



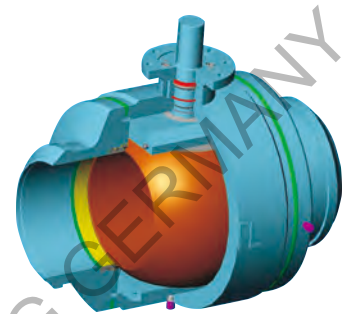
PIPELINE VALVE

Fully welded ball valve



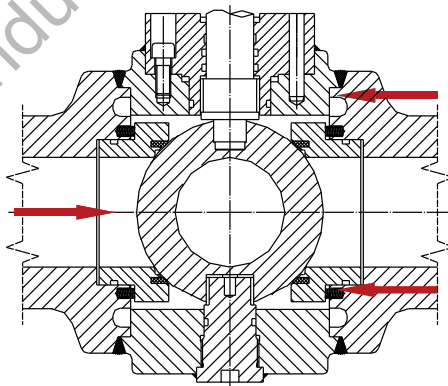
Technical Features

STANDARD FEATURES	Type Z	Type C	COMMENTS
Size range	1½FB up to 6" RB	6FB up to 60"	Special sizes
pressure	ANSI 150-2500	ANSI 150-2500	
Fully welded body design	YES	YES	
Anti-static device	YES	YES	
Self relieving seats	YES	NO	C-optional features (no extra cost)
Double Piston Effect seats	NO	YES	Z-optional features (*)
Primary metal to metal seal, secondary protection with o-ring	NO	YES	
Plastic polymer insert on seat sealing	YES	YES	C-optional fatures(*)
Lubricated stem	YES	YES	
Lubricated seat	NO	YES	Z-optional features (*)
Double block and bleed	YES	YES	Open/closed position
Metal to metal seats	YES(*)	YES(*)	
Trunion mounted ball	YES	YES	
Full or Reduced bore	YES	YES	
Bi-directional	YES	YES	
Stem anti-blow out proof design	YES	YES	
Stem extension	YES(*)	YES(*)	
N.D.T. Verification on body weld joints (ultrasonic(examination)	YES	YES	According to ASME VIII Div.(appendix 12)
N.D.T.verification on welding ends (dye penetrant)	YES	YES	According to ASME VIII Div.I
Minimum thickness ASME B16.34	YES	YES	
RF or RTJ flanges to ASME B16.5	YES	YES	Other flange design(*)
BW(butt-weld)ends to ASME B16.25	YES	YES	Other code for BW design(*)
Bore and end-to-end dimensions to API6D	YES	YES	Dimensions other than API 6D(*)
Manufacture in accordance with API spec.6D/ASME B16.34	YES	YES	
Materials certification to EN10204 type 3.1B for pressure containing parts,ball, stem and seats	YES	YES	Type3.1c materials certification level(*)
fire safe design to API 6FA(BS6755Pt.2)	YES	YES	Other fire safe code(e.g.API607)(*)
Operation by lever, gear w/handwheel or catuator	YES	YES	
Maintenance	The body construction preduces the internal disassembly at site. The complete replacement on the upper stem seal can be achieved with the valve installed without pressure		

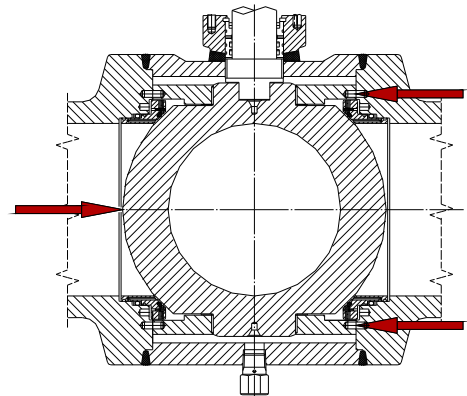


(*) available with extra cost

Trunion mounted ball valve



Type Z



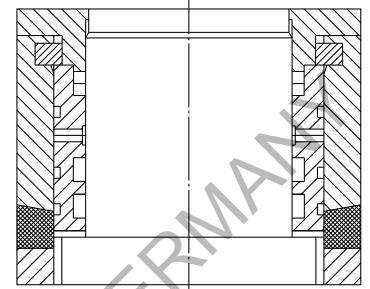
Type C

When the ball is in fully closed position, two trunnions absorb the side thrust generated by line pressures, preventing excess friction between ball and seats. With this system, even at full rated working pressure, operating torque stays low. Therefore a generous sizing of trunnions is essential to the life and operability of the valve. The spherical surface is machined and ground to close tolerance. To reduce torque and minimize wear, the ball is then electroless nickel plated and polished to mirror finish. For special applications the ball may be hardfaced with T.C.C (Tungsten carbide coating) to improve resistance to wear and prevent scratching caused by hard particles.

Technical features

Emergency stem and seat sealant injection

In case of emergency, when sealing materials (seat sealing and stem o-ring) are damaged or decomposed by fire or other accidental cause, a sealant injection into fitting on both stem and seat prevents leakage until the primary seal is restored. For TypeZ ball valve the seat sealant injection is an optional feature available with an extra cost. However, the material between ball and seat is a thermoplastic, thus no further injection is necessary. Self lubricated, low friction materials are used for stem bearings, stem seals and body seats. Low friction materials, e.g. nylon, are used for seat inserts. Stem bearings and self-lubricating seals give predictable operating torque for the life of the valve.



Stem

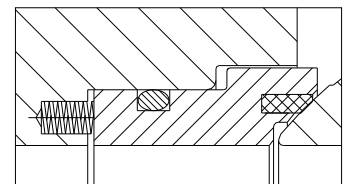
The stem is made separately from the ball. It is blow-out proof, properly obtained with an integral collar in the bottom of the stem.

Stem Seal

Sealing system can be defined triple: two static o-rings seal the stem, plus a third graphite retained by the adaptor flange. This ultimate seal can be replaced when the valve is in line and in closed position.

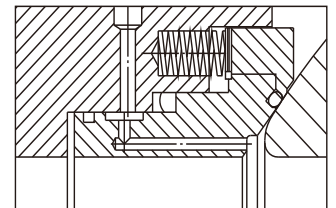
Polymer insert

The sealing between the seat and the ball is performed by a plastic polymer insert. The choice of this soft sealing depends on the service conditions. The initial seal, at low differential pressure, is obtained by the spring loaded floating seats (spring energized) which achieve independent sealing. Increasing the line pressure behind the upstream seat ring helps the seat spring load to force the upstream seat tightly against the ball.



Elastomer seat

The sealing between the seat and the ball is performed by a primary metal seal, and a secondary o-ring seal for both the seats. The choice of the secondary seal "soft sealing" depends on the service conditions. The initial seal, at low differential pressure, is obtained by the spring loaded floating seats (spring energized) which achieve independent sealing. Increasing the line pressure behind the upstream seat ring helps the seat spring load to force the upstream seat tightly against the ball.



Firesafe Design and Test

Fire safe is standard design

Two o-ring and gland gasket prevent leakpaths from the valve stem area. If fire deteriorate o-ring, gland gasket, the stem firesafe packing prevent fluid or gas leakage.

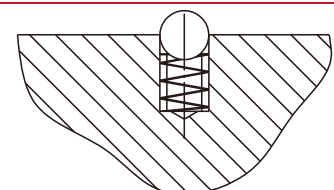
soft seat ball valve fire safe test (shown in the image) was witnessed and certified according to API607/API6FA BS 6755 PT.2



Anti-static Device

This device is a standard feature

A coil spring thrusts a little sphere, providing earthed continuity between stem and other metallic components of valve (ball and body) in order to avoid sparks during turning of the stem for opening and closing the valve and prevent problems in case of use with flammable fluids and gas.



Technical Features

Body vent and drain

The drain and vent plug of the valve body enable to check the integrity of the seat ring. A bleed valve may replace the drain plug.

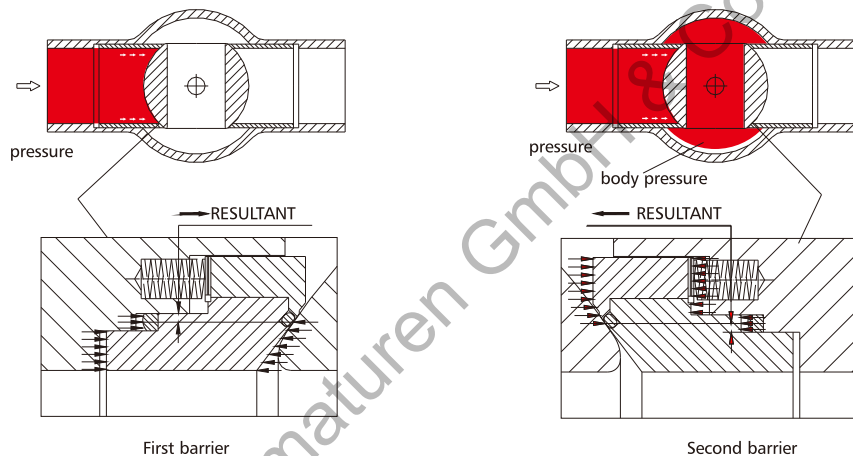
Double block and bleed

design of a valve with two seating surfaces between which the cavity can be vented through a bleed connection and thus confirm the tightness of the valve, as well in closed position as open position, when pressure is applied to any side or both sides of the valve.

Double piston effect (Z-option, C-standard)

With the DPE seat configuration when there is a leakage in the upstream seat, the pressure entering into the body cavity pushes the downstream seat against the ball and the valve seals.

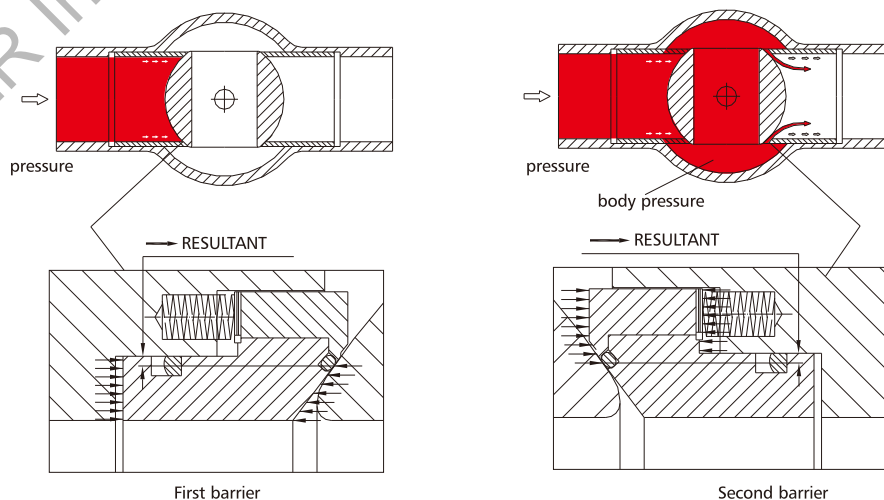
This effect is a sealing principle involved in utilising line pressure to effect a seal across the floating seat.



A relief valve is recommended to be installed to protect the body cavity from excess pressure.

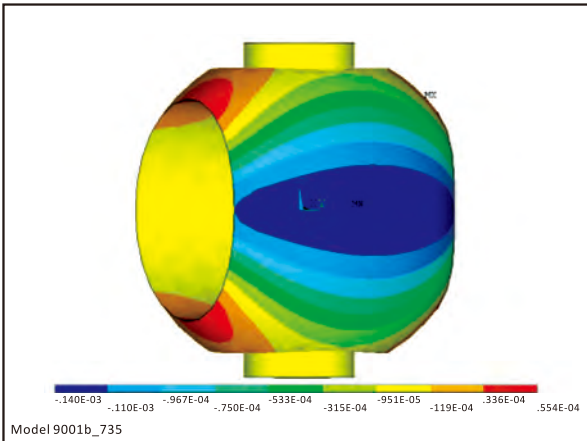
Self relieving seat (Z-standard, C-option)

In self relieving condition, excessive internal body pressure is automatically relieved both in upstream and downstream line by forcing the seats away from the closure element.

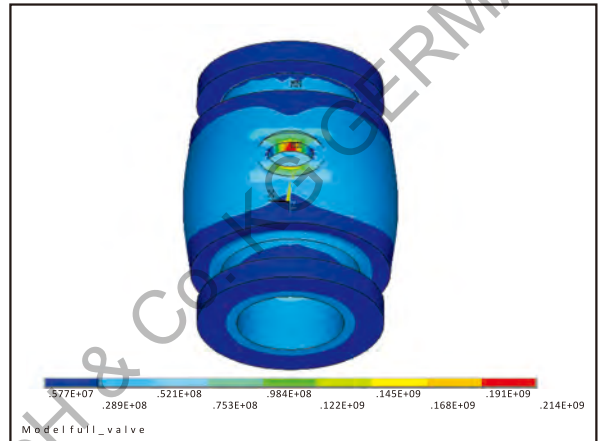


Ball valve fixed deformation finite element analysis

Ball Valve Strength and Finite Element Analysis of Deformation

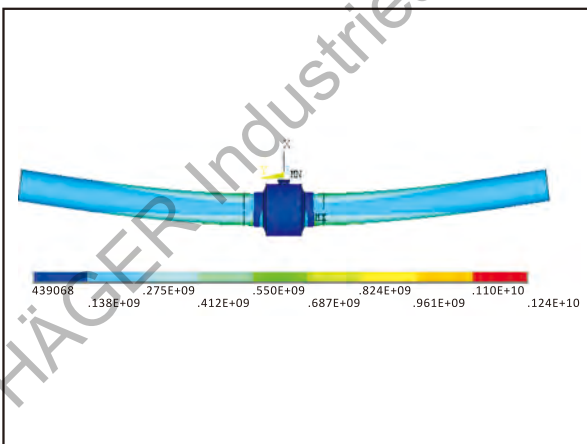


Class900 36" ball

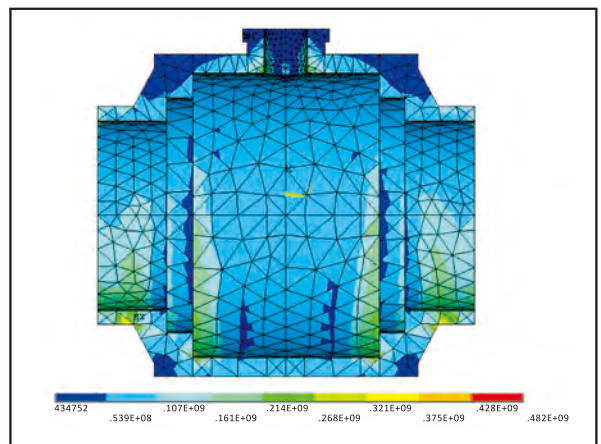


Class900 36" body

safety assessment of structure strength of valve body under the composite function of medium pressure and external bending moment



Class600 40" fully welded valve body

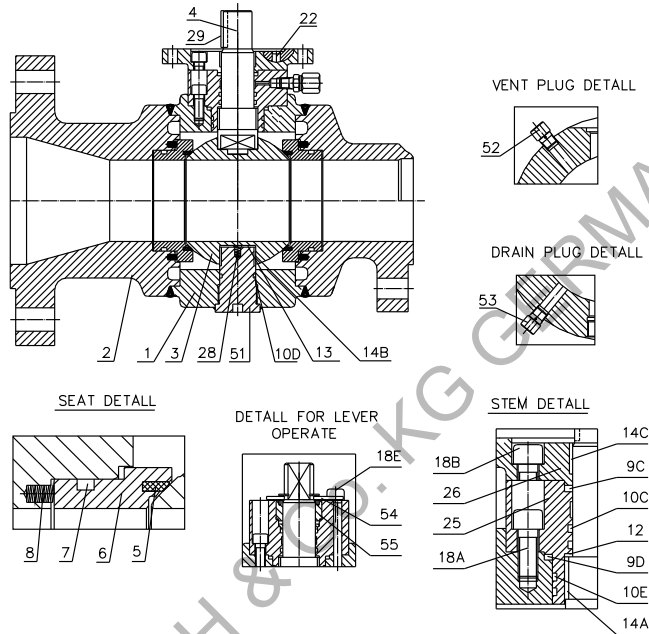


STD. Material Selection

Type Z

55	SCREW RING	A182 F6a	3
54	STOP COLLAR	AISI 1025	3
53	DRAIN PLUG	AISI 1025+Zn	
52	VENT PLUG	AISI 1025+Zn	
51	LOWER TRUNNION	A182 F6a	
29	KEY	AISI 1045	
28	ANTI-STATIC SPRING	304SS	
26	COUPLING FLANGE	A105N	4
25	TOP COVER	A105N+ENP	1
22	PIN	AISI 410	
18E	SCREW	A193 B7	3
18B	SCREW	A193 B7	4
18A	SCREW	A193 B7	
14C	RADIAL BEARING	304+PTFE	
14B	RADIAL BEARING	304+PTFE	
14A	RADIAL BEARING	304+PTFE	
13	PLANE BEARING	304+PTFE	
12	THRUST WASHER	PTFE	
10E	O-RING	VITON	
10D	O-RING	VITON	
10C	O-RUBG	VITON	
9D	FIRE SAFE RING	GRARHITE	
9C	FIRE SAFE RING	GRAPHITE	
8	SEAT SPRING	17-4PH	
7	O-RING	VITON	
6	SEAT RING	A105N+ENP	1
5	SEAT INSERT	RP TFE	2
4	STEM	A182-F6a	
3	BALL	A105N+ENP	1
2	CLOSURE	A105N	
1	BODY	A105N	

Pos.	Description	Material	Notes
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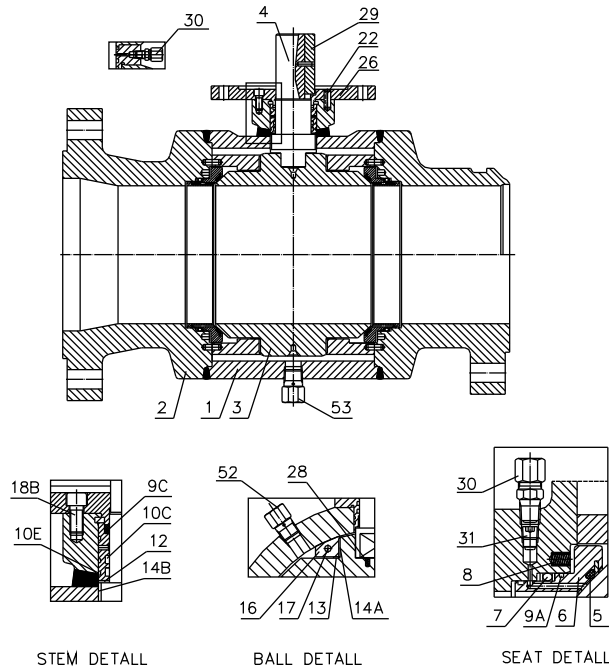


NOTES: 1) ELECTRIKISS NICKEL PLATED 0.001" THICKNESS
 2) NYLON INSERT ON CLASS 900/1500
 3) FOR LEVER OPERATED VALVES
 4) FOR GEAR OR ACTUATOR OPERATED VALVES
 SERVICE: STANDARD FLUID-CARBON STEEL VALVE-FIRE SAFE DESIGN
 TEMPERATURE: -7°C + 160°C (-7°C + 121°C FOR CLASS 900 ~ 1500)

Type C

53	DRAIN PLUG	AISI 1025+Zn	
52	VENT PLUG	AISI 1025+Zn	
31	CHECK VALVE	AISI 1025+Zn	
30	SEAT GREASE FITTING	AISI 1025+Zn	
29	KEY	AISI 1045	
28	ANTI-STATIC SPRING	304SS	
26	COUPLING FLANGE	A105N	
22	PIN	AISI 410	
18A	SCREW	A193 B7	
17	BEARING RETAINER PIN	AISI 1035	
16	BEARING RETAINER	A105N	
14B	RADIAL BEARING	304+PTFE	
14A	RADIAL BEARING	304+PTFE	
13	PLANE BEARING	304+PTFE	
12	THRUST WASHER	PTFE	
10E	O-RING	VITON	3
10C	O-RING	VITON	3
9C	FIRE SAFE RING	GRARHITE	
9A	FIRE SAFE RING	GRAPHITE	
8	SEAT SPRING	17-4PH	
7	O-RING	VITON	3
6	SEAT RING	A105N+ENP	1
5	SEAT INSERT	VITON/GLT/AED/NYLON 2	
4	STEM	A182-F6a	
3	BALL	A105N+ENP	1
2	CLOSURE	A105N	
1	BODY	A105N	

Pos.	Description	Material	Notes
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NOTES: 1) ELECTRIKISS NICKEL PLATED 0.001" THICKNESS
 2) NYLON FOR CLASS 1500.
 3) VITON (AED) FOR CLASS 600 AND ABOVE.
 SERVICE: STANDARD FLUID-CARBON STEEL VALVE-FIRE SAFE DESIGN
 TEMPERATURE: -7°C + 160°C (-7°C + 121°C FOR CLASS 900 ~ 1500)

STD.Material Selection

Trim materials for general service (sweet fluids) FULL CARBON STEEL

AA	Z		C	
Rating	150-1500	2500	150-1500	2500
Temperature	-29° + 180°C	-29° / + 180°C	-29° + 180°C	-29° / + 180°C
Body	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2
Closure	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2
Ball	ASTM A350 Gr.LF2 + ENP	AISI 4140 + ENP	ASTM A350 Gr.LF2 + ENP	A-694-F65 + ENP
Seat	ASTM A350 Gr.LF2 + ENP	ASTM A350 Gr.LF2 + ENP	ASTM A350 Gr.LF2 + ENP	ASTM A350 Gr.LF2 + ENP
Stem	AISI 4140 + ENP	AISI 4140 + ENP	AISI 1040 + ENP	AISI 4140 + ENP
Capscrew	B7/2H	B7/2H	B7/2H	B7/2H
Seat gasket	PTFE (2)	NYLON	VITON (2)	NYLON
Other seals	VITON	VITON	VITON	VITON
Seat spring	INCONEL X 750	INCONEL X 750	INCONEL X 750	INCONEL X 750

Trim materials for corrosive services (comply to NACE MR 01-75) STAINLESS STEEL TRIM

CC	Z		C	
Rating	150-1500	2500	150-1500	2500
Temperature	-29° + 180°C	-29° / + 180°C	-29° + 180°C	-29° / + 180°C
Body	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2
Closure	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2
Ball	A 182 F316 + ENP	A 182 F316 LN+ ENP	A 182 F316 + ENP	A-694-F65 + ENP
Seat	A 182 F316 + ENP	A 182 F316 LN+ ENP	A 182 F316 + ENP	ASTM A350 Gr.LF2 + ENP
Stem	A 182 F316 + ENP	17-4-PH + ENP	17-4-PH + ENP	AISI 4140 + ENP
Capscrew	B7/2H	B7/2H	B7/2H	B7/2H
Seat gasket	PTFE (2)	NYLON	VITON (2)	NYLON
Other seals	VITON	VITON	VITON	VITON
Seat spring	INCONEL X 750	INCONEL X 750	INCONEL X 750	INCONEL X 750

Trim materials for highly corrosive services 13% Cr. STAINLESS STEEL TRIM

DD	Z		C	
Rating	150-1500	2500	150-1500	2500
Temperature	-29° + 180°C	-29° / + 180°C	-29° + 180°C	-29° / + 180°C
Body	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2
Closure	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2	ASTM A350 Gr.LF2
Ball	A 182 F6 + ENP	A 182 F6 + ENP	A 182 F6 + ENP	A 182 F6 + ENP
Seat	A 182 F6 + ENP	A 182 F6 + ENP	A 182 F6 + ENP	A 182 F6 + ENP
Stem	A 182 F6 + ENP	A 182 F6NM + ENP	A 182 F6 + ENP	A 182 F6 + ENP
Capscrew	B7/2H	B7/2H	B7/2H	B7/2H
Seat gasket	PTFE (2)	NYLON	VITON (2)	NYLON
Other seals	VITON	VITON	VITON	VITON
Seat spring	INCONEL X 750	INCONEL X 750	INCONEL X 750	INCONEL X 750

Trim materials for corrosive services (comply to NACE MR 01-75) FULL STAINLESS STEEL VALVE

EE	Z		C	
Rating	150-1500	2500	150-1500	2500
Temperature	-29° + 180°C	-29° / + 180°C	-29° + 180°C	-29° / + 180°C
Body	A 182 F316	A 182 F316	A 182 F316	A 182 F316
Closure	A 182 F316	A 182 F316	A 182 F316	A 182 F316
Ball	A 182 F316 + ENP	A 182 F316 LN+ ENP	A 182 F316 + ENP	A 182 F316 LN+ ENP
Seat	A 182 F316 + ENP	A 182 F316 LN+ ENP	A 182 F316 + ENP	A 182 F316 LN+ ENP
Stem	A 182 F316 + ENP	17-4-PH + ENP	17-4-PH + ENP	17-4-PH + ENP
Capscrew	B7/2H (TEFLON COATED)	B7/2H (TEFLON COATED)	B7/2H (TEFLON COATED)	B7/2H (TEFLON COATED)
Seat gasket	PTFE (2)	NYLON	VITON (2)	NYLON
Other seals	VITON	VITON	VITON	VITON
Seat spring	INCONEL X 750	INCONEL X 750	INCONEL X 750	INCONEL X 750

Note:(2)NYLON FOR CLASS 900-1500

Alternative material selections available upon request

STD.Material Selection

Trim materials for corrosive services (comply to NACE MR 01-75) FULL DUPLEX STEEL VALVE

	Z	C		
FF				
Rating	150-1500	2500	150-1500	2500
Temperature	-29° + 180°C	-29° / + 180°C	-29° + 180°C	-29° / + 180°C
Body	A 182 F51	A 182 F51	A 182 F51	A 182 F51
Closure	A 182 F51	A 182 F51	A 182 F51	A 182 F51
Ball	A 182 F51	A 182 F51	A 182 F51 + ENP	A 182 F51
Seat	A 182 F51	A 182 F51	A 182 F51 + ENP	A 182 F51
Stem	A 182 F51 + ENP	A 182 F51 + ENP	A 182 F51 + ENP	A 182 F51 + ENP
Capscrew	B7/2H (TEFLON COATED)	B7/2H (TEFLON COATED)	B7/2H (TEFLON COATED)	B7/2H (TEFLON COATED)
Seat gasket	PTFE (2)	NYLON	VITON (2)	NYLON
Other seals	VITON	VITON	VITON	VITON
Seat spring	INCONEL X 750	INCONEL X 750	INCONEL X 750	INCONEL X 750



Trim materials for low temperature with stem extension FULL STAINLESS STEEL VALVE

	Z	C		
GG				
Rating	150-1500	2500	150-1500	2500
Temperature	-49° + 180°C	-49° / + 180°C	-49° + 180°C	-49° / + 180°C
Body	A 182 F316	A 182 F316	A 182 F316	A 182 F316
Closure	A 182 F316	A 182 F316	A 182 F316	A 182 F316
Ball	A 182 F316 + ENP	A 182 F316 LN+ ENP	A 182 F316 + ENP	A 182 F316 LN+ ENP
Seat	A 182 F316 + ENP	A 182 F316 LN+ ENP	A 182 F316 + ENP	A 182 F316 LN+ ENP
Stem	A 182 F316 + ENP	17-4-PH + ENP	17-4-PH + ENP	17-4-PH + ENP
Capscrew	L7/Gr7	L7/Gr7	L7/Gr7	L7/Gr7
Seat gasket	PTFE (2)	NYLON	VITON (2)	NYLON
Other seals	PTFE + ELGILOY	PTFE + ELGILOY	PTFE + ELGILOY	PTFE + ELGILOY
Seat spring	INCONEL X 750	INCONEL X 750	INCONEL X 750	INCONEL X 750



Trim materials for cryogenic temperature with extension FULL STAINLESS STEEL VALVE

	Z	C		
LL				
Rating	150-1500	2500	150-1500	2500
Temperature	-196° + 120°C	-196° / + 120°C	-196° + 120°C	-196° / + 120°C
Body	A 182 F316	A 182 F316	A 182 F316	A 182 F316
Closure	A 182 F316	A 182 F316	A 182 F316	A 182 F316
Ball	A 182 F316 + ENP	A 182 F316 LN+ ENP	A 182 F316 + ENP	A 182 F316 LN+ ENP
Seat	A 182 F316 + ENP	A 182 F316 LN+ ENP	A 182 F316 + ENP	A 182 F316 LN+ ENP
Stem	XM 19 + ENP	INCONEL 718 + ENP	XM 19 + ENP	XM 19 + ENP
Capscrew	A 453 Gr660	A 453 Gr660	A 453 Gr660	A 453 Gr660
Seat gasket	KEL-F	KEL-F	KEL-F	KEL-F
Other seals	PTFE + ELGILOY	PTFE + ELGILOY	PTFE + ELGILOY	PTFE + ELGILOY
Seat spring	INCONEL X 750	INCONEL X 750	INCONEL X 750	INCONEL X 750



Trim materials for high temperature

	Z	C		
MM				
Rating	150-1500	2500	150-1500	2500
Temperature	-29° + 250°C	-29° / + 250°C	-29° + 250°C	-29° / + 250°C
Body	ASTM A350 GrLF2	ASTM A350 GrLF2	ASTM A350 GrLF2	ASTM A350 GrLF2
Closure	ASTM A350 GrLF2	ASTM A350 GrLF2	ASTM A350 GrLF2	ASTM A350 GrLF2
Ball	ASTM A350 GrLF2 + TCC	ASTM A350 GrLF2 + TCC	ASTM A350 GrLF2 + TCC	ASTM A350 GrLF2 + TCC
Seat	ASTM A350 GrLF2 + TCC	ASTM A350 GrLF2 + TCC	ASTM A350 GrLF2 + TCC	ASTM A350 GrLF2 + TCC
Stem	17-4-PH + ENP	INCONEL 718 + ENP	17-4-PH + ENP	INCONEL 718 + ENP
Capscrew	B7/2H	B7/2H	B7/2H	B7/2H
Seat gasket	METAL TO METAL	METAL TO METAL	METAL TO METAL	METAL TO METAL
Other seals	PTFE + ELGILOY	PTFE + ELGILOY	PTFE + ELGILOY	PTFE + ELGILOY
Seat spring	INCONEL X 750	INCONEL X 750	INCONEL X 750	INCONEL X 750



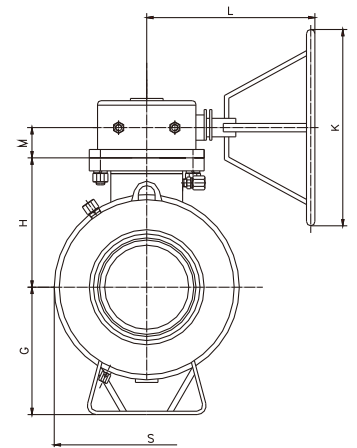
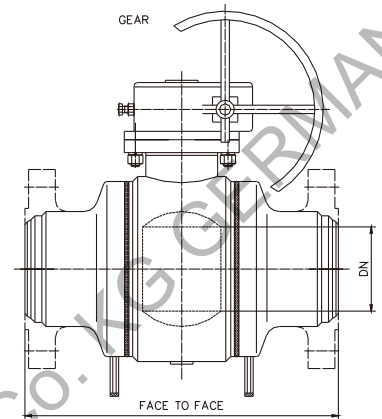
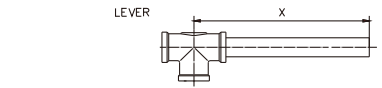
Ball valves type Z (Overall Dimensions)

TYPE Z		ANSI CLASS150 (PN 20) Working Pressure 275 Psi (19 bar) Hydrostatic Shell Test 420 Psi (29 bar)									
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K	X
		WE	RF	RTJ							
1.5"	38	191	165	178	75	88	130	--	--	--	300
2" x 1.5" x 2"	38	216	178	191	75	88	130	--	--	--	300
2"	49	216	178	191	110	113	160	--	--	--	300
3" x 2" x 3"	49	283	203	216	110	113	160	--	--	--	300
3"	74	283	203	216	140	145	220	54	300	350	400
4" x 3" x 4"	74	305	229	241	140	145	220	54	300	350	400
4"	100	305	229	241	160	160	245	54	300	350	450
6" x 4" x 6"	100	457	394	406	160	160	245	54	300	350	450

TYPE Z		ANSI CLASS300 (PN50) Working Pressure 720 Psi (50bar) Hydrostatic Shell Test 1080Psi (75 bar)									
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K	X
		WE	RF	RTJ							
1.5"	38	191	191	203	75	88	130	--	--	--	300
2" x 1.5" x 2"	38	216	216	232	75	88	130	--	--	--	300
2"	49	216	216	232	110	113	160	--	--	--	300
3" x 2" x 3"	49	283	283	298	110	113	160	--	--	--	300
3"	74	283	283	298	140	145	220	54	300	350	400
4" x 3" x 4"	74	305	305	321	140	145	220	54	300	350	400
4"	100	305	305	321	160	160	245	54	300	350	450
6" x 4" x 6"	100	457	404	419	160	160	245	54	300	350	450

TYPE Z		ANSI CLASS400 (PN64) Working Pressure 960 Psi (66bar) Hydrostatic Shell Test 1440Psi (100bar)									
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K	X
		WE	RF	RTJ							
1.5"	38	241	241	241	75	88	130	--	--	--	300
2" x 1.5" x 2"	38	292	292	295	75	88	130	--	--	--	300
2"	49	292	292	295	110	113	160	--	--	--	300
3" x 2" x 3"	49	356	356	359	110	113	160	--	--	--	300
3"	74	356	356	359	140	145	220	54	300	350	400
4" x 3" x 4"	74	406	406	410	140	145	220	54	300	350	400
4"	100	406	406	410	165	170	251	54	300	350	600
6" x 4" x 6"	100	495	495	498	165	170	251	54	300	350	600

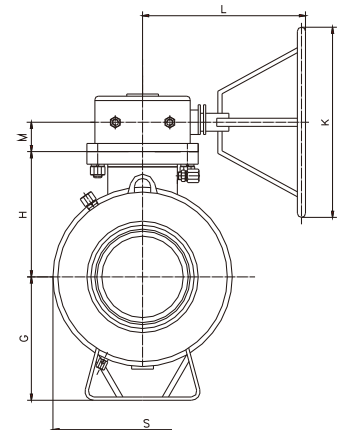
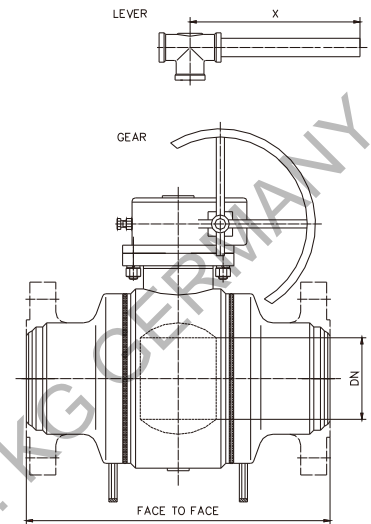
TYPE Z		ANSI CLASS600 (PN100) Working Pressure 1440 Psi (100bar) Hydrostatic Shell Test 2160Psi (149bar)									
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K	X
		WE	RF	RTJ							
1.5"	38	241	241	241	75	88	130	--	--	--	300
2" x 1.5" x 2"	38	292	292	295	75	88	130	--	--	--	300
2"	49	292	292	295	110	113	160	--	--	--	400
3" x 2" x 3"	49	356	356	359	110	113	160	--	--	--	400
3"	74	356	356	359	145	153	227	54	300	350	500
4" x 3" x 4"	74	432	432	435	145	153	227	54	300	350	500
4"	100	432	432	435	170	170	256	54	300	350	700
6" x 4" x 6"	100	559	559	562	170	170	256	54	300	350	700



Ball valves type Z (Overall Dimensions)

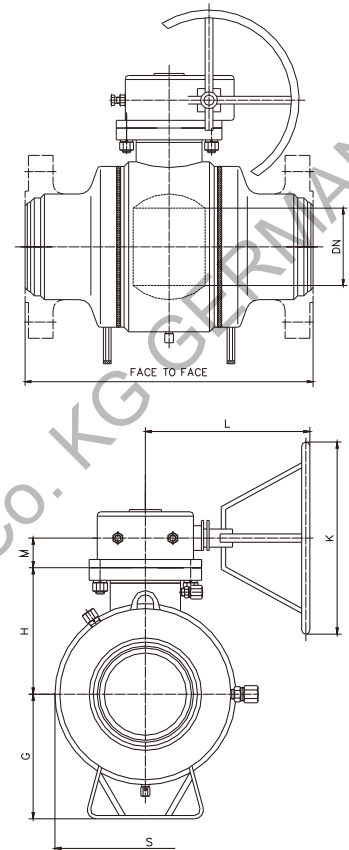
TYPE Z		ANSI CLASS 900 (PN 150) Working Pressure 2160 Psi (149 bar) Hydrostatic Shell Test 2240 Psi (223 bar)									
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K	X
		WE	RF	RTJ							
1.5"	38	305	305	305	95	95	150	--	--	--	400
2" x 1.5" x 2"	38	369	369	372	95	95	150	--	--	--	400
2"	49	369	369	372	150	133	178	54	300	350	500
3" x 2" x 3"	49	381	381	384	150	133	178	54	300	350	500
3"	74	381	381	384	155	153	215	54	300	350	750
4" x 3" x 4"	74	457	457	460	155	153	215	54	300	350	750
4"	100	457	457	460	185	194	270	54	300	350	-
6" x 4" x 6"	100	610	610	613	185	194	270	54	300	350	-

TYPE Z		ANSI CLASS 1500 (PN 250) Working Pressure 3600 Psi (248 bar) Hydrostatic Shell Test 5400 Psi (372 bar)									
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K	X
		WE	RF	RTJ							
1.5"	38	305	305	305	95	95	175	--	--	--	500
2" x 1.5" x 2"	38	369	369	372	95	95	175	--	--	--	500
2"	49	369	369	372	127	134	190	54	300	350	600
3" x 2" x 3"	49	470	470	473	127	134	190	54	300	350	600
3"	74	470	470	473	155	167	240	54	300	350	800
4" x 3" x 4"	74	546	546	549	155	167	240	54	300	350	800
4"	100	546	546	549	190	195	290	54	450	460	-
6" x 4" x 6"	100	705	705	711	190	195	290	54	450	460	-



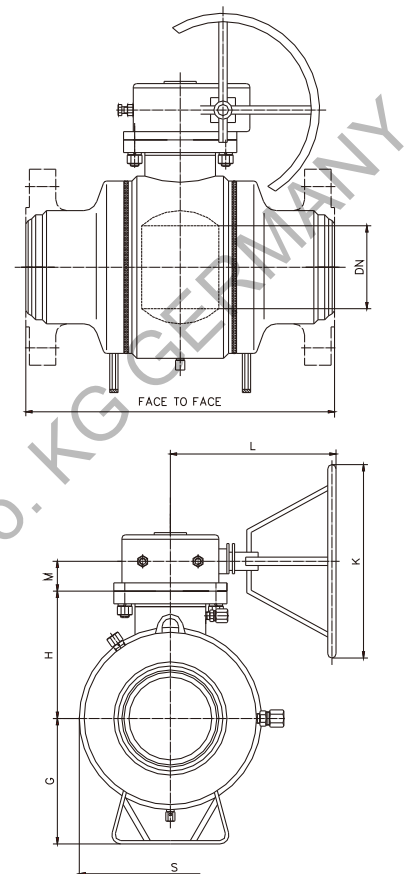
Ball valves type C (Overall Dimensions)

TYPE		ANSI CLASS150 (PN20)								
C		Working Pressure 275 Psi (19bar) Hydrostatic Shell Test 420Psi (29bar)								
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K
		WE	RF	RTJ						
6"	150	457	394	406	235	205	320	54	300	350
8" x 6" x 8"	150	521	457	470	235	205	320	54	300	350
8"	201	521	457	470	260	255	400	54	300	350
10" x 8" x 10"	201	559	533	546	260	255	400	54	300	350
10"	252	559	533	546	310	290	475	54	450	460
12" x 10" x 12"	252	635	610	622	310	290	475	54	450	460
12"	303	635	610	622	370	345	570	54	450	460
14" x 12" x 14"	303	762	686	699	370	345	570	54	450	460
14"	335	762	686	699	400	370	615	54	450	460
16" x 14" x 16"	335	838	762	775	400	370	615	54	450	460
16"	385	838	762	775	435	415	697	54	450	600
18" x 16" x 18"	385	914	864	876	435	415	697	54	450	600
18"	436	914	864	876	500	456	792	54	450	600
20" x 18" x 20"	436	991	914	927	500	456	792	54	450	600
20"	488	991	914	927	530	492	860	77	600	600
24" x 20" x 24"	488	1143	1067	1080	530	492	860	77	600	600
22"	528	*	*	*	620	540	925	77	600	600
24"	589	1143	1067	1080	670	575	990	77	600	600
30" x 24" x 30"	589	1397	1395	*	670	575	990	77	600	600
26"	633	1245	1143	*	720	625	1065	77	600	600
28"	684	1346	1245	*	755	660	1140	87	700	600
30"	735	1397	1295	*	805	700	1235	87	700	600
36" x 30" x 36"	735	1727	1524	*	805	700	1235	87	700	600
32"	779	1524	1372	*	845	740	1295	87	700	600
34"	830	1626	1473	*	875	785	1360	87	700	600
36"	874	1727	1524	*	910	825	1445	87	700	600
40"	976	*	*	*	1000	905	1625	87	700	600
42"	1020	*	*	*	1035	970	1715	87	700	600
48"	1166	*	*	*	1180	1130	1970	109	700	600
56"	1360	*	*	*	1340	1280	2285	109	700	600
60"	1458	*	*	*	1435	1400	2450	109	700	600



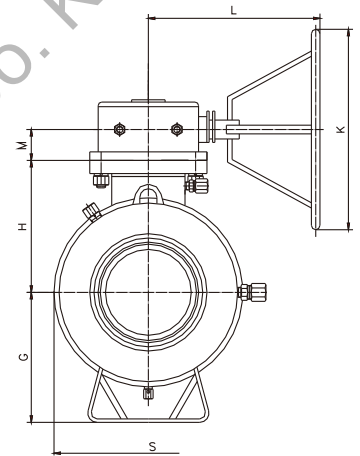
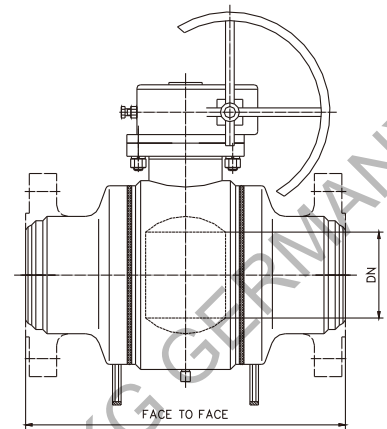
Ball valves type C (Overall Dimensions)

TYPE C	ANSI CLASS300 (PN50) Working Pressure720Psi (50bar) Hydrostatic Shell Test 1080Psi (75bar)										
	SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K
		WE	RF	RTJ							
6"	150	403	403	419	235	205	330	54	300	350	
8" x6" x8"	150	521	502	518	235	205	330	54	300	350	
8"	201	521	502	518	260	255	400	54	300	350	
10" x8" x10"	201	559	568	584	260	255	400	54	300	350	
10"	252	559	568	584	320	307	485	54	450	460	
12" x10" x12"	252	635	648	664	320	307	485	54	450	460	
12"	303	635	648	664	375	357	570	54	450	460	
14" x12" x14"	303	762	762	778	375	357	570	54	450	460	
14"	334	762	762	778	400	375	625	54	450	600	
16" x14" x16"	334	838	838	854	400	375	625	54	450	600	
16"	385	838	838	854	435	425	705	77	600	600	
18" x16" x18"	385	914	914	930	435	425	705	77	600	600	
18"	436	814	914	930	500	456	800	77	600	600	
20" x18" x20"	436	991	991	1010	500	456	800	77	600	600	
20"	487	991	991	1010	535	500	865	77	600	600	
24" x20" x24"	487	1143	1143	1165	535	500	865	77	600	600	
22"	538	1092	1092	1114	620	540	930	77	600	600	
24"	589	1143	1143	1165	670	575	1010	87	700	600	
30" x24" x30"	589	1397	1397	1422	670	575	1010	87	700	600	
26"	633	1245	1245	1270	720	625	1075	87	700	600	
28"	684	1346	1346	1372	755	660	1150	87	700	600	
30"	735	1397	1397	1422	805	700	1245	87	700	600	
36" x30" x36"	735	1727	1727	1756	805	700	1245	87	700	600	
32"	779	1524	1524	1553	845	740	1305	87	700	600	
34"	830	1626	1626	1654	875	785	1370	87	700	600	
36"	874	1727	1727	1756	910	825	1450	109	700	600	
40"	976	♣	♣	♣	1000	905	1635	109	700	600	
42"	1020	♣	♣	♣	1035	970	1725	109	700	600	
48"	1166	♣	♣	♣	1180	1130	1980	109	700	600	
56"	1360	♣	♣	♣	1340	1280	2295	191	568	600	
60"	1458	♣	♣	♣	1435	1400	2465	191	568	600	



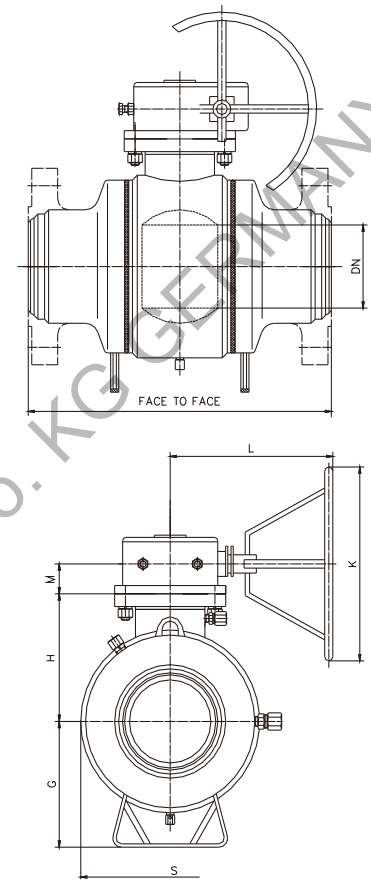
Ball valves type C (Overall Dimensions)

TYPE C		ANSI CLASS400 (PN64)									
		Working Pressure 960Psi (66bar)					Hydrostatic Shell Test 1440Psi (100bar)				
SIZE	DN	FACE TO FACE			G	H	S	M	L	K	
inches		WE	RF	RTJ							
6"	150	495	495	498	240	227	335	54	300	350	
8" x 6" x 8"	150	597	597	600	240	227	335	54	300	350	
8"	201	597	597	600	310	290	425	54	450	460	
10" x 8" x 10"	201	673	673	676	310	290	415	54	450	460	
10"	252	673	673	676	350	330	490	54	450	600	
12" x 10" x 12"	252	762	762	765	350	330	490	54	450	600	
12"	303	762	762	765	390	376	575	54	450	600	
14" x 12" x 14"	303	826	826	829	390	376	575	54	450	600	
14"	334	826	826	829	415	400	630	77	600	600	
16" x 14" x 16"	334	902	902	905	415	400	630	77	600	600	
16"	385	920	902	905	450	425	710	77	600	600	
18" x 16" x 18"	385	978	978	981	450	425	710	77	600	600	
18"	436	978	978	981	515	460	805	77	600	600	
20" x 18" x 20"	436	1054	1054	1060	515	460	805	77	600	600	
20"	487	1054	1054	1060	555	500	870	77	600	600	
24" x 20" x 24"	487	1232	1232	1241	555	500	870	77	600	600	
22"	538	1143	1143	1153	625	545	935	87	700	600	
24"	589	1232	1232	1241	680	545	1015	87	700	600	
30" x 24" x 30"	589	1524	1524	1537	680	590	1015	87	700	600	
26"	633	1308	1308	1321	740	590	1080	87	700	600	
28"	684	1397	1397	1410	775	635	1155	87	700	600	
30"	735	1524	1524	1537	820	670	1250	87	700	600	
36" x 30" x 36"	735	1880	1880	1895	820	705	1250	87	600	600	
32"	779	1651	1651	1667	860	705	1310	87	700	600	
34"	830	1778	1778	1794	885	795	1375	109	700	600	
36"	874	1880	1880	1895	925	835	1455	109	700	600	
40"	976	*	*	*	1000	910	1640	109	700	600	
42"	1020	*	*	*	1050	975	1730	109	700	600	
48"	1166	*	*	*	1190	1130	1990	191	568	600	
56"	1360	*	*	*	1350	1290	2300	191	568	600	
60"	1458	*	*	*	1460	1410	2475	206	590	600	



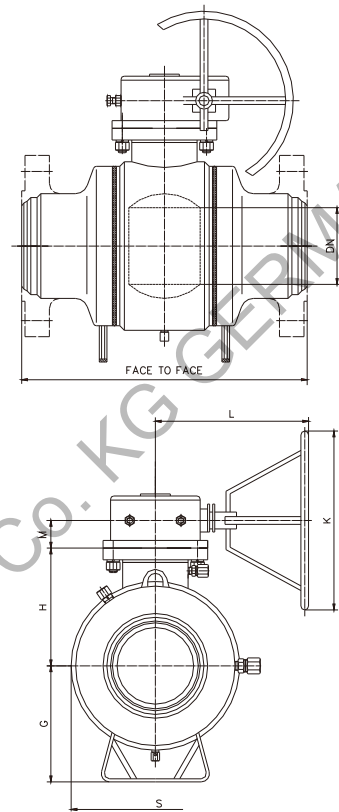
Ball valves type C (Overall Dimensions)

TYPE C		ANSI CLASS600 (PN100) Working Pressure1440Psi (99bar) Hydrostatic Shell Test 2160Psi (149bar)								
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K
		WE	RF	RTJ						
6"	150	559	559	562	250	223	340	54	300	350
8" x6" x8"	150	660	660	664	250	223	340	54	300	350
8"	201	660	660	664	285	263	420	54	450	460
10" x8" x10"	201	787	787	791	285	263	420	54	450	460
10"	252	787	787	791	340	313	505	54	450	600
12" x10" x12"	252	838	838	841	340	313	505	54	450	600
12"	303	838	838	841	380	356	590	77	600	600
14" x12" x14"	303	889	889	892	380	356	590	77	600	600
14"	334	889	889	892	410	395	642	77	600	600
16" x14" x16"	334	991	991	994	410	395	642	77	600	600
16"	385	991	991	994	465	437	725	77	600	600
18" x16" x18"	385	1092	1092	1095	465	437	725	77	600	600
18"	436	1092	1092	1095	520	499	815	87	700	600
20" x18" x20"	436	1194	1194	1200	520	499	815	87	700	600
20"	487	1194	1194	1200	570	540	895	87	700	600
24" x20" x24"	487	1397	1397	1407	570	540	895	87	700	600
22"	538	1295	1295	1305	615	595	965	87	700	600
24"	589	1397	1397	1407	685	615	1035	87	700	600
30" x24" x30"	589	1651	1651	1664	685	615	1035	87	700	600
26"	633	1448	1448	1461	745	645	1090	87	700	600
28"	684	1549	1549	1562	780	675	1170	87	700	600
30"	735	1651	1651	1664	825	705	1270	109	700	600
36" x30" x36"	735	2083	2083	2099	825	705	1270	109	700	600
32"	779	1778	1778	1794	870	745	1330	109	700	600
34"	830	1930	1930	1946	890	795	1395	191	568	600
36"	874	2083	2083	2099	935	835	1480	191	568	600
40"	976	*	*	*	1010	910	1660	191	568	600
42"	1020	*	*	*	1070	975	1760	206	590	600
48"	1166	*	*	*	1205	1130	2030	206	590	600
56"	1360	*	*	*	1380	1290	2330	206	590	600
60"	1458	*	*	*	1425	1410	2500	215	674	800



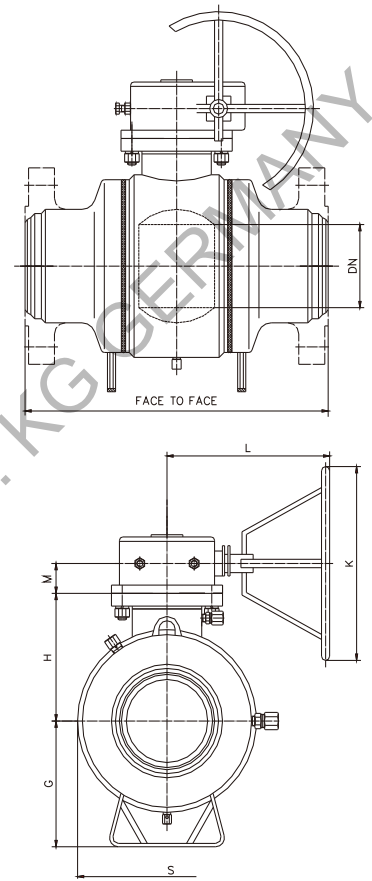
Ball valves type C (Overall Dimensions)

TYPE C	ANSI CLASS900 (PN150)									
	Working Pressure 2160Psi (149bar) Hydrostatic Shell Test 3240Psi (223bar)									
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K
		WE	RF	RTJ						
6"	150	610	610	613	255	239	373	54	450	460
8" x 6" x 8"	150	737	737	740	255	239	373	54	450	460
8"	201	737	737	740	315	287	455	54	450	600
10" x 8" x 10"	201	838	838	841	315	287	455	54	450	600
10"	252	838	838	841	340	323	536	77	600	600
12" x 10" x 12"	252	965	965	968	340	323	536	77	600	600
12"	303	965	965	968	400	382	621	77	600	600
14" x 12" x 14"	303	1129	1029	1038	400	382	621	77	600	600
14"	322	1029	1029	1038	450	403	663	87	700	600
16" x 14" x 16"	322	1130	1130	1140	450	403	663	87	700	600
16"	373	1130	1130	1140	490	465	750	87	700	600
18" x 16" x 18"	373	1219	1219	1232	490	465	750	87	700	600
18"	473	1219	1219	1232	540	508	840	87	700	600
20" x 18" x 20"	423	1321	1321	1334	540	508	840	87	700	600
20"	423	1321	1321	1334	590	579	925	109	700	600
24" x 20" x 24"	471	1549	1549	1568	590	579	925	109	700	600
22"	471	*	*	*	655	615	1050	109	700	600
24"	522	1549	1549	1568	690	687	1130	191	568	600
30" x 24" x 30"	570	*	*	*	690	687	1130	191	568	600
26"	570	*	*	*	755	710	1220	191	568	600
28"	617	*	*	*	790	755	1300	206	590	600
30"	712	*	*	*	850	815	1365	206	590	600
36" x 30" x 36"	712	*	*	*	850	815	1365	206	590	600
32"	760	*	*	*	910	850	1465	215	674	800
34"	808	*	*	*	960	885	1555	215	674	800
36"	855	*	*	*	1020	970	1640	170	726	800
40"	956	*	*	*	1120	1060	1815	170	726	800
42"	1006	*	*	*	1200	1110	1910	216	620	800
48"	1149	*	*	*	1330	1250	2160	216	620	800

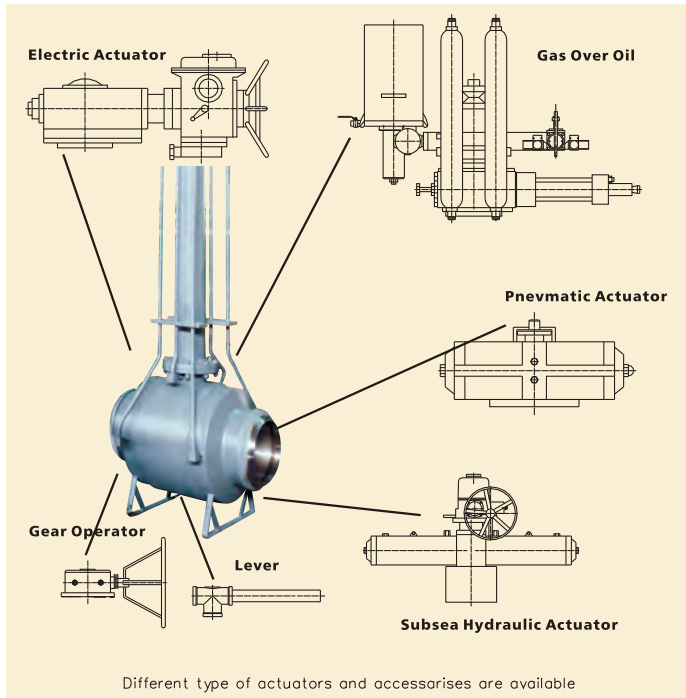


Ball valves type C (Overall Dimensions)

TYPE C	ANSI CLASS1500 (PN250)									
	Working Pressure 3600Psi (248bar) Hydrostatic Shell Test 5400Psi (372bar)									
SIZE inches	DN	FACE TO FACE			G	H	S	M	L	K
		WE	RF	RTJ						
6"	144	705	705	711	255	262	405	54	600	600
8" x 6" x 8"	144	832	832	841	255	262	405	54	600	600
8"	192	832	832	841	315	327	515	77	600	600
10" x 8" x 10"	192	991	991	1000	315	327	515	77	600	600
10"	239	991	991	1000	370	382	615	87	700	600
12" x 10" x 12"	239	1130	1130	1146	370	382	615	87	700	600
12"	287	1130	1130	1146	430	458	725	87	700	600
14" x 12" x 14"	287	1257	1257	1276	430	458	725	87	700	600
14"	315	1257	1257	1276	475	496	835	87	700	600
16" x 14" x 16"	315	1384	1384	1407	475	496	835	87	700	600
16"	360	1384	1384	1407	535	559	960	87	700	600
18" x 16" x 18"	360	1537	1537	1559	535	559	960	87	700	600
18"	407	1537	1537	1559	640	590	1070	87	700	600
20" x 18" x 20"	407	1664	1664	1686	640	590	1070	87	700	600
20"	451	1664	1664	1686	705	725	1180	109	700	600
24" x 20" x 24"	451	1943	1943	1971	705	725	1180	109	700	600
22"	502	*	*	*	760	770	1320	109	700	600
24"	534	1943	1943	1971	840	815	1425	191	568	600
30" x 24" x 30"	534	*	*	*	840	815	1425	191	568	600
26"	597	*	*	*	895	905	1530	191	568	600
28"	641	*	*	*	975	945	1650	206	590	600
30"	686	*	*	*	1040	1035	1730	206	590	600
36" x 30" x 36"	686	*	*	*	1040	1035	1800	215	674	600
32"	730	*	*	*	1105	1060	1870	215	674	600
34"	775	*	*	*	1230	1140	1980	170	726	600
36"	819	*	*	*	1310	1180	2100	216	620	800



Special Applications



Operating unit



Cryogenic service

Use range up to minus 196°C.
Assure the maneuverability at low temperature.
Materials and dimensions are specially designed to suit low temperature.

Subsea service

Special materials and protective overlays for extended life of service.
Reliable product in order to provide long lasting service without maintenance.
Additional sea water gaskets protect stem and external sealing areas.
Special protective coatings.

Engineering Examples

