



TECHNICAL DATASHEET

ASME DESIGN

KROMBACH® TUFSEAT™ Performance Series Ball Valves

TUFSEAT by KROMBACH - THE SUPERIOR MSBV

CRANE[®]

v in www.cranecpe.com

KROMBACH[®] TUFSEAT[™] Performance Series

Features and Benefits

KROMBACH[®] TUFSEAT[™] PERFORMANCE SERIES

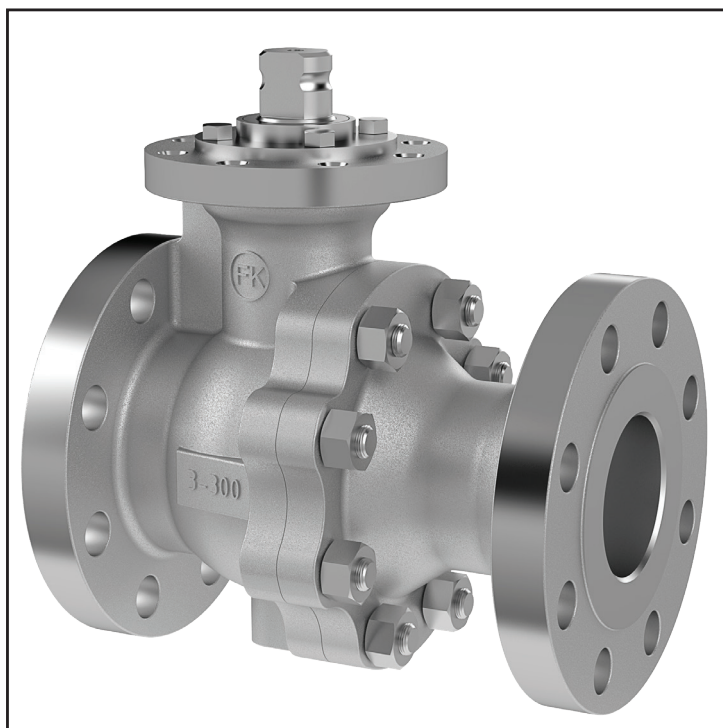
The KROMBACH[®] TUFSEAT[™] Ball Valve Performance Series combines critical safety and performance features required for demanding service applications in chemical and refining markets.

STANDARD DESIGN

- Class V seat leak performance
- Up to 500F / 260°C
- Up to 10% Solids
- Hard Chrome or Nickel Alloy coatings on ball and seats
- Design acc. to ASME B16.34
- Floating Ball: KFO 1176 (1/2" to 6" / 150# and 300#)
- Trunnion: KFO 9176 (8" to 12" / 150# and 300#)

HIGH TEMPERATURE TRIM DESIGN

- Class VI seat leak performance
- Up to 800F / 427°C
- Up to 20% Solids
- Nickel Alloy, Chrome and Tungsten Carbide coatings on ball and seats available
- Floating Ball: KFO1156 (1/2" to 6" / 150# and 300#)
- Trunnion: KFO 9156 (8" to 12" / 150# and 300#)



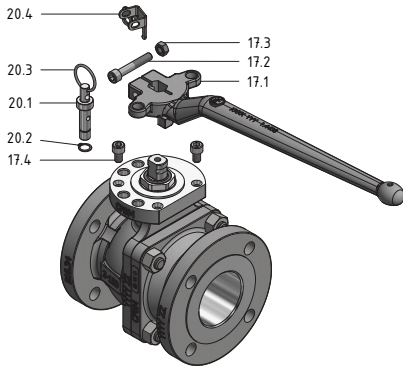
Product Range

Size	Class	Body Design	Face-to-Face Dimension	Body Material
1/2"-12" DN 15-300	Class 150-300	2-piece design Flanged Floating Ball and Trunnion Design	ASME B16.10 Long Pattern EN 558-1 Series 12 & 4	WCB / 1.0619 CF8M / 1.4408

KROMBACH® TUFSEAT™ Performance Series

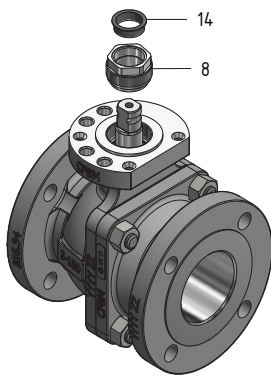
Floating Ball Design

Lever Design



Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
17.1	1	Hand lever	A351 CF8M	1.4408	A351 CF8M	1.4408
17.2	1	Hex socket head cap screw	316SS	A4-70	316SS	A4-70
17.3	1	Hex nut	316SS	A4	316SS	A4
17.4	2	Hex socket head cap screw	316SS	A4-70	316SS	A4-70
20.1	1	Locking pin	AISI 316	1.4401	AISI 316	1.4401
20.2	1	Retaining ring	-	1.4122	-	1.4122
20.3	1	Ring	AISI 301	1.431	AISI 301	1.4310
20.4	1	Locking plate	316 Ti	1.4571	316 Ti	1.4571

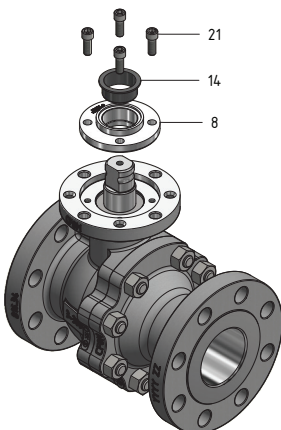
Press Nut Design



Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
8	1	Press nut	F51, A479 UNS S31803	1.4462	F51, A479 UNS S31803	1.4462
14	1	Guide bushing	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled

Sizes 1/2"-150# to 3"-150# and 1/2"-300# to 2"-300#.

Packing Gland Design



Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
8	1	Packing gland	A479 316Ti; 316SS	1.4571; 1.4401	A479 316Ti; 316SS	1.4571; 1.4401
14	1	Guide bushing	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled
21	4	Hex socket head cap screw	A193 B8M Class 2	A4-70	A193 B8M Class 2	A4-70

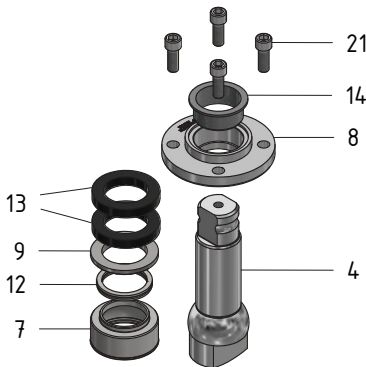
Sizes 4"-150# to 6"-150# and 3-300# to 6"-300#

KROMBACH® TUFSEAT™ Performance Series

Floating Ball Design Standard Trim

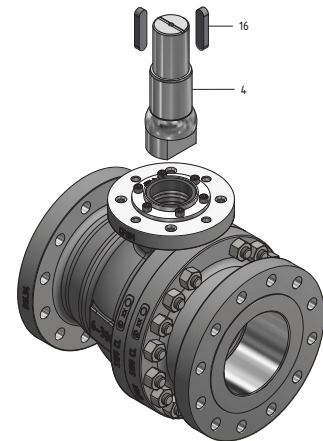
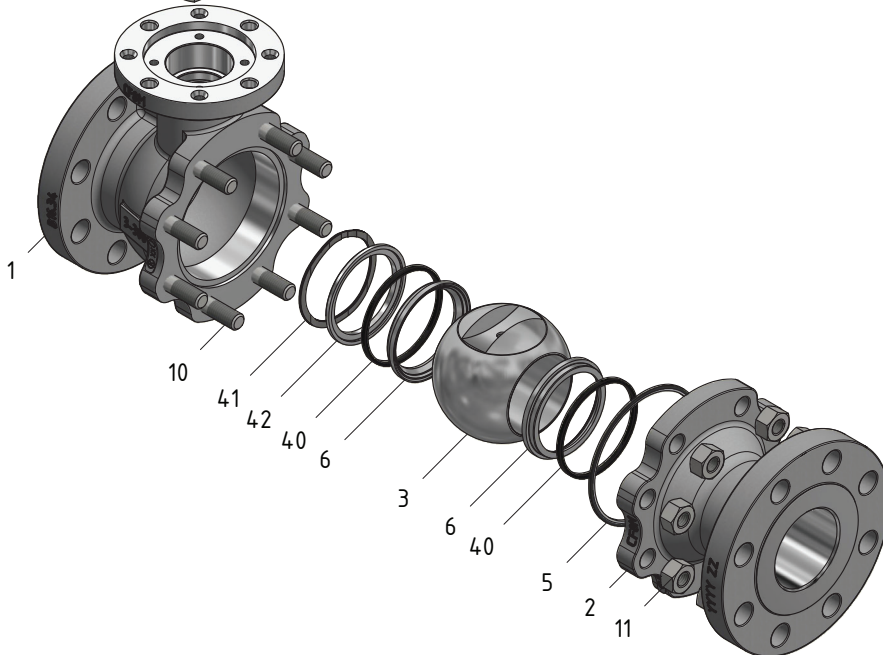
Floating Ball Design

Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
1	1	Body	A216 WCB	1.0619	A351 CF8M	1.4408
2	1	Tail	A216 WCB	1.0619	A351 CF8M	1.4408
3	1	Ball	A182 F316L+coating	1.4404+coating	A182 F316L+coating	1.4404+coating
4	1	Stem	F51, A479 UNS S31803	1.4462	F51, A479 UNS S31803	1.4462
5	1	Body gasket	PTFE/Graphite/316SS	PTFE/Graphite/1.4571	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571
6	2	Seat	A182 F316L +coating	1.4404+coating	A182 F316L +coating	1.4404+coating
7	1	SX Stem seal	TFM	TFM	TFM	TFM
8	1	Packing gland	A479 316Ti; 316SS	1.4571; 1.4401	A479 316Ti; 316SS	1.4571; 1.4401
9	1	Support Ring	A479 316Ti; 316SS	1.4571; 1.4401	A479 316Ti; 316	1.4571; 1.4401
10	4	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
11	4	Heavy hex nut	A194 Gr.2H	A4-70	A194 Gr.8M	A4-70
12	1	Spring energized lip seal	PTFE - Carbon+Graphite filled / AISI 301	PTFE - Carbon+Graphite filled/ 1.4310	PTFE - Carbon+Graphite filled / AISI 301	PTFE - Carbon+Graphite filled / AISI 301
13	1	Packing set	Graphite	Graphite	Graphite	Graphite
14	1	Guide bushing	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled
21	4	Hex socket head cap screw	A193 B8M Class 2	A4-70	A193 B8M Class 2	A4-70
40	2	Seal ring	Graphite	Graphite	Graphite	Graphite
41	1	Wave spring	17-7 PH	1.4568	17-7 PH	1.4568
42	1	S-Ring	F51, A276 UNS S31803, A276 316L, A276 316 Ti	1.4462; 1.4404; 1.4571	F51, A276 UNS S31803, A276 316L, A276 316 Ti	1.4462; 1.4404; 1.4571



Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
16	2	Parallel key	316SS/316Ti	A4/1.4571	316ss/316Ti	A4/1.4571

6" class 300 floating ball design with key connection item 16

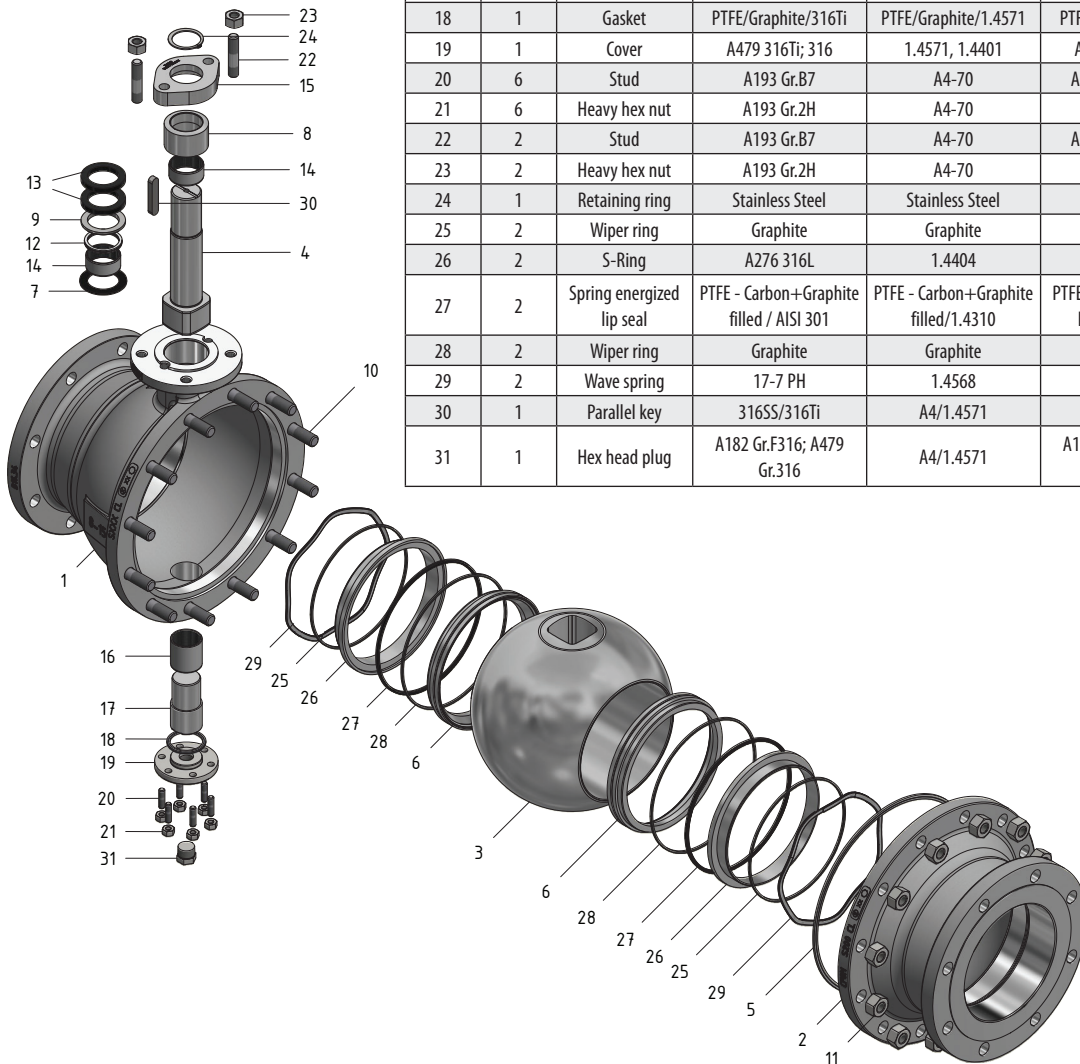


KROMBACH® TUFSEAT™ Performance Series

Trunnion Design Standard Trim

Trunnion Design

Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
1	1	Body	A216 WCB	1.0619	A351 CF8M	1.4408
2	1	Tail	A216 WCB	1.0619	A351 CF8M	1.4408
3	1	Ball	A351 CF8M+ coating; A182 F316L+ coating	1.4408 +coating; 1.4404 +coating	A351 CF8M+ coating; A182 F316L+ coating	1.4408+ coating, 1.4404+ coating
4	1	Stem	F51, A479 UNS S31803	1.4462	F51, A479 UNS S31803	1.4462
5	1	Body gasket	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571
6	2	Seat	A182 F316L+ coating	1.4404+ coating	A182 F316L +coating	1.4404 +coating
7	1	Stem seal	PTFE-Carbon filled	PTFE-Carbon filled	PTFE-Carbon filled	PTFE-Carbon filled
8	1	Gland	A582 303	1.4305	A582 303	1.4305
9	1	Support Ring	A479 316Ti; 316	1.4571, 1.4401	A479 316Ti; 316	1.4571, 1.4401
10	12	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
11	12	Heavy hex nut	A193 Gr.ZH	A4-70	A194 Gr.8M	A4-70
12	1	Spring energized lip seal	PTFE - Carbon+Graphite filled / AISI 301	"PTFE - Carbon+Graphite filled/1.4310"	PTFE Carbon+Graphite Filled/ AISI 301	PTFE - Carbon+Graphite filled/1.4310
13	1	Packing set	Graphite	Graphite	Graphite	Graphite
14	2	Sleeve bearing	316L+ coating	1.4404+ coating	316L+ coating	1.4404+ coating
15	1	Gland flange	A240 316Ti; 316	1.4571, 1.4401	A240 316Ti; 316	1.4571, 1.4401
16	1	Sleeve bearing	316L+ coating	1.4404+ coating	316L+ coating	1.4404+ coating
17	1	Bottom stem	A479 316Ti; 316	1.4571, 1.4401	A479 316Ti; 316	1.4571, 1.4401
18	1	Gasket	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571
19	1	Cover	A479 316Ti; 316	1.4571, 1.4401	A479 316Ti; 316	1.4571, 1.4401
20	6	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
21	6	Heavy hex nut	A193 Gr.ZH	A4-70	A194 Gr.8M	A4-70
22	2	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
23	2	Heavy hex nut	A193 Gr.ZH	A4-70	A194 Gr.8M	A4-70
24	1	Retaining ring	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
25	2	Wiper ring	Graphite	Graphite	Graphite	Graphite
26	2	S-Ring	A276 316L	1.4404	A276 316L	1.4404
27	2	Spring energized lip seal	PTFE - Carbon+Graphite filled / AISI 301	PTFE - Carbon+Graphite filled/1.4310	PTFE Carbon+Graphite Filled/ AISI 301	PTFE - Carbon+Graphite filled/1.4310
28	2	Wiper ring	Graphite	Graphite	Graphite	Graphite
29	2	Wave spring	17-7 PH	1.4568	17-7 PH	1.4568
30	1	Parallel key	316SS/316Ti	A4/1.4571	316ss/316Ti	A4/1.4571
31	1	Hex head plug	A182 Gr.F316; A479 Gr.316	A4/1.4571	A182 Gr.F316; A479 Gr.316	A4/1.4571

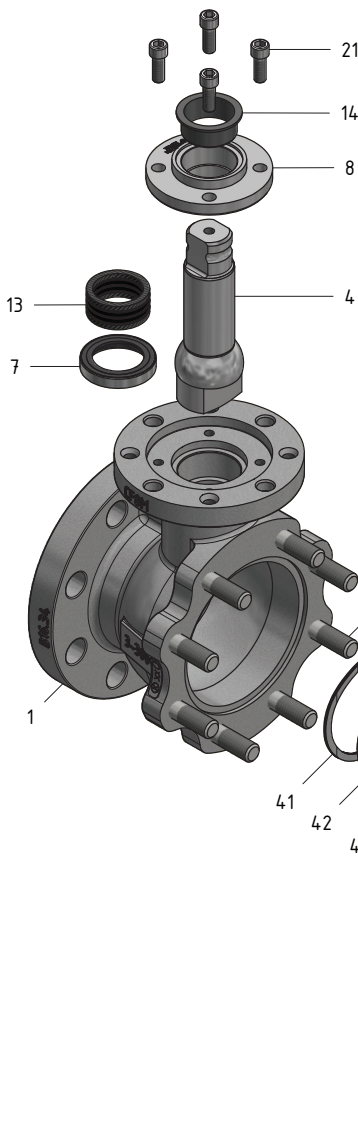


KROMBACH® TUFSEAT™ Performance Series

Floating ball Design High Temperature Trim

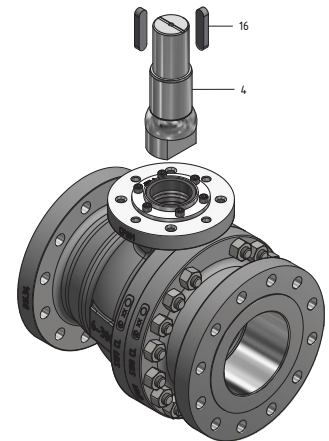
Floating Ball Design

Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
1	1	Body	A216 WCB	1.0619	A351 CF8M	1.4408
2	1	Tail	A216 WCB	1.0619	A351 CF8M	1.4408
3	1	Ball	A182 F316L+coating	1.4404+coating	A182 F316L+coating	1.4404+coating
4	1	Stem	F51, A479 UNS S31803	1.4462	F51, A479 UNS S31803	1.4462
5	1	Body gasket	PTFE/Graphite/316SS	PTFE/Graphite/1.4571	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571
6	2	Seat	A182 F316L +coating	1.4404+coating	A182 F316L +coating	1.4404+coating
7	1	SX Stem seal	TFM	TFM	TFM	TFM
8	1	Packing gland	A479 316Ti; 316SS	1.4571; 1.4401	A479 316Ti; 316SS	1.4571; 1.4401
10	4	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
11	4	Heavy hex nut	A194 Gr.2H	A4-70	A194 Gr.8M	A4-70
13	1	Packing set	Graphite	Graphite	Graphite	Graphite
14	1	Guide bushing	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled
21	4	Hex socket head cap screw	A193 B8M Class 2	A4-70	A193 B8M Class 2	A4-70
40	2	Seal ring	Graphite	Graphite	Graphite	Graphite
41	1	Wave spring	A286	1.498	A286	1.498
42	1	S-Ring	F51, A276 UNS S31803, A276 316L, A276 316 Ti	1.4462; 1.4404; 1.4571	F51, A276 UNS S31803, A276 316L, A276 316 Ti	1.4462; 1.4404; 1.4571



Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
16	2	Parallel key	316SS/316Ti	A4/1.4571	316ss/316Ti	A4/1.4571

6" class 300 floating ball design with key connection item 16

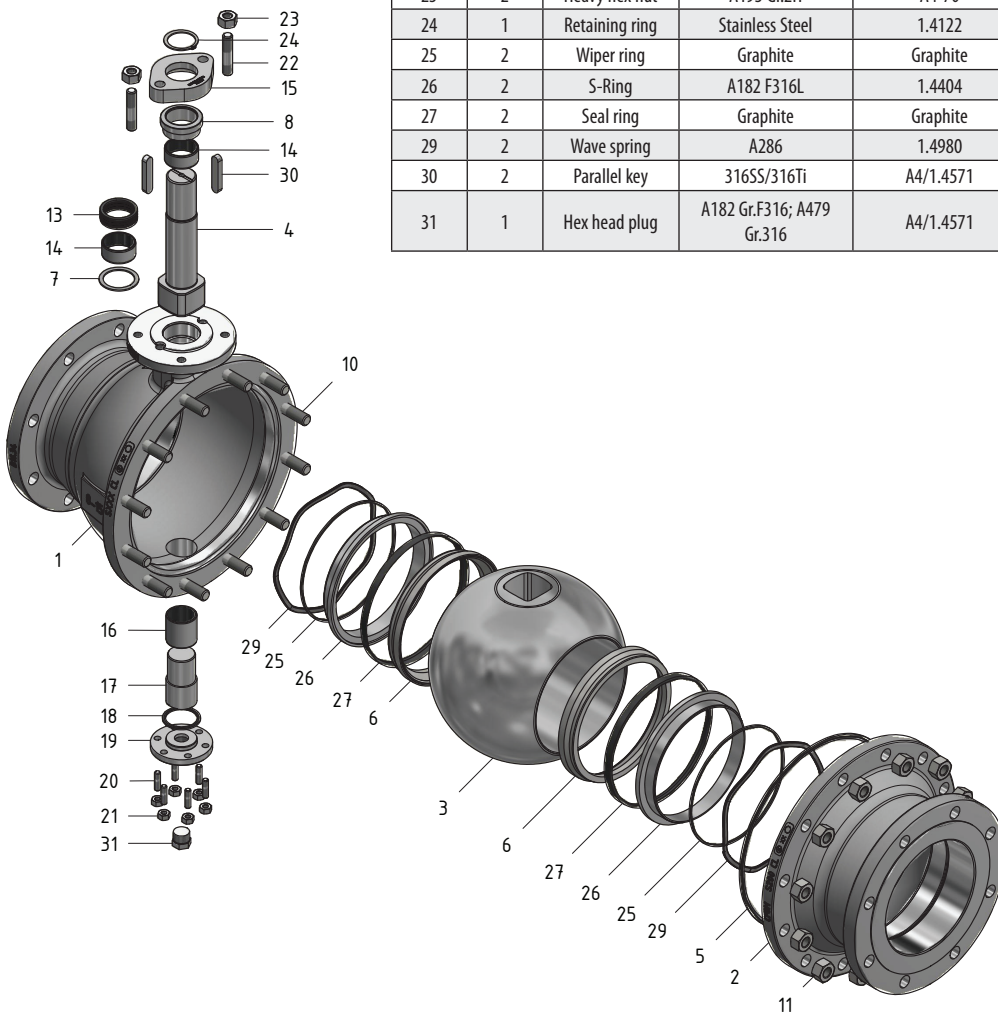


KROMBACH® TUFSEAT™ Performance Series

Trunnion Design High Temperature Trim

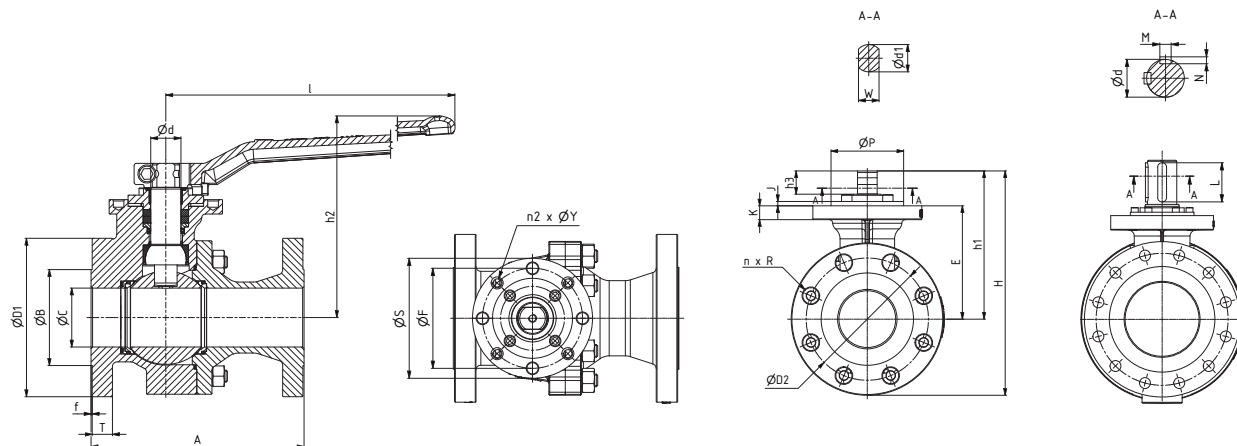
Trunnion Design

Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
1	1	Body	A216 WCB	1.0619	A351 CF8M	1.4408
2	1	Tail	A216 WCB	1.0619	A351 CF8M	1.4408
3	1	Ball	A182 F316L+ coating	1.4404 +coating	A182 F316L+ coating	1.4404+ coating
4	1	Stem	A276 Gr.431	1.4057	A276 Gr.431	1.4057
5	1	Body gasket	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571
6	2	Seat	A182 F316L+ coating	1.4404+ coating	A182 F316L +coating	1.4404 +coating
7	1	Thrust washer	Inconel 625+ coating	Inconel 625+ coating	Inconel 625+ coating	Inconel 625+ coating
8	1	Gland	A582 303	1.4305	A582 303	1.4305
10	12	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
11	12	Heavy hex nut	A193 Gr.2H	A4-70	A194 Gr.8M	A4-70
13	1	Packing set	Graphite	Graphite	Graphite	Graphite
14	2	Sleeve bearing	Inconel 625+ coating		Inconel 625+ coating	
15	1	Gland flange	A240 316Ti; 316	1.4571, 1.4401	A240 316Ti; 316	1.4571, 1.4401
16	1	Sleeve bearing	Inconel 625+ coating	Inconel 625+ coating	Inconel 625+ coating	Inconel 625+ coating
17	1	Bottom stem	A479 316Ti; 316	1.4571, 1.4401	A479 316Ti; 316	1.4571, 1.4401
18	1	Sealing	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571	PTFE/Graphite/316Ti	PTFE/Graphite/1.4571
19	1	Cover	A479 316Ti; 316	1.4571, 1.4401	A479 316Ti; 316	1.4571, 1.4401
20	6	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
21	6	Heavy hex nut	A193 Gr.2H	A4-70	A194 Gr.8M	A4-70
22	2	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
23	2	Heavy hex nut	A193 Gr.2H	A4-70	A194 Gr.8M	A4-70
24	1	Retaining ring	Stainless Steel	1.4122	Stainless Steel	1.4122
25	2	Wiper ring	Graphite	Graphite	Graphite	Graphite
26	2	S-Ring	A182 F316L	1.4404	A182 F316L	1.4404
27	2	Seal ring	Graphite	Graphite	Graphite	Graphite
29	2	Wave spring	A286	1.4980	A286	1.4980
30	2	Parallel key	316SS/316Ti	A4/1.4571	316ss/316Ti	A4/1.4571
31	1	Hex head plug	A182 Gr.F316; A479 Gr.316	A4/1.4571	A182 Gr.F316; A479 Gr.316	A4/1.4571



KROMBACH® TUFSEAT™ Performance Series Floating Ball Design

Dimensions and Weights Class 150



Dimensions D1, L, h2, S, E, h1 and H are for reference only.

DN	NPS	Dimensions (inch)														Weights (lb)
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	h2	I	
15	1/2"	4.252	0.512	5.6	2.7	1.9	3.5	2.382	4	0.622	1.378	0.382	0.063	3.858	7.165	5.1
20	3/4"	4.606	0.748	6.0	2.9	2.1	3.9	2.752	4	0.622	1.693	0.437	0.063	4.016	7.165	6.4
25	1"	5.000	0.984	6.3	3.1	2.3	4.3	3.118	4	0.622	2.000	0.500	0.063	4.213	7.165	7.7
40	1 1/2"	6.496	1.496	8.4	4.4	3.2	5.0	3.882	4	0.622	2.882	0.626	0.063	5.906	11.024	17.3
50	2"	7.008	1.929	9.2	4.6	3.5	6.0	4.752	4	0.748	3.622	0.689	0.063	6.220	11.024	23.3
80	3"	7.992	3.071	12.5	6.5	5.0	7.5	5.984	4	0.748	5.000	0.878	0.063	8.740	17.638	49.7
100	4"	9.016	3.937	15.4	8.5	6.6	9.0	7.500	8	0.748	6.189	0.878	0.063	10.945	28.346	83.0
150	6"	15.512	5.945	17.0	10.4	8.3	11.0	9.500	8	0.875	8.500	0.937	0.063	-	-	213.5

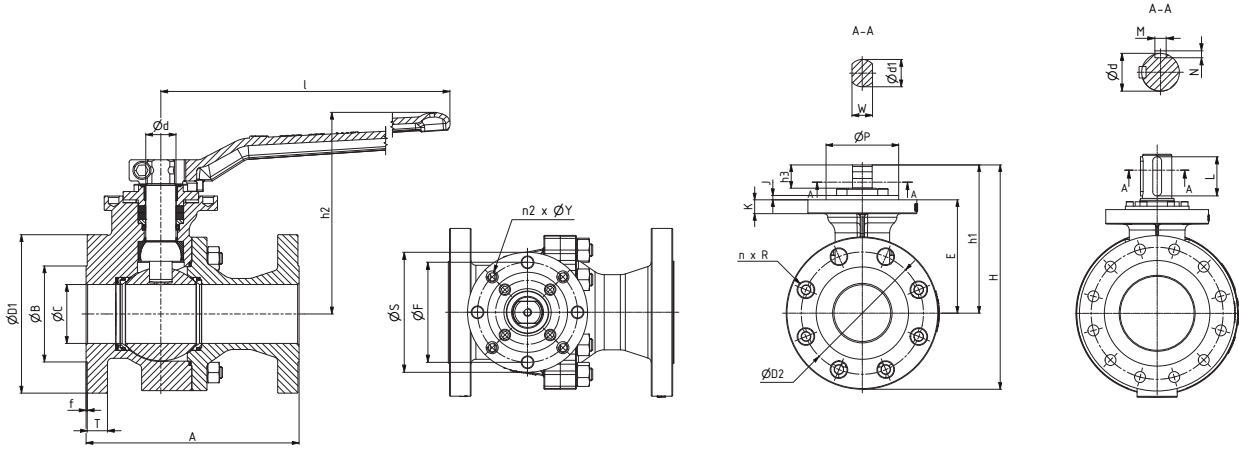
DN	NPS	Dimensions (inch)														
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N	h3	W	Ød1
15	1/2"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	0.433	0.551
20	3/4"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	0.433	0.551
25	1"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	0.433	0.551
40	1 1/2"	F07	3.543	2.165	2.756	4	M8	0.354	0.118	0.787	-	-	-	0.709	0.551	0.709
50	2"	F07	3.543	2.165	2.756	4	M8	0.394	0.118	0.787	-	-	-	0.709	0.551	0.709
80	3"	F10	4.921	2.756	4.016	4	M10	0.846	0.118	1.102	-	-	-	0.945	0.748	0.984
100	4"	F12	5.906	3.937	4.921	4	M12	0.709	0.236	1.575	-	-	-	1.260	1.063	1.417
150	6"	F14	6.890	3.937	5.512	4	M16	0.866	0.236	1.969	-	-	-	1.417	1.417	1.890

DN	NPS	Dimensions (mm)														Weights (kg)
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	h2	I	
15	1/2"	108	13	143	69	48	89	61	4	15.8	35.0	10	1.6	98	182	2.3
20	3/4"	117	19	151	73	53	99	70	4	15.8	43.0	11	1.6	102	182	2.9
25	1"	127	25	161	78	58	108	79	4	15.8	50.8	13	1.6	107	182	3.5
40	1 1/2"	165	38	214	111	82	127	99	4	15.8	73.2	16	1.6	150	280	7.8
50	2"	178	49	234	118	90	152	121	4	19.0	92.0	18	1.6	158	280	10.6
80	3"	203	78	317	165	127	191	152	4	19.0	127.0	22	1.6	222	448	22.6
100	4"	229	100	392	215	167	229	191	8	19.0	157.2	22	1.6	278	720	37.6
150	6"	394	151	433	264	212	279	241	8	22.2	215.9	24	1.6	-	-	96.9

DN	NPS	Dimensions (mm)														
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N	h3	W	Ød1
15	1/2"	F05	65	35	50	4	M6	9	2	16	-	-	-	12	11	14
20	3/4"	F05	65	35	50	4	M6	9	2	16	-	-	-	12	11	14
25	1"	F05	65	35	50	4	M6	9	2	16	-	-	-	12	11	14
40	1 1/2"	F07	90	55	70	4	M8	9	3	20	-	-	-	18	14	18
50	2"	F07	90	55	70	4	M8	10	3	20	-	-	-	18	14	18
80	3"	F10	125	70	102	4	M10	22	3	28	-	-	-	24	19	25
100	4"	F12	150	100	125	4	M12	18	6	40	-	-	-	32	27	36
150	6"	F14	175	100	140	4	M16	22	6	50	-	-	-	36	36	48

KROMBACH® TUFSEAT™ Performance Series Floating Ball Design

Dimensions and Weights Class 300



Dimensions D1, L, h2, S, E, h1 and H are for reference only.

DN	NPS	Dimensions (inch)														Weights (lb)
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	h2	l	
15	1/2"	5.512	0.512	5.7	2.7	1.9	3.7	2.618	4	0.622	1.378	0.500	0.063	3.858	7.165	7.1
20	3/4"	5.984	0.748	6.3	2.9	2.1	4.6	3.252	4	0.748	1.693	0.555	0.063	4.016	7.165	9.9
25	1"	6.496	0.984	6.7	3.1	2.3	4.9	3.500	4	0.748	2.000	0.622	0.063	4.213	7.165	11.2
40	1 1/2"	7.480	1.496	9.0	4.4	3.2	6.1	4.500	4	0.874	2.882	0.752	0.063	5.906	11.024	24.3
50	2"	8.504	1.929	11.3	5.8	4.3	6.5	5.000	8	0.748	3.622	0.815	0.063	8.071	17.638	35.1
80	3"	11.102	3.071	14.6	8.0	6.1	8.3	6.622	8	0.874	5.000	1.055	0.063	10.433	28.346	76.1
100	4"	12.008	3.937	13.8	8.8	6.7	10.0	7.882	8	0.874	6.189	1.189	0.063	-	-	124
150	6"	15.866	5.945	19.5	12.8	8.3	12.5	10.618	12	0.875	8.500	1.378	0.063	-	-	301.2

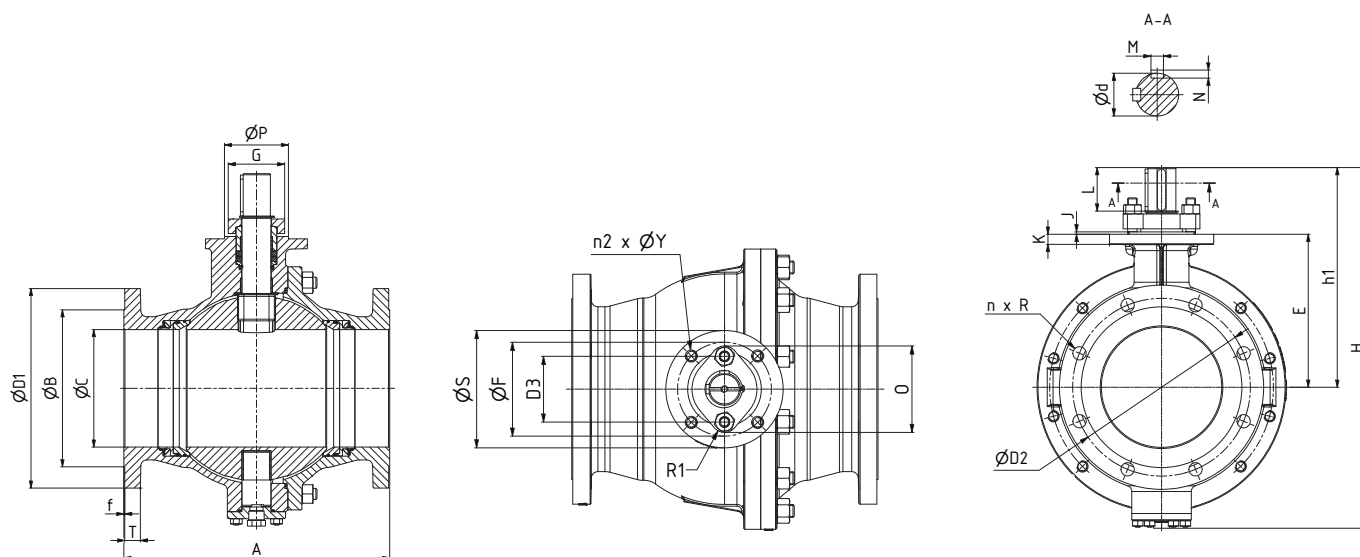
DN	NPS	Dimensions (inch)														
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N	h3	W	Ød1
15	1/2"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	0.433	0.551
20	3/4"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	0.433	0.551
25	1"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	0.433	0.551
40	1 1/2"	F07	3.543	2.165	2.756	4	M8	0.354	0.118	0.787	-	-	-	0.709	0.551	0.709
50	2"	F10	4.921	2.756	4.016	4	M10	0.669	0.118	1.102	-	-	-	0.945	0.748	0.984
80	3"	F12	4.921	2.756	4.016	4	M10	0.748	0.236	1.575	-	-	-	1.260	1.063	1.417
100	4"	F14	6.890	3.937	5.512	4	M16	0.945	0.236	1.969	-	-	-	1.417	1.417	1.890
150	6"	F14	8.268	5.118	6.496	4	M20	1.142	0.276	2.756	3.150	0.709	0.433	-	-	-

DN	NPS	Dimensions (mm)														Weights (kg)
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	h2	l	
15	1/2"	140	13	146	69	48	95	67	4	15.8	35.0	13	1.6	98	182	3.2
20	3/4"	152	19	161	73	53	117	83	4	19.0	43.0	14	1.6	102	182	4.5
25	1"	165	25	169	78	58	124	89	4	19.0	50.8	16	1.6	107	182	5.1
40	1 1/2"	190	38	228	111	82	155	114	4	22.2	73.2	19	1.6	150	280	11.0
50	2"	216	49	288	147	109	165	127	8	19.0	92.0	21	1.6	205	448	15.9
80	3"	282	78	370	204	156	210	168	8	22.2	127.0	27	1.6	265	720	34.5
100	4"	305	100	350	223	171	254	200	8	22.2	157.2	30	1.6	-	-	56.3
150	6"	403	151	496	325	212	318	270	12	22.2	215.9	35	1.6	-	-	136.6

DN	NPS	Dimensions (mm)														
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N	h3	W	Ød1
15	1/2"	F05	65	35	50	4	M6	9	2	16	-	-	-	12	11	14
20	3/4"	F05	65	35	50	4	M6	9	2	16	-	-	-	12	11	14
25	1"	F05	65	35	50	4	M6	9	2	16	-	-	-	12	11	14
40	1 1/2"	F07	90	55	70	4	M8	9	3	20	-	-	-	18	14	18
50	2"	F10	125	70	102	4	M10	17	3	28	-	-	-	24	19	25
80	3"	F12	125	70	102	4	M10	19	6	40	-	-	-	32	27	36
100	4"	F14	175	100	140	4	M16	24	6	50	-	-	-	36	36	48
150	6"	F14	210	130	165	4	M20	29	7	70	80	18	11	-	-	-

KROMBACH® TUFSEAT™ Performance Series Trunnion Design

Dimensions and Weights Class 150



Dimensions D1, L, h2, S, E, h1 and H are for reference only.

DN	NPS	Dimensions (inch)															Weights (lb)	
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	O	G	D3		R1
200	8"	17.992	7.953	23.5	14.5	10.1	13.5	11.748	8	0.875	10.622	1.059	0.063	5.079	3.819	3.858	0.787	377.5
250	10"	20.984	9.921	26.7	16.2	11.8	16.0	14.252	12	1.000	12.748	1.126	0.063	5.079	3.819	3.858	0.787	619.8
300	12"	24.016	11.929	31.9	19.0	13.2	19.0	17.000	12	1.000	15.000	1.189	0.063	7.008	4.016	5.118	0.945	1016.6

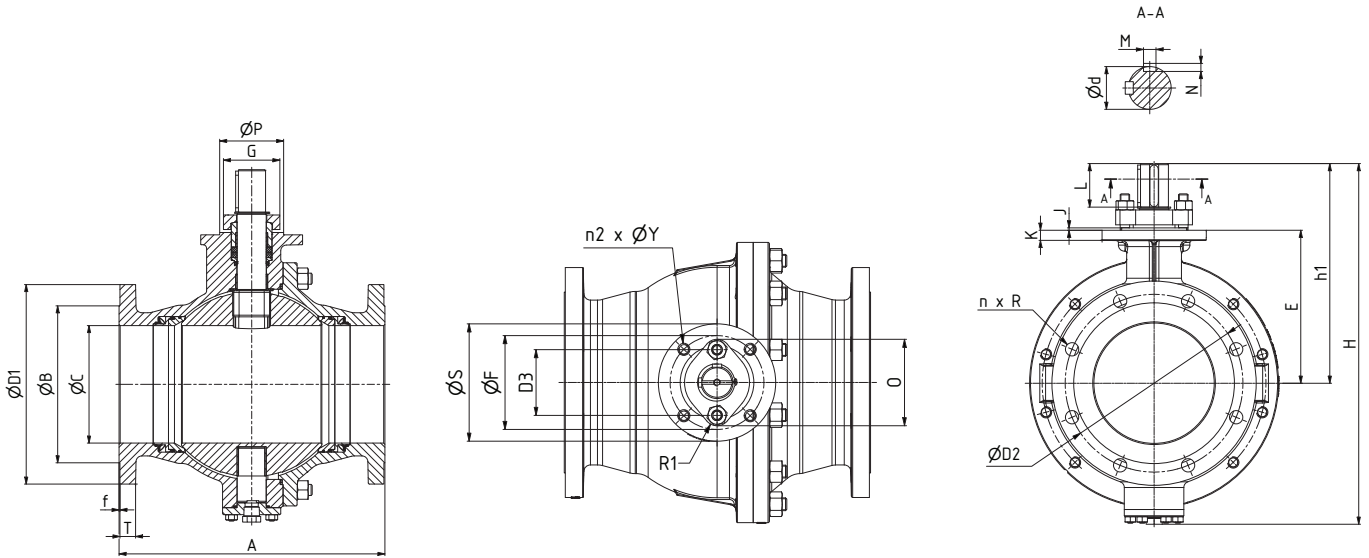
DN	NPS	Dimensions (inch)											
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N
200	8"	F14	6.890	3.937	5.512	4	M16	0.669	0.157	1.969	2.756	0.551	0.354
250	10"	F14	6.890	3.937	5.512	4	M16	0.866	0.157	1.969	2.756	0.551	0.354
300	12"	F16	8.268	5.118	6.496	4	M20	0.827	0.197	2.756	3.937	0.709	0.433

DN	NPS	Dimensions (mm)															Weights (kg)	
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	O	G	D3		R1
200	8"	457	202	596	369	257	343	298	8	22.2	269.8	27	1.6	129	97	98	20	171.2
250	10"	533	252	677	412	300	406	362	12	25.4	323.8	29	1.6	129	97	98	20	281.1
300	12"	610	303	809	482	335	483	432	12	25.4	381.0	30	1.6	178	102	130	24	461.1

DN	NPS	Dimensions (mm)											
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N
200	8"	F14	175	100	140	4	M16	17	4	50	70	14	9
250	10"	F14	175	100	140	4	M16	22	4	50	70	14	9
300	12"	F16	210	130	165	4	M20	21	5	70	100	18	11

KROMBACH® TUFSEAT™ Performance Series Trunnion Design

Dimensions and Weights Class 300



Dimensions D1, L, h2, S, E, h1 and H are for reference only.

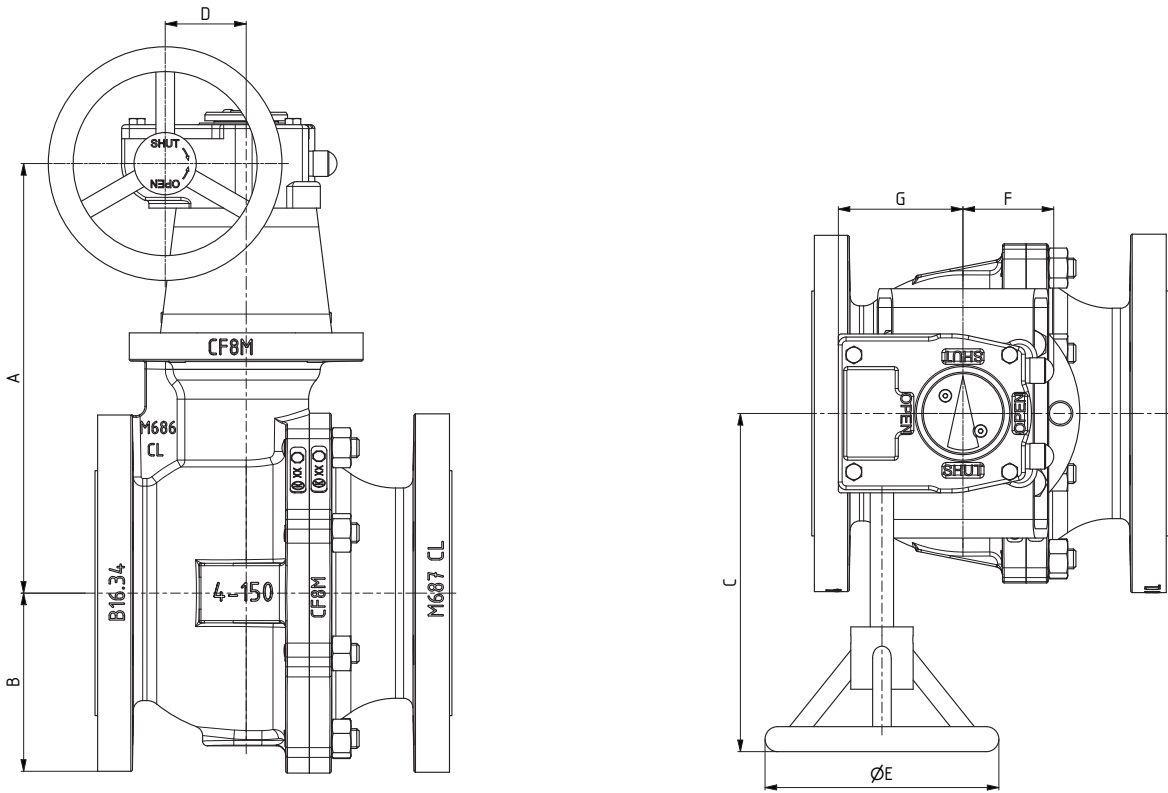
DN	NPS	Dimensions (inch)															Weights (lb)	
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	O	G	D3		R1
200	8"	19.764	7.953	24.0	14.6	10.1	15.0	13.000	12	1.000	10.622	1.555	0.063	7.008	4.016	5.118	0.945	517.3
250	10"	22.362	9.921	28.2	17.4	11.4	17.5	15.252	16	1.125	12.748	1.815	0.063	7.008	4.016	5.118	0.945	913.7
300	12"	25.512	11.929	32.4	19.5	13.2	20.5	17.748	16	1.250	15.000	1.937	0.063	7.402	4.409	5.512	0.945	1312.4

DN	NPS	Dimensions (inch)											
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N
200	8"	F14	8.268	5.118	6.496	4	M20	1.142	0.276	2.756	3.150	0.709	0.433
250	10"	F16	8.268	5.118	6.496	4	M20	0.827	0.197	2.756	2.756	0.709	0.433
300	12"	F25	11.811	7.874	10.000	8	M16	0.709	0.197	2.756	3.937	0.709	0.433

DN	NPS	Dimensions (mm)															Weights (kg)	
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	O	G	D3		R1
200	8"	502	202	609	372	256	381	330	12	25.4	269.8	40	1.6	178	102	130	24	234.6
250	10"	568	252	716	441	290	445	387	16	28.6	323.8	46	1.6	178	102	130	24	414.5
300	12"	648	303	824	497	335	521	451	16	31.8	381.0	49	1.6	188	112	140	24	595.3

DN	NPS	Dimensions (mm)											
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N
200	8"	F16	210	130	165	4	M20	21	5	70	70	18	11
250	10"	F25	300	200	254	8	M16	18	5	70	100	18	11
300	12"	F25	300	200	254	8	M16	30	5	80	110	20	12

KROMBACH® TUFSEAT™ Performance Series
 Floating Ball Design with Gears Class 150



Gear dimensions are for reference only.

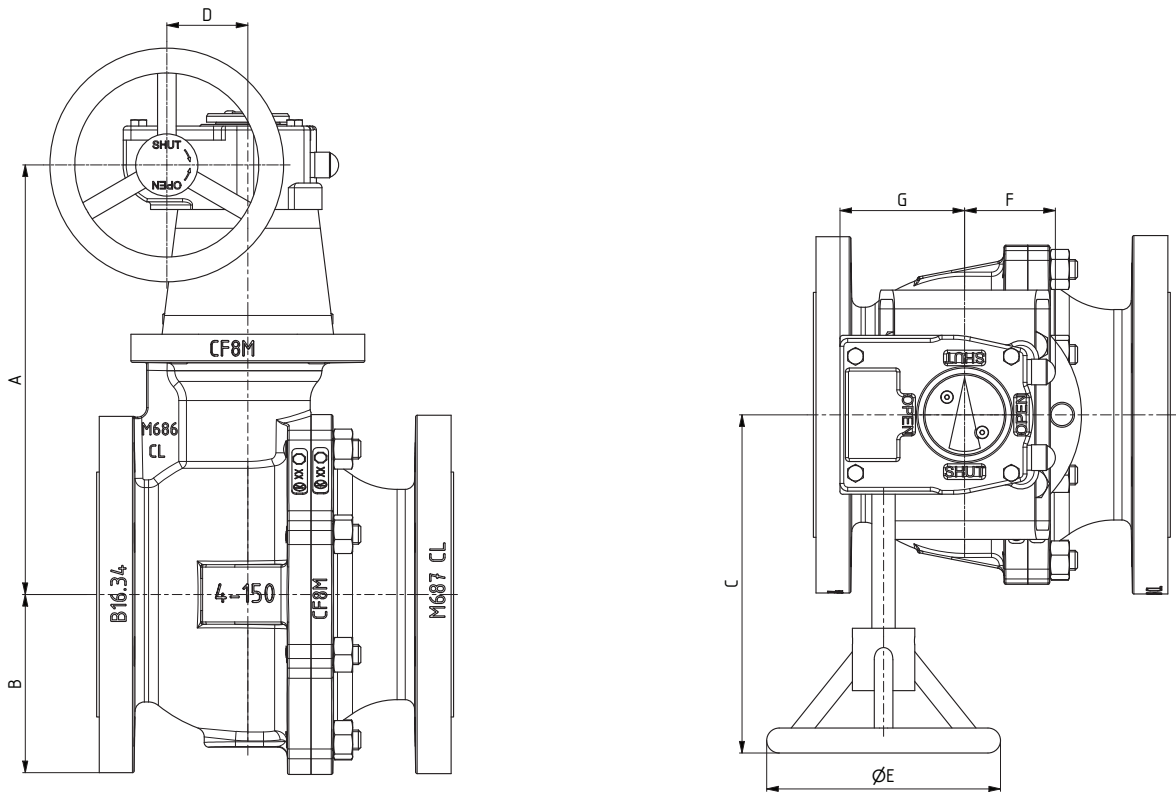
DN	NPS	Dimensions (inch)						
		A	B	C	D	ØE	F	G
100	4"	10.87	4.53	8.54	2.05	5.91	2.28	3.15
150	6"	13.15	5.51	10.63	3.39	11.81	4.06	4.96
200	8"	18.03	9.33	9.73	2.80	7.88	3.39	4.13
250	10"	19.76	10.43	10.63	3.39	11.81	4.06	4.96
300	12"	22.88	12.88	12.44	4.13	13.78	4.21	5.83

DN	NPS	Dimensions (mm)						
		A	B	C	D	ØE	F	G
100	4"	276	115	217	52	150	58	80
150	6"	334	140	270	86	300	103	126
200	8"	458	237	247	71	200	86	105
250	10"	502	265	270	86	300	103	126
300	12"	581	327	316	105	350	107	148

Gear size is based on clear, clean liquid fluid at maximum differential pressure.

KROMBACH® TUFSEAT™ Performance Series

Floating Ball Design with Gears Class 300



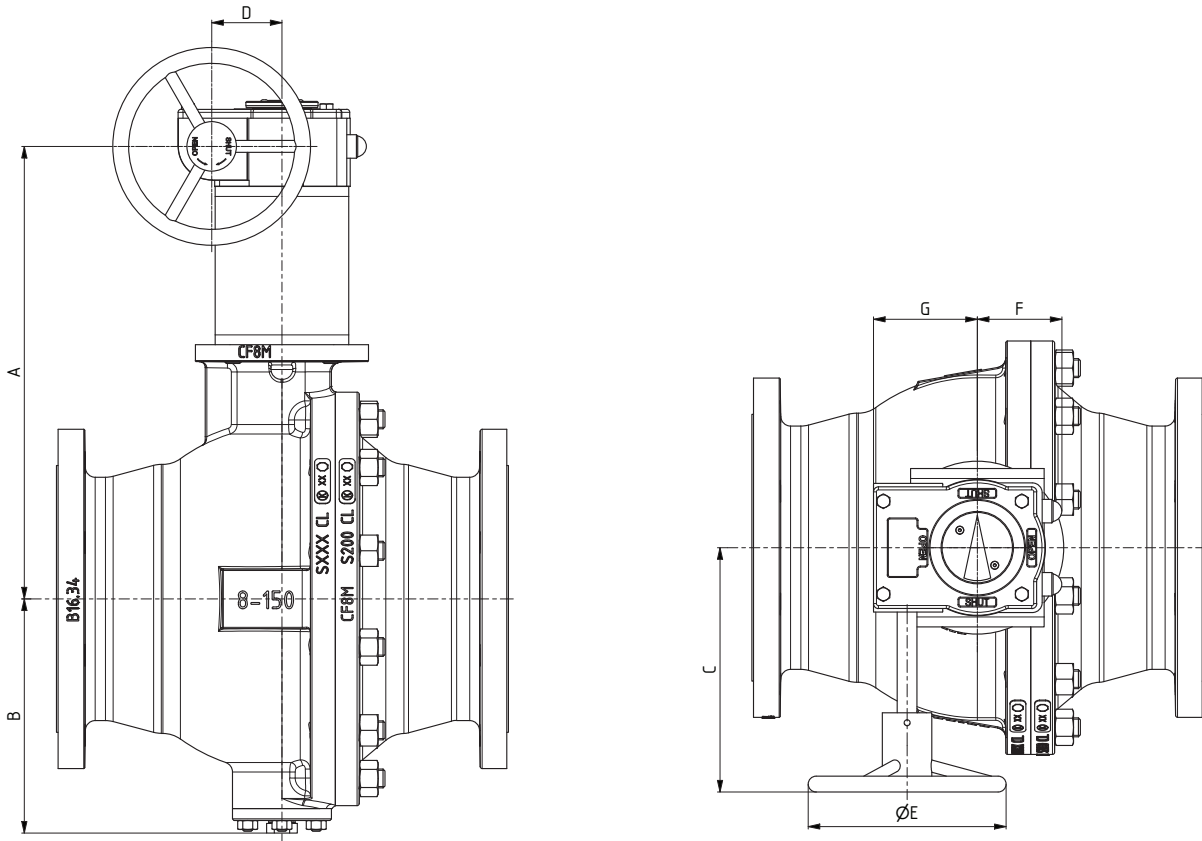
Gear dimensions are for reference only.

DN	NPS	Dimensions (inch)						
		A	B	C	D	ØE	F	G
80	3"	10.43	4.13	8.54	2.05	5.91	2.28	3.15
100	4"	11.50	5.00	10.91	2.80	9.84	3.39	4.13
150	6"	16.14	6.77	13.62	4.13	17.72	4.21	5.83
200	8"	17.88	9.33	12.44	4.13	13.78	4.21	5.83
250	10"	21.10	10.83	13.62	4.13	19.69	4.21	5.83
300	12"	23.15	12.88	14.88	5.12	9.84	5.63	7.09

DN	NPS	Dimensions (mm)						
		A	B	C	D	ØE	F	G
80	3"	265	105	217	52	150	58	80
100	4"	292	127	277	71	250	86	105
150	6"	410	172	346	105	450	107	148
200	8"	454	237	316	105	350	107	148
250	10"	536	275	346	105	500	107	148
300	12"	588	327	378	130	250	143	180

Gear size is based on clear, clean liquid fluid at maximum differential pressure.

KROMBACH[®] **TUFSEAT**[™] Performance Series
 Trunnion Design with Gears Class 150



Gear dimensions are for reference only.

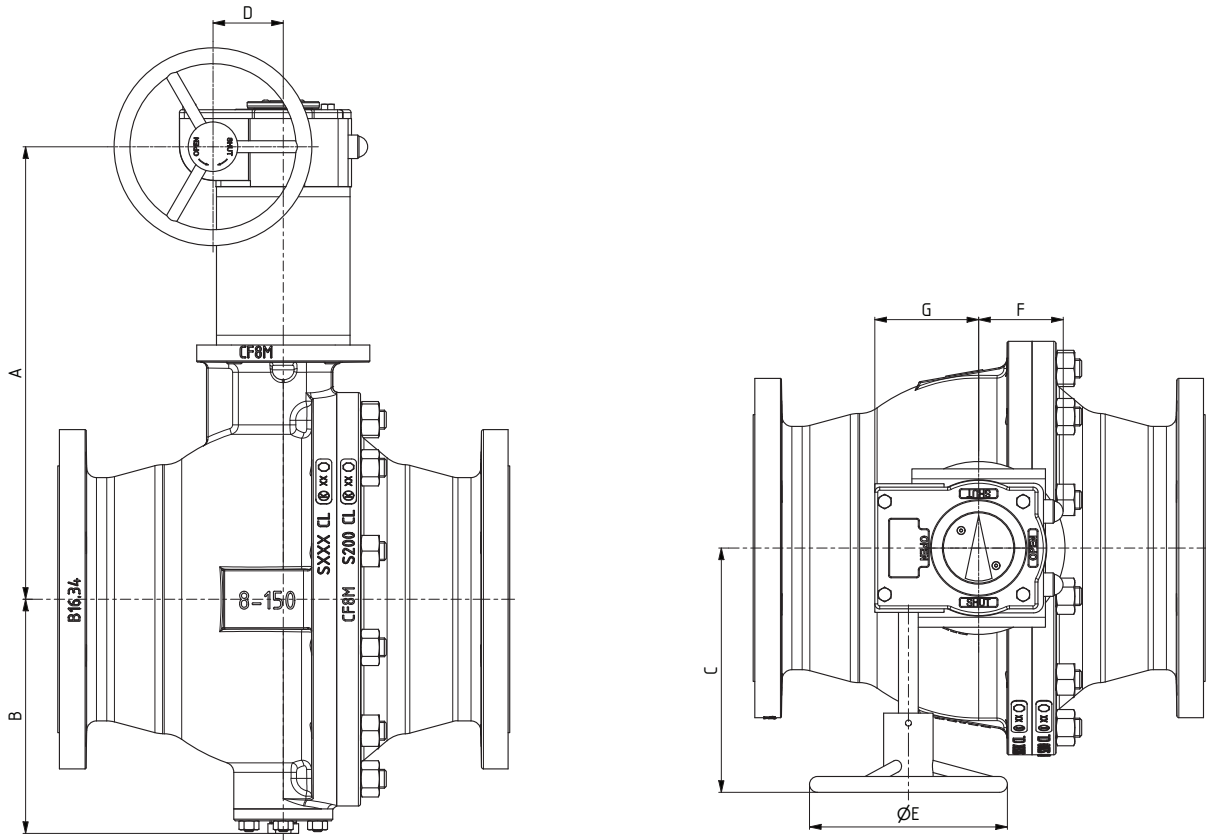
DN	NPS	Dimensions (inch)						
		A	B	C	D	ØE	F	G
100	4"	11.34	4.53	9.80	2.80	5.91	3.35	4.13
150	6"	13.15	5.51	10.63	3.39	11.81	4.06	4.96
200	8"	18.07	9.33	10.63	3.39	11.81	4.06	4.96
250	10"	19.76	10.43	10.63	3.39	11.81	4.06	4.96
300	12"	23.19	12.88	12.52	2.09	13.78	4.29	5.91

DN	NPS	Dimensions (mm)						
		A	B	C	D	ØE	F	G
100	4"	288	115	249	71	150	85	105
150	6"	334	140	270	86	300	103	126
200	8"	459	237	270	86	300	103	126
250	10"	502	265	270	86	300	103	126
300	12"	589	327	318	53	350	109	150

Gear size is based on clear, clean liquid fluid at maximum differential pressure.

KROMBACH® TUFSEAT™ Performance Series

Trunnion Design with Gears Class 300



Gear dimensions are for reference only.

DN	NPS	Dimensions (inch)						
		A	B	C	D	ØE	F	G
80	3"	10.91	4.13	9.80	2.80	5.91	3.39	4.13
100	4"	11.54	5.00	10.43	3.39	9.84	4.06	4.96
150	6"	18.43	6.77	12.52	2.09	13.78	4.29	5.91
200	8"	20.08	9.33	12.52	2.09	13.78	4.29	5.91
250	10"	21.38	10.83	14.88	5.12	9.84	5.00	7.09
300	12"	23.54	12.88	15.75	5.51	13.78	5.24	7.68

DN	NPS	Dimensions (mm)						
		A	B	C	D	ØE	F	G
80	3"	277	105	249	71	150	86	105
100	4"	293	127	265	86	250	103	126
150	6"	468	172	318	53	350	109	150
200	8"	510	237	318	53	350	109	150
250	10"	543	275	378	130	250	127	180
300	12"	598	327	400	140	350	133	195

Gear size is based on clear, clean liquid fluid at maximum differential pressure.

KROMBACH[®] TUFSEAT[™] Performance Series

Pressure/Temperature Ratings

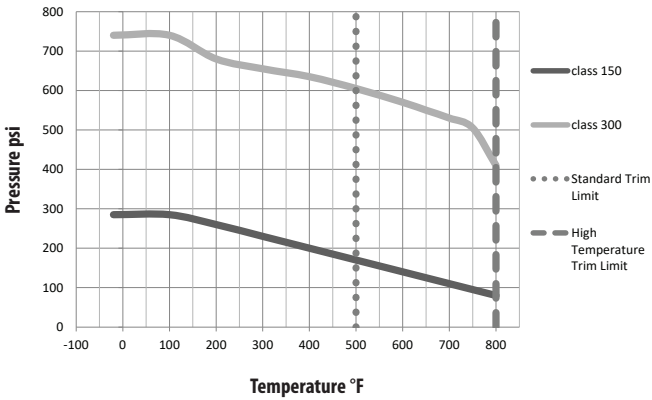
Temperature	Max working pressure ASME class 150	Max working pressure ASME class 300
	ASTM A216 Gr. WCB*	
°F	psi	
-20	285	740
100	285	740
200	260	680
300	230	655
400	200	635
500	170	605
600	140	570
650	125	550
700	110	530
750	95	505
800	80	410

*according ASME B16.34 - Material Group 1.1

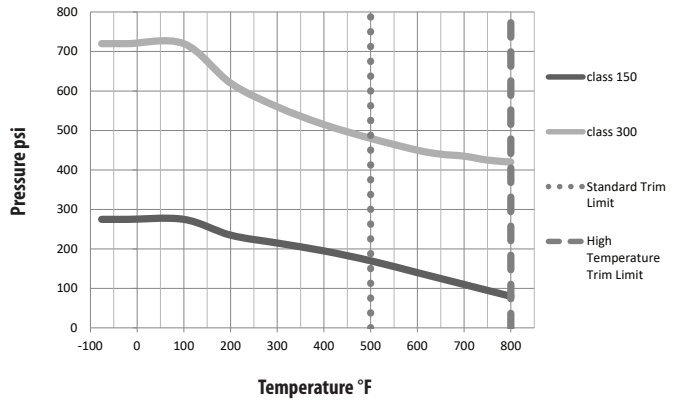
Temperature	Max working pressure ASME class 150	Max working pressure ASME class 300
	ASTM A351 Gr. CF8M*	
°F	psi	
-76	275	720
-20	275	720
100	275	720
200	235	620
300	215	560
400	195	515
500	170	480
600	140	450
650	125	440
700	110	435
750	95	425
800	80	420

*according ASME B16.34 - Material Group 2.2

Pressure & Temperature
 ASTM A216 Gr. WCB



Pressure & Temperature
 ASTM A351 Gr. CF8M



KROMBACH® TUFSEAT™ Performance Series Pressure/Temperature Ratings

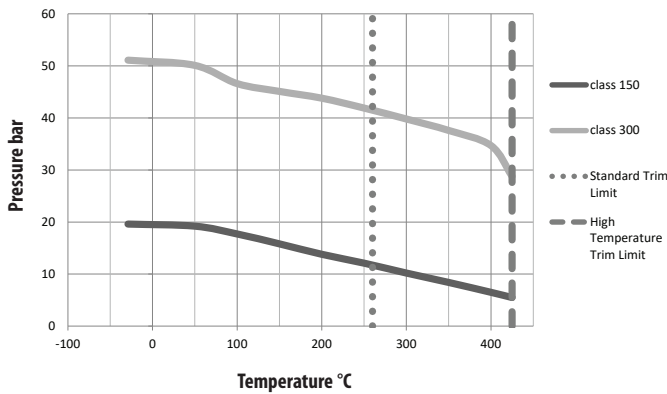
Temperature	Max working pressure ASME class 150	Max working pressure ASME class 300
	ASTM A216 Gr. WCB*	
°C	bar	
-29	19.6	51.1
50	19.2	50.1
100	17.7	46.6
150	15.8	45.1
200	13.8	43.8
250	12.1	41.9
300	10.2	39.8
350	8.4	37.6
400	6.5	34.7
425	5.5	28.8

*according ASME B16.34 - Material Group 1.1

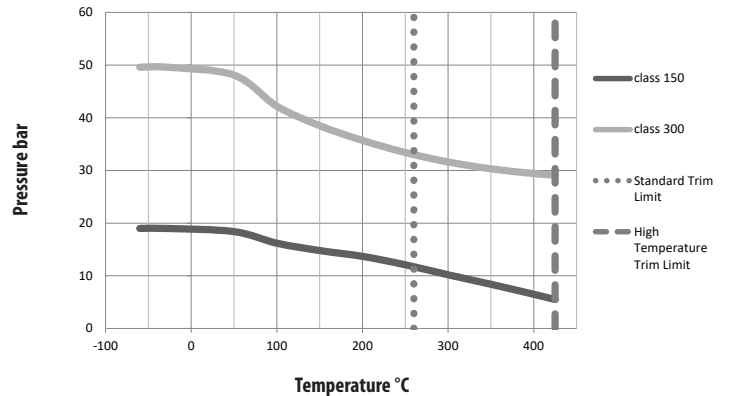
Temperature	Max working pressure ASME class 150	Max working pressure ASME class 300
	ASTM A351 Gr. CF8M*	
°C	bar	
-60	19.0	49.6
-29	19.0	49.6
50	18.4	48.1
100	16.2	42.2
150	14.8	38.5
200	13.7	35.7
250	12.1	33.4
300	10.2	31.6
350	8.4	30.3
400	6.5	29.4
425	5.5	29.1

*according ASME B16.34 - Material Group 2.2

**Pressure & Temperature
ASTM A216 Gr. WCB**



**Pressure & Temperature
ASTM A351 Gr. CF8M**



KROMBACH® TUFSEAT™ Performance Series

MAST Class 150

Maximum Allowable Stem Torque Class 150

DN	NPS	MAST [in-Lb]						
		Stem Material						
		A276 Gr431 1.4057	A182 F51 1.4462	A564 Gr630 1.4542	A453 Gr660 1.4980	A276 Gr316Ti 1.4571	A276 Gr316 L 1.4404	A286 GrXM-19 1.3964
Floating Ball Design								
15	1/2"	956	744	948	1,080	585	470	779
20	3/4"	956	744	948	1,080	585	470	779
25	1"	956	744	948	1,080	585	470	779
40	1 1/2"	2,443	1,895	2,434	2,753	1,390	983	1,992
50	2"	2,443	1,895	2,434	2,753	1,390	983	1,992
80	3"	7,010	5,435	6,966	7,887	3,594	2,532	5,700
100	4"	19,269	14,932	19,154	21,676	10,506	7,409	15,657
150	6"	38,545	29,872	38,298	43,360	23,605	17,552	31,314
Trunion Design								
200	8"	67,346	50,282	57,805	67,346	27,385	19,304	44,900
250	10"	67,346	50,282	57,805	67,346	27,385	19,304	44,900
300	12"	130,425	97,385	111,954	130,425	53,043	37,386	86,950

DN	NPS	MAST [Nm]						
		Stem Material						
		A276 Gr431 1.4057	A182 F51 1.4462	A564 Gr630 1.4542	A453 Gr660 1.4980	A276 Gr316Ti 1.4571	A276 Gr316 L 1.4404	A286 GrXM-19 1.3964
Floating Ball Design								
15	1/2"	108	84	107	122	66	53	88
20	3/4"	108	84	107	122	66	53	88
25	1"	108	84	107	122	66	53	88
40	1 1/2"	276	214	275	311	157	111	225
50	2"	276	214	275	311	157	111	225
80	3"	792	614	787	891	406	286	644
100	4"	2,177	1,687	2,164	2,449	1,187	837	1,769
150	6"	4,355	3,375	4,327	4,899	2,667	1,983	3,538
Trunion Design								
200	8"	7,609	5,681	6,531	7,609	3,094	2,181	5,073
250	10"	7,609	5,681	6,531	7,609	3,094	2,181	5,073
300	12"	14,736	11,003	12,649	14,736	5,993	4,224	9,824

KROMBACH® TUFSEAT™ Performance Series

MAST Class 300

Maximum Allowable Stem Torque Class 300

DN	NPS	MAST [in-Lb]						
		Stem Material						
		A276 Gr431 1.4057	A182 F51 1.4462	A564 Gr630 1.4542	A453 Gr660 1.4980	A276 Gr316Ti 1.4571	A276 Gr316 L 1.4404	A286 GrXM-19 1.3964
Floating Ball Design								
15	1/2"	956	744	948	1,080	585	470	779
20	3/4"	956	744	948	1,080	585	470	779
25	1"	956	744	948	1,080	585	470	779
40	1 1/2"	2,443	1,895	2,434	2,753	1,390	983	1,992
50	2"	7,010	5,435	6,966	7,887	3,594	2,532	5,700
80	3"	19,269	14,932	19,154	21,676	10,506	7,409	15,657
100	4"	38,545	29,872	38,298	43,360	23,605	17,552	31,314
150	6"	121,318	97,385	111,954	121,318	53,043	37,386	86,950
Trunion Design								
200	8"	104,227	97,385	104,227	104,227	53,043	37,386	86,950
250	10"	130,425	97,385	111,954	130,425	53,043	37,386	86,950
300	12"	223,677	176,989	203,461	223,677	96,394	67,957	158,031

DN	NPS	MAST [Nm]						
		Stem Material						
		A276 Gr431 1.4057	A182 F51 1.4462	A564 Gr630 1.4542	A453 Gr660 1.4980	A276 Gr316Ti 1.4571	A276 Gr316 L 1.4404	A286 GrXM-19 1.3964
Floating Ball Design								
15	1/2"	108	84	107	122	66	53	88
20	3/4"	108	84	107	122	66	53	88
25	1"	108	84	107	122	66	53	88
40	1 1/2"	276	214	275	311	157	111	225
50	2"	792	614	787	891	406	286	644
80	3"	2,177	1,687	2,164	2,449	1,187	837	1,769
100	4"	4,355	3,375	4,327	4,899	2,667	1,983	3,538
150	6"	13,707	11,003	12,649	13,707	5,993	4,224	9,824
Trunion Design								
200	8"	11,776	11,003	11,776	11,776	5,993	4,224	9,824
250	10"	14,736	11,003	12,649	14,736	5,993	4,224	9,824
300	12"	25,272	19,997	22,988	25,272	10,891	7,678	17,855

KROMBACH® TUFSEAT™ Performance Series

Operating Torques

Torques Class 150

DN	NPS	Torque [in-Lb]						
		BTO	RUN	ETO		BTC	RUN	ETC
Floating Ball Design								
15	1/2"	29	21	24		27	21	30
20	3/4"	46	29	33		36	29	41
25	1"	77	43	49		54	43	60
40	1 1/2"	206	91	101		111	91	133
50	2"	399	166	186		204	166	255
80	3"	1327	451	498		548	451	737
100	4"	2852	949	1033		1136	949	1539
150	6"	9367	3131	3472		3820	3131	4183
Trunion Design								
200	8"	5974	2288	2551		2806	2288	3223
250	10"	9072	3551	4023		4425	3551	4948
300	12"	16640	6388	7158		7874	6388	9129

Torques Class 300

DN	NPS	Torque [in-Lb]						
		BTO	RUN	ETO		BTC	RUN	ETC
Floating Ball Design								
15	1/2"	58	29	32		35	29	52
20	3/4"	95	40	43		48	40	74
25	1"	160	60	65		72	60	108
40	1 1/2"	456	138	148		162	138	251
50	2"	953	297	318		350	297	543
80	3"	3284	921	969		1066	921	1686
100	4"	6822	1784	1868		2055	1784	3343
150	6"	22574	5805	6147		6762	5805	8775
Trunion Design								
200	8"	13223	4711	4973		5471	4711	7544
250	10"	19702	6879	7351		8086	6879	11145
300	12"	36386	11690	12460		13707	11690	18974

DN	NPS	Torque [Nm]						
		BTO	RUN	ETO		BTC	RUN	ETC
Floating Ball Design								
15	1/2"	3	2	3		3	2	3
20	3/4"	5	3	4		4	3	5
25	1"	9	5	6		6	5	7
40	1 1/2"	23	10	11		13	10	15
50	2"	45	19	21		23	19	29
80	3"	150	51	56		62	51	83
100	4"	322	107	117		128	107	174
150	6"	1058	354	392		432	354	473
Trunion Design								
200	8"	675	259	288		317	259	364
250	10"	1025	401	455		500	401	559
300	12"	1880	722	809		890	722	1031

DN	NPS	Torque [Nm]						
		BTO	RUN	ETO		BTC	RUN	ETC
Floating Ball Design								
15	1/2"	7	3	4		4	3	6
20	3/4"	11	5	5		5	5	8
25	1"	18	7	7		8	7	12
40	1 1/2"	52	16	17		18	16	28
50	2"	108	34	36		40	34	61
80	3"	371	104	109		120	104	190
100	4"	771	202	211		232	202	378
150	6"	2551	656	695		764	656	991
Trunion Design								
200	8"	1494	532	562		618	532	852
250	10"	2226	777	831		914	777	1259
300	12"	4111	1321	1408		1549	1321	2144

The torques shown in the chart are for reference only (clean clear lubricating liquid, actuation safety factor = 1.0). For application-specific torques, please consult the factory.

BTO = Break to open
 RUN = Running
 ETO = End to open

BTC = Break to close
 RUN = Running
 ETC = End to close

KROMBACH® TUFSEAT™ Performance Series

Packing Gland Nut Torques

Packing gland nut torques Class 150

DN	NPS	Thread Size	Standard Trim	High Temperature Trim
			[in-Lb]	[in-Lb]
15	1/2"	M30x1	222	1018
20	3/4"	M30x1	222	1018
25	1"	M30x1	222	1018
40	1 1/2"	M36x1,5	425	1992
50	2"	M36x1,5	425	1992
80	3"	M48x1,5	930	3452
100	4"	3/8-16 UNC	98	213
150	6"	5/16-18 UNC	62	142
200	8"	5/8-11 UNC	399	850
250	10"	5/8-11 UNC	399	850
300	12"	1-8 UNC	850	3098

Packing gland nut torques Class 300

DN	NPS	Thread Size	Standard Trim	High Temperature Trim
			[in-Lb]	[in-Lb]
15	1/2"	M30x1	222	1018
20	3/4"	M30x1	222	1018
25	1"	M30x1	222	1018
40	1 1/2"	M36x1,5	425	1992
50	2"	M48x1,5	930	3452
80	3"	3/8-16 UNC	98	213
100	4"	5/16-18 UNC	62	142
150	6"	3/8-16 UNC	107	293
200	8"	1-8 UNC	850	3098
250	10"	1-8 UNC	850	3098
300	12"	1-8 UNC	974	3497

DN	NPS	Thread Size	Standard Trim	High Temperature Trim
			[Nm]	[Nm]
15	1/2"	M30x1	25	115
20	3/4"	M30x1	25	115
25	1"	M30x1	25	115
40	1 1/2"	M36x1,5	48	225
50	2"	M36x1,5	48	225
80	3"	M48x1,5	105	390
100	4"	3/8-16 UNC	11	24
150	6"	5/16-18 UNC	7	16
200	8"	5/8-11 UNC	45	96
250	10"	5/8-11 UNC	45	96
300	12"	1-8 UNC	96	350

DN	NPS	Thread Size	Standard Trim	High Temperature Trim
			[Nm]	[Nm]
15	1/2"	M30x1	25	115
20	3/4"	M30x1	25	115
25	1"	M30x1	25	115
40	1 1/2"	M36x1,5	48	225
50	2"	M48x1,5	105	390
80	3"	3/8-16 UNC	11	24
100	4"	5/16-18 UNC	7	16
150	6"	3/8-16 UNC	12	33
200	8"	1-8 UNC	96	350
250	10"	1-8 UNC	96	350
300	12"	1-8 UNC	110	395

KROMBACH® TUFSEAT™ Performance Series

Body Joint & Cover Torques

Body joint torques Class 150

DN	NPS	Thread Size	[in-Lb]
Floating Ball Design			
15	1/2"	5/16-18 UNC	142
20	3/4"	5/16-18 UNC	142
25	1"	5/16-18 UNC	142
40	1 1/2"	7/16-14 UNC	389
50	2"	7/16-14 UNC	389
80	3"	5/8-11 UNC	1195
100	4"	1/2-13 UNC	637
150	6"	3/4-10 UNC	2106
Trunion Design			
200	8"	3/4-10 UNC	2106
250	10"	3/4-10 UNC	2106
300	12"	7/8-9 UNC	3009

DN	NPS	Thread Size	[Nm]
Floating Ball Design			
15	1/2"	5/16-18 UNC	16
20	3/4"	5/16-18 UNC	16
25	1"	5/16-18 UNC	16
40	1 1/2"	7/16-14 UNC	44
50	2"	7/16-14 UNC	44
80	3"	5/8-11 UNC	135
100	4"	1/2-13 UNC	72
150	6"	3/4-10 UNC	238
Trunion Design			
200	8"	3/4-10 UNC	238
250	10"	3/4-10 UNC	238
300	12"	7/8-9 UNC	340

Cover torques Class 150

DN	NPS	Thread Size	[in-Lb]
Floating Ball Design			
15-150	1/2"-6"	N/A	N/A
Trunion Design			
200	8"	3/8"-16"	248
250	10"	3/8"-16"	248
300	12"	3/8"-16"	248

DN	NPS	Thread Size	[Nm]
Floating Ball Design			
15-150	1/2"-6"	N/A	N/A
Trunion Design			
200	8"	3/8"-16"	28
250	10"	3/8"-16"	28
300	12"	3/8"-16"	28

Body joint torques Class 300

DN	NPS	Thread Size	[in-Lb]
Floating Ball Design			
15	1/2"	3/8-16 UNC	248
20	3/4"	3/8-16 UNC	248
25	1"	3/8-16 UNC	248
40	1 1/2"	1/2-13 UNC	637
50	2"	5/8-11 UNC	1195
80	3"	5/8-11 UNC	1195
100	4"	5/8-11 UNC	1195
150	6"	3/4-10 UNC	2106
Trunion Design			
200	8"	3/4-10 UNC	2106
250	10"	7/8-9 UNC	3009
300	12"	1-8 UNC	4425

DN	NPS	Thread Size	[Nm]
Floating Ball Design			
15	1/2"	3/8-16 UNC	28
20	3/4"	3/8-16 UNC	28
25	1"	3/8-16 UNC	28
40	1 1/2"	1/2-13 UNC	72
50	2"	5/8-11 UNC	135
80	3"	5/8-11 UNC	135
100	4"	5/8-11 UNC	135
150	6"	3/4-10 UNC	238
Trunion Design			
200	8"	3/4-10 UNC	238
250	10"	7/8-9 UNC	340
300	12"	1-8 UNC	500

Cover torques Class 300

DN	NPS	Thread Size	[in-Lb]
Floating Ball Design			
15-150	1/2"-6"	N/A	N/A
Trunion Design			
200	8"	3/8"-16"	248
250	10"	3/8"-16"	248
300	12"	3/8"-16"	248

DN	NPS	Thread Size	[Nm]
Floating Ball Design			
15-150	1/2"-6"	N/A	N/A
Trunion Design			
200	8"	3/8"-16"	28
250	10"	3/8"-16"	28
300	12"	3/8"-16"	28

KROMBACH® TUFSEAT™ Performance Series

Kv / Cv Values

Kv / Cv Values Class 150-300

DN	NPS	Opening Angle															
		90°		80°		70°		60°		50°		40°		30°		20°	
		Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv
Floating Ball Design																	
15	1/2"	26	30	22	26	17	20	10	12	7	8	4	5	3	3	2	2
20	3/4"	48	56	41	48	31	36	18	21	12	14	8	9	5	6	3	3
25	1"	82	95	71	82	52	60	31	36	21	24	13	15	8	9	5	6
40	1 1/2"	225	261	194	225	144	167	86	100	56	65	36	42	23	27	14	16
50	2"	424	492	365	423	271	314	161	187	106	123	68	79	42	49	25	29
80	3"	1125	1305	968	1123	720	835	428	496	281	326	180	209	113	131	68	79
100	4"	1903	2207	1637	1899	1218	1413	723	839	476	552	304	353	190	220	114	132
150	6"	4801	5569	4129	4790	3073	3565	1824	2116	1200	1392	768	891	480	557	288	334
Trunion Design																	
200	8"	8737	10135	7514	8716	5592	6487	3320	3851	2184	2533	1398	1622	874	1014	524	608
250	10"	14186	16456	12200	14152	9079	10532	5391	6254	3547	4115	2270	2633	1419	1646	851	987
300	12"	20933	24282	18002	20882	13397	15541	7955	9228	5233	6070	3349	3885	2093	2428	1256	1457

KROMBACH® TUFSEAT™ Performance Series

Product Coding

PRODUCT LINE				DESIGN						
Valve	General Design	Bonnet	Valve Type	Size	Pressure Class	Seat Type	Seat Sealing System	Bore Size	End Type	Face to Face
KFO	1	1	76	G	D	B	3	1	A	1
Standard Flanged Ball Valve	two piece cast split body, floating	Standard	Performance Series Standard Trim	2"	Class 150	Double Seat/ Bi-Directional	Standard Scraping	Full Port	Flanged - ASME B16.5 RF	ASME B16.5 Long

PRODUCT LINE

Valve	
Standard Flange Ball Valve	KFO

General Design	
two piece cast split body, floating	1
two piece forged split body, floating	5
two piece forged split body, trunnion mounted	7
two piece cast split body, trunnion mounted	9

Bonnet	
Standard	1
Bonnet extension	2
Cryogenic extension	3
High temperature extension	4

Valve Type	
Severe Service Series	36
Performance Series (425°C/800°F)	56
Performance Series (260°C/500°F)	76

DESIGN

Nominal pipe size		
	DN 10	A
1/2"	DN 15	B
3/4"	DN 20	C
1"	DN 25	D
1-1/2"	DN 40	F
2"	DN 50	G
3"	DN 80	I
4"	DN 100	J
6"	DN 150	L
8"	DN 200	M
10"	DN 250	N
12"	DN 300	O
14"	DN 350	P
16"	DN 400	Q
	DN 450	R
	DN 500	S

Pressure Class	
Class 150	D
Class 300	G

Seat Type	
Double Seat/ Bi-Directional	B

Standard Sealing System	
Standard Sealing System	1
Protected Backseat/Springs (Slurry/Catylst)	2

Seat Type	
Full Port	1

Connection	
Flanged - ASME B16.5 RF	A
Other	I

Face to Face	
ASME B16.5 Long	1

KROMBACH® TUFSEAT™ Performance Series

Product Coding

MATERIAL						OTHER				OPERATION
Body Material	Stem Material	Stem Seal	Ball Base Material	Seat Base Material	Coating System	Maximum Temperature	Jacket	Drain/ Purge Ports	Options	Operator
A	D	1	X	X	1	B	0	0	0	F
ASTM A216 Gr. WCB	ASTM A182 Gr. F51 (UNS S31803)	Standard Graphite	ASTM A182 Gr. F316L (UNS S31603)	ASTM A182 Gr. F316L (UNS S31603)	H11 Hard Chromium (Cr)	260°C / 500°F	none	none	none	Bare Stem

MATERIAL

Body Material	
ASTM A216 Gr. WCB	A
ASTM A351 Gr. CF8M	B
ASTM A995 Gr. 5A - Superduplex	C
ASTM A352 Gr. LCB	E
ASTM A352 Gr. LCC	F
ASTM A217 Gr. WC6	G
ASTM A351 Gr. CT15C	L
ASTM A494 Gr. CY40	J
ASTM A351 Gr. CN7M	K
ASTM A494 Gr. CX2MW	H
ASTM A494 Gr. M35-1	M
ASTM A351 Gr. CF3M	N
Other	X

Seat Base Material	
ASTM A276 Gr 316Ti (UNS S31635)	C
ASTM A182 Gr. F51 (UNS S31803)	D
ASTM A543 Gr. 660 (UNS S66286)	E
ASTM A182 Gr. F316L (UNS S31603)	F

Coating System	
H3 Nickel/Chrome (NiCr)	2
H4 Nickel/Chrome/Tungsten Carbide (NiCrW)	3
H5 Cobalt Based (Stellite SF20)	4
H6 Chromium/Carbide-Nickel/Chromium (Cr3C2-NiCr)	5
H10 Tungsten Carbide	6
H11 Hard Chromium (Cr)	7

Stem Material	
ASTM A276 Gr 316Ti (UNS S31635)	C
ASTM A182 Gr. F51 (UNS S31803)	D
ASTM A543 Gr. 660 (UNS S66286)	E
ASTM A276 Gr. 420 (UNS S42000)	B
ASTM A564 Gr. 630 (17-4 PH), H1150-D	A
ASTM A286 Gr. XM-19	F
ASTM A276 Gr. 431 (UNS S43100)	H

Stem Seal (Packing)	
Standard Graphite	1

Ball Base Material	
ASTM A276 Gr 316Ti (UNS S31635)	C
ASTM A182 Gr. F51 (UNS S31803)	D
ASTM A543 Gr. 660 (UNS S66286)	E
ASTM A182 Gr. F316L (UNS S31603)	F

OTHER

Maximum Temperature	
260°C / 500°F	B
425°C / 800°F	C

Jacket	
none	0

Drain/Purge Ports	
none	0

Options	
none	0
NACE MR 0103 or 1075	1

OPERATION

Operator	
Bare Stem	F
Lever	L
Gear	G
Actuated	A

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