



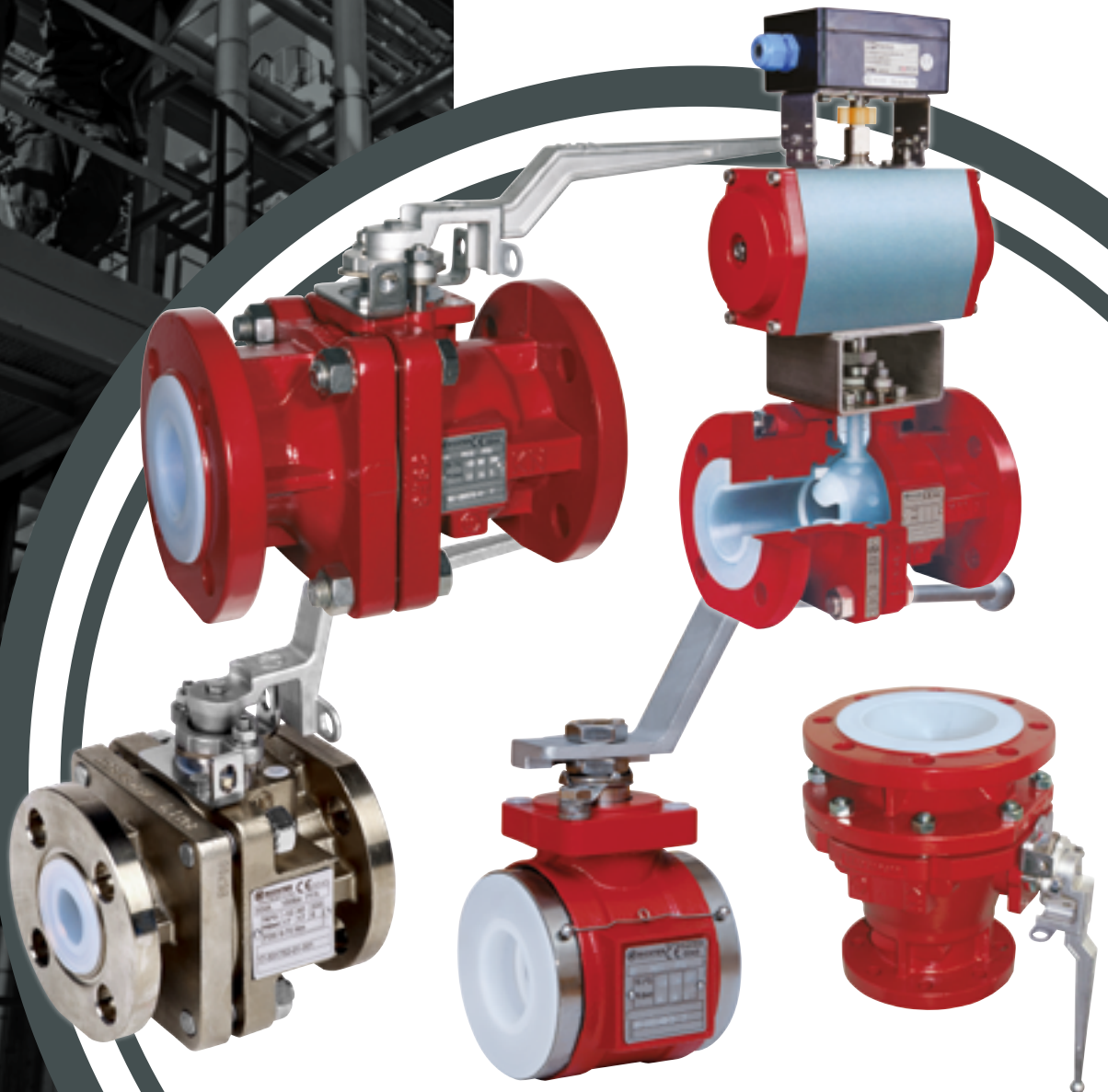
**RICHTER**  
Process Pumps & Valves

*KN, KNA, KNR, KNAR, KA-N, KK*

# HEAVY-DUTY BALL VALVES

*SHUT-OFF, CONTROL &  
DRAIN VALVES*

- ✓ *SUPERIOR CORROSION RESISTANCE*
- ✓ *RELIABLE DESIGN*
- ✓ *MAINTENANCE-FREE ENVIPACK STEM SEALING*
- ✓ *-60 TO +200 °C  
(-75 TO +400 °F)*



## Heavy duty ball valves with ENVIPACK stem sealing

The ball valve family, KN, excels by offering problem solutions from a modular system. The selection of fluoroplastic linings, the large temperature/pressure range and the numerous options permit a tailor-made solution for virtually every application involving highly corrosive and ultrapure media – with more or less the same components!

### The standard KN/KNA modular system:

1 ISO/DIN + 1 ASME/ANSI body, 2 lining materials, 1 universal stem sealing, 4 standard ball versions.

In addition, Richter's speciality: customised special solutions.

### The ball valves of the KN/KNA family are

- Shut-off and control valves for highly aggressive fluids
- For applications where stainless steel, special metals and standard plastics are not sufficiently corrosion-resistant
- the cost-effective and readily available alternative to special metals
- Suitable for pure, ultrapure and solids-laden media

### Product features

- 1-piece, PFA-lined ball/stem, optionally Al<sub>2</sub>O<sub>3</sub> ball and special versions
- DN 15-200 and 1/2"-8", full bore
- DN 200 optional with reduced bore
- Optional manufacturer's declaration to TRwS ATV-DWVK-A 780, part 1, design A
- optional: type-test approval mark according to DIN EN 14432

Type codes	manual actuation		remote actuation	
	Shut-off valve	Control valve	Shut-off valve	Control valve
• ISO/DIN	KN/...	KNR/...	KNP/...	KNRP/...
• ASME/ANSI short	KNA/...	KNAR/...	KNAP/...	KNARP/...

### Lining

- PFA .../F
- Antistatic PFA-L .../F-L

### ① min. 3.5 mm (1/7") thick lining made of pure PFA

- High permeation resistance
- Vacuum-proof anchoring
- transparent, optimal quality assurance,
- **minimal 5 mm (1/5") wall thickness option** (≥ DN 25/1")
- Optional antistatic lining

### ② Body made of ductile cast iron

EN-JS 1049/ASTM A395, absorbs the system and pipe forces

DN 25 up to DN 80 respectively ASME/ANSI 1"-2" also available in stainless steel (1.4408)

### ③ Permanently tight body connection

- Also with frequent temperature changes
- Full lining (3a)
- Body halves center themselves exactly to each other owing to the fit (3b)
- Labyrinth-like sealing (3c): maximum surface pressure between the body halves
- „Almost metallic stop“ (3d) absorbs pipe forces (see page 3)

### ④ Different ball versions (see page 3)

- Standard one-piece ball/stem with lining and stainless steel core
- Eliminates the fits of 2-piece plastic-lined ball/stem versions which are less load-bearing
- Thus optimising operational reliability

### ⑤ Resilient PTFE seat rings: spring loaded

Permanent pretension of the ball, gas-tight seal

### ⑥ Richter ENVIPACK stem sealing with active stainless steel packing gland follower (6a)

- Conformity with German Clean Air Act (TA Luft), self-adjusting
- Bellows-type packing insert (6b), gas-tight to EN 12266 leakage rate A
- Virtually maintenance-free sealing even with frequent hot/cold cycles
- Visual inspection of the pre-tensioning action
- Can be re-adjusted from outside in a controlled manner (6c)

### ⑦ Universal ISO 5211 connection

### ⑧ External corrosion protection

Epoxy coating. Stuffing box, lever, screws/nuts made of stainless steel

Ball valve series selection, Outline of the features that can be configured

Options	KN	KNA	KNR	KNAR	KA-N	KK
ISO/DIN face to face, flanges PN 16 ① / ISO/DIN face to face, flanges PN 25 (DN 25-80)	•/•		•/•		②	③
ASME/ANSI short face to face, flanges Cl. 150 ①		•		•		
Shut-off/control	•/-	•/-	•/•	•/•	•/-	•/-
ENVIPACK bellows-type packing	•	•	•	•	•	
Operating temperature up to 150 °C/200 °C (-20 °F/400 °F)	•/•	•/•	•/•	•/•	•/•	•/-
Operating temperature down to -29 °C/-60 °C (-20 °F/-75 °F)	•/•	•	•/•	•	•/•	•/•
Vacuum applications	•	•	•	•	•	•
Solids-containing fluids ④	•	•	⑤	⑤	•	•
Ultrapure media	•	•	•	•	•	
TF ball/stem for optimum drainability	•	•			•	
Low-cavity	•	•	•	•	•	•
Lining pure PFA, min. 3.5 mm/min. 5 mm (1/7" 1/5")	•/•	•/•	•/•	•/•	•/•	•/-
Lining antistatic PFA-L	•	•	•	•	•	•
One-piece PFA-lined ball/stem	•	•	•	•	•	
PFA-lined ball, separate stem						•
Al <sub>2</sub> O <sub>3</sub> ceramic ball, separate stem	•	•			•	•
Body ductile cast iron	•	•	•	•	•	•
Body stainless steel ISO/DIN (DN 25-80)	•		•			
ASME/ANSI (1"-2")		•		•		

① On request, flanges drilled to ASME Cl.150

② Special face to face, see tables on page 7

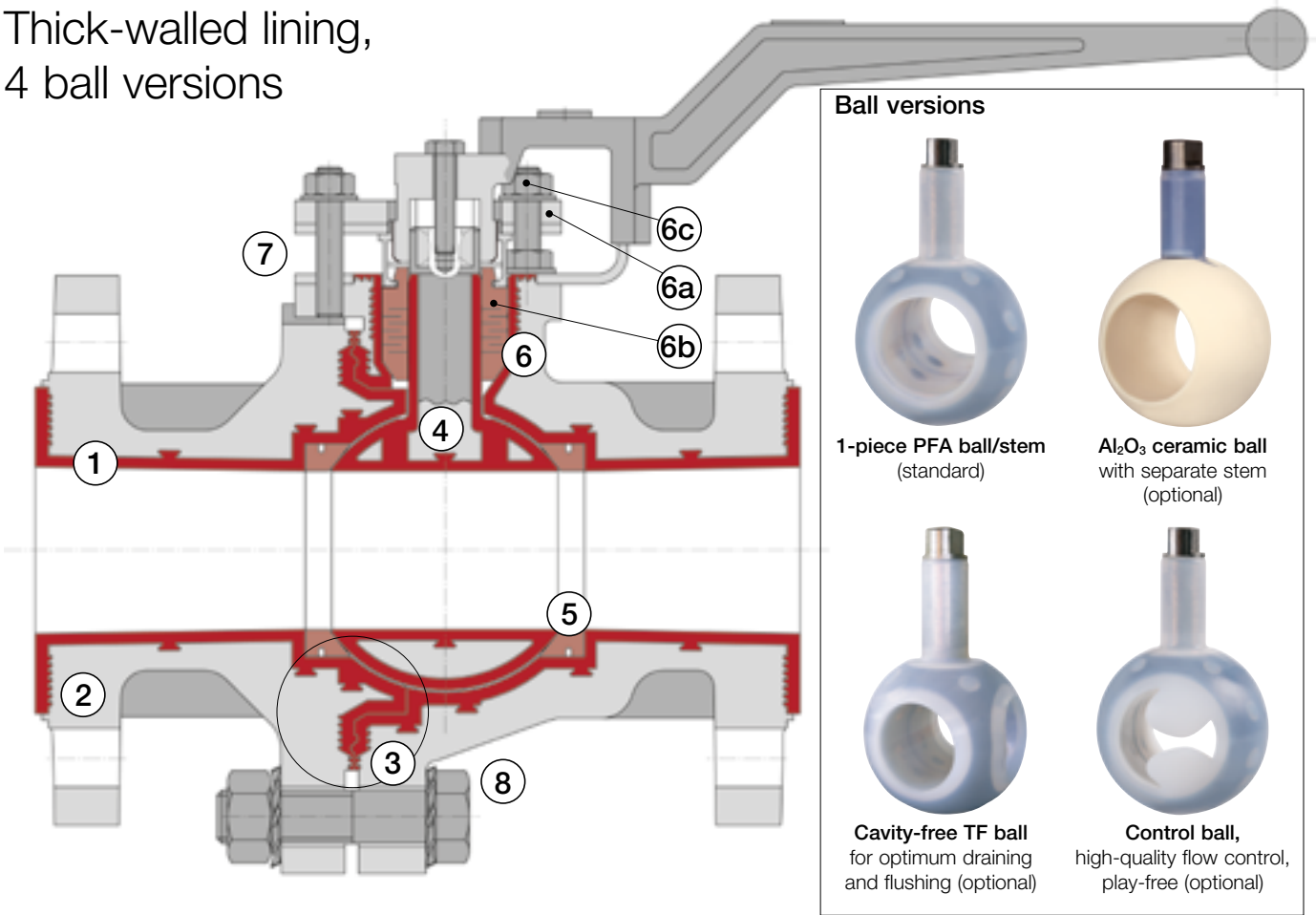
③ Flangeless compact design, face to face = DN + 50 mm

④ Solids: in general, consultation with manufacturer recommended

⑤ Limited suitability



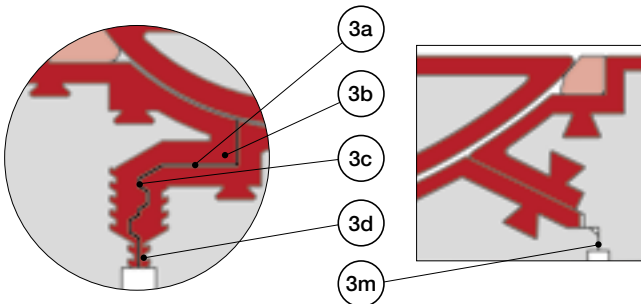
Thick-walled lining,  
4 ball versions



Why does Richter rely on “almost metallic stop” instead of “metallic stop”?

Richter’s “virtually metal-to-metal contact”, permanently tight:

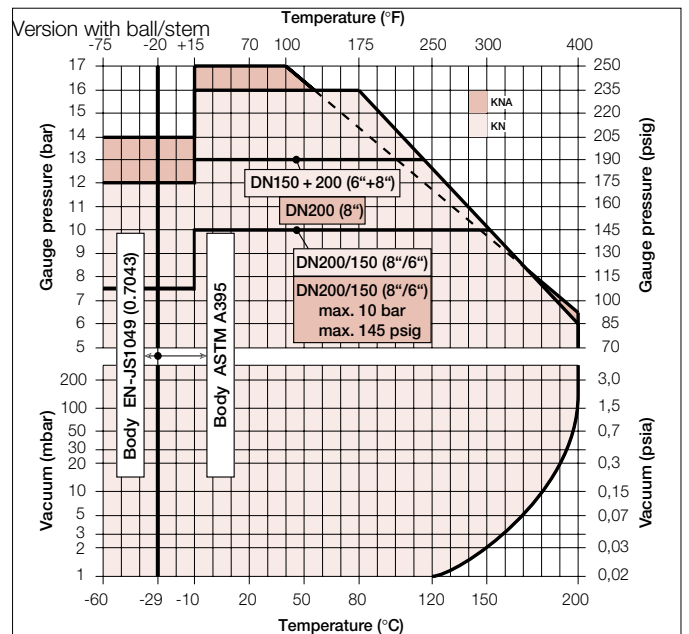
The body lining (3d) decreases to about 0.5 mm (0.02”) permitting the inner flange connection to be retightened in the event of a leak in the sealing area. However, leakage is highly improbable thanks to the labyrinth-type design (3c) typical of Richter.



What are the disadvantages of lined valves with “metallic stop”?

The body halves are bolted together with full metallic contact (3m). Retightening is not possible, any leak that occurs cannot be stopped. The cavity between the lining and the metallic contact also prevents the early detection of any leak.

Pressure/temperature range



Body EN-JS 1049 (0.7043)/PFA:

-60 °C (-75 °F) to +200 °C (400 °F); max. 16 bar (235 psi) acc. to AD 2000

Body ASTM A395/PFA:

-29°C (-20 °F) to +200 °C (400 °F); max. 17.2 bar (250 psi) acc. to ASME B16.42

For applications at low temperatures, please observe the local regulations!

## Richter drain valves KA-N with ENVIPACK stem sealing

Drain valves are compact, sturdy vessel drain valves and much lower-priced than sliding stem valves.

The KA-N has – apart from the tapered inlet nozzle – the same design as the ball valve series KN.

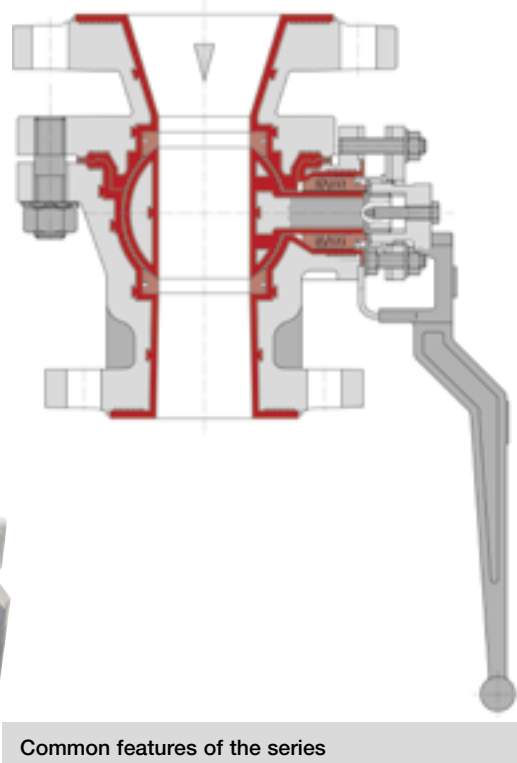
The pressure/temperature range, design features, material range and the major spare parts are identical.

### Product features

- Full bore
- DN 50/25 (Ø 24,5 mm) to 150/100 (Ø 96 mm), 2 1/4" (Ø 1") to 8 7/8" (Ø 6")
- -60 to +200 °C (-75 to +400 °F), see diagram on page 3
- Face-to-face: see table on page 7
- Flanges ISO/DIN 7005-2 PN 16, on request, drilled to ASME B16.05 class 150

### Other options:

- Body heating jacket, stem extension



### Common features of the series KA-N, KNA-S and KNR/KNAR

- Labyrinth-like, permanently tight body connection
- Lining 3.5 mm (1/7") virgin PFA, optionally PFA-L antistatic
- Self-adjusting, maintenance-free ENVIPACK stem sealing
- Resilient seat rings, gas-tight in the seat
- Conformity with the German Clean Air Act
- Lockable stainless steel lever
- Actuator mounting to ISO 5211, optionally head flange to ISO
- Low-cavity as standard feature
- One-piece PFA ball stem, optionally Al<sub>2</sub>O<sub>3</sub> ceramic ball with separate stem, cavityfree TF ball, all blowout-proof
- Or control ball with high-quality control performance for KNR and KNAR valves

## PFA lined stainless steel shut-off and control valves

The PFA-lined stainless steel KNA-S and KN-S are predestined for the shut-off and control of corrosive fluids

- in clean-room environments where high-quality exterior surfaces without paint are preferred
- in corrosive atmospheres, e. g. in HF, HNO<sub>3</sub> and pickling plants
- in processes where the fluid itself must not come into contact with ductile cast iron if the lining is damaged.

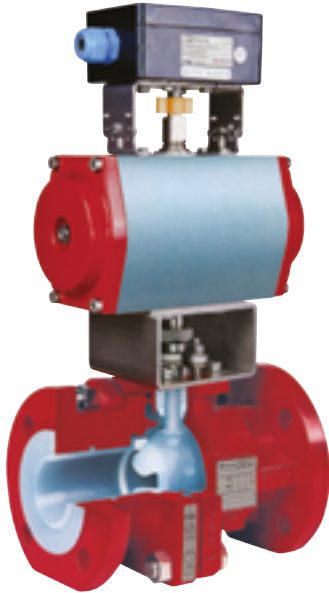
The pressure/temperature range as well as the components balls, seat rings, stem sealing and valve actuation correspond to those of the KN and KNA series, see page 3.

### Product features

- Precision cast stainless steel 1.4408 (316, CF8M), lining PFA
- Full bore flow
- ISO/DIN (DN 25 to DN 80) ASME/ANSI (1" to 2"), other nominal sizes on request
- from -29 to +200 °C (-20 to +400 °F) for KNA series
- from -60 to +200 °C (-75 to +400 °F) for KN series, see diagram on page 3
- Very low temperatures down to -200 °C (-330 °F) on request
- Face-to-face acc. to ASME/ANSI 16.10/short, face-to-face ISO/DIN on request



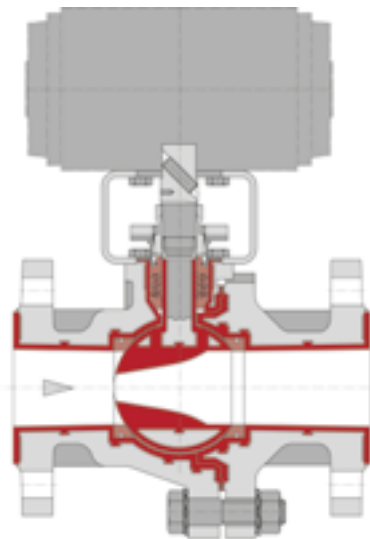
## Richter control valves KNR and KNAR with play-free torque transmission



With the series KNR (ISO/DIN) and KNAR (ASME/ANSI) compact control valves with high control accuracy are available to plant operators. The KNR/KNAR valves are in many applications a very economical alternative to bellows-type, sliding stem valves.

Valve bodies, seat rings and the ENVIPACK stem sealing are identical to those of the shut-off valves KN and KNA as are the selection of material and the pressure/temperature range. Advantages: minimum stock of spare parts, conversion from shut-off to control valve possible.

Weitere Informationen siehe separate Druckschrift.



### Product features

- Up to 8 finely graduated  $k_{vs}/C_v$ -values per nominal size
- Equal percentage characteristic acc. to DIN EN 60534, linear by means of positioner
- DN 15 to 200 (1/2" to 8")
- -60 to +200 °C (-75 to +400 °F), see diagram on page 3
- Face-to-face according to
  - ISO/DIN 5752 R.1 (apart from DN 200)
  - ASME/ANSI B 16.10/8, Cl.150
- Flanges to
  - ISO/DIN 7005-2 PN 16 (DN 200/150 8"/6": PN 10), DN 25-80 (1"-3")
  - ASME B16.5 Cl.150

### Other options:

- Extra thick body lining: 5 mm (1/5") PFA for permeating media

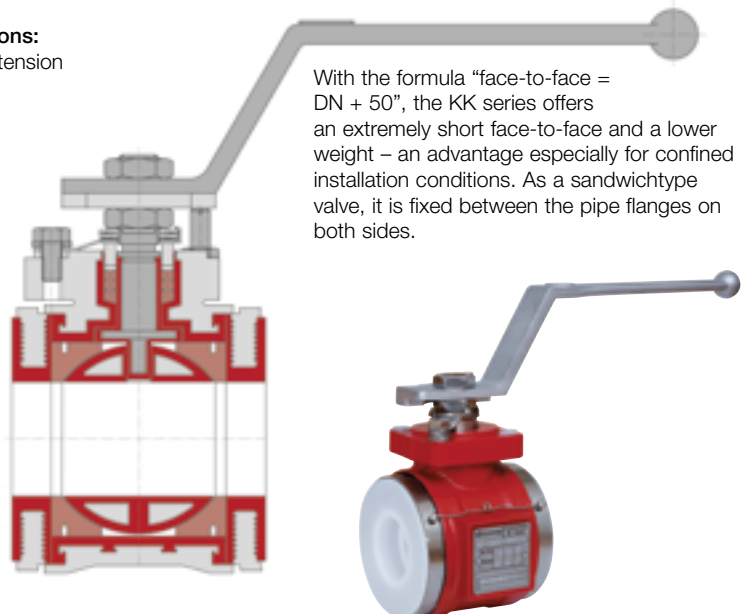
## Richter flangeless compact ball valves KK

### Product features

- Lining 3.5 mm (1/7") virgin PFA
- Body of ductile cast iron EN-JS 1049 (ASTM A395)
- DN 25-150 (1"-6"), PN 16 (DN 150 (6") = PN 10)
- Full bore with DN 25-50 (1"-2"), reduced bore with DN ≥ 65 (2 1/2")
- -60 to +180 °C (-75 to +360 °F)
- Flangeless, face-to-face: DN+50 mm (2"), e. g. DN 50 (2") = 100 mm (4")
- PFA ball with separate stem, Al<sub>2</sub>O<sub>3</sub> ceramic ball option, blowout-proof
- Self-adjusting, maintenance-free stem sealing
- Resilient seat rings, gas-tight in the seat
- Conformity with German Clean Air Act
- DIN EN 14432 Dangerous goods certified to "dangerous goods" GGVSE/ADR/RID ch. 6.8
- Stainless steel lever
- Actuator mounting to ISO 5211
- Stainless steel grounding rope

### Other options:

- Stem extension



With the formula "face-to-face = DN + 50", the KK series offers an extremely short face-to-face and a lower weight – an advantage especially for confined installation conditions. As a sandwichtype valve, it is fixed between the pipe flanges on both sides.



# KN, KNA, KNR, KA-N, KK

Components and materials, operating torques, kv/Cv-values

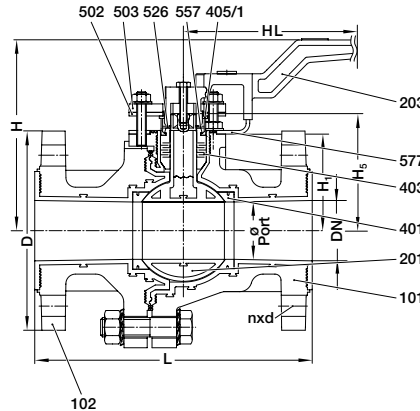
## Components and materials

Item	Designation	Material
101	Main body	Ductile cast iron EN-JS1049 (ASTM A395), PFA-lined optionally PFA-L
102	Body end piece	
109	Transition cover	Stainless steel/PTFE
200	Ball	Al <sub>2</sub> O <sub>3</sub> 99,7 %
200	Ball (only KK)	Al <sub>2</sub> O <sub>3</sub> 99,7 %, stainl. steel/PFA
201	Ball stem unit	Stainless steel, PFA-lined optionally PFA-L
202	Stem	
203	Lever*	Stainless steel
401	Seat rings	PTFE (opt. Al <sub>2</sub> O <sub>3</sub> ball: mod. PTFE)
402/1	Packing ring	PTFE
403	Packing bellows	PTFE
405/1	Thrust ring	Stainless steel
422	Base lever	Modified PTFE
502	Spring gland follower	Stainless steel
503	Packing gland follower	Stainless steel
504	Cup spring assembly	Stainless steel
510	Bracket	Stainless steel
512	Sleeve nut	Stainless steel
526	Retaining washer	Stainless steel
532	Grounding rope	Stainless steel
557	Grounding spring washer	Stainless steel
577	Lever stop	Stainless steel
804	Coupling, play-free	Stainless steel
850	Actuator	to customer request
904/4	Setscrew	Stainless steel
w/o.	Screws and nuts	Stainless steel

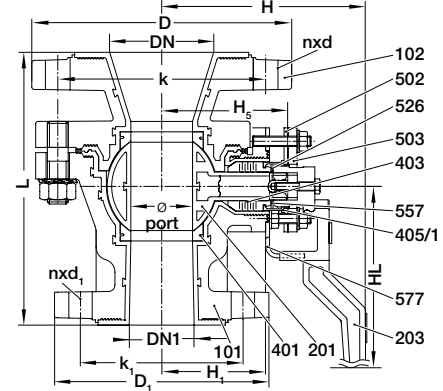
\* a worm gear is recommended for torques >= 200 Nm (1770lbs)

All torques: Test medium water 20 °C, seat rings of pure PTFE. The torques may vary depending on the medium (dry gases, crystallising media, oil contents etc.)

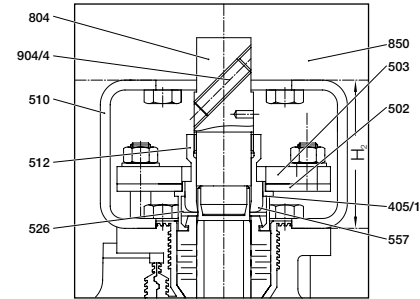
## Series KN, KNA, KNR, KNAR



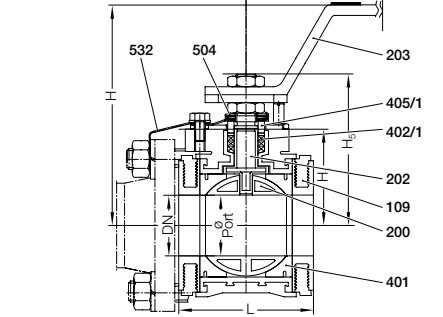
## Series KA-N



## Play-free coupling for KNR, KNAR



## Series KK



## KK: Operating torques (incl. breakaway torques) with PFA-lined or with Al<sub>2</sub>O<sub>3</sub>-ball

DN	Operating torques										k <sub>vs</sub> / Cv-values*			
	Δp 3 bar		Δp 6 bar		Δp 10 bar		Δp 16 bar		max. admissible					
	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs				
25	7	62	7	62	7	62	7	62	7	62	20	177	51	59
40	15	133	15	133	15	133	18	159	50	443	150	175	248	289
50	15	133	15	133	15	133	18	159	50	443	300	350	455	530
65	15	133	15	133	15	133	18	159	50	443	830	967	1270	1480
80	40	354	40	354	42	372	50	443	120	1062	-	-	-	-
100	60	531	60	531	64	566	80	708	250	2213	-	-	-	-
150	100	885	113	1000	180	1593	-	-	500	4425	-	-	-	-

## KN, KNA, KNR, KNAR, KA-N: Operating torques (incl. breakaway torques) with PFA-lined ball

KN, KNA, KNR, KNAR		KA-N		Operating torques										k <sub>vs</sub> / Cv-values*	
DN		DN/DN1		Δp 3 bar		Δp 6 bar		Δp 10 bar		Δp 16 bar		max. admissible			
mm	inch	mm	inch	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs		
15	1/2"	-	-	8	71	8	71	8	71	10	89	70	620	17,5	20
20	3/4"	-	-	8	71	8	71	8	71	10	89	70	620	31	36
25	1"	50/25	2'1"	12	106	12	106	12	106	12	106	70	620	75	87
40	1 1/2"	-	-	20	177	20	177	20	177	25	221	225	1990	200	233
50	2"	80/50 + 100/50	3'1/2" + 4'1/2"	25	221	25	221	25	221	30	266	225	1990	310	361
80	3"	-	-	60	531	60	531	65	575	80	708	500	4425	800	932
100	4"	150/100	6'4"	80	708	80	708	90	797	170	1505	500	4425	1250	1456
150	6"	-	-	200	1770	250	2213	350	3098	-	-	2200	19470	2800	3262
200/150	8'6"	-	-	200	1770	250	2213	350	3098	-	-	2250	19913	3200	3728
200	8"	-	-	600	5310	600	5310	700	5310	-	-	2200	19470	6000	6990

## KN, KNA, KA-N: Operating torques (incl. breakaway torques) with Al<sub>2</sub>O<sub>3</sub> ball

KN, KNA		KA-N		Schaltmomente										k <sub>vs</sub> / Cv-values*	
DN		DN/DN1		Δp 3 bar		Δp 6 bar		Δp 10 bar		Δp 16 bar		max. admissible			
mm	inch	mm	inch	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs		
15	1/2"	-	-	10	89	10	89	10	89	12	106	28	248	17,5	20
20	3/4"	-	-	10	89	10	89	10	89	12	106	28	248	31	36
25	1"	50/25	2'1"	12	106	12	106	12	106	12	106	28	248	75	87
40	1 1/2"	-	-	20	177	25	221	30	266	45	398	80	708	200	233
50	2"	80/50 + 100/50	3'1/2" + 4'1/2"	25	221	30	266	35	310	50	443	120	1062	310	361
80	3"	-	-	60	531	100	885	160	1416	220	1947	250	2215	800	932
100	4"	150/100	6'4"	80	708	130	1151	200	1770	280	2478	350	3098	1250	1456
150	6"	-	-	350	3098	450	3983	600	5310	-	-	1200	10620	2800	3262
200/150	8'6"	-	-	350	3098	450	3983	600	5310	-	-	1200	10620	3200	3728

## k<sub>vs</sub> / Cv-values\*

KN, KNA, KA-N*	
k <sub>vs</sub>	Cv
m <sup>3</sup> /h	US gpm
17,5	20
31	36
75	87
200	233
310	361
800	932
1250	1456
2800	3262
3200	3728
6000	6990

## k<sub>vs</sub> / Cv-values\*

KN, KNA, KA-N*	
k <sub>vs</sub>	Cv
m <sup>3</sup> /h	US gpm
17,5	20
31	36
75	87
200	233
310	361
800	932
1250	1456
2800	3262
3200	3728

\* for KNR and KNAR k<sub>vs</sub> / Cv-values see separate brochure



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