valve was developed to cater for pump or metering station, tank farms, marine loading docks and blending plants.

No Abrasion

The 3Z Twin Slip Double Block and Bleed valve can completely isolate a line without leakage. The valve design is such that the seals do not come into contact with the valve body at any time while opening or closing of the valve. The seals come in contact with the body at the last moment force. This pressure force is perpendicular to the seating area and a shearing force is thus eliminated. When the valve is in the opening position, the seals are separated from the body, and are maintained at this state during wedge rotation. This eliminates abrasion forces from the seals and extends seal life.

Double Block & Bleed

With the 3Z Twin Slip Double Block and Bleed valve, there is an up-stream and down-stream seal, as well as a bleed point in between. This one D.B.B. may be substituted for two valves with one spool (drain). The spool sends any leaking fluid from the valve to the tank. The bleed system on the 3Z double block and bleed is provided to prove zero leakage. The ensures that if any leakage was to occur, it would be eliminated via the bleed. This in turn, guarantees complete and total product segregation.



High Integrity Shutoff

When the valve is closed the elastomeric seal rings are pushed against the seats each side of the valve body. The force is directed at a perpendicular direction by the wedging action of the slips. The elastomer seals on the slips are secured within a machined groove by a bonding agent. As for being fire-safe, the outside surface around the seals (on the slips) is a finished surface of metal, that is pushed against the metal body seat. This results in both an elastomeric and metal-to-metal bubble tight seal.

In Line Repairability

It is possible to inspect and replace the sealing slips with the valve still in line. The valve has a top and bottom bolted flange that is removable while the valve remains bolted in place.

Applications

3Z Double Block and Bleed valves are widely used for critical areas such as refinery, distribution center, Loading arm and air ports.



Loading Arm



Tank Farm



Metering Station



Air Port

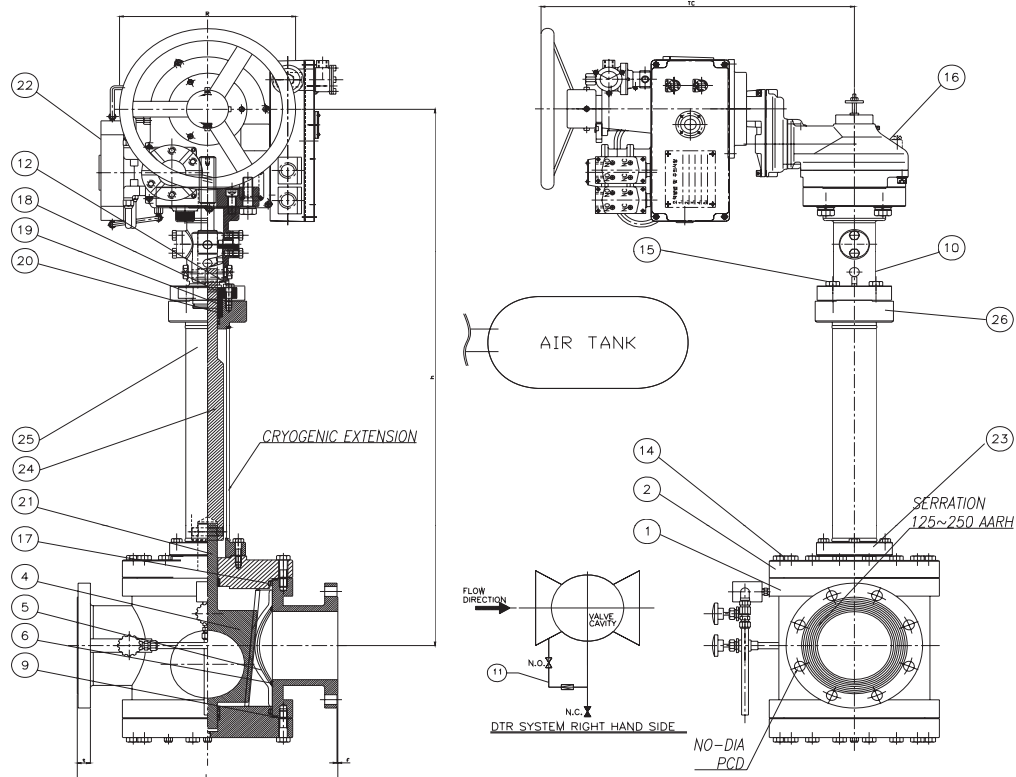


Tank Terminals



Pipe Line

Cryogenic Application (Construction)



NO	PART NAME	Q'TY	MATERIAL
1	BODY	1	STAINLESS STEEL
2	TOP COVER	1	STAINLESS STEEL
3	BOTTOM COVER	1	STAINLESS STEEL
4	PLUG	1	STAINLESS STEEL
5	SLIP	2	STAINLESS STEEL
6	SLIP INSERT	2	PFA
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHIT
10	MECHANISM OPERATOR	1S	STAINLESS STEEL
11	BLEED SYSTEMS	1S	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	STAINLESS STEEL
13	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
14	COVER BOLT	1S	STAINLESS STEEL
15	OPERATOR HOUSING BOLT	1S	STAINLESS STEEL
16	GEAR OPERATOR	1S	DUCTILE IRON
17	BODY O-RING	1S	PTFE
18	INNER GLAND O-RING	1	PTFE
19	OUTER GLAND O-RING	1	PTFE
20	PACKING SET	1S	GRAPHITE
21	STEM	1	STAINLESS STEEL
22	ACTUATOR	1	COMMERCIAL
23	UNDER BONNET	1	STAINLESS STEEL
24	EXTENSION STEM	1	STAINLESS STEEL
25	EXTENSION BONNET	1	STAINLESS STEEL
26	TOP BONNET	1	STAINLESS STEEL

Cryogenic Application (At Site)



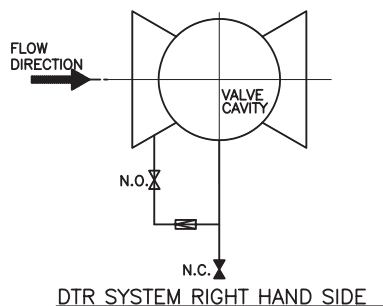
Loading Arm of LNG Terminal at one of the Middle East Country



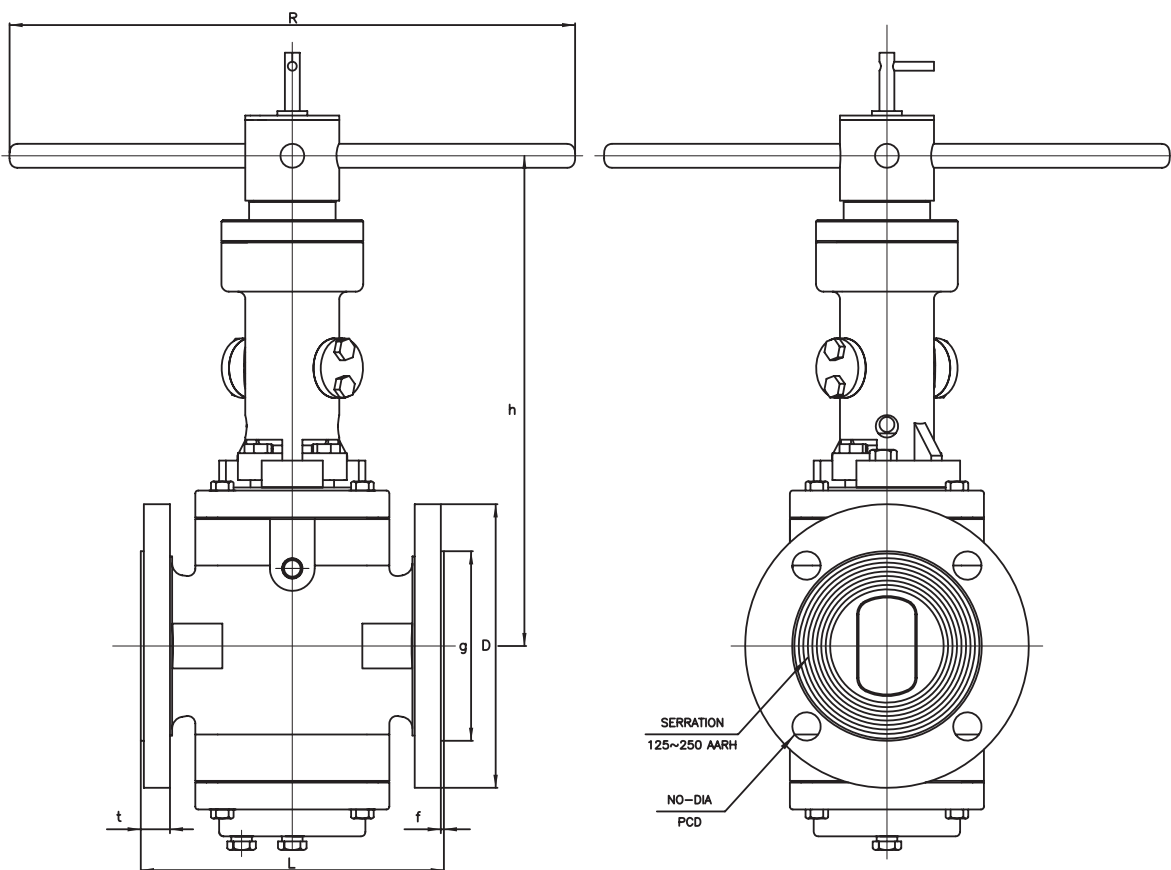
After Cryogenic Test at Factory



Actual Installation with
Heavy Insulation

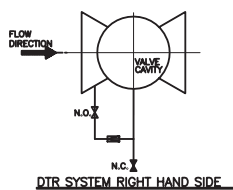


NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	TOP COVER	1	CARBON STEEL
3	BOTTOM COVER	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	INDICATOR	1	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	COVER BOLT	1S	ALLOY STEEL
14	BLEED SYSTEMS	1S	STAINLESS STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	HAND WHEEL	1	STEEL
17	BODY O-RING	2	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
22	STEM	1	STAINLESS STEEL

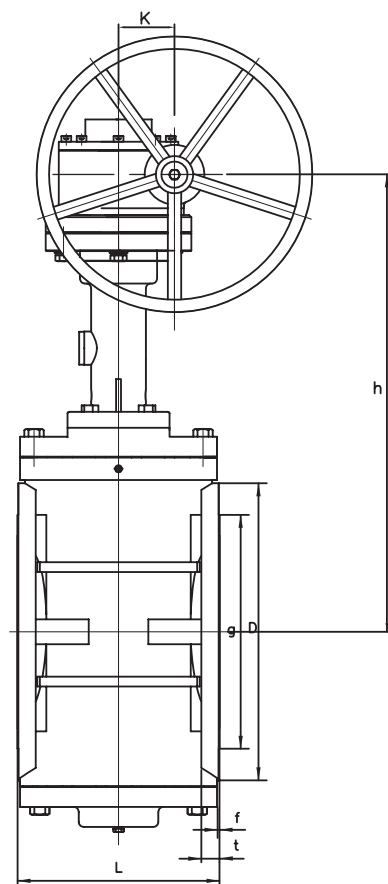
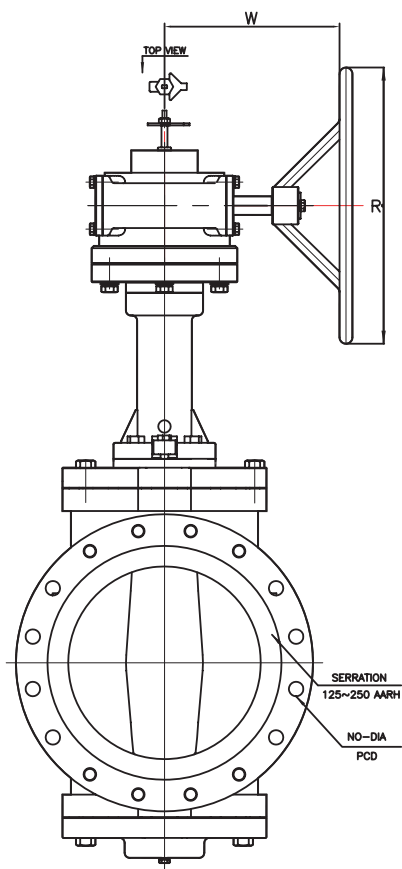


NOMINAL SIZE		DIMENSIONS(mm)									
		L	h	D	BOLT HOLE			g	t	f	R
IN	MM				PCD	NO	DIA				
2	50	178	333	150	120.7	4	19	92.1	16.3	2	380
3	80	203	344	190	152.4	4	19	127	19.5	2	380
4	100	229	359	230	190.5	8	19	157.2	24.3	2	380

NOTE.		END CONNECTION : RF	
1. Manganese Phosphate Coated		TEST	API 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
		WALL THICKNESS	ANSI API 599
3Z DOUBLE BLOCK & BLEED PLUG VALVE		PRODUCTION NO.	
		124.1-W.W.DI	



NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	BLEED SYSTEMS	1S	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
14	COVER BOLT	1S	ALLOY STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	GEAR OPERATOR	1S	DUCTILE IRON
17	BODY O-RING	1S	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	STEM	1	STAINLESS STEEL



DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES							R	K	W	d	Key
				D	BOLT HOLE			g	t	f					
					PCD	NO	DIA								
IN	MM														
6	150	267	485	280	241.3	8	22	216	25.9	2	300	53	155	20	6*6
8	200	292	596	345	298.5	8	22	270	29	2	400	63	206	25	8*7
10	250	330	709	405	362	12	25	324	30.6	2	450	75	230	25	8*7
12	300	356	753	485	431.8	12	25	381	32.2	2	450	75	230	25	8*7
14	350	381	790	535	476.3	12	29	413	35.4	2	560	92	279	35	10*8
16	400	406	908	595	539.8	16	29	470	37	2	560	92	279	35	10*8
18	450	432	945	635	577.9	16	32	533.4	40.1	2	630	113	312	35	10*8
20	500	457	1055	700	635	20	32	584.2	43.3	2	630	113	312	35	10*8

NOTE.

1. Manganese Phosphate Coated
2. 6" 8" 2 Top and Bottom Holes In Flanges Are Tapped For 3/4-10UNC
3. 10", 12" 2 Top and Bottom Holes In Flanges Are Tapped For 7/8-9UNC
4. 14" 2 Top and Bottom Holes In Flanges Are Tapped For 1-8UNC
5. 16" 4 Top and Bottom Holes In Flanges Are Tapped For 1-8UNC
6. 18" 4 Top and Bottom Holes In Flanges Are Tapped For 1 1/8-8UNC
7. 20" 4 Top and Bottom Holes In Flanges Are Tapped For 1 1/8-8UNC

END CONNECTION : RF

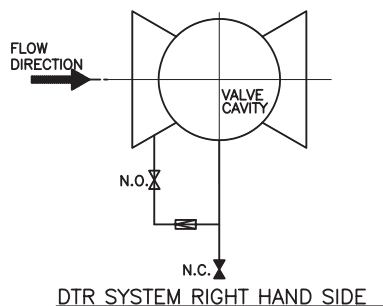
TEST	API 6D
FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
WALL THICKNESS	ANSI API 599

3Z

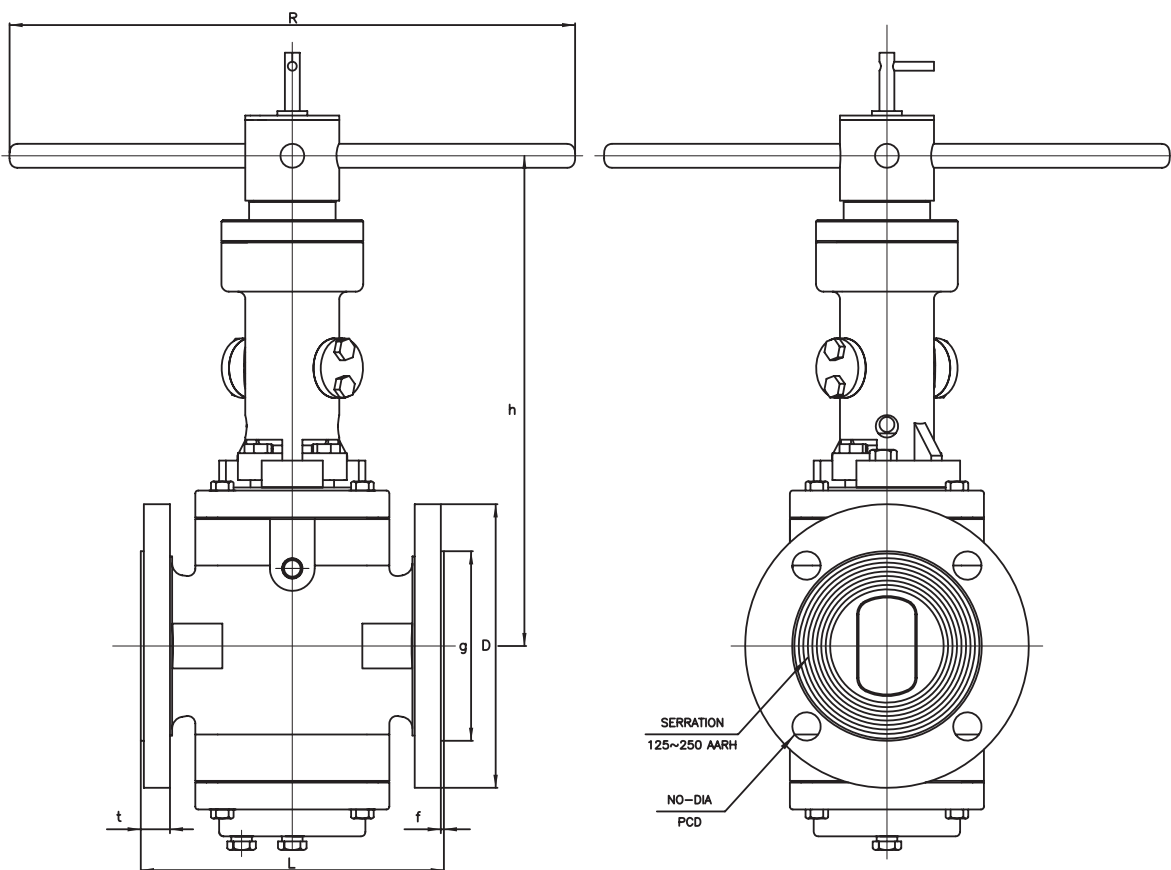
DOUBLE BLOCK & BLEED
PLUG VALVE

PRODUCTION NO.

124.2-W.W.DI

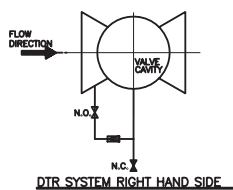


NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	TOP COVER	1	CARBON STEEL
3	BOTTOM COVER	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	INDICATOR	1	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	COVER BOLT	1S	ALLOY STEEL
14	BLEED SYSTEMS	1S	STAINLESS STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	HAND WHEEL	1	STEEL
17	BODY O-RING	2	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
22	STEM	1	STAINLESS STEEL

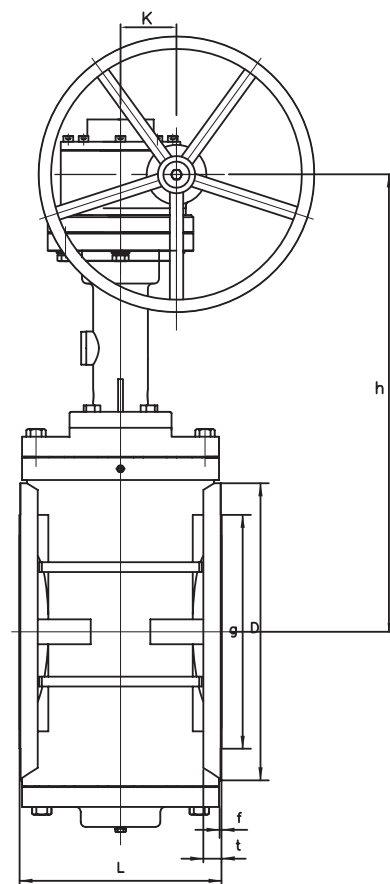
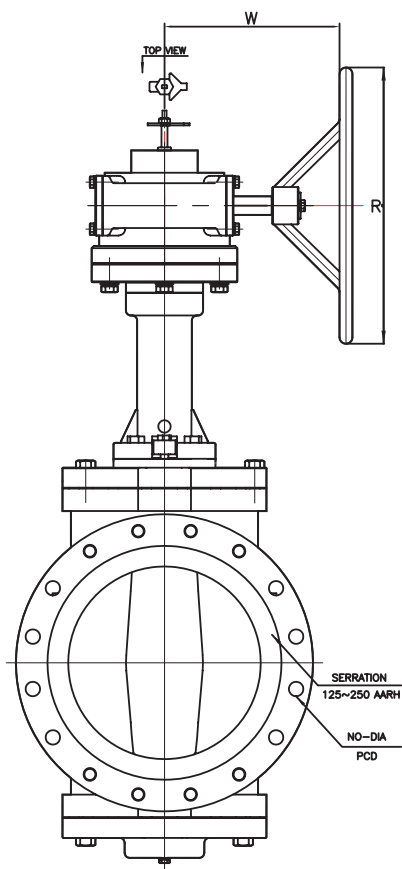


NOMINAL SIZE		DIMENSIONS(mm)									
IN	MM	L	h	D	BOLT HOLE			g	t	f	R
					PCD	NO	DIA				
2	50	216	448	165	127	8	19	92.1	22.7	2	380
3	80	283	484	210	168	8	22	127	29	2	300
4	100	305	549	255	200	8	22	157.2	32.2	2	300

NOTE.		END CONNECTION : RF	
1. Manganese Phosphate Coated		TEST	API 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
		WALL THICKNESS	ANSI API 599
3Z DOUBLE BLOCK & BLEED PLUG VALVE		PRODUCTION NO.	
		324.1-W.W.DI	



NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	BLEED SYSTEMS	1S	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
14	COVER BOLT	1S	ALLOY STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	GEAR OPERATOR	1S	DUCTILE IRON
17	BODY O-RING	1S	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	STEM	1	STAINLESS STEEL



DIMENSIONS(mm)

NOMINAL SIZE		END FLANGES														DIMENSIONS (mm)	
		L	h	D	BOLT HOLE			g	t	f	R	K	W	d	Key		
					PCD	NO	DIA										
IN	MM																
6	150	403	470	320	269.9	12	22	215.9	37	2	300	53	155	20	6*6		
8	200	419	610	380	330.2	12	25	269.9	41.7	2	400	63	206	25	8*7		
10	250	457	690	445	387.4	16	29	323.8	48.1	2	450	75	230	25	8*7		
12	300	502	750	520	450.8	16	32	381	51.3	2	560	92	279	35	10*8		
16	400	838	930	650	571.5	20	35	469.9	57.6	2	710	144.5	371	40	12*8		
24	500	1143	1400	915	812.8	24	41	692.2	70.3	2	710	184.5	425	40	12*8		

NOTE.

1. Manganese Phosphate Coated
2. 12" 4 Top and Bottom Holes In Flanges Are Tapped For 1.1/8-8UNC TEST

END CONNECTION : RF

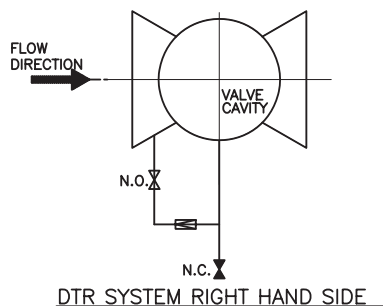
STD	TEST	API 6D
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
	WALL THICKNESS	ANSI API 599

3Z

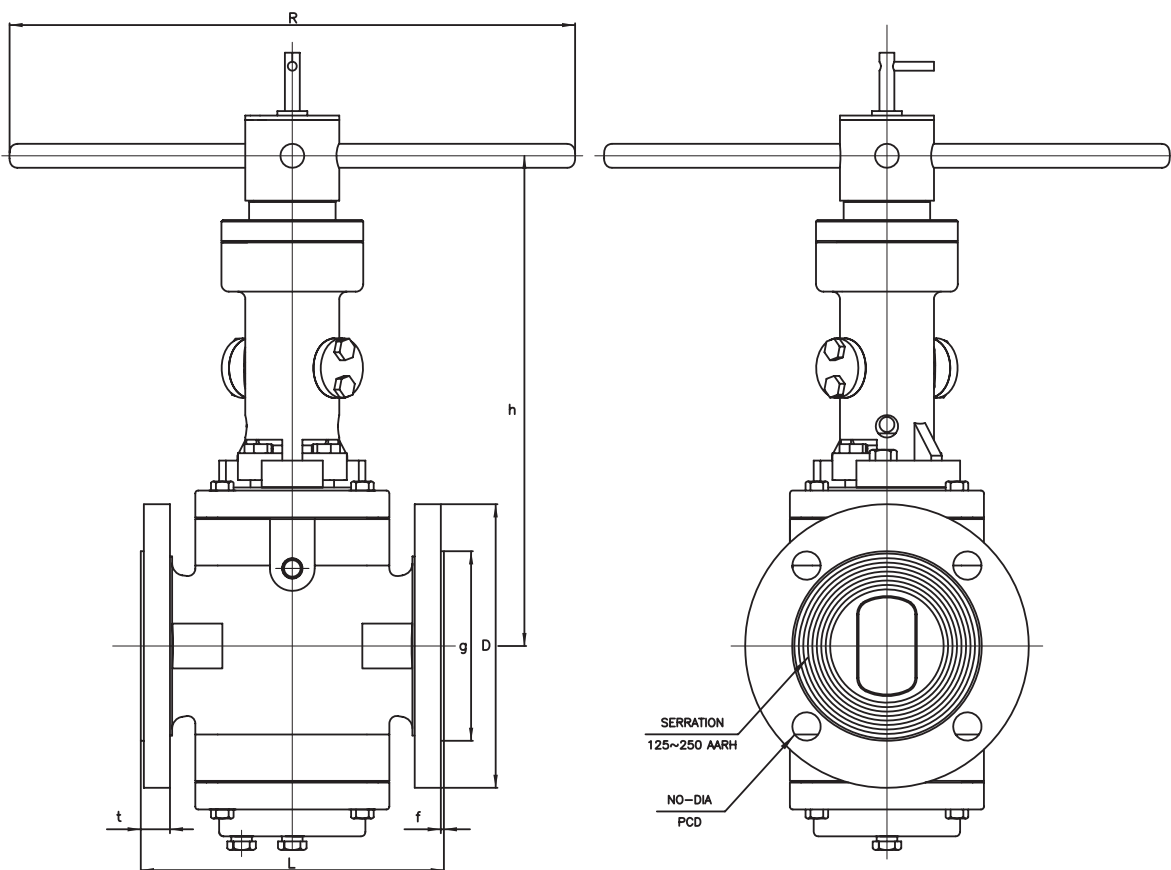
DOUBLE BLOCK & BLEED
PLUG VALVE

PRODUCTION NO.

324.2-W.W.DI

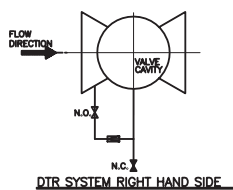


NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	TOP COVER	1	CARBON STEEL
3	BOTTOM COVER	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	INDICATOR	1	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	COVER BOLT	1S	ALLOY STEEL
14	BLEED SYSTEMS	1S	STAINLESS STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	HAND WHEEL	1	STEEL
17	BODY O-RING	2	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
22	STEM	1	STAINLESS STEEL

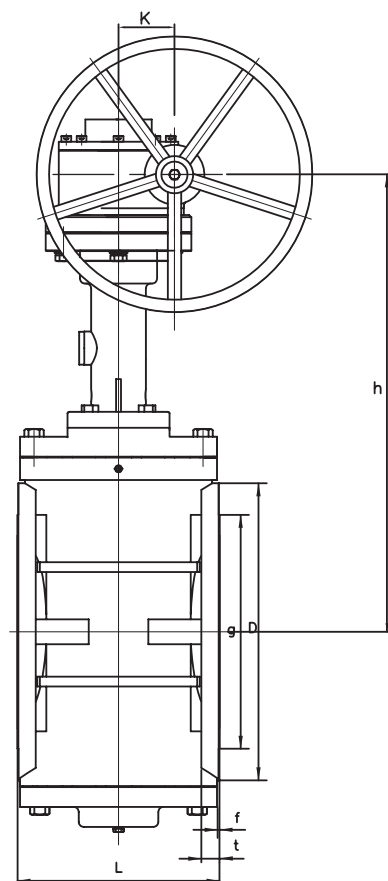
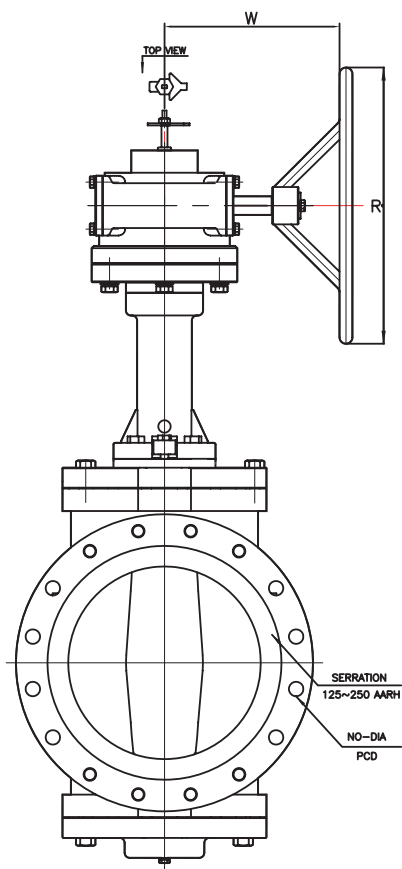


DIMENSIONS(mm)											
NOMINAL SIZE		L	h	D	END FLANGES				t	f	R
					BOLT HOLE			g			
IN	MM				PCD	NO	DIA				
2	50	292	448	165	127	8	19	92.1	32.4	2	380
3	80	356	484	210	168.3	8	22	127	38.8	2	380

NOTE.		END CONNECTION : RF	
1. Manganese Phosphate Coated		TEST	API 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 600
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 600
		WALL THICKNESS	ANSI API 599
3Z DOUBLE BLOCK & BLEED PLUG VALVE		PRODUCTION NO.	
		624.1-W.W.DI	



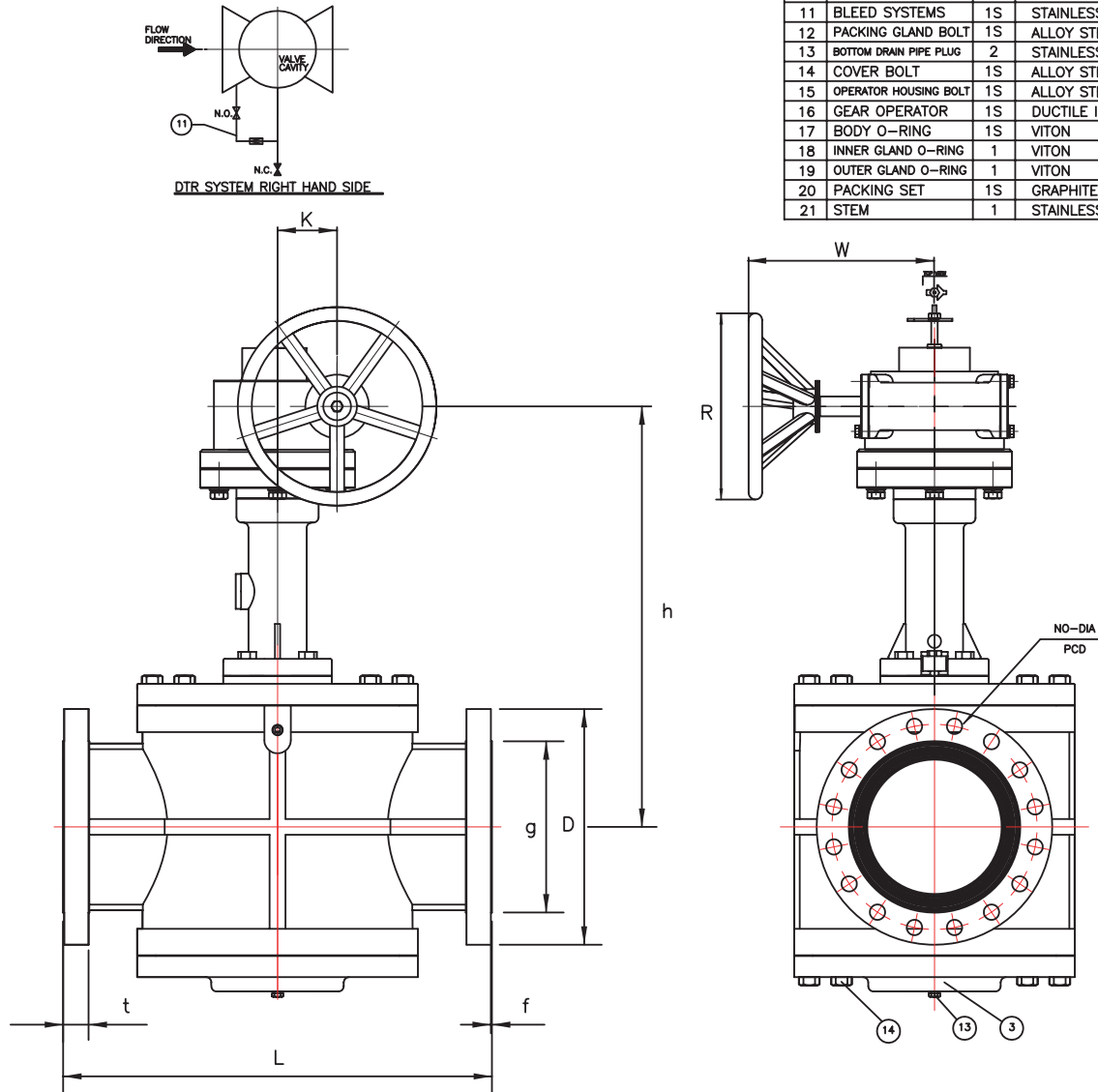
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	BLEED SYSTEMS	1S	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
14	COVER BOLT	1S	ALLOY STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	GEAR OPERATOR	1S	DUCTILE IRON
17	BODY O-RING	1S	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	STEM	1	STAINLESS STEEL



DIMENSIONS(mm)															
NOMINAL SIZE		L	h	END FLANGES							R	K	W	d	Key
				D	BOLT HOLE			g	t	f					
					PCD	NO	DIA								
IN	MM			D	PCD	NO	DIA	g	t	f					
4	100	432	453	275	215.9	8	25	157.2	45.1	7	250	53	155	20	6*6
6	150	559	688	355	292.1	12	29	215.9	54.7	7	400	75	230	25	8*7
8	200	660	776	420	349.2	12	32	269.9	62.6	7	450	92	279	35	10*8
10	250	787	813	510	431.8	16	35	323.8	70.5	7	560	92	279	35	10*8
12	300	838	852	560	489	20	35	381	73.7	7	630	113	312	35	10*8
16	400	991	1184	685	603.2	20	41	469.9	83.2	7	710	185	425	40	12*8

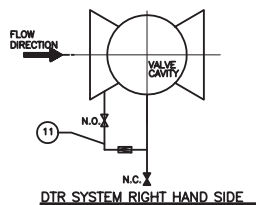
NOTE.		END CONNECTION : RF	
1. Manganese Phosphate Coated		TEST	API 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 600
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 600
		WALL THICKNESS	ANSI API 599
3Z DOUBLE BLOCK & BLEED PLUG VALVE		PRODUCTION NO.	
		624.2-W.W.DI	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	BLEED SYSTEMS	1S	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
14	COVER BOLT	1S	ALLOY STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	GEAR OPERATOR	1S	DUCTILE IRON
17	BODY O-RING	1S	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	STEM	1	STAINLESS STEEL

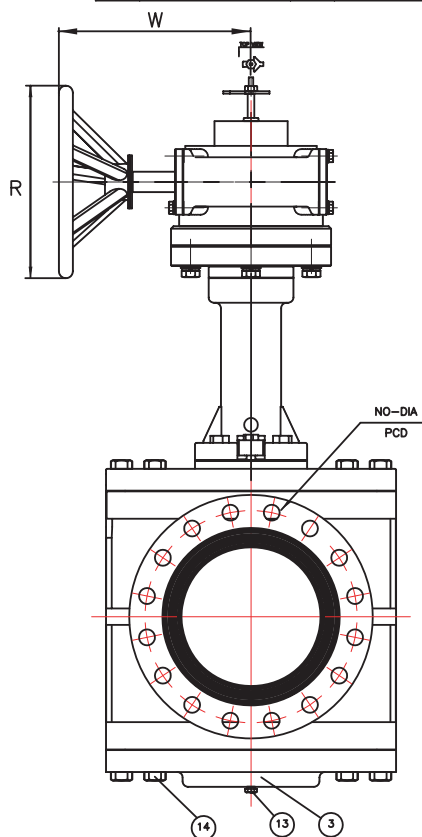
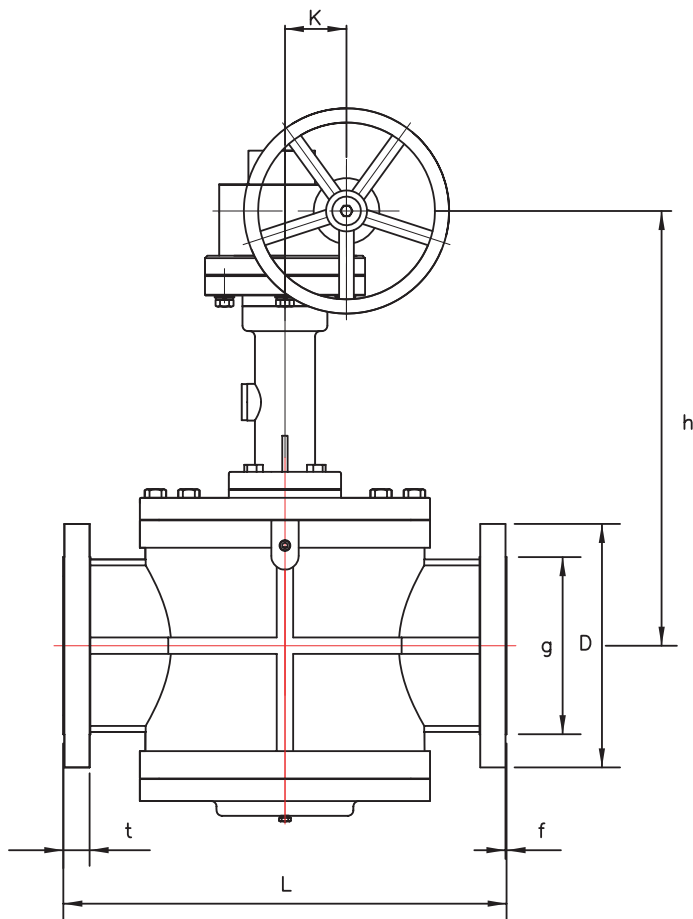


DIMENSIONS(mm)															
NOMINAL SIZE		L	h	END FLANGES							R	K	W	d	Key
				D	BOLT HOLE			g	t	f					
					PCD	NO	DIA								
IN	MM	432	460	230	190.5	8	19	157.2	24.3	2	300	53	155	20	6*6
4	100	534	510	280	241.3	8	22	216	25.9	2	400	62.5	206	25	8*7
6	150	635	694	345	298.5	8	22	270	29	2	450	75	230	25	8*7
8	200	788	750	405	362	12	25	324	30.6	2	460	91.5	279	35	10*8
10	250	915	1010	485	431.8	12	25	381	32.2	2	630	113	312	35	10*8
12	300	1219	1270	625	577.9	16	32	533.4	40.1	2	800	184.5	425	40	12*8
18	450	1219	1300	700	635	20	32	584.2	43.3	2	800	184.5	425	40	12*8

NOTE.		END CONNECTION : RF	
1. Manganese Phosphate Coated	STD	TEST	API 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150/maker standard PD
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
		WALL THICKNESS	ANSI API 599
3Z	DOUBLE BLOCK & BLEED PLUG VALVE		PRODUCTION NO.
			124FB.2-W.W.DI

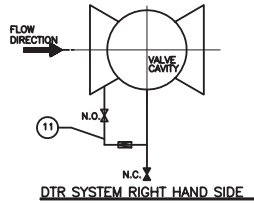


NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	BLEED SYSTEMS	1S	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
14	COVER BOLT	1S	ALLOY STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	GEAR OPERATOR	1S	DUCTILE IRON
17	BODY O-RING	1S	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	STEM	1	STAINLESS STEEL

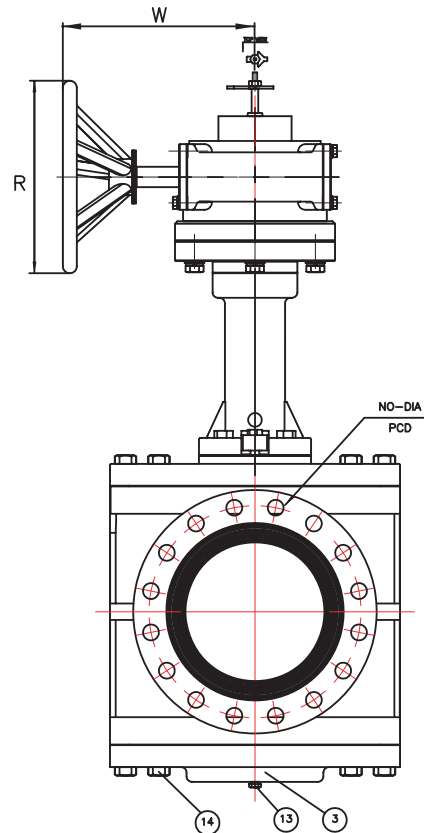
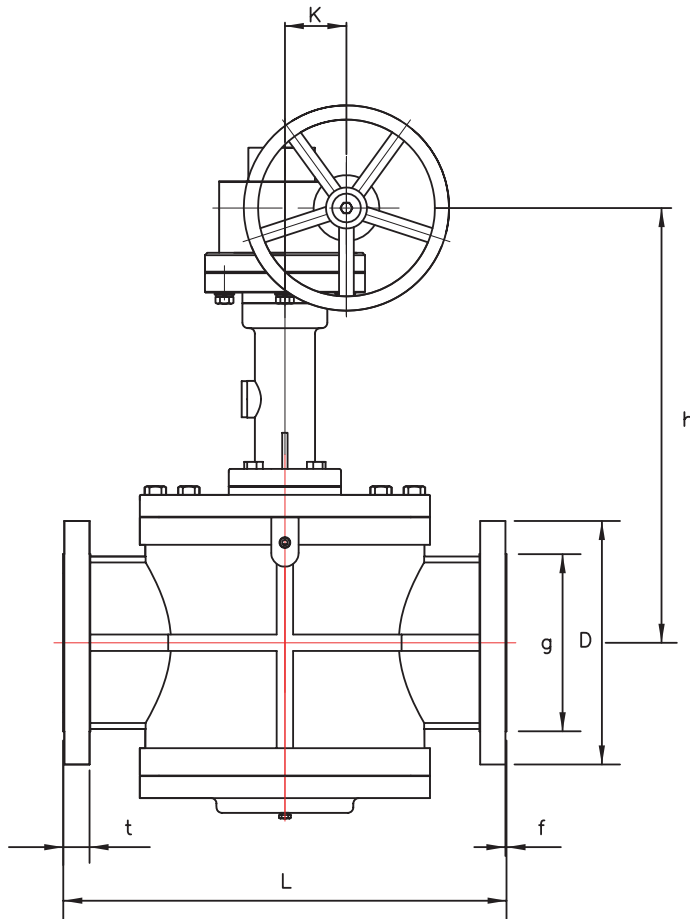


NOMINAL SIZE		END FLANGES														
		BOLT HOLE														
		L	h	D	PCD	NO	DIA	g	t	f	R	K	W	d	Key	
4	100	457	419	255	200	8	22	157.2	32.2	2	300	53	155	20	6*6	
6	150	559	533	320	269.9	12	22	215.9	37	2	400	62.5	206	25	8*7	
8	200	686	638	380	330.2	12	25	269.9	41.7	2	450	75	230	25	8*7	
10	250	826	776	445	387.4	16	29	323.8	48.1	2	560	91.5	279	35	10*8	
12	300	965	889	520	450.8	16	32	381	51.3	2	630	113	312	35	10*8	
14	350	864	1086	585	514.4	20	32	412.8	54.4	2	710	144.5	371	40	12*8	
16	400	1042	1219	650	571.5	20	35	469.9	57.6	2	800	184.5	425	40	12*8	

NOTE.		END CONNECTION : RF	
1. Manganese Phosphate Coated		TEST	API 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300/maker standard PD
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
		WALL THICKNESS	ANSI API 599
3Z DOUBLE BLOCK & BLEED PLUG VALVE		PRODUCTION NO.	
		324FB.2-W.W.DI	



NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	CARBON STEEL
4	PLUG	1	CARBON STEEL
5	SLIP	2	DUCTILE IRON
6	SLIP INSERT	2	VITON
7	PACKING GLAND	1	STAINLESS STEEL
8	PIN(ANTISTATIC DEVICE)	1	ALLOY STEEL
9	GASKET	1S	STAINLESS STEEL/GRAPHITE
10	MECHANISM OPERATOR	1S	CARBON STEEL
11	BLEED SYSTEMS	1S	STAINLESS STEEL
12	PACKING GLAND BOLT	1S	ALLOY STEEL
13	BOTTOM DRAIN PIPE PLUG	2	STAINLESS STEEL
14	COVER BOLT	1S	ALLOY STEEL
15	OPERATOR HOUSING BOLT	1S	ALLOY STEEL
16	GEAR OPERATOR	1S	DUCTILE IRON
17	BODY O-RING	1S	VITON
18	INNER GLAND O-RING	1	VITON
19	OUTER GLAND O-RING	1	VITON
20	PACKING SET	1S	GRAPHITE
21	STEM	1	STAINLESS STEEL



DIMENSIONS(mm)															
NOMINAL SIZE		L	h	END FLANGES							R	K	W	d	Key
				D	BOLT HOLE			g	t	f					
					PCD	NO	DIA								
IN	MM														
10	250	787	765	510	431.8	16	35	323.8	70.5	7	560	91.5	279	35	10*8
20	500	1194	1244	815	723.9	24	45	584.2	95.9	7	800	184.5	425	40	12*8

NOTE.		END CONNECTION : RF	
1. Manganese Phosphate Coated		TEST	API 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 600/maker standard PD
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 600
		WALL THICKNESS	ANSI API 599
3Z DOUBLE BLOCK & BLEED PLUG VALVE		PRODUCTION NO.	
		624FB.2-W.W.DI	



3Z[®]



**Sleeved &
Lined
Plug Valve**

Soft Seated Plug Valves

The Solution For The Valve Problems

3Z[®] Plug Valves



**3Z Standard
Port Plug Valve**
FIG 120, 320, 620



3Z Live Loaded Plug Valve
FIG 120LL, 320LL, 620LL



**3Z Full Port
Plug Valve**
FIG 120FB, 320FB, 620FB



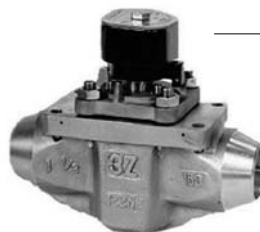
**3Z 3-Way
Plug Valve**
FIG 130, 330, 630



**3Z 5-Way
Plug Valve**
FIG 150, 350, 650



**3Z Jacketed
Plug Valve,
Full or Partial**
FIG 120FJ, 320FJ, 620FJ, 120PJ, 320PJ, 620PJ



**3Z Nuclear
Plug Valve**
FIG 122N BW, 322NBW, 622N BW



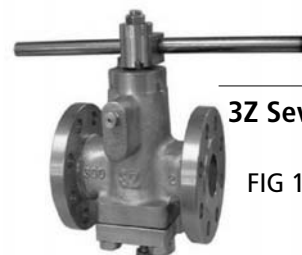
**3Z Screwed End
Plug Valve**
FIG 122SE, 322SE, 622SE



**3Z 3-Way Full
Port Plug Valve**
FIG 130FB, 330FB, 630FB



**3Z Socket
Welded End
Plug Valve**
FIG 122SW, 322SW, 622SW



**3Z Severe Service
Valve**
FIG 120SS, 320SS, 620SS

Control Valves / Specialty Valves



**3Z Electric Control
Plug Valve**
FIG 120CVE



120CVE 3Z Sleeved valves are also available for various Hydrofluoric Acid applications.



**3Z Direct Mounted Pneumatic
Control Plug Valve**
FIG 120CVD



3Z CAGED PLUG Valve
FIG 120CG, 320CG, 620CG



**3Z Pneumatic
Control Metal
Seated Plug Valve**
FIG 123CV



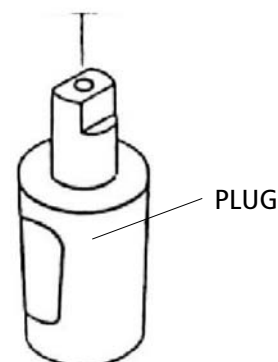
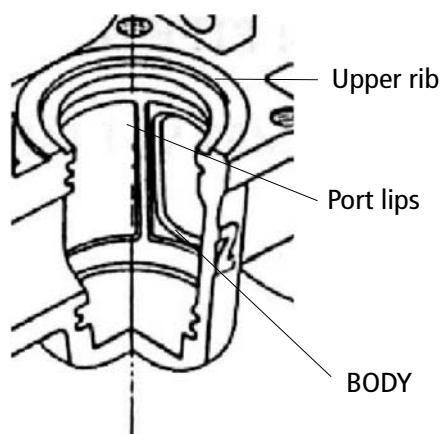
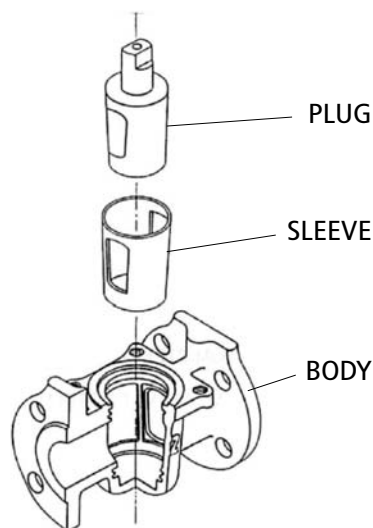
**3Z Interlocked
Type Plug Valve**
FIG 120CVT



**3Z Direct Mounted Pneumatic
Fingertrol Control valve**
FIG 120CVD

- 3Z Autoclave Line Plug Valve
- 3Z Black Liquor Line Plug Valve
- 3Z Bleed Systems Valve
- 3Z Cryogenic Plug Valve
- 3Z Chlorine Valve
- 3Z Caged Plug Valve
- 3Z Diverted Type Plug Valve
- 3Z Fingertrol Plug Valve
- 3Z Fire Safe Plug Valve
- 3Z Gas Distribution Plug Valve
- 3Z Metal Proving Plug Valve
- 3Z Piloted Plug Valve
- 3Z Power Plant Plug Valve
- 3Z Spandex Plug Valve
- 3Z System Flush Plug Valve
- 3Z Tandem Plug Valve
- 3Z Underground Plug Valve
- 3Z Vacuum Plug Valve

Construction of Sleeved Plug Valves



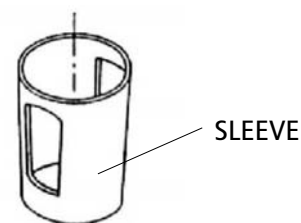
Basic structure is plug, sleeve, body. Sleeve is inserted and engaged inside the body. Tapered plug is inserted onto the sleeve. The sleeve is acting as a soft seat. And completely surrounds plug creating areal sealing surfaces. Also not permitting any dead space in the flow path. Plug is rotating 90 degree. When it is aligned with the body port, flow is open. When the plug is rotated so that plug port is perpendicular to the body port the flow is blocked. The media kept in the plug while at closed position, will be contained in the plug port only, and when the valve is open again, the flow will flush the out. And no remains

PTFE is an plastic material, even though they are high grade engineering material. All plastics are subject to cold flow.; at higher temperature volume increase, escape to the low pressure area and don't get back to its original position even after removal of temperature, pressure. But, if they get confined , they would not cold flow. Upper boundary and lower boundary, and 360 port lips. Recessed wall is acting as absorption of inflated volume of PTFE when volume is increased due to temperature.

The vertical, upper horizontal, and lower horizontal pressure ribs are provided to provide pressure seal lines along plug any time.

True circularity of body center bore is very important for firm sealing. Ribs and lips must be truly circular and concentrically defined as cast state. 3Z is has its own foundry. Did this for over 20 years. Reliable.

Plug is tapered. Monolithic design. Wedge action. Lowering 1 mm will result in side pressure vectors. Adjustable. Solid not unstable as pressure dependent. Materials can be upgraded for the plug alone to be better resistive than the body corrosion rate.

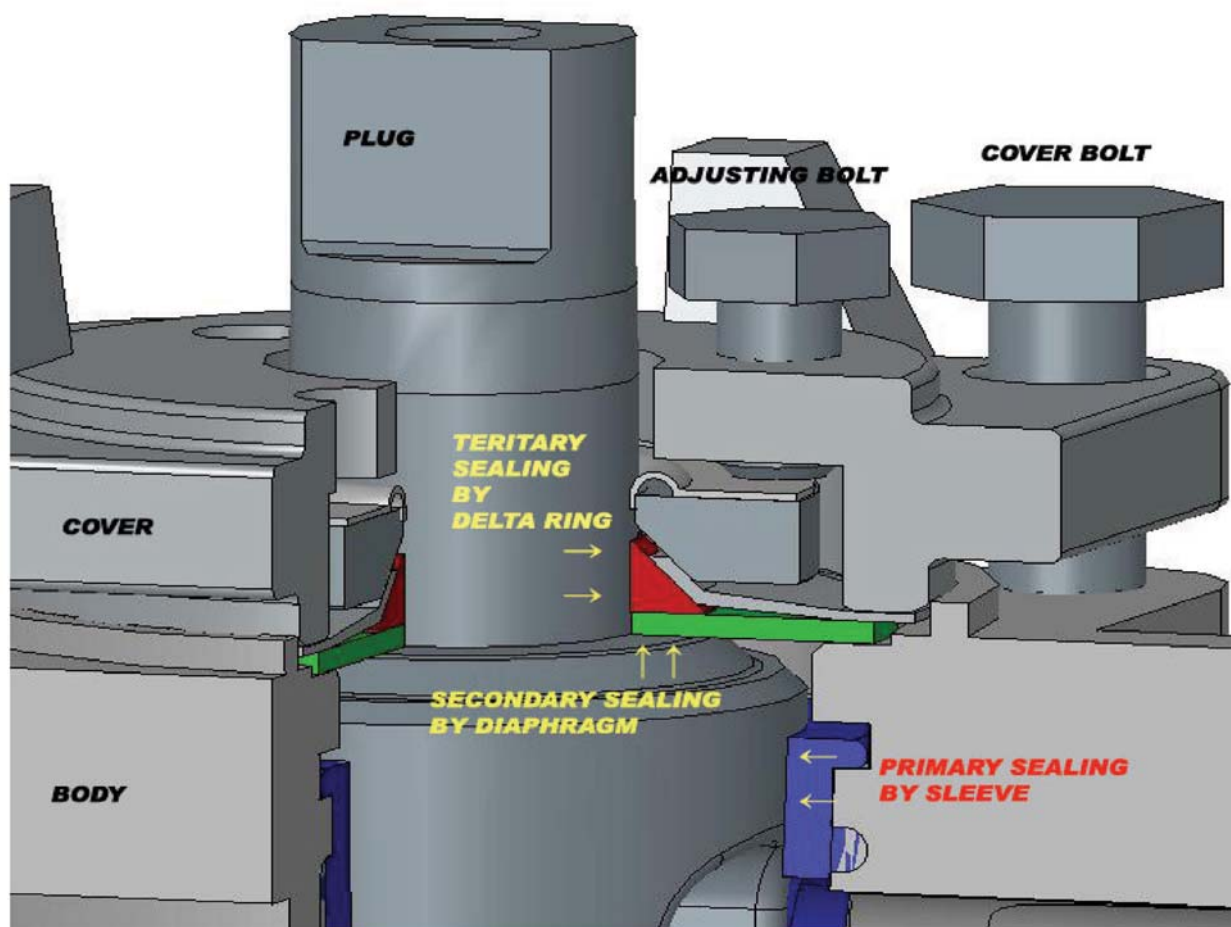


Sleeve is also tapered to accepted the configure of plug. They are snugly fit into the void space created by upper, lower and metal port lips.

The PTFE materials are rigid enough, resilient enough, elastic enough. Corrosion resistant. Temperature, pressure.

For highly radioactive environment, higher temperatures, several different materials are used.

Threefold Sealing System



Threefold Sealing System

The zero leakage stem sealing is achieved by threefold sealing system.

The primary seal is provided by the sleeve. The sealing is so tight that no leakage can be observed even without a valve cover.

The secondary and tertiary seal (top seal package) are provided by a PTFE Teflon delta ring and a diaphragm. The sealing is also so tight that no leakage can be observed even without a sleeve.

A test report is available at request

1.0 Types of generic valve failures

Valves fail to serve their function when they indicate leakage or inoperability. They have to be repaired to function properly. Any valve design have a moving part which close or open the flow path. The part protrudes through the pressure boundary to be operated outside. At gate valve design it is called wedge/stem; globe valve, plug/stem; ball valve, ball/stem; etc.

1.1 Leakage - This type of failure can occur internally or externally at this moving part. External leakage can be generated at the pressure boundary through stem of the valve. Internal leakage can be generated between the seat of the body and the moving part. When leakage develops the valves can be judged failed. The leakage damages various factors. Depending on the degree of seriousness, users determine whether to repair the valve or to use it as is.

1.2 Inoperability - This type of failure occurs when the moving part of the valve cannot be engaged or disengaged due to various reasons, such as by the slurry accumulated at the crevice of wedge way in gate valve design. This type of failure hampers serious problems in flow control. They have to be repaired right away to perform the intended role of the valve.

1.3 Life-time - At initial inspection and test stage, almost all the valves function properly. That is, it does not leak and open/close well. But when installed and exposed at actual conditions, after a certain period of time, the valve start to fail. The time is called "Life-time" of the valve. If the life-time is practically and economically too short, the valve is not suitable for the service.

2.0 Factors influencing valve failures/life-time

Natures and conditions of flow media, modes of operation and environmental conditions are important factors. The valve design employed must have features to overcome the given conditions.

2.1 Phase of Media - The flow media can be in the phase of solid, liquid, or gas. The solids can be in powder, granule or larger particles. They can be dissolved or suspended in a solution. They can crystallize, precipitate, solidify, polymerize, crack, react chemically or physically, etc. They can in the form of slurry/sludge. They may carry unexpected impurities or wastes, generated from reactors or pipe lines.

2.2 Nature of Media - The media can be corrosive, toxic when ingested or inhaled, carcinogenic, irritative to skin and eyes, explosive, flammable, oxidizing with air infiltrated in, etc.

2.3 Modes of operation - They may be in different cycle time, temperature/pressure variations, start up mode, shut down mode, emergency mode, etc.

2.4 Environmental Conditions - They may be under hot or cold weather, facing salty sea wind, at corrosive atmosphere.

3.0 Valve problems cost a lot of money

When improperly designed valves are use, capital cost for repeated procurement of valves, materials and labor cost for frequent repair of installed valves, production disturbance cost, safety protection cost, environmental protection cost, administrative cost for valve maintenance management cost, etc., adds up to enormous cost and expenses.

4.0 Conventional valves, too short a life-time

The conventional valves had been developed to meet the requirement of steam handling since the industrial revolution of 200 years ago. The new industrial revolution of hydrocarbon processing of oil, gas and petrochemicals outbreak 50 years ago. The conventional valves have been used for the process industries but with failures. The life-time is too short to be safe, reliable and economic.

4.1 Gate valves - Valve cannot be closed when solids accumulates at the void space at the seat where the wedge seats in. It galls. Over-tightening when closing damage valve seals quickly. Gland seal fails quickly.

4.3 Globe valves - Direction changes, 6 times of 90 degree, may be okay for throttling but prohibitive for normal flow use. Over-tightening when closing damage valve seals quickly. Slurry clogs port quickly. Gland seal fails quickly.

4.2 Ball valves - Valve seal ring fails quickly due to the slurry kept in dead space between ball and body. Gland seal fails quickly.

4.3 Diaphragm valves - Rubber containing diaphragm ages about a year. Quickly torn away by aging and over-tightening. Gland seal fails quickly. Diaphragm gets damaged by solids in the media.

4.4 Butterfly valves - Slurry gotten in dead space at the bottom stem damage the valve. Excessive rubbing action and aging wears and tears off seat rubber. Gland seal fails quickly.

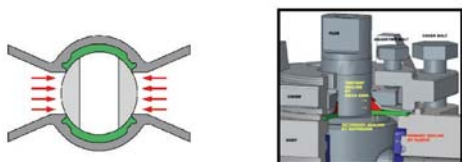
5.0 3Z, the solution for valve problems

3Z sleeved plug valves are specifically designed to overcome the problems described above.

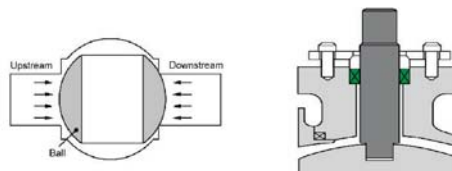
Solution for Valve Problem (3 Zero Features)

Zero Leakage

3Z PLUG VALVE

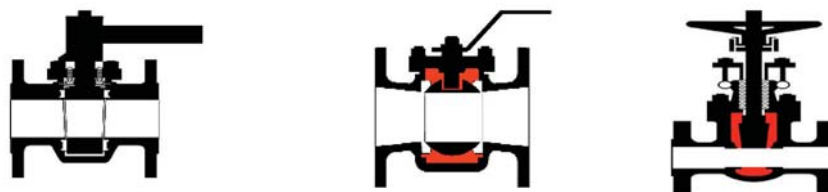


OTHER VALVES



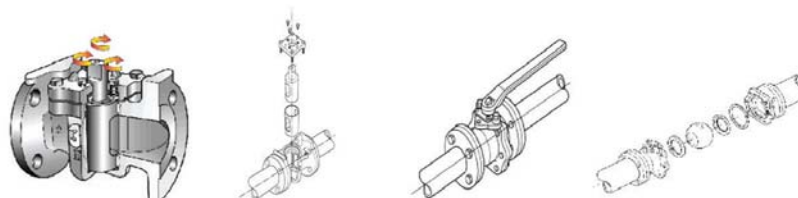
The zero leakage stem sealing is achieved by the Threefold Stem Sealing System. The primary seal is provided by the sleeve. The sealing is so tight that no leakage can be observed even without a valve cover. The secondary and the tertiary seal (top seal package) are provided by a delta ring and a diaphragm made of RTFE (Reinforced Teflon). The sealing is also so tight that no leakage can be observed even without a sleeve.

Zero Cavity



Plug is always surrounded by PTFE sleeve 360 degree around and therefore the liquid in the plug internal cannot flow into no dead space whether it's open or close. When the valve is open the line flow would flush out the liquid in the plug internals. Ball Valve & other Valve : When the ball is closed, the liquid containing slurry which was kept in ball openings, flows into the dead space between ball and body. The liquid imprisoned at the dead space will stay during life time of the valve. When PVC slurry of sludge is precipitated and accumulated in this dead space the burdened solids will block the rotation of ball, pushes out the seal surface of Teflon ring, and gives damages to the seal, which eventually produces the leakage.

Zero Maintenance



Owed to the merits of its structure, the valve is zero leakage and no maintenance is required. When seal pressure adjustment is required due to PTFE sleeve wear, a quarter turn of adjustment bolts pushes the plug down regenerating a sealing pressure as if it is a new valve. Therefore no disassembles, no repair is required for more than 10 years for the most of cases. Line repair is possible because the plug is the top entry type.

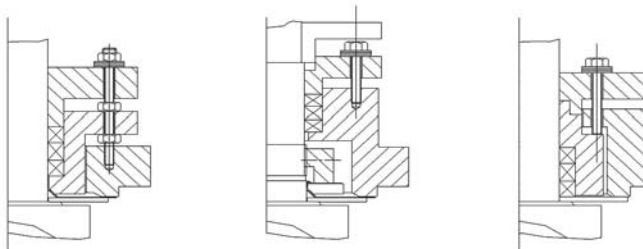
For lethal, toxic and sub-zero fluid services where an absolute stem seal is required.



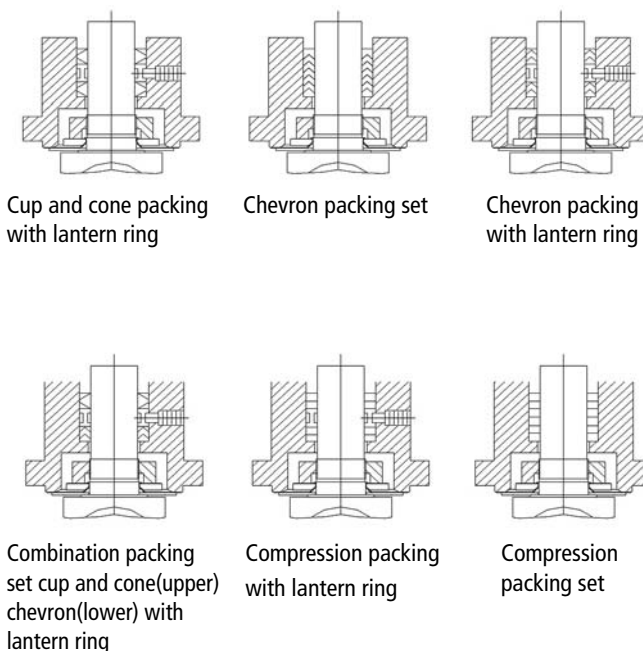
3Z Live Loaded Plug Valve
Fig. 120, 320, 620LL

- Designed and built to eliminate fugitive emissions and to handle the toughest services such as
Chlorine
Hydrofluoric Acid
Anhydrous HCl
- A true stuffing box design with all the positive shut-off, corrosion resisting features of other 3Z Sleeved Plug Valves.
- Will accommodate all standard packing.
- Many options such as bonnet tap for insertion of chlorine compatible lubricant or other greases, for inert gas pad, or as a leak-off connection.
- V-Port and 3-way plug configuration are available as options.
- Port : 2-5 way
- Class : 150/300/600
- Size : 1/2" - 24"
- Temperature Range : -30 °C to 260 °C

Live Loaded Design Options



Wide Range of Stuffing Box Options



Multiport Valves

The versatility of 3Z multiport valves and the variety of flow arrangements in which they are available make these valves ideal for many types of piping systems handling liquids, gases, slurries or other applications where tight shutoff is required.



**3Z 3-Way
Plug Valve**
FIG 130, 330, 630



**3Z 5-Way
Plug Valve**
FIG 150, 350, 650



**3Z 4-Way
Plug Valve**
FIG 140, 340, 640



**3Z 3-Way Full
Port Plug Valve**
FIG 130FB, 330FB,
630FB

3 way Port Arrangement

FORMS	A	AX	D	C	I	T	L
FLOW							
POSITION 1 0°							
POSITION 2 90°							
POSITION 3 180°							
POSITION 4 270°							

Designed for Nuclear Power Plant application
.Standard type : Sleeve is "UHMWPE"

- Port : 2-5 way
- Class : 150/300/600
- Size : 1/2" - 24"
- Temperature Range : -30 °C to 260 °C



**3Z FIG 322N.BW
BUTT WELD END
NUCLEAR
PLUG VALVE**

2-Way
Class 150/300
1/2-6 inch



**3Z FIG 322N.P
PUP WELDED
NUCLEAR
PLUG VALVE**

2-Way
Class 150/300
1/2-6 inch
Pup Welded



**3Z FIG 322N.SW
SOCKET WELD END
NUCLEAR
PLUG VALVE**

2-Way
Class 150/300
1/2-6 inch
For Nuclear Service



**3Z FIG 332N
BUTT WELD END
NUCLEAR
PLUG VALVE**

3-Way
Class 150/300
1/2-6 inch



**3Z FIG 322N.CV
PNEUMATIC
NUCLEAR
CONTROL
PLUG VALVE**

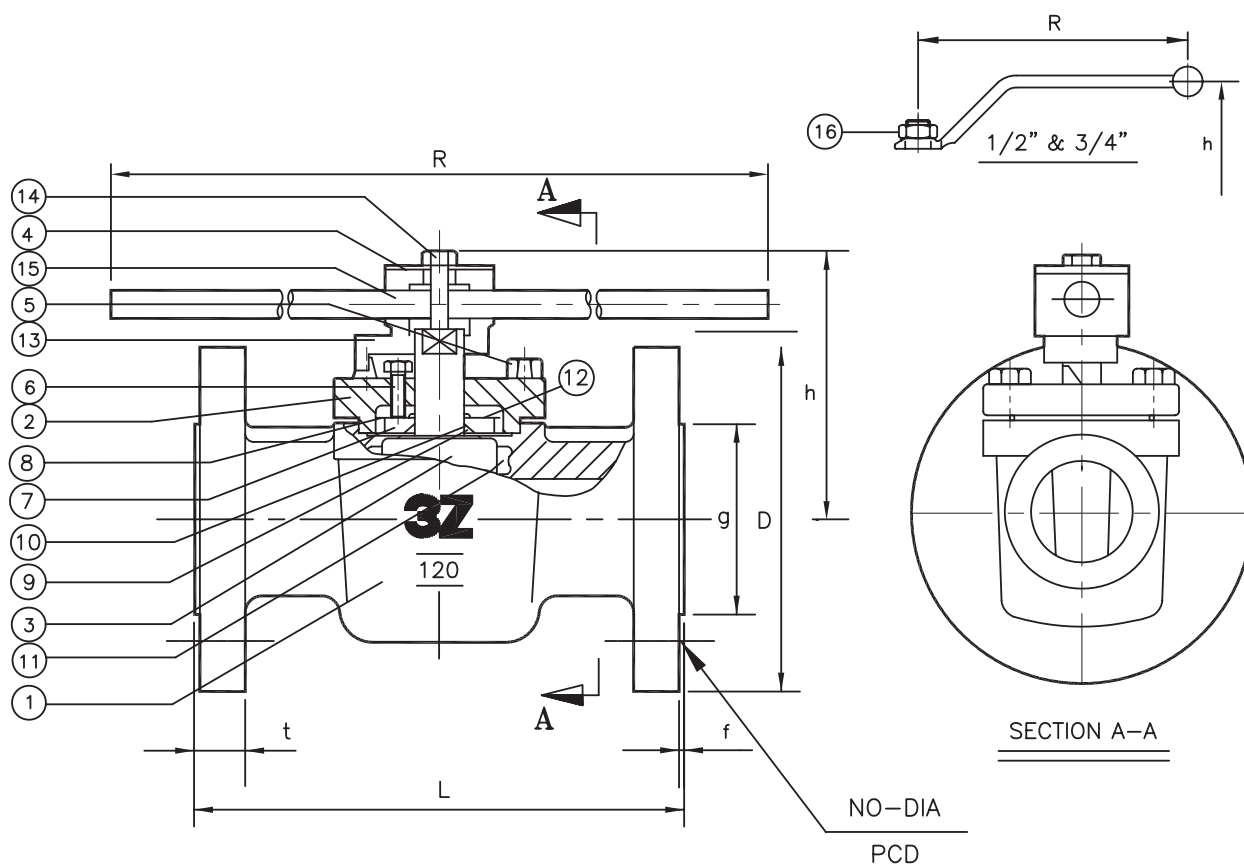
Double Acting Type
2-Way
Class 150/300
1/2-6 inch



**3Z FIG 322N.CV
PNEUMATIC
NUCLEAR
CONTROL
PLUG VALVE**

Spring Return Type
2-Way
Class 150/300
1/2-6 inch

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CALBON STEEL
3	PLUG	1	STAINLESS STEEL
4	NAME PLATE	1	STAINLESS STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	ADJUSTING BOLT	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'M	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	SLEEVE	1	PTFE
12	ANTISTATIC DEVICE	1	STAINLESS STEEL
13	HUB	1	STAINLESS STEEL
14	HUB BOLT	1	STAINLESS STEEL
15	HANDLE	1	CARBON STEEL
16	HANDLE NUT	1	STAINLESS STEEL

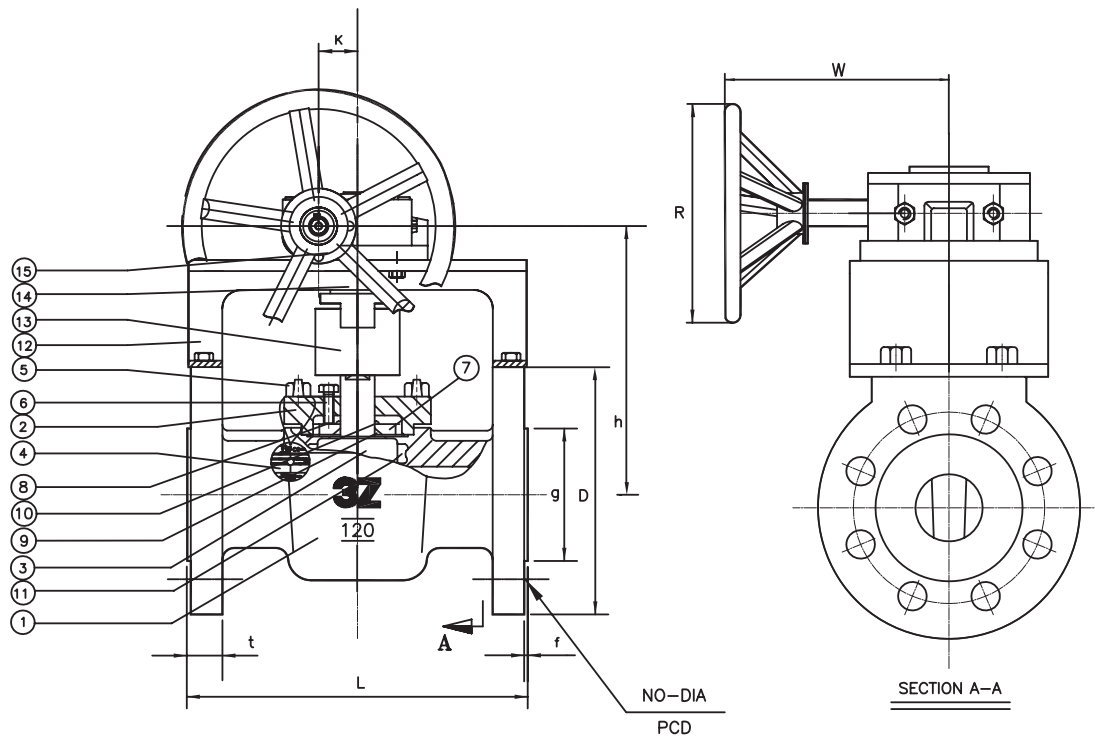


DIMENSIONS(mm)

NOMINAL SIZE		END FLANGES									
		L	h	D	BOLT HOLE			g	t	f	R
IN	MM				PCD	NO	DIA				
0.5	15	108	110	89	60.5	4	16	35	9.7	1.6	180
0.75	20	117	110	98	70	4	16	43	10.4	1.6	180
1	25	127	90.6	108	79.5	4	16	51	11.2	1.6	222
1.5	40	165	110.9	127	98.5	4	16	73	14.2	1.6	318
2	50	178	126	152	120.5	4	19	92	15.8	1.6	458
2.5	65	190	140.7	178	139.5	4	19	105	25.4	1.6	597
3	80	208	140.7	190	152.5	4	19	127	19.1	1.6	597
4	100	229	174.4	229	190.5	8	19	157	23.9	1.6	746

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
	WALL THICKNESS	ANSI B 16.34 CLASS 150
<div>3Z</div> <div>SLEEVED PLUG VALVES</div>		PRODUCTION NO.
		120.1-W.6

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	NAME PLATE	1	STAINLESS STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	ADJUSTING BOLT	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'G	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	SLEEVE	1	PTFE
12	BRACKET	1	CARBON STEEL
13	COMPENSATOR	1	CARBON STEEL
14	TORQUE BAR	1	CARBON STEEL
15	GEAR OPERATOR	1	STEEL

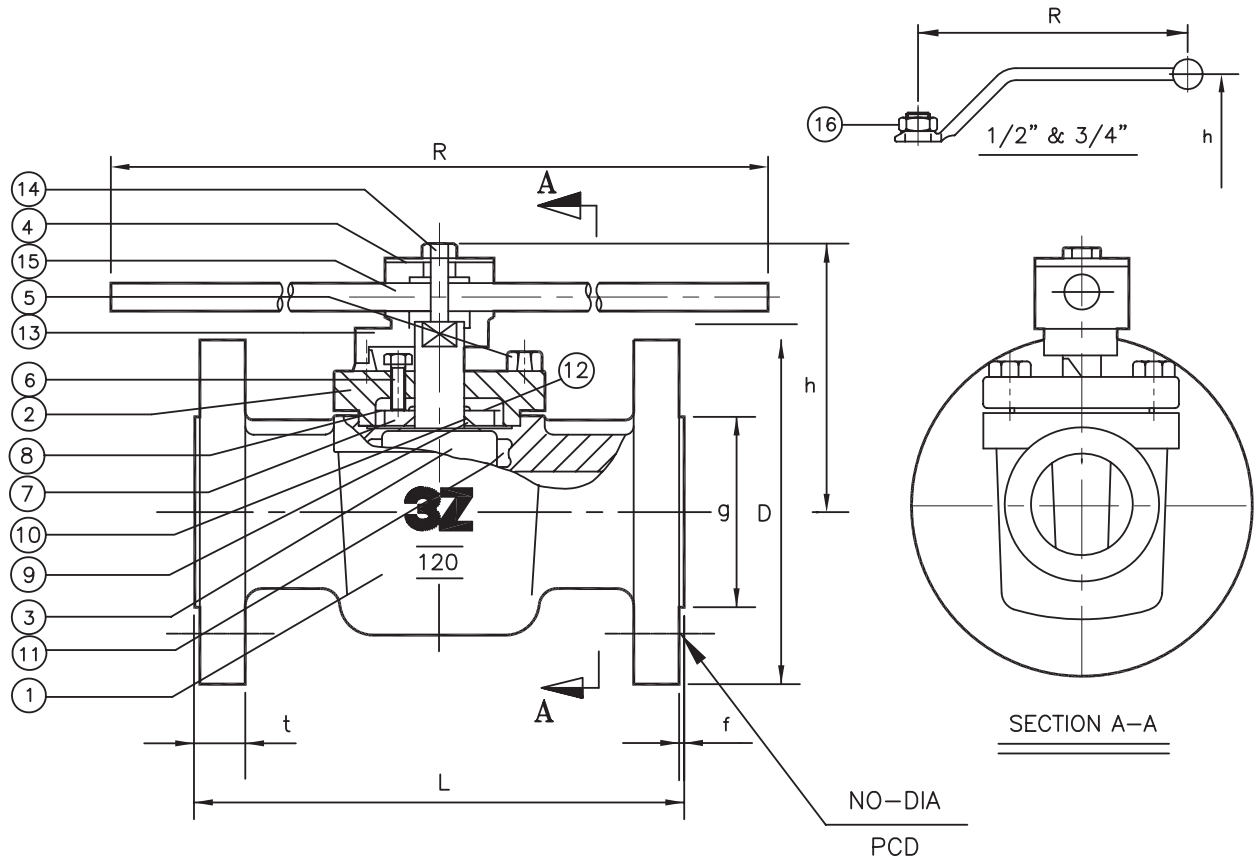


DIMENSIONS(mm)

NOMINAL SIZE		L	h	D	END FLANGES						R	K	W
					BOLT HOLE			g	t	f			
IN	MM				PCD	NO	DIA						
6	150	267	282	279	241.5	8	22	216	25.4	1.6	200	73	300
8	200	292	348	343	298.5	8	22	269.9	28.6	1.6	225	108	350
10	250	330	379	406	362	12	25	324	30.2	1.6	225	108	350
12	300	356	418	483	432	12	25	381	31.8	1.6	280	108	350
14	350	381	506	533	476	12	29	413	35.1	1.6	315	166	450
16	400	762	559	597	539.5	16	29	470	36.6	1.6	315	166	450

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
	WALL THICKNESS	ANSI B 16.34 CLASS 150
<div>3Z</div> <div>SLEEVED PLUG VALVES</div>		PRODUCTION NO.
		120.2-W.6

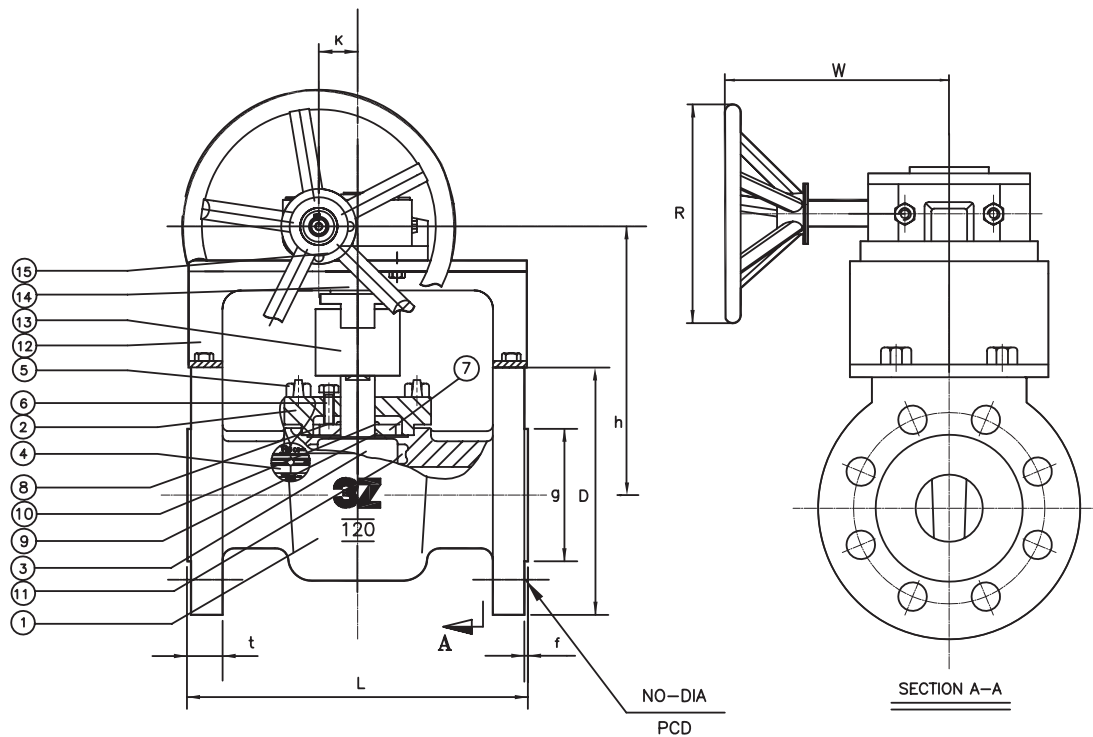
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	STAINLESS STEEL
2	COVER	1	STAINLESS STEEL
3	PLUG	1	STAINLESS STEEL
4	NAME PLATE	1	STAINLESS STEEL
5	COVER BOLT	1S	STAINLESS STEEL
6	ADJUSTING BOLT	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'M	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	SLEEVE	1	PTFE
12	ANTISTATIC DEVICE	1	STAINLESS STEEL
13	HUB	1	STAINLESS STEEL
14	HUB BOLT	1	STAINLESS STEEL
15	HANDLE	1	CARBON STEEL
16	HANDLE NUT	1	STAINLESS STEEL



NOMINAL SIZE		END FLANGES									
		BOLT HOLE									
IN	MM	L	h	D	PCD	NO	DIA	g	t	f	R
0.5	15	108	110	89	60.5	4	16	35	9.7	1.6	180
0.75	20	117	110	98	70	4	16	43	10.4	1.6	180
1	25	127	90.6	108	79.5	4	16	51	11.2	1.6	222
1.5	40	165	110.9	127	98.5	4	16	73	14.2	1.6	318
2	50	178	126	152	120.5	4	19	92	15.8	1.6	458
2.5	65	190	140.7	178	139.5	4	19	105	25.4	1.6	597
3	80	208	140.7	190	152.5	4	19	127	19.1	1.6	597
4	100	229	174.4	229	190.5	8	19	157	23.9	1.6	746

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
	WALL THICKNESS	ANSI B 16.34 CLASS 150
<div>3Z</div> <div>SLEEVED PLUG VALVES</div>		PRODUCTION NO.
		120.1-6.6

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	STAINLESS STEEL
2	COVER	1	STAINLESS STEEL
3	PLUG	1	STAINLESS STEEL
4	NAME PLATE	1	STAINLESS STEEL
5	COVER BOLT	1S	STAINLESS STEEL
6	ADJUSTING BOLT	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'M	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	SLEEVE	1	PTFE
12	BRACKET	1	CARBON STEEL
13	COMPENSATOR	1	CARBON STEEL
14	TORQUE BAR	1	CARBON STEEL
15	GEAR OPERATOR	1	STEEL

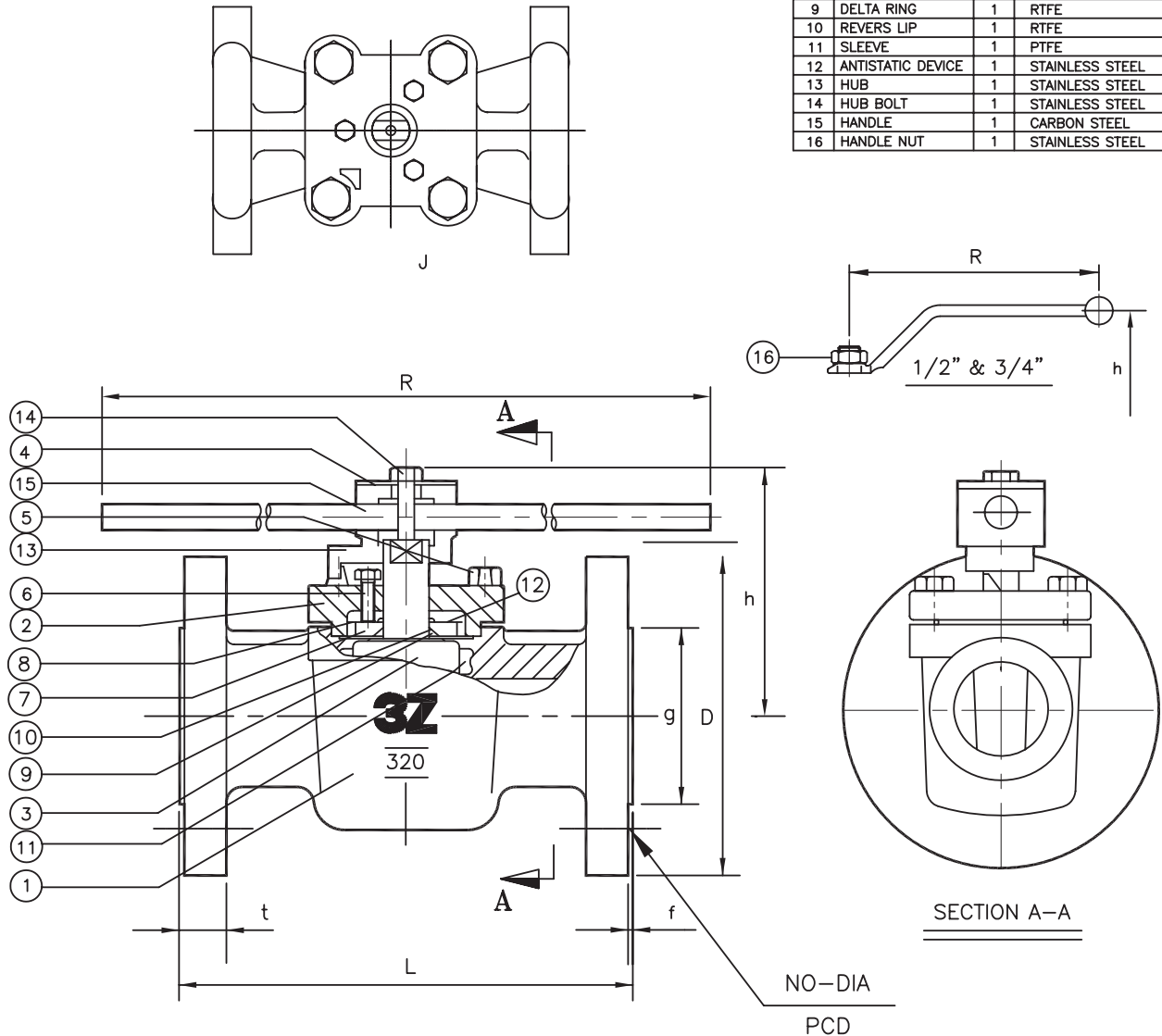


DIMENSIONS(mm)

	NOMINAL SIZE		L	h	END FLANGES								R	K	W
					D	BOLT HOLE			g	t	f				
	IN	MM				PCD	NO	DIA							
*	6	150	267	282	279	241.5	8	22	216	25.4	1.6	200	73	300	
	8	200	292	348	343	298.5	8	22	269.9	28.6	1.6	225	108	350	
**	10	250	330	379	406	362	12	25	324	30.2	1.6	225	108	350	
	12	300	356	418	483	432	12	25	381	31.8	1.6	280	108	350	
	14	350	381	506	533	476	12	29	413	35.1	1.6	315	166	450	
	16	400	762	559	597	539.5	16	29	470	36.6	1.6	315	166	450	

NOTE.		END CONNECTION : RF	
1. * 2 TOP HOLES IN FLANGES ARE TAPPING FOR 3/4-10UNC 2.** 2 TOP HOLES IN FLANGES ARE TAPPING FOR 8/7-9UNC	STD	TEST	ANSI B 16.34
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
		WALL THICKNESS	ANSI B 16.34 CLASS 150
<div>3Z</div> <div>SLEEVED PLUG VALVES</div>		PRODUCTION NO.	
		120.2-6.6	

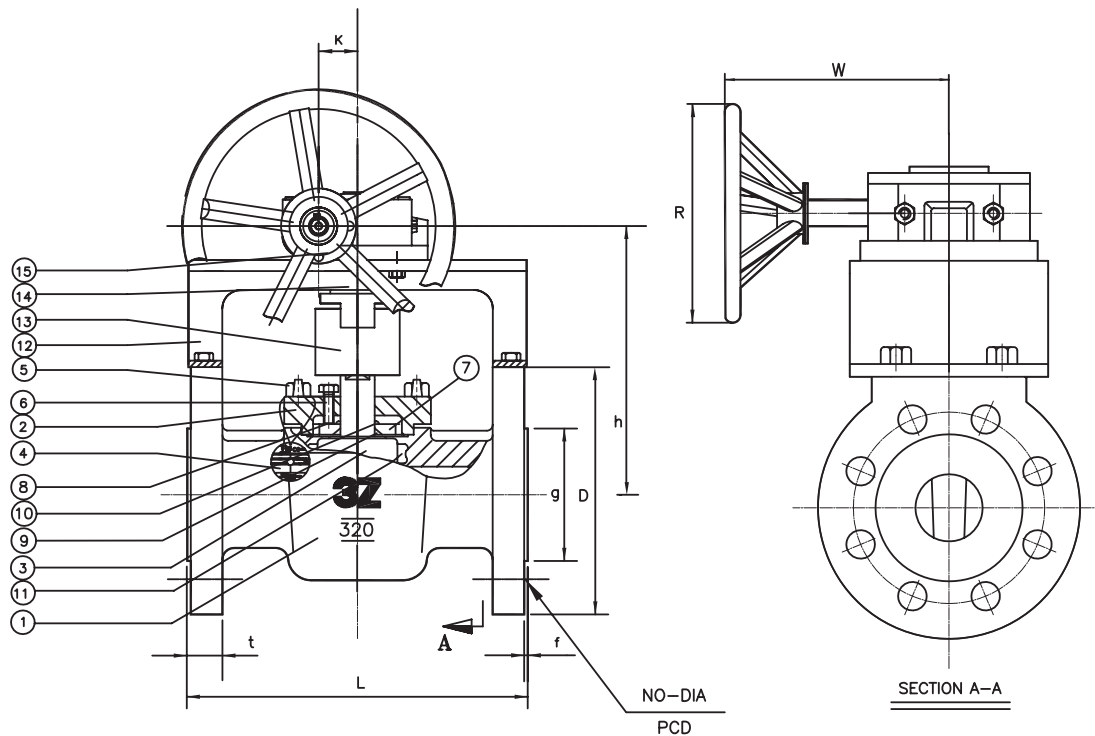
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	NAME PLATE	1	STAINLESS STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	ADJUSTING BOLT	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'M	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	SLEEVE	1	PTFE
12	ANTISTATIC DEVICE	1	STAINLESS STEEL
13	HUB	1	STAINLESS STEEL
14	HUB BOLT	1	STAINLESS STEEL
15	HANDLE	1	CARBON STEEL
16	HANDLE NUT	1	STAINLESS STEEL



NOMINAL SIZE		DIMENSIONS(mm)									
		L		h		D		END FLANGES			
								BOLT HOLE		PCD	
IN	MM							NO	DIA	g	t
0.5	15	140	110	95	66.5	4	16	35	14.3	1.6	180
0.75	20	152	110	117	82.5	4	19	43	15.9	1.6	180
1	25	165	90.6	124	89	4	19	51	17.5	1.6	222
1.5	40	190	110.9	156	114.5	4	22	73	20.7	1.6	318
2	50	216	126	165	127	8	19	92	22.3	1.6	458
2.5	65	241	140.7	190	149	8	22	105	25.4	1.6	597
3	80	283	140.7	210	168	8	22	127	28.6	1.6	597
4	100	305	174.4	254	200	8	22	157	31.8	1.6	746

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
	WALL THICKNESS	ANSI B 16.34 CLASS 300
<div>3Z</div> <div>SLEEVED PLUG VALVES</div>		PRODUCTION NO.
		320.1-W.6

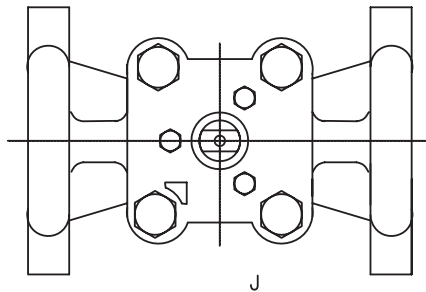
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	NAME PLATE	1	STAINLESS STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	ADJUSTING BOLT	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'G	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	SLEEVE	1	PTFE
12	BRACKET	1	CARBON STEEL
13	COMPENSATOR	1	CARBON STEEL
14	TORQUE BAR	1	CARBON STEEL
15	GEAR OPERATOR	1	STEEL



DIMENSIONS(mm)

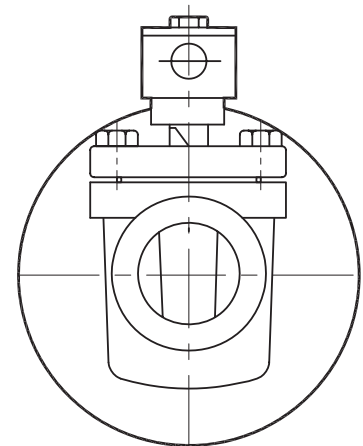
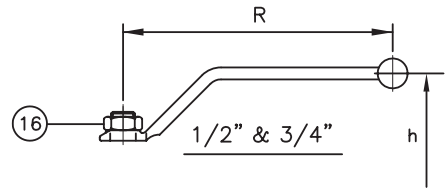
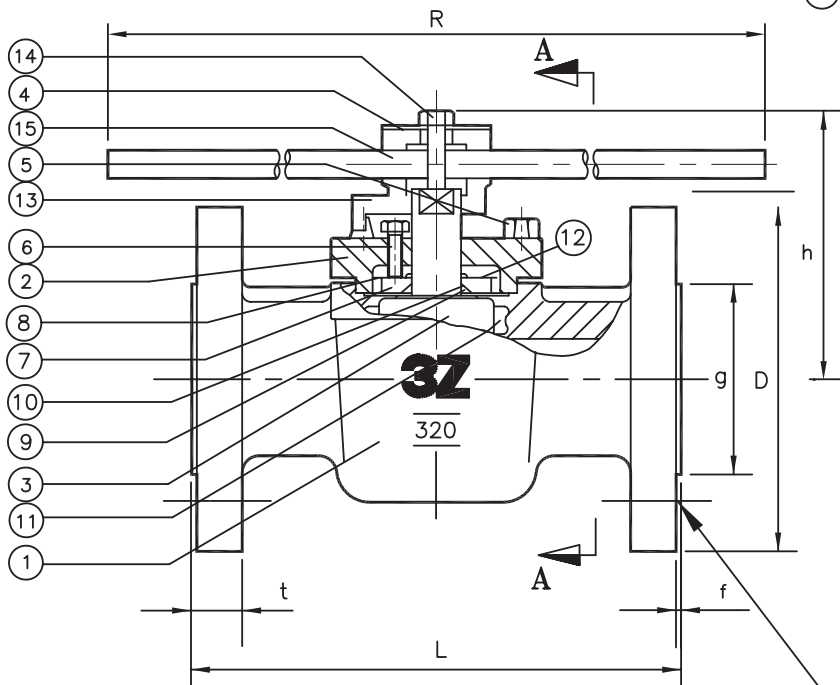
NOMINAL SIZE		L	h	END FLANGES								R	K	W
				D	BOLT HOLE			g	t	f				
					PCD	NO	DIA							
IN	MM	403	282	318	270	12	22	216	36.6	1.6	200	73	300	
6	150	419	348	381	330	12	25	269.9	41.3	1.6	225	108	350	
8	200	457	379	444	387.5	16	29	324	47.7	1.6	225	108	350	
10	250	502	418	521	451	16	32	381	50.8	1.6	280	108	350	
12	300	502	418	521	451	16	32	381	50.8	1.6	280	108	350	
14	350	762	506	584	514.5	20	32	413	54	1.6	315	166	450	
16	400	838	559	648	571.5	20	35	470	57.2	1.6	315	166	450	

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
	WALL THICKNESS	ANSI B 16.34 CLASS 300
<div>3Z</div> <div>SLEEVED PLUG VALVES</div>		PRODUCTION NO.
		320.2-W.6



J

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	STAINLESS STEEL
2	COVER	1	STAINLESS STEEL
3	PLUG	1	STAINLESS STEEL
4	NAME PLATE	1	STAINLESS STEEL
5	COVER BOLT	1S	STAINLESS STEEL
6	ADJUSTING BOLT	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'M	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	SLEEVE	1	PTFE
12	ANTISTATIC DEVICE	1	STAINLESS STEEL
13	HUB	1	STAINLESS STEEL
14	HUB BOLT	1	STAINLESS STEEL
15	HANDLE	1	CARBON STEEL
16	HANDLE NUT	1	STAINLESS STEEL



SECTION A-A

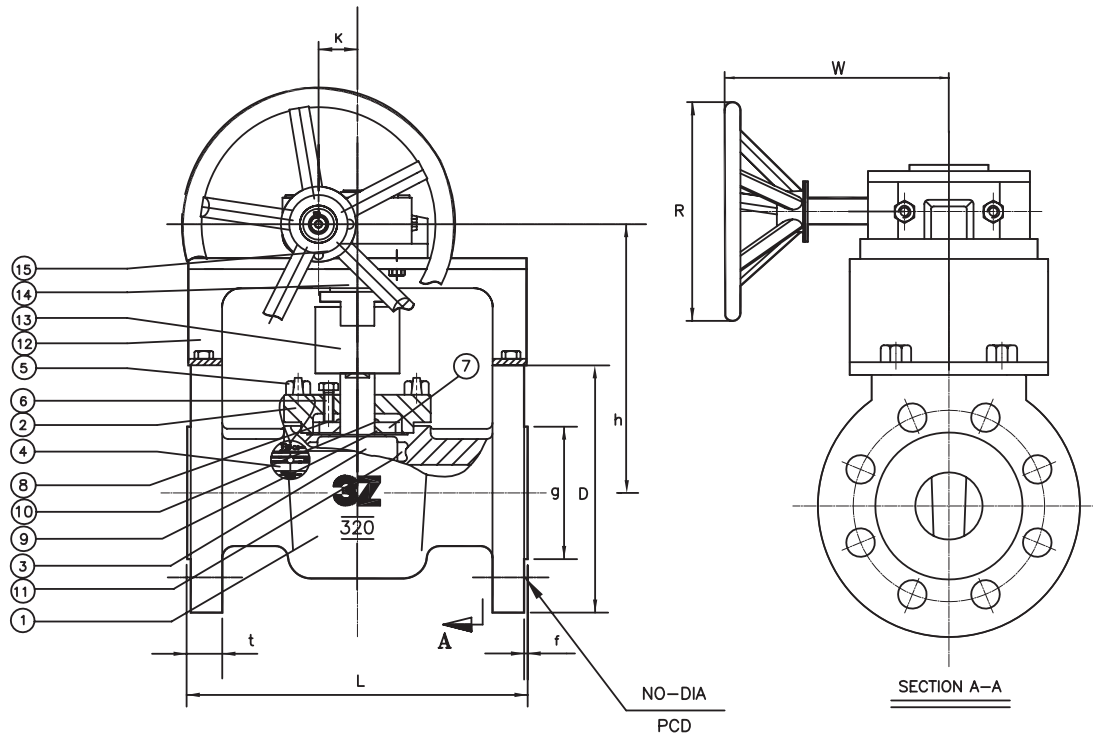
NO-DIA
PCD

DIMENSIONS(mm)

NOMINAL SIZE		END FLANGES									
		L	h	D	BOLT HOLE			g	t	f	R
IN	MM				PCD	NO	DIA				
0.5	15	140	110	95	66.5	4	16	35	14.3	1.6	180
0.75	20	152	110	117	82.5	4	19	43	15.9	1.6	180
1	25	165	90.6	124	89	4	19	51	17.5	1.6	222
1.5	40	190	110.9	156	114.5	4	22	73	20.7	1.6	318
2	50	216	126	165	127	8	19	92	22.3	1.6	458
2.5	65	241	140.7	190	149	8	22	105	25.4	1.6	597
3	80	283	140.7	210	168	8	22	127	28.6	1.6	597
4	100	305	174.4	254	200	8	22	157	31.8	1.6	746

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
	WALL THICKNESS	ANSI B 16.34 CLASS 300
<div>3Z</div> <div>SLEEVED PLUG VALVES</div>		PRODUCTION NO.
		320.1-6.6

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	STAINLESS STEEL
2	COVER	1	STAINLESS STEEL
3	PLUG	1	STAINLESS STEEL
4	NAME PLATE	1	STAINLESS STEEL
5	COVER BOLT	1S	STAINLESS STEEL
6	ADJUSTING BOLT	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'M	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	SLEEVE	1	PTFE
12	BRACKET	1	CARBON STEEL
13	COMPENSATOR	1	CARBON STEEL
14	TORQUE BAR	1	CARBON STEEL
15	GEAR OPERATOR	1	STEEL

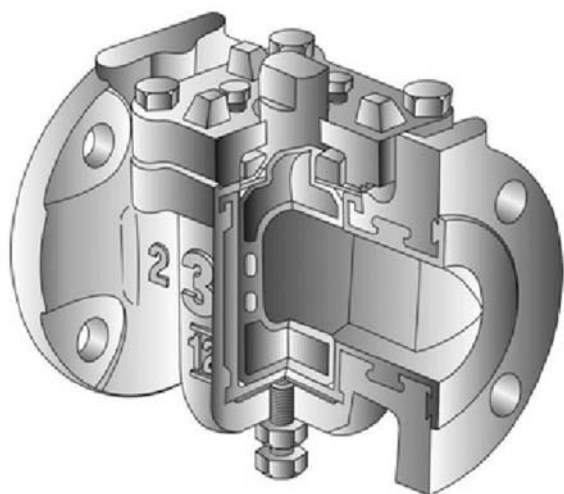


DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES								R	K	W
				D	BOLT HOLE			g	t	f				
					PCD	NO	DIA							
IN	MM	403	282	318	270	12	22	216	36.6	1.6	200	73	300	
6	150	419	348	381	330	12	25	269.9	41.3	1.6	225	108	350	
8	200	457	379	444	387.5	16	29	324	47.7	1.6	225	108	350	
10	250	502	418	521	451	16	32	381	50.8	1.6	280	108	350	
12	300	762	506	584	514.5	20	32	413	54	1.6	315	166	450	
14	350	838	559	648	571.5	20	35	470	57.2	1.6	315	166	450	
16	400													

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
	WALL THICKNESS	ANSI B 16.34 CLASS 300
<div>3Z</div> <div>SLEEVED PLUG VALVES</div>		PRODUCTION NO.
		320.2-6.6

Lined Plug Valves and Lined products



Fully-lined, quarter turn non-lubricated plug valve ideally suited for corrosive application. Locking of liner to body and molding technique permit use on many chemical services with higher pressures and vacuums without fear of liner collapse, shrinkage, stress cracking and blowout. Excellent sealing capability



3Z 2-way Lined Plug Valve
FIG 121, 321



3Z Bottomless Plug Valve
FIG 121, 321



3Z Lined Ball Check Valve
FIG 171, 371



3Z Lined Live Loaded Plug Valve
FIG 121LL, 331LL



3Z Lined Swing Check Valve
FIG 181, 381, 681



3Z Lined Strainer
FIG 190



3Z 3 way Lined Plug Valve
FIG 131, 331

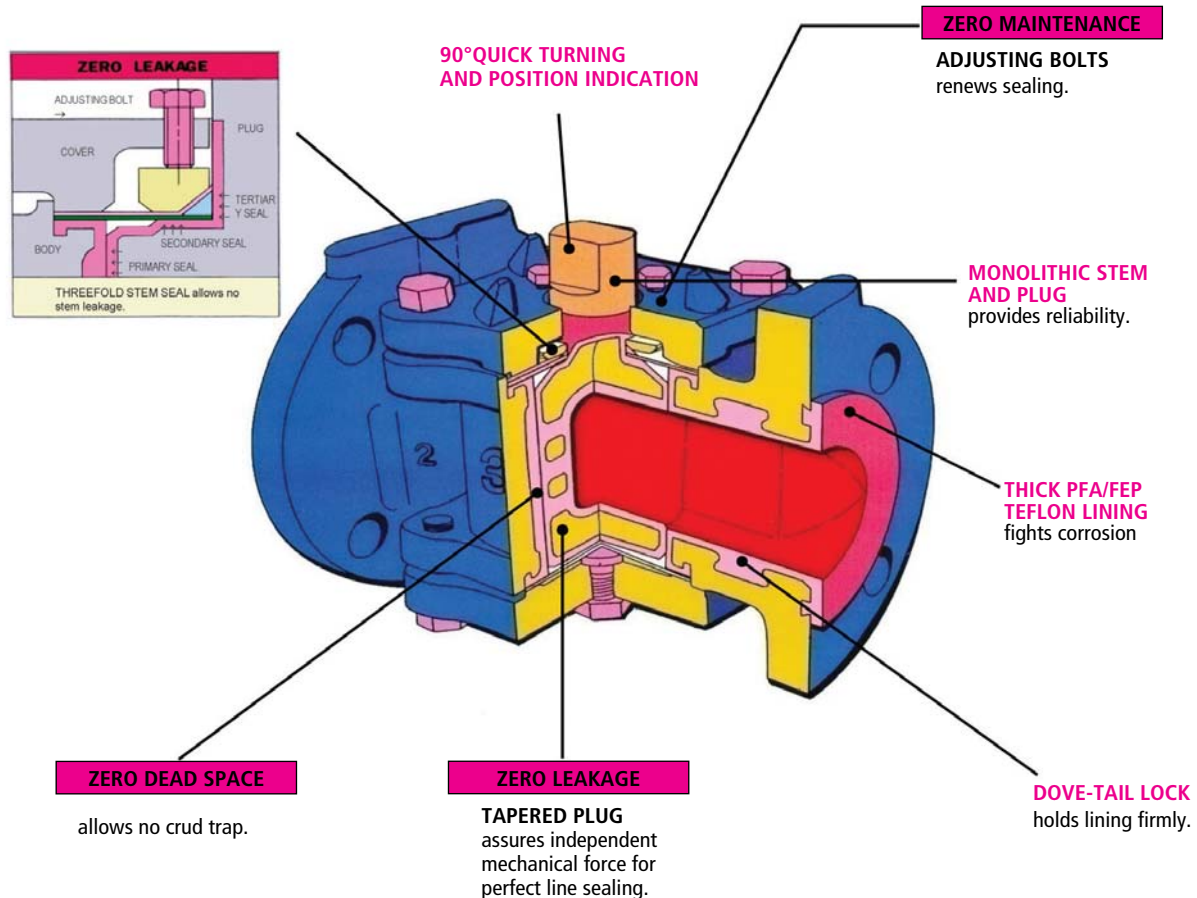


3Z Lined Y-Type Strainer
FIG 191Y



3Z 5-way Lined Plug Valve
FIG 151, 351

Construction of Lined Plug Valves



All sealing surfaces are machined to close tolerances, providing tight shutoff.

- (1) Independent wrench stops are cast in the cover.
- (2) Three stainless steel adjusting screws, silver-plated for added corrosion resistance, give parallelism to the plug through the thrust collar, assuring uniform position of the plug in the body.
- (3) The multiple top seal is designed to transmit sealing forces diagonally across the delta ring and vertically on the diaphragm to seal the plug shank, providing an added safeguard against hazardous fluids escaping to atmosphere
- (4) FEP and PFA are melt processible and offer maximum density and elimination of stress cracking at the corners, affording longer maintenance-free service for the liner and the valve.
- (5) The liner is locked to the casting by means of cast dovetail recesses and machined grooves, permitting the valve to be used on high vacuum and pressure applications without liner collapse, shrinkage or blowout.
- (6) The bottom seal adjustment provides a positive means of maintaining tight shutoff.
- (7) The body of the valve is coated with corrosion- resistant paint to retard external corrosion and rust.
- (8) Three-way valve has side entry design with choice of three port arrangements.

Construction & Materials

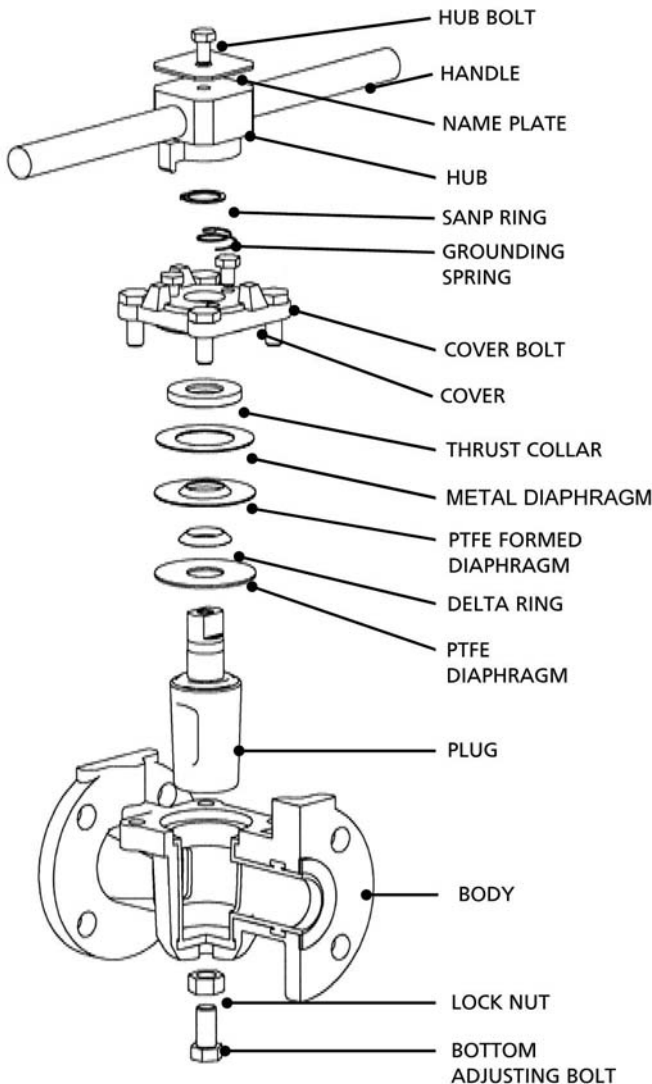
3Z Lined Plug Valve, 2-way Fig 121, 321

Fully-lined, quarter turn non-lubricated plug valve ideally suited for corrosive application. Locking of liner to body and molding technique permit use on many chemical services with higher pressures and vacuums without fear of liner collapse, shrinkage, stress cracking and blowout. Excellent sealing capability.

Linings : FEP, PFA

Sizes : 1/2" - 18"

Rating ANSI Class 150, 300



Materials of construction

Handle	Steel
Truarc ring	Steel, zinc plated
Static eliminator	Stainless steel
Cover nuts	Stainless steel
Adjusting screws	Stainless steel, silver plated
Top cover :	
121	Malleable iron
321	Carbon steel
130	Malleable iron
Thrust collar	Stainless steel
Formed diaphragm	PTFE
Delta ring	PTFE
Flat diaphragm	PTFE
Plug :	
121	FEP or PFA lined ductile iron
321	PFA lined ductile iron
130	FEP or PFA lined ductile iron

FIG 171

Size 1/2 through 6 inch, Class 150

Construction

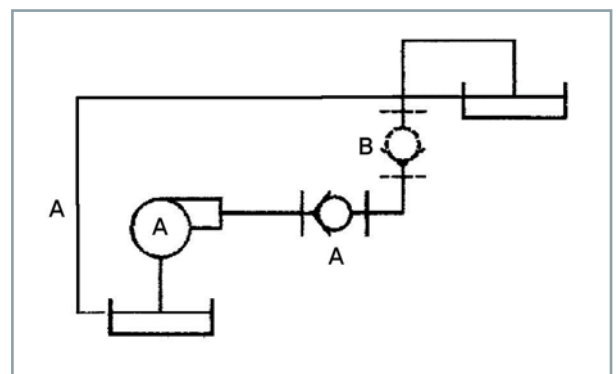
The valve body is fully lined with either PFA or FEP teflon material. A RTFE ball is freely moving internally on spacer, but the movement is stopped by either flanged water way. Back pressure or backflow of the flow moves the ball upstream and the ball blocks the flow. Spacer at down stream has openings like a comb construction. Therefore, when there occurs a normal flow to downstream, the flow is free to flow.

Use & Function

- 1) Protection of pump motor from backflow damage.
- 2) Protection of pump impeller from backflow damage.
- 3) Certain degree of shut-off function when backhead is high.

Operation

- 1) 3Z FIG 171 can be mounted on "A" or "B".
- 2) When a pump stop signal is given during operation of the pump, the pump motor will be stopped but keeps running for a short period of time and gradually stops. At this time, if there is not 3Z FIG 171 installed, the backflow caused by back head will flow backward towards the pump.
- 3) On this occasion, motor and pump impeller can be damaged by the back flowing fluids because of the fighting direction of rotation.
- 4) But when a 3Z FIG 171 is mounted on the exit side of the pump, the backflow will push the ball inside 3Z FIG 171, seats the ball against the flanged water way bore instantly. Then, the back flow will seat the ball on the flange seat.
- 5) The higher the back pressure is, the greater the backflow forces. Therefore, the ball performs a shut-off function, but not tight shut-off. When a backhead is small, ball instantly

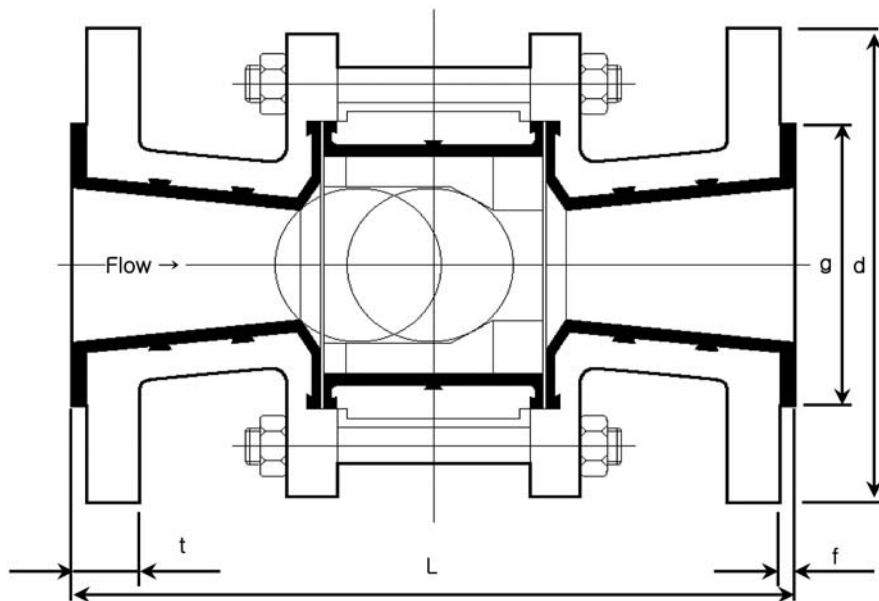


Fully Lined Ball Check Valves

prevents impact to the pump, but may move slightly from the shut off position. In this case, a partial backflow can occur to the pump, would not damage the pump impeller or motor because the backflow forces negligible.

6) 3Z FIG 171 can be mounted both horizontally and vertically. When mounted vertically, it operates with and aid of gravity.

7) When a tight shut-off is required for the back flow, and additional shut-off valve should be installed. Check valves are not designed for a shut-off function.



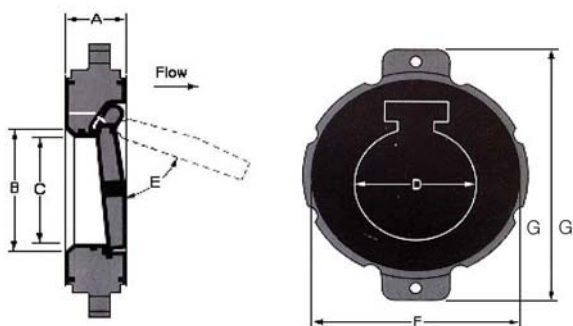
DIMENSIONS

SIZE		BOLT HOLE							
IN	MM	L	D	PCD	NO	DIA	g	t	f
1/2	15	152	89	60.5	4	16	35	15.5	3.2
3/4	20	152	98	70	4	16	43	15.9	3.2
1	25	152	108	79.5	4	16	51	17.3	3.8
1.1/2	40	178	127	98.5	4	16	73	18.1	3.8
2	50	203	152	120.5	4	19	92	20.3	4.4
2.1/2	65	242	178	139.5	4	19	105	24.1	5.0
3	80	242	190	152.5	4	19	121	24.1	5.0
4	100	292	229	190.5	8	19	147	29.2	5.3
6	150	394	279	241.5	8	22	206	31.2	5.8
8	20	482	343	298.5	8	22	264	35.1	6.5

FIG 181

3Z SWING CHECK VALVES

ANSI Class 150 : 2"-12"



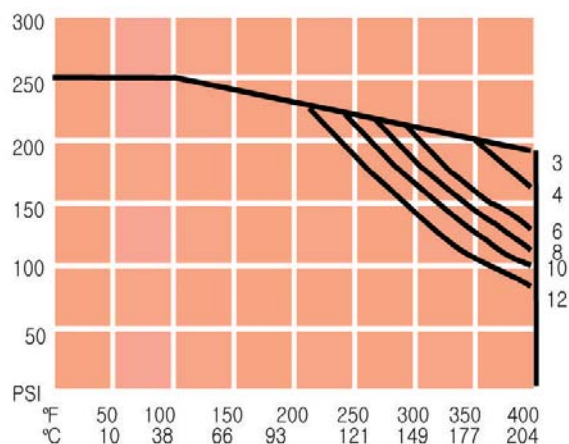
■ Features

- To be mounted horizontally and vertically in piping.
- To be used to replacing high alloy steel for corrosive process material
- No application of spring/pin causing corrosion or abrasion in Body.

■ Materials

- BODY WCB(316) / PFA (FEP)
- DISC FEP (PFA) : 4" and Under
WCB/PFA (FEP) : 6" and Over
Not less than 2.4_ of Lining thickness

■ Pressure Temperature Ratings



■ DIMENSIONS

SIZE	A	B	C	D	E	F	G	Wt(kg)	Cv	Max.matingl Flange I.D	
										Min	Max.
2	40	40	30	40.6	53 ^ø	89	172	1.9	45	43	49
3	46	55	45	56	55 ^ø	127	190	3.2	100	71	82
4	46	80	70	78	64 ^ø	157	266	5.9	234	92	100
6	57	125	111	124	65 ^ø	216	319	12.7	667	142	148
8	67	172	158	165	61 ^ø	298.5	373	22.7	1404	188	195
10	76	222	184	221	53 ^ø	324	394	28.6	1965	239	260
12	86	256	232	267	53 ^ø	381	510	42.2	3160	290	310

Technical drawing of a 3Z 120 hydraulic cylinder, showing side and end views with dimensions and callouts.

Side View Dimensions:

- R : Radius of the top flange.
- h : Height of the top flange.
- $1/2'' \text{ \& } 3/4''$: Dimension for the top flange thickness.


End View Dimensions:

- R : Radius of the top flange.
- h : Height of the top flange.
- 9 : Distance from the top flange to the center of the cylinder body.
- D : Diameter of the cylinder body.
- f : Flange thickness.
- L : Total length of the cylinder.
- t : Thickness of the bottom flange.
- $NO-DIA$: No Dia (No Diameter) callout.
- PCD : Pitch Circle Diameter callout.

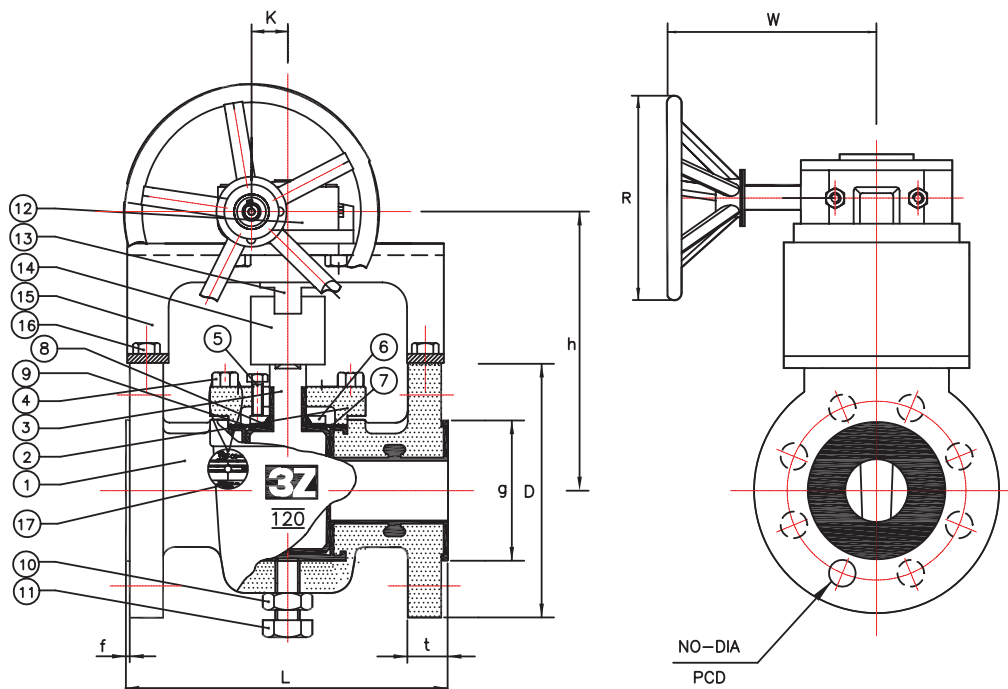
Callouts:

- 14, 16, 13, 15: Callouts for the top flange.
- 4, 2, 3, 1, 8, 9, 10, 11, 12: Callouts for the cylinder body and mounting bracket.
- 6, 5, 7: Callouts for internal components.

Model Number: 3Z 120

END CONNECTION : RF		
S T D	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
	WALL THICKNESS	ANSI B 16.34 CLASS 150
	LINED PLUG VALVES	

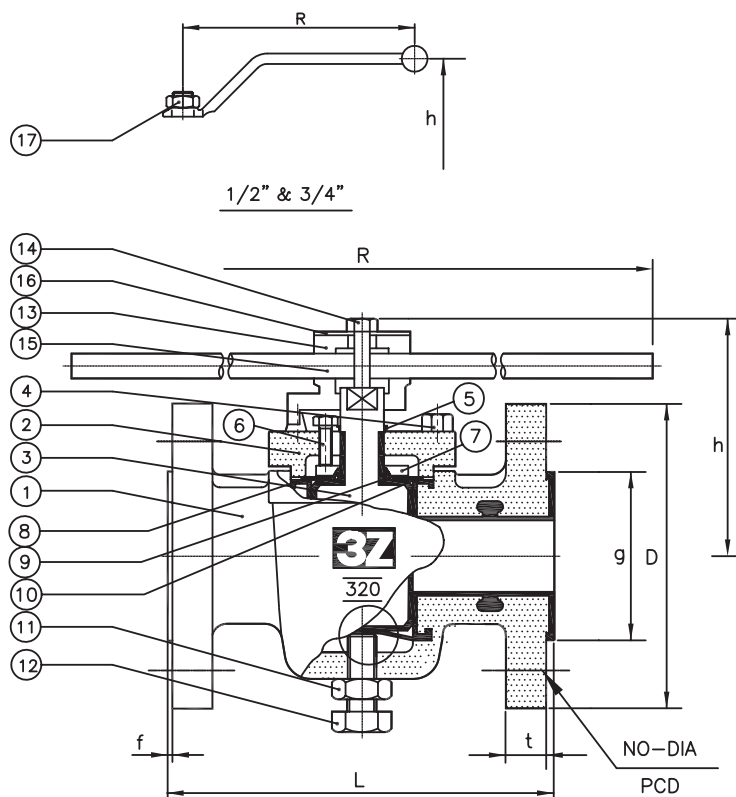
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	COVER BOLT	1S	ALLOY STEEL
5	ADJUSTING BOLT(1)	3	STAINLESS STEEL
6	THRUST COLLAR	1	STAINLESS STEEL
7	METAL DIAPHR'M	1	STAINLESS STEEL
8	DELTA RING	1	RTFE
9	REVERS LIP	1	RTFE
10	LOCK NUT	1	STAINLESS STEEL
11	ADJUSTING BOLT(2)	3	STAINLESS STEEL
12	GEAR OPERATOR	1	STEEL
13	TORQUE BAR	1	CARBON STEEL
14	COMPENSATOR	1	CARBON STEEL
15	BRACKET	1	CARBON STEEL
16	BRACKET BOLT	1	STAINLESS STEEL
17	NAME PLATE	1	STAINLESS STEEL



NOMINAL SIZE		END FLANGES											DIMENSIONS(mm)		
		L	h	D	BOLT HOLE			g	t	f	R	K	W		
					PCD	NO	DIA								
	IN	MM													
	6	150	267	282	279	241.5	8	22	211	33	3.5	200	75	235	
*	8	200	292	334.5	343	298.5	8	22	267	32.9	5.9	255	92	288	
**	10	250	330	366	406	362	12	25	319	35.4	6.8	255	92	288	

NOTE.		END CONNECTION : RF	
1. * 2 TOP, 2 BOTTOM HOLES IN FLANGES ARE TAPPING FOR 3/4-10UNC 2. ** 2 TOP, 2 BOTTOM HOLES IN FLANGES ARE TAPPING FOR 7/8-9UNC	STD	TEST	ANSI B 16.34
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
		WALL THICKNESS	ANSI B 16.34 CLASS 150
<div>3Z</div> <div>LINED PLUG VALVES</div>		PRODUCTION NO.	
		121.2-W.P	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	COVER BOLT	1S	ALLOY STEEL
5	GROUNDING SPRING	1	CARBON STEEL
6	ADJUSTING BOLT(1)	3	STAINLESS STEEL
7	THRUST COLLAR	1	STAINLESS STEEL
8	METAL DIAPHR'M	1	STAINLESS STEEL
9	DELTA RING	1	RTFE
10	REVERS LIP	1	RTFE
11	LOCK NUT	1	STAINLESS STEEL
12	ADJUSTING BOLT(2)	3	STAINLESS STEEL
13	HUB	1	STAINLESS STEEL
14	HUB BOLT	1	STAINLESS STEEL
15	HANDLE	1	CARBON STEEL
16	NAME PLATE	1	STAINLESS STEEL
17	HANDLE NUT	1	STAINLESS STEEL

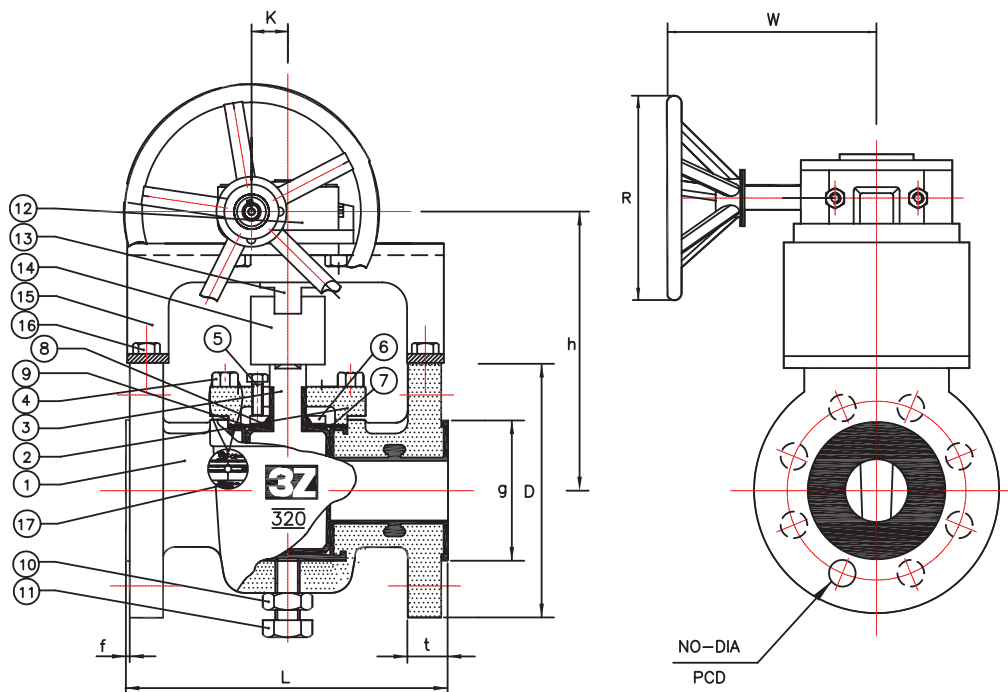


DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES								R
				D	BOLT HOLE		g	t	f			
					PCD	NO				DIA		
IN	MM											
0.5	15	140	110	95	66.5	4	16	35	14.2	1.5	180	
0.75	20	152	110	117	82.5	4	19	43	16	2.1	180	
1	25	165	90.6	124	89	4	19	51	22.6	2.4	222	
1.5	40	190	110.9	156	114.5	4	22	73	25.7	2.4	318	
2	50	216	126	165	127	8	19	92	27.8	2.8	458	
3	80	283	140.7	210	168	8	22	127	33.5	2.8	597	
4	100	305	174.4	254	200	8	22	157	37.6	5.8	746	

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
	WALL THICKNESS	ANSI B 16.34 CLASS 300
<div>3Z</div> <div>LINED PLUG VALVES</div>		PRODUCTION NO.
		321.1-W.P

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	COVER BOLT	1S	ALLOY STEEL
5	ADJUSTING BOLT(1)	3	STAINLESS STEEL
6	THRUST COLLAR	1	STAINLESS STEEL
7	METAL DIAPHR'M	1	STAINLESS STEEL
8	DELTA RING	1	RTFE
9	REVERS LIP	1	RTFE
10	LOCK NUT	1	STAINLESS STEEL
11	ADJUSTING BOLT(2)	3	STAINLESS STEEL
12	GEAR OPERATOR	1	STEEL
13	TORQUE BAR	1	CARBON STEEL
14	COMPENSATOR	1	CARBON STEEL
15	BRACKET	1	CARBON STEEL
16	BRACKET BOLT	1	STAINLESS STEEL
17	NAME PLATE	1	STAINLESS STEEL



DIMENSIONS(mm)													
NOMINAL SIZE		L	h	END FLANGES							R	K	W
				D	BOLT HOLE			g	t	f			
					PCD	NO	DIA						
6	150	403	282	318	270	12	22	229	39.8	3.3	200	75	235

END CONNECTION : RF	
STD	TEST
	FACE TO FACE or END TO END
	DIMENSIONS OF FLANGE
	WALL THICKNESS
ANSI B 16.34	
ANSI B 16.10 CLASS 300	
ANSI B 16.5 CLASS 300	
ANSI B 16.34 CLASS 300	
3Z LINED PLUG VALVES	
PRODUCTION NO.	
321.2-W.P	



3Z[®]



Wedge/Lubricated/Eccentric Metal Seated Plug Valves 3Z[®] Plug Valves

Metal Seated Wedge Plug Valves

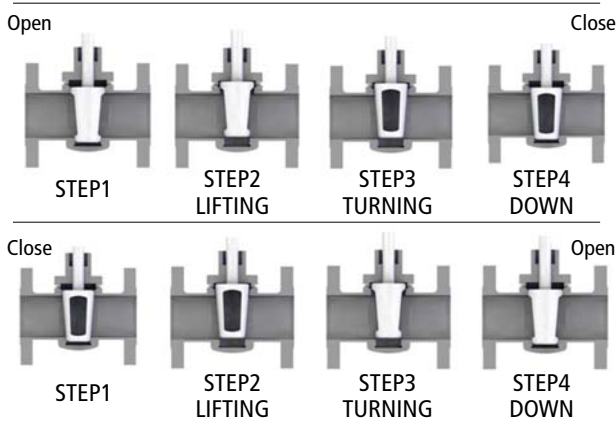


3Z Metal Seated plug Valves, Non-Lubricated

Designed to cope with higher temperature applications of the 3Z sleeved and lined products. Line sealing is achieved by metal to metal contact between body and plug.

To avoid damage on the sealing surfaces, during opening and closing, the plug is lifted first, and rotated 90 degrees, and then, set to its desired position. The whole opening and closing operation is achieved by one action assuring full proof operation using specially designed and patented operating mechanism by 3Z.

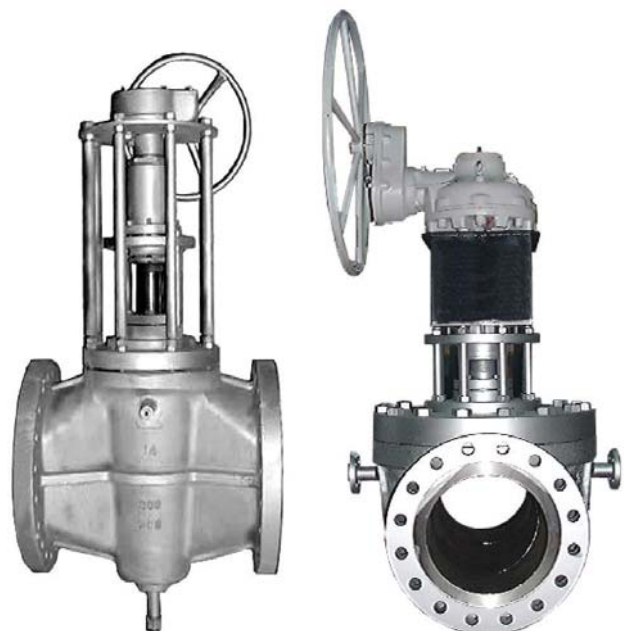
Principle of 3Z Wedge Plug valve operation



The body and plug contacts directly metal-to-metal. To prevent the surfaces from galling or abrading the valve is designed to operate as following steps;

- STEP1 - Lowered & Seated position;** The plug is lowered and seats at fully open or closed position.
- STEP 2 - Lifted position;** The plug is lifted slightly to avoid galling or abrasion during this step.
- STEP 3 - 90° Rotated position;** The plug is rotated 90° to allow line media to flow or stop by positioning the plug at open or closed position. No contact between body and plug during this step. No rubbing. No friction.
- STEP 4 - Lowered & Seated position;** The plug is lowered and reseated at fully open or closed position.

Port Opening Available



75% Opening

100% Opening

Special Instruction For Operation and Maintenance

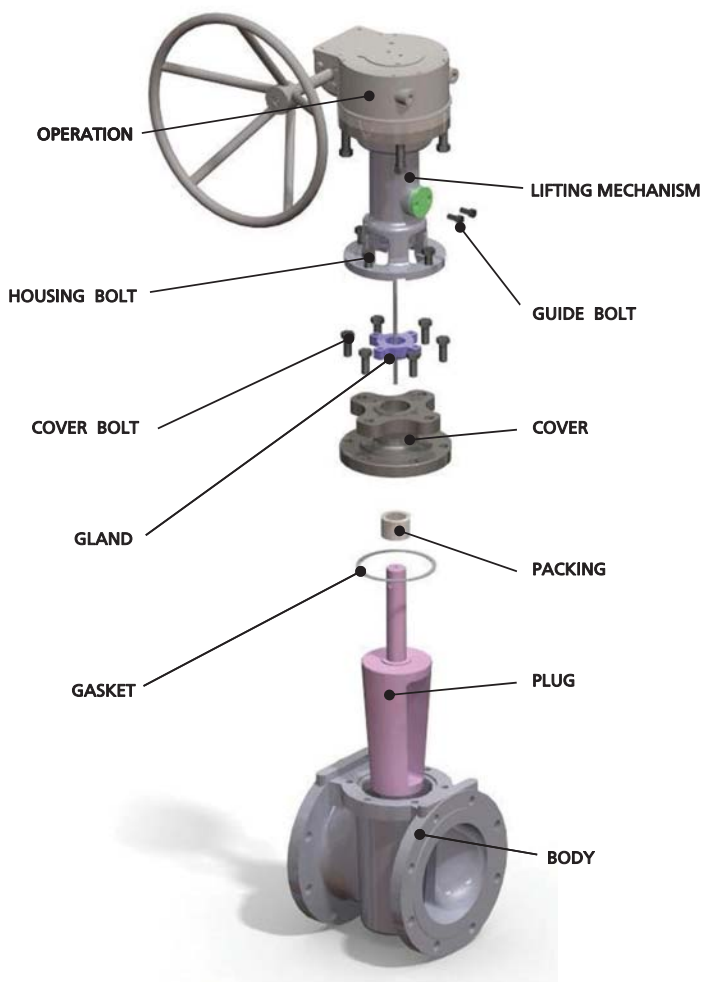


Fig 323W FB 300# 12"- EXPLODED VIEW

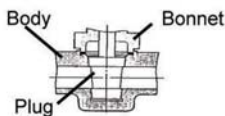
1. Before valve is installed, valve should not be closed. The special case must be taken in order to prevent foreign material's intrusion to the valve.
2. When valve is open or closed, the excessive force should not be applied to Handwheel. When operator does the open and close operation in front of valve by use of both hands, Operator should stop the further rotation of handwheel when operator feels exhaust of power.
3. When valve is open position, body port and plug valve may not be exactly aligned and this does not mean that valve is problem.. So attempt to align the both ports should be discouraged.
4. If possible, valve is installed in a way that Lifting mechanism is vertical position.
5. The lifting mechanism should not be touch-ed. When it is required to touch the mechanism, the only expert who knows the system clearly should do.
7. While valve is open or closed, the operator should look at the flow indicator on top of valve .

Purpose of purge operation

Depending on line media, automatic purge operation is required for the valves in the line, due to the following reasons ;

- 1) To prevent suspended solids or deposits being accumulated in the probable dead spaces in the valve internals.
- 2) To prevent fugitive emissions released to the atmosphere

Construction of 3Z Wedge Plug valves

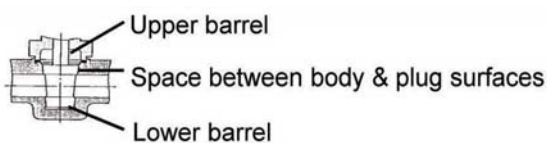


3Z Wedge Plug valves are designed to operate metal-to-metal seated to be used for high temperature, high pressure, high solids, and as such media, yet maintaining extra long life of the valve having the same 3Z functions of Zero dead space, Zero Leakage and Zero dead space.

The pressure containing parts of the valve consists of body, plug and bonnet. The plug and raised ribs of the body seats together creating sealing surfaces; upper sealing, port sealing and lower sealing around the plug. These sealing surfaces provide line sealing, and also primary stem sealing. Stem has additional seals assuring no external leakage to the atmosphere.

No other valves have these 3Z unique design features.

Potential dead space



Upper barrel : The space created between body, bonnet, and plug

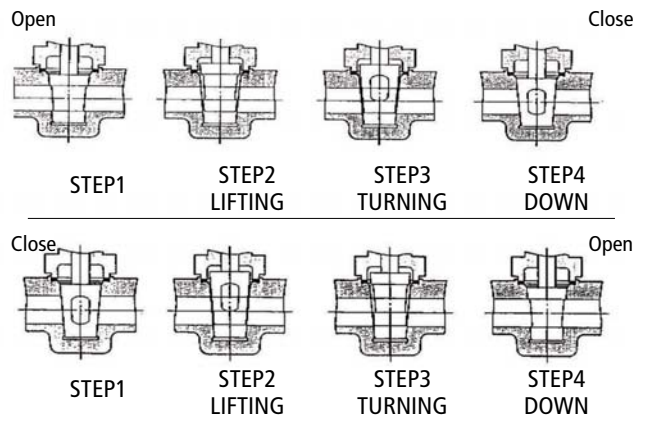
Space between body & plug surfaces ; The space created between body and plug when lifted

Lower barrel ; The space created between plug, body and bottom bowl of body.

The 3 spaces are potential dead space when left alone. The dead space means the space where there is no fluid flow occurs. Slurry, sludge, suspended solids, crystallizing or precipitating media can be deposited with solids in the space because of no flow.

These may cause valve malfunction shortening the life time of the valve, or increasing ownership cost due to frequent maintenance or plant shut down.

Principle of 3Z Wedge Plug valve operation



The body and plug contacts directly metal-to-metal. To prevent the surfaces from galling or abrading the valve is designed to operate as following steps;

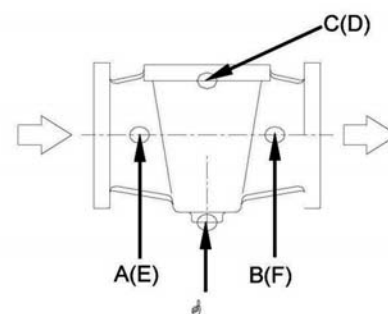
STEP 1 - Lowered & Seated position; The plug is lowered and seats at fully open or closed position.

STEP 2 - Lifted position; The plug is lifted slightly to avoid galling or abrasion during this step.

STEP 3 - 90° Rotated position; The plug is rotated 90° to allow line media to flow or stop by positioning the plug at open or closed position. No contact between body and plug during this step. No rubbing. No friction.

STEP 4 - Lowered & Seated position; The plug is lowered and reseated at fully open or closed position.

Denomination of purge connections



DESIGNATING LOCATION OF PURGE CONN.

For ease of identification of purge connections, 3Z denominates the connections as is shown on the figure.

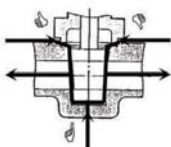
The connections are provided per customer's request as an option. A spool piece with a NPT thread end is provided, welded to the connection as a standard unless specified otherwise by the customer.

PURGE Operation (2/2)

Principle of purging assuring zero dead space

The potential dead space can be protected from the line media carrying undesirable solids to reside by creating fluid flow in the spaces. There are two ways to mobilize the space;

1) By use of outside purge media ;



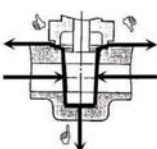
purge media provided by the plant, which has higher pressure than line media is introduced into the upper barrel through the purge port C and/or D, and also introduced into the lower barrel through the purge port G.

Whenever opening or closing the valve, the plug gets lifted, rotated and lowered down. As soon as the plug starts being lifted and the purge media gets introduced into the space between body and plug seat surface, creating flows into the line media preventing it from invading into the space from the first place.

When the plug is lowered and seated the purging action stops automatically.

Therefore, the valve can maintain clean surfaces and spaces.

2) By use of line media ;

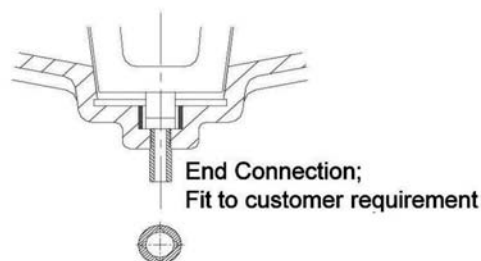


Whenever opening or closing the valve, the plug gets lifted, rotated and lowered down. As soon as the plug starts being lifted and the line media gets introduced into the space between body and plug seat surface, creating flows into the upper and lower barrel, and flows out through the purge port C, D and G.

When the plug is lowered and seated the purging action stops automatically. Therefore, the valve does not allow dead space, and maintain clean surface and spaces all the time.

The purging, in either case, happens automatically whenever opening or closing valves.

Purging for trunnion construction



CROSS SECTION OF BUSHING

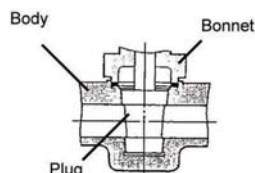
When trunnion mounted plug design is used, G connection is interfered by the trunnion hub.

The thrust bearing and trunnion is designed to allow purging of the flushing media freely and thoroughly. This also allows rigidity and reliability of trunnion mounting in any operating conditions.

For Flange Dimensions, Face to Face and End to End Dimensions, please refer to the 3Z homepage, www.3zvalve.com

For Flange Dimensions, Face to Face and End to End Dimensions, please refer to the 3Z homepage, www.3zvalve.com

Construction of 3Z Wedge Plug valves

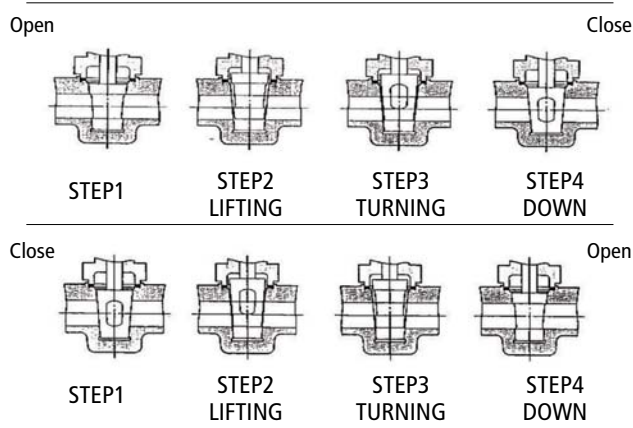


3Z Wedge Plug valves are designed to operate metal-to-metal seated to be used for high temperature, high pressure, high solids, and as such media, yet maintaining extra long life of the valve having the same 3Z functions of Zero dead space, Zero Leakage and Zero dead space.

The pressure containing parts of the valve consists of body, plug and bonnet. The plug and raised ribs of the body seats together creating sealing surfaces; upper sealing, port sealing and lower sealing around the plug. These sealing surfaces provide line sealing, and also primary stem sealing. Stem has additional seals assuring no external leakage to the atmosphere.

No other valves have these 3Z unique design features.

Principle of 3Z Wedge Plug valve operation



The body and plug contacts directly metal-to-metal. To prevent the surfaces from galling or abrading the valve is designed to operate as following steps;

STEP 1 - Lowered & Seated position; The plug is lowered and seats at fully open or closed position.

STEP 2 - Lifted position; The plug is lifted slightly to avoid galling or abrasion during this step.

STEP 3 - 90° Rotated position; The plug is rotated 90° to allow line media to flow or stop by positioning the plug at open or closed position. No contact between body and plug during this step. No rubbing. No friction.

STEP 4 - Lowered & Seated position; The plug is lowered and resealed at fully open or closed position.

Operator Mechanism

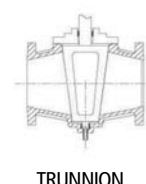


Fool-proof valve operation is very important for this type of valve. The smooth operation with lower torque is also important. A typical cam type operator which moves plug stem along a pre-defined guide trench on the stem, experiences high friction resulting high torque.

3Z developed a unique patented ball-locking mechanism. The 3Z mechanism assures smooth, frictionless and fool-proof operation. This mechanism is provided as a standard in 3Z Wedge Plug Valves.

The principle of operation is a ball inside the mechanism is engaged in, locking the stem and the operator during rotating operation. And then the ball is disengaged out unlocking the stem and the operator during lifting and lowering operation.

Trunnion Construction



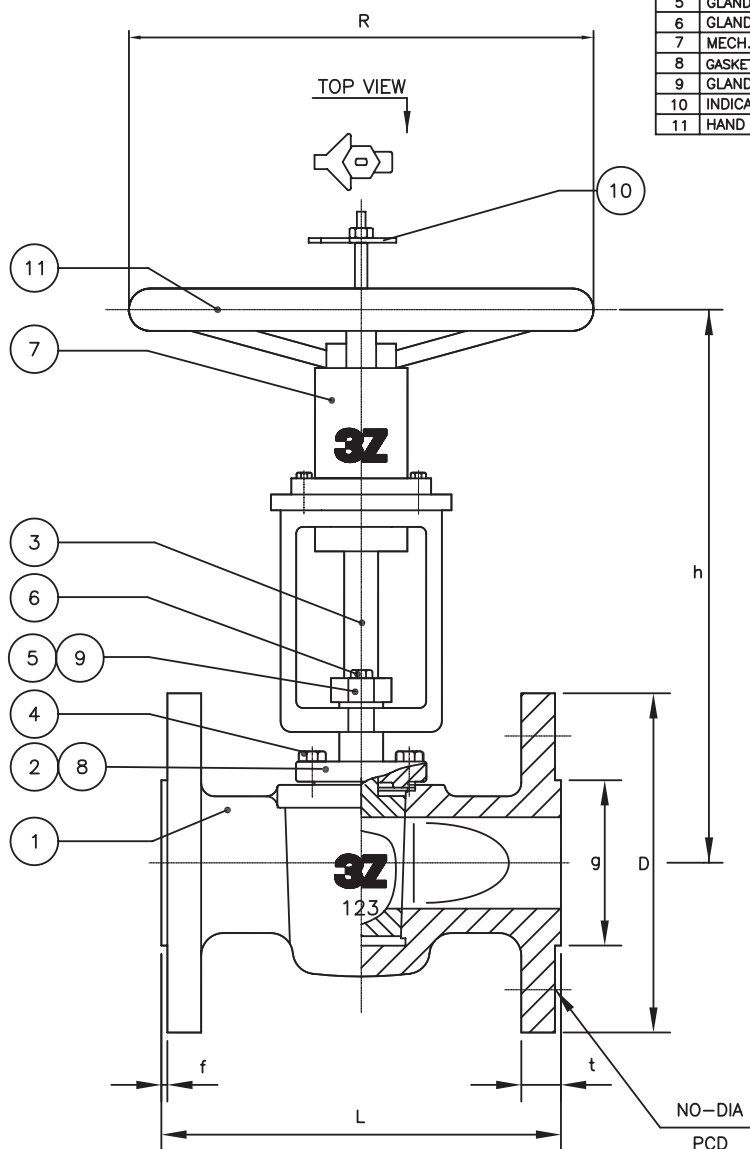
When the plug is lifted and exposed to a high upstream pressure and dynamic force, even though the gap is minimal, the plug can be shifted and contact the body down stream.

To prevent this happening, the plug is designed to be supported rigidly using trunnion construction. 3Z design employed body hub as the trunnion hub to provide the best reliability in rigidity.

DESIGNATING LOCATION OF PURGE CONN.

This design feature is optional, however, depending on sizes and operating T/P condition, the feature is provided as a standard.

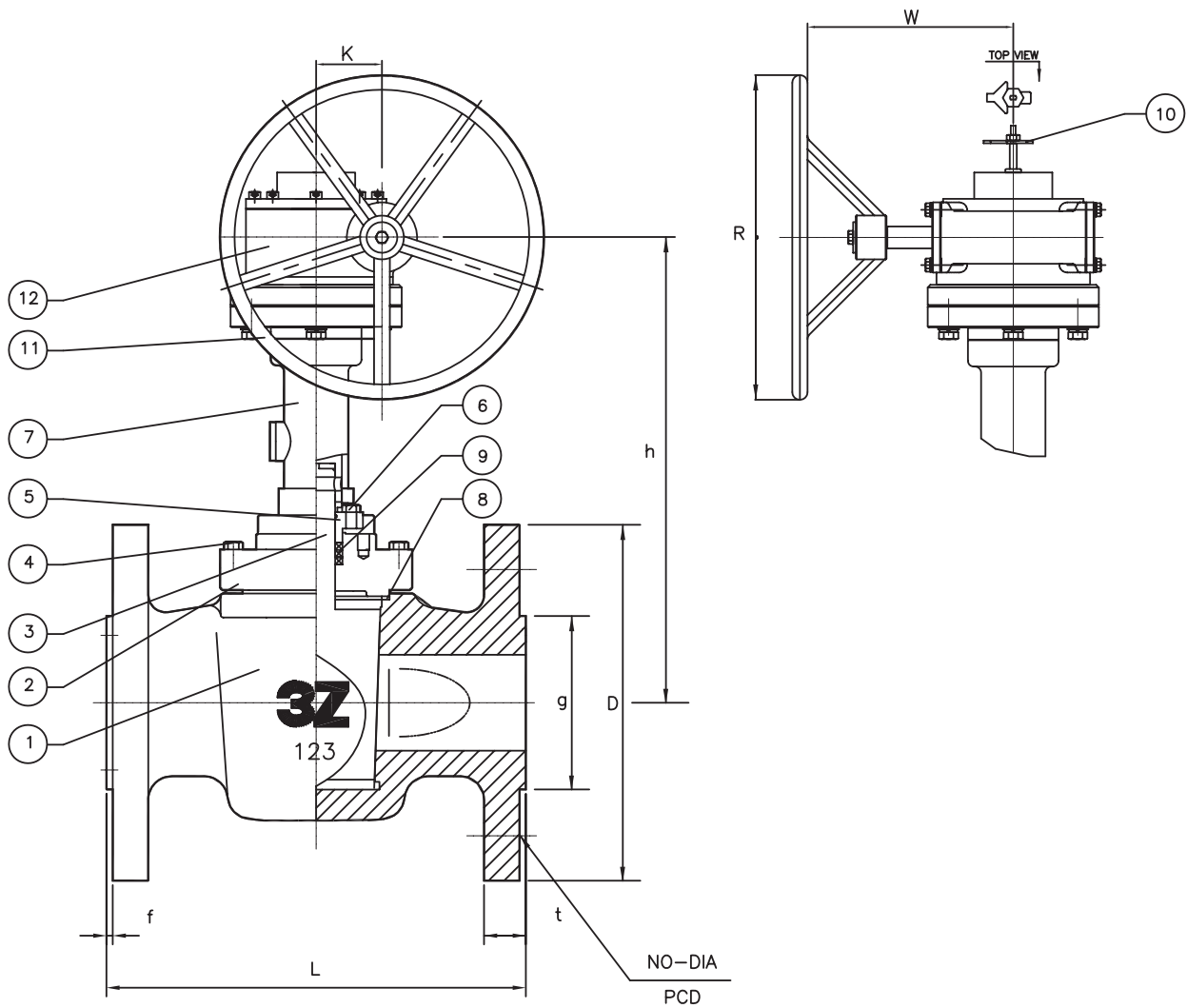
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	BOLT	1S	STAINLESS STEEL
5	GLAND	1	STAINLESS STEEL
6	GLAND BOLT	1S	STAINLESS STEEL
7	MECH. BOX	1S	STEEL
8	GASKET	1	GRAPHITE/SOFT STEEL
9	GLAND PACKING	1S	GRAPHITE
10	INDICATOR	1	STAINLESS STEEL
11	HAND WEEL	1	CARBON STEEL



DIMENSIONS(mm)												
NOMINAL SIZE		L	h	END FLANGES								R
				D	BOLT HOLE			g	t	f		
IN	MM				PCD	NO	DIA					
0.5	15	108	319	90	60.3	4	16	35	10	2	250	
0.75	20	117	319	100	70	4	16	43	10.9	2	250	
1	25	127	346	110	79.4	4	16	51	11.6	2	250	
1.5	40	165	378	125	98.4	4	16	73	14.7	2	250	
2	50	178	371	150	120.7	4	19	92	16.3	2	250	
3	80	203	381	190	152.4	4	19	127	19.5	2	250	
4	100	229	556	230	190.5	8	19	157	24.3	2	630	

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
	WALL THICKNESS	ANSI B 16.34 CLASS 150
<div>3Z</div> <div>METAL SEATED PLUG VALVE</div>		PRODUCTION NO.
		123.1-W.6

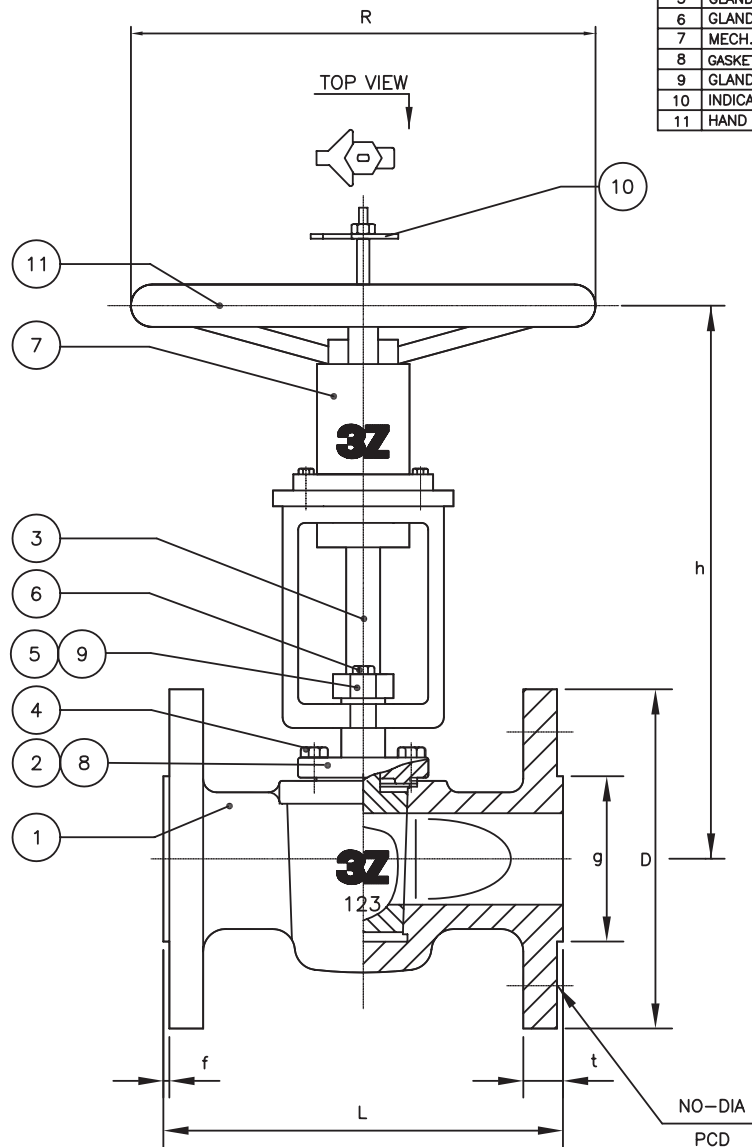
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	BOLT	1S	STAINLESS STEEL
5	GLAND	1	STAINLESS STEEL
6	GLAND BOLT	1S	STAINLESS STEEL
7	MECH. BOX	1S	STEEL
8	GASKET	1	GRAPHITE/SOFT STEEL
9	GLAND PACKING	1S	GRAPHITE
10	INDICATOR	1	STAINLESS STEEL
11	HAND WHEEL	1	CARBON STEEL
12	GEAR OPERATOR	1S	STEEL



DIMENSIONS(mm)																
NOMINAL SIZE		L	h	END FLANGES							R	K	W	d	Key	
				D	BOLT HOLE			g	t	f						
IN	MM				PCD	NO	DIA									
6	150	267	576	280	241.3	8	22	216	25.4	2	300	63	206	25	8*7	
8	200	292	656	345	298.5	8	22	270	28.6	2	400	63	206	25	8*7	
10	250	330	780	405	362	12	25	324	30.2	2	450	75	230	25	8*7	
12	300	356	885	485	432	12	25	381	31.8	2	560	92	279	35	10*8	

END CONNECTION : RF			
STD	TEST	ANSI B 16.34	
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150	
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150	
	WALL THICKNESS	ANSI B 16.34 CLASS 150	
3Z		METAL SEATED PLUG VALVE	
		PRODUCTION NO. 123.2-W.6	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	BOLT	1S	STAINLESS STEEL
5	GLAND	1	STAINLESS STEEL
6	GLAND BOLT	1S	STAINLESS STEEL
7	MECH. BOX	1S	STEEL
8	GASKET	1	GRAPHITE/SOFT STEEL
9	GLAND PACKING	1S	GRAPHITE
10	INDICATOR	1	STAINLESS STEEL
11	HAND WEEL	1	CARBON STEEL

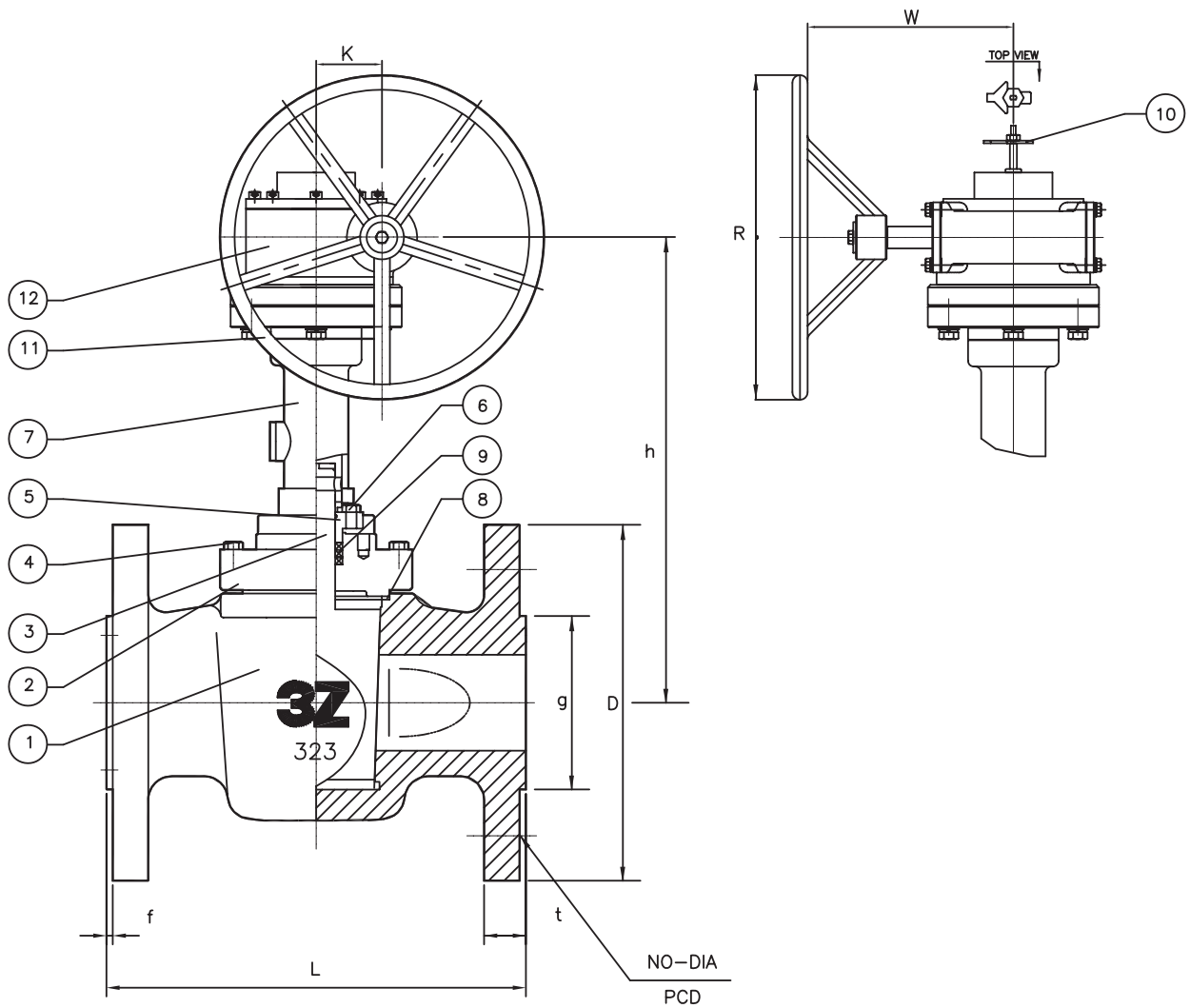


DIMENSIONS(mm)

NOMINAL SIZE		L		h		END FLANGES							R
						D	BOLT HOLE			g	t	f	
							PCD	NO	DIA				
IN	MM												
0.5	15	140	319	95	66.7	4	16	35	14.7	2	250		
0.75	20	152	319	115	82.6	4	19	43	16.3	2	250		
1	25	165	346	125	88.9	4	19	51	17.9	2	250		
1.5	40	190	367	155	114.3	4	22	73	21.1	2	250		
2	50	216	373	165	127	8	19	92	22.7	2	250		
3	80	283	381	210	168.3	8	22	127	29	2	250		
4	100	305	556	255	200	8	22	157	32.2	2	630		

END CONNECTION : RF		
STD	TEST	ANSI B 16.34
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
	WALL THICKNESS	ANSI B 16.34 CLASS 300
<div>3Z</div> <div>METAL SEATED PLUG VALVE</div>		PRODUCTION NO.
		323.1-W.6

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	COVER	1	CARBON STEEL
3	PLUG	1	STAINLESS STEEL
4	BOLT	1S	STAINLESS STEEL
5	GLAND	1	STAINLESS STEEL
6	GLAND BOLT	1S	STAINLESS STEEL
7	MECH. BOX	1S	STEEL
8	GASKET	1	GRAPHITE/SOFT STEEL
9	GLAND PACKING	1S	GRAPHITE
10	INDICATOR	1	STAINLESS STEEL
11	HAND WEEL	1	CARBON STEEL
12	GEAR OPERATOR	1S	STEEL



NOMINAL SIZE		DIMENSIONS(mm)													
		END FLANGES													
IN	MM	L	h	D	BOLT HOLE			g	t	f	R	K	W	d	Key
6	150	403	576	320	PCD	NO	DIA	215.9	37	2	300	63	206	25	8*7
8	250	419	735	380	330.2	12	25	269.6	41.7	2	450	75	230	25	8*7
16	400	838	1141	650	571.5	20	35	469.9	57.6	2	630	113	312	35	10*8

END CONNECTION : RF			
STD	TEST	ANSI B 16.34	
	FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300	
	DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300	
	WALL THICKNESS	ANSI B 16.34 CLASS 300	
3Z METAL SEATED PLUG VALVE		PRODUCTION NO.	
		323.2-W.6	

Lubricated Plug Valves



3Z Metal Seated Plug Valves, Lubricated

Designed for Crude oil, Oil, Natural gas handling and transmission lines. Line sealing is achieved basically by metal to metal contact between body and plug with assistance of sealant injected in between body and plug, which serves both sealing and lubricating during operation.

Uniqueness of dynamically and pressure balanced design together with inverted plug design, assure prevention of locking, which has been the problems of conventional design at higher pressure application.



3Z Lubricated plug valves have been installed around the world for its price, quality and on time delivery Benefits. The important locations where 3Z Lubricated plug valves are installed are : USA, Mexico, Venezuela India, Pakistan, Taiwan, Kazakstan, Uzbekistan, UK, Italy, Iran, Kuwait, Egypt, South Africa, Zambia, France, Germany , Turkey and Australia etc. The class covered from #150 upto #3000. Furthermore variety of Material is available as well as different configurations. Whenever and wherever the demands for Lubricated Plug valves exist, please contact 3Z and/or our sales network around the world.



If the threat of fire is one of your major valve considerations, then 3Z fire safe valve is for you. This valve was successfully tested in accordance with the fire safe testing procedure suggested by API

Construction of Lubricated Plug Valve

The valve is mainly consisted of 1) Pressure containing system and 2) Operation system.

Pressure containing system:

The flow media with a pressure is contained and controlled by this system. They are;

Body: Body is a main component of the valve and has provisions for 1) connection to the pipe lines, 2) port opening for flow passage, 3) strength requirements for containment of pressure, 4) seating surface for plug, 5) sealing surface for flow control, 6) affixing geometry for most of the valve components, 7) facilitation of lubrication system, 8) stem sealing, etc.

Plug: Plug has provisions for 1) connection to the operation component, 2) port opening for flow passage, 3) strength requirements for containment of pressure, 4) seating surface matching to body, 5) sealing surface for flow control, 6) facilitation of lubrication system, etc.

Covers: Bottom and Top covers have provisions for 1) strength requirements for containment of pressure, 2) limiting and adjusting geometry for plug movement, 3) facilitation of stem sealing, etc. The bottom cover is bolted onto body with stud and nuts. Two metal diaphragm are placed in a recess between body and bottom cover in order to prevent the leakage.

Sealant system: Sealant system contains 1) injection nipple, 2) injection check valve, 3) grooved plug, 4) Upper chamber, and 4) grooved body.

Stem seals: Stem seals are consisted of 1) gland yoke, and 2) gland packing.

Rotary Action: 3Z plug valves are rotary valves in which a plug closure member is rotated through increments of a certain degrees to engage and disengage a port hole in the plug with the ports in the valve body.

Wedge Action: 3Z tapered plug valves permit the sealing gap between the seatings to be adjusted by forcing the plug deeper into the seat, for the plug is tapered. The plug is rotated while in intimate contact with the valve body.

Inverted Plug: The plug is mounted in the inverted position and divorced from the stem. The inverted plug design is the solution for preventing the ✕ Taper Lock ✕. The plug is adjusted in its position by a adjusting screw in the valve cover.

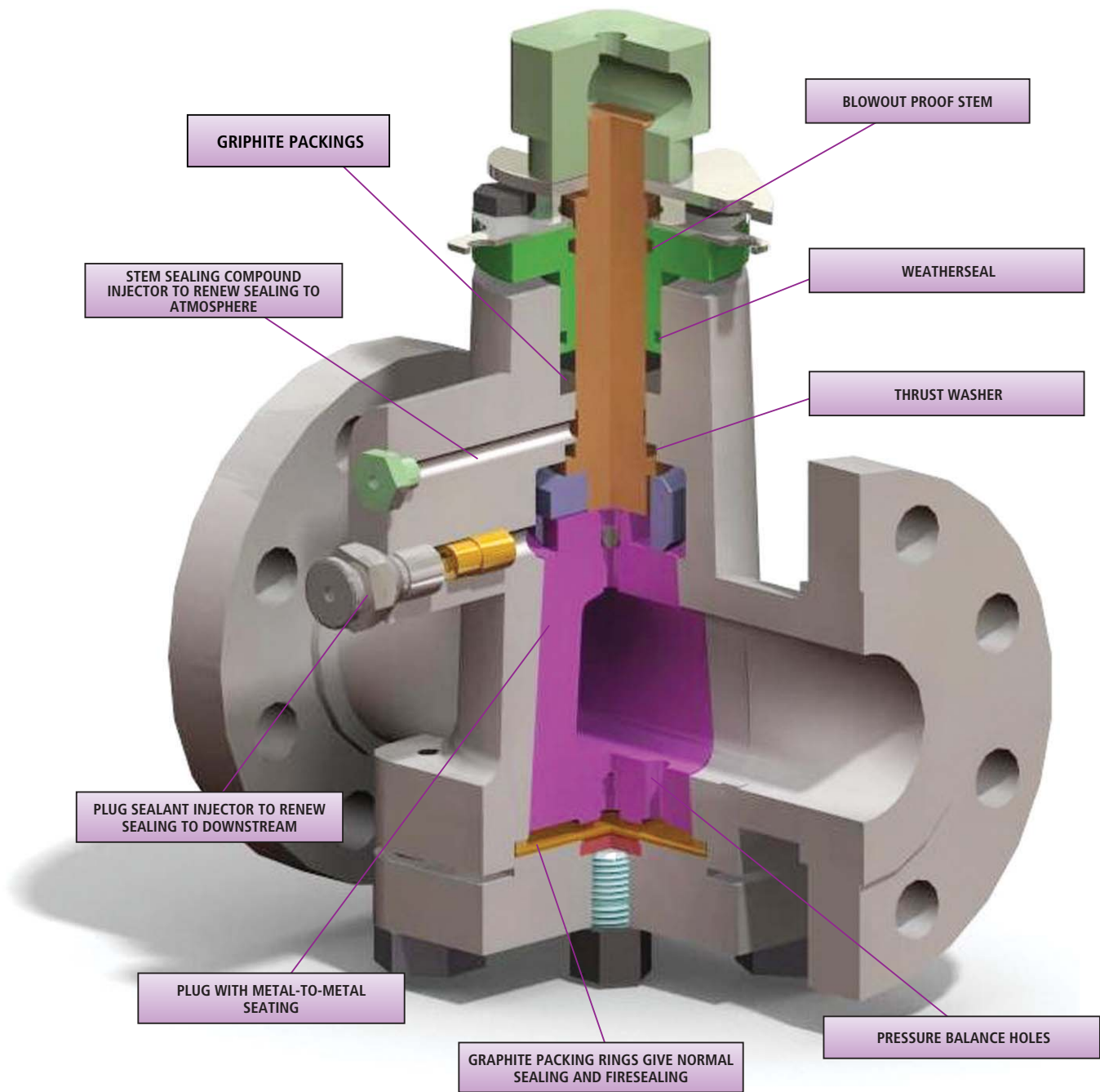
Primary Seal by Metal-to-Metal Seatings: The primary sealing is achieved by the seating surfaces metal body and seat surfaces.

Secondary Seal by Sealant Action: As a secondary seal, the valve is provided with a lubrication system which allows feeding a special sealant into the valve while the valve is in operation. Besides sealing, the lubricant is to protect the internals of the valve against corrosion and wear as well as reducing the valve torque. Sealant injection system ensures that all seal faces are supplied with thin coat of lubricant and by so doing becomes an efficient secondary seal.



Design Features

3Z Metal Seated Plug Valves provide Safety, Reliability, and Economy in plant operation, owing to its super longevity. General merits in construction make it possible.



Class : ANSI 150-2500(PN20 -420),
API 2000, 5000 & 10000

Pattern : Short, Regular, and Venturi

Size : 1/2" - 30" (DN 25- 750)

Temperature : -30°C ~400°C

Construction: Standard, API-6D 60K, Special, NACE, Low Temperature, Other specials

End Conn: Flanged, Butt Welding Socket Weld

ANSI AND API 6D VALVES			API 6A VALVES	
PART NAME	STANDARD CONSTRUCTION	SOUR GAS CONSTRUCTION PER NACE MR-01-75	STANDARD CONSTRUCTION	SOUR GAS CONSTRUCTION PER NACE MR-01-75
BODY	CARBON STEEL	CARBON STEEL HRC 33 MAX.	API* TYPE 2 STEEL	API TYPE 2 STEEL* HRC 22 MAX.
COVER	CARBON STEEL	CARBON STEEL HRC 33 MAX.	API* TYPE 2 STEEL	API TYPE 1 STEEL* HRC 22 MAX.
STEM (WRENCH OPERATED)	STAINLESS STEEL	STAINLESS STEEL HRC 22 MAX.	STAINLESS STEEL	STAINLESS STEEL
STEM (GEAR OPERATED)	WROUGHT CARBON OR LOW ALLOY STEEL	ALLOY STEEL HRC 22 MAX.	WROUGHT CARBON OR LOW ALLOY STEEL	ALLOY STEEL HRC 22 MAX.
GLAND	MALLEABLE OR DUCTILE IRON			
GLAND BOLTS	A193 GRADE B7	A193 GRADE B7M	A193 GRADE B7	A193 GRADE B7M
PACKING	COMPOUND OF GRAPHITE AND PTFE			
STEM RING	MILD STEEL			
THRUST BEARING**	STAINLESS STEEL			
EQUALIZER	ALLOY STEEL	ALLOY STEEL HRC 22 MAX.	ALLOY STEEL	ALLOY STEEL HRC 22 MAX.
BALL	STAINLESS STEEL	MONEL K-500 HRC 27-35	STAINLESS STEEL	MONEL K-500 HRC 27-35
SPRING	STAINLESS STEEL	INCONEL X-750	STAINLESS STEEL	INCONEL X-750
PLUG	STEEL IN SIZE 6 AND 8 ANSI CLASS 1500, AND SIZE 10 AND SMALLER CLASS 2500 VALVES. ASTM A-48 IRON IN ALL OTHER SIZES AND ANSI PRESSURE CLASSES. PLUGS HAVE LOW COEFFICIENT OF FRICTION MATERIAL COATINGS.	ALLOY STEEL HRC 22 MAX. COATED WITH 001" ELECTROLESS NICKEL	STEEL IN API CLASS 5000 VALVES. ASTM-A-48 IRON IN ALL OTHER SIZES AND PRESSURE CLASSES. PLUGS HAVE LOW COEFFICIENT FRICTION MATERIAL COATINGS.	ALLOY STEEL HRC 22 MAX. COATED WITH 001" ELECTROLESS NICKEL
COVER BOLTS	A193 GRADE B7	A193 GRADE B7M	A193 GRADE B7	A193 GRADE B7M

Various Applications



**3Z Metal Seated
Plug Valve,
Lubricated
RF/BW**



**3Z Metal Seated
Plug Valve,
Lubricated &
Jacketed.**



**3Z Metal Seated
Plug Valve,
Lubricated,
3-Way Type.**



**3Z Metal Seated
Plug Valve,
Lubricated,
4-Way Type.**



**3Z Metal Seated
Plug Valve,
Lubricated,
Full Bore Type**

Hard Surfaced Valves

High Temperature and Abrasive services: For high temperature and abrasive services, 3Z plug valve can be supplied with plug taper and body seat hard surfaced with nickel or cobalt base alloys. These materials provides a coating at elevated temperatures. With additional hard surfacing in high erosion areas, hard surfaced valve provides excellent resistance to abrasion in coal, limestone, iron core, copper ore and other water carried slurries. For severe services, hard sufacing extends valve life and improves valve performance significantly.



Hard Surfacing of Plug: 3Z has extensive experience. Fully trained technicians take hard surfaced plugs and lap these into the matching body. Valve assembly at room temperature is made with dimension allowance to assure proper operation at elevated temperature in actual services. A valve shell test is performed to prove pressure containment, and a seat test is performed with normal adjustment to prove the integrity of the seat. To prevent stress cracking of the hard surfacing material, these tests are performed at the valve maximum operating pressure

NACE Construction valves for sour gas application

Sulfide Stress Cracking: The basic problem is that whenever even a small amount of hydrogen sulfide is encouraged in natural gas or under oil pressure, a corrosion phenomenon may occur, known as hydrogen sulfide embrittlement or sulfide stress cracking. Actually the steel part is absorbing hydrogen. This causes ductility, and when other stresses are added, may result in failure of part.

Yield Strength: Currently with yield strength above 621 Mpa and/or hardness greater than RC 22 are subject to sulfide stress cracking. Failure below these limits is unlikely.

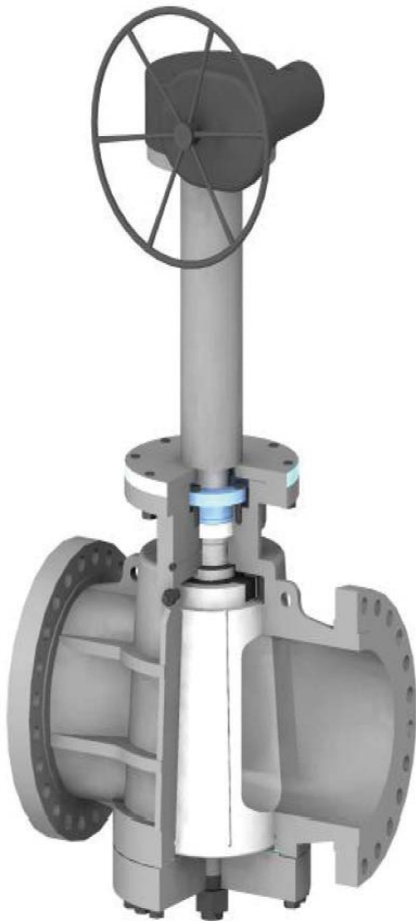
Heat Treatment: All major components are heat treated to a controlled hardness of 22 or lower on RC scale. In this configuration the plug is coated with electrolysis nickel to prevent galling.

Complete details are available upon request.

Extended stems are made to be installed on Wrench Operated standard stems, in case of buried installation of the Plug Valve or in case of installation of the valve in plant location of the valve in plant locations where a normal access of manover is not possible.

Valve extension for underground service include piping for lubrication and are supplied with water tight seals.

Extension length should be advised by customer.



NO	PART NAME	Q'TY	MATERIAL
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	STAINLESS STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	CARBON STEEL
6	LUB. NIPPLE	1	STAINLESS STEEL
7	GLAND BOLT	1S	CARBON STEEL
8	PRESS. BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(I)	1	CARBON STEEL
10	METAL DIAPHR'M(II)	1	STAINLESS STEEL
11	GASKET	1	GRAFOIL
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAFOIL
15	GLAND	1	STAINLESS STEEL
16	O-RING(I)	1	VITON
17	O-RING(II)	1	VITON
18	LOCK NUT	1	CARBON STEEL
19	THRUST BEARING	1	STAINLESS STEEL
20	ADJUSTING BOLT	1	CARBON STEEL
21	LOCK BOLT	1	CARBON STEEL
22	NEEDLE VALVE	1	CARBON STEEL
23	GEAR OPERATOR	1S	STEEL
24	CHECK VALVE	1	STAINLESS STEEL
25	PIPE	1	STEEL
26	ADAPTER	1	STEEL

Patterns

3Z Plug valves are available in a wide range of variants described in the valve standards. In API6D, API599 and BS 5353, the variants are defined as Short pattern, regular pattern, Venturi pattern and full bore pattern, respectively. The different variants refer to face to face dimension, plug port and shape.

Venturi Pattern: The plug port is reduced area, but the change of section thru the body throat is so designed as to produce a Venturi effect to restore the velocity head losses thru the valve thus resulting in a relatively low pressure drop.

Regular Pattern: These valves have face to face dimensions in accordance with the appropriate British and American standards where applicable. This ensures the maximum interchangeability between valves or different types and end connections. The plug ports of these valves have a rectangular-slightly tapered shape in section and have an area larger than Venturi Pattern. The transition from the round body end ports to the rectangular seat ports is smooth, and entails no sudden alteration in shape or section which might cause excessive changes in velocity or direction of the fluid flowing in the pipeline.

Short Pattern: These valve have the same face to face dimension as gate valves according to ANSI B16.10 in class 125,150,250 and 300. In order to obtain the relatively short face to face dimensions, the plug port is reduced and has a rectangular slightly tapered-shape.

INCH SIZE	ANSI #150	ANSI #300	ANSI #600	ANSI #900	ANSI #1500	ANSI #2500
0.5			R		R	R
0.75			R		R	R
1			R		R	R
1.5		S	R	V	R	R
2	S	S	R	V	R	R
3	S	S	R	V	R	R
4	S	S	R	V	R	R
6	S	V	R / V	R / V	R / V	R
8	S	V	R / V	R / V	R / V	R
10	S	V	R / V	R / V	R / V	R
12	S	V	R / V	R / V	R / V	R
14	V	V	R / V	R / V		
16	V	V	V		V	
18	V	V	V			
20	V	V	V			
24	V	V	V			

Maximum BreakTorque

3Z LUBRICATED PLUG VALVES AVE LOWEST POSSIBLE TURNING TORQUE COMPATRBLE WITH TIGHT SHUT-OFF CONDITIONS. THE TABLE GIVENIN BELOW IS AN ACTUAL TEST DATA FOR EXPECTED MAXIMUM WORKING CONDITIONS.

INCH SIZE	ANSI #150	ANSI #300	ANSI #600	ANSI #900	ANSI #1500	ANSI #2500
1	33			100	110	250
2	162	173	210	210	230	700
3	173	249	400	480	580	1,100
4	303	378	735	720	820	2,500
6	497	649	1,167	1,600	2,500	6,800
8	1,027	984	2,269	2,800	3,600	12,000
10	1,470	2,475	3,620	5,400	6,000	18,000
12	2,053	2,637	5,923	8,500	11,600	25,000
14	2,053	3,729	5,620			
16	2,702	4,648	7,350			
18	3,459	6,794	10,593			
20	4,626	5,859	17,294			
24	5,836	13,295	31,344			

Notes : 1. Above table data add 30% safety factor to actual torque data.

2. When sizing an Actuator, consult with 3Z.

Materials Availability

Variety of materials are available such as Cast iron, Ductile iron, Carbon steel, Lead-Bronze 80/10/10, stainless acid-resisting steel, Duplex stainless steel and special qualities and alloys.

Carbon steel: cast carbon steel used is a medium carbon steel, conforming to ASTM A216 WCC. Steel plug is made of a low alloy steel, heat treated to produce the proper balance between non-galling properties and the toughness required to resist the mechanical loads imposed in operating the valve.

Manganese-Molybdenum Alloy Steel: (ASTM A-487 Grade 4 Class C) This alloy steel is used for body castings for Class 3000 and higher Pressure balanced valves for oilfield services, which must conform to API 6A, covering Steel valves for Drilling and Production Service.

Ferritic Steel: Grade LCC Ferritic Steel, conforming to ASTM A352, is basically a "killed" mild carbon steel which has good impact qualities at low temperature to 146C and must have a minimum average Charpy V notch impact strength of 15 foot pounds at that temperature.

Type CF8M Stainless Steel: This is an 18-12 type of stainless steel casting material, containing molybdenum, with analysis and properties closely corresponding to AISI type 316 wrought stainless steel, and conforming to ASTM spec 351 Grade CF8M.

13% Chromium stainless steel: ASTM A351 Grade CA-15. 13% chromium stainless steel is used for body castings of high pressure 3Z valves made especially for use in the oil fields on high pressure corrosive services which cannot be handled with standard manganese-molybdenum alloy steel valves. While the bodies of such valves are 13% chromium stainless steel, the plugs are 18-8 stainless steel with taper surface hard faced.

Pressure and temperature Chart

3Z Lubricated plug valves are designed and manufactured in accordance with pressure and Temperature rating Criteria. One of the typical chart showing WCB/WCB is as below. For other various material information, please Consult with us and/or your nearest agent around the world.

Pressure Temperature Ratings

(Carbon Steel ASTM A105, ASTM A216 Grade WCB and ASTM A216 Grade WCC)

Service Temperature In °F	Working Pressure by Classes(PSIG)					
	150	300	600	900	1500	2500
-20 to 100	285	740	1480	2220	3705	6170
200	260	675	1350	2025	3375	5625
250	245	665	1333	1998	3328	5548
300	230	655	1315	1970	3283	5470
400	200	635	1270	1900	3170	5280
450	185	618	1235	148	3080	5135
500	170	600	1200	1795	2995	4990
600	140	550	1095	1640	2735	4560
700	110	535	1065	1600	2665	4440
750	95	505	1010	1510	2520	4200
800	80	410	825	1235	2060	3420

Service Temperature °C	Working Pressure by Rating Number(BAR)					
	150	300	600	900	1500	2500
-29 to 38	19.6	51.5	102.1	153.2	255.3	425.5
50	19.2	50.1	100.2	150.2	250.4	417.3
100	17.7	46.4	92.8	139.1	231.9	386.5
120	16.9	45.9	91.9	137.8	229.5	382.5
150	15.8	45.3	90.5	135.7	226.1	376.9
200	14	43.5	87.6	131.5	219.1	365.2
232	12.8	42.6	85.2	127.4	212.6	354
250	12.1	41.5	83.4	125.2	208.6	347.7
300	10.2	38.1	77.5	116.2	193.7	322.8
350	8.4	36.1	73.9	110.9	184.8	308
375	7.4	36	72.9	109.4	182.3	303.9
400	6.5	34.1	69	103.5	172.5	287.5
425	5.6	28.1	57.5	86.3	143.8	239.6
450	4.7	20.5	41.4	60.1	100.2	166.9

3Z Lubricated plug valves are strictly tested as per various international standard as well as customer requirement if any. The typical test pressure and test duration tables are illustrated as under

Test Pressure

VALVE RATING	Maximum C.W.P		SHELL TEST(minimum)		SEAT TEST(minimum)	
	bar	ibf/in ²	bar	ibf/in ²	bar	ibf/in ²
CLASS 150 PN 20	19.6	285	29.4	427.5	21.6	313.5
CLASS 300 PN 50	51.1	740	76.7	1110	56.2	814
CLASS 600 PN 100	102.1	1480	153.2	2220	112.3	1628
CLASS 800 PN 140	138	2000	207	3002	152	2204
CLASS 900 PN 150	153.2	2220	229.8	3330	168.5	2442
CLASS 1500 PN 250	255.3	3705	383	5558	280.8	4076
CLASS 2500 PN 420	425.5	6170	638.3	9255	468	6787
API 2000	138	2000	276	4000	138	2000
API 2000	2074	3000	414	6200	207	3000
API 5000	345	5000	690	10000	345	5000

Test Duration(MIN)

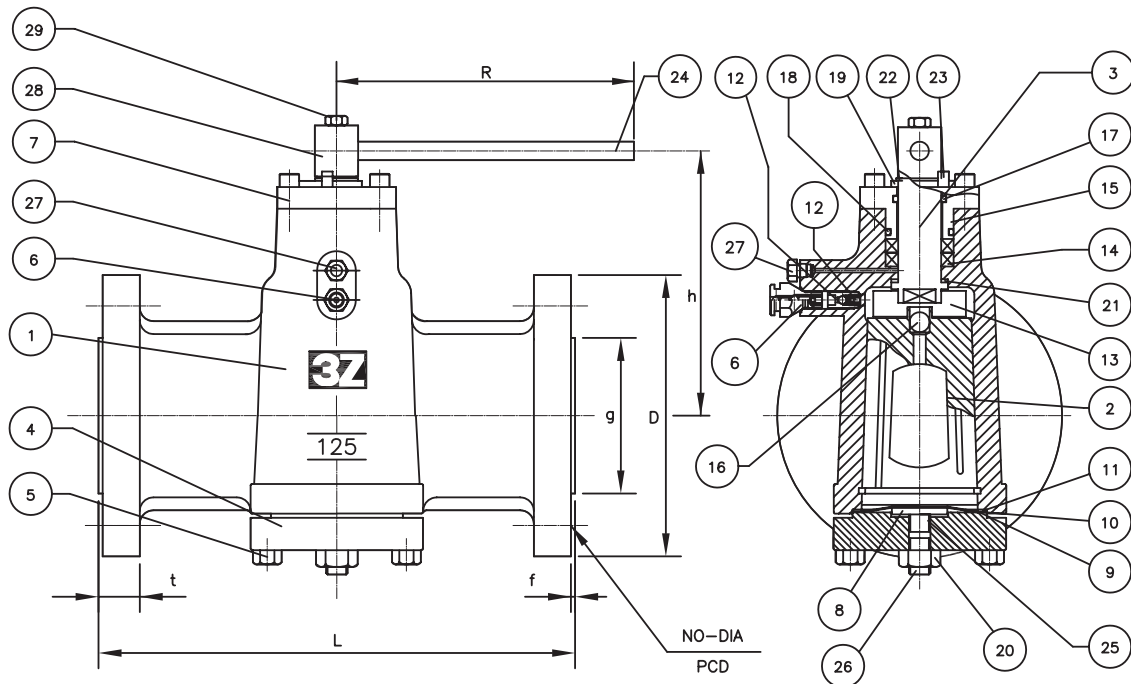
VALVE SIZE		BS 5146		API 6D	
		SHELL TEST	SEAT TEST	SHELL TEST	SEAT TEST
≤ 401mm	≤ 1 ½"	¾	¾	not applicable	
50mm	2"	¾	¾	2	2
65-100mm	2 ½" - 4"	1	1	2	2
150mm	6"	1	1	5	5
200&250mm	8" & 10"	2	2	5	5
300mm	12"	2	2	15	5
350-450mm	14" - 18"	5	2	15	5
≥ 500mm	≥ 20"	5	2	30	5

- **LUBRICANT FUNCTION :**
1. To minimize friction during operation of valve.
 2. To protect seat surfaces from corrosion.
 3. To prevent leakage by lubricant encircled with lubricant grooves.

LUBRICANT NO.	COLOR	TEMP. RANGE	PRINCIPAL SERVICES	UNSUITABLE FLUID
G-104	Peanut Butter	-18 ~ 260 °C	* API Gate Valve, Body scored, Ball or Plug Valve	Alkalies
G-204	White	-45 ~ 204 °C	* Molten Sulphur, Acetic Anhydride, Acetic Acid, Food and Pharmaceutical applications as determined by user.	LPG and hydrocarbon solvents
G-220	Clear	-59 ~ 121 °C	* Very cold service for pipe lines, compressor stations, gasoline plants and crude oil production fields.	Aromatic, Solvents
G-304	Yellow	-29 ~ 204 °C	* Where H ₂ S and CO ₂ are encountered	Solvents & Amine
G-350A	Yellow	-29 ~ 204 °C	* Hydrofluoric acid or mixtures of HF & L.P.G.	Hot Air
G-400A	Amber	-29 ~ 204 °C	* Aqueous solutions of Acides and Caustics	Liquid Hydrocarbons
G-400	Red	-20 ~ 232 °C	* Acids and Caustics	Liquid Hydrocarbons
G-525	Clear	-18 ~ 204 °C	* Air starting valves Air fractionation	Liquid Hydrocarbons
G-600	Brown	-29 ~ 260 °C	* General gas and water Sealant and general Hydrocarbons service	LPG
G-650	Green	-40 ~ 260 °C	* Hydrocarbon and L.P.G. service	Aeromatic, Alkalies Solvents
G-711	White	0 ~ 204 °C	* Aviation gasoline, Jet fuel, fuel blends of Alkylate	100% Bezine
G-750	Black	-18 ~ 316 °C	* asphalt hot oil service Salt brine, high temperature steam	Aeromatic, Alkalies Solvents


COMPARISON TABLE OF SEALANTS				
3Z	ROCKWELL	WALWORTH	CLIMAX	AVAILABLE FLUID
G-400/400A	147-421		400/400A	acids, alcohols, glycerine
G-204	234		204	silicone sealant
G-711	357		711	gasoline, mineral oils, kerosene
G-600	386		600	general gas and water sealant
G-650/800/900	555	NO. 1	650/800/900	aliphatic hydrocarbon liquids and gases
G-650/800/900	654		650/800/900	hot hydrocarbon vapors and gases
G-711	755	NO. 7	711	benzene, butane, solvent naphthas
G-711	833		711	aviation gasoline, jet fuel
G-220	862	NO.5 , NO.6	220	air and inert gases at sub-zero temp.
G-950	950		950	benzene, propylene, styrene, LPGS
G-400A		NO. 4	400A	strong acides, alkalies
G-340			340	sour gas, H ₂ S, CO ₂
G-FL5	660		FL-5	fluorocarbon, lubricant wxygen chlorine
G-PS2	921		Polyseal No. 3	hot hydrocarbon gases and vapors
G-PS6		NO. 2	Polyseal No. 6	steam, high temperature water

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CALBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	CHECK BALL	1	STAINLESS STEEL
17	O-RING(1)	1	VITON
18	O-RING(2)	1	VITON
19	INDICATOR	1	CARBON STEEL
20	LOCK NUT	1	ALLOY STEEL
21	THRUST BEARING	1	CARBON STEEL
22	SNAP RING	1	CARBON STEEL
23	STOPPER	1	CARBON STEEL
24	WRENCH	1	CARBON STEEL
25	ADJUSTING BOLT	1	ALLOY STEEL
26	LOCK BOLT	1	ALLOY STEEL
27	STEM PACKING INJECTOR	1	STAINLESS STEEL
28	HUB	1	STAINLESS STEEL
29	HUB BOLT	1	STAINLESS STEEL

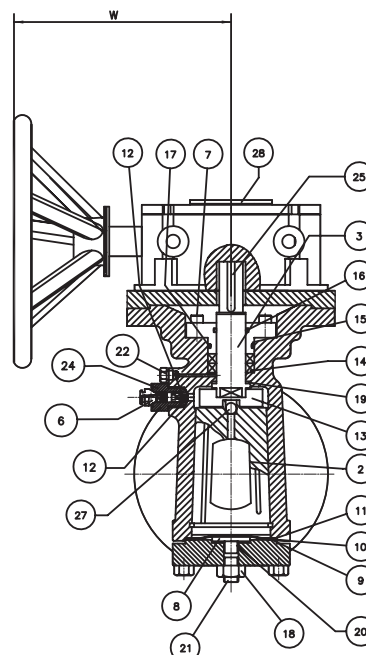
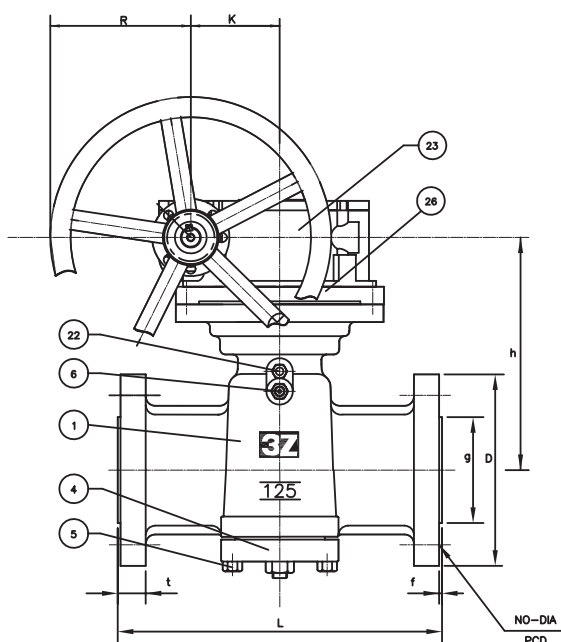


DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES								R
				D	BOLT HOLE		g	t	f			
					PCD	NO				DIA		
IN	MM											
0.5	15	108	135	89	60.5	4	16	35	9.7	1.6	180	
0.75	20	117	135	98	70	4	16	43	10.4	1.6	180	
1	25	140	140	108	79.5	4	16	51	11.2	1.6	222	
1.5	40	165	197	127	98.5	4	16	73	14.2	1.6	318	
2	50	178	197	152	120.5	4	19	92	15.8	1.6	457	
3	80	203	230	190	152.5	4	19	127	19.1	1.6	597	
4	100	299	308	229	190.5	8	19	157	23.9	1.6	746	


NOTE.	END CONNECTION : RF		
1. FIRE SAFE DESIGN : ACCORDING TO API 6FA 2. PLUG : CASE HARDENED WITH PTFE	STD	TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
		WALL THICKNESS	ANSI 599
	LUBRICATED PLUG VALVES		PRODUCTION NO.
			125.1-W.W

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CARBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	O-RING(1)	1	VITON
17	O-RING(2)	1	VITON
18	LOCK NUT	1	ALLOY STEEL
19	THRUST BEARING	1	CARBON STEEL
20	ADJUSTING BOLT	1	ALLOY STEEL
21	LOCK BOLT	1	ALLOY STEEL
22	STEM PACKING INJECTOR	1	STAINLESS STEEL
23	GEAR OPERATOR	1	STEEL
24	SOCKET	1	CARBON STEEL
25	KEY	1	STEEL
26	ADAPTER	1	CARBON STEEL
27	CHECK BALL	1	STAINLESS STEEL
28	INDICATOR	1	CARBON STEEL

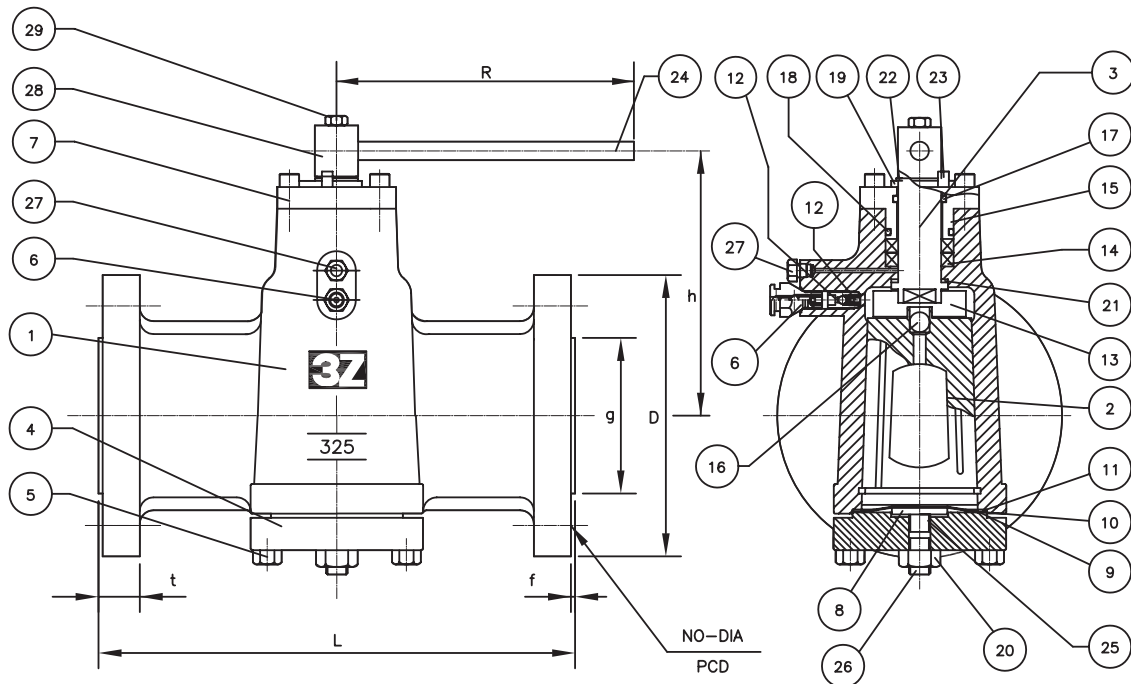


DIMENSIONS(mm)

NOMINAL SIZE		L		h		END FLANGES					R		K		W		
						D	BOLT HOLE		g	t							f
							PCD	NO									
IN	MM	L	h	D	PCD	NO	DIA	g	t	f	R	K	W				
6	150	267	310	279	241.5	8	22	216	25.4	1.6	200	73	300				
8	200	292	393	343	298.5	8	22	270	28.6	1.6	225	108	350				
10	250	330	424	406	362	12	25	324	30.2	1.6	225	108	350				
12	300	356	524	483	432	12	25	381	31.8	1.6	225	108	450				
14	350	687	570	533	476	12	29	413	35.1	1.6	225	166	450				
16	400	762	642	597	539.5	16	29	470	36.6	1.6	280	166	450				
18	450	864	678	635	578	16	32	533	39.7	1.6	315	166	450				
20	500	914	732	698	635	20	32	584	42.9	1.6	315	166	450				
24	600	1067	785	812.8	749.3	20	35	692	47.8	1.6	355	166	450				

NOTE.		END CONNECTION : RF	
1. FIRE SAFE DESIGN : ACCORDING TO API 6FA 2. PLUG : CASE HARDENED WITH PTFE	STD	TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
		WALL THICKNESS	ANSI 599
	LUBRICATED PLUG VALVES		PRODUCTION NO.
			125.2-W.W

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CARBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	CHECK BALL	1	STAINLESS STEEL
17	O-RING(1)	1	VITON
18	O-RING(2)	1	VITON
19	INDICATOR	1	CARBON STEEL
20	LOCK NUT	1	ALLOY STEEL
21	THRUST BEARING	1	CARBON STEEL
22	SNAP RING	1	CARBON STEEL
23	STOPPER	1	CARBON STEEL
24	WRENCH	1	CARBON STEEL
25	ADJUSTING BOLT	1	ALLOY STEEL
26	LOCK BOLT	1	ALLOY STEEL
27	STEM PACKING INJECTOR	1	STAINLESS STEEL
28	HUB	1	STAINLESS STEEL
29	HUB BOLT	1	STAINLESS STEEL

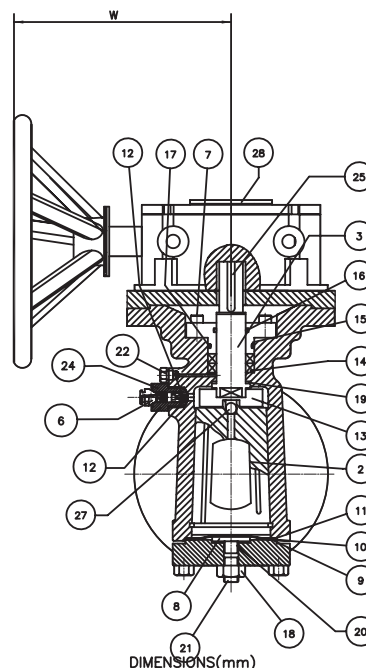
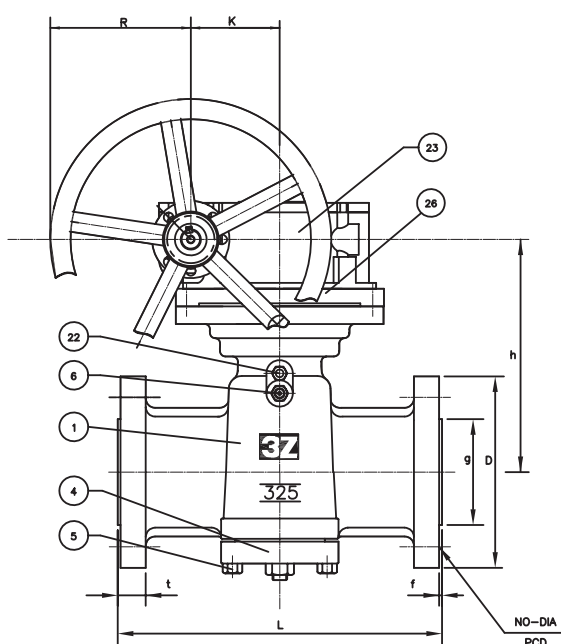


DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES								R
				D	BOLT HOLE		g	t	f			
IN	MM				PCD	NO				DIA		
0.5	15	140	135	95	66.5	4	16	35	14.3	1.6	180	
0.75	20	152	135	117	82.5	4	19	43	15.9	1.6	180	
1	25	165	140	124	89	4	19	51	17.5	1.6	222	
1.5	40	190	197	156	114.5	4	22	73	20.7	1.6	318	
2	50	216	197	165	127	8	19	92	22.3	1.6	457	
3	80	283	230	210	168	8	22	127	28.6	1.6	597	
4	100	305	324	254	200	8	22	157	31.8	1.6	960	

NOTE.		END CONNECTION : RF	
1 .FIRE SAFE DESIGN : ACCORDING TO API 6FA		TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
		WALL THICKNESS	ANSI 599
3Z LUBRICATED PLUG VALVES		PRODUCTION NO.	
		325.1-W.W	

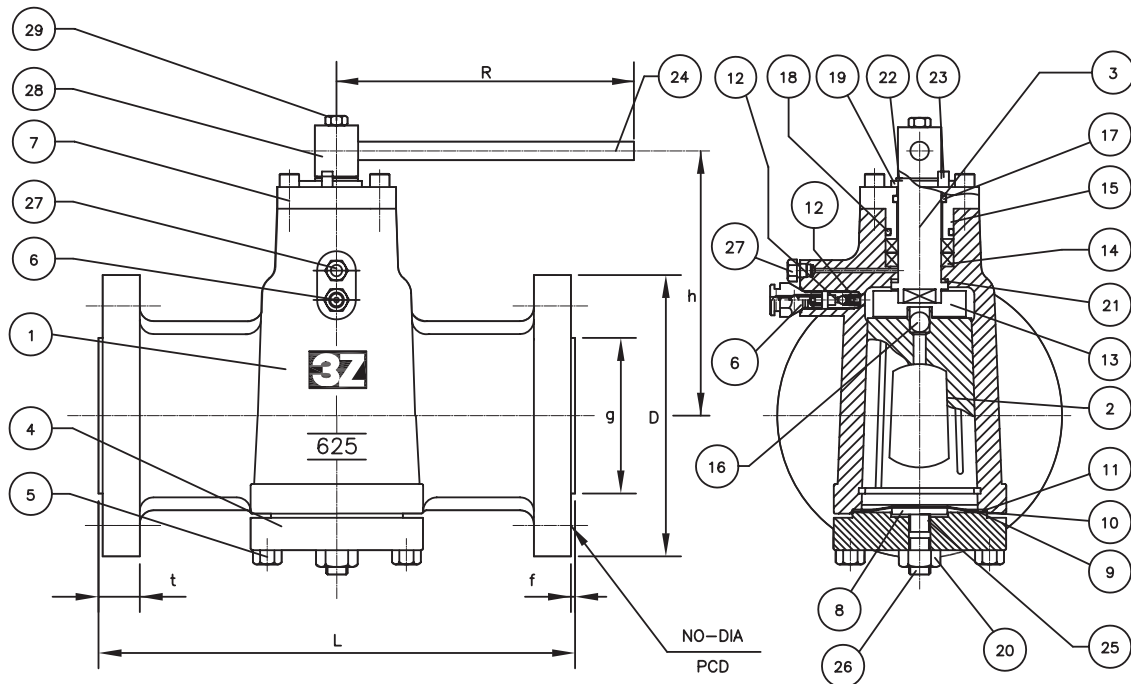
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CARBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	O-RING(1)	1	VITON
17	O-RING(2)	1	VITON
18	LOCK NUT	1	ALLOY STEEL
19	THRUST BEARING	1	CARBON STEEL
20	ADJUSTING BOLT	1	ALLOY STEEL
21	LOCK BOLT	1	ALLOY STEEL
22	STEM PACKING INJECTOR	1	STAINLESS STEEL
23	GEAR OPERATOR	1	STEEL
24	SOCKET	1	CARBON STEEL
25	KEY	1	STEEL
26	ADAPTER	1	CARBON STEEL
27	CHECK BALL	1	STAINLESS STEEL
28	INDICATOR	1	CARBON STEEL



NOMINAL SIZE		L	h	END FLANGES										R	K	W
				D	BOLT HOLE			g	t	f						
IN	MM				PCD	NO	DIA									
4	100	305	324	254	200	8	22	157	31.8	1.6	200	75	235			
6	150	403	310	318	270	12	22	216	36.6	1.6	200	75	235			
8	200	419	393	381	330	12	25	270	41.3	1.6	225	92	288			
* 10	250	457	429	444	387.5	16	29	324	47.7	1.6	225	92	288			
12	300	502	534	521	451	16	32	381	50.8	1.6	225	92	288			
14	350	762	585	584	514.5	20	32	413	54	1.6	280	113	321			
16	400	838	662	648	571.5	20	35	470	57.2	1.6	315	145	371			
18	450	914	678	711	628.5	24	35	533	60.4	1.6	355	185	454			
20	500	991	762	775	686	24	35	584	63.5	1.6	355	185	454			
24	600	1143	820	914.4	812.8	24	41	692	69.8	1.6	400	230	540			

NOTE.		END CONNECTION : RF	
1. FIRE SAFE DESIGN : ACCORDING TO API 6FA 2. * 2 BOTTOM HOLES IN FLANGES ARE TAPPING FOR 1-BUNC THRU	STD	TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 300
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 300
		WALL THICKNESS	ANSI 599
<div>3Z</div>	LUBRICATED PLUG VALVES		PRODUCTION NO.
			325.2-W.W

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CALBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	CHECK BALL	1	STAINLESS STEEL
17	O-RING(1)	1	VITON
18	O-RING(2)	1	VITON
19	INDICATOR	1	CARBON STEEL
20	LOCK NUT	1	ALLOY STEEL
21	THRUST BEARING	1	CARBON STEEL
22	SNAP RING	1	CARBON STEEL
23	STOPPER	1	CARBON STEEL
24	WRENCH	1	CARBON STEEL
25	ADJUSTING BOLT	1	ALLOY STEEL
26	LOCK BOLT	1	ALLOY STEEL
27	STEM PACKING INJECTOR	1	STAINLESS STEEL
28	HUB	1	STAINLESS STEEL
29	HUB BOLT	1	STAINLESS STEEL

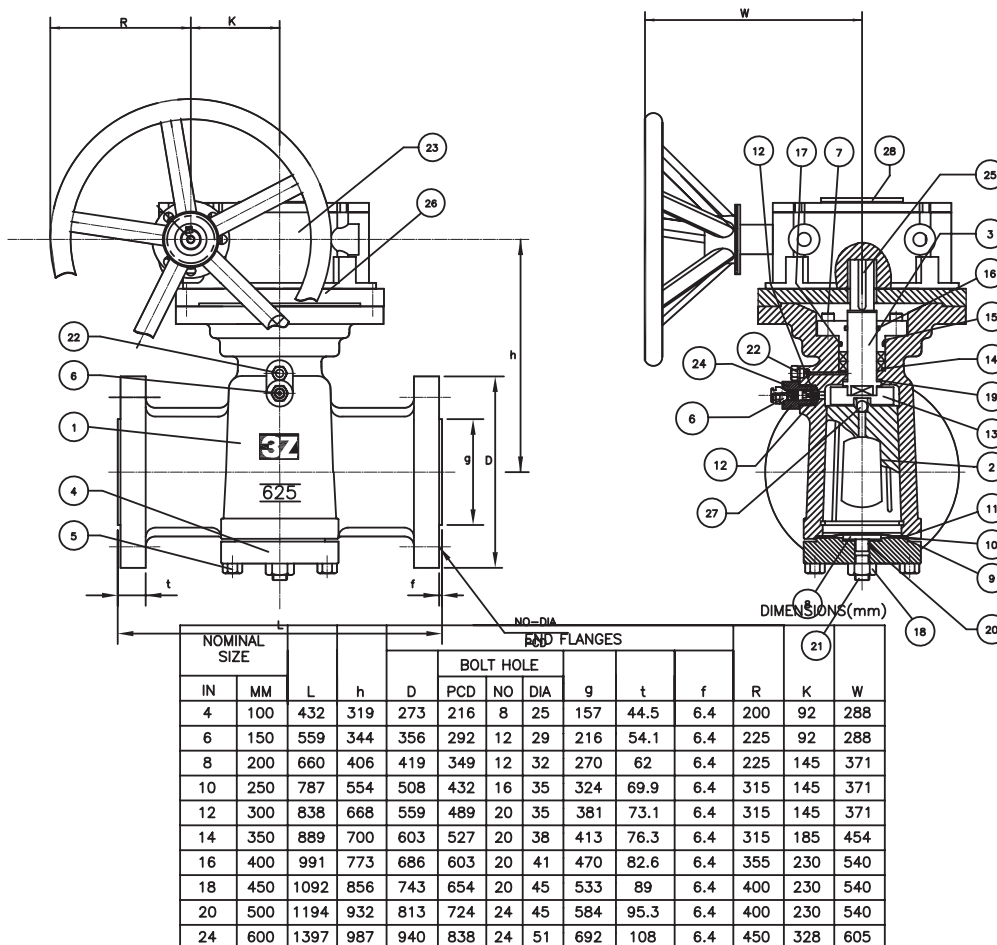


DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES								R
				D	BOLT HOLE		g	t	f			
					PCD	NO				DIA		
IN	MM											
0.5	15	165	135	95	66.5	4	16	35	20.7	6.4	180	
0.75	20	190	135	117	82.5	4	19	43	22.3	6.4	180	
1	25	216	140	124	89	4	19	51	23.9	6.4	317.5	
1.5	40	241	197	156	114.5	4	22	73	28.7	6.4	317.5	
2	50	292	197	165	127	8	19	92	31.8	6.4	597	
3	80	356	258	210	168	8	22	127	38.2	6.4	960	
4	100	432	319	273	216	8	25	157	44.5	6.4	1070	

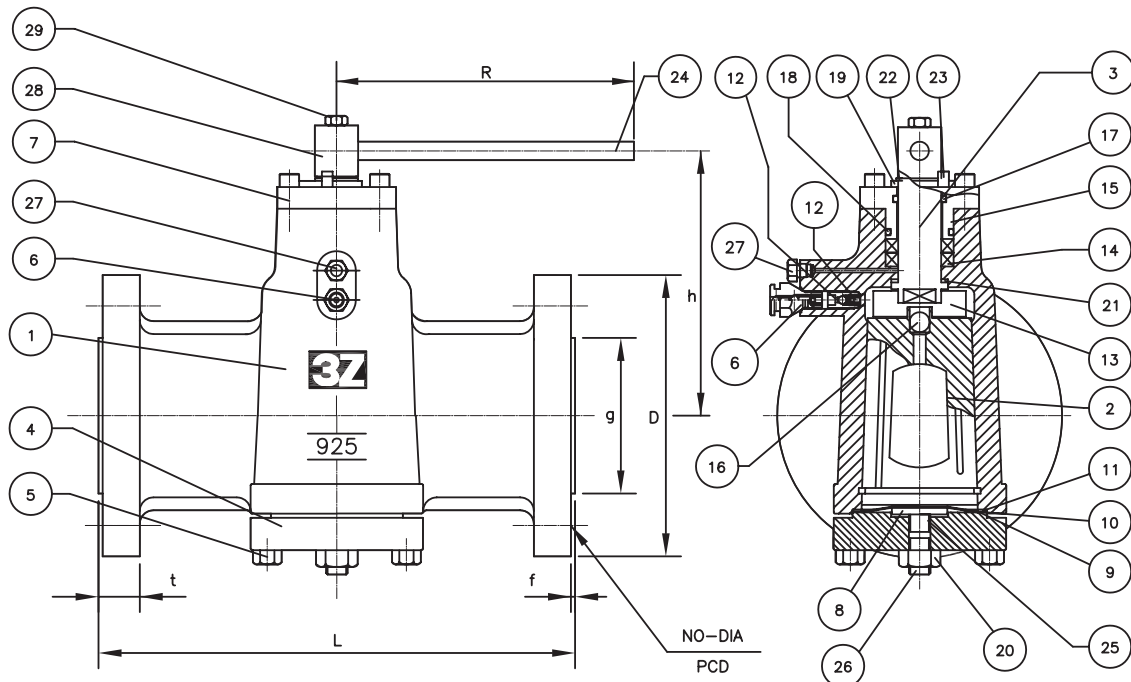
NOTE.		END CONNECTION : RF	
1 .FIRE SAFE DESIGN : ACCORDING TO API 6FA		TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 600
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 600
		WALL THICKNESS	ANSI 599
3Z LUBRICATED PLUG VALVES		PRODUCTION NO.	
		625.1-W.W	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CARBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	O-RING(1)	1	VITON
17	O-RING(2)	1	VITON
18	LOCK NUT	1	ALLOY STEEL
19	THRUST BEARING	1	CARBON STEEL
20	ADJUSTING BOLT	1	ALLOY STEEL
21	LOCK BOLT	1	ALLOY STEEL
22	STEM PACKING INJECTOR	1	STAINLESS STEEL
23	GEAR OPERATOR	1	STEEL
24	SOCKET	1	CARBON STEEL
25	KEY	1	STEEL
26	ADAPTER	1	CARBON STEEL
27	CHECK BALL	1	STAINLESS STEEL
28	INDICATOR	1	CARBON STEEL



NOTE.		END CONNECTION : RF	
1. FIRE SAFE DESIGN : ACCORDING TO API 6FA		TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 600
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 600
		WALL THICKNESS	ANSI 599
<div>3Z</div> <div>LUBRICATED PLUG VALVES</div>		PRODUCTION NO.	
		625.2-W.W	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CALBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	CHECK BALL	1	STAINLESS STEEL
17	O-RING(1)	1	VITON
18	O-RING(2)	1	VITON
19	INDICATOR	1	CARBON STEEL
20	LOCK NUT	1	ALLOY STEEL
21	THRUST BEARING	1	CARBON STEEL
22	SNAP RING	1	CARBON STEEL
23	STOPPER	1	CARBON STEEL
24	WRENCH	1	CARBON STEEL
25	ADJUSTING BOLT	1	ALLOY STEEL
26	LOCK BOLT	1	ALLOY STEEL
27	STEM PACKING INJECTOR	1	STAINLESS STEEL
28	HUB	1	STAINLESS STEEL
29	HUB BOLT	1	STAINLESS STEEL

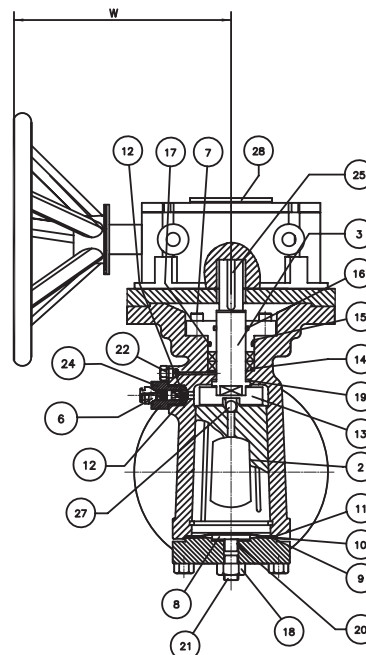
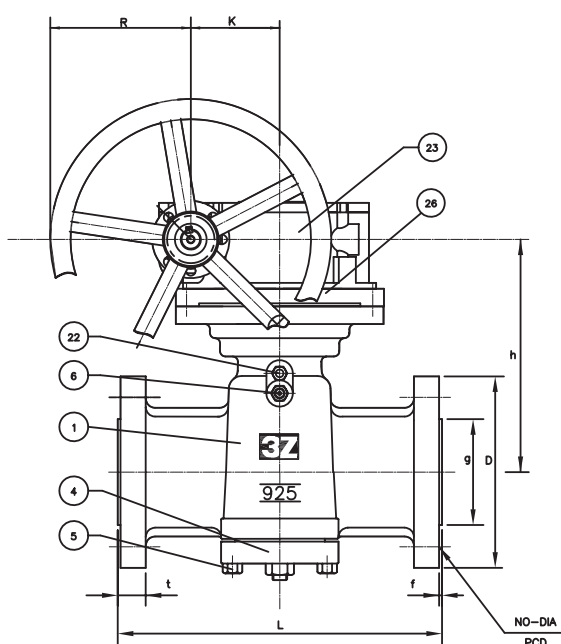


DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES								R
				D	BOLT HOLE			g	t	f		
					PCD	NO	DIA					
IN	MM											
0.5	15	215.9	135	120.7	82.6	4	22.4	35	28.8	6.4	180	
0.75	20	228.6	135	130	88.9	4	22.4	43	31.8	6.4	180	
1	25	254	140	149	101.6	4	25.4	51	34.8	6.4	222	
1.5	40	305	197	178	124	4	28.4	73	38.2	6.4	597	
2	50	368	197	216	165.1	8	25.4	92	44.5	6.4	746	
3	80	381	258	241	190.5	8	25.4	127	44.5	6.4	1070	

NOTE.		END CONNECTION : RF	
1 .FIRE SAFE DESIGN : ACCORDING TO API 6FA		TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 900
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 900
		WALL THICKNESS	ANSI 599
3Z LUBRICATED PLUG VALVES		PRODUCTION NO.	
		925.1-W.W	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CARBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	O-RING(1)	1	VITON
17	O-RING(2)	1	VITON
18	LOCK NUT	1	ALLOY STEEL
19	THRUST BEARING	1	CARBON STEEL
20	ADJUSTING BOLT	1	ALLOY STEEL
21	LOCK BOLT	1	ALLOY STEEL
22	STEM PACKING INJECTOR	1	STAINLESS STEEL
23	GEAR OPERATOR	1	STEEL
24	SOCKET	1	CARBON STEEL
25	KEY	1	STEEL
26	ADAPTER	1	CARBON STEEL
27	CHECK BALL	1	STAINLESS STEEL
28	INDICATOR	1	CARBON STEEL

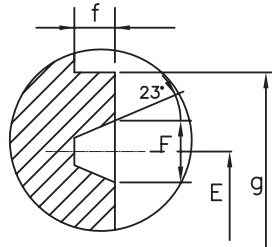


DIMENSIONS(mm)

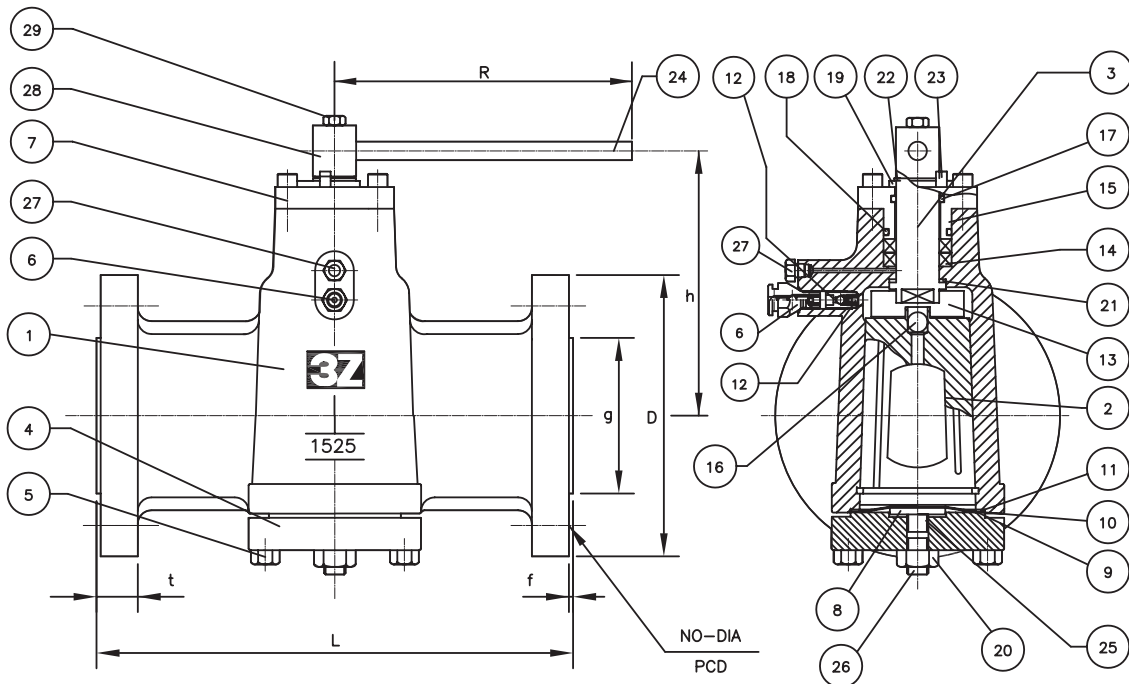
NOMINAL SIZE		END FLANGES										R	K	W
		L	h	D	BOLT HOLE			g	t	f				
					PCD	NO	DIA							
IN	MM													
4	100	457	319	292	235	8	31.8	157	50.9	6.4	225	108	350	
6	150	610	344	381	317.5	12	31.75	216	61.8	6.4	225	108	350	
8	200	737	406	470	393.7	12	38.1	270	69.9	6.4	280	166	450	
10	250	838	554	546	469.9	18	38.1	324	76.3	6.4	315	166	450	
12	300	965	668	610	533.4	20	38.1	381	85.6	6.4	355	166	450	
16	400	1130	932	705	616	20	44	470	95.3	6.4	355	290	800	

NOTE.		END CONNECTION : RF	
1. FIRE SAFE DESIGN : ACCORDING TO API 6FA		TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 900
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 900
		WALL THICKNESS	ANSI 599
<div>3Z</div> <div>LUBRICATED PLUG VALVES</div>		PRODUCTION NO.	
		925.2-W.W	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CALBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	CHECK BALL	1	STAINLESS STEEL
17	O-RING(1)	1	VITON
18	O-RING(2)	1	VITON
19	INDICATOR	1	CARBON STEEL
20	LOCK NUT	1	ALLOY STEEL
21	THRUST BEARING	1	CARBON STEEL
22	SNAP RING	1	CARBON STEEL
23	STOPPER	1	CARBON STEEL
24	WRENCH	1	CARBON STEEL
25	ADJUSTING BOLT	1	ALLOY STEEL
26	LOCK BOLT	1	ALLOY STEEL
27	STEM PACKING INJECTOR	1	STAINLESS STEEL
28	HUB	1	STAINLESS STEEL
29	HUB BOLT	1	STAINLESS STEEL



FORM B

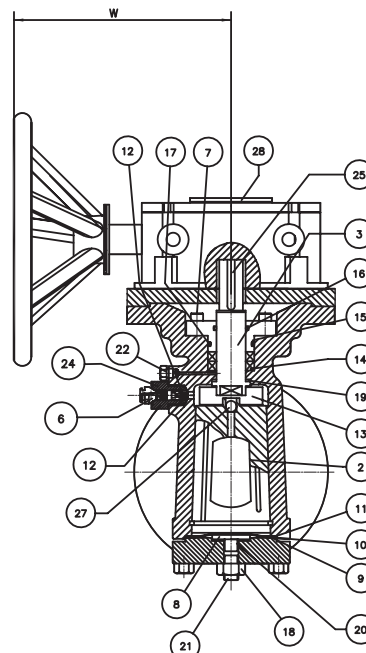
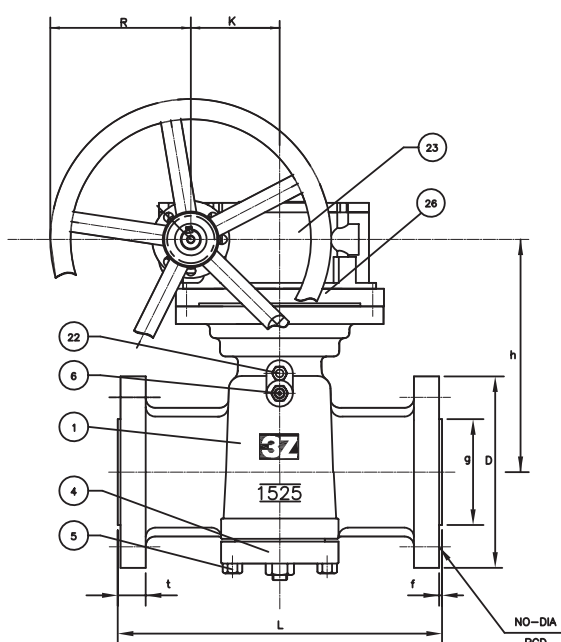


DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES							R	E	F
				D	BOLT HOLE			g	t	f			
IN	MM				PCD	NO	DIA						
0.5	15	215.9	135	120.7	82.6	4	22.4	60.5	28.8	6.4	180	39.7	8.7
0.75	20	228.6	135	130	88.9	4	22.4	66.5	31.8	6.4	180	44.5	8.7
1	25	254	140	149	101.6	4	25.4	71.5	34.8	6.4	317.5	50.8	8.7
1.5	40	305	197	178	124	4	28.4	92	38.2	6.4	597	68.3	8.7
2	50	368	258	216	165.1	8	25.4	124	44.5	7.9	1070	95.3	11.9
3	80	470	258	267	203.2	8	32	168	54.2	7.9	1070	136.5	11.9

NOTE.		END CONNECTION : RF	
1 .FIRE SAFE DESIGN : ACCORDING TO API 6FA		TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 1500
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 1500
		WALL THICKNESS	ANSI 599
<div>3Z</div> <div>LUBRICATED PLUG VALVES</div>		PRODUCTION NO.	
		1525.1-W.W	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CARBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	O-RING(1)	1	VITON
17	O-RING(2)	1	VITON
18	LOCK NUT	1	ALLOY STEEL
19	THRUST BEARING	1	CARBON STEEL
20	ADJUSTING BOLT	1	ALLOY STEEL
21	LOCK BOLT	1	ALLOY STEEL
22	STEM PACKING INJECTOR	1	STAINLESS STEEL
23	GEAR OPERATOR	1	STEEL
24	SOCKET	1	CARBON STEEL
25	KEY	1	STEEL
26	ADAPTER	1	CARBON STEEL
27	CHECK BALL	1	STAINLESS STEEL
28	INDICATOR	1	CARBON STEEL

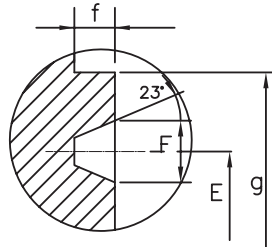


DIMENSIONS(mm)

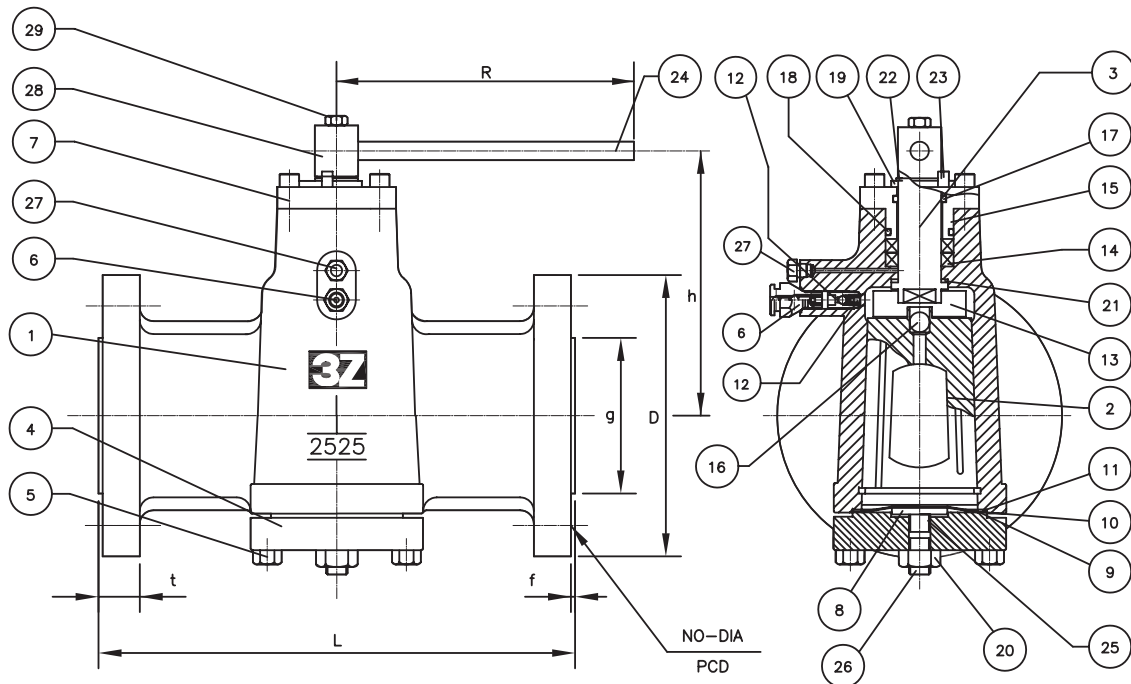
NOMINAL SIZE		L	h	END FLANGES							R	K	W
				D	BOLT HOLE			g	t	f			
					PCD	NO	DIA						
IN	MM												
4	100	546.1	344	311.2	241.3	8	35.1	157	60.3	6.4	225	108	350
6	150	705	406	393.7	317.5	12	38.1	216	89	6.4	225	108	350
8	200	832	668	483	393.7	12	44	270	98.3	6.4	280	166	450
10	250	991	650	584.2	482.6	12	50.8	324	114.3	6.4	315	166	450
14	450	1257	932	749	635	16	60	412.8	139.8	6.4	355	290	800
16	400	1384	987	826	704.9	16	67	470	154	6.4	355	290	800

NOTE.		END CONNECTION : RF	
1. FIRE SAFE DESIGN : ACCORDING TO API 6FA		TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 1500
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 1500
		WALL THICKNESS	ANSI 599
<div>3Z</div> <div>LUBRICATED PLUG VALVES</div>		PRODUCTION NO.	
		1525.2-W.W	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	CARBON STEEL
2	PLUG	1	CARBON STEEL
3	STEM	1	CARBON STEEL
4	COVER	1	CARBON STEEL
5	COVER BOLT	1S	ALLOY STEEL
6	SEALANT INJECTOR	1	STAINLESS STEEL
7	GLAND BOLT	1S	ALLOY STEEL
8	PRESS.BUTTON	1	STAINLESS STEEL
9	METAL DIAPHR'M(1)	1	CARBON STEEL
10	DETAL DIAPHR'M(2)	1	STAINLESS STEEL
11	GASKET	1	GRAPHITE
12	CHECK VALVE	1	STAINLESS STEEL
13	COMPENSATOR	1	CARBON STEEL
14	GLAND PACKING	2	GRAPHITE
15	GLAND	1	CARBON STEEL
16	CHECK BALL	1	STAINLESS STEEL
17	O-RING(1)	1	VITON
18	O-RING(2)	1	VITON
19	INDICATOR	1	CARBON STEEL
20	LOCK NUT	1	ALLOY STEEL
21	THRUST BEARING	1	CARBON STEEL
22	SNAP RING	1	CARBON STEEL
23	STOPPER	1	CARBON STEEL
24	WRENCH	1	CARBON STEEL
25	ADJUSTING BOLT	1	ALLOY STEEL
26	LOCK BOLT	1	ALLOY STEEL
27	STEM PACKING INJECTOR	1	STAINLESS STEEL
28	HUB	1	STAINLESS STEEL
29	HUB BOLT	1	STAINLESS STEEL



FORM B



DIMENSIONS(mm)

NOMINAL SIZE		L	h	END FLANGES								R	E	F
				D	BOLT HOLE		DIA	g	t	f				
IN	MM	PCD	NO											
3	80	583	197	305	228.6	8	35	168	76.2	9.6	1070	127	13.5	

NOTE.		END CONNECTION : RF	
1 .FIRE SAFE DESIGN : ACCORDING TO API 6FA		TEST	ANSI 6D
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 1500
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 1500
		WALL THICKNESS	ANSI 599
3Z		PRODUCTION NO.	
		2525.1-W.W	

LUBRICATED
PLUG VALVES

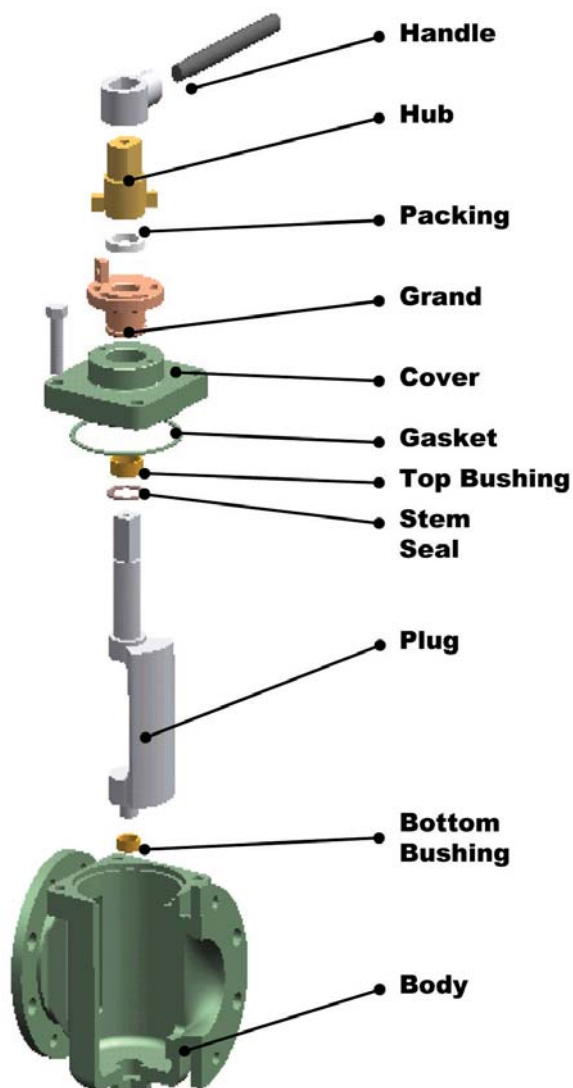
Eccentric Plug Valves

Eccentric Plug Valves are designed to handle a wide variety of liquids, gasses and solids, including water, air, petroleum, paint and non-corrosive chemicals. Eccentric plug valves are used in power and chemical plants, paper mills, water and waste water treatment plants, HVAC applications as well as hot process applications, and mining operations.

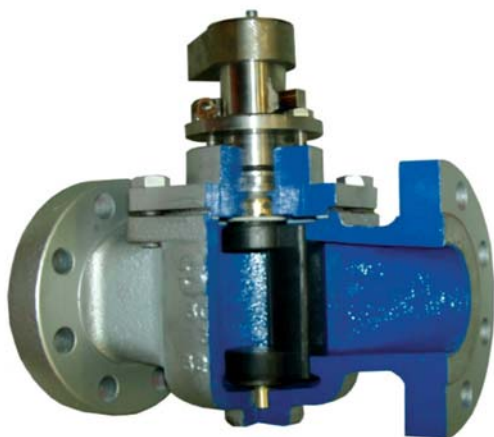
Basic structure is consists of plug, cover, body, position indicators, stem seal and bearing. Single piece plug/stem is designed for a quick lift camming motion to provide both low torque and reduced wear of the plug face elastomer.

The elastomer extends along the stem in both directions to protect the integral tunnions and form the bearing interference. A wide range of plug elastomers are available to assure complete fluid compatibility.

Body casting is in ASTM A126 Class B cast iron and conforms to the leading standard for wall thickness. Flange thickness, diameter and drilling fully conform to ANSI B16.1 Class 150. Alternative flanged, screwed or mechanical joint ends are available. A high quality two-part epoxy coating can be applied externally and internally to protect the casting integrity and assure long, trouble-free performance.



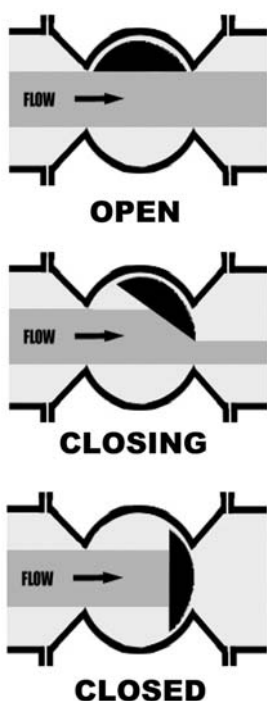
3Z eccentric plug valves provide Safety, Reliability, and Economy in plant operation, owing to its super longevity. Merits in construction make it possible.



3Z Eccentric Plug Valve

Designed to meet higher CV requirements and excessive sludge handling in such as sewage treatment plant or waste water treatment plant. Line seal is achieved by an eccentric plug and metal body. The plug is designed in half shape of concentric plug, and centered eccentrically to seat smoothly on the seat sealing surface in pressing motion.

The plugs can be supplied with or without elastomer coated.



Eccentric Action

Eccentric action and resilient plug facings assure lasting dead-tight shutoff. As the eccentric plug rotates 90° from open to closed, it moves into a raised eccentric seat.

In the open position, the segmented plug is out of the flow path. Flow is straight through, flow capacity is high.

As the plug closes, it moves toward the seat without scraping the seat or body walls so there is no plug binding or wear.

Flow is still straight through making the throttling characteristic of this valve ideal for gases, liquids and slurries.

In the closed position, the plug makes contact with the seat. When furnished with resilient facing, the plug is pressed firmly into the seat for dead-tight shutoff. Eccentric plug and seat design assures lasting shutoff because the plug continues to be pressed against the seat until firm contact is made.

Plug Options Available



Plug for Metal Seated Type



Plug for Rubber Coated Type

Design Features

● High Flow Capacity Feature

Clean interior design and straight through flow allow high maximum capacity with minimum pressure drop.



Plug for Metal Seated Type



Plug for Rubber Coated Type

● Resilient Plug Facings for Dead-Tight Shutoff Feature

3Z valves are available with a variety of resilient plug facings suitable for temperatures up to 450 F (232 C). Resilient-faced plugs provide dead-tight shutoff without the use of sealing lubricants. Even if small solids are trapped between the plug and seat, the resilient facing provides tight shutoff and prevents seat damage. The resilient plug design provides drip-tight shutoff on wet service applications up to the full pressure rating of the valve with pressure in either direction. Materials available include chloroprene, acrylonitrile-butadiene, hard natural rubber, chloro-isobutene isoprene, hard rubber with fluoro rubber. All-metal plugs are also available for high-temperature or throttling applications where dead tight shutoff is not required.

● One-Piece Cast Plug Feature

3Z Eccentric Plug valves feature a plug with upper and lower shaft in a one-piece casting. The straight plug face allows for inherent linear flow characteristic. The plug rotates completely out of flow, allowing high, straight-through flow capacity. Because the plug is out of flow path, it provides increased plug life in abrasive application.

● Control Valve Availability Features

3Z mounting kits for eccentric plug valves are available for most popular actuators which customer requests. And a full line of accessories designed to match 3Z control systems is also available, like positioners, solenoids, switches, speed controls, extensions and floorstands.

● Wide Choice of Body Materials Feature

3Z offers the most complete line of eccentric body materials to meet the requirements of a broad range of applications such as Cast Iron, Bronze, Nickel, Carbon Steel, Stain Less Steel, Alloy 20, CD4M, Monel and Hastelloy C, from our own foundry.

● Bolted Cover Feature

3Z valves have a rugged, one piece bolted cover for maximum strength. It houses upper bearing and shaft seals to increase cycle life. If maintenance is ever required, ease of disassembly allows accessibility to internal components.

- **Long-Life Stem Seals Feature**

A Variety of stem seal materials provides Zero-Maintenance sealing that matches valve performance and assures long life and reliability.

- **Corrosion-Resistant Bearing Feature**

Heavy-duty bearings resist corrosion to prevent binding and assure lasting easy valve operation without lubrication. These rugged stainless steel bearings are furnished in the cover and body of all 3Z valves.

- **Choice of Patterns & End Styles Feature**

A Complete choice of patterns and end styles includes ANSI, DIN, BS, or JIS standards.

- **Eccentric Action**

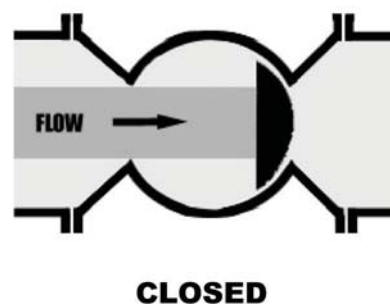
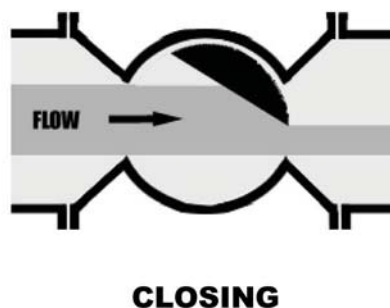
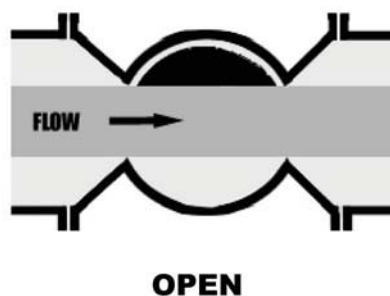
Eccentric action and resilient plug facings assure lasting dead-tight shutoff. As the eccentric plug rotates 90° from open to closed, it moves into a raised eccentric seat.

In the open position, the segmented plug is out of the flow path. Flow is straight through, flow capacity is high.

As the plug closes, it moves toward the seat without scraping the seat or body walls so there is no plug binding or wear.

Flow is still straight through making the throttling characteristic of this valve ideal for gases, liquids and slurries.

In the closed position, the plug makes contact with the seat. When furnished with resilient facing, the plug is pressed firmly into the seat for dead-tight shutoff. Eccentric plug and seat design assures lasting shutoff because the plug continues to be pressed against the seat until firm contact is made.



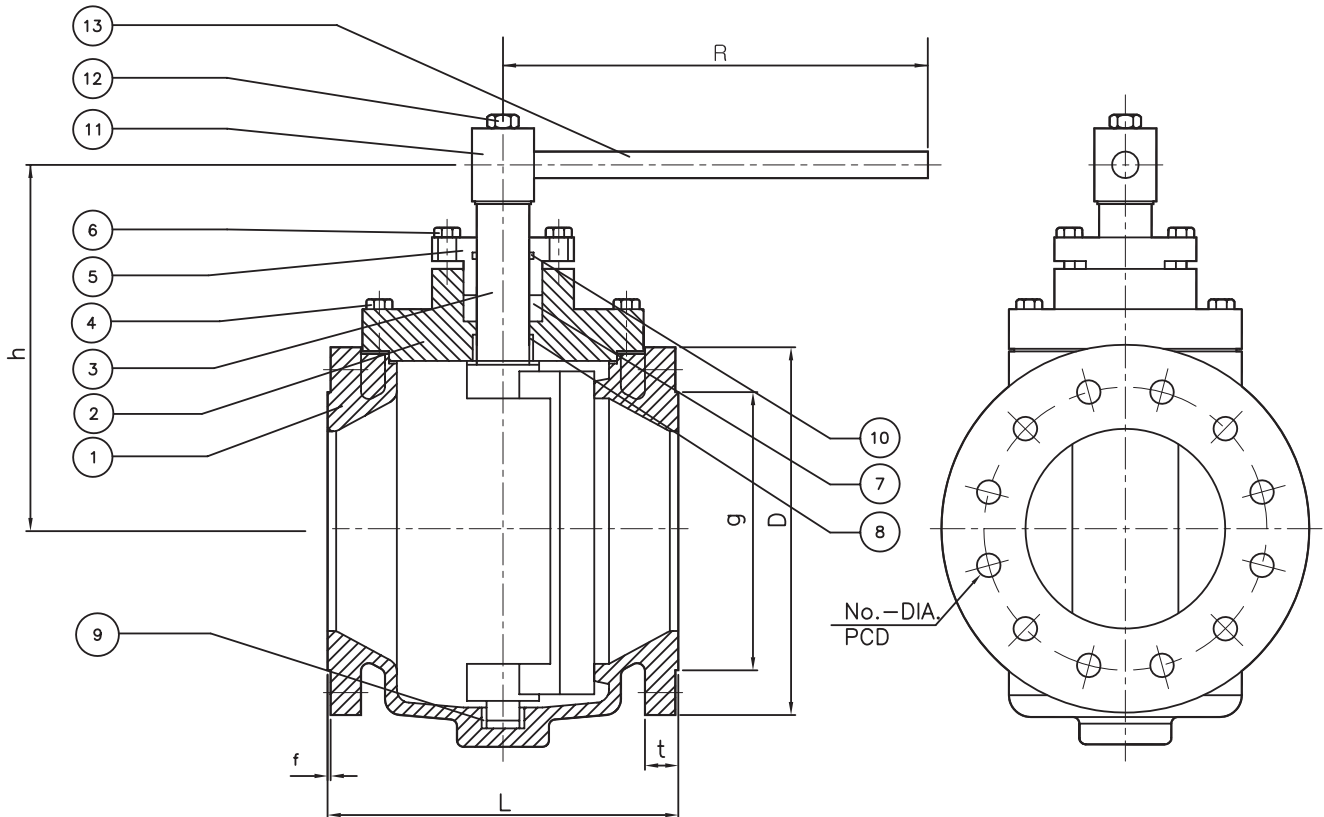
Specification and Material

- 3Z Eccentric Plug Valves shall be Zero leakage at the rated pressure.
- 3Z Eccentric Plug Valve shall be satisfactory for applications involving throttling service as well as on-off service
- The valve closing member should rotate approximately 90 degrees from the full-open to full-close position and vice versa.
- Body ends shall be: 1) Flanged in full conformance with ANSI, DIN, JIS, and Class 150, 300. 2) Mechanical Joint to meet the requirements of AWWA C111/ANSI A21.11. 3) Grooved ends to meet the requirements of AWWA C606.
- The plug shaft shall be integral. The 3Z rubber coated plug valves shall have 100% encapsulated plug with NBR, EPDM, VITON, etc. The rubber to metal bond must withstand 75 lbs, under test procedure ASTM D-429-73 Method B.
- Shaft bearings, upper and lower, shall be sleeve type metal bearings, sintered, oil impregnated and permanently lubricated Type 316 stainless steel.
- All packing shall be replaceable without removing the valve from the line while the valve is in service.
- Manual valves shall have lever or worm gear type actuators with hand wheels. Worm gear type actuators shall be furnished on all 4" or larger valves where the max. unseating pressure is 25 psig or more.
- Eccentric plug valves have no void spaces to entrap solids or other debris and interfere with tight shutoff.

Materials of Construction

Description	Material
Body	Cast Iron, ASTM A126 Class B
	Carbon Steel, ASTM A216, Grade WCB
	316 Stainless Steel, ASETM a743, Grade CF8M
	Alloy 20
	Hastelloy C
	Acid Resistant Bronze, ASTM B427 Alloy C90800
	Ni-Resist, ASTM A436 Type 2
	Monel
Top, Botton Bushing	Brass + Graphite
Plug	Metal
	NBR Acrylonitrile-Butadiene
	NRH Hard Natural Rubber
	CR Cholroprene
Gasket	PTFE
Cover	Same material as body
Stem Seal	PTFE
Packing	Graphite
Gland	Same material as body
Hub	Carbon Steel, ASTM A216, Grade WCB
Handle	Carbon Steel, ASTM A216, Grade WCB

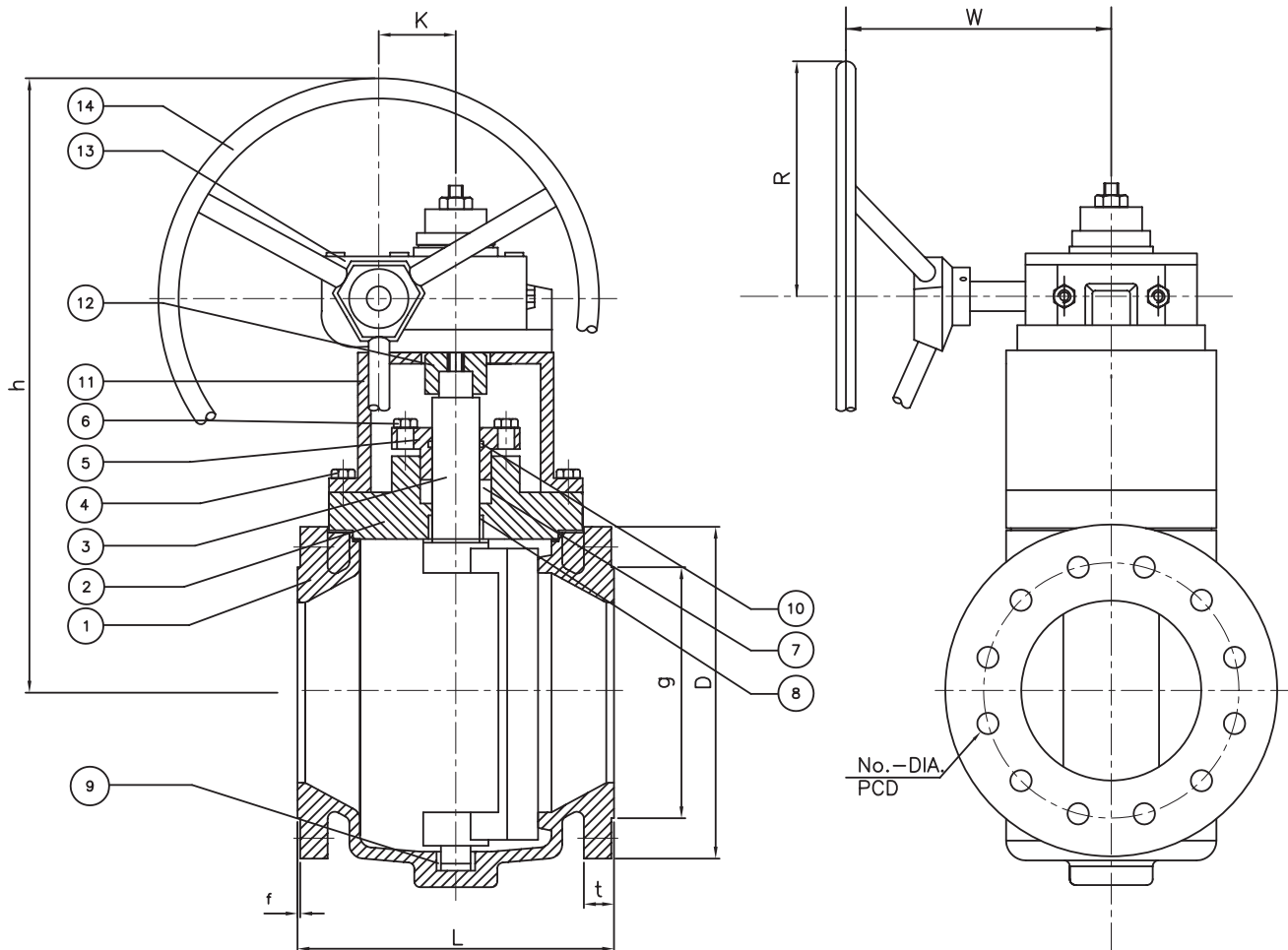
NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	DUCTILE IRON
2	COVER	1	DUCTILE IRON
3	PLUG	1	DUCTILE IRON
4	COVER BOLT	1S	STAINLESS STEEL
5	GALND	1	STAINLESS STEEL
6	GALND BOLT	1S	STAINLESS STEEL
7	GALND RACKING	1S	GRAPHITE
8	TOP BEARING	1	STAINLESS STEEL
9	BOTTOM BEARING	1	STAINLESS STEEL
10	O-RING	1	VITON
11	HUB	1	STAINLESS STEEL
12	HUB BOLT	1S	STAINLESS STEEL
13	WRENCH	1	CARBON STEEL



DIMENSIONS(mm)											
NOMINAL SIZE		L	h	D	END FLANGES						R
					BOLT HOLE			g	t	f	
IN	MM				PCD	NO	DIA				
2	50	178	237	150	120.7	4	19	92	16.3	2	457
3	80	203	270	190	152.4	4	19	127	19.5	2	597
4	100	229	320	230	190.5	8	19	157	24.3	2	746

NOTE.		END CONNECTION : RF	
1. NON-LUBRICATED VALVE	STD	TEST	ANSI B 16.34
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
		WALL THICKNESS	ANSI B 16.34 CLASS 150
<div>3Z</div> ECCENTRIC PLUG VALVES		PRODUCTION NO.	
		126.1—DI.DI	

NO.	PART NAME	Q'TY	MATERIALS
1	BODY	1	DUCTILE IRON
2	COVER	1	DUCTILE IRON
3	PLUG	1	DUCTILE IRON
4	COVER BOLT	1S	STAINLESS STEEL
5	GALND	1	STAINLESS STEEL
6	GALND BOLT	1S	STAINLESS STEEL
7	GALND PACKING	1S	GRAPHITE
8	TOP BEARING	1	STAINLESS STEEL
9	BOTTOM BEARING	1	STAINLESS STEEL
10	O-RING	1	VITON
11	BRACKET	1	CARBON STEEL
12	COMPENSATOR	1	CARBON STEEL
13	GEAR OPERATOR	1S	STEEL
14	HANDWHEEL	1	STEEL



DIMENSIONS(mm)													
NOMINAL SIZE		L	h	D	END FLANGES						R	K	W
					BOLT HOLE			g	t	f			
IN	MM				PCD	NO	DIA						
6	150	267	314.5	280	241.3	8	22	216	25.9	2	190	73	300
8	200	292	362	345	298.5	8	22	270	29	2	225	108	350
10	250	330	420.6	405	362	12	25	324	30.6	2	270	166	450

NOTE.		END CONNECTION : RF	
1. NON-LUBRICATED VALVE		TEST	ANSI B 16.34
		FACE TO FACE or END TO END	ANSI B 16.10 CLASS 150
		DIMENSIONS OF FLANGE	ANSI B 16.5 CLASS 150
		WALL THICKNESS	ANSI B 16.34 CLASS 150
3Z ECCENTRIC PLUG VALVES		PRODUCTION NO.	
		126.2-DI.DI	



The Solution for the Valve Problems
3Z[®] Rising Stem Ball Valves

Design Features

Low Torque

Low operation torque by enabling the dual action with special mechanism.

Fire Safe

Having passed the test of fire safety according to API 6FA.

Non-Slam

Not occurring the situation of slam as special mechanism induces stem to do linear action.

Energized Sealing

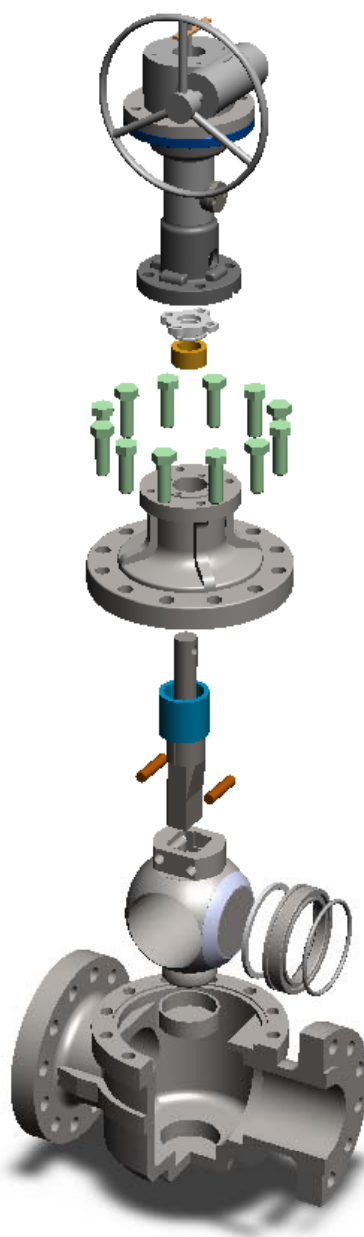
Perfect sealing mechanically, not using spring or other assistive devices.

Corrosion & Erosion Resistance Material

Strong corrosion and erosion to be applied on the seating part of core.

Customizing

Being responsible according to customer's request of position indicator, locking device, limit switch, jacket etc.



Optimum Flow

Enabling full bore or reduced bore products and having high Cv numerical value.

Special Mechanism

Operating after divided Tilting and Turn action clearly.

Perfect Friction Free

Reducing the seat abrasion by being rotated after core is separated from seat completely.

Self Cleaning

During core is open or close, self cleaning is performed for seat.

No Thermal Expansion

No thermal expansion situation as there is no closed space with the single seating design.

Trunnion with Rounded End

No impact even to the liquid of high pressure.

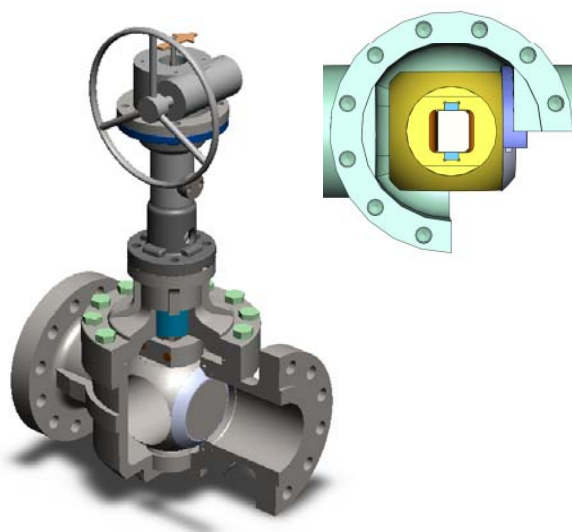
Inline Maintenance

Easy seat exchange and line inspection/cleaning with the top entry type.

Operation

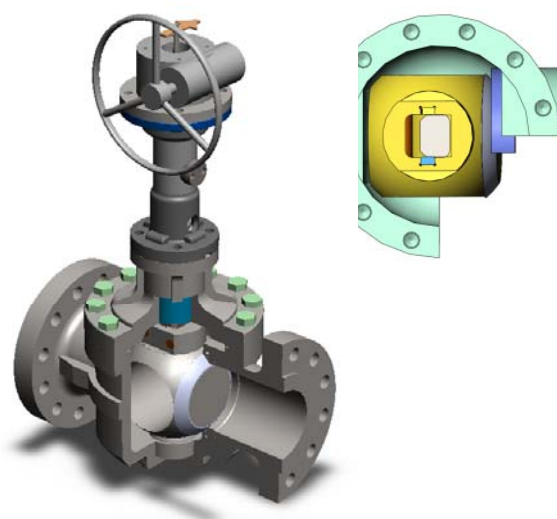
1. Close position

Perfect sealing in core and seat by the working of cam after stem's falling.



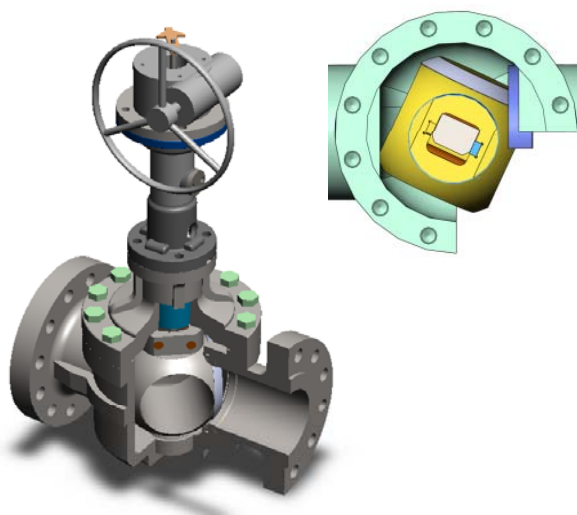
2. Tilting

As stem is rising, core becomes tilting and then core gets separated from seat.



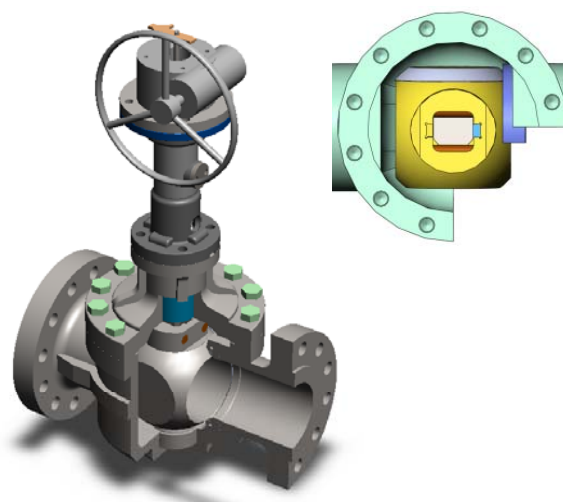
3. Rotating

Core is turned by rotating of stem in order to be perfect open position of port.



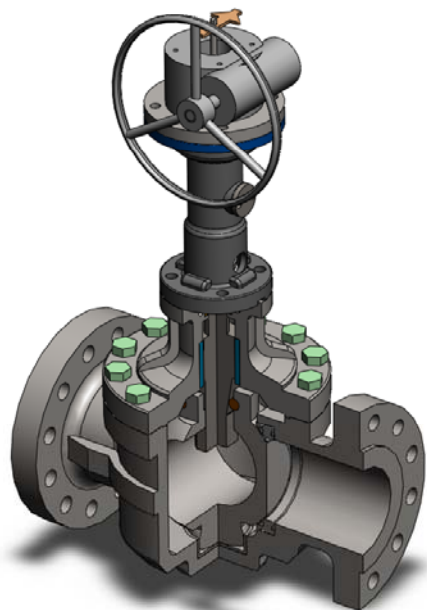
4. Open position

Core becomes open completely after stem has rotated.



* The above is opening sequence, and in case of closing sequence the process is in the opposite direction.

Specification



• **3Z Rising stem ball valve(RBV)** has mechanism to enable dual action and gets sealing by the acting of tilting & turn. Generally, it has low torque prominently compared to other ball valves. So, the size of actuator is to be small and our customer can adjust it if there is some leakage in using. Basically 3Z Rising stem ball valve is perfect in sealing. It is easy to exchange seat because of top entry type, based on the field situation, and it has long life cycle as there is no friction and abrasion.

- Zero Leakage.
- Low Operation Torque.
- Long life of seat because of no seat abrasion.
- Easy Seat Exchange with Top entry type.
- Protecting seat as there is divided action with dual action.
- Easy and continuous sealing as stem is cam type.

Materials of Construction

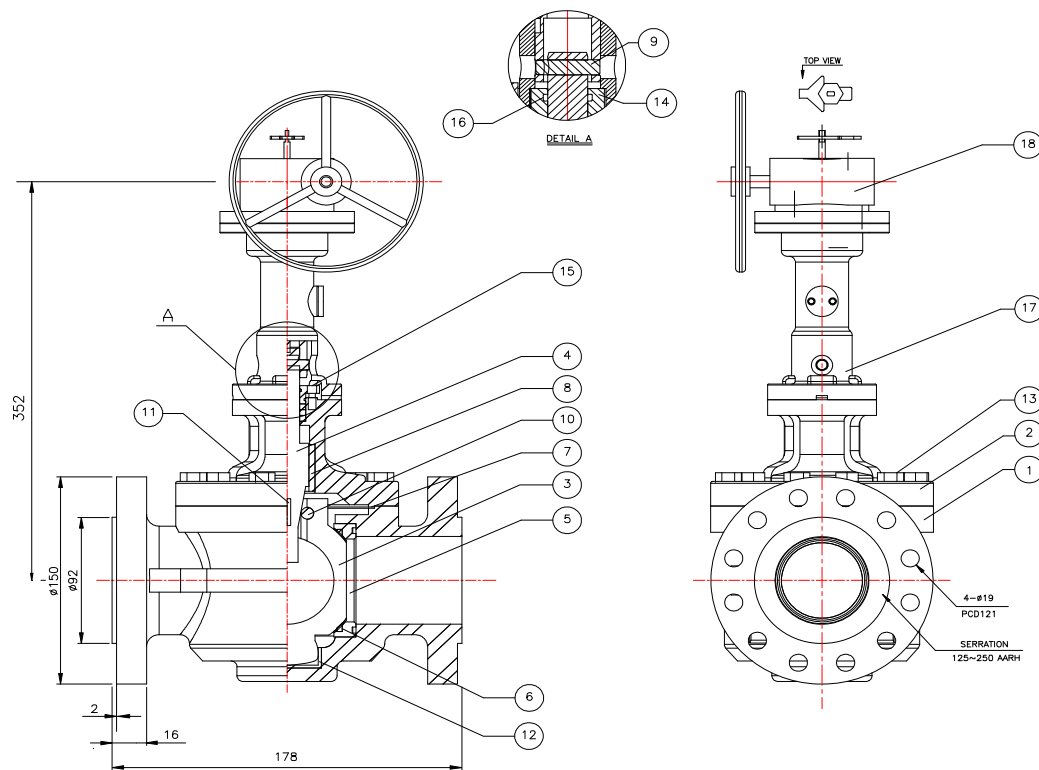
Body	Carbon Steel	ASTM A216 Gr.WCB
Core	Carbon Steel	ASTM A216 Gr.WCB
Bonnet	Carbon Steel	ASTM A216 Gr.WCB
Stem	Alloy Steel	SNM21
Seat body	Carbon Steel	ASTM A-106 GR B
Insert	Teflon	-
Bushing	Stainless Steel	AISI 410
Packing	Graphite Type	-
Bolt	Carbon Steel	ASTM A193 B7

Availability

- Flow lines
- Gas metering
- Oil metering
- Low temperature service
- High temperature service
- Steam service
- Hydrocarbon service
- Emergency Blow Down service
- Sand slurry service
- Lethal service


Design

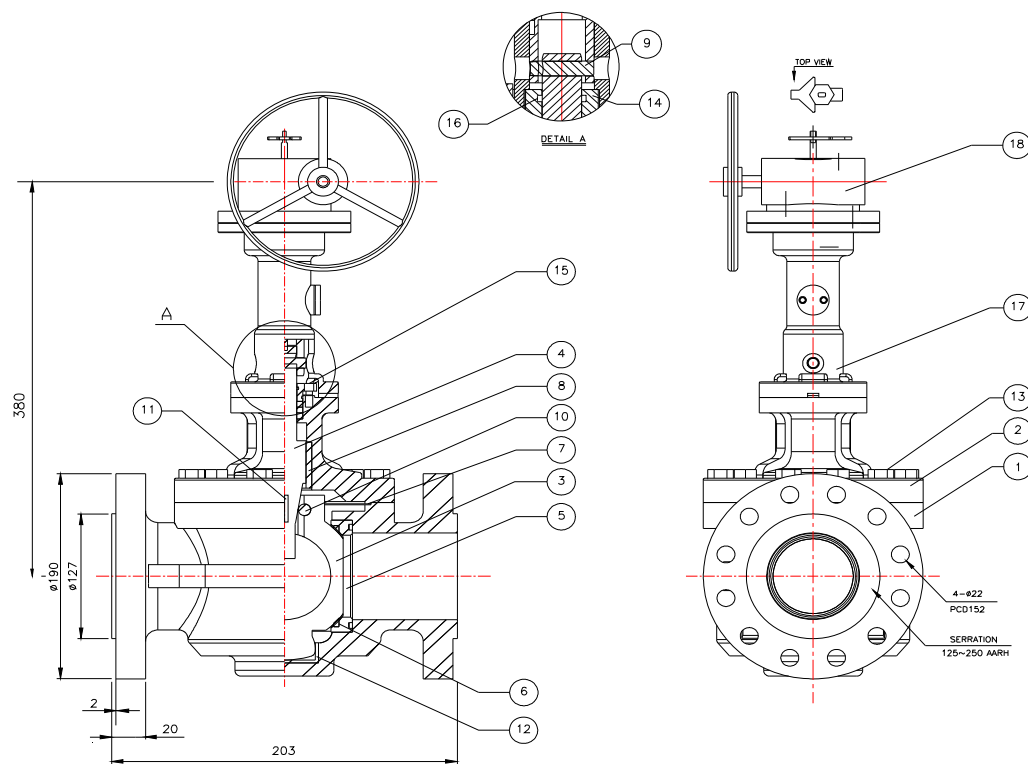
Class : 150~1500(PN 20~250)
NPS : 2~20(DN 50~500)



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
150	2"	27	100	5	32	23	


*For actuator sizing, safety factor of 30% to be considered.

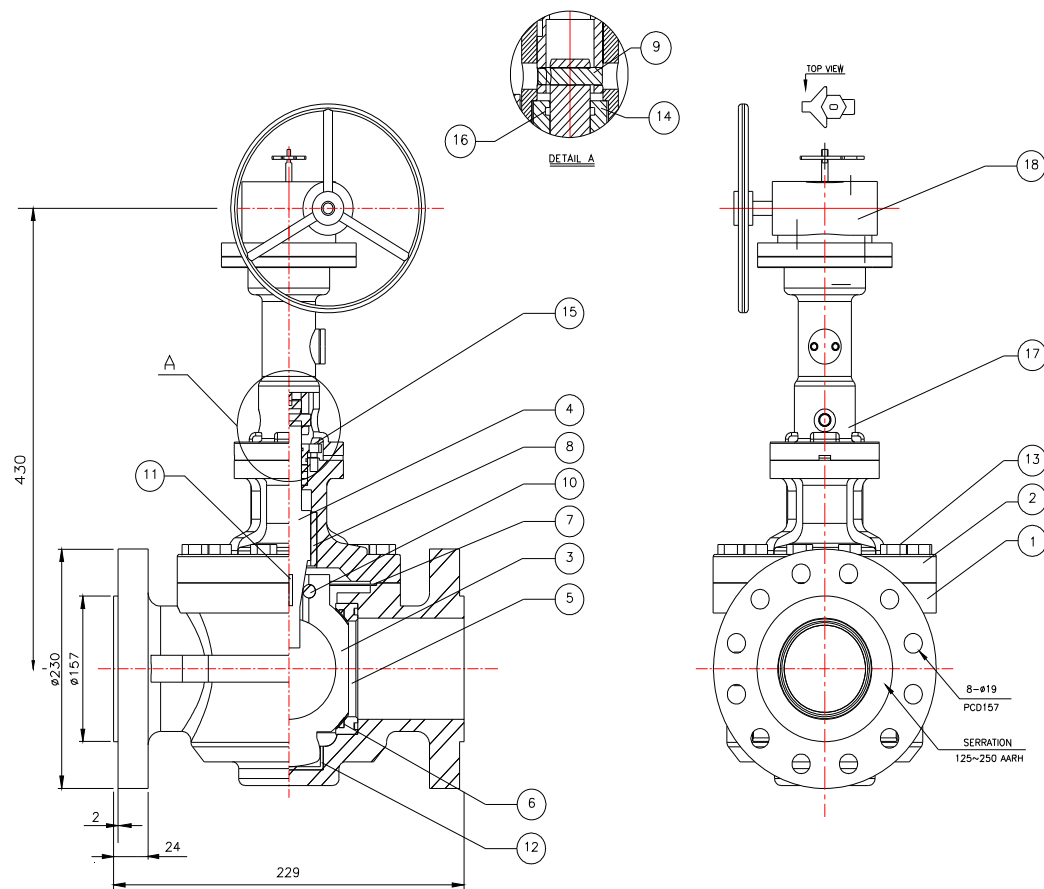
NO	PART NAME	Q'TY	SPECIFICATION			
1	BODY	1	ASTM A216 Gr.WCC			
2	BONNET	1	ASTM A216 Gr.WCC			
3	CORE	1	ASTM A216 Gr.WCC			
4	STEM	1	ASTM A564 Gr.630			
5	SEAT BODY	1	ASTM A351 CF8			
6	SEAT INSERT	1	PTFE			
7	GASKET	1	GRAPIHTE			
8	STEM BUSHING	1	AISI 410			
9	STEM PIN(ANTI STATIC)	1	SCM440			
10	CORE PIN	2	SCM440			
11	SURPPOT PIN	2	-			
12	TRUNNION BUSING	1	AISI 440			
13	BONNET BOLT	12	ASTM A193 Gr.B7			
14	PACKING GLAND	3	GRAPIHTE			
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7			
16	GLAND O-RING	2	VITON			
17	MECHANISM	1S	-			
18	GEAR OPERATOR	1S	-			
19						
20						
21						
22						
NOTES						
STANDARD	INSPECTION & TEST		API 598			
	FACE TO FACE		ANSI B 16.10			
	DIMENSION OF FLANGE		ANSI B 16.5			
	WALL THICKNESS		API 599			
1						N/S
0		K.T.YANG	H.S.KIM	H.S.KIM		
Rev.	Date	Drawn by	Chkd by	Appd by	Scale	
 <div>Rising Stem Ball Valve</div>					02-RV06AGSBCCC3	
					Product Code	
ANSI		150	2	GEAR		
Standard		Class	Size	Operator		



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
150	3"	44	100	6	32	23	


*For actuator sizing, safety factor of 30% to be considered.

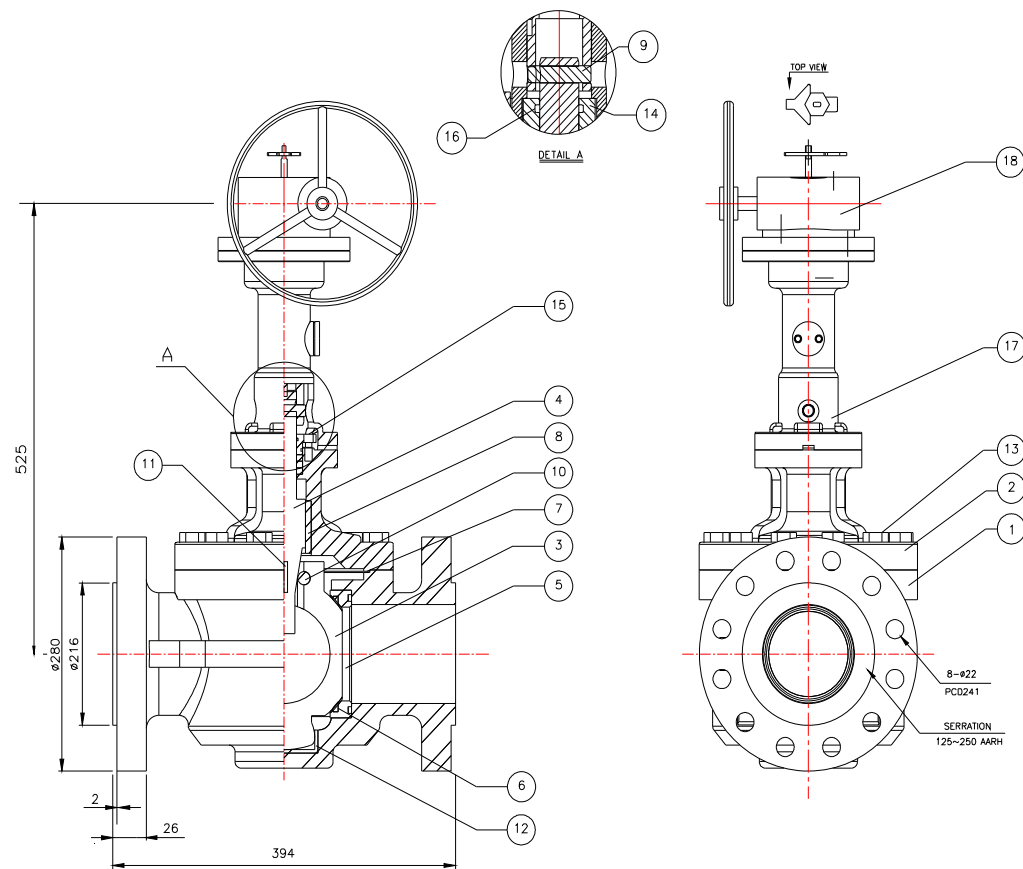
NO	PART NAME	Q'TY	SPECIFICATION			
1	BODY	1	ASTM A216 Gr.WCC			
2	BONNET	1	ASTM A216 Gr.WCC			
3	CORE	1	ASTM A216 Gr.WCC			
4	STEM	1	ASTM A564 Gr.630			
5	SEAT BODY	1	ASTM A351 CF8			
6	SEAT INSERT	1	PTFE			
7	GASKET	1	GRAPHITE			
8	STEM BUSHING	1	AISI 410			
9	STEM PIN(ANTI STATIC)	1	SCM440			
10	CORE PIN	2	SCM440			
11	SURPPOT PIN	2	-			
12	TRUNNION BUSING	1	AISI 440			
13	BONNET BOLT	12	ASTM A193 Gr.B7			
14	PACKING GLAND	3	GRAPHITE			
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7			
16	GLAND O-RING	2	VITON			
17	MECHANISM	1S	-			
18	GEAR OPERATOR	1S	-			
19						
20						
21						
22						
NOTES						
STANDARD	INSPECTION & TEST		API 598			
	FACE TO FACE		ANSI B 16.10			
	DIMENSION OF FLANGE		ANSI B 16.5			
	WALL THICKNESS		API 599			
1						N/S
0		K.T.YANG	H.S.KIM	H.S.KIM		
Rev.	Date		Drawn by	Chkd by	Appd by	Scale
<div><div><div>Rising Stem Ball Valve</div><div>Product Code</div></div></div>					03-RV06AGSBCCC3	
ANSI		150	3	GEAR		
Standard		Class	Size	Operator		



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
150	4"	92	100	10	32	23	


*For actuator sizing, safety factor of 30% to be considered.

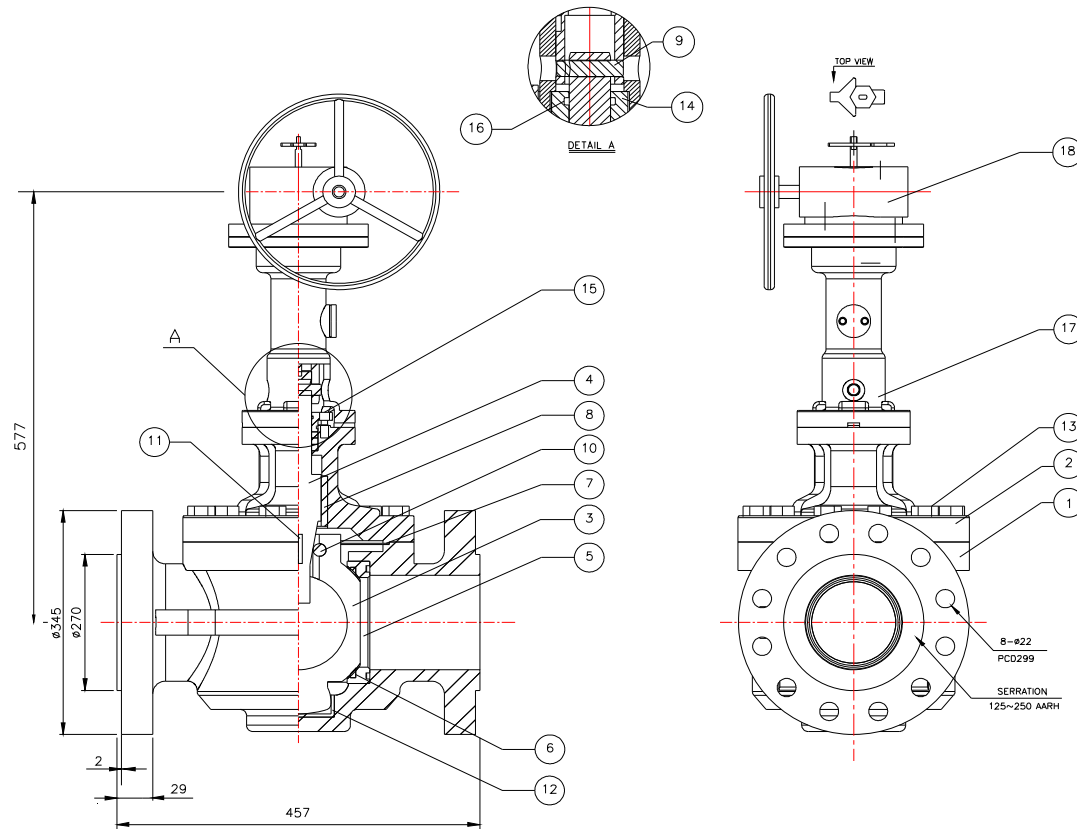
NO	PART NAME	Q'TY	SPECIFICATION				
1	BODY	1	ASTM A216 Gr.WCC				
2	BONNET	1	ASTM A216 Gr.WCC				
3	CORE	1	ASTM A216 Gr.WCC				
4	STEM	1	ASTM A564 Gr.630				
5	SEAT BODY	1	ASTM A351 CF8				
6	SEAT INSERT	1	PTFE				
7	GASKET	1	GRAPHITE				
8	STEM BUSHING	1	AISI 410				
9	STEM PIN(ANTI STATIC)	1	SCM440				
10	CORE PIN	2	SCM440				
11	SURPPOT PIN	2	-				
12	TRUNNION BUSING	1	AISI 440				
13	BONNET BOLT	12	ASTM A193 Gr.B7				
14	PACKING GLAND	3	GRAPHITE				
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7				
16	GLAND O-RING	2	VITON				
17	MECHANISM	1S	-				
18	GEAR OPERATOR	1S	-				
19							
20							
21							
22							
NOTES							
STANDARD	INSPECTION & TEST		API 598				
	FACE TO FACE		ANSI B 16.10				
	DIMENSION OF FLANGE		ANSI B 16.5				
	WALL THICKNESS		API 599				
1						N/S	
0		K.T.YANG	H.S.KIM	H.S.KIM			
Rev.	Date	Drawn by	Chkd by	Appd by	Scale		
<div><div><div>Rising Stem Ball Valve</div><div>Product Code</div></div></div>					04-RV06AGSBCCC3		
ANSI		150	4	GEAR			
Standard		Class	Size	Operator			



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
150	6"	189	100	28	32	20	


*For actuator sizing, safety factor of 30% to be considered.

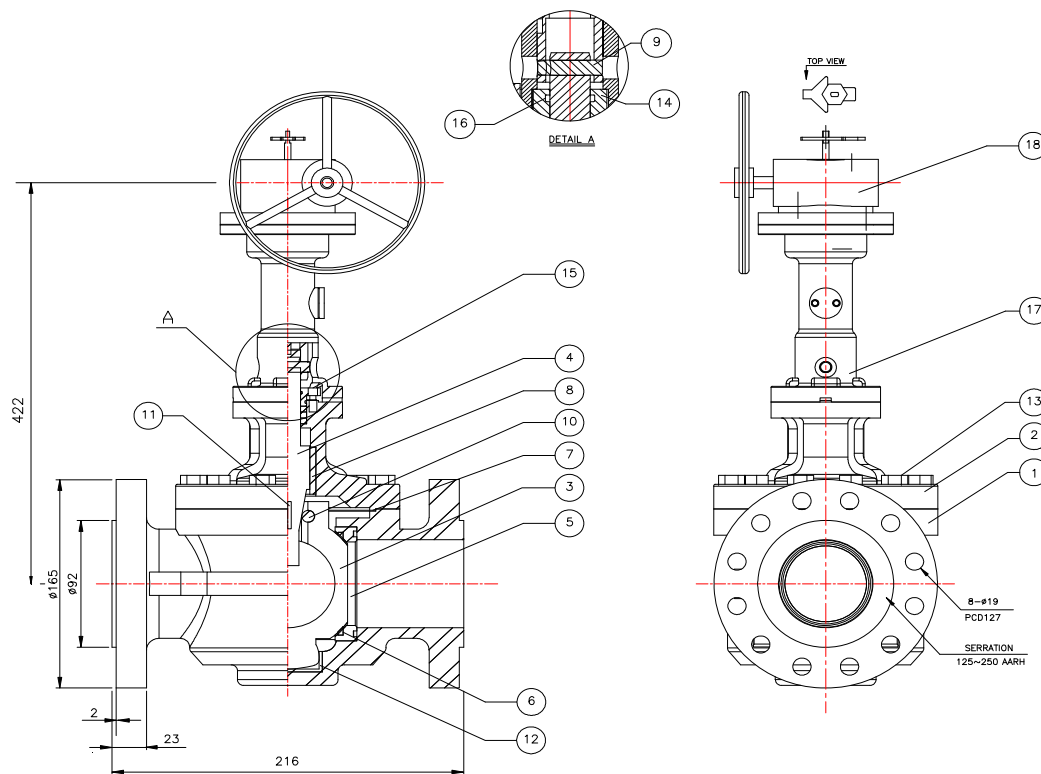
NO	PART NAME	Q'TY	SPECIFICATION			
1	BODY	1	ASTM A216 Gr.WCC			
2	BONNET	1	ASTM A216 Gr.WCC			
3	CORE	1	ASTM A216 Gr.WCC			
4	STEM	1	ASTM A564 Gr.630			
5	SEAT BODY	1	ASTM A351 CF8			
6	SEAT INSERT	1	PTFE			
7	GASKET	1	GRAPIHTE			
8	STEM BUSHING	1	AISI 410			
9	STEM PIN(ANTI STATIC)	1	SCM440			
10	CORE PIN	2	SCM440			
11	SURPPOT PIN	2	-			
12	TRUNNION Busing	1	AISI 440			
13	BONNET BOLT	12	ASTM A193 Gr.B7			
14	PACKING GLAND	3	GRAPIHTE			
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7			
16	GLAND O-RING	2	VITON			
17	MECHANISM	1S	-			
18	GEAR OPERATOR	1S	-			
19						
20						
21						
22						
NOTES						
STANDARD	INSPECTION & TEST		API 598			
	FACE TO FACE		ANSI B 16.10			
	DIMENSION OF FLANGE		ANSI B 16.5			
	WALL THICKNESS		API 599			
1					N/S	
0		K.T.YANG	H.S.KIM	H.S.KIM		
Rev.	Date		Drawn by	Chkd by	Appd by	Scale
<div></div> <div>Rising Stem Ball Valve</div>					06-RV06AGSBCCC3	
					Product Code	
ANSI		150	6	GEAR		
Standard		Class	Size	Operator		



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
150	8"	247	100	51	32	23	


*For actuator sizing, safety factor of 30% to be considered.

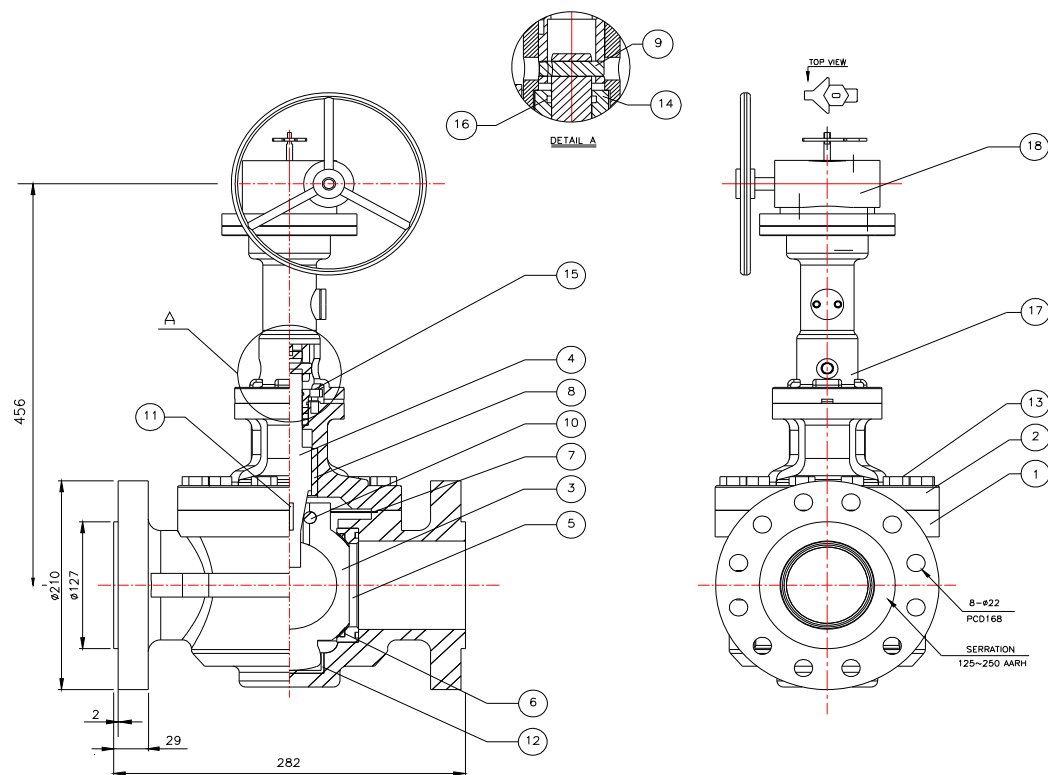
NO	PART NAME	Q'TY	SPECIFICATION			
1	BODY	1	ASTM A216 Gr.WCC			
2	BONNET	1	ASTM A216 Gr.WCC			
3	CORE	1	ASTM A216 Gr.WCC			
4	STEM	1	ASTM A564 Gr.630			
5	SEAT BODY	1	ASTM A351 CF8			
6	SEAT INSERT	1	PTFE			
7	GASKET	1	GRAPITE			
8	STEM BUSHING	1	AISI 410			
9	STEM PIN(ANTI STATIC)	1	SCM440			
10	CORE PIN	2	SCM440			
11	SURPPOT PIN	2	-			
12	TRUNNION Busing	1	AISI 440			
13	BONNET BOLT	12	ASTM A193 Gr.B7			
14	PACKING GLAND	3	GRAPITE			
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7			
16	GLAND O-RING	2	VITON			
17	MECHANISM	1S	-			
18	GEAR OPERATOR	1S	-			
19						
20						
21						
22						
STANDARD	INSPECTION & TEST		API 598			
	FACE TO FACE		ANSI B 16.10			
	DIMENSION OF FLANGE		ANSI B 16.5			
	WALL THICKNESS		API 599			
1						N/S
0			K.T.YANG	H.S.KIM	H.S.KIM	
Rev.	Date	Drawn by	Chkd by	Appd by	Scale	
 Rising Stem Ball Valve						08-RV06AGSBCCC3
						Product Code
ANSI		150	8	GEAR		
Standard		Class	Size	Operator		



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
300	2"	30	100	5	97	58	


*For actuator sizing, safety factor of 30% to be considered.

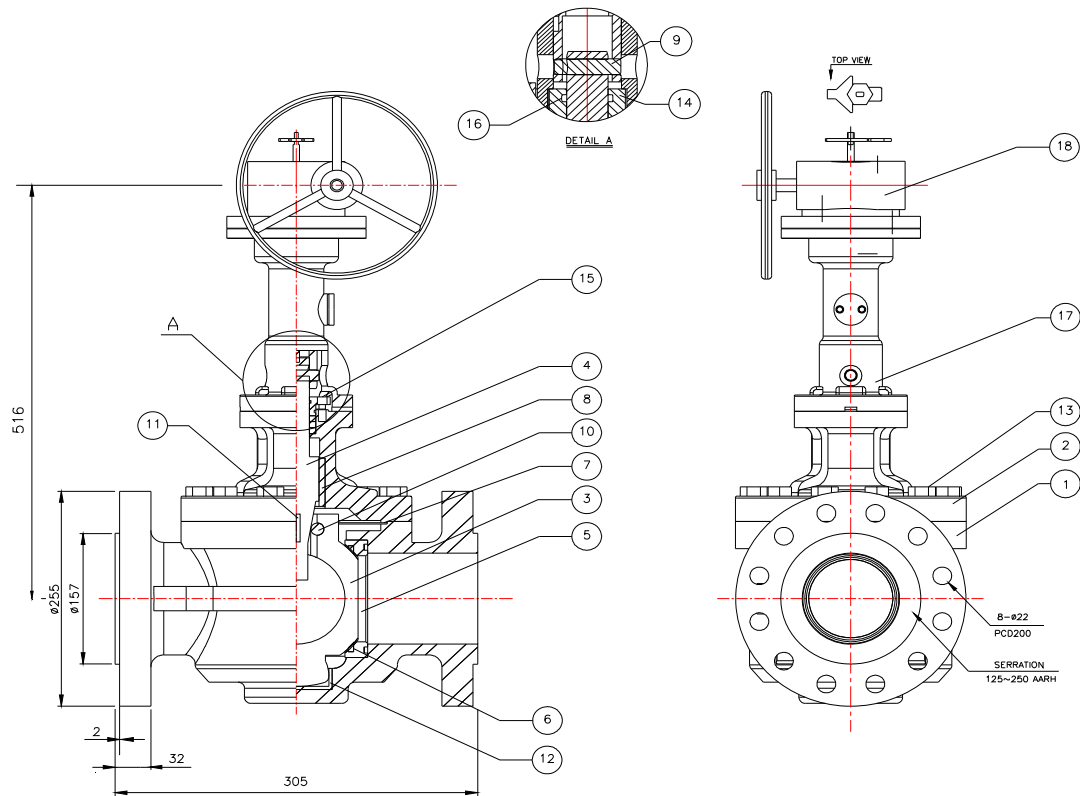
NO	PART NAME	Q'TY	SPECIFICATION				
1	BODY	1	ASTM A216 Gr.WCC				
2	BONNET	1	ASTM A216 Gr.WCC				
3	CORE	1	ASTM A216 Gr.WCC				
4	STEM	1	ASTM A564 Gr.630				
5	SEAT BODY	1	ASTM A351 CF8				
6	SEAT INSERT	1	PTFE				
7	GASKET	1	GRAPIHTE				
8	STEM BUSHING	1	AISI 410				
9	STEM PIN(ANTI STATIC)	1	SCM440				
10	CORE PIN	2	SCM440				
11	SURPPOT PIN	2	-				
12	TRUNNION BUSING	1	AISI 440				
13	BONNET BOLT	12	ASTM A193 Gr.B7				
14	PACKING GLAND	3	GRAPIHTE				
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7				
16	GLAND O-RING	2	VITON				
17	MECHANISM	1S	-				
18	GEAR OPERATOR	1S	-				
19							
20							
21							
22							
NOTES							
STANDARD	INSPECTION & TEST		API 598				
	FACE TO FACE		ANSI B 16.10				
	DIMENSION OF FLANGE		ANSI B 16.5				
	WALL THICKNESS		API 599				
1						N/S	
0		K.T.YANG	H.S.KIM	H.S.KIM			
Rev.	Date		Drawn by	Chkd by	Appd by	Scale	
<div></div> <div>Rising Stem Ball Valve</div>					02-RV06AGSBCCC3		
					Product Code		
ANSI		300	2	GEAR			
Standard		Class	Size	Operator			



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
300	3"	44	100	6	79	58	


*For actuator sizing, safety factor of 30% to be considered.

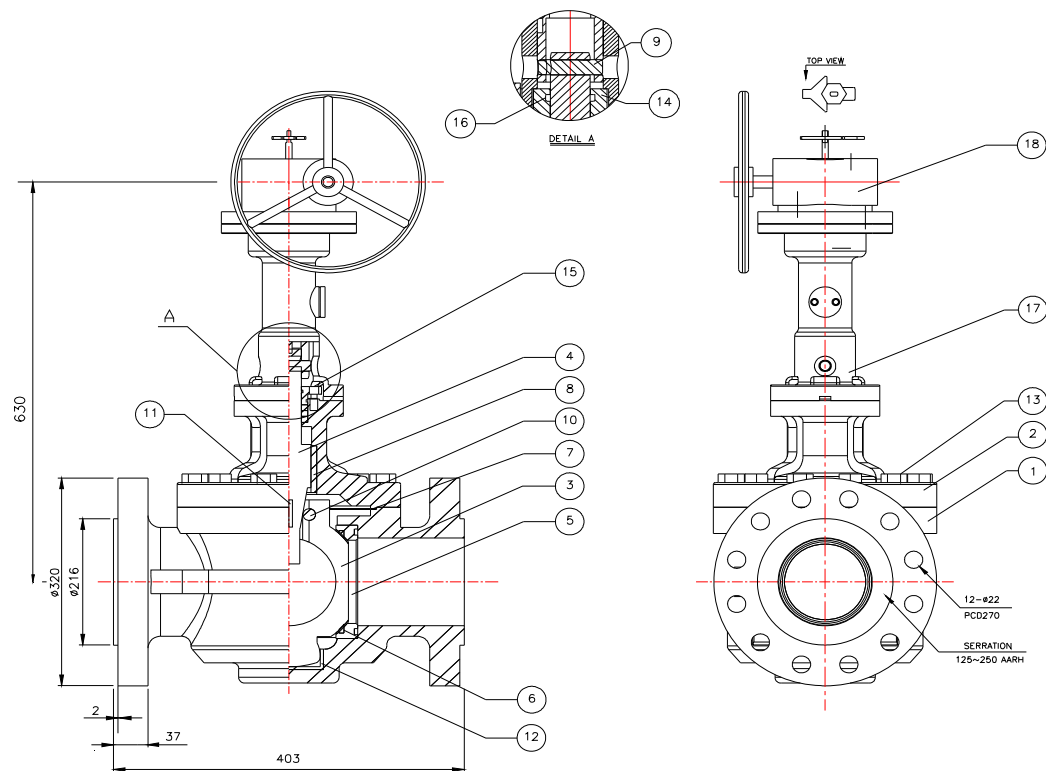
NO	PART NAME	Q'TY	SPECIFICATION			
1	BODY	1	ASTM A216 Gr.WCC			
2	BONNET	1	ASTM A216 Gr.WCC			
3	CORE	1	ASTM A216 Gr.WCC			
4	STEM	1	ASTM A564 Gr.630			
5	SEAT BODY	1	ASTM A351 CF8			
6	SEAT INSERT	1	PTFE			
7	GASKET	1	GRAPHIHTE			
8	STEM BUSHING	1	AISI 410			
9	STEM PIN(ANTI STATIC)	1	SCM440			
10	CORE PIN	2	SCM440			
11	SURPPOT PIN	2	-			
12	TRUNNION BUSING	1	AISI 440			
13	BONNET BOLT	12	ASTM A193 Gr.B7			
14	PACKING GLAND	3	GRAPHIHTE			
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7			
16	GLAND O-RING	2	VITON			
17	MECHANISM	1S	-			
18	GEAR OPERATOR	1S	-			
19						
20						
21						
22						
NOTES						
STANDARD	INSPECTION & TEST		API 598			
	FACE TO FACE		ANSI B 16.10			
	DIMENSION OF FLANGE		ANSI B 16.5			
	WALL THICKNESS		API 599			
1						N/S
0		K.T.YANG	H.S.KIM	H.S.KIM		
Rev.	Date		Drawn by	Chkd by	Appd by	Scale
 Rising Stem Ball Valve					03-RV06AGSBCCC3	
					Product Code	
ANSI		300	3	GEAR		
Standard		Class	Size	Operator		



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
300	4"	92	100	13	79	58	


*For actuator sizing, safety factor of 30% to be considered.

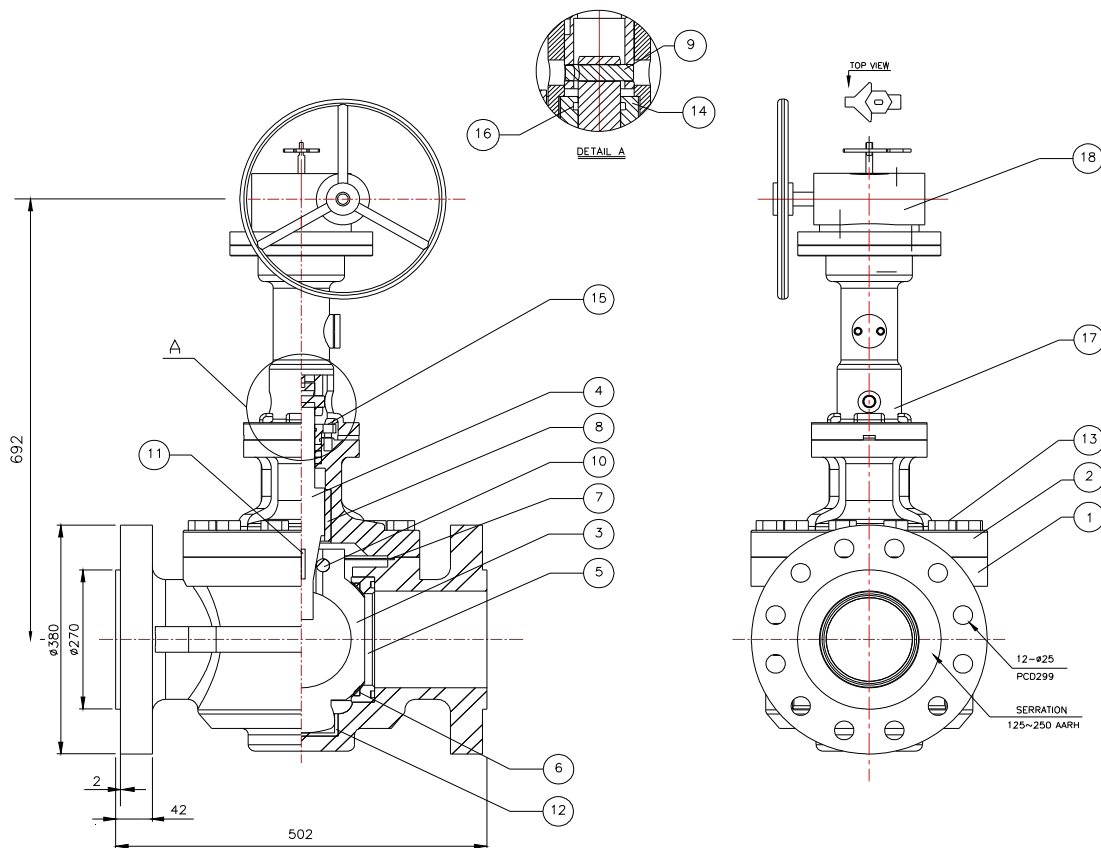
NO	PART NAME	Q'TY	SPECIFICATION			
1	BODY	1	ASTM A216 Gr.WCC			
2	BONNET	1	ASTM A216 Gr.WCC			
3	CORE	1	ASTM A216 Gr.WCC			
4	STEM	1	ASTM A564 Gr.630			
5	SEAT BODY	1	ASTM A351 CF8			
6	SEAT INSERT	1	PTFE			
7	GASKET	1	GRAPIHTE			
8	STEM BUSHING	1	AISI 410			
9	STEM PIN(ANTI STATIC)	1	SCM440			
10	CORE PIN	2	SCM440			
11	SURPPOT PIN	2	-			
12	TRUNNION BUSING	1	AISI 440			
13	BONNET BOLT	12	ASTM A193 Gr.B7			
14	PACKING GLAND	3	GRAPIHTE			
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7			
16	GLAND O-RING	2	VITON			
17	MECHANISM	1S	-			
18	GEAR OPERATOR	1S	-			
19						
20						
21						
22						
NOTES						
STANDARD	INSPECTION & TEST		API 598			
	FACE TO FACE		ANSI B 16.10			
	DIMENSION OF FLANGE		ANSI B 16.5			
	WALL THICKNESS		API 599			
1					N/S	
0		K.T.YANG	H.S.KIM	H.S.KIM		
Rev.	Date		Drawn by	Chkd by	Appd by	Scale
<div></div> <div>Rising Stem Ball Valve</div>					04-RV06AGSBCCC3	
					Product Code	
ANSI		300	4	GEAR		
Standard		Class	Size	Operator		



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
300	6"	189	100	34	79	58	


*For actuator sizing, safety factor of 30% to be considered.

NO	PART NAME	Q'TY	SPECIFICATION			
1	BODY	1	ASTM A216 Gr.WCC			
2	BONNET	1	ASTM A216 Gr.WCC			
3	CORE	1	ASTM A216 Gr.WCC			
4	STEM	1	ASTM A564 Gr.630			
5	SEAT BODY	1	ASTM A351 CF8			
6	SEAT INSERT	1	PTFE			
7	GASKET	1	GRAPHITE			
8	STEM BUSHING	1	AISI 410			
9	STEM PIN(ANTI STATIC)	1	SCM440			
10	CORE PIN	2	SCM440			
11	SURPPOT PIN	2	-			
12	TRUNNION BUSING	1	AISI 440			
13	BONNET BOLT	12	ASTM A193 Gr.B7			
14	PACKING GLAND	3	GRAPHITE			
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7			
16	GLAND O-RING	2	VITON			
17	MECHANISM	1S	-			
18	GEAR OPERATOR	1S	-			
19						
20						
21						
22						
NOTES						
STANDARD	INSPECTION & TEST		API 598			
	FACE TO FACE		ANSI B 16.10			
	DIMENSION OF FLANGE		ANSI B 16.5			
	WALL THICKNESS		API 599			
1						N/S
0		K.T.YANG	H.S.KIM	H.S.KIM		
Rev.	Date		Drawn by	Chkd by	Appd by	Scale
 Rising Stem Ball Valve					06-RV06AGSBCCC3	
					Product Code	
ANSI		300	6	GEAR		
Standard		Class	Size	Operator		



Class	Size	Weight(kg)	Port Ratio(%)	Torque (N.m)	Test Pressure(bar)		Tag No.
					Shell	Seat	
300	8"	247	100	60	79	58	

*For actuator sizing, safety factor of 30% to be considered.

NO	PART NAME	Q'TY	SPECIFICATION			
1	BODY	1	ASTM A216 Gr.WCC			
2	BONNET	1	ASTM A216 Gr.WCC			
3	CORE	1	ASTM A216 Gr.WCC			
4	STEM	1	ASTM A564 Gr.630			
5	SEAT BODY	1	ASTM A351 CF8			
6	SEAT INSERT	1	PTFE			
7	GASKET	1	GRAPITE			
8	STEM BUSHING	1	AISI 410			
9	STEM PIN(ANTI STATIC)	1	SCM440			
10	CORE PIN	2	SCM440			
11	SURPPOT PIN	2	-			
12	TRUNNION Busing	1	AISI 440			
13	BONNET BOLT	12	ASTM A193 Gr.B7			
14	PACKING GLAND	3	GRAPITE			
15	PACKING GLAND BOLT	4	ASTM A193 Gr.B7			
16	GLAND O-RING	2	VITON			
17	MECHANISM	1S	-			
18	GEAR OPERATOR	1S	-			
19						
20						
21						
22						
STANDARD	INSPECTION & TEST		API 598			
	FACE TO FACE		ANSI B 16.10			
	DIMENSION OF FLANGE		ANSI B 16.5			
	WALL THICKNESS		API 599			
1						N/S
0			K.T.YANG	H.S.KIM	H.S.KIM	
Rev.	Date	Drawn by	Chkd by	Appd by	Scale	
 Rising Stem Ball Valve						08-RV06AGSBCCC3
						Product Code
ANSI		300	8	GEAR		
Standard		Class	Size	Operator		

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