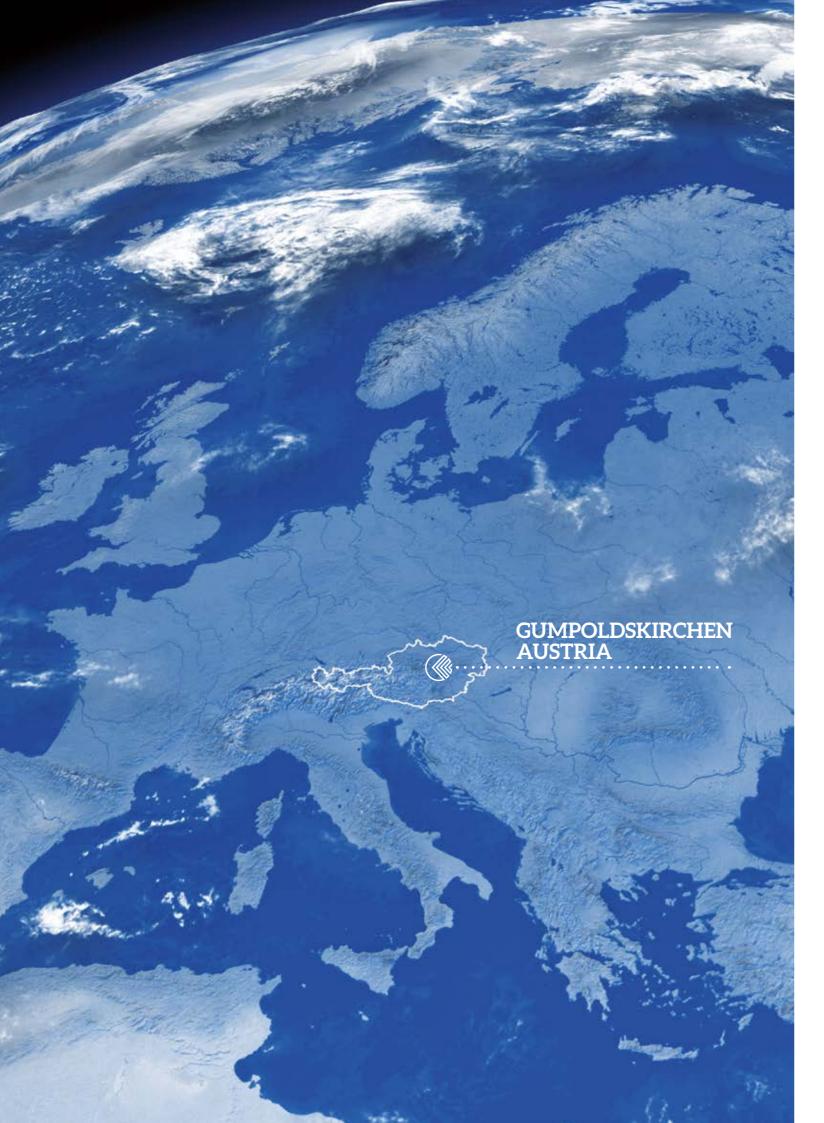




KLINGER MONOLITH KHO

Single-piece ball valve DN 20 – 300





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 and 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 trusted solutions partner, KLINGER Fluid Control creates customer benefits with added value with the focus 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

RELIABLE STABILITY

Developed for the toughest application scenarios

PRODUCT ADVANTAGES

- » EN 488:2015 certification
- » Maintenance-free
- » Supports pressurization on both sides
- » Long heat-insulating shaft
- » Trunnion mounted and blowout-proof operating stem
- » Multi-layer, durable operating stem seal
- » High degree of resilience against pipework forces
- » Meets the requirements of the AGFW worksheet FW 401 – Part 5
- » Elastically pre-stressed sealing elements with stainless steel sinus springs
- » Trunnion-mounted ball (from DN 150 / 200R150 upwards)
- » Operating stem and end of stem construction made of stainless steel
- » Impervious to dirt

SPECIAL TYPES

- » Pre-insulated design for plastic casing pipe systems
- » Available in different shaft lengths
- » Top flange in accordance with EN ISO 5211 for automation
- » Full solution with insulation extension, venting and bleeding, insulation and alert system



PN	25/40
DN	20 – 250 / 25R20 – 300R250
Material	Cast steel
Temperature	-10 °C to +200 °C
Design	Welding ends, for underground installation, full and reduced bore
Туре	Fully welded ball valve

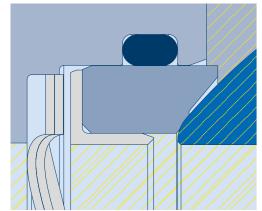


GREATEST SAFETY Sealing system

The KLINGER Monolith KHO ball valve was developed to meet the demand for absolute tightness as well as durability. The ball valve, which was especially designed with district heating applications in mind, is characterized by the high degree of stability of the body, its small installation space requirement, guaranteed tightness, no maintenance and its exceptional operational safety.

OPERATING PRINCIPLE

The elastic sealing system ensures optimal tightness even in combination with low differential pressures and minimizes actuating torques. The ball with cylindrical bore causes only minimal flow losses and prevents turbulences. The KLINGER KHO Monolith ball valve can be operated in both flow directions.





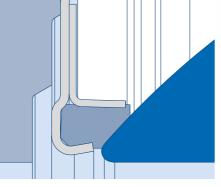


Fig. 2: Sealing element with trunnion-mounted ball for up to DN 150 / 200R150

Up to a nominal width of DN 125 / 150R125, the sealing system in the bore is formed by the two sealing rings (prestressed by sinus springs) and the ball. The pressure of the medium forces the ball against the downstream sealing element. The sealing ring on the upstream side, enclosed on three sides, is simultaneously pushed against the ball by the pressure of the medium and the sinus spring.

The forces exerted on the sealing rings increase with greater nominal widths. As a consequence, a reliable sealing system can only be ensured by means of a trunnion-mounted ball. From DN 150 / 200R150 upwards, the forces of the differential pressure are diverted into the body by the trunnion and the operating stem and the sealing elements serve only to ensure reliable sealing of the valve in the bore. Tightness to atmosphere is ensured by double-sealing the operating stem. This prevents the medium from rising within the body shaft. Two O-rings, located at the base of the operating stem, form the primary seal and protect the trunnions of the operating stem against major contamination. The secondary O-rings are located at the end of the shaft construction and facilitate simple replacement – neither the entire valve nor the insulation must be removed for such a task.

CERTIFIED QUALITY EN 488:2015

Over the years, the demands regarding underground shut-off valves have been continuously increased in order to further improve operational safety. This, however, is only possible through the utilization of special valves with especially rigid and deformation-resistant bodies. The KLINGER Monolith KHO ball valve series was specifically developed for the application in pipe systems operated in combination with major external loads. The valve is characterized by its massive cast design and the fully welded body, which is optimized to cope with major forces. As a consequence, neither cold formed sheet metal or pipe components are utilized, nor is a welding seam located directly on the body shaft. Instead, an optimized position of the body welding seams prevents contact corrosion. These measures lead to a valve body with a very high degree of rigidity and ensure that external loads do not exert an influence on the sealing system. The KLINGER Monolith KHO meets the requirements of the standard EN 488:2015 and of the AGFW worksheet FW 401.



EN 488 defines the technical requirements as well as the testing procedure for underground shut-off valves integrated directly into the district heating network.

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 and shaft construction must feature corrosion protection. KLINGER Monolith KHO ball valves are successfully tested and certified by the TÜV Austria on the company-own multi-function test stand under inclusion of the expanded requirements of EN 488:2015.

MONOLITH KHO

Overview of types



KHO WITH LONG SHAFT

Full bore

- » Trunnion mounted ball from DN 150 upwards
- » High degree of resilience against pipework forces

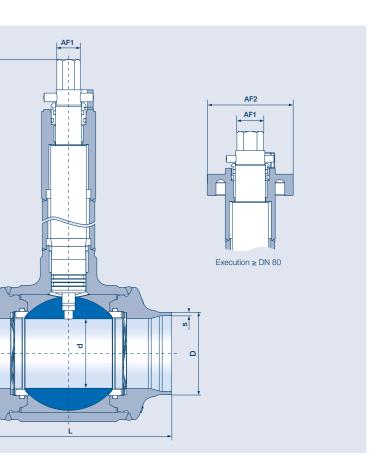
Welding ends in accordance with AGFW worksheet

Face-to-face dimensions in accordance with EN 12982, series 67 (up to DN 125) and series 63

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

DN	DN PN		Di	imensio	ns			450	Weight in	
DN	PN	L	Н	Ød	ØD	s	AF1	AF2	kg	
20	40	90	398	20	26.9	2.6	19	n.a.	2.7	
25	40	100	402	25	33.7	2.6	19	n.a.	3.2	
32	40	110	413	32	42.4	3.2	19	n.a.	3.9	
40	40	125	420	40	48.3	3.2	19	n.a.	5.3	
50	40	150	430	50	60.3	3.2	19	n.a.	8.9	
65	40	190	440	64	76.1	3.2	19	n.a.	13	
80	40	220	449	79	88.9	3.2	27	90	20.1	
100	40	260	463	98	114.3	3.6	27	90	31.2	
125	40	330	495	125	139.7	3.6	27	90	52.6	
150	25	457	515	150	168.3	4	50	90	80.9	
200	25	521	548	200	219.1	4.5	50	90	139	
250	25	559	583	250	273	5	50	90	206.1	
n.a. = not	available									





KHO WITH LONG SHAFT

Reduced bore

GENERAL FEATURES

- » Fully welded ball valve with reduced bore
- » Certified according to EN 488:2015
- » Trunnion mounted ball from DN 200R150 upwards
- » High degree of resilience against pipework forces

CONNECTIONS

Welding ends in accordance with AGFW worksheet FW 401 – Part 5 $\,$

DIMENSIONS

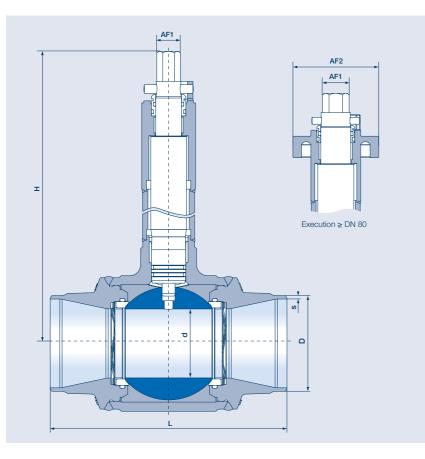
Face-to-face dimensions in accordance with EN 12982, series 67 (up to DN 125R100) and series 63 (from DN 150R125 upwards)

ACCEPTANCE TESTING

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

TEMPERATURE

-10 °C to +200 °C (see P-T diagram)



REDUCED BORE

MATERIAL

Body: Cast steel 1.0619 (Material code VII)

Ball: Stainless steel 1.4408 (up to DN 150R125), nodular cast iron 0.7040, hard-chrome plated surface (from DN 200R150 upwards)

DN	PN		DI	mensio	JIS		AF1	AF2	Weight		
DN	FIN	L	Н	Ød	ØD	s	AFT	AF2	in kg		
25R20	40	100	398	20	33.7	2.6	19	n.a.	2.7		
32R25	40	110	402	25	42.4	3.2	19	n.a.	3.3		
40R32	40	125	413	32	48.3	3.2	19	n.a.	4		
50R40	40	150	420	40	60.3	3.2	19	n.a.	5.5		
65R50	40	190	430	50	76.1	3.2	19	n.a.	9.5		
80R65	40	220	440	64	88.9	3.2	19	n.a.	13.6		
100R80	40	260	449	79	114.3	3.6	27	90	23		
125R100	40	330	463	98	139.7	3,6	27	90	35.5		
150R125	40	457	495	125	168.3	4	27	90	64.8		
200R150	25	521	515	150	219.1	4,5	50	90	103.1		
250R200	25	559	548	200	273	5	50	90	155.7		
300R250	25	635	583	250	323.9	5.6	50	90	245.5		
n.a. = not availabl	е										

KHO – LONG SHAFT WITH ISO FLANGE

Full bore

GENERAL FEATURES

- » Fully welded ball valve with full bore
- » Certified according to EN 488:2015
- » Trunnion mounted ball from DN 150 upwards
- » High degree of resilience against pipework forces

CONNECTIONS

Welding ends in accordance with AGFW worksheet FW 401 – Part 5

DIMENSIONS

Face-to-face dimensions in accordance with EN 12982, series 67 (up to DN 125) and series 63 (from DN 150 upwards)

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.

Cast steel 1.0619 (Material code VII)

Stainless steel 1.4408 (up to DN 125),

nodular cast iron 0.7040, hard-chrome

plated surface (from DN 150 upwards)

TEMPERATURE

-10 °C to +200 °C (see P-T diagram)

FULL BORE

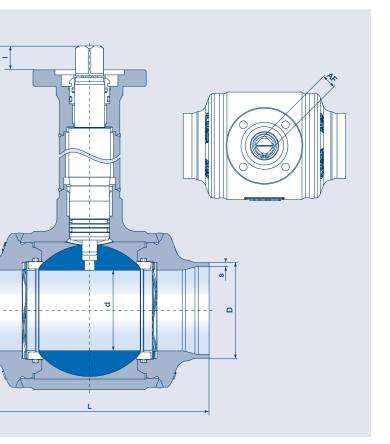
MATERIAL

Body:

Ball:

	DN	PN	
	DIN	FIN	L

20	40	90
25	40	100
32	40	110
40	40	125
50	40	150
65	40	190
80	40	220
100	40	260
125	40	330
150	25	457
200	25	521
250	25	559



Di	mensio	ns		Mounting	flange for	actuator	Weight in
Н	Ød	ØD	s	ISO	I.	AF	kg
381	20	26.9	2.6	F05	12	11	2.8
385	25	33.7	2.6	F05	12	11	3.3
396	32	42.4	3.2	F05	12	11	4
403	40	48.3	3.2	F05	12	11	5.4
421	50	60.3	3.2	F07	19	17	9.2
431	64	76.1	3.2	F07	19	17	13.3
448	79	88.9	3.2	F10	24	22	20.7
462	98	114.3	3.6	F10	24	22	31.8
494	125	139.7	3.6	F10	24	22	53.7
553	150	168.3	4	F14	65	Ø 48	84.5
586	200	219.1	4,5	F14	65	Ø 48	142.5
636	250	273	5	F16	80	Ø 60	213.4

KHO – LONG SHAFT WITH ISO FLANGE

Reduced bore

GENERAL FEATURES

- » Fully welded ball valve with reduced bore
- » Certified according to EN 488:2015
- » Trunnion mounted ball from DN 200R150 upwards
- » High degree of resilience against pipework forces

CONNECTIONS

Welding ends in accordance with AGFW worksheet FW 401 – Part 5

DIMENSIONS

Face-to-face dimensions in accordance with EN 12982, series 67 (up to DN 125R100) and series 63 (from DN 150R125 upwards)

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.

Cast steel 1.0619 (Material code VII)

150R125), nodular cast iron 0.7040, hard-chrome plated surface

Stainless steel 1.4408 (up to DN

(from DN 200R150 upwards)

TEMPERATURE

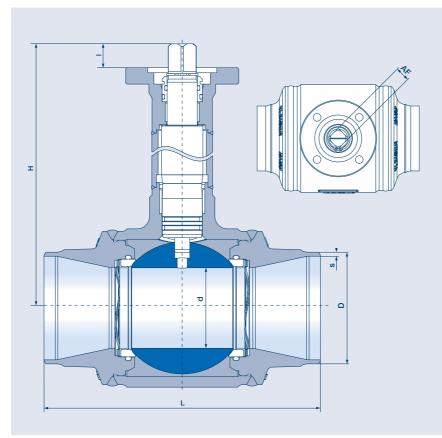
MATERIAL

Body:

Ball:

-10 °C to +200 °C (see P-T diagram)

REDUCED BORE



DN PN			Din	nensio	ns		Mounting	actuator	Weight	
DN	PN	L	Н	Ød	ØD	s	ISO	I.	AF	in kg
25R20	40	100	381	20	33.7	2.6	F05	12	11	2.8
32R25	40	110	385	25	42.4	3.2	F05	12	11	3.4
40R32	40	125	396	32	48.3	3.2	F05	12	11	4.1
50R40	40	150	403	40	60.3	3.2	F05	12	11	5.6
65R50	40	190	421	50	76.1	3.2	F07	19	17	9.8
80R65	40	220	431	64	88.9	3.2	F07	19	17	13.9
100R80	40	260	448	79	114.3	3.6	F10	24	22	23.6
125R100	40	330	462	98	139.7	3.6	F10	24	22	36.1
150R125	40	457	494	125	168.3	4	F10	24	22	65.9
200R150	25	521	553	150	219.1	4,5	F14	65	Ø 48	106.7
250R200	25	559	586	200	273	5	F14	65	Ø 48	159.2
300R250	25	635	636	250	323.9	5.6	F16	80	Ø 60	252.8

KHO **SHORT SHAFT**

Full bore

GENERAL FEATURES

- » Fully welded ball valve with full bore
- » Certified according to EN 488:2015
- » Trunnion mounted ball from DN 150 upwards
- » High degree of resilience against pipework forces

CONNECTIONS

Welding ends in accordance with AGFW worksheet FW 401 – Part 5

DIMENSIONS

Face-to-face dimensions in accordance with EN 12982, series 67 (up to DN 125) and series 63 (from DN 150 upwards)

ACCEPTANCE TESTING

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

TEMPERATURE

-10 °C to +200 °C (see P-T diagram)

FULL BORE

MATERIAL

Body:

Ball:

т

DN	PN			Dimen	isions			AF1	AF2	Weight
DIN	PIN	L	н	G	Ød	ØD	s	AFT	AF2	in kg
20	40	90	398	120	20	26.9	2.6	19	n.a.	1.5
25	40	100	402	120	25	33.7	2.6	19	n.a.	2
32	40	110	413	120	32	42.4	3.2	19	n.a.	2.7
40	40	125	420	120	40	48.3	3.2	19	n.a.	4.1
50	40	150	430	200	50	60.3	3.2	19	n.a.	6.3
65	40	190	440	200	64	76.1	3.2	19	n.a.	10.4
80	40	220	449	400	79	88.9	3.2	27	90	17.1
100	40	260	463	400	98	114.3	3.6	27	90	28.8
125	40	330	495	630	125	139.7	3.6	27	90	50.2
150	25	457	515	700	150	168.3	4	50	90	74.9
200	25	521	548	1100	200	219.1	4.5	50	90	133.1
250	25	559	583	n.a.	250	273	5	50	90	197.4
n.a.= no	ot availat	ole								

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

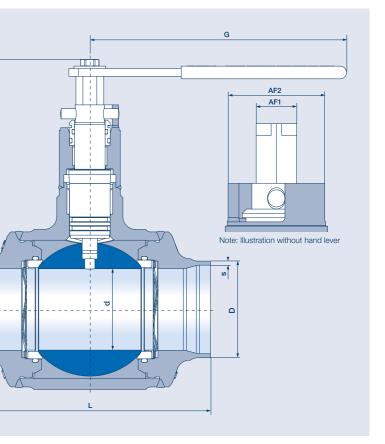
Cast steel 1.0619 (Material code VII)

Stainless steel 1.4408 (up to DN 125),

nodular cast iron 0.7040, hard-chrome

plated surface (from DN 150 upwards)





KHO SHORT SHAFT

Reduced bore

GENERAL FEATURES

- » Fully welded ball valve with reduced bore
- » Certified according to EN 488:2015
- » Trunnion mounted ball from DN 200R150 upwards
- » High degree of resilience against pipework forces

CONNECTIONS

Welding ends in accordance with AGFW worksheet FW 401 – Part 5 $\,$

DIMENSIONS

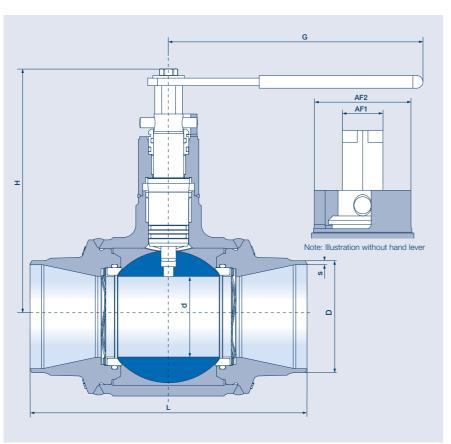
Face-to-face dimensions in accordance with EN 12982, series 67 (up to DN 125R100) and series 63 (from DN 150R125 upwards)

ACCEPTANCE TESTING

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

TEMPERATURE

-10 °C to +200 °C (see P-T diagram)



REDUCED BORE

MATERIAL

Body: Cast steel 1.0619 (Material code VII)

Ball: Stainless steel 1.4408 (up to DN 150R125), nodular cast iron 0.7040, hard-chrome plated surface (from DN 200R150 upwards)

25R20	40	100	398	120	20	33.7	2.6	19	n.a.	1.5
32R25	40	110	402	120	25	42.4	3.2	19	n.a.	2.1
40R32	40	125	413	120	32	48.3	3.2	19	n.a.	2.8
50R40	40	150	420	120	40	60.3	3.2	19	n.a.	4.3
65R50	40	190	430	200	50	76.1	3.2	19	n.a.	6.9
80R65	40	220	440	200	64	88.9	3.2	19	n.a.	11
100R80	40	260	449	400	79	114.3	3.6	27	90	20
125R100	40	330	463	400	98	139.7	3.6	27	90	32.5
150R125	40	457	495	630	125	168.3	4	27	90	62.4
200R150	25	521	515	700	150	219.1	4,5	50	90	97.1
250R200	25	559	545	1100	200	273	5	50	90	149.8
300R250	25	635	583	n.a.	250	323.9	5.6	50	90	236.8
n.a.= not availab	le									

Dimensions

H G Ød ØD s

DN

PN

KHO – SHORT SHAFT WITH ISO FLANGE

Full bore

GENERAL FEATURES

- » Fully welded ball valve with full bore
- » Certified according to EN 488:2015
- » Trunnion mounted ball from DN 150 upwards
- » High degree of resilience against pipework forces

CONNECTIONS

Welding ends in accordance with AGFW worksheet FW 401 – Part 5

DIMENSIONS

Face-to-face dimensions in accordance with EN 12982, series 67 (up to DN 125) and series 63 (from DN 150 upwards)

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.

Cast steel 1.0619 (Material code VII)

Stainless steel 1.4408 (up to DN 125),

nodular cast iron 0.7040, hard-chrome

plated surface (from DN 150 upwards)

TEMPERATURE

-10 °C to +200 °C (see P-T diagram)

FULL BORE

MATERIAL

Body:

Ball:

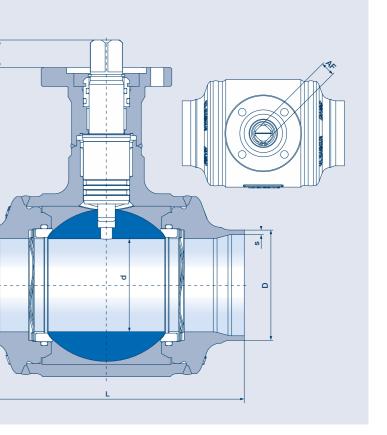
Weight

in kg

AF1 AF2

DN PN L

20	40	90
25	40	100
32	40	110
40	40	125
50	40	150
65	40	190
80	40	220
100	40	260
125	40	330
150	25	457
200	25	521
250	25	559



Di	mensio	ns		Mounting	flange for	actuator	Weight in
Н	Ød	ØD	s	ISO	I.	AF	kg
99	20	26.9	2.6	F05	12	11	1.4
103	25	33.7	2.6	F05	12	11	1.9
114	32	42.4	3.2	F05	12	11	2.6
121	40	48.3	3.2	F05	12	11	4
159	50	60.3	3.2	F07	19	17	6.1
169	64	76.1	3.2	F07	19	17	10.2
206	79	88.9	3.2	F10	24	22	16.4
220	98	114.3	3.6	F10	24	22	27.5
252	125	139.7	3.6	F10	24	22	48.9
353	150	168.3	4	F14	65	Ø 48	75.6
386	200	219.1	4,5	F14	65	Ø 48	132.7
461	250	273	5	F16	80	Ø 60	203.4

KHO – SHORT SHAFT WITH ISO FLANGE

Reduced bore

GENERAL FEATURES

- » Fully welded ball valve with reduced bore
- » Certified according to EN 488:2015
- » Trunnion mounted ball from DN 200R150 upwards
- » High degree of resilience against pipework forces

CONNECTIONS

Welding ends in accordance with AGFW worksheet FW 401 – Part 5

DIMENSIONS

Face-to-face dimensions in accordance with EN 12982, series 67 (up to DN 125R100) and series 63 (from DN 150R125 upwards)

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.

Cast steel 1.0619 (Material code VII)

(up to DN 150R125), nodular cast iron

0.7040, hard-chrome plated surface

(from DN 200R150 upwards)

Stainless steel 1.4408

TEMPERATURE

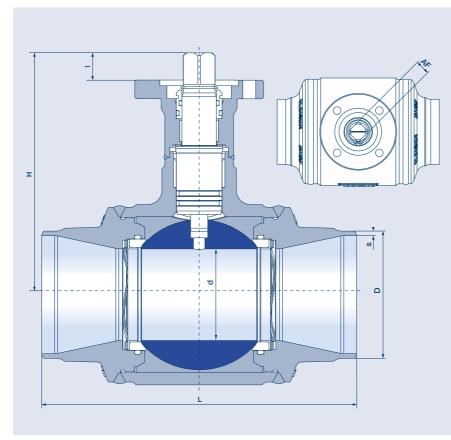
MATERIAL

Body:

Ball:

-10 °C to +200 °C (see P-T diagram)

REDUCED BORE

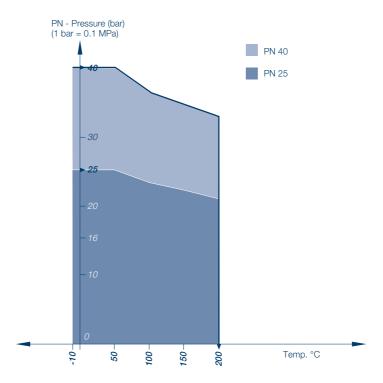


DN PN		Dimensions				Mounting flange for actuator			Weight	
DN	PN	L	н	Ød	ØD	s	ISO	1	AF	in kg
25R20	40	100	99	20	33.7	2.6	F05	12	11	1.4
32R25	40	110	103	25	42.4	3.2	F05	12	11	2
40R32	40	125	114	32	48.3	3.2	F05	12	11	2.7
50R40	40	150	121	40	60.3	3.2	F05	12	11	4.2
65R50	40	190	159	50	76.1	3.2	F07	19	17	6.7
80R65	40	220	169	64	88.9	3.2	F07	19	17	10.8
100R80	40	260	206	79	114.3	3.6	F10	24	22	19.3
125R100	40	330	220	98	139.7	3.6	F10	24	22	31.8
150R125	40	457	252	125	168.3	4	F10	24	22	61.1
200R150	25	521	353	150	219.1	4.5	F14	65	Ø 48	97.8
250R200	25	559	386	200	273	5	F14	65	Ø 48	149.4
300R250	25	635	461	250	323.9	5.6	F16	80	Ø 60	242.8

TECHNICAL DETAILS

Application design

Pressure and temperature ranges



Flow Values

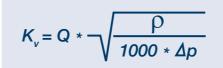
FULL BORE

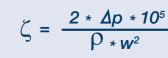
REDUCED BORE

DN (mm)	ζ	\mathbf{K}_{vs} -value	DN (mm)
20	0.2	35.8	25R20
25	0.14	66.8	32R25
32	0.12	118	40R32
40	0.11	193	50R40
50	0.1	316	65R50
65	0.076	607	80R65
80	0.067	980	100R80
100	0.058	1,645	125R100
125	0.051	2,742	150R125
150	0.045	4,203	200R150
200	0.038	8,131	250R200
250	0.033	13,630	300R250

Allows for the calculation of:

or





Torques	
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Nominal diameter DN	Differential pressure (bar)	Torque (Nm)
mm	bar	Nm
20 / 25R20	40	11
25 / 32R25	40	16
32 / 40R32	40	26
40 / 50R40	40	42
50 / 65R50	40	61
65 / 80R65	40	113
80 / 100R80	40	190
100 / 125R100	40	326
125 / 150R125	40	490
150 / 200R150	25	431
200 / 250R200	25	708
250 / 300R250	25	1,379

For standard computations, KLINGER Fluid Control recommends the factor 1.5, i.e. using plus 50 %.

ζ	$\mathbf{K}_{vs} ext{-Wert}$
0.54	34
0.41	63.9
0.35	108
0.33	174
0.32	299
0.31	460
0.3	730
0.3	1,141
0.3	1,642
0.3	2,920
0.29	4,640
0.29	6,682

SIZE OF BALL VALVE

Flow rate
Pressure loss
Density
Velocity
Flow coefficient
Pressure loss coefficier

Q in m³/h **Δp** in bar n in kg/m³ W in m/s Κ in m³/h nt C



The valve is to be selected in a manner that the K_{vs} -value is greater, or the ζ -value less than the computed value for the application.

PRODUCT **OVERVIEW**



X



























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