KLINGER Fluid Control

KLINGERballostar® KHA
3 pieces ball valve
DN 10 – 150

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

Tel. +43 (0)2252 600-0
Fax +43 (0)2252 63-336
Web: www.klinger.kfc.at

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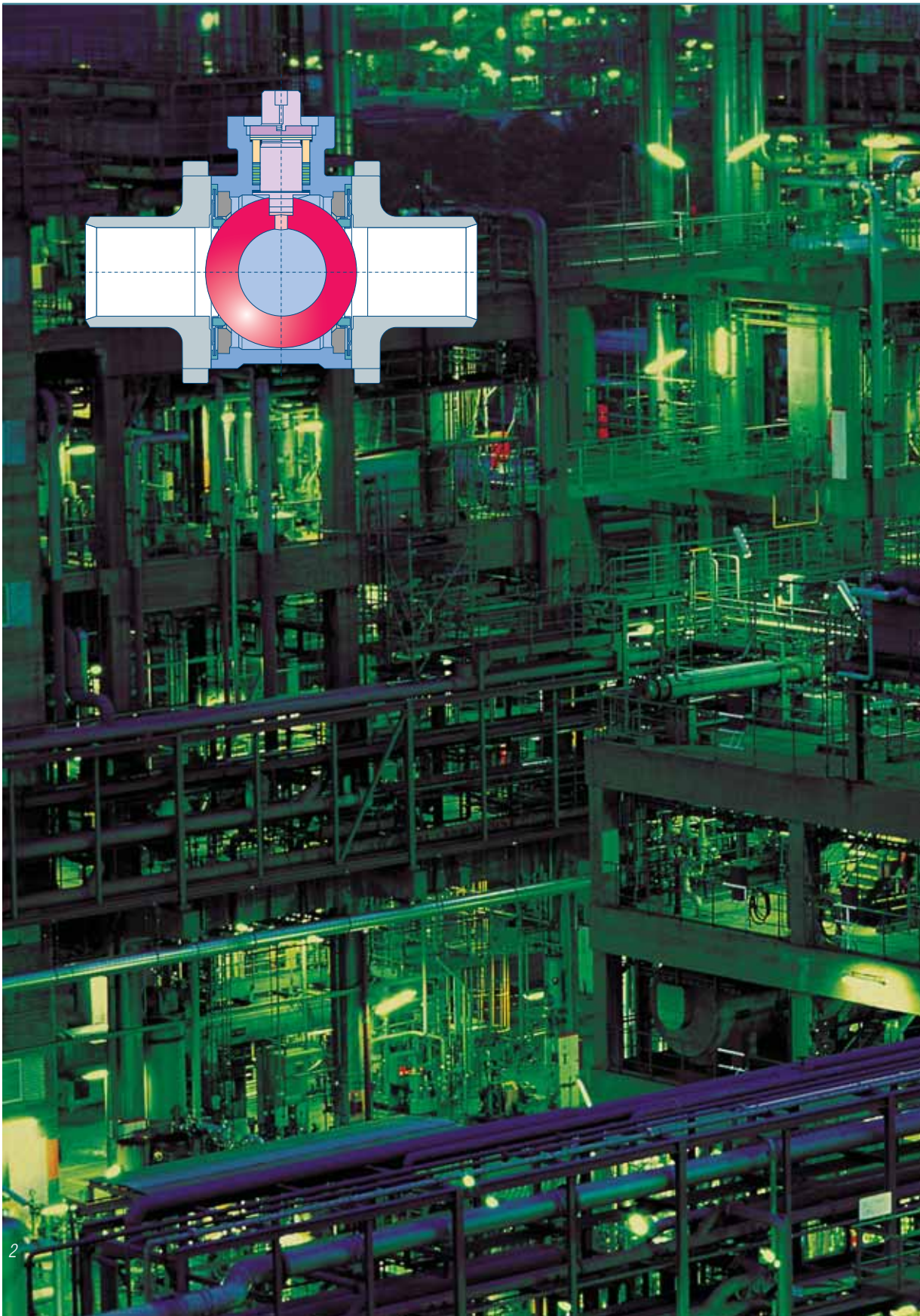
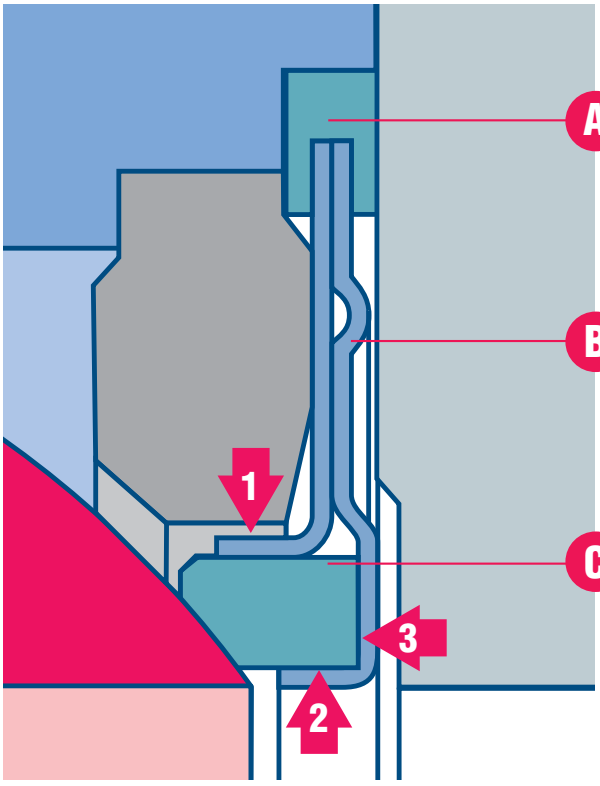


KLINGERballostar-A: The new ball valve just offers more

Who or whatever controls



The sealing element from Klinger offers safety for many years

The sleeve

This consists of a soft material with good flow characteristics (PTFE) so that the sealing element is reliably held in the flange. A graphite ring provides protection against thermal loads in the Fire Safe version.

The diaphragm spring

Thanks to the spring load a tight fit of the actual sealing ring to the ball is guaranteed independent of fluid pressure and direction.

The sealing ring

The ring is enclosed on three sides by metal. Hence it is able to absorb the incorporated spring load and transfers the force to the ball without suffering any deformation.

The sealing element is the heart of a valve. If a valve can reliably fulfil the sealing or controlling functions is determined by the seal. Who or whatever controls the sealing element, controls safety.

Klinger is the only manufacturer in the world who offers both valves and seals.

It is obvious that a hundred years of experience in sealing technology has led to a natural advantage in competition. You are just about to see part of it.

Here we show you the main differences of the Klinger sealing element. On the next pages we explain how these advantages affect the entire valve concept.

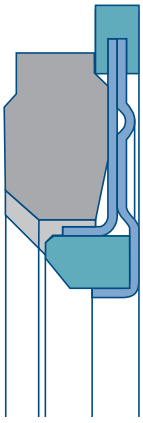
The sealing system decides a ball valve´s quality

the sealing element and the stuffing box, controls safety

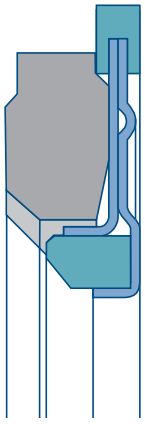
One principle. Six safeties!

Each sealing element can be replaced by another at any time. This allows quick and easy adjustment of the valve to altering requirements, even in-line.

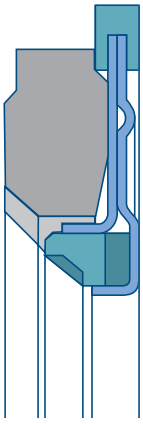
Standard:
For applications up to 300 °C, sealing ring of KFC-25.



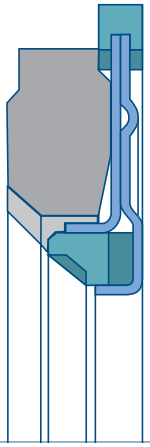
Resistant to fluids:
For an extremely high leak tightness and special application in the chemical area. Sealing ring of PTFE.



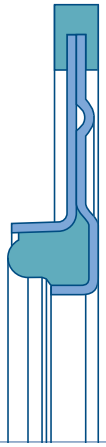
Resistant to wear:
For abrasive fluids and those containing solids. Sealing ring of coated metal.



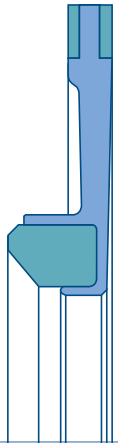
Temperature resistance:
For the high temperature range up to 425 °C. Sealing ring of coated metal.



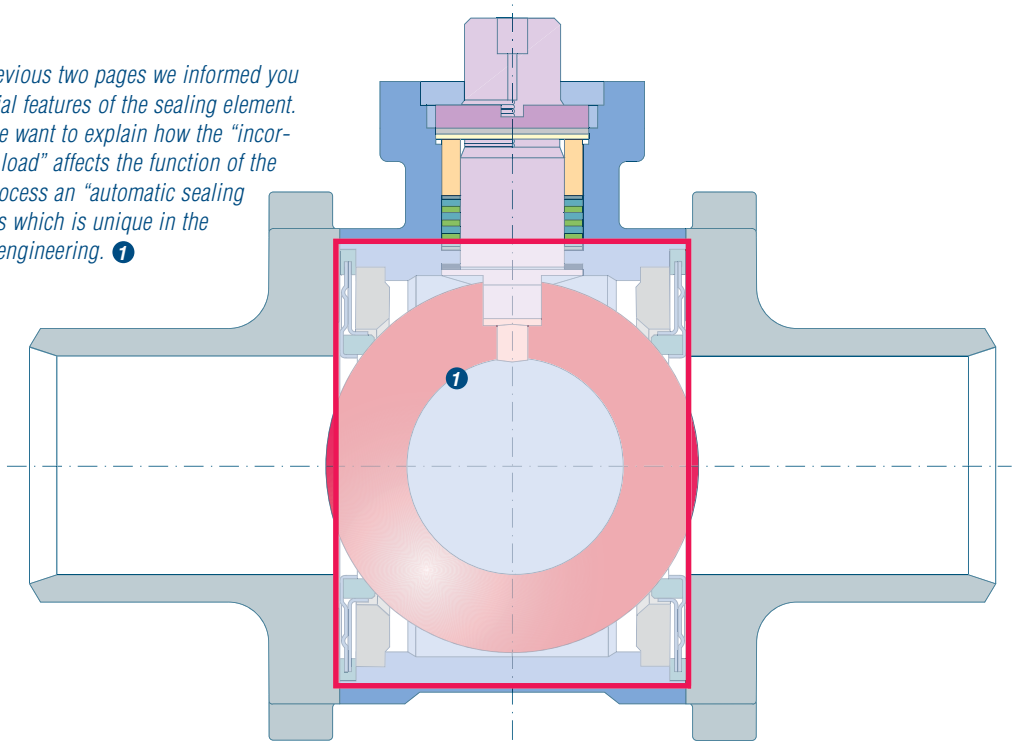
Resistant to vacuum:
Reliably leak-proof at low pressure and fine vacuum. Viton sealing ring.



Fire Safe:
Safety acc. to API 607. Special sleeve. Sealing ring of KFC-25.



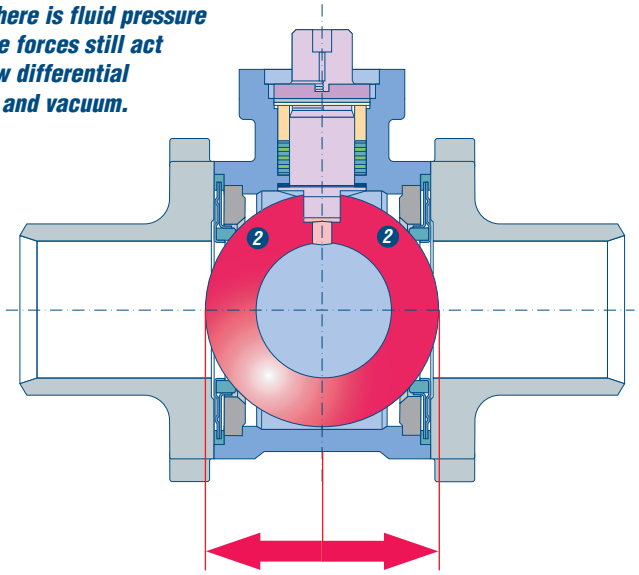
On the previous two pages we informed you about the special features of the sealing element. On this page we want to explain how the "incorporated spring load" affects the function of the valve. In the process an "automatic sealing chamber" forms which is unique in the world of valve engineering. ❶



Automatic sealing chamber. Absolutely leaktight, even at no fluid pressure

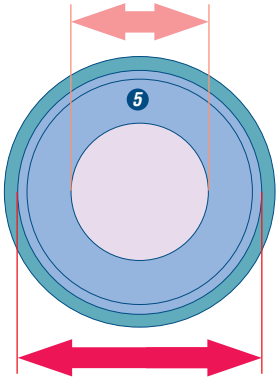
When connecting the flanges with the centre piece the forces of the preloaded springs are released and press the sealing rings to the ball. ❷

This happens irrespective of whether there is fluid pressure or not! The forces still act at very low differential pressures and vacuum.



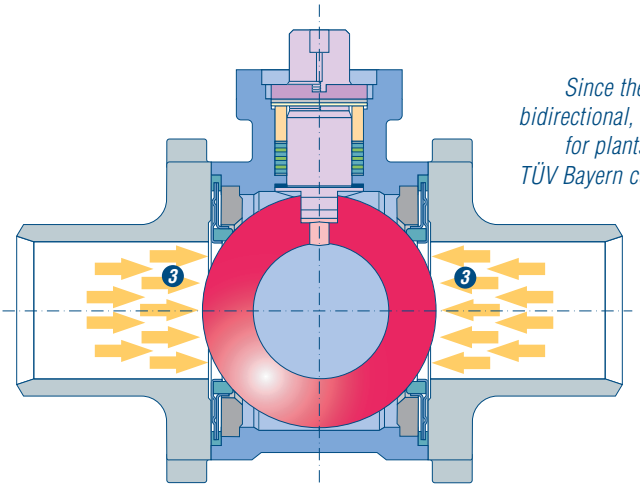
The accumulated force of the sealing elements acts in both directions!

Fluid pressure absorption area in rival systems: Ball area only.



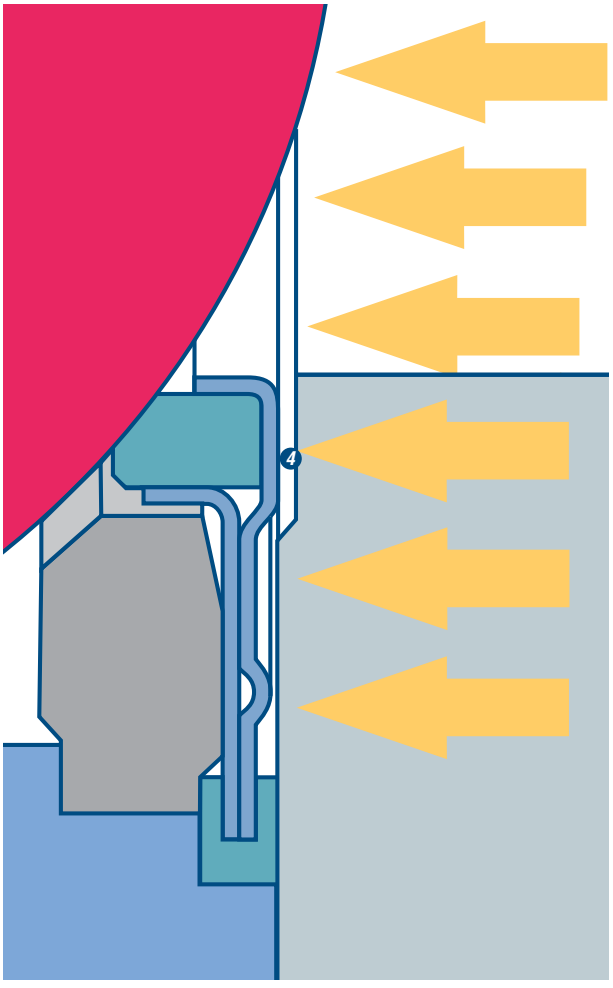
Fluid pressure absorption area at Klinger: Ball and diaphragm spring area.

Only at Klinger will you find a ball valve with "automatic sealing chamber"

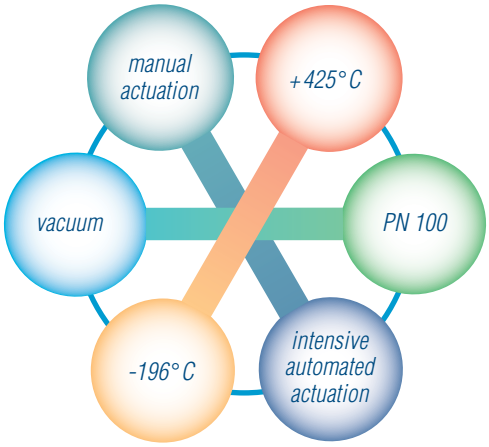


Since the "automatic sealing chamber" acts bidirectional, ❸ the KLINGERballostar-A is ideal for plants with changing flow directions.
TÜV Bayern confirms:
...the „automatic sealing chamber" can substitute two on-sided sealing standard valves as are required sometimes in security sections.

In conventional ball valves, fluid only acts on the ball in the flow direction. In a KLINGERballostar-A ball valve, the complete sealing element is charged with the fluid pressure. ❹
Advantage:
With an increasing differential pressure the additional forces increase as well. This relieves the preloaded diaphragm spring and prolongs the service life.



The sketch to the right clearly shows how much larger the pressure absorbing surface is in a Klinger sealing element. ❺



Remark: Type plate since 2003 only for special design

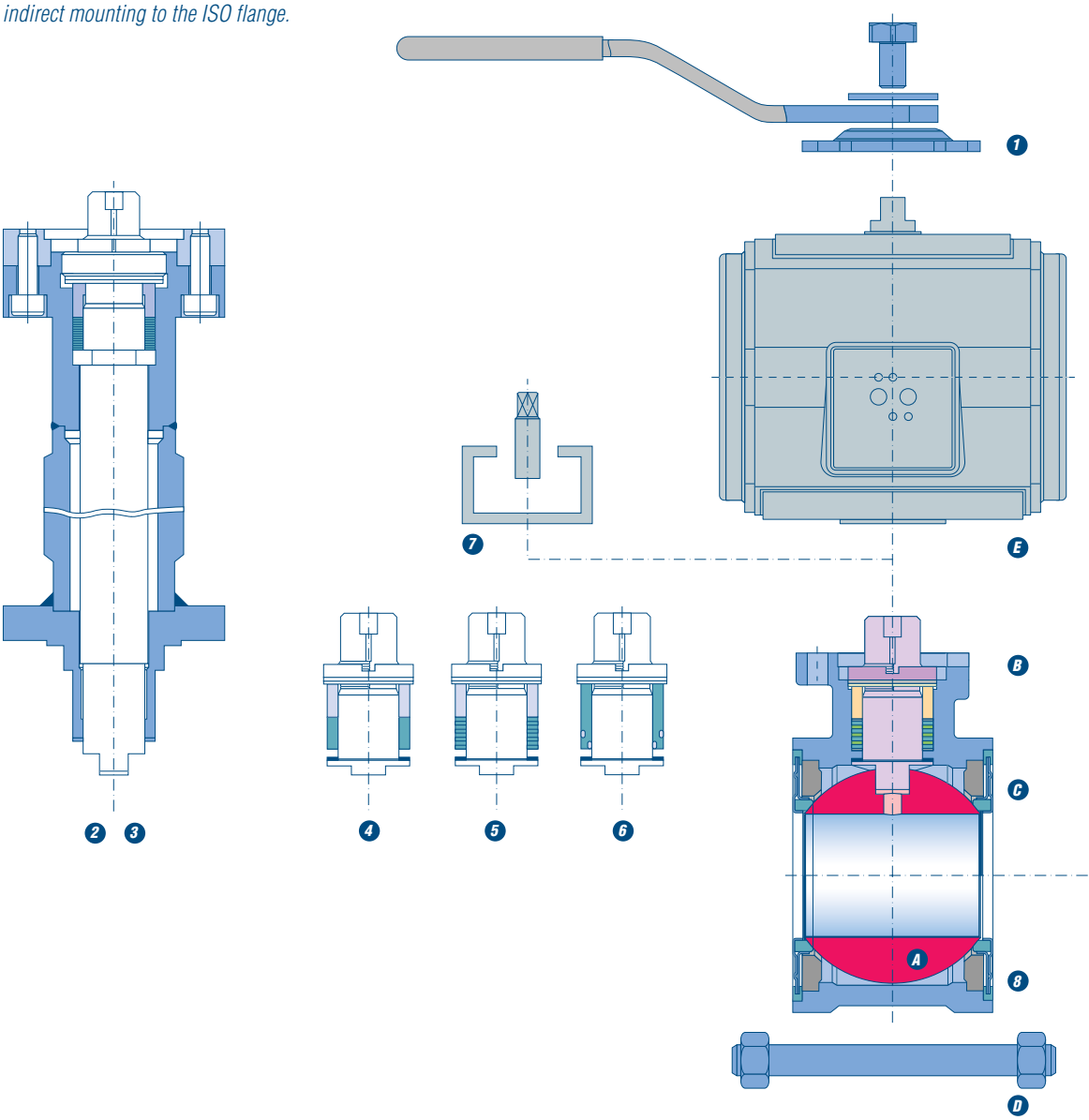
What can provide you with more safety, profitability and universality than a KLINGERballostar-A?

The modular system

A *The ball of acid-resistant steel.*
B *The valve body, two different materials to choose from. The ISO flange is the defined connection to the actuator.*
C *Different sealing elements in the port of different material combinations*
D *Connecting bolts and nuts of three different materials to choose from, suitable for temperature ranges from +425° C to -196° C.*
E *Pneumatically or electrically activated actuators, suitable for direct or indirect mounting to the ISO flange.*

1 *The lever is included in the standard scope of supply.*
2 - **3** *The operating bolt extension for fluids in the low temperature range, also with insulation, depending on the job.*
4 - **6** *Reloadable stuffing boxes for the operating stem. Four different versions and materials : Graphite, PTFE, labyrinth seal and Viton ring.*

7 *At option: The bracket for mounting the actuator, where direct mounting is either not feasible or desirable.*
8 - **13** *The elastic sealing element for the port. Six different materials and versions: KFC-25, PTFE, metal, metal in high-temperature version, Viton, Fire Safe.*
14 - **20** *Connections designed as flange or threaded connections or weld ends with full or reduced port.*



You determine the spot-on ball valve quality through variation of the system components

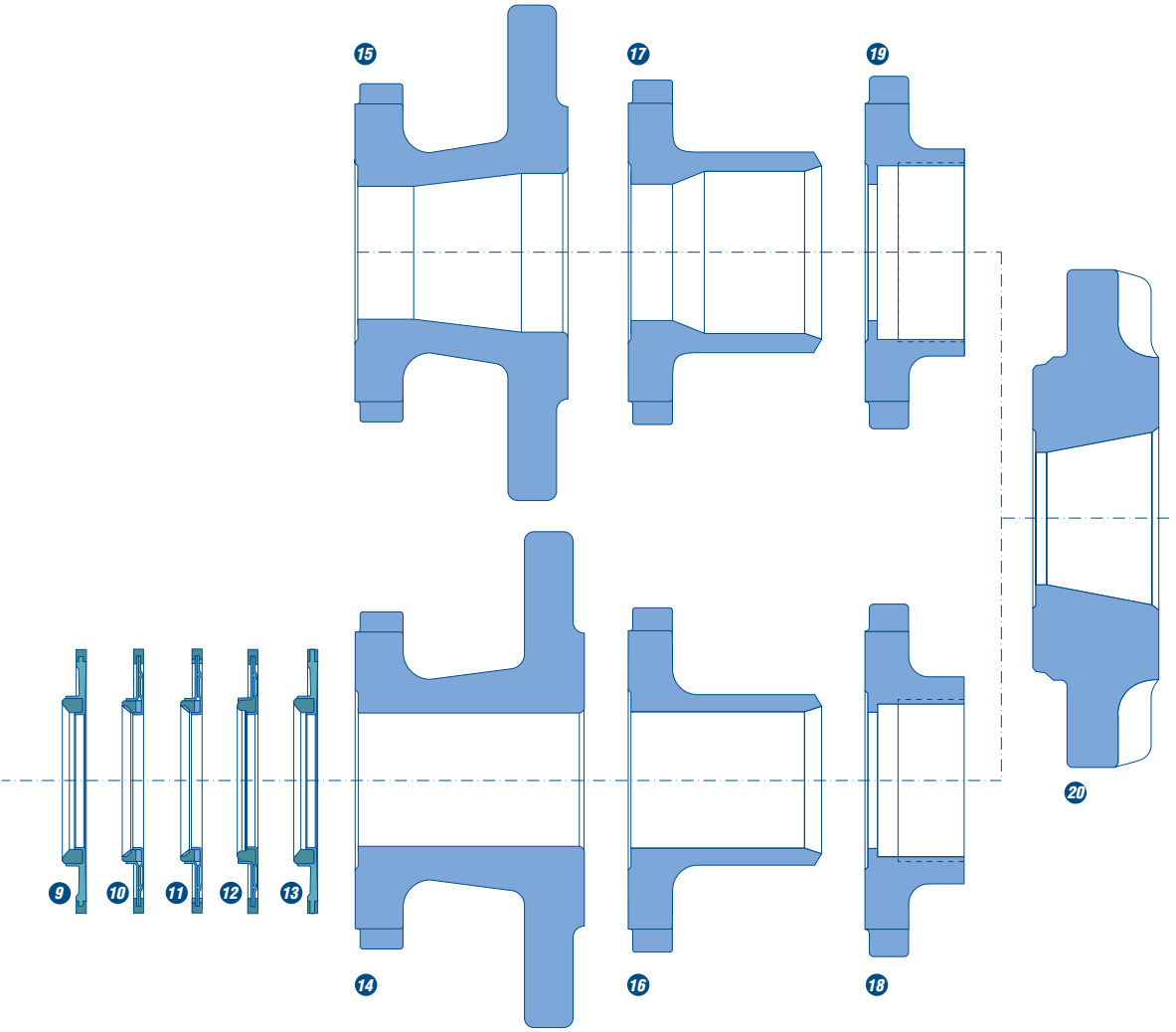
You can fit, retrofit or convert your ball valve for every special operating condition by choosing and combining the various versions and qualities of the system components.

Thanks to the modular system, the safety of the ball valve is quite cost-efficient, because you only buy what you really need and don't waste money on "panic surcharges" or superfluous equipment features.

The fields of application for body materials, sealing elements, and connecting bolts at different pressures and temperatures are shown in the safety diagrams on the pages 16-17.

We place great store in the fact that the low torques of our ball valves definitely result in the choice of an – often – smaller actuator. For more information on the proper torque please see pages 26-27.

With valves of a modular design, maintenance, repair and retrofitting are cost-efficient and easy. For details see the following page.



If you are the sort of person who asks: what does the valve cost after it has been purchased, and if you relate the investment to follow-up costs, then we have some good news for you.

In the fields of application of the ball valves, with the KLINGER-ballostar-A now you can achieve a whole new dimension in safety and economy for plant maintenance with a low capital tie-up and fewer working hours.

Not only does the modular technology of the components offer the big advantages of exactly matched original equipment, but it also ensures spot-on substitution in maintenance and upgrading.

You only have to replace what needs be replaced. This considerably prolongs the service life of the valves in the system, and at the same time cuts the costs of plant maintenance for stockkeeping and assembly.

What is not lowered is the safety standard, which in many cases can in fact easily be improved, if required.

The quality sign on the spare parts packages is your guarantee of original quality.

For a better understanding of the spare part kits:
The sum of the parts in the spare parts kits ***always forms a functional unit.***
Depending on the nominal width of the valve or the application parameters the number of parts and/or their materials may vary with an identical function. In this respect, the kit illustrations only serve for a better understanding and, in most cases, only have a symbolic meaning.

Spare part kit «ball»
The ball, standard version: Original Klinger quality

Even after years, you still have original quality

But guarantee promises and warranty are based on three prerequisites:

1. *You use only original Klinger parts, which can be recognized by the "Q".*

2. *Maintenance and assembly work must always comply with the KLINGER Fluid Control guidelines.*

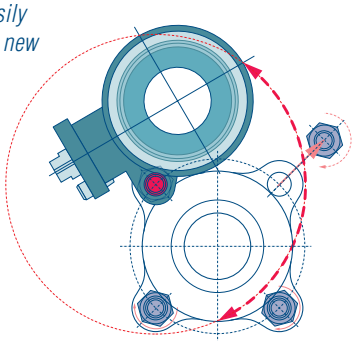
3. *Acceptance tests in accordance with DIN 3230 are performed exclusively by organisations authorized by KLINGER Fluid Control.*

Maintenance and Service without disassembly

Only the nuts on three of the four through bolts need to be slightly loosened for maintenance and service work. The fourth nut is removed and the bolt retracted. The core of the valve can then be easily swung out, as shown in the schematic diagram alongside.

The two sealing elements in the port are then accessible and can be easily removed and replaced by new ones.

And changing the stuffing box seals, removing the ball or the operating stem is just as easy.



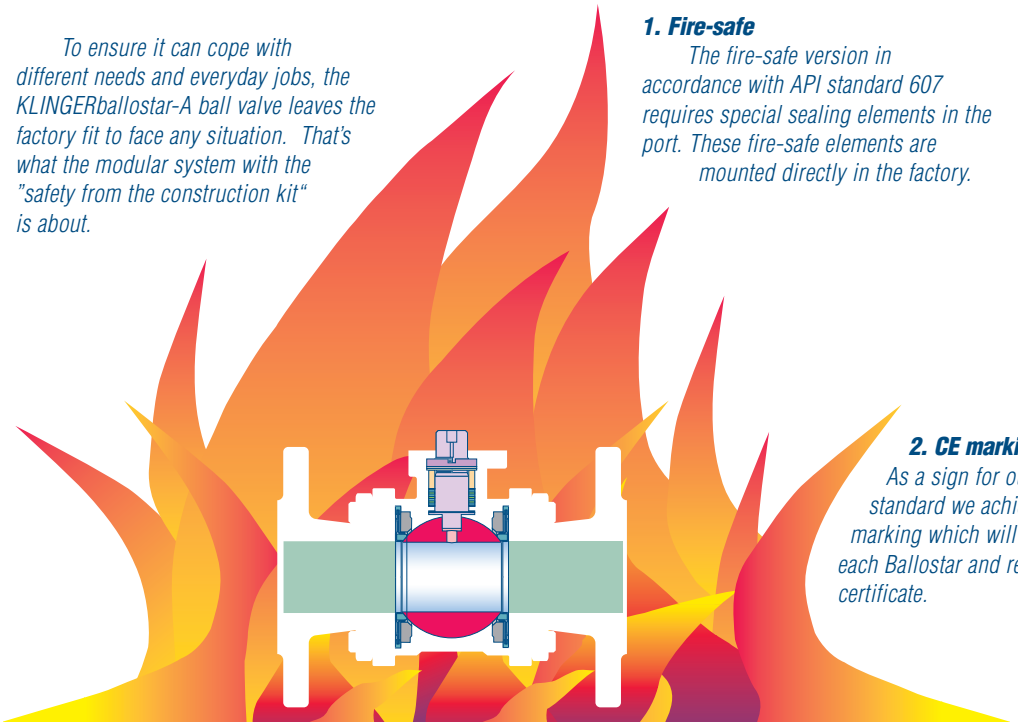
Spare part kit «sealing elements»
The two preloaded sealing elements: Original Klinger quality

Spare part kit «set of seals»
Stuffing box and sealing elements: Original Klinger quality

To ensure it can cope with different needs and everyday jobs, the KLINGERballostar-A ball valve leaves the factory fit to face any situation. That's what the modular system with the "safety from the construction kit" is about.

1. Fire-safe

The fire-safe version in accordance with API standard 607 requires special sealing elements in the port. These fire-safe elements are mounted directly in the factory.

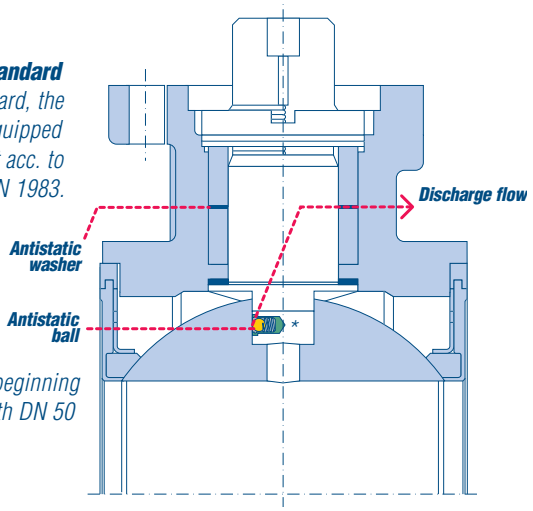


2. CE marking

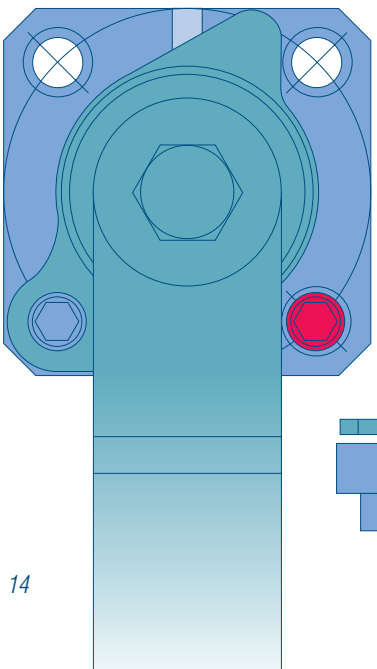
As a sign for our high quality standard we achieved the CE marking which will be printed on each Ballostar and replaces the 3.1B certificate.

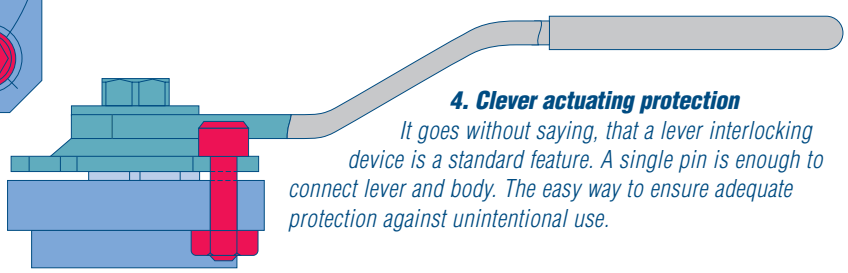
3. Antistatic design as standard

As standard, the KLINGERballostar-A is equipped with an antistatic equipment acc. to ISO 7121 or EN 1983.



** beginning with DN 50*

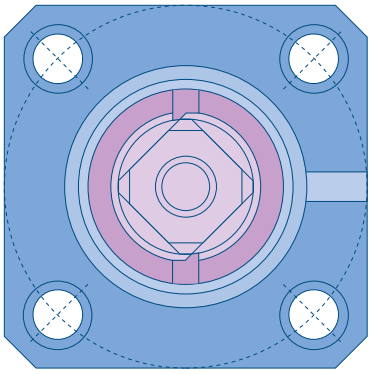




4. Clever actuating protection

It goes without saying, that a lever interlocking device is a standard feature. A single pin is enough to connect lever and body. The easy way to ensure adequate protection against unintentional use.

What more can a good ball valve offer



5. Actuators

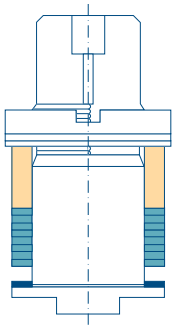
The flange acc. to ISO 5211 is connected to the actuator either directly or via a bracket.

You can fit and dismantle the required actuator type any time, even when the plant is in operation, which makes changing the actuator after a breakdown a piece of cake.

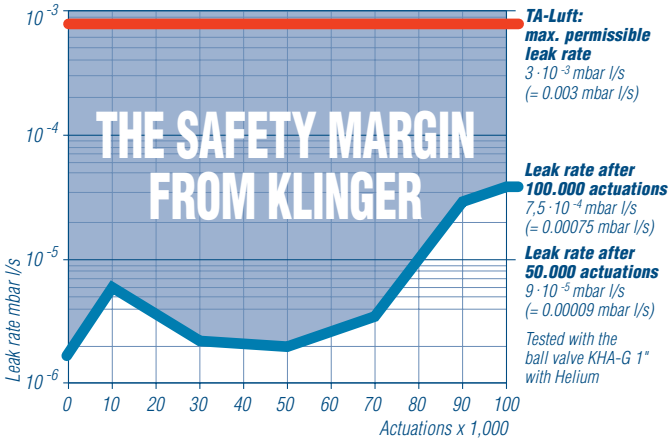
10-5

6. Standard leak tightness: 10^{-5}

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 port and the stuffing box.
The diagram shows the safety margin of the ball valve as compared with the requirements of the Clean Air regulations (TA-Luft).



The labyrinth stuffing box



Safety with guarantee

Summary of the current type approvals

Valve according to the TA-Luft (Clean air regulations)
The requirements for limiting emissions to prevent air pollution (TA-Luft) are clearly fulfilled.

Fire safety
The fire-safe test according to the API Standard 607 and ISO 10497 was certified by TÜV Österreich.

Valve for liquid fuel
The ball valve is approved as a safety control system for furnaces using liquid fuels, under European Standard EN 264.

Valve for gaseous fuel
The ball valve is approved as a safety control system for furnaces using gaseous fuels, under European Standard EN 161.

Valve for gases and hazardous liquids
The valve passed the type test with evidence under VdTÜV 1065.
This also covers the requirements under VbF, Gas-HL-VO, TRB 801 No.45, DIN 3840, DIN 3230 Part 3, DIN 3230 Part 5/PG3 and Part 6, by VdTÜV Essen.

Valve for tanks transporting hazardous goods
The type test for valves used in tanks transporting hazardous goods was likewise passed. This also covers the requirements of GGVE/RID, GGVS/ADR, TRT 006, TRT 024, TRT 042, TRG 770/ Annex 2, DIN 3840, DIN 3230 Part 6, VdTÜV Essen.

Valve for use with oxygen
Approval for use with oxygen was issued by the Federal Institute for Material Research and Testing (BAM) Berlin.

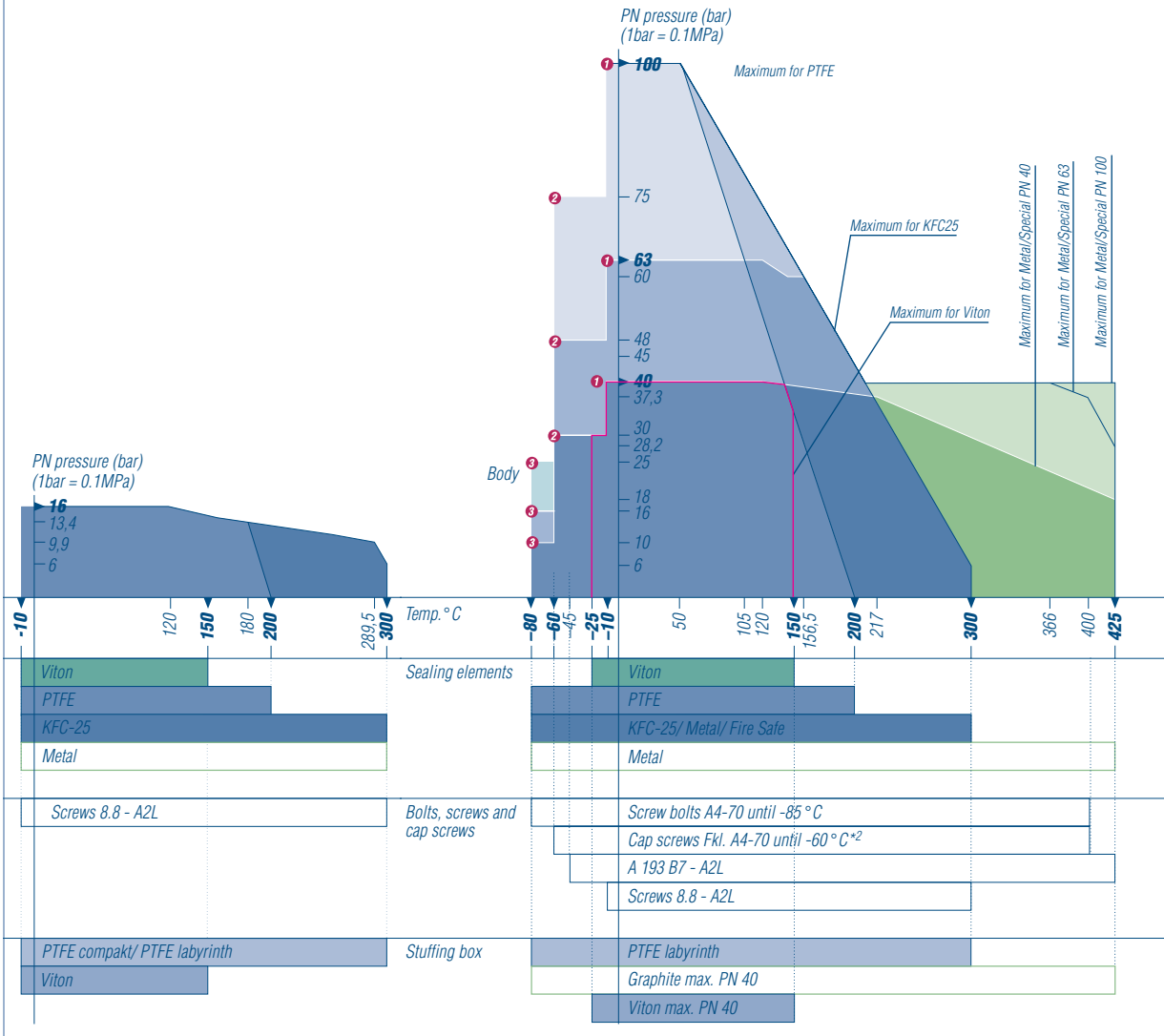
Valve as gas house connection
The approval was issued under ÖVGW approval mark G2.531.
DVGW approval:
NG-4314AU2451 for type KHA-FL/SL/SK
NG-4313AU2452 for type KHA-G

❶ *With an operating pressure between 75 and 100% of the nominal pressure, the field of application in all three pressure stages (PN 100, 63, 40) is down to -10°C.*

❷ *If the operating pressure incl. load peaks is between 25 and 75 %, the field of application is extended to -60°C assuming cap screws of A4-70.*

❸ *If the operating pressure reaches max. 25% of the nominal pressure, the safety range for the valve is extended to -85°C assuming screw bolts of A4-70.*

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



Grey cast iron

Material code III

Cast steel

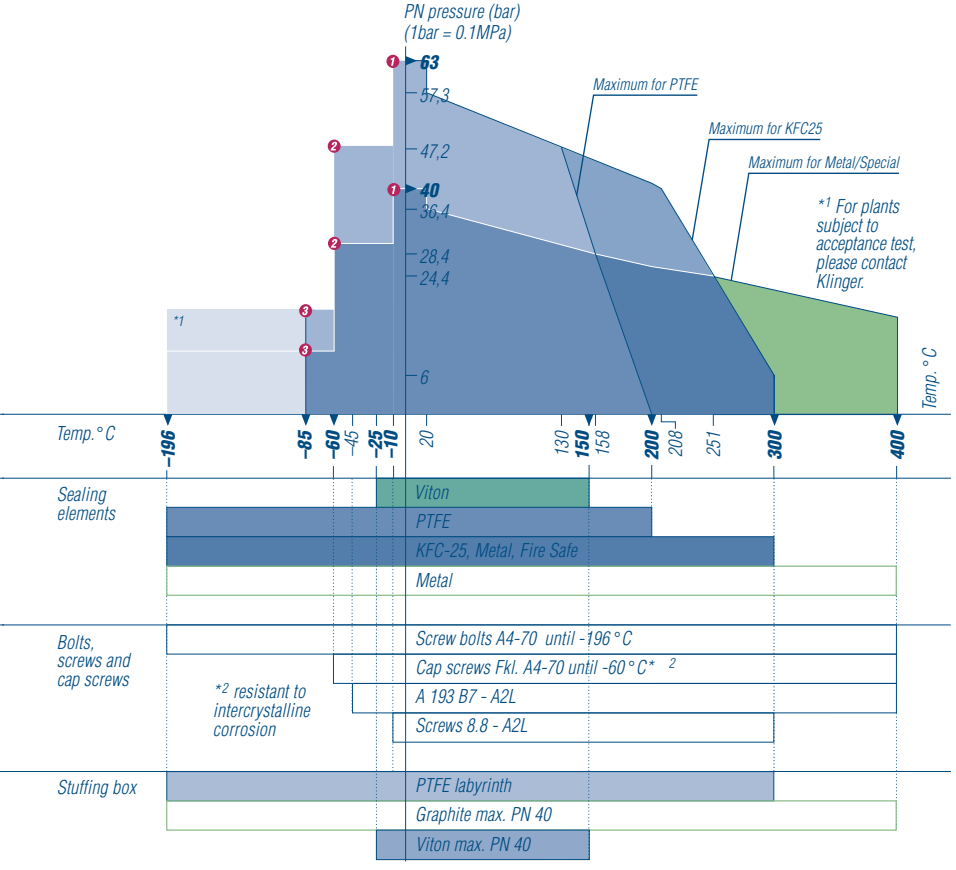
Material code VIII

The safety diagrams help you optimise the efficiency of the valve

The influence of the three body materials, the sealing materials and the screws on the range of application of the ball valve is clearly shown in the pt diagrams.

This is safety à la carte. Plot your operating point in the diagram fields to find out whether the safety margins meet your requirements or not. And at the same time you can see which parameters have to be changed.

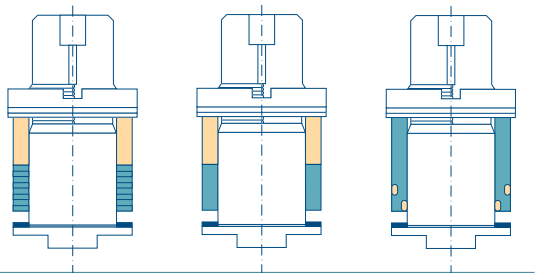
Choosing your ball valve in this way means optimizing the economy of the valve.



Acid-resistant cast steel

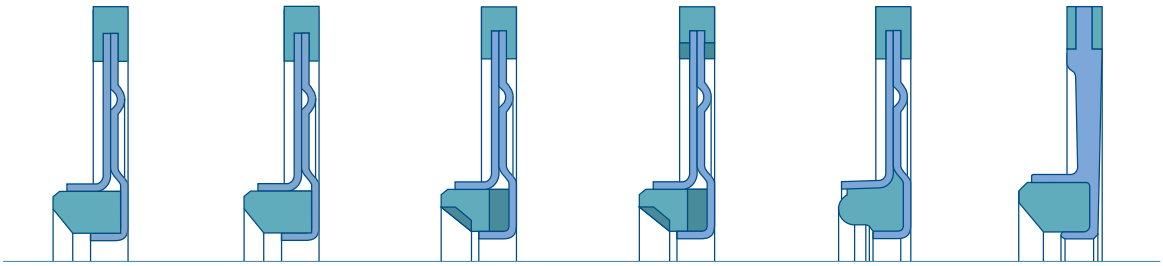
Material code X_C

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



		PTL	GRK	VIT
		PTFE labyrinth	Graphite compakt	Viton
Fluids	Water/hot water	■	■	□
	Mineral oil	■	■	■
	Heat transfer oil	□	■	□
	Liquid gas/low temperature	■	□	□
	Saturated steam	■	□	□
	Misc. gases	■	■	■
	Vacuum/ high vacuum	■	□	■
	Hot steam	□	■	□
	O_2	■		
Conditions of use	Standard application			
	High no. of cycles	■	□	■
	Frequent temp. changes	■	■	□
	Fire safety (Fire Safe)	■	■	□
	Chemical industry	■	■	□
	Abrasive fluids	■	□	□
	Temperature range [°C]	-196/ +300	-85/ +425	-25/ +150
Approval certificates	DVGW	■		■
	ÖVGW	■		■
	Fire Safe API 607	■		
	TA-Luft	■		■
	VdTÜV 1065	■		
	EN 161			■
	EN 264			■

The safety margins of the stuffing boxes and sealing elements



KFC	PTF	MET	MES	VIR	FIS
KFC-25	PTFE	Metal*	Metal/Special*	Viton	Fire Safe
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
-196/ +300	-196/ +200	-196/ +300	-196/ +425	-25/ +150	-196/ +300
■					
■					
					■
■					
■					
■					

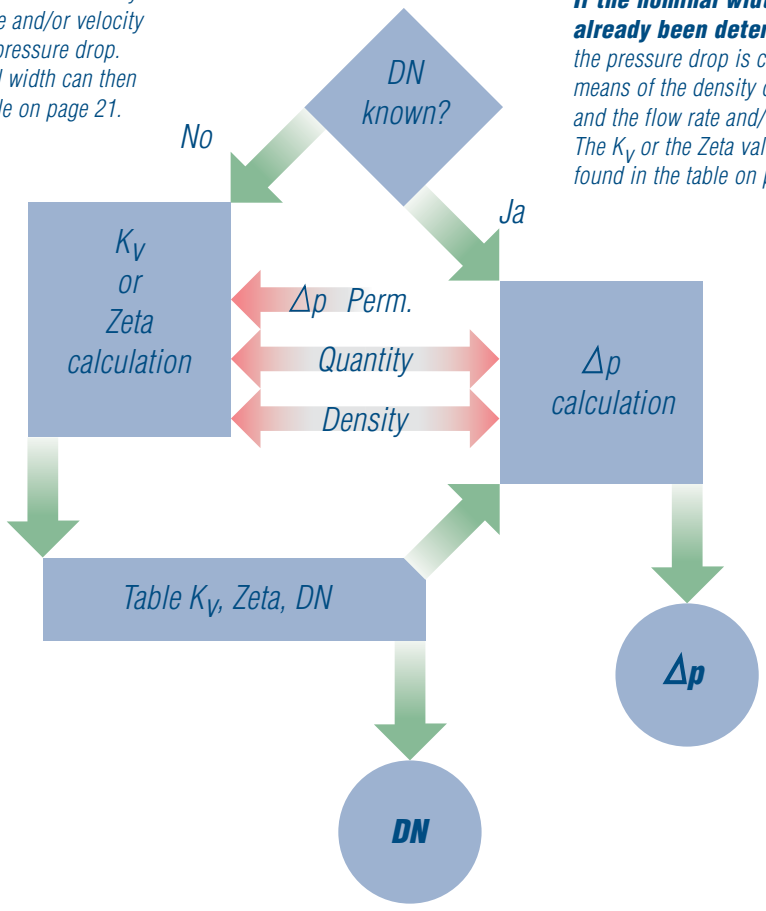
■ recommended ■ less suitable ■ not recommended

* permissible leakage rate in the port: 1 permille of the KV-value (at 6 bar water per minute)

Flow calculation

If the nominal width (DN) has to be determined, *the K_V or Zeta value is calculated by means of the density of the fluid, the flow rate and/or velocity and the permissible pressure drop. The required nominal width can then be read off in the table on page 21.*

If the nominal width (DN) has already been determined, *the pressure drop is calculated by means of the density of the fluid and the flow rate and/or velocity. The K_V or the Zeta value can be found in the table on page 21.*



Flow characteristic curves to determine the nominal diameter

Size of the ball valve

Flow rate	Q	in m^3/h
Pressure drop	Δp	in bar
Density	ϱ	in kg/m^3
Velocity	w	in m/s

so that:

$$K_V = Q \sqrt{\frac{\varrho}{1000 \times \Delta p}}$$

or

$$Zeta = \frac{2 \times \Delta p \times 10^5}{\varrho \times w^2}$$

When choosing a valve note that the K_V-value should be bigger and the Zeta-value smaller than the calculated value.

Flow characteristic values

DN mm	Zeta	K_V (m^3/h)
10	0.35	6.8
15	0.23	18.8
20	0.20	35.8
25	0.14	66.8
32	0.12	118
40	0.11	193
50	0.10	316
65	0.076	607
80	0.067	980
100	0.058	1645
125	0.051	2742
20R15	0.96	16.3
25R20	0.54	34
32R25	0.41	63,9
40R32	0.35	108
50R40	0.33	174
65R50	0.32	299
80R65	0.31	460
100R80	0.30	730
125R100	0.30	1141
150R125	0.30	1642

The coefficients quoted in the table can be used to calculate the right size or pressure drop of the KLINGERballostar-A 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.

Pressure drops

$$\Delta p = Zeta \times \frac{\varrho}{2} \times w^2 \times 10^{-5} \, [bar]$$

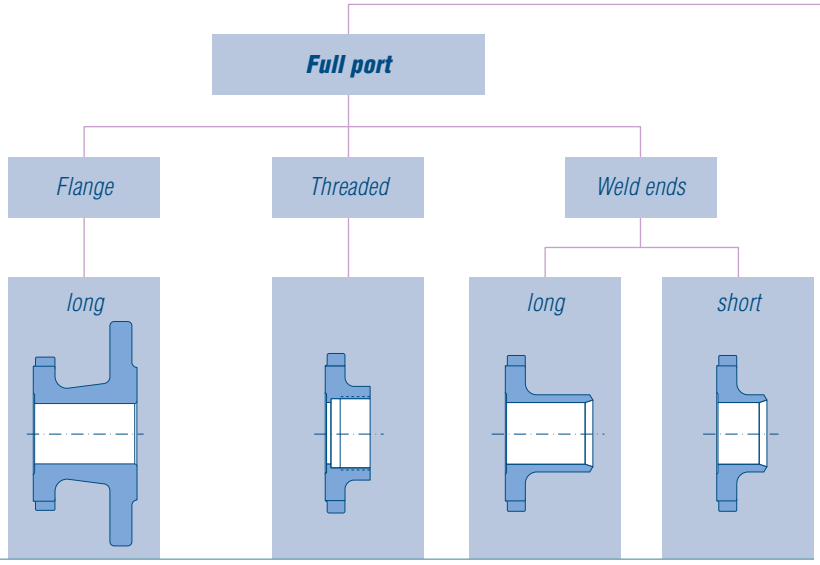
or

$$\Delta p = \left(\frac{Q}{K_V}\right)^2 \times \frac{\varrho}{1000}$$

Once you have chosen your Klingerballostar-A with the help of the pt-diagram, all you have to do now is find the right connection for the pipeline system

On this page you will find a detailed illustration of the port, type of connection and connection length for the respective material groups.

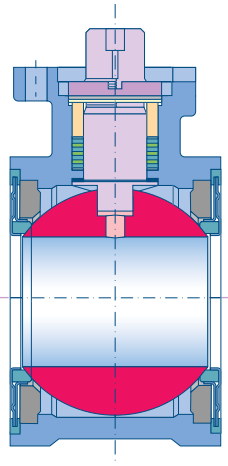
III = Grey cast iron
VIII = Steel
Xc = Acid-resistant steel

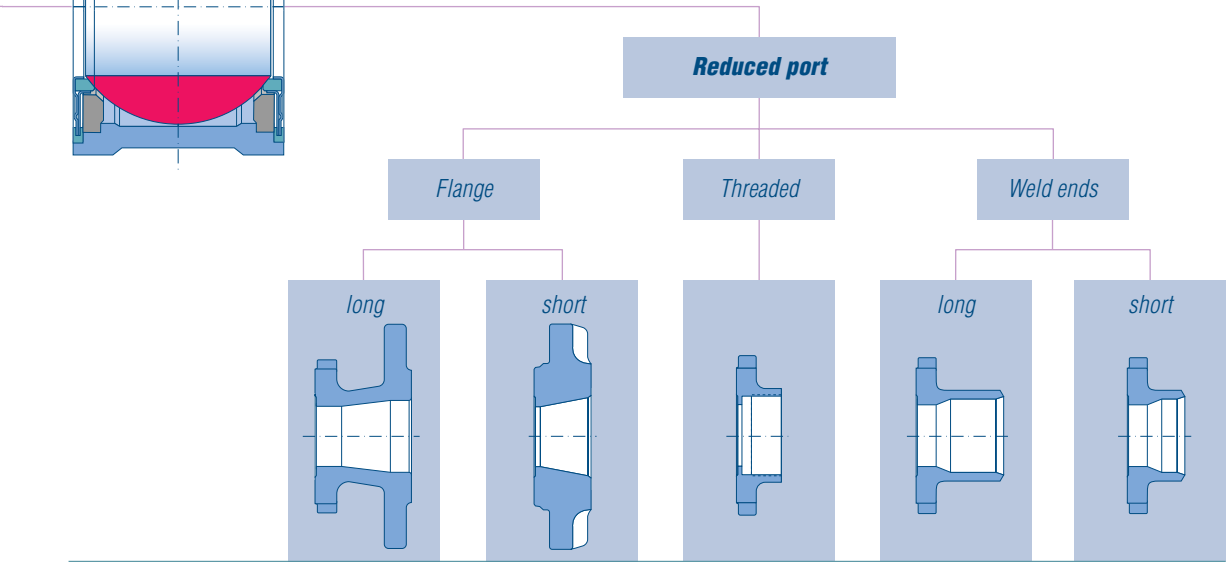


Type of connection			FL			G			SL			SK		
Material code			III	VIII	Xc	III	VIII	Xc	III	VIII	Xc	III	VIII	Xc
DN	10	3/8"		■	■		■	■		■	■		■	■
DN	15	1/2"	■	■	■		■	■		■	■		■	■
DN	20	3/4"		■	■		■	■		■	■		■	■
DN	25	1"		■	■		■	■		■	■		■	■
DN	32	1 1/4"		■	■		■	■		■	■		■	■
DN	40	1 1/2"		■	■		■	■		■	■		■	■
DN	50	2"	■	■	■		■	■		■	■			
DN	65	2 1/2"	■	■	■					■	■			
DN	80	3"	■	■	■					■	■			
DN	100	4"	■	■	■					■	■			
DN	125	5"		■	■					■	■			

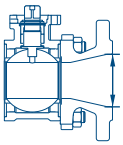
mm *inch*

Types of connection and choice of material

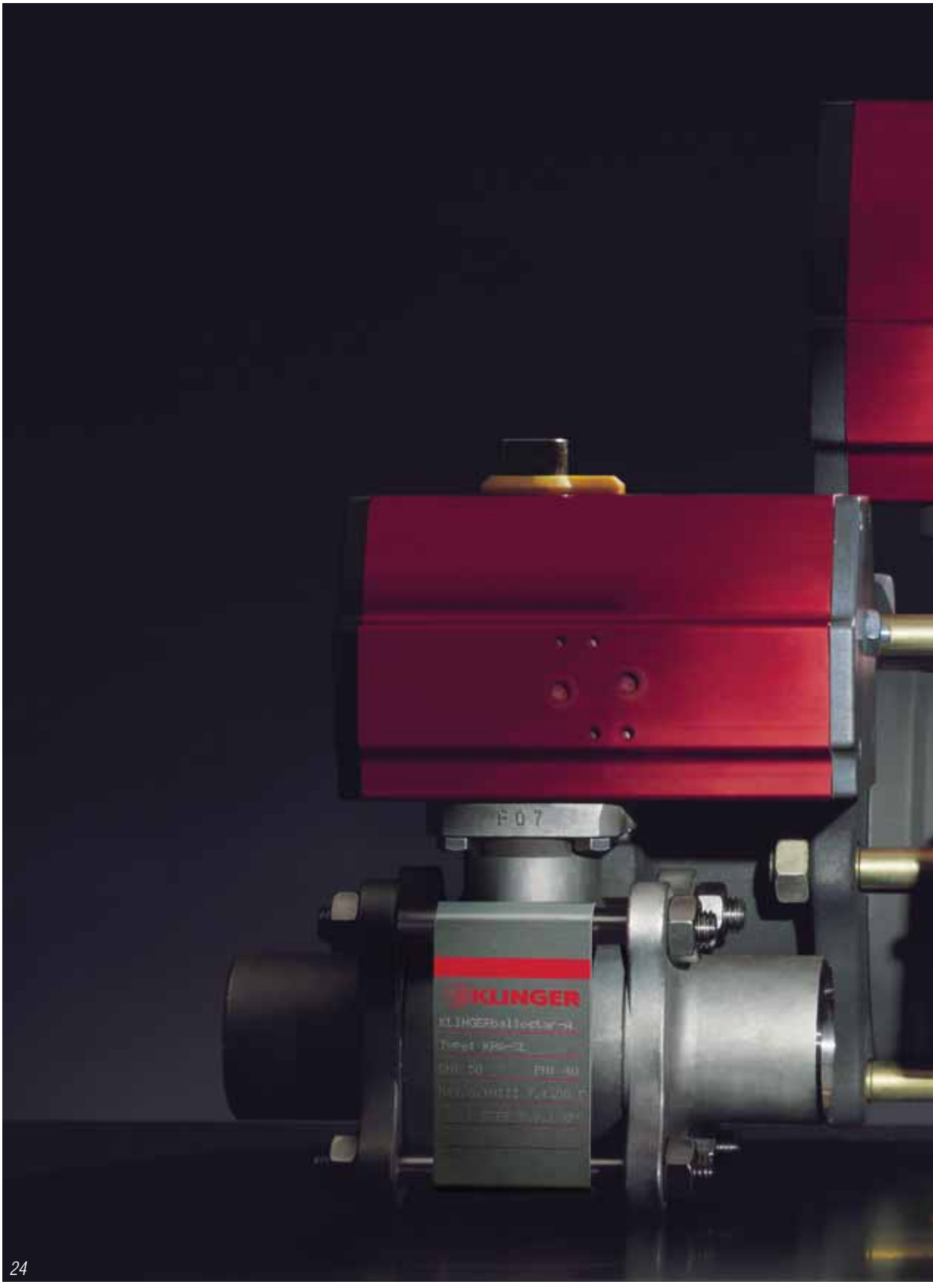




Type of connection		FL			FK			G			SL			SK		
Material code		III	VIII	Xc	III	VIII	Xc	III	VIII	Xc	III	VIII	Xc	III	VIII	Xc
	1/2"R15							■								
DN 20R15	3/4"R15	■	■	■				■	■	■		■	■		■	■
DN 25R20	1"R20	■	■	■				■	■	■		■	■		■	■
DN 32R25	1 1/4"R25	■	■	■				■	■	■		■	■		■	■
DN 40R32	1 1/2"R32	■	■	■				■	■	■		■	■		■	■
DN 50R40	2"R40	■	■	■				■	■	■		■	■		■	■
DN 65R50	2 1/2"R50	■			■	■	■					■	■			
DN 80R65	3"R65	■			■	■	■					■	■			
DN 100R80	4"R80	■			■	■	■					■	■			
DN 125R100	5"R100	■	■	■												
DN 150R125	6"R125	■														
mm*	inch*															



* Connection nominal diameter with reduced port



Remark: type plate since 2003 only for special design.

Especially suitable for automation systems thanks to long-time safety. KLINGERballostar-A

Your actuator will appreciate the low torque

Choice of actuator

Min. torques for the various seals

1 **KFC-25**

Nominal diameter DN		Differential pressure (bar)										
		0	5	10	16	20	25	30	40	50	63	100
inch	mm	Torque Nm										
½"	15	6	6.2	6.4	6.6	6.8	7	7.2	7.6	8	8.5	10
¾"	20	12	12.4	12.7	13.1	13.4	13.8	14.1	14.8	15.5	16.4	19
1"	25	14	15	16.1	17.3	18.1	19.2	20.2	22.3	24.3	27	
1 ¼"	32	17	18.4	19.9	21.6	22.7	24.1	25.6	28.4	31.3	35	
1 ½"	40	25	27.8	30.6	**33.9**	36.1	38.9	41.7	47.2	52.8	60	
2"	50	37	40.6	44.3	48.6	51.5	55.1	58.8	66			
2 ½"	65	60	66.3	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 **PTFE**

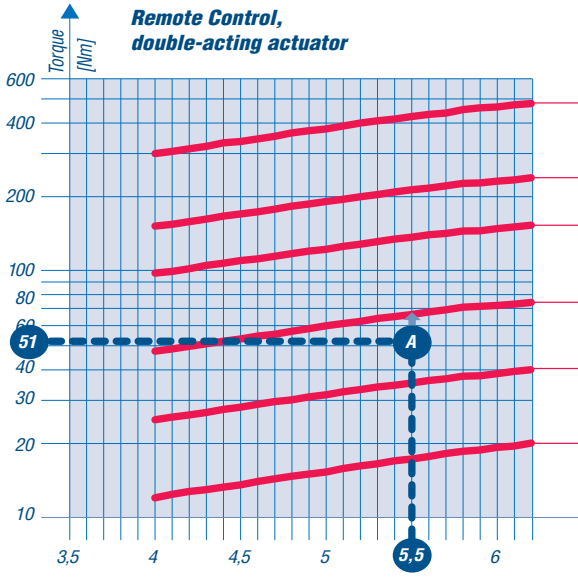
½"	15	5.4	5.6	5.8	6.0	6.1	6.3	6.5	6.4	7.2	7.7	9.0
¾"	20	10.8	11.1	11.4	11.8	12.1	12.4	12.7	13.3	14.0	14.8	17.1
1"	25	12.6	13.5	14.5	15.6	16.3	17.2	18.2	20.0	21.9	24.3	
1 ¼"	32	15.3	16.6	17.9	19.4	20.4	21.7	23.0	25.6	28.2	31.5	
1 ½"	40	21.3	23.6	26.0	28.8	30.7	33.1	35.4	40.1	44.9	51.0	
2"	50	30.3	33.3	36.3	39.9	42.2	45.2	48.2	54.1			
2 ½"	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 **Metall/ metal**

½"	15	7.5	7.8	8.2	8.5	8.8	9.1	9.5	10.1	10.8	11.6	14
¾"	20	15	15.7	16.4	17.2	17.8	18.5	19.2	20.6	22	23.8	29
1"	25	18	19.4	20.9	22.6	23.7	25.1	26.6	29.4	32.3	36	
1 ¼"	32	25	26.7	28.3	30.3	31.7	33.3	35.0	38.3	41.7	46	
1 ½"	40	40	44.8	49.5	55.2	59	63.8	68.6	78.1	87.6	100	
2"	50	55	64.4	73.8	85	92.5	101.9	111.3	130			
2 ½"	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					

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

Remote Control, double-acting actuator



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

4 **Viton**

Nominal diameter DN		Differential pressure (bar)			
		0	5	10	16
inch	mm	Torque Nm			
½"	15				
¾"	20				
1"	25	14.0	15.9	17.8	20.0
1 ¼"	32	18.0	20.2	22.4	25.0
1 ½"	40	25.0	29.7	34.4	40.0
2"	50	40.0	49.4	58.8	70.0
2 ½"	65	55.0	72.2	89.4	110.0
3"	80	100.0	150.0	200.0	260.0
4"	100	160.0	219.4	278.8	350.0
5"	125				

Information on other sizes or differential pressures on request

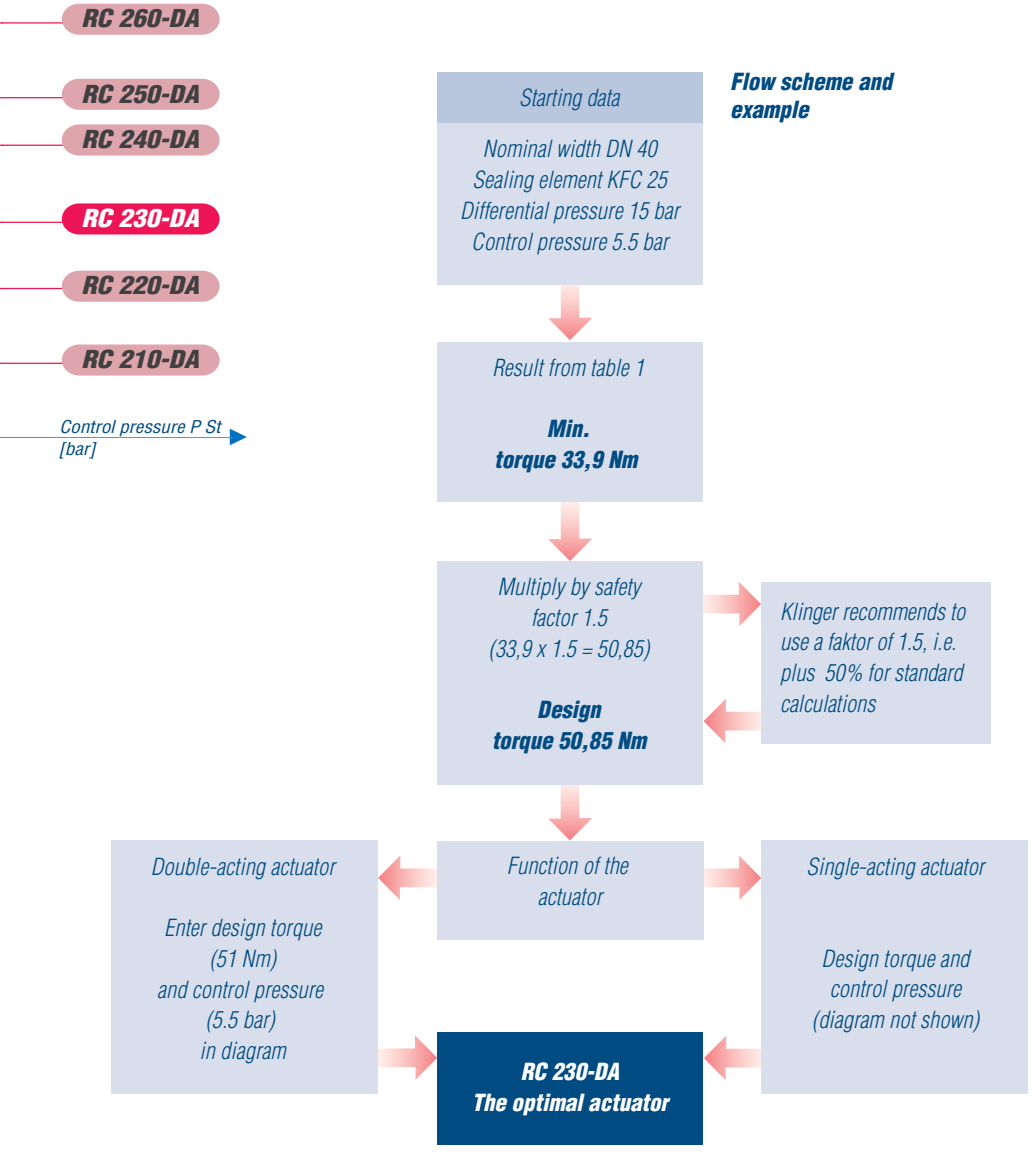
How to choose an actuator

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 KLINGERballostar-A 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. And a smaller actuator means smaller structural size and smaller fitting dimension. This is important for in plant construction millimetres often make a big difference. And a smaller structural size means a lower capacity and a lower energy requirement for the kinematics. And this day by day, for many years!

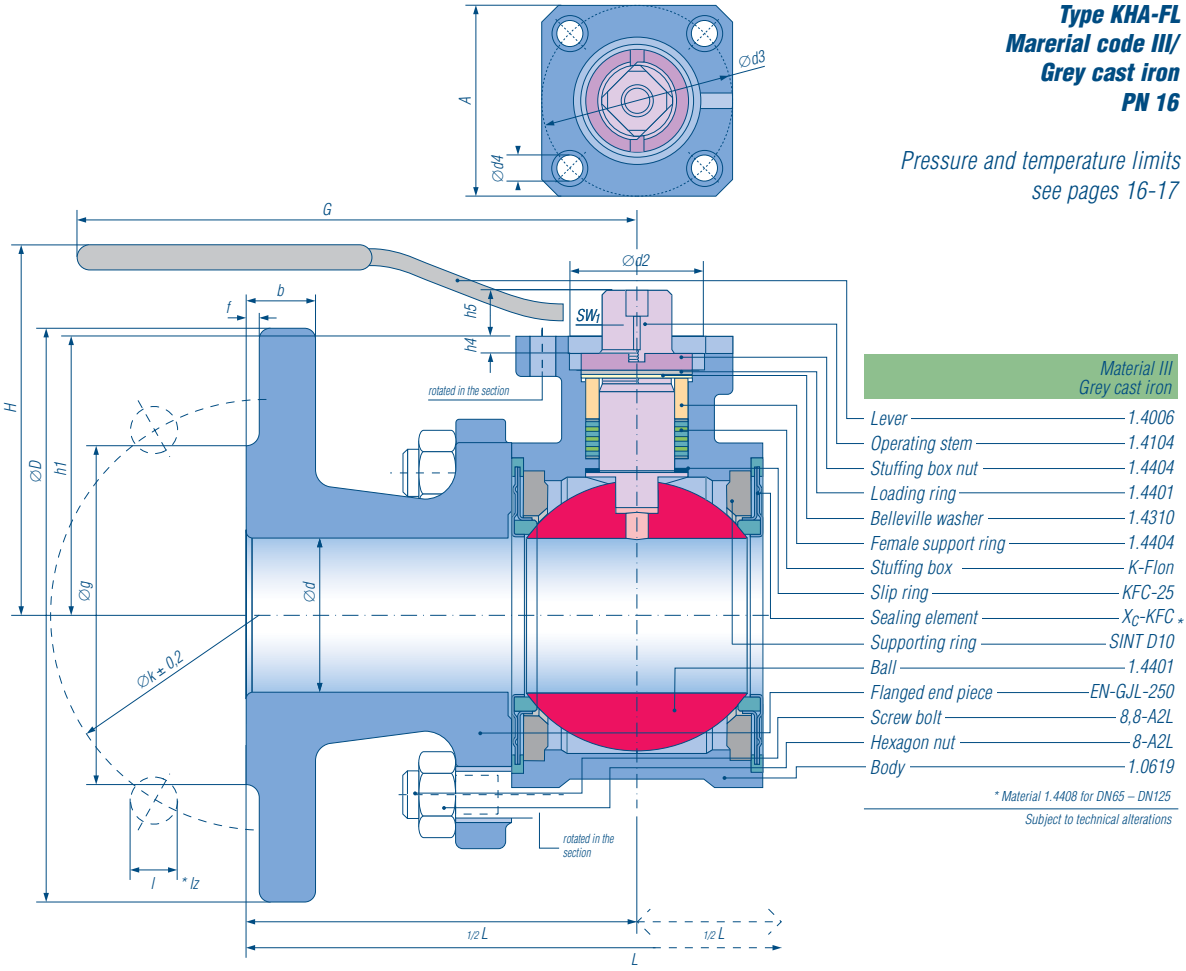


Flow scheme and example

KLINGERballostar-A
Ball valve with flange connection and full port, long

Type KHA-FL
Marerial code III/
Grey cast iron
PN 16

Pressure and temperature limits see pages 16-17



Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak tightness bi-directional.
Modular construction kit system:
several versions of stuffing boxes and sealing elements available

Connections
Flanges acc. to EN 1092-2 (former DIN 2533)
Dimensions
Face-to-face dimensions acc. to EN 558-1, basic line 1, or DIN 3202-F1.
Main use
Generally for liquids and gases, other fluids see resistance table.

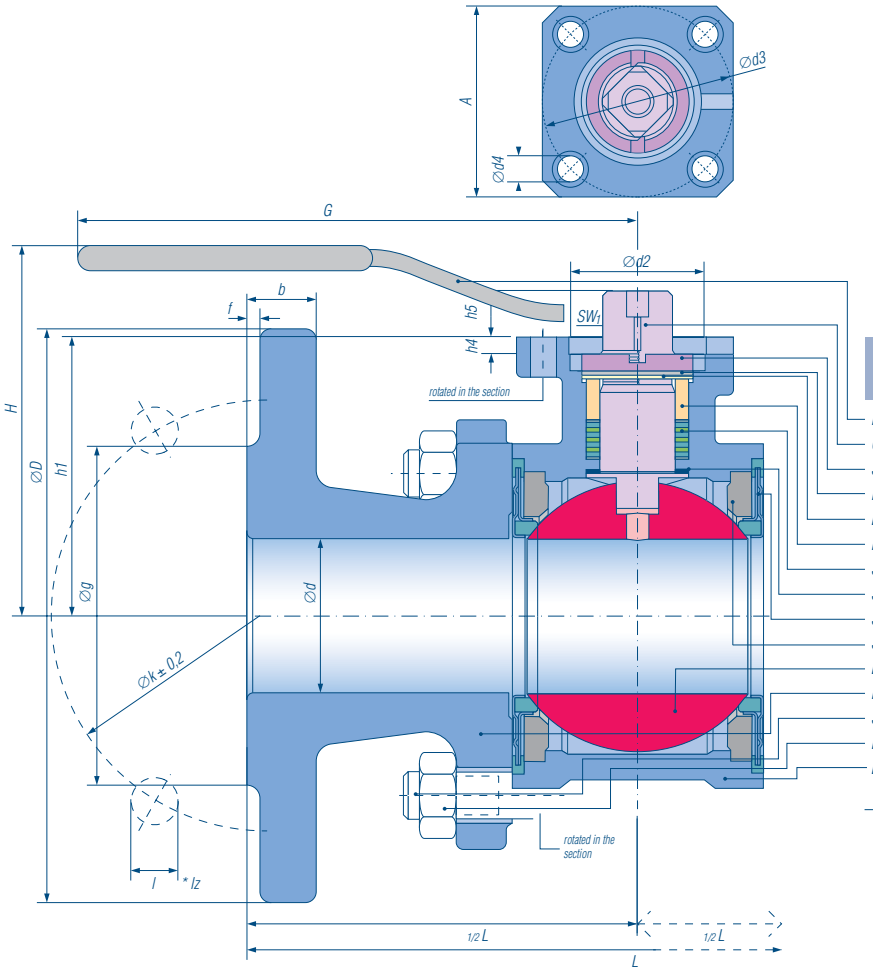
Leak tightness
DIN 3230, Part 3, test level B0. Complies with the requirements of TA Luft.
Automation
Flange connection acc. to ISO 5211, allows direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN	Connecting dimensions									Mounting flange for actuator								Weight
	L	H	G		h1	Ød	ØD	Øg	f	b	Øk	l	lz*	ISO	A	d3	SW_1	Ød2	Ød4	h4	h5	kg/pc
15	130	80	130	16	35	15	95	45	2	14	65	14	4	F04	42	42	8	30	5,8	3	7	2.4
50	230	131	315	16	90	50	165	102	3	20	125	18	4	F07	70	70	17	55	10	4	15	13.3
65	290	141	315	16	100	65	185	122	3	20	145	18	4	F07	70	70	17	55	10	4	15	16.4
80	310	162	500	16	122	80	200	138	3	22	160	18	8	F10	102	102	22	70	12	4	20	30.1
100	350	176	500	16	135	100	220	158	3	24	180	18	8	F10	102	102	22	70	12	4	20	36.8

all dimensions in mm

** lz: number of bore holes*

KLINGERballostar-A
Ball valve with flange connection and full port, long



Type KHA-FL
Material code VIII/ Steel and Material code Xc/ Acid-resistant steel
PN 40

Pressure and temperature limits see pages 16-17

	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4401	1.4401
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Flanged end piece	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions.
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Flanges acc. to EN 1092-1
Dimensions
Face-to-face dimensions acc. to EN 558-1, basic line 1, or DIN 3202-F1.
Main use
Generally for liquids and gases, other fluids see resistance table.

Leak tightness
DIN 3230, Part 3, test level B0. Complies with the requirements of TA Luft.
Fire safety *(special version)*
Fire safe acc. to API 607.
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket. Pneumatic and electrical actuators possible.

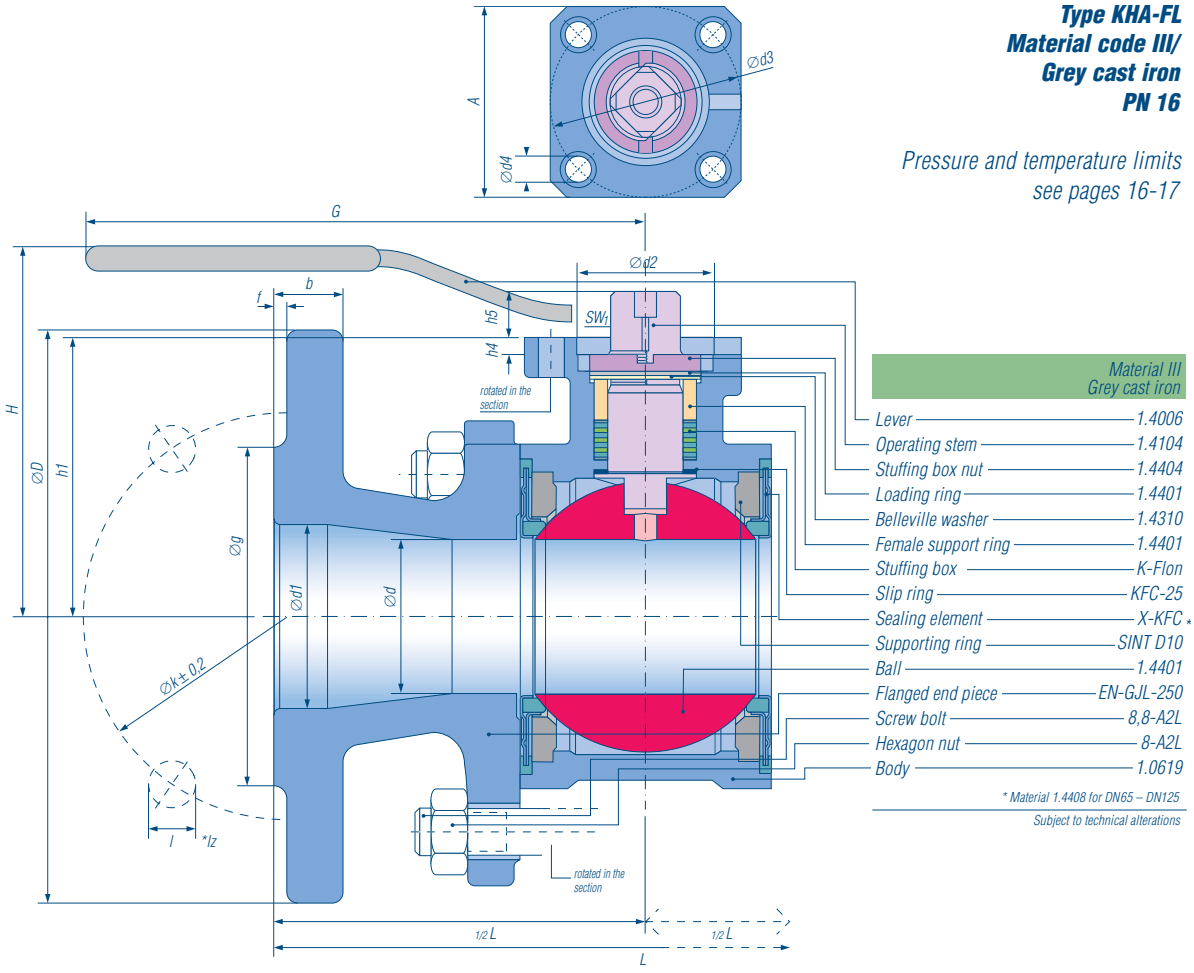
DN	Dimensions			PN	Connecting dimensions									Mounting flange for actuator								Weight
	L	H	G		h1	Ød	ØD	Øg	f	b	Øk	l	lz*	ISO	A	d3	SW_1	Ød2	Ød4	h4	h5	kg/pc
10	120	80	130	40	35	10	90	40	2	16	60	14	4	F04	42	42	8	30	5.8	3	7	2.3
15	130	80	130	40	35	15	95	45	2	16	65	14	4	F04	42	42	8	30	5.8	3	7	2.8
20	150	94	160	40	46	20	105	58	2	18	75	14	4	F04	42	42	11	30	5.8	3	9	3.8
25	160	98	160	40	50	25	115	68	2	18	85	14	4	F04	42	42	11	30	5.8	3	9	5.1
32	180	106	250	40	65	32	140	78	2	18	100	18	4	F05	50	50	14	35	7	4	12	7.9
40	200	113	250	40	72	40	150	88	3	18	110	18	4	F05	50	50	14	35	7	4	12	9.8
50	230	131	315	40	90	50	165	102	3	20	125	18	4	F07	70	70	17	55	10	4	15	14.1
65	290	141	315	40	100	65	185	122	3	22	145	18	8	F07	70	70	17	55	10	4	15	18.3
80	310	162	500	40	122	80	200	138	3	24	160	18	8	F10	102	102	22	70	12	4	20	30.9
100	350	176	500	40	135	100	235	162	3	24	190	22	8	F10	102	102	22	70	12	4	20	39.7
125	400	211	650	40	175	125	270	188	3	26	220	26	8	F12	125	125	27	85	15	4	25	52.2

all dimensions in mm

** lz: number of bore holes*

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

KLINGERballostar-A
Ball valve with flange connection and reduced port, long



Type KHA-FL
Material code III/
Grey cast iron
PN 16

Pressure and temperature limits see pages 16-17

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Flanges acc. to EN 1092-2 (former DIN 2533).

Dimensions
Face-to-face dimensions acc. to EN 558-1, basic line 1, or DIN 3202-F1 up to DN 100R80.
Face-to-face dimensions acc. to EN 558-1, basic line 27, or acc. to DIN 3202-F5 for DN 125R100 and DN 150R125.

Main use
Generally for liquids and gases, other fluids see resistance table.

Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.

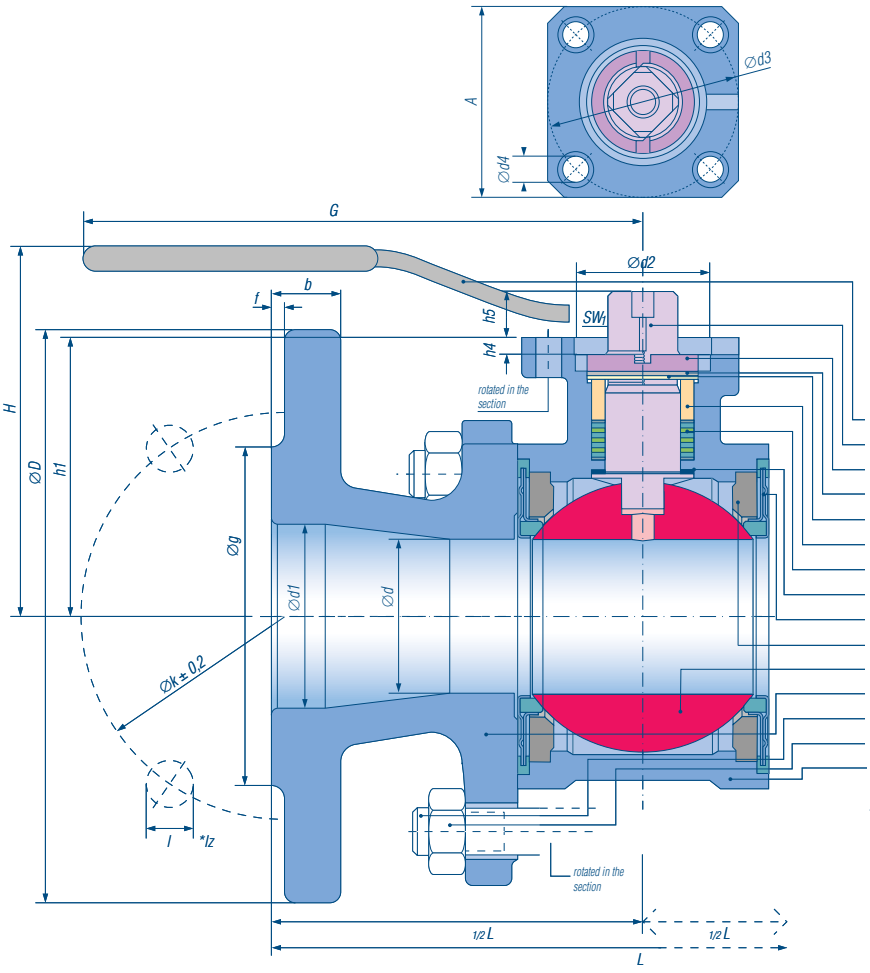
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN	Connecting dimensions										Mounting flange for actuator								Weight
	L	H	G		h1	Ød	Ød1	ØD	Øg	f	b	Øk	l	lz*	ISO	A	d3	SW_1	Ød2	Ød4	h4	h5	kg/pc
20R15	150	80	130	16	35	15	20	105	58	2	16	75	14	4	F04	42	42	8	30	5.8	3	7	3.3
25R20	160	94	160	16	46	20	25	115	68	2	16	85	14	4	F04	42	42	11	30	5.8	3	9	4.2
32R25	180	98	160	16	50	25	32	140	78	2	18	100	18	4	F04	42	42	11	30	5.8	3	9	6.2
40R32	200	106	250	16	65	32	40	150	88	3	18	110	18	4	F05	50	50	14	35	7	4	12	8.2
50R40	230	113	250	16	72	40	50	165	102	3	20	125	18	4	F05	50	50	14	35	7	4	12	11.5
65R50	290	131	315	16	90	50	65	185	122	3	20	145	18	4	F07	70	70	17	55	10	4	15	13.4
80R65	310	141	315	16	100	65	80	200	138	3	22	160	18	8	F07	70	70	17	55	10	4	15	20.5
100R80	350	162	500	16	122	80	100	220	158	3	24	180	18	8	F10	102	102	22	70	12	4	20	26.8
125R100	325	176	500	16	135	100	125	250	188	3	26	210	18	8	F10	102	102	22	70	12	4	20	48.2
150R125	350	211	650	16	175	125	150	285	212	3	26	240	22	8	F12	125	125	27	85	15	4	25	63.2

all dimensions in mm

** lz: number of bore holes*

KLINGERballostar-A
Ball valve with flange connection and reduced port, long



Type KHA-FL
Material code VIII/ Steel
and Material code Xc/
Acid-resistant steel
PN 40

Pressure and temperature limits
see pages 16-17

	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4401	1.4401
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC *
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Flanged end piece	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions.
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Flanges acc. to EN 1092-1
Dimensions
Face-to-face dimensions acc. to EN 558-1, basic line 1, or DIN 3202-F1 up to DN 50R40.
Face-to-face dimensions acc.to EN 558-1, basic line 27, acc. to DIN 3202-F5 for DN 125R100.
Main use
Generally for liquids and gases, other fluids see resistance table.

Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.
Fire safety *(special version)*
Fire safe acc. to API 607.
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN	Connecting dimensions										Mounting flange for actuator							Weight
	L	H	G		h1	Ød	Ød1	ØD	Øg	f	b	Øk	l	lz*	ISO	A	SW_1	Ød3	Ød4	h4	h5	kg/pc
20R15	150	80	130	40	35	15	20	105	58	2	18	75	14	4	F04	42	8	42	5.8	3	7	3.2
25R20	160	94	160	40	46	20	25	115	68	2	18	85	14	4	F04	42	11	42	5.8	3	9	4.4
32R25	180	98	160	40	50	25	32	140	78	2	18	100	18	4	F04	42	11	42	5.8	3	9	5.9
40R32	200	106	250	40	65	32	40	150	88	3	18	110	18	4	F05	50	14	50	7	4	12	8.1
50R40	230	113	250	40	72	40	50	165	102	3	20	125	18	4	F05	50	14	50	7	4	12	11.6
125R100	325	176	500	40	135	100	125	270	188	3	26	220	26	8	F10	102	22	102	12	4	20	49.5

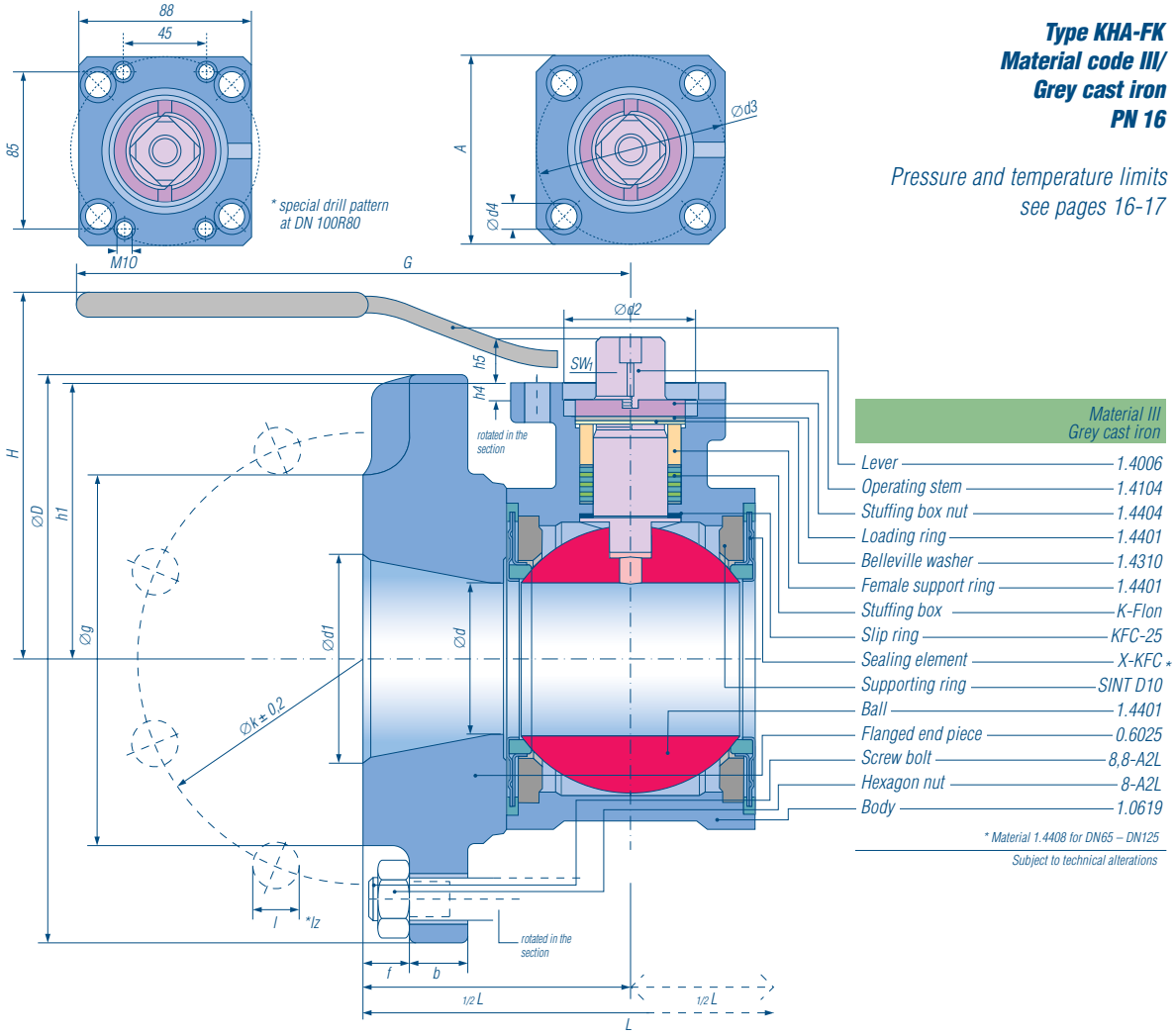
all dimensions in mm ** lz: number of bore holes*

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

KLINGERballostar-A
Ball valve with flange connection and reduced port, short

Type KHA-FK
Material code III/
Grey cast iron
PN 16

Pressure and temperature limits see pages 16-17



Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Flanges acc. to EN 1092-2 (former DIN 2533).

Dimensions
Face-to-face dimensions acc. to EN 558-1, basic line 27, or DIN 3202-F4.

Main use
Generally for liquids and gases, other fluids see resistance table.

Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.

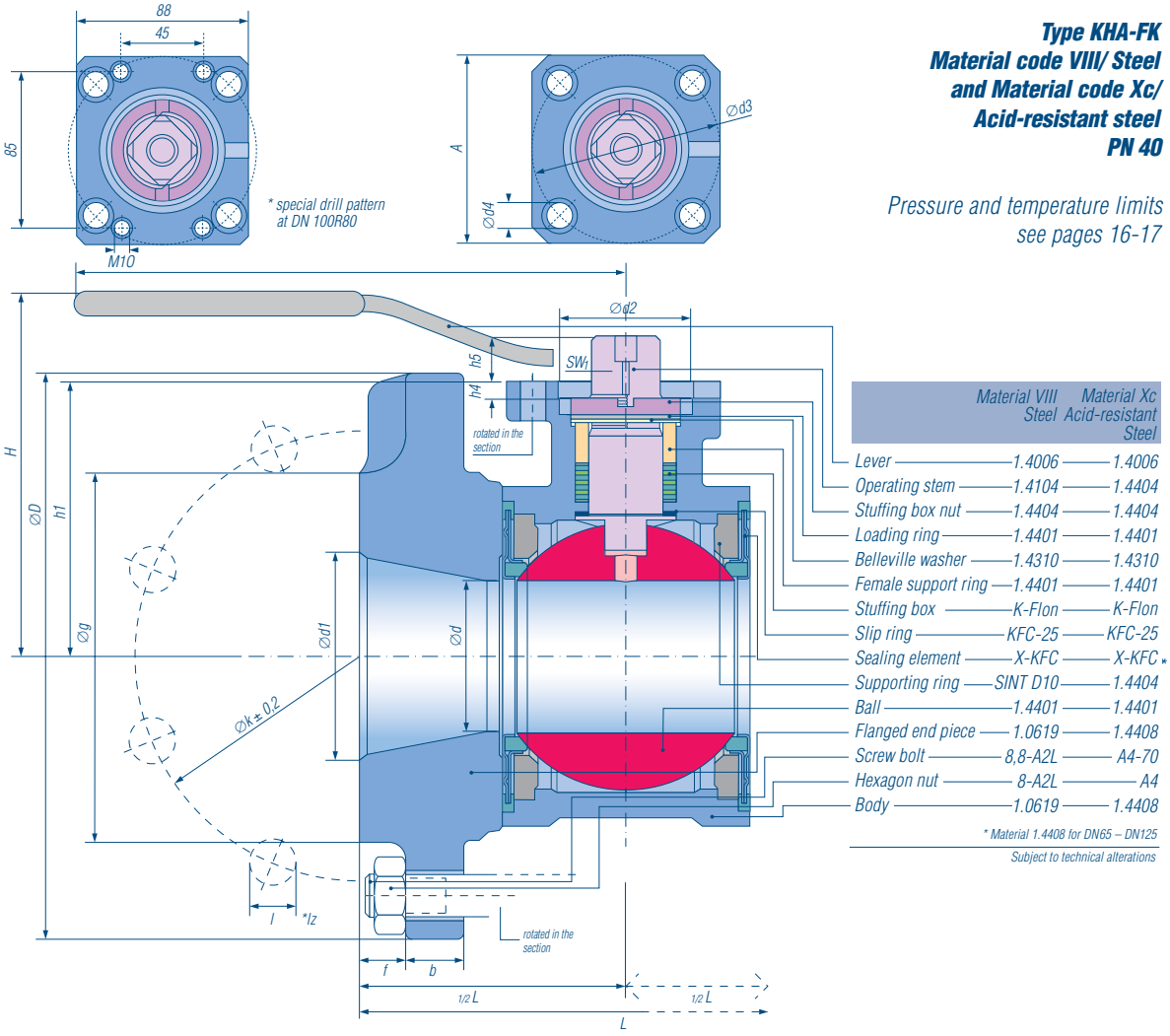
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN	Connecting dimensions										Mounting flange for actuator								Weight
	L	H	G		h1	Ød	Ød1	ØD	Øg	f	b	Øk	l	lz*	ISO	A	SW_1	Ød2	Ød3	Ød4	h4	h5	kg/pc
65R50	170	131	315	16	90	50	65	185	122	20	17	145	18	4	F07	70	17	55	70	10	4	15	13.5
80R65	180	141	315	16	100	65	80	204	138	16	21	160	18	8	F07	70	17	55	70	10	4	15	19.7
* **100R80**	190	162	500	16	122	80	100	225	158	16	21	180	18	8	F10	102	22	70	102	12	4	20	25.7

all dimensions in mm

** lz: number of bore holes*

KLINGERballostar-A
Ball valve with flange connection and reduced port, short



Type KHA-FK
Material code VIII/ Steel
and Material code Xc/
Acid-resistant steel
PN 40

Pressure and temperature limits see pages 16-17

	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4401	1.4401
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC *
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Flanged end piece	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Flanges acc. to EN 1092-1
Dimensions
Face-to-face dimensions acc. to EN 558-1, basic line 27, or DIN 3202-F4.
Main use
Generally for liquids and gases, other fluids see resistance table.
Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.

Fire safety *(special version)*
Fire safe acc. to API 607.
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

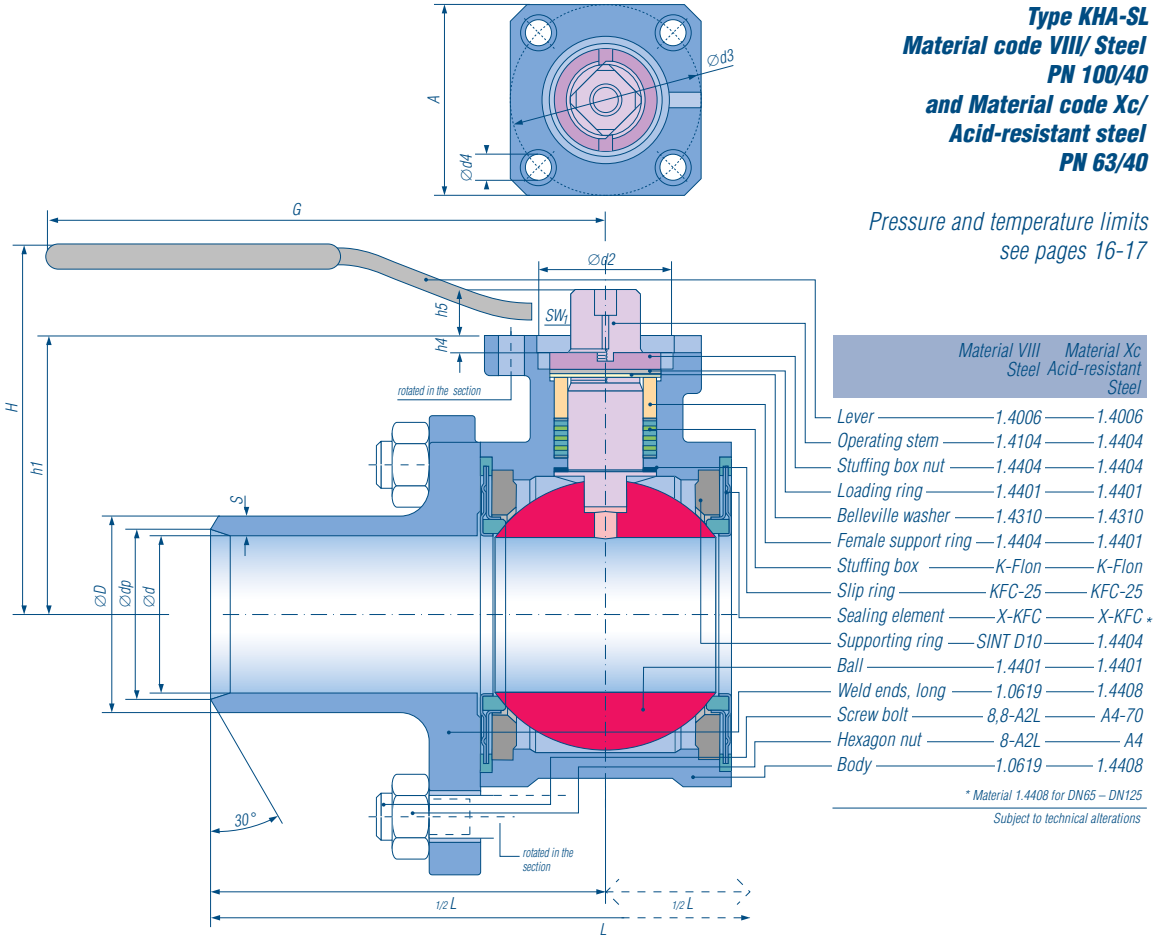
DN	Dimensions			PN	Connecting dimensions										Mounting flange for actuator								Weight
	L	H	G		h1	Ød	Ød1	ØD	Øg	f	b	Øk	l	lz*	ISO	A	SW_1	Ød2	Ød3	Ød4	h4	h5	kg/pc
65R50	170	131	315	40	90	50	65	188	122	15	19	145	18	8	F07	70	17	55	70	10	4	15	15.3
80R65	180	141	315	40	100	65	80	204	138	16	21	160	18	8	F07	70	17	55	70	10	4	15	21.3
* **100R80**	190	162	500	40	122	80	100	235	162	16	21	190	22	8	F10	102	22	70	102	12	4	20	29.7

all dimensions in mm

** lz: number of bore holes*

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

KLINGERballostar-A
Ball valve with weld ends and full port, long



	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4404	1.4401
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC *
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Weld ends, long	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Type KHA-SL
Material code VIII/ Steel
PN 100/40
and Material code Xc/
Acid-resistant steel
PN 63/40

Pressure and temperature limits see pages 16-17

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Weld ends acc. to DIN 3239 (EN 12627)

Dimensions
Face-to-face dimensions acc. to DIN 3202-S10 (DN 10-40)
Face-to-face dimensions acc. to ANSI B16.10 Cl.300 (DN 50-125)

Main use
Generally for liquids and gases, other fluids see resistance table.

Leak tightness
DIN 3230, Part 3, test level B0. In accordance with the requirements of TA Luft.

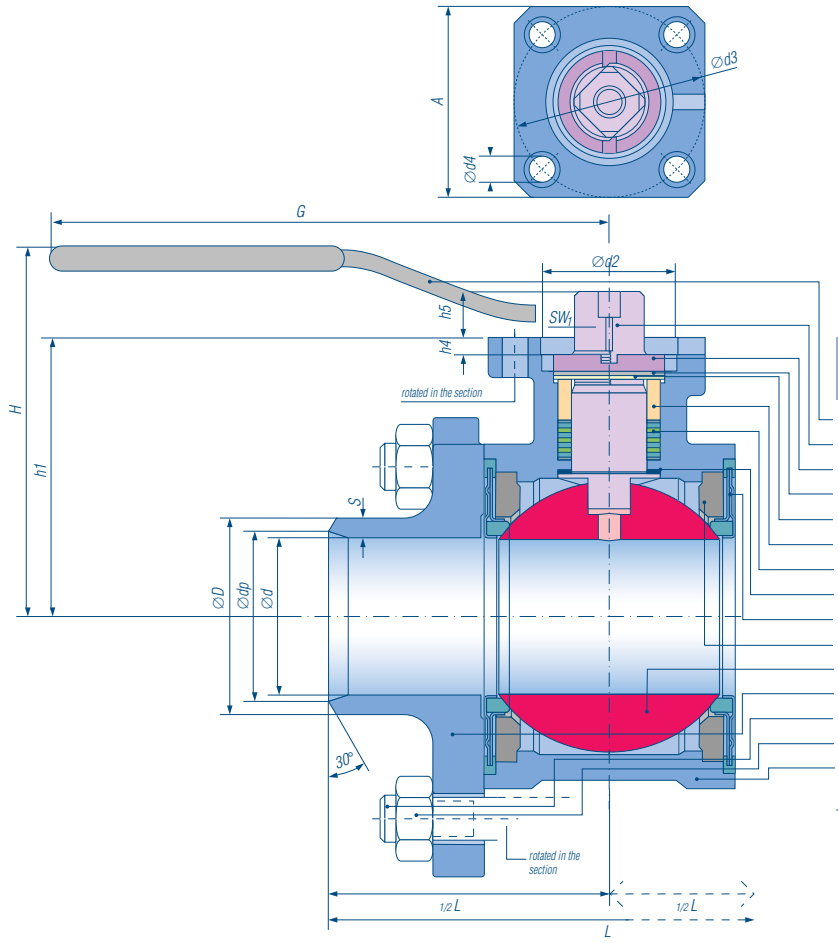
Fire safety *(special version)*
Fire safe acc. to API 607.

Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN		Connecting dimensions					Mounting flange for actuator								Weight
	L	H	G	VIII	Xc	h1	Ød	ØD	Ødp	S	ISO	A	SW_1	Ød2	Ød3	Ød4	h4	h5	kg/pc
10	270	80	130	100	63	35	10	18	13	4.0	F04	42	8	30	42	5.8	3	7	0.7
15	270	80	130	100	63	35	15	22	17	3.5	F04	42	8	30	42	5.8	3	7	0.9
20	270	94	160	100	63	46	20	28	22	4.0	F04	42	11	30	42	5.8	3	9	1.5
25	270	98	160	63	40	50	25	34	28,5	4.5	F04	42	11	30	42	5.8	3	9	2.1
32	270	106	250	63	40	65	32	43	37	5.5	F05	50	14	35	50	7	4	12	2.3
40	270	113	250	63	40	72	40	49	43	4.5	F05	50	14	35	50	7	4	12	4.8
50	216	131	315	40	40	90	50	61	54,5	5.5	F07	70	17	55	70	10	4	15	8.3
65	241	141	315	40	40	100	65	77	70	6.0	F07	70	17	55	70	10	4	15	12.5
80	282	162	500	40	40	122	80	90	82	5.0	F10	102	22	70	102	12	4	20	22.8
100	305	176	500	40	40	135	100	115	106,5	7.5	F10	102	22	70	102	12	4	20	33.5
125	356	211	650	40	40	175	125	141	131	8.0	F12	125	27	85	125	15	4	25	42.0

all dimensions in mm

KLINGERballostar-A
Ball valve with weld ends and full port, short



Type KHA-SK
Material code VIII/ Steel
PN 100/63
and Material code Xc/
Acid-resistant steel
PN 63/40

Pressure and temperature limits see pages 16-17

	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4404	1.4401
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC *
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Weld ends, short	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Weld ends acc. to DIN 3239 (EN 12627)
Dimensions
Face-to-face dimensions acc. to DIN 3202-S13
Main use
Generally for liquids and gases, other fluids see resistance table.
Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.
Fire safety *(special version)*
Fire safe acc. to API 607.

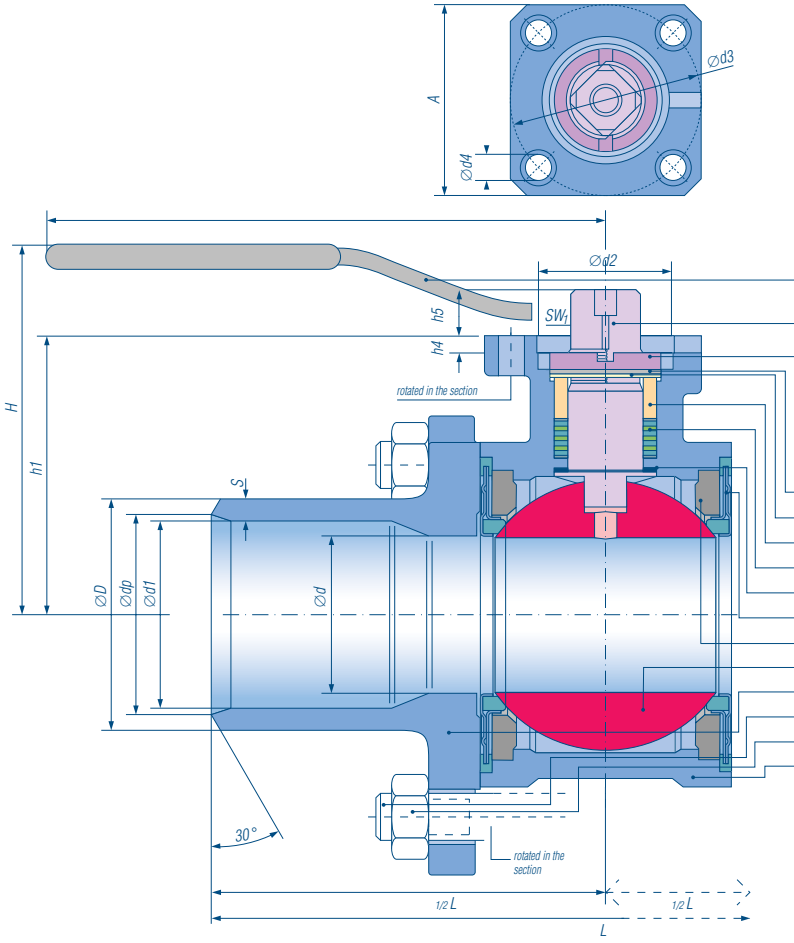
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN		Connecting dimensions					Mounting flange for actuator								Weight
	L	H	G	VIII	Xc	h1	Ød	ØD	Ødp	S	ISO	A	SW_1	Ød2	Ød3	Ød4	h4	h5	kg/pc
10	70	80	130	100	63	35	10	18	13	4.0	F04	42	8	30	42	5.8	3	7	0.6
15	75	80	130	100	63	35	15	22	17	3.5	F04	42	8	30	42	5.8	3	7	0.8
20	90	94	160	100	63	46	20	28	22	4.0	F04	42	11	30	42	5.8	3	9	1.4
25	100	98	160	63	40	50	25	34	28,5	4.5	F04	42	11	30	42	5.8	3	9	1.9
32	110	106	250	63	40	65	32	43	37	5.5	F05	50	14	35	50	7	4	12	2.7
40	125	113	250	63	40	72	40	49	43	4.5	F05	50	14	35	50	7	4	12	4.6

all dimensions in mm

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

KLINGERballostar-A
Ball valve with weld ends and reduced port, long



Type KHA-SL
Material code VIII/ Steel
PN 100/40
and Material code Xc/
Acid-resistant steel
PN 63/40

Pressure and temperature limits see pages 16-17

	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4404	1.4404
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Weld ends, long	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Weld ends acc. to DIN 3239 (EN 12627)

Dimensions
Face-to-face dimensions acc. to DIN 3202-S10 (20R15-40R32)
Face-to face dimensions acc. to ANSI B16.10 Cl. 300 (50R40-100R80)

Main use
Generally for liquids and gases, other fluids see resistance table.

Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.

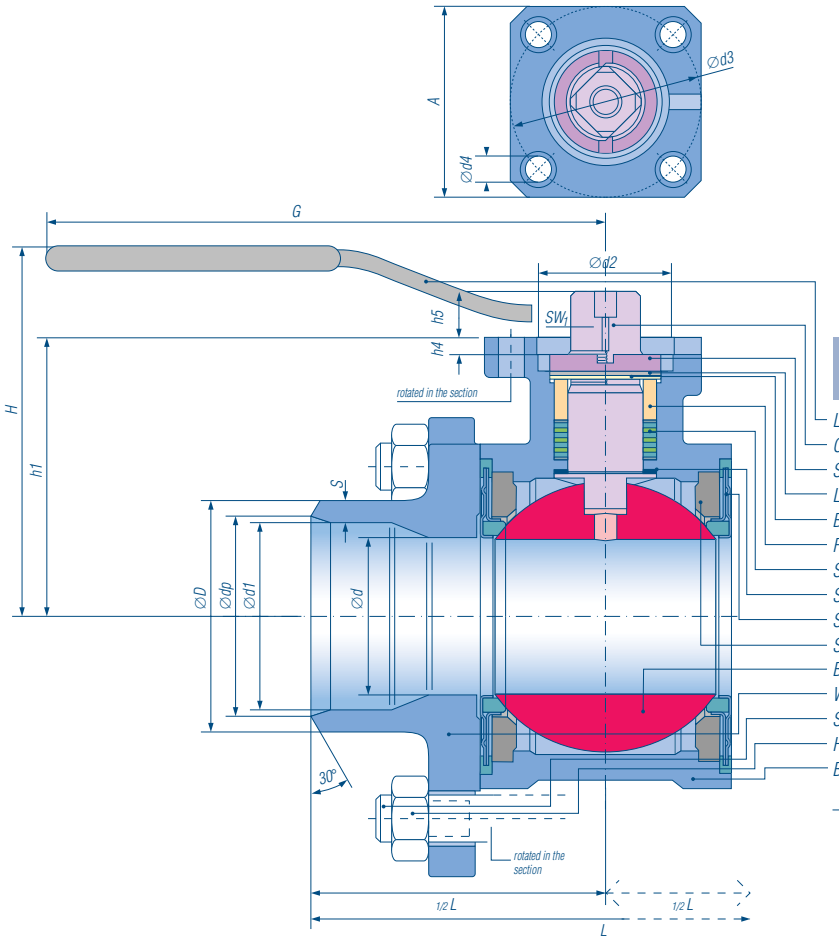
Fire safety *(special version)*
Fire safe acc. to API 607.

Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN		Connecting dimensions						Mounting flange for actuator								Weight
	L	H	G	VIII	Xc	h1	Ød	Ød1	ØD	Ødp	S	ISO	A	SW_1	Ød2	Ød3	Ød4	h4	h5	kg/pc
20R15	270	80	130	100	63	35	15	20	28	22	4.0	F04	42	8	30	42	5.8	3	7	1.0
25R20	270	94	160	100	63	46	20	25	34	28.5	4.5	F04	42	11	30	42	5.8	3	9	1.6
32R25	270	98	160	63	40	50	25	32	43	37	5.5	F04	42	11	30	42	5.8	3	9	2.3
40R32	270	106	250	63	40	65	32	40	49	43	4.5	F05	50	14	35	50	7	4	12	3.2
50R40	216	113	250	63	40	72	40	50	61	54.5	5.5	F05	50	14	35	50	7	4	12	5.7
65R50	241	131	315	40	40	90	50	65	77	70	6.0	F07	70	17	55	70	10	4	15	9.1
80R65	282	141	315	40	40	100	65	80	90	82	5.0	F07	70	17	55	70	10	4	15	14.4
100R80	305	162	500	40	40	122	80	100	115	106.5	7.5	F10	102	22	70	102	12	4	20	24.1

all dimensions in mm

KLINGERballostar-A
Ball valve with weld ends and reduced port, short



Type KHA-SK
Material code VIII/ Steel
PN 100/ 63
and Material code Xc/
Acid-resistant steel
PN 63/ 40

Pressure and temperature limits see pages 16-17

	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4404	1.4404
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Weld ends, short	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Weld ends acc. to DIN 3239 (EN 12627)
Dimensions
Face-to-face dimensions acc. to DIN 3202-S13 (20R15-40R32)
Face-to-face dimensions acc. to ANSI B16.10 Cl. 300 (50R40)
Main use
Generally for liquids and gases, other fluids see resistance table.
Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.

Fire safety *(special version)*
Fire safe acc. to API 607.
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN		Connecting dimensions						Mounting flange for actuator								Weight
	L	H	G	VIII	Xc	h1	Ød	Ød1	ØD	Ødp	S	ISO	A	SW_1	Ød2	Ød3	Ød4	h4	h5	kg/pc
20R15	90	80	130	100	63	35	15	20	28	22	4.0	F04	42	8	30	42	5.8	3	7	0.8
25R20	100	94	160	100	63	46	20	25	34	28.5	4.5	F04	42	11	30	42	5.8	3	9	1.4
32R25	110	98	160	63	40	50	25	32	43	37	5.5	F04	42	11	30	42	5.8	3	9	2.1
40R32	125	106	250	63	40	65	32	40	49	43	4.5	F05	50	14	35	50	7	4	12	2.9
50R40	150	113	250	63	40	72	40	50	61	54.5	5.5	F05	50	14	35	50	7	4	12	5.0

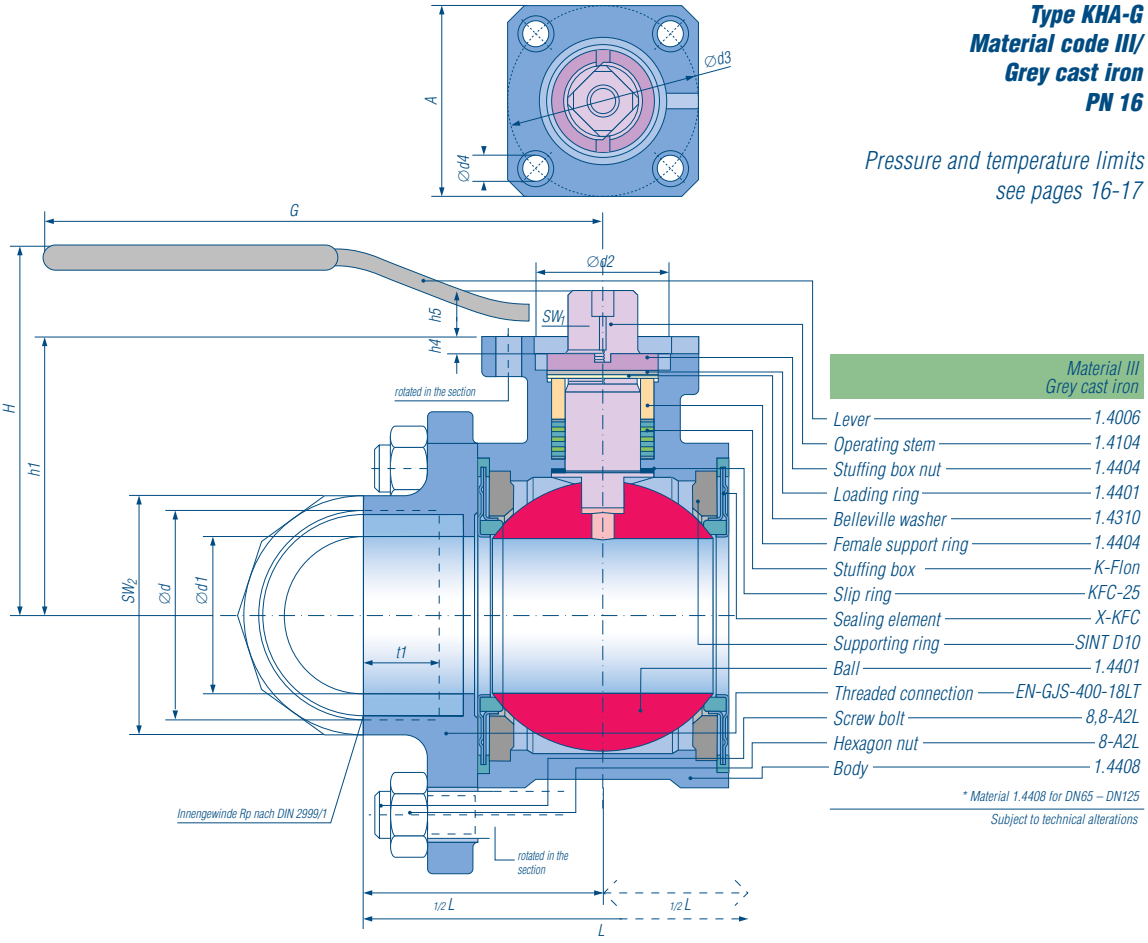
all dimensions in mm

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

KLINGERballostar-A
Ball valve with threaded connection and reduced port

Type KHA-G
Material code III/
Grey cast iron
PN 16

Pressure and temperature limits see pages 16-17



Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Pipe thread acc. to DIN/ISO 228/1

Dimensions
Face-to-face dimensions acc. to DIN 3202-M3

Main use
Generally for liquids and gases, other fluids see resistance table.

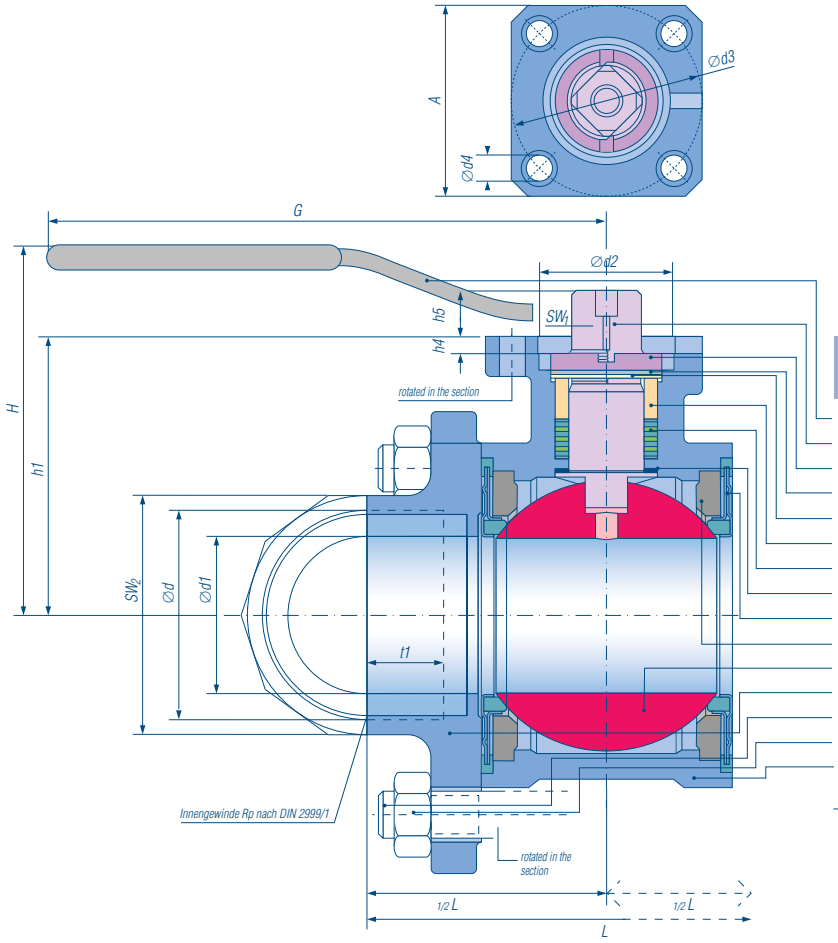
Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.

Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN	Connecting dimensions					Mounting flange for actuator								Weight
	L	H	G		h1	Ød1	Ød	SW_2	t1	ISO	A	SW_1	Ød2	Ød3	Ød4	h4	h5	kg/pc
1/2“ / R15	75	80	130	16	35	15	R_P 1/2“	32	14,5	F04	42	8	30	42	5.8	3	7	0.6
3/4“ / R15	80	80	130	16	35	15	R_P 3/4“	32	16	F04	42	8	30	42	5.8	3	7	0.7
1“ / R20	90	94	160	16	46	20	R_P 1“	41	17	F04	42	11	30	42	5.8	3	9	1.3
1 1/4“ / R25	110	98	160	16	50	25	R_P 1 1/4“	50	21	F04	42	11	30	42	5.8	3	9	1.9
1 1/2“ / R32	120	106	250	16	65	32	R_P 1 1/2“	55	21	F05	50	14	35	50	7	4	12	2.6
2“ / R40	140	113	250	16	72	40	R_P 2“	70	25	F05	50	14	35	50	7	4	12	4.5

all dimensions in mm or inch

KLINGERballostar-A
Ball valve with threaded connection and reduced port



Type KHA-G
Material code VIII/ Steel
PN 100 – 63
and Material code Xc/
Acid-resistant steel
PN 63 – 40

Pressure and temperature limits
see pages 16-17

	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4404	1.4404
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Threaded connection	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Pipe thread acc. to DIN/ISO 228/1
Dimensions
Face-to-face dimensions acc. to DIN 3202 Part 4 – M3
Main use
Generally for liquids and gases, other fluids see resistance table.
Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.

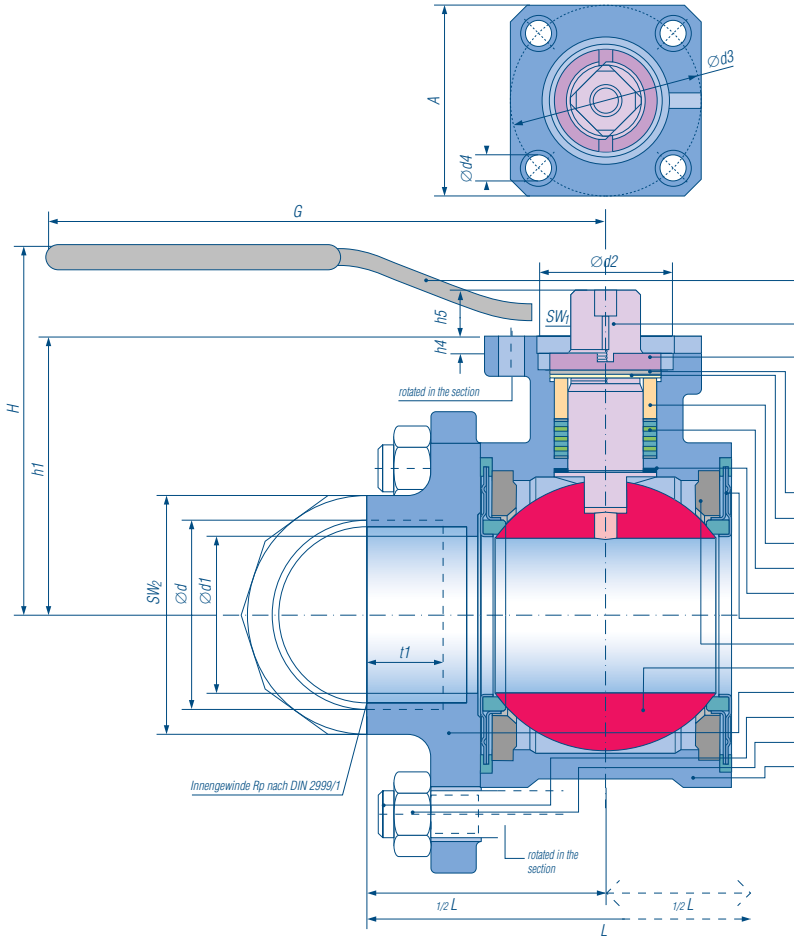
Fire safety *(special version).*
Fire safe acc. to API 607.
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN		Connecting dimensions					Mounting flange for actuator								Weight
	L	H	G	VIII	Xc	h1	Ød1	Ød	SW_2	t1	ISO	A	SW_1	Ød2	Ød3	Ød4	h4	h5	kg/pc
3/4" / R15	80	80	130	100	63	35	15	R_P 3/4"	32	16	F04	42	8	30	42	5.8	3	7	0.7
1" / R20	90	94	160	100	63	46	20	R_P 1"	41	17	F04	42	11	30	42	5.8	3	9	1.3
1 1/4" / R25	110	98	160	63	40	50	25	R_P 1 1/4"	50	21	F04	42	11	30	42	5.8	3	9	1.9
1 1/2" / R32	120	106	250	63	40	65	32	R_P 1 1/2"	55	21	F05	50	14	35	50	7	4	12	2.6
2" / R40	140	113	250	63	40	72	40	R_P 2"	70	25	F05	50	14	35	50	7	4	12	4.5

all dimensions in mm or inch

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

KLINGERballostar-A
Ball valve with threaded connection and full port



Type KHA-G
Material code VIII/ Steel
PN 100/40
and Material code Xc/
Acid-resistant steel
PN 63/40

Pressure and temperature limits see pages 16-17

	Material VIII Steel	Material Xc Acid-resistant Steel
Lever	1.4006	1.4006
Operating stem	1.4104	1.4404
Stuffing box nut	1.4404	1.4404
Loading ring	1.4401	1.4401
Belleville washer	1.4310	1.4310
Female support ring	1.4404	1.4404
Stuffing box	K-Flon	K-Flon
Slip ring	KFC-25	KFC-25
Sealing element	X-KFC	X-KFC
Supporting ring	SINT D10	1.4404
Ball	1.4401	1.4401
Threaded connection	1.0619	1.4408
Screw bolt	8,8-A2L	A4-70
Hexagon nut	8-A2L	A4
Body	1.0619	1.4408

* Material 1.4408 for DN65 – DN125

Subject to technical alterations

Design features
3-piece ball valve,
floating ball, antistatic, lockable.
Double leak-tightness in both port directions
Modular construction kit system: several versions of stuffing boxes and sealing elements available

Connections
Pipe thread acc. to DIN/ISO 228/1
Dimensions
Face-to-face dimensions acc. to DIN 3202 Part 4 – M4
Main use
Generally for liquids and gases, other fluids see resistance table.
Leak tightness
DIN 3230, Part 3, test level B0.
In accordance with the requirements of TA Luft.

Fire safety *(special version)*
Fire safe acc. to API 607.
Automation
Flange connection acc. to ISO 5211, permits direct mounting of the actuator or mounting with bracket.
Pneumatic and electrical actuators possible.

DN	Dimensions			PN		Connecting dimensions						Mounting flange for actuator							Weight
	L	H	G	VIII	Xc	h1	Ød	Ød1	SW_2	t1	ISO	A	SW_1	Ød2	Ød3	Ød4,	h4	h5	kg/pc
3/8“	75	80	130	100	63	35	R_P 3/8“	10	27	11	F04	42	8	30	42	5.8	3	7	0.7
1/2“	85	80	130	100	63	35	R_P 1/2“	15	32	14.5	F04	42	8	30	42	5.8	3	7	0.8
3/4“	95	94	160	100	63	46	R_P 3/4“	20	36	16	F04	42	11	30	42	5.8	3	9	1.5
1“	105	98	160	63	40	50	R_P 1“	25	46	17	F04	42	11	30	42	5.8	3	9	2.1
1 1/4“	120	106	250	63	40	65	R_P 1 1/4“	32	55	21	F05	50	14	35	50	7	4	12	2.9
1 1/2“	130	113	250	63	40	72	R_P 1 1/2“	40	60	21	F05	50	14	35	50	7	4	12	4.7
2“	150	131	315	40	40	90	R_P 2“	50	75	25	F07	70	17	55	70	10	4	15	7.4

all dimensions in mm or inch

Applications

Ballostar ball valves type KHA with pneumatic actuator in a chemical plant in Sweden.
Medium: Thermal oil

Resistance table

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 over which the manufacturer has no influence.

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.

Names of materials for seals:

PTFE = KLINGERflon® PTFE
KFC-25 = KLINGERflon® carbon-reinforced
MetalI = 1.4436 sealing ring coated with STELLITE
Viton = Fluorinated rubber

Body material codes:

Material code III
Body: Cast steel
Colour of body: Dark grey, phosphated
Connection: Grey cast iron
Inside parts: Corrosion resistant steel

Material code VIII
Body and connection: Steel
Colour of body: Dark grey, phosphated
Inside parts: Corrosion resistant steel

Material code Xc
Body and connection: Acid-resistant steel
Colour of body: Bright, pickled
Inside parts: Acid-resistant steel

Fluid	Chemical formula	Concentration and temperature		Materials for seals				Body and connection (material code)		
		%	°C	KFC-25	PTFE	Metal	Viton	III	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	$(NH_4)_2CO_3$		Kp	●	●	●	✖	▲	▲	●
Ammonium nitrate	NH_4NO_3		Kp	●	●	●	●	▲	▲	●
Ammonium sulphate	$(NH_4)_2SO_4$		Kp	●	●	●	●	✖	✖	●
Aniline	$C_6H_5NH_2$			●	●	●	●	●	●	●

Our contribution to fluid safety

Fluid	Chemical formula	Concentration and temperature		Materials for seals				Body and connection (material code)		
		%	°C	KFC-25	PTFE	Metal	Viton	III	VIII	Xc
Arsenic acid	H_3AsO_4			●	●	●	●	▲	▲	●
Asphalt (tar)				●	●	●	●	▮	▮	●
Beer				●	●	●	●	✖	✖	●
Benzene	C_6H_6			●	●	●	●	●	●	●
Benzine				●	●	●	✖	●	●	●
Bleaching liquor (chloride of lime)				●	●	●	●	▮	▮	■
Borax	$Na_2B_4O_7\ 10H_2O$			●	●	●	●	▮	▮	●
Boric acid	H_3BO_3	4	20	●	●	●	●	▲	▲	●
Boric acid	H_3BO_3	4	100	●	●	●	●	▲	▲	●
Boric acid	H_3BO_3	100	100	●	●	●	●	▲	▲	●
Butane	C_4H_{10}			●	●	●	●	●	●	●
Buttermilk			20	●	●	●	✖	▮	▮	●
Butyl acetate	$CH_3COOC_4H_9$			●	●	●	✖	●	●	●
Butyl alcohol	C_4H_9OH			●	●	●	✖	●	●	●
Calcium 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	$Ca(OH)_2$			●	●	●	●	●	●	●
Calcium hydroxide	$Ca(OH)_2$		20	●	●	●	●	●	●	●
Calcium hydroxide	$Ca(OH)_2$		Kp	●	●	●	●	●	●	●
Calcium hypochlorite	$Ca(ClO)_2$			●	●	●	●	▲	▲	■
Calcium sulphate	$CaSO_4$			●	●	●	✖	●	●	●
Carbon dioxyde	CO_2	to	150	●	●	●	●	●	●	●
Carbon dioxyde	CO_2		400	●	●	●	●	●	●	●
Carbon disulfide	CS_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	●[3]	●	●	●	✖	✖	●
Citric acid	$(CH_2COOH)_2C(OH)COOH$		Kp	●	●[3]	●	●	✖	✖	●
Clophen T 64				●	●	●	✖	●	●	●
Coagulating baths (up to 10%)	H_2SO_4		80	●	●	●	✖	✖	✖	●
Copper acetate	$(CH_3COO)_2Cu$		20	●	●	●	✖	●	●	●

Abbreviations:

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

Explanation of symbols:

for metallic materials:
● *practically resistant, removal up to 2.4 g/m²/day*
■ *fairly resistant, removal 2.4-24 g/m²/day*
▲ *hardly resistant, removal 24-72 g/m²/day*
✖ *not resistant, removal over 72 g/m²/day*
▮ *not tested or not common*

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

1) *Discolorations may occur.*

2) *All iron materials are in general chemically resistant to hydrogen; however, we would like to point out that hydrogen diffuses and can lead to brittleness in grey cast iron.*

3) *150 °C*

Resistance table

Fluid	Chemical formula	Concentration and temperature		Materials for seals				Body and connection (material code)		
		%	°C	KFC-25	PTFE	Metal	Viton	III	VIII	Xc
Copper acetate	$(CH_3COO)_2CU$		Kp	●	●	●	✖	▲	▲	●
Copper sulphate	$CuSO_4$		20	●	●	●	●	✖	▲	●
Copper sulphate	$CuSO_4$		Kp	●	●	●	●	✖	▲	●
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				●	●	●	●	■	■	●
Formaldehyde	HCHO	40	20	●	●	●	●	✖	✖	●
Formaldehyde	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	50	20	●	●	●	✖	✖	▲	●
Glacial acetic acid	CH_3COOH	50	Kp	●	●	●	✖	✖	▲	■
Glacial acetic acid	CH_3COOH	80	20	●	●	●	✖	✖	▲	■
Glacial acetic acid	CH_3COOH	80	Kp	●	●	●	✖	✖	▲	■
Glycerine	(CH_2OH_2) CHOH		20	●	●	●	●	▲	▲	●
Glycerine	(CH_2OH_2) CHOH		100	●	●	●	●	▲	▲	●
Grape vinegar			20	●	●	●	●	▮	▮	●
Heat transfer oils				●	●	●	✖	●	●	●
Hydrochloric acid, dry	HCl		20	●	●	●	●	■	■	■
Hydrochloric acid, dry	HCl		100	●	●	●	●	■	■	▲

Our contribution to fluid safety

Fluid	Chemical formula	Concentration and temperature		Materials for seals				Body and connection (material code)			
		%	°C	KFC-25	PTFE	Metal	Viton	III	VIII	Xc	
Hydroxylamine sulphate	$(NH_2OH)H_2SO_4$	10	20	●	●	●	●	▮	▮	●	
Hydroxylamine sulphate	$(NH_2OH)H_2SO_4$	10	Kp	●	●	●	✖	▮	▮	●	
Hydrochloric acid	HCl	0,2	20	●	●	●	●	✖	✖	●	
Hydrochloric acid	HCl	0,2	50	●	●	●	●	✖	✖	■	
Hydrochloric acid	HCl	1	20	●	●	●	●	✖	✖	■	
Hydrogen sulphide, gas, dry	H_2S		20	●	●	●	✖	▮	▮	●	
Hydrogen sulphide, gas, wet	H_2S		20	●	●	●	✖	▮	▮	●	
Hydrogen	H_2			●	●	●	●	●	●	●	2)
Hydrogen peroxide	H_2O_2		20	●	●	●	✖	✖	✖	●	
Hydrogen peroxide	H_2O_2		50	●	●	●	✖	✖	✖	●	
Illuminating gas				●	●	●	●	●	●	●	
Kreosote			20	●	●	●	●	▮	▮	●	
Kreosote			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)	●	
Methylene chloride	CH_2Cl_2		20	●	●	●	✖	■	■	●	
Methylene 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	●	●	●	●	✖	▲	■	

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Resistance table

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		%	°C	KFC-25	PTFE	Metal	Viton	III	VIII	Xc
Nitrogen	N_2			●	●	●	●	●	●	●
Oils (lubricating oils, mineral)			20	●	●	●	●	●	●	●
Oils (vegetable)			20	●	●	●	●	●	●	●
Oleic acid	$C_{17}H_{33}COOH$			●	●	●	✖	●	●	●
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 acetate	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	$KCr(SO_4)_212H_2O$		20	●	●	●	●	▮	▮	●
Potassium chromium sulphate	$KCr(SO_4)_212H_2O$		Kp	●	●	●	✖	▮	▮	✖
Potassium cyanide solution	KCN	5	20	●[3)]	●	●	✖	■	■	●
Potassium dichromate	$K_2Cr_2O_7$	25	20	●	●	●	✖	●	●	●
Potassium dichromate	$K_2Cr_2O_7$		Kp	●	●	●	✖	▲	▲	●
Potassium hydrogentartrate	$COOH(CHOH)_2COOK$		20	●	●	●	✖	▮	▮	●
Potassium hydrogentartrate, at100°, 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	●	●	●	●	✖	✖	●
Propane	C_3H_8		20	●	●	●	●	●	●	●
Salicylic acid	$C_6H_4OHCOOH$		20	●	●	●	●	▲	▲	●
Salpeter				●	●	●	●	●	●	●
Salt (rock salt)	$NaCl$		20	●	●	●	●	✖	✖	■

Our contribution to fluid safety

Fluid	Chemical formula	Concentration and temperature		Materials for seals				Body and connection (material code)			
		%	°C	KFC-25	PTFE	Metal	Viton	III	VIII	Xc	
Sea water			20	●	●	●	●	✖	✖	●	
Sea water			Kp	●	●	●	●	✖	✖	●	
Silicone oil				●	●	●	●	●	●	●	
Soap				●	●	●	●	●	●	●	
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				●	●[3]	●	✖	●	●	●	
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			●	●	●	●	✖	✖	●	[2]
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 drinking water)	H_2O			●	●	●	●	●	●	●	
Water glass (K- and Na-silicate)	K_2SiO_3 Na_2HCl_3			●	●	●	●	●	●	●	
Xylene	$C_6H_4(CH_3)_2$		20	●	●	●	●	●	●	●	

Abbreviations:

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

Explanation of symbols:

for metallic materials:
● practically resistant, removal up to 2.4 g/m²/day
■ fairly resistant, removal 2.4-24 g/m²/day
▲ hardly resistant, removal 24-72 g/m²/day
✖ not resistant, removal over 72 g/m²/day
▮ not tested or not common

for sealing materials:
● suitable
✖ unsuitable

1) Discolorations may occur.

2) All iron materials are in general chemically resistant to hydrogen; however, we would like to point out that hydrogen diffuses and can lead to brittleness in grey cast iron.

3) 150 °C

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

KLINGER Monoball®
One-piece ball valve made of steel and stainless cast steel

KLINGER Ball-o-top
Brass ball valve

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

KLINGERMATIC®
Actuator for ball valves and piston valves

Liquid level gauges
For steam boilers and process applications

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

KLINGER Fluid Control GmbH
A-2352 Gumpoldskirchen, Austria
p.o. box 19, Am Kanal 8–10
Tel. + 43 (0)2252-600-0
Fax + 43 (0)2252-63 336
e-mail: office@klinger.kfc.at
www.klinger.kfc.at