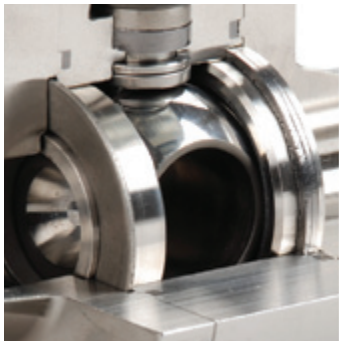


Metal Seated Valves

Extreme Conditions / Severe Applications

HABONIM
Industrial Valves & Actuators

DEDICATED TO INNOVATION

METAL SEATED VALVES

How tough is tough?

Habonim's metal seated ball valves series is tough - designed to stand up to the most difficult process conditions including a combination of extreme temperatures, high pressure, and abrasive media. Its superior engineered design and rigid construction make Habonim metal seated valves the right choice for industry's toughest applications

- Oil & Gas
- Refining / Petrochemical
- Chemical Process
- Power Generation
- Pulp & Paper
- Mining

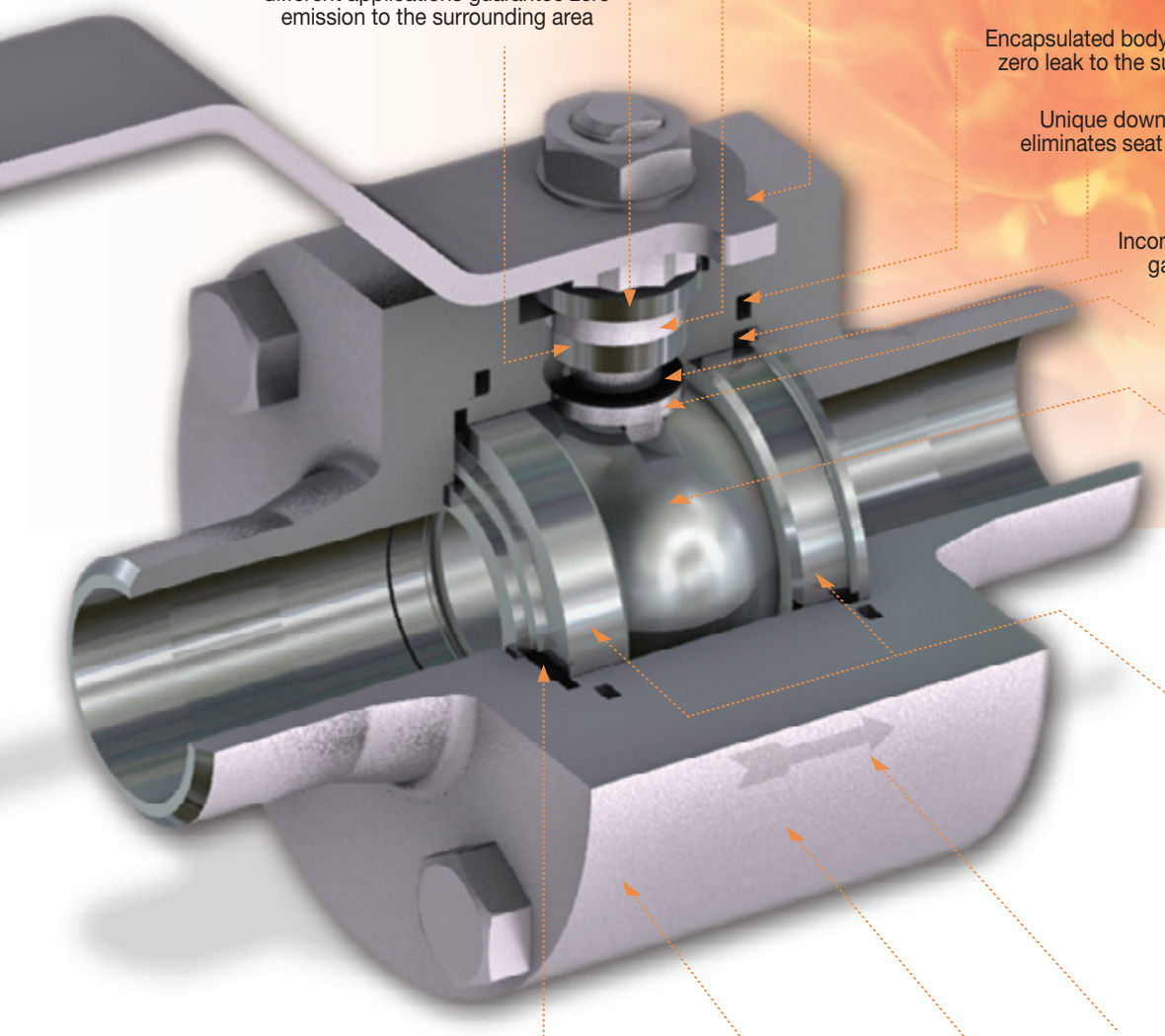
Features

- Full port design, as standard, for high flow capacity and minimum turbulences
- Absolute shutoff achieved by perfect lapping process of ball and metal seats set
- Various surface treatments and coatings available for superb corrosion and abrasion resistance
- Constant preload of ball/seats set obtained by Inconel 718 Belleville spring
- Rigid one piece stem extension for extreme applications

Technical summary

Size Range:	1/4"-8"(DN8-DN200)
Construction:	Uni-directional, Full-port
Series in Range:	28Z (High-pressure), 47 (3-piece), 73 / 74 (Full bore ANSI flange) 77 / 78 (Full bore DIN flange)
Typical Service:	Super heated steam, hot gas, coal ash, high viscous media, molten metals
Pressure Range:	Vacuum 10^{-6} Torr to 414 bar (6000 psi)
Temperature Range:	-196^{0}C to +650^{0}C (-320°F to 1200°F)
Materials:	Carbon steel, Stainless Steel, Super Duplex
End connections:	Flanged, threaded, welded, extended welded
Standards:	ISO 10497 & API 607 6th Fire type-testing requirements ANSI/ASME B16.34 - 2009 - Valves Flanged, Threaded and Welding End BS EN ISO 17292 - Anti-static - Metal ball valves for the petroleum, petrochemical and allied industries API spec 6D - Specification for Pipeline Valves ISO 14313 - Petroleum and natural gas industries - Pipeline transportation systems - Pipeline valves
Operation:	Lever or gear operated, pneumatic or electric actuated

METAL SEATED VALVES - Up to 425°C/800°F



Live loaded stem seal assures zero emission and long operating life

Metal follower allows valve stem aligned rotation

Mechanical stops limit the handle from 180° turn, assures repeatability of ball sphere and seats face contact

Variety of stem seal designs for different applications guarantee zero emission to the surrounding area

Encapsulated body seals guarantee zero leak to the surrounding area

Unique downstream seat seal design eliminates seat back flow and in-line leak

Inconel 718 thrust bearings eliminate galling of stem and valve body

High tensile material, blow out proof stem design

Variety of surface treatments and coatings to withstand corrosion and wear

Mate lapped metal ball and seats ncreasing engagement and sealing.

Flow plate

Robust valve body design

Preload of the ball/seats set maintained by Belleville spring, ensure low valve operating torque

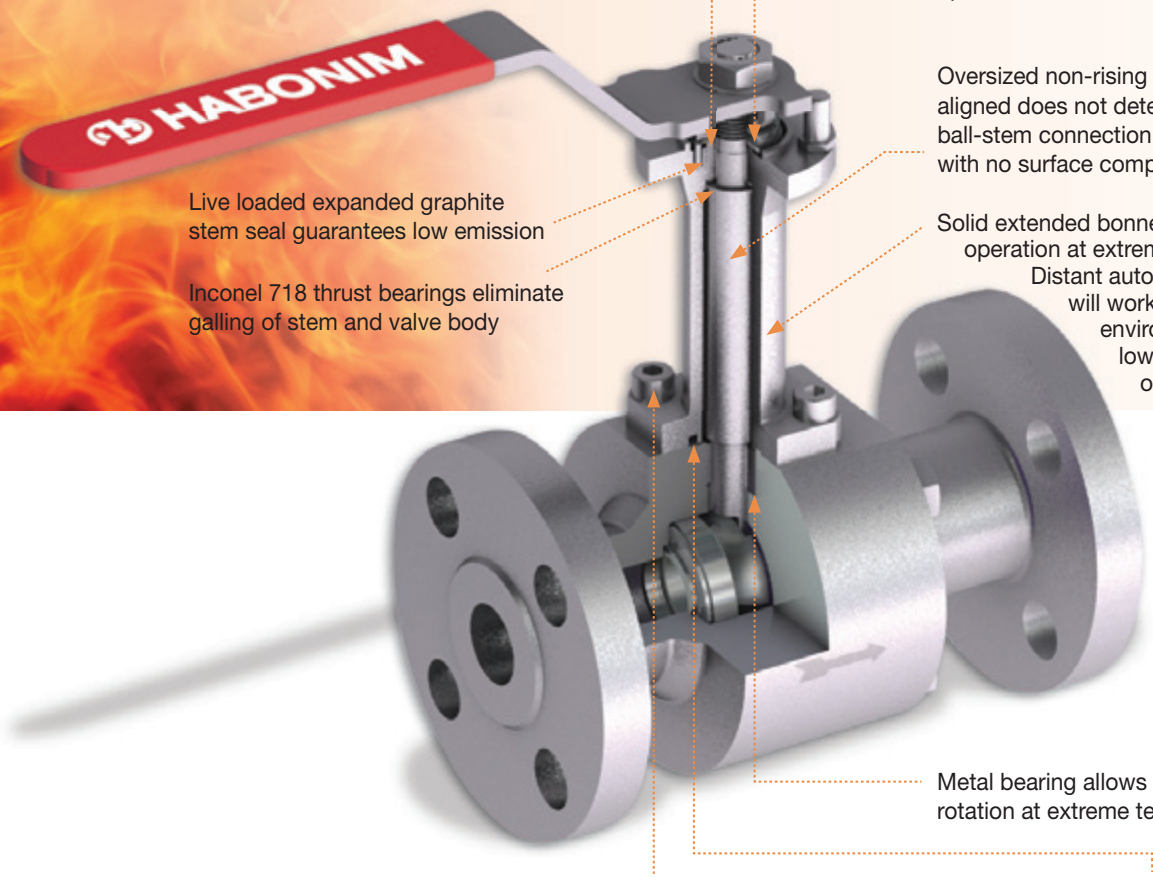
Variety of valve end connections, welded, screwed, flanged

METAL SEATED VALVES - Up to 650°C/1200°F

Habonim tough line challenges the extreme, for temperatures higher than 425°C / 800°F and up to temperatures as high as 650°C / 1200°F Meticulous engineering effort covers every design aspect of a valve intend to serve in the toughest applications. Detailed metallurgical selection of all valve parts and development of special surface treatment and hard coatings, detailed mechanical strength calculation and thermal expansion analysis assures that the Habonim MTM line is the best choice for industry's toughest applications

Metal bearing allows valve stem aligned rotation and full encapsulation of stem seal

Mechanical stop prevents turning ball 180°, this assures repeatability of ball upstream and downstream surfaces to their mate lapped upstream and downstream seats respectively



Oversized non-rising extended stem perfectly aligned does not deteriorate stem seal. Broad ball-stem connection allows torque transfer with no surface compressive deformation

Live loaded expanded graphite stem seal guarantees low emission

Solid extended bonnet allows safe operation at extremely high temperature. Distant automatic operator will work under moderate environment and continued, low maintenance operation

Inconel 718 thrust bearings eliminate galling of stem and valve body

Metal bearing allows valve stem aligned rotation at extreme temperature

Special alloy oversized body / bonnet bolts maintain mechanical properties in temperatures as high as 800°C/1472°F*.
bolts design, double in number and short in length, reduce thermal expansion and keep valve shell integrity at elevated temperature and pressure

Encapsulated bonnet seal guarantees zero leak to the surrounding

Surface Treatments/ Coatings	Process Method	Process Material	Coating Thickness	Hardness	Max Temp*	Corrosion Resistance
LTPN	Plasma Nitriding	Nitrogen, Carbon	20 - 35 µm	60HRC	350°C / 660°F	Excellent
DHN	Salt Bath Nitriding	Nitrogen	60µm	60HRC	425°C / 800°F	Low
Cr3C2	HVOF spray	Chromium, Carbon Nickel	0.3mm	68HRC	815°C / 1500°F	Good
WC-Co	HVOF spray	Tungsten, Carbon Cobalt	0.3mm	72HRC	538°C / 1000°F	Excellent
Stellite	PTA (Plasma Thermal Arc)	Cobalt-Ni	3mm	36HRC	538°C / 1000°F	Good

*** The valve maximum temperature is 650°C.**

Surface treatments and coatings

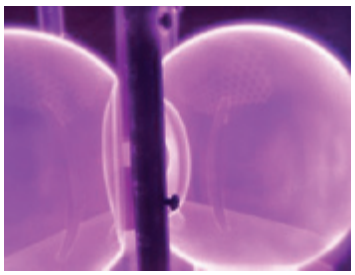
Selecting the appropriate hard surface technique for the Habonim range of metal seated valves, is key in overcoming a wide variety of tough and critical services. These surfaces must resist wear, galling and corrosion, in addition to maintaining total sealability. The process of hardening the surface must also be well-matched with the base material for precise adhesion, corrosion resistance and thermal stability.
Hardening systems from Habonim can be divided in two categories; Surface Treatment and Coatings.

Surface treatments

Nitriding is a surface treatment technique that significantly increases the hardness and wear resistance of austenitic 300 series stainless steel, by thermochemical diffusion. There are two types of Nitriding process provided by Habonim; ***LTPN*** and ***DHN***.

Low Temperature Plasma Nitriding (LTPN)

Low-temperature plasma nitriding at temperatures of 400°C (750˚F) produce a significant hardening effect on the surface of austenitic 300 series stainless steel. LTPN typically results in a nitride layer up to 25µm thick and a micro-hardness as high as 62HRC, compared with a hardness of no more than 25HRC on an untreated surface. As a result, the wear resistance of the stainless steel is improved whilst preserving its corrosion and resistance properties. Although conventional nitriding treatments can result in diminished corrosion resistance, the recent development of low temperature thermo-chemical processes has resulted in greater hardness and excellent corrosion resistance of austenitic stainless steels. **The maximum allowable temperature for valves using the LTPN treatment is 350°C (660˚F).**



Balls in LTPN Process

Salt-bath Nitriding (DHN)

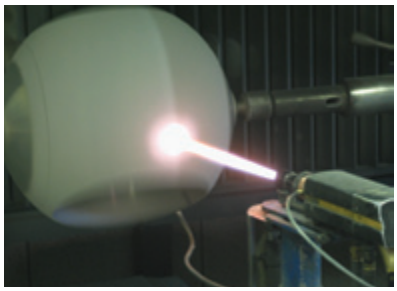
Salt bath nitriding treatment at a temperature of 550˚C (1020˚F) provides a similar hardening effect as that of the LTPN treatment. Typically, the DHN nitride layer is 60µm thick. Since the relatively high temperature of this treatment reduces the corrosion resistant of the stainless steel, **it is limited to applications with a minimum PH level of 6. DHN can be used on applications up to 425˚C (800˚F) and is ideally suited on thermal oil and hot air applications.**

Coatings

Unlike surface treatment methods whereby the existing surface is changed by diffusion, in surface coating an outer layer of new material is generated on the surface. The following types of surface coating methods are available in the Habonim metal seated range; chromium carbide with nickel chrome binder (Cr3C2), tungsten carbide with cobalt binder (WC-Co), and stellite welding.

Cr3C2 (Chromium Carbide)

Chromium Carbide with nickel chrome binder applied by a High Velocity Oxygen Fuel (HVOF) gun creates a 0.3mm hard outer layer. Cr3C2 coating applied to high strength steels, results in a micro-hardness of up to 68HRC. This coating resists cryogenic temperatures down to -196˚C (-320˚F) and high temperatures up to 815˚C The valve maximum temperature is 650°C. All the temperatures above 650°C refer to the coating or bolts performance only (1500˚F). This multipurpose wear resistance coating is used extensively in the power generation, refining and hot catalyst handling services. Its limitations are in wet sulphur or chloride environments where sulphuric acid can form and attack the coating.



Hard Coating done by HVOF

WC-Co (Tungsten Carbide)

Tungsten Carbide with a cobalt binder coating applied by HVOF techniques similar to Cr3C2.
WC-Co coating applied mainly to 400 series martensitic stainless steel results with micro-hardness as high as 72HRC. This coating resists cryogenic temperature down to -196˚C (-320˚F) and high temperatures up to 538˚C (1000˚F). WC-Co is a wear resistance and dense coating with chemical resistance to sulphur environment on Nickel based alloy.

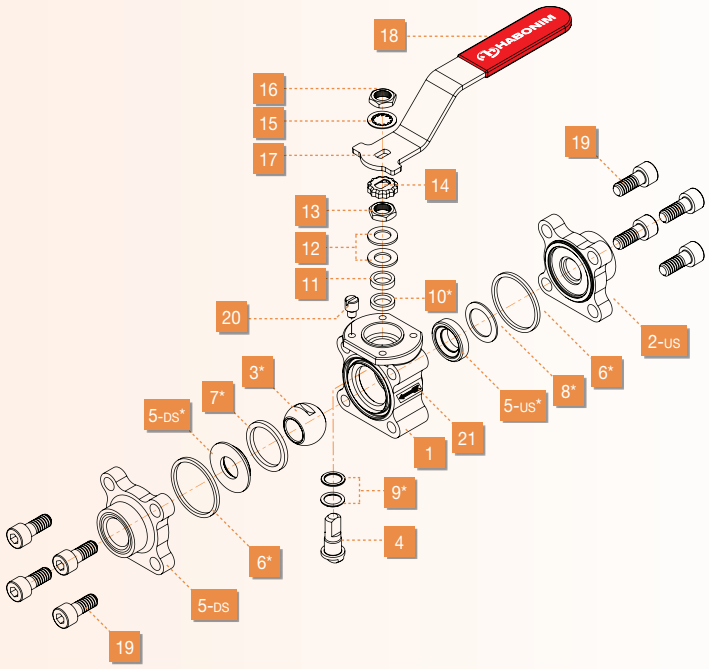
Stellite

A cobalt-based stellite coating provides excellent mechanical wear resistance, with good corrosion resistance at temperatures up to 538˚C (1000˚F).
The Stellite is applied by a Plasma Thermal Arc (PTA) method. Most stellite alloys are cobalt based with elements of Chromium (Cr), Carbon(C), Tungsten (W) and Nickel (Ni). Stellite is broadly used in the pulp and paper industry, as well as in refining applications, such as catalyst handling and hydrocracker processes.

47Z series #900 ¼”-1½”

Material specifications

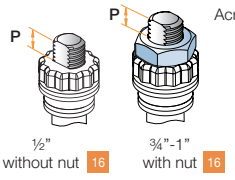
Item	Descripition	Material	Qty.
1	Body**	ASTM A351 S.St CF8M ASTM A216 C.St WCB	1
2-DS	Downstream End**	ASTM A351 S.St CF3M/CF8M ASTM A216 C.St WCB	1
2-US	Upstream End**	ASTM A351 S.St CF3M/CF8M ASTM A216 C.St WCB	1
3	Ball	ASTM A351 S.St CF8M (Hardened)	1*
4	Stem	ASTM A564 S.St 17-4PH	1
5-DS	Downstream Seat	ASTM A479 S.St 316L (Hardened)	1*
5-US	Upstream Seat	ASTM A479 S.St 316L (Hardened)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Disc Spring	ASTM A693 S.St 17-7PH	2
13	Stem Nut	ASTM A194 S.St 316	1
14	Locking Clip	ASTM A164 S.St 304	1
15	Serrated Washer	AISI 410	1
16	Handle Nut	ASTM A194 S.St 316	1
17	Handle	ASTM A240 S.St 430	1
18	Handle Sleeve	PVC	1
19	Body Bolts	ISO 4014 S.St A4-80	8
20	Stop Pin	ASTM A582 S.St 303	1
21	Arrow Flow	S.St	1



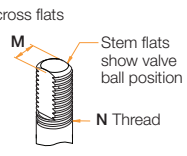
* Recommended spare parts
** 47Z body and ends are also available in bar stock material, add '-B' suffix to defer from cast made body

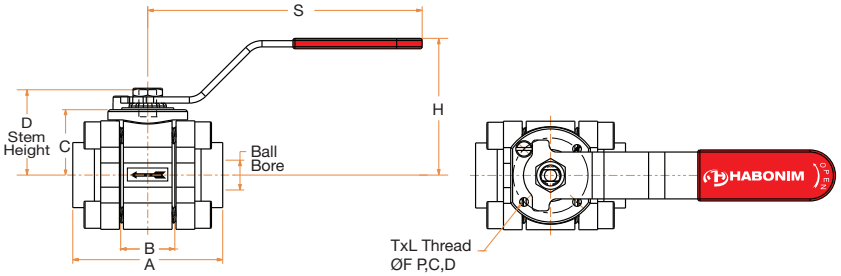
47Z & T47Z		Flow coefficient		Limiting stem input torque			
				17-4PH		Inconel 718	
Valve size		Cv	Kv	Nm	in-lb	Nm	in-lb
¼”	DN8	5	4.3	45	398	60	531
⅜”	DN10	8	6.9	45	398	60	531
½”	DN15	12	10.6	45	398	60	531
¾”	DN20	32	28.1	100	885	120	1062
1”	DN25	57	49.3	100	885	120	1062
1¼”	DN32	80	69.2	200	1770	250	2213
1½”	DN40	104	90	200	1770	250	2213

Preparation for actuation



Stem dimensions





Valve dimensions

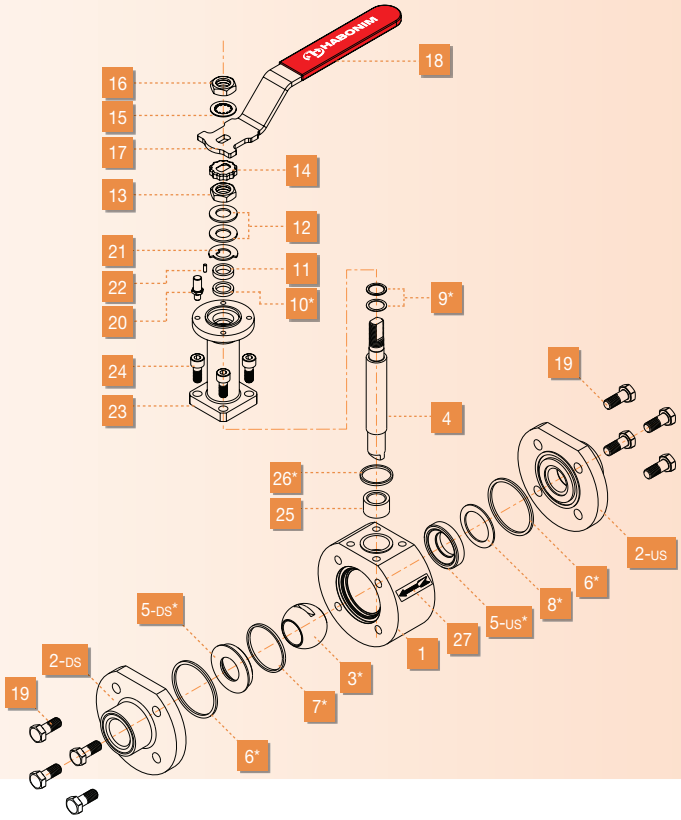
SIZE		BORE	A	B	C	D	H	S	W	TxL	ØF (ISO)	M	N	P	Weight Kg/Lb
DN8, DN10	mm	11.15	66	20.6	29	37.9	62	150	46	M5x10	36	5.5	3/8” UNF	7.2	0.8
¼” ⅜”	inch	0.44	2.60	0.81	1.14	1.49	2.44	5.91	1.81		(F03)	0.22		0.28	1.8
DN15	mm	14.3	70.6	24.55	31.4	40.3	64	150	52.1	M5x10	36	5.5	3/8” UNF	7.2	1
½”	inch	0.56	2.78	0.97	1.24	1.59	2.52	5.91	2.05		(F03)	0.22		0.28	2.2
DN20	mm	20.65	94	31.75	38.15	55.5	80	187	60.5	M5x10	42	7.5	7/16” UNF	7.2	2
¾”	inch	0.81	3.70	1.25	1.50	2.19	3.15	7.36	2.38		(F04)	0.30		0.28	4.4
DN25	mm	25.5	108.5	41.25	42.65	60.5	84.5	187	69	M5x10	42	7.5	7/16” UNF	7.2	2.7
1”	inch	1.00	4.27	1.62	1.68	2.38	3.33	7.36	2.72		(F04)	0.30		0.28	6.0
DN32	mm	31.8	116	48.4	43.5	73	96	237	79.2	M6x12	50	8.67	9/16” UNF	8	3.5
1¼”	inch	1.25	4.57	1.91	1.71	2.87	3.78	9.33	3.12		(F05)	0.34		0.31	7.7
DN40	mm	38.1	128	56.3	48.2	77.7	100	237	90.7	M6x12	50	8.67	9/16” UNF	8	5
1½”	inch	1.50	5.04	2.22	1.90	3.06	3.94	9.33	3.57		(F05)	0.34		0.31	11.0

T47Z series #900 ¼”-1½” for extreme high temperature

Material specifications

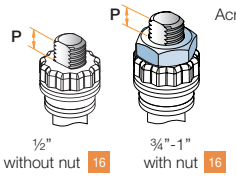
Item	Description	Material	Qty.
1	Body	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2-DS	Downstream End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2-US	Upstream End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
3	Ball	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
4	Stem	ASTM B637 Inconel 718 ASTM A564 S.St 17-4PH ASTM A479 S.St 316Ti	1
5-DS	Downstream Seat	ASTM A479 S.St 316Ti(coated) ASTM A479 S.St 310 (coated)	1*
5-US	Upstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Upstream Seat Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Disc Spring	ASTM A693 S.St 17-7PH	2
13	Stem Nut	ASTM A194 S.St 316	1
14	Locking Clip	ASTM A164 S.St 304	1
15	Seratted Washer	AISI 410	1
16	Handle Nut	ASTM A194 S.St 316	1
17	Handle	ASTM A240 S.St 430	1
18	Handle Sleeve	PVC	1
19	Body Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	8
20	Stop Pin	ASTM A582 S.St 303	1
21	Location Ring	ASTM A164 S.St 304	1
22	Location Pin	S.St	1
23	Bonnet	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
24	Bonnet Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	4
25	Bearing	ASTM B637 Inconel 718	1
26	Bonnet Seal	Expanded Graphite	1*
27	Arrow Flow	S.St	1

* Recommended spare parts

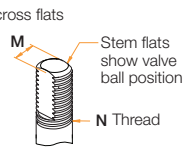


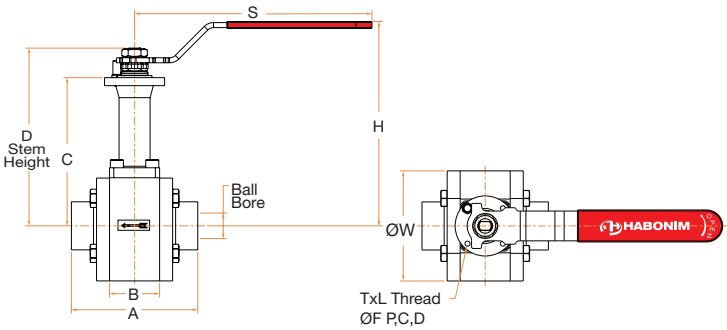
The 47Z/T47Z series, ¼” – 1½”, class 600, design for full B16.34 rating and shutoff against full B16.34 differential pressure.

Preparation for actuation



Stem dimensions





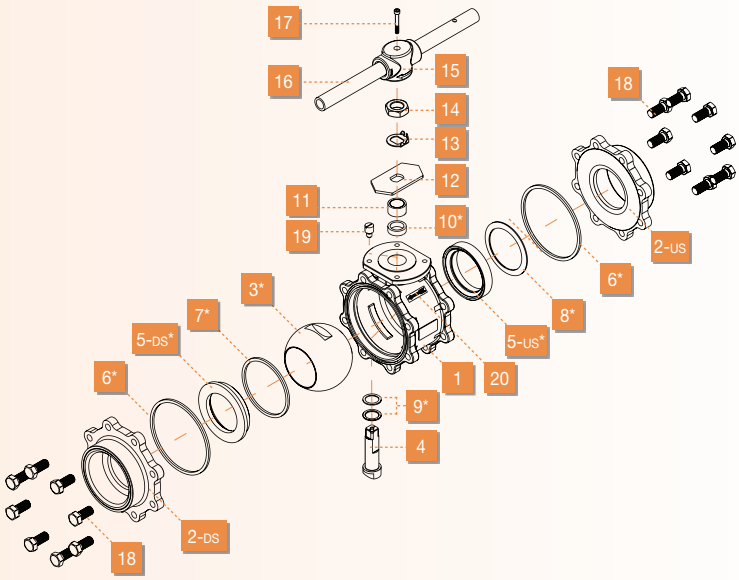
Valve dimensions

SIZE		BORE	A	B	C	D	H	S	ØW	TxL	ØF (ISO)	M	N	P	Weight Kg/Lb
DN8, DN10	mm	11.15	80.4	35	129	137.9	162	150	70	M5x10	36	5.5	3/8” UNF	7.2	2
¼” , ⅜”	inch	0.44	3.17	1.38	5.08	5.43	6.38	5.91	2.76		(F03)	0.22		0.28	4.4
DN15	mm	14.3	83.1	37	131.4	148.9	175	187	75	M5x10	42	7.5	7/16” UNF	7.2	2.7
½”	inch	0.56	3.27	1.46	5.17	5.86	6.89	7.36	2.95		(F04)	0.295		0.283	6.0
DN20	mm	20.65	104.3	42	135	152.5	179	187	85	M5x10	42	7.5	7/16” UNF	7.2	4
¾”	inch	0.81	4.10	1.65	5.31	6.00	7.05	7.36	3.35		(F04)	0.295		0.283	8.8
DN25	mm	25.5	117.3	50	148	177.5	202	237	110	M6x12	50	8.67	9/16” UNF	8	6.7
1”	inch	1.00	4.62	1.97	5.83	6.99	7.95	9.33	4.33		(F05)	0.341		0.315	14.8
DN32	mm	31.8	117.6	50	151	180.5	205	237	115	M6x12	50	8.67	9/16” UNF	8	7.3
1¼”	inch	1.25	4.63	1.97	5.94	7.11	8.07	9.33	4.53		(F05)	0.341		0.315	16.1
DN40	mm	38.1	128.0	56.3	155	184.5	209	237	125	M6x12	50	8.67	9/16” UNF	8	8.5
1½”	inch	1.50	5.04	2.22	6.10	7.26	8.23	9.33	4.92		(F05)	0.341		0.315	18.7

47Z series #600 2”- 6”

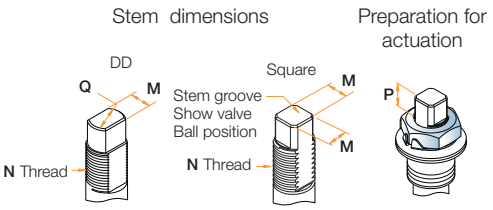
Material specifications

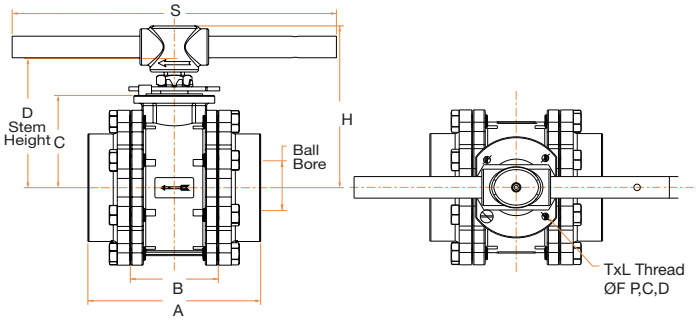
Item	Description	Material	Qty.
1	Body**	ASTM A351 S.St CF8M ASTM A216 C.St WCB	1
2-DS	Downstream End**	ASTM A351 S.St CF3M/CF8M ASTM A216 C.St WCB	1
2-US	Upstream End**	ASTM A351 S.St CF3M/CF8M ASTM A216 C.St WCB	1
3	Ball	ASTM A351 S.St CF8M (Hardened)	1*
4	Stem	ASTM A564 S.St 17-4PH	1
5-DS	Downstream Seat	ASTM A479 S.St 316L (Hardened)	1*
5-US	Upstream Seat	ASTM A479 S.St 316L (Hardened)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Stop Plate	ASTM A240 S.St 430	1
13	Tab Washer	ASTM A240 S.St 304	1
14	Stem Nut	ASTM A194 S.St 316	1
15	Wrench Head	ASTM A47 Maleable Iron	1
16	Wrench Handle	S.St 304	1
17	Wrench Bolt	ISO 4014 S.St A2-70	1
18	Body Bolts	ISO 4014 S.St A4-80	8-16-20
19	Stop Pin	ASTM A582 S.St 303	1
20	Arrow flow	S.St	1



* Recommended spare parts
** 47Z body and ends are also available in bar stock material, add '-B' suffix to defer from cast made body

47Z & T47Z		Flow coefficient		Limiting stem input torque			
				17-4PH		Inconel 718	
Valve size		Cv	Kv	Nm	in-lb	Nm	in-lb
2"	DN50	240	208	450	3983	550	4868
2½"	DN65	320	277	1500	13275	1750	15488
3"	DN80	580	501	1500	13275	1750	15488
4"	DN100	2400	2070	3500	30975	4000	35400
6"	DN150	5400	4660	7000	61950	8000	70800





Valve dimensions

SIZE		BORE	A	B	C	D	H	S	ØW	T	ØF (ISO)	M	M(DD)	Q	N	P	Weight kg./lb
DN50	mm	51.05	158	72.65	70	111.6	137.3	256	108	M8X12	70	****	13.9	20	M20	17	9
2"	inch	2.01	6.22	2.86	2.76	4.39	5.41	10.08	4.25		(F07)	****	0.55	0.79		0.67	19.84
DN65 *	mm	63.5	181	95	85.7	132.3	171.6	401	195	M10X20	102	18.9	15.9	22.7	1”-14 UNS-2A	16.7	30
2½" *	inch	2.50	7.13	3.74	3.37	5.21	6.76	15.79	7.68		(F10)	0.74	0.63	0.89		0.66	66.14
DN80	mm	82.8	213.6	108.8	114.1	160.6	201	610	191.5	M10X20	102	18.9	15.9	22.7	1”-14 UNS-2A	16.7	25
3"	inch	3.26	8.41	4.28	4.49	6.32	7.91	24	7.54		(F10)	0.74	0.63	0.89		0.66	55.12
DN100	mm	100	239	123	123.3	210.8	262	916	217	M12X20	102	28	23.75	35.2	1½”-12 UNF-1A	26.2	35
4"	inch	3.94	9.41	4.84	4.85	8.3	10.31	36	8.54		(F10)	1.118	0.94	1.39		1.03	77.16
DN150	mm	150	380	180	179	248.4	302.7	916	327	M12X20	125	28.45	23.75	35.2	1½'' 12 UNF-2A	26.2	105
6"	inch	5.91	14.96	7.09	7.05	9.78	11.92	36.06	12.87		(F12)	1.12	0.94	1.39		1.03	231.49

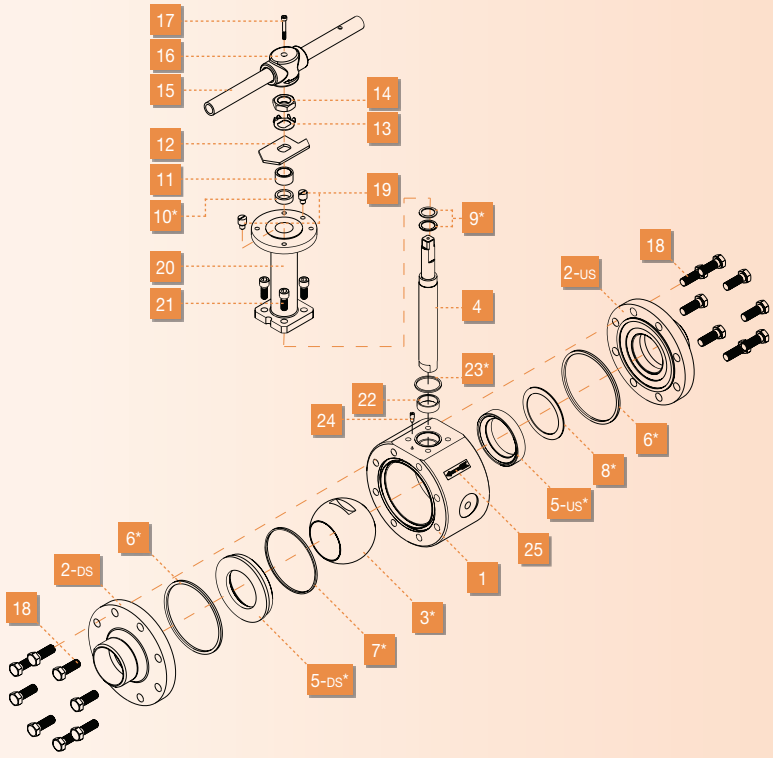
*Body and End made from bar stock

T47Z series #600 2”- 6” for extreme high temperature

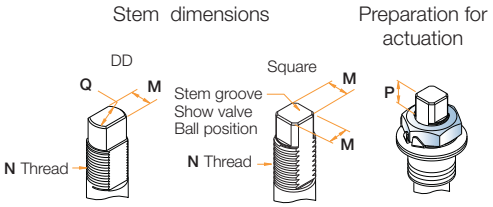
Material specifications

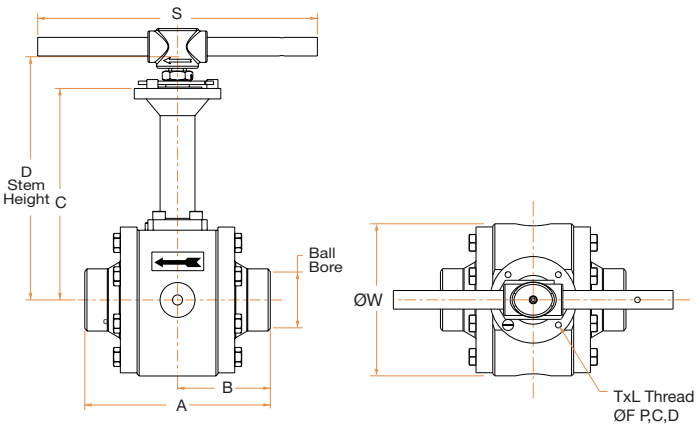
Item	Description	Material	Qty.
1	Body	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2-DS	Downstream End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2-US	Upstream End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
3	Ball	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
4	Stem	ASTM B637 Inconel 718 ASTM A564 S.St 17-4PH ASTM A479 S.St 316Ti	1
5-DS	Downstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
5-US	Upstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Upstream Seat Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Stop Plate	ASTM A240 S.St 430	1
13	Tab Washer	ASTM A240 S.St 304	1
14	Stem Nut	ASTM A194 S.St 316	1
15	Wrench Head	ASTM A47 Maleable Iron	1
16	Wrench Handle	S.St 304	1
17	Wrench Bolt	ISO 4014 S.St A2-70	1
18	Body Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	8-16-20
19	Stop Pin	ASTM A582 S.St 303	2
20	Bonnet	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
21	Bonnet Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	4
22	Bearing	ASTM B637 Inconel 718	1
23	Bonnet Seal	Expanded Graphite	1*
24	Location Pin	S.ST	1
25	Arrow Flow	S.St	1

* Recommended spare parts



The 47Z/T47Z series, 2"-6", class 600, design for full B16.34 rating and shutoff against full B16.34 differential pressure, except for 3" (DN80) which is limited to a differential pressure of 35 bar \ 500 Psi, and 4" (DN100) and 6" (DN150) which are limited to a differential pressure of 20 bar \ 290 Psi. For higher class rating, please consult Habonim engineering team.





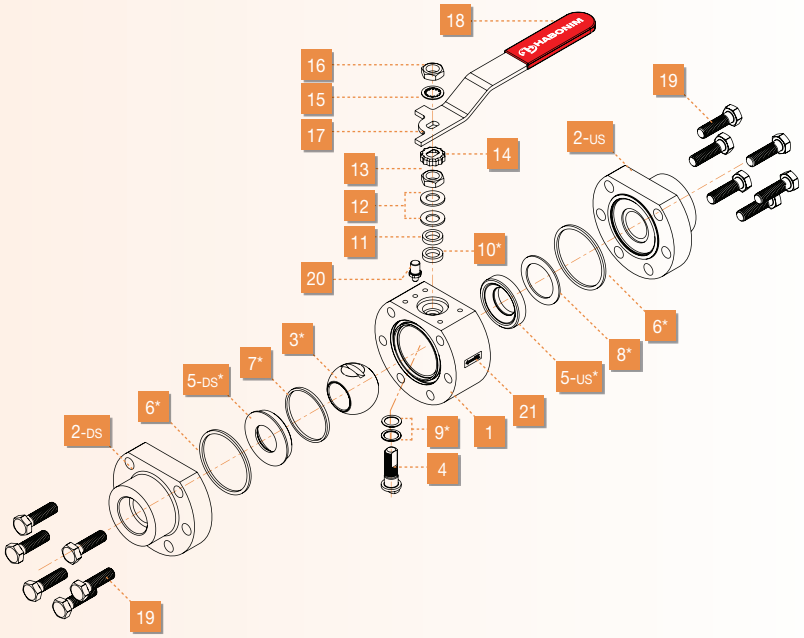
Valve dimensions

SIZE		BORE	A	B	C	D	H	S	ØW	T	ØF (ISO)	M	M(DD)	Q	N	P	Weight kg./lb
DN50	mm	51.05	158	72.65	222.4	264	289.7	256	159	M8X12	70	*****	13.9	20	M20	17	18
2"	inch	2.01	6.22	2.86	8.76	10.39	11.41	10.08	6.26		(F07)	*****	0.55	0.79		0.67	39.7
DN65	mm	63.5	181	95	301.5	348.1	387.5	401	215	M10X20	102	18.9	15.9	22.7	1”-14 UNS-2A	16.7	45
2½"	inch	2.50	7.13	3.74	11.87	13.70	15.26	15.79	8.46		(F10)	0.74	0.63	0.89		0.66	99.2
DN80	mm	82.8	213.6	108.8	309.7	356.3	395.6	610	230	M10X20	102	18.9	15.9	22.7	1”-14 UNS-2A	16.7	52
3"	inch	3.26	8.41	4.28	12.19	14.03	15.57	24	9.06		(F10)	0.74	0.63	0.89		0.66	114.6
DN100	mm	100	239	123	374	443.5	495	916	265	M12X20	125	28.45	23.75	35.2	1½'' 12 UNF-2A	26.2	80
4"	inch	3.94	9.41	4.84	14.72	17.46	19.49	36.06	10.43		(F12)	1.12	0.94	1.39		1.03	176.4
DN150	mm	150	380	180	437	558.8	******	******	400	M20X30	165	35.9	35.9	46.5	2'' UN-2A	56	250
6"	inch	5.91	14.96	7.09	17.20	22.00	*******	*******	15.75		(F16)	1.41	1.41	1.83		2.20	551.2

28Z Series ¼"-2" #2500 / 2½"-8" #1500

Material specifications

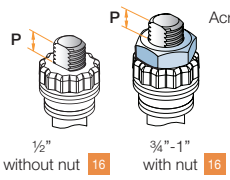
Item	Description	Material	Qty.
1	Body	ASTM A479 S.St 316L ASTM A105 C.St	1
2-DS	Downstream End	ASTM A479 S.St 316L ASTM A105 C.St	1
2-US	Upstream End	ASTM A479 S.St 316L ASTM A105 C.St	1
3	Ball	ASTM A351 S.St CF8M (Hardened)	1*
4	Stem	ASTM A564 S.St 17-4PH	1
5-DS	Downstream Seat	ASTM A479 S.St 316L (Hardened)	1*
5-US	Upstream Seat	ASTM A479 S.St 316L (Hardened)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Disc Spring	ASTM A693 S.St 17-7PH	2
13	Stem Nut	ASTM A194 S.St 316	1
14	Locking Clip	ASTM A164 S.St 304	1
15	Serrated Washer	AISI 410	1
16	Handle Nut	ASTM A194 S.St 316	1
17	Handle	ASTM A240 S.St 430	1
18	Handle Sleeve	PVC	1
19	Body Bolts	ISO 4014 S.St A4-80	12-16
20	Stop Pin	ASTM A582 S.St 303	1
21	Arrow Flow	S.St	1



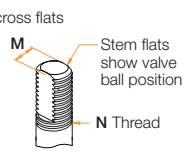
* Recommended spare parts

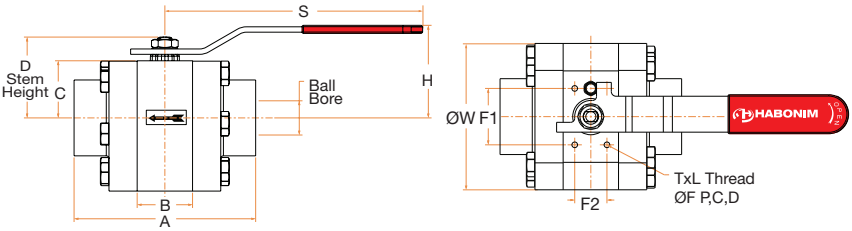
28Z & T28Z		Flow coefficient		Limiting stem input torque			
				17-4PH		Inconel 718	
Valve size		Cv	Kv	Nm	in-lb	Nm	in-lb
¼"	DN8	5	4.3	45	398	60	531
⅜"	DN10	8	6.9	45	398	60	531
½"	DN15	12	10.6	45	398	60	531
¾"	DN20	32	28.1	100	885	120	1062
1"	DN25	57	49.3	100	885	120	1062
1¼"	DN32	80	69.2	200	1770	250	2213
1½"	DN40	104	90	200	1770	250	2213

Preparation for actuation



Stem dimensions





Valve dimensions

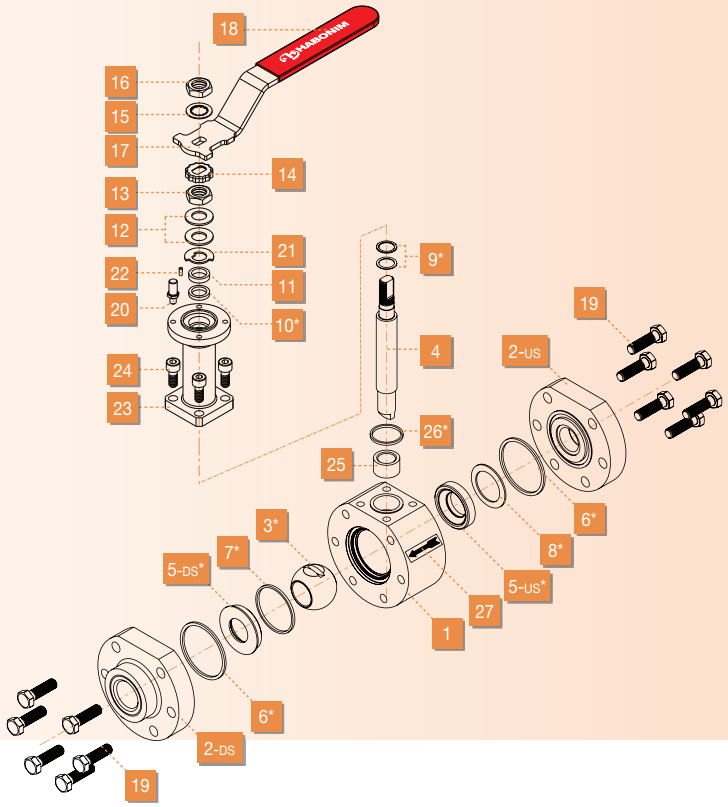
SIZE		BORE	A	B	C	D	H	S	ØW	TxL	F1	F2	M	N	P	Weight kg./lb
DN8, DN10	mm	11.15	77.8	20.6	27	38	46	200	69.5	M5x8	34	0	5.5	3/8" UNF	7.2	1.5
¼" , ⅜"	inch	0.44	3.06	0.81	1.06	1.50	1.81	7.87	2.74		1.34	0.00	0.22		0.28	3.3
DN15	mm	14.3	85	24.6	29.4	40.4	48	200	79	M10x25	34	15	5.5	3/8" UNF	7.2	2.4
½"	inch	0.56	3.35	0.97	1.16	1.59	1.89	7.87	3.11		1.34	0.59	0.22		0.28	5.3
DN20	mm	20.65	107.9	31.75	38.2	55.7	64	300	98	M10x30	42	24	7.5	7/16" UNF	7.2	4.5
¾"	inch	0.81	4.25	1.25	1.50	2.19	2.52	11.81	3.86		1.65	0.94	0.30		0.28	9.9
DN25	mm	25.5	120.7	41.25	42.6	60.3	68.7	300	109	M12x35	42	24	7.5	7/16" UNF	7.2	5.6
1"	inch	1.00	4.75	1.62	1.68	2.37	2.70	11.81	4.29		1.65	0.94	0.30		0.28	12.3
DN32	mm	31.8	131.2	48.4	50	72.8	81.1	400	128	M6x8	40	36	8.67	9/16" UNF	8	9.5
1¼"	inch	1.25	5.17	1.91	1.97	2.87	3.19	15.75	5.04		1.57	1.42	0.34		0.31	20.9
DN40	mm	38.1	142.9	56.3	55	77.8	81.1	400	145	M6x8	58	40	8.67	9/16" UNF	8	13.5
1½"	inch	1.50	5.63	2.22	2.17	3.06	3.19	15.75	5.71		2.28	1.57	0.34		0.31	29.8

T28Z Series ¼"-2" #2500 / 2 ½"-8" #1500 for extreme high temperature

Material specifications

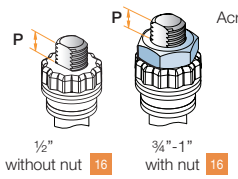
Item	Description	Material	Qty.
1	Body	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2-DS	Downstream End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2-US	Upstream End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
3	Ball	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
4	Stem	ASTM B637 Inconel 718 ASTM A564 S.St 17-4PH ASTM A479 S.St 316Ti	1
5-DS	Downstream Seat	ASTM A479 S.St 316Ti(coated) ASTM A479 S.St 310 (coated)	1*
5-US	Upstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Upstream Seat Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Disc Spring	ASTM A693 S.St 17-7PH	2
13	Stem Nut	ASTM A194 S.St 316	1
14	Locking Clip	ASTM A164 S.St 304	1
15	Seratted Washer	AISI 410	1
16	Handle Nut	ASTM A194 S.St 316	1
17	Handle	ASTM A240 S.St 430	1
18	Handle Sleeve	PVC	1
19	Body Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	12-16
20	Stop Pin	ASTM A582 S.St 303	1
21	Location Ring	ASTM A164 S.St 304	1
22	Location Pin	S.St	1
23	Bonnet	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
24	Bonnet Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	6
25	Bearing	ASTM B637 Inconel 718	1
26	Bonnet Seal	Expanded Graphite	1*
27	Arrow Flow	S.St	1

* Recommended spare parts

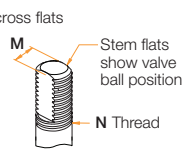


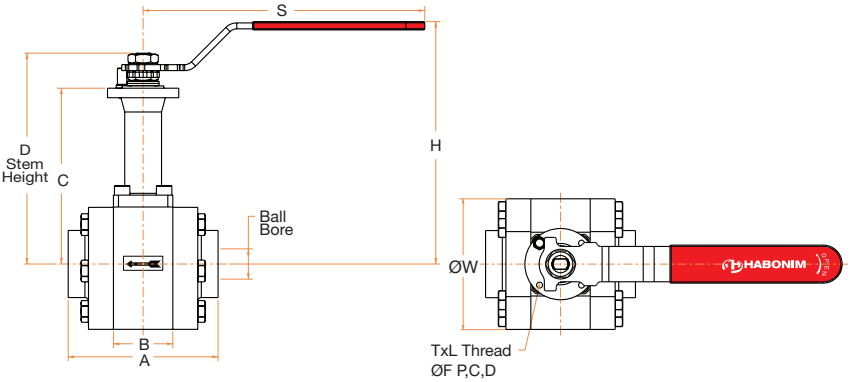
The 28Z-T28Z series, ¼"-2" class 2500 design for full B16.34 rating.
Valve operation shutoff is limited to the differential pressure graphs as shown in page 22.

Preparation for actuation



Stem dimensions





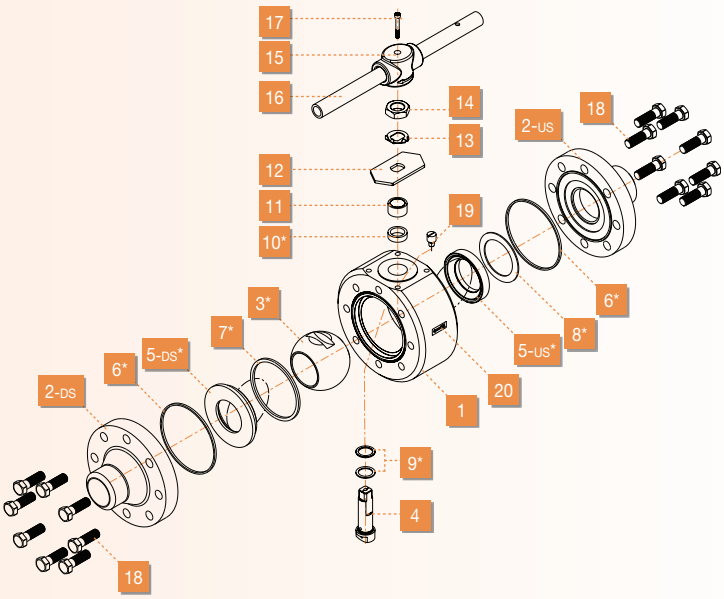
Valve dimensions

SIZE		BORE	A	B	C	D	H	S	ØW	TxL	ØF (ISO)	M	N	P	Weight kg./lb
DN8, DN10	mm	11.15	97.2	40	129	137.9	145.9	200	69.5	M5x8	36	5.5	3/8"	7.2	2.6
¼" , ⅜"	inch	0.44	3.83	1.57	5.08	5.43	5.74	7.87	2.74		(F03)	0.22	UNF	0.28	5.7
DN15	mm	14.3	100.5	40	131.4	148.9	157.2	300	79	M5x8	42	7.5	7/16"	7.2	3.3
½"	inch	0.56	3.96	1.57	5.17	5.86	6.19	11.81	3.11		(F04)	0.295	UNF	0.283	7.3
DN20	mm	20.65	116.2	40	135	152.5	160.8	300	98	M5x8	42	7.5	7/16"	7.2	5.3
¾"	inch	0.81	4.57	1.57	5.31	6.00	6.33	11.81	3.86		(F04)	0.295	UNF	0.283	11.7
DN25	mm	25.5	129.5	50	148	177.5	185.8	400	109	M6x12	50	8.67	9/16"	8	8
1"	inch	1.00	5.10	1.97	5.83	6.99	7.31	15.75	4.29		(F05)	0.341	UNF	0.315	17.6
DN32	mm	31.8	147.8	65	151	180.5	188.8	400	128	M8X12	70	8.67	9/16"	13.5	12
1¼"	inch	1.25	5.82	2.56	5.94	7.11	7.43	15.75	5.04		(F07)	0.34	UNF	0.53	26.5
DN40	mm	38.1	151.6	65	155	184.5	192.8	400	145	M8X12	70	8.67	9/16"	13.5	17
1½"	inch	1.50	5.97	2.56	6.10	7.26	7.59	15.75	5.71		(F07)	0.34	UNF	0.53	37.5

28Z Series ¼"-2" #2500 / 2½"-8" #1500

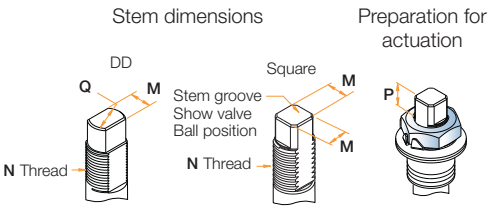
Material specifications

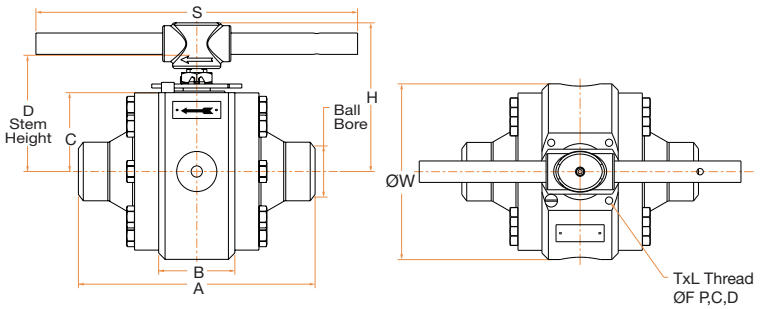
Item	Descripition	Material	Qty.
1	Body	ASTM A479 S.St 316L ASTM A216 C.St	1
2-DS	Downstream End	ASTM A479 S.St 316L ASTM A216 C.St	1
2-US	Upstream End	ASTM A479 S.St 316L ASTM A216 C.St	1
3	Ball	ASTM A351 S.St CF8M (Hardened)	1*
4	Stem	ASTM A564 S.St 17-4PH	1
5-DS	Downstream Seat	ASTM A479 S.St 316L (Hardened)	1*
5-US	Upstream Seat	ASTM A479 S.St 316L (Hardened)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Stop Plate	ASTM A240 S.St 430	1
13	Tab Washer	ASTM A240 S.St 304	1
14	Stem Nut	ASTM A194 S.St 316	1
15	Wrench Head	ASTM A47 Maleable Iron	1
16	Wrench Handle	S.St 304	1
17	Wrench Bolt	ISO 4014 S.St A2-70	1
18	Body Bolts	ISO 4014 S.St A4-80	16-20-28-32
19	Stop Pin	ASTM A582 S.St 303	1
20	Arrow Flow	S.St	1



* Recommended spare parts

28Z & T28Z		Flow coefficient		Limiting stem input torque			
				17-4PH		Inconel 718	
Valve size		Cv	Kv	Nm	in-lb	Nm	in-lb
2"	DN50	240	208	450	3983	550	4868
2½"	DN65	320	277	1500	13275	1750	15488
3"	DN80	580	501	1500	13275	1750	15488
4"	DN100	2400	2070	3500	30975	4000	35400
6"	DN150	5400	4660	7000	61950	8000	70800
8"	DN200	7600	6590	7000	61950	8000	70800





Valve dimensions

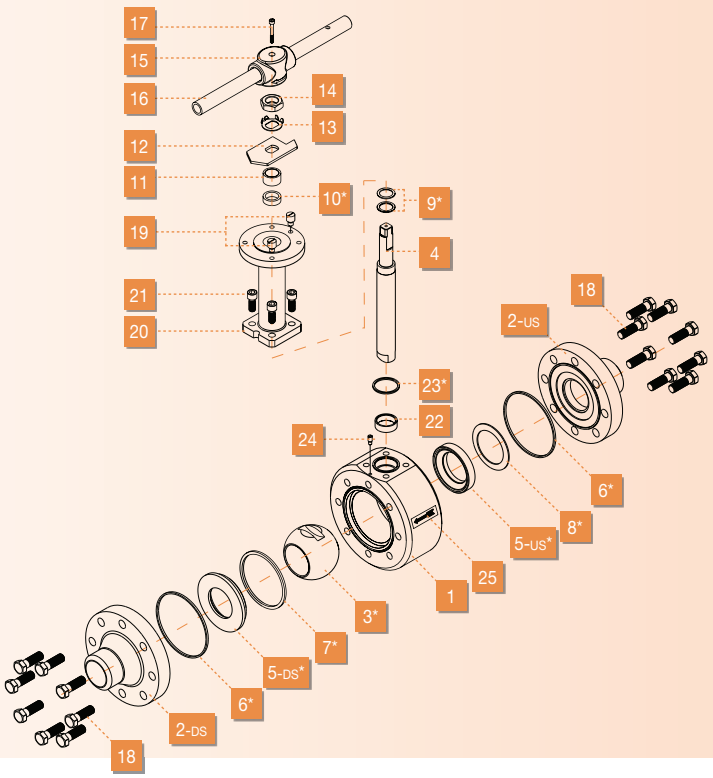
SIZE		BORE	A	B	C	D	H	S	ØW	T	F1	F2	M	M(DD)	Q	N	P	Weight kg./lb
DN50	mm	51.05	172.6	72.65	77.2	111.6	137.3	401	190	M16X45	92	50	*****	13.9	20	M20	17	25
2"	inch	2.01	6.80	2.86	3.04	4.39	5.41	15.79	7.48		3.62	1.97	*****	0.55	0.79		0.67	55.1
DN65	mm	63.5	224	83.3	98.3	144.9	184	401	220	M10X20	Ø102			18.9	15.9	22.7	1"-14 UNS-2A	16.7	42
2½"	inch	2.50	8.82	3.28	3.87	5.70	7.24	15.79	8.66		(F10)			0.74	0.63	0.89		0.66	92.6
DN80	mm	82.8	268	108.8	102	176.8	228	916	235	M12X20	Ø125			28.45	23.75	35.2	1½'' 12 UNF-2A	26.2	50
3"	inch	3.26	10.55	4.28	4.02	6.7	9	36	9.25		(F12)			1.12	0.94	1.39		1.03	110.2
DN100	mm	100	336	123	137	206.4	257.4	916	300	M16X24	Ø140			28.45	23.75	35.2	1½'' 12 UNF-2A	26.2	100
4"	inch	3.94	13.23	4.84	5.39	8.13	10.13	36.06	11.81		(F14)			1.12	0.94	1.39		1.03	220.5
DN150	mm	150	558.6	180	183	304.8	******	******	400	M20X30	Ø165			35.9	35.9	46.5	2'' UN-2A	56	218
6"	inch	5.91	21.99	7.09	7.20	12.00	*******	*******	15.75		(F16)			1.41	1.41	1.83		2.20	480.6
DN200	mm	200	750	280	207	335.5	******	******	480	M20X30	Ø254			35.9	35.9	46.5	2'' UN-2A	56	580
8"	inch	7.87	29.53	11.02	8.15	13.21	*******	*******	18.90		(F25)			1.41	1.41	1.83		2.20	1278.7

T28Z Series ¼"-2" #2500 / 2½"-8" #1500 for extreme high temperature

Material specifications

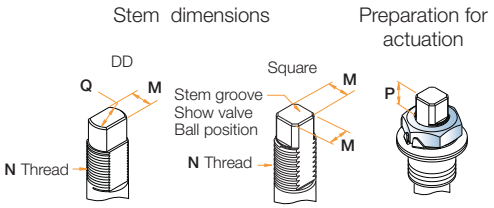
Item	Descripition	Material	Qty.
1	Body	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2-DS	Downstream End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2-US	Upstream End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
3	Ball	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
4	Stem	ASTM B637 Inconel 718 ASTM A564 S.St 17-4PH ASTM A479 S.St 316Ti	1
5-DS	Downstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
5-US	Upstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Upstream Seat Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Stop Plate	ASTM A240 S.St 430	1
13	Tab Washer	ASTM A240 S.St 304	1
14	Stem Nut	ASTM A194 S.St 316	1
15	Wrench Head	ASTM A47 Maleable Iron	1
16	Wrench Handle	S.St 304	1
17	Wrench Bolt	ISO 4014 S.St A2-70	1
18	Body Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	16-20-28-32
19	Stop Pin	ASTM A582 S.St 303	1
20	Bonnet	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
21	Bonnet Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	6-8
22	Bearing	ASTM B637 Inconel 718	1
23	Bonnet Seal	Expanded Graphite	1*
24	Location Pin	S.St	1
25	Arrow Flow	S.St	1

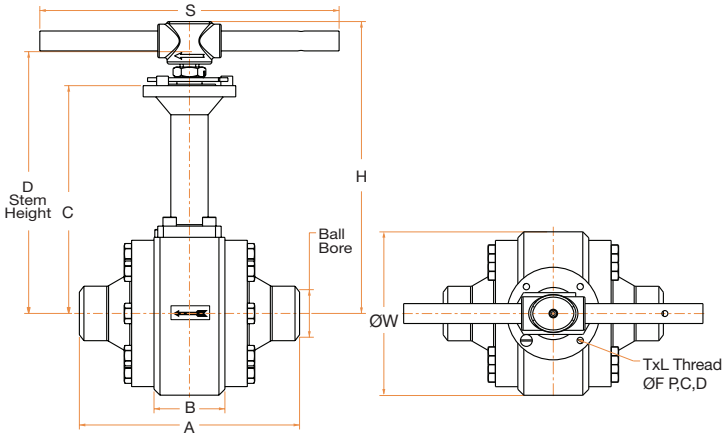
* Recommended spare parts



The 28Z-T28Z series, 2"-8", class 1500, design for full B16.34 rating. Valve operation shutoff pressure is limited to the differential pressure graphs as shown in page 22. For higher class rating, please consult Habonim engineering team.

For gear operation recommendation please refer to Page 22





Valve dimensions

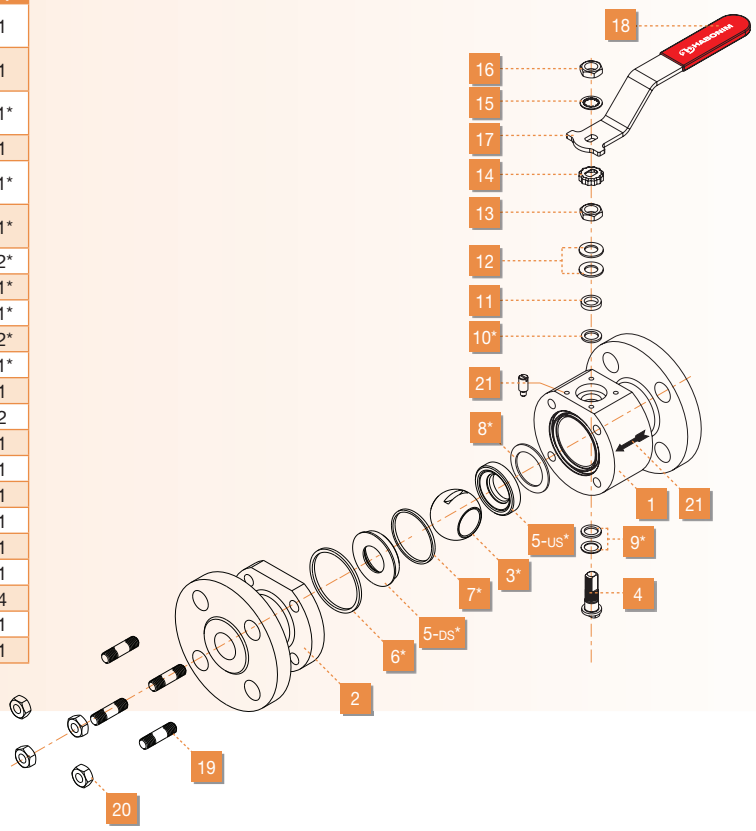
SIZE		BORE	A	B	C	D	H	S	ØW	T	ØF (ISO)	M	M(DD)	Q	N	P	Weight kg./lb
DN50	mm	51.05	172.6	72.65	222.4	264	289.7	256	190	M10X20	102	****	13.9	20	1"-14 UNS-2A	16.7	22
2"	inch	2.01	6.80	2.86	8.76	10.39	11.41	10.08	7.48		(F10)	*****	0.55	0.79		0.66	48.5
DN65	mm	63.5	224	95	301.5	348.1	387.5	401	220	M10X20	102	18.9	15.9	22.7	1"-14 UNS-2A	16.7	50
2½"	inch	2.50	8.82	3.74	11.87	13.70	15.26	15.79	8.66		(F10)	0.74	0.63	0.89		0.66	110.2
DN80	mm	82.8	268	108.8	309.7	379.2	395.6	916	230	M12X20	125	28.45	23.75	35.2	1½'' 12 UNF-2A	26.2	60
3"	inch	3.26	10.55	4.28	12.19	15	15.57	36	9.06		(F12)	1.12	0.94	1.39		1.03	132.3
DN100	mm	100	336	123	374	443.5	495	916	265	M16X24	140	28.45	23.75	35.2	1½'' 12 UNF-2A	26.2	115
4"	inch	3.94	13.23	4.84	14.72	17.46	19.49	36.06	10.43		(F14)	1.12	0.94	1.39		1.03	253.5
DN150	mm	150	558.6	180	437	558.8	******	******	400	M20X30	165	35.9	35.9	46.5	2'' UN-2A	56	250
6"	inch	5.91	21.99	7.09	17.20	22.00	*******	*******	15.75		(F16)	1.41	1.41	1.83		2.20	551.2

73Z ANSI Flanged series ½"-1½" #150 / 74Z ANSI Flanged series ½"-1½" #300

Material specifications

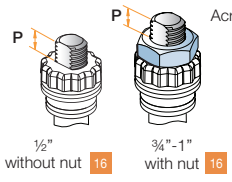
Item	Description	Material	Qty.
1	Body**	ASTM A479 S.St 316L ASTM A105 C.St	1
2	End**	ASTM A479 S.St 316L ASTM A105 C.St	1
3	Ball	ASTM A351 S.St CF8M (Hardened)	1*
4	Stem	ASTM A564 S.St 17-4PH	1
5-DS	Downstream Seat	ASTM A479 S.St 316L (Hardened)	1*
5-US	Upstream Seat	ASTM A479 S.St 316L (Hardened)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Disc Spring	ASTM A693 S.St 17-7PH	2
13	Stem Nut	ASTM A194 S.St 316	1
14	Locking Clip	ASTM A164 S.St 304	1
15	Serrated washer	AISI 410	1
16	Handle Nut	ASTM A194 S.St 316	1
17	Handle	ASTM A240 S.St 430	1
18	Handle Sleeve	PVC	1
19	Body Bolts	ISO 4014 S.St A4-80	4
20	Stop Pin	ASTM A582 S.St 303	1
21	Arrow Flow	S.St	1

* Recommended spare parts
** 1½" body and end is cast made C.St. WCB or S.St CF8M

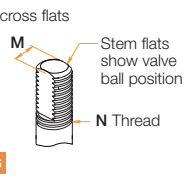


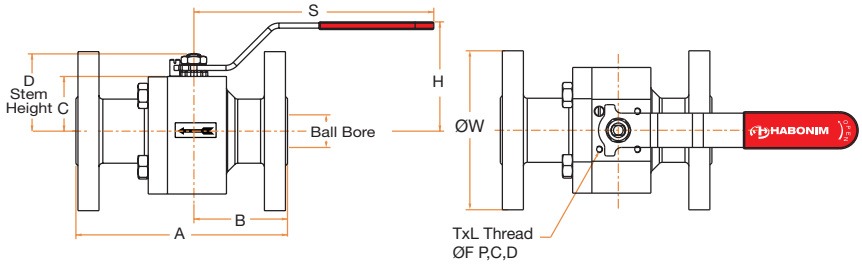
73Z/74Z & T73Z/T74Z		Flow coefficient		Limiting stem input torque 17-4PH		Limiting stem input torque Inconel 718	
Valve size		Cv	Kv	Nm	in-lb	Nm	in-lb
½"	DN15	12	10.6	45	398	60	531
¾"	DN20	32	28.1	100	885	120	1062
1"	DN25	57	49.3	100	885	120	1062
1½"	DN40	104	90	200	1770	250	2213

Preparation for actuation



Stem dimensions





Valve dimensions

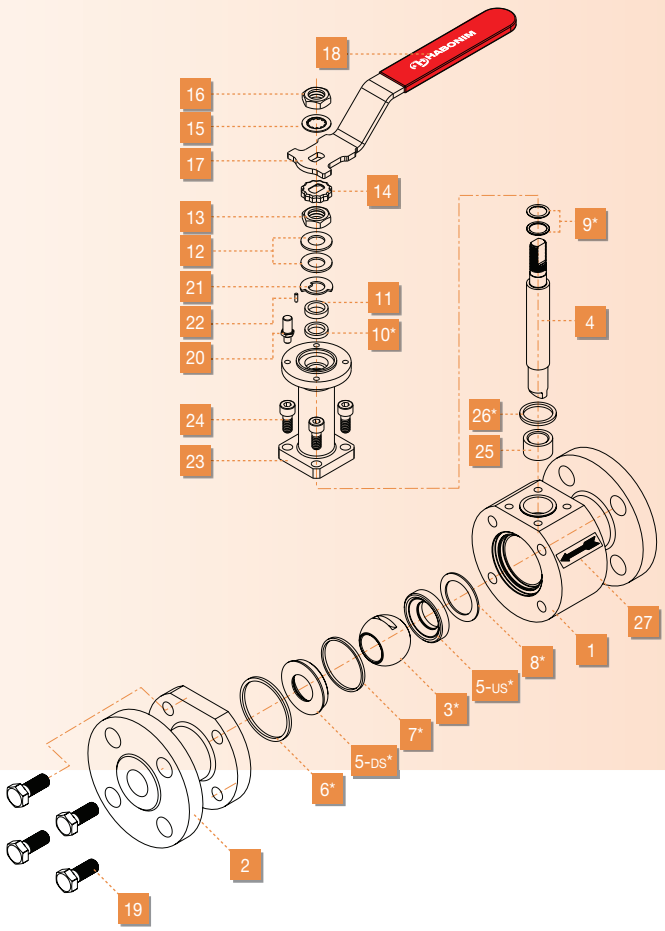
SIZE		BORE	A		B		C	D	H	S	ØW		T	F1	F2	M	N	P	Weight kg./lb	
			150	300	150	300					150	300							150	300
DN15	mm	14.3	108	139.7	49	60	29.4	40.4	92	151	89	95	M5x10	34	15	5.5	3/8" UNF	7.2	2.7	3.9
½"	inch	0.56	4.25	5.50	1.93	2.36	1.16	1.59	3.62	5.94	3.50	3.74		1.34	0.59	0.217		0.283	6.0	8.6
DN20	mm	20.65	117	152	58	65	38.2	55.7	103.5	170	98	117	M5x10	42	24	7.5	7/16" UNF	7.2	4	5.5
¾"	inch	0.81	4.61	5.98	2.28	2.56	1.50	2.19	4.07	6.69	3.86	4.61		1.65	0.94	0.295		0.283	8.8	12.1
DN25	mm	25.5	127	165	55	73	42.65	60.2	108	170	108	124	M5x10	Ø42		7.5	7/16" UNF	7.2	5.4	7
1"	inch	1.00	5.00	6.50	2.17	2.87	1.68	2.37	4.25	6.69	4.25	4.88		(F04)		0.295		0.283	11.9	15.4
DN40	mm	38.1	165	190	68	80.4	48.2	77.7	124	220.5	127	156	M6x12	Ø50		8.67	9/16" UNF	8	7.2	10.5
1½"	inch	1.50	6.50	7.48	2.68	3.17	1.90	3.06	4.88	8.68	5.00	6.14		(F05)		0.341		0.315	15.9	23.1

T73Z series ANSI Flanged ½"- 1 ½" #150 for extreme high temperature
T74Z series ANSI Flanged ½"-1 ½" #300 for extreme high temperature

Material specifications

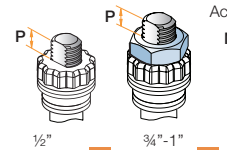
Item	Descripition	Material	Qty.
1	Body	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2	End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
3	Ball	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
4	Stem	ASTM B637 Inconel 718 ASTM A564 S.St 17-4PH ASTM A479 S.St 316Ti	1
5-DS	Downstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
5-US	Upstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Upstream Seat Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	EXPANDED GRAPHITE	1*
11	Follower	ASTM B783 S.St 316L	1
12	Disc Spring	ASTM A693 S.St 17-7PH	2
13	Stem Nut	ASTM A194 S.St 316	1
14	Locking Clip	ASTM A164 S.St 304	1
15	Seratted Washer	AISI 410	1
16	Handle Nut	ASTM A194 S.St 316	1
17	Handle	ASTM A240 S.St 430	1
18	Handle Sleeve	PVC	1
19	Body Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	4
20	Stop Pin	ASTM A582 S.St 303	1
21	Location Ring	ASTM A164 S.St 304	1
22	Location Pin	S.St	1
23	Bonnet	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
24	Bonnet Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	4
25	Bearing	ASTM B637 Inconel 718	1
26	Bonnet Seal	Expanded Graphite	1*
27	Arrow Flow	S.St	1

* Recommended spare parts

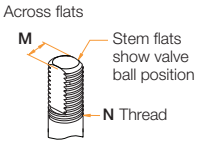


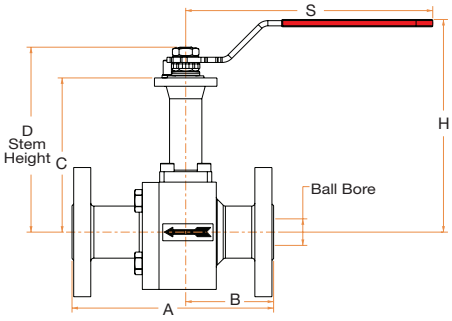
The 73Z/T73Z series (class 150) and 74Z/T74Z series (class 300) , ½" – 1½" (DN15-DN40), are design for full B16.34 rating and shutoff against full B16.34 differential pressure.

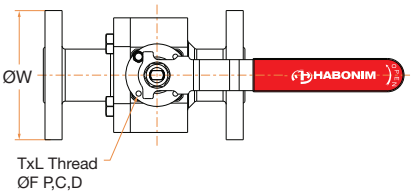
Preparation for actuation



Stem dimensions







Valve dimensions

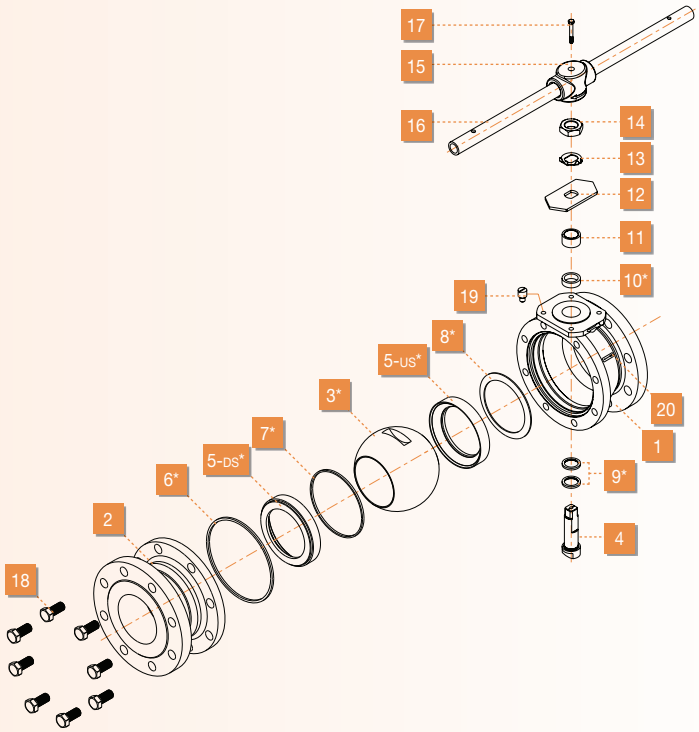
SIZE		BORE	A		B		C	D	H	S	ØW		T	ØF (ISO)	M	N	P	Weight kg./lb	
			150	300	150	300					150	300						150	300
DN15	mm	14.3	108	139.7	49	60	131.4	148.9	175	187	89	95	M5x10	42	7.5	7/16" UNF	7.2	4.4	5.6
½"	inch	0.56	4.25	5.50	1.93	2.36	5.17	5.86	6.89	7.36	3.50	3.74		(F04)	0.295		0.283	9.7	12.3
DN20	mm	20.65	117	152	58	65	135	152.5	179	187	98	117	M5x10	42	7.5	7/16" UNF	8	6	7.5
¾"	inch	0.81	4.61	5.98	2.28	2.56	5.31	6.00	7.05	7.36	3.86	4.61		(F04)	0.295		0.315	13.2	16.5
DN25	mm	25.5	127	165	55	73	148	177.5	202	237	110	124	M6x12	50	8.67	9/16" UNF	8	9.4	11
1"	inch	1.00	5.00	6.50	2.17	2.87	5.83	6.99	7.95	9.33	4.33	4.88		(F05)	0.341		0.315	20.7	24.3
DN40	mm	38.1	165	190	68	80.4	155	184.5	209	237	127	156	M6x12	50	8.67	9/16" UNF	8	12	14
1½"	inch	1.50	6.50	7.48	2.68	3.17	6.10	7.26	8.23	9.33	5.00	6.14		(F05)	0.341		0.315	26.5	30.9

73Z series ANSI Flanged 2" - 6" #150 / 74Z series ANSI Flanged 2" - 6" #300

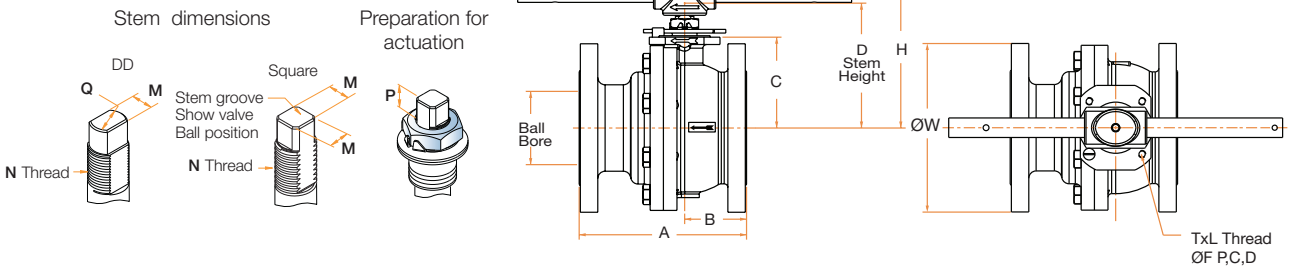
Material specifications

Item	Description	Material	Qty.
1	Body	ASTM A351 S.St CF8M ASTM A216 C.St WCB	1
2	End	ASTM A351 S.St CF8M ASTM A216 C.St WCB	1
3	Ball	ASTM A351 S.St CF8M (Hardened)	1*
4	Stem	ASTM A564 S.St 17-4PH	1
5-DS	Downstream Seat	ASTM A479 S.St 316L (Hardened)	1*
5-US	Upstream Seat	ASTM A479 S.St 316L (Hardened)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Stop Plate	ASTM A240 S.St 430	1
13	Tab Washer	ASTM A240 S.St 304	1
14	Stem Nut	ASTM A194 S.St 316	1
15	Wrench Head	ASTM A47 Maleable Iron	1
16	Wrench Handle	S.St 304	1
17	Wrench Bolt	ISO 4014 S.St A2-70	1
18	Body Bolts	ISO 4014 S.St A4-80	4-8-10-12
19	Stop Pin	ASTM A582 S.St 303	1
20	Arrow Flow	S.St	1

* Recommended spare parts



73Z/74Z & T73Z/T74Z		Flow coefficient		Limiting stem input torque			
				17-4PH		Inconel 718	
Valve size		Cv	Kv	Nm	in-lb	Nm	in-lb
2"	DN50	240	208	450	3983	550	4868
3"	DN80	580	501	1500	13275	1750	15488
4"	DN100	2400	2070	1500	13275	1750	15488
6"	DN150	5400	4660	3500	30975	4000	35400
8"	DN200	9850	8500	7000	61950	8000	70800



Valve dimensions

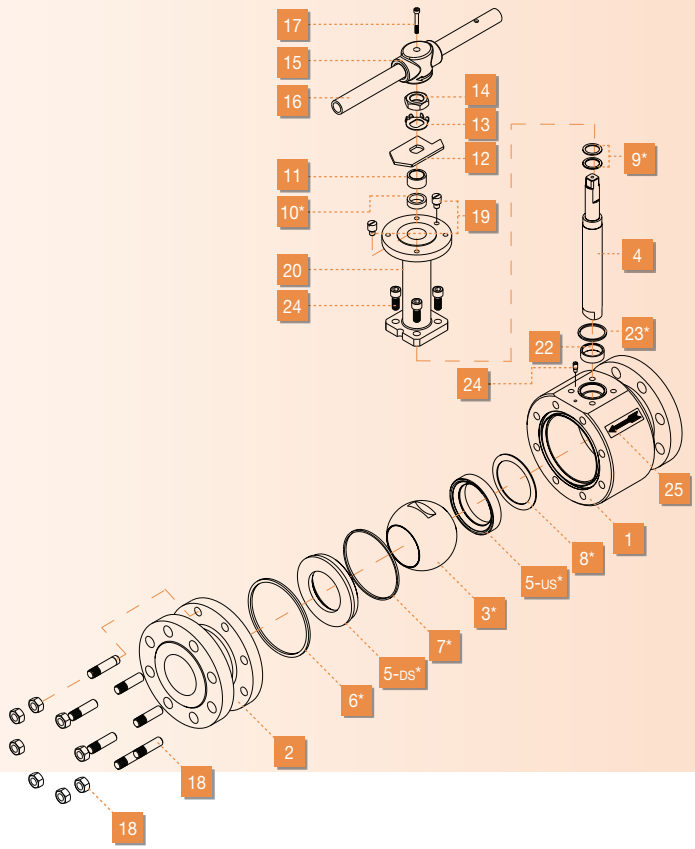
SIZE		BORE	A		B		C	D	H	S	W		T	ØF (ISO)	M	M(DD)	Q	N	P	Weight kg./lb	
			150	300	150	300					150	300								150	300
DN50	mm	50.05	178	216	69	75.1	70	111.6	137.3	256	152	165	M8X12	70	****	13.9	20	M20	17	11.5	14.2
2"	inch	1.97	7.01	8.50	2.72	2.96	2.76	4.39	5.41	10.08	5.98	6.50		(F07)	****	0.55	0.79		0.67	25.4	31.3
DN80	mm	80	203	282.5	77.5	96.4	108	154.6	194.8	610	191	210	M10X20	102	18.9	15.9	22.7	1"-14 UNF-2A	16.7	22	28.2
3"	inch	3.15	7.99	11.12	3.05	3.80	4.25	6.09	7.67	24	7.52	8.27		(F10)	0.744	0.63	0.89		0.66	48.5	62.2
DN100	mm	100	228.5	304.8	84.5	104.5	124	210.8	262	916	230	254	M12X20	102	28.4	23.75	35.2	1½"-12 UNF-1A	26.2	39	44.5
4"	inch	3.94	9.00	12.00	3.33	4.11	4.88	8.3	10.31	36	9.06	10.00		(F10)	1.118	0.94	1.39		1.03	86.0	98.1
DN150	mm	150	394	403.5	163.5	174.5	179	248.5	308	916	328	328	M12X20	125	28.4	23.75	35.2	1½"-12 UNF-1A	26.2	82	100
6"	inch	5.91	15.51	15.89	6.44	6.87	7.05	9.78	12.13	36	12.91	12.91		(F12)	1.118	0.94	1.39		1.03	180.8	220.5
DN200	mm	200	457.2	403.5	242.5	174.5	241	353.7	*****	****	450	450	M16X24	140	35.9	35.9	46.5	2'' UN-2A	56	190	225
8"	inch	7.87	18.00	15.89	9.55	6.87	9.49	13.93	****	****	17.72	17.72		(F14)	1.41	1.41	1.83		2.20	418.9	496.0

T73Z series ANSI Flanged 2" - 6" #150 for extreme high temperature
T74Z series ANSI Flanged 2" - 6" #300 for extreme high temperature

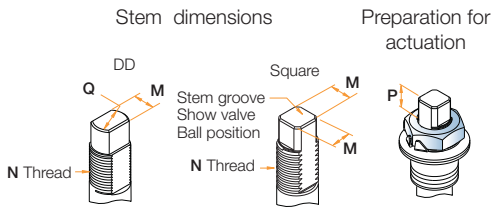
Material specifications

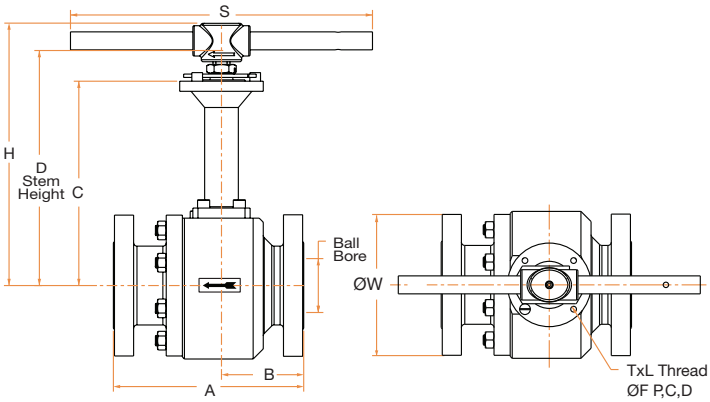
Item	Description	Material	Qty.
1	Body	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
2	End	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
3	Ball	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
4	Stem	ASTM B637 Inconel 718 ASTM A564 S.St 17-4PH ASTM A479 S.St 316Ti	1
5-DS	Downstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
5-US	Upstream Seat	ASTM A479 S.St 316Ti (coated) ASTM A479 S.St 310 (coated)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Upstream Seat Spring	ASTM B637 Inconel 718	1*
9	Stem Thrust Seal	ASTM B637 Inconel 718	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	ASTM B783 S.St 316L	1
12	Stop Plate	ASTM A240 S.St 430	1
13	Tab Washer	ASTM A240 S.St 304	1
14	Stem Nut	ASTM A194 S.St 316	1
15	Wrench Head	ASTM A47 Maleable Iron	1
16	Wrench Handle	S.St 304	1
17	Wrench Bolt	ISO 4014 S.St A2-70	1
18	Body Studs + Nuts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	4-8-10-12
19	Stop Pin	ASTM A582 S.St 303	1
20	Bonnet	ASTM A479 S.St 316Ti ASTM A479 S.St 347H	1
21	Bonnet Bolts	ISO 4014 DIN Gr.1.4986 ASTM A193 Grade B16	4
22	Bearing	ASTM B637 Inconel 718	1
23	Bonnet Seal	Expanded Graphite	1*
24	Location Pin	S.St	1
25	Arrow Flow	S.St	1

* Recommended spare parts



The 73Z/T73Z series (class 150) and 74Z/T74Z series (class 300) , 2"– 8" (DN50-DN200), are design for full B16.34 rating and shutoff against full B16.34 differential pressure, except for 3" (DN80) which is limited to a differential pressure of 35 bar \ 500 Psi, and 4" (DN100) and 6" (DN150) which are limited to a differential pressure of 20 bar \ 290 Psi.For higher class rating, please consult Habonim engineering team.
For gear operation recommendation please refer to Page 22





Valve dimensions

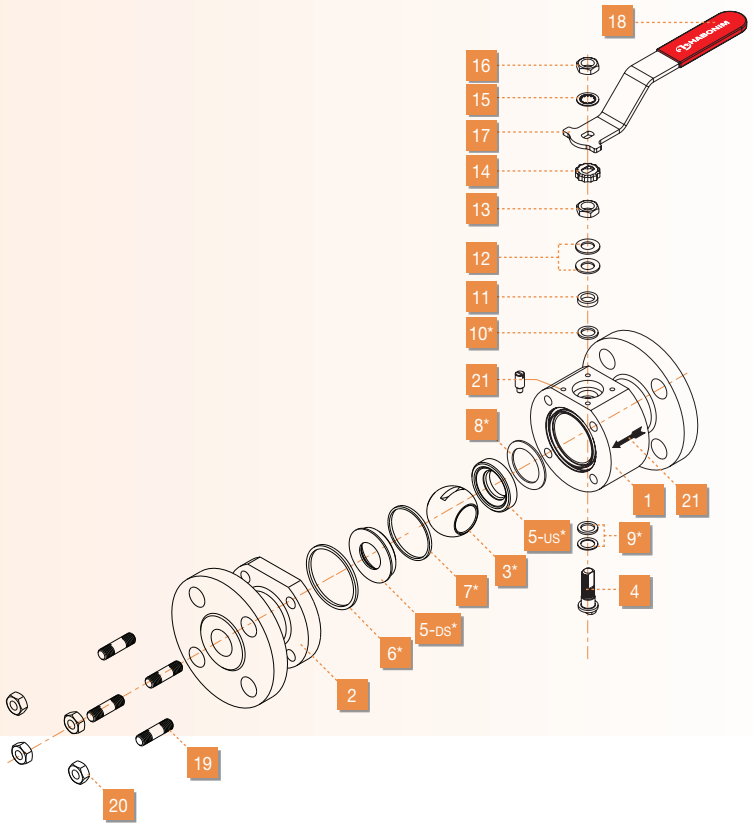
SIZE		BORE	A		B		C	D	H	S	W		T	ØF (ISO)	M	M(DD)	Q	N	P	Weight kg./lb	
			150	300	150	300					150	300								150	300
DN50	mm	50.05	178	216	78.5	75.1	222.4	264	289.7	256	159	165	M8X12	70	****	13.9	20	M20	17	21.5	24
2"	inch	1.97	7.01	8.50	3.09	2.96	8.76	10.39	11.41	10.08	6.26	6.50		(F07)	****	0.55	0.79		0.67	47.4	52.9
DN80	mm	80	203	282.5	77.5	122	309.7	356.3	395.6	610	230	210	M10X20	102	18.9	15.9	22.7	1"-14 UNF-2A	16.7	55	61
3"	inch	3.15	7.99	11.12	3.05	4.80	12.19	14.03	15.57	24	9.06	8.27		(F10)	0.744	0.63	0.89		0.66	121.3	134.5
DN100	mm	100	228.5	304.8	86	104.5	374	443.5	495	916	265	265	M12X20	125	28.45	23.75	35.2	1½'' 12 UNF-2A	26.2	75	84
4"	inch	3.94	9.00	12.00	3.39	4.11	14.72	17.46	19.49	36.06	10.43	10.43		(F12)	1.12	0.94	1.39		1.03	165.3	185.2
DN150	mm	150	394	403.5	140	140	437	558.8	******	******	400	400	M20X30	165	35.9	35.9	46.5	2'' UN-2A	56	215	220
6"	inch	5.91	15.51	15.89	5.51	5.51	17.20	22.00	*******	*******	15.75	15.75		(F16)	1.41	1.41	1.83		2.20	474.0	485.0

78Z series DIN Flanged DN15-DN40 PN40

Material specifications

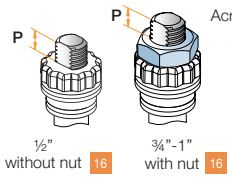
Item	Description	Material	Qty.
1	Body**	DIN GR. 1.4404 DIN GR. 1.0402	1
2	End**	DIN GR. 1.4404 DIN GR. 1.0402	1
3	Ball	DIN GR. 1.4401 (Hardened)	1*
4	Stem	DIN GR. 1.4542	1
5-DS	Downstream Seat	DIN GR. 1.4404 (Hardened)	1*
5-US	Upstream Seat	DIN GR. 1.4404 (Hardened)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Spring	DIN GR. 2.4668	1*
9	Stem Thrust Seal	DIN GR. 2.4668	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	DIN GR. 1.4401	1
12	Disc Spring	DIN GR. 1.4568	2
13	Stem Nut	DIN GR. 1.4401	1
14	Locking Clip	DIN GR. 1.4401	1
15	Serrated Washer	DIN GR. 1.4006	1
16	Handle Nut	DIN GR. 1.4401	1
17	Handle	DIN GR. 1.4016	1
18	Handle Sleeve	PVC	1
19	Body Bolts	DIN GR. 1.4401	4
20	Stop Pin	DIN GR. 1.4305	1
21	Arrow Flow	S.St	1

* Recommended spare parts
** 1½" body and end is cast made C.St. WCB (1.0402) or S.St CF8M (1.4401)

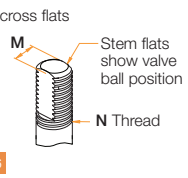


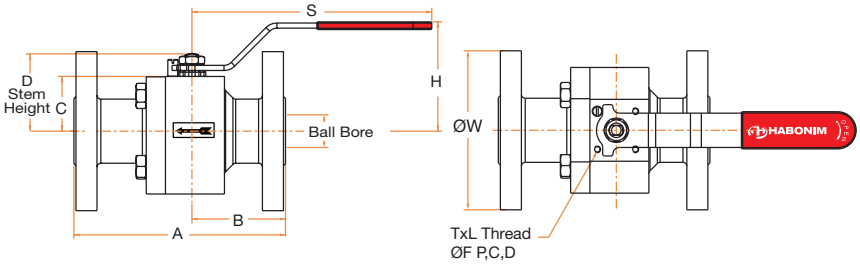
78Z / T78Z		Flow coefficient		Limiting stem input torque			
				17-4PH		Inconel 718	
Valve size		Cv	Kv	Nm	in-lb	Nm	in-lb
½"	DN15	12	10.6	45	398	60	531
¾"	DN20	32	28.1	100	885	120	1062
1"	DN25	57	49.3	100	885	120	1062
1½"	DN40	104	90	200	1770	250	2213

Preparation for actuation



Stem dimensions





Valve dimensions

SIZE		BORE	A	B	C	D	H	S	ØW	T	F1	F2	M	N	P	Weight kg./lb
DN15	mm	14.3	115	49	29.4	40.4	92	151	95	M5x10	34	15	5.5	3/8" UNF	7.2	3
½"	inch	0.56	4.53	1.93	1.16	1.59	3.62	5.94	3.74		1.34	0.59	0.217		0.283	6.6
DN20	mm	20.65	120	58	38.2	55.7	103.5	170	105	M5x10	42	24	7.5	7/16" UNF	7.2	4.3
¾"	inch	0.81	4.72	2.28	1.50	2.19	4.07	6.69	4.13		1.65	0.94	0.295		0.283	9.5
DN25	mm	25.5	125	55	42.65	60.2	108	170	115	M5x10	Ø42		7.5	7/16" UNF	7.2	6
1"	inch	1.00	4.92	2.17	1.68	2.37	4.25	6.69	4.53		(F04)		0.295		0.283	13.2
DN40	mm	38.1	140	65.9	48.2	77.7	124	220.5	150	M6x12	Ø50		8.67	9/16" UNF	8	8
1½"	inch	1.50	5.51	2.59	1.90	3.06	4.88	8.68	5.91		(F05)		0.341		0.315	17.6

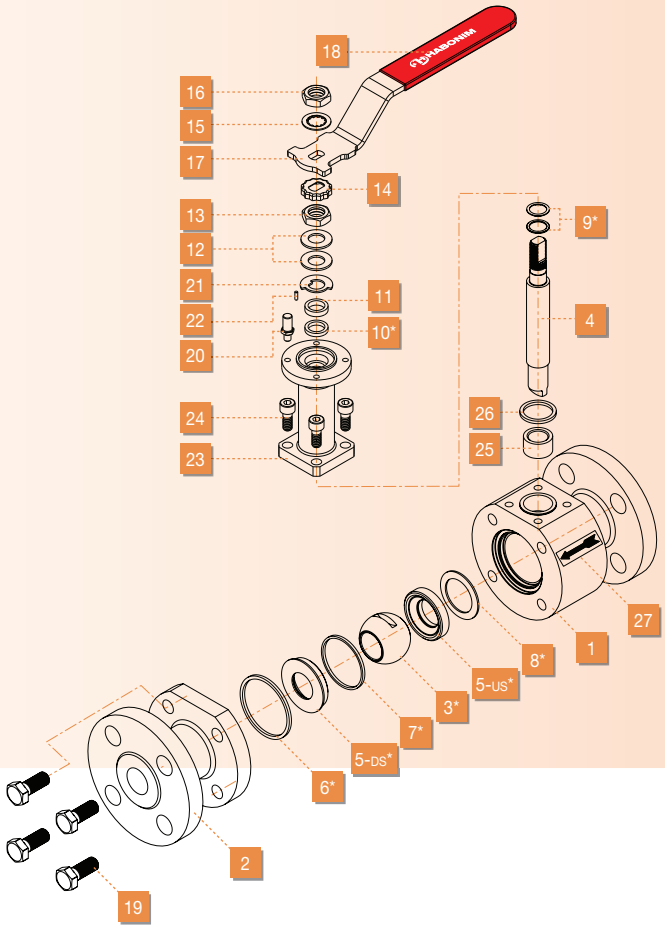
*Face to face dimension DIN 3202-F4

T78Z series DIN Flanged DN15-DN40 PN40 for extreme high temperature

Material specifications

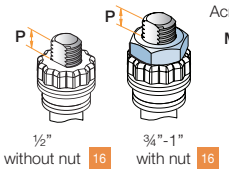
Item	Descripition	Material	Qty.
1	Body	DIN GR. 1.4571 DIN GR. 1.4550	1
2	End	DIN GR. 1.4571 DIN GR. 1.4550	1
3	Ball	DIN GR. 1.4571 (Coated) DIN GR. 1.4845 (Coated)	1*
4	Stem	DIN GR. 2.4668 DIN GR. 1.4542 DIN GR. 1.4571	1
5-DS	Downstream Seat	DIN GR. 1.4571 (Coated) DIN GR. 1.4845 (Coated)	1*
5-US	Upstream Seat	DIN GR. 1.4571 (Coated) DIN GR. 1.4845 (Coated)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Upstream Seat Spring	DIN GR. 2.4668	1*
9	Stem Thrust Seal	DIN GR. 2.4668	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	DIN GR. 1.4401	1
12	Disc Spring	DIN GR. 1.4568	2
13	Stem Nut	DIN GR. 1.4401	1
14	Locking Clip	DIN GR. 1.4401	1
15	Seratted Washer	DIN GR. 1.4006	1
16	Handle Nut	DIN GR. 1.4401	1
17	Handle	DIN GR. 1.4016	1
18	Handle Sleeve	PVC	1
19	Body Bolts	DIN Gr.1.4986 ASTM A193 Grade B16	4
20	Stop Pin	DIN GR. 1.4305	1
21	Location Ring	DIN GR. 1.4301	1
22	Location Pin	S.St	1
23	Bonnet	DIN GR. 1.4571 DIN GR. 1.4550	1
24	Bonnet Bolts	DIN Gr.1.4986 ASTM A193 Grade B16	4
25	Bearing	DIN GR. 2.4668	1
26	Bonnet Seal	Expanded Graphite	1*
27	Arrow Flow	S.St	1

* Recommended spare parts

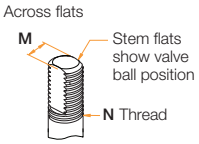


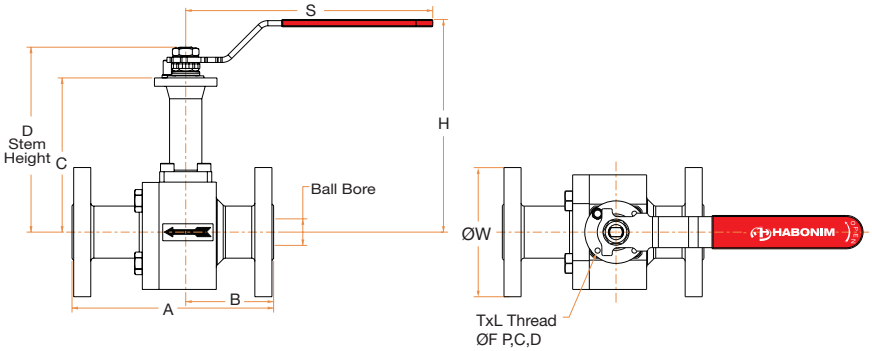
The 78Z/T78Z series (PN40) , DN15-DN40 (½" – 1 ½") , are design for full B16.34 rating and shutoff against full B16.34 differential pressure.

Preparation for actuation



Stem dimensions





Valve dimensions

SIZE		BORE	A**	B	C	D	H	S	ØW	T	ØF (ISO)	M	N	P	Weight kg./lb
DN15	mm	14.3	130	49	131.4	148.9	175	187	95	M5x10	42	7.5	7/16" UNF	7.2	5
½"	inch	0.56	5.12	1.93	5.17	5.86	6.89	7.36	3.74		(F04)	0.295		0.283	11.0
DN20	mm	20.65	150	58	135	152.5	179	187	105	M5x10	42	7.5	7/16" UNF	8	6.8
¾"	inch	0.81	5.91	2.28	5.31	6.00	7.05	7.36	4.13		(F04)	0.295		0.315	15.0
DN25	mm	25.5	160	55	148	177.5	202	237	115	M6x12	50	8.67	9/16" UNF	8	10.4
1"	inch	1.00	6.30	2.17	5.83	6.99	7.95	9.33	4.53		(F05)	0.341		0.315	22.9
DN40	mm	38.1	200	68	155	184.5	209	237	150	M6x12	50	8.67	9/16" UNF	8	13.6
1½"	inch	1.50	7.87	2.68	6.10	7.26	8.23	9.33	5.91		(F05)	0.341		0.315	30.0

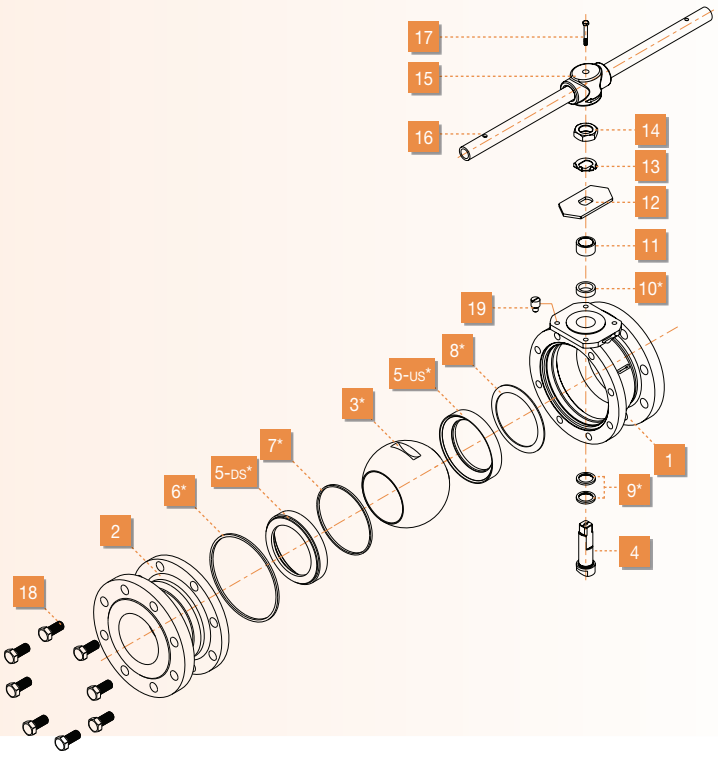
*Face to face dimension DIN 3202-F4

77Z series DIN Flanged series DN80 - DN150 PN16
78Z series DIN Flanged series DN50 PN40

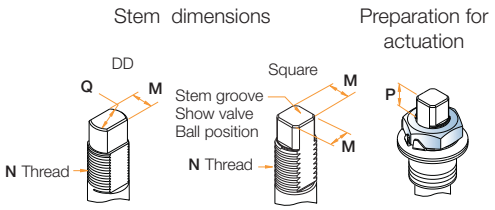
Material specifications

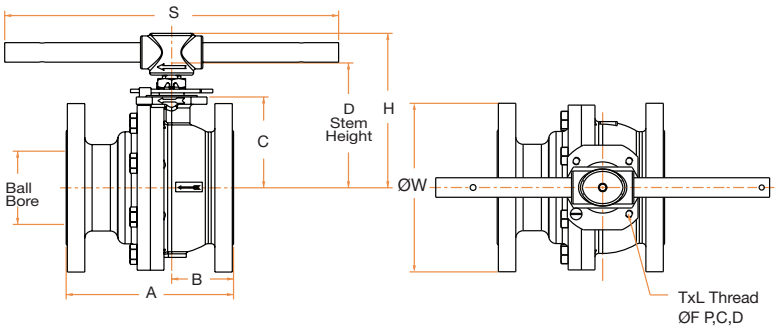
Item	Descripition	Material	Qty.
1	Body	DIN GR. 1.4401 DIN GR. 1.0402	1
2	End	DIN GR. 1.4401 DIN GR. 1.0402	1
3	Ball	DIN GR. 1.4401 (Hardened)	1*
4	Stem	DIN GR. 1.4542	1
5-DS	Downstream Seat	DIN GR. 1.4404 (Hardened)	1*
5-US	Upstream Seat	DIN GR. 1.4404 (Hardened)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Spring	DIN GR. 2.4668	1*
9	Stem Thrust Seal	DIN GR. 2.4668	2*
10	Stem packing	Expanded Graphite	1*
11	Follower	DIN GR. 1.4401	1
12	Stop Plate	DIN GR. 1.4016	1
13	Tab Washer	DIN GR. 1.4301	1
14	Stem Nut	DIN GR. 1.4401	1
15	Wrench Head	ASTM A47 Maleable Iron	1
16	Wrench Handle	DIN GR. 1.4301	1
17	Wrench Bolt	DIN GR. 1.4301	1
18	Body Bolts	DIN GR. 1.4401	4-8-10-12
19	Stop Pin	DIN GR. 1.4305	1
20	Arrow flow	S.St	1

* Recommended spare parts



77Z/78Z & T77Z/T78Z		Flow coefficient		Limiting stem input torque			
				17-4PH		Inconel 718	
Valve size		Cv	Kv	Nm	in-lb	Nm	in-lb
2"	DN50	240	208	450	3983	550	4868
3"	DN80	580	501	1500	13275	1750	15488
4"	DN100	2400	2070	1500	13275	1750	15488
6"	DN150	5400	4660	3500	30975	4000	35400
8"	DN200	9850	8500	7000	61950	8000	70800





Valve dimensions

SIZE		BORE	A*	B	C	D	H	S	ØW	T	ØF (ISO)	M	M(DD)	Q	N	P	Weight kg./lb
DN50	mm	50.05	150	60.7	70	111.6	137.3	256	165	M8X12	70	****	13.9	20	M20	17	11.3
2"	inch	1.97	5.91	2.39	2.76	4.39	5.41	10.08	6.50		(F07)	****	0.55	0.79		0.67	24.9
DN80	mm	80	180	77.5	108	154.6	194.8	610	200	M10X20	102	18.9	15.9	22.7	1"-14 UNF-2A	16.7	24
3"	inch	3.15	7.09	3.05	4.25	6.09	7.67	24	7.87		(F10)	0.744	0.63	0.89		0.66	52.9
DN100	mm	100	190	84.5	124	210.8	262	916	225	M12X20	102	28.4	23.75	35.2	1½"-12 UNF-1A	26.2	31.5
4"	inch	3.94	7.48	3.33	4.88	8.3	10.31	36	8.86		(F10)	1.118	0.94	1.39		1.03	69.4
DN150	mm	150	350**	163.5	179	248.5	308	916	328	M12X20	125	28.4	23.75	35.2	1½"-12 UNF-1A	26.2	78
6"	inch	5.91	13.78	6.44	7.05	9.78	12.13	36	12.91		(F12)	1.118	0.94	1.39		1.03	172.0

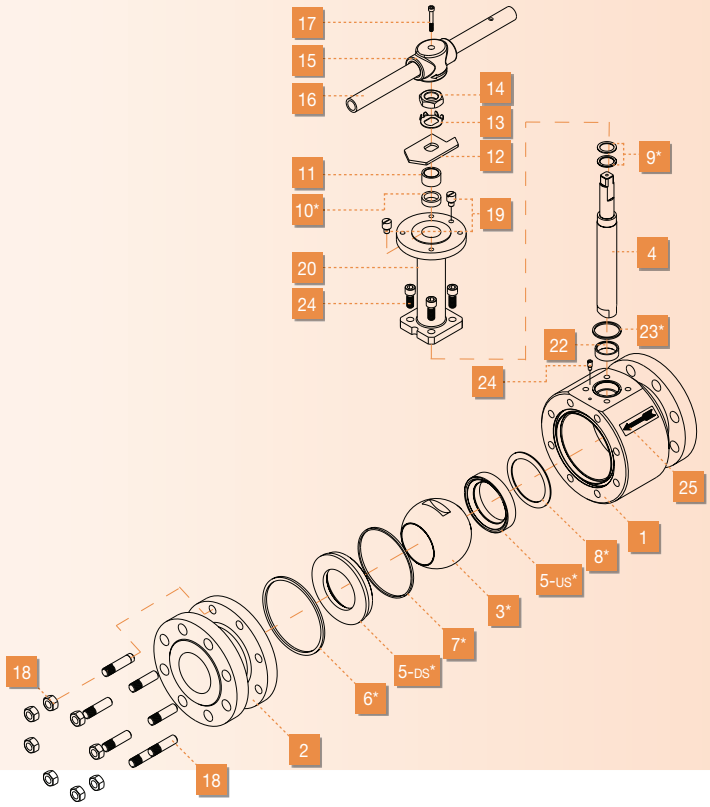
* Face to face dimension DIN 3202-F4
** Face to face dimension DIN 3202-F5

T77Z/T78Z DIN Flanged DN50-DN150 for extreme high temperature

Material specifications

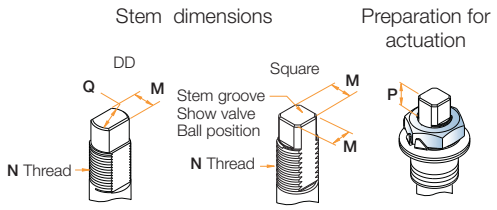
Item	Descripition	Material	Qty.
1	Body	DIN GR. 1.4571 DIN GR. 1.4550	1
2	End	DIN GR. 1.4571 DIN GR. 1.4550	1
3	Ball	DIN GR. 1.4571 (Coated) DIN GR. 1.4845 (Coated)	1*
4	Stem	DIN GR. 2.4668 DIN GR. 1.4542 DIN GR. 1.4571	1
5-DS	Downstream Seat	DIN GR. 1.4571 (Coated) DIN GR. 1.4845 (Coated)	1*
5-US	Upstream Seat	DIN GR. 1.4571 (Coated) DIN GR. 1.4845 (Coated)	1*
6	Body Seal	Expanded Graphite	2*
7	Downstream Seat Seal	Expanded Graphite	1*
8	Upstream Seat Spring	DIN GR. 2.4668	1*
9	Stem Thrust Seal	DIN GR. 2.4668	2*
10	Stem Packing	Expanded Graphite	1*
11	Follower	DIN GR. 1.4401	1
12	Stop Plate	DIN GR. 1.4016	1
13	Tab Washer	DIN GR. 1.4301	1
14	Stem Nut	DIN GR. 1.4401	1
15	Wrench Head	ASTM A47 Maleable Iron	1
16	Wrench Handle	DIN GR. 1.4301	1
17	Wrench Bolt	DIN GR. 1.4301	1
18	Body Studs + Nuts	DIN Gr.1.4986 ASTM A193 Grade B16	4-8-10-12
19	Stop Pin	DIN GR. 1.4305	1
20	Bonnet	DIN GR. 1.4571 DIN GR. 1.4550	1
21	Bonnet Bolts	DIN Gr.1.4986 ASTM A193 Grade B16	4
22	Bearing	DIN GR. 2.4668	1
23	Bonnet Seal	Expanded Graphite	1*
24	Location Pin	DIN GR. 2.4668	1
25	Arrow Flow	Expanded Graphite	1

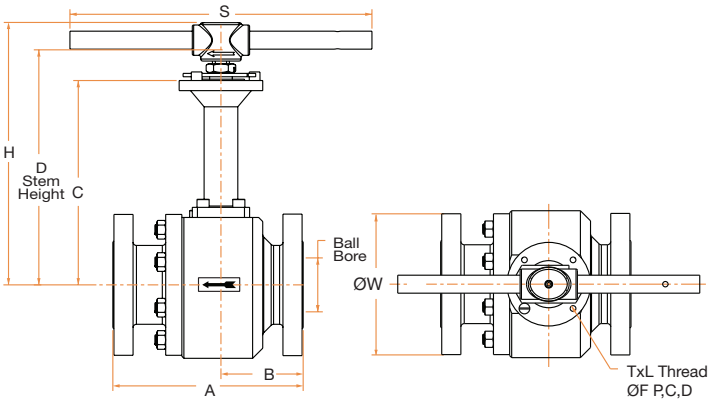
* Recommended spare parts



The 78Z/T78Z series, DN50 (2") PN40, and 77Z/T77Z series, DN80-DN150 (3"-6") PN16, are design for full B16.34 rating and shutoff against full B16.34 differential pressure.

For gear operation recommendation please refer to Page 22



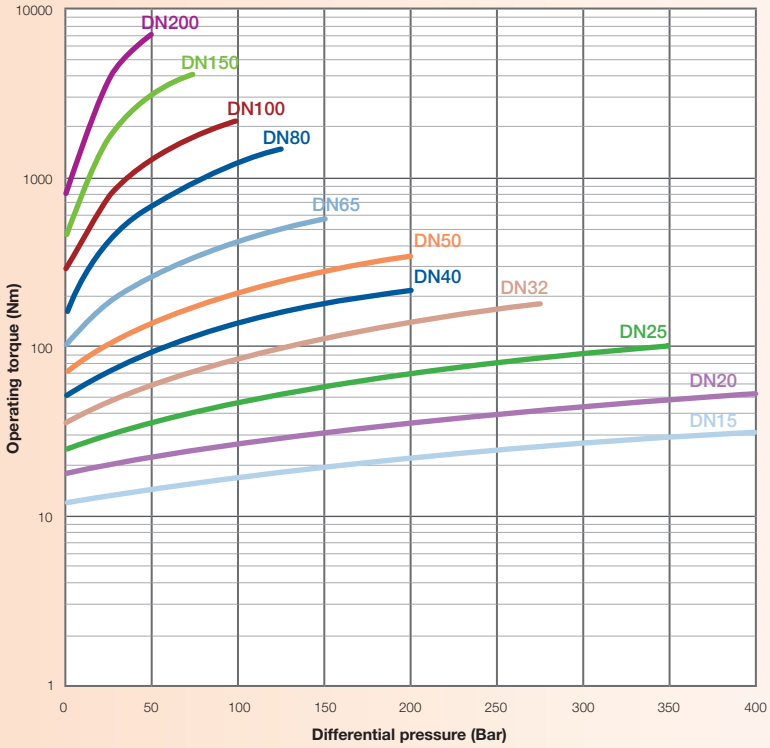


Valve dimensions

SIZE		BORE	A*	B	C	D	H	S	ØW	T	ØF (ISO)	M	M(DD)	Q	N	P	Weight kg./lb
DN50	mm	50.05	230	78.5	222.4	264	289.7	256	159	M8X12	70	****	13.9	20	M20	17	21.5
2"	inch	1.97	9.06	3.09	8.76	10.39	11.41	10.08	6.26		(F07)	****	0.55	0.79		0.67	47.4
DN80	mm	80	290	77.5	309.7	356.3	395.6	610	230	M10X20	102	18.9	15.9	22.7	1"-14 UNF-2A	16.7	57
3"	inch	3.15	11.42	3.05	12.19	14.03	15.57	24	9.06		(F10)	0.744	0.63	0.89		0.66	125.7
DN100	mm	100	310	86	374	443.5	495	916	265	M12X20	125	28.45	23.75	35.2	1½'' 12 UNF-2A	26.2	90
4"	inch	3.94	12.20	3.39	14.72	17.46	19.49	36.06	10.43		(F12)	1.12	0.94	1.39		1.03	198.4
DN150	mm	150	350**	163.5	437	558.8	******	******	400	M20X30	165	35.9	30.15	44	2'' UN-2A	56	210
6"	inch	5.91	13.78	6.44	17.20	22.00	*******	*******	15.75		(F16)	1.41	1.19	1.73		2.20	463.0

* Face to face dimension DIN 3202-F1
**Face to face dimension DIN 3202-F5

Valve operation torque

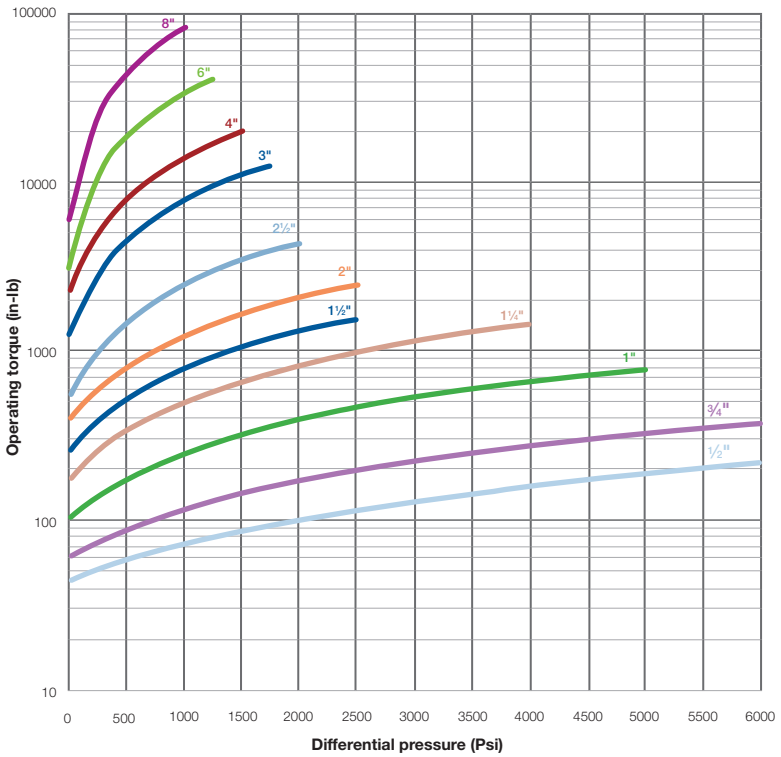


Pneumatic operation

When actuation is required, Habonim will provide a complete calibrated assembly of valve, actuator and accessories. The metal seated ball valve series is available with Habonim unique Compact 4-Piston rack and pinion pneumatic actuator. The Compact actuator is available in 8 different sizes, spring return (up to 700 Nm/ 6200 in-lb) or double acting (up to 2500 Nm / 22100 in-lb). For extreme environment a special actuator designed to withstand temperature as high as 120˚C / 248˚F can be provided. Extensions and other means of removing the actuator from the extreme environment are also available.

For more information about the Compact-4-pistons actuator, please refer to Bulletin B-360.

Automation of metal seated valves for larger torque figures (up to 10000 Nm / 88500 in-lb) covering the complete line is also available; please consult with Habonim engineering team for a variety of solutions.



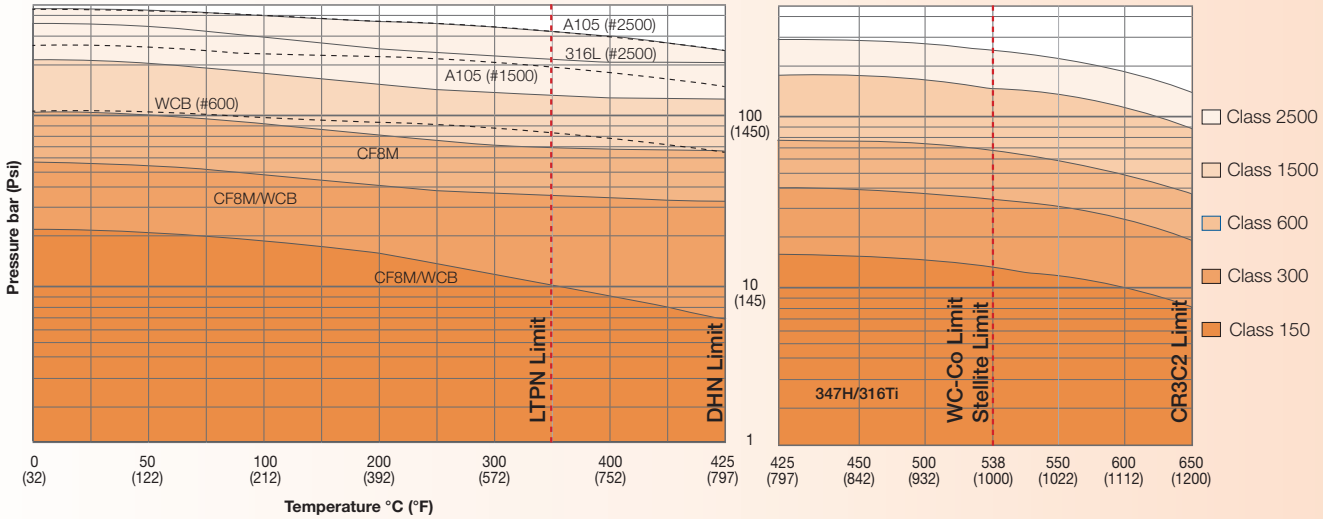
The above charts indicate valve nominal torque figures, a safety factor of 20% minimum must be added as a standard sizing practice.

Manual operation

Habonim's metal seated valves having sizes equal to or greater than those given in the table below shall be provided with gearboxes (unless otherwise agreed with the client). As a design rule the force required to operate the valve under maximum differential pressure shall not exceed 350 N / 80 lbf at the handwheel rim or extremity of the lever.

Class	150	300	600	900	1500	2500
Valve size	4"	3"	2½"	2"	2"	1½"
	DN100	DN80	DN65	DN50	DN50	DN40

Temperature vs Pressure



Temperature vs Pressure (bar) - Standard class rating

ASME B16.34	Material	Temperature (°C)												
		-29 to 38	50	100	200	300	400	425	450	500	538	550	600	650
Class 150	A105/WCB/LF2	20	19	18	14	10	7	6	5					
	316L/CF3M	16	15	13	11	10	7	6	5					
	F22/Inconel625	20	20	18	14	10	7	6	5					
	CF8M/St.St 316	19	18	16	14	10	7	6	5					
	347H/316Ti	19	19	17	14	10	7	6	5	4	4	4	4	4
Class 300	A105/WCB/LF2	51	50	47	44	40	35	29	23					
	316L/CF3M	41	40	35	29	26	24	24	23					
	F22/Inconel625	52	52	52	49	43	37	35	34					
	CF8M/St.St 316	50	48	42	36	32	29	29	30					
	347H/316Ti	50	49	45	40	36	34	34	34	28	25	25	22	14
Class 600	A105/WCB/LF2	102	100	93	88	80	69	58	46					
	316L/CF3M	83	80	70	58	52	49	48	47					
	F22/Inconel625	103	103	103	97	86	73	70	68					
	CF8M/St.St 316	99	96	84	71	63	59	58	58					
	347H/316Ti	99	98	91	80	72	68	67	67	57	50	50	43	28
Class 900	A105/WCB/LF2	153	150	140	131	120	104	86	69					
	316L/CF3M	124	120	104	88	78	73	72	70					
	F22/Inconel625	155	155	155	146	129	110	105	101					
	CF8M/St.St 316	15	144	127	107	95	88	87	87					
	347H/316Ti	149	146	136	120	108	102	101	100	85	75	75	64	43
Class 1500	A105/WCB/LF2	255	251	233	219	199	174	144	115					
	316L/CF3M	207	200	174	146	130	122	119	117					
	F22/Inconel625	259	259	258	243	214	183	175	169					
	CF8M/St.St 316	248	241	211	178	158	147	146	144					
	347H/316Ti	248	244	227	200	180	170	168	167	141	126	125	107	71
Class 2500	A105/WCB/LF2	426	418	388	376	332	289	240	192					
	316L/CF3M	345	34	290	243	217	203	199	195					
	F22/Inconel625	431	431	429	405	357	305	292	282					
	CF8M/St.St 316	414	401	352	297	264	245	243	240					
	347H/316Ti	414	406	378	333	301	283	280	279	235	209	208	179	118

Temperature vs Pressure (Psi) - Standard class rating

ASME B16.34	Material	Temperature (°F)												
		-20 to 100	200	300	400	500	600	700	800	850	900	1000	1100	1200
Class 150	A105/WCB/LF2	284	278	257	200	148	94	80	67					
	316L/CF3M	231	222	193	162	145	94	80	67					
	F22/Inconel625	287	283	257	200	148	94	80	67					
	CF8M/St.St 316	276	267	235	199	148	94	80	67					
	347H/316Ti	276	271	252	200	148	94	80	67	60	60	60	60	60
Class 300	A105/WCB/LF2	741	726	676	635	577	503	418	334					
	316L/CF3M	600	580	505	423	378	352	347	339					
	F22/Inconel625	750	750	747	705	622	529	510	489					
	CF8M/St.St 316	719	697	612	518	458	426	422	432					
	347H/316Ti	719	708	657	579	523	492	487	486	409	365	363	313	204
Class 600	A105/WCB/LF2	1480	1453	1351	1270	1154	1006	834	667					
	316L/CF3M	1199	1160	1009	845	755	705	692	679					
	F22/Inconel625	1499	1499	1494	1409	1243	1063	1015	982					
	CF8M/St.St 316	1440	1395	1224	1034	916	854	845	837					
	347H/316Ti	1440	1414	1314	1159	1047	983	974	970	819	725	722	622	407
Class 900	A105/WCB/LF2	2221	2181	2027	1905	1733	1511	1251	1001					
	316L/CF3M	1799	1741	1514	1269	1134	1057	1038	1018					
	F22/Inconel625	2249	2249	2242	2114	1865	1592	1524	1470					
	CF8M/St.St 316	216	2092	1836	1552	1376	1280	1267	1254					
	347H/316Ti	2159	2121	1971	1737	1570	1475	1462	1456	1228	1090	1085	931	616
Class 1500	A105/WCB/LF2	3702	3634	3379	3176	2887	2517	2085	1668					
	316L/CF3M	2999	2901	2522	2114	1889	1762	1730	1698					
	F22/Inconel625	3750	3750	3735	3529	3109	2655	2539	2451					
	CF8M/St.St 316	3599	3489	3060	2585	2292	2134	2113	2091					
	347H/316Ti	3599	3535	3284	2896	2616	2458	2437	2426	2043	1820	1811	1552	1025
Class 2500	A105/WCB/LF2	6170	6057	5630	5446	4811	4195	3476	2780					
	316L/CF3M	4998	486	4204	3524	3149	2936	2883	2829					
	F22/Inconel625	6248	6248	6226	5878	5178	4421	4228	4086					
	CF8M/St.St 316	5999	5813	5098	4309	3821	3557	3522	3486					
	347H/316Ti	5999	5893	5477	4826	4360	4098	4061	4043	3408	3029	3016	2588	1707

* It is totaly forbidden to use a material when pressure rating is missing
* 316L material is not recommended for prolonged use above 450°C/850°F
* A105 material is not recommended for prolonged use above 425°C/800°F
* CF3M material is not to be used above 455°C/850°F

METAL SEATED VALVES

How to order The HABONIM metal seated ball valve identification code

Size		
Code	Inch	DN
02	1/4"	8
03	3/8"	10
05	1/2"	15
07	3/4"	20
10	1"	25
12	1 1/4"	32
15	1 1/2"	40
20	2"	50
25	2 1/2"	65
30	3"	80
40	4"	100
60	6"	150
80	8"	200

Series[4]	
47Z	3 Pcs design
28Z	High pressure design
73Z	Flanged ANSI 150
74Z	Flanged ANSI 300
77Z	Flanged DIN PN16
78Z	Flanged DIN PN40

Body/End connection	
4	ASTM A105 C.St A216 C.St WCB
6	ASTM A479 S.St. 316/316L ASTM A351 S.St CF8M/CF3M
F	ASTM A350 LF2 C.St
G	ASTM A479 S.St. 316Ti
H	ASTM A479 S.St. 347H
I	Inconel 625
P	ASTM A182 F22

Ball/Seats Set	
6	ASTM A479 S.St. 316/316L
G	ASTM A479 S.St. 316Ti
L	ASTM A479 S.St. 310H
N	ASTM A479 S.St. 410
P	ASTM A479 S.St. 416

Special Features	
V30[3]	Characterized control downstream seat
NA	Nace MR0175 service
WR	DD Stem
FF	Flat facing
RTJ	Ring type joint facing
159	C ball
B	Rolled bar
TTL	Hardening of all valve metal parts

1	2	3	4	5	6	7	8	9	10	11		12		13		14		15	16	17	18	19	20		21	22	.	30
4	0				7	3	Z	–	6	6		6		M		N		G	/	1	5	0		–				
Size		Design			Series				Body/End			Ball/Seats		Stem		Hardening		Seals		Connection					Special Features			

Design	
C[1]	Cryogenic Temperature (<-50°C)
T[2]	Extreme High Temperature 425°C<T<650°C
N[3]	Control
D	Diverter bottom entry
S	Diverter side entry

Hardening	
N	LTPN - Low Temperature Plasma Nitriding
D	DHN - Salt bath nitriding
I	Cr3C2 - Chromium Carbide with Nickel Chrome binder - HVOF technique
O	WC-Co - Tungsten Carbide with Cobalt binder - HVOF technique
E	Stellite - PTA technique

Seals	
G	Expended Graphite
B	NBR Sh. 90
V	Viton Sh. 70

Stem	
6	S.St. 316 (L)
M	S.St. 17-4PH
Z	Inconel 718

End Connection [5]	
BSPT	BS 21
DIN	DIN 2999 (BSPP)
NPT	B1.20.1
BW	Buttweld Sch 5,10, 40, 80,160
XBW	Extended buttweld
SW	Socketweld
XSW	Extended Socket Weld

Flange connection
ANSI B16.5 (B16.47 series A) - Raised Face
150, 300, 600, 900, 1500, 2500
DIN 2501 - Raised Face
PN16, PN25, PN40, PN64, PN100, PN250, PN400
ISO 6164 Flat Face
SAE3000, SAE6000

(1) For more information use Habonim cryogenic valves catalogue (bulletin P-119M).
(2) When using the prefix "T" the valve design will include bolted on extended bonnet.
(3) For more information use Habonim control valves catalogue (bulletin B-412M).
(4) As standard the Habonim metal seated series is full port uni-directional design.
(5) Other end connections are available upon request.

It is essential to provide as many details possible on the application such as: media, temperature, pressure, pipe line size and type of connection.

Standard of compliance

Valve test	ISO10497, API 607 6th ed.	Fire testing
	BS EN 12266-1(Rate C), ANSI/FCI 70-2 (Class V)	Seat test Shell test
Valve design	ANSI B16.10	Face to face and end dimensions of valves
	ANSI B16.25	Butt welding end of valves
	ANSI B16.34	Valves - Flanged threaded and welding ends
		ASME Section VIII div. 1- Boiler and pressure vessel code, rules for construction of pressure vessels
	NACE MR-0175 ISO 15156-1/2/3	(optional)
	ISO 17292 and API-6D	Anti-Static
Quality Assurance	ISO9001-2008	
Certification	PED 97/23/EC	Module H
	ATEX	directive 94/9/EC
	BS EN 10204	3.1/3.2 certification, full material traceability (optional)

2" 73Z valve in a fire test

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