



# TECHNICAL DATASHEET

ASME DESIGN

## KROMBACH® TUFSEAT™ Performance Series Ball Valves

TUFSEAT by KROMBACH - THE SUPERIOR MSBV



## 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#)

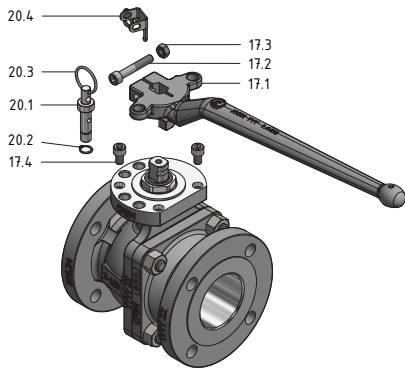


#### Product Range

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

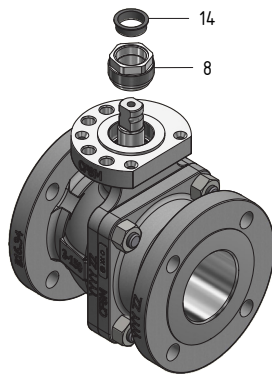
# Floating Ball Design

## 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	316Ti	1.4571	316Ti	1.4571

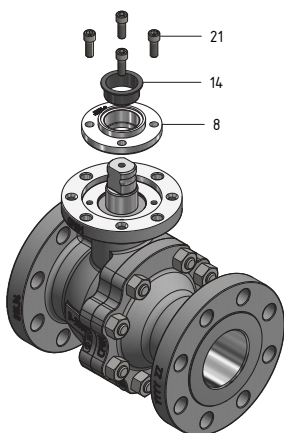
## Press Nut Design



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



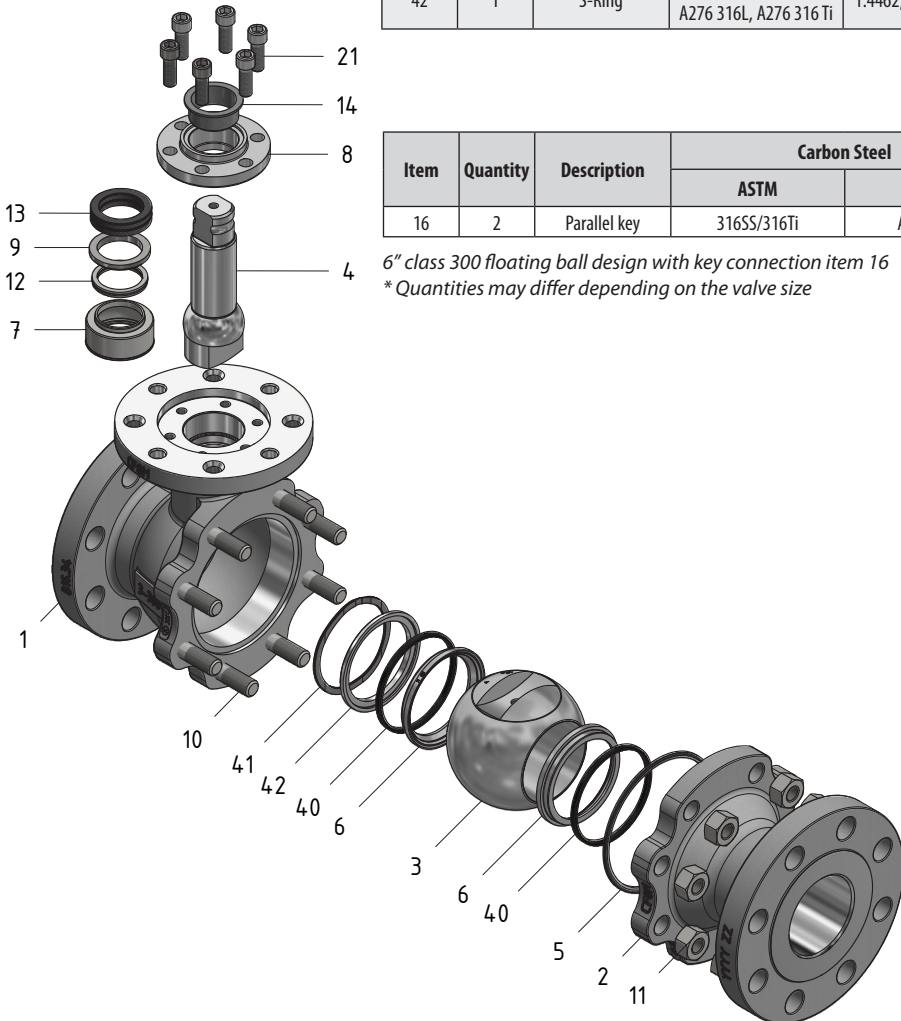
Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
8	1	Packing gland	A479 316Ti; 316SS	1.4571; 1.4401	A479 316Ti; 316SS	1.4571; 1.4401
14	1	Guide bushing	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled	PTFE - Carbon filled
21	4	Hex socket head cap screw	A193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

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

# Floating Ball Design Standard Trim

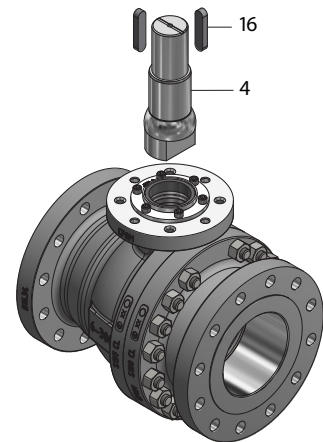
## Floating Ball Design

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	A276 Gr.431	1.4057	A276 Gr.431	1.4057
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 ; 316SS	1.4571; 1.4401
10*	8	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
11*	8	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*	6	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



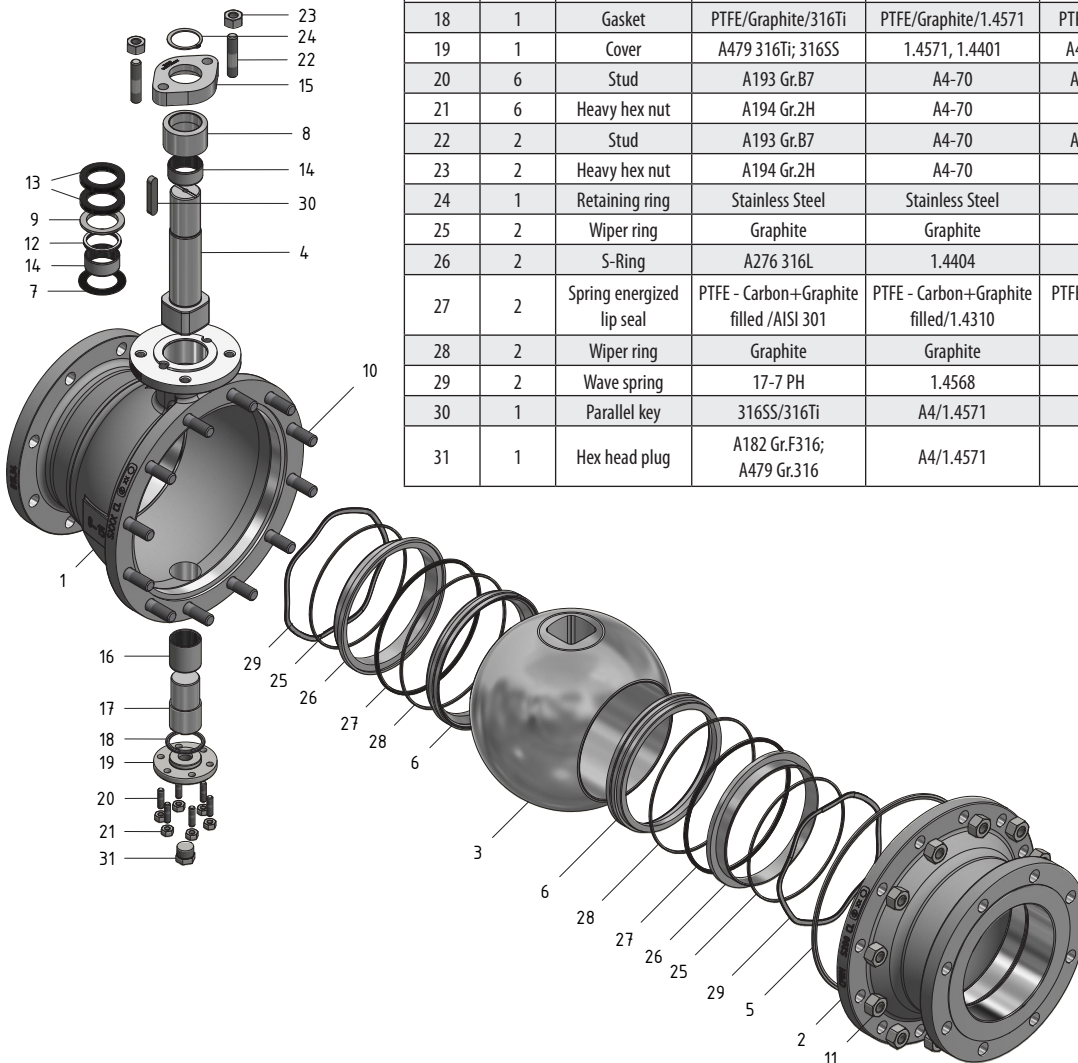
Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
16	2	Parallel key	316SS/316Ti	A4/1.4571	316ss/316Ti	A4/1.4571

6" class 300 floating ball design with key connection item 16  
 \* Quantities may differ depending on the valve size



# Trunnion Design Standard Trim

## Trunnion Design

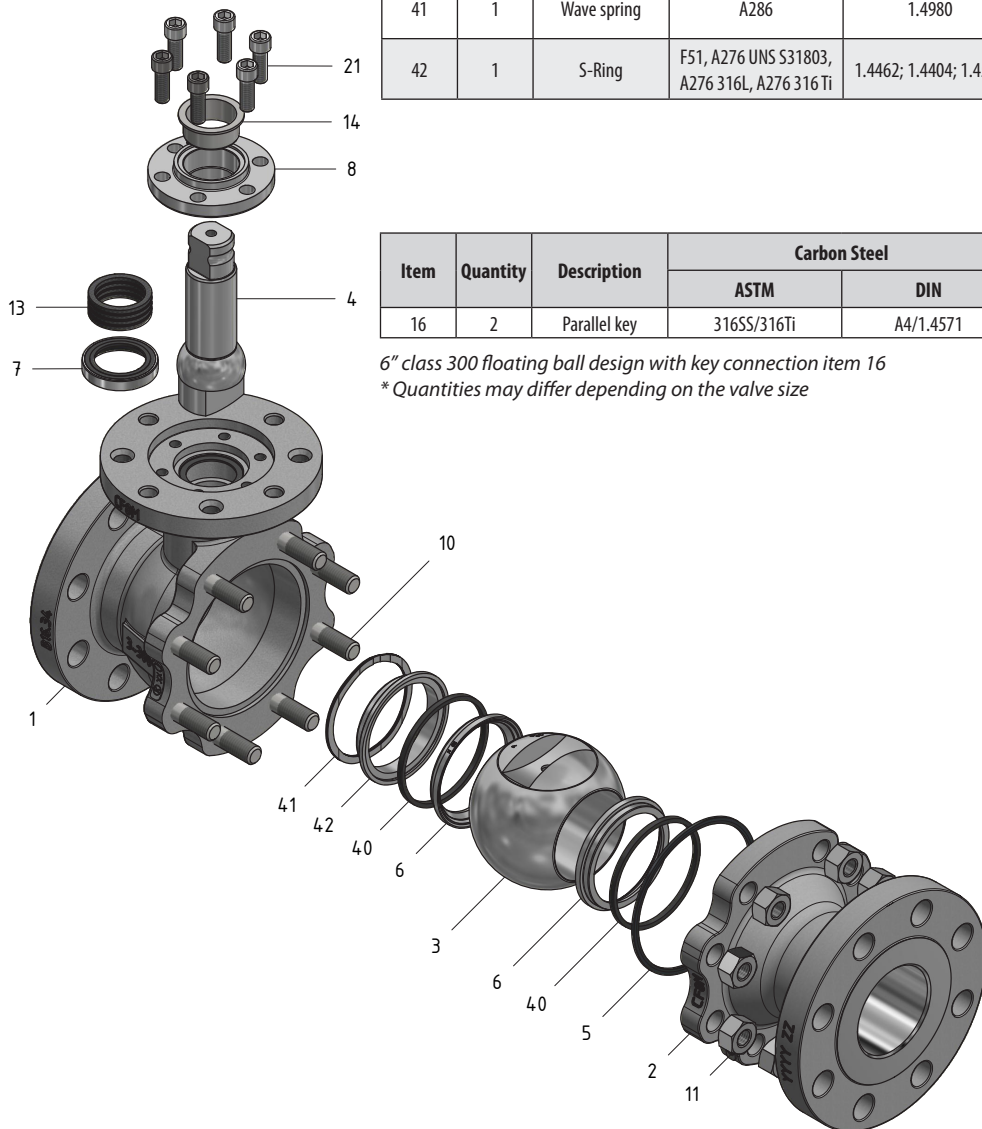


Item	Quantity	Description	Carbon Steel		Stainless Steel	
			ASTM	DIN	ASTM	DIN
1	1	Body	A216 WCB	1.0619	A351 CF8M	1.4408
2	1	Tail	A216 WCB	1.0619	A351 CF8M	1.4408
3	1	Ball	A351 CF8M+coating; A182 F316L+coating	1.4408+coating; 1.4404+coating	A351 CF8M+coating; A182 F316L+coating	1.4408+coating, 1.4404+coating
4	1	Stem	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	Stem seal	Inconel 625	Inconel 625	Inconel 625	Inconel 625
8	1	Gland	A582 303	1.4305	A582 303	1.4305
9	1	Support Ring	A479 316Ti; 316SS	1.4571; 1.4401	A479 316Ti; 316SS	1.4571; 1.4401
10	12	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
11	12	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/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	A516 Gr.70	1.0425	A240 316Ti; 316SS	1.4571, 1.4401
16	1	Sleeve bearing	316L+coating	1.4404+coating	316L+coating	1.4404+coating
17	1	Bottom stem	A479 316Ti; 316SS	1.4571, 1.4401	A479 316Ti; 316SS	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; 316SS	1.4571, 1.4401	A479 316Ti; 316SS	1.4571, 1.4401
20	6	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
21	6	Heavy hex nut	A194 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	A194 Gr.2H	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

# Floating Ball Design High Temperature Trim

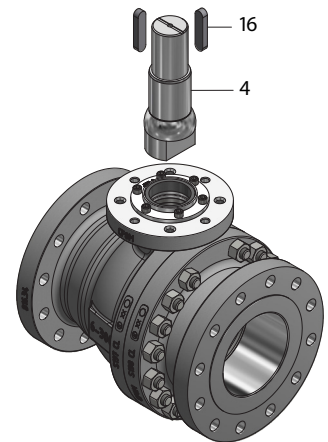
## Floating Ball Design

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	A276 Gr.431	1.4057	A276 Gr.431	1.4057
5	1	Body gasket	Graphite/316SS	Graphite/1.4571	Graphite/316Ti	Graphite/1.4571
6	2	Seat	A182 F316L +coating	1.4404+coating	A182 F316L +coating	1.4404+coating
7	1	S2 Stem seal	e-Carbon	e-Carbon	e-Carbon	e-Carbon
8	1	Packing gland	A479 316Ti ; 316SS	1.4571; 1.4401	A479 316Ti ; 316SS	1.4571; 1.4401
10*	8	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
11*	8	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	A582 303 coated	1.4305 coated	A582 303 coated	1.4305 coated
21*	6	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	1.4980	A286	1.4980
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

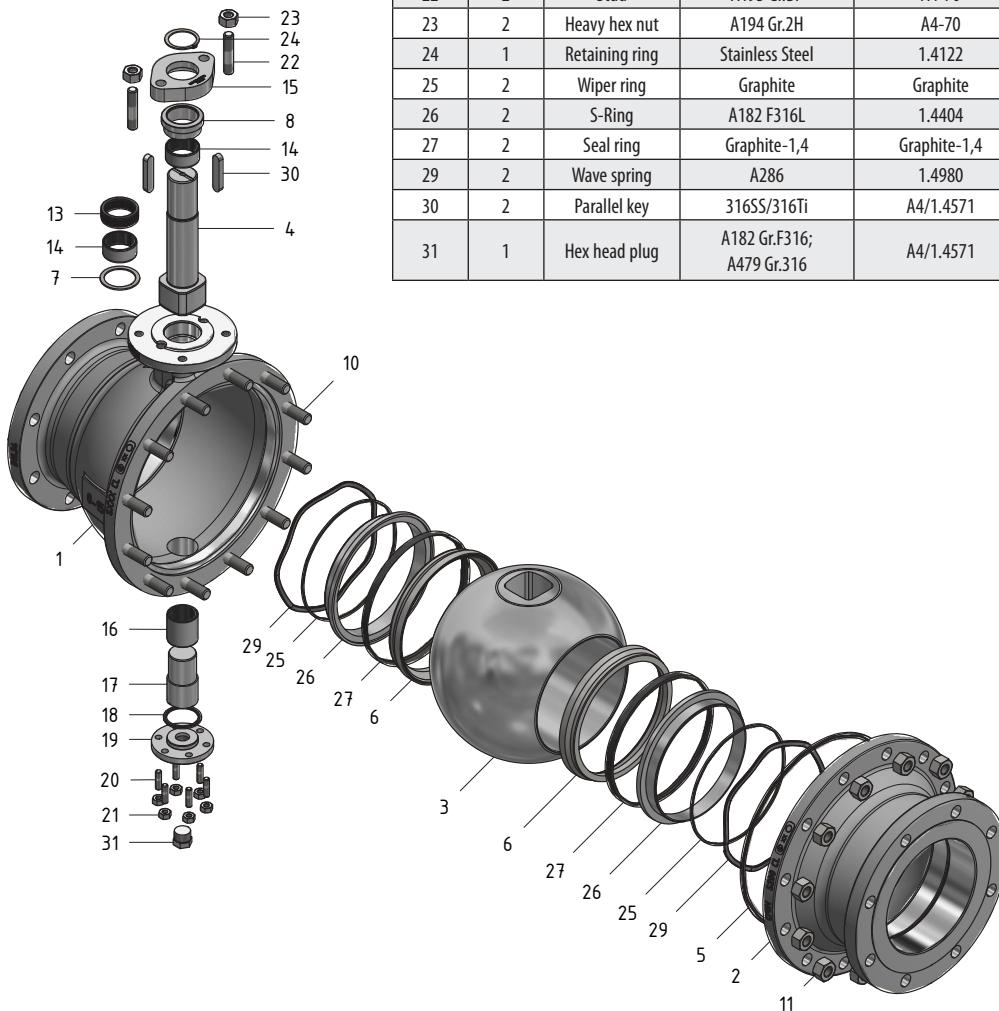
6" class 300 floating ball design with key connection item 16  
 \* Quantities may differ depending on the valve size



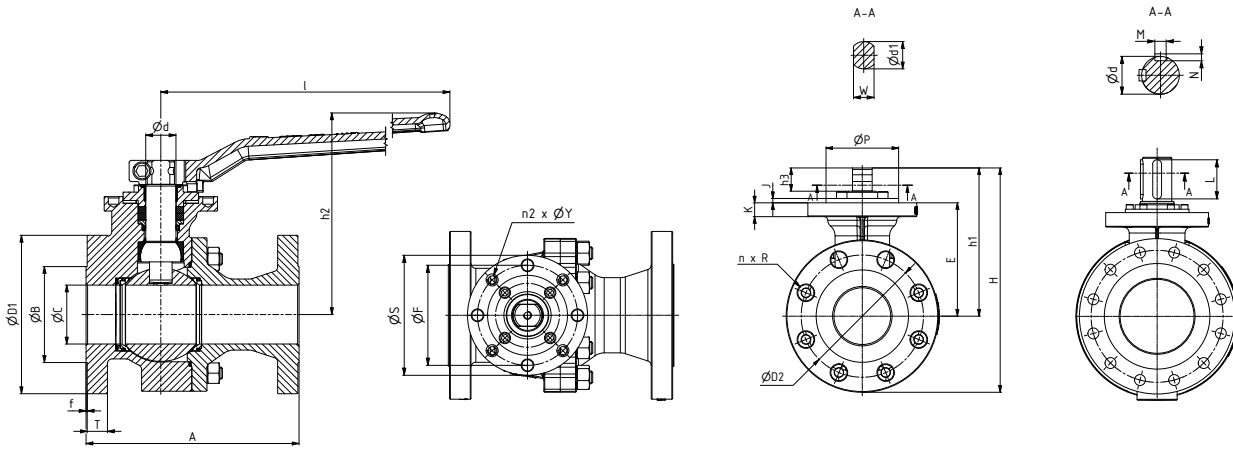
# Trunnion Design High Temperature Trim

## 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	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	A276 Gr.431	1.4057	A276 Gr.431	1.4057
5	1	Body gasket	Graphite/316Ti	Graphite/1.4571	Graphite/316Ti	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 Gr.303	1.4305	A582 Gr.303	1.4305
10	12	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
11	12	Heavy hex nut	A194 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	Inconel 625+coating	Inconel 625+coating
15	1	Gland flange	A516 Gr.70	1.0425	A240 316Ti; 316SS	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; 316SS	1.4571, 1.4401	A479 316Ti; 316SS	1.4571, 1.4401
18	1	Sealing	Graphite/316Ti	Graphite/1.4571	Graphite/316Ti	Graphite/1.4571
19	1	Cover	A479 316Ti; 316	1.4571; 1.4401	A479 316Ti; 316SS	1.4571; 1.4401
20	6	Stud	A193 Gr.B7	A4-70	A193 Gr.B8M Cl.2	A4-70
21	6	Heavy hex nut	A194 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	A194 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	A276 316Ti, 316L	1.4571; 1.4404
27	2	Seal ring	Graphite-1,4	Graphite-1,4	Graphite-1,4	Graphite-1,4
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



# 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	l	
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

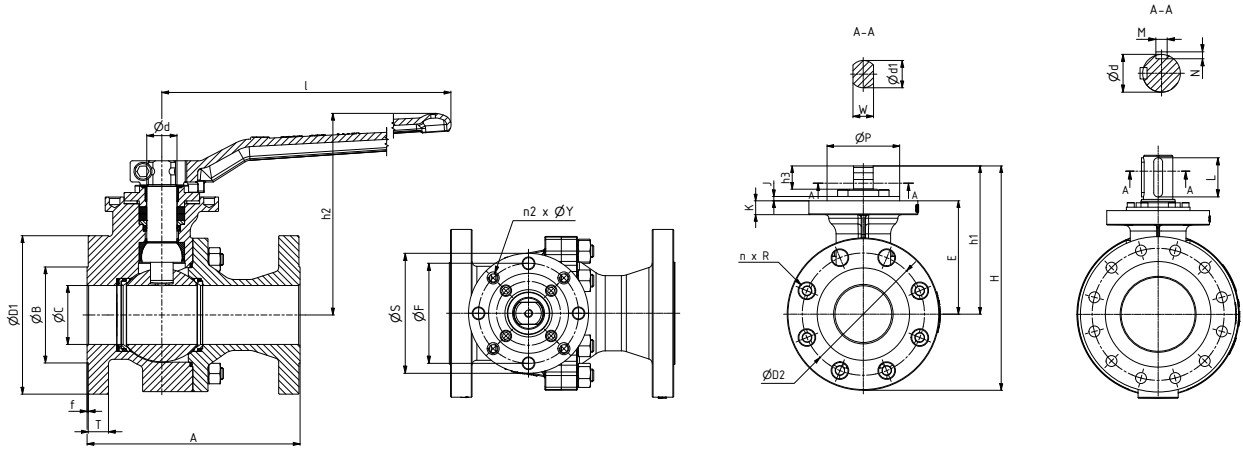
DN	NPS	Dimensions (inch)														
		ISO 5211	ØS	ØP	ØF	n2	ØY	K	J	Ød	L	M	N	h3	W	Ød1
15	1/2"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	0.433	0.551
20	3/4"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	0.433	0.551
25	1"	F05	2.559	1.378	1.969	4	M6	0.354	0.079	0.630	-	-	-	0.472	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"	F14	6.89	3.937	5.512	4	M16	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	l	
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"	F14	175	100	140	4	M16	18	6	40	-	-	-	32	27	36
150	6"	F14	175	100	140	4	M16	22	6	50	-	-	-	36	36	48



# Floating Ball Design Dimensions and Weights Class 300



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

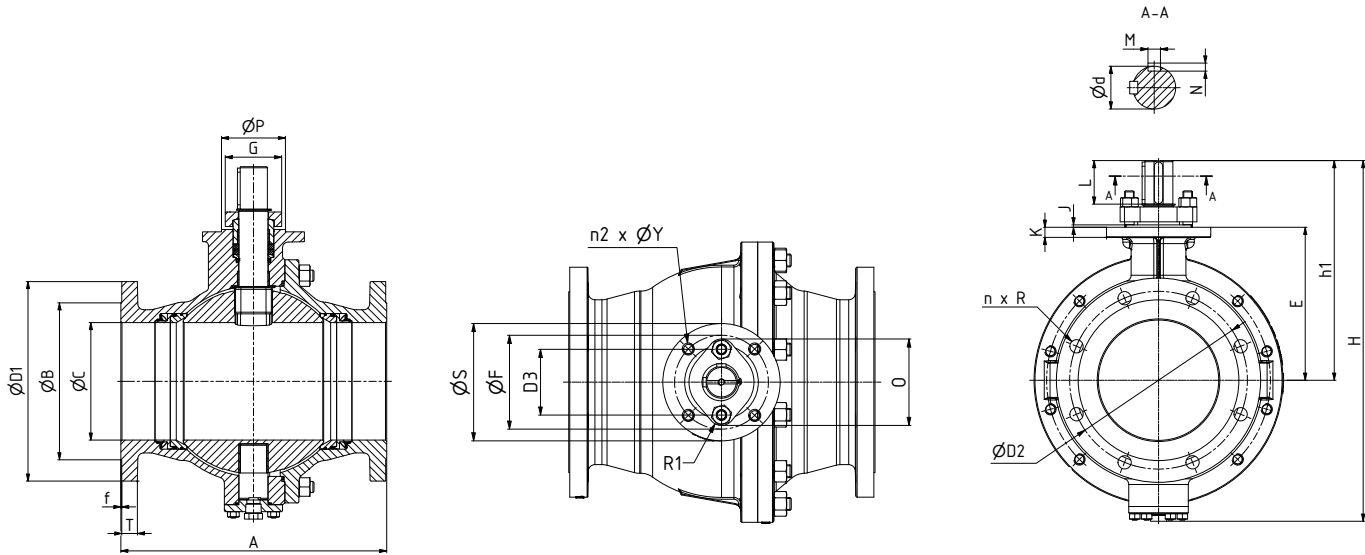
DN	NPS	Dimensions (inch)														Weights (lb)
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	h2	I	
15	1/2"	5.512	0.512	5.7	2.7	1.9	3.7	2.618	4	0.622	1.378	0.500	0.063	3.858	7.165	7.1
20	3/4"	5.984	0.748	6.3	2.9	2.1	4.6	3.252	4	0.748	1.693	0.555	0.063	4.016	7.165	9.9
25	1"	6.496	0.984	6.7	3.1	2.3	4.9	3.500	4	0.748	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"	F14	6.89	3.937	5.512	4	M16	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	I	
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"	F14	175	100	140	4	M16	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	-	-	-

# Trunnion Design Dimensions and Weights Class 150



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

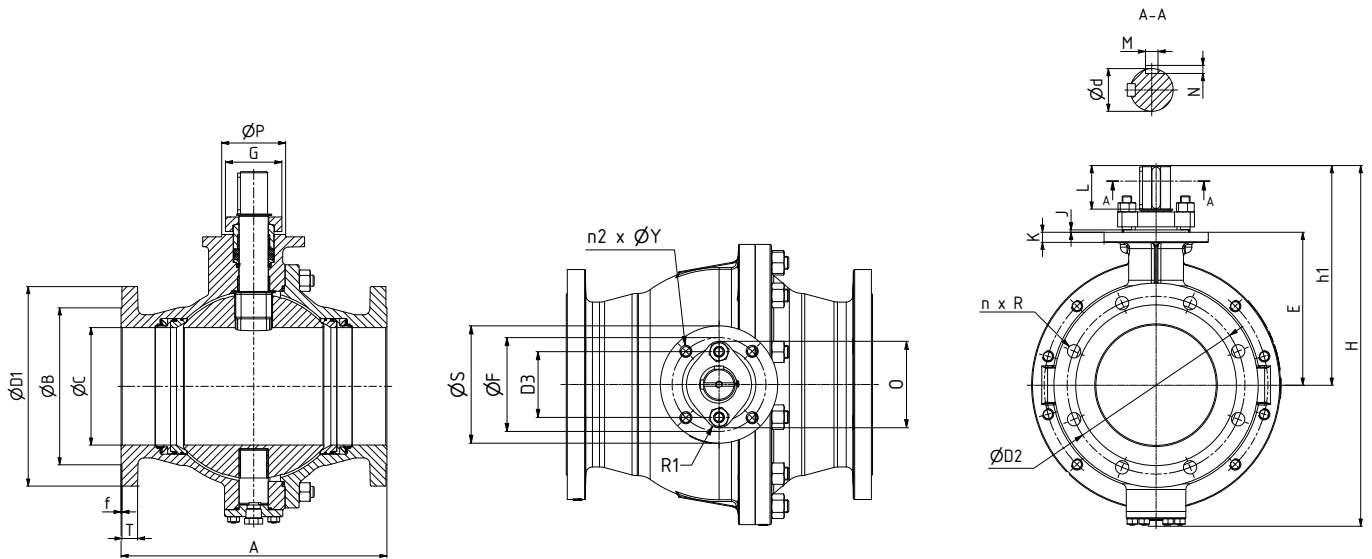
DN	NPS	Dimensions (inch)															Weights (lb)	
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	O	G	D3		R1
200	8"	17.992	7.953	23.5	14.5	10.1	13.5	11.748	8	0.875	10.622	1.059	0.063	5.079	3.819	3.858	0.787	377.5
250	10"	20.984	9.921	26.7	16.2	11.8	16.0	14.252	12	1.000	12.748	1.126	0.063	5.079	3.819	3.858	0.787	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	0.669	0.669	0.157	1.969	2.756	0.551	0.354
250	10"	F14	6.890	3.937	5.512	4	0.669	0.866	0.157	1.969	2.756	0.551	0.354
300	12"	F16	8.268	5.118	6.496	4	0.827	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	17	17	4	50	70	14	9
250	10"	F14	175	100	140	4	17	22	4	50	70	14	9
300	12"	F16	210	130	165	4	21	21	5	70	100	18	11

# Trunnion Design Dimensions and Weights Class 300



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

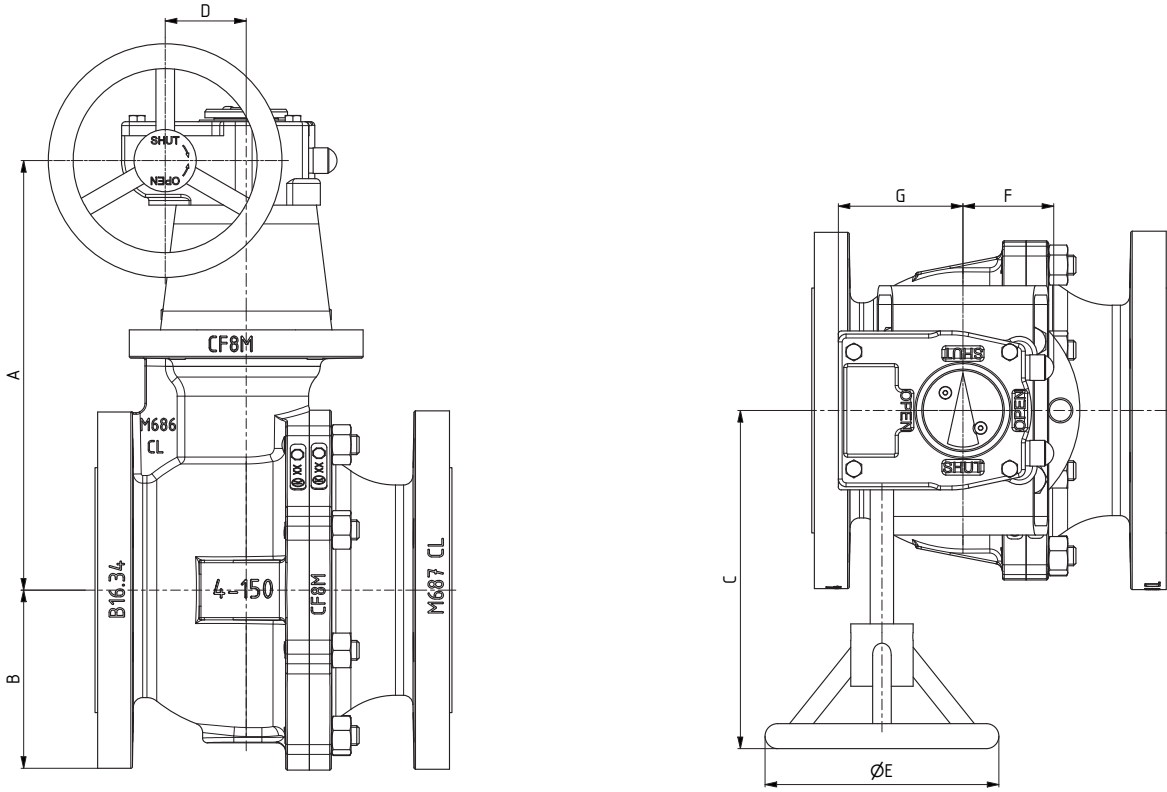
DN	NPS	Dimensions (inch)															Weights (lb)	
		A	ØC	H	h1	E	ØD1	ØD2	n	R	ØB	T	f	O	G	D3		R1
200	8"	19.764	7.953	24.0	14.6	10.1	15.0	13.000	12	1.000	10.622	1.555	0.063	7.008	4.016	5.118	0.945	517.3
250	10"	22.362	9.921	28.2	17.4	11.4	17.5	15.252	16	1.125	12.748	1.815	0.063	7.008	4.016	5.118	0.945	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	0.827	1.142	0.276	2.756	3.150	0.709	0.433
250	10"	F16	8.268	5.118	6.496	4	0.827	0.827	0.197	2.756	2.756	0.709	0.433
300	12"	F25	11.811	7.874	10.000	8	0.669	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	21	21	5	70	70	18	11
250	10"	F25	300	200	254	8	17	18	5	70	100	18	11
300	12"	F25	300	200	254	8	17	30	5	80	110	20	12

# Standard Design with Gears Class 150



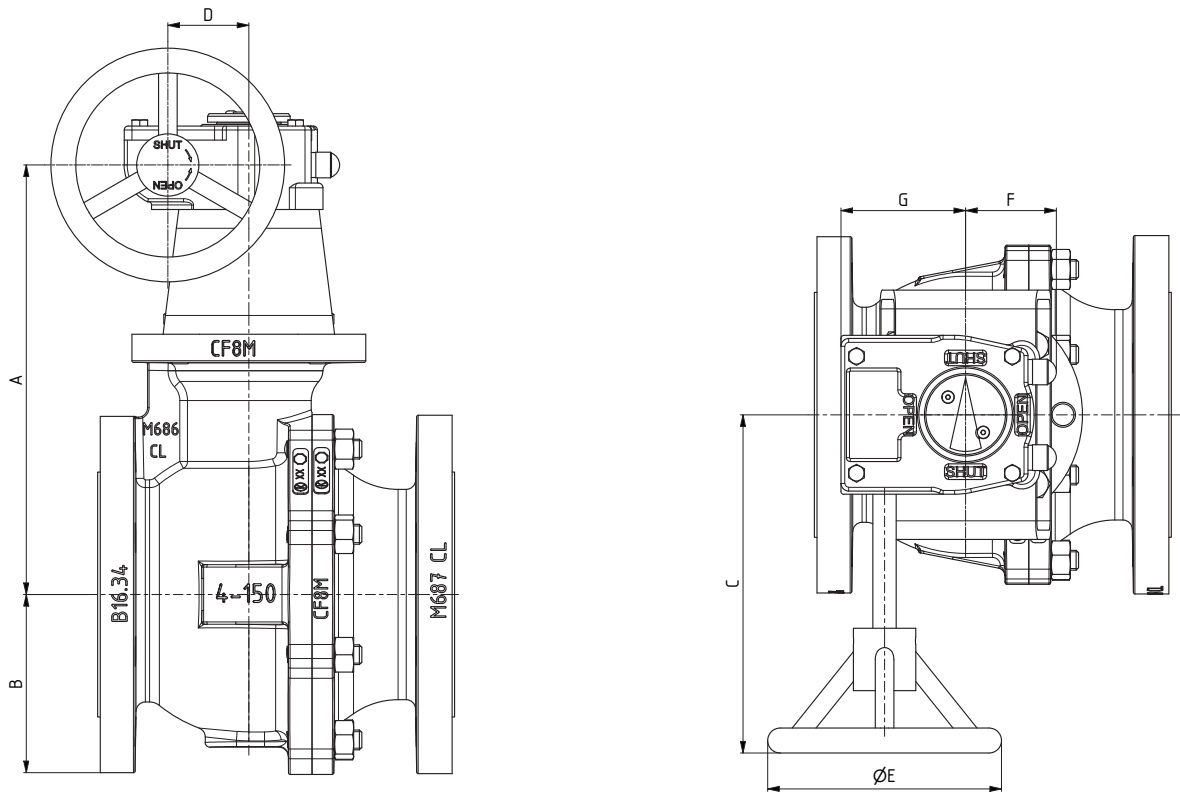
Gear dimensions are for reference only.

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.

## Standard Design with Gears Class 300



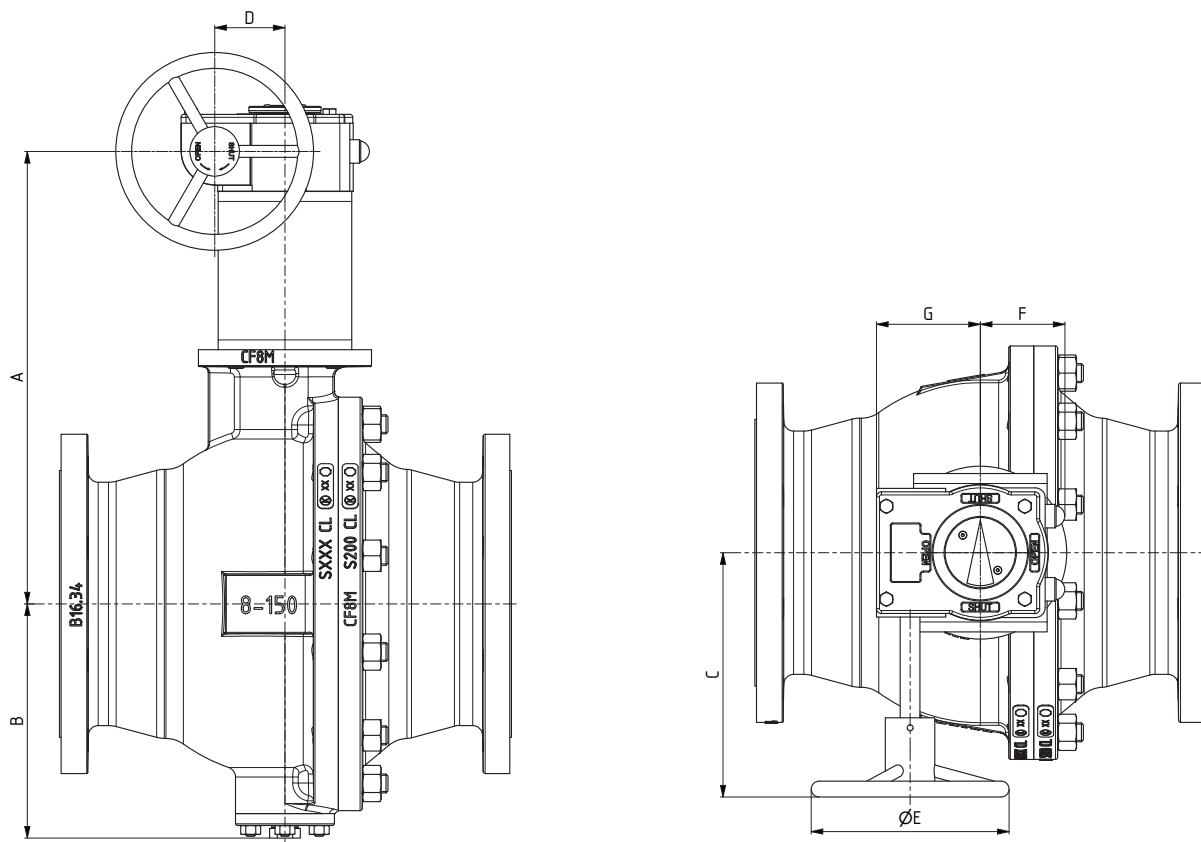
Gear dimensions are for reference only.

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.

# High Temperature Design with Gears Class 150



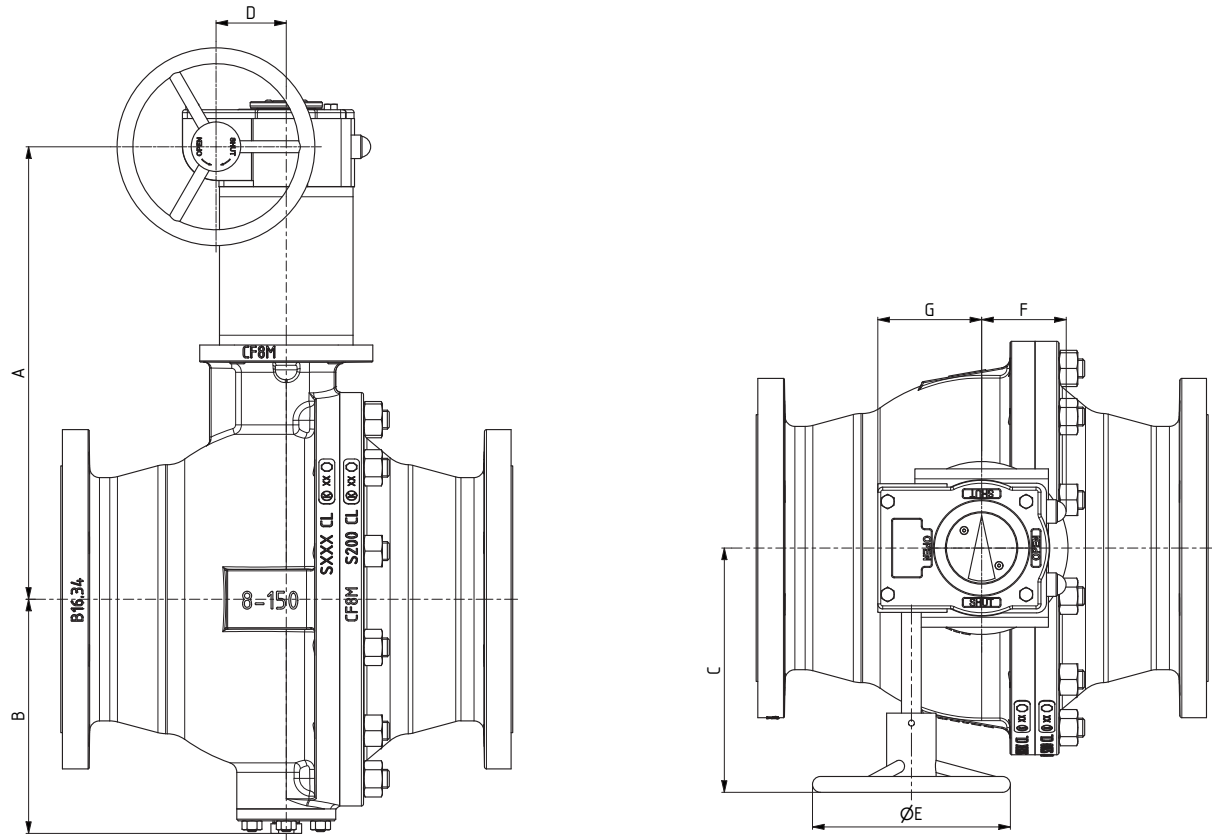
Gear dimensions are for reference only.

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.

## High Temperature 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.

# Pressure/Temperature Ratings

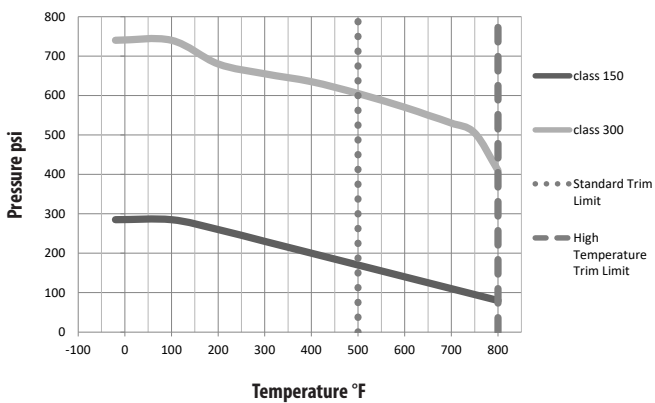
Temperature	Max working pressure ASME class 150	Max working pressure ASME class 300
	ASTM A216 Gr. WCB*	
°F	psi	
-20	285	740
100	285	740
200	260	680
300	230	655
400	200	635
500	170	605
600	140	570
650	125	550
700	110	530
750	95	505
800	80	410

\*according ASME B16.34 - Material Group 1.1

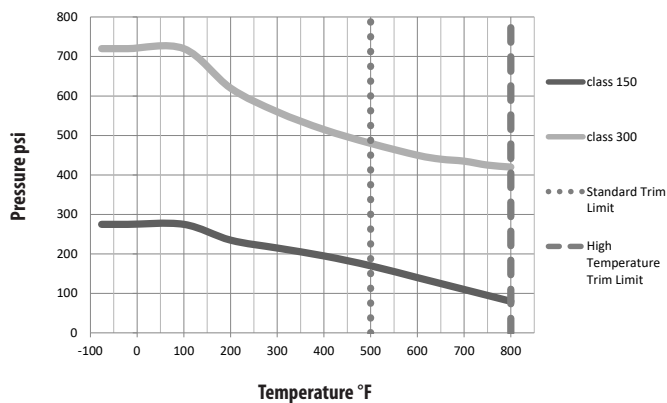
Temperature	Max working pressure ASME class 150	Max working pressure ASME class 300
	ASTM A351 Gr. CF8M*	
°F	psi	
-76	275	720
-20	275	720
100	275	720
200	235	620
300	215	560
400	195	515
500	170	480
600	140	450
650	125	440
700	110	435
750	95	425
800	80	420

\*according ASME B16.34 - Material Group 2.2

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



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





# Pressure/Temperature Ratings

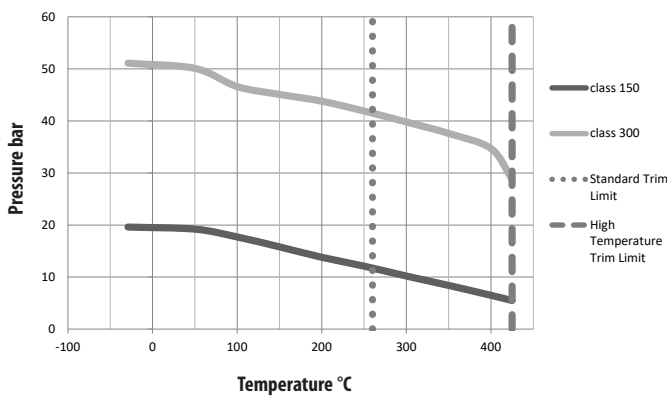
Temperature	Max working pressure ASME class 150	Max working pressure ASME class 300
	ASTM A216 Gr. WCB*	
°C	bar	
-29	19.6	51.1
50	19.2	50.1
100	17.7	46.6
150	15.8	45.1
200	13.8	43.8
250	12.1	41.9
300	10.2	39.8
350	8.4	37.6
400	6.5	34.7
425	5.5	28.8

\*according ASME B16.34 - Material Group 1.1

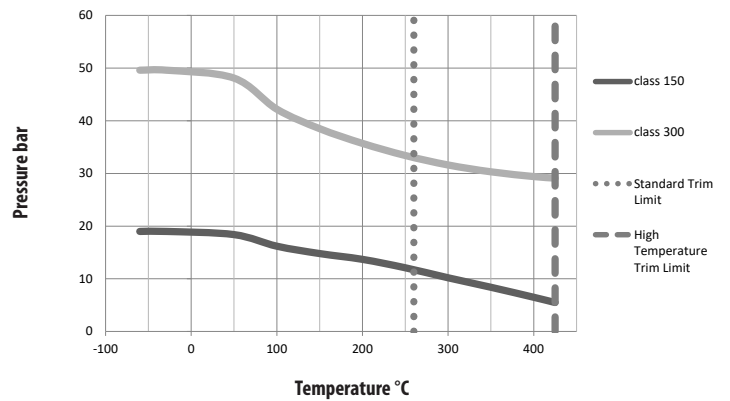
Temperature	Max working pressure ASME class 150	Max working pressure ASME class 300
	ASTM A351 Gr. CF8M*	
°C	bar	
-60	19.0	49.6
-29	19.0	49.6
50	18.4	48.1
100	16.2	42.2
150	14.8	38.5
200	13.7	35.7
250	12.1	33.4
300	10.2	31.6
350	8.4	30.3
400	6.5	29.4
425	5.5	29.1

\*according ASME B16.34 - Material Group 2.2

Pressure & Temperature  
ASTM A216 Gr. WCB



Pressure & Temperature  
ASTM A351 Gr. CF8M



# 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
<b>Floating Ball Design</b>								
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
<b>Trunion Design</b>								
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
<b>Floating Ball Design</b>								
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
<b>Trunion Design</b>								
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

# 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
<b>Floating Ball Design</b>								
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
<b>Trunion Design</b>								
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
<b>Floating Ball Design</b>								
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
<b>Trunion Design</b>								
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

# Operating Torques

## Torques Class 150

DN	NPS	Torque [in-Lb]					
		BTO	RUN	ETO	BTC	RUN	ETC
<b>Floating Ball Design</b>							
15	1/2"	89	80	80	89	80	80
20	3/4"	106	80	89	97	80	89
25	1"	124	89	89	97	89	97
40	1 1/2"	283	168	177	195	168	212
50	2"	451	221	239	266	221	319
80	3"	1372	566	611	673	566	903
100	4"	3009	1275	1345	1478	1275	1974
150	6"	8922	3284	3576	3939	3284	5656
<b>Trunion Design</b>							
200	8"	6125	2894	3124	3434	2894	3779
250	10"	8868	4027	4443	4886	4027	5355
300	12"	16285	7373	8036	8842	7373	9966

## Torques Class 300

DN	NPS	Torque [in-Lb]					
		BTO	RUN	ETO	BTC	RUN	ETC
<b>Floating Ball Design</b>							
15	1/2"	115	80	89	97	80	97
20	3/4"	142	89	89	106	89	115
25	1"	195	97	106	115	97	142
40	1 1/2"	496	204	212	239	204	319
50	2"	1053	451	469	522	451	690
80	3"	3381	1275	1319	1443	1275	2106
100	4"	6753	2292	2363	2593	2292	4045
150	6"	21375	6576	6868	7559	6576	12497
<b>Trunion Design</b>							
200	8"	13940	5974	6196	6815	5974	8674
250	10"	20118	7948	8355	9187	7948	12028
300	12"	33934	12745	13409	14745	12745	19658

DN	NPS	Torque [Nm]					
		BTO	RUN	ETO	BTC	RUN	ETC
<b>Floating Ball Design</b>							
15	1/2"	10	9	9	10	9	9
20	3/4"	12	9	10	11	9	10
25	1"	14	10	10	11	10	11
40	1 1/2"	32	19	20	22	19	24
50	2"	51	25	27	30	25	36
80	3"	155	64	69	76	64	102
100	4"	340	144	152	167	144	223
150	6"	1008	371	404	445	371	639
<b>Trunion Design</b>							
200	8"	692	327	353	388	327	427
250	10"	1002	455	502	552	455	605
300	12"	1840	833	908	999	833	1126

DN	NPS	Torque [Nm]					
		BTO	RUN	ETO	BTC	RUN	ETC
<b>Floating Ball Design</b>							
15	1/2"	13	9	10	11	9	11
20	3/4"	16	10	10	12	10	13
25	1"	22	11	12	13	11	16
40	1 1/2"	56	23	24	27	23	36
50	2"	119	51	53	59	51	78
80	3"	382	144	149	163	144	238
100	4"	763	259	267	293	259	457
150	6"	2415	743	776	854	743	1412
<b>Trunion Design</b>							
200	8"	1575	675	700	770	675	980
250	10"	2273	898	944	1038	898	1359
300	12"	3834	1440	1515	1666	1440	2221

The torques shown in the chart are for reference only (liquid, 260°C, BH Packing, Safety=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

# 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	1027	1027
20	3/4"	M30x1	1027	1027
25	1"	M30x1	1027	1027
40	1 1/2"	M36x1,5	1983	1983
50	2"	M36x1,5	1983	1983
80	3"	M48x1,5	4337	3443
100	4"	3/8-16 UNC	239	160
150	6"	5/16-18 UNC	213	151
200	8"	5/8-11 UNC	1231	850
250	10"	5/8-11 UNC	1231	850
300	12"	1-8 UNC	3089	3098

## Packing gland nut torques Class 300

DN	NPS	Thread Size	Standard Trim	High Temperature Trim
			[in-Lb]	[in-Lb]
15	1/2"	M30x1	1027	1027
20	3/4"	M30x1	1027	1027
25	1"	M30x1	1027	1027
40	1 1/2"	M36x1,5	1983	1983
50	2"	M48x1,5	4337	3443
80	3"	3/8-16 UNC	239	160
100	4"	5/16-18 UNC	213	151
150	6"	3/8-16 UNC	390	390
200	8"	1-8 UNC	3089	3098
250	10"	1-8 UNC	3089	3098
300	12"	1-8 UNC	3497	3497

DN	NPS	Thread Size	Standard Trim	High Temperature Trim
			[Nm]	[Nm]
15	1/2"	M30x1	116	116
20	3/4"	M30x1	116	116
25	1"	M30x1	116	116
40	1 1/2"	M36x1,5	224	224
50	2"	M36x1,5	224	224
80	3"	M48x1,5	490	389
100	4"	3/8-16 UNC	27	18
150	6"	5/16-18 UNC	24	17
200	8"	5/8-11 UNC	139	96
250	10"	5/8-11 UNC	139	96
300	12"	1-8 UNC	349	350

DN	NPS	Thread Size	Standard Trim	High Temperature Trim
			[Nm]	[Nm]
15	1/2"	M30x1	116	116
20	3/4"	M30x1	116	116
25	1"	M30x1	116	116
40	1 1/2"	M36x1,5	224	224
50	2"	M48x1,5	490	389
80	3"	3/8-16 UNC	27	18
100	4"	5/16-18 UNC	24	17
150	6"	3/8-16 UNC	44	44
200	8"	1-8 UNC	349	350
250	10"	1-8 UNC	349	350
300	12"	1-8 UNC	395	395

# Body Joint & Cover Torques

## Body joint torques Class 150

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

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

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

# 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
<b>Floating Ball Design</b>																	
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
<b>Trunion Design</b>																	
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

# Product Coding

PRODUCT LINE				DESIGN							
Valve	General Design	Bonnet	Valve Type	Size	Pressure Class	Seat Type	Sealing System	Bore Size	End Connection	Face to Face	Bo
KFO	1	1	76	G	D	B	1	1	A	1	

## PRODUCT LINE

Valve	
Standard Flange Ball Valve	KFO

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

Bonnet	
Standard	1
Bonnet extension	2

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

## DESIGN

Nominal pipe size		
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

Pressure Class	
Class 150	D
Class 300	G

Seat Type	
Double Seat/ Bi-Directional	B

Sealing System	
Standard Sealing System	1

Bore Size	
Full Port	1

Connection	
Flanged - ASME B16.5 RF	A

Face to Face	
ASME B16.10 Long	1



# Product Coding

MATERIAL						OTHER			OPERATION	OPTIONS
Body Material	Stem Material	Stem Seal	Ball Base Material	Seat Base Material	Coating System	Maximum Temperature	Jacket	Drain/ Purge Ports	Operator	Options
B	H	2	F	F	2	B	0	0	F	0

## 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 A494 Gr. CY40	J
ASTM A351 Gr. CN7M	K
ASTM A351 Gr. CT15C	L
ASTM A494 Gr. M35-1	M
ASTM A351 Gr. CF3M	N
ASTM A995 Gr. 6A	R
ASTM A494 Gr. CX2MW	T
Other	X

Stem Material	
ASTM A564 Gr. 630 (17-4 PH), H1150-D	A
ASTM A276 Gr. 420 (UNS S42000)	B
ASTM A276 Gr 316Ti (UNS S31635)	C
ASTM A182 Gr. F51 (UNS S31803)	D
ASTM A543 Gr. 660 (UNS S66286)	E
ASTM A286 Gr. XM-19	F
ASTM A276 Gr. 431 (UNS S43100)	H
ASTM A182 Gr. F316L (UNS S31603)	I
Other	X

Stem Seal (Packing)	
Standard Graphite	1
Fugitive Emission Packing (ISO15484/API-641)	2

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	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
Other	X

Coating System		
H3	Ball: M3 Nickel/Chrome (NiCr) Seat: M3 Nickel/Chrome (NiCr)	2
H4	Ball: M6 Nickel/Chrome/Tungsten Carbide (NiCr-WC) Seat: M3 Nickel/Chrome (NiCr)	3
H5	Ball: M4 Cobalt based (Stellite SF20) Seat: M4 Cobalt based (Stellite SF20)	4
H6	Ball: M11 Chromium Carbide/Nickel/Chromium (Cr3C2-NiCr) Seat: M11 Chromium Carbide/Nickel/Chromium (Cr3C2-NiCr)	5
H10	Ball: M12 Tungsten Carbide Seat: M12 Tungsten Carbide	6
H11	Ball: M2 Hard Chromium (Cr) Seat: M2 Hard Chromium (Cr)	7

## OTHER

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

Heating Jacket	
None	0

Drain/Purge Ports	
None	0

## OPERATION

Operator	
Bare Stem	F
Lever - Locking	L
Gear (manual)	G
Actuated (pneumatic, hydraulic, electric)	A
Mounting kit w/o Operator	M
Extended Lever	J
Stem Extension	H
Stem Extension with Locking Lever	O
Stem Extension with Gear	P
Stem Extension with Actuator	R
Other	X

## OPTIONS

Options	
None	0
NACE MR 0103 or 0175	1
Special	X





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