



KROMBACH BALL VALVES

Product Catalogue

 English version



SOLUTIONS
for the process industry

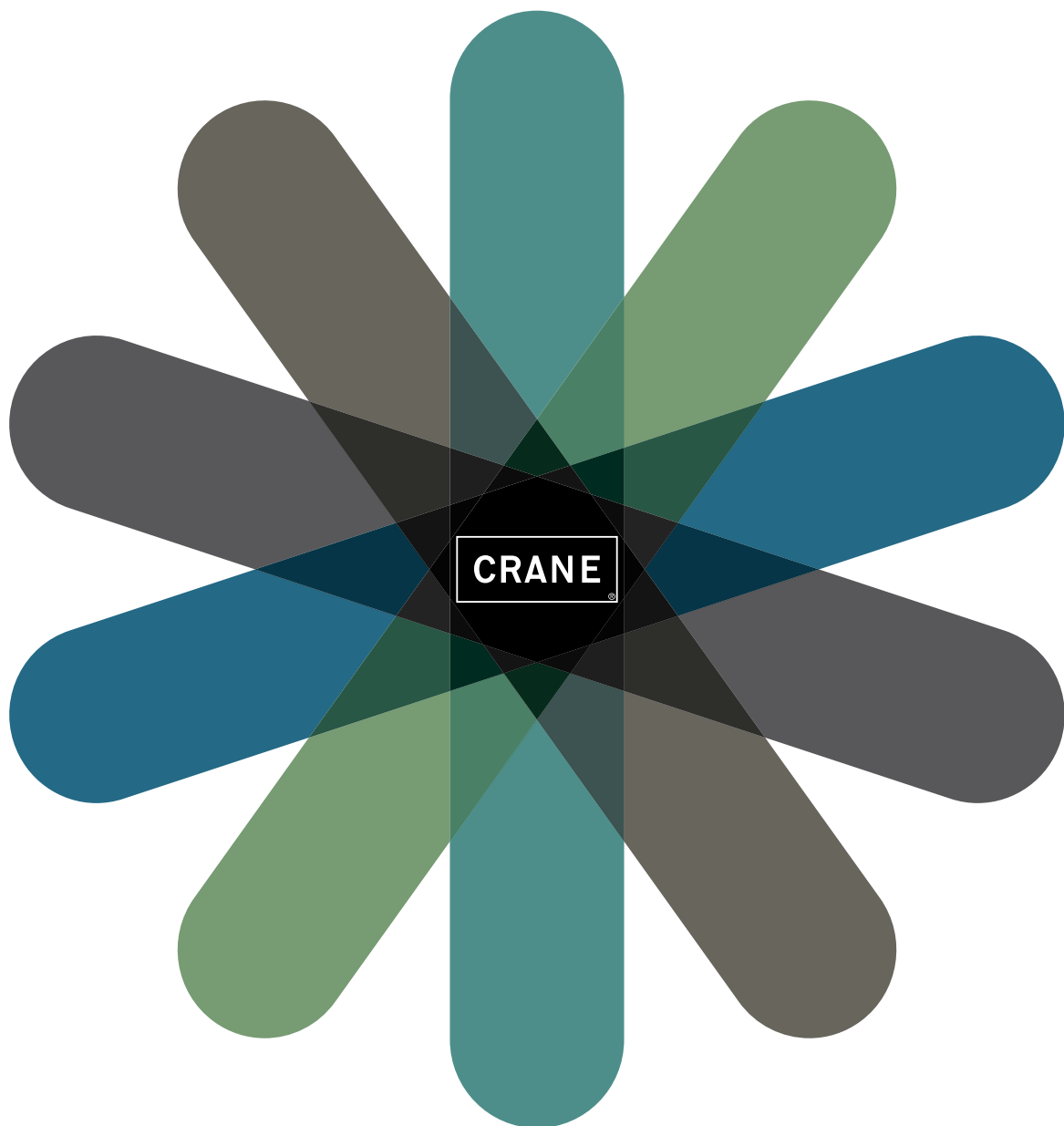
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CRANE

®

Crane Co. is a diversified global manufacturer of engineered industrial products, traded on the New York Stock Exchange (NYSE: CR). Two of their businesses, **Crane ChemPharma** Flow Solutions and **Crane Energy** Flow Solutions, are providing highly engineered products for fluid handling applications worldwide.



since 1855

Fluid handling

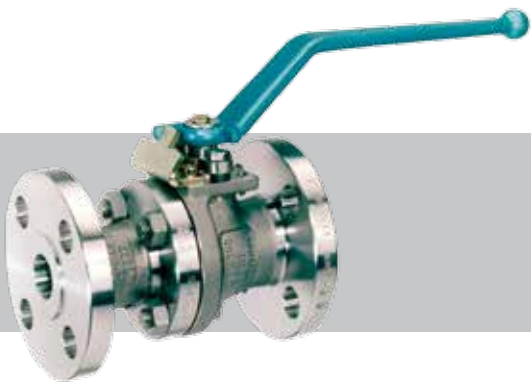
In 2007, the Fluid Handling segment joined together six individual product-centered valve businesses into two market-centered businesses, Crane ChemPharma Flow Solutions and Crane Energy Flow Solutions, to penetrate worldwide markets more efficiently and create the greatest value for customers. This new structure enables it to focus energetically on applications and flow solutions that best meet the needs of its customers. At the same time, it is even better able to leverage synergies and efficiencies as an integrated business segment to produce real savings internally.

The Fluid Handling segment serves global markets that are huge and growing. The total global market served by the Group is estimated at over \$15 billion. With global investment in the oil, gas and power markets continuing at a record pace, the chemical and pharmaceutical markets continuing to expand, and an exciting worldwide opportunity in the nuclear plant construction industry, among others, the Fluid Handling segment is poised to continue its growth.



R. J. Crane





CRANE® Ball Valves

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CRANE

FK
KROMBACH
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brands you trust.

CRANE Energy Flow solutions®

Aloyco
Center Line
CRANE
Duo-Chek
Flowseal
Jenkins
Krombach
Noz-Chek

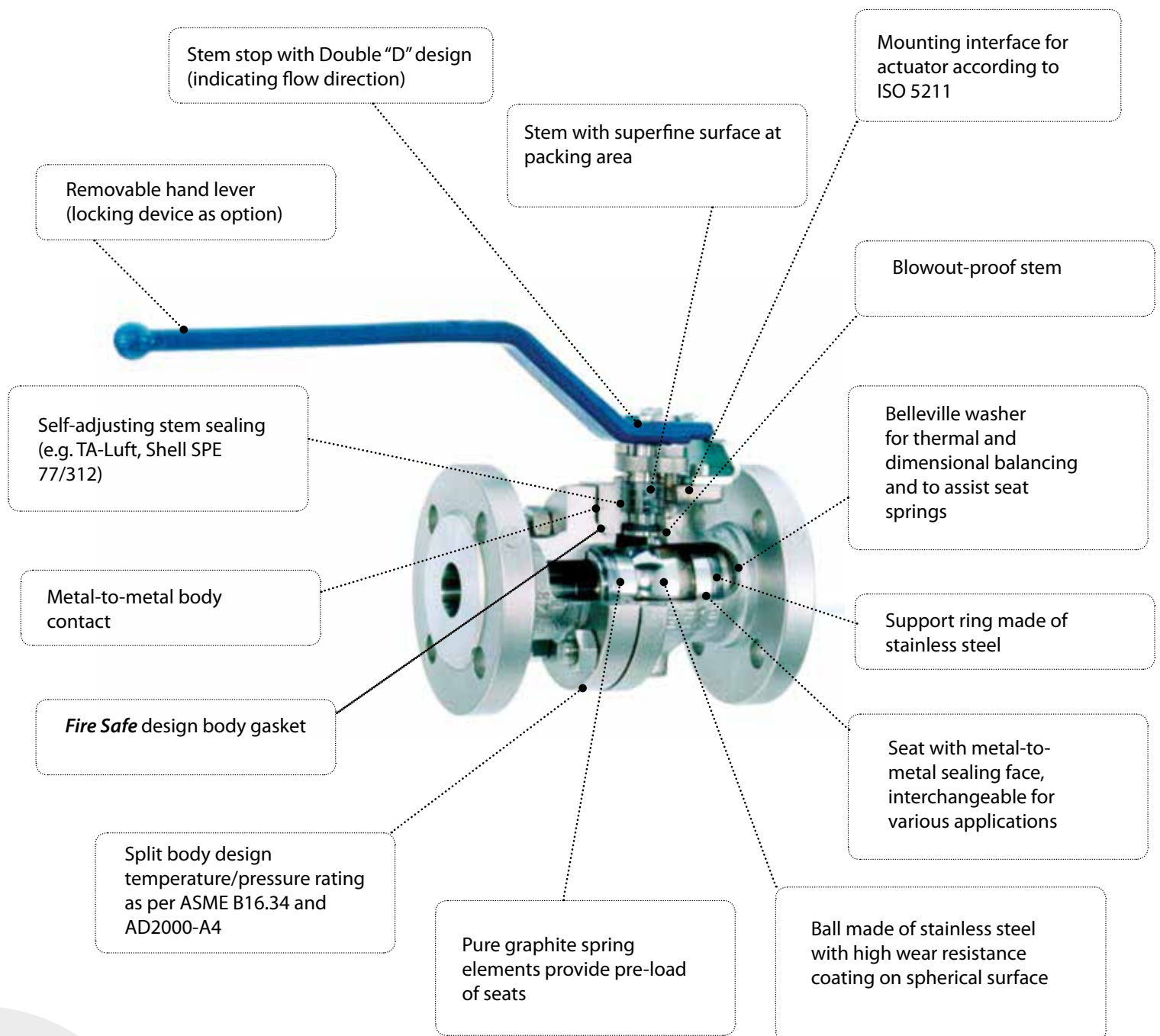
Pacific
Stockham
Triangle
REVO
Compac-Noz
NH valves
Uni-Chek

CRANE ChemPharma Flow solutions®

XOMOX
Saunders
Resistoflex
Resistopure
DEPA
ELRO
REVO
PSI
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KROMBACH® Metal Seated Ball Valves



Design Features and Applications

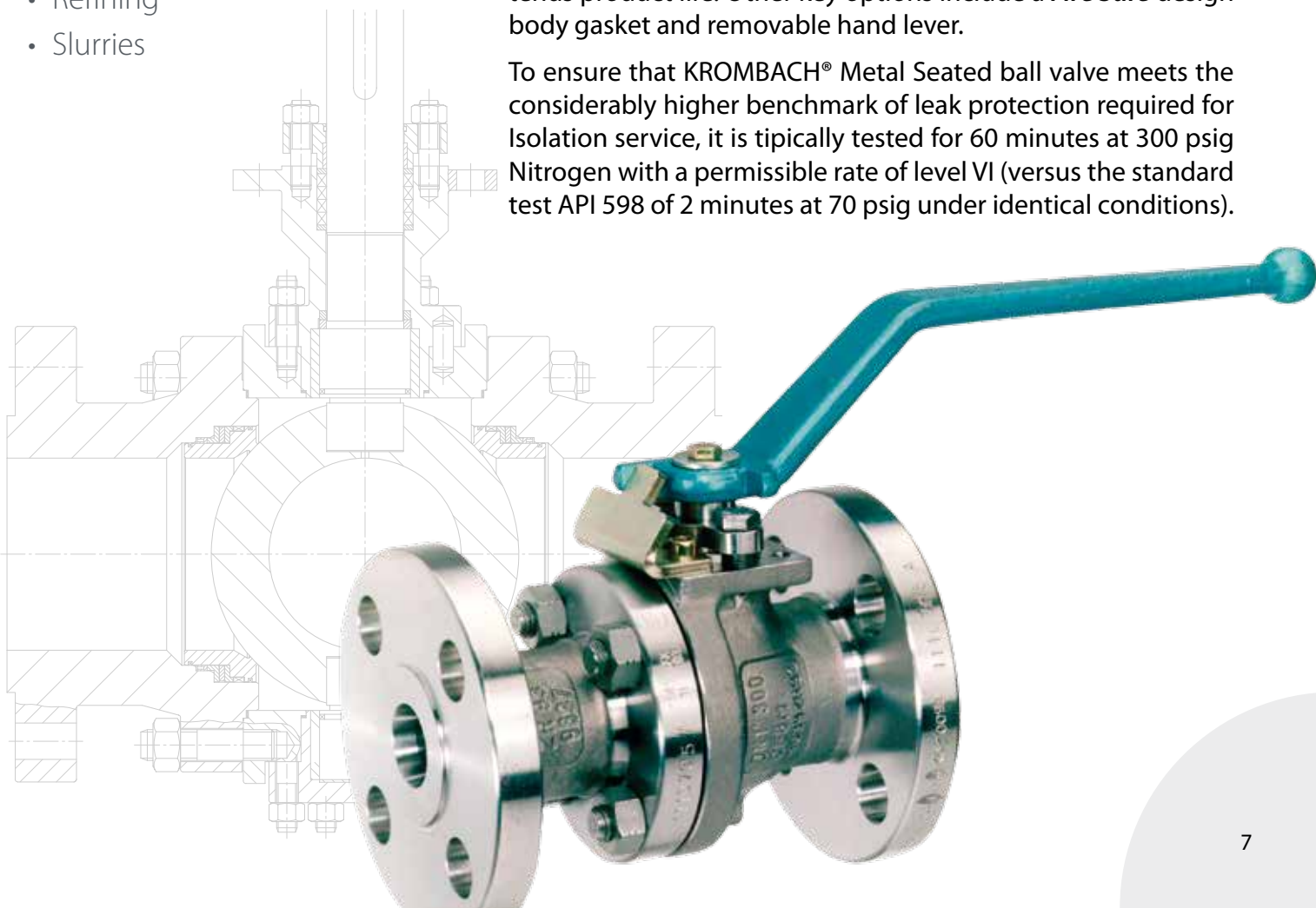
APPLICATIONS

- Chemical Processing
- Food and Fragrances
- Gases
- Mining
- Oil & Gas
- Pharmaceutical
- Power Generation
- Refining
- Slurries

KROMBACH® Metal Seated Ball valve's ball and seat are machined to such precise tolerances that ball and seat lapping does not have to be performed individually for each valve —making both the ball and seat freely interchangeable (if equal in nominal size)—.

Its trunnion-mounted ball design offers a polygon stem-to-ball connection, which reduces stress and ensures optimal torque transmission. And additional feature is its self-cleaning system which removes excess particles, minimizes leakage, and extends product life. Other key options include a **Fire Safe** design body gasket and removable hand lever.

To ensure that KROMBACH® Metal Seated ball valve meets the considerably higher benchmark of leak protection required for Isolation service, it is typically tested for 60 minutes at 300 psig Nitrogen with a permissible rate of level VI (versus the standard test API 598 of 2 minutes at 70 psig under identical conditions).



Metal Sealing System Design

Our KROMBACH[®] Metal Seated Ball Valve's design and production is the culmination of over 25 years of development and manufacturing experience. Innovations offered by this group of products have proven successful in many fields of service application worldwide. Our process-optimized standard series KFO 1136 complies —within respective pressure/temperature ranges— with the ASME B16.34 and AD2000-A4 standards.

The Metal Seated Ball Valve's modular sealing system utilizing hard coatings for the ball and seats is just one of the features from which it derives its superior performance. The KROMBACH[®] brand is well known for its broad range of special designs for very demanding applications, and supplies many high-profile enterprises globally.

A **self-adjusting seat** design offers leakage protection for a variety of applications utilizing bi-directional flow control. Special flexible graphite spring elements and a cup spring made of high-strength Inconel[®] deliver the required pre-load of the seats to the ball, creating a tight seal without the need for a separate mechanism to generate differential pressure. The sealing system compensates for thermal balancing, minimizes dimensional tolerances, and extends the service life of the valve.

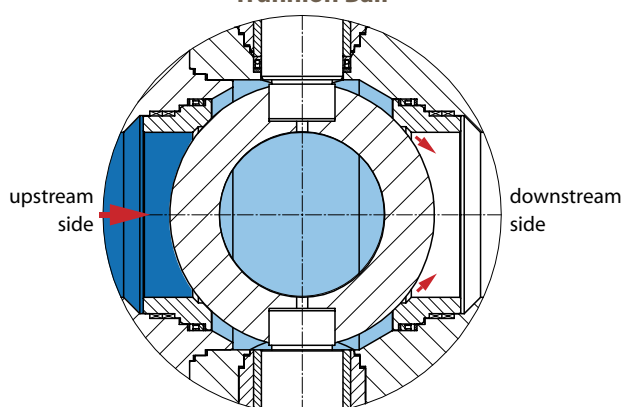
Its **self-cleaning system** removes adhesive media whenever the valve is cycled. The hardness of the coatings and the special edge treatment of the seats removes sediments from the ball during cycling, prolonging service life.

An automatic **self-relieving seat design** allows for venting of internal cavity pressures without venting the ball.

The ability to freely interchange valve components allows ease of maintenance. Special lapping and surface treatment technology are the primary features that make this possible. The sealing system resists corrosion and wear, which increases the valve's reliability, safety and operating economy.

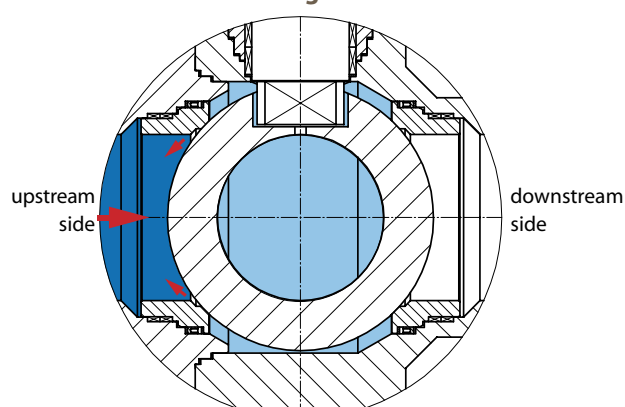
Note: The valves can be ordered with a variety of surfaces to accommodate harsh media and other unique internal characteristics of the system being operated with our valves. For critical applications it is recommended that the sealing system is tested under field conditions to ensure that its sealing surface materials offer the desired level of resistance to wear and corrosion or abrasion.

Trunnion Ball



Pressure relief of cavity to downstream side

Floating Ball



Pressure relief of cavity to upstream side

Spring-loaded seats delivering appropriate pre-load (against the ball) and our range of various wear-resistant hard coatings are unique features of the KROMBACH® sealing system. The selection of the optimal coating to be used in a particular application will be based on several factors (see Table 1: Selection; is based on 4 key parameters).

Condition phases: gaseous, vapor, steam, liquid, suspensions, molten, solid particles.

Under equal pressure and velocity conditions the abrasive effects of the media increase with the size and quantity of solids in the media. The hardness of the coatings measured in Rockwell C, ranging from 56 to approximately 70 HRC, is what determines the level of resistance to wear (of the ball and seat sealing surfaces). The coating thickness is between 0.0025 and 0.03 inches.

Acidic or alkaline

Due to the wide range of chemical processes and conditions within a flow-handling system, it is not practical to recommend a single coating surface that will work in all applications. The pH value of the medium is just one among many considerations in selecting a coating.

Corrosion resistance depends on many factors. The behavior of materials can change substantially in response to small variations in media content, changes in pressure, temperature, flow velocity, and the like. Coatings with a higher content of chrome/cobalt are more effective in acidic applications (pH value 0-7). Coatings based on nickel are used with alkaline fluids (pH value 7-14).

Metal Sealing Selection

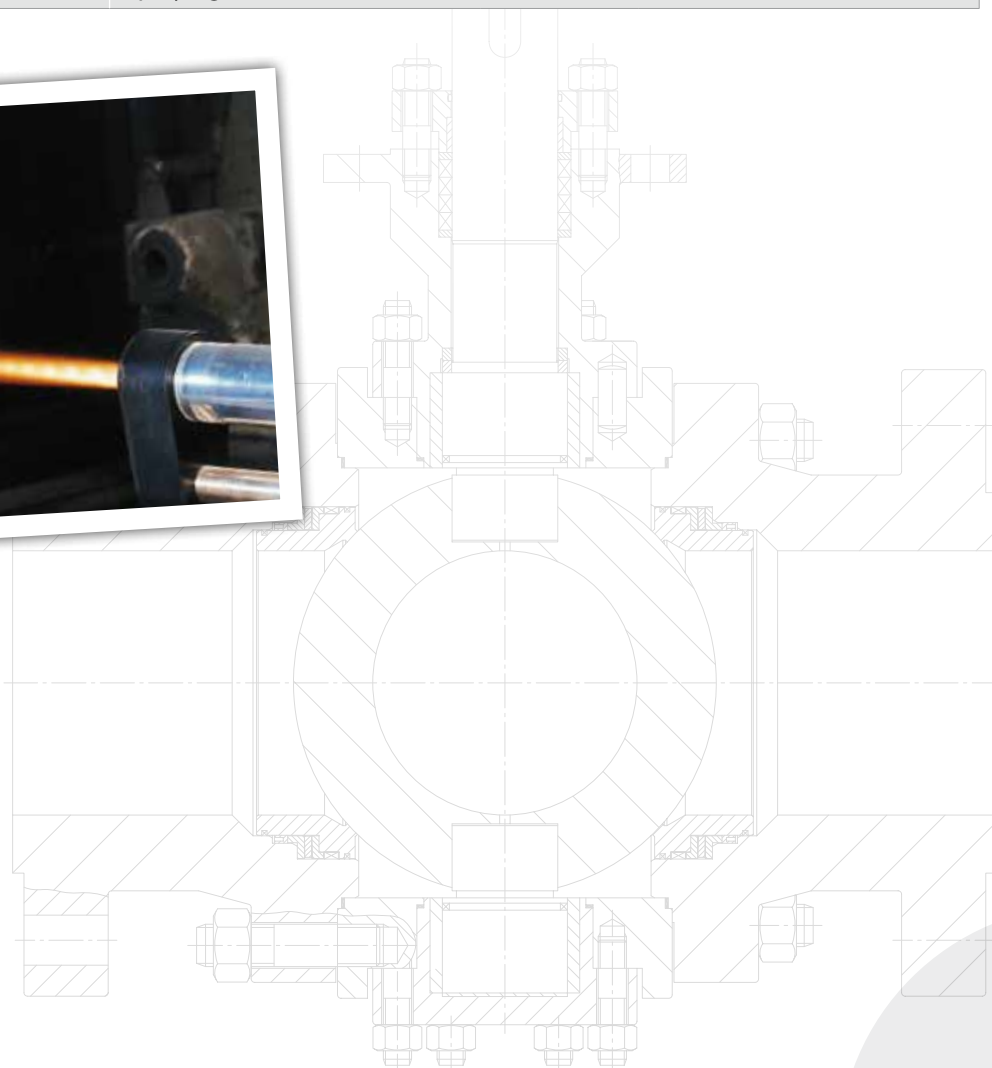
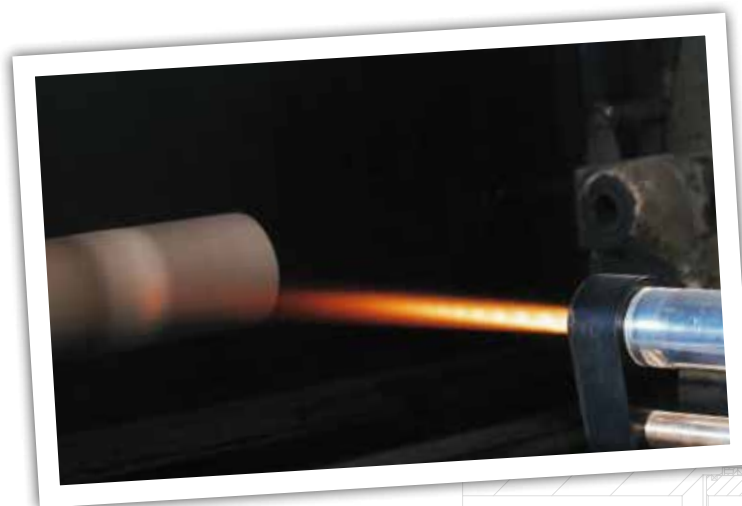
Selection of Sealing System (Table 1)

Selection of Sealing System			Code of Sealing System					
			H2	H3	H4	H5	H6	H7
Substance Property	Phase	Slurry, suspensions	✓	✓	✓	✓	✓	✓
		Liquid fluids	✓	✓	✓	✓	✓	✓
		Steam / Vapor	*	✓	✓	✓	✓	✓
		Gas	*	✓	✓	✓	✓	✓
		With traces of particles	*	✓	✓	✓	✓	✓
		With solid parts	✗	*	✓	✓	✓	✓
	pH Value	0-9	✓	✗	✗	*	✓	✓
		6-8	✓	✓	✓	✓	✓	✓
		4-14	✗	*	*	✓	*	✗
		7-14	✗	✓	✓	*	✗	✗
Operating Conditions	Temperature	up to 600° F	✓	✓	✓	✓	✓	✓
		up to 800° F	*	✓	✓	✓	✓	*
		up to 1050° F	*	*	✓	✓	✓	✗
		up to 1500° F	✗	✗	✗	✗	✓	✗
	Pressure	up to Class 300	✓	✓	✓	✓	✓	✓
		up to Class 600	*	*	✓	✓	✓	✓
		up to Class 900	✗	*	✓	✓	✓	*
		up to Class 2500	✗	*	✓	✓	*	*

✓ Suitable ✗ Not suitable * To be consulted

Characteristics of Coating (Table 2)

Code	Based on	Coating Procedure	Thickness	Hardness HRC approx.
H2	Chromium	Electro galvanic	0.003"	70
H3	Nickel Alloy	Plasma spray and fused	0.032"	56-58
H4	Nickel Alloy and carbides	Plasma spray and fused	0.032"	60-62
H5	Cobalt Alloy	Plasma spray and fused	0.032"	62-65
H6	Chrom-carbides	High speed spraying	0.012"	65-70
H7	Ceramic chromoxide	Spraying	0.012"	> 70



Emission Monitoring

We fulfill the mandatory requirements of the TA-Luft / Shell SPE 77/312. Nearly all KROM-BACH® ball valves can be equipped with leak detection / purge ports.

The housing seal is available in a double-gasket configuration. The inner gasket is made of PTFE. The outer gasket is made of pure graphite. These gaskets are linked with the body by means of a connecting bore, ending with a female-threaded bore (e.g., G1/4A). Extremely small leakage rates can be monitored at ports 1 or 2. For monitoring under standard conditions, testing equipment with a measuring range of $\leq n \times 10^{-8}$ mbar / L per sec. (n= 1-9) is recommended.

Along the stem, the first seal ring on the stem shoulder is loaded by the line pressure. After the guide bushing, the spring-loaded PTFE gasket seals regardless of the line pressure. Any potential leakage along this gasket can be detected at port 3. The spring-loaded PTFE gaskets above the yoke prevent any leakage from reaching the graphite packing rings. The packing rings are preloaded and retain elasticity even in high temperature ranges (resulting in improved fire safety). To enable the plant to carry out a controlled shut-down (as may be needed in certain critical situations), these packing rings are adjustable by quarter turns of the stuffing-box nut (to shutoff).

Example of test results

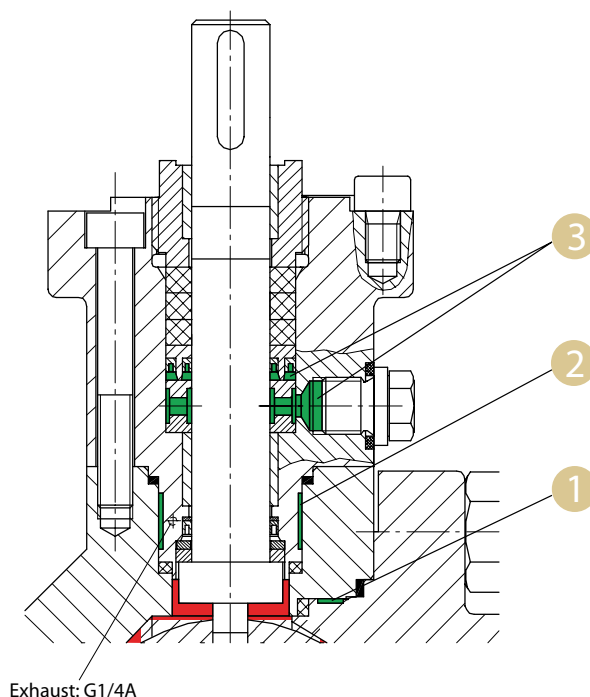
An independent laboratory test attended by RWTuV (a technical inspection organization) obtained the following results with a helium pressure test at 3.2 bar:

Leakage rate of body gasket:

$\leq n \times 10^{-8}$ mbar / L per sec. (n= 1-9)

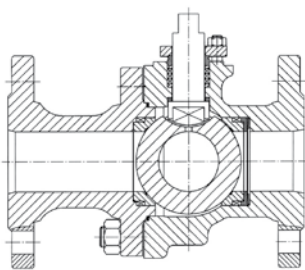
After 40,000 cycles:

$\leq n \times 10^{-6}$ mbar / L per sec. (n= 1-9)



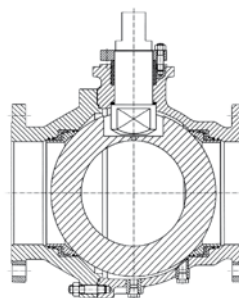
Product Range

Product Range



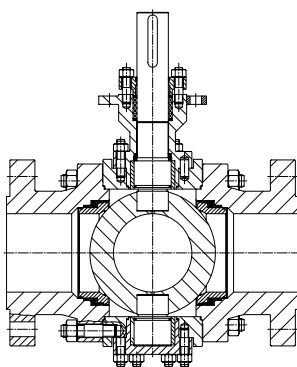
KFO 1136

Cast body material
Class 150 up to 300
Size range: 1/2" - 8"



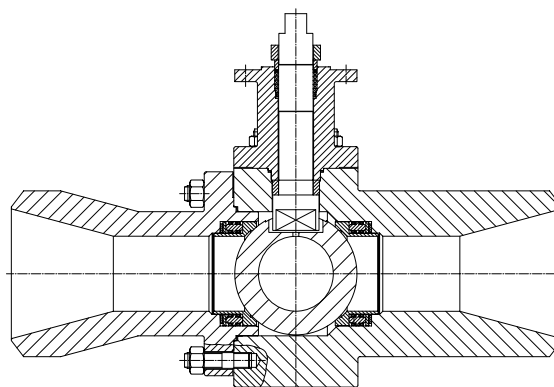
KFO 5136

Forged body material
Class 150 up to 900
Size range: 1/2" - 16"



KFO 7136

Trunnion mounted
Class 150 up to 2500
Size range: 3" - 16"

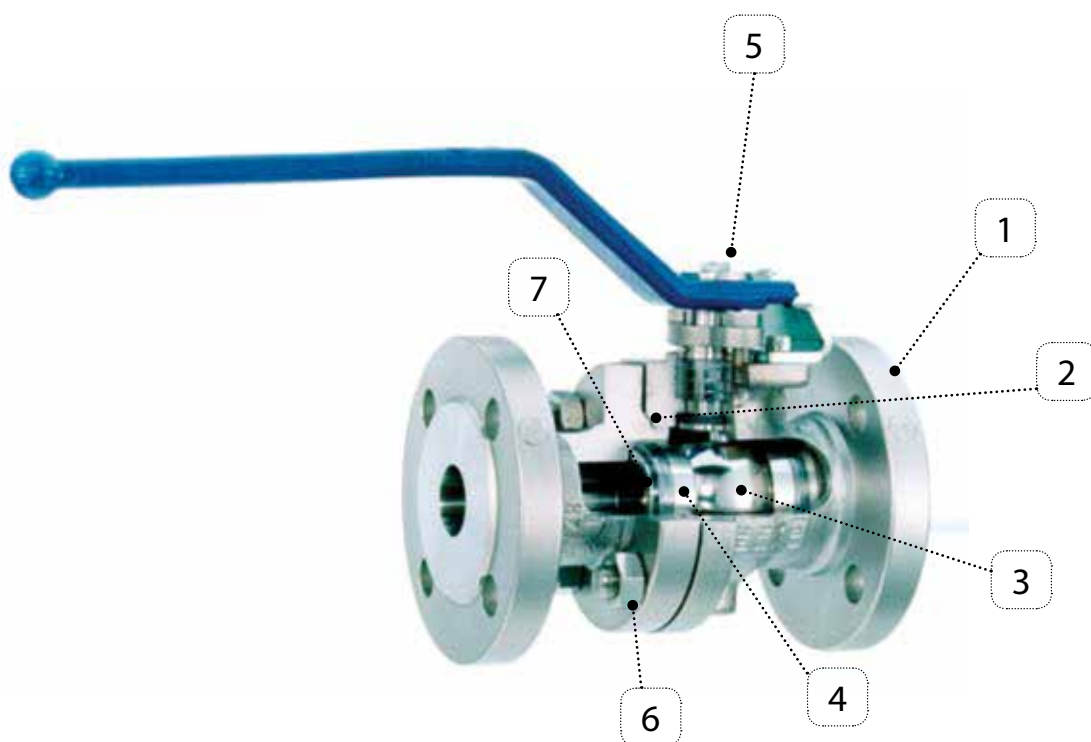


KAO 580

Butt Weld ends
Class 150 up to 600
Size range: 1/2" - 8"

FLOATING BALL VALVES

Materials of Construction

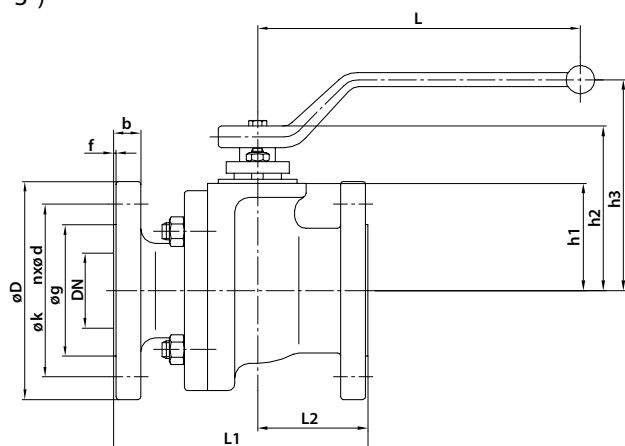


Materials of Construction

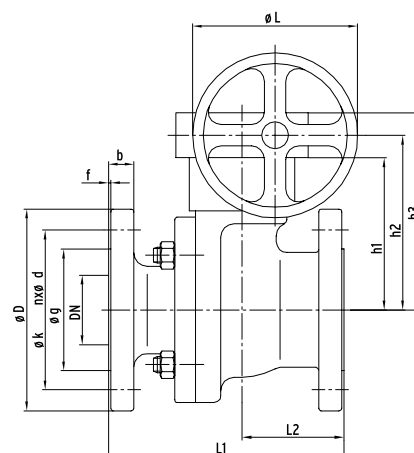
Item	Component	Materials
1	Body	1.0619, 1.4581, 1.4571, 1.0460, Hastelloy® C276, Hastelloy® C2000 and other special materials A216 Gr. WCB, A105, A182 Gr. F316 (1.4301), A182 Gr. F316Ti (1.4571), etc.
2	Body Gasket	Pure Graphite
3	Ball	Stainless steel or other special alloys with coating (see Table 2)
4	Seat Ring	Stainless steel or other special alloys with coating (see Table 2)
5	Stem	F316Ti, A453 Gr. 660 (1.4980) or other special alloys
6	Stud Bolt / Hex. Nut	A4-70, 1.7709 A193 Gr. B8 / A194 Gr. Gr.8M, A193 Gr. B16 / A194 Gr. 7
7	Pressure Ring	A182 F316Ti (1.4571) and other special alloys

Dimensions and Weights

Ball valve with **Hand lever**
(1/2" - 3")



Ball valve with **Gear box**
(4" - 16")



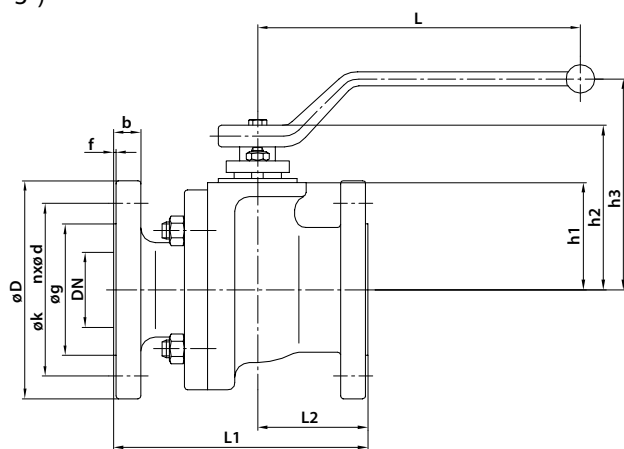
Dimensions and Weights | **Class 150**

DN	Dimensionss						Flange Dimensions						Weight (Kg.)
	L1	L2	L	h1	h2	h3	ØD	Øk	n x Ød	Øg	f	b	
1/2"	108	51	260	35	62	108	88.9	60.5	4 x 15.7	35.1	1.6	11.2	4.4
3/4"	117	53	260	35	62	108	98.6	69.9	4 x 15.7	42.9	1.6	12.7	6.0
1"	127	60	260	49	77	123	108.0	79.2	4 x 15.7	50.8	1.6	14.2	6.4
1.1/2"	165	68	330	65	105	155	127.0	98.6	4 x 15.7	73.1	1.6	17.5	10.0
2"	178	77	330	75	115	165	152.4	120.7	4 x 19.0	91.9	1.6	19.1	14.0
3"	203	89	405	107	164	207	190.5	152.4	4 x 19.0	127.0	1.6	23.9	24.0
4"	229	107	300	210	245	280	228.6	190.5	8 x 19.0	157.2	1.6	23.9	38.0
6"	394	180	350	307	357	400	279.4	241.3	8 x 22.4	215.9	1.6	25.4	84.0
8"	457	220	457	364	414	470	342.9	298.5	8 x 22.4	269.7	1.6	28.4	142.0
10"	533	240	457	580	630	706	406.4	326.0	12 x 25.4	323.9	1.6	30.2	320.0
12"	609	305	457	630	695	790	482.6	431.8	12 x 25.4	381.0	1.6	31.8	500.0
14"	686	343	457	650	715	800	533.4	476.3	12 x 28.4	412.8	1.6	35.1	600.0
16"	762	381	457	680	745	840	596.9	539.8	16 x 28.4	469.9	1.6	36.6	850.0

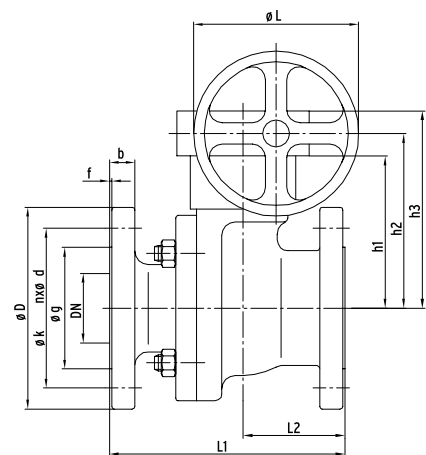
FLOATING BALL VALVES

Dimensions and Weights

Ball valve with **Hand lever**
(1/2" - 3")



Ball valve with **Gear box**
(4" - 16")

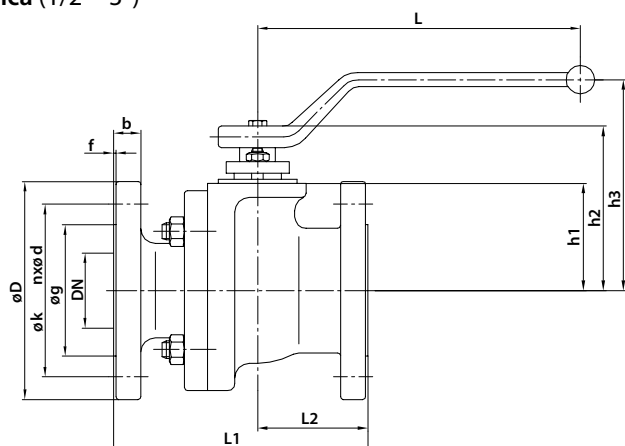


Dimensions and Weights | **Class 300**

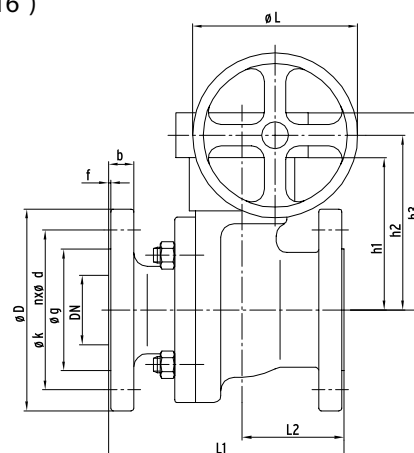
DN	Dimensions						Flange Dimensions						Weight (Kg.)
	L1	L2	L	h1	h2	h3	ØD	Øk	n x Ød	Øg	f	b	
1/2"	140	56	260	35	62	108	95.2	66.5	4 x 15.7	35.1	1.6	14.2	5.4
3/4"	152	61	260	35	62	108	117.3	82.5	4 x 19.0	42.9	1.6	15.7	7.0
1"	165	60	260	49	77	123	123.9	88.9	4 x 19.0	50.8	1.6	17.5	7.5
1.1/2"	190	72	330	65	105	155	155.4	114.3	4 x 22.3	73.1	1.6	20.6	12.0
2"	216	90	330	75	115	165	165.1	127.0	4 x 19.0	91.9	1.6	22.3	18.0
3"	283	105	405	107	164	207	209.5	168.1	8 x 22.3	127.0	1.6	28.4	33.0
4"	305	125	300	210	245	280	254.0	200.1	8 x 22.3	157.2	1.6	31.7	54.0
6"	403	168	350	307	357	400	317.5	269.7	12 x 22.3	215.9	1.6	36.5	110.0
8"	502	220	457	364	414	470	381.0	330.2	12 x 25.4	269.7	1.6	41.1	195.0
10"	568	254	457	580	630	706	444.5	387.3	16 x 28.4	323.9	1.6	47.7	400.0
12"	648	324	457	630	695	790	520.7	480.8	16 x 31.7	381.0	1.6	50.8	600.0
14"	762	381	457	650	715	810	584.2	514.3	20 x 31.7	412.8	1.6	53.8	725.0
16"	838	419	457	680	745	840	647.7	571.5	20 x 35.0	469.9	1.6	57.1	1000.0

Dimensions and Weights

Válvula de bola con
Palanca (1/2" - 3")



Válvula de bola con
Reductor (4" - 16")



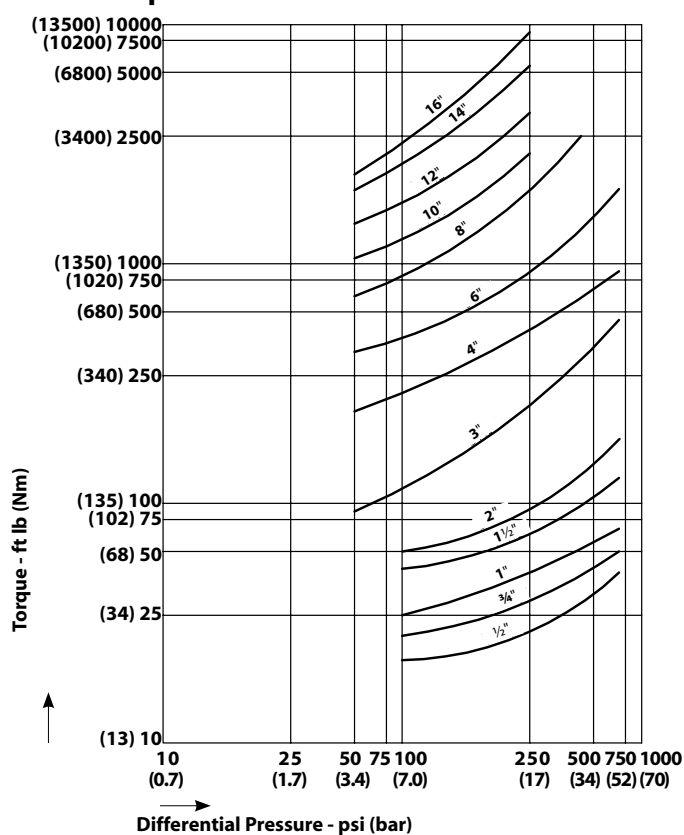
Dimensions and Weights | Class 600

DN	Dimensions						Flange Dimensions						Weight (Kg.)
	L1	L2	L	h1	h2	h3	ØD	Øk	n x Ød	Øg	f	b	
1/2"	165	74	260	35	62	108	95.2	66.5	4 x 15.7	35.1	1.6	14.2	6.0
3/4"	190	85	260	35	62	108	117.3	82.5	4 x 19.0	42.9	1.6	15.7	8.5
1"	216	95	260	49	77	123	123.9	88.9	4 x 19.0	50.8	1.6	17.5	11.0
1.1/2"	241	108	330	65	105	155	155.4	114.3	4 x 22.3	73.1	1.6	22.4	20.0
2"	292	131	330	75	115	165	165.1	127.0	4 x 19.0	91.9	1.6	25.4	28.0
3"	356	160	405	107	1.064	207	209.5	168.1	8 x 22.3	127.0	1.6	31.8	65.0
4"	432	194	300	210	245	280	273.1	215.9	8 x 25.4	157.2	1.6	38.1	100.0
6"	559	251	350	307	357	400	355.6	292.1	12 x 28.4	215.9	1.6	47.8	200.0
8"	660	290	457	364	414	470	419.1	349.3	12 x 31.8	269.7	1.6	55.6	315.0
10"	787	349	457	580	630	706	508.0	431.8	16 x 35.1	323.9	1.6	63.5	450.0
12"	838	419	457	630	695	790	558.8	489.0	20 x 35.1	381.0	1.6	66.5	720.0
14"	889	444	457	650	715	810	603.3	527.1	20 x 38.1	412.8	1.6	69.9	870.0
16"	990	495	457	680	745	840	685.8	603.3	20 x 41.1	469.9	1.6	76.2	1.250.0

FLOATING BALL VALVES

Break Away Torques

Basic Torque vs Differential Pressure



Break away torque depends on the combination of differential pressure, media and cycle frequency. It can be determined as follows:

Basic torque x Safety factor x Cycle frequency factor

Media factor

Media	Safety Factor
Pure oil	1.0
Thermal oil	1.3
Other HC fluids	1.5
Water	1.5
Suspension, slurry	2.6
Steam, Vapor	2.6
Gas	2.6
Solid particles	3.0

Cycle Frequency Factor

If a Valve is Cycled Once Per	C.F.F.
Day or more	1.25
Week or more	1.28
Month or more	1.30
Every four months	1.41
Every eight months	1.45

Maximum Operating Torques

Maximum Allowable Torques of Stem: **ASTM A453 Gr. 660** (1.4980)

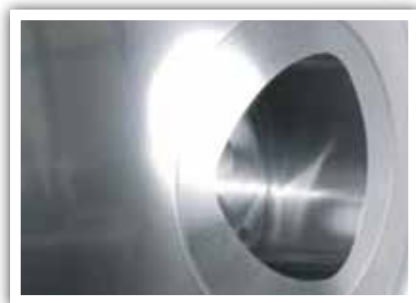
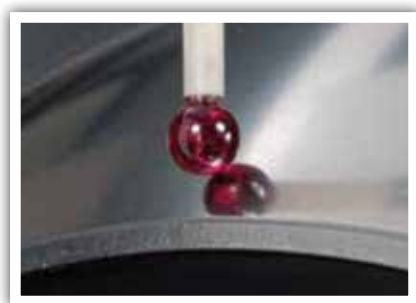
DN		< 20°C	< 100°C	< 200°C	< 300°C	< 400°C
Inches	mm	Nm	Nm	Nm	Nm	Nm
1/2"	15	81	69	63	57	54
3/4"	20	81	69	63	57	54
1"	25	140	117	105	93	86
1.1/4"	32	450	378	340	300	283
1.1/2"	40	450	378	340	300	283
2"	50	450	378	340	300	283
2.1/2"	65	1.420	1.375	1.235	1.085	1.025
3"	80	1.420	1.375	1.235	1.085	1.025
4"	100	2.260	1.870	1.680	1.490	1.375
6"	150	5.900	5.650	5.075	4.500	4.215
8"	200	12.200	10.120	9.000	8.000	7.570
10"	250	14.000	11.500	10.800	9.300	8.500
12"	300	40.000	32.500	30.000	26.000	24.000
14"	350	40.000	32.500	30.000	26.000	24.000
16"	400	40.000	32.500	30.000	26.000	24.000

TRUNNION MOUNTED BALL VALVES

Design Features

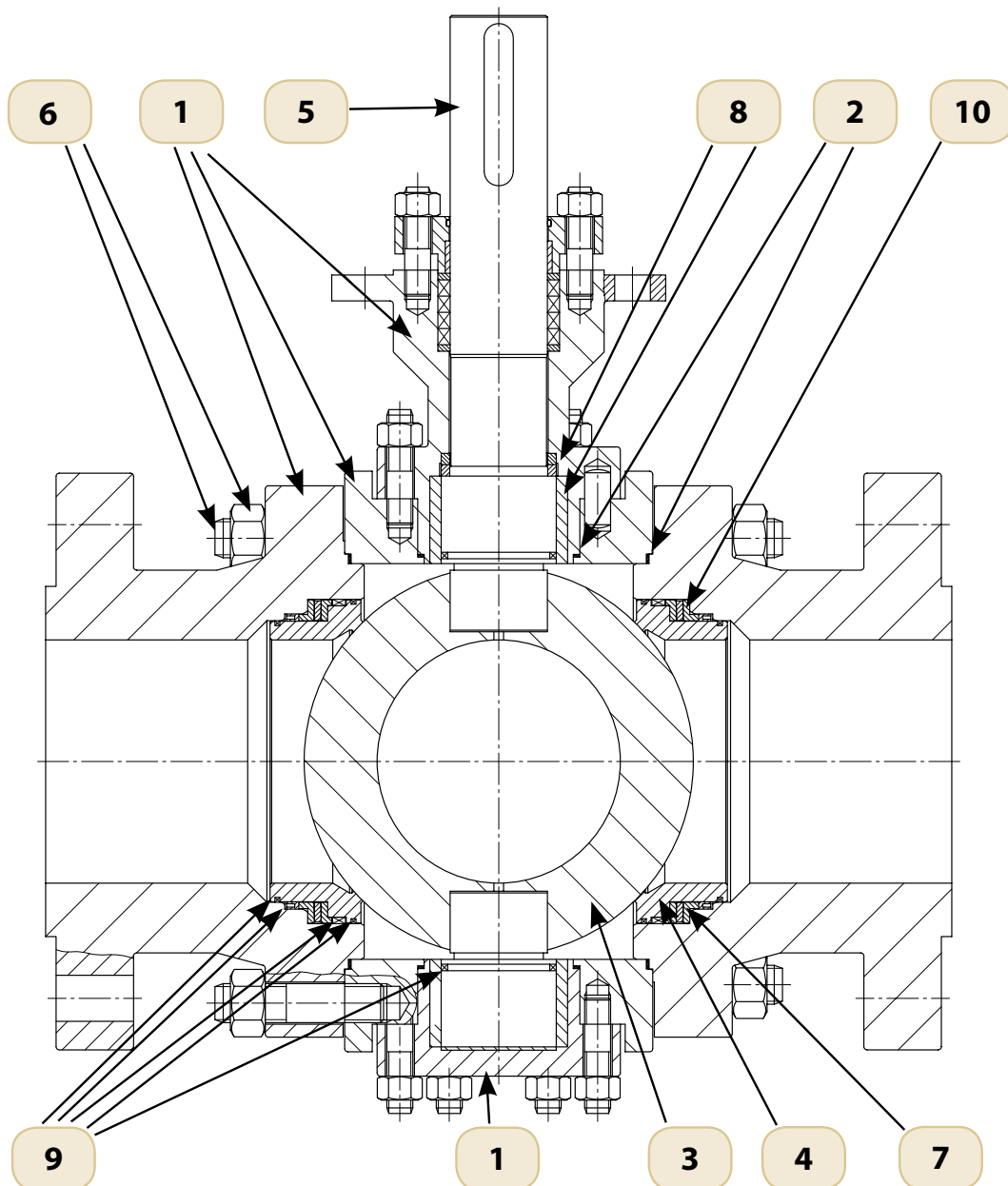
Special **Lapping** Procedure
ensures precise roundness

Interchangeable Ball and Seats



FK-Polygon profile ensures most
effective torque transmission





TRUNNION MOUNTED BALL VALVES

Materials of Construction

Materials of Construction

Item	Component	Materials
1	Body	1.4571, 1.0460, Hastelloy® C276, Hastelloy® C2000 and other special materials A216 Gr. WCB, A105, A182 Gr. F316 (1.4301), A182 Gr. F316Ti (1.4571), etc.
2	Body Gasket	Pure Graphite
3	Ball	Stainless steel and other special alloys with coating (see Table 2)
4	Seat Ring	Stainless steel and other special alloys with coating (see Table 2)
5	Stem	F316Ti, A453 Gr. 660 (1.4980) and other special alloys
6	Stud Bolt / Hex. Nut	A4-70, 1.7709 A193 Gr. B8 / A194 Gr. Gr. 8M, A193 Gr. B16 / A194 Gr. 7
7	Pressure Ring	A182 F316Ti (1.4571) and other special alloys
8	Bearing	Stainless steel and other special alloys with coating (see Table 2)
9	Secondary Gaskets	Grafito, Viton®, PTFE, Kalrez (depending on the temperature, pressure and medium)
10	Belleville Washer	Inconel® 718

Hastelloy® is a registered trademark of *Haynes International Inc.*

Inconel® is a registered trademark of *Special Metal Corporation*

Viton® is a registered trademark of *Dupont Performance Elastomers L.L.C.*

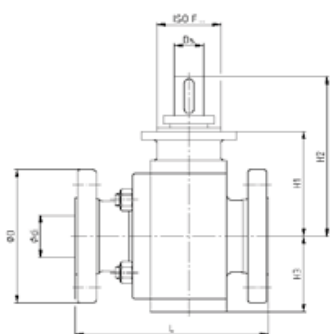


FIG. A

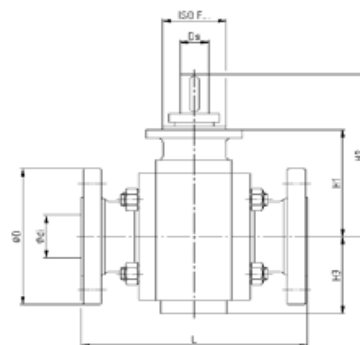


FIG. B

Dimensions and Weights

Dimensions and Weights | Class 150

DN	ØD	Ødi	L	H1	H2	H3	Ds	ISO 5211	Fig.	Weight
8"	342	203	457	350	450	220	60	F16	A	350
10"	406	254	533	410	520	280	80	F25	A	400
12"	482	304	610	460	600	320	100	F25	A	750
14"	533	336	686	490	670	360	100	F25	A	950
16"	596	387	762	540	720	380	100	F25	A	1.100

Dimensions and Weights | Class 300

DN	ØD	Ødi	L	H1	H2	H3	Ds	ISO 5211	Fig.	Weight
8"	381	203	502	350	450	220	60	F16	A	380
10"	444	254	568	410	520	280	80	F25	A/B	450
12"	520	304	648	460	600	320	100	F25	A/B	850
14"	584	336	762	490	670	360	100	F25	A/B	950
16"	647	387	838	540	720	380	100	F25	A/B	1.200

Dimensions and Weights | Class 600

DN	ØD	Ødi	L	H1	H2	H3	Ds	ISO 5211	Fig.	Weight
4"	273	101	432	250	360	150	50	F16	A/B	130
6"	355	152	559	300	460	200	60	F25	B	270
8"	419	199	660	350	520	250	70	F25	B	550
10"	508	247	787	430	610	300	80	F25	B	750
12"	558	298	838	500	750	350	100	F25	B	1.150
14"	603	326	889	520	770	375	100	F25	B	1.400
16"	685	374	991	550	800	420	100	F30	B	1.650

TRUNNION MOUNTED BALL VALVES

Dimensions and Weights

Dimensions and Weights | Class 900

DN	ØD	Ødi	L	H1	H2	H3	Ds	ISO 5211	Fig.	Weight
4"	292	98	457	250	360	150	50	F16	A/B	160
6"	381	146	610	300	460	200	60	F25	A/B	300
8"	469	190	737	370	540	260	70	F25	B	680
10"	546	238	838	440	630	300	80	F25	B	1.100
12"	609	282	965	520	770	360	100	F25	B	1.600
14"	641	311	1.029	550	820	390	120	F30	B	1.900
16"	704	355	1.130	570	840	430	120	F30	B	2.200

Dimensions and Weights | Class 1500

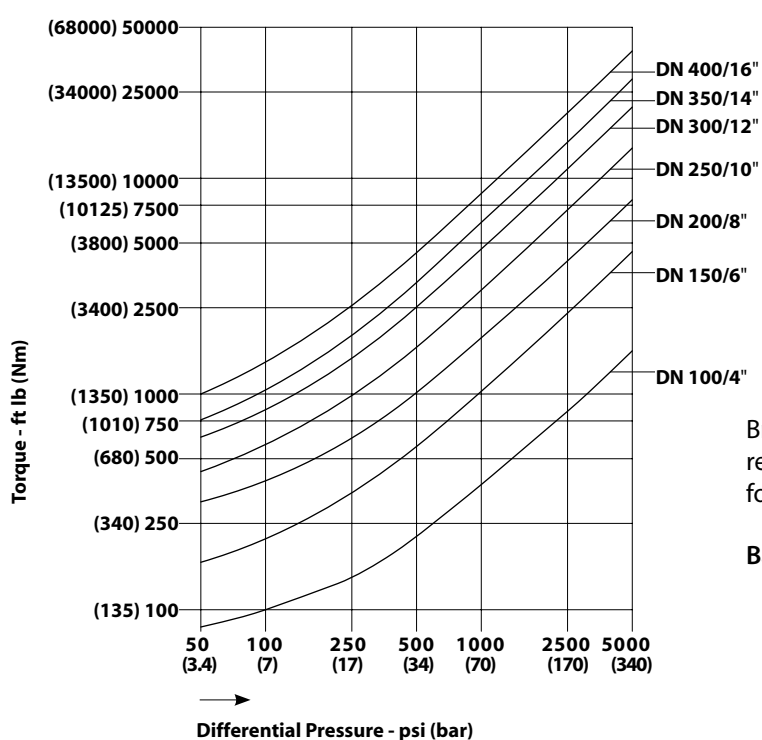
DN	ØD	Ødi	L	H1	H2	H3	Ds	ISO 5211	Fig.	Weight
4"	311	91	546	290	480	180	60	F25	B	250
6"	393	136	705	380	520	220	75	F25	B	520
8"	482	177	832	530	720	340	110	F30	B	1.000
10"	584	222	991	560	780	400	120	F30	B	1.600
12"	673	263	1.130	590	850	420	120	F35	B	2.400
14"	749	288	1.257	640	900	450	130	F35	B	3.000
16"	825	330	1.384	680	960	480	150	F40	B	4.400

Dimensions and Weights | Class 2500

DN	ØD	Ødi	L	H1	H2	H3	Ds	ISO 5211	Fig.	Weight
4"	355	72	673	300	500	200	60	F25	B	390
6"	482	111	914	380	620	240	80	F25	B	900
8"	552	146	1.022	550	800	360	120	F35	B	1.500
10"	673	184	1.270	600	900	420	150	F40	B	2.250
12"	762	218	1.422	750	1.100	450	180	F48	B	3.550

Break Away Torques

Basic Torque vs Differential Pressure



Break away torque is determined by differential pressure, media and cycle frequency. It can be determined as follows:

Basic torque x Safety factor x Cycle frequency factor

Media Factor

Media	Safety Factor
Pure oil	1.0
Thermal oil	1.3
Other HC fluids	1.5
Water	1.5
Suspension, slurry	2.6
Steam, Vapor	2.6
Gas	2.6
Solid particles	3.0

Cycle Frequency Factor

If a Valve is Cycled Once	C.F.F.
Per Day or more	1.25
Per Week or more	1.28
Per Month or more	1.30
Every four months	1.41
Every eight months	1.45

TRUNNION MOUNTED BALL VALVES

Maximum Allowable Torques

Maximum Allowable Torques of Stem: **ASTM A182 Gr. 316Ti**

DN		Class							
Inches	mm	150	300	600	900	1500	2500	Temp. (°C)	
4"	100	On request		3510	3510	6060	6060	20	
				2950	2950	5100	5100	100	
				2660	2660	4600	4600	200	
				2310	2310	4000	4000	300	
6"	150			6060	6060	11850	14370	20	
				5100	5100	9960	12080	100	
				4600	4600	8990	10910	200	
				4000	4000	7810	9470	300	
8"	200		6060	6060	9630	9630	37370	48520	20
			5100	5100	8100	8100	31430	40800	100
			4600	4600	7310	7310	28370	36830	200
			4000	4000	6350	6350	24630	31980	300
10"	250		14370	14370	14370	14370	48520	94770	20
			12080	12080	12080	12080	40800	79690	100
			10910	10910	10910	10910	36830	71930	200
			9470	9470	9470	9470	31980	62460	300
12"	300		28100	28100	28100	28100	48520	163750	20
			23600	23600	23600	23600	40800	137700	100
			21300	21300	21300	21300	36830	124300	200
			18500	18500	18500	18500	31980	107930	300
14"	350		28100	28100	28100	48520	61690	On request	20
			23600	23600	23600	40800	51870		100
			21300	21300	21300	36830	46830		200
			18500	18500	18500	31980	40660		300
16"	400		28100	28100	28100	48520	94770		20
			23600	23600	23600	40800	79690		100
			21300	21300	21300	36830	71930		200
			18500	18500	18500	31980	62460		300

Conversion Factor

Stem Material Conversion Factor

ASTM	DIN	20°C	100°C	200°C	300°C
A182 Gr. 316Ti	1.4571	1	1	1	1
A182 Gr. F51	1.4462	2	2	2	2
A286 Gr. 660	1.4980	2.7	3.1	3.3	3.7

Special Designs



Ball valves with bottom
drain discharge



Ball valves with heating
/ cooling jacket



Ball valves with electric,
pneumatic, hydraulic or
special actuators



Ball valves with emission
monitoring ports for
Hazardous Service



Ball valves with stem
extensions

MAIN OFFICES



HEAD OFFICE

Av. del Llano Castellano, 15
28034 Madrid (Spain)
T +34 913 581 212
F +34 913 580 488
gral@saidi.es



OPERATION CENTRE

C/. Mas del Conde, s/nº
Pol. Masía de Baló
46394 Ribarroja del Turia (Valencia)
Apdo. Correos 288
Logistics Centre T +34 961 640 339
Service Centre T +34 961 640 303
clv@saidi.es | ssc@saidi.es



KLINGER SAIDI MEXICO

C/. Alfredo Nobel No. 3, Bodega 2
Colonia Fracc. Ind. Los Reyes,
Municipio de Tlalnepantla
CP 54073 Estado de México
(México)
T +52 (55) 5565 1026
mexico@klingersaidi.mx

BRANCH NETWORK

ANDALUCÍA

C/. Astronomía, 1
Parque Empresarial Nuevo Torneo
Torre 3, 2ª Pl., Ofic. 7 y 8 - 41015 Sevilla
Tel. 954 437 500 | Fax 954 434 278
andalucia@saidi.es

CATALUÑA & BALEARES

C/ de la Telemática, 11- Pol. Ind. "La Ferrería"
08110 Montcada i Reixach (Barcelona)
Tel. 935 751 970 | Fax 935 750 910
barcelona@saidi.es

LEVANTE

C/. Mas del Conde, s/nº
Pol. Masía de Baló
46394 Ribarroja del Turia (Valencia)
Apdo. Correos 288
Tel. 961 640 330 | Fax 961 640 337
levante@saidi.es

ASTURIAS

C/. Corín Tellado, 22 Bajo
33204 Gijón
Tel. 985 337 093 | Fax 985 337 145
asturias@saidi.es

CENTRO

Avda. Castilla, 53 - Nave nº 3
28830 San Fernando de Henares (Madrid)
Tel. 916 088 165 | Fax 916 767 012
castilla@saidi.es

NORTE

Av. Ibaibe, 31 - Edif. GARVE I Planta 1ª Dpto. 5
48901 Baracaldo (Vizcaya)
Tel. 944 380 012 | Fax 944 780 559
norte@saidi.es

CANARIAS

C/ Cíncel Nº71
Pol.Ind. Arinaga P3 Norte
35118 Agüimes (Gran Canaria)
Tel. 928 184 658 | Fax 928 122 444
canarias@saidi.es

GALICIA

Pol. Ind. "Pocomaco", Parcela D - 4
Portal Nº 5 - 1ª Planta
15190 Mesoiro (A Coruña)
Tel. 981 294 166 | Fax 981 290 367
galicia@saidi.es

SALES OFFICES

MURCIA

Tel. 961 640 330 | Fax 961 640 337
murcia@saidi.es

TARRAGONA

Tel. 961 640 330 | Fax 961 640 337
tarragona@saidi.es

VIGO

Tel. 981 29 41 66 | M 626 31 06 98
asturias@saidi.es

PUERTOLLANO

Tel. 961 640 330 | Fax 961 640 337
puertollano@saidi.es

VALLADOLID

Tel. 985 33 70 93 | M 648 75 46 10
asturias@saidi.es

ZARAGOZA

Tel. 961 640 330 | Fax 961 640 337
aragon@saidi.es



BRANCH NETWORK

Close to the customer



SAIDI | An Independent Klinger company
Av. del Llano Castellano, 15
28034 Madrid
T +34 91 358 12 12
F +34 91 358 04 88
gral@saidi.es