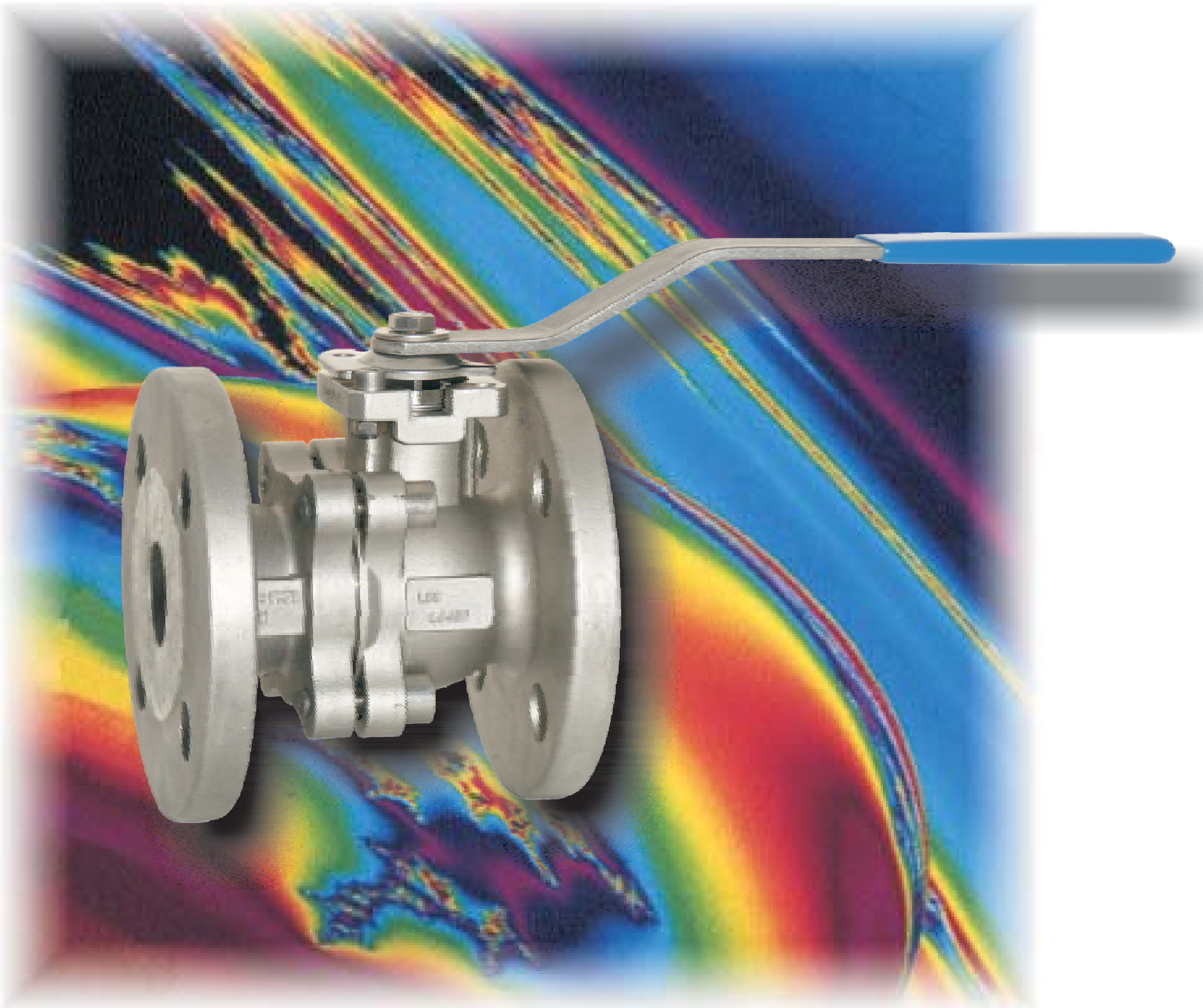

KLINGERballostar® KHE
Split body ball valve
DN 15 (1/2”) – 200 (8”)

CE 0408
Conformity with Pressure
Equipment Directive 97/23/EC

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Edition 2005


B 1534
201

KLINGERballostar-KHE: This ball valve offers more

The advantages of a unique sealing system and a modular construction design

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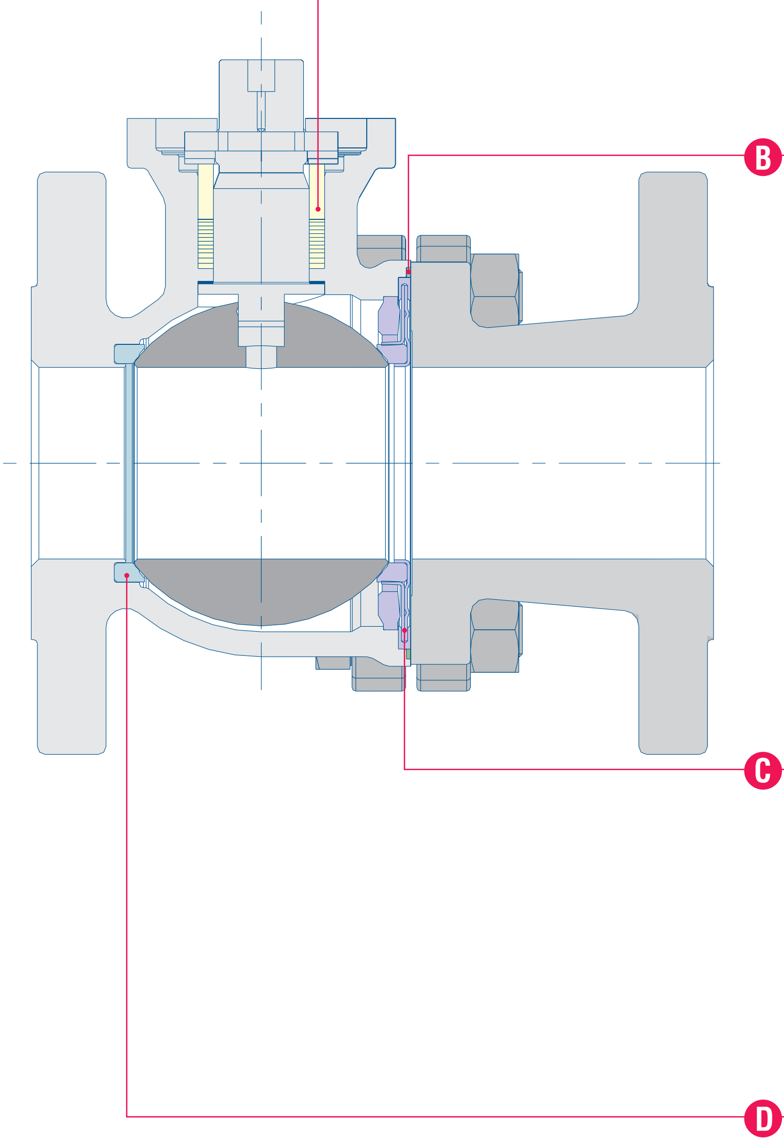
Define the field of application of your valve

The technical details of the ball valve types at one glance

A safe way to choose your actuator

The table of chemical resistance

The design of the sealing systems



A The stuffing box

The sealing of the operating stem is achieved by using a belleville washer supported (labyrinth-) stuffing box. This sort of sealing is maintenance free and has little set-off behaviour. Only small forces are required for tightening. Because of the arrangement of the belleville washer a constant pressure against the stuffing box is created, which is independent of pressure- and temperature changes.

B The secondary body sealing

This supporting sealing, consisting of graphite, is located among the pitch flange of body and flanged end piece. The secondary body sealing improves the safety against external leakages, when operating with high variations of temperature and pressure.

C The sealing element

The sealing element located at the end piece consists of a supporting and a cover disc, both made of stainless steel, a KFC sealing ring and a sleeve made of K-Flon. The spring load of the sealing element is similar to a diaphragm spring.

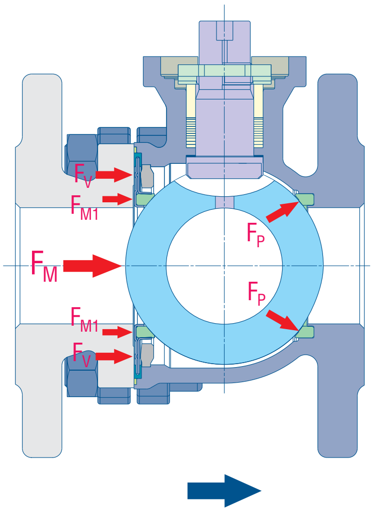
D The sealing ring

The sealing ring made of KFC 25 is located in a enclosed groove in the valve body. This groove prevents floating of the sealing ring in radial direction, against the backside or the bore. The ball presses against the sealing ring, so the sealing ring is not able to set or flow, because it is enclosed on every side.

In the interest of technical progress designs and dimensions are subjected to modification.

The functional principe of the seat sealing system

Basically the Ballostar KHE ball valve can be pressurised in both flow directions.
In consequence of the different design of the sealing systems two operating conditions depending on the mounting direction are possible:



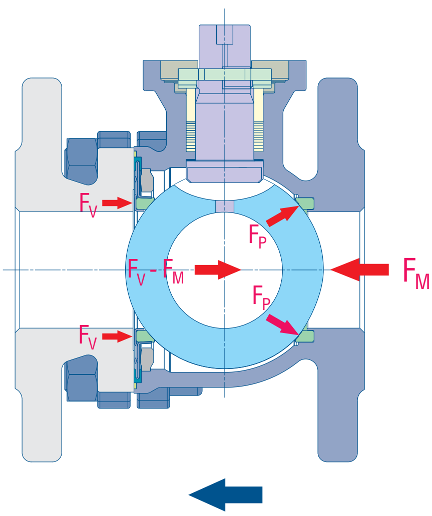
Flow direction of fluid

Mounting direction: flange end piece upstream

If the flange end piece is mounted upstream, the fluid pressure (characterized by force F_M) presses the ball to the downstream situated sealing ring (F_P). The pre-stressed, elastic sealing element (F_V) located upstream, presses against the ball too. The elastic sealing element is additionally effected by the fluid pressure (F_{M1}), which leads to an increase of the force effect onto the ball and simultaneously means a stress relief for the diaphragm spring.

The elasticity of the KLINGER sealing system continuously provides two sealing areas in the bore.

*Therefore we recommend this situation of installation as **preferred mounting direction** for standard applications. Additionally this direction is marked with an arrow on the valve body.*



Flow direction of fluid

Mounting direction: body flange upstream

If the body flange is mounted upstream, the pressure of the fluid (F_M) takes effect against the spring force (F_V) of the downstream located elastic sealing element.

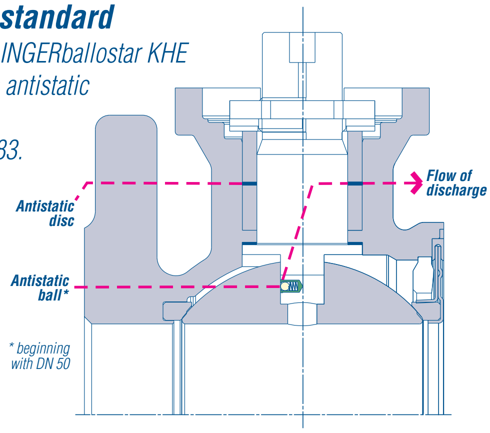
If the pressure of the fluid (F_M) is higher than the spring force (F_V) of the sealing element, the ball lifts from the sealing ring. The presure of the ball, which acts against the downstream sealing element rises and it takes over the sealing function.

If the differential pressure is low, the spring force of the sealing element is high enough to press the ball against the sealing ring too (F_P=F_V-F_M). A second sealing area is created and enable an outstanding effective sealing system.

To ensure it can cope with different needs and is fit to face any application, the KLINGERballostar KHE ball valve satisfies with a modular system of stuffing boxes and sealing elements.

Anti-static as standard

As standard, the KLINGERballostar KHE is equipped with an antistatic device according to ISO 7121 or EN 1983.



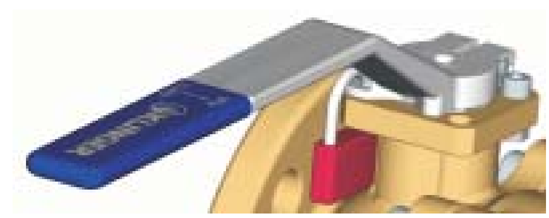
CE-Marking

Due to the Conformity with Pressure Equipment Directive 97/23/EC KLINGER Fluid Control is authorized to issue the CE-Marking.
It is applied on each Ballostar ball valve to symbolize our high standard of quality.

Fire safety

The fire-safe version in accordance with EN ISO 10497/API 607 requires special sealing elements.
These fire-safe elements are mounted directly in the factory, but they can also be easily upgraded every time.

Lever stop unit



Lever interlocking device

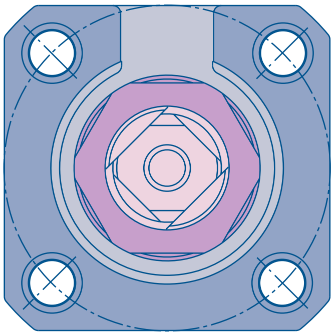
The functions of the lever

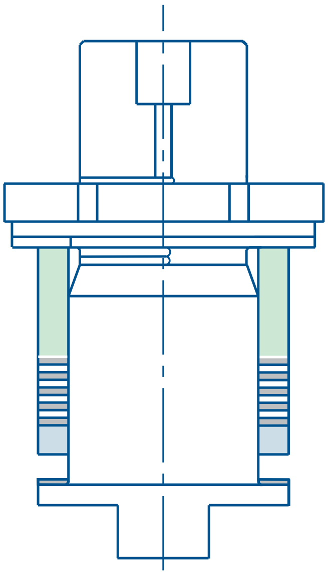
Both lever stop and interlocking device are standard features. A hexagon socket screw defines the end position. The usage of a screw or a padlock makes it possible to connect lever and body of the ball valve.
It's the easiest way to prevent unauthorised or unintentional operation.

Product features, certificates and approvals

Actuators

The flange acc. to ISO 5211 is connected to the actuator either directly or via a bracket and coupling. You can mount and demount the required actuator type at any time, even when the plant is in operation, which makes changing the actuator a piece of cake.





The labyrinth stuffing box

Leak tight in series

Klinger is the only manufacturer in the world who offers both valves and seals. The synergistic effect of these two fields of knowledge can be seen in the seals for the seat and the stuffing box. The requirements for limiting emission to prevent air pollution are met demonstrably.

Special valve typ for gas applications: G-KHE

According to the requirements of the relevant international standards, the usage of an adjustable stuffing box is not allowed for gas applications. Therefore KLINGER uses O-Ring stuffing boxes. The requirement, for an additional stop which defines the end position if the hand lever is dismantled, is also fullfilled. We offer a solution which can be mounted on the valve body optionally. For the installation of G-KHE ball valves only one mounting direction is allowed. The correct direction is indicated with an arrow on the valve body.

Safety with guarantee

Summary of the current type approvals

Valve according to the clean air regulations (TA-Luft):

The requirements for limiting emissions to prevent air pollution according to VDI 2440 and EN ISO 15848 are clearly fullfilled.

Fire safety:

The fire-safe-tests according to EN ISO 10497 are certified.

Valve with class VI leak tightness:

The approval according API/FC104 is issued for soft-sealing elements.

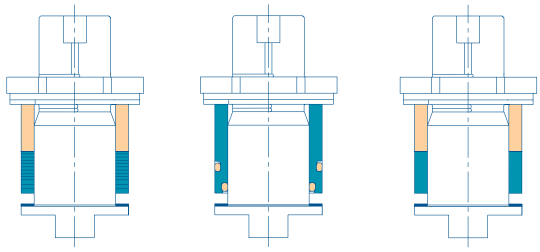
Valve for natural gas transportation in pipelines:

The requirements of the European Standard EN 14141 for valves with a operation pressure over 16 bar are fullfilled.

Valve for gas distribution systems with operational pressure up to 16 bar:

Type approval according to EN 13774.

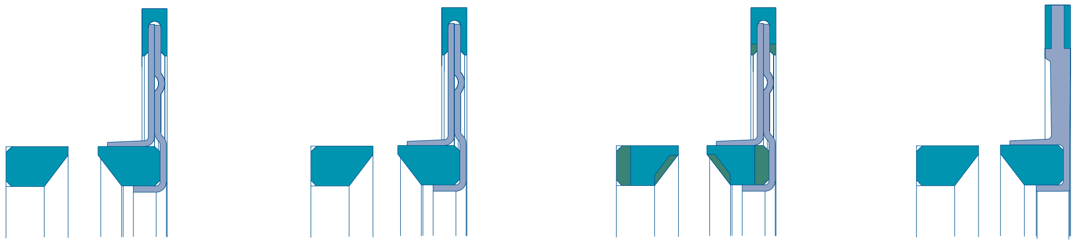
The ball valves are by default equipped with the stuffing box "PTFE labyrinth" and the sealing element "KFC 25" as standard. The other versions listed may be ordered optionally when placing the order.



		Stuffing box	**Stuffing box**	**Stuffing box**
		LABYR.	VIT.	GRAF.
		PTFE labyrinth	Viton*	Graphite labyrinth
Fluids	Water/hot water	recommended	not recommended	recommended
	Mineral oil	recommended	recommended	recommended
	Heat transfer oil	not recommended	not recommended	recommended
	Liquid gas/low temperature	recommended	not recommended	less suitable
	Saturated steam	recommended	not recommended	less suitable
	Misc. gases	not recommended	recommended	
	Vacuum	recommended	recommended	not recommended
	Hot steam (max. 300° C)	not recommended	not recommended	recommended
Conditions of use	Standard application	recommended		
	High no. of cycles	recommended	recommended	not recommended
	Frequent temp. changes	recommended	not recommended	recommended
	High temperature	less suitable	not recommended	recommended
	Chemical industry	recommended	not recommended	recommended
	Abrasive fluids	recommended	not recommended	not recommended
Approvals and certificates	EN 13774	not recommended	recommended	
	EN 14141	less suitable	recommended	
	Fire Safe EN ISO 10497	recommended		
	EN ISO 15848 resp. VDI 2440	recommended	recommended	

recommended · *less suitable* · *not recommended* · ** (O-ring)*

Operational areas of stuffing box, sealing ring and -element



Sealing ring/ -element	***Sealing ring/ -element***	***Sealing ring/ -element***	***Sealing ring/ -element***
KFC	*PTF*	*M*	*FS*
KFC-25	*PTFE*	*Metal*	*Fire Safe*
■	■	▨	■
■	■	▨	■
■	▨	▨	■
■	■	□	■
■	▨	▨	▨
■	■	□	■
■	▨	□	▨
■	□	□	□
■			
■	■	▨	■
■	▨	■	■
▨	□	■	■
■	■	▨	■
□	□	■	□
■			
■			
			■
■			

Pressure and temperature limits of KHE ball valves made of carbon steel

P/T-diagrams are an important tool to visualise the application field of a ball valve.

The strengthness of the body material restricts and standardises the application limits of pressure and temperature.

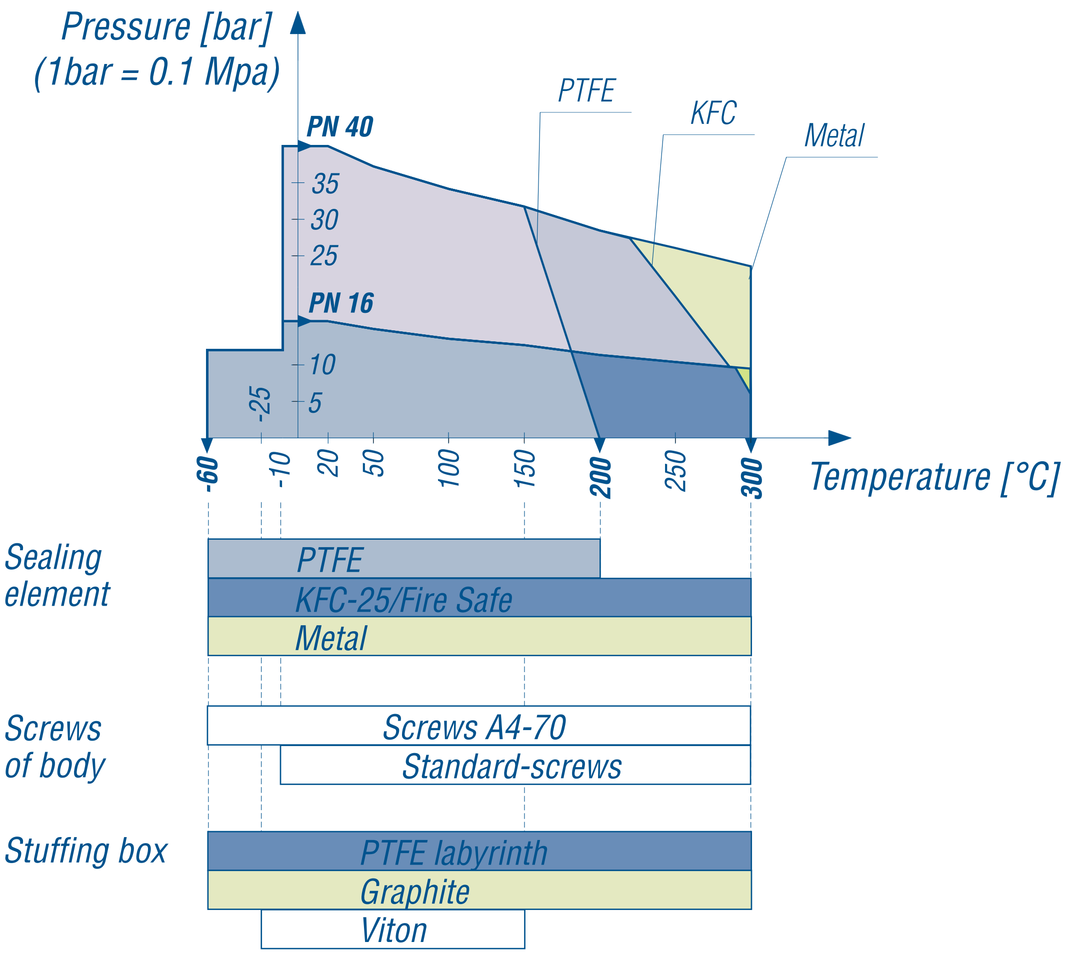
A general rule for valve bodies consisting of steel:

A decrease of operating pressure in the nominal pressure range means an increase in the field of applications in the temperature range.

KHE-FK, KHE-FL

PN 16
DN 15 – 200
Material: VIII

PN 40
DN 15 – 200
Material: VIII



In the interest of technical progress designs and dimensions are subjected to modification.

Pressure and temperature limits of KHE ball valves made of stainless steel

Additionally the influence of the body materials, the sealing materials and the screws on the range of application of the ball valve is clearly shown in the P/T-diagrams.

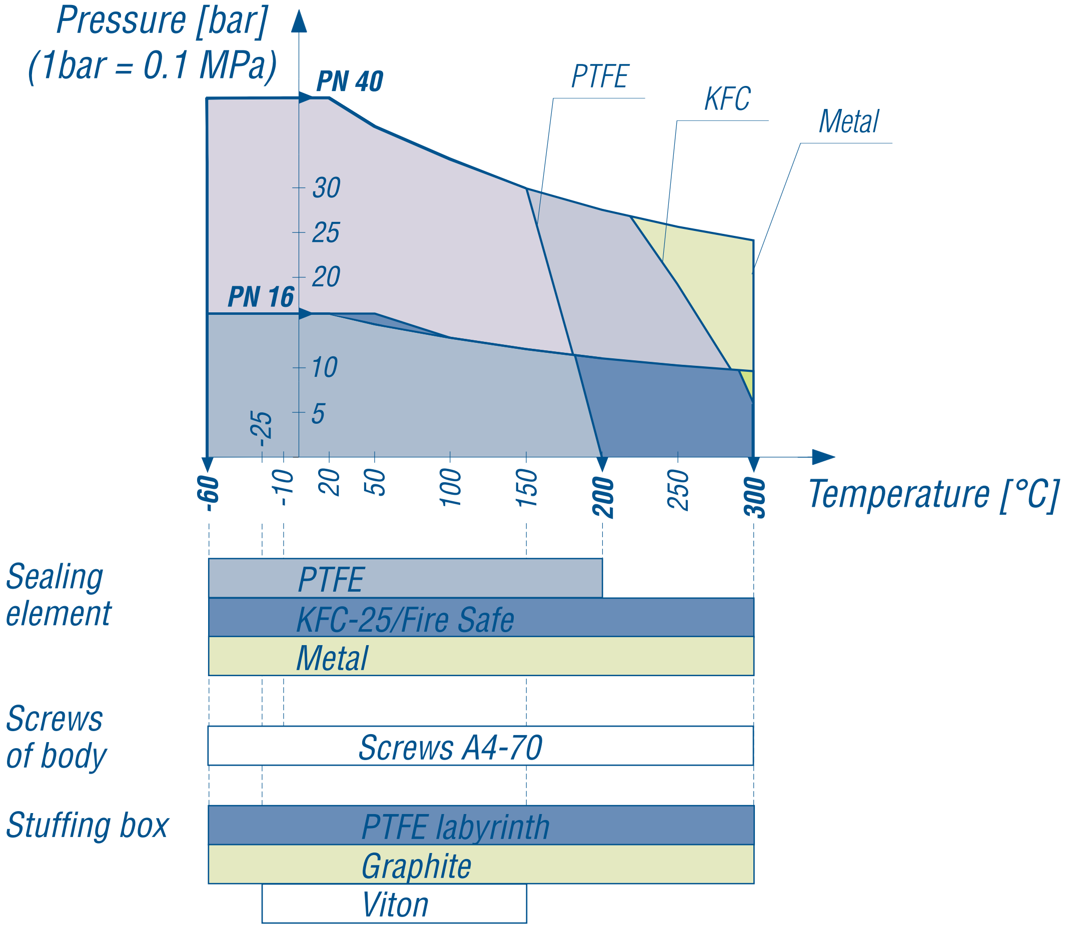
Plot your operating point in the diagram fields to find out wether the safety margins meet your requirements or not. At the same time you can see which parameters have to be changed.

Choosing your ball valve this way means optimizing the economy and safety of the valve.

KHE-FK, KHE-FL

PN 16
DN 15 – 200
Material: Xc

PN 40
DN 15 – 200
Material: Xc



Pressure and temperature limits of KHE ball valves made of carbon steel

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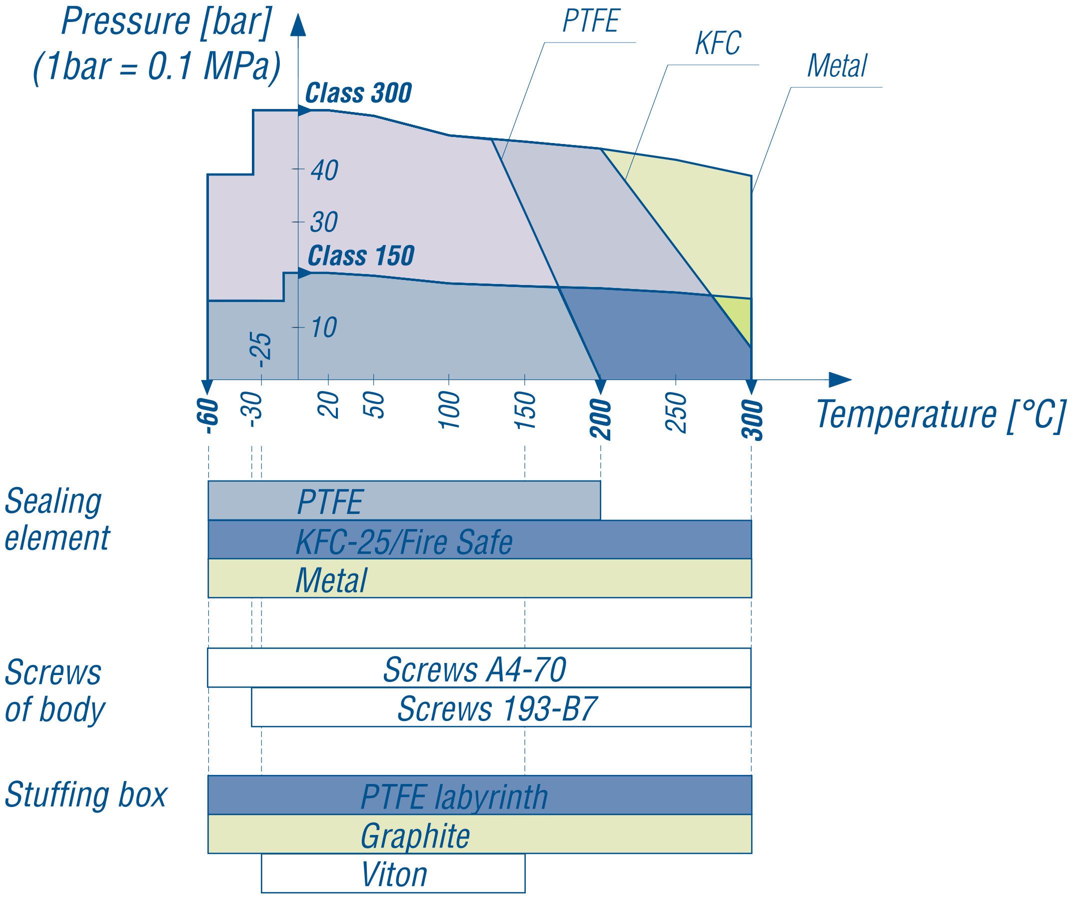
A general rule for valve bodies consisting of steel:

A decrease of operating pressure in the nominal pressure range means an increase in the field of applications in the temperature range.

KHE-CL

Class 150
NPS 1/2" - 8"
Material: VIII

Class 300
NPS 1/2" - 8"
Material: VIII



NPS = Nominal Pipe Size

Pressure and temperature limits of KHE ball valves made of stainless steel

Additionally the influence of the body materials, the sealing materials and the screws on the range of application of the ball valve is clearly shown in the P/T-diagrams.

Plot your operating point in the diagram fields to find out wether the safety margins meet your requirements or not. At the same time you can see which parameters have to be changed.

Choosing your ball valve this way means optimizing the economy and safety of the valve.

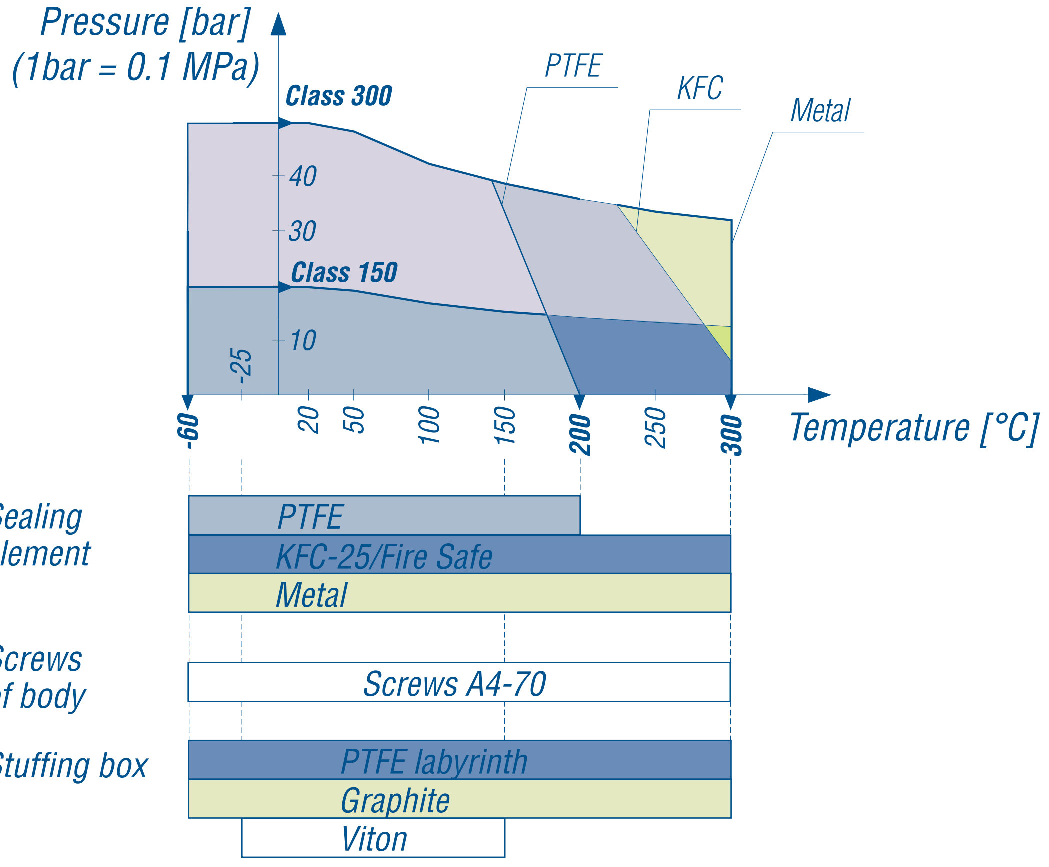
KHE-CL

Class 150

NPS 1/2" - 8"
Material: Xc

Class 300

NPS 1/2" - 8"
Material: Xc



NPS = Nominal Pipe Size

Material overview and flow characteristic values

KLINGER material code

m.c. *	Body and end piece	Internal parts	Body colour
VIII	carbon steel	without copper alloy parts	black, phosphated
Xc	stainless steel	stainless steel	blanc pickled

*m.c. = material code

Flow characteristic values

The coefficients quoted in the table can be used to calculate the right size or pressure drop of the KHE ball valves. Both the Zeta and K_V values are shown.

K_V values valid for water with a density of 1000 kg/m^3.

DN	NPS	Zeta	K_V (m^3/h)
15	1/2"	0.23	18.8
20	3/4"	0.20	35.8
25	1"	0.14	66.8
32	1 1/4"	0.12	118
40	1 1/2"	0.11	193
50	2"	0.10	316
65	2 1/2"	0.076	607
80	3"	0.067	980
100	4"	0.058	1645
125	5"	0.051	2742
150	6"	0.045	4203
200	8"	0.038	8131

Split-body ball valves KHE

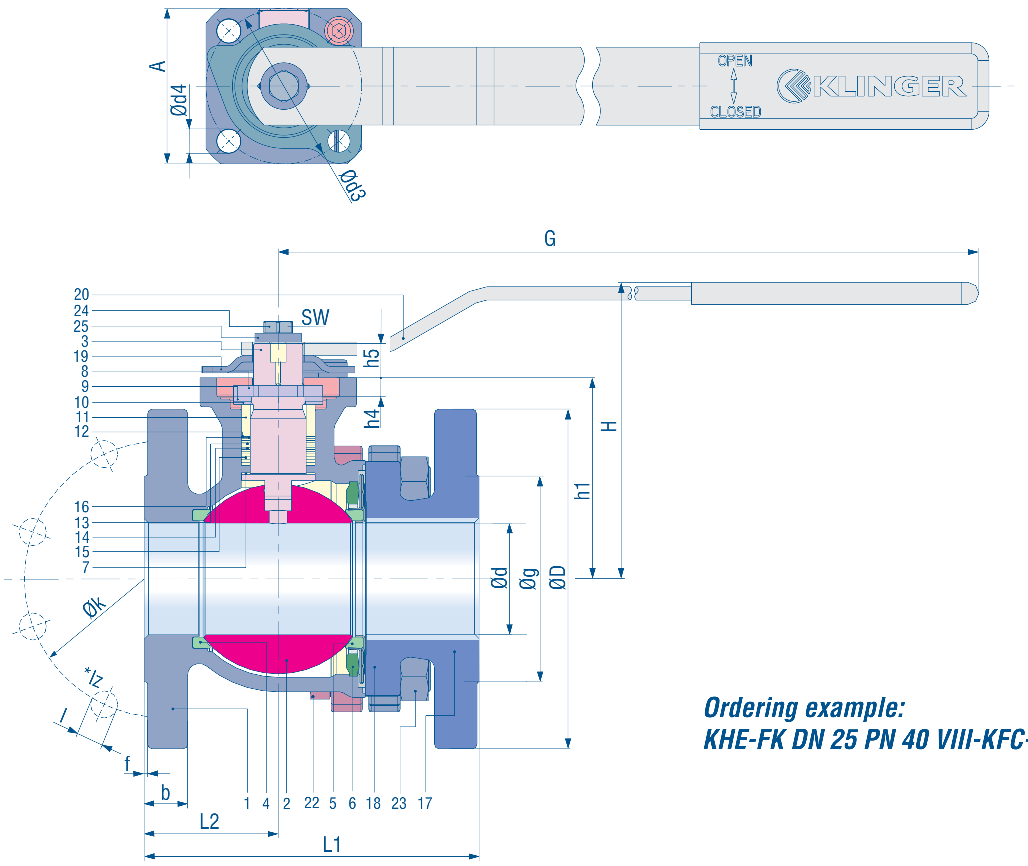
Flanges acc. to EN 1092-1 / PN 40 or PN 16, short design
Materials: carbon steel, stainless steel

KHE-FK

PN 40
DN 15 - 200
Materials VIII, Xc

PN 16
DN 15 - 200
Materials VIII, Xc

Face-to-face dimensions acc. to EN 558-1, basic series 27



Ordering example:
KHE-FK DN 25 PN 40 VIII-KFC-Laby.

Pressure range PN 40

DN	PN	Body dimensions					Flange dimensions								Weight
		d	L1	L2	H	G	h1	D	g	f	b	k	l	lz*1	Kg/piece
15	40	15	115	50	80	132	35	95	45	2	16	65	14	4	2.3
20	40	20	120	45	94	162	46	105	58	2	18	75	14	4	3.4
25	40	25	125	45	98	162	50	115	68	2	18	85	14	4	4.1
32	40	32	130	50	106	252	65	140	78	2	18	100	18	4	6.2
40	40	40	140	50	113	252	72	150	88	3	18	110	18	4	7.8
50	40	50	150	60	131	317	90	165	102	3	20	125	18	4	11.4
65	40	65	170	65	144	317	100	185	122	3	22	145	18	8	16.2
80	40	80	180	65	162	502	122	200	138	3	24	160	18	8	23.9
100	40	100	190	75	176	502	135	235	162	3	24	190	22	8	31.6
125	40	125	325	125	211	652	175	270	188	3	26	220	26	8	64
150	40	150	350	*4	*4	*4	*4	300	218	3	28	250	26	8	*4
200	40	200	400	*4	*4	*3	*4	375	285	3	34	320	30	12	*4

*Pressure range PN 16*2*

DN	PN	Body dimensions					Flange dimensions								Weight
		D	L1	L2	H	G	h1	D	g	f	b	k	l	lz*1	Kg/piece
65	16	65	170	65	144	315	100	185	122	3	22	145	18	4	16.2
80	16	80	180	65	162	500	122	200	138	3	24	160	18	8	23.9
100	16	100	190	75	176	500	135	220	158	3	24	180	18	8	31.6
125	16	125	325	125	211	650	175	250	188	3	26	210	18	8	64
150	16	150	350	150	234	650	195	285	212	3	32	240	22	8	*4
200	16	200	400	170	300	*3	264	340	268	3	34	295	22	12	167.3

Components and materials of standard type

Pos	Part	Material	
		VIII	Xc
1	Body	1.0619	1.4408
2	Ball	1.4401	1.4401
3	Operating stem	1.4104	1.4571
4	Sealing ring	KFC-25	KFC-25
5	Sealing element	KFC-25	KFC-25
6	Supporting ring	SINT C39	1.4404
7	Slip ring	KFC-25	KFC-25
8	Stuffing box nut	1.4404	1.4404
9	Loading ring	1.4404	1.4404
10	Belleville washer	1.4310	1.4310
11	Fem. Supporting ring	1.4404	1.4404
12	Antistatic disc	1.4401	1.4401
13	Disc	1.4401	1.4401
14	Stuffing box lamella	K-Flon	K-Flon
15	Washer	Graphite	Graphite
16	Washer	Graphite	Graphite
17	End piece	1.0619	1.4408
18	Sealing ring	Graphite	Graphite
19	Stop	1.4310	1.4310
20	Hand lever	stainless steel	
22	Heavy hex screw	8.8	A4-70
23	Heavy hex nut	8	A4
24	Heavy hex screw	A4-70	A4-70
25	Disc	A4	A4

*1 = Number of drilling holes
*2 = DN 15–50 and DN 80: the flange dimensions of pressure stage PN 16 are equal to the measurements of PN 40 flanges.
*3 = DN 200 standardly with bare shaft (no lever)
*4 = Dimensions on request

Split-body ball valves KHE

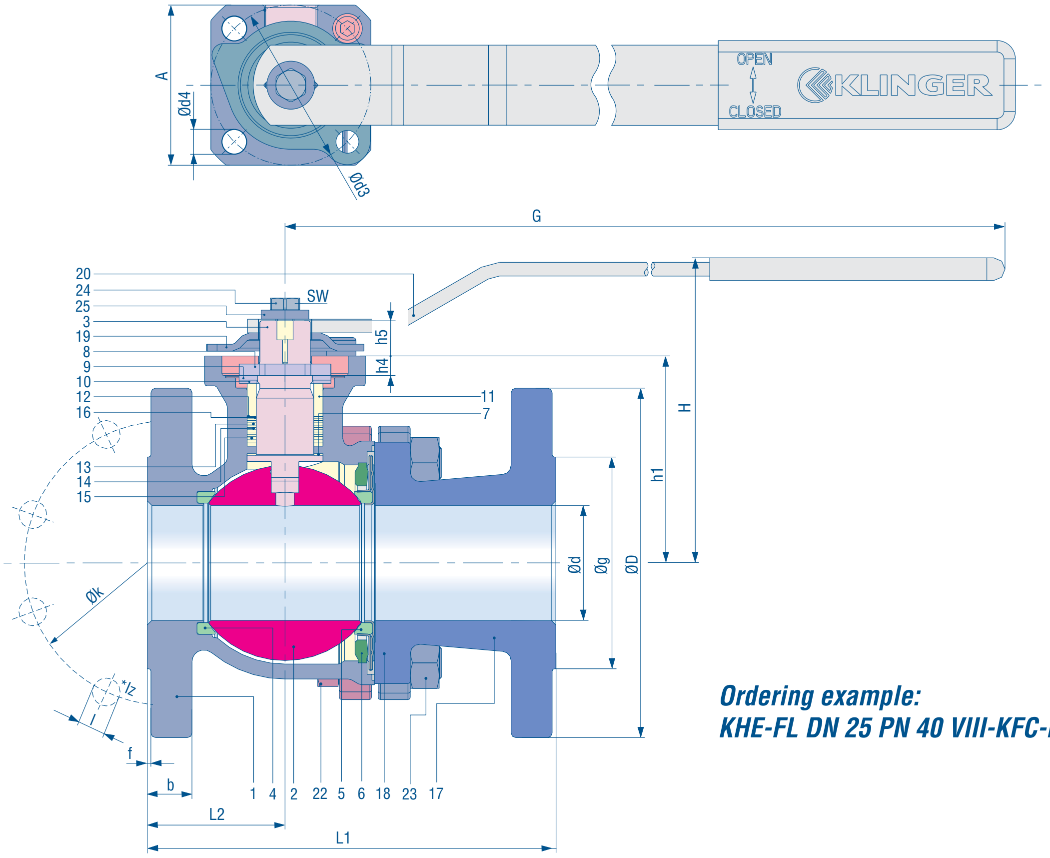
Flanges acc. to EN 1092-1 / PN 40 or PN 16, long design
Materials: carbon steel, stainless steel

KHE-FL

PN 40
DN 15 - 200
Material VIII, Xc

PN 16
DN 15 - 200
Material VIII, Xc

Face-to-face dimensions acc. to EN 558-1, basic series 1



Ordering example:
KHE-FL DN 25 PN 40 VIII-KFC-Laby.

Pressure range PN 40

DN	PN	Body dimensions					Flange dimensions								Weight
		d	L1	L2	H	G	h1	D	g	f	b	k	l	lz*1	Kg/piece
15	40	15	1130	50	80	130	35	95	45	2	16	65	14	4	2.4
20	40	20	150	45	94	160	46	105	58	2	18	75	14	4	3.6
25	40	25	160	45	98	160	50	115	68	2	18	85	14	4	4.5
32	40	32	180	50	106	250	65	140	78	2	18	100	18	4	6.9
40	40	40	200	50	113	250	72	150	88	3	18	110	18	4	8.8
50	40	50	230	60	131	315	90	165	102	3	20	125	18	4	13.6
65	40	65	290	65	141	315	100	185	122	3	22	145	18	8	19.5
80	40	80	310	65	162	500	122	200	138	3	24	160	18	8	28.4
100	40	100	350	75	176	500	135	235	162	3	24	190	22	8	38.7
125	40	125	400	125	211	650	175	270	188	3	26	220	26	8	67.4
150	40	150	480	*4	*4	*4	*4	300	218	3	28	250	26	8	*4
200	40	200	600	*4	*4	*3	*4	375	285	3	34	320	30	12	*4

Pressure range PN 16*2

DN	PN	Body dimensions					Flange dimensions								Weight
		d	L1	L2	H	G	h1	D	g	f	b	k	l	lz*1	Kg/piece
65	16	65	290	65	141	315	100	185	122	3	22	145	16	4	19.5
80	16	80	310	65	162	500	122	200	138	3	24	160	18	8	28.4
100	16	100	350	75	176	500	135	220	158	3	24	180	18	8	38.7
125	16	125	400	125	211	650	175	250	188	3	26	210	18	8	67.4
150	16	150	480	150	234	650	195	285	212	3	32	240	22	8	*4
200	16	200	600	170	300	*3	264	340	268	3	34	295	22	12	167.3

*1 = Number of drilling holes
*2 = DN 15–50 and DN 80: the flange dimensions of pressure stage PN 16 are equal to the measurements of PN 40 flanges.
*3 = DN 200 standardly with bare shaft (no lever)
*4 = Dimensions on request

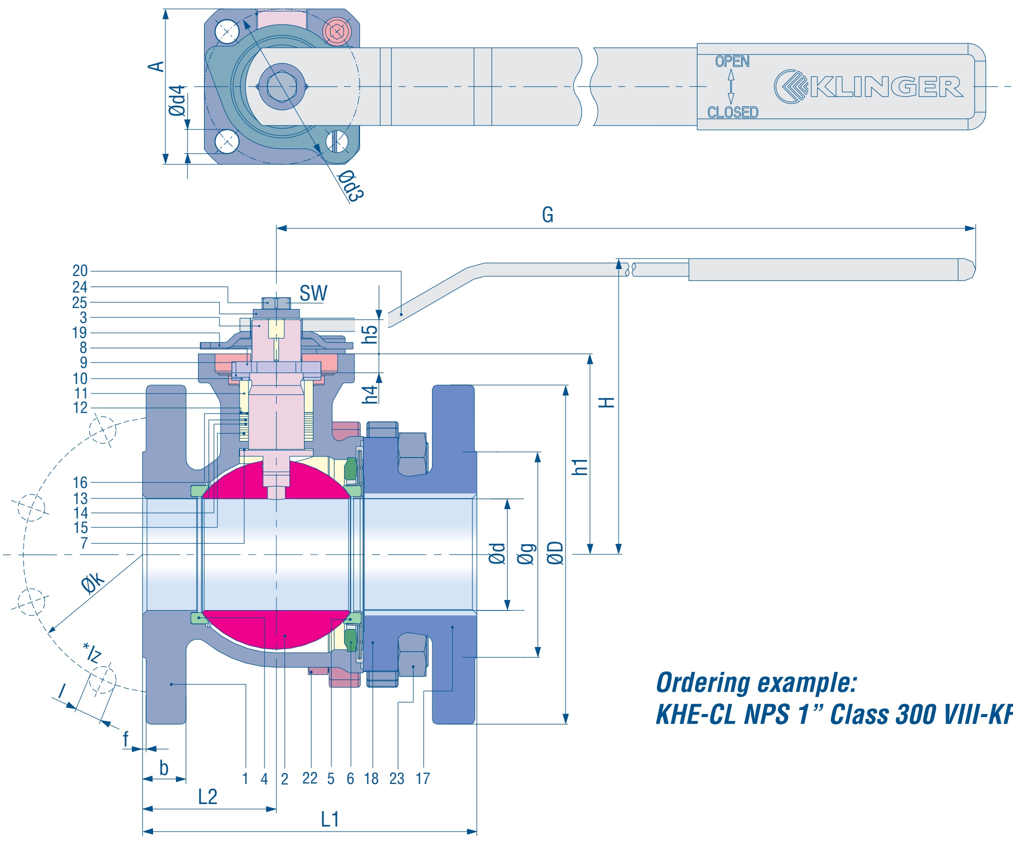
Components and materials of standard type

Pos	Part	Material VIII	Material Xc
1	Body	1.0619	1.4408
2	Ball	1.4401	1.4401
3	Operating stem	1.4104	1.4571
4	Sealing ring	KFC-25	KFC-25
5	Sealing element	KFC-25	KFC-25
6	Supporting ring	SINT C39	1.4404
7	Slip ring	KFC-25	KFC-25
8	Stuffing box nut	1.4404	1.4404
9	Loading ring	1.4404	1.4404
10	Belleville washer	1.4310	1.4310
11	Fem. Supporting ring	1.4404	1.4404
12	Antistatic disc	1.4401	1.4401
13	Disc	1.4401	1.4401
14	Stuffing box lamella	K-Flon	K-Flon
15	Washer	Graphite	Graphite
16	Washer	Graphite	Graphite
17	End piece	1.0619	1.0619
18	Sealing ring	Graphite	Graphite
19	Stop	1.4310	1.4310
20	Hand lever	stainless steel	
22	Heavy hex screw	8.8	A4-70
23	Heavy hex nut	8	A4
24	Heavy hex screw	A4-70	A4-70
25	Disc	A4	A4

 All dimensions in mm. In the interest of technical progress designs and dimensions are subjected to modification.

Split-body ball valves KHE

Flanges acc. to ANSI B16.5, Class 150/300
Materials: carbon steel, stainless steel



KHE-CL

Class 150
NPS 1/2" - 8"
Material: VIII, Xc

Class 300
NPS 1/2" - 8"
Material: VIII, Xc

Face-to-face dimensions acc. to ANSI B16.10

Ordering example:
KHE-CL NPS 1" Class 300 VIII-KFC-Laby.

Pressure range Class 150

NPS	Class	Body dimensions					Flange dimensions								Weight
		d	L1	L2	H	G	h1	D	g	f	b	k	l	lz*1	Kg/piece
1/2"	150	1/2"	108	43	81	130	35	89	34.9	1.6	11.5	60.3	16	4	1.6
3/4"	150	3/4"	117	42	95	160	46.5	98	42.9	1.6	13.	69.9	16	4	2.5
1"	150	1"	127	47	98	160	50	108	50.8	1.6	14.5	79.4	16	4	3.3
1 1/2"	150	1 1/2"	165	64	114	250	72.5	127	73	1.6	17.5	98.4	16	4	7
2"	150	2"	178	60	131	315	90	152	92.1	1.6	19.5	120.6	20	4	11.2
2 1/2"	150	2 1/2"	191	66	141	315	100	178	104.8	1.6	22.5	139.7	20	4	17.1
3"	150	3"	203	83	163	500	121	191	127	1.6	24	152.4	20	4	24.3
4"	150	4"	229	83	176	500	135	229	157.2	1.6	24	190.5	20	8	34.8
6"	150	6"	267	150	234	650	195	279	215.9	1.6	25.5	214.3	23	8	92.3
8"	150	8"	292	229	300	*2	264	343	269.9	1.6	29	298.4	23	8	159.3

Pressure range Class 300

NPS	Class	Body dimensions					Flange dimensions								Weight
		d	L1	L2	H	G	h1	D	g	f	b	k	l	lz*1	Kg/piece
1/2"	300	1/2"	140	70	81	130	35	95	34.9	1.6	14.5	60.7	16	4	2.3
3/4"	300	3/4"	152	65	95	160	46.5	117	42.9	1.6	16	82.5	20	4	3.8
1"	300	1"	165	75	98	160	50	124	50.8	1.6	17.5	88.9	20	4	4.7
1 1/2"	300	1 1/2"	191	75	114	250	72.5	156	73	1.6	21	114.3	23	4	9.7
2"	300	2"	216	90	131	315	90	165	92.1	1.6	22.5	127	20	4	13.4
2 1/2"	300	2 1/2"	241	111	141	315	100	191	104.8	1.6	25.5	149.2	23	4	19.8
3"	300	3"	282	127	163	500	121	210	127	1.6	29	168.3	23	4	30.9
4"	300	4"	305	135	176	500	135	254	157.2	1.6	32	200	23	8	46.4
6"	300	6"	403	*3	*3	*3	*3	398	215.9	1.6	37	269.9	23	12	*3
8"	300	8"	419	*3	*3	*2	*3	381	269.9	1.6	41.5	330.2	26	12	*3

*1 = Number of drilling holes
*2 = NPS 8" standardly with bare shaft (no lever)
*3 = Dimensions on request

Components and materials of standard type

Pos	Part	Material	
		VIII	Xc
1	Body	WCB	CF8M
2	Ball	CF8M	CF8M
3	Operating stem	430F	316Ti
4	Sealing ring	KFC-25	KFC-25
5	Sealing element	KFC-25	KFC-25
6	Supporting ring	SINT C39	316L
7	Slip ring	KFC-25	KFC-25
8	Stuffing box nut	316L	316L
9	Loading ring	316L	316L
10	Belleville washer	301	301
11	Fem. Supporting ring	316L	316L
12	Antistatic disc	316	316
13	Disc	316	316
14	Stuffing box lamella	K-Flon	K-Flon
15	Washer	Graphite	Graphite
16	Washer	Graphite	Graphite
17	End piece	WCB	CF8M
18	Sealing ring	Graphite	Graphite
19	Stop	301	310
20	Hand lever	stainless steel	
22	Heavy hex screw	B7	A4-70
23	Heavy hex nut	2H	A4
24	Heavy hex screw	A4-70	A4-70
25	Disc	A4	A4

Spare parts, accessories and special designs

KLINGERballostar® KHE ball valves are maintenance-free!

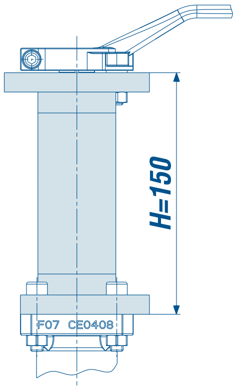

Spare parts: sealing ring, sealing element and washers for the labyrinth stuffing box

Spare parts:

The modular construction design of the ball valve makes it easy to change components, which are damaged because of wear out or corrosion.
The installation of original KLINGER spare parts enables the original quality of the valve, even after years of operation.


Standard type of spare part ball

The modular system of the valve components also ensures the technical upgrading or adaption to special requirements. For example it is possible to replace a KFC-sealing element with a metal-sealing element. For detailed information feel free to contact our sales team.



Special designs

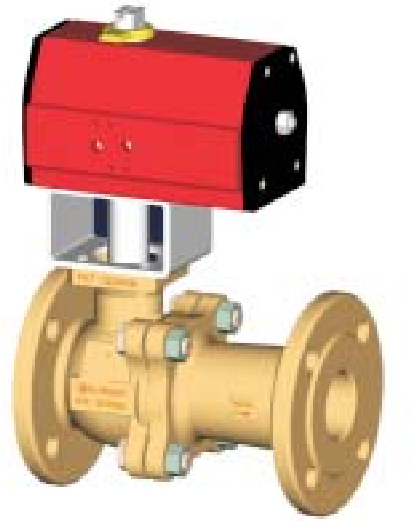
Our customers and their needs are in center of attention. In close cooperation innovative and tailor-made solutions are developed to fulfil the specified assignments. Our main criterion is to achieve customer satisfaction:


KLINGERballostar® KHE with operating stem extension and protection pipe

Among other things we offer the following special designs and equipment:

- Fire-safe version
- Vacuum application
- Valve for gas application (sealing of stuffing box with O-rings)
- Metal sealing element for abrasive medium
- Heating jacket
- Operating stem extension, optional with protection pipe (standard length 150 mm)
- Mounting kits (bracket and coupling) used as connection element between top flange and actuator.

Without automation hardly any cost-effective industrial process is imaginable. Rising requirements for operating and controlling valves in installations are challenges we face.
The application of actuators helps to realise the customer specific demands for valve-automation.



KHE-FL
with pneumatic actuator

Type overview of actuators and specifications

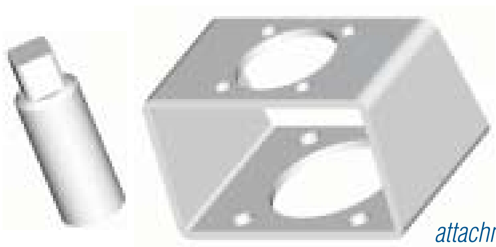
KLINGERballostar KHE ball valves can be equipped with all types of actuators.

Absolutely necessary information for dimensioning of actuator:

1. *Size of the ball valve and the operating torque (the following two pages show how to choose the correct nominal size and torque)*

2. *Type of actuator: – electro-mechanic (operating voltage and frequency)*
   – pneumatic (single or double acting, control pressure)
   – hydraulic

3. *Type of mounting: directly or with bracket and coupling (direct mounting is not recommended for temperatures above 80°C)*



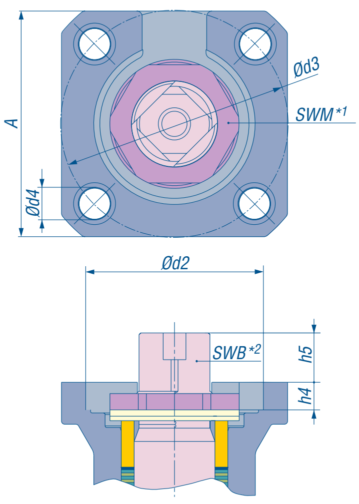
Mounting kit for valve-actuator attachment acc. to EN ISO 15081

4. *Positioning time*

5. *Accessories: limit switch, solenoid valve, controlling device a.o.*

KHE-FK
with electro-mechanic actuator

Dimensions of top flange (acc. to ISO 5211)



Size		Top flange for actuator attachment									
					SWM*1						
DN	NPS	ISO	A	d3	DIN	ANSI	d2	d4	h4	h5	SWB*2
15	1/2"	F04	42	42	16	5/8"	30	5.8	6.5	7	8
20	3/4"	F04	42	42	22	7/8"	30	5.8	6.5	9.5	11
25	1"	F04	42	42	22	7/8"	30	5.8	6.5	9.5	11
32		F05	50	50	24		35	7	7.5	12.3	14
40	1 1/2"	F05	50	50	24	15/16"	35	7	7.5	12.3	14
50	2"	F07	70	70	36	1 7/16"	55	10	8.5	15.3	17
65	2 1/2"	F07	70	70	36	1/ 7/16"	55	10	8.5	15.3	17
80	3"	F10	102	102	46	1 13/16"	70	12	9	20.5	22
100	4"	F10	102	102	46	1 13/16"	70	12	9	20.5	22
125		F12	125	125	50		85	15	11	25.5	27
150	6"	F12	125	125	50	2"	85	15	11	25.5	27
200	8"	F14	140	140	65	2 9/16"	98	18	10	36	36

*[*1] = Wrench size of hexagonal stuffing box nut*
*[*2] = Wrench size of square operating stem*

Choice of actuator

Torques of the various seals

1

Size		KFC								
		Differential pressure (bar)								
NPS	DN	0	5	10	16	Class 150	25	30	40	Class 300
inch	mm	Torque Nm								
1/2"	15	6	6.2	6.4	6.6	6.8	7	7.2	7.6	8
3/4"	20	12	12.4	12.7	13.1	13.4	13.8	14.1	14.8	15.5
1"	25	14	15	16.1	17.3	18.1	19.2	20.2	22.3	24.3
1 1/4"	32	17	18.4	19.9	21.6	22.7	24.1	25.6	28.4	31.3
1 1/2"	40	25	27.8	30.6	33.9	36.1	38.9	41.7	47.2	52.8
2"	50	37	40.6	44.3	48.6	51.5	55.1	58.8	66	
2 1/2"	65	60	66.23	72.5	80	85	91.3	97.5	110	
3"	80	96	114	132	153.6	168	186	204	240	
4"	100	160	183.8	207.5	236	255	278.8	302.5	350	
5"	125	270	317.5	365	422	460	507.5	555	650	

2

Size		PTFE								
		Differential pressure (bar)								
NPS	DN	0	5	10	16	Class 150	25	30	40	Class 300
inch	mm	Torque Nm								
1/2"	15	5.4	5.6	5.8	6.0	6.1	6.3	6.5	6.4	7.2
3/4"	20	10.8	11.1	11.4	11.8	12.1	12.4	12.7	13.3	14.0
1"	25	12.6	13.5	14.5	15.6	16.3	17.2	18.2	20.0	21.9
1 1/4"	32	15.3	16.6	17.9	19.4	20.4	21.7	23.0	25.6	28.2
1 1/2"	40	21.3	23.6	26.0	28.8	30.7	33.1	35.4	40.1	44.9
2"	50	30.3	33.3	36.3	39.9	42.2	45.2	48.2	54.1	
2 1/2"	65	51.0	56.3	61.6	68.0	72.3	77.6	82.9	93.5	
3"	80	72.0	85.5	99.0	115.2	126.0	139.5	153.0	180.0	
4"	100	120.0	137.8	155.6	177.0	191.3	209.1	226.9	262.5	
5"	125	202.5	238.1	273.8	316.5	345.0	380.6	416.3	487.5	

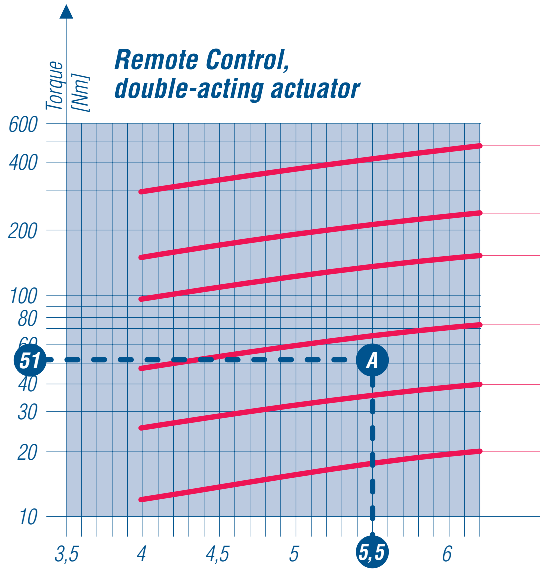
3

Size		Metal								
		Differential pressure (bar)								
NPS	DN	0	5	10	16	Class 150	25	30	40	Class 300
inch	mm	Torque Nm								
1/2"	15	7.5	7.8	8.2	8.5	8.8	9.1	9.5	10.1	10.8
3/4"	20	15	15.7	16.4	17.2	17.8	18.5	19.2	20.6	22
1"	25	18	19.4	20.9	22.6	23.7	25.1	26.6	29.4	32.3
1 1/4"	32	25	26.7	28.3	30.3	31.7	33.3	35.0	38.3	41.7
1 1/2"	40	40	44.8	49.5	55.2	59	63.8	68.6	78.1	87.6
2"	50	55	64.4	73.8	85	92.5	101.9	111.3	130	
2 1/2"	65	85	101.9	118.8	139	152.5	169.4	186.3	220	
3"	80	140	172.5	205	244	270	302.5	335	400	
4"	100	250	293.8	337.5	390	425	468.8	512.5	600	
5"	125	450	580	710	866	970	1.100			

4

Size		Viton			
		Differential pressure (bar)			
NPS	DN	0	5	10	16
inch	mm	Torque Nm			
1/2"	15				
3/4"	20				
1"	25	14	15.9	17.8	20
1 1/4"	32	18	20.2	22.4	25
1 1/2"	40	25	29.7	34.4	40
2"	50	40	49.4	58.8	70
2 1/2"	65	55	72.2	89.4	110
3"	80	100	150	200	260
4"	100	160	219.4	278.8	350
5"	125				

KLINGER recommends to use a factor of 1.5, i.e. plus 50% for standard calculations.



Transfer the design torque and the control pressure to obtain the working pont A. Now you choose the actuator with the next higher torque. In this case it is RC 230-DA.

The way to the right actuator

You can save on investment and additional costs by designing the actuator for your ball valve assuming not the possible but the necessary maximum.

The torque of the actuator is determined by the required differential pressure, not by the nominal pressure.
What's more, the KLINGER ballostar KHE ball valve has the same, relatively low torque in all operating states.

When both aspects are considered, the actuator can often be smaller by one or two performance stages, which leads to a smaller overall size and fitting dimension, which is an important advice for a plant constructor. Small size also means lower power and energy requirement for the kinematics. And this day by day, for many years.

Flow chart and example for remote control actuator

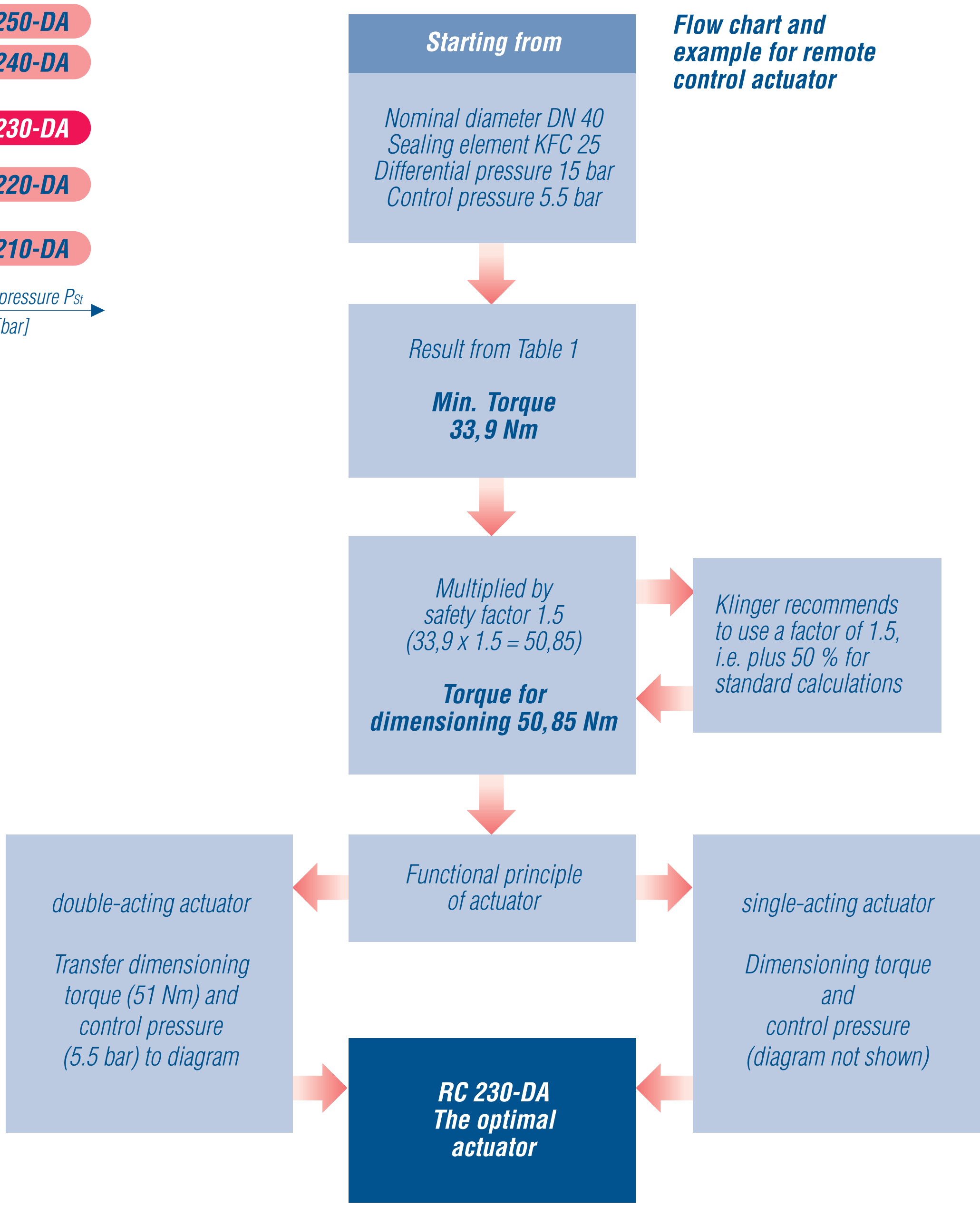


Table of chemical resistance

The recommendations in this table should help you to choose suitable materials and types. We cannot assume a guarantee since the function and durability of the products are largely dependent on factors which can't be influenced by the manufacturer.

In the event of specific conditions of approval, these must be observed. Please contact us if in doubt. Wherever solids are named in the list, what is meant are their aqueous solutions or suspensions.

Designation of sealing materials:

KFC-25 = KLINGERflon® carbon-reinforced

PTFE = KLINGERflon® PTFE

Metal = 1.4436 sealing ring coated With STELLITE

Viton = Fluorinated rubber

Fluid	Chemical formula	Concentration & temperature		Sealing materials				Body (material code)	
		%	°C	KFC-25	PTFE	Metal	Viton	VIII	Xc
Acetone	CH_3COCH_3		20	●	●	●	✖	●	●
Acetylene	C_2H_2			●	●	●	●	●	●
Air, dry				●	●	●	●	●	●
Alum	$KAl(SO_4)_2$	10	20	●	●	●	●	▮	●
Alum	$KAl(SO_4)_2$	10	100	●	●	●	●	▮	●
Aluminium acetate	$(CH_3COO)_3Al$			●	●	●	✖	✖	●
Aluminium ethylate	$Al(OC_2H_5)_2$			●	●	●	✖	●	●
Aluminium chlorate	$Al(ClO_3)_3$			●	●	●	✖	▮	●
Aluminium fluoride	AlF_3			●	●	●	✖	●	●
Aluminium oxyde	Al_2O_3			●	●	●	✖	●	●
Ammonia	Nh_3	10	20	●	●	●	●	●	●
Ammonium hydroxyde	NH_4OH	10	20	●	●	●	●	●	●
Ammonium hydroxyde	NH_4OH	10	100	●	●	●	●	●	●
Ammonium bicarbonate	$(NH_4)HCO_3$			●	●	●	✖	●	●
Ammonium chloride	NH_4Cl	5	20	●	●	●	●	■	●
Ammonium chloride	NH_4Cl	10	20	●	●	●	●	■	●
Ammonium chloride	NH_4Cl	10	100	●	●	●	●	✖	●
Ammonium chloride	NH_4Cl	50	20	●	●	●	●	■	●
Ammonium diphosphate	$(NH_4)_2HPO_4$			●	●	●	●	■	●
Ammonium carbonate	$(NA_4)_2CO_3$		Kp	●	●	●	✖	▲	●
Ammonium nitrate	NH_4NO_3		Kp	●	●	●	●	▲	●
Ammonium sulphate	$(NH_4)_2SO_4$		Kp	●	●	●	●	✖	●
Aniline	$C_6H_5NH_2$			●	●	●	●	●	●
Arsenic acid	H_3AsO_4			●	●	●	●	▲	●
Asphalt (tar)				●	●	●	●	▮	●

Our contribution to fluid safety

Fluid	Chemical formula	Concentration & temperature %	°C	Sealing materials KFC-25	PTFE	Metal	Viton	Body (material code) VIII	Xc
***B**eer*				●	●	●	●	✖	●
Benzene	C_6H_6			●	●	●	●	●	●
Benzine				●	●	●	✖	●	●
Bleaching liquor (chloride of lime)				●	●	●	●	▮	■
Borax	$Na_2B_4O_710H_2O$			●	●	●	●	▮	●
Borsäure	H_3BO_3	4	20	●	●	●	●	▲	●
Borsäure	H_3BO_3	4	100	●	●	●	●	▲	●
Borsäure	H_3BO_3	100	100	●	●	●	●	▲	●
Butan	C_4H_{10}			●	●	●	●	●	●
Buttermilch			20	●	●	●	✖	▮	●
Butylacetat	$CH_3COOC_4H_9$			●	●	●	✖	●	●
Butyalkohol	C_4H_9OH			●	●	●	✖	●	●
***C**alcium bisulphite*	$Ca(HSO_3)_2$		20	●	●	●	●	▮	●
Calcium bisulphite	$Ca(HSO_3)_2$		200	●	●	●	●	▮	●
Calcium chloride	$CaCl_2$		20	●	●	●	●	■	●
Calcium chloride	$CaCl_2$		100	●	●	●	●	▲	■
Calcium hydroxide (Kalkmilch)	$Ca(OH)_2$			●	●	●	●	●	●
Calcium hydroxide	$Ca(OH)_2$		20	●	●	●	●	●	●
Calcium hydroxide	$Ca(OH)_2$		Kp	●	●	●	●	●	●
Calcium hypochlorite	$Ca(ClO)_2$			●	●	●	●	▲	■
Calcium sulphat	$CaSO_4$			●	●	●	✖	●	●
Carbon dioxyde	Co_2		150	●	●	●	●	●	●
Carbon dioxyde	Co_2		400	●	●	●	●	●	●
Carbon disulfide	Co_2		20	●	●	●	●	●	●
Carbon tetrachloride	CCl_4			●	●	●	●	■	●
Chloroform	$CHCl_3$			●	●	●	●	●	●
Chloroform	$CHCl_3$		20	●	●	●	●	●	●
Chlorosulphonic acid	$HOSO_2Cl$		Kp	●	●	●	✖	■	▮
Chromic acid	H_2CrO_4	10	20	●	●	●	●	●	●
Chromic acid	$H_{2x}CrO_4$	10	Kp	●	●	●	●	▮	●
Chromic acid	H_2CrO_4	50	20	●	●	●	●	●	●
Citric acid	$(CH_2COOH)_2C(OH)COOH$		20	●	●	●	●	✖	●
Citric acid	$(CH_2COOH)_2C(OH)COOH$		Kp	●	●	●	●	✖	●
Clophen T 64				●	●	●	✖	●	●
Coagulating baths (up to 10%)	H_2SO_4		80	●	●	●	✖	✖	●
Copper acetate	$(CH_3COO)_2Cu$		20	●	●	●	✖	●	●
Copper acetate	$(CH_3COO)_2Cu$		Kp	●	●	●	✖	▲	●
Copper sulphate	$CuSO_4$		20	●	●	●	●	▲	●
Copper sulphate	$CuSO_4$		Kp	●	●	●	●	▲	●

Abbreviations:
Kp = boiling point
sat. sol. = saturated solution
aq. sol. = aqueous solution
conc. = concentrated

Explanation:
for metallic materials:
● *practically resistant, removal up to 2,4 g/m²/day*
■ *fairly resistant, removal up to 2,4–24 g/m²/day*
▲ *hardly resistant, removal up to 24–72 g/m²/day*
✖ *not resistant, removal up to 72 g/m²/day*
▮ *not tested or not common*

for sealing materials:
● *suitable*
✖ *unsuitable*

1) Discolorations may occur.
2) 150°C

Table of chemical resistance

Fluid	Chemical formula	Concentration & temperature		Sealing materials				Body (material code)	
		%	°C	KFC-25	PTFE	Metal	Viton	VIII	Xc
Diazotation bath (weakly acid)			20	●	●	●	✖	▲	■
Diazotation bath (weakly acid)			80	●	●	●	✖	▲	■
Diesel oil			20	●	●	●	●	●	●
Diphyl				●	●	●	✖	●	●
Dowtherm A				●	●	●	✖	●	●
Dye liquor, alkaline or neutral			20	●	●	●	✖	▮	●
Dye liquor, alkaline or neutral			Kp	●	●	●	✖	▮	●
Dye liquor, organic acid			20	●	●	●	✖	▮	●
Dye liquor, organic acid			Kp	●	●	●	✖	▮	●
Dye liquor, strongly sulphuric acid	H_2SO_4 over 0,3%		20	●	●	●	✖	▮	●
Dye liquor, strongly sulphuric acid	H_2SO_4 over 0,3%		Kp	●	●	●	✖	▮	■
Dye liquor, weakly sulphuric acid	H_2SO_4 under 0,3%		Kp	●	●	●	✖	▮	●
Ethane	C_2H_6			●	●	●	●	●	●
Ethanol	C_2H_5OH			●	●	●	✖	●	●
Ethyl ether	$C_2H_5OC_2H_6$			●	●	●	✖	■	●
Ethyl acetate	$CH_3COOC_2H_5$		Kp	●	●	●	✖	●	●
Ethylene	C_2H_4			●	●	●	●	●	●
Ethylen chloride (dichlorethane)	$(CH_2Cl)_2$	20		●	●	●	●	●	●
Fatty acids from C6				●	●	●	●	■	●
Formaldehyd	HCHO	40	20	●	●	●	●	✖	●
Formaldehyd	HCHO	40	Kp	●	●	●	●	✖	●
Formic acid	HCOOH	10	20	●	●	●	✖	✖	●
Formic acid	HCOOH	10	100	●	●	●	✖	✖	■
Formic acid	HCOOH	100	20	●	●	●	✖	✖	●
Formic acid	HCOOH	100	100	●	●	●	✖	✖	■
Freon 12, Frigen 12				●	●	●	✖	●	●
Glacial acetic acid	CH_3COOH		20	●	●	●	✖	▲	●
Glacial acetic acid	CH_3COOH	10	20	●	●	●	✖	▲	●
Glacial acetic acid	CH_3COOH	10	Kp	●	●	●	✖	▲	●
Glacial acetic acid	CH_3COOH	10	20	●	●	●	✖	▲	●
Glacial acetic acid	CH_3COOH	50	Kp	●	●	●	✖	▲	■
Glacial acetic acid	CH_3COOH	50	20	●	●	●	✖	▲	■
Glacial acetic acid	CH_3COOH	80	Kp	●	●	●	✖	▲	■
Glycerine	(CH_2OH_2) CHOH	80	20	●	●	●	●	▲	●
Glycerine	(CH_2OH_2) CHOH		100	●	●	●	●	▲	●
Grape vinegar			20	●	●	●	✖	▮	●
Heat transfer oils				●	●	●	✖	●	●
Hydrochloric acid, dry	HCl		20	●	●	●	●	■	■
Hydrochloric acid, dry	HCl		100	●	●	●	●	■	▲
Hyroxylamine sulphate	$(NH_2OH)H_2SO_4$	10	20	●	●	●	●	▮	●
Hyroxylamine sulphate	$(NH_2OH)H_2SO_4$	10	KP	●	●	●	✖	▮	●
Hydrochloric acid	HCl	0,2	20	●	●	●	●	✖	●

Our contribution to fluid safety

Fluid	Chemical formula	Concentration & temperature %	°C	Sealing materials KFC-25	PTFE	Metal	Viton	Body (material code) VIII	Xc
Hydrochlorid acid	HCl	0,2	50	●	●	●	●	✖	■
Hydrochlorid acid	HCl	1	20	●	●	●	●	✖	■
Hydrogen sulphide, gas, dry	H_2S		20	●	●	●	✖	▮	●
Hydrogen sulphide, gas, wet	H_2S		20	●	●	●	✖	▮	●
Hydrogen	H_2			●	●	●	●	●	●
Hydrogen peroxide	H_2O_2		20	●	●	●	✖	✖	●
Hydrogen peroxide	H_2O_2		20	●	●	●	✖	✖	●
Illuminating gas				●	●	●	●	●	●
Kreosot			20	●	●	●	✖	▮	●
Kreosot			Kp	●	●	●	✖	▮	●
Lead acetate (lead sugar)	$Pb(CH_3COO)_2$	100	Kp	●	●	●	✖	✖	▲
Lead arsenate	$Pb_3(AsO_4)_2$			●	●	●	✖	▮	●
Linseed oil			20	●	●	●	●	▮	●
Linseed oil			100	●	●	●	●	▮	●
Magnesium sulphate	$MgSO_4$		20	●	●	●	●	■	●
Magnesium sulphate	$MgSO_4$		Kp	●	●	●	●	■	●
Manganous chloride	$MnCl_2$		20	●	●	●	●	▲	●
Manganous chloride	$MnCl_2$		Kp	●	●	●	●	▲	●
M.E.K. (Butanone)	$CH_3COC_2H_5$		Kp	●	●	●	✖	■	●
Mercury	Hg		20	●	●	●	●	■	●
Mercury (II) chloride (sublimate)	$HgCl_2$		20	●	●	●	●	✖	●
Mercury (II) nitrate	$Hg(NO_3)_2$		20	●	●	●	✖	▲	■
Methyl alcohol	CH_3OH		20	●	●	●	✖	● 1)	● 1)
Methyl alcohol	CH_3OH		Kp	●	●	●	✖	● 1)	● 1)
Methylen chloride	CH_2Cl_2		20	●	●	●	✖	■	●
Methylen chloride	CH_2Cl_2		Kp	●	●	●	✖	■	●
Milk				●	●	●	●	▲	●
Natrium acetate	CH_3COONa			●	●	●	✖	■	●
Natural gas				●	●	●	✖	●	●
Nitric acid	HNO_3	10	20	●	●	●	●	✖	●
Nitric acid	HNO_3	10	Kp	●	●	●	●	✖	●
Nitric acid	HNO_3	40	20	●	●	●	●	✖	●
Nitric acid	HNO_3	40	Kp	●	●	●	●	✖	●
Nitric acid	HNO_3	conc.	20	●	●	●	●	✖	●
Nitric acid	HNO_3	conc.	Kp	●	●	●	●	▲	■
Nitrogen	N_2			●	●	●	●	●	●
Oils (lubricating oils, mineral)			20	●	●	●	●	●	●
Oils (vegetable)			20	●	●	●	●	●	●
Oleic acid	$C_{17}H_{33}COOH$			●	●	●	✖	●	●

Abbreviations:
Kp = boiling point
sat. sol. = saturated solution
aq. sol. = aqueous solution
conc. = concentrated

Explanation:
for metallic materials:
● practically resistant, removal up to 2,4 g/m²/day
■ fairly resistant, removal up to 2,4–24 g/m²/day
▲ hardly resistant, removal up to 24–72 g/m²/day
✖ not resistant, removal up to 72 g/m²/day
▮ not tested or not common

for sealing materials:
● suitable
✖ unsuitable

1) Discolorations may occur.
2) 150°C

Table of chemical resistance

Fluid	Chemical formula	Concentration & temperature %	°C	Sealing materials KFC-25	PTFE	Metal	Viton	Body (material code) VIII	Xc
Oxalic acid	COOHCOOH			●	●	●	●	▲	●
Oxygen	O_2		20	●	●	●	●	●	●
Pentyl acetate	$CH_3COOC_5H_{11}$			●	●	●	✖	●	●
Petroleum ether			20	●	●	●	✖	●	●
Phenol	C_6H_5OH			●	●	●	●	▲	●
Phosphoric acid	H_3PO_4	10	20	●	●	●	●	▲	●
Phosphoric acid	H_3PO_4	10	Kp	●	●	●	●	✖	●
Phosphoric acid	H_3PO_4	50	20	●	●	●	●	▲	●
Phosphoric acid	H_3PO_4	50	Kp	●	●	●	●	✖	■
Phosphoric acid	H_3PO_4	80	20	●	●	●	●	✖	●
Phosphoric acid	H_3PO_4	80	Kp	●	●	●	●	✖	▲
Potassium acetat	CH_3COOH		Kp	●	●	●	✖	●	●
Potassium carbonate	K_2CO_3	50	20	●	●	●	●	●	●
Potassium carbonate	K_2CO_3		Kp	●	●	●	●	●	●
Potassium chlorate, at 100°, saturated sol.	$KClO_3$		Kp	●	●	●	●	▲	●
Potassium chromium sulphate	$KCr(SO_4)_2 12H_2O$		20	●	●	●	●	▮	●
Potassium chromium sulphate	$KCr(SO_4)_2 12H_2O$		Kp	●	●	●	✖	▮	✖
Potassium cyanide solution	KCN	5	20	●	●	●	✖	■	●
Potassium dichromate	$K_2Cr_2O_7$	25	20	●	●	●	✖	●	●
Potassium dichromate	$K_2Cr_2O_7$		Kp	●	●	●	✖	▲	●
Potassium hydrogentartrate	$COOH(CHOH)_2COOK$		20	●	●	●	✖	▮	●
Potassium hydrogentartrate, at 100°, sat. sol	$COOH(CHOH)_2COOK$		Kp	●	●	●	✖	▮	■
Potassium hydroxide	KOH	25	20	●	●	●	✖	●	●
Potassium hydroxide	KOH	25	Kp	●	●	●	✖	▮	●
Potassium hydroxide	KOH	50	20	●	●	●	✖	●	●
Potassium hydroxide	KOH	50	Kp	●	●	●	✖	✖	●
Potassium hydrochlorite	KOCl		20	●	●	●	✖	▲	■
Potassium hydrochlorite	KOCl		40	●	●	●	✖	▲	■
Potassium iodide	Kj		Kp	●	●	●	●	▲	●
Potassium iodide	Kj			●	●	●	●	■	●
Potassium nitrate	KNO_3		20	●	●	●	●	●	●
Potassium nitrate	KNO_3		Kp	●	●	●	●	▲	●
Potassium permanganate	$KMnO_4$		20	●	●	●	●	●	●
Potassium permanganate	$KMnO_4$		Kp	●	●	●	●	✖	●
Propan	C_3H_8		20	●	●	●	●	●	●
Salicylic acid	$C_6H_4OHCOOH$		20	●	●	●	●	▲	●
Salpeter				●	●	●	●	●	●
Salt (rock salt)	NaCl		20	●	●	●	●	✖	■
Sea water			20	●	●	●	●	✖	●
Sea water			Kp	●	●	●	●	✖	●
Silicone oil				●	●	●	●	●	●
Soap				●	●	●	●	●	●

In the interest of technical progress designs and dimensions are subjected to modification.

Our contribution to fluid safety

Fluid	Chemical formula	Concentration & temperature %	°C	Sealing materials KFC-25	PTFE	Metal	Viton	Body (material code) VIII	Xc
Sodium carbonate (soda solution, cold sat.)	Na_2CO_3		20	●	●	●	✖	●	●
Sodium carbonate (soda solution)	Na_2CO_3		Kp	●	●	●	✖	■	●
Sodium hydroxide	$NaOH$	20	20	●	●	●	✖	●	●
Sodium hydroxide	$NaOH$	20	Kp	●	●	●	✖	▮	●
Sodium hydroxide	$NaOH$	35	20	●	●	●	✖	●	●
Sodium hydroxide	$NaOH$	35	Kp	●	●	●	✖	✖	●
Sodium sulphate	Na_2SO_4			●	●	●	●	●	■
Starch solution				●	●	●	●	▲	●
Steam				●	●	●	✖	●	●
Stearic acid	$C_{17}H_{35}COOH$			●	●	●	●	▲	●
Sugar			20	●	●	●	●	■	●
Sugar			80	●	●	●	●	■	●
Sulphite lye	$Ca(HSO_3)_2$		20	●	●	●	●	▮	●
(fresh cooking liquor, spent liquor)	$Ca(HSO_3)_2$		80	●	●	●	●	▮	●
Sulphur dioxide	SO_2			●	●	●	✖	✖	●
Sulphuric acid	H_2SO_4	1	20	●	●	●	✖	✖	●
Sulphuric acid	H_2SO_4	10	20	●	●	●	✖	✖	●
Sulphuric acid	H_2SO_4	90	20	●	●	●	✖	■	●
Sulphuric acid	H_2SO_4	conc.	20	●	●	●	●	●	●
Sulphurous acid	H_2SO_3			●	●	●	●	✖	●
Tannic acid	$C_{76}H_{52}O_{46}$	10	20	●	●	●	●	▲	●
Tannic acid	$C_{76}H_{52}O_{46}$	10	Kp	●	●	●	●	✖	●
Tannic acid	$C_{76}H_{52}O_{46}$	50	20	●	●	●	●	▲	●
Tar			180	●	●	●	●	■	●
Tartaric acid	$(CHOHCOOH)_2$		20	●	●	●	●	▲	●
Toluene	$C_6H_5CH_3$		20	●	●	●	●	●	●
Trichlorethylene	C_2HCl_3			●	●	●	●	■	●
Turpentine oil			20	●	●	●	●	●	●
Urea	$(NH_2)_2CO$		20	●	●	●	●	■	●
Water (fresh and trinking water)	H_2O			●	●	●	●	●	●
Water glass (K- and Na-silicate)	$K_2SiO_3Na_2HCl_3$			●	●	●	●	●	●
Xylene	$C_6H_4(CH_3)_2$		20	●	●	●	●	●	●

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KLINGER product range

Product range

Ballostar® KHA
3-piece ball valve made of grey cast iron, steel and stainless cast steel

Ballostar® KHI
2-piece ball valve made of grey cast iron, steel and stainless cast steel

Ballostar® KHE
2-piece ball valve with floating ball, made of carbon steel and stainless steel

Monolith KHO
One-piece, fully welded ball valve made of carbon steel (casted)

KLINGER Monoball®
One-piece ball valve made of steel pipes

KLINGER Ball-o-top
Brass ball valves

Piston valves KVN
made of grey cast iron, nodular cast iron, steel and stainless cast steel

KLINGERMATIC®
Actuator for piston valves and ball valves

Liquid level gauges
for steam and process application

Reflex and transparent sight-glasses

Circular sight-glasses

AB cocks
Packing-sleeve cocks and pressure-gauge cocks in brass, steel and stainless steel

Key role
Link
Innovation
Navigation
Growth
Efficiency
Routine

KHE eng 3/05

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