

T60S Series

Soft Seated 3-Piece Body Trunnion Mounted Ball Valves



DESIGN STANDARDS

- Basic design: API 6D/ISO 14313
- F-F dimensions: API 6D/ASME B16.10
- End connection: ASME B16.5
- Bore diameter: API 6D/ISO 14313
- Wall thickness: ASME PBVC Section VIII

CERTIFICATION

- Fugitive emission: ISO 15848-1 BH CO1
- Fire test: API 607/API 6FA/ISO 10497
- PED: 2014/68/EU
- ATEX: 2014/34/EU
- SIL: IEC 61508 (SIL 2)

PRODUCT RANGE

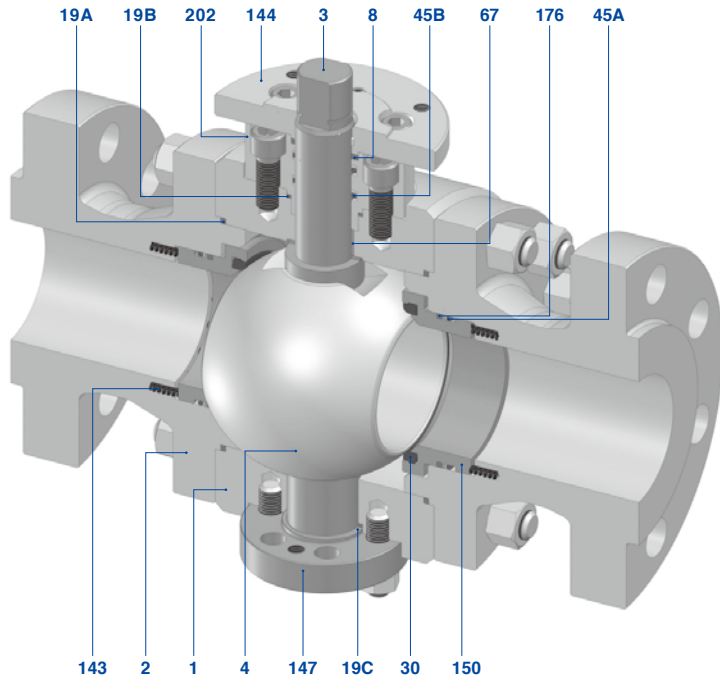
- Nominal pressure: ASME Class 150 to 1500
- Nominal size: NPS 2 to NPS 24 (DN 50 to DN 600)
- Shell materials:
 - Carbon steel, Alloy steel,
 - Austenitic stainless steel, Duplex stainless steel,
 - High alloy steel, Nickel based alloy
- Ball seat materials:
 - RPTFE (Reinforced PTFE), Modified PTFE,
 - RNylon (Reinforced Nylon), DEVLON V[®],
 - PEEK

DESIGN FEATURES

- Structure: 3-piece bolted body and cap
- Standard material: NACE MR0175, ASTM and others
- Tight shut-off sealing mechanism
- Low operating torque
- Triple stem sealing system with 2 O-rings & Packing
- Double Block and Bleed function
- Self-relief of excessive cavity pressure
- Fire safe tested
- Blowout-proof ball seat & stem construction
- Antistatic provision design
- Locking device for lever operation
- ISO 5211 actuator mounting pad
- Available for DPE (Double Piston Effect)/SPE (Single Piston Effect)

Component Drawing

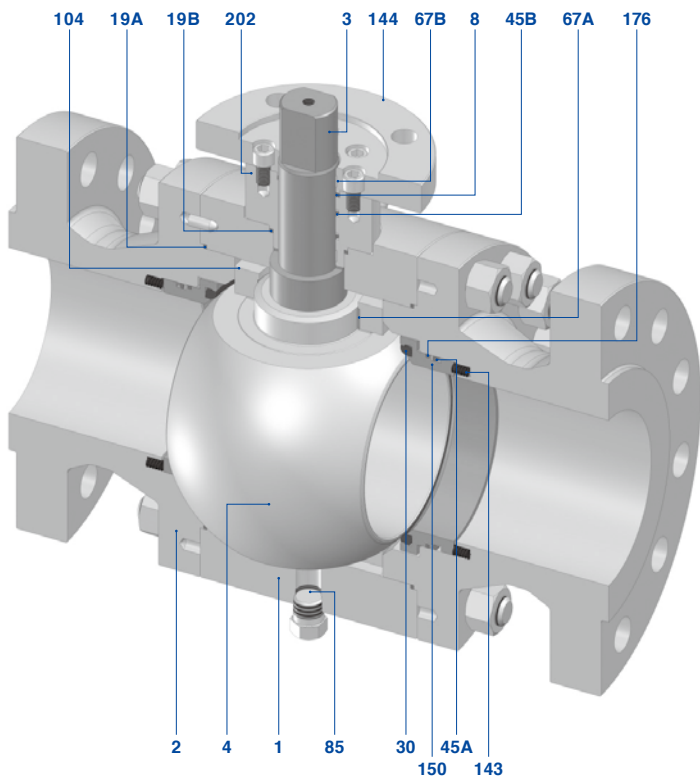
Up to size NPS 4



- 1 Body*
- 2 Cap*
- 3 Stem
- 4 Precision machined ball
- 8 Firesafe gland packing (Flexible graphite)
- 19A Gasket (Flexible graphite)
- 19B Gasket (Flexible graphite)
- 19C Gasket (Flexible graphite)
- 30 Ball seat
- 45A O-ring
- 45B O-ring
- 67 Stem bearing (Metal + RPTFE)
- 143 Seat spring
- 144 Gland plate
- 147 End plate
- 150 Seat retainer
- 176 Fire safe retainer packing (Flexible graphite)
- 202 Bonnet

*Note: Made of forged carbon steel, low alloy steel and high alloy steel. Made of forged or cast austenitic stainless steel, duplex stainless steel and other special alloy materials. Contact KITZ for current available materials.

Size NPS 6 and larger



- 1 Body*
- 2 Cap*
- 3 Stem
- 4 Precision machined ball
- 8 Fire safe gland packing (Flexible graphite)
- 19A Gasket (Flexible graphite)
- 19B Gasket (Flexible graphite)
- 30 Ball seat
- 45A O-ring
- 45B O-ring
- 67A Curl bearing (Metal + RPTFE)
- 67B Stem bearing (PTFE)
- 85 Plug
- 104 Trunnion plate
- 143 Seat spring
- 144 Gland plate
- 150 Seat retainer
- 176 Fire safe retainer packing (Flexible graphite)
- 202 Bonnet

The illustration shown in this catalog represents the typical structure of Class 600 valves.

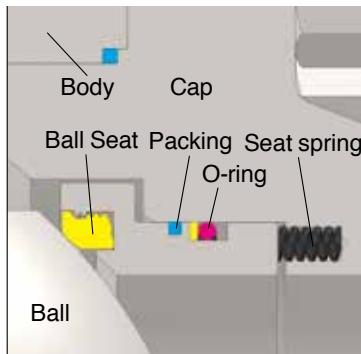
The structure may differ depending on sizes and classes. Please consult KITZ for more details on the specifications and structure of the valve.

Design Features

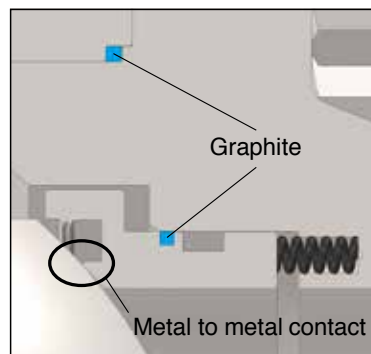
1. Fire Safe Design

(1) Internal Leakage Prevention

When resilient sealing materials are damaged or destroyed by a plant fire, edges of upstream and downstream metal seat retainers preloaded by seat springs come into contact with the ball to shut off line fluid to minimize internal leakage through the valve bore. And, flexible graphite seat retainer packing rings of KITZ original design prevent fluid leakage from between the valve caps and seat retainers during and after the plant fire.



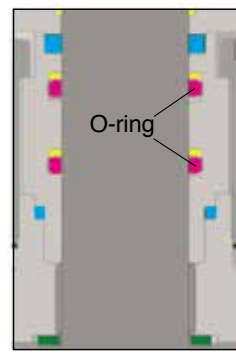
Before



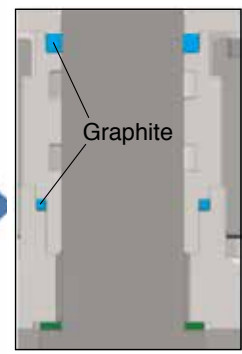
After

(2) External Leakage Prevention

External leakage from the valve stem area is prevented by double sealing with O-rings and flexible graphite gland packing rings. Leakage through the valve body joint is protected by flexible graphite gaskets. Even after a fire has deteriorated O-rings, flexible graphite gland packing rings and gaskets remain intact to prevent external fluid leakage.



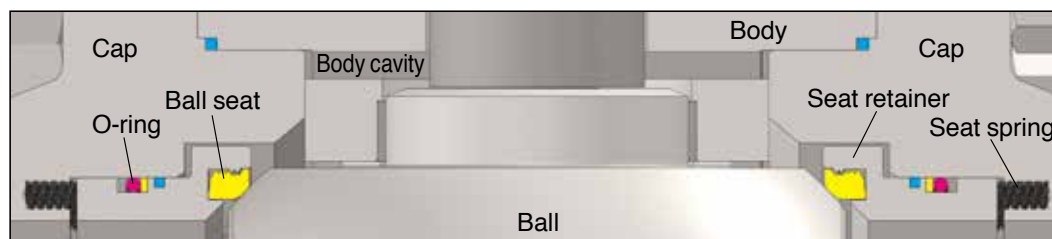
Before



After

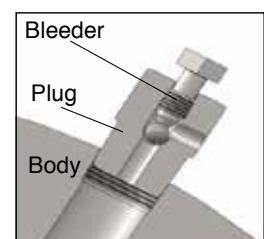
2. Tight Shut-off Sealing Mechanism

The resilient seat design adequately maintains each of the upstream and downstream ball seats in contact with the ball by means of repulsing force of seat springs inserted behind the seat retainers. Line fluid pressure also helps this contact method. This sealing mechanism features un failing thru-the-bore sealing performance of upstream and downstream side ball seats at the same time.



3. Double Block and Bleed Function

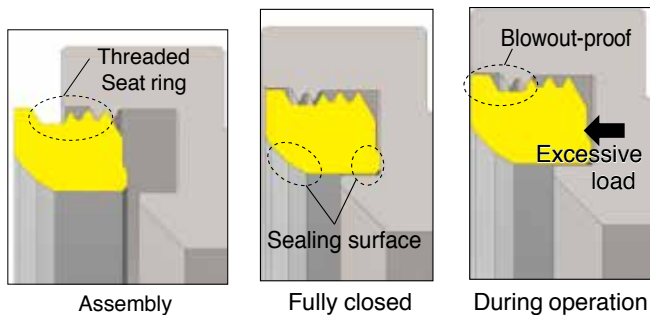
Ball seats independently shut off the line fluid on the upstream and downstream side of the ball. The valve bore and the body cavity are isolated from each other when the valve is fully open or closed. Under this condition, the cavity pressure can be discharged with a vent valve and a drain plug. The vent valve is equipped with a blowout-proof bleeder for safe discharge. Relieving the cavity pressure with a vent valve is recommended for safe draining.



Design Features

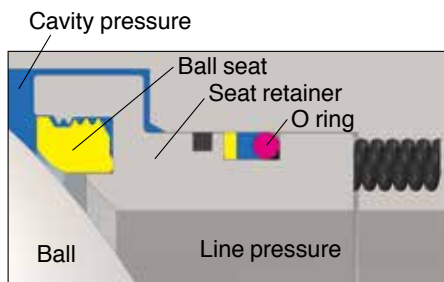
4. Blowout-proof Ball Seat Assembly

As illustrated below, ball seats are threaded into unthreaded back of seat retainers to finally reach to inner walls and lower shoulders of the seat retainers for tightly sealing surface-to-surface contact. This unique design provides easy maintenance and blowout-proof seat assembly when ball seats are excessively loaded by back pressure due to incidental cavity pressure rise.



6. Cavity Pressure Relief

In case of incidental rise of servicing or ambient temperature, liquefied gas or highly volatile liquid trapped within the body cavity may vaporize, and cause an excessive rise in the cavity pressure. For safety consideration, when the cavity pressure exceeds the line pressure, either one of the ball seats will move slightly away from the ball surface together with seat retainers to relieve the excessive cavity pressure into the valve bore.

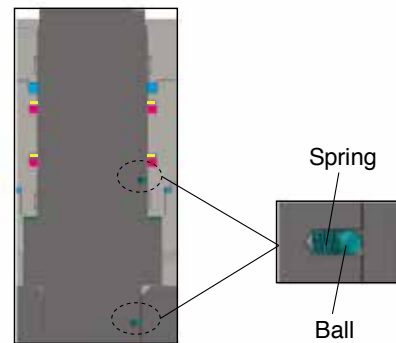


7. Low Emission Guaranteed Design

The fugitive emission suppressing design for both resilient and metal seated valves are certified to ISO 15848 tightness class "B" (Lower than $10^{-4} \text{ mg}\cdot\text{s}^{-1}\cdot\text{m}^{-1}$ for stem leakage and lower than 50 ppmv for body leakage). This verifies the outstanding low emission performance of the whole sealing mechanism of the valve.

5. Antistatic Design

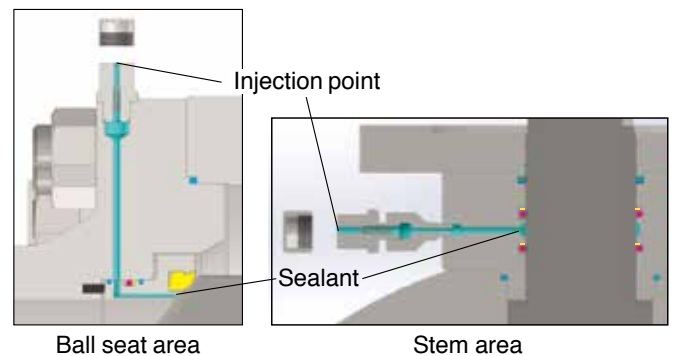
Spring loaded balls assembled between the stem and the bonnet and between the stem and the ball permits electric conductivity through all metallic valve components.



8. Options¹

(1) Emergency Seal Restoration²

For accidental leakage from ball seats or stem sealing area, a sealant supply mechanism may be provided as an option. Should sealing parts be damaged or decomposed by a fire or other accidental causes, leakage can be temporarily prevented or reduced by sealant injection into this mechanism.



(2) Special Shell and Trim Materials

(3) Special Sealing Component Materials

(4) Butt-weld Piping Connection

(5) Pipe Pups Welded to Valve Ends

(6) DIB: Double Isolation and Bleed (Double Seal)³

(7) Stem Extension

(8) Overlay for Bore and Cavity

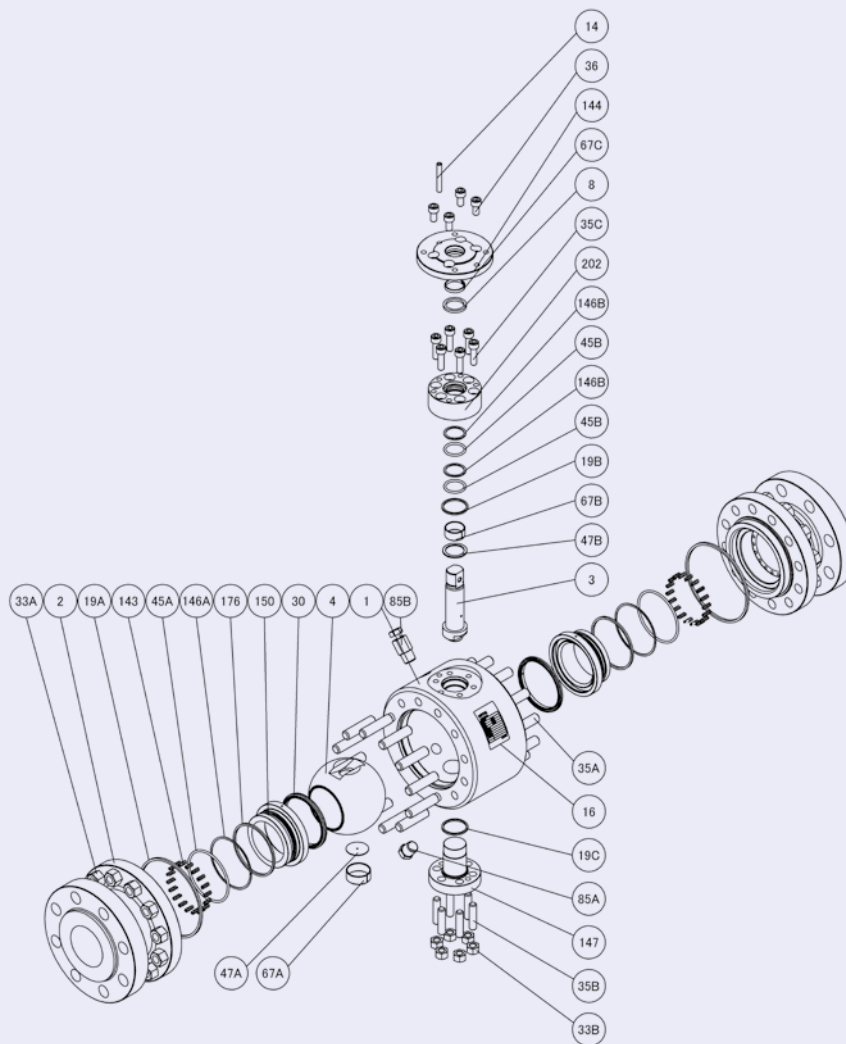
(9) Actuation (Pneumatic and Electric)

¹ For all optional provisions, please contact your local KITZ agents or distributors.

² Standard design for North America.

³ Any combination of DPE (Double Piston Effect)/SPE (Single Piston Effect) is available.

Construction and Materials

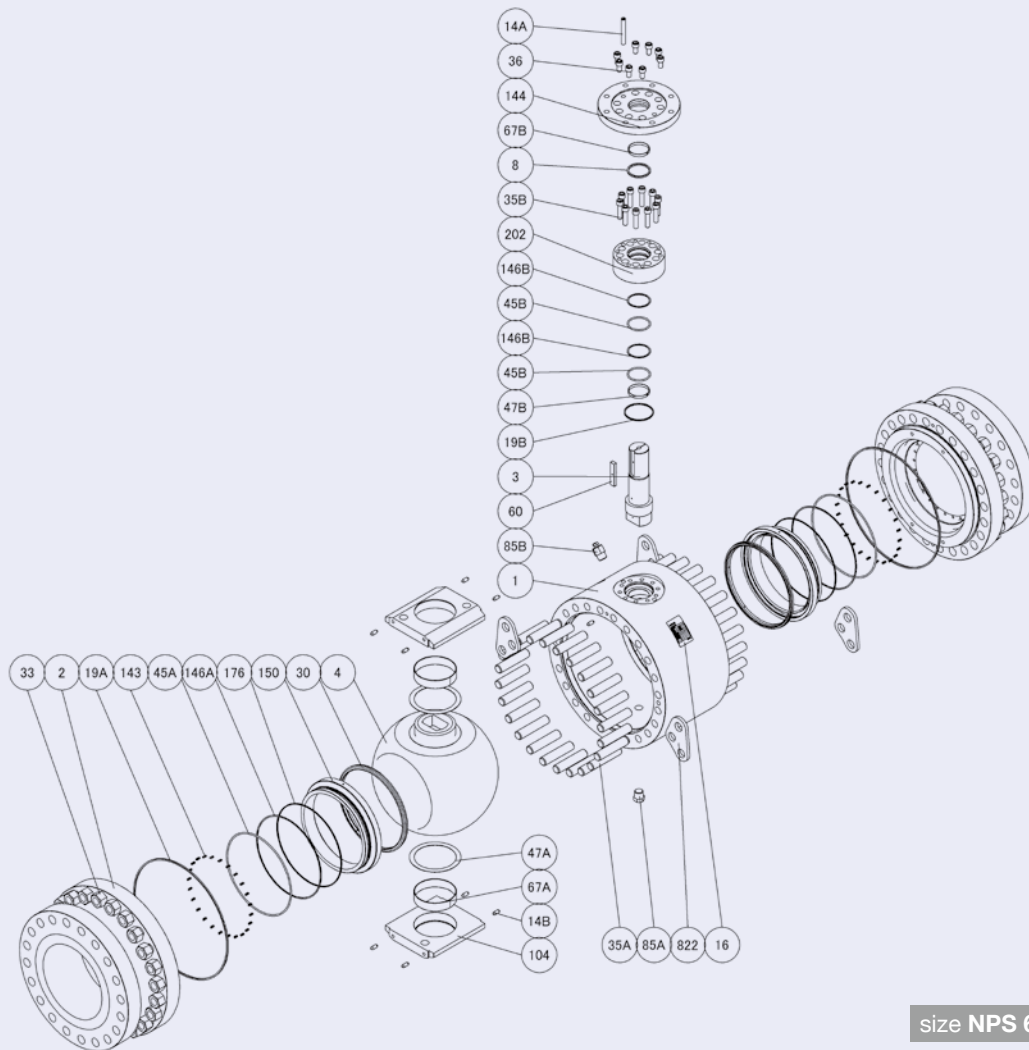


NO	NAME OF PARTS	MATERIALS	NO	NAME OF PARTS	MATERIALS
1	BODY	A105	36	GLAND BOLT	A193 Gr. B7M
2	CAP	A105	45A	O-RING	HNBR
3	STEM	A479 TYPE 316 or A276 TYPE 316 or A182 Gr. F316	45B	O-RING	HNBR
4	BALL	A105 + ENP or A216 Gr. WCB + ENP F60+ENP (CLASS 900/1500)	47A	THRUST WASHER	RPTFE
8	GLAND PACKING	FLEXIBLE GRAPHITE	47B	THRUST WASHER	CS + RPTFE
14	SET PIN	A564 TYPE 630 H1150D	67A	CURL BEARING (BALL)	CS + RPTFE
16	NAME PLATE	STAINLESS STEEL	67C	STEM BEARING	PTFE
19A	GASKET	FLEXIBLE GRAPHITE	85A	PLUG	A350 Gr. LF2 cl.1
19B	GASKET	FLEXIBLE GRAPHITE	85B	VENT VALVE	A350 Gr. LF2 cl.1
19C	GASKET	FLEXIBLE GRAPHITE	143	SEAT SPRING	INCONEL® X750 NICKEL ALLOY
30	BALL SEAT	RPTFE	144	GLAND PLATE	A105
33A	CAP NUT	A194 Gr. 2HM	146A	BACK UP RING	PTFE
33B	COVER NUT	A194 Gr. 2HM	146B	BACK UP RING	PTFE
35A	CAP BOLT	A193 Gr. B7M	147	END PLATE	A105
35B	COVER BOLT	A193 Gr. B7M	150	SEAT RETAINER	A105 + ENP
35C	BONNET BOLT	A193 Gr. B7M	176	RETAINER PACKING	BRAIDED GRAPHITE
			202	BONNET	A105

The illustration shown in this catalog represents the typical structure of Class 600 valves.

The structure may differ depending on sizes and classes. Please consult KITZ for more details on the specifications and structure of the valve.

Construction and Materials



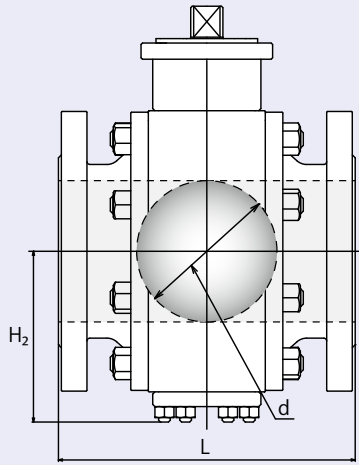
size NPS 6 and larger

NO	NAME OF PARTS	MATERIALS	NO	NAME OF PARTS	MATERIALS
1	BODY	A105	45B	O-RING	HNBR
2	CAP	A105	47A	THRUST WASHER	RPTFE
3	STEM	A479 TYPE 316 or A276 TYPE 316 or A182 Gr. F316	47B	THRUST WASHER	CS + RPTFE
4	BALL	A105 + ENP or A216 Gr. WCB + ENP F60+ENP (CLASS 900/1500)	60	KEY	CARBON STEEL
8	GLAND PACKING	FLEXIBLE GRAPHITE	67A	CURL BEARING (BALL)	CS + RPTFE
14A	SET PIN	A564 TYPE 630 H1150D	67B	STEM BEARING	PTFE
14B	SET PIN	A276 TYPE 316 or A479 TYPE 316	85A	PLUG	A350 Gr. LF2 cl.1
16	NAME PLATE	STAINLESS STEEL	85B	VENT VALVE	A350 Gr. LF2 cl.1
19A	GASKET	FLEXIBLE GRAPHITE	104	TRUNNION PLATE	A105 or A216 Gr. WCB
19B	GASKET	FLEXIBLE GRAPHITE	143	SEAT SPRING	INCONEL® X750 NICKEL ALLOY
30	BALL SEAT	RPTFE	144	GLAND PLATE	A105
33	CAP NUT	A194 Gr. 2HM	146A	BACK UP RING	PTFE
35A	CAP BOLT	A193 Gr. B7M	146B	BACK UP RING	PTFE
35B	BONNET BOLT	A193 Gr. B7M	150	SEAT RETAINER	A105 + ENP
36	GLAND BOLT	A193 Gr. B7M	176	RETAINER PACKING	BRAIDED GRAPHITE
45A	O-RING	HNBR	202	BONNET	A105
			822	LIFTING LUG	CARBON STEEL

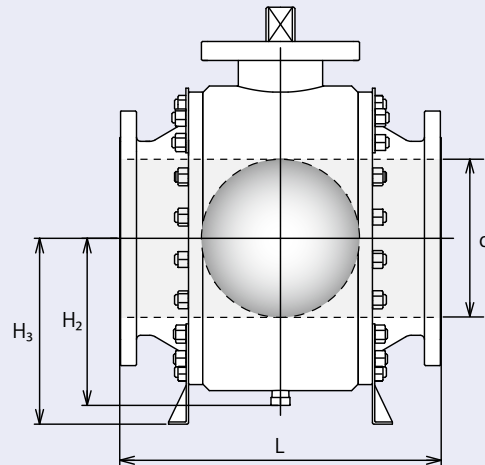
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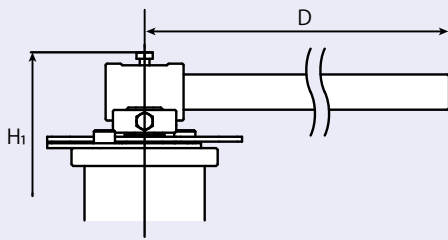
Valve Dimensions and Operators



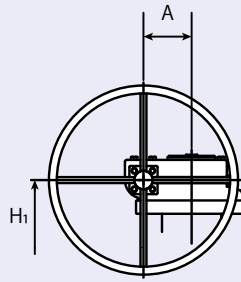
Up to Size NPS 4



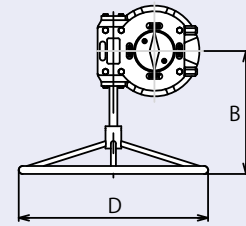
Size NPS 6 and larger



Lever



Gear



< size unit : mm >

Class 150

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24	
	DN	50	80	100	150	200	250	300	350	400	450	500	600	
Valve Operator		Lever					Gear							
d		49	74	100	150	201	252	303	334	385	436	487	589	
L		178	203	229	394	457	533	610	686	762	864	914	1067	
H1		159	201	260	326	316	372	407	441	511	551	613	687	
H2		96	116	148	185	221	275	-	-	-	-	-	-	
H3		-	-	-	-	-	-	426	444	498	526	618	697	
A		-	-	-	-	86	105	105	53	130	130	130	130	
B		-	-	-	-	305	396	396	396	567	567	567	567	
D		300	400	450	750	500	600	600	600	800	800	800	800	

Class 300

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24	
	DN	50	80	100	150	200	250	300	350	400	450	500	600	
Valve Operator		Lever					Gear							
d		49	74	100	150	201	252	303	334	385	436	487	589	
L		216	283	305	403	502	568	648	762	838	914	991	1143	
H1		159	201	260	326	316	372	415	441	511	551	613	695	
H2		96	116	148	185	221	275	-	-	-	-	-	-	
H3		-	-	-	-	-	-	428	445	498	528	618	698	
A		-	-	-	-	86	105	53	53	130	130	130	140	
B		-	-	-	-	305	396	396	396	567	567	567	567	
D		300	400	450	750	500	600	600	600	800	800	800	800	

Valve Dimensions and Operators

Class 600

unit: mm

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
Valve Operator		Lever				Gear							
d	49	74	100	150	201	252	303	334	385	436	487	589	
L	292	356	432	559	660	787	838	889	991	1092	1194	1397	
H1	182	236	263	282	335	382	448	478	540	588	652	749	
H2	98	120	150	191	237	-	-	-	-	-	-	-	
H3	-	-	-	-	-	383	427	459	497	553	643	721	
A	-	-	-	86	105	53	130	130	130	140	140	182	
B	-	-	-	305	396	396	567	567	567	581	581	570	
D	400	450	800	500	600	600	800	800	800	800	800	800	

Class 900

unit: mm

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
Valve Operator		Lever				Gear							
d	49	74	100	150	201	252	303	322	373	423	471	570	
L	368	381	457	610	737	838	965	1029	1130	1219	1321	1549	
H1	218	243	276	295	355	406	480	547	588	673	781	930	
H2	109	134	172	201	246	-	-	-	-	-	-	-	
H3	-	-	-	-	-	414	454	508	570	614	676	788	
A	-	-	-	86	53	130	130	140	140	182	279	279	
B	-	-	-	305	396	417	567	581	581	570	701	701	
D	700	700	700	600	600	600	800	800	800	800	800	800	

Class 1500

unit: mm

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
Valve Operator		Lever				Gear							
d	49	74	100	144	192	239	287	315	360	406	454	546	
L	368	470	546	705	832	991	1130	1257	1384	1537	1664	1972	
H1	218	250	262	353	435	482	600	625	730	807	912	1000	
H2	109	146	186	237	-	-	-	-	-	-	-	-	
H3	-	-	-	-	408	446	556	568	623	701	764	857	
A	-	-	86	53	130	130	182	182	279	279	279	279	
B	-	-	305	396	567	567	570	570	701	701	701	701	
D	700	900	500	600	600	800	800	800	800	800	800	800	

< size unit : inch >

Class 150

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
Valve Operator		Lever				Gear							
d	1.94	2.94	3.94	5.94	7.94	9.94	11.94	13.19	15.19	17.19	19.19	23.19	
L	7.00	8.00	9.00	15.50	18.00	21.00	24.00	27.00	30.00	34.00	36.00	42.00	
H1	6.26	7.91	10.24	12.83	12.44	14.65	16.02	17.36	20.12	21.69	24.13	27.05	
H2	3.78	4.57	5.83	7.28	8.70	10.83	-	-	-	-	-	-	
H3	-	-	-	-	-	-	16.77	17.48	19.61	20.71	24.33	27.44	
A	-	-	-	-	3.39	4.13	4.13	2.09	5.12	5.12	5.12	5.12	
B	-	-	-	-	12.01	15.59	15.59	15.59	22.32	22.32	22.32	22.32	
D	11.81	15.75	17.72	29.53	19.69	23.62	23.62	23.62	31.50	31.50	31.50	31.50	

Class 300

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
Valve Operator		Lever				Gear							
d	1.94	2.94	3.94	5.94	7.94	9.94	11.94	13.19	15.19	17.19	19.19	23.19	
L	8.50	11.13	12.00	15.88	19.75	22.38	25.50	30.00	33.00	36.00	39.00	45.00	
H1	6.26	7.91	10.24	12.83	12.44	14.65	16.34	17.36	20.12	21.69	24.13	27.36	
H2	3.78	4.57	5.83	7.28	8.70	10.83	-	-	-	-	-	-	
H3	-	-	-	-	-	-	16.85	17.52	19.61	20.79	24.33	27.48	
A	-	-	-	-	3.39	4.13	2.09	2.09	5.12	5.12	5.12	5.51	
B	-	-	-	-	12.01	15.59	15.59	15.59	22.32	22.32	22.32	22.32	
D	11.81	15.75	17.72	29.53	19.69	23.62	23.62	23.62	31.50	31.50	31.50	31.50	

Valve Dimensions and Operators

Class 600

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
Valve Operator		Lever				Gear							
d		1.94	2.94	3.94	5.94	7.94	9.94	11.94	13.19	15.19	17.19	19.19	23.19
L		11.50	14.00	17.00	22.00	26.00	31.00	33.00	35.00	39.00	43.00	47.00	55.00
H1		7.17	9.29	10.35	11.10	13.19	15.04	17.64	18.82	21.26	23.15	25.67	29.49
H2		3.86	4.72	5.91	7.52	9.33	-	-	-	-	-	-	-
H3		-	-	-	-	-	15.08	16.81	18.07	19.57	21.77	25.31	28.39
A		-	-	-	3.39	4.13	2.09	5.12	5.12	5.12	5.51	5.51	7.17
B		-	-	-	12.01	15.59	15.59	22.32	22.32	22.32	22.87	22.87	22.44
D		15.75	17.72	31.50	19.69	23.62	23.62	31.50	31.50	31.50	31.50	31.50	31.50

Class 900

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
Valve Operator		Lever				Gear							
d		1.94	2.94	3.94	5.94	7.94	9.94	11.94	12.69	14.69	16.69	18.56	22.44
L		14.50	15.00	18.00	24.00	29.00	33.00	38.00	40.50	44.50	48.00	52.00	61.00
H1		8.58	9.57	10.87	11.61	13.98	15.98	18.90	21.54	23.15	26.50	30.75	36.61
H2		4.29	5.28	6.77	7.91	9.69	-	-	-	-	-	-	-
H3		-	-	-	-	-	16.30	17.87	20.00	22.44	24.17	26.61	31.02
A		-	-	-	3.39	2.09	5.12	5.12	5.51	5.51	7.17	10.98	10.98
B		-	-	-	12.01	15.59	16.42	22.32	22.87	22.87	22.44	27.60	27.60
D		27.56	27.56	27.56	23.62	23.62	23.62	31.50	31.50	31.50	31.50	31.50	31.50

Class 1500

unit: inch

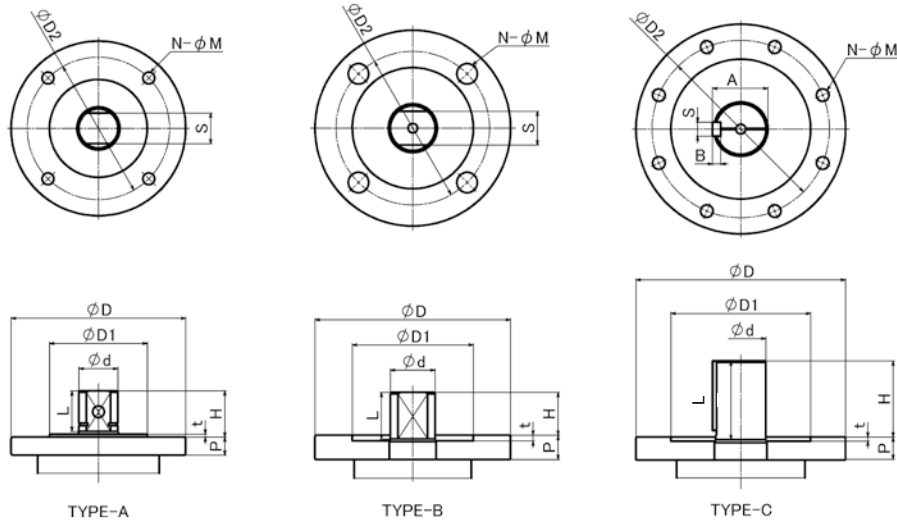
Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
Valve Operator		Lever				Gear							
d		1.94	2.94	3.94	5.69	7.56	9.44	11.31	12.44	14.19	16.00	17.88	21.50
L		14.50	18.50	21.50	27.75	32.75	39.00	44.50	49.50	54.50	60.50	65.50	76.50
H1		8.58	9.84	10.31	13.90	17.13	18.98	23.62	24.61	28.74	31.77	35.91	39.37
H2		4.29	5.75	7.32	9.33	-	-	-	-	-	-	-	-
H3		-	-	-	-	16.06	17.56	21.89	22.36	24.53	27.60	30.08	33.74
A		-	-	3.39	2.09	5.12	5.12	7.17	7.17	10.98	10.98	10.98	10.98
B		-	-	12.01	15.59	22.32	22.32	22.44	22.44	27.60	27.60	27.60	27.60
D		27.56	35.43	19.69	23.62	23.62	31.50	31.50	31.50	31.50	31.50	31.50	31.50

Material Example

Service	Non-corrosive	Low Temp.	Corrosive	Sour	
Body/Cap	A105	LF2	F316	F51, S31803 or CD3MN	F55, S32760 or CD3MWCuN
Stem	316SS	316SS	316SS	F51 or S31803	F55 or S32760
Ball	A105+ENP	LF2+ENP F60+ENP (CLASS 900/1500)	316SS F51, S31803 or CD3MN (CLASS 900/1500)	F51, S31803 or CD3MN	F55, S32760 or CD3MWCuN
Seat Retainer	A105+ENP	LF2+ENP	316SS	F51, S31803 or CD3MN	F55, S32760 or CD3MWCuN
Ball Seat	CLASS 150 to 600: RPTFE CLASS 900 and over: RNYLON				
Spring	INCONEL® X750				
O-ring	HNBR	L-NBR	FKM	FKM	FKM
Bolt	B7M	L7M	B8M	B8M	B8M
Nut	2HM	7M	8M	8M	8M

Dimensions of Actuator Mounting Pads

KITZ trunnion mounted ball valves are provided with integral actuator mounting pads designed in compliance with ISO 5211. This feature enables users to readily mount actuators on these valves.



< size unit : mm >

T60S Class 150

Nominal Size	NPS DN	unit: mm											
		2 50	3 80	4 100	6 150	8 200	10 250	12 300	14 350	16 400	18 450	20 500	24 600
TYPE		A	A	A	A	B	B	B	C	C	C	C	C
φ d		18	22	28	48	48	60	60	60	72	72	80	80
φ D		65	90	125	175	210	300	300	300	300	300	300	300
φ D1		35	55	70	100	130	200	200	200	200	200	200	200
φ D2		50	70	102	140	165	254	254	254	254	254	254	254
t		3	3	3	3	6	6	6	6	6	6	6	6
L		19	21	26	44.5	54	64	64	89	113	113	112	112
H		23	25	30	49.5	50	60	60	85	109	109	109	109
S		14	17	22	36	36	46	46	18	20	20	22	22
A		-	-	-	-	-	-	-	64	76.5	76.5	85	85
B		-	-	-	-	-	-	-	11	12	12	14	14
N		4	4	4	4	4	8	8	8	8	8	8	8
M		M6	M8	M10	M16	22	18	18	18	18	18	18	18
P		9	11	13	17	26	28	28	28	33	33	38	38
ISO 5211 Flange Type		F05	F07	F10	F14	F16	F25	F25	F25	F25	F25	F25	F25

T60S Class 300

Nominal Size	NPS DN	unit: mm											
		2 50	3 80	4 100	6 150	8 200	10 250	12 300	14 350	16 400	18 450	20 500	24 600
TYPE		A	A	A	A	B	B	B	C	C	C	C	C
φ d		18	22	28	48	48	60	60	60	72	72	80	80
φ D		65	90	125	175	210	300	300	300	300	300	300	350
φ D1		35	55	70	100	130	200	200	200	200	200	200	230
φ D2		50	70	102	140	165	254	254	254	254	254	254	298
t		3	3	3	3	6	6	6	6	6	6	6	6
L		19	21	26	44.5	54	64	64	89	113	113	112	112
H		23	25	30	49.5	50	60	60	85	109	109	109	109
S		14	17	22	36	36	46	46	18	20	20	22	22
A		-	-	-	-	-	-	-	64	76.5	76.5	85	85
B		-	-	-	-	-	-	-	11	12	12	14	14
N		4	4	4	4	4	8	8	8	8	8	8	8
M		M6	M8	M10	M16	22	18	18	18	18	18	18	18
P		9	11	13	17	26	28	28	28	33	33	38	38
ISO 5211 Flange Type		F05	F07	F10	F14	F16	F25	F25	F25	F25	F25	F25	F30

T60S Class 600

unit: mm

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
TYPE		A	A	A	B	B	C	C	C	C	C	C	C
ϕ d		22	28	36	48	60	60	72	72	80	80	98	98
ϕ D		90	125	150	210	300	300	300	300	300	350	350	415
ϕ D1		55	70	85	130	200	200	200	200	200	230	230	260
ϕ D2		70	102	125	165	254	254	254	254	254	298	298	356
t		3	3	3	6	6	6	6	6	6	6	6	6
L		21	26	33	50	64	89	113	113	112	112	131	131
H		25	30	37	46	60	85	109	109	109	109	128	128
S		17	22	27	36	46	18	20	20	22	22	28	28
A		-	-	-	-	-	64	76.5	76.5	85	85	104	104
B		-	-	-	-	-	11	12	12	14	14	16	16
N		4	4	4	4	8	8	8	8	8	8	8	8
M		M8	M10	M12	22	18	18	18	18	18	22	22	32
P		11	13	13	26	28	28	33	33	38	38	41	41
ISO 5211 Flange Type		F07	F10	F12	F16	F25	F25	F25	F25	F25	F30	F30	F35

T60S Class 900

unit: mm

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
TYPE		A	A	A	B	B	C	C	C	C	C	C	C
ϕ d		28	28	36	48	60	60	72	98	98	98	120	160
ϕ D		125	125	150	210	300	300	300	350	350	415	475	560
ϕ D1		70	70	85	130	200	200	200	230	230	260	300	370
ϕ D2		102	102	125	165	254	254	254	298	298	356	406	483
t		3	3	3	6	6	6	6	6	6	6	9	9
L		26	26	33	50	64	89	113	132.5	132.5	140	168	172
H		30	30	37	46	60	85	109	130.5	130.5	138	165	168
S		22	22	27	36	46	18	20	28	28	28	32	40
A		-	-	-	-	-	64	76.5	104	104	104	127	169
B		-	-	-	-	-	11	12	16	16	16	18	22
N		4	4	4	4	8	8	8	8	8	8	8	12
M		M10	M10	M12	22	18	18	18	22	22	32	38	38
P		13	13	13	26	28	28	33	42	42	52	62	73
ISO 5211 Flange Type		F10	F10	F12	F16	F25	F25	F25	F30	F30	F35	F40	F48

T60S Class 1500

unit: mm

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
TYPE		A	A	B	B	C	C	C	C	C	C	C	C
ϕ d		28	36	48	60	72	80	98	98	120	120	160	160
ϕ D		125	150	210	300	300	300	415	415	475	475	560	560
ϕ D1		70	85	130	200	200	200	260	260	300	300	370	370
ϕ D2		102	125	165	254	254	254	356	356	406	406	483	483
t		3	3	6	6	6	6	6	6	9	9	9	9
L		26	33	50	64	113	112	131	140	168	168	172	172
H		30	37	46	60	109	109	128	138	165	165	168	168
S		22	27	36	46	20	22	28	28	32	32	40	40
A		-	-	-	-	77	85	104	104	127	127	169	169
B		-	-	-	-	12	14	16	16	18	18	22	22
N		4	4	4	8	8	8	8	8	8	8	12	12
M		M10	M12	22	18	18	18	32	32	38	38	38	38
P		13	13	26	33	33	41	41	52	62	62	73	73
ISO 5211 Flange Type		F10	F12	F16	F25	F25	F25	F35	F35	F40	F40	F48	F48

< size unit : inch >

T60S Class 150

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
TYPE		A	A	A	A	B	B	B	C	C	C	C	C
ϕ d		0.71	0.87	1.10	1.89	1.89	2.36	2.36	2.36	2.83	2.83	3.15	3.15
ϕ D		2.56	3.54	4.92	6.89	8.27	11.81	11.81	11.81	11.81	11.81	11.81	11.81
ϕ D1		1.38	2.17	2.76	3.94	5.12	7.87	7.87	7.87	7.87	7.87	7.87	7.87
ϕ D2		1.97	2.76	4.02	5.51	6.50	10.00	10.00	10.00	10.00	10.00	10.00	10.00
t		0.12	0.12	0.12	0.12	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
L		0.75	0.83	1.02	1.75	2.13	2.52	2.52	3.50	4.45	4.45	4.41	4.41
H		0.91	0.98	1.18	1.95	1.97	2.36	2.36	3.35	4.29	4.29	4.29	4.29
S		0.55	0.67	0.87	1.42	1.42	1.81	1.81	0.71	0.79	0.79	0.87	0.87
A		-	-	-	-	-	-	-	2.52	3.01	3.01	3.35	3.35
B		-	-	-	-	-	-	-	0.43	0.47	0.47	0.55	0.55
N		4	4	4	4	4	8	8	8	8	8	8	8
M		M6	M8	M10	M16	0.87	0.71	0.71	0.71	0.71	0.71	0.71	0.71
P		0.35	0.43	0.51	0.67	1.02	1.10	1.10	1.10	1.30	1.30	1.50	1.50
ISO 5211 Flange Type		F05	F07	F10	F14	F16	F25	F25	F25	F25	F25	F25	F25

T60S Class 300

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
TYPE		A	A	A	A	B	B	B	C	C	C	C	C
ϕ d		0.71	0.87	1.10	1.89	1.89	2.36	2.36	2.36	2.83	2.83	3.15	3.15
ϕ D		2.56	3.54	4.92	6.89	8.27	11.81	11.81	11.81	11.81	11.81	11.81	13.78
ϕ D1		1.38	2.17	2.76	3.94	5.12	7.87	7.87	7.87	7.87	7.87	7.87	9.06
ϕ D2		1.97	2.76	4.02	5.51	6.50	10.00	10.00	10.00	10.00	10.00	10.00	11.73
t		0.12	0.12	0.12	0.12	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
L		0.75	0.83	1.02	1.75	2.13	2.52	2.52	3.50	4.45	4.45	4.41	4.41
H		0.91	0.98	1.18	1.95	1.97	2.36	2.36	3.35	4.29	4.29	4.29	4.29
S		0.55	0.67	0.87	1.42	1.42	1.81	1.81	0.71	0.79	0.79	0.87	0.87
A		-	-	-	-	-	-	-	2.52	3.01	3.01	3.35	3.35
B		-	-	-	-	-	-	-	0.43	0.47	0.47	0.55	0.55
N		4	4	4	4	4	8	8	8	8	8	8	8
M		M6	M8	M10	M16	0.87	0.71	0.71	0.71	0.71	0.71	0.71	0.71
P		0.35	0.43	0.51	0.67	1.02	1.10	1.10	1.10	1.30	1.30	1.50	1.50
ISO 5211 Flange Type		F05	F07	F10	F14	F16	F25	F25	F25	F25	F25	F25	F30

T60S Class 600

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
TYPE		A	A	A	B	B	C	C	C	C	C	C	C
ϕ d		0.87	1.10	1.42	1.89	2.36	2.36	2.83	2.83	3.15	3.15	3.86	3.86
ϕ D		3.54	4.92	5.91	8.27	11.81	11.81	11.81	11.81	11.81	13.78	13.78	16.34
ϕ D1		2.17	2.76	3.35	5.12	7.87	7.87	7.87	7.87	7.87	9.06	9.06	10.24
ϕ D2		2.76	4.02	4.92	6.50	10.00	10.00	10.00	10.00	10.00	11.73	11.73	14.02
t		0.12	0.12	0.12	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
L		0.83	1.02	1.30	1.97	2.52	3.50	4.45	4.45	4.41	4.41	5.16	5.16
H		0.98	1.18	1.46	1.81	2.36	3.35	4.29	4.29	4.29	4.29	5.04	5.04
S		0.67	0.87	1.06	1.42	1.81	0.71	0.79	0.79	0.87	0.87	1.10	1.10
A		-	-	-	-	-	2.52	3.01	3.01	3.35	3.35	4.09	4.09
B		-	-	-	-	-	0.43	0.47	0.47	0.55	0.55	0.63	0.63
N		4	4	4	4	8	8	8	8	8	8	8	8
M		M8	M10	M12	0.87	0.71	0.71	0.71	0.71	0.71	0.87	0.87	1.26
P		0.43	0.51	0.51	1.02	1.10	1.10	1.30	1.30	1.50	1.50	1.61	1.61
ISO 5211 Flange Type		F07	F10	F12	F16	F25	F25	F25	F25	F25	F30	F30	F35

T60S Class 900

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
TYPE		A	A	A	B	B	C	C	C	C	C	C	C
ϕ d		1.10	1.10	1.42	1.89	2.36	2.36	2.83	3.86	3.86	3.86	4.72	6.30
ϕ D		4.92	4.92	5.91	8.27	11.81	11.81	11.81	13.78	13.78	16.34	18.70	22.05
ϕ D1		2.76	2.76	3.35	5.12	7.87	7.87	7.87	9.06	9.06	10.24	11.81	14.57
ϕ D2		4.02	4.02	4.92	6.50	10.00	10.00	10.00	11.73	11.73	14.02	15.98	19.02
t		0.12	0.12	0.12	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.35	0.35
L		1.02	1.02	1.30	1.97	2.52	3.50	4.45	5.22	5.22	5.51	6.61	6.77
H		1.18	1.18	1.46	1.81	2.36	3.35	4.29	5.14	5.14	5.43	6.50	6.61
S		0.87	0.87	1.06	1.42	1.81	0.71	0.79	1.10	1.10	1.10	1.26	1.57
A		-	-	-	-	-	2.52	3.01	4.09	4.09	4.09	5.00	6.65
B		-	-	-	-	-	0.43	0.47	0.63	0.63	0.63	0.71	0.87
N		4	4	4	4	8	8	8	8	8	8	8	12
M		M10	M10	M12	0.87	0.71	0.71	0.71	0.87	0.87	1.26	1.50	1.50
P		0.51	0.51	0.51	1.02	1.10	1.10	1.30	1.65	1.65	2.05	2.44	2.87
ISO 5211 Flange Type		F10	F10	F12	F16	F25	F25	F25	F30	F30	F35	F40	F48

T60S Class 1500

unit: inch

Nominal Size	NPS	2	3	4	6	8	10	12	14	16	18	20	24
	DN	50	80	100	150	200	250	300	350	400	450	500	600
TYPE		A	A	B	B	C	C	C	C	C	C	C	C
ϕ d		1.10	1.42	1.89	2.36	2.83	3.15	3.86	3.86	4.72	4.72	6.30	6.30
ϕ D		4.92	5.91	8.27	11.81	11.81	11.81	16.34	16.34	18.70	18.70	22.05	22.05
ϕ D1		2.76	3.35	5.12	7.87	7.87	7.87	10.24	10.24	11.81	11.81	14.57	14.57
ϕ D2		4.02	4.92	6.50	10.00	10.00	10.00	14.02	14.02	15.98	15.98	19.02	19.02
t		0.12	0.12	0.24	0.24	0.24	0.24	0.24	0.24	0.35	0.35	0.35	0.35
L		1.02	1.30	1.97	2.52	4.45	4.41	5.16	5.51	6.61	6.61	6.77	6.77
H		1.18	1.46	1.81	2.36	4.29	4.29	5.04	5.43	6.50	6.50	6.61	6.61
S		0.87	1.06	1.42	1.81	0.79	0.87	1.10	1.10	1.26	1.26	1.57	1.57
A		-	-	-	-	3.03	3.35	4.09	4.09	5.00	5.00	6.65	6.65
B		-	-	-	-	0.47	0.55	0.63	0.63	0.71	0.71	0.87	0.87
N		4	4	4	8	8	8	8	8	8	8	12	12
M		M10	M12	0.87	0.71	0.71	0.71	1.26	1.26	1.50	1.50	1.50	1.50
P		0.51	0.51	1.02	1.30	1.30	1.61	1.61	2.05	2.44	2.44	2.87	2.87
ISO 5211 Flange Type		F10	F12	F16	F25	F25	F25	F35	F35	F40	F40	F48	F48