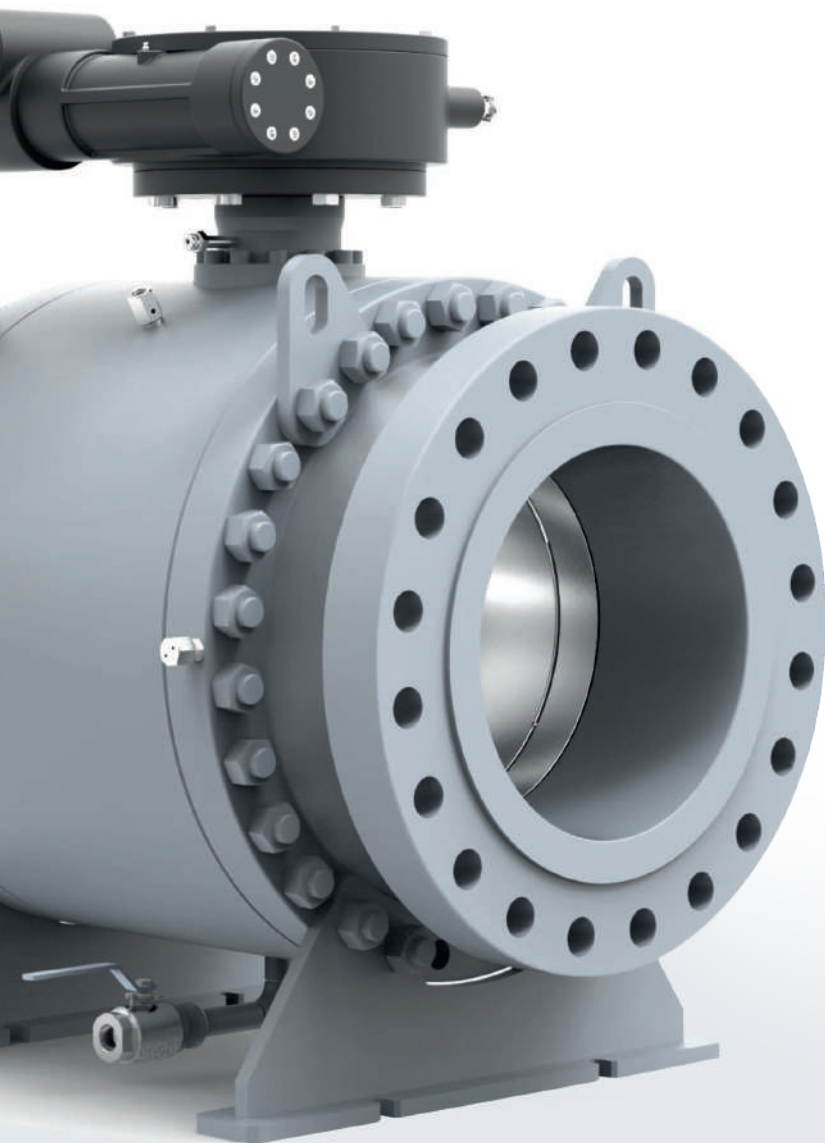




SPLIT BODY TRUNNION BALL VALVES



*fluid
under
control*

SPLIT BODY TRUNNION BALL VALVES

Trunnion type valves are used at Oil & Gas industry for their high sealing performance at low pressure and easy on-off operation at high pressure applications. As ball is mounted with bearing top and bottom, torque values are getting down significantly compare to floating valves. TORK all trunnion mounted ball valves has double block and bleed features that allows body cavity free from both upstream and downstream ends.

WHERE TO USE

- On/Off Shore Oil and Gas Production
- Subsea Oil and Gas Production
- Oil and Gas Storage
- Oil and Gas Transportation
- Oil and Gas Gathering Systems
- Gas Re-injection Plants
- Gas Treatment Plants
- LPG and LNG Production
- LPG and LNG Storage
- LPG and LNG Transportation
- Petrochemical Industry
- Metering Systems
- Refining Industry



SIZE RANGE

6" - 56"
(DN150mm - 1400mm)



PRESSURE RATINGS

ANSI Classes:
150 - 2500



BORE

Full bore & reduced bore



END CONNECTIONS

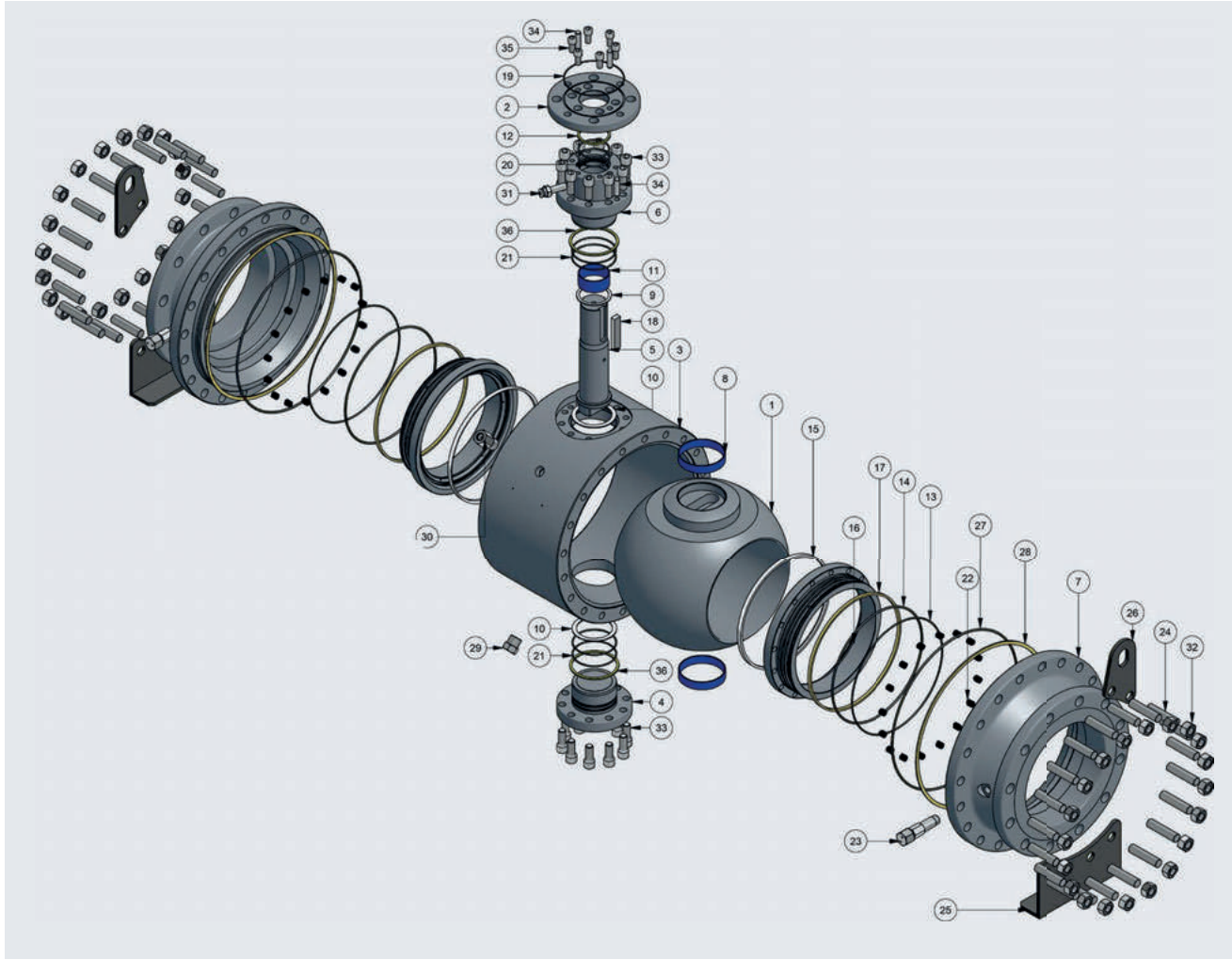
Flanged or welded

FEATURES

- Trunnion mounted (low operating torque)
- Bubble-tight sealing from zero to full rated pressure.
- Metal-to-metal primary seal – protected o-ring secondary seal.
- Double stem seals – can be replaced with pipeline under pressure.
- Integral mechanical stops.
- Both upstream and downstream seat seals capable of sealing upstream pressure.
- Full block and bleed capability.
- Seal integrity can be checked by pressurising the body cavity only.
- Piggable.

REFERENCE STANDARDS

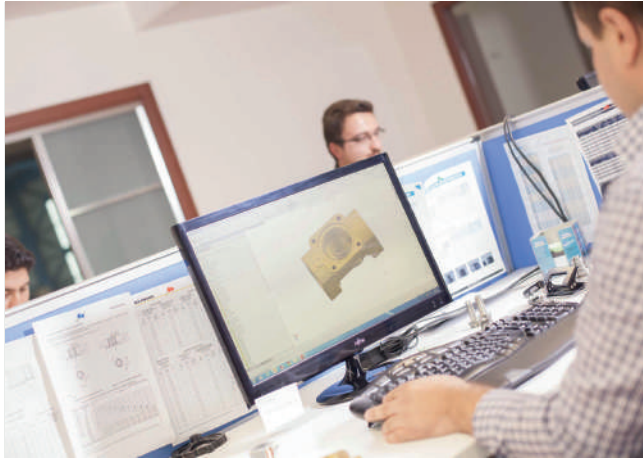
Valves Design Standard :	ISO 17292, API 6D, ISO 14313
Face To Face Std :	ANSI B16.10
End Connection :	ANSI B16.5 / ANSI B.16.25 DIN EN 1092-1
Testing :	API 6D / API 598
Fire safe testing :	API 607 / ISO 10497 / API 6FA
Certificate Acc. to :	10204 3.1 - 3.2



VALVE PART LIST

ITEM	PART NAME	QTY	MATERIAL	ITEM	PART NAME	QTY	MATERIAL
1	Ball	1	ASTM A105 + ENP	19	O-Ring	1	NBR
2	Gearbox Flange ISO 5211	1	ASTM A105	20	O-Ring	2	NBR
3	Body	1	ASTM A105	21	O-Ring	4	NBR
4	Trunion	1	ASTM A105	22	Springs	32	INCONEL X750
5	Stem	1	ASTM A105 + ENP	23	Seat Sealent	2	ASTM A105
6	Gland	1	STEEL +C.G	24	Stud	40	ASTM A193 B7
7	Bonnet	2	ASTM A216 WCB	25	Valve Feet	2	ST 37
8	Bushing	2	STEEL +C.G	26	Lifting Device	2	ST 52
9	Thrust Washer	1	PTFE + C.G	27	O-Ring	2	NBR
10	Thrust Washer	2	PTFE + C.G	28	Gasket	2	GRAPHITE
11	Bushing	1	STEEL + C.G	29	Drain Plug	1	ASTM A105
12	Gasket	1	GRAPHITE	30	Drain Plug	1	ASTM A105
13	O-Ring	2	NBR	31	Stem Sealent	1	ASTM A105
14	O-Ring	2	NBR	32	Nut	40	ASTM A194 2H
15	Seat	2	ASTM A105 + ENP	33	Bolt	20	DIN 8.8
16	Ring	2	ASTM A105	34	Pin	4	DIN 8.8
17	Gasket	2	GRAPHITE	35	Bolt	6	DIN 8.8
18	Key	1	C45	36	Gasket	2	GRAPHITE

VALVE DESIGN & TEST



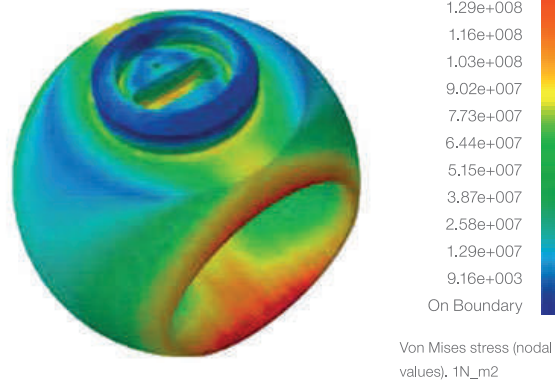
VALVE DESIGN & ANALYSIS

All valve designs, have been asset stress analysis to ensure pressure contained parts performance before manufacturing process.

VALVE REACTION & PRESSURE TEST

TORK products are tested in accordance with API 598 standards with digitally aided valve test machines which correspond %100 of modern requirements. Each valve is delivered to customers as EN10204 3.1 certified. The types of test performed as follows:

- hell test
- Back-seat test
- Low pressure closure test
- High pressure closure test
- Visual examination of casting
- High pressure pneumatic shell test



LEAKAGE TEST TABLE

API 598 ISO - 5208		HYDROSTATIC SEMI OPEN BODY TEST (Working pressure x 1,5)		HYDROSTATIC SEAT TEST (Working pressure x 1,1)		PNEUMATIC SEAT TEST	
		Pressure (Bar)	Time	Pressure (Bar)	Time	Pressure (Bar)	Time
ANSI 150	Working pressure 20 Bar	30 Bar	Depends on nominal diameter	22 Bar	Depends on nominal diameter	6 Bar	Depends on nominal diameter
ANSI 300	Working pressure 51 Bar	76 Bar		57 Bar			
ANSI 600	Working pressure 102 Bar	153 Bar		113 Bar			
DN 15 - 100 (1/2" - 4")		ANSI 150 30 Bar ANSI 300 76 Bar ANSI 600 153 Bar	2 minute	ANSI 150 - 22 Bar ANSI 300 - 57 Bar ANSI 600 - 113 Bar	2 minute	6 Bar	2 minute
DN 150 - 250 (6" - 10")			5 minute		5 minute		5 minute
DN 300 - 450 (12" - 18")			15 minute				
DN 500 and bigger			30 minute				

QUALITY

TORQUE TABLE (FULL BORE) (Nm)

CLASS	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	32"	36"	40"	42"
150	80	120	200	300	440	700	830	1.050	1.460	2.400	3.340	6.890	11.700	17.500	24.000	29.500	35.000	45.000
300	110	190	240	430	700	1.150	1.300	1.550	2.800	3.450	4.520	8.530	17.000	23.000	28.500	36.000	44.000	53.000
600	145	260	275	600	900	1.830	2.100	2.550	3.900	4.500	5.400	13.100	24.500	29.500	35.000	48.000	59.000	68.000

Before selecting proper size, take consideration on factor of safety. Recommended factor of safety for general usage is min. 1,5 times of required torque value.

TORQUE MEASUREMENT

By making all torque measurements of our valves in the most correct way with torque measurement devices, we provide cost advantage and longevity for our customers on the equipment they chose.

Torque measurement values may show an alteration depending on valve design type and fluid type. Frequently used BTO values are shown in the table. All measurements are BTO torque values and they are for ball valves with soft and hard seat.

It is recommended to add a safety factor of 1.5 times, when selecting an actuator above the torque values.

For MTM seat, hard insert seat and other type valve torque information, please contact with us.



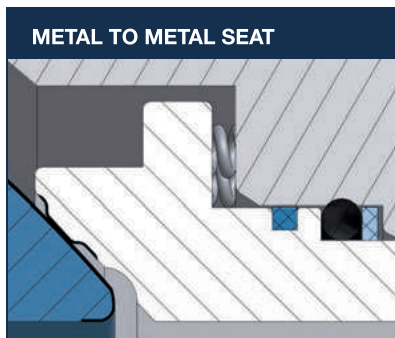
Ball surface plating with 150 micron TCC.

METAL COATING TYPES

- Stellite
- Tungsten Carbide
- Nickel Bore
- Special coatings available

METAL TO METAL SEAT

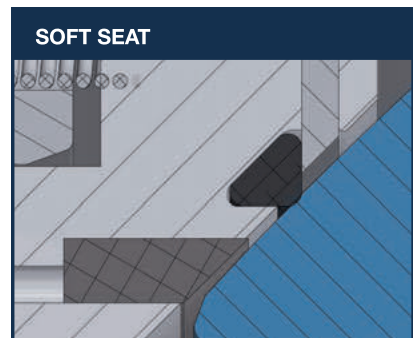
Mainly used abrasive fluids, severe service and corrosive fluids also high temperatures and pressures.



- Ball
- Seat

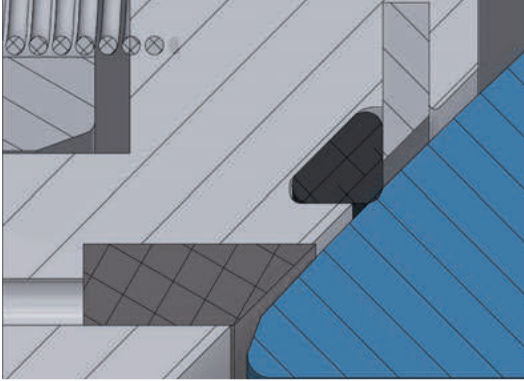
SOFT SEAT

Soft seats provide excellent sealing performance and are used in normal conditions and normal temperatures and aggressive environments.



- Sealing (H-NBR)
- Ball
- Seat

DESIGN FEATURES



SINGLE PISTON EFFECT

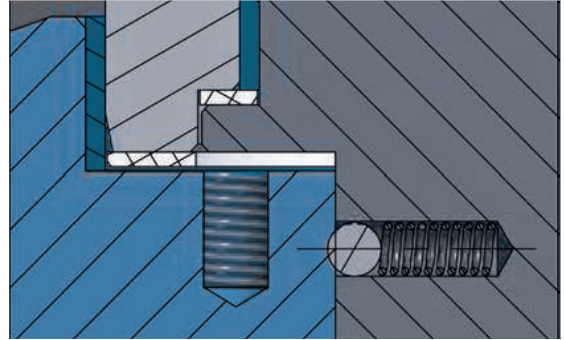
This type of seat design can ensure a tight contact with the ball in only single direction. In fact, when the line (so the valve) is under pressure (upstream), the seat is pushed toward the ball normally. It is called single piston effect due to one side seat ring pushed toward the ball.

DOUBLE PISTON EFFECT

As the name of it indicates, this type of seat design provide a tight contact with the ball in the normal direction, and also in the reverse direction. So, both sides upstream and downstream can be sealed for better leakage proof. Its design allows to use body cavity pressure to push downstream side ring toward the ball also. It is called double piston effect due to both side seat ring pushed toward the ball.

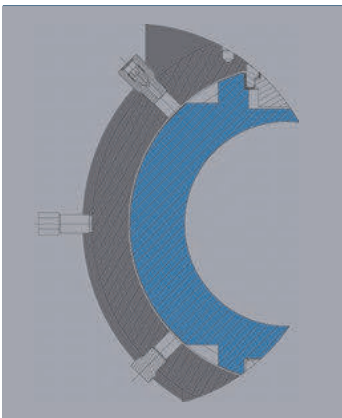
ANTI STATIC DEVICE

Spring plus graphite type antistatic device are applied between the ball, stem, gland flange and body, to keep the electrical continuity between all the metallic components, and ensure the resistance lower than the most severe service requirement.



BLOW-OUT PROOF STEM

This design ensures the valve stem cannot be blown out of the body in the event of the gland being removed while the valve is under pressure. To prevent stem blow out from body, the stem has a shoulder in the lower part and so constructs that it may not blow out upwards.

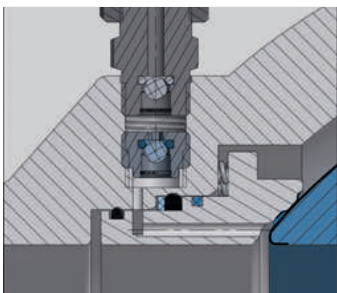


DOUBLE BLOCK AND BLEED

When the ball is in the closed position, each seat seals off the process medium independently at the same time between the up/down stream and body cavity; it allows bleeding of the trapped cavity pressure (DBB) through drain or vent valve. The double block and bleed function makes it possible to flush the valve under pressure and verify that the seats are sealing properly.

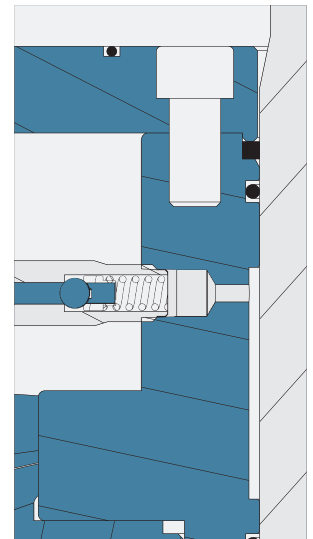
STEM SEAL

For high pressure or large size valves, double o-rings located in the upper stem area are used to ensure positive sealing. And upon request, additional stem seal injection fittings are provided to be utilized in the case of emergencies, o-ring damage, or if stem leakage occurs.



EMERGENCY SEAT SEAL

In the event of damage to the valve seat, sealant can be injected to temporarily seal the valve until maintenance can be performed. It provides high integrity shut-off. On request, secondary seat sealant injection fittings are installed.



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