

# Fisher™ Z500 Severe Service Ball Valves

This bulletin covers Fisher NPS 1/2 - 36 Z500 Severe Service Ball Valves. The Z500 severe service ball valve line is a simplistic two-piece floating ball design with integral metal seat meant to provide tight shutoff in high temperature, high pressure, and erosive applications across all industries. The mated ball and seat constructions help ensure sealing and the high-velocity oxyfuel coatings (HVOF) provide excellent corrosion resistance and help eliminate the problems associated with severe service conditions.

Z500 valves are available with a variety of end connections from ASME CL150 through CL4500.

All Z500 valves are designed and manufactured to be used in severe service applications. They are highly engineered to help enhance safety in potentially dangerous operating parameters and reduce valve maintenance costs.



Fisher Z500 Valve

X1243

## Features

- **Machined Stops** -- Integral 90 degree lockplate design prevents over-rotation and maintains critical alignment on lever-operated valves.
- **Side Mounted Bracket** -- Helps prevent shaft and packing box side load and bolt shear by attaching to the side of the valve body. Allows easy access to packing gland nuts for needed adjustments.
- **Live-Loaded Packing** -- Packing design utilizes live-loaded spring washers for easy adjustment. Compact stuffing box and live-loaded Belleville springs ensure packing is continuously energized and protects against shaft side loading and temperature fluctuations.
- **Shaft Adapter** -- Lever-operated valves have a contact-proof shaft adapter designed to prevent the shaft from being knocked into the ball, causing misalignment and possible leakage.
- **Blow-Out Proof Shaft** -- Rugged, one-piece, machined, surface-hardened and polished shaft is designed to be blow-out proof. There are no pins to rely on, which helps increase safety and reliability.
- **Integral Metal Seat** -- Preferred sealing seat is machined into the end adapter, coated, and mated lapped with the ball. Design eliminates a potential leak path and helps the valve withstand high pressures, temperatures and severe service conditions.
- **Metal Body Gasket** -- Specially engineered, self-energizing gasket helps ensure that there is no leakage during thermal transients.
- **High-Velocity Oxyfuel Coatings (HVOF)** -- Forms a very hard and dense coating on the base metal of the ball forming a strong mechanical bond. Typically these coatings are chrome or tungsten carbide. These coatings provide exceptional wear, corrosion, and erosion resistance.

*(continued on page 2)*

**Specifications**

**Valve Sizes**

Z500: NPS ■ 1/2, ■ 3/4, ■ 1, ■ 1-1/2, ■ 2, ■ 3, ■ 4, ■ 6, ■ 8, ■ 10, ■ 12, ■ 14, ■ 16, ■ 18, ■ 20, ■ 24, ■ 26, ■ 28, ■ 30 and, ■ 36

**Maximum Working Pressures<sup>(1)</sup>**

Consistent with applicable pressure-temperature ratings in table 1 per ASME B16.34, but do not exceed the material temperature capabilities shown below

**Shutoff Classification<sup>(1)</sup>**

Z500: Valves are tested to API 598 in the preferred flow direction.

Class V type B per FCI 70-2 in reverse flow in bi-directional design (Must be specified). For other shutoff requirements, please contact your [Emerson sales office](#) or Local Business Partner.

**Construction Materials**

See table 2

**Temperature Capabilities<sup>(1)</sup>**

Welded and Threaded Ends: *Carbon Steel*: 427°C (800°F); *F22*: 593°C (1100°F); *F91*: 649°C (1200°F); *F316*: 538°C (1000°F); *F316H*: 760°C (1400°F)

Flanged End Connections: *Carbon Steel*: 316°C (600°F); *F22*: 427°C (800°F); *F91*: 538°C (1000°F); *F316*: 538°C (1000°F)

Lower Limits: *Carbon steel*: -29°C (-20°F), *Stainless steel*: -40°C (-40°F)

**Packing Constructions**

**Carbon Steel Valve Bodies:** Wire reinforced graphite packing, AISI 4130 nitrided packing gland  
**Stainless Steel:** N06600 wire-reinforced graphite packing, S31600 nitrided packing gland

**Dimensions**

See figures 4 and 5 and tables 10 through 13 or contact your Emerson sales office

**Standard Flow Direction**

**Preferred Flow Direction:** Preferred flow for optimal sealing is forward into the integral seat

**Flow Coefficients**

Contact your Emerson sales office

**Maximum Ball Rotation**

90 degrees

**Actuator Mounting**

The preferred mounting orientation is vertical. Other orientations are acceptable

**Approximate Weight**

Contact your Emerson sales office

**Options**

- Reduced port, ■ Expanded outlet, ■ Scraper seats, ■ HVOF coating options, ■ Bi-directional sealing, ■ High cycle constructions, ■ Lockouts, ■ Spray and fused coatings

1. The pressure/temperature limits in this bulletin, and any applicable code or standard limitation, should not be exceeded.

**Features (continued)**

- **Bi-Directional Sealing** -- Optional bi-directional sealing is available for all configurations but must be specified when ordering. Selecting this option designates reverse flow sealing to ANSI/FCI 70-2 Class V Type B shutoff classification.
- **Sour Service Capability** -- Materials are available for applications involving sour liquids and gases. These constructions comply with NACE MR0103.
- **Back Pressure Protection** -- Welded and threaded end connection valves with 0.65, 1.15, 1.5, and 2 inch bores come standard with a seat holder designed to protect the Belleville spring from being deformed in case of process back pressure.

Table 1. Valve Body Materials, End Connections, and Ratings

Ratings	Bore (inches)	Size, NPS	End Connection	Valve Body Materials <sup>(1)</sup>	
CL150 through 1500	0.65	1/2	Buttweld, Socketweld, FNPT, RF, RTJ	Carbon Steel, F22, F91, F316, and F316H	
		3/4			
		1			
		1-1/2			
	1.15	1			
		1-1/2			
		2			
		2-1/2			
	1.5	1-1/2			Buttweld, RF, RTJ
		2			
		2-1/2			
	2	2	Buttweld, Socketweld, FNPT, RF, RTJ		
		2-1/2			
		3	Buttweld, RF, RTJ		
	3	3			
		4			
		6			
	4	4			
		6			
	6	6			
		8			
	8	8			RF, RTJ
		10			
	10				
	12				
	14				
16					
18					
20					
24					
26					
28					
30					
36					

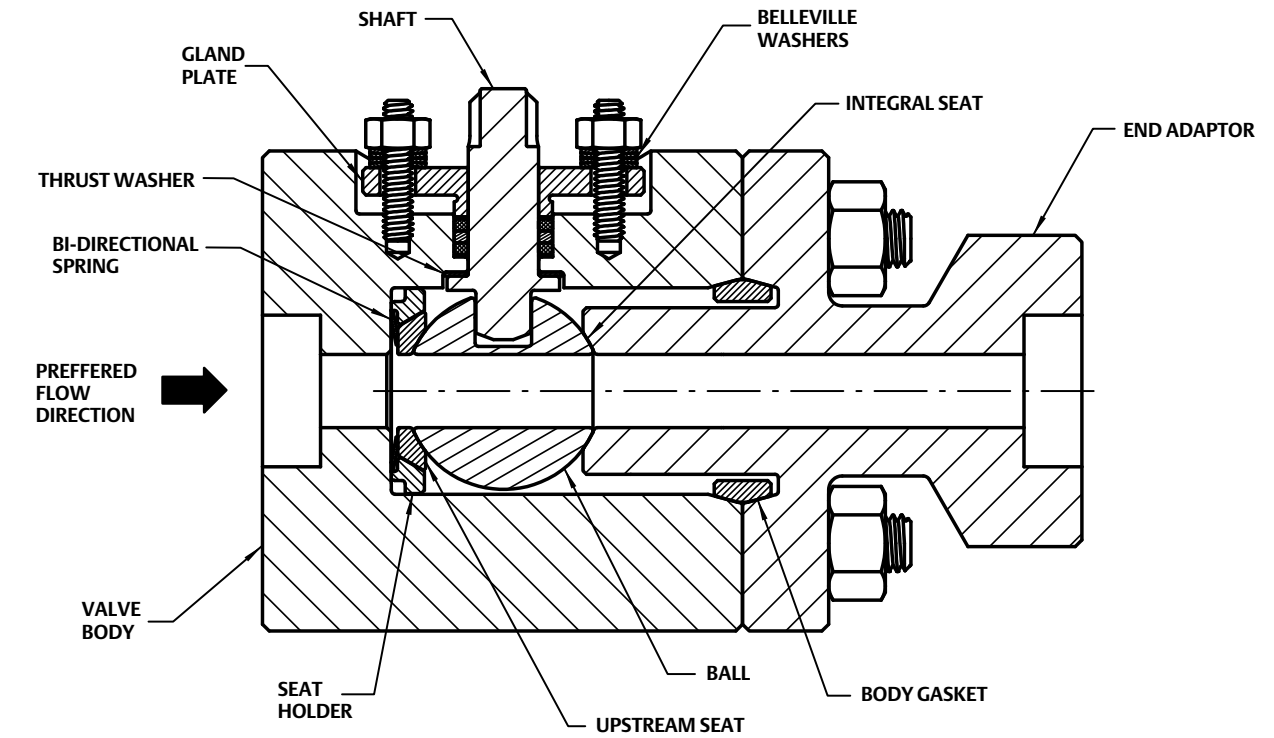
-continued-

**Table 1. Valve Body Materials, End Connections, and Ratings (continued)**

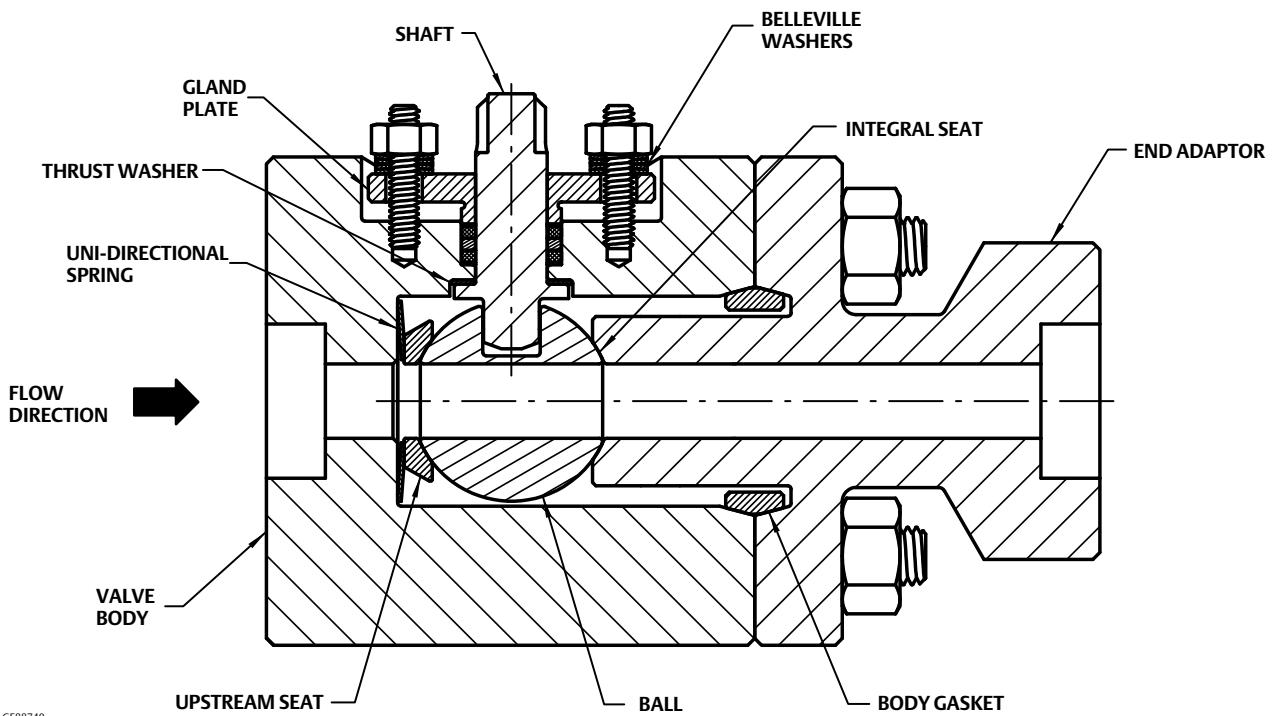
Ratings	Bore (inches)	Size, NPS	End Connection	Valve Body Materials <sup>(1)</sup>
CL2500	0.65	1/2	Buttweld, Socketweld, FNPT, RF, RTJ	Carbon Steel, F22, F91, F316, and F316H
		3/4		
		1		
		1-1/2		
	1.15	1		
		1-1/2		
		2		
		2-1/2		
	1.5	1-1/2		
		2		
		2-1/2	Buttweld, RF, RTJ	
		3		
	2	2	Buttweld, Socketweld, FNPT, RF, RTJ	
		2-1/2		
		3	Buttweld, RF, RTJ	
		4		
3	3			
	4			
	6			
4	4			
	6			
6	6			
	8			
8	8	RF, RTJ		
	10			
CL3200	0.65	1/2	Buttweld, Socketweld	Carbon Steel, F22, F91, F316, and F316H
		3/4		
		1		
	1.15	1		
		1-1/2		
		2		
	1.5	1-1/2		
		2		
2-1/2				
CL4500	0.65	1/2	Buttweld, Socketweld	Carbon Steel, F22, F91, F316, and F316H
		3/4		
		1		
	1.15	1		
		1-1/2		
		2		
	1.5	1-1/2		
2				
2-1/2				

1. Valve bodies are machined from forgings or forged bar.

Figure 1. Z500 Cross Section Construction Features



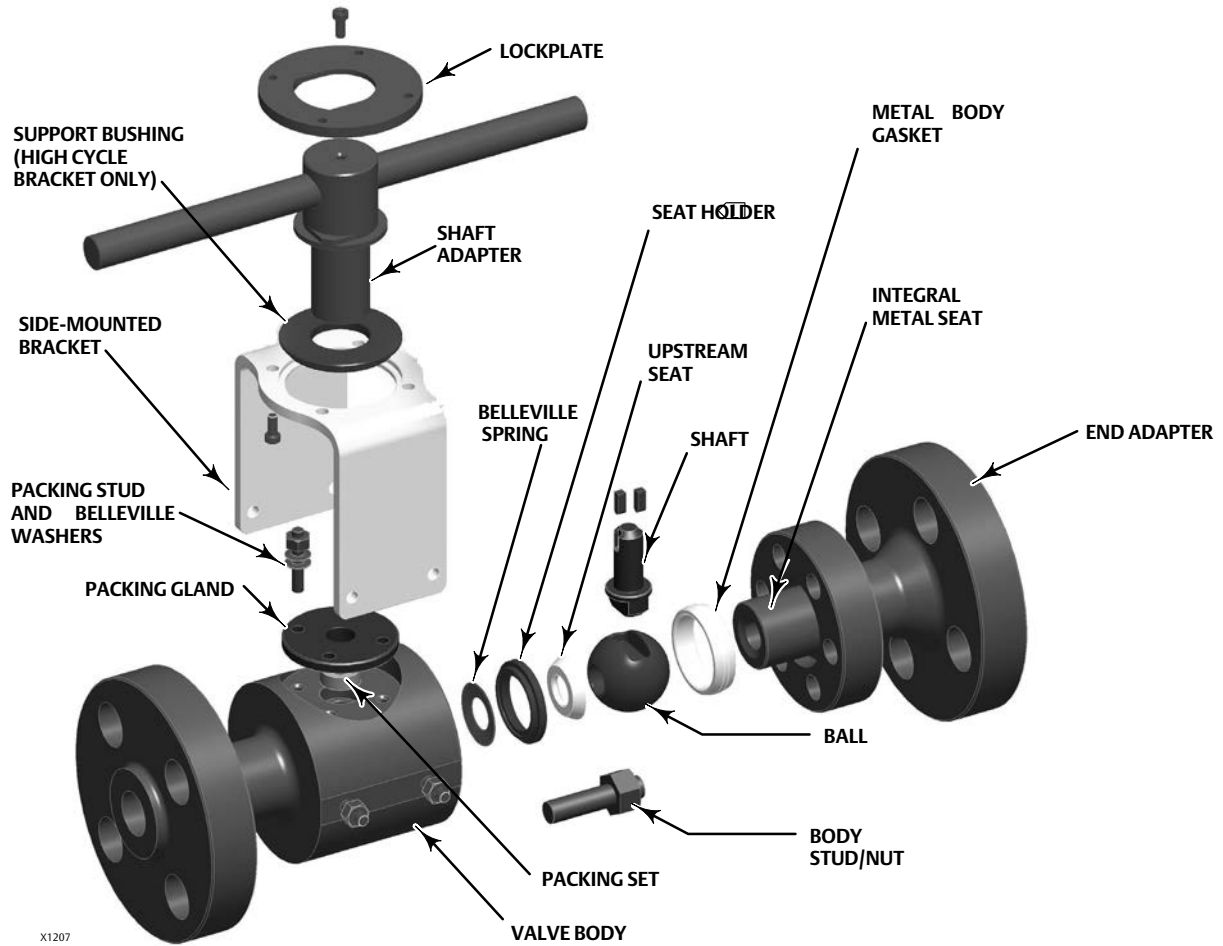
BI-DIRECTIONAL DESIGN



UNI-DIRECTIONAL DESIGN

GE88740

Figure 2. Z500 Construction Features



Note:

ⓘ Seat holder is standard on welded and threaded end connections in 0.65, 1.15, 1.5, and 2 inch bores only. Bidirectional option must be specified for all other constructions.

**Table 2. Standard Construction Materials for NPS 1/2 through 36 Valves**

PART	VALVE BODY AND END ADAPTER MATERIAL			
	Carbon Steel	F22	F91	F316, F316H
Ball <sup>(1)</sup>	S41000	S41000	S41000	S31600
Upstream seat <sup>(1)</sup>	S41000	S41000	S41000	S31600
Seat Holder <sup>(2)</sup>	S41000	S41000	S41000	S31600
Body gasket	S17400	N07718	N07718	S66286
Spring	N07718 or S17400 <sup>(3)</sup>	N07718	N07718	S66286
Packing	Flexible graphite with wire-reinforced braided graphite and stainless steel washers			
Shaft	S17400 Nitrided	N07718 Nitrided	N07718 Nitrided	S66286 Nitrided
Shaft adapter	AISI 4130 Nitrided, 4140 Nitrided			
Coatings	HVOF Chrome Carbide (standard), HVOF Tungsten Carbide, Spray and Fused Nickel-Boron			

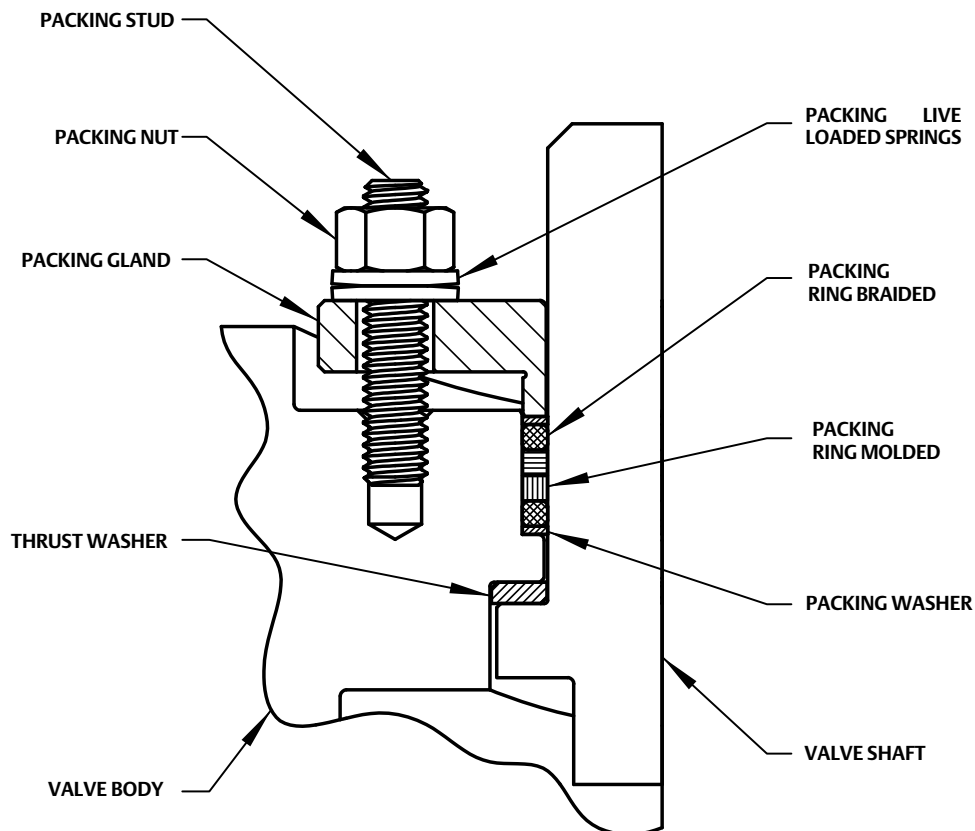
1. Part is coated (HVOF chrome carbide standard)  
 2. Seat holder is standard on welded and threaded end connections in 0.65, 1.15, 1.5, and 2 inch bores only. Bidirectional option must be specified for all other constructions.  
 3. N07718 spring for 2 inch bore and below. S17400 spring for 3 inch bore and below.

**Table 3. Spray and Fused Coating Standard Construction Materials<sup>(1)</sup>**

PART	VALVE BODY AND END ADAPTER MATERIAL			
	Carbon Steel	F22	F91	F316, F316H
Ball and Upstream Seat <sup>(2)</sup>	F22			S31600

1. Seat holder is standard on welded and threaded end connections in 0.65, 1.15, 1.5, and 2 inch bores only. Bidirectional option must be specified for all other constructions.  
 2. Part is coated.

**Figure 3. Typical Z500 Packing Arrangement**



GE88834

# Pressure Drops

Pressure drop limits of any given valve are based on valve body and material limits. Z500 valves meet full B16.34 pressure drop capabilities up to to specified material maximum temperature limit. Information on

limits for other material constructions can be obtained by contacting your [Emerson sales office](#) or Local Business Partner.

**Table 4. Maximum Allowable Shutoff Pressure Drops (Body Ratings)**

TEMPERATURE RANGE	PRESSURE CLASS						
	Carbon Steel CL150	Carbon Steel CL300	Carbon Steel CL600	Carbon Steel CL900	Carbon Steel CL1500	Carbon Steel CL2500	Carbon Steel CL4500
°C	Bar						
-29 to 38	19.7	51.0	102.0	153.1	255.5	425.4	766.0
93	17.9	46.9	93.8	140.3	234.1	389.9	702.2
149	15.9	45.2	90.3	135.5	225.5	375.8	676.7
204	13.8	43.8	87.2	131.0	218.6	364.0	655.3
260	11.7	41.7	83.1	124.8	207.9	346.5	623.3
316	9.7	39.3	78.3	117.6	195.8	326.1	587.1
343 <sup>(1)</sup>	8.6	37.9	75.8	113.8	189.3	315.4	568.1
371 <sup>(1)</sup>	7.6	36.5	71.0	109.6	183.7	305.1	548.8
399 <sup>(1)</sup>	6.6	34.8	70.0	104.8	174.8	291.6	524.7
427 <sup>(1)</sup>	5.5	28.3	56.9	85.2	141.7	236.5	425.4
°F	Psi						
-20 to 100	285	740	1480	2220	3705	6170	11110
200	260	680	1360	2035	3395	5655	10185
300	230	655	1310	1965	3270	5450	9815
400	200	635	1265	1900	3170	5280	9505
500	170	605	1205	1810	3015	5025	9040
600	140	570	1135	1705	2840	4730	8515
650 <sup>(1)</sup>	125	550	1100	1650	2745	4575	8240
700 <sup>(1)</sup>	110	530	1030	1590	2665	4425	7960
750 <sup>(1)</sup>	95	505	1015	1520	2535	4230	7610
800 <sup>(1)</sup>	80	410	825	1235	2055	3430	6170

1. Due to material limitations, consult your [Emerson sales office](#) for flanged end connection use over 316°C (600°F).



Table 5. Maximum Allowable Shutoff Pressure Drops (Body Ratings)

TEMPERATURE RANGE	PRESSURE CLASS						
	F22 Class 3 CL150	F22 Class 3 CL300	F22 Class 3 CL600	F22 Class 3 CL900	F22 Class 3 CL1500	F22 Class 3 CL2500	F22 Class 3 CL4500
°C	Bar						
-29 to 38	20.0	51.7	103.4	155.1	258.6	430.9	775.7
93	17.9	51.7	103.4	155.1	258.6	430.9	775.7
149	15.9	50.3	100.3	150.7	251.0	418.5	753.3
204	13.8	48.6	97.2	145.8	243.4	405.4	729.8
260	11.7	45.9	91.7	137.6	229.3	382.0	687.1
316	9.7	41.7	83.4	125.1	208.6	347.5	625.4
343	8.6	40.7	81.0	121.7	202.7	338.2	608.5
371	7.6	39.3	78.3	117.6	195.8	326.1	587.1
399	6.6	36.5	73.4	110.0	183.4	305.4	549.5
427	5.5	35.2	70.0	105.1	175.1	291.6	524.7
454 <sup>(1)</sup>	4.5	33.4	67.2	100.7	167.9	279.9	503.7
482 <sup>(1)</sup>	3.4	31.0	62.1	93.1	154.8	258.2	464.7
510 <sup>(1)</sup>	2.4	26.5	52.1	80.0	133.1	222.0	399.6
538 <sup>(1)</sup>	1.4	18.3	36.9	55.2	92.0	153.8	276.5
566 <sup>(1)</sup>	1.4	12.1	24.1	36.2	60.3	100.3	181.0
593 <sup>(1)</sup>	1.4	7.6	15.2	22.8	37.9	63.1	113.4
°F	Psi						
-20 to 100	290	750	1500	2250	3750	6250	11250
200	260	750	1500	2250	3750	6250	11250
300	230	730	1455	2185	3640	6070	10925
400	200	705	1410	2115	3530	5880	10585
500	170	665	1330	1995	3325	5540	9965
600	140	605	1210	1815	3025	5040	9070
650	125	590	1175	1765	2940	4905	8825
700	110	570	1135	1705	2840	4730	8515
750	95	530	1065	1595	2660	4430	7970
800	80	510	1015	1525	2540	4230	7610
850 <sup>(1)</sup>	65	485	975	1460	2435	4060	7305
900 <sup>(1)</sup>	50	450	900	1350	2245	3745	6740
950 <sup>(1)</sup>	35	385	755	1160	1930	3220	5795
1000 <sup>(1)</sup>	20	265	535	800	1335	2230	4010
1050 <sup>(1)</sup>	20	175	350	525	875	1455	2625
1100 <sup>(1)</sup>	20	110	220	330	550	915	1645

1. Due to material limitations, consult your [Emerson sales office](#) for flanged end connection use over 427°C (800°F).

**Table 6. Maximum Allowable Shutoff Pressure Drops (Body Ratings)**

TEMPERATURE RANGE	PRESSURE CLASS						
	F316, F316H <sup>(2)</sup> CL150	F316, F316H <sup>(2)</sup> CL300	F316, F316H <sup>(2)</sup> CL600	F316, F316H <sup>(2)</sup> CL900	F316, F316H <sup>(2)</sup> CL1500	F316, F316H <sup>(2)</sup> CL2500	F316, F316H <sup>(2)</sup> CL4500
°C	Bar						
-29 to 38	19.0	49.6	99.3	148.9	248.2	413.7	744.6
93	16.2	42.7	85.5	128.2	213.4	355.8	640.5
149	14.8	38.6	77.2	115.8	192.7	321.3	578.5
204	13.4	35.5	70.7	106.2	177.2	295.1	531.2
260	11.7	33.1	65.8	98.9	164.8	274.4	494.0
316	9.7	31.0	62.1	93.4	155.5	259.2	466.8
343	8.6	30.3	61.0	91.4	152.4	253.7	456.8
371	7.6	30.0	60.0	90.0	149.6	249.6	456.1
399	6.6	29.3	59.0	88.3	147.2	245.5	442.0
427	5.5	29.0	58.3	87.2	145.5	242.7	436.8
454	4.5	29.0	57.6	86.5	144.1	239.9	432.0
482	3.4	28.6	57.2	85.8	143.1	238.6	429.5
510	2.4	26.5	53.4	80.0	133.1	222.0	399.6
538	1.4	25.2	50.0	75.2	125.5	208.9	375.8
566 <sup>(1)</sup>	1.4	11.0	49.6	74.5	124.1	206.8	372.3
593 <sup>(1)</sup>	1.4	21.0	42.1	63.1	105.1	175.5	315.4
621 <sup>(1)</sup>	1.4	16.2	32.8	49.0	81.7	135.8	244.8
649 <sup>(1)</sup>	1.4	12.8	25.5	38.3	63.8	106.5	191.3
677 <sup>(1)</sup>	1.4	10	20.3	30.3	50.7	84.8	145.5
704 <sup>(1)</sup>	1.4	7.9	16.2	24.1	40.3	66.9	120.6
732 <sup>(1)</sup>	1.4	6.6	13.1	20	33.1	55.2	99.3
760 <sup>(1)</sup>	1.4	5.2	10.3	15.5	26.2	43.4	77.9
°F	Psi						
-20 to 100	275	720	1440	2160	3600	6000	10800
200	235	620	1240	1860	3095	5160	9290
300	215	560	1120	1680	2795	4660	8390
400	195	515	1025	1540	2570	4280	7705
500	170	480	955	1435	2390	3980	7165
600	140	450	900	1355	2255	3760	6770
650	125	440	885	1325	2210	3680	6625
700	110	435	870	1305	2170	3620	6615
750	95	425	855	1280	2135	3560	6410
800	80	420	845	1265	2110	3520	6335
850	65	420	835	1255	2090	3480	6265
900	50	415	830	1245	2075	3460	6230
950	35	385	775	1160	1930	3220	5795
1000	20	365	725	1090	1820	3030	5450
1050 <sup>(1)</sup>	20	160	720	1080	1800	3000	5400
1100 <sup>(1)</sup>	20	305	610	915	1525	2545	4575
1150 <sup>(1)</sup>	20	235	475	710	1185	1970	3550
1200 <sup>(1)</sup>	20	185	370	555	925	1545	2775
1250 <sup>(1)</sup>	20	145	295	440	735	1230	2110
1300 <sup>(1)</sup>	20	115	235	350	585	970	1750
1350 <sup>(1)</sup>	20	95	190	290	480	800	1440
1400 <sup>(1)</sup>	20	75	150	225	380	630	1130

1. Due to material limitations, consult your [Emerson sales office](#) for flanged end connection use over 538°C (1000°F).  
2. Use F316H above 538°C (1000°F).

Table 7. Maximum Allowable Shutoff Pressure Drops (Body Ratings)

TEMPERATURE RANGE	PRESSURE CLASS						
	F91 CL150	F91 CL300	F91 CL600	F91 CL900	F91 CL1500	F91 CL2500	F91 CL4500
°C	Bar						
-29 to 38	20.0	51.7	103.4	155.1	258.6	430.9	775.7
93	17.9	51.7	103.4	155.1	258.6	430.9	775.7
149	15.9	50.3	100.3	150.7	251.0	418.5	753.3
204	13.8	48.6	97.2	145.8	243.4	405.4	729.8
260	11.7	45.9	91.7	137.6	229.3	382.0	687.1
316	9.7	41.7	83.4	125.1	208.6	347.5	625.4
343	8.6	40.7	81.0	121.7	133.8	338.2	608.5
371	7.6	39.3	78.3	117.6	126.9	326.1	587.1
399	6.6	36.5	73.4	110.0	114.5	305.4	549.5
427	5.5	35.2	70.0	105.1	106.2	291.6	524.7
454	4.5	33.4	67.2	100.7	98.9	279.9	503.7
482	3.4	31.0	62.1	93.1	154.8	258.2	464.7
510	2.4	26.5	53.4	80.0	133.1	222.0	399.6
538	1.4	25.2	50.0	75.2	125.5	208.9	375.8
566 <sup>(1)</sup>	1.4	24.8	49.6	74.5	124.1	206.8	448.2
593 <sup>(1)</sup>	1.4	20.7	41.7	62.6	104.1	173.4	312.0
621 <sup>(1)</sup>	1.4	15.5	30.7	46.2	76.9	127.9	230.6
649 <sup>(1)</sup>	1.4	10.0	20.0	29.6	49.6	82.7	148.9
°F	Psi						
-20 to 100	290	750	1500	2250	3750	6250	11250
200	260	750	1500	2250	3750	6250	11250
300	230	730	1455	2185	3640	6070	10925
400	200	705	1410	2115	3530	5880	10585
500	170	665	1330	1995	3325	5540	9965
600	140	605	1210	1815	3025	5040	9070
650	125	590	1175	1765	1940	4905	8825
700	110	570	1135	1705	1840	4730	8515
750	95	530	1065	1595	1660	4430	7970
800	80	510	1015	1525	1540	4230	7610
850	65	485	975	1460	1435	4060	7305
900	50	450	900	1350	2245	3745	6740
950	35	385	775	1160	1930	3220	5795
1000	20	365	725	1090	1820	3030	5450
1050 <sup>(1)</sup>	20	360	720	1080	1800	3000	6500
1100 <sup>(1)</sup>	20	300	605	908	1510	2515	4525
1150 <sup>(1)</sup>	20	225	445	670	1115	1855	3345
1200 <sup>(1)</sup>	20	145	290	430	720	1200	2160

1. Due to material limitations, consult your [Emerson sales office](#) for flanged end connection use over 538°C (1000°F).

**Table 8. Maximum Allowable Shutoff Pressure Drops - Limited Class (Valve Body Ratings)**

Temperature Range	CL 1500				CL 2500				CL 3200				CL 4500			
	Carbon Steel	F22 CL3	F91	F316, F316H	Carbon Steel	F22 CL3	F91	F316, F316H	Carbon Steel	F22 CL3	F91	F316, F316H	Carbon Steel	F22 CL3	F91	F316, F316H
°C	Bar															
-29 to 38	259	259	259	259	431	431	431	431	552	552	552	552	776	776	776	776
93	259	259	259	231	431	431	431	385	552	552	552	492	776	776	776	693
149	255	255	259	207	425	425	431	345	544	544	552	441	766	765	776	621
204	253	251	259	191	421	418	431	319	539	535	552	408	758	753	776	573
260	253	250	259	179	421	416	431	299	539	533	552	382	758	749	776	537
316	253	249	259	170	421	414	431	283	539	530	552	362	758	746	776	510
343	246	247	259	166	411	411	431	277	526	526	552	355	740	740	776	498
371	238	244	253	162	397	406	421	271	508	520	539	347	715	731	758	487
399	219	244	251	159	364	406	419	265	466	520	536	339	656	731	754	476
427	177	244	248	156	295	406	414	260	378	520	530	333	532	731	745	468
454	-	233	233	152	-	389	389	254	-	498	498	325	-	701	701	457
482	-	207	207	150	-	345	345	249	-	441	441	319	-	621	621	449
510	-	166	166	147	-	281	281	245	-	365	365	313	-	521	521	441
538	-	123	155	143	-	215	271	239	-	290	365	305	-	428	539	430
566	-	81	155	140	-	141	271	234	-	189	365	300	-	280	539	421
893	-	51	139	113	-	88	243	192	-	119	327	249	-	176	483	355
621	-	-	103	95	-	-	179	166	-	-	241	223	-	-	357	329
649	-	-	66	76	-	-	116	132	-	-	156	178	-	-	231	264
677	-	-	-	62	-	-	-	108	-	-	-	145	-	-	-	214
704	-	-	-	52	-	-	-	91	-	-	-	123	-	-	-	181
732	-	-	-	43	-	-	-	75	-	-	-	100	-	-	-	148
760	-	-	-	35	-	-	-	61	-	-	-	82	-	-	-	121

**Table 9. Maximum Allowable Shutoff Pressure Drops - Limited Class (Valve Body Ratings)**

Temperature Range	CL 1500				CL 2500				CL 3200				CL 4500			
	Carbon Steel	F22 CL3	F91	F316, F316H	Carbon Steel	F22 CL3	F91	F316, F316H	Carbon Steel	F22 CL3	F91	F316, F316H	Carbon Steel	F22 CL3	F91	F316, F316H
°F	Psi															
-20 to 100	3750	3750	3750	3750	6250	6250	6250	6250	8000	8000	8000	8000	11250	11250	11250	11250
200	3750	3750	3750	3350	6250	6250	6250	5580	8000	8000	8000	7143	11250	11250	11250	10045
300	3700	3695	3750	3000	6170	6160	6250	5000	7897	7886	8000	6400	11105	11090	11250	9000
400	3665	3640	3750	2770	6105	6065	6250	4620	7817	7763	8000	5913	10995	10915	11250	8315
500	3665	3620	3750	2600	6105	6035	6250	4330	7817	7726	8000	5543	10995	10865	11250	7795
600	3665	3605	3750	2465	6105	6010	6250	4105	7817	7692	8000	5257	10995	10815	11250	7395
650	3575	3580	3750	2410	5960	5965	6250	4020	7630	7635	8000	5144	10730	10735	11250	7230
700	3455	3535	3665	2355	5760	5895	6110	3930	7372	7544	7820	5029	10365	10605	10995	7070
750	3170	3535	3645	2305	5285	5895	6070	3840	6766	7544	7771	4915	9515	10605	10930	6910
800	2570	3535	3600	2265	4285	5895	6000	3770	5486	7544	7680	4827	7715	10605	10800	6790
850	-	3385	3385	2210	-	5645	5645	3685	-	7225	7225	4716	-	10160	10160	6630
900	-	3000	3000	2170	-	5000	5000	3615	-	6400	6400	4628	-	9000	9000	6510
950	-	2412	2412	2130	-	4076	4076	3550	-	5294	5294	4544	-	7556	7556	6390
1000	-	1785	2250	2075	-	3119	3926	3460	-	4202	5288	4430	-	6213	7818	6230
1050	-	1170	2250	2035	-	2038	3926	3395	-	2747	5288	4344	-	4064	7818	6105
1100	-	732	2015	1640	-	1282	3522	2779	-	1725	4742	3609	-	2546	7006	5151
1150	-	-	1491	1373	-	-	2598	2402	-	-	3502	3233	-	-	5179	4776
1200	-	-	962	1101	-	-	1680	1921	-	-	2263	2586	-	-	3345	3822
1250	-	-	-	892	-	-	-	1562	-	-	-	2102	-	-	-	3104
1300	-	-	-	753	-	-	-	1322	-	-	-	1778	-	-	-	2627
1350	-	-	-	620	-	-	-	1081	-	-	-	1455	-	-	-	2150
1400	-	-	-	502	-	-	-	879	-	-	-	1185	-	-	-	1753

Figure 4. Fisher Z500 Socket Weld End Connections Dimensions (see tables 10 and 11)

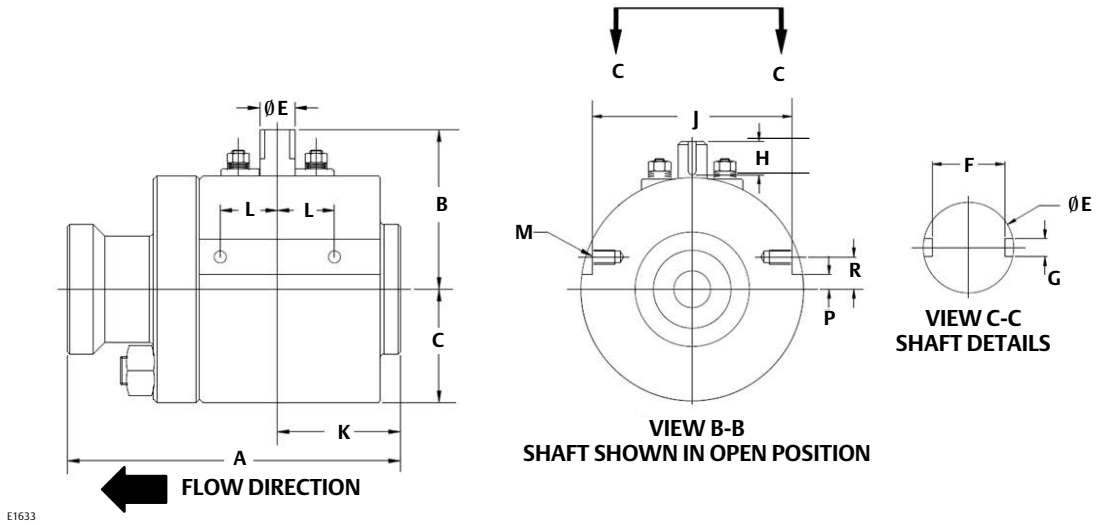
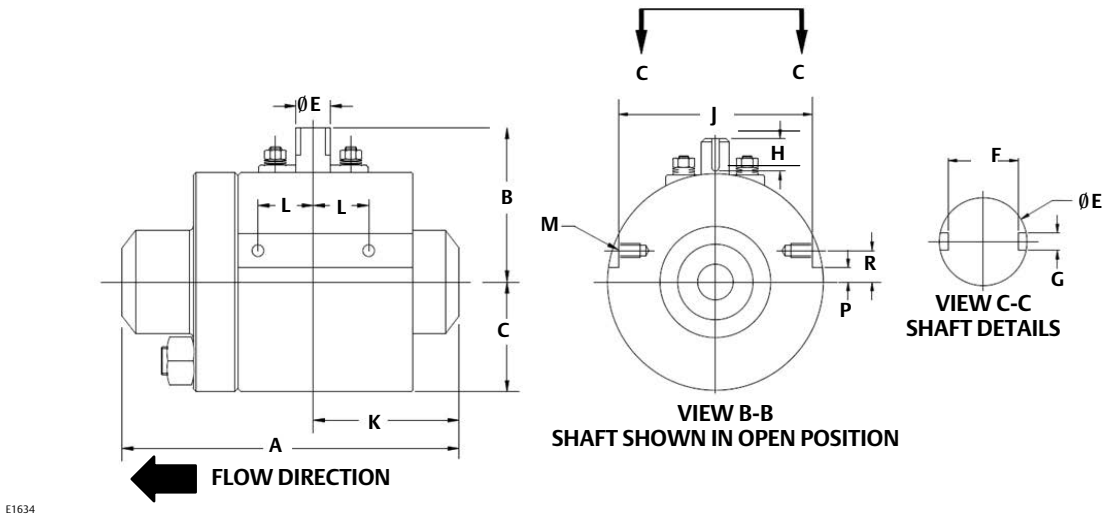


Figure 5. Fisher Z500 Buttweld End Connections Dimensions (see tables 12 and 13)



**Table 10. Fisher Z500 Severe Service Ball Valve Dimensions, mm**

PRESSURE CLASS	VALVE BORE SIZE	VALVE SIZE (NPS)	SOCKET WELD END CONNECTION (mm, kg)													
			A	B	C	E	F	G	H	J	K	L	M	P	R	Weight
CL900 and CL1500	0.65	1/2	228.60	61.90	53.98	15.88	10.41	4.78	12.70	100.33	79.38	25.40	1/4-20 UNC	N/A	0.00	13.61
		3/4														
		1														
		1-1/2														
	1.15	1	228.60	78.11	66.68	19.05	13.67	4.48	15.88	101.60	76.20	25.40	3/8-16 UNC	12.70	25.40	20.41
		1-1/2														
		2														
		2-1/2														
	1.5	1-1/2	263.65	98.81	82.55	25.40	18.24	6.35	25.40	132.08	73.15	25.40	3/8-16 UNC	13.20	25.40	34.02
		2														
		2-1/2														
	2	2.00	241.30	117.09	92.08	28.58	21.54	6.35	25.40	139.70	101.60	25.40	3/8-16 UNC	13.20	38.10	38.56
2.50																
CL2500	0.65	1/2	241.30	61.90	63.50	15.88	10.41	4.78	12.70	100.33	66.68	25.40	1/4-20 UNC	N/A	0.00	20.41
		3/4														
		1														
		1-1/2														
	1.15	1	285.75	78.11	79.38	19.05	13.67	4.78	15.88	139.70	76.20	25.40	3/8-16 UNC	N/A	0.00	36.29
		1-1/2														
		2														
		2-1/2														
	1.5	1-1/2	342.90	98.81	101.60	25.40	18.24	6.35	25.40	196.85	114.30	38.10	3/8-16 UNC	N/A	0.00	68.04
		2														
		2-1/2														
	2	2.00	276.86	114.30	114.30	31.75	24.77	6.35	25.40	193.70	98.68	25.40	1/2-13 UNC	0.00	17.78	68.04
2.50		Consult your <a href="#">Emerson sales office</a>														
CL3200	0.65	1/2	244.86	63.40	71.25	15.88	10.41	4.78	12.70	127.00	95.50	25.40	1/4-20 UNC	N/A	0.00	24.95
		3/4														
		1														
	1.15	1	313.94	78.84	81.48	19.05	13.69	4.78	15.88	139.70	96.90	25.40	3/8-16 UNC	N/A	0.76	40.82
		1-1/2														
	1.5	2	342.90	99.77	111.13	25.40	18.26	6.35	23.37	196.85	142.88	38.10	3/8-16 UNC	N/A	1.52	81.65
1-1/2																
CL4500	0.65	1/2	286.39	66.34	82.55	19.05	13.69	4.78	11.81	158.75	111.63	25.40	3/8-16 UNC	N/A	0.00	38.56
		3/4														
		1														
	1.15	1	309.50	92.84	114.50	22.23	16.97	4.78	16.13	203.20	118.49	25.40	3/8-16 UNC	N/A	0.00	79.38
		1-1/2														
	1.5	2	406.78	108.31	139.70	28.58	21.54	6.35	22.10	260.35	155.96	38.10	3/8-16 UNC	N/A	0.00	154.22
1-1/2																

**Product Bulletin**

51.3:Z500  
March 2018

**Z500 Ball Valves**

D103992X012

**Table 11. Fisher Z500 Severe Service Ball Valve Dimensions, Inches**

PRESSURE CLASS	VALVE BORE SIZE	VALVE SIZE (NPS)	SOCKET WELD END CONNECTION (INCHES LBS)													Weight	
			A	B	C	E	F	G	H	J	K	L	M	P	R		
CL900 and CL1500	0.65	1/2	9.000	2.437	2.125	0.625	0.410	0.188	0.500	3.950	3.125	1.000	1/4-20 UNC	N/A	0.000	30	
		3/4															
		1															
		1-1/2															
	1.15	1	9.000	3.075	2.625	0.750	0.538	0.188	0.625	4.000	3.000	1.000	3/8-16 UNC	0.500	1.000	45	
		1-1/2															
		2															
	Consult your <a href="#">Emerson sales office</a>																
	1.5	1-1/2	10.380	3.890	3.250	1.000	0.718	0.250	1.000	5.200	2.880	1.000	3/8-16 UNC	0.500	1.000	75	
		2															
2-1/2																	
2	2.00	9.500	4.610	3.625	1.125	0.848	0.250	1.000	5.500	4.000	1.000	3/8-16 UNC	0.500	1.500	85		
	2.50																
CL2500	0.65	1/2	9.500	2.437	2.500	0.625	0.410	0.188	0.500	3.950	2.625	1.000	1/4-20 UNC	N/A	0.000	45	
		3/4															
		1															
		1-1/2															
	1.15	1	11.250	3.075	3.125	0.750	0.538	0.188	0.625	5.500	3.000	1.000	3/8-16 UNC	N/A	0.000	80	
		1-1/2															
		2															
	Consult your <a href="#">Emerson sales office</a>																
	1.5	1-1/2	13.500	3.890	4.000	1.000	0.718	0.250	1.000	7.750	4.500	1.500	3/8-16 UNC	N/A	0.000	150	
		2															
2-1/2																	
2	2.00	10.900	5.348	4.500	1.250	0.975	0.250	1.000	7.626	3.885	1.000	1/2-13 UNC	0.000	0.700	150		
	2.50																
Consult your <a href="#">Emerson sales office</a>																	
CL3200	0.65	1/2	9.640	2.496	2.805	0.625	0.410	0.188	0.500	5.000	3.760	1.000	1/4-20 UNC	N/A	0.000	55	
		3/4															
		1															
	1.15	1-1/2	12.360	3.104	3.208	0.750	0.539	0.188	0.625	5.500	3.815	1.000	3/8-16 UNC	N/A	0.030	90	
		2															
	1.5	1-1/2	13.500	3.928	4.375	1.000	0.719	0.250	0.920	7.750	5.625	1.500	3/8-16 UNC	N/A	0.060	180	
2-1/2																	
CL4500	0.65	1/2	11.275	2.612	3.250	0.750	0.539	0.188	0.465	6.250	4.395	1.000	3/8-16 UNC	N/A	0.000	85	
		3/4															
		1															
	1.15	1	12.185	3.655	4.508	0.875	0.668	0.188	0.635	8.000	4.665	1.000	3/8-16 UNC	N/A	0.000	175	
		1-1/2															
	1.5	2	16.015	4.264	5.500	1.125	0.848	0.250	0.870	10.250	6.140	1.500	3/8-16 UNC	N/A	0.000	340	
		1-1/2															
Consult your <a href="#">Emerson sales office</a>																	



**Table 12. Fisher Z500 Severe Service Ball Valve Dimensions, mm**

PRESSURE CLASS	VALVE BORE SIZE	VALVE SIZE (NPS)	BUTTWELD END CONNECTION (mm, kg)													Weight
			A	B	C	E	F	G	H	J	K	L	M	P	R	
CL150 - CL1500	0.65	1/2,3/4, 1,1-1/2	254.00	61.90	53.98	15.88	10.41	4.78	12.70	100.33	101.60	25.40	1/4-20 UNC	N/A	25.40	14.51
	1.15	1,1-1/2, 2	266.70	78.11	66.68	19.05	13.67	4.78	15.88	101.60	107.95	25.40	3/8-16 UNC	12.70	25.40	22.68
		2-1/2	Consult your <a href="#">Emerson sales office</a>													
	1.5	1-1/2,2, 2-1/2,3	323.85	98.81	82.55	25.40	18.24	6.35	25.40	132.08	107.95	25.40	3/8-16 UNC	12.70	25.40	41.73
	2	2,2-1/2	286.00	117.09	92.08	28.58	21.54	6.35	25.40	139.70	123.95	25.40	3/8-16 UNC	12.70	38.10	44.45
		3	Consult your <a href="#">Emerson sales office</a>													
		4	Consult your <a href="#">Emerson sales office</a>													
	3	3 <sup>(1)</sup> , 4,6	412.75	168.02	123.83	38.10	27.38	9.53	38.10	234.95	172.44	31.75	5/8-16 UNC	N/A	0.00	113.40
4	4,6	Consult your <a href="#">Emerson sales office</a>														
6	6,8	Consult your <a href="#">Emerson sales office</a>														
CL2500	0.65	1/2,3/4, 1,1-1/2	273.05	61.90	63.50	15.88	10.41	4.78	12.70	100.33	98.43	25.40	1/4-20 UNC	N/A	0.00	21.77
	1.15	1	323.85	78.11	79.38	19.05	13.67	4.78	15.88	139.70	114.30	25.40	3/8-16 UNC	N/A	0.00	40.82
		1-1/2,2	298.45													36.29
		2-1/2	Consult your <a href="#">Emerson sales office</a>													
	1.5	1-1/2,2, 2-1/2,3	457.20	98.81	101.60	25.40	18.24	6.35	25.40	196.85	184.15	38.10	3/8-16 UNC	N/A	0.00	90.72
	2	2,2-1/2, 3,4	328.42	135.84	119.33	31.75	24.77	6.35	25.40	193.70	183.77	25.40	1/2-13 UNC	0.00	17.78	109.77
	3	3,4,6	Consult your <a href="#">Emerson sales office</a>													
4	4,6	Consult your <a href="#">Emerson sales office</a>														
6	6,8	Consult your <a href="#">Emerson sales office</a>														
CL3200	0.65	1/2,3/4, 1	244.86	63.40	71.25	15.88	10.41	4.78	12.70	127.00	95.50	25.40	1/4-20 UNC	N/A	0.00	24.49
	1.15	1,1-1/2, 2	313.94	78.84	81.48	19.05	13.69	4.78	15.88	139.70	96.90	25.40	3/8-16 UNC	N/A	0.76	39.92
	1.5	1-1/2,2, 2-1/2	342.90	99.77	111.13	25.40	18.26	6.35	23.37	196.85	142.88	38.10	3/8-16 UNC	N/A	1.52	81.65
CL4500	0.65	1/2,3/4, 1	286.39	66.34	82.55	19.05	13.69	4.78	11.81	158.75	111.63	25.40	3/8-16 UNC	N/A	0.00	39.01
	1.15	1,1-1/2, 2	309.50	92.84	114.50	22.23	16.97	4.78	16.13	203.20	118.49	25.40	3/8-16 UNC	N/A	0.00	78.93
	1.5	1-1/2,2, 2-1/2	406.78	108.31	139.70	28.58	21.54	6.35	22.10	260.35	155.96	38.10	3/8-16 UNC	N/A	0.00	154.22

1. 3 inch bore size is limited to CL900.

**Table 13. Fisher Z500 Severe Service Ball Valve Dimensions, Inches**

PRESSURE CLASS	VALVE BORE SIZE	VALVE SIZE (NPS)	BUTTWELD END CONNECTION (INCHES, LBS)													Weight
			A	B	C	E	F	G	H	J	K	L	M	P	R	
CL150 - CL1500	0.65	1/2,3/4, 1,1-1/2	10.000	2.437	2.125	0.625	0.410	0.188	0.500	3.950	4.000	1.000	1/4-20 UNC	N/A	0.000	32
	1.15	1,1-1/2, 2	10.500	3.075	2.625	0.750	0.538	0.188	0.625	4.000	4.250	1.000	3/8-16 UNC	0.500	1.000	50
		2-1/2	Consult your <a href="#">Emerson sales office</a>													
	1.5	1-1/2,2, 2-1/2,3	12.750	3.890	3.250	1.000	0.718	0.250	1.000	5.200	4.250	1.000	3/8-16 UNC	0.500	1.000	92
	2	2,2-1/2	11.260	4.610	3.625	1.125	0.848	0.250	1.000	5.500	4.880	1.000	3/8-16 UNC	0.500	1.500	98
		3 4	Consult your <a href="#">Emerson sales office</a>													
	3	3 <sup>(1)</sup> , 4,6	16.250	6.615	4.875	1.500	1.078	0.375	1.500	9.250	6.789	1.250	5/8-16 UNC	N/A	0.00	250
	4 6	4,6 6,8	Consult your <a href="#">Emerson sales office</a>													
CL2500	0.65	1/2,3/4, 1,1-1/2	10.750	2.437	2.500	0.625	0.410	0.188	0.500	3.950	3.875	1.000	1/4-20 UNC	N/A	0.00	48
	1.15	1	12.75	3.075	3.125	0.750	0.538	0.188	0.625	5.500	4.500	1.000	3/8-16 UNC	N/A	0.00	90
		1-1/2,2, 2-1/2	11.750													80
	2-1/2	Consult your <a href="#">Emerson sales office</a>														
	1.5	1-1/2,2, 2-1/2,3	18.000	3.890	4.000	1.000	0.718	0.250	1.000	7.750	7.250	1.500	3/8-16 UNC	N/A	0.00	200
	2	2,2-1/2, 3,4	12.930	5.348	4.698	1.250	0.975	0.250	1.000	7.626	5.250	1.000	1/2-13 UNC	0.00	0.700	242
	3 4 6	3,4,6 4,6 6,8	Consult your <a href="#">Emerson sales office</a>													
CL3200	0.65	1/2,3/4, 1	9.640	2.496	2.805	0.625	0.410	0.188	0.500	5.000	3.760	1.000	1/4-20 UNC	N/A	0.00	54
	1.15	1,1-1/2, 2	12.360	3.104	3.208	0.750	0.539	0.188	0.625	5.500	3.815	1.000	3/8-16 UNC	N/A	0.030	88
	1.5	1-1/2,2, 2-1/2	13.500	3.928	4.375	1.000	0.719	0.250	0.920	7.750	5.625	1.500	3/8-16 UNC	N/A	0.060	180
CL4500	0.65	1/2,3/4, 1	11.275	2.612	3.250	0.750	0.539	0.188	0.465	6.250	4.395	1.000	3/8-16 UNC	N/A	0.00	86
	1.15	1,1-1/2, 2	12.185	3.655	4.508	0.875	0.668	0.188	0.635	8.000	4.665	1.000	3/8-16 UNC	N/A	0.00	174
	1.5	1-1/2,2, 2-1/2	16.015	4.264	5.500	1.125	0.848	0.250	0.870	10.250	6.140	1.500	3/8-16 UNC	N/A	0.00	340

1. 3 inch bore size is limited to CL900.

**Table 14. Fisher Z500 Severe Service Ball Valve, Raised-Face Flange Face-to-Face Dimensions**

VALVE SIZE, NPS	RAISED-FACE FLANGE, FACE-TO-FACE									
	CL300		CL600		CL900		CL1500		CL2500	
	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches
1/2	140	5.50	165	6.50	--- (1)	--- (1)	--- (1)	--- (1)	--- (1)	--- (1)
3/4	152	6.00	190	7.50	--- (1)	--- (1)	--- (1)	--- (1)	--- (1)	--- (1)
1	165	6.50	216	8.50	254	10.00	--- (1)	--- (1)	--- (1)	--- (1)
1-1/2	190	7.50	241	9.50	305	12.00	--- (1)	--- (1)	--- (1)	--- (1)
2	216	8.50	292	11.50	368	14.50	368	14.50	451	17.75
2-1/2	241	9.50	330	13.00	419	16.50	419	16.50	508	20.00
3	282	11.12	356	14.00	381	15.00	470	18.50	578	22.75
4	305	12.00	432	17.00	457	18.00	546	21.50	673	26.50
6	403	15.88	559	22.00	610	24.00	705	27.75	914	36.00
8	2502	19.75	660	26.00	737	29.00	832	32.75	1022	40.25
10	568	22.38	787	31.00	838	33.00	991	39.00	1270	50.00

1. Consult your [Emerson sales office](#).

## Product Bulletin

51.3:Z500  
March 2018

**Z500 Ball Valves**  
D103992X012

---

Neither Emerson, Emerson Automation Solutions, nor any of their affiliated entities assumes responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use, and maintenance of any product remains solely with the purchaser and end user.

Fisher is a mark owned by one of the companies in the Emerson Automation Solutions business unit of Emerson Electric Co. Emerson Automation Solutions, Emerson, and the Emerson logo are trademarks and service marks of Emerson Electric Co. All other marks are the property of their respective owners.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available upon request. We reserve the right to modify or improve the designs or specifications of such products at any time without notice.

Emerson Automation Solutions  
Marshalltown, Iowa 50158 USA  
Sorocaba, 18087 Brazil  
Cernay, 68700 France  
Dubai, United Arab Emirates  
Singapore 128461 Singapore

[www.Fisher.com](http://www.Fisher.com)

