

CE
0035



A-T Controls, Inc.

ACUTROL

Trunnion Mounted Ball Valves

*2 pc. Cast Soft Seat
3 pc. Forged Soft Seat
Welded Body*



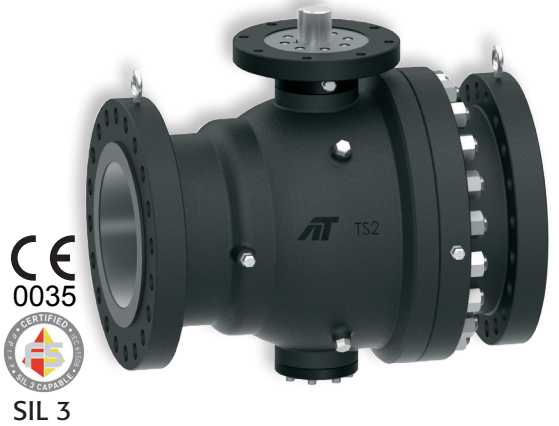
WWW.ATCONTROLS.COM

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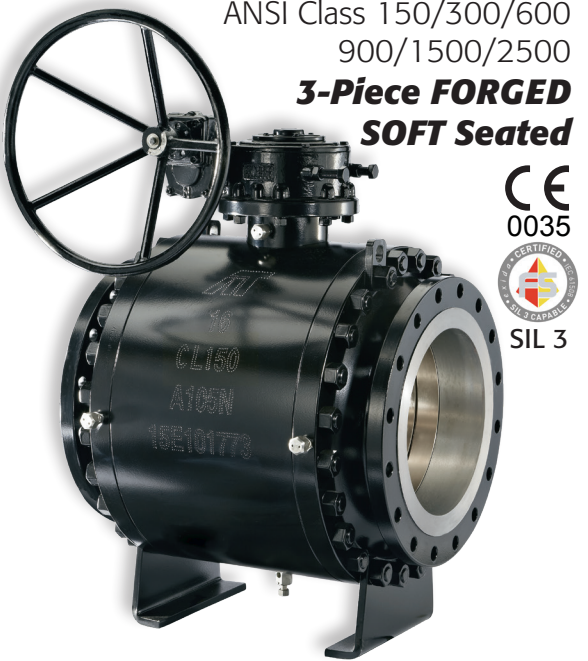
TS & TSW SERIES Soft Seat Trunnion Mounted Ball Valves

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TS2 Series 2" to 12" Cast, ANSI Class 150/300 **2-Piece CAST SOFT Seated**



TS3 Series 2" to 48" Forged ANSI Class 150/300/600 900/1500/2500 **3-Piece FORGED SOFT Seated**



A-T Controls has been providing automated valve solutions for process industries since 1994. We have a 122,000 sq. ft. facility in Cincinnati, Ohio and a 85,000 sq. ft. facility in Houston, Texas. With strong engineering and application expertise, and an unparalleled inventory, A-T is ready to provide the highest quality quarter-turn valve packages from 1/4" to 48" in multiple end connections and port configurations.

SOFT SEAT

Valve Standards, Testing & Certifications

SOFT SEAT TRUNNION STANDARDS

DESIGN	API 6D, ASME B16.34, CSA Z245.15-13
END CONNECTIONS	Raised Face (RF), Ring Type Joint (RTJ), Butt Weld
TEMPERATURE RANGE	-50°F to 400°F
FACE-TO-FACE DIMENSION	API 6D, ASME B16.10
FLANGED DIMENSION	ASME B16.5, ASME B16.47
BODY PRESSURE TESTING	API 6D, ASME B16.34, API 598
SEAT LEAKAGE TESTING	API 6D, API 598
FIRE TESTING	API 607
NACE	MR0175/MR0103
MOUNTING	ISO 5211
MARKING SYSTEM FOR VALVES	MSS SP-25, ISO 5209
SAFETY INTEGRITY	IEC 61508:2010; SIL 3
MATERIAL CERTIFICATION	EN 10204-3.1
QUALITY ASSURANCE	ISO 9001:2015; CE/PED 2014/68/EU
CANADA REGISTRATION	CRN on file (www.atcontrols.com)

**API 607
FIRE SAFE**



API 6D



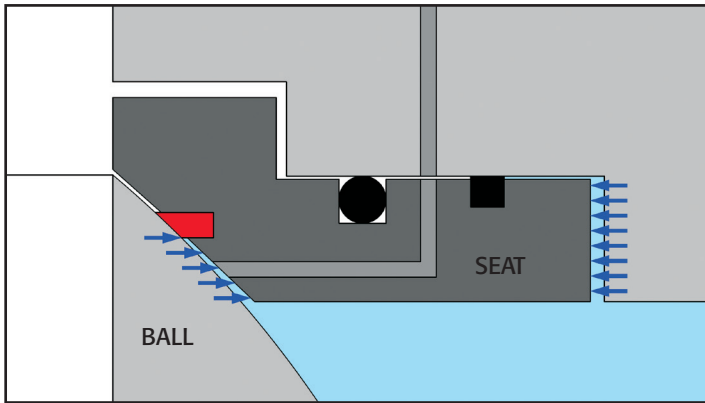
TRUNNION Mounted Ball Valve

Principle Features

SOFT SEAT

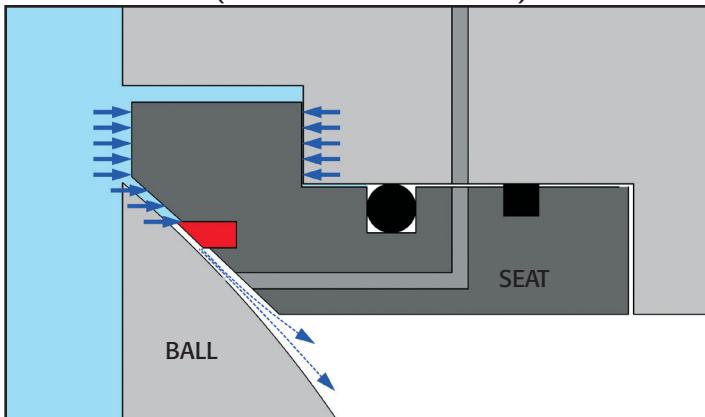
SINGLE PISTON Effect (SPE)/Self-Relieving Seats

SPE - PRESSURE AT THE SEAT UPSTREAM



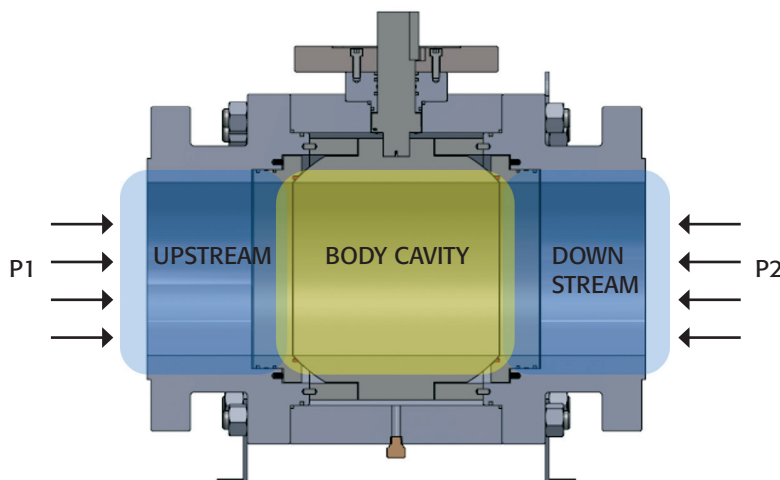
Standard seat design is SPE seat or self-relieving seat with a soft seat insert. Under normal working conditions, the resultant pressure force pushes the seat against the ball to ensure a tight seal.

SPE - PRESSURE AT THE SEAT DOWNSTREAM
(PRESSURE SELF-RELIEVING)



When the trapped pressure inside the body cavity is building up, it will push the seat away and relieve the pressure into the pipeline.

Double Block & Bleed



When pressure is applied to both closures, each seat will be forced against the ball, creating a double block. The vent in the main body can then be used to vent out the center cavity.

PRINCIPLE FEATURES

TRUNNION Mounted Ball Valve

SOFT SEAT

DOUBLE PISTON Effect (DPE)/Double Isolation Block and Bleed

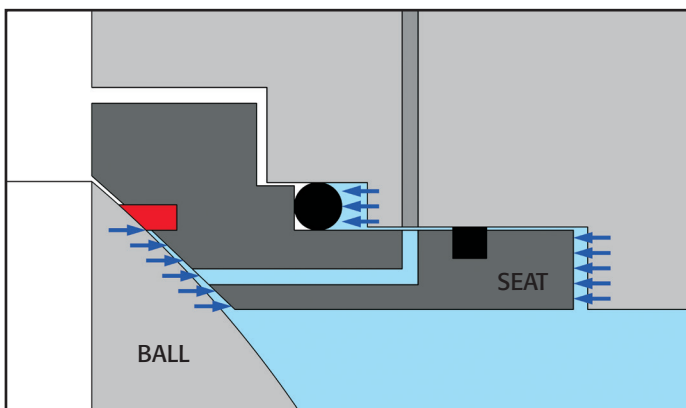
The DPE seat is an optional feature. The seat design comprises of a unique seal design that allows the seat to seal in both directions with the pressure either acting from the upstream or downstream of the seat.

When the pressure is applied from the upstream, the DPE seat works just like the SPE seat design.

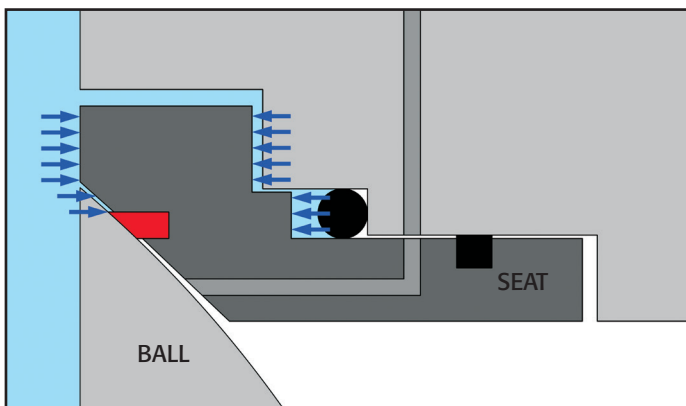
When the pressure is acting from the downstream or body cavity, the floating seal design allows the downstream pressure to push the seat against the ball.

Note that the DPE seat configuration does not have self-relieving capability, and it requires a pressure relief valve to be installed in order to avoid the pressure build up inside the body cavity.

DPE - PRESSURE AT THE SEAT UPSTREAM



DPE - PRESSURE AT THE SEAT DOWNSTREAM



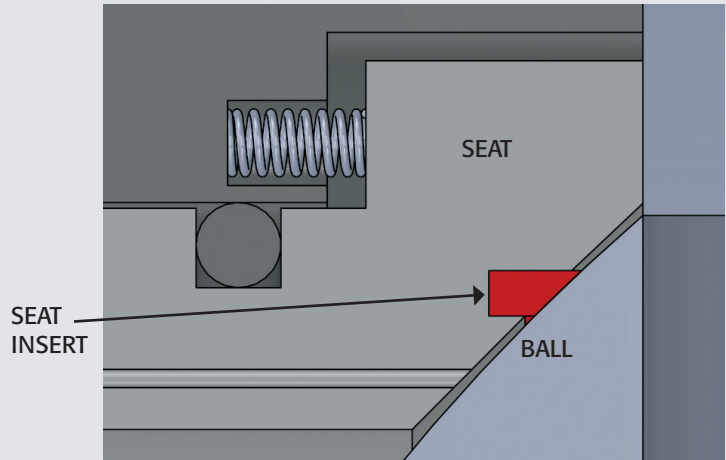
SOFT SEAT

Valve Features

Seat/Ball Sealing

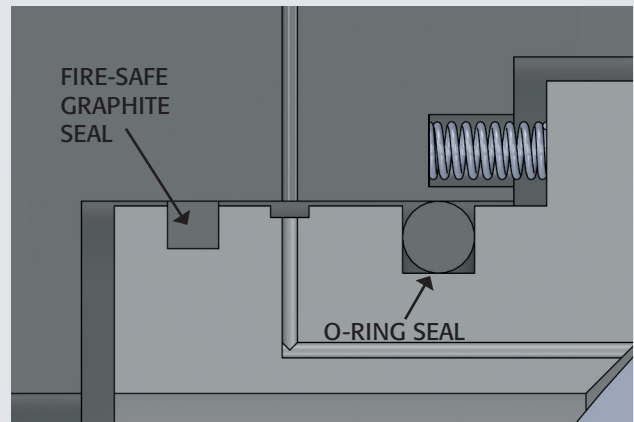
To reduce the operating torque, the seat is designed with a pressure assisted sealing mechanism coupled with seat springs to ensure a tight seal under very low differential pressure conditions.

The seat insert is made from a thermoplastic material and can be offered with a variety of materials for specific applications. Single Piston/SPE is standard. Double Piston/DPE is optional.



Seat/Body Sealing

Fire-safe seat design is a standard feature. The seat/body seal design includes a combination of soft seal and graphite seal.

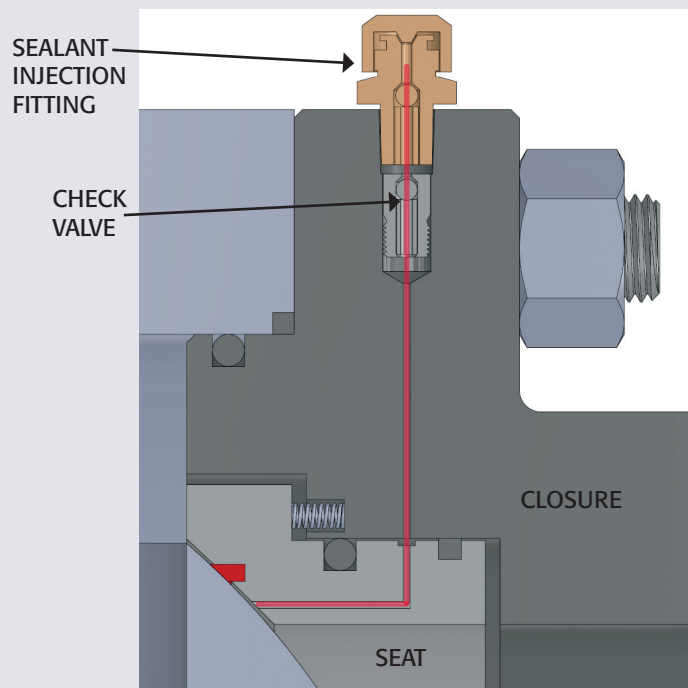


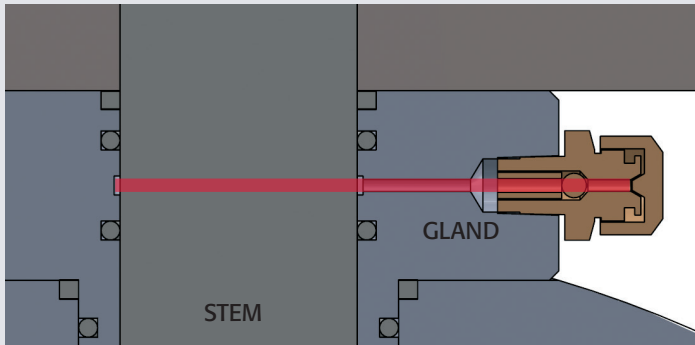
Emergency Seat Sealant Injection

Under normal operating conditions, A-T trunnion valves do not require sealants or lubricants. In the unlikely event that the seat gets damaged, an emergency shutoff may be achieved with a sealant injected into the seat sealing area.

SEALANT INJECTION FOR THE SEAT

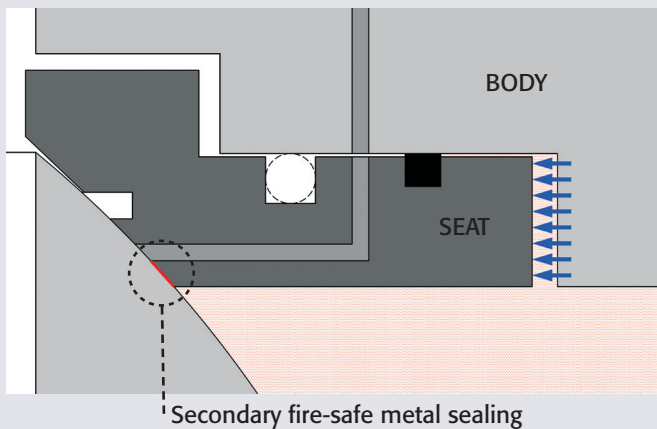
- Requires a check valve
- Not available on smaller sizes





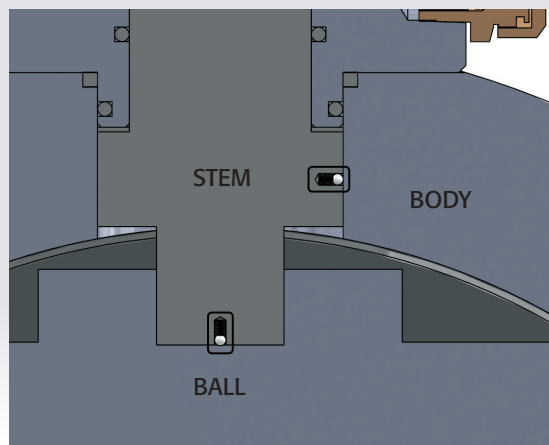
Emergency Stem Sealing & Sealant Injection

Standard stem seal configuration consists of double O-Rings and a graphite seal ring. In the unlikely event that the soft seals get damaged, the seal can be restored by injecting valve sealant into the sealing area through the sealant fitting.



Fire-safe Metal Sealing After Fire

If the soft seat insert gets damaged due to fire, the seat is designed with a secondary sealing mechanism that allows a metal-to-metal contact between the seat and ball. This secondary metal sealing is a standard feature for all A-T soft-seated trunnion mounted ball valves.



Anti-Static Device

- Anti-static devices between
 - Body and Stem
 - Stem and Ball

Paint Specification

- Epoxy Coating (Black)
- Special paint available upon request

Additional Features

- Blowout Proof Stem
- ISO 5211 Actuator Mounting

Optional Features

- Regular Port
- Extended Bonnet
- Stem Extensions
- Pup Joints

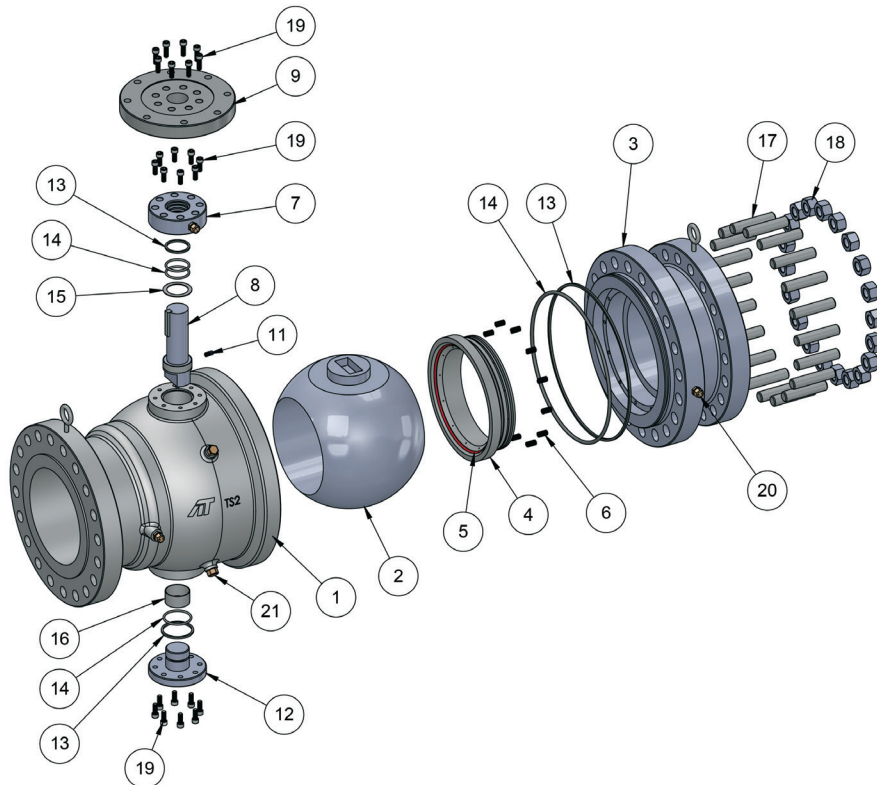
End Connection Options

- Raised Face
- RTJ
- Butt Weld

MATERIALS LIST		TRUNNION 2-PIECE DESIGN		
NO.	PART NAME	TS2 Series		
		STEEL	LOW TEMP STEEL	STAINLESS STEEL
1	BODY	A216 WCB	A352 LCC	A351 CF8M
2	BALL	A105N	A350 LF2	A182 F316
3	CLOSURE	A216 WCB	A352 LCC	A351 CF8M/CF3M
4	SEAT RING	A105N	A350 LF2	A182 F316
5	SEAT INSERT	RTFE/Nylon/Devlon®/PEEK	RTFE/Nylon/Devlon®/PEEK	RTFE/Nylon/Devlon®/PEEK
6	SPRING	Inconel® X750	Inconel® X750	Inconel® X750
7	BODY COVER	A105N	A350 LF2	A182 F316
8	STEM	A105N/4140	A350 LF2/4140	A182 F316
9	ADAPTER PLATE	A105N	A350 LF2	A182 F316
11	ANTI-STATIC DEVICE	Stainless Steel	Stainless Steel	Stainless Steel
12	LOWER TRUNNION	A105N	A350 LF2	A182 F316
13	FIRE-SAFE SEAL	Graphite	Graphite	Graphite
14	O-RING	FKM	HNBR (Low Temp)	FKM
15	THRUST WASHER	CS/TFE	SS/TFE	SS/TFE
16	BEARING	CS/TFE	SS/TFE	SS/TFE
17	STUD	A193 B7M	A320 L7M	A193 B8M
18	NUT	A194 2HM	A194 7M	A194 8M
19	CAP SCREW	A193 B7M	A320 L7M	A193 B8M
20	SEALANT FITTING	Stainless Steel	Stainless Steel	Stainless Steel
21	DRAIN VALVE	Stainless Steel	Stainless Steel	Stainless Steel

Standard materials subject to change without notice.

Seat Insert Note: RTFE is standard for 2-12"; Devlon® is standard for 14" and larger.



Forged

TS2
SERIES

SOFT SEAT

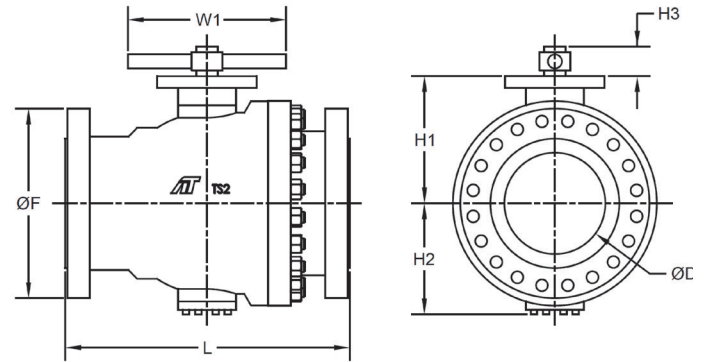
2-PC Soft Seat Valve Dimensions

DIMENSIONS (IN)

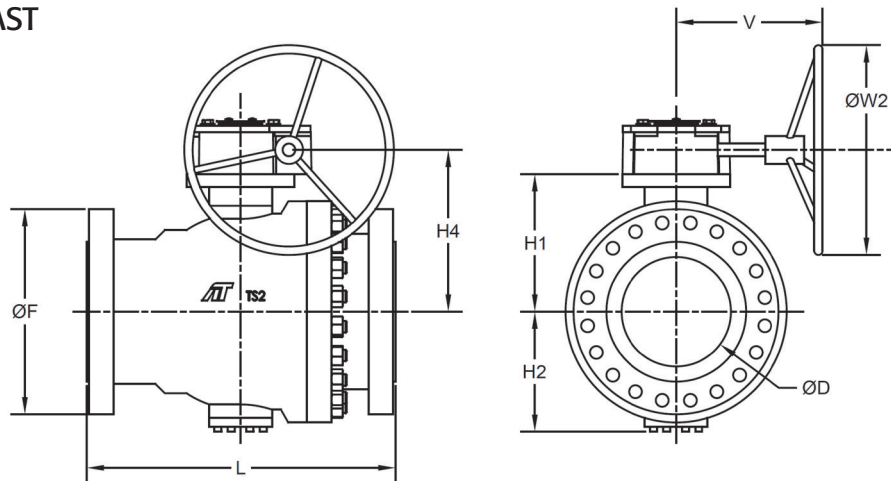
150	SIZE	ØD	L			ØF	H1	H2	H3	W1	WEIGHT (Lb)
			RF	WE	RTJ						
	2"	1.94	7.00	8.50	7.50	6.00	5.08	3.74	0.75	12.00	40
	3"	2.94	8.00	11.13	8.50	7.50	5.77	4.41	0.75	12.00	79
	4"	3.94	9.00	12.00	9.50	9.00	6.89	5.75	1.20	27.50	119

300	SIZE	ØD	L			ØF	H1	H2	H3	W1	WEIGHT (Lb)
			RF	WE	RTJ						
	2"	1.94	8.50	8.50	9.13	6.50	5.08	3.75	0.75	2.00	43
	3"	2.94	11.13	11.13	11.75	8.25	5.75	4.45	0.77	2.00	95
	4"	3.94	12.00	12.00	12.63	10.00	6.89	5.75	1.20	27.50	150

2-PIECE CAST 2"-4"



2-PIECE CAST 6"-12"



150	SIZE	ØD	L			ØF	H1	H2	H4	ØW2	V	WEIGHT (Lb)
			RF	WE	RTJ							
	6"	5.94	15.50	18.00	16.00	11.00	9.11	7.70	11.16	12.00	10.00	221
	8"	7.94	18.00	20.50	18.50	13.50	11.28	9.50	13.33	12.00	10.00	395
	10"	9.94	21.00	22.00	21.50	16.00	12.78	11.32	14.78	16.00	11.25	650
	12"	11.94	24.00	25.00	24.50	19.00	14.50	13.00	16.52	16.00	11.25	1,131

300	SIZE	ØD	L			ØF	H1	H2	H4	ØW2	V	WEIGHT (Lb)
			RF	WE	RTJ							
	6"	5.94	15.88	18.00	16.50	12.50	9.11	7.70	11.16	12.00	10.00	357
	8"	7.94	19.75	20.50	20.38	15.00	11.28	9.50	13.37	16.00	11.25	571
	10"	9.94	22.38	22.00	23.00	17.50	12.78	11.32	16.52	18.00	14.00	726
	12"	11.94	25.50	25.00	26.13	20.50	14.50	13.03	16.59	20.00	15.75	1,207

Dimensions subject to change without notice.

MATERIALS LIST

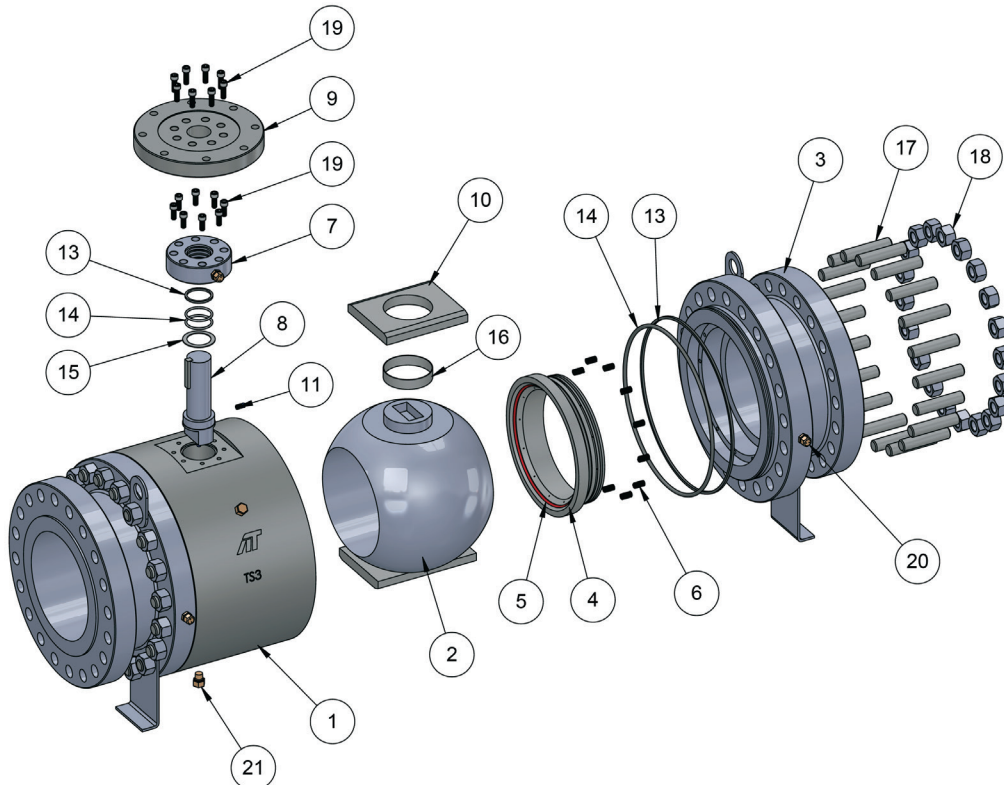
TRUNNION 3-PIECE DESIGN

NO.	PART NAME	TS3 Series		
		STEEL	LOW TEMP STEEL	STAINLESS STEEL
1	BODY	A105N	A350 LF2	A182 F316
2	BALL	A105N	A350 LF2	A182 F316
3	CLOSURE	A105N	A350 LF2	A182 F316/F316L*
4	SEAT RING	A105N	A350 LF2	A182 F316
5	SEAT INSERT	RTFE/Nylon/Devlon®/PEEK	RTFE/Nylon/Devlon®/PEEK	RTFE/Nylon/Devlon®/PEEK
6	SPRING	Inconel® X750	Inconel® X750	Inconel® X750
7	BODY COVER	A105N	A350 LF2	A182 F316
8	STEM	A105N/4140	A350 LF2/4140	A182 F316
9	ADAPTER PLATE	A105N	A350 LF2	A182 F316
10	BEARING RETAINER	A105N	A350 LF2	A182 F316
11	ANTI-STATIC DEVICE	Stainless Steel	Stainless Steel	Stainless Steel
13	FIRE-SAFE SEAL	Graphite	Graphite	Graphite
14	O-RING	FKM/HNBR	HNBR (Low Temp)	FKM
15	THRUST WASHER	CS/TFE	SS/TFE	SS/TFE
16	BEARING	CS/TFE	SS/TFE	SS/TFE
17	STUD	A193 B7M	A320 L7M	A193 B8M
18	NUT	A194 2HM	A194 7M	A194 8M
19	CAP SCREW	A193 B7M	A320 L7M	A193 B8M
20	SEALANT FITTING	Stainless Steel	Stainless Steel	Stainless Steel
21	DRAIN VALVE	Stainless Steel	Stainless Steel	Stainless Steel

Standard materials subject to change without notice.

*F316L FOR WELDED END ONLY

Seat Insert Note: RTFE is standard for 2-12"; Devlon® is standard for 14" and larger.



Forged

TS3
SERIES

SOFT SEAT

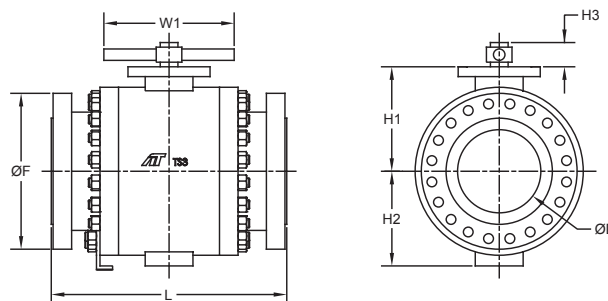
3-PC Soft Seat Valve Dimensions

3-PIECE FORGED
2"-4" Class 150/300
2"-3" Class 600

DIMENSIONS (IN)

150	SIZE	ØD	L			ØF	H1	H2	H3	W1	WEIGHT (Lb)
			RF	WE	RTJ						
	2"	1.94	7.00	8.50	7.50	6.00	4.84	3.54	0.75	11.8	45
	3"	2.94	8.00	11.13	8.50	7.50	5.51	4.21	0.75	11.8	67
	4"	3.94	9.00	12.00	9.50	9.00	6.61	5.47	1.20	17.7	120

300	SIZE	ØD	L			ØF	H1	H2	H3	W1	WEIGHT (Lb)
			RF	WE	RTJ						
	2"	1.94	8.50	8.50	9.13	6.50	4.84	3.54	0.75	11.8	53
	3"	2.94	11.13	11.13	11.75	8.25	5.53	4.27	0.77	17.7	97
	4"	3.94	12.00	12.00	12.63	10.00	6.61	5.47	1.20	17.7	168

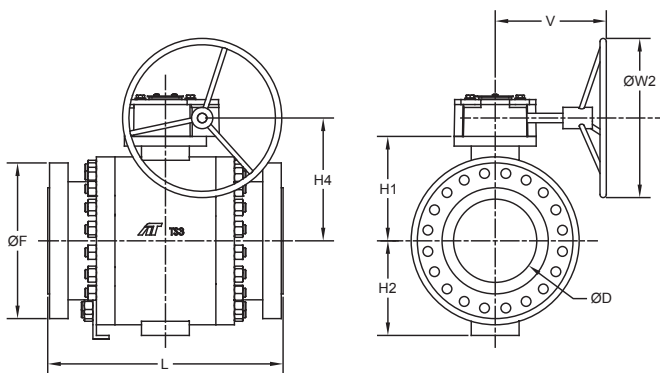


600	SIZE	ØD	L			ØF	H1	H2	H3	W1	WEIGHT (Lb)
			RF	WE	RTJ						
	2"	1.94	11.50	11.50	11.63	6.50	4.88	3.62	0.77	21.7	76
	3"	2.94	14.00	14.00	14.13	8.25	5.91	4.76	1.20	27.6	145

DIMENSIONS (IN)

150	SIZE	D	L			ØF	H1	H2	H4	ØW2	V	WEIGHT (Lb)
			RF	WE	RTJ							
	6"	5.94	15.50	18.00	16.00	11.00	9.27	8.66	11.32	12.0	10.00	370
	8"	7.94	18.00	20.50	18.50	13.50	11.38	10.63	13.43	12.0	10.00	630
	10"	9.94	21.00	22.00	21.50	16.00	13.15	12.20	15.16	16.0	11.25	1,050
	12"	11.94	24.00	25.00	24.50	19.00	14.72	13.75	16.75	16.0	11.25	1,506
	14"	13.19	27.00	30.00	27.50	21.00	15.79	16.75	20.31	20.0	18.50	2,205
	16"	15.19	30.00	33.00	30.50	23.50	17.44	18.70	22.24	20.0	18.50	2,954
	18"	17.19	34.00	36.00	34.50	25.00	18.80	20.67	23.60	20.0	18.50	3,583
	20"	19.19	36.00	39.00	36.50	27.50	20.57	22.44	25.38	24.0	18.50	4,850
	24"	23.19	42.00	45.00	42.50	32.00	24.15	26.38	30.06	24.0	19.75	7,518
	30"	28.94	51.00	55.00	---	38.75	28.78	28.94	35.94	28.0	24.00	13,228
	36"	34.44	60.00	68.00	---	46.00	32.95	32.87	40.91	32.0	27.18	20,723

3-PIECE FORGED
6"-36" Class 150/300, 4"-36" Class 600



300	SIZE	D	L			ØF	H1	H2	H4	ØW2	V	WEIGHT (Lb)
			RF	WE	RTJ							
	6"	5.94	15.88	18.00	16.50	12.50	9.27	8.66	11.32	12.0	10.00	420
	8"	7.94	19.75	20.50	20.38	15.00	11.38	10.63	13.46	16.0	11.25	717
	10"	9.94	22.38	22.00	23.00	17.50	13.15	12.20	16.89	18.0	14.00	1,125
	12"	11.94	25.50	25.00	26.13	20.50	14.72	13.78	16.81	20.0	15.75	1,628
	14"	13.19	30.00	30.00	30.63	23.00	15.79	16.73	20.59	24.0	18.50	2,370
	16"	15.19	33.00	33.00	33.63	25.50	17.44	18.70	23.39	24.0	20.88	3,274
	18"	17.19	36.00	36.00	36.63	28.00	19.11	20.67	25.06	28.0	20.88	4,321
	20"	19.19	39.00	39.00	39.75	30.50	20.89	22.83	27.30	28.0	20.63	5,952
	24"	23.19	45.00	45.00	45.88	36.00	24.47	26.38	31.63	28.0	24.00	8,863
	30"	28.94	55.00	55.00	56.00	43.00	29.17	29.37	37.13	32.0	27.18	15,432
	36"	34.44	68.00	68.00	69.13	50.00	33.62	33.39	41.89	32.0	28.38	24,692

600	SIZE	D	L			ØF	H1	H2	H4	ØW2	V	WEIGHT (Lb)
			RF	WE	RTJ							
	4"	3.94	17.00	17.00	17.13	10.75	7.20	5.83	8.86	12.0	10.00	300
	6"	5.94	22.00	22.00	22.13	14.00	9.92	9.06	12.01	16.0	11.25	615
	8"	7.94	26.00	26.00	26.13	16.50	11.87	11.02	13.96	20.0	15.75	1,091
	10"	9.94	31.00	31.00	31.13	20.00	13.48	12.80	18.29	20.0	18.50	1,720
	12"	11.94	33.00	33.00	33.13	22.00	15.28	14.96	20.08	24.0	18.50	2,458
	14"	13.19	35.00	35.00	35.13	23.75	16.36	17.13	22.30	28.0	20.88	3,109
	16"	15.19	39.00	39.00	39.13	27.00	18.01	19.49	24.43	28.0	21.50	4,222
	18"	17.19	43.00	43.00	43.13	29.25	20.49	21.65	27.66	28.0	24.00	5,886
	20"	19.19	47.00	47.00	47.25	32.00	22.15	23.82	30.33	30.0	26.00	7,760
	24"	23.19	55.00	55.00	55.38	37.00	25.31	27.17	33.66	32.0	27.18	11,729
	30"	28.94	65.00	65.00	65.50	44.50	30.08	30.00	38.35	32.0	28.25	19,621
	36"	34.44	82.00	82.00	82.63	51.75	34.65	34.65	45.75	32.0	31.50	32,011

3-PC Soft Seat Valve Dimensions

DIMENSIONS (IN)

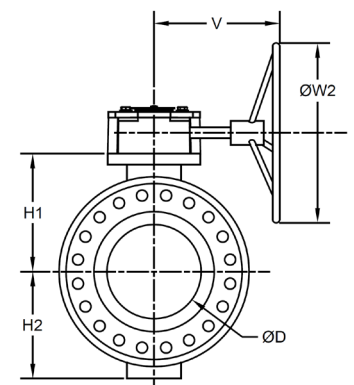
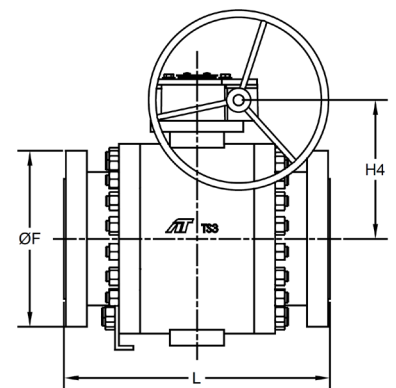
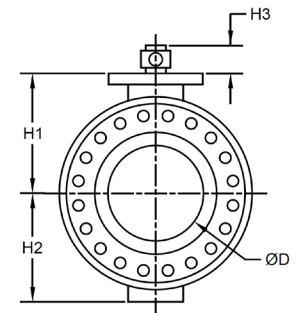
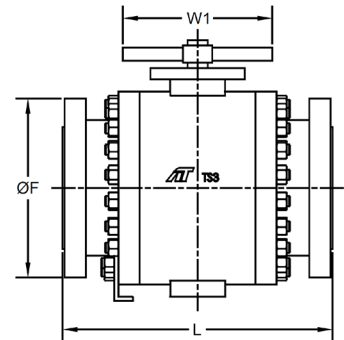
909	SIZE	ØD	L			ØF	H1	H2	H3	H4	V	W1	ØW2	WEIGHT (Lb)
			RF	WE	RTJ									
2"	1.94	14.50	14.50	14.63	8.50	5.38	4.00	3.25	---	---	33.50	---	132	
3"	2.94	15.00	15.00	15.13	9.50	6.50	5.25	4.25	---	---	39.37	---	187	
4"	3.94	18.00	18.00	18.13	11.50	8.00	6.50	---	10.00	10.25	---	14.00	351	
6"	5.94	24.00	24.00	24.13	15.00	10.00	11.00	---	14.00	13.88	---	24.00	791	
8"	7.94	29.00	29.00	29.13	18.50	11.50	12.50	---	16.63	14.50	---	24.00	1,376	
10"	9.94	33.00	33.00	33.13	21.50	13.63	14.75	---	19.25	16.13	---	24.00	2,187	
12"	11.94	38.00	38.00	38.13	24.00	16.25	15.50	---	20.00	18.50	---	24.00	3,596	
14"	12.69	40.50	40.50	40.88	25.25	16.75	17.75	---	22.50	19.75	---	24.00	4,030	
16"	14.69	44.50	44.50	44.88	27.75	18.25	19.25	---	25.50	24.00	---	28.00	4,456	
18"	16.69	48.00	48.00	48.50	31.00	20.75	22.50	---	30.00	28.38	---	32.00	10,141	
20"	18.56	52.00	52.00	52.50	33.75	23.00	24.25	---	31.25	28.38	---	32.00	12,125	
24"	22.44	61.00	61.00	61.75	41.00	26.75	28.25	---	38.00	28.25	---	32.00	12,119	

1501	SIZE	ØD	L			ØF	H1	H2	H3	H4	V	W1	ØW2	WEIGHT (Lb)
			RF	WE	RTJ									
2"	1.94	14.50	14.50	14.63	8.50	5.25	4.00	3.25	---	---	33.50	---	132	
3"	2.94	18.50	18.50	18.63	10.50	6.75	5.50	---	8.63	10.50	---	14.00	291	
4"	3.94	21.50	21.50	21.63	12.25	8.00	6.50	---	10.25	11.00	---	20.00	459	
6"	5.69	27.75	27.75	28.00	15.50	10.63	12.25	---	14.75	13.88	---	24.00	1,045	
8"	7.56	32.75	32.75	33.13	19.00	12.75	13.38	---	19.00	16.13	---	24.00	2,017	
10"	9.44	39.00	39.00	39.38	23.00	14.88	15.50	---	18.00	18.75	---	24.00	3,289	
12"	11.31	44.50	44.50	45.13	26.50	17.63	18.50	---	21.88	26.50	---	32.00	5,463	
14"	12.44	49.50	49.50	50.25	29.50	18.63	19.63	---	21.00	20.00	---	32.00	6,759	
16"	14.19	54.50	54.50	55.38	32.50	21.00	21.63	---	23.88	28.38	---	32.00	10,216	
18"	16.00	60.50	---	61.38	36.00	22.75	23.25	---	25.75	28.25	---	32.00	13,043	
20"	17.88	65.50	---	66.38	38.75	27.88	29.50	---	31.88	28.25	---	32.00	14,771	
24"	21.50	---	---	77.63	46.00	32.88	33.25	---	36.88	28.25	---	34.00	15,765	

2500	SIZE	ØD	L			ØF	H1	H2	H4	V	ØW2	WEIGHT (Lb)
			RF	WE	RTJ							
2"	1.69	17.75	17.75	17.88	9.25	6.25	4.63	8.25	9.50	14.00	236	
3"	2.44	22.75	22.75	23.00	12.00	8.50	6.00	10.50	11.00	20.00	516	
4"	3.44	26.50	26.50	26.88	14.00	9.63	7.00	11.75	16.50	20.00	825	
6"	5.19	36.00	36.00	36.50	19.00	11.63	13.38	16.75	14.38	24.00	2,013	
8"	7.06	40.25	40.25	40.88	21.75	15.50	14.50	17.88	24.00	28.00	3,693	
10"	8.81	50.00	50.00	50.88	26.50	18.50	18.50	21.50	20.00	32.00	6,329	
12"	10.44	56.00	56.00	56.88	30.00	21.00	22.00	23.75	28.38	32.00	7,203	

Dimensions subject to change without notice.

3-PIECE FORGED
2"-24" Class 900/1500
2"-12" Class 2500



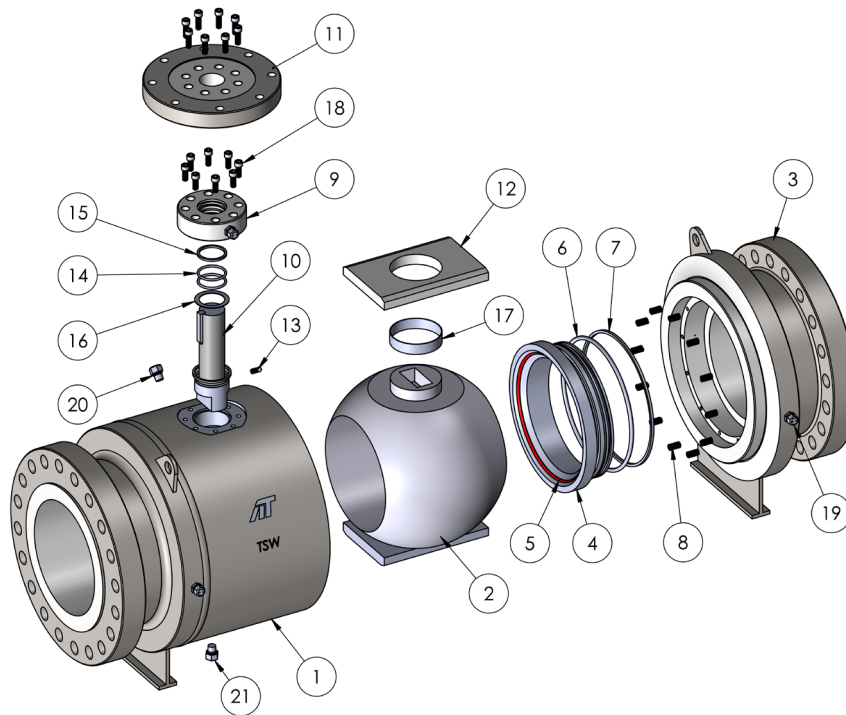
**ACUTROL**

SERIES TSW - Welded Body Trunnion Mounted Ball Valves

Standard Design Features:

- Seamless, fully welded forged body design
- Zero leak path at the body joint
- -50F Low temperature rated A350 LF2 body construction
- Sizes 2" thru 36"
- ANSI Pressure Class ranges from 150-600
- Anti-blowout stem design
- Stem sealant injection port
- Seat sealant injection port for both seats
- Replaceable stem seals
- Double Block-and-Bleed
- NACE MR0175
- ISO 5211 Mounting Pad
- Ready to be automated
- Epoxy exterior paint with polyurethane top finish





No.	PART NAME	MATERIAL
1	BODY	A350 LF2
2	BALL	A350 LF2 ENP
3	CLOSURE	A350 LF2
4	SEAT RING	A350 LF2
5	SEAT INSERT	RTFE/Nylon/Devlon/PEEK
6	O-RING	HNBR
7	FIRE-SAFE SEAL	Graphite
8	SPRING	Inconel@ X750
9	BODY COVER	A350 LF2
10	STEM	A350 LF2/4140 ENP
11	ADAPTER PLATE	A350 LF2
12	^a BEARING RETAINER	A350 LF2
13	ANTI-STATIC DEVICE	Stainless Steel
14	O-RING	HNBR
15	FIRE-SAFE SEAL	Graphite
16	THRUST WASHER	SS/TFE
17	BEARING	SS/TFE
18	CAP SCREW	A320 L7M
19	^b SEALANT FITTING	Stainless Steel
20	VENT VALVE	Stainless Steel
21	DRAIN VALVE	Stainless Steel

^a 6" and larger

^b Not available for 2"-4" Class 150/300

Fully Welded Body Design

SOFT SEAT

Design Features / Dimensions



ACUTROL

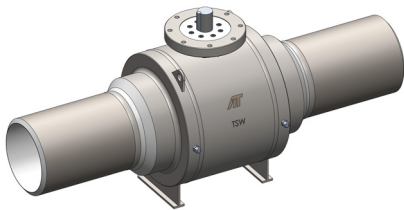
SERIES TSW - Welded Body Trunnion Mounted Ball Valves

Optional Design Features:

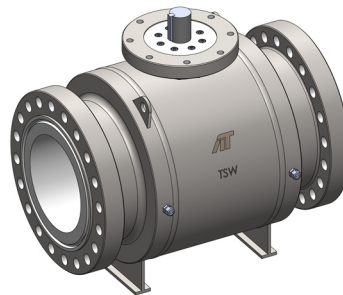
- Stainless Steel Trims (Ball/Seats/Stem)
- DPE (Double Piston Effect) Seats
- High Temperature Trims, Seals, and Coatings
- RTJ Flange Ends
- Welded Ends/Butt-Weld Ends
- Welded Ends with Pup Pieces
- Extended Bonnet
- Custom Paint/Coating



Welded End / Butt-Weld Connection



Welded End Connection with Pup Pieces



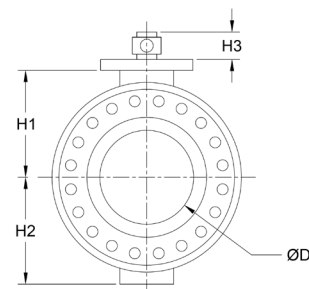
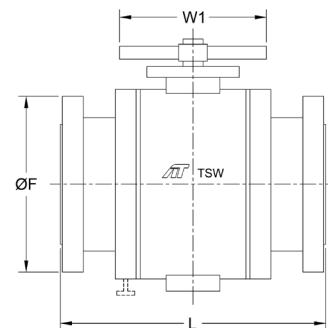
Ring Joint RTJ End Connection

Dimensions (IN):

150	SIZE	ØD	L			ØF	H1	H2	H3	W1	WEIGHT (Lb)
			RF	WE	RTJ						
	2"	1.94	7.00	8.50	7.50	6.00	4.49	3.19	3.19	15.00	44.5
	3"	2.94	8.00	11.13	8.50	7.50	5.31	3.94	3.19	17.50	67
	4"	3.94	9.00	12.00	9.50	9.00	6.38	5.14	3.41	21.50	136

300	SIZE	ØD	L			ØF	H1	H2	H3	W1	WEIGHT (Lb)
			RF	WE	RTJ						
	2"	1.94	8.50	8.50	9.13	6.50	4.49	3.19	3.19	17.50	52.2
	3"	2.94	11.13	11.13	11.75	8.25	5.31	3.94	3.19	17.50	92
	4"	3.94	12.00	12.00	12.63	10.00	6.38	5.14	3.41	21.50	136

600	SIZE	ØD	L			ØF	H1	H2	H3	W1	WEIGHT (Lb)
			RF	WE	RTJ						
	2"	1.94	11.50	11.50	11.63	6.50	4.49	3.19	3.19	17.50	57
	3"	2.94	14.00	14.00	14.13	8.25	5.75	4.29	3.41	27.50	137



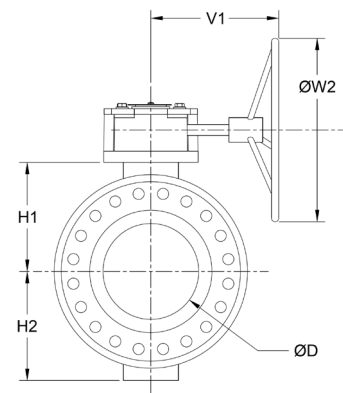
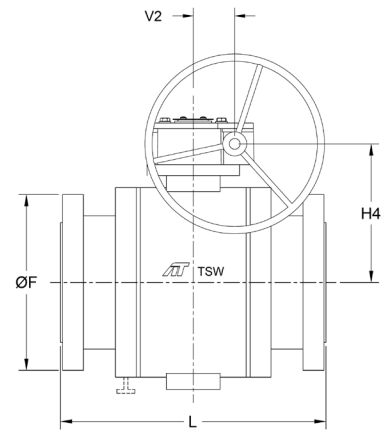
Valve Dimensions

Dimensions (IN):

150	SIZE	ØD	L			ØF	H1	H2	H4	ØW2	V	WEIGHT (lb)
			RF	WE	RTJ							
6"	5.94	15.50	18.00	16.00	11.00	9.09	9.25	10.98	14.17	10.45	394	
8"	7.94	18.00	20.50	18.50	13.50	10.16	10.24	12.05	14.17	10.45	580	
10"	9.94	21.00	22.00	21.50	16.00	11.75	12.60	14.07	23.62	12.09	932	
12"	11.94	24.00	25.00	24.50	19.00	13.41	14.57	15.73	23.62	12.09	1,449	
14"	13.19	27.00	30.00	27.50	21.00	15.75	16.75	20.25	18.50	20.00	2,196	
16"	15.19	30.00	33.00	30.50	23.50	16.26	19.29	22.52	23.62	16.18	2,698	
18"	17.19	34.00	36.00	34.50	25.00	17.58	18.90	23.84	23.62	16.18	3,332	
20"	19.19	36.00	39.00	36.50	27.50	20.50	22.44	25.38	18.50	24.00	4,833	
24"	23.19	42.00	45.00	42.50	32.00	22.50	23.62	25.22	23.62	17.99	7,070	
30"	28.94	51.00	55.00	---	38.75	28.75	29.00	36.00	24.00	28.00	13,192	
36"	34.44	60.00	68.00	---	46.00	33.00	32.88	41.00	27.18	32.00	20,666	

300	SIZE	ØD	L			ØF	H1	H2	H4	ØW2	V	WEIGHT (lb)
			RF	WE	RTJ							
6"	5.94	15.88	18.00	16.50	12.50	9.09	9.25	10.98	14.17	10.45	327	
8"	7.94	19.75	20.50	20.38	15.00	10.16	10.24	12.32	19.69	16.54	616	
10"	9.94	22.38	22.00	23.00	17.50	11.75	12.60	14.07	23.62	12.09	979	
12"	11.94	25.50	25.00	26.13	20.50	13.41	14.57	17.50	23.62	13.86	1,437	
14"	13.19	30.00	30.00	30.63	23.00	15.75	16.75	20.59	18.50	24.00	2,350	
16"	15.19	33.00	33.00	33.63	25.50	16.26	19.29	22.52	23.62	16.18	3,148	
18"	17.19	36.00	36.00	36.63	28.00	19.11	20.63	25.06	20.88	28.00	4,283	
20"	19.19	39.00	39.00	39.75	30.50	20.88	22.88	27.30	20.63	28.00	5,905	
24"	23.19	45.00	45.00	45.88	36.00	23.01	24.88	27.07	29.92	26.14	8,357	
30"	28.94	55.00	55.00	56.00	43.00	29.17	29.38	37.13	27.18	32.00	15,327	
36"	34.44	68.00	68.00	69.13	50.00	33.63	33.38	41.88	28.38	32.00	24,521	

600	SIZE	ØD	L			ØF	H1	H2	H4	ØW2	V	WEIGHT (lb)
			RF	WE	RTJ							
4"	3.94	17.00	17.00	17.13	10.75	6.67	5.14	8.29	12.60	8.11	248	
6"	5.94	22.00	22.00	22.13	14.00	9.06	9.45	11.22	19.69	16.54	583	
8"	7.94	26.00	26.00	26.13	16.50	10.71	11.42	13.03	23.62	12.09	1,021	
10"	9.94	31.00	31.00	31.13	20.00	12.44	13.58	17.50	23.62	14.25	1,607	
12"	11.94	33.00	33.00	33.13	22.00	14.04	15.35	19.09	23.62	14.25	2,192	
14"	13.19	35.00	35.00	35.13	23.75	16.38	17.13	22.25	20.88	28.00	3,057	
16"	15.19	39.00	39.00	39.13	27.00	17.76	18.11	21.81	31.89	26.14	4,273	
18"	17.19	43.00	43.00	43.13	29.25	19.59	19.88	23.64	31.89	26.14	7,969	
20"	19.19	47.00	47.00	47.25	32.00	21.36	22.24	25.41	29.92	26.14	8,307	
24"	23.19	55.00	55.00	55.38	37.00	25.31	27.17	33.66	27.18	32.00	11,562	
30"	28.94	65.00	65.00	65.50	44.50	30.08	30.00	38.35	28.25	32.00	19,328	
36"	34.44	82.00	82.00	82.63	51.75	34.65	34.65	45.75	31.50	32.00	31,568	



2-Piece Cast and 3-Piece Forged Soft-Seat TRUNNION Torques

Series TS2, TS3 & TSW Torques
(with standard seats)

SIZE (NPS)	Break to OPEN Torques (In-Lbs)					
	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
2"	308	539	896	1,664	2,699	3,027
3"	584	895	2,087	3,690	5,541	7,249
4"	859	1,710	4,206	6,138	9,727	13,117
6"	3,369	4,655	10,154	15,208	23,543	41,917
8"	5,222	9,293	16,947	32,978	49,104	81,637
10"	9,813	15,035	25,785	50,069	70,257	133,018
12"	11,698	24,782	34,606	69,611	113,618	241,749
14"	18,178	28,433	44,996	93,871	145,186	
16"	23,249	37,838	67,198	139,206	190,787	
18"	29,278	50,592	90,771	205,578	314,478	
20"	43,396	70,295	128,818	253,866	402,443	
24"	85,073	112,962	172,707	403,318	734,508	
30"	141,877	198,983	298,458			
36"	188,114	263,099	391,296			
40"	226,668	364,208	620,897			
42"	252,352	401,116	720,026			
46"	CF	CF	CF			
48"	CF	CF	CF			



Notes:

1. Torques are tested by clean water at full differential pressure, based on carbon steel trim and standard seats.
2. Torques are based on SPE (Single Piston Effect) seats.
3. Contact factory for DPE (Double Piston Effect) seat option.
4. Torque values do not include safety factors.
5. For regular port, use dimensions of ball diameter.
6. Contact factory for other safety factors for different operating conditions.

TS2, TS3, TSW SERIES

SOFT SEAT

Cast & Forged

Soft Seat Valve Technical Data

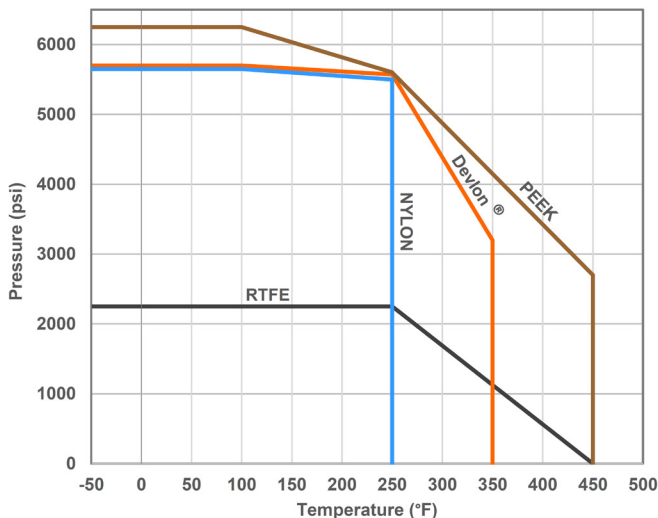
Cv VALUES

Valve Size	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
2"	420	420	350	381	381	283
3"	1,290	1,050	1,000	845	845	600
4"	2,350	2,000	1,850	1,523	1,523	1,160
6"	5,249	5,186	4,400	3,381	3,120	2,590
8"	10,250	10,250	8,450	6,031	5,508	4,795
10"	16,775	16,775	14,250	9,442	8,500	7,410
12"	24,250	24,250	22,790	13,614	12,223	10,433
14"	30,600	30,600	28,600	15,363	14,800	
16"	40,700	40,700	39,250	20,581	19,178	
18"	52,500	52,000	51,450	26,435	24,243	
20"	66,000	62,700	62,500	32,743	30,565	
24"	103,500	100,150	99,000	47,884	41,733	
30"	159,300	151,700	148,900			
36"	228,300	223,050	226,300			

O-RING SEAL OPTIONS

Material	Typ Operating Temp. (°F)	Typ Short Term Temp. (°F)
EPDM	-40° ~ 280°	-50° ~ 300°
HNBR	-30° ~ 275°	-40° ~ 300°
HNBR AED	-40° ~ 280°	-58° ~ 300°
FKM	5° ~ 428°	-4° ~ 480°
FKM AED	5° ~ 390°	-4° ~ 480°

Soft Seat TRUNNION Pressure vs. Temperature



Note: For specific operating conditions or low temp capabilities, consult factory for other seal/seat options.

How To Order

TRUNNION MOUNTED BALL VALVES PART NUMBER MATRIX

Fire Safe Designation (must be included)

- X Non-Firesafe
- F Firesafe (standard)

Port

- F Full Port
- R Regular Port

Valve Series

- TS2 Soft seat Trunnion, 2 pc design (cast)
- TS3 Soft seat Trunnion, 3 pc design (forged)
- TSW Soft seat Trunnion, seal welded
- TM3 Metal seat Trunnion, 3 pc design (cast)
- TMW Metal seat Trunnion, seal welded

Body Material

- C A216 WCB (-20°F to 800°F)
 - 5 A352 LCB (-50°F to 800°F)
 - 8 A352 LCC (-50°F to 650°F)
 - X CF8M 316 SST (-450°F to 1200°F)
 - L CF3M 316L SST (-450°F to 800° F)
 - 7 A105N Forged Steel (-20°F to 800°F)
 - D CD3MN Duplex SST (-50°F to 550°F)
 - G CE3MN Super Duplex SST (-50°F to 550°F)
 - 6 WC6, A217 (-20° F to 1100° F)
 - 9 WC9, A217 (-20° F to 1100° F)
 - F A350 LF2 (-50° F to 800° F)
 - 4 A182 F316 (-450°F to 1200°F)
- (other options: consult factory)

End Connection

- | | | | |
|-----|---------|-----|----------|
| F1 | 150 RF | R1 | 150 RTJ |
| F3 | 300 RF | R3 | 300 RTJ |
| F6 | 600 RF | R6 | 600 RTJ |
| F9 | 900 RF | R9 | 900 RTJ |
| F15 | 1500 RF | R15 | 1500 RTJ |
| F25 | 2500 RF | R25 | 2500 RTJ |

- WE Weld End (*please see chart)
- X Special Configuration (BW x Flanged, etc.)

Configurable End Connection

- SB Schedule B Flanges
 - *XX Standard Bevel or not applicable
- *See chart below for various options

* Weld End Connections Chart for ordering

Pipe Schedule	ANSI Class						
	150	300	600	900	1500	2500	Special
10	AA	AB	AC	AD	AE	AF	AY
20	BA	BB	BC	BD	BE	BF	BY
30	CA	CB	CC	CD	CE	CF	CY
40	DA	DB	DC	DD	DE	DF	DY
60	EA	EB	EC	ED	EE	EF	EY
80	FA	FB	FC	FD	FE	FF	FY
XH	GA	GB	GC	GD	GE	GF	GY
100	HA	HB	HC	HD	HE	HF	HY
120	JA	JB	JC	JD	JE	JF	JY
140	KA	KB	KC	KD	KE	KF	KY
160	LA	LB	LC	LD	LE	LF	LY
XXH	MA	MB	MC	MD	ME	MF	MY
Spec	YA	YB	YC	YD	YE	YF	YY

Valve Size

- | | | | |
|------|-----|------|-----|
| 0200 | 2" | 1600 | 16" |
| 0300 | 3" | 1800 | 18" |
| 0400 | 4" | 2000 | 20" |
| 0600 | 6" | 2400 | 24" |
| 0800 | 8" | 3000 | 30" |
| 1000 | 10" | 3600 | 36" |
| 1200 | 12" | 4200 | 42" |
| 1400 | 14" | 4800 | 48" |

Ball

- S 316 SS
- 9 LF2 / ENP
- 7 A105N / ENP
- 2 Tungsten Carbide Coated 316SST
- 3 316SST / HCr
- 4 Chrome Carbide Coated 316SST
- C A182 F51 Duplex SST

Stem

- H 4140 / ENP
- A 17-4 PH
- B XM-19
- S 316SST
- D Inconel® 718
- C A182 F51 Duplex SST
- 9 A350 LF2 / ENP
- 7 A105N / ENP

Seat

- R1 RTFE (Single Piston)
- R2 RTFE (Double Piston)
- V1 Devlon® (Single Piston)
- V2 Devlon® (Double Piston)
- Z1 PEEK (Single Piston)
- Z2 PEEK (Double Piston)
- N1 Nylon (Single Piston)
- N2 Nylon (Double Piston)
- 3 316/Stellite®
- 2 Tungsten Carbide Coated 316SS
- 4 Chrome Carbide Coated 316SS

Packing

- G Graphite packing (standard)
- P TFE packing

Seals

- E EPDM
- B HNBR
- N HNBR AED
- W FKM
- V FKM AED
- L Low Temp FKM (-40°F to 400°F)
- F Low Temp FKM AED (-40°F to 400°F)
- A Aflas
- X Custom Material/Compound

Paint

- X Standard
- S Special (Customer Specified Coating)

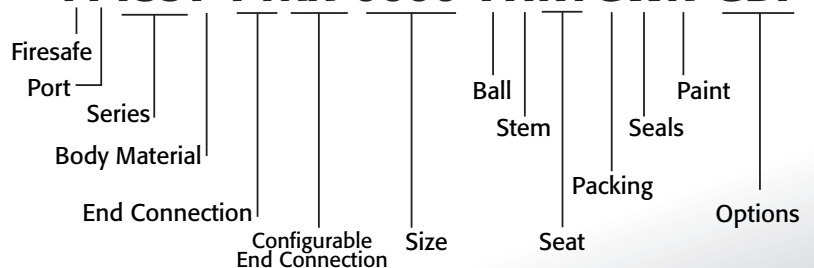
Options

- H Wrench Operated to 4"
 - G Gear Operator
 - L Gear Operator w/ Locking Plate
 - X Bare Stem
 - E Extended Bonnet (specify extension length required)
 - B Bypass Piping w/ 2-way valve
 - F Factory Acceptance Test
 - C Customer to specify custom testing
 - S Spool Piece Mounting Kit for Automation
 - M Channel Design Mounting Kit for Automation
 - A API 641 Certified (Fugitive Emissions)
 - P Purge Ports per Drawing
 - W Welded Body Cover (TSW only)
- (other options: consult factory)

HOW TO ORDER

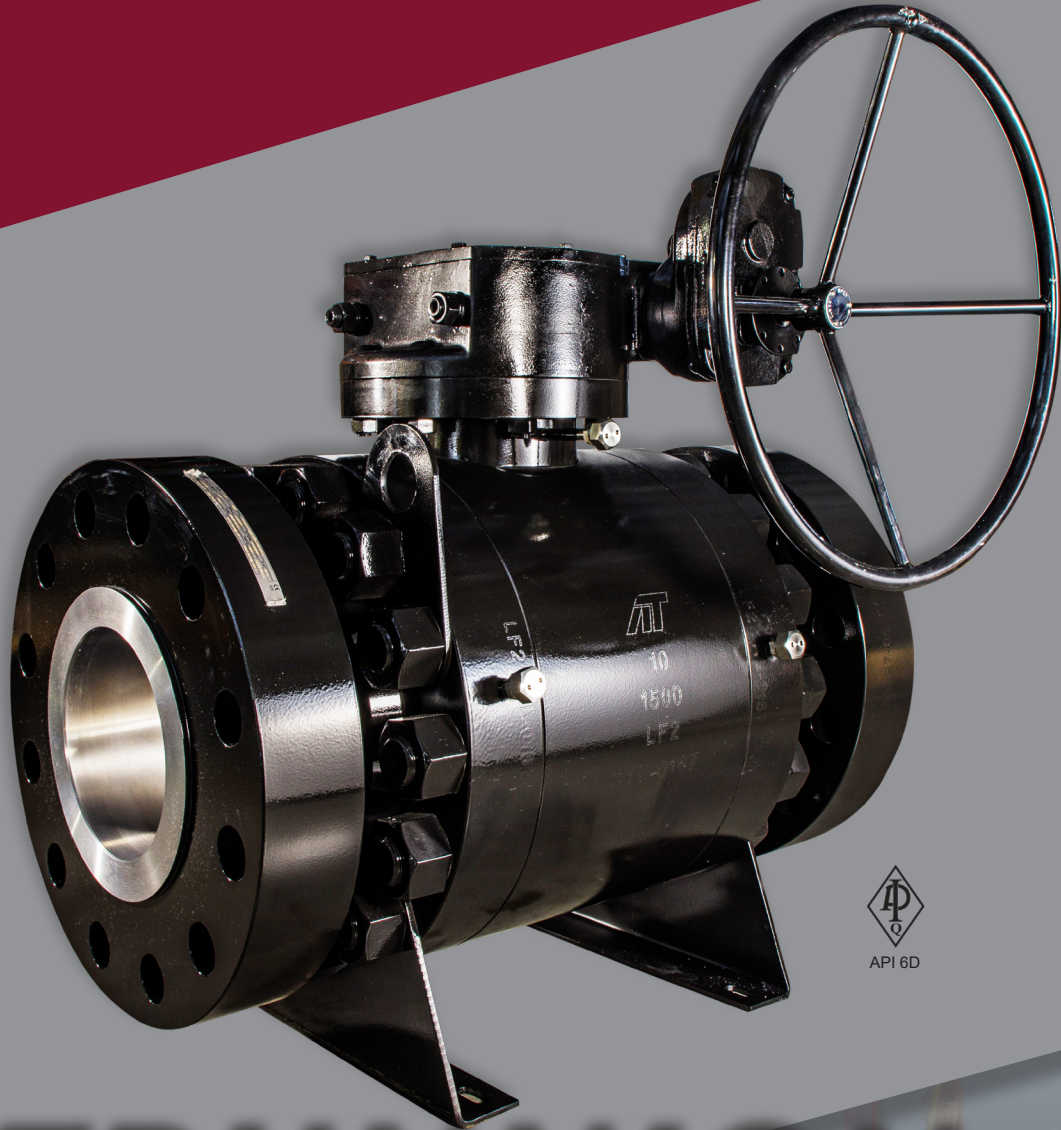
A-T Trunnion Mounted Ball Valves:

FFTS37-F1XX-0600-7HR1GWX-GBF



FFTS37-F1XX-0600-7HR1GWX-L
 6", 3-Piece, Full Port Trunnion Forged Ball Valve, ANSI Class 150 RFF, API 6D, API-607 Firesafe, A105N Body, A105N/3mil ENP Ball, 4140/1mil ENP Stem, RTFE (Single Piston) Seat, Graphite Packing/Seals, FKM Seals, NACE MR-0175, Gear Operator with Locking Plate

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API 6D

TRUNNION MOUNTED BALL VALVES

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