FUSION T-SERIES BALL VALVE

SEVERE SERVICE BALL VALVES FOR POWER

LADISH VALVES - CATALOG 441

CONTROLLED QUALITY. CORROSION RESISTANT.

CONTENTS

Fusion Valves for Power
THE LADISH WAY

A "FUSION" OF THE BEST OF HIGH PRESSURE VALVE SEALING TECHNOLOGY.

The Fusion Power Ball Valve is engineered with a single controllable leak path of the integral seat while providing thermal match of the ball and seat to achieve reliable and long-lasting shut off. Other standard options include:

- Oven-Fused Carbide Coatings for many times the bond strength of more traditional HVOF-type coatings while eliminating the porosity that can allow leakage.
- Precision grinding followed by 360º Lapping to prevent "ridges" in the coating and improve sealing reliability.
- Captured Flange / Repairable Design - Tight Shutoff (TA Series)
- TA Series (Split-Body) Design for SW, BW & HUB-End Preparation available without welding or modification
- TZ Series (Uni-Body) Design for SW Preparation
- Low emission design
- Integral stem stabilization

QUALITY CONTROL
PROPRIETARY DATABASE

- Fully traceable to every heat & lot number for ALL inspections & fabrication points from receipt of raw material to shipment of final product.
- Fully integrated throughout local server for efficient distribution of records, procedures & documents.
- Documented corrections to any non-conformance with requalification testing recorded.
- Calibration control of all measuring & monitoring devices.

COATING
TECHNOLOGY

The term “Metal Seated Ball Valve” is widely used for this technology, but the ball and seat coatings that allow the valve to cycle without galling is the real heart of the valve. It is this same coating that is lapped for a Tight Shut-Off and must resist chemical and thermal attack from the process in which the valve is installed. The key to the reliability of the valves in your process is the selection of the right coating for your application, and Ladish engineers are expert in assisting with that selection. Some of the more standard options offered are:

SPRAY & FUSED

The ball and seat surfaces are coated with a relatively thick layer of hardening material, then the part is heated to “fuse” (similar to welding) the coating to the base material for the highest possible bond strength and lowest porosity.

- Complex Carbides and Borides
- Nickel/Cobalt Based Materials

HP-HVOF PROCESS

Ladish utilizes a robotically controlled “gun” which applies the coatings at a velocity and energy level that creates a mechanical bond with the base metal.

- Chromium Carbide with Nickel, Chromium or Cobalt Binders
- Tungsten Carbide with Cobalt or Nickel Binders

HVOF Process

IN-HOUSE TESTING

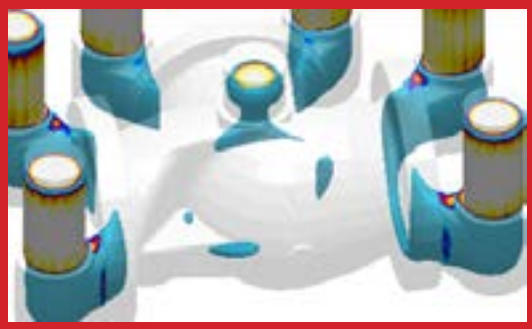
- Ladish designs & builds our own test equipment
- Hydro-Pressure testing equipment capable of testing up to 15,000 PSI
- Inert gas test equipment (Snoop Method)
- Fully Submerged Underwater Inert Gas Test Tank
- Horizontal to vertical valve test equipment for large diameter valves
- Vacuum testing w/ mass spectrometer sniff detection equipment
- Cryogenic testing rig capable of testing up to 24” diameter
- Digital Radiography for RT testing to B16.34
- In house PMI, PT, UT, RT & Ferrite

Traceability

TRACEABLITY

Each valve individually marked with Lot/Serial number to trace back from:

- Engineering
- Pattern/Die Creation
- Raw Material Fabrication
- NDE Testing
- Cleaning & Shipment



Engineering Capabilities

ENGINEERING QUALITY CAPABILITIES

- 3D Modeling Design Software
- FEA Analysis
- Flow Simulation Software
- Casting Simulation Software

CERTIFIED QUALITY PROGRAMS

- ISO 9001
- PED
- API Q1

TA Series
Split-Body Design Overview

Applications: High Energy Isolation, Steam, Condensate & Hydrocarbons

Available Sizes: 1/2” - 3”

A105, F22, F91, F92 & others

Available Classes: ASME 1500-4500 Limited Class

Two-Piece Construction

Uni-Directional

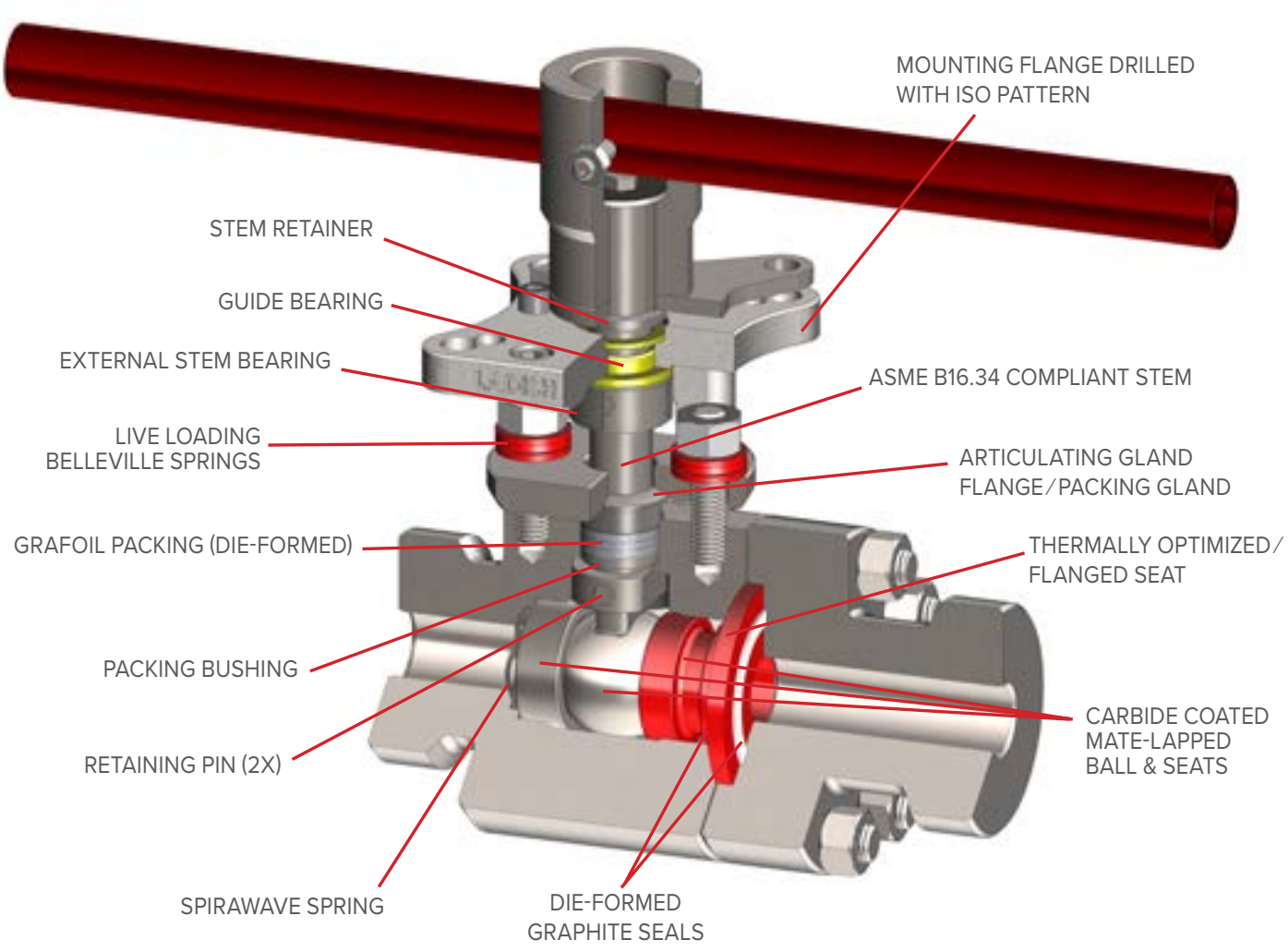
Available in: SWE, BWE, HUB-END

- Ball & Seat
  - 410SS, HP-HVOF *(Chrome Carbide Nickel Chrome)*
  - Inconel 718 - Fused *(Chromium Boride Chrome Carbide)*
  - Others available upon request
- Bore Sizes
  - .65", 1.00", 1.50" (1500, 3100)
  - .65", 1.00" (4500)
  - Other bore sizes available upon request

			PIPE SIZE (Max. Sch.)						
CLASS	Bore	L	0.50	0.75	1.00	1.50	2.00	2.50	3.00 **
1500	0.65"	8.25	● (xxs)	● (xxs)	● (xxs)	● (160)			
1500	1.00"	9.00				● (xxs)	● (xxs)		
1500	1.50"	11.00					● (xxs)	● (xxs)	● (160)
3100	0.65"	9.25	● (xxs)	● (xxs)	● (xxs)	● (xxs)			
3100	1.00"	10.25				● (xxs)	● (xxs)	● (160)	
3100	1.50"	13.00					● (xxs)	● (xxs)	● (xxs)
4500	0.65"	11.50	● (xxs)	● (xxs)	● (xxs)	● (xxs)	● (xxs)		
4500	1.00"	13.50				● (xxs)	● (xxs)	● (xxs)	● (xxs)

● Denotes Applicability ** 3.oo Size Available as STD. Class "L": end-to-end

Overview



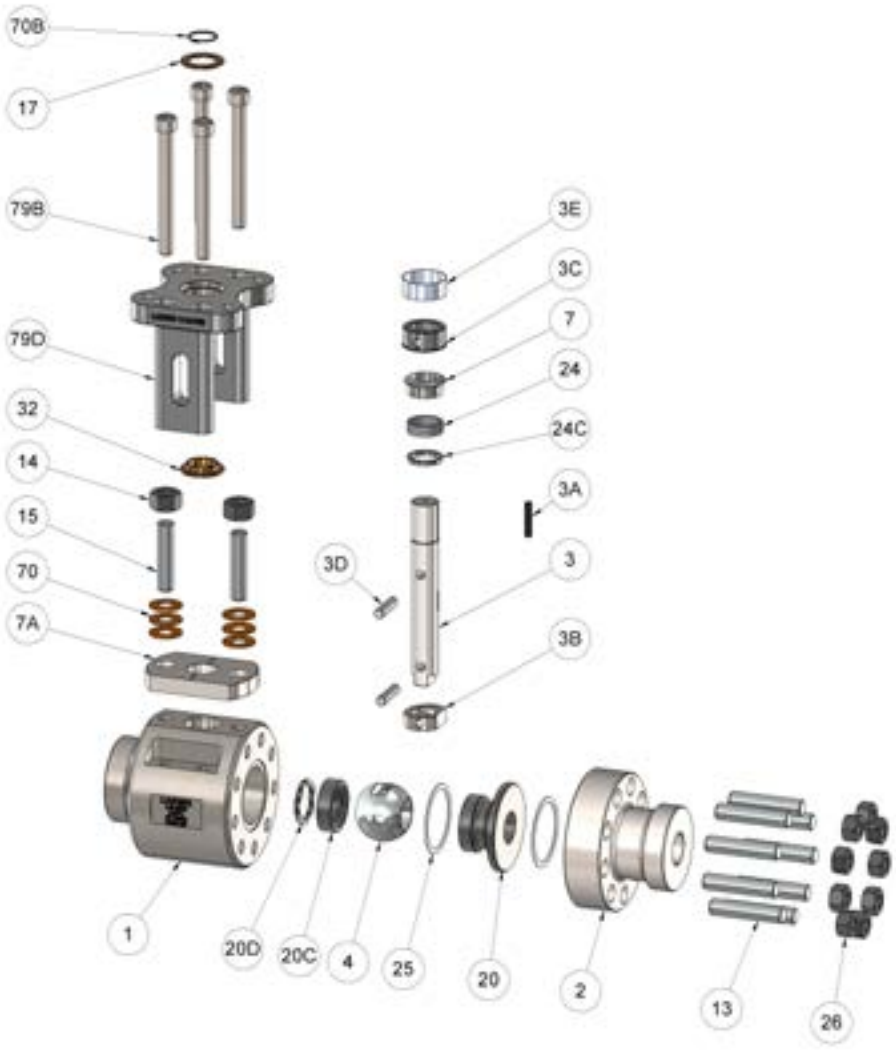
FEATURES & DESIGN ATTRIBUTES

- Captured Flange Repairable Design - Tight Shutoff
- 360º Lapping
- Split Body Design for SW & BW Preparation
- Low Emission Design
- Integral Actuator Mounting

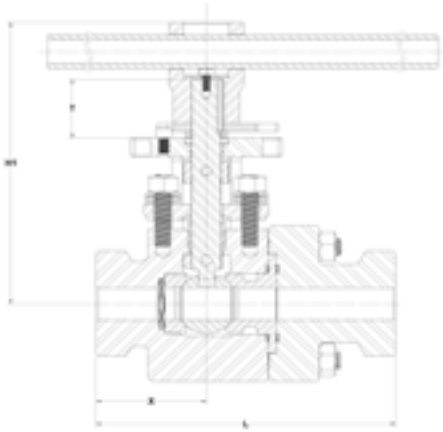
TA Series
Fusion Valve

Parts & Materials

Item No.	Description
1	BODY
2	CAP
3	STEM
3A	STEM KEY - SQUARE
3B	COLLAR, INNER
3C	COLLAR, OUTER
3D	RETAINING PIN (2X)
3E	RETAINING RING
4	BALL
7	PACKING GLAND
7A	GLAND FLANGE
13	STUD - BODY
14	PACKING NUT
15	PACKING STUD
17	THRUST WASHER
20	SEAT
20C	PUSH RING
20D	SPIRAWAVE SPRING
24	PACKING RING
24C	PACKING BUSHING
25	BODY GASKET (2X)
26	HEX NUT - BODY
32	GUIDE BEARING
70	BELLEVILLE SPRING WASHER
70B	SNAP RING
79B	HX-SHCS
79D	MOUNTING BRACKET
79B	MOUNTING BRACKET BOLT

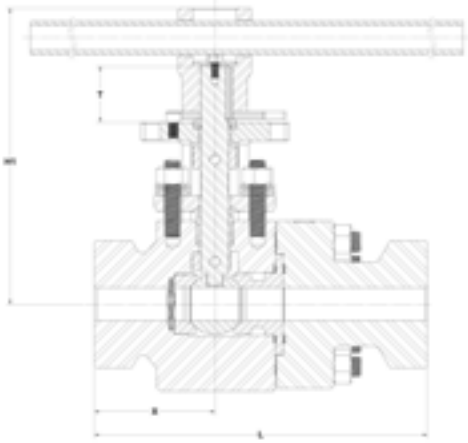


End to End Dimensions: ASME 1500



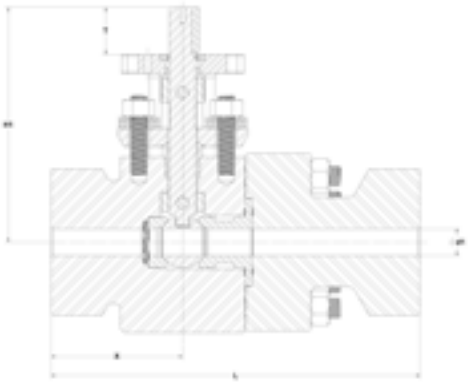
BORE	L	X	H1	T	Base C_v	Weight
0.65	8.25	2.84	7.63	1.35	27	26
1.00	9.00	3.31	8.72	1.72	80	40
1.50	11.00	4.06	11.39	1.72	207	96

End to End Dimensions: ASME 2500 / 3100



BORE	L	X	H1	T	Base C_v	Weight
0.65	9.25	3.14	6.23	1.35	26	32
1.00	10.25	3.71	7.33	1.72	75	54
1.50	13.00	4.57	10.56	2.48	191	124

End to End Dimensions: ASME 4500



BORE	L	X	H1	T	Base C_v	Weight
0.65	11.50	3.80	6.86	1.35	23	62
1.00	13.50	4.81	8.60	1.72	65	113
1.50	18.00	6.30	12.20	2.80	162	375

TZ Series
Uni-Body Design Overview

Applications: High Energy Isolation, Steam, Condensate & Hydrocarbons

Available Sizes: 1/2” - 2 1/2”

A105, F22, F91, F92 & others

Available Classes: ASME 1500-3100 Limited Class (3200 available)

Uni-Body Construction

Uni-Directional

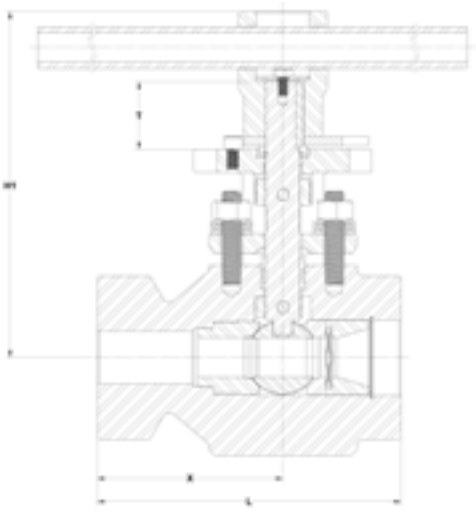
Available in: SWE

- Ball & Seat
  - 410SS, HP-HVOF *(Chrome Carbide Nickel Chrome)*
  - Inconel 718 - Fused *(Chromium Boride Chrome Carbide)*
  - Others available upon request
- Bore Sizes
  - .65", 1.00" (1500, 3100)

			PIPE SIZE (Max. Sch.)					
CLASS	Bore	L	0.50	0.75	1.00	1.50	2.00	2.50
1500	0.65"	6.75	● (xxs)	● (xxs)	● (xxs)	● (xxs)		
1500	1.00"	7.75				● (xxs)	● (xxs)	● (xxs)
3100	0.65"	6.75	● (xxs)	● (xxs)	● (xxs)	● (xxs)		
3100	1.00"	7.75				● (xxs)	● (xxs)	● (xxs)

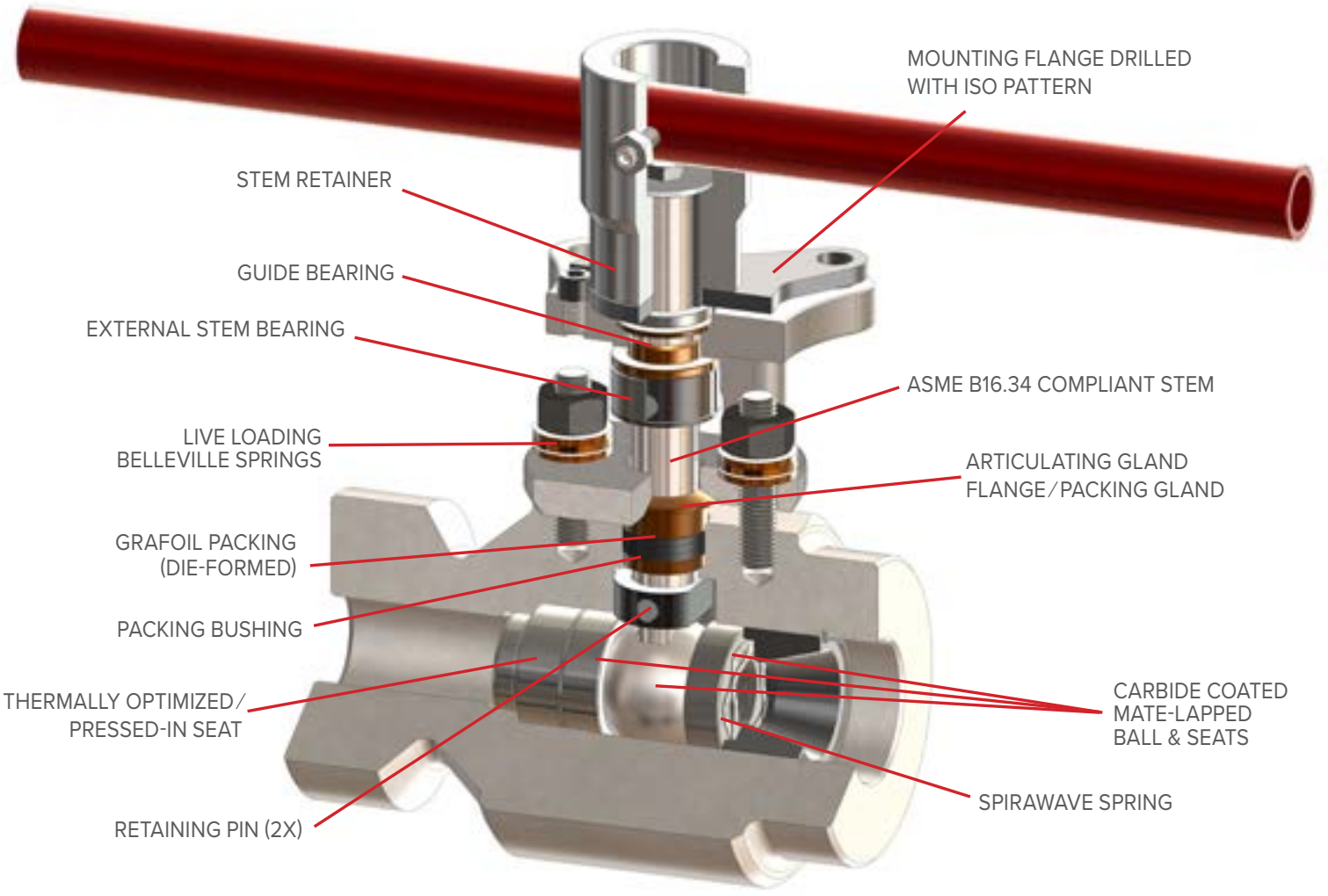
● Denotes Applicability "L": end-to-end

End to End Dimensions: ASME 1500 / 3100



BORE	L	X	H1	T	Base C_v	Weight
0.65	6.75	4.20	7.62	1.35	19	28
1.00	7.75	4.73	8.82	1.72	43	40

Overview



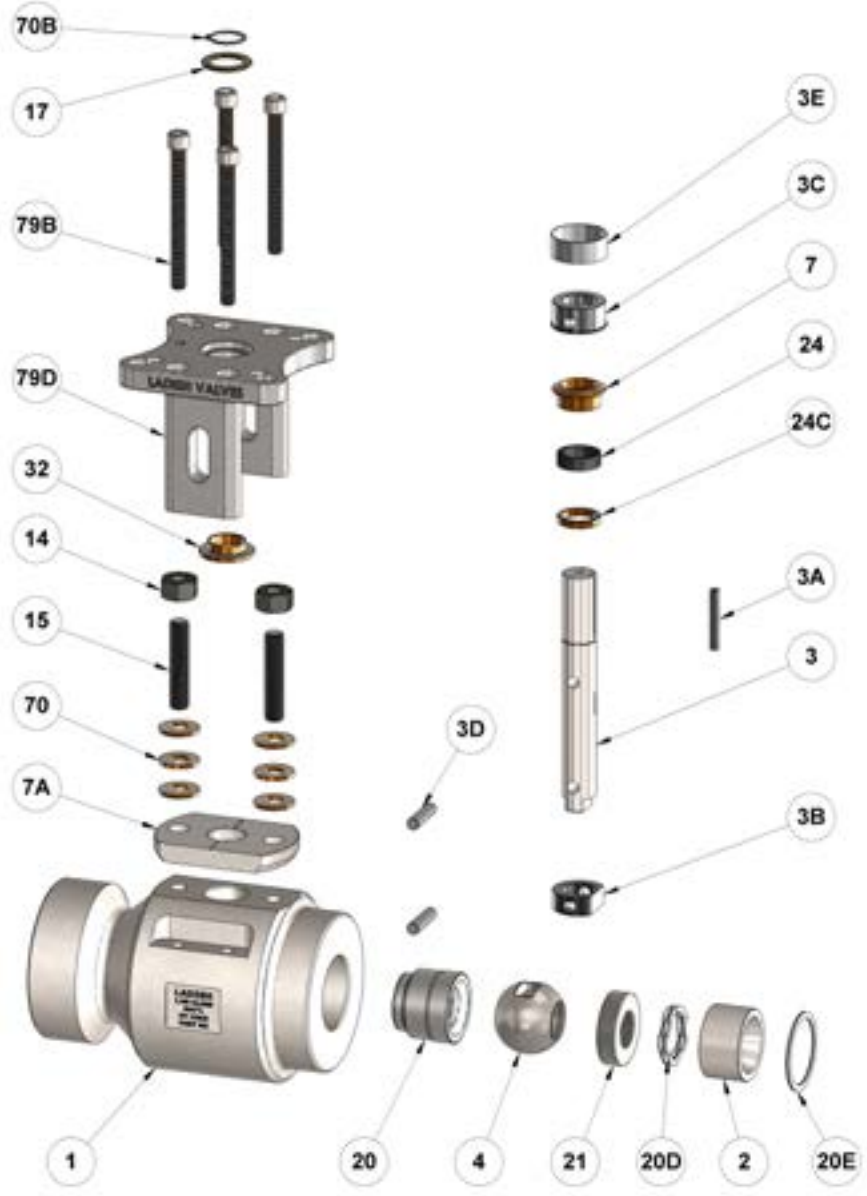
FEATURES & DESIGN ATTRIBUTES

- Tight Shutoff
- 360⁰ Lapping
- Uni-Body Design for SW Preparation
- Low Emission Design
- Integral Actuator Mounting

TZ Series
Fusion Valve

Parts & Materials

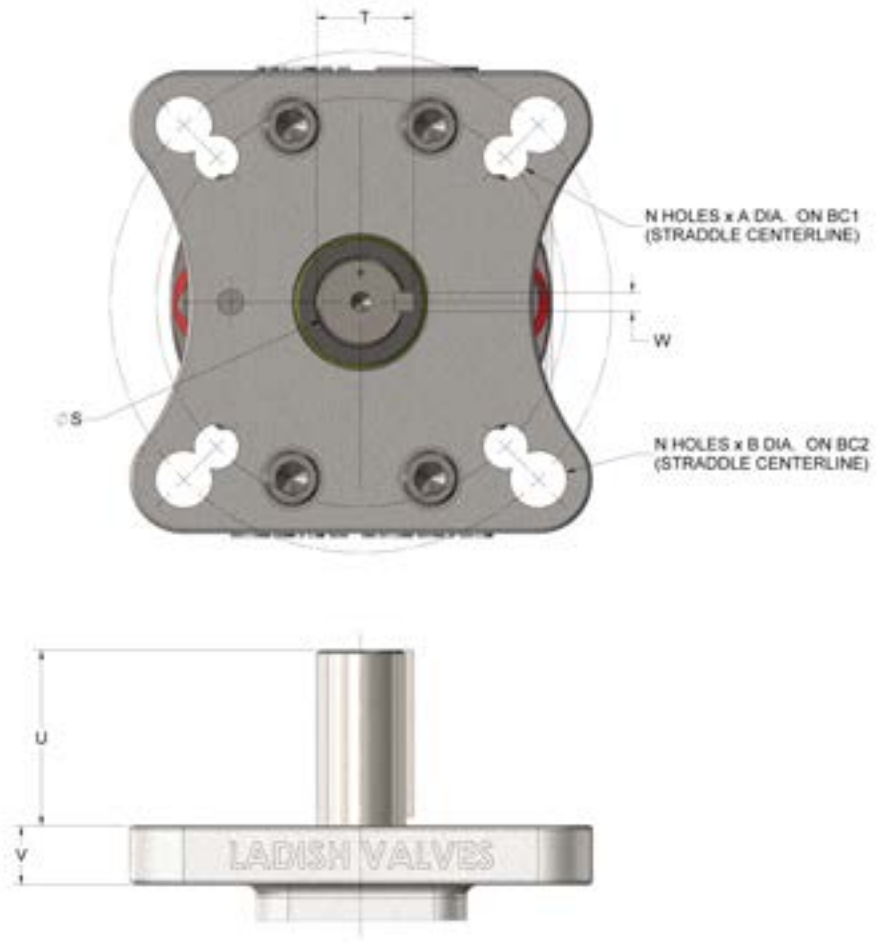
Item No.	Description
1	BODY
2	TRANSITION PIECE
3	STEM
3A	STEM KEY
3B	COLLAR, INNER
3C	COLLAR, OUTER
3D	RETAINING PIN
3E	RETAINING SLEEVE
4	BALL
7	PACKING GLAND
7A	GLAND FLANGE
14	PACKING NUT
15	PACKING STUD
17	THRUST WASHER
20	SEAT, PRESSED-IN
20D	SPRINGWAVE SPRING
20E	RETAINING RING
21	SEAT, INSERTED
24	PACKING RING
24C	PACKING BUSHING
32	GUIDE BEARING
70	SPRING WASHER
70B	SNAP RING
79B	MOUNTING BRACKET SHCS
79D	MOUNTING BRACKET
79B	MOUNTING BRACKET BOLT



ACTUATOR
Mounting Flanges

Ladish utilizes a rigidly secured mounting bracket for actuators, worm gears and levers. The bracket, constructed of heavy plate steel, is welded or bolted to the valve body. The mounting plate is parallel to the bore, and perpendicular to the stem, so there is no misalignment of the operator. Ladish places a heavy metal bushing in the bracket of the valve to guide the stem and ensure that the stem does not experience lateral movement if subjected to side loads during operation. If a side load occurs, it is absorbed outside the packing chamber and does not deform the packing. Deformation of packing caused by side loading is a major cause of stem leakage in quarter-turn valves.

Dimensional Data



BORE	PRESSURE CLASS	HOLE PATTERN	N	A	BC1	B	BC2	ØS +.000 -.002	T	U	V	W +.000 -.002
0.65	1500	F10	4	0.44	4.02	-	-	0.625	0.70	1.34	0.51	0.188
	3100	F10	4	0.44	4.02	-	-	0.625	0.70	1.34	0.51	0.188
	4500	F10 / F12	4	0.44	4.02	0.56	4.92	0.750	0.82	1.34	0.58	0.188
1.00	1500	F10 / F12	4	0.44	4.02	0.56	4.92	0.875	0.95	1.72	0.58	0.188
	3100	F10 / F12	4	0.44	4.02	0.56	4.92	0.875	0.95	1.72	0.58	0.188
	4500	F12	4	0.56	4.92	-	-	1.000	1.10	1.72	0.75	0.250
1.50	1500	F14	4	0.69	5.51	-	-	1.250	1.35	1.72	0.95	0.250
	3100	F14	4	0.69	5.51	-	-	1.250	1.35	2.48	0.95	0.250
	4500	F14	4	0.69	5.51	-	-	1.375	1.50	2.73	0.95	0.313

MOUNTING HOLE PATTERNS PER ISO-5211

HOW TO ORDER

Ladish Fusion T-Series Ball Valve

The Ladish Valves figure number is comprised of 20 alpha numeric digits defining the required product in detail. If you need assistance, give our knowledgeable sales staff a call at 281.880.8560 with the leading 4 digits and we can guide you through the rest. Our aim is to provide you with precisely what you need.

EXAMPLE:

TA50-LH0V-4X23-C00A-A001 Fusion Power Ball Valve, Forged Split-Body, CL1500, Blank End, Lever Operated, A105 Body, Gr. 660 Stem, 410SS Trim w/ Chromium Carbide Coating, B16 Bolting, Graphite Packing and Seals, Ends to be Machined per requirement, Preferred Direction, .65" Bore

VALVE STYLE	CONSTRUCT & VALVE TYPE	ANSI CLASS	END CONNECT	OPER.	BODY MAT.	STEM	BALL / SEAT MATERIAL
T	**A**	**5**	**0**	**L**	**H0**	**V**	**4**
T - THERMAL POWER BALL VALVE	**A** - HIGH PRESSURE POWER VALVE, FORGED, 2PC, SPLIT BODY, (≥CL900) **Z** - FORGED UNIBODY VALVE, CL 1500 / 3100	**9** - 900 **5** - 1500 **2** - 2500 **7** - 3100 **4** - 4500	**0** - BLANK ENDS **3** - NPT **4** - SWE **5** - RF **7** - THD-SWE **J** - RTJ **A** - BWE-S5 **B** - BWE-S10 **C** - BWE-S40 **D** - BWE-S80 **E** - BWE-S160 **G** - BWE-XXS **P** - GRAYLOC **R** - R-CON	**A** - Actuator **B** - Bare Stem **G** - Gear **L** - Lever **W** - Chain Wheel Gear Operated	**H0 – A105** **J1 – A182 F11 CL2** **J2 – A182 F22 CL3** **J6 – A182 F91 Type 1** **J7 – A182 F92** **05 – A479 316**	**V** - Gr.660 +QPQ **W** - 410 + QPQ **Y** - 17-4PH + QPQ **Z** - INCONEL 718 + QPQ	**4** - 410 **J** - INCONEL 718 **R** - Gr. 660 **W** - 410 + QPQ

OPTIONAL MATERIALS OF CONSTRUCTION

CARBON & CHROME STEELS

CARBON STEEL

LOW TEMP CARBON STEEL

5% AND 9% CHROME (PROCESS)

F11, F22, F91

STAINLESS STEELS

316SS, 304SS, 317SS

347SS & 321SS FOR SPECIAL APPLICATIONS

DUPLEX STAINLESS

SUPER DUPLEX

COATING	BOLT/NUT	PACKING & GASKET	SIZE	SEAT TYPE	MISC. OPTION	MODIFIER	SPECIAL BORE SIZE
X	**23**	**C**	**00**	**A**	**A**	**00**	**1**
A - Tungsten Carbide WC-10Ni **B** - Fused Chromium Carbide **F** - Nitride-QPQ **W** - Tungsten Carbide WC-12-Co **X** - Chrome Carbide Cr2C2-20NiCr **Z** - Chrome Carbide Cr2C2-25NiCr	**00** - N/A **02** – B8CL2/GR8 **05** – B7/2H **10** – L7/GR7 **23** - B16/GR4	**A** - GRF / SWG **C** - GRF / GRF **H** - HIGH TEMP: GRF GRF	**00** - BLANK **05** - 1/2” **07** - 3/4” **10** - 1” **15** - 1 1/2” **20** - 2” **25** - 2 1/2” **30** - 3”	**A** - Preferred Direction, FLNG Captured Seat **1** - Bi-Directional, Flange Captured Seat	**A** - No Added Option **B** - Cleaned **E** - Extended Handle **H** - Fugitive Emission Extended Bonnet Lantern Ring (Chlorine Clean)	**00** - N/A	**1** - Bore Size 0.65" **2** - Bore Size 1.0" **3** - Bore Size 1.5"

MATERIAL REFERENCE CHART

Common	Elements	Forging			Bar		
			ASTM	UNS		ASTM	UNS
A105	C - Si	H0	A105	K03504	H0	A105	K03504
LF2	C - Mn - Si	H2	A350 LF2 CL.1	K03011	H2	A350 LF2 CL.1	K03011
F5a	5Cr - 1/2Mo	I0	A182 F5a	K42544	I0	A182 F5a	K42544
F5	5Cr - 1/2Mo	J5	A182 F5	K41545	J5	A182 F5	K41545
F11 CL2	1 1/4Cr - 1/2Mo - Si	J1	A182 F11 CL2	K11572	J1	A182 F11 CL2	K11572
F22 CL3	2 1/4Cr - 1Mo	J2	A182 F22 CL3	K21590	J2	A182 F22 CL3	K21590
F9	9Cr - 1Mo	J9	A182 F9	K90941	J9	A182 F9	K90941
F91 CL1	9Cr - 1Mo - V	J6	A182 F91 Type 1	K90901	J6	A182 F91 Type 1	K90901
F92	9Cr - 2W - V	J7	A182 F92	K92460	J7	A182 F92	K92460
304L	18Cr - 8Ni	A2	A182 F304L	S30403	02	A479 304L	S30403
304	18Cr - 8Ni	A1	A182 F304	S30400	01	A479 304	S30400
304H	18Cr - 8Ni	A3	A182 F304H	S30409	03	A479 304H	S30409
310H	25Cr - 20Ni	I1	A182 F310H	S31009	I1	A479 310H	S31009
316L	16Cr - 12Ni - 2Mo	A6	A182 F316L	S31603	06	A479 316L	S31603
316	16Cr - 12Ni - 2Mo	A8	A182 F316	S31600	05	A479 316	S31600
316H	16Cr - 12Ni - 2Mo	A7	A182 F316H	S31609	07	A479 316H	S31609
317L	18Cr - 13Ni - 3Mo	B1	A182 F317L	S31703	11	A182 317L	S31703
317	18Cr - 13Ni - 3Mo	B0	A182 F317	S31700	-	N/A	-
321	18Cr - 10Ni - Ti	B8	A182 F321	S32100	43	A479 321	S32100
321H	18Cr - 10Ni - Ti	I2	A182 F321H	S32109	I2	A479 321H	S32109
347	18Cr - 10Ni - Cb	B3	A182 F347	S34700	12	A479 347	S34700
347H	18Cr - 10Ni - Cb	B2	A182 F347H	S34709	B2	A479 347H	S34709
F44	20Cr - 18Ni - 6Mo	B6	A182 F44	S31254	16	A479 S31254	S31254
Duplex 2205	22Cr - 5Ni - 3Mo - N	F5	A182 F51	S31803	F5	A479 S31803	S31803
Super Duplex 2507	25Cr - 7Ni - 4Mo - N	F6	A182 F53	S32750	56	A479 S32750	S32750
F55	25Cr - 7.5Ni - 3.5Mo - N - Cu - W	F7	A182 F55	S32760	57	A479 S32760	S32760
Alloy 20	35Ni - 35Fe - 20Cr - Cb	B5	B462 N08020	N08020	15	B473 N08020	N08020
Monel 400	67Ni - 30Cu	D0	B564 N04400	N04400	30	B164 N04400	N04400
Hastelloy C276	54Ni - 16Mo - 15Cr	C0	B564 N10276	N10276	20	B574 N10276	N10276
Inconel 625	60Ni - 22Cr - 9Mo - 3.5Cb	D4	B564 N06625	N06625	34	B446 N06625	N06625
Incoloy 825	42Ni - 21.5Cr - 3Mo - 2.3Cu	D6	B564 N08825	N08825	36	B425 N08825	N08825
AL6XN	46Fe - 24Ni - 21Cr - 6Mo - Cu - N	B7	B462 N08367	N08367	17	B462 N08367	N08367
-	99 Ni	C2	B564 N02200	N02200	37	B160 N02200	N02200
-	99Ni - Low C		N/A	-	C7	B160 N02201	N02201
-	72Ni - 15Cr - 8Fe	D3	B564 N06600	N06600	33	B166 N06600	N06600
-	33Ni - 42Fe - 21Cr	D5	B564 N08800	N08800	D5	B408 N08800	N08800
Hastelloy B2	65Ni - 28Mo - 2Fe	C4	B564 N10665	N10665	C4	B462 N10665	N10665
Hastelloy B3	64Ni - 29.5Mo - 2Cr - 2Fe - Mn - W	C5	B564 N10675	N10675	27	B462 N10675	N10675
-	62Ni - 28Mo - 5Fe		N/A	-	25	B335 N10001	N10001
-	70Ni - 16Mo - 7Cr - 5Fe		N/A	-	C8	B573 N10003	N10003
-	61Ni - 16Mo - 16Cr		N/A	-	22	B574 N06455	N06455
-	55Ni - 21Cr - 13.5Mo	C3	B564 N06022	N06022	23	B462 N06022	N06022
-	55Ni - 23Cr - 16Mo - 1.6Cu	C6	B564 N06200	N06200	C6	B574 N06200	N06200
-	47Ni - 22Cr - 9Mo - 18Fe		N/A	-	D1	B572 N06002	N06002
HS 556	21Ni - 30Fe - 22Cr - 18Co - 3Mo - 3W		N/A	-	D2	B572 R30556	R30556
Inconel 800	42Ni - 2Fe - 21Cr	D8	B564 N08810	N08810	35	B408 N08810	N08810
Alloy 230	57Ni - 22Cr - 14W - 2Mo - La	D9	B564 N06230	N06230	D9	B572 N06230	N06230

NOTES

LADISH VALVES

CONTROLLED QUALITY • CORROSION RESISTANT

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2024 REV_OCTOBER