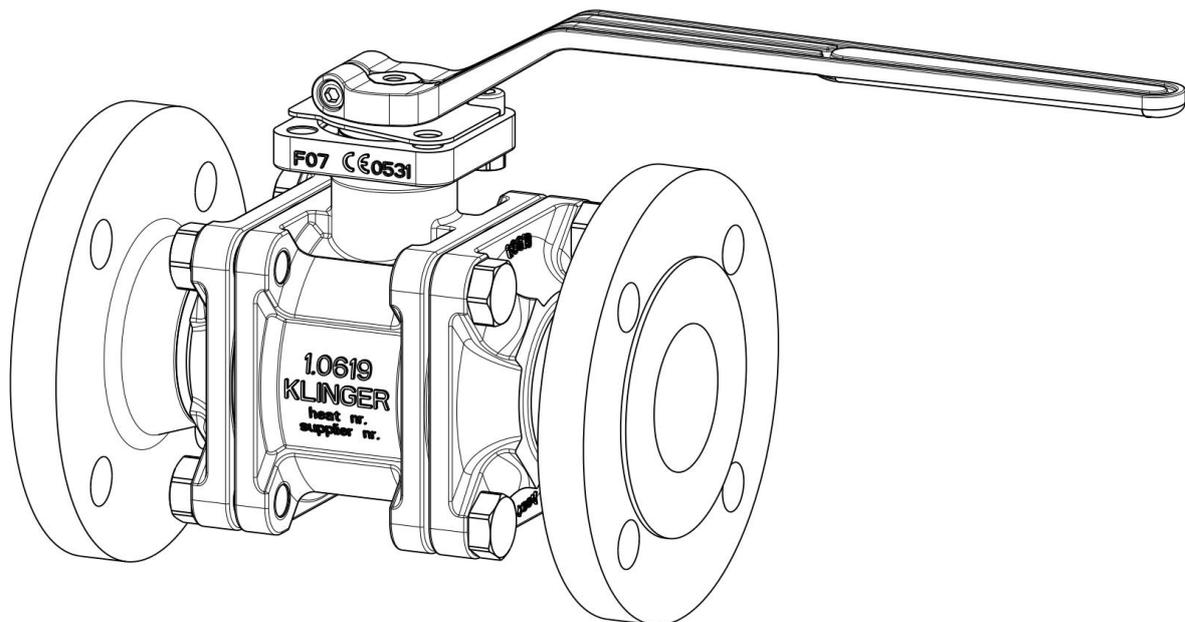


STANDARD OPERATION MANUAL FOR

KLINGER VALVES

**BALLOSTAR® KHA BALL VALVE
STANDARD-, HIGH-TEMPERATURE AND
DOUBLE BLOCK & BLEED VERSION
NOMINAL PIPE SIZE: DN 10 – DN 125
TYPE: 3-PIECE BALL VALVE**



Issued: 01/2022

KLINGER Fluid Control GmbH

Am Kanal 8-10 » 2352 Gumpoldskirchen » Austria

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1. Declaration of Conformity:



DECLARATION OF CONFORMITY

according to Directive 2014/68/EU

We,

KLINGER Fluid Control GmbH
Am Kanal 8-10
A-2352 Gumpoldskirchen

declare, that the product range

Ball Valve KLINGER Ballostar
Type: **KHA**
Size: **DN 32 - 125 and 1 1/4" - 5"**
Connection: **Flange, welding ends, threads**

to which this declaration is referring to, is in compliance with the directive 2014/68/EU (PED) and the following standards:

EN 19, EN 1092-1/-2, EN 1563, EN 10213, EN 12266-1,
EN 12516-1/-2 (except point 10), EN 13445-3 (only point 11), EN 558,
EN 1983 and AD 2000 (B0, W3/2)

and was subjected to the following conformity assessment procedure:

Modul H (full quality assurance)

The surveillance of the quality system and the design review is performed by:

TÜV Süd Landesgesellschaft Österreich GmbH
Franz-Grill-Straße 1, Arsenal Objekt 207
1030 Wien
(notified body no. 0531)

Gumpoldskirchen, 09.12.2021
(place and date of issue)

ppca. Yusuf Avci
(managing director under trade law)



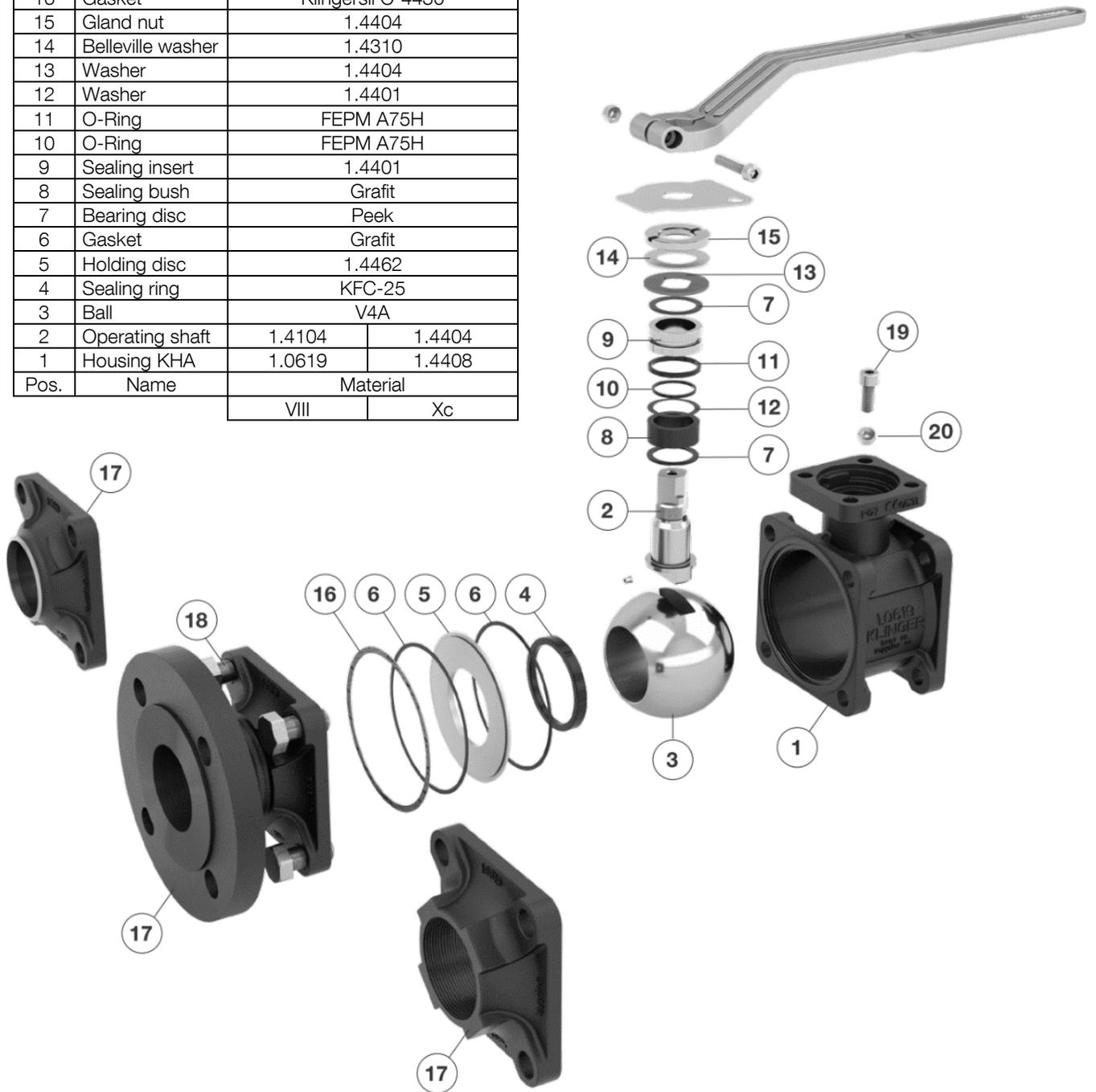
Rev: 12/2021

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2. Individual Parts Designation:

20	Hexagon nut	A4	
19	Socket screw	A4	
18	Hexagon screw	A4	
17	Flange cap	1.0619/1.0345	1.4408/1.4404
16	Gasket	Klingersil C-4430	
15	Gland nut	1.4404	
14	Belleville washer	1.4310	
13	Washer	1.4404	
12	Washer	1.4401	
11	O-Ring	FEPM A75H	
10	O-Ring	FEPM A75H	
9	Sealing insert	1.4401	
8	Sealing bush	Grafit	
7	Bearing disc	Peek	
6	Gasket	Grafit	
5	Holding disc	1.4462	
4	Sealing ring	KFC-25	
3	Ball	V4A	
2	Operating shaft	1.4104	1.4404
1	Housing KHA	1.0619	1.4408
Pos.	Name	Material	
		VIII	Xc



3. Proper Use:

This product is exclusively intended to shut off or convey media within the approved pressure and temperature limits after installation in a pipeline system.

Please see the P/T diagram (pressure temperature diagram) for the permissible threshold values in accordance with the utilized materials.

This operating manual must unconditionally be brought to the attention of the corresponding personnel!

Prior to installation and putting into service for the first time, please read the operating manual carefully and pay attention to the hazard and safety notes!

<p>! CAUTION</p>	<p>Non-compliance with the hazard and safety notes of this operating manual may result in the creation of hazards and loss of the manufacturer's warranty.</p> <p>Please contact the manufacturer under +43 2252 600-0 for further details.</p>
------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Subject to technical alterations and misprints!

4. Testing of KLINGER Valves:

KLINGER Valves are pressure-tested in accordance with EN 12266-1. The pressure test comprises the tests P10, P11 and P12. Testing the resistance to pressure of the ball (P20) is not included in the standard package.

5. Labeling of the Valves:

Each valve is provided with the following data listed either on the body or on a type plate.

	Designation	Comment
Manufacturer	KLINGER	Please see the operation manual for the address
Model	e.g. KHA	Manufacturer's type designation
Size	DN and numeric value	Numeric value in mm, e.g. DN 80 or inches, e.g. 3"
PN / Class	Numeric value for PN / Class	Provides the max. permissible pressure at ambient temperature
FA-No.	Numbers / letters	FA-No. serves identification purposes
Material	e.g. 1.0619 or VII	In accordance with material codes
	CE	Market approval designation
	Designation	Comment

6. Safety Instructions:

This operation manual must be brought to the attention of the operating service staff.

6.1 General Notes on Safety:

The safety instructions for valves also has to belong to the pipeline systems, which are installed. This operating manual exclusively focuses on safety instructions, which are to be additionally complied with for valves.

6.2 Safety Instructions for Operators:

<p style="text-align: center;">! Danger to Life</p>	<p>A valve with a permissive pressure/temperature range that is not sufficient for the operating conditions may not be operated! This range is to be derived from the P/T diagram. With regard to materials, pressures or temperatures not listed there, contacting the manufacturer is mandatory. Ignoring this regulation can result in life-threatening situations and can cause damage to the pipeline system.</p>
<p style="text-align: center;">! Danger to Life</p>	<p>It must be ensured that materials selected for the parts coming into contact with the media are suitable for the utilized media. The manufacturer takes no responsibility for damages resulting from corrosion or through aggressive media. Ignoring this regulation can result in life-threatening situations and can cause damage to the pipeline system.</p>

The following items do **not** lie in the scope of responsibility of the manufacturer. As a consequence, when utilizing the valve, it must be ensured that

- » the valve is only utilized in accordance with its proper use, as illustrated under "Proper Use".
- » the actuator unit, which is subsequently mounted on the valve, is adjusted to the valve and correctly adjusted in the end position.
- » when connecting a valve actuator to the power grid, the safety notices of the actuator manufacturer are complied with.
- » the valves are correctly implemented into the system, especially those connected to the pipeline system by means of welding.
- » no additional tensions bear on the valves.
- » the operation parameters and operating conditions have been clarified with the manufacturer of the valve and that operating conditions such as vibrations, water hammers, pressure surges, erosion etc. are to be avoided.
- » pipeline system connections and valves, which are operated at operating temperatures $> 50\text{ °C}$ or $< -20\text{ °C}$, are protected against contact.
- » during welding procedures, the safety regulations of the plant operator and/or plant constructor are to be complied with.
- » the valve is only operated and maintained by trained service staff.
- » valves, which are used for hazardous media (flammable, corrosive, harmful to health etc.), are to be handled in accordance with their dangers. The corresponding handling regulations are the responsibility of the plant operator.

- » all ergonomic hazards are to be considered by the plant operator, such as e.g. accessibility, gauges etc.
- » when applying internal pressure for the first time (pressure test, trial operation) a sufficient safety distance must be maintained.
- » when pressurized (medium), it is prohibited to open screw connections (with the exception of those on hand levers and handwheels).
- » installation and removal of valves is only carried out with a depressurized and drained pipeline.
- » all connections, following loosening, are again correctly tightened afterwards.
- » no screws are loosened on pressure-retaining parts, unless described so in the operation manual.
- » no screwed connections are forcibly opened.
- » that during longer shutdown periods, in the event of freezing media, the valve is drained and/or that depressurization is achieved in case of expanding media.

6.3 Hazard Warnings:

Mechanical hazards:

- » Beware of possible sharp or protruding parts posing risk of injury.
- » Extra care is required during putting into operation: Do not reach into the bore opening during the valve closing process, as this poses a risk of injury.
- » Be careful of falling parts during transportation, maintenance and putting into operation.
- » When manipulating lifting appliances, the safety regulations for lifting appliances must be complied with.
- » Unauthorized and improper handling can result in undesired and spontaneous pressure loss and can result in significant damage.
- » With regard to valves featuring a mounting bracket it must be ensured that moving valve parts do not result in a risk of injury.

Electrical hazards:

- » With regard to valves featuring electric actuators, the operating manual and the safety instructions of the actuator manufacturer must be complied with.

Thermal hazards:

- » During operation, the surfaces of valves may feature high / low temperatures. Caution: Burn hazard.
- » Caution: The hot surfaces can cause self-ignition of flammable materials through either contact or heat emission.

Hazard generated by noise:

- » Depending on the application conditions, high levels of noise can be created by the cavitation processes, which bear the risk of hearing damage.
- » Opening an internally pressurized valve can result in major noise exposure as a result of exiting media; hearing damage hazard.

Vibration hazard:

- » Caution: Abrupt opening or closing of a valve can lead to undesired surges and vibrations in the pipe, which may possibly damage the valve or the pipeline system.

Electromagnetic radiation hazard:

- » The hazards resulting from possibly created electromagnetic radiation are to be consulted in the operating manual of the actuator manufacturer.

Hazards linked to the operational environment:

- » The ambient atmosphere and the ambient temperature are to be set in a manner that has no negative influence on the valve, the actuator of the valve, and the medium.

Transportation hazards:

- » Please see the chapter “Transportation and Storage” for transportation hazards.

Maintenance hazards:

- » All maintenance and repair tasks with the exception of lubricating and subsequent sealing of stuffing boxes are without exception to be carried out in an unpressurized state. Where required, the valve may have to be drained prior to servicing.
- » Valves may only be removed from pipeline systems in an unpressurized and empty state.
- » Attention must be paid to exiting media when resealing.
- » Caution: (Fire and chemical) burn hazard and risk of poisoning caused by valves utilized in dangerous media. Attention must be paid to medium residues during maintenance and putting into operation tasks.
- » Maintenance and repairs may only be carried out by qualified personnel.

Placing out of operation hazards:

- » When placing out of operation, the valves must be emptied fully and attention must be paid to hazards resulting from medium residue.
- » If valves are no longer in use, they have to be disposed of correctly.

Hazards when opening drain valves:

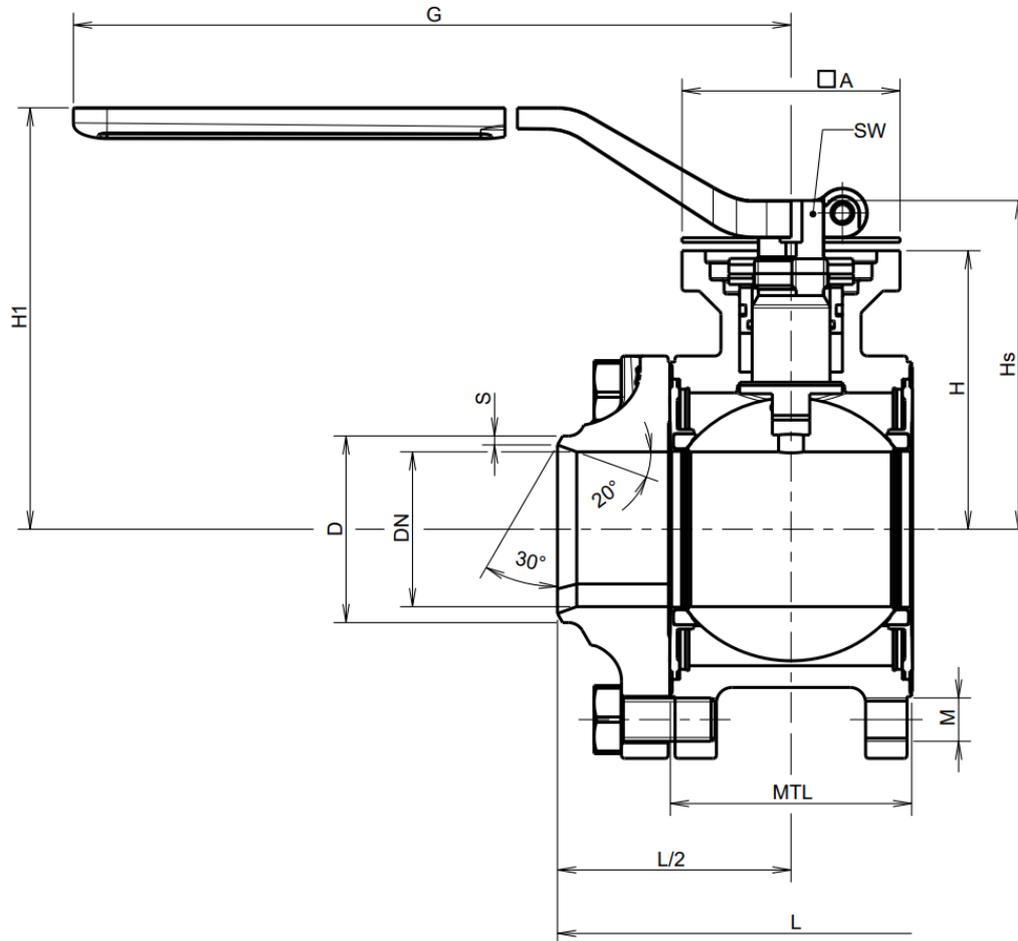
- » Danger of exiting medium. If utilized in high temperature water systems, the drain ball valve may only be opened after it has been ensured that the drain line is either correspondingly pressurized or that the temperature is less than 100°C (avoidance of steam hammers in the clearance volume).

Material failure hazard:

- » Parts made of grey cast iron are especially sensitive to brittle fracture and impact. This aspect must be considered in the course of material selection.

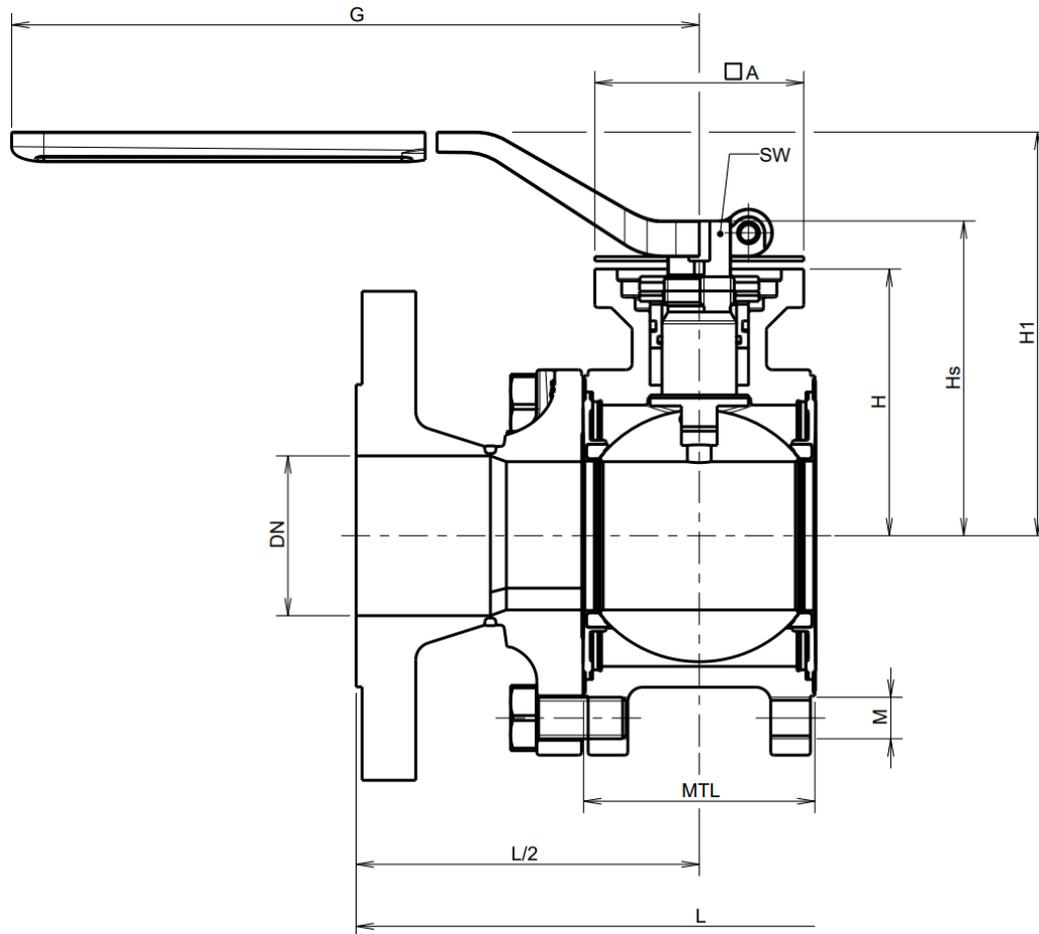
7. Technical Data:

7.1 Product Data Sheet KHA-S / with Welding Ends:



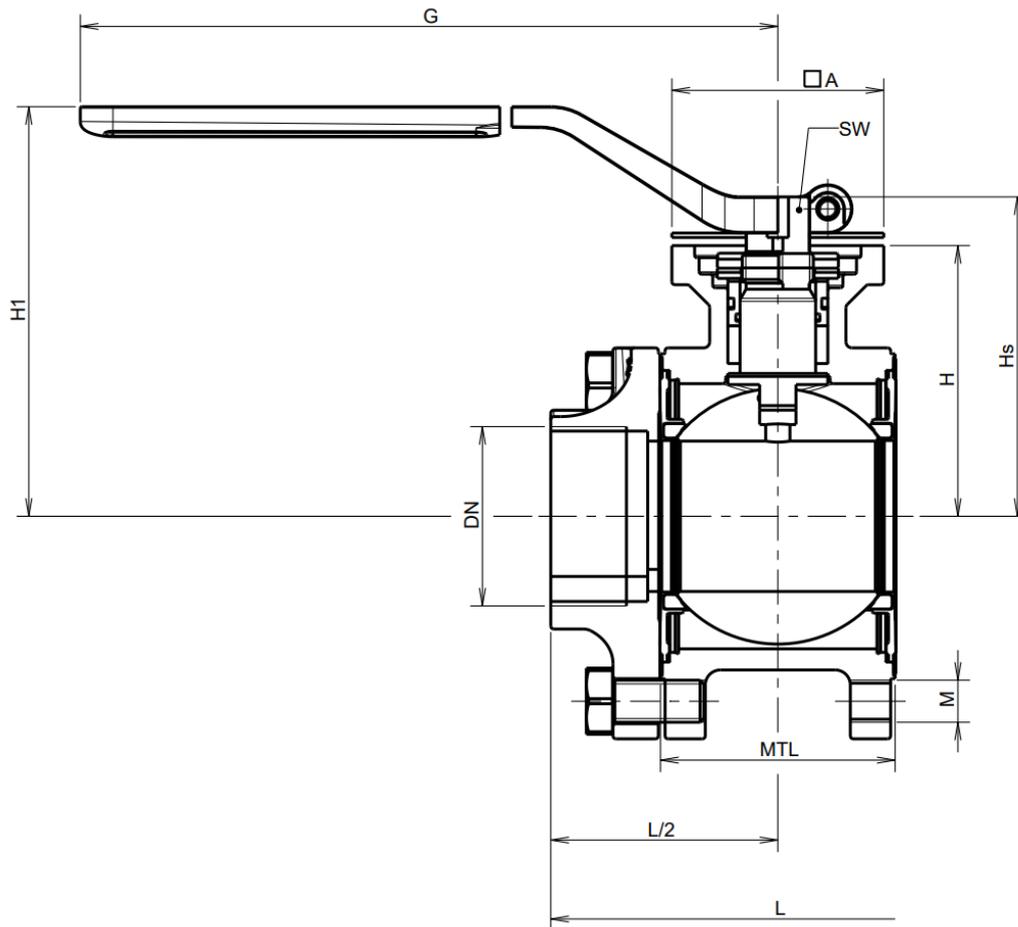
DN	Dimensionen												PN		Top Flange ISO 5211	[kg]	
	MTL	D	S	A	H	Hs	H1	G	SW	M	n	L	VIII	Xc			
15	26,4	21,3	2	42	35	43,5	83	130	8	M6	4	75	100	63	F04	0,85	
20	35,2	28	3	42	46,5	57	96	160	11	M8	4	90				1,45	
25	41,5	33,7	2,6	42	50	60,5	100	160	11	M8	4	105				1,8	
32	49,5	42,4	2,6	50	65	77,7	107,5	252	14	M10	4	110	63	40	F05	3,1	
40	63	48,3	3,2	50	72,5	85,2	114,7	252	14	M12	4	125				4,75	
50	77,5	60,3	2,9	70	90	106,2	136,2	310	17	M14	4	150	40		F07	7,6	
65	93,5	76,1	3,05	70	100	116,2	146,2	310	17	M12	6	190				10,6	
80	111,4	88,9	3,2	102	121,5	143	165	500	22	M16	6	220				F10	19,5
100	131,6	114,3	3,6	102	135	156,5	178,5	500	22	M16	6	270					28
125	171,4	139,7	4	125	175	202,5	212,5	650	27	M16	8	330				F12	49,5

7.2 Product Data Sheet KHA-F / with Flange End Pieces:



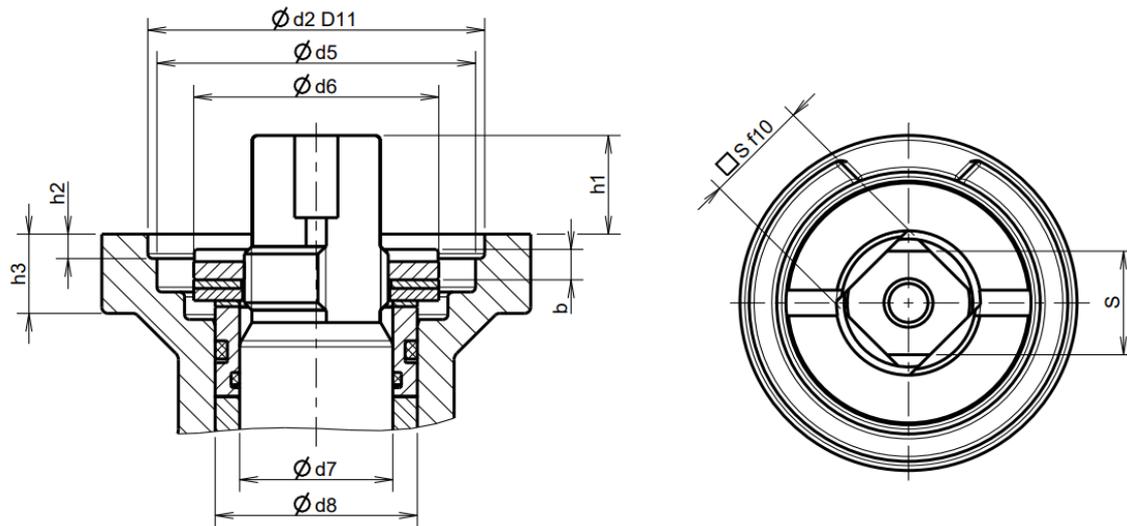
DN	Dimensionen										PN		Top Flange ISO 5211	[kg]		
	MTL	A	H	Hs	H1	G	SW	M	n	L	VIII	Xc				
15	1/2"	26,4	42	35	43,5	83	130	8	M6	4	130	140	100	63	F04	2,3
20	3/4"	35,2		46,5	57	96	160	11	M8		150	152				3,5
25	1"	41,5		50	60,5	100					160	165				4,25
32	1-1/4"	49,5	50	65	77,7	107,5	252	14	M10	6	180	178	63	40	F05	6,8
40	1-1/2"	63		72,5	85,2	114,7			M12		200	190				9
50	2"	77,5	90	106,2	136,2	310			17		M14	6				230
65	2-1/2"	93,5	100	116,2	146,2		M12	290		241	18					
80	3"	111,4	102	121,5	143		165	500		22	M16		6	310	282	40
100	4"	131,6		135	156,5	178,5	350		305			40,6				
125	5"	171,4	125	175	202,5	212,5	650		27			8		400	381	

7.3 Product Data Sheet KHA-G / for Threaded End Pieces:



DN	Dimensionen										PN		Top Flange ISO 5211	[kg]	
	MTL	A	H	Hs	H1	G	SW	M	n	L	VIII	Xc			
15	1/2"	26,4	42	35	43,5	83	130	8	M6	4	85	100	63	F04	0,9
20	3/4"	35,2		46,5	57	96		11	M8		95				1,45
25	1"	41,5		50	60,5	100		M10	105		1,8				
32	1-1/4"	49,5	50	65	77,7	107,5	252	14	M12		63	40	F05	3,15	
40	1-1/2"	63		72,5	85,2	114,7		M14	130					4,75	
50	2"	77,5		70	90	106,2		136,2	310					17	M14

7.4 Dimensions on the ISO5211 Top Flange:



DN	d2	d5	d6	d7	d8	h1	h2	h3	b	s
15	30	20	16	10	14	7	3	4	4	8
20, 25	30	28	24	16	21	9,5	3	6	4	11
32, 40	35	33	29	20	26	12,3	4	10	4,5	14
50, 65	55	52	43	25	33	15,3	4	13	5,5	17
80, 100	70	56	47	30	40	20,5	4	14	6	22
125	85	64	52	34	45	25,5	4	17	8,5	27

7.5 Material Codes:

The main criterion of the material codes is the basic material of the body.

Symbol	Body	Interior Parts
VII	Cast steel	Nonferrous metal parts possible
VIII	Cast steel	Without nonferrous metal part
X	Stainless steel	Medium wetted parts acid resistant
Xc	Stainless steel	All parts acid-resistant

The above table may also contain material codes unavailable for this product.

7.6 Actuating Torques:

Actuating Torques KFC-Sealing Ring												
Nominal Dia DN		Differential pressure (bar)										
		0	5	10	16	20	25	30	40	50	63	100
Zoll	mm	Torque (Nm)										
1/2"	15	6	6	6	7	7	7	7	8	8	9	10
3/4"	20	12	12	13	13	13	14	14	15	16	16	19
1"	25	14	15	16	17	18	19	20	22	24	27	
1 1/4"	32	17	18	20	22	23	24	26	28	31	35	
1 1/2"	40	25	28	31	34	36	39	42	47	53	60	
2"	50	37	41	44	49	52	55	59	66			
2 1/2"	65	60	66	73	80	85	91	98	110			
3"	80	96	114	132	154	168	186	204	240			
4"	100	160	184	208	236	255	279	303	350			
5"	125	270	318	365	422	460	508	555	650			

Actuating Torques PTFE-Sealing Ring												
Nominal Dia DN		Differential pressure (bar)										
		0	5	10	16	20	25	30	40	50	63	100
Zoll	mm	Torque (Nm)										
1/2"	15	5	6	6	6	6	6	6	7	7	8	9
3/4"	20	11	11	11	12	12	12	13	13	14	15	17
1"	25	13	14	14	16	16	17	18	20	22	24	
1 1/4"	32	15	17	18	19	20	22	23	26	28	32	
1 1/2"	40	21	24	26	29	31	33	35	40	45	51	
2"	50	30	33	36	40	42	45	48	54			
2 1/2"	65	51	56	62	68	72	78	83	94			
3"	80	72	86	99	115	126	140	153	180			
4"	100	120	138	156	177	191	209	227	263			
5"	125	203	238	274	317	345	381	416	488			

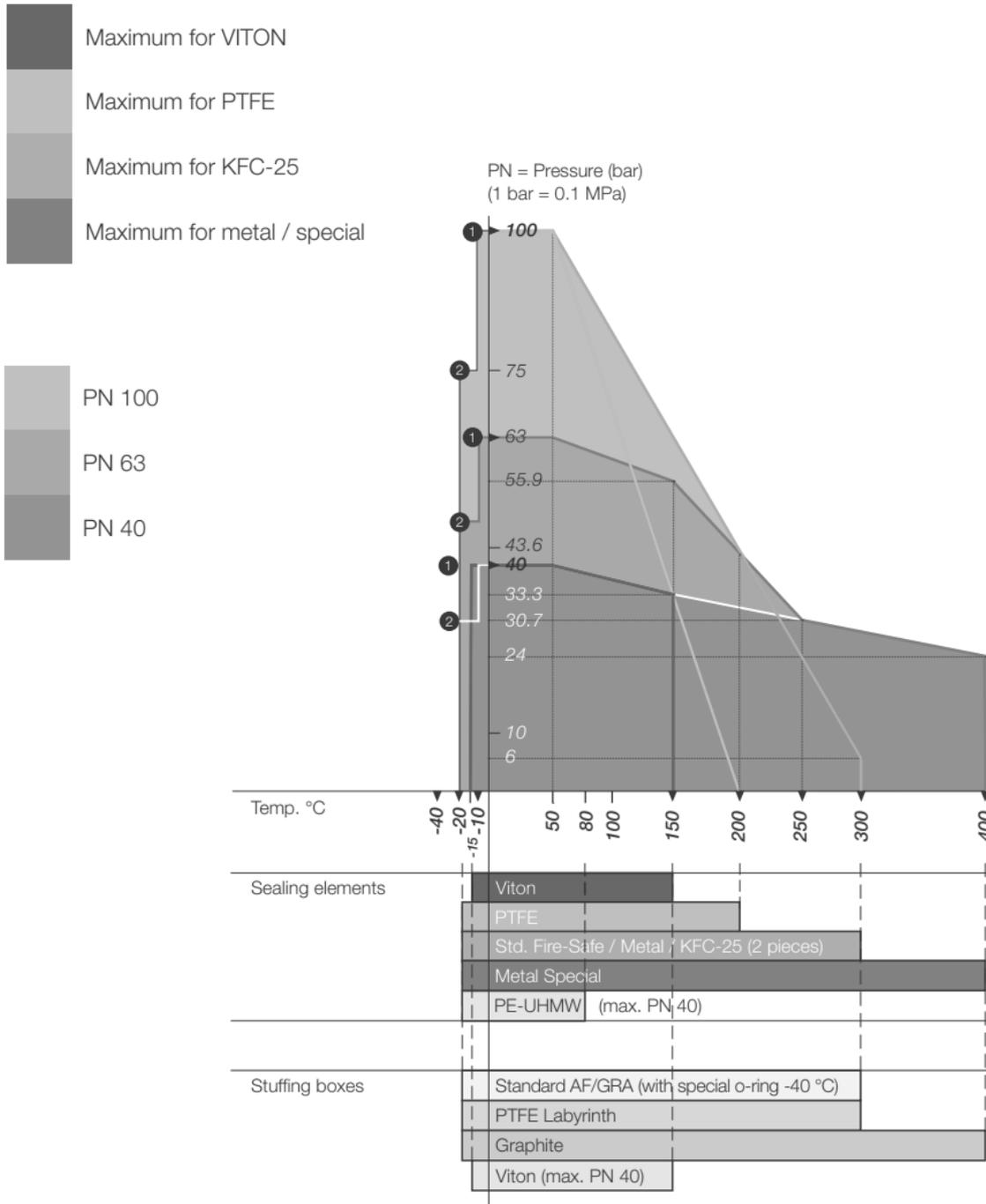
Actuating Torques M-Sealing Ring												
Nominal Dia DN		Differential pressure (bar)										
		0	5	10	16	20	25	30	40	50	63	100
Inch	mm	Torque (Nm)										
1/2"	15	8	8	8	9	9	9	9	10	11	12	14
3/4"	20	15	16	16	17	18	19	19	21	22	24	29
1"	25	18	19	21	23	24	25	27	29	32	36	
1 1/4"	32	25	27	28	30	32	33	35	38	42	46	
1 1/2"	40	40	45	50	55	59	64	69	78	88	100	
2"	50	55	64	74	85	93	102	111	130			
2 1/2"	65	85	102	119	139	153	169	186	220			
3"	80	140	173	205	244	270	303	335	400			
4"	100	250	294	338	390	425	469	513	600			
5"	125	450	580	710	866	970	1100					

Actuating Torques KHA DBB and TM / KFC-25									
Nominal Dia DN		Differential pressure (bar)							
		0	5	10	16	20	25	30	40
Inch	mm	Torque (Nm)							
1/2"	15	6	0	7	7	7	7	7	8
3/4"	20	12	12	12	12	12	13	13	14
1"	25	14	0	15	0	16	17	17	0
1 1/4"	32	17	0	0	0	0	0	0	0
1 1/2"	40	25	0	27	0	0	0	0	0
2"	50	16	19	25	28	29	33	38	43
2 1/2"	65	26	38	46	47	55	59	67	75
3"	80	38	43	60	68	75	80	89	125
4"	100	38	62	90	108	133	155	184	207
5"	125	150	184	225	319	372	403	419	465

Actuating Torques VITON-Sealing Rings					
Nominal Dia DN		Differential pressure (bar)			
		0	5	10	16
Inch	mm	Torque (Nm)			
1/2"	15	6	6	6	7
3/4"	20	12	12	13	13
1"	25	14	15	16	17
1 1/4"	32	17	18	20	22
1 1/2"	40	25	28	31	34
2"	50	37	41	44	49
2 1/2"	65	60	66	73	80
3"	80	96	114	132	154
4"	100	160	184	208	236

7.7 PT-Diagrams:

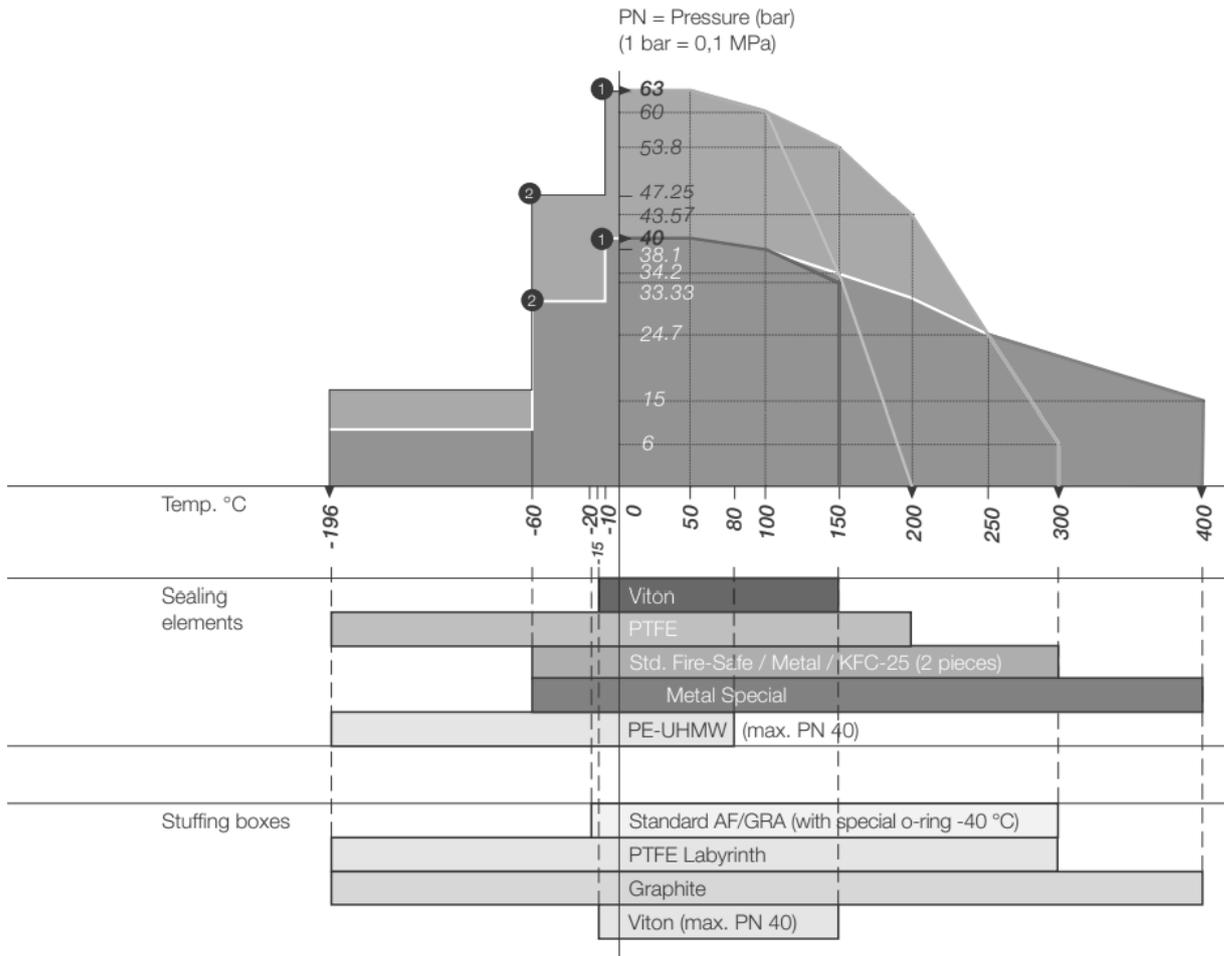
The applicable maximum limitations of use regarding pressure and temperature are defined by their mutual interdependency. A P/T diagram is an ideal tool in order to select a suitable valve for pre-defined operational characteristics.



Steel cast iron

Material index VIII

CAUTION The diagrams illustrate all possible limitations of use of KLINGER valves.



For application cases under -60 °C
please contact the producer

rust and acid-proof cast iron

Material index VIII

7.8 Tightening torques and wrench sizes:

Nominal width mid-body section	15	20	25	32	40	50	65	80	100	125
Tightening torque stuffing box nut (Nm)	5	15	15	25	25	20	20	40	40	40
Tightening torque body screws Xc (Nm)	9	25	25	40	55	75	70	100	130	145
Tightening torque body screws VIII (Nm)	9	20	20	30	40	60	60	80	110	120
Tightening torque body screws III (Nm)	9	20	20	30	40	60	60	70	110	120
AF hexagon screw stop	8	10	10	13	13	13	13	19	19	19

Tolerance for stuffing box nut tightening torque + 10 %

Tolerance for body screw tightening torque \pm 10 %

7.9 Table of weights:

The following table contains weight estimates of PN 40 valves with tap handle in standard design.

Nennweite DN		End Piece Type		
Inch	mm	Flanged	Welded	Socket
1/2"	15	2,3	0,85	0,90
3/4"	20	3,5	1,45	1,45
1"	25	4,3	1,80	1,80
1 1/4"	32	6,8	3,10	3,15
1 1/2"	40	9,0	4,75	4,75
2"	50	13,5	7,60	7,55
2 1/2"	65	18,0	10,60	-
3"	80	28,8	19,50	-
4"	100	40,6	28,00	-
5"	125	66,0	49,50	-

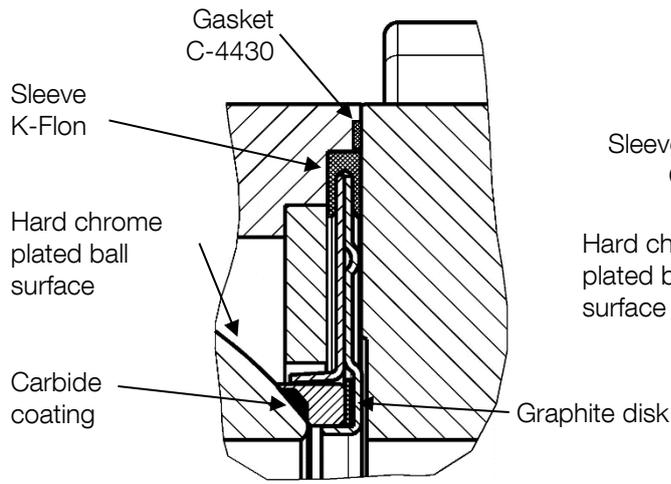
7.10 Sealing element for special requirements:

A modular system allows the sealing elements to be equipped with special sealing rings according to requirements. This is also possible for ball valves that have already been installed.

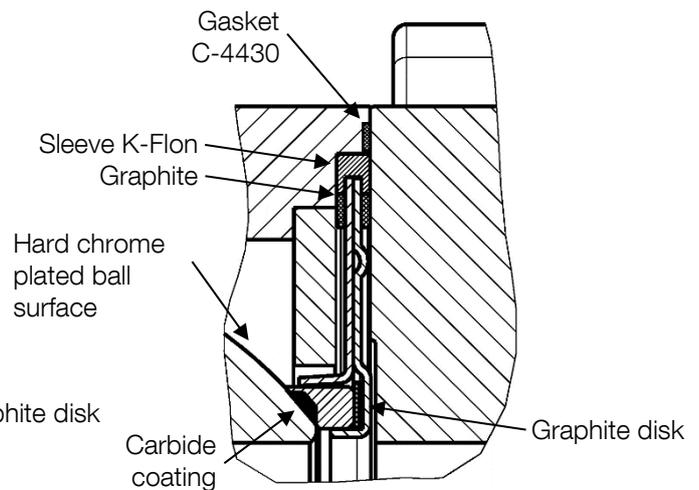
All sealing elements are pre-assembled ready for installation!

CAUTION: During assembly, the ball and the sealing ring must be greased

METAL Sealing element

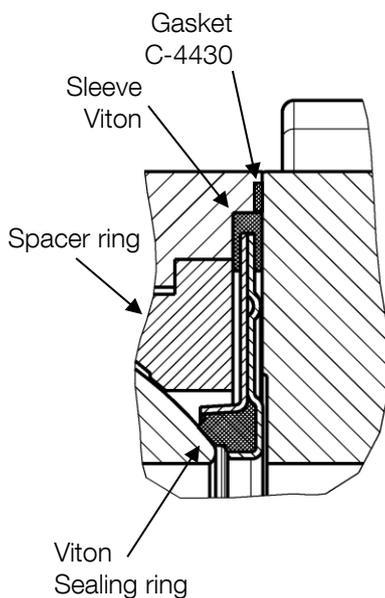


Metall-Spezial Temp.400°C Sealing element

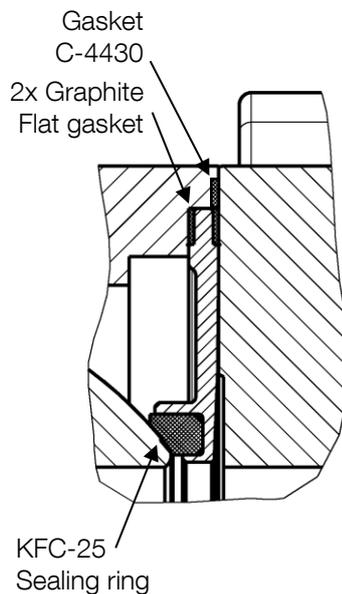


For abrasive media and media containing solids, as well as for media that are heavily contaminated and granular or have a tendency to crystallize.

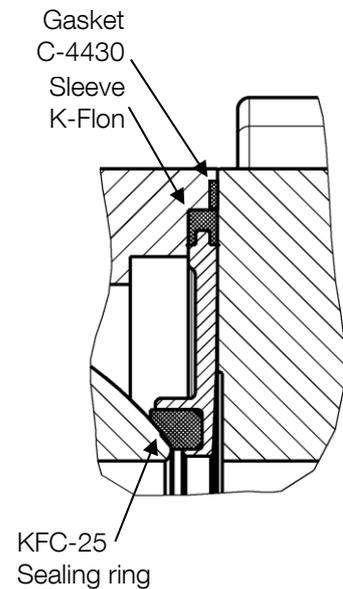
Viton sealing element
(e.g. low and DD high vacuum range)



Std. Fire-Safe Sealing element

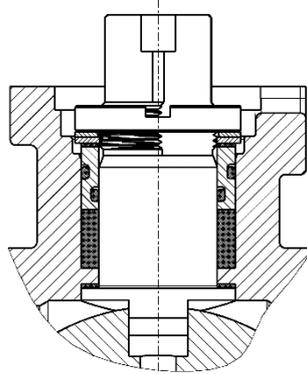


One-piece sealing element
(e.g. use in the gas sector)



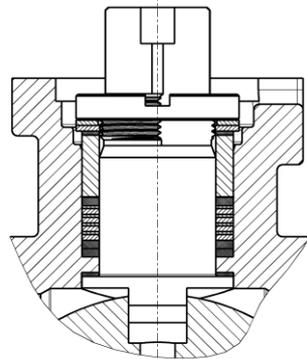
7.11 Stuffing box for special requirements:

Standard stuffing box



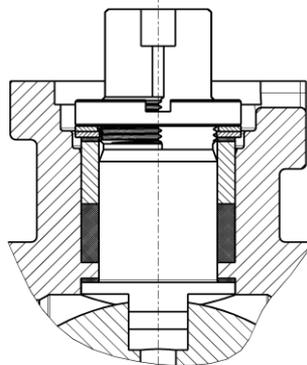
Area of application:
- Ideal for most applications

PTFE Labyrinth stuffing box



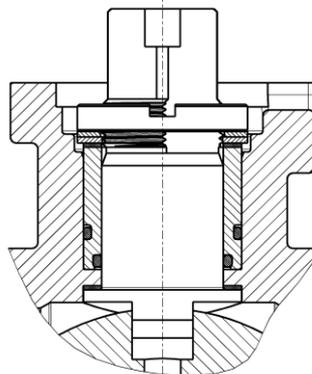
Area of application:
- Ideal for most applications

Grafit stuffing box



Area of application:
- High-temperature

Stuffing box set with O-ring sealing



Area of application:
- Low and high vacuum
- Gas applications

8. Transportation and Storage:

Check the shipment immediately upon receipt for completeness of delivery and transport damage. Furthermore, it should be ensured that the valves and possibly mounted actuators have not been damaged during transport. Please also check that the supplied valves (types, nominal sizes etc.) correspond with the order. KLINGER Fluid Control is to be immediately notified of any kind of deviations. Regarding damage obviously resulting from transportation, please contact the freight forwarder in charge of delivery.

Ballostar® ball valves are supplied in the OPEN position with the connections covered in order to protect against dirt and damage. These covers may only be removed immediately prior to installation.

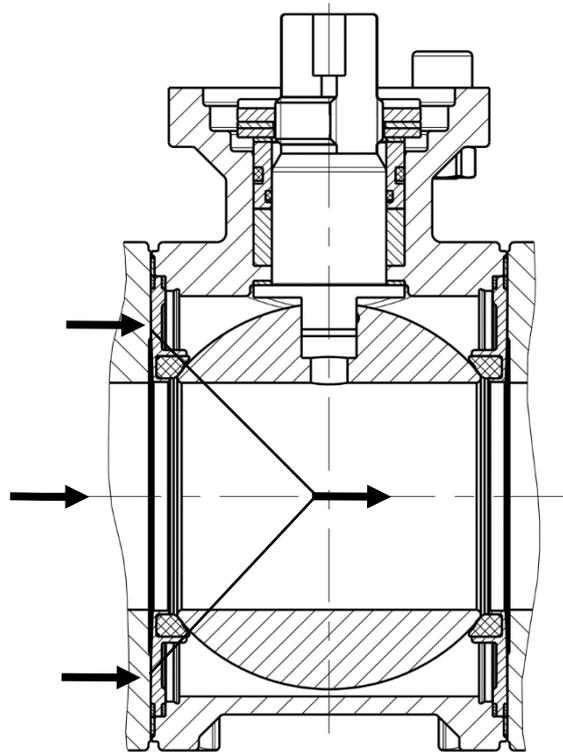
- » Storage in the default factory packaging.
- » The valves are to be stored in closed rooms, in a non-aggressive atmosphere, and protected against humidity and contaminants.
- » In the event that protective sheeting or shrinking foils are used, it must be ensured – through adequate measures – that the atmosphere within the covers remain free of condensation.
- » Corresponding protective measures are recommended for storage in dusty rooms.
- » In order to avoid mix-ups, all stored parts should be labeled in accordance with the shipping notes and stored in the correct place.
- » The temperature in the storage rooms should not exceed the limits -20 °C and +50 °C. Rapid temperature changes are to be avoided whenever possible (condensate water).
- » Possible changes originating from KLINGER Fluid Control and having an impact on storage will be announced in a timely manner in the form of a circular.
- » The operation manual is part of the delivery and must be stored with the item. This ensures that all important information and documents can be passed on.
- » Lift lines suitable for the weight and the lifting aids on the valve (to the extent present) are to be used for manipulation purposes.

Damages resulting from incorrect storage or manipulation free KLINGER Fluid Control from any obligations derivable from the warranty, guarantee and product liability.

9. Operating Principle:

With its "elastic sealing system" the ball valve guarantees full tightness at both high and lowest pressures. The necessary contact forces between the ball-shaped shut-off section and the sealing elements are generated by the pressure differential created in the shut-off valve. With regard to this sealing principle, the "FLOATING BALL", it is important that the shut-off section between the two sealing rings is movable. These rings carry out a double function: They guide the ball and act as force transducers.

DISTRIBUTION OF FORCES



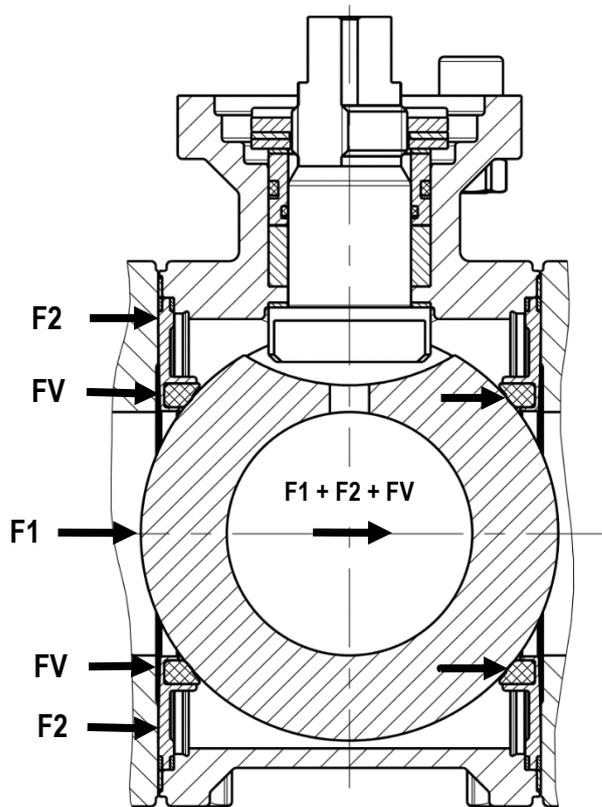
This principle is used in combination with ball valves of smaller nominal sizes. As the nominal sizes increase, so do the forces which have to be absorbed by the sealing rings. In order to achieve a long service life and to keep the torques for the pivoting of the ball as low as possible, this three-component design is not suitable for all nominal sizes.

10. Mode of Operation:

The two pre-stressed elastic sealing elements made of stainless steel with KFC sealing rings, a K-Flon sleeve at the upstream and downstream side of the ball valve and the ball create the sealing system.

The pressure of the medium presses the ball into the downstream sealing element. At the same time, the upstream element is also pressed against the ball. The Ballostar® ball valve is maintenance-free and can be pressurized in both flow directions.

The U-sleeve on the outer circumference of the holding disc is fully chambered (only refers to holding disc design) and provides tightness to atmosphere towards the body connector section.



Exerted forces:

F_1Force of the medium exerted on the ball

F_2 ...Force of the medium exerted on the sealing element

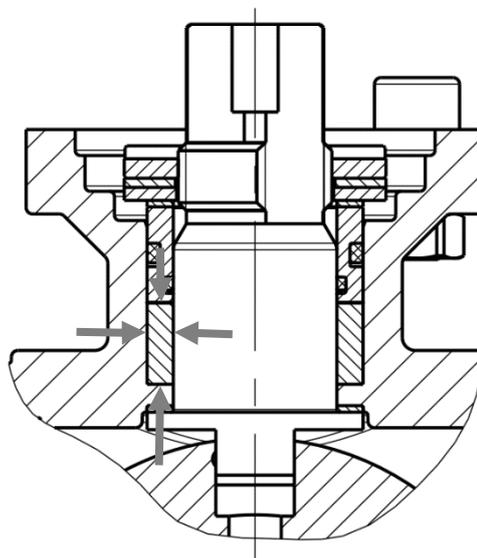
F_vPre-stress force of the sealing element

$F_1+F_2+F_v$Total force exerted on the seat ring

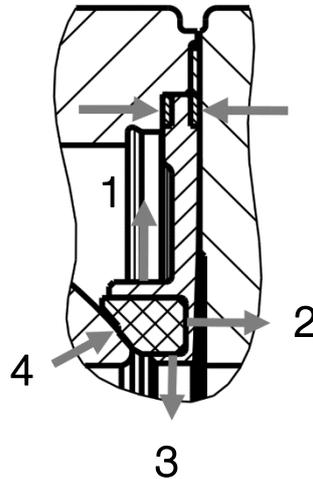
The seal of the operating unit (operating stem) is formed by a **STUFFING BOX** supported by a Belleville spring washer.

This type of seal is virtually maintenance-free, has a low setting behavior and only minor contact forces are necessary to achieve tightness.

The Belleville spring washer is positioned in a manner that a contact force is always exerted on the stuffing box. This ensures that temperature and pressure differences are compensated for.

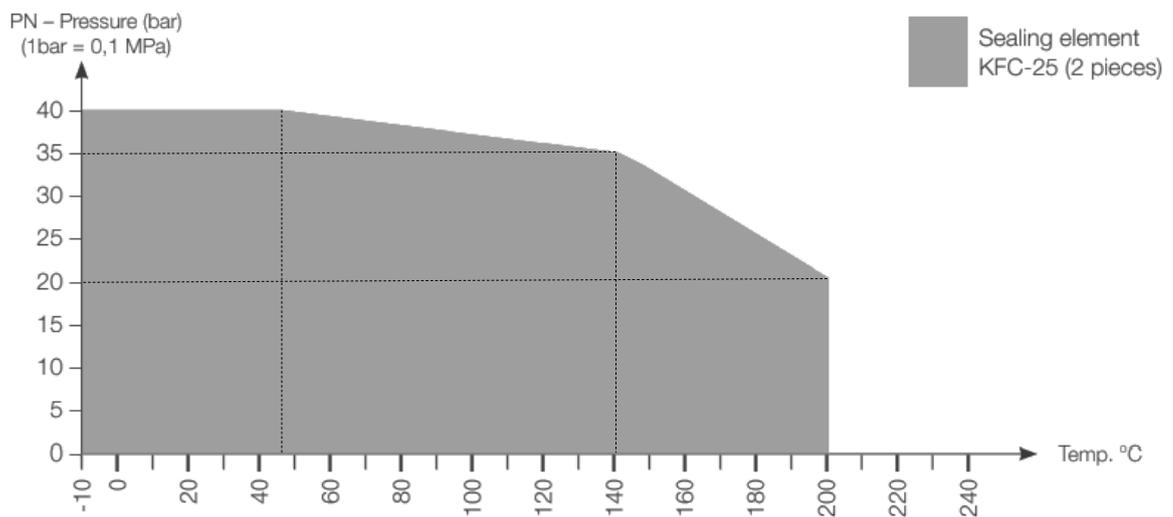


The retaining washer negates movement of the sealing ring in radial direction (1), against the rear (2) and against the bore (3). The ball presses against the sealing ring (4). The sealing ring can therefore neither set nor shift, as it is enclosed on all sides (applies to retaining washer).



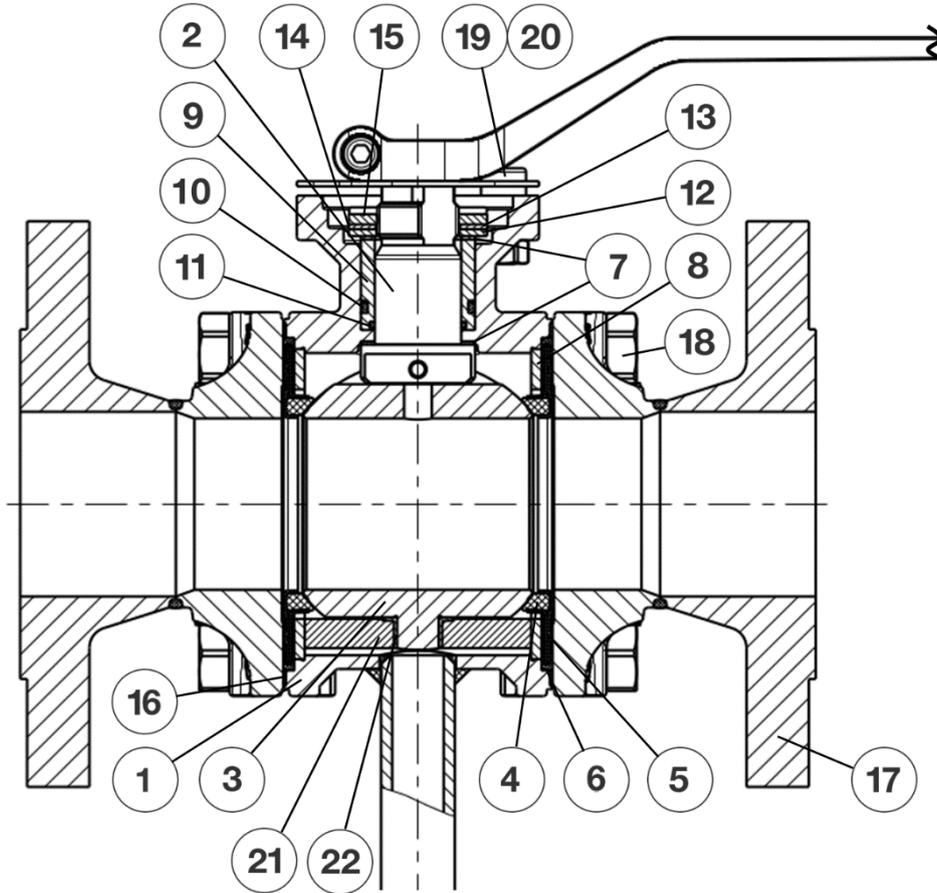
11. Version DBB (Double Block & Bleed):

11.1 PT-Diagram:



Applies to stainless and carbon steel

11.2 Material combinations:



22	Collar bushing	Peek	
21	Ball bed	1.4462	
20	Hexagon nut	A4	
19	Socket screw	A4	
18	Hexagon screw	A4	
17	Flange cap	1.0619/1.0345	
16	Gasket	Klingersil C-4430	
15	Gland nut	1.4404	
14	Belleville washer	1.4310	
13	Washer	1.4404	
12	Washer	1.4401	
11	O-Ring	FEPM A75H	
10	O-Ring	FEPM A75H	
9	Sealing insert	1.4401	
8	Support ring	1.0038	
7	Bearing disc	Peek	
6	Cuff	K-FLON	
5	Support & cover disc	1.4101	
4	Sealing ring	KFC-25	
3	Ball	V4A	
2	Operating shaft	1.4104	
1	Housing KHA	1.0619	1.4408
Pos.	Name	Material	
		VIII	Xc

12. Installation and Putting into Service Regulations:

In order to protect against impurities and damage, the connections of the valves are covered. We recommend removal of these covers only prior to installation.

Ballostar® ball valves can be installed in every position. Installation should be carried out in the OPEN position (delivery state) in order to avoid damage to the ball surface.

Valves with welding ends may generally be welded into a pipework by means of fusing welding procedures. In this context, the welding and quality requirements and their norms are to be complied with. As a consequence, welding may only be carried out by qualified personnel. The safety regulations of the plant operator and/or the plant manufacturer are also to be complied with.

The installation of valves with flange ends may only be carried out by qualified staff in accordance to EN 1591. In this context it must be ensured that no additional tensions affect the valve, such as e.g. a too large gap between the to be screwed flanges.

Following installation and prior to putting into service, it must be ensured that solids and impurities, which are not part of the medium, have been removed from the pipeline system and/or from the facility.

A pressure and a function test must be carried out prior to putting into operation. Prior to putting into service of valves in steam pipes, proper condensate draining must be ensured in order to avoid steam hammer hazards. In extreme cases, a steam hammer may lead to breaking of the valve. Rapid increases in temperature and pressure are to be avoided during all operation phases (start – operation – shutting down).

The maximum permissible test pressure is $1.1 \times PN$ if the valve is in a closed state. The valve must be open when testing the pipe pressure ($1.5 \times PN$).

The ball valves are also to be secured against toppling or falling down during transportation to the place of installation. Furthermore, they are to be protected against colliding with each other or other forms of damage.

12.1 Welding Instructions:

When welding, the requirements relating to both welding and quality and their respective norms must be complied with. The ball valve must be welded into the pipeline in the open ball position.

The ball valve "KHA-S" with welding ends and short overall length does not have to be dismantled when welding into the pipeline: The heat generated during welding has no influence on the sealing elements, as the wall thickness of the body material is sufficient as a cooling zone.

Welded hexagon nipple materials

Material designation			C %	Si %	Mn %	P % max.	S % max.	Cr %	Mo %	Ni %	Cu % Klinger	V %
Klinger	Material No.											
VIII	GP240GH	1.0619	0,18 - 0,23	0,60 max.	0,50 - 1,20	0,030	0,020*	0,30 max.**	0,12 max.**	0,40 max.**	VIII	0,03 max.**
XC	GX5CrNiMo 19-11-2	1.4408	0,07 max.	1,50 max.	1,50 max.	0,040	0,030	18,00 - 20,00	2,00 - 2,50	9,00 - 12,00	XC	-

* For castings with a relevant wall thickness < 28 mm a mass fraction of S of 0.030 % is permitted.

** $Cr + Mo + Ni + V + Cu \leq 1.0 \%$

At the edge of the body, a temperature of +250 °C may not be exceeded. Carry out temperature checks. Cooling the ball valve body during welding is advisable. Following cooling down, the tightening torques of the connection screws must be checked against the values from the table.

13. Service and Maintenance:

Maintenance and inspection intervals are to be determined by the operator dependent on the operating mode, as these valves can be utilized under a number of different operating conditions.

In order to increase service life at low activation counts, we recommend carrying out an activation from time to time. For this purpose it is fully sufficient to only shift the ball by a few angular degrees.

Maintenance and inspection work may only be carried out by trained staff.

Prior to the start of service and maintenance work, it must be ensured that the pipeline system is depressurized and that no medium residues are contained within.

In the event of possible leakages to the atmosphere, the tightening torques at the affected positions must be checked against the values of the tightening table.

When removing an actuator, it is necessary to protect it against rotation prior to loosening of the connecting screws.

13.1 Seal Replacement:

! CAUTION	Prior to installation, all individual parts, especially seals and sealing surfaces, must be carefully checked and replaced if damaged. Visible contamination on the machined surfaces must be cleaned off.
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13.1.1 Seal Replacement on the Operating Stem:

- » Bring the valve into the OPEN position
- » Depressurize the line
- » Remove the valve from the line
- » Remove the body connection screws
- » Remove sealing elements and supporting rings (to the extent present) from the body midsection
- » Bring the ball into the CLOSED position and remove it
- » Remove the handle
- » Remove the stuffing box nut
- » Remove the operating stem and the washer
- » Remove the Belleville spring washer, dis, washer, pressure ring and antistatic disc
- » Remove the stuffing box and replace with a new one
- » Inspect washers and if necessary, replace
- » Assemble in reverse sequence (tightening torques in accordance with table)
- » Function test

13.1.2 Replacement of Sealing Elements (Flange Connection):

- » Bring valve into OPEN position
- » Depressurize line
- » Remove valve from line
- » Remove body connection screws
- » Remove sealing elements and supporting rings (to the extent present) from the body midsection
- » Bring the ball into the CLOSED position
- » Install new sealing elements and supporting rings (in the case of single-part sealing elements, do not install supporting rings)
- » Reconnect body sections by means of body connection screws and tighten lightly
- » Tighten screws crosswise with required tightening torque as listed in the table
- » Function test

13.1.3 Replacement of Sealing Elements (Welded and Threaded Ends):

- » Bring valve into OPEN position
- » Depressurize line
- » Loosen all housing connection screws and dismantle at least six screws, leave two opposite screws in loosened position to use them as swivel axis
- » Swing out the body midsection
- » Remove sealing elements and supporting rings (to the extent present)
- » Bring the ball into the CLOSED position
- » Install new sealing elements and supporting rings (in the case of single-part sealing elements, do not install supporting rings)
- » Reinsert body midsection between the connectors and tighten lightly
- » Tighten screws crosswise in accordance with required tightening torque as listed in the table
- » Function test

13.2 Standard Lubricants:

O-Rings: Silicone grease OKS 1110

Screw thread: MOLYKOTE 1000

Other parts: MOLYKOTE 55 M

In special cases, the designated lubricant must be used for the order.

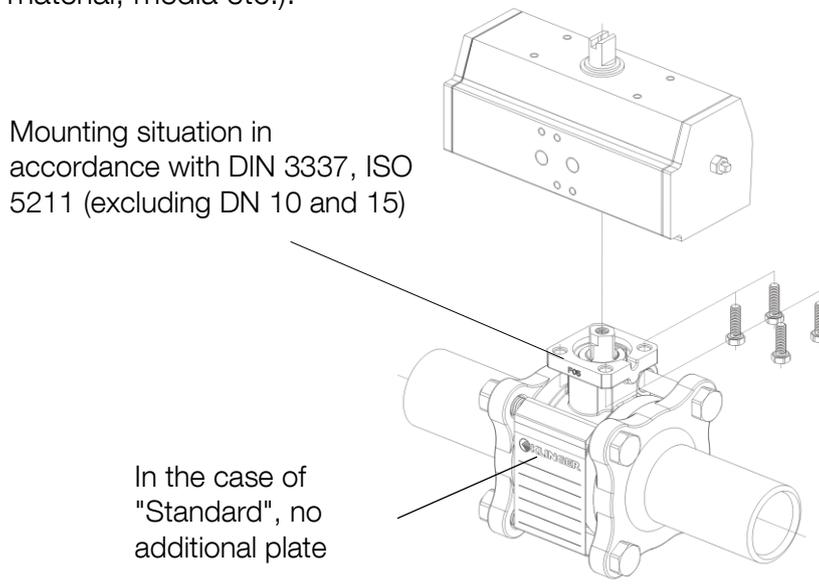
e.g.: **Oxygen applications** Klüberalfa YV93-302

Gas applications Klüber Nontrop ZB91

Sterile steam applications Klüberalfa YV91

14. Actuator Mounting:

The actuator has to be executed with a torque in accordance with the nominal size. The values are to be defined with the manufacturer following a technical query (pressure, sealing material, media etc.).



Direct mounting of an actuator (as illustrated in the image above) is only recommended for operation temperatures under 80 °C.

KLINGER Fluid Control recommends the utilization of superstructure elements (console and coupling) if the connection holes of drive and valve do not fit or if higher temperatures occur.

14.1 Fitting the Actuator:

When fitting actuators, the requirements of the actuator manufacturer have to be mandatorily complied with. The manufacturer of the KLINGER Ballostar® KHA assumes no liability for damage resulting from improper actuator installation. In case of doubt, it is recommended to discuss every actuator installation with the manufacturer of the actuator and the valve. Installation work may only be carried out by qualified personnel.

- » Bring ball valve into the "OPEN" position.
- » Place the actuator in the correct positional arrangement and screw together. If necessary, bolt.
- » Set the end positions.
- » Function test.

! CAUTION	With regard to electrical actuators, it must be ensured that the end positions are limited by the path end switches and not by the torque end switches.
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! CAUTION	The valve is closed clockwise. It is to be ensured that the 90° movement is precisely complied with in its OPEN-CLOSED end positions.
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15. Spare Parts List:

The table below provides an overview of the available spare parts variants. During ordering, the precise designation of the valve, the stuffing box, the sealing elements and the material code of the valve must be provided.

Nominal Width	Stuffing Box	Stuffing Box & Sealing Elements	Sealing Elements
10	•	•	•
15	•	•	•
20	•	•	•
25	•	•	•
32	•	•	•
40	•	•	•
50	•	•	•
65	•	•	•
80	•	•	•
100	•	•	•

• = available X = not available

16. Disposal:

To the extent that other laws do not require a deviating treatment, the utilized materials should be separated in accordance with their properties and entered into the raw materials recycling process. The pre-requirement in this regard is that the raw materials have been correspondingly decontaminated on the order of the operator.

Notes: