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 COMPETING DESIGNS.

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.

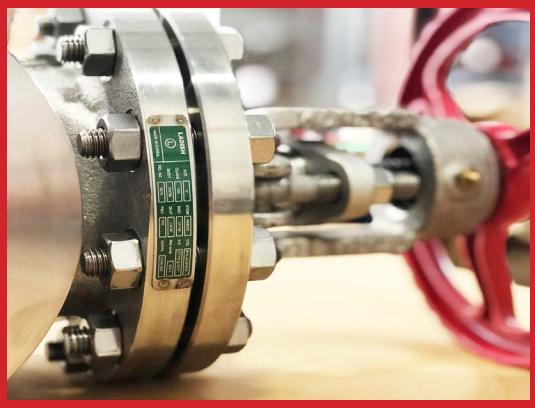
- Complex Carbides and Borides
- Nickel/Cobalt Based Materials

HP-HVOF PROCESS

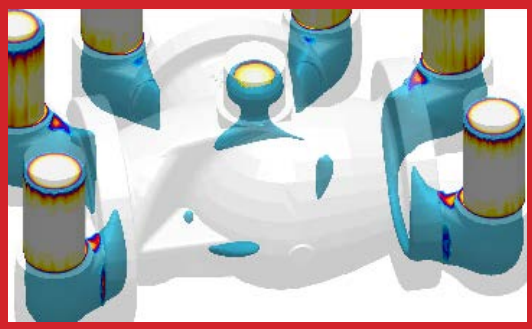
Ladish utilizes a robotically controlled “gun” which applies the coatings at a velocity and energy level that creates a mechanical bond with the base metal.

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

HVOF Process



Traceability



Engineering Capabilities

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

TRACEABLITY

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

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

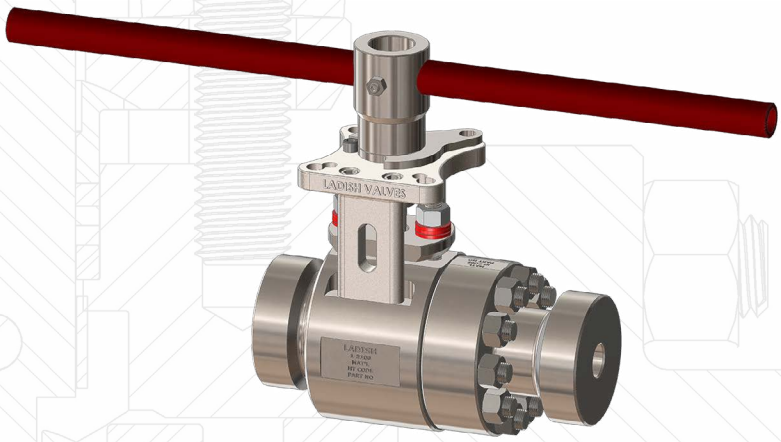
ENGINEERING QUALITY CAPABILITIES

- 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” - 2 1/2”

A105, F22, F91, F92 & others

Available Classes: ASME 1500-4500 Limited Class

Two-Piece Construction

Uni-Directional

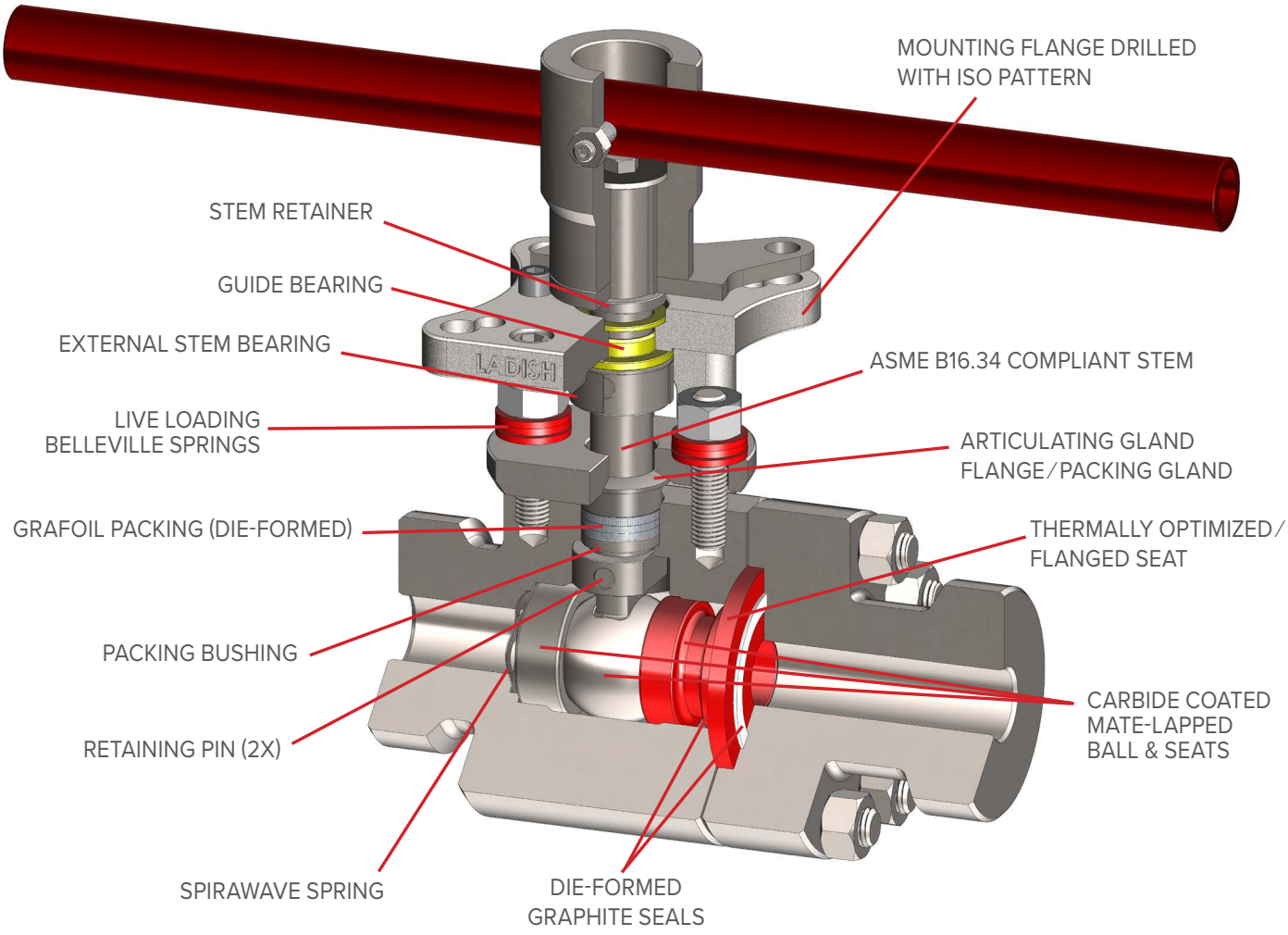
Available in: SWE, BWE, HUB-END

- 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



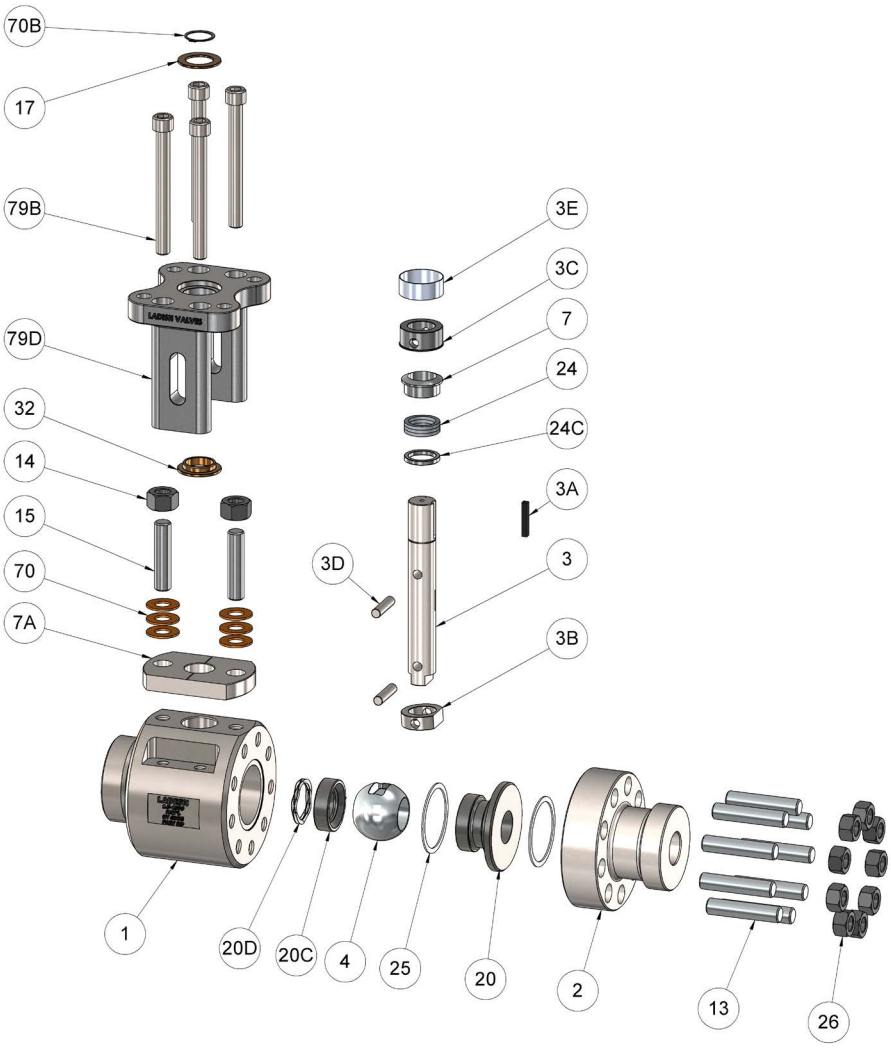
FEATURES & DESIGN ATTRIBUTES

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

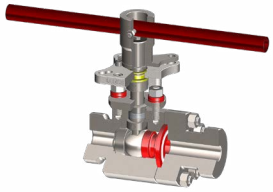
TA Series
Fusion Valve

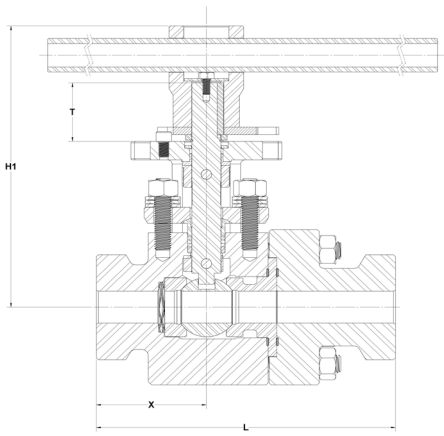
Parts & Materials

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



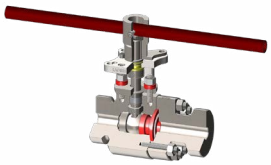
End to End Dimensions: ASME 900 / 1500

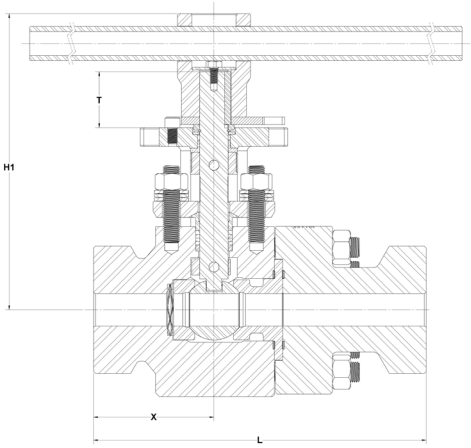




BORE	L	X	H1	T	Base C_v	Weight
0.65	8.25	2.84	7.63	1.35	27	26
1.00	9.00	3.31	8.72	1.72	80	40
1.50	11.00	4.06	11.39	1.72	207	96

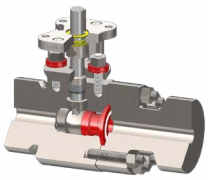
End to End Dimensions: ASME 2500 / 3100

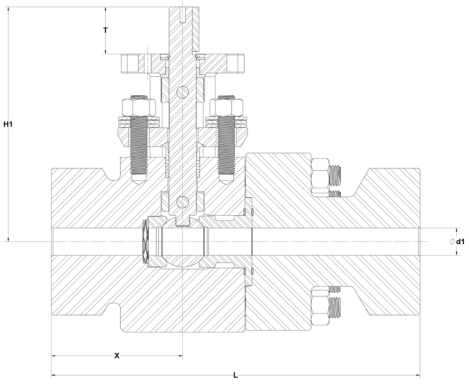




BORE	L	X	H1	T	Base C_v	Weight
0.65	9.25	3.14	6.23	1.35	26	32
1.00	10.25	3.71	7.33	1.72	75	54
1.50	13.00	4.57	10.56	2.48	191	124

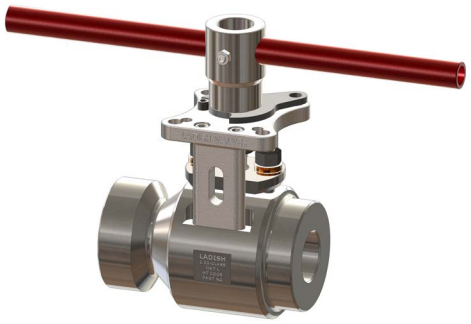
End to End Dimensions: ASME 4500





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

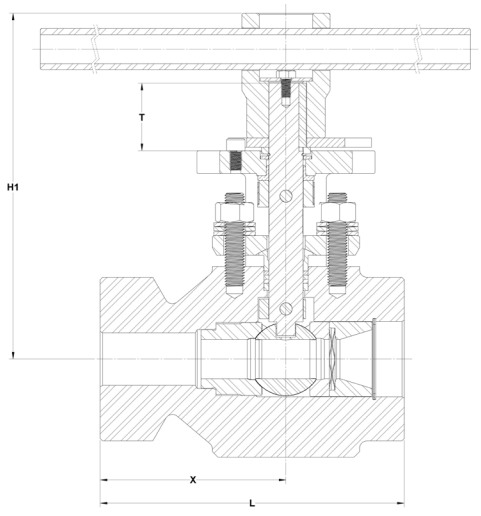
Available in: SWE

- 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)

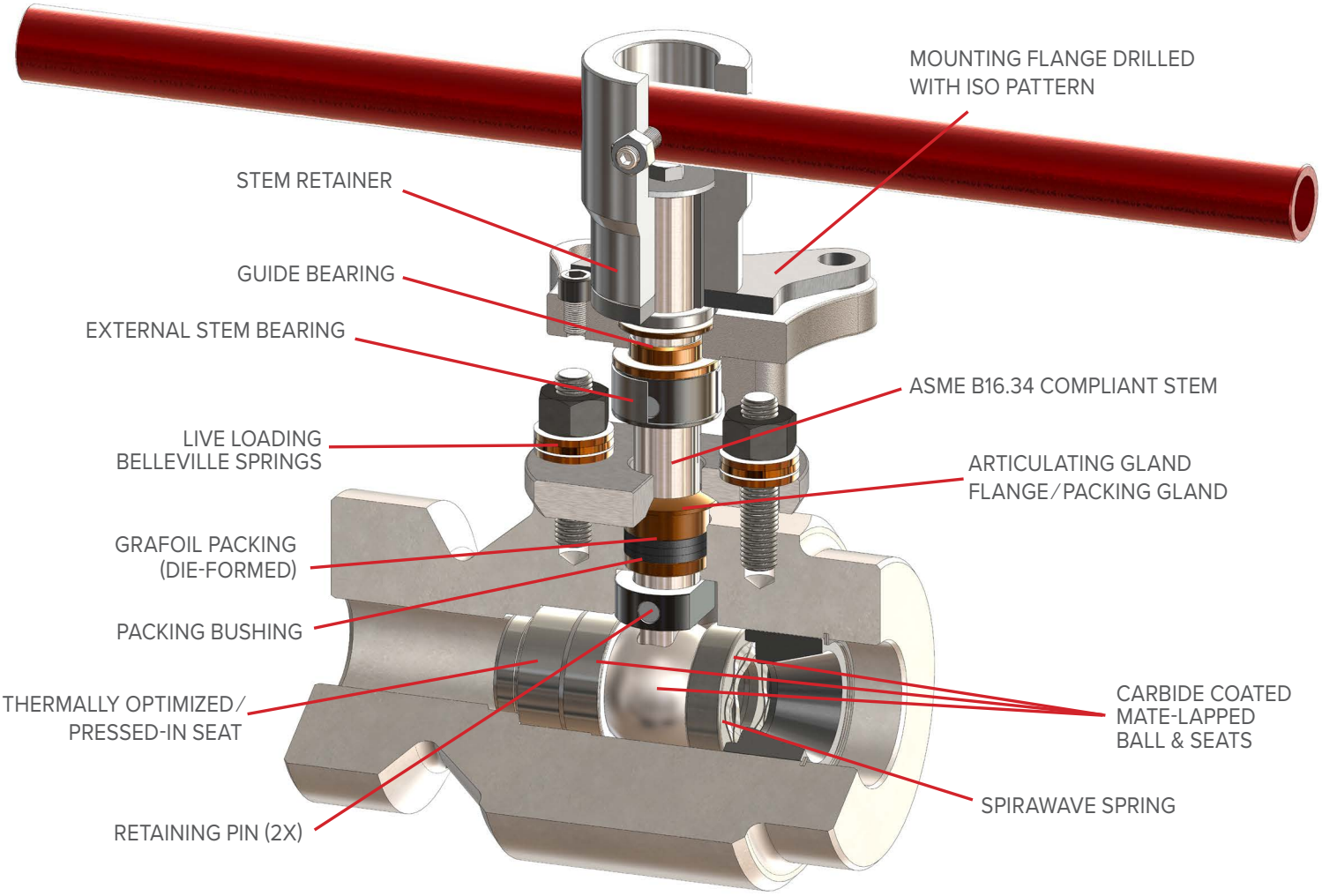
● Denotes Applicability "L": end-to-end

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



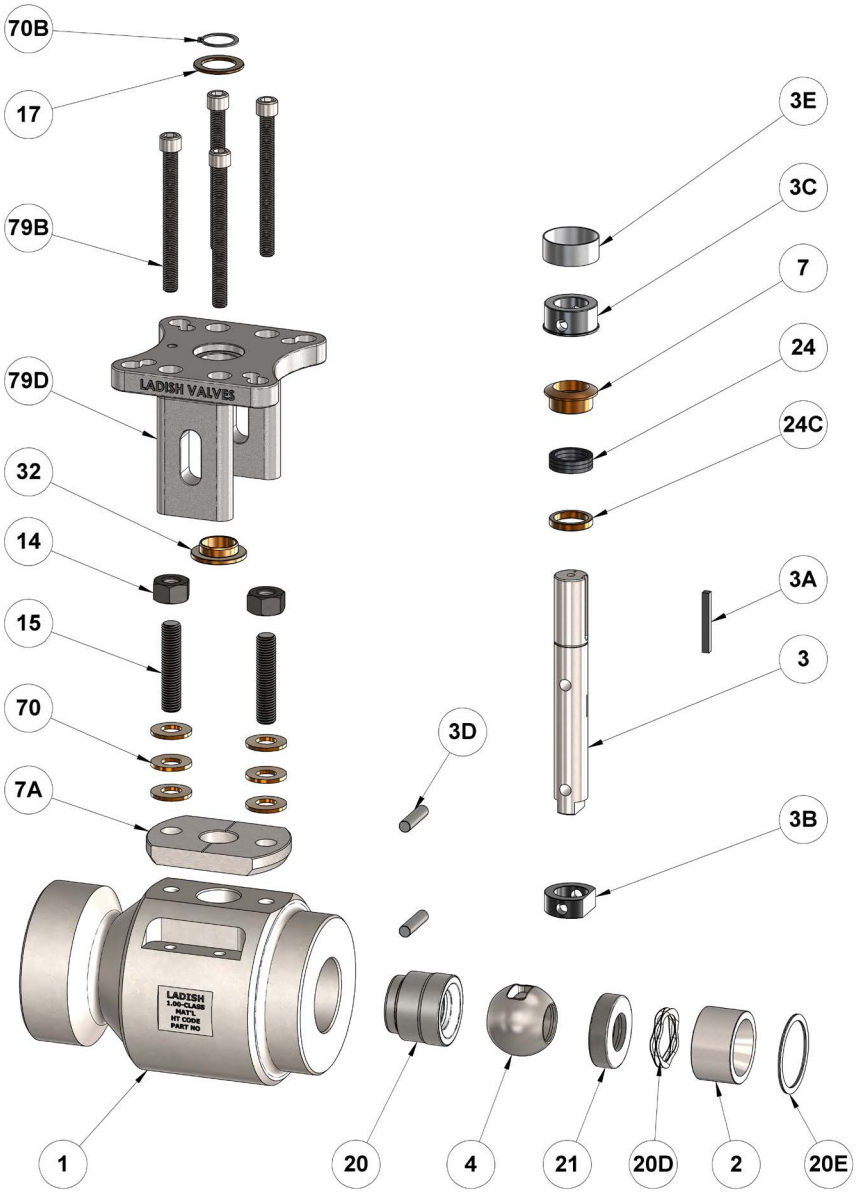
FEATURES & DESIGN ATTRIBUTES

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

TZ Series
Fusion Valve

Parts & Materials

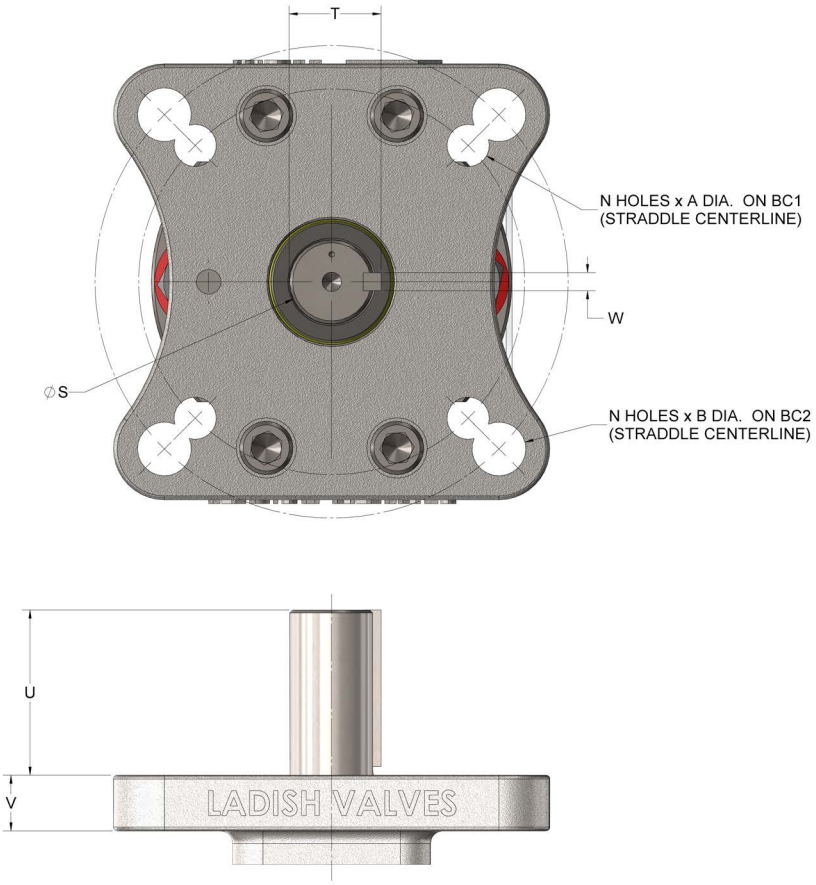
Item No.	Description
1	BODY
2	TRANSITION PIECE
3	STEM
3A	STEM KEY
3B	COLLAR, INNER
3C	COLLAR, OUTER
3D	RETAINING PIN
3E	RETAINING SLEEVE
4	BALL
7	PACKING GLAND
7A	GLAND FLANGE
14	PACKING NUT
15	PACKING STUD
17	THRUST WASHER
20	SEAT, PRESSED-IN
20D	SPRINGWAVE SPRING
20E	RETAINING RING
21	SEAT, INSERTED
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
2.0	1500	F16	4	0.84	6.50	-	-	1.750	1.91	3.06	1.13	0.375
	3100	F16	4	0.84	6.50	-	-	1.750	1.91	3.06	1.13	0.375
	4500	F25	8	0.69	10.00	-	-	1.750	1.91	3.22	1.13	0.375
2.50	1500	F25	8	0.69	10.00	-	-	2.000	2.21	3.44	1.13	0.500
	3100	F25	8	0.69	10.00	-	-	2.000	2.21	3.91	1.13	0.500
	4500	F30	8	0.84	11.73	-	-	2.000	2.21	3.91	1.13	0.500

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** - F11 **J2** - F22 **J6** - F91 **J7** - F92 **05** - 316SS	**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

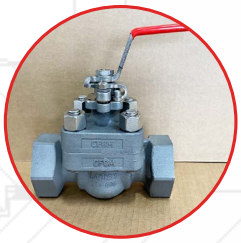
SUPER DUPLEX

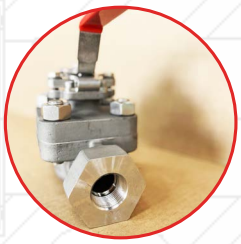
COATING	BOLT/NUT	PACKING & GASKET	SIZE	SEAT TYPE	MISC. OPTION	MODIFIER	SPECIAL BORE SIZE
X	**23**	**C**	**00**	**A**	**A**	**00**	**1**
A - Tungsten Carbide WC-10Ni **B** - Fused Chromium Carbide **F** - Nitride-QPQ **W** - Tungsten Carbide WC-12-Co **X** - Chrome Carbide Cr2C2-20NiCr **Z** - Chrome 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	**00** - N/A	**0** - N/A Bore diameter per ASME B16.34 Table A1 **1** - Bore Size 0.65" **2** - Bore Size 1.0" **3** - Bore Size 1.5"

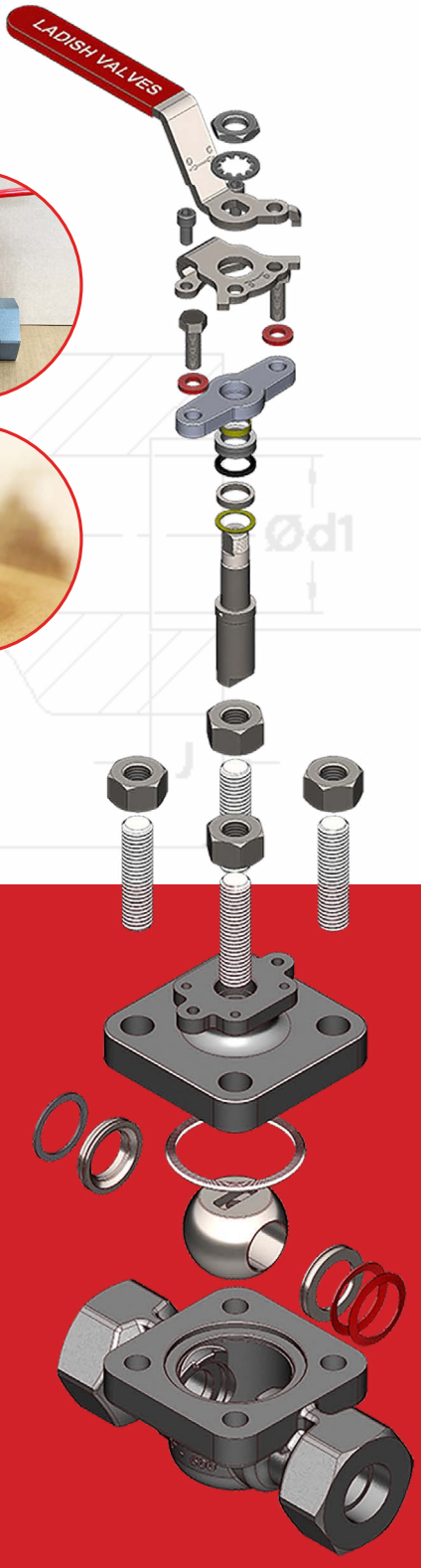
TL SERIES
Top Entry Ball Valves

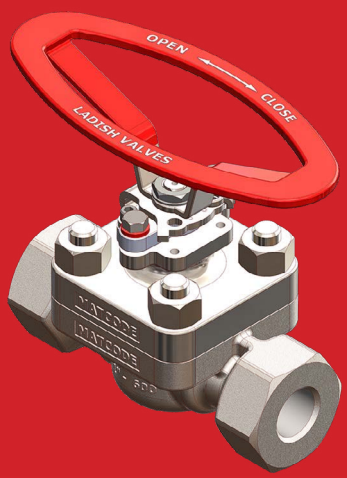
FEATURES & DESIGN ATTRIBUTES

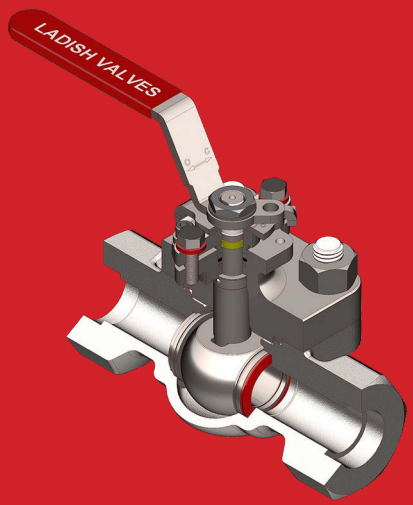
- API 608
- Low Fugitive Emissions
- Live-loaded packing; fully adjustable
- In-line Repairable
- Metal seats; option for Elastomers
- BWE, SWE, THD
- 1/2” - 2” CL150 - CL600











NOTES

LADISH VALVES

CONTROLLED QUALITY • CORROSION RESISTANT

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2021 REV_MAY