KLINGER Fluid Control

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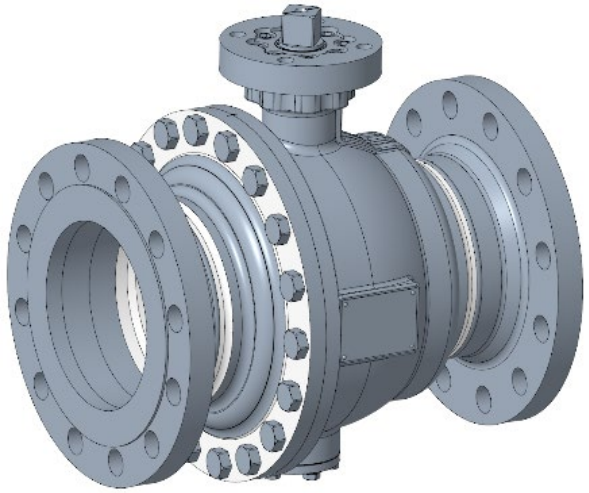
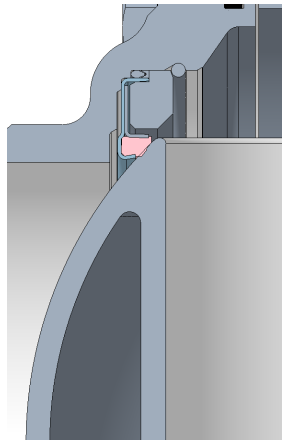
Ball valve model KHI-F, stainless steel & duplex „Basic“

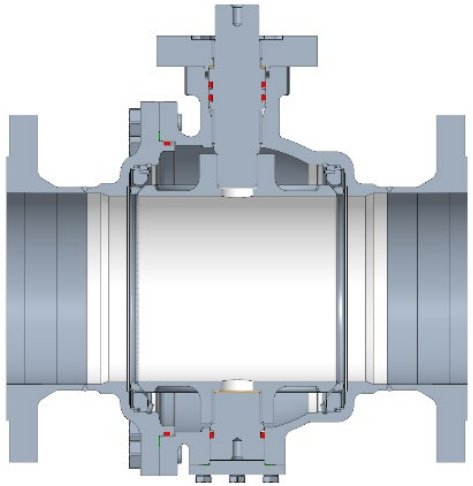
KHI-F BASIC

Agenda

- Construction
- Dimensions
- Materials
- Construction stem and O-Rings
- Construction sealing elements
- Construction trunnion
- Ball & weight improvement
- P/T diagrams
- Benefits
- ISO 5211



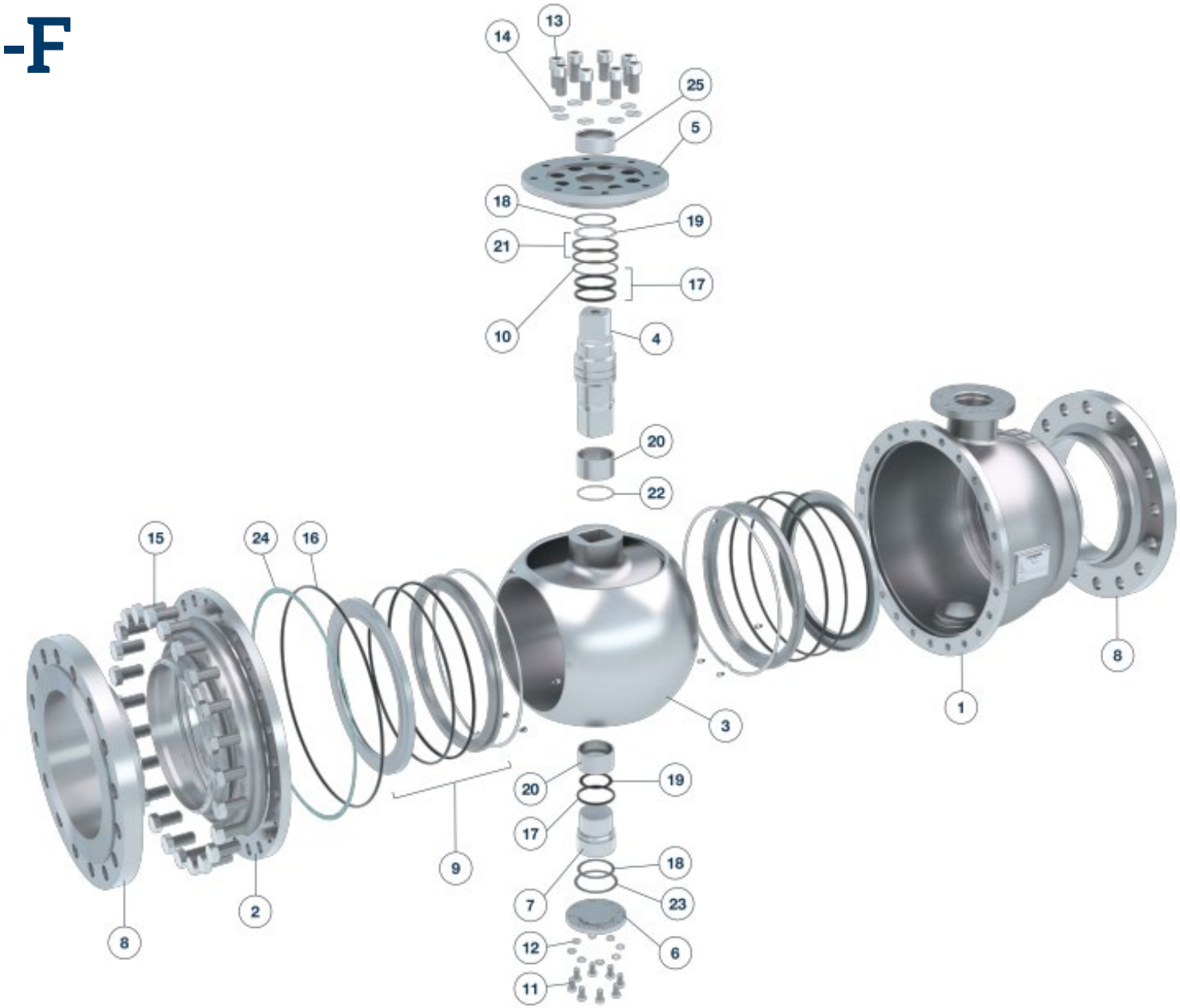


BALL VALVE KHI-F

Construction

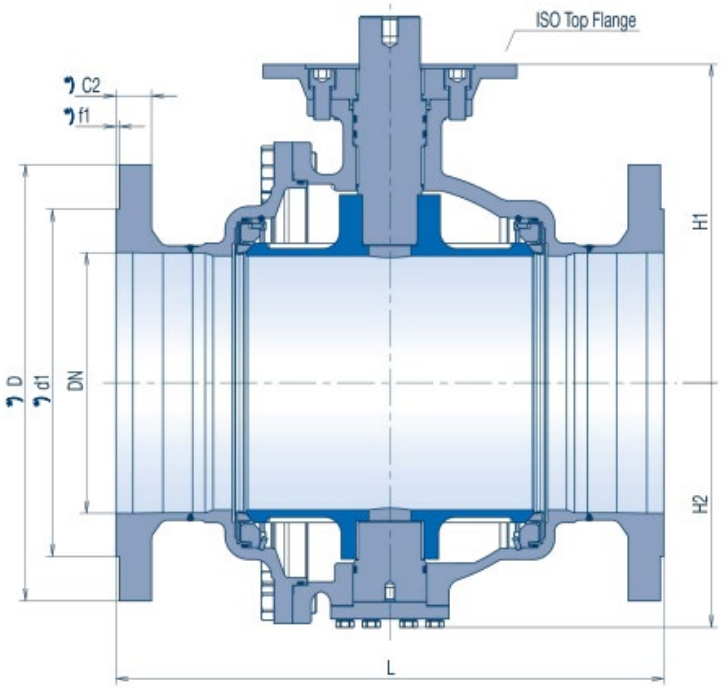
Pos	Qu	Name	M2 (Xc)	M3 (Xd)
1	1	housing	1.4581 / 316Ti	1.4470 / 318LN
2	1	cap	1.4581 / 316Ti	1.4470 / 318LN
3	1	ball	1.4581 / 316Ti	1.4470 / 318LN
4	1	shaft	1.4404 / 316L	1.4462 / 318LN
5	1	installation plate	1.4404 / 316L	1.4462 / 318LN
6	1	bearing plug	1.4404 / 316L	1.4462 / 318LN
7	1	bearing pin	1.4404 / 316L	1.4462 / 318LN
8	2	weld neck flange	1.4571 / 316Ti	1.4462 / 318LN
9	2	sealing element*	variants available	variants available
10	1	Firesafe support washer **	1.4571 / 316Ti	1.4462 / 318LN
11	6/8	hex headscrew	A4-70	A4-70
12	6/8	Wedge lock washer	1.4404 / 316L	1.4404 / 316L
13	8	cylinder screw	A4-70	A4-70
14	8	Wedge lock washer	1.4404 / 316L	1.4404 / 316L
15	16/18/20/24	hex headscrew	A4-70	A4-70
16	1	O-Ring *	variants available	variants available
17	3	O-Ring **	variants available	variants available
18	as needed	tolerance washer	1.4404 / 316L	1.4404 / 316L
19	2	friction washer **	PEEK	PEEK
20	2	bearing bush **	SS - PTFE	1.4462 - PTFE
21	2	Firesafe packing ring **	K35-C + Aramid	K35-C + Aramid
22	1	support ring **	PTFE	PTFE
23	1	flat seal **	C4430	C4430
24	1	flat seal *	C4430	C4430
25	1	bearing bush	BZ - PTFE	BZ - PTFE

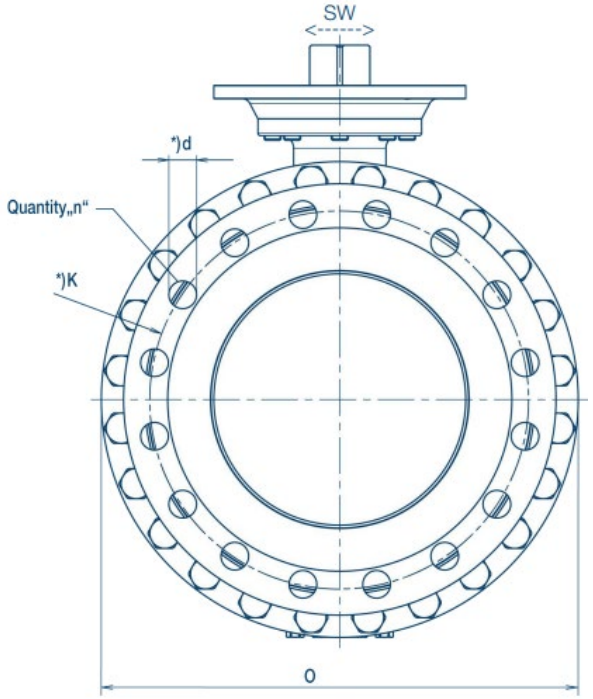
*	full spare part kit (including **)
**	shaft + bearing spare part kit



BALL VALVE KHI-F

Dimensions





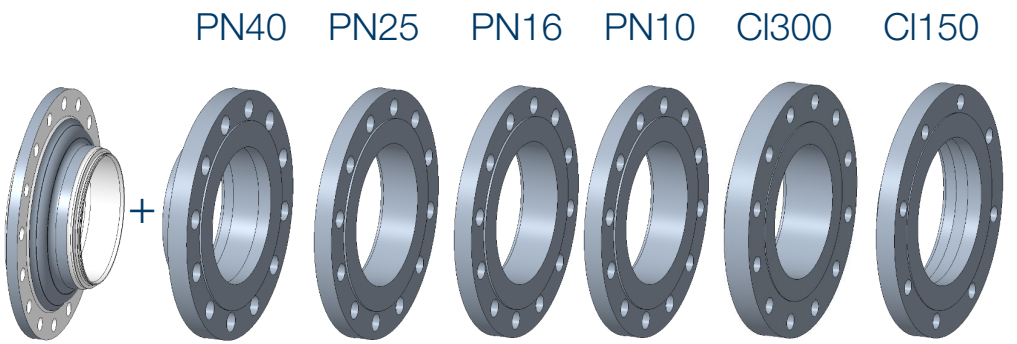
DN (ASME)	DN (mm)	L (mm) PN10-25*) CL150	L (mm) PN40**) CL300	H2 (mm)	H1 (mm)	O (mm)	Weight (kg) (PN40)	Top Flange ISO 5211 not double drilled	SW
6"	150	394	403	167	232	320	71	F14/F16	36
8"	200	457	502	209	273	398	120	F14/F16	36
10"	250	533	568	261	349	490	200	F16/F25	46
12"	300	610	648	289	376	568	288	F25/F30	55
14"	350	686	762	346	440	660	414	F25/F30	55
16"	400	762	838	359	442	700	534	F25/F30	55

acc. to EN558-1 row 12 / ANSI B16.10 Long pattern

acc. to EN558-1 row 4 / ANSI B16.10 Long pattern

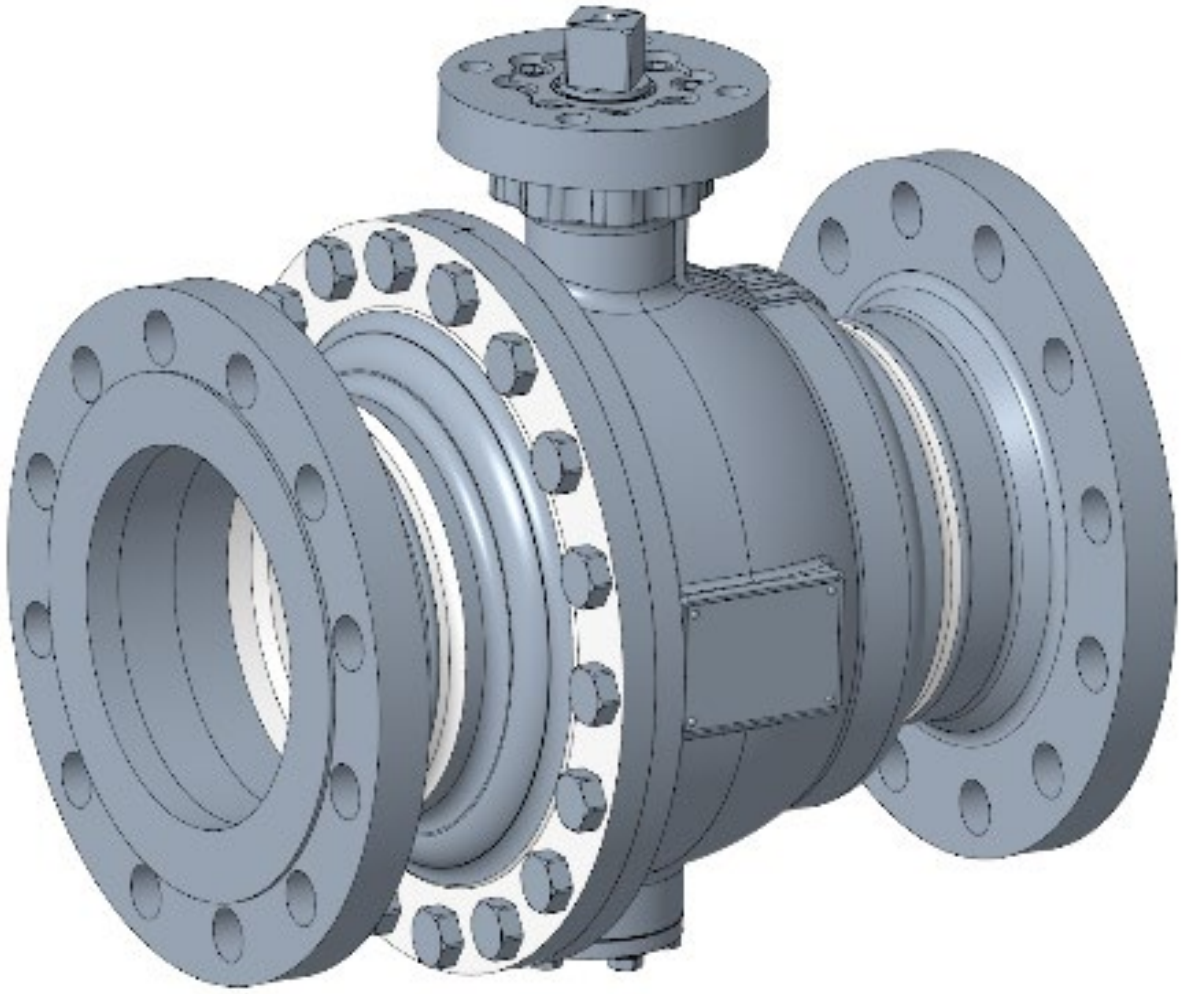
Face to face dimensions:
PN10/16/25/CL150 acc. EN558-1 row 12 / ANSI B16.10 long pattern
PN40/CL300 acc. EN558-1 row 4 / ANSI B16.10 long pattern

Connection flanges:
Acc. EN1092-1 for PN10/16/25/40
Acc. ANSI B16.5 for CL150/300



BALL VALVE KHI-F

Materials



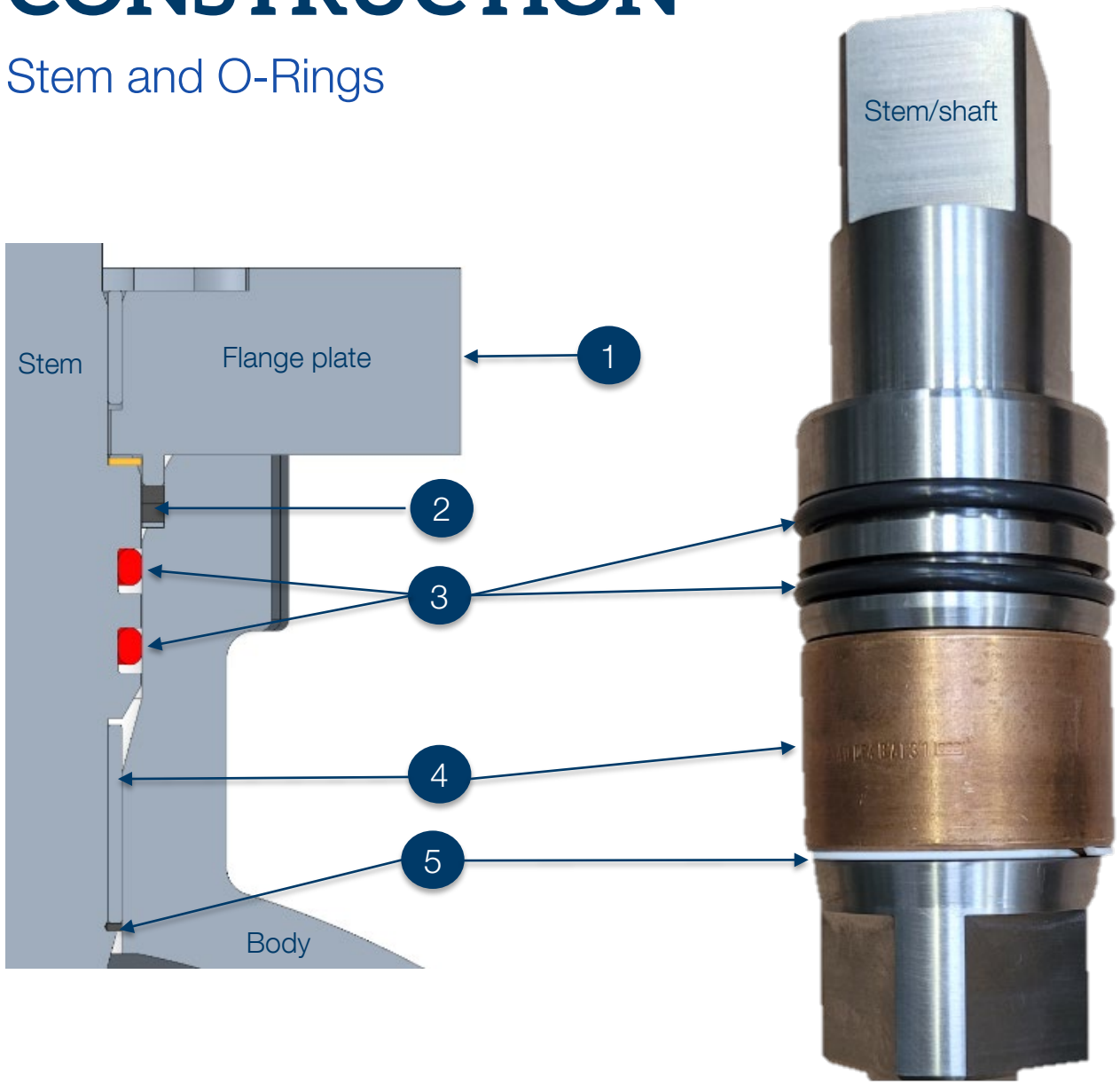
Body/ball/stem material:
Body stainless steel casting 1.4581 / 316 Ti
DN150 – 250 investment WAX casting
DN300 – 400 replicast (polystyrene foam) casting
Ball material 1.4581 /316 Ti
Stem/shaft material1.4404 / 316L
or
Body duplex casting 1.4470 / 318 LN
DN150 – 250 investment WAX casting
DN300 – 400 replicast (polystyrene foam) casting
Ball material 1.4470 / 318 LN
Stem/shaft material 1.4462

Size range DN150 to DN400 (6“ to 16“)

DN	Carbon Steel	Stainless Steel	Duplex
150	WAX casting raw	WAX casting fully machined	
200			
250			
300	Replicast fully machined	Replicast fully machined	
350			
400			
450			
500			
600			

CONSTRUCTION

Stem and O-Rings



(1) Top Flange acc. to ISO 5211: for direct connection to gearbox or bridge

(2) Graphite sealing → Fire Safe acc. ISO 10497 & API 607 in standard version

(3) Stem O-rings in different versions:

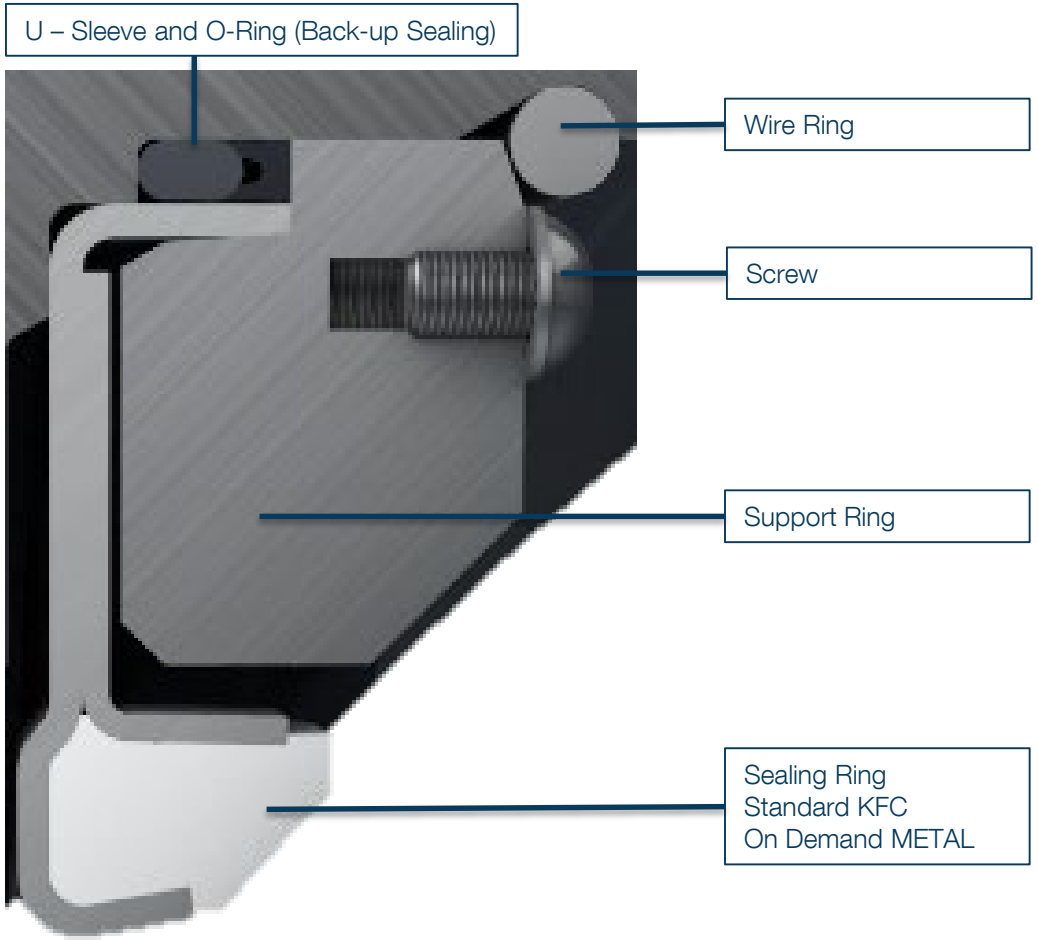
- A75H (FEPM) standard -10°C to +250°C
- V71C (FEPM) low temperature -45°C to +200°C
- C70M for ammonia -30°C to +125°C
- EN682 (FKM) gas version 0°C to +150°C

(4) One large bearing bush: Stainless steel /PTFE or 1.4462 / PTFE

(5) Back up ring KFC

CONSTRUCTION

Sealing elements

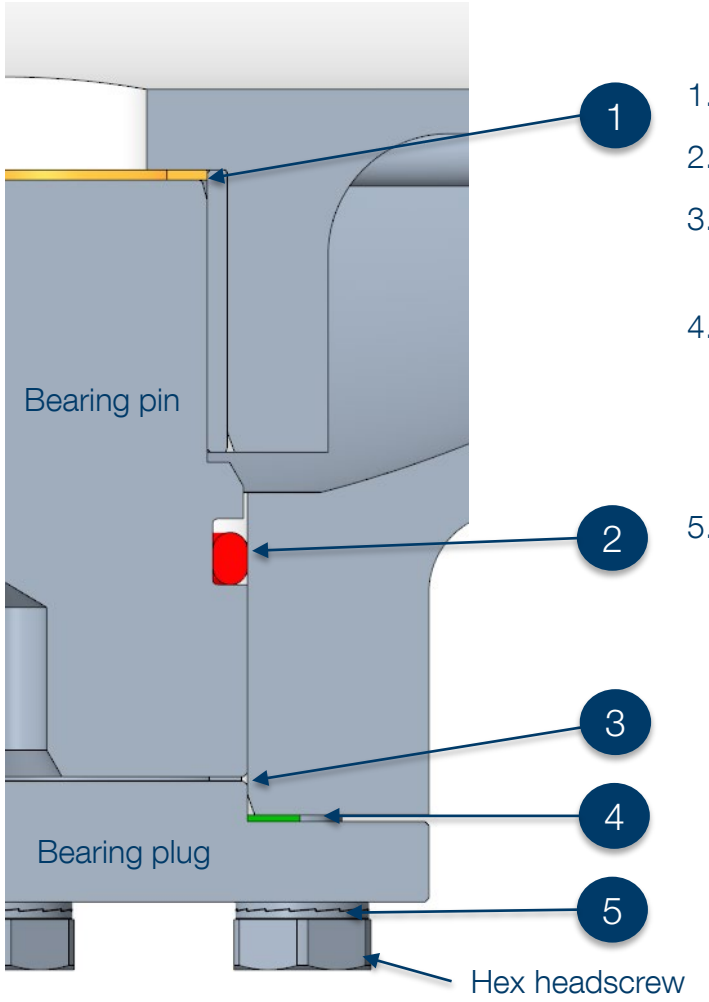


The sealing system at the ball is pre-stressed during assembly. The two pre-stressed elastic sealing elements made of stainless steel and featuring sealing rings and a back seal (consisting of a U-sleeve and an O-ring) form a system upstream and downstream of the valve together with the ball. Furthermore, a support ring protects the elastic sealing element against overloads, for example caused by water hammers. A wire ring safeguards the sealing unit.

The ball valve can be pressurized in both flow directions. The elasticity of the sealing elements allows for a compensation of thermal expansion. Thanks to this function, two primary sealed areas are constantly present in the bore.

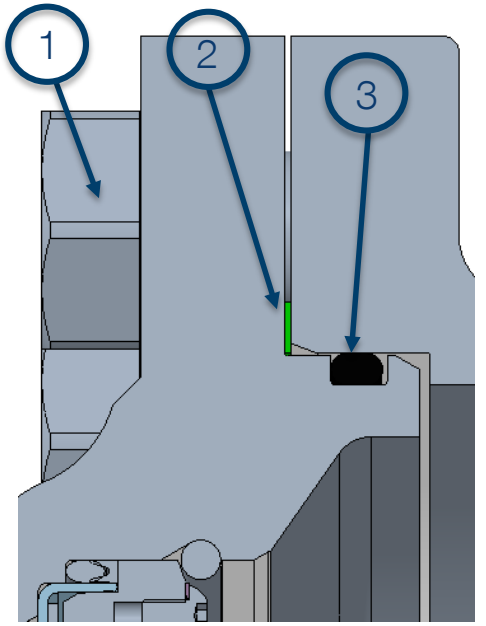
CONSTRUCTION

Trunnion



1. Friction washer PEEK
2. O-Ring for better leak proof
3. Distance washer 1.4404 / 316L
4. C4430 gasket → Fire safe acc. ISO10497 & API607 and fugitive emission ISO15848-1
5. Lock washer (Nordlock) 1.4404 /316L - no loosen because of vibration

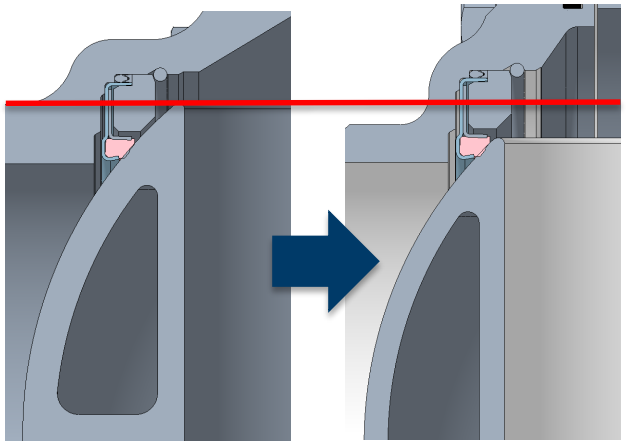
Division flange and sealing

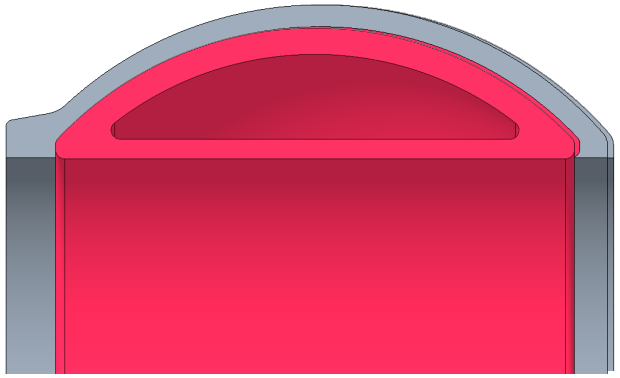


1. Screws A4-70 instead of stud & nut
2. Added C4430 sealing
   - » Firesafe acc. ISO 10497 & API 607and fugitive emission acc. ISO15848-1
3. O-Ring as radial sealing
   - » better handling & leak proofness

CONSTRUCTION

Ball and weight improvement – new casting methods





Thinner Walls on casted ball:

- Calculated with MathCad acc. to EN12516-2
- Example for wall thickness DN200 ball at pass through: reduction from 13,5mm to 8,5mm due to improvement of tolerance
- Total weight reduction ball 42%: 42,3kg => 24,5kg
- Smaller balls for some sizes (e.g. DN200) => smaller housing too
  BUT: **Identical sealing element**

Body investment Casting (Wax)

- Better tolerance class then sand casting: DCTG 12 => 9
- Less material add on, which needs to be removed during process

Body replicast (polystyrene foam instead of wax)

- Stable at bigger mould
- Even smaller tolerance class: DCTG8

Housing	PN40 old	PN40 new + flange	Reduction	PN25 old	PN25 new + flange	Reduction
DN200 Xc	88kg	61kg	-31%	56,8kg	47kg	-36%
DN400 Xc	374kg	239kg	-36%	n.a.	182kg	-51%

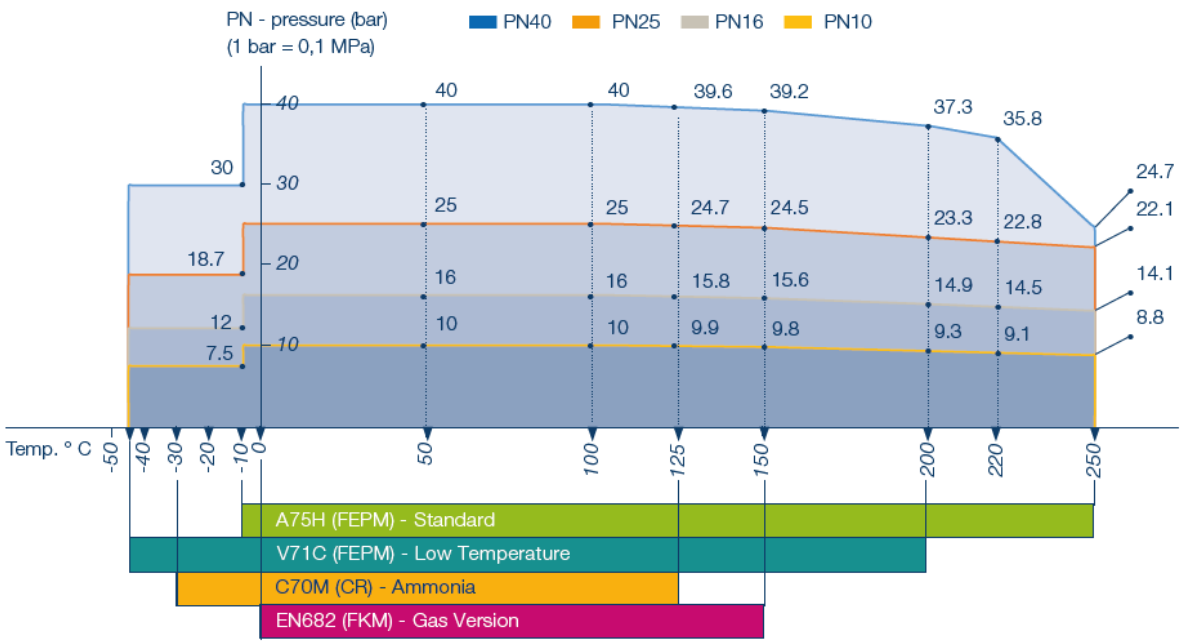
DN	Carbon Steel	Stainless Steel	Duplex
150	WAX casting raw	WAX casting fully machined	
200			
250			
300	Replicast fully machined	Replicast fully machined	
350			
400			
450			
500			
600			

P/T DIAGRAM

Stainless Steel

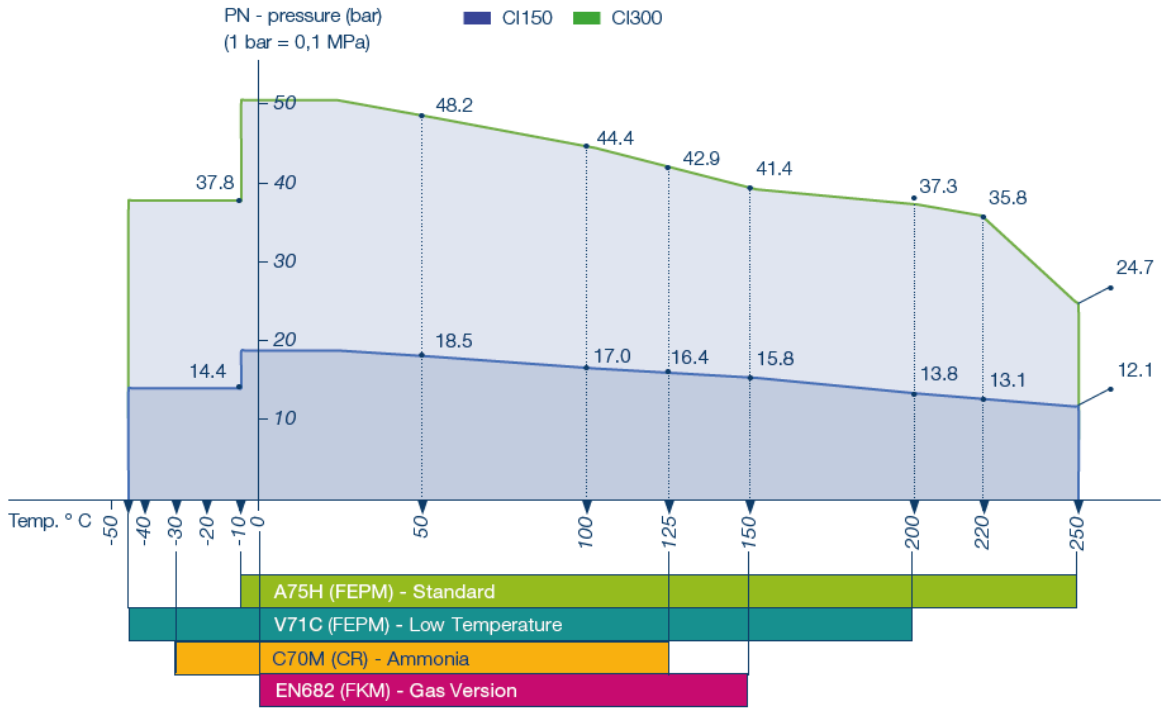
Stainless steel

Material index M2 (Xc)



Stainless Steel ANSI

Material index M2 (Xc)

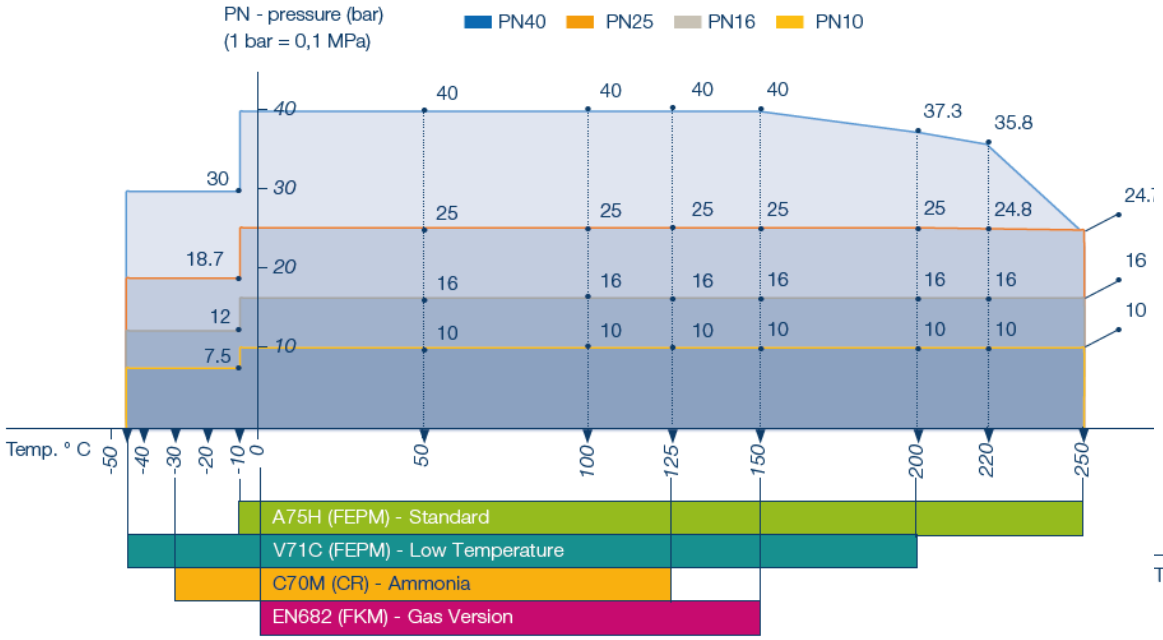


P/T DIAGRAM

Duplex

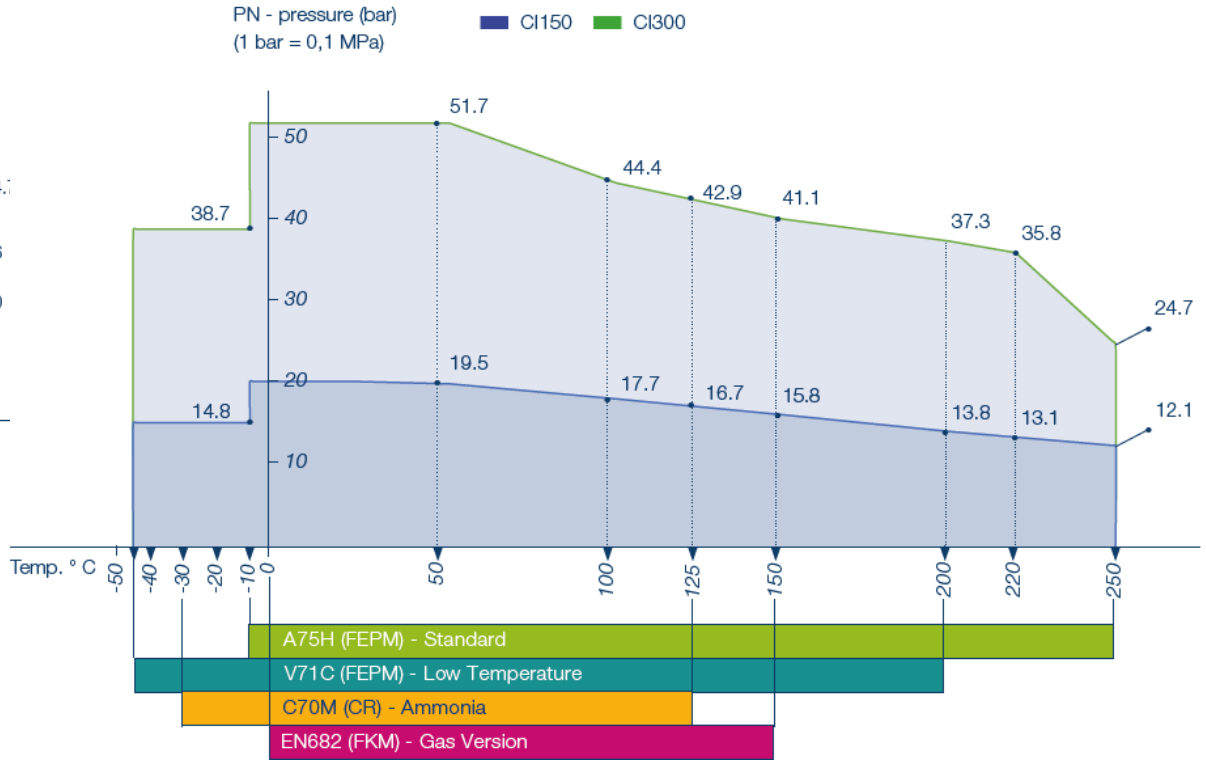
Duplex

Material index M3 (Xd)



Duplex ANSI

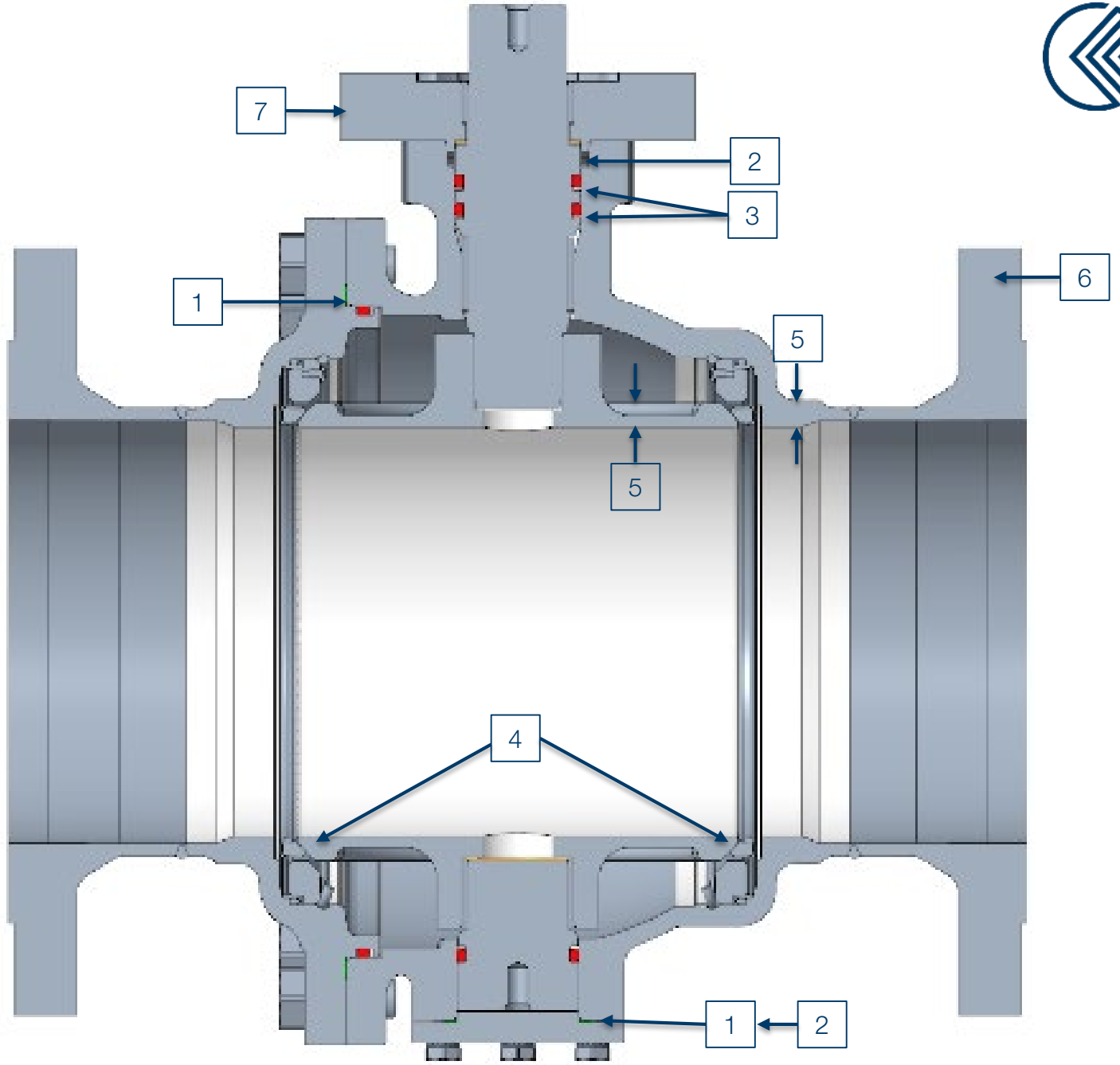
Material index M3 (Xd)



CONSTRUCTION

Benefits

- (1) Fugitive emissions acc. to ISO 15848-1 due to added C4430 gasket on trunnion and division flange (optimized trunnion and division flange construction)
- (2) Fire safe acc. ISO10497 & API607 in standard version due to added graphite sealing on stem and C4430 gasket on trunnion
- (3) Max. temperature: +250°C due to optimized O-Ring construction on stem
- (4) EN12266-1 (ISO5208) P12 leakage rate A for soft seated, leakage rate IV-S1 acc. to EN 60534-4 for metal seat due to reliable sealing system
- (5) Weight optimized ball and body casting (investment, replicast)
- Body material stainless steel 1.4581 or duplex 1.4470
- (6) Larger flange diversity
- (7) Top Flange acc. to ISO 5211: for direct connection to gearbox or bridge
- PED 2014/68/EU (pressure equipment directive)
- Double Block & Bleed acc. ISO 5208 and ISO 14313
- SIL Level: SIL 2 (reliability)
- BAM Oxygen (material test for oxygen)



TOP FLANGE

ISO 5211

Size	PN	Square	Feather key	ISO5211 soft seat	ISO5211 metal seat
DN150	10/16/25/CL150	SW36	48	F14	F14
DN200		SW36	48	F14	F14
DN250		SW46	60	F16	F16
DN300		SW55	72	F25	F25
DN350		SW55	72	F25	F30
DN400		SW55	72	F25	F30

Size	PN	Square	Feather key	ISO5211 soft seat	ISO5211 metal seat
DN150	40/CL300	SW36	48	F14	F14
DN200		SW36	48	F14	F16
DN250		SW46	60	F16	25
DN300		SW55	72	F25	F25
DN350		SW55	72	F25	F30
DN400		SW55	72	F25	F30

THANKS FOR YOUR ATTENTION!

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