



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

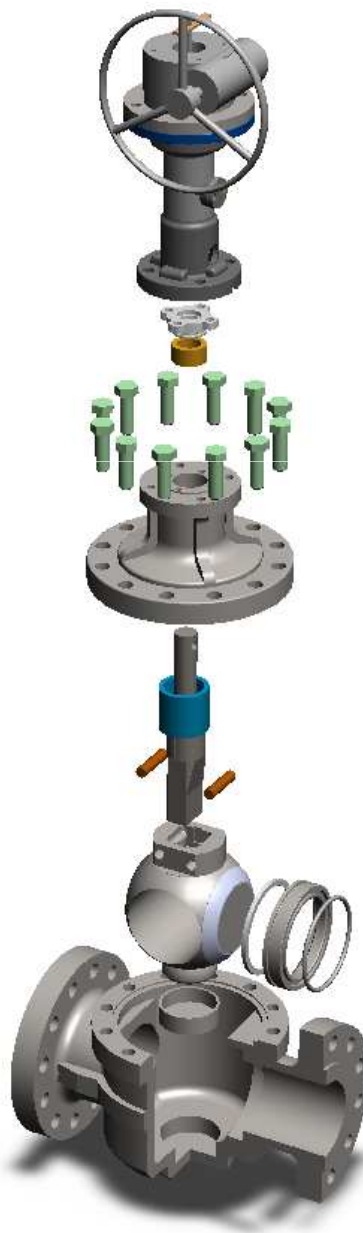
Perfect sealing mechanically, not using spring or other assistive devices.

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.

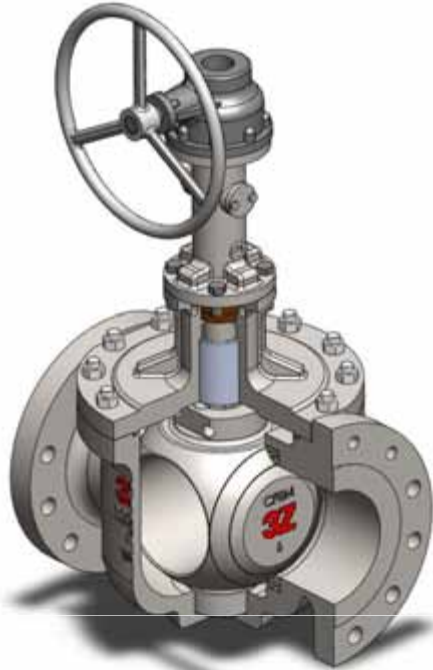
Trunnion with Rounded End

No impact even to the liquid of high pressure.

Inline Maintenance

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

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.

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

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

Design

Design and Manufacture:	API 6D/608
Face to Face Dimension:	API6D
End Flange Dimension:	ASME B16.5, DIN2501 BS4504
P-T Ratings:	ASME B16.34
Inspection and Test:	API 598, API 6D

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.



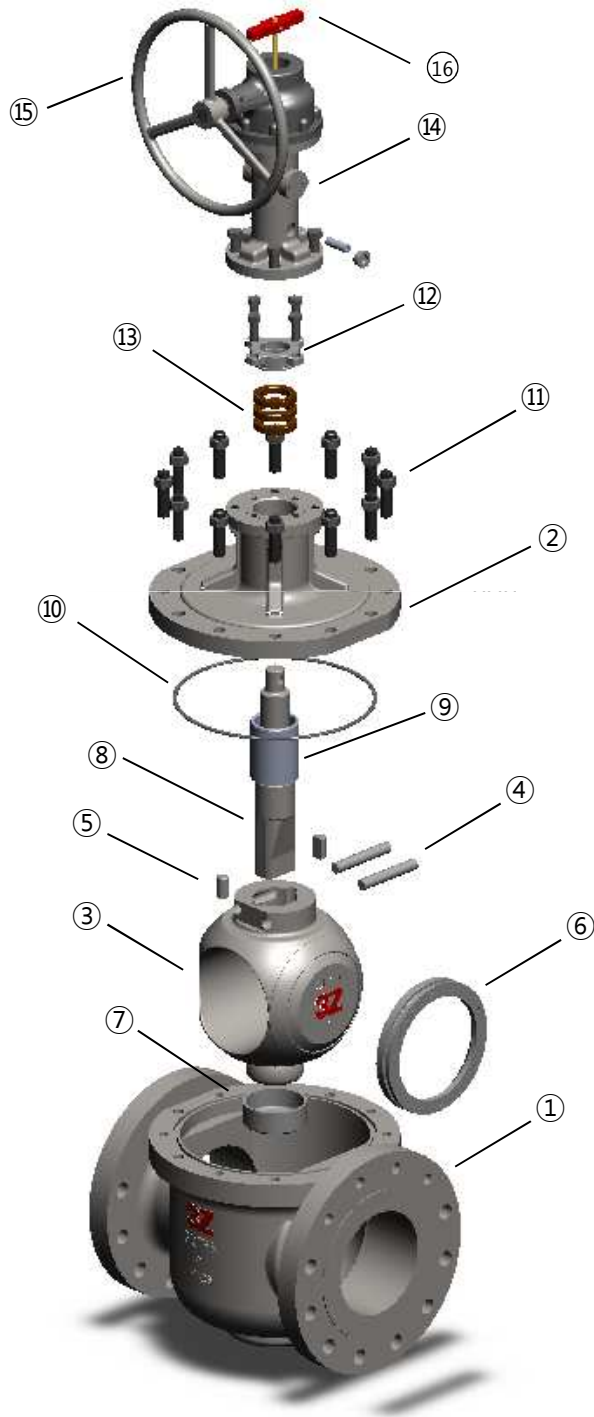
4. Open position

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.

COMPONENTS



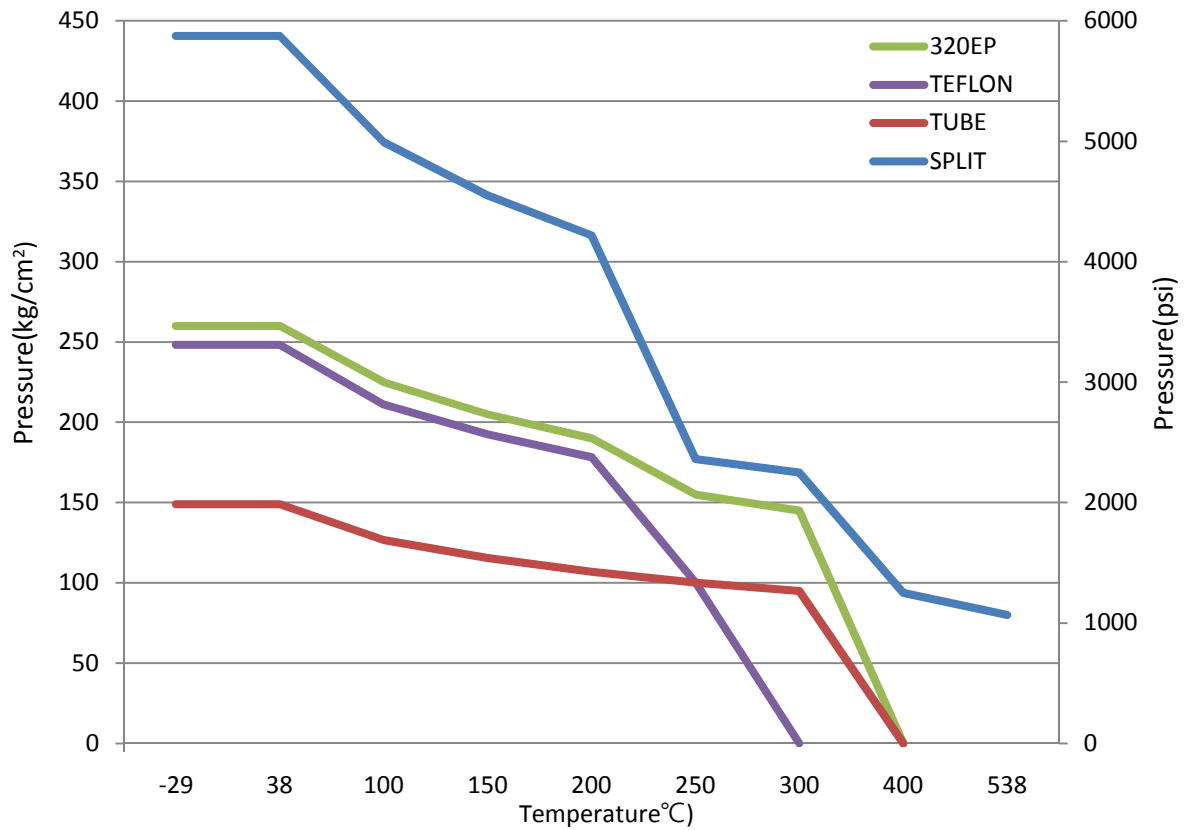
No	Parts	Material
1	Body	Carbon steel
2	Bonnet	Carbon steel
3	Core	Carbon steel
4	Core pin	Alloy steel
5	Support pin	Alloy steel
6	Seat ring	Stainless steel
7	T - Bushing	Stainless steel
8	Stem	Alloy steel
9	Stem bushing	Alloy steel
10	Gasket	Graphite
11	Bolt	Alloy steel
12	Gland	Carbon steel
13	Packing	Graphite
14	Mechanism	-
15	Handle wheel	Steel
16	Indicator	Stainless steel

SEAT SELECTION



Type	Temperature	Insert Material	Seat ring	Bore size(in.)
Cryogenic	-196°C to -46°C	PCTFE(KEL-F)	Stainless steel	2 to 16
Soft	-46°C to 300°C	Teflon	Stainless steel	2 to 24
Tube	-46°C to 300°C	tube	Stainless steel	2 to 16
Split	-104°C to 538°C	None	Stainless steel	2 to 10

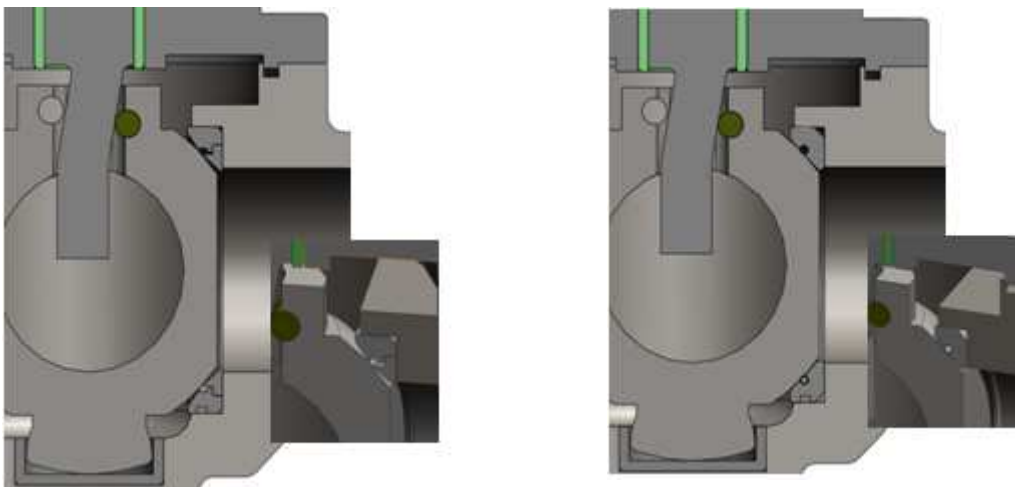
Pressure / Temperature Rating



Seat Selection



Type	Temperature	Insert Material	Seat ring	Bore size(in.)
Cryogenic	-196°C to -46°C	PCTFE(KEL-F)	Stainless steel	2 to 16
Soft	-46°C to 200°C	Teflon	Stainless steel	2 to 24
Tube	-46°C to 300°C	Stainless steel tube	Stainless steel	2 to 16
Split	-104°C to 538°C	None	Stainless steel	2 to 10



All Metal Type

SERVICE



* FLOW SERVICE

- PN : 15~50
- DN : 25~600
- BORE : Full & Reduced bore
- OPERATORE : H/G/M

* CRYOGENIC

- PN : 15~50
- DN : 25~150
- BORE : Full & Reduced bore
- OPERATORE : H/G/M

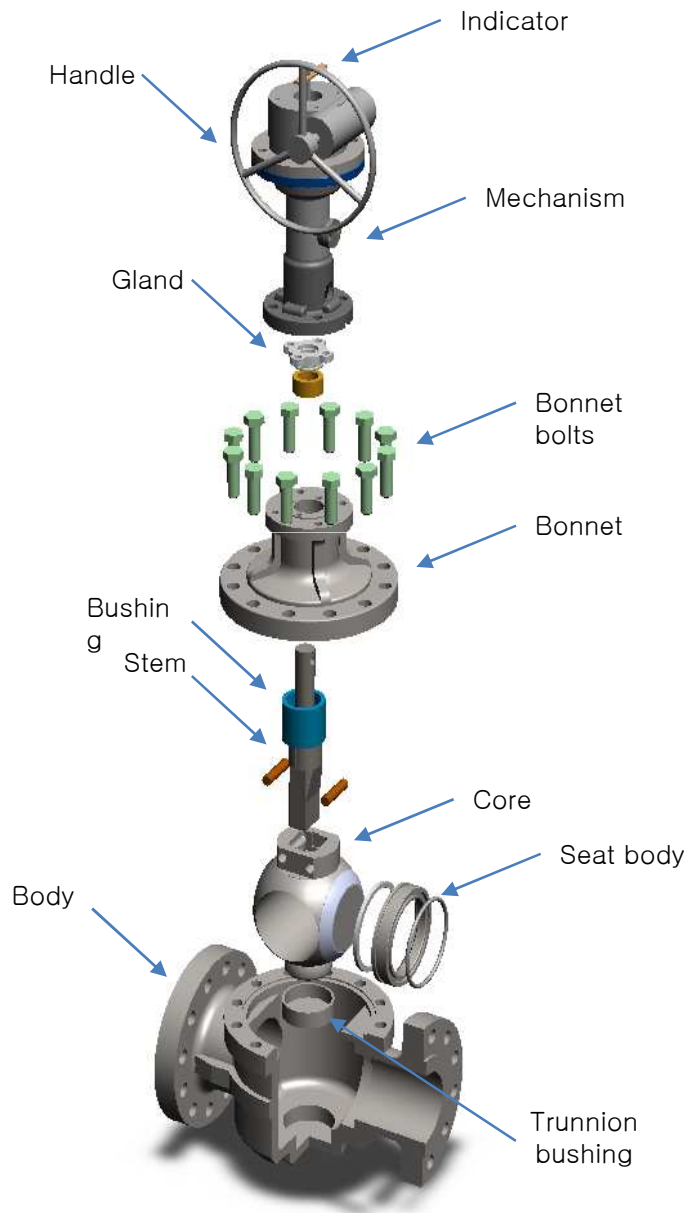


*HIGH TEMPERATURE

- PN : 15~150
- DN : 25~150
- BORE : Full & Reduced bore
- OPERATORE : H/G

Type	MANUAL	M.O.V	LINEAR
Action	Multi-turn	Multi-turn	Reciprocating
Actuator	Hand wheel & Gear	Electronic & Air motor	Diaphragm & Piston
Media	General	General	Explosive
Source	Human	Elec. & Air	Line pressure

EXPLODED VIEW



Design Feature Comparisons



3Z Rising stem ball valve

Other company

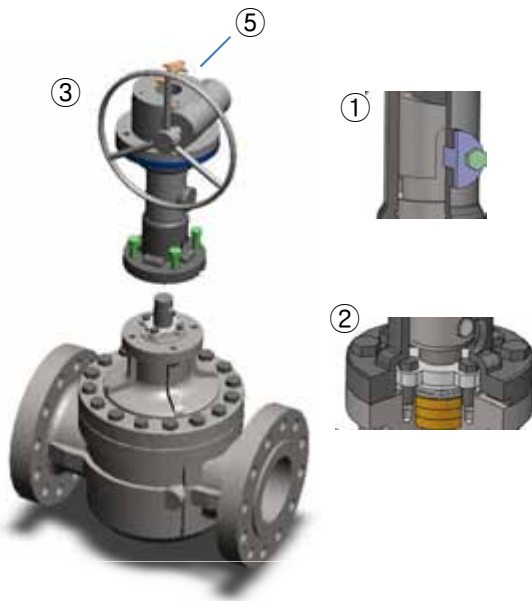
Design Feature Comparisons

- 3Z Rising stem ball valve(RSV) has various advantages

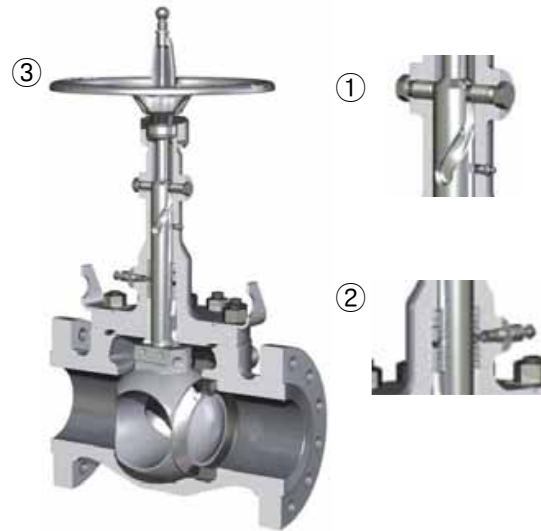
	Advantages	3Z RBV	Other company
1	Perfect Friction Free	- L-type Lift & turn Mechanism - Core is turning without contact Seating surface result in no friction	- S-type Mechanism - Core is turning with contact seating surface result in high friction & torque value
2	Adjustable Stem Packing	- Stem Packing is adjustable when its leakage	- One piece stem with valve body is not allowed to adjust when stem packing leakage
3	Separated Lift & turn Mechanism	- Valve Mechanism can be replaced because valve body and stem is separated	- One piece stem with valve body design figure is not allowed to replace its stem packing
4	Non Lubricant	- Design construction of adjusting stem packing doesn't need lubricant	- Stem packing periodically need lubricant injection for stem packing operation
5	Self Locking	- Worm-gear type make valve self locking	- Core deviate from its position due to S-type Mechanism

- Major problem of malfunctioning is caused while operating of Stem packing
- 4" and Above 4" 3Z RBV type use L-type Mechanism, Other company use S-Type Mechanism for all size.

Design Feature Comparisons



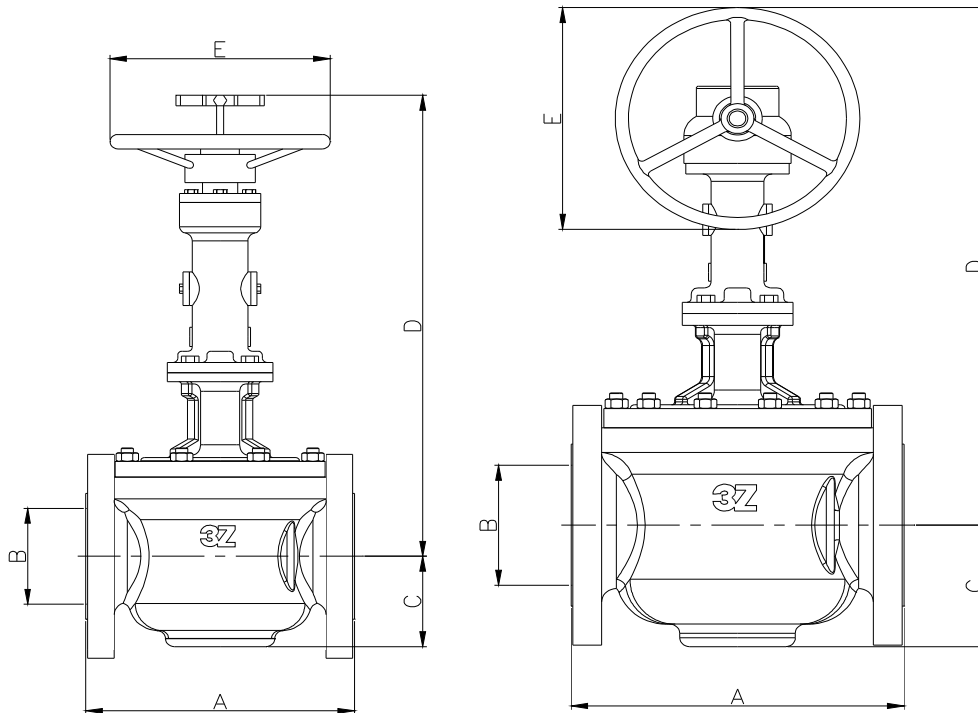
3Z RSV



Other companies

	3Z RBV	Other companies	3Z RBV Merit
① Action	L - type	S - type	* L-type mechanism Stem is moving in groove result in Low torque & Friction free effect. Especially the effect can be proved in big size valve
② Stem packing	Adjustable	Non-Adjustable	Stem packing is adjustable
③ Mechanism	Separated	United	Merit to separated Mechanism, it does not need maintenance
④ Maintenance	Non Lubricant	Lubricant	No Lubricant injection
⑤ Operating	Self Locking	Non-Self Locking	Worm-gear type makes valve self locking

DIMENSIONAL DATA FOR VALVES ASME CLASS 150 REDUCED FULL AND FULL PORT



ASME CLASS 150

Size	Oper.	A	B	C	D	E	turn	Kg
1	H	127	25	50	290	120	8	17
1.5	H	165	38	57	310	120	8	17
2	H	178	49	67	346	160	8	27
3	H	203	74	87	375	160	8	37
4	H	229	100	113	510	200	8	62
6	H/G	394	150	158	570	250	8/17	113
8	G	457	201	205	607	250	17	233
10	G	533	252	251	680	250	17	339
12	G	610	303	298	820	300	17	724
14	G	686	334	302	902	350	24	1048
16	G	762	385	370	1037	400	24	1216
18	G	864	436	425	1140	500	28	1680
20	G	914	487	494	1300	500	28	1944
24	G	1067	589	605	1500	500	35	2560



DIMENSIONAL DATA FOR VALVES ASME CLASS 300 / 600 REDUCED FULL AND FULL PORT

ASME CLASS 300

Size	Oper.	A	B	C	D	E	turn	Kg
1	H	165	25	50	300	120	8	20
1.5	H	190	38	58	315	120	8	27
2	H	216	49	68	348	200	8	30
3	H	283	74	88	492	250	8	43
4	H/G	305	100	116	528	250	8/17	77
6	G	403	150	162	543	250	17	153
8	G	502	201	210	640	250	24	208
10	G	568	252	258	830	300	24	416
12	G	648	303	301	997	350	26	744
14	G	762	334	305	1090	400	35	1120
16	G	838	385	374	1260	500	39	1288
18	G	914	436	429	1380	500	46	1840
20	G	991	487	499	1510	500	46	2392
24	G	1143	589	611	1690	550	49	2990

ASME CLASS 600

Size	Oper.	A	B	C	D	E	turn	Kg
2	H	292	49	70	458	150	8	35
3	H	356	74	91	494	150	8	62
4	H/G	432	100	119	559	300	8/17	98
6	H/G	559	150	167	683	300	8/24	252
8	G	660	201	216	751	350	28	415
10	G	787	252	265	901	400	39	800
12	G	838	303	310	1073	500	46	1150
14	G	889	334	314	1126	500	46	1650
16	G	991	385	385	1357	500	49	1800
18	G	1092	436	442	1424	550	49	2560
20	G	1194	487	514	1567	600	49	3740



DIMENSIONAL DATA FOR VALVES ASME CLASS 900 / 1500 REDUCED FULL AND FULL PORT

ASME CLASS 900

Size	Oper.	A	B	C	D	E	turn	Kg
2	H/G	368	49	74	550	200	8/17	41
3	H/G	381	74	95	593	250	8/24	72
4	G	457	100	125	671	300	28	114
6	G	610	150	175	820	350	39	292
8	G	737	201	227	901	400	46	481
10	G	838	252	278	1036	500	46	928
12	G	965	303	326	1234	600	49	1334
14	G	1029	334	330	1295	600	49	1914
16	G	1130	385	404	1561	800	49	2088
18	G	1219	436	464	1638	800	53	2970
20	G	1321	487	540	1802	800	53	4338

ASME CLASS 1500

Size	Oper.	A	B	C	D	E	turn	Kg
2	H/G	368	49	81	632	250	8/24	50
3	G	470	74	105	682	300	28	79
4	G	546	100	138	771	400	39	125
6	G	705	150	193	943	500	46	322
8	G	832	201	250	1036	700	46	530
10	G	991	252	306	1192	700	49	1021
12	G	1130	303	358	1419	800	53	1467



Design Feature Comparisons for Face to Face Dimension

Fig	NPS (inch.)	DN (mm)	WP (kg/cm ²)	ANSI B16.5 (R.F)				
				Face to Face(6D)	gate	Orbits	Control Cseal	SCV
127FB	1	25	20	127		216	216	
127FB	1.5	38	20	165		241		
127FB	2	49	20	178	178	187	178	178
127FB	3	74	20	203	203	203	204	203
127FB	4	100	20	229	229	305	305	229
127FB	6	150	20	394	267	403	404	394
127FB	8	201	20	457	292	457	458	457
127FB	10	252	20	533	330	673	674	533
127FB	12	303	20	610	356	762	762	610
127FB	14	334	20	686	381		826	686
127FB	16	385	20	762	406	902	902	762
127FB	18	436	20	864	432		925	864
127FB	20	487	20	914	457		991	914
127FB	24	589	20	1067	508			1067
327FB	1	25	51	165		216	216	
327FB	1.5	38	51	190		241	242	
327FB	2	49	51	216	216	216	216	216
327FB	3	74	51	283	283	282	283	283
327FB	4	100	51	305	305	305	305	305
327FB	6	150	51	403	403	403	404	457
327FB	8	201	51	502	419	502	502	521
327FB	10	252	51	568	457	673	674	559
327FB	12	303	51	648	502	762	762	635
327FB	14	334	51	762	762		826	762
327FB	16	385	51	838	838	826	902	838
327FB	18	436	51	914	914		915	914
327FB	20	487	51	991	991	1194	991	991
327FB	24	589	51	1143	1143			1143
627FB	1	25	102					
627FB	1.5	38	102					
627FB	2	49	102	292	292	292	293	292
627FB	3	74	102	356	356	356	356	356
627FB	4	100	102	432	406	432	432	432
627FB	6	150	102	559	495	559	559	559
627FB	8	201	102	660	597	660	661	660
627FB	10	252	102	787	673	787	788	787
627FB	12	303	102	838	762	838	839	838
627FB	14	334	102	889	826	889	889	889
627FB	16	385	102	991	902	991	991	991
627FB	18	436	102	1092	978		1093	1092
627FB	20	487	102	1194	1054	1194	1194	1194
627FB	24	589	102	1397	1232			1397

DURABILITY TEST & APPLICATION



- Durability test -



- Cryogenic test -



- Application -