KLINGER India

KLINGER BALLOSTAR® KHI

DN 150 – 1000





www.klinger.in


KLINGER
TYPE: KH
DR
TEMPERATUR:
WERKSTOFF:

KLINGER FLUID CONTROL

Today for tomorrow

As a subsidiary of the KLINGER Group, KLINGER Fluid Control has been developing, manufacturing and maintaining high-quality industrial valves at the business location Gumpoldskirchen/Austria for more than 125 years. Via the global distribution and service network, KLINGER Fluid Control offers both standardized and tailored products, services as well as solutions for customers around the globe.

Products from KLINGER Fluid Control are characterized by their high level of reliability as well as by an above average lifecycle at a simultaneously very low total cost of ownership (TCO). As a solutions partner, KLINGER Fluid Control creates customer benefits with added value. In this regard, the focus is on the following core competences:







ENCOMPASSING SERVICE

» Application expertise
» Product trainings
» Fast quotation and order processing
» Customer-specific special solutions
» Supply of spare parts
» Valve maintenance
» On-site technical support

INNOVATIVE SOLUTIONS

» State of the art development tools
» Product development for different areas of application
» Customer-specific special solutions
» Automation solutions
» Product tests in the company-own technical center
» A wide range of certificates and approvals

OPERATIONAL EXCELLENCE

» Flexible production
» Transparency in the supply chain
» Short delivery times
» ISO 9001 certified quality
» ISO 14001 as well as EMAS certified environmental management system

GUARANTEED DURABILITY

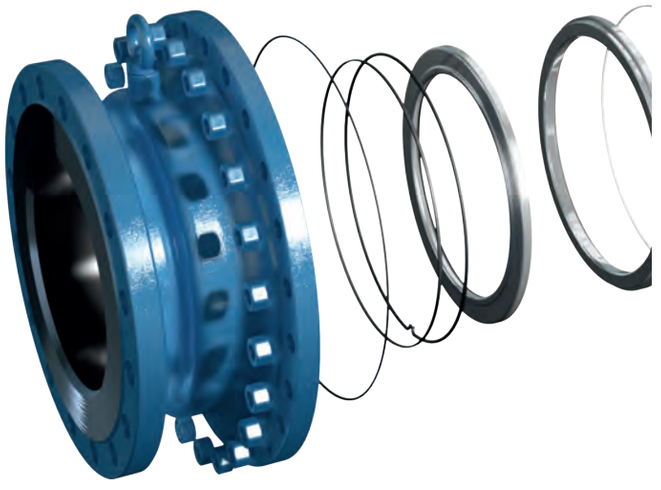
The guarantee for reliability across decades

PRODUCT ADVANTAGES

- Maintenance-free
- Certified according to EN 488:2015 (KHSVI VVS)
- Supports pressurization on both sides
- Trunnion mounted ball with cylindrical bore
- Sealing elements protected against water hammers
- Double block function with bleeding (TÜV-certified)
- High degree of resilience against pipework forces
- Subsequent automation possible (top flange in accordance with EN ISO 5211)

SPECIAL TYPES

- High temperature version (up to +260 °C)
- Special design for tunnel boring machines
- Pre-insulated design for underground installations (KHSVI VVS)
- Special ball coatings
- Metal seat for abrasive media
- Oxygen version
- Fire Safe version
- Vacuum version
- Gas version
- Oil, grease and silicone-free



PRODUCT DETAILS

PN	16/25/40
DN	150 – 1000 (KHSVI VVS up to DN 800)
Material	Cast steel, stainless steel, further materials upon request
Temperature	-45 °C to +260 °C
Design	Flanges, welding ends, fully welded (KHSVI VVS), reducing cones, full bore
Type	Two-piece ball valve KHI / KHSVI Single-piece ball valve KHSVI VVS



Ballostar® KHI

Two-piece body
Flange ends on both sides

Ballostar® KHSVI

Two-piece body
Welding ends on both sides



Ballostar® KHSVI VVS

Fully welded body
Welding ends on both sides



GREATEST SAFETY

Ballostar® KHI sealing system

Leakages represent the worst case for any plant operator. Negative impacts on the environment as well as downtimes, harm to personnel and assets and in some cases heavy financial losses are just a few of the possible outcomes. A seal, which therefore “practices what it preaches”, i.e. a valve capable of reliably fulfilling its shut-off function, is a must. With the KLINGER Ballostar® KHI, this is ensured in multiple ways: By means of the unique ball valve sealing system and the double block and bleed function.

FUNCTION

Thanks to its "elastic sealing system" the ball valve ensures absolute tightness in combination with both high and low pressures. This is achieved by means of two elastic sealing elements working independent of each other.

As the differential pressure increases, the additional contact forces also increase – the pre-stressed diaphragm springs, which press the sealing rings against the ball, are relaxed and the operating life thus further extended. (Fig. 1)

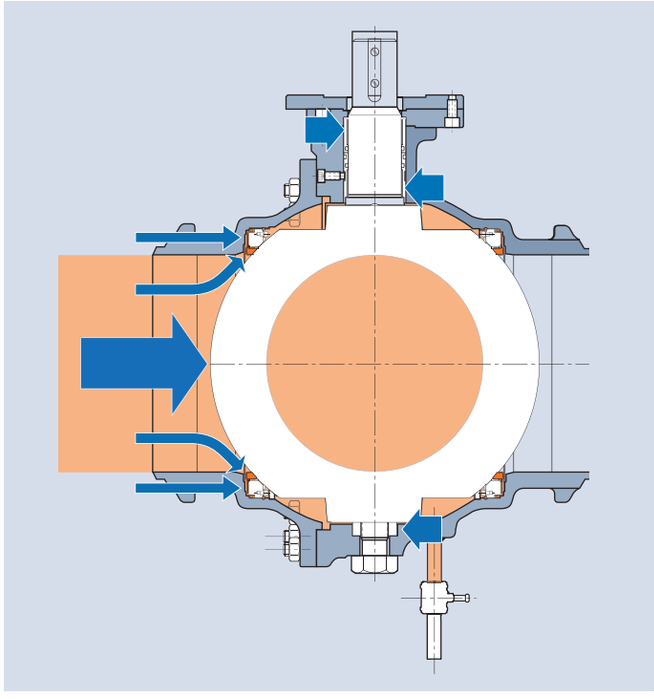


Fig. 1

EFFECT

The sealing system at the ball is pre-stressed during assembly. The two pre-stressed elastic sealing elements made of stainless steel and featuring sealing rings and a back seal (consisting of a U-sleeve and an O-ring) form a system upstream and downstream of the valve together with the ball. Furthermore, a support ring protects the elastic sealing element against overloads, for example caused by water hammers. A wire ring safeguards the sealing unit. (Fig. 2)

The ball valve can be pressurized in both flow directions. The elasticity of the sealing elements allows for a compensation of thermal expansion. Thanks to this function, two primary sealed areas are constantly present in the bore.

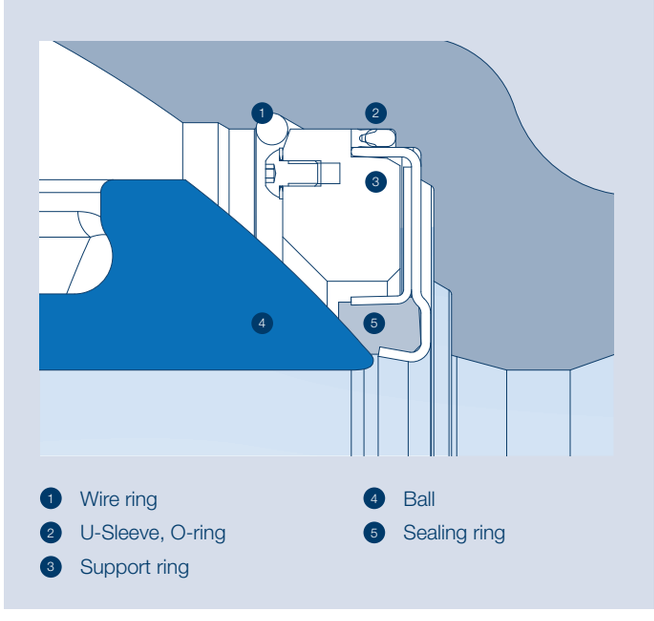


Fig. 2

DOUBLE BLOCK & BLEED

A "Double Block & Bleed" configuration is usually achieved by means of two separate valves. The same effect, however, can be achieved by utilizing a single KLINGER Ballostar® KHI ball valve. Next to saving time and money, this solution is of enormous importance in tight installation fits. With regard to safety and tightness the KLINGER Ballostar® KHI – in comparison to standard "Double Block & Bleed" solutions – convinces in both flow directions, under a wide range of operating conditions and even in a vacuum. Furthermore, pressurization by the medium is not restricted to the surface of the ball of Ballostar® KHI ball valves, but covers the entire sealing element (ball and surface of the diaphragm spring).

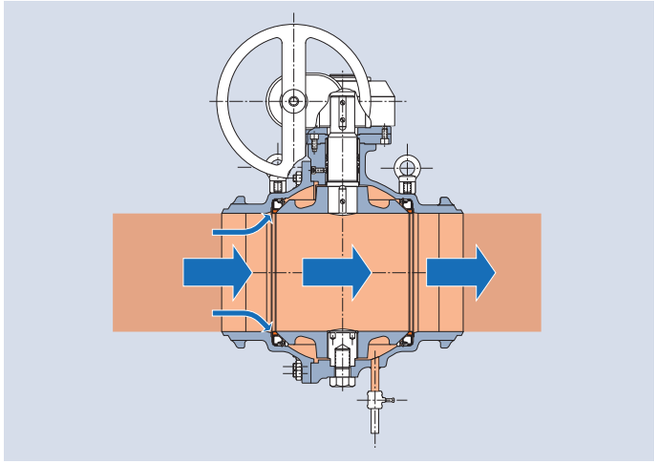


Fig. 1

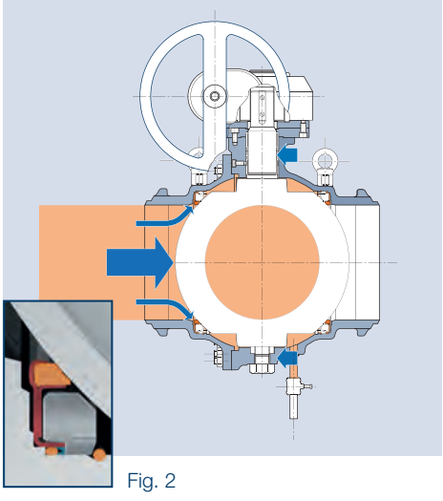


Fig. 2

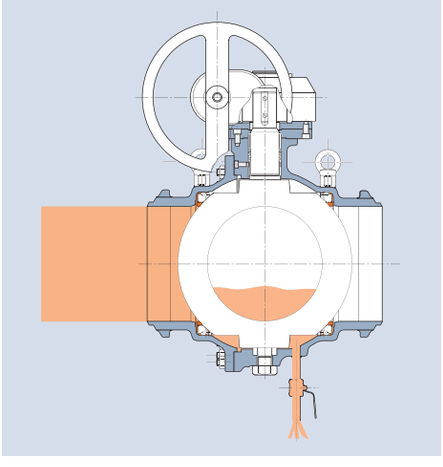


Fig. 3

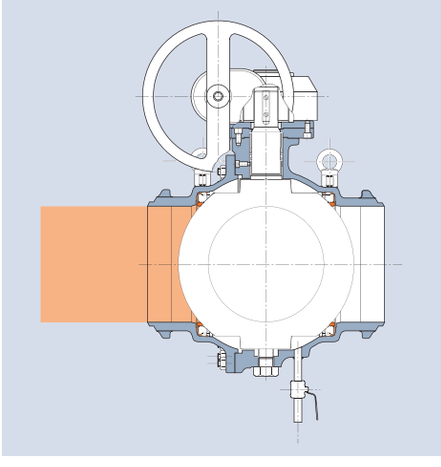


Fig. 4

FUNCTION

The open valve (Fig. 1) represents the starting point for the explanation of the function of the Ballostar® KHI: The medium flows through the open ball with the test and drain valve closed. Now the ball valve is closed (Fig. 2), the medium collects in the cavity of the ball valve as a result of the closing process. Draining is achieved by means of opening the test and drain valve (Fig. 3). This configuration state also allows for quick and uncomplicated testing of the function of the sealing element: The cavity has been drained, the sealing elements ensure the tightness of the valve – additional leakage of the medium is therefore impossible. If required, and as long as the ball valve remains closed and the test and drain valve open (Fig. 4), the pipe section on the medium-free side can now be opened up and/or worked on without hazard.

CERTIFIED QUALITY

The KLINGER Ballostar® KHI lives up to its promises

With regard to its application scope, the KLINGER Ballostar® KHI leaves no questions unanswered. This has been proven by various tests and certifications – for plant operators this means absolute safety in operation with guaranteed tightness.

» **EN 488:2019 KHSVI VVS**
KLINGER Ballostar® KHSVI VVS ball valves, DN 150 to 800, have been successfully tested and certified by the TÜV Austria under inclusion of the extended requirements of the EN 488:2019.

» **Fire Safe**
The Fire Safe tests in accordance with API Standard 607, 4th Edition and EN ISO 10497:2004 have been certified by Lloyd's Register and TÜV Austria respectively.

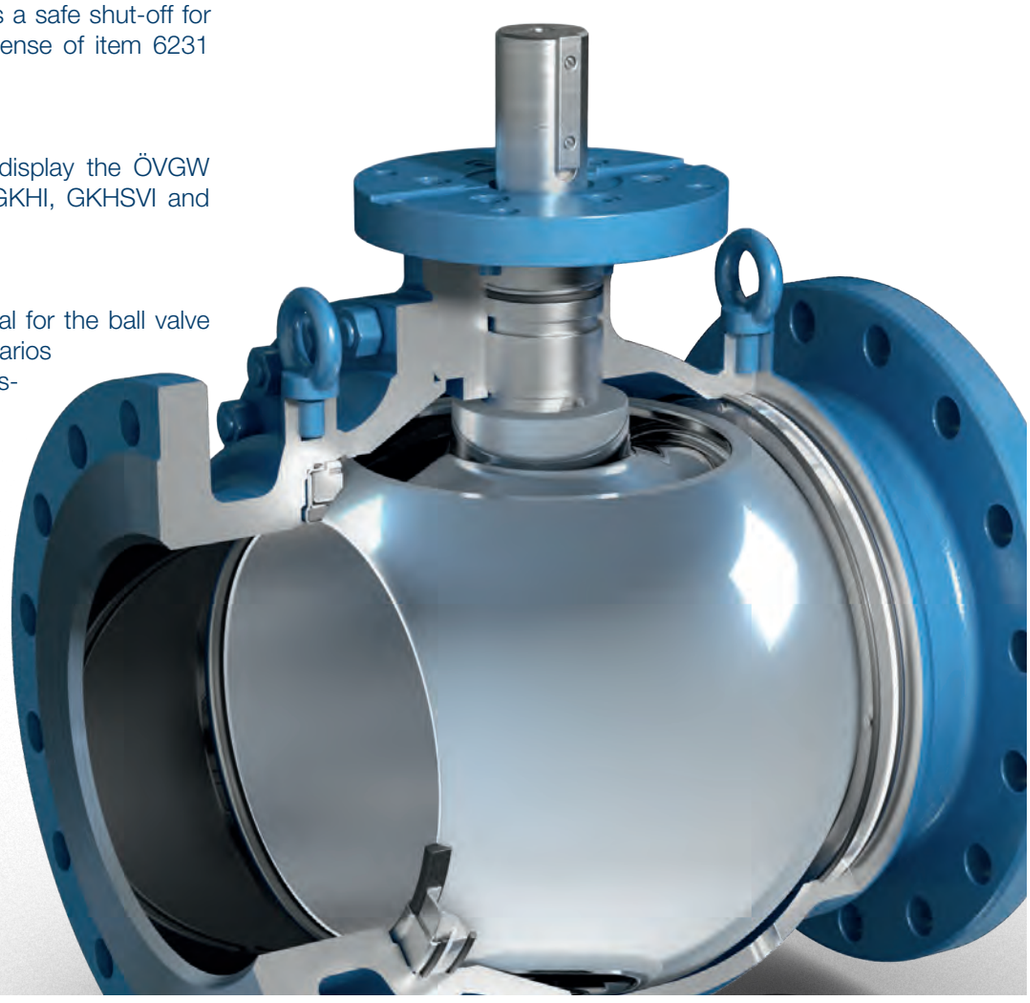
» **Approval of the KHI sealing chamber**
The KLINGER Ballostar® KHI represents a safe shut-off for the operation of steam boilers in the sense of item 6231 TRD 601 B12.

» **Gas approval**
ÖVGW Certificate for authorization to display the ÖVGW quality label "Gas" for the ball valves GKHI, GKHSVI and GKHSVI VVS, DN 150 - 800.

» **Utilization for gaseous oxygen**
The BAM Berlin has granted its approval for the ball valve series Ballostar® KHI in utilization scenarios with gaseous oxygen at operating pressures of up to 16 bar and operating temperatures of up to 60 °C.

» **Emission testing in accordance with VDI 2440**
Certified emission testing pursuant to VDI 2440 for Ballostar® KHI / KHSVI ball valves at temperatures < 250 °C.

» **Pressure Equipment Directive 2014/68/EU**
The Ballostar® KHI, KHSVI and KHSVI VVS ball valves are developed, produced, tested and delivered in accordance with the valid standards of the Pressure Equipment Directive 2014/68/EU.



HIGHEST REQUIREMENTS

Certification in accordance with EN 488:2019

In order to increase operational safety, the requirements regarding buried shut-off valves are constantly increased. Meeting these requirements is achieved through the utilization of special valves with particularly rigid and deformation-free bodies. The corresponding technical requirements and test methods for shut-off valves directly buried within district heating networks are defined in the EN 488.

Increased compressive forces as well as new bending moments for valves were already defined in the 2011 predecessor version of the standard. The tensile forces, however, remained unchanged. Compared to 2011, some requirements have now again been made stricter. The number of operations during the type approval test, for example, has been increased and all tests must be carried out on the same valve. Furthermore, the end of the last 100 mm of the spindle / shaft construction must feature corrosion protection.

KLINGER Ballostar® KHSVI VVS ball valves are successfully tested and certified by the TÜV Austria on the company-own multi-function test stand under inclusion of the expanded re-quirements of EN 488:2019.



BALLOSTAR® KHI

Overview of types

KHI flange design
Full bore
» 11

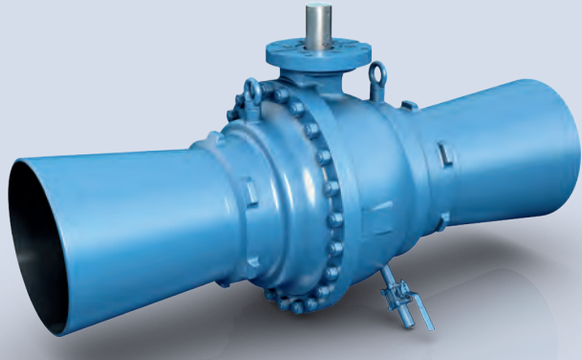
KHSVI welding ends
Full bore
» 12





KHSVI welding ends
With reducing cones
» 13

KHSVI VVS fully welded
Full bore
» 14-15





BALLOSTAR® KHI

Flange design, full bore

GENERAL FEATURES
» 2-piece ball valve with full bore
» Trunnion mounted ball
» Bidirectionally sealing
» High degree of resilience against pipework forces

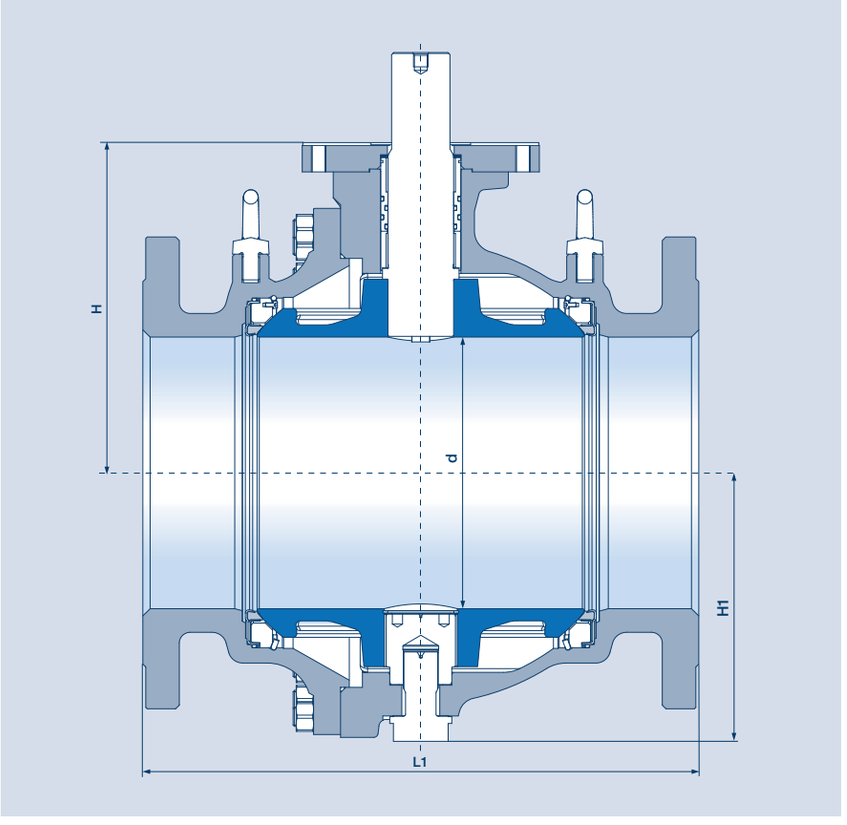
CONNECTIONS
Flanges in accordance with EN 1092-1 (up to DN 400) and DIN 2544 (from DN 500 upwards)

DIMENSIONS
Face-to-face dimensions in accordance with EN 558, series 12

ACCEPTANCE TESTING
» Seat leak tightness: EN 12266-1 P12, leakage rate A
» Tightness to atmosphere: EN 12266-1 P11
» Strength: EN 12266-1 P10

AUTOMATION
Flange connection in accordance with ISO 5211, allows for direct mounting of an actuator or by means of brackets. Pneumatic and electrical actuators utilizable.

TEMPERATURE
-45 °C to +200 °C (see P-T diagram)



KHI VARIANTS

FULL BORE DN 150-800
Material: Cast steel 1.0619
(Material code VII, VIII)
Stainless steel 1.4408
(Material code X, Xc)

	Dimensions				PN			Weight in kg	
DN	L1	H1	H	d	VII	X	Xc	at PN 25	at PN 40
150*	394	171	497	150	25/40	40	25	85	85
200*	457	222	257	200	25/40	40	25	150	160
250	533	264	327	250	25/40	40	25	220	240
300	610	294	352	300	25/40	40	25	380	410
350	686	356	443	350	25/40	40	25	580	620
400	762	376	462	380	25/40	40	25	800	856
500	914	468	563	475	25/40		25	1,200	1,330
600	1,067	533	667	585	25/40			1,750	1,863
700	1,245	640	789	686	25/40			3,100	3,350
800	1,372	710	886	782	25/40			4,850	5,055

*available with hand lever

Dimensions in mm. Subject to modification of design and dimensions.

BALLOSTAR® KHSVI

Welding ends, full bore

GENERAL FEATURES
» 2-piece ball valve with full bore
» Trunnion mounted ball
» Bidirectionally sealing
» High degree of resilience against pipework forces

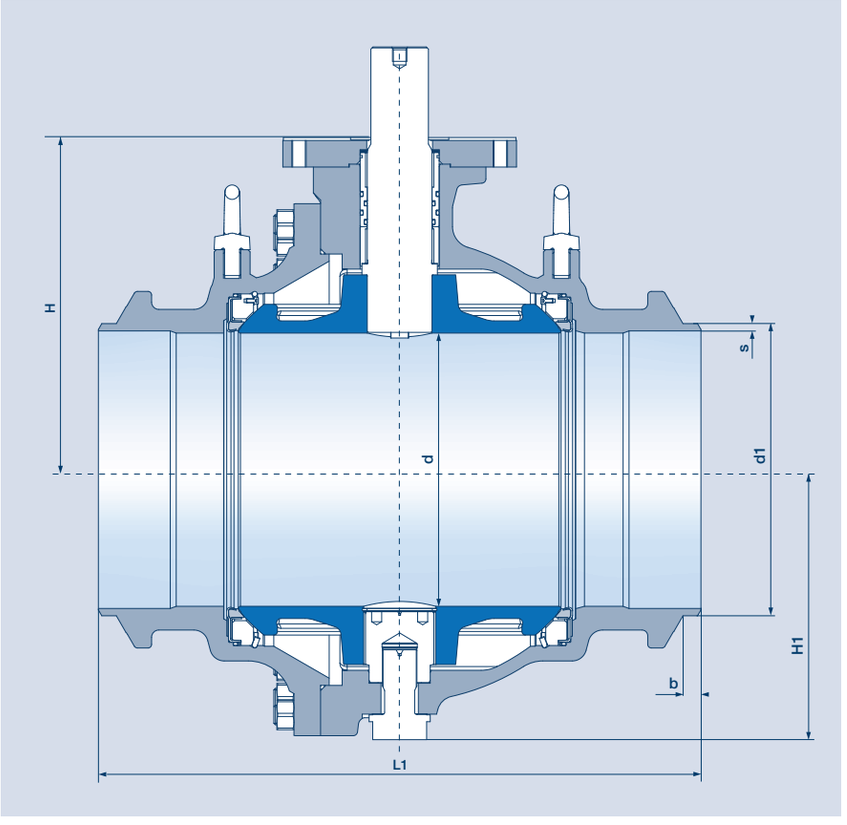
CONNECTIONS
Welding ends in accordance with customer requirements

DIMENSIONS
Face-to-face dimensions in accordance with ANSI B16.10 Class 300 and EN 12982, series 63

ACCEPTANCE TESTING
» Seat leak tightness: EN 12266-1 P12, leakage rate A
» Tightness to atmosphere: EN 12266-1 P11
» Strength: EN 12266-1 P10

AUTOMATION
Flange connection in accordance with ISO 5211, allows for direct mounting of an actuator or by means of brackets. Pneumatic and electrical actuators utilizable.

TEMPERATURE
-45 °C to +200 °C (see P-T diagram)



KHSVI VARIANTS

FULL BORE DN 150-1000
Material: Cast steel 1.0619
(Material code VII, VIII)

	Dimensions			Connection dimensions				PN	Weight
DN	L1	H1	H	d	d1	s*	b	VII	in kg
150**	457	171	268	150	168.3	6.65	20	25/40	68
200**	521	222	343	200	219.1	8.05	20	25/40	130
250	559	264	327	250	273	8.5	20	25/40	200
300	635	294	352	300	323.9	9.45	20	25/40	355
350	762	356	443	350	355.6	10.8	20	25/40	555
400	838	376	462	380	406.4	10.2	25	25/40	760
500	991	468	563	475	508	16	25	25/40	1,150
600	1,143	533	667	585	610	17.5	25	25/40	1,700
700	1,346	640	789	686	711	17.5	25	25/40	3,000
800	1,524	710	886	782	813	19	25	25/40	4,700
1000	1,981	860	1,034	980	1,016	10	25	25/40	7,480

* Standard dimensions, also configurable in accordance with customer requirements
** See page 18 for actuator flange illustration

BALLOSTAR® KHSVI

Welding ends with reducing cones

GENERAL FEATURES
» 2-piece ball valve with reducing cones
» Trunnion mounted ball
» Bidirectionally sealing
» High degree of resilience against pipework forces

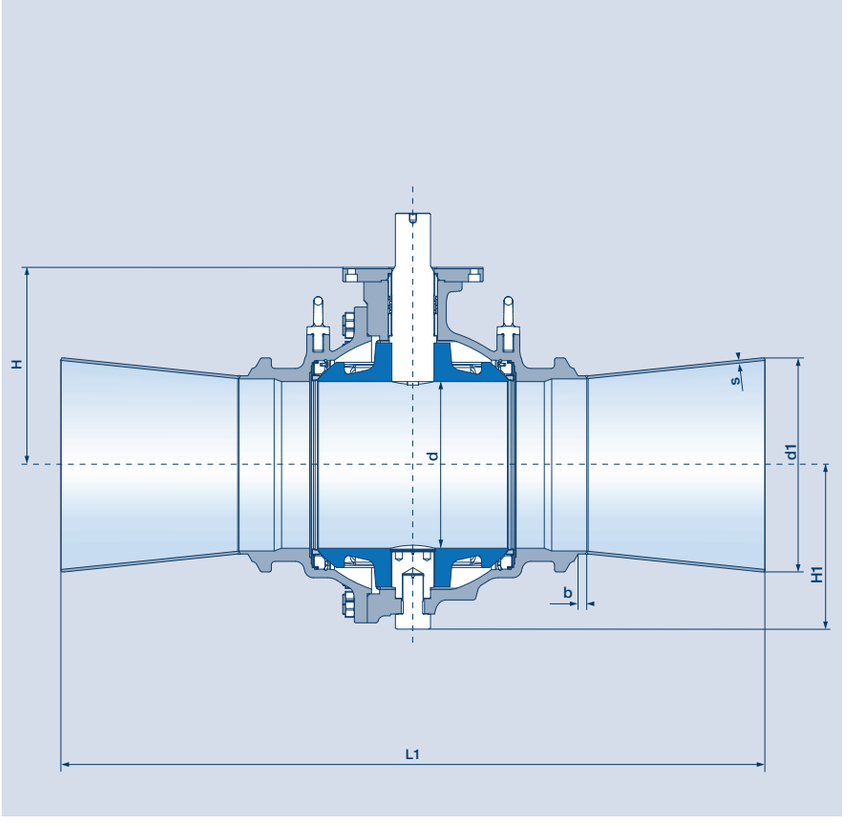
CONNECTIONS
Welding ends in accordance with customer requirements

DIMENSIONS
Special dimensions as illustrated in table below

ACCEPTANCE TESTING
» Seat leak tightness: EN 12266-1 P12, leakage rate A
» Tightness to atmosphere: EN 12266-1 P11
» Strength: EN 12266-1 P10

AUTOMATION
Flange connection in accordance with ISO 5211, allows for direct mounting of an actuator or by means of brackets. Pneumatic and electrical actuators utilizable.

TEMPERATURE
-45 °C to +200 °C (see P-T diagram)



KHSVI VARIANTS

REDUCING CONES DN 600/500-1200/1000
Material: Cast steel 1.0619
(Material code VII, VIII)

	Dimensions			Connection dimensions				PN	Weight
DN	L1	H1	H	d	d1	s	b	VII	in kg
600/500	2,011	468	563	475	610	7	25	40	1,264
700/600	2,367	533	667	585	711	8	25	40	1,860
800/700	2,570	640	789	686	813	8	25	40	3,184
900/800	2,748	710	886	782	914	10	25	40	4,960
1000/800	2,748	710	886	782	1,016	10	25	40	4,980
1200/800	2,950	710	886	782	1,220	12	25	40	5,070
1200/1000	3,407	860	1,034	980	1,220	12	25	40	7,950

Dimensions in mm. Subject to modification of design and dimensions.

BALLOSTAR®
KHSVI VVS DN 150-250

Fully welded, full bore

GENERAL FEATURES
» 2-piece ball valve with full bore
» Trunnion mounted ball
» Bidirectionally sealing
» High level of resilience against pipework forces

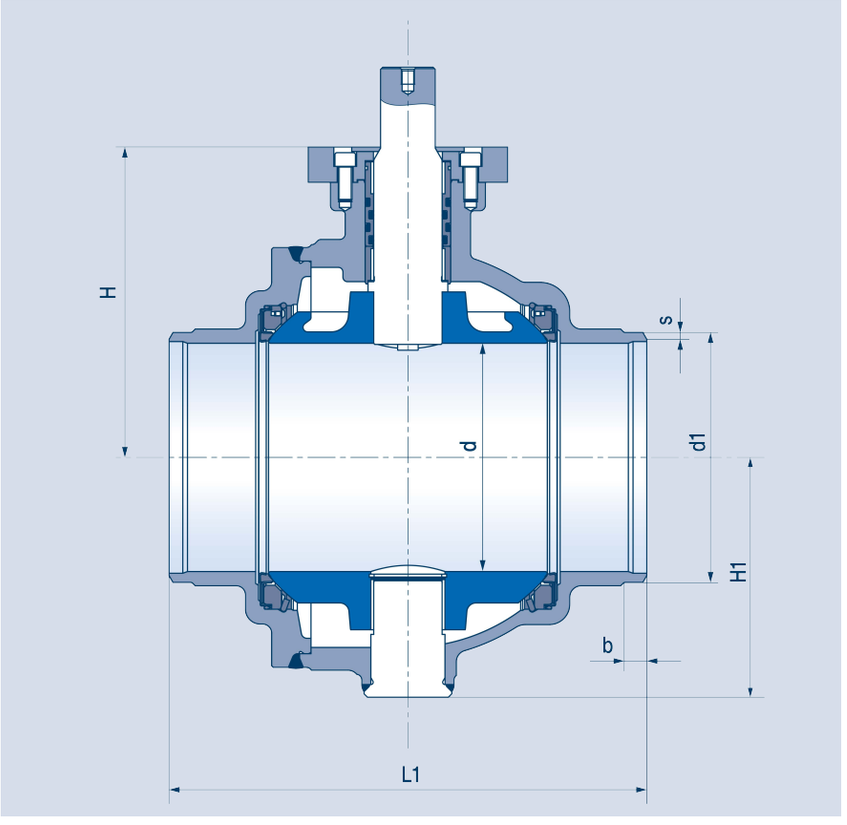
CONNECTIONS
Welding ends in accordance with customer requirements

DIMENSIONS
Face-to-face dimensions in accordance with EN 12982; series GR 61

ACCEPTANCE TESTING
» Seat leak tightness: EN 12266-1 P12, leakage rate A
» Tightness to atmosphere: EN 12266-1 P11
» Strength: EN 12266-1 P10

AUTOMATION
Flange connection in accordance with ISO 5211, allows for direct mounting of an actuator or by means of brackets. Pneumatic and electrical actuators utilizable.

TEMPERATURE
-45 °C to +200 °C (see P-T diagram)



KHSVI VVS VARIANTS

FULL BORE DN 150-250
Material: Cast steel 1.0619
(Material code VII, VIII)

	Dimensions			Connection dimensions				PN	Weight
DN	L1	H1	H	d	d1	s*	b	VII	in kg
150	403	159	213	150	168.3	6.65	20	25/40	55
200	419	210	272	200	219.1	8.05	20	25/40	106
250	457	262	346	250	273	8.5	20	25/40	170

* Standard dimensions, also configurable in accordance with customer requirements

DN150: connection flange F12 or F14 optional with Ø 36 mm, AF 27 or AF 36
DN200: connection flange F14 or F16 optional with Ø 48 mm or AF 36
DN250: connection flange F16 or F25 optional with Ø 50 mm or Ø 60 mm, AF 46 or AF 55

BALLOSTAR®
KHSVI VVS DN 300-800

Fully welded, full bore

GENERAL FEATURES
» 2-piece ball valve with full bore
» Trunnion mounted ball
» Bidirectionally sealing
» High level of resilience against pipework forces

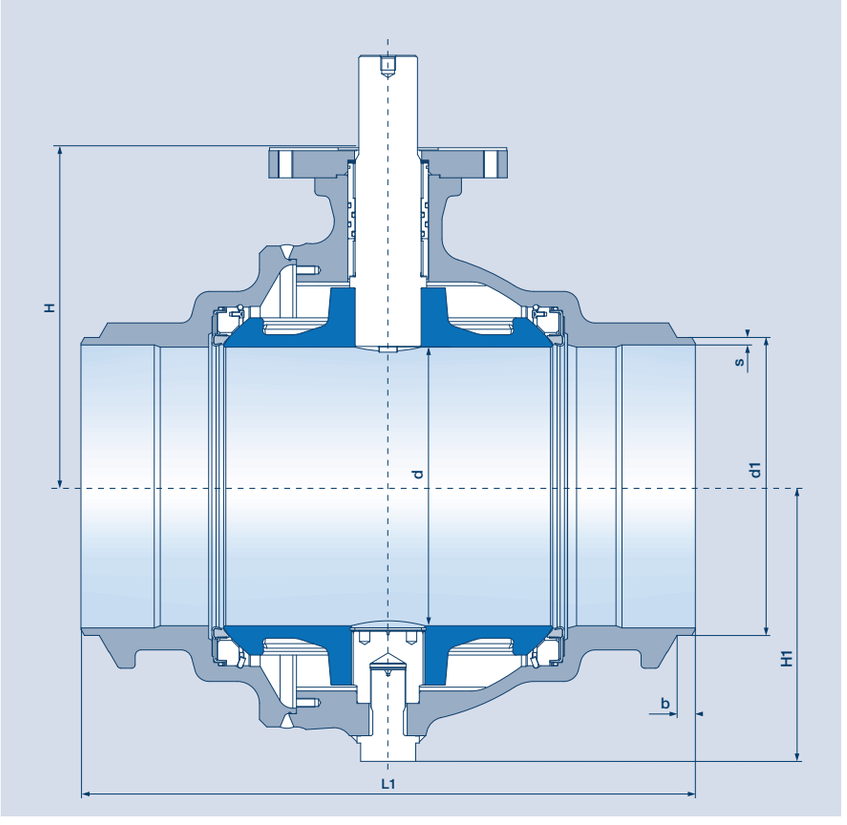
CONNECTIONS
Welding ends in accordance with customer requirements

DIMENSIONS
Face-to-face dimensions in accordance with ANSI B16.10 Class 300 and EN 12982, series 63

ACCEPTANCE TESTING
» Seat leak tightness: EN 12266-1 P12, leakage rate A
» Tightness to atmosphere: EN 12266-1 P11
» Strength: EN 12266-1 P10

AUTOMATION
Flange connection in accordance with ISO 5211, allows for direct mounting of an actuator or by means of brackets. Pneumatic and electrical actuators utilizable.

TEMPERATURE
-45 °C to +200 °C (see P-T diagram)



KHSVI VVS VARIANTS

FULL BORE DN 300-800
Material: Cast steel 1.0619
(Material code VII, VIII)

	Dimensions			Connection dimensions				PN	Weight
DN	L1	H1	H	d	d1	s*	b	VII	in kg
300	635	294	352	300	323.9	9.45	20	25/40	277
350	762	356	443	350	355.6	10.8	20	25/40	442
400	838	376	462	380	406.4	10.2	25	25/40	580
500	991	468	563	475	508	16	25	25/40	990
600	1,143	533	667	585	610	17.5	25	25/40	1,650
700	1,346	640	789	686	711	17.5	25	25/40	2,690
800	1,524	710	886	782	813	19	25	25/40	3,810

* Standard dimensions, also configurable in accordance with customer requirements

Dimensions in mm. Subject to modification of design and dimensions.

SPECIFIC SOLUTIONS

Underground installation

The KLINGER Ballostar® KHSVI VVS ball valves, certified in accordance with EN 488:2019, are ideally suited for underground installations thanks to their robust design. In this context the ball valves can be, amongst others, enhanced by means of the following options:

- Top-mounted gear box including position marker with fixed underground installation extension in various lengths
- Side-mounted gear box with telescopic extension including position marker for simple adaptation to surface
- Welding ends extended on both sides in accordance with DIN EN 12627 and insulation for plastic-sheathed pipe systems including leakage warning system of choice
- Various draining / venting extensions with ball valves and insulation

Shaft extension in various lengths with mechanical gearbox



Gearbox with telescopic extension for underground installations

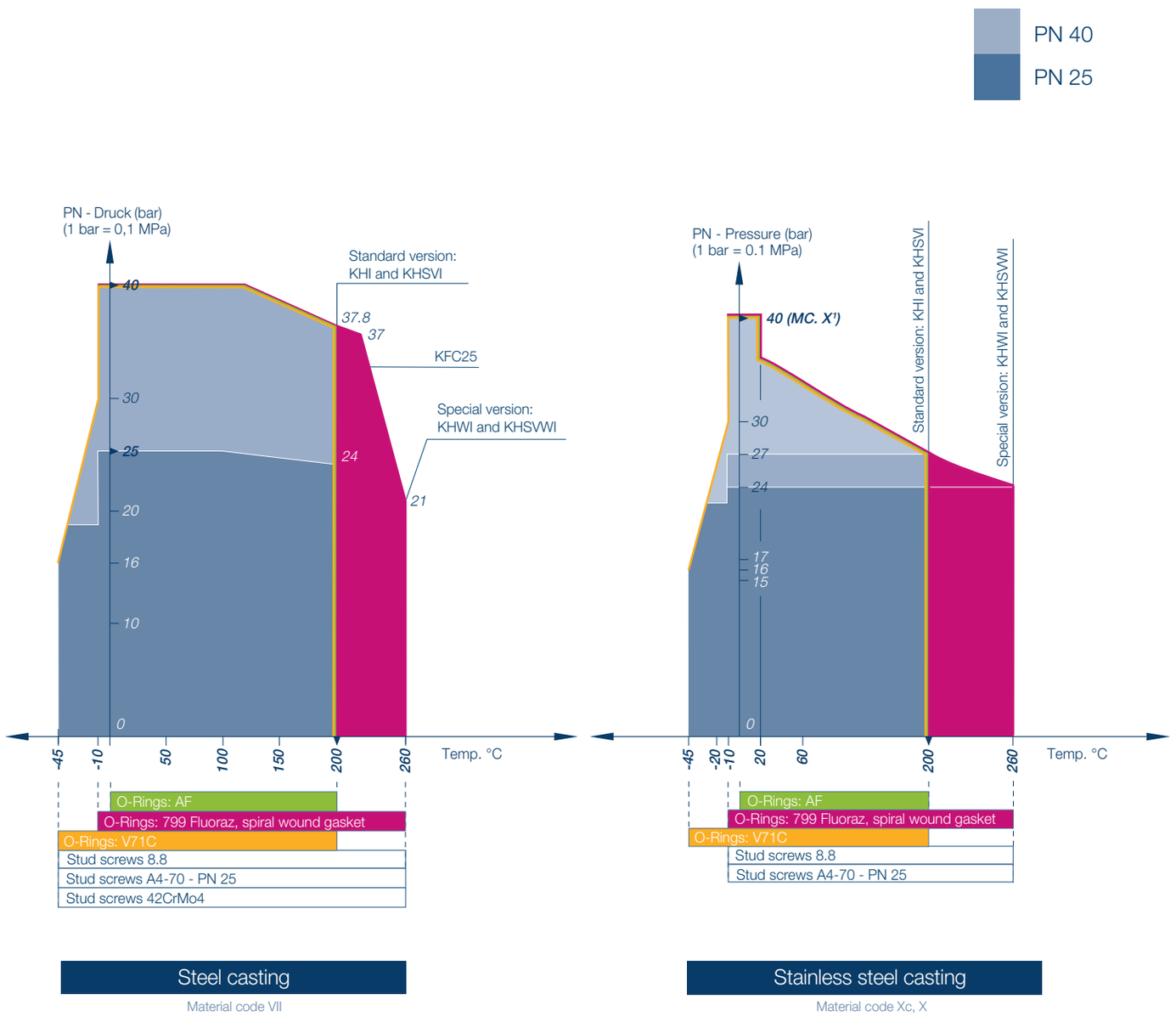


AREAS OF UTILIZATION

Pressure and temperature ranges

The temperatures provided are threshold values that must always be observed in tandem with the medium and the prevailing operating pressure. The permissible continuous temperatures are always within these thresholds.

1) Material code X = acid-proof, stainless steel:
Connecting screws 8.8 Fe/Ni 5P (or equivalent)
Material code Xc = all parts made of stainless steel!



Steel casting

Material code VII

Stainless steel casting

Material code Xc, X

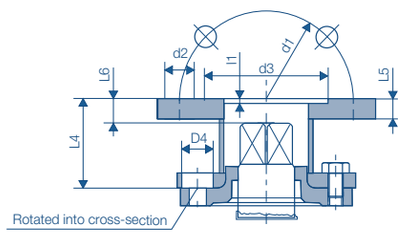
TECHNICAL DETAILS

Automation and actuator design

Connection flanges in accordance with ISO 5211 for DN 150 – 200

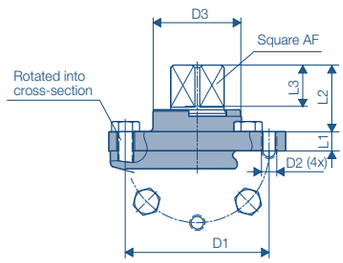
DN	150		200	
	F12	F14	F12	F14
L4	76	71	80	86
L5	15	15	14	20
L6	24	19	12.5	18.5
D4	25	25	30	30
d1	125	140	125	140
d2	14	18	14	18
d3	85	100	85	100
l1	4	5	4	5

Mounting scenario with mounting console F12, F14



DN	150	200
D1	112	150
D2	M12	M16
D3	69	93.5
L1	15	18
L2	52	67.5
L3	32.8	42.8
SW	32	41

Mounting scenario with free shaft end

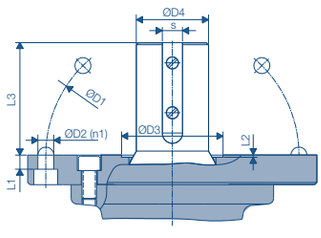


Connection flanges in accordance with ISO 5211 for DN 250 – 1000

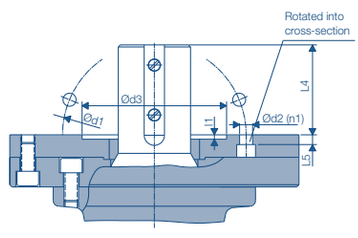
DN	250/300	350/400	500/600	700/800	1000
D1	240	280	350	500	590
D2	18	22	22	33	39
D3	110.2	140.3	140.3	260.1	300.1
D4	60	80	100	140	180
L1	13.5	19.5	19.5	19	19
L2	3	3	3	5.1	5.1
L3	108	128	155	193	237
n1	4	4	8	8	12
s	18	22	28	36	45

ISO 5211	F16 | F25	F25	F25 | F30	F35	F40 | F48
L4	77	97	124	148	180
L5	9.5 | 13.5	13.5	13.5 | 10.5	13	19
d1	165 | 254	254	254 | 298	356	406 | 483
d2	22 | 18	18	18 | 22	33	39
d3	130 | 200	200	200 | 230	260	300 | 370
l1	6	6	6	6	9
n2	4 | 8	8	8 | 8	8	8 | 12

Mounting scenario with free shaft end



Mounting scenario with intermediate plate



Torques

KFC SEAT RING

Nominal diameter DN	Differential pressure (bar)	
	25	40
mm	Torque (Nm)	
150	651	1,260
200	1,069	1,757
250	2,083	2,905
300	3,710	5,733
350	5,068	7,063
400	6,251	7,987
500	8,701	11,655
600	13,020	15,540
700	19,320	27,510
800	31,395	36,960
1000	45,000	60,000

METAL SEAT

Nominal diameter DN	Differential pressure (bar)	
	16	25
mm	Torque (Nm)	
150	882	1,176
200	1,372	1,764
250	2,646	3,528
300	4,998	6,272
350	6,958	8,624
400	8,526	10,192
500	10,668	14,063

TECHNICAL DETAILS

Flow characteristics for the determination of the nominal diameter

Size of ball valve

Flow rate	Q	in m^3/h
Pressure loss	Δp	in bar
Density	ρ	in kg/m^3
Velocity	w	in m/s
Flow coefficient	K_v	in m^3/h
Pressure loss coefficient	ζ	

The valve is to be selected in a manner that the K_v-value is greater, or the ζ-value less than the computed value.

Allows for the calculation of:

$$K_v = Q * \sqrt{\frac{\rho}{1000 * \Delta p}}$$

or

$$\zeta = \frac{2 * \Delta p * 10^5}{\rho * w^2}$$

Flow Values

FULL BORE

DN (mm)	ζ	K_{vs}-value
150	0.045	4,203
200	0.04	8,131
250	0.033	13,630
300	0.030	20,590
350	0.027	29,540
400	0.03	38,582
500	0.025	59,978
600	0.025	95,695
700	0.025	118,940
800	0.025	154,245
1000	0.025	242,900

REDUCED BORE

DN (mm)	ζ	K_{vs}-value
150/125	0.3	1,642
200/150	0.3	2,920
250/200	0.29	4,640
300/250	0.29	6,682
350/300	0.28	9,256
400/350	0.28	12,090
500/400	0.26	19,064
600/500	0.26	28,230
700/600	0.25	39,186
800/700	0.25	51,182

REDUCING CONES

DN (mm)	ζ	K_{vs}-value
500/400	0.060	39,837
600/500	0.055	60,565
700/600	0.052	84,698
800/700	0.048	115,932
900/800	0.045	150,652
1000/800	0.224	83,886
1200/1000	0.127	161,700

In metric measurement systems the characteristic unit utilized for shut-off and control valves is the K_V-value. The values provided in the table apply to a H_2O flow medium with a temperature of 5-30 °C, a density of 1000 kg/m^3 and a pressure loss of p = 1 bar at the valve.

In countries using inches, the characteristic unit is the C_V-value. It provides how many US gal/min of H_2O, at a temperature of 60 °F and with a pressure loss of 1 psi, flow through the valve.

$$\Delta p = \zeta * \frac{\rho}{2} * w^2 * 10^{-5}$$

or

$$\Delta p = \left(\frac{Q}{K_v}\right)^2 * \frac{\rho}{1000}$$

KLINGER India

Certified acc. to DIN EN ISO 9001:2015 Subject to technical alterations.
KLINGER Industrial Products India Pvt. Ltd. #6 Tarana, 1st Floor, GoodEarth Malhar, Kambipura, Kengeri, Bengaluru
560074, Karnataka, India. Tel +91 8618523021 / +91 80 2990 9572 / e-mail: info@klinger.in

www.klinger.in