



# ***Worcester Controls High Pressure and High Temperature Ball Valves***

Series 4, Series H44, High-per Mizer, H71 Hydromizer



*Experience In Motion*



## Series 4 High-Pressure Ball Valves

*Lubetal™ seated high-performance ball valves capable of pressures to 3000 psi, temperatures to 180°F*

Worcestor Controls Series 4 is a rugged, three-piece valve designed to handle high-pressure applications beyond the capabilities of the Series 44 ball valve line, i.e., above ANSI Class 600. The unique seat design assures bi-directional tight shutoff and adjusts automatically for changing pressure and temperature variations and wear.

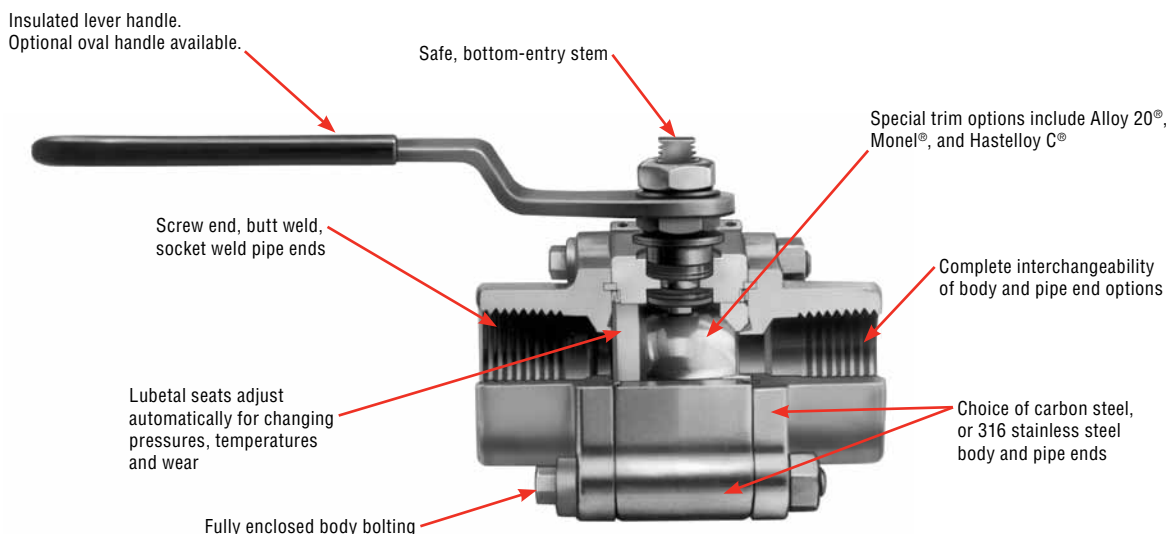
Available through a nationwide network of distributors, Series 4 quarter-turn ball valves and replacement parts are stocked and ready to be adapted to each application. Features that make this tough, reliable ball valve so unique

include tight shutoff; smooth, two-way flow; Lubetal seats; a variety of interchangeable end connections; swing-away three-piece construction; and a design based on automation.

### Automation

Where automation is required, Series 4 valves can be electrically or pneumatically automated for on/off applications.

Worcestor Controls unique stem seal package for the Series 4 is ideal for high-cycle, on/off applications. The control stem assembly greatly increases stem seal cycle life. For torque curves refer to the Actuator Sizing Manual.



## Series H44 Dyn-O-Miser® for Higher P/T

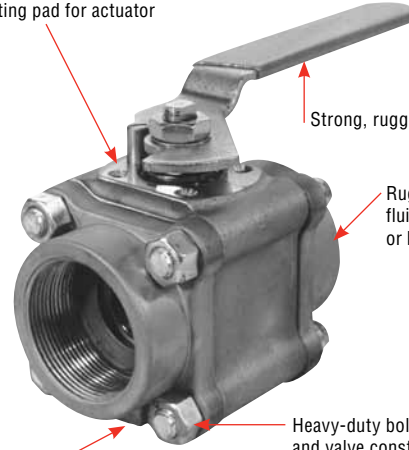
Resilient-seated high-performance ball valves capable of pressures to 5000 psi and temperatures to 450°F

Series H44, an advanced-design ball valve that can take the stress of hydraulic and other high-pressure systems.

Worcester Series H44 three-piece ball valve continues to be one of the most respected ball valve designs in the industry. With advanced sealing technology and top-mount actuator bracket design, this ball valve is very durable and can handle pressures to 5000 psi and temperatures to 450°F.



Standardized center body mounting pad for actuator



Stainless steel nameplate to meet MSS SP-25

H44 Series valves feature two seat materials. One is Delrin® AF, a high-pressure material by Dupont, composed of an Acetal homopolomer filled with fluoropolymer and glass fiber. The other is High-per Fill®, made of PolyEtherEtherKetone (PEEK) filled with glass and graphite, recommended for high pressure systems with temperatures above 180°F.

### Top-Mounted Actuator Design

Actuators for Worcester's Series H44 three-piece valves are mounted on rigid, precisely machined, box style brackets bolted to the valve center section. This brings a number of advantages to the valve user:

- Actuator loads are on the valve body.
- Actuators and brackets can be removed for service without affecting valve or piping integrity.
- Easy access to stem seal adjustment.

### Maximum Operating Pressure Body Rating (non-shock)

Valve Size	Valve and Pipe End Material	Maximum Pressure Rating
1/4", 3/8", 1/2"	Carbon and Stainless Steel	Up to 5000 psi
3/4", 1"	Carbon and Stainless Steel	Up to 4500 psi
1 1/4", 1 1/2", 2"	Carbon and Stainless Steel	Up to 4000 psi

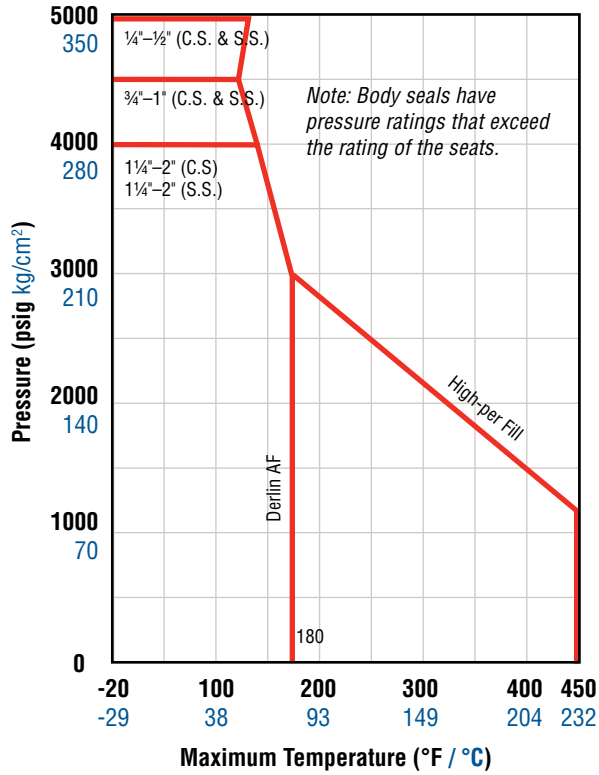
### Specifications

<b>Sizes</b>	1/4", 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2", 2".
<b>Style</b>	Three-piece – Series H44.
<b>Ratings</b>	Body and seat/seal ratings shown opposite.
<b>Body/Pipe End Materials</b>	Carbon steel or stainless steel.
<b>Ends</b>	Screwed or socket weld.
<b>Operation</b>	Manual lever handle. Electric or pneumatic actuators available.

Seats	Delrin AF		High-per Fill	
<b>Maximum Temp.</b>	180°F		450°F	
<b>Maximum Temp. of Body Seals</b>	<b>Seal</b>	<b>Temp.</b>	<b>Seal</b>	<b>Temp.</b>
	Buna	300°F	Viton	450°F
	EPR	350°F	TFE	400°F
	Viton	450°F	UHMWPE	200°F
	Neoprene	250°F		
	UHMWPE	200°F		
	TFE	400°F		
<b>Leakage Rate</b>	Bubbletight		Bubbletight	
<b>Thrust Bearing</b>	Delrin		PEEK	
<b>Stem Seal</b>	Reinforced TFE		Reinforced TFE	

## Series H44 Dyn-O-Miser® for Higher P/T

### Pressure/Temperature Ratings



### Flow Coefficient

*C<sub>v</sub>* Values (USGPM)

Valve Size	<i>C<sub>v</sub></i>
1/4"	8
3/8"	8
1/2"	8
3/4"	12
1"	32
1 1/4"	46
1 1/2"	82
2"	120

## High-Per Mizer

*A High-Durability Ball Valve for Superheated Steam, High-Temperature and Abrasive Fluid Applications*

High-Per Mizer advantages include:

- Ability to handle pressure and temperature shock.
- Ability to withstand high pressure drops.
- Ability to handle slurries, resist abrasion and wear.
- Bubbletight sealing to 600°F.
- Bubbletight sealing to 1440 psi.
- Ability to handle superheated steam.
- Offers leaktight integrity on thermal fluid services.
- Ability to handle a wide range of corrosives.
- Long-life operation.

### Metal-Seated Versions

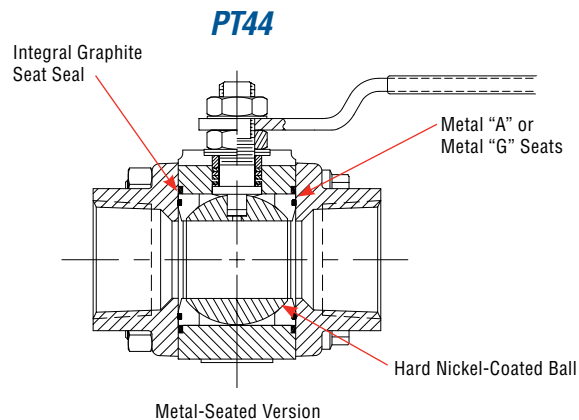
Metal-seated versions feature a unique seat sealing design, which incorporates an alloy stainless steel seat impregnated with self-lubricating fillers. The rigid metal seat construction is strong, highly wear and corrosion resistant, and eliminates fracturing common to graphite-based seats.

The 316 stainless steel ball is nickel-coated. The coating makes the ball surface harder, as well as acting as a lubricant to prevent the metal seats and ball from galling as they cycle.

**Metal "A" seated versions** feature a TFE impregnated stainless steel seat with integral graphite seat seal and offer temperature capability to 600°F and pressures to 1000 psi.

**Metal "G" seated versions** feature a graphite impregnated stainless steel seat with integral graphite seat seal and offer temperature capability to 650°F and 1000 psi.

For temperatures between 650°F and 800°F, refer to Series 94, brochure WCABR1023. For temperatures to 1000°F consult Flowserve.



### Resilient-Seated Versions

Resilient-seated versions feature High-Per Fill® seat. Proprietary to Flowserve Worcester Controls, High-Per Fill is a blend of polyetheretherketone, glass and graphite fillers. This blend strengthens, provides thermal resistance even at high pressures, prolongs cycle life and reduces operating torque. High-Per Fill is chemically inert, has a broad corrosion compatibility and is a non-halogen (no TFE) material.

High-Per Fill can be used in certain food, drug, tobacco and radiation services where TFE is inappropriate. The radiation resistance of High-Per Fill is 2 x 10<sup>9</sup> rads.

High-Per Fill will handle up to 500 psi saturated steam, temperatures to 600°F and pressure to 1440 psi, while offering bubbletight sealing.

### Automation

Flowserve Worcester Controls offers a complete line of pneumatic and electric automation packages for the High-Per Mizer Valve. Refer to Brochure WCABR1014 for Series 75 Electric Actuators and Brochure WCABR1003 for Series 39 Pneumatic Actuators.



**Electric Control**



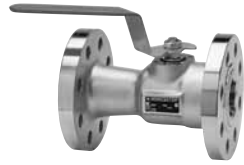
**Pneumatic Control**

## Specifications



**PT44/PT59**

¼"-2"



**PT51/PT52**

½"-2"



**PT51/PT52**

3"-6"



**PT44 151/301**

3"-6"



**PT45**

2½"-6"

**PT59**

2"-4"

<b>Sizes</b>	¼"-6" (depending on style)
<b>Styles</b>	Three-piece – Series PT44
	¼", ⅜", ½", ¾", 1", 1¼", 1½", 2"
	Three-piece – Series PT45
	2½", 3", 4", 6"
	Three-piece – Full-Port Series PT59
	¼", ⅜", ½", ¾", 1", 1¼", 1½", 2", 3", 4"
	Flanged – Series PT51 and PT52
	½", ¾", 1", 1½", 2", 3", 4", 6"
<b>*Body</b>	Wafer – Series PT44 151/301
	3", 4", 6"
	Series PT44–1440 psi Class 600 ANSI
	Series PT59–1440 psi ¼"-2"; Class 300 – 3" and 4"
	Series PT51–Class 150 ANSI
	Series PT52–Class 300 ANSI
	Series PT44 151–Class 150 ANSI
	Series PT44 301–Class 300 ANSI
	Series PT45–Class 300

<b>Ends</b>	Screwed, Socket Weld, Flanged ANSI 150#
	Flanged ANSI 300#, between 150# or 300# flanges
<b>Body</b>	Carbon Steel, 316 Stainless Steel
<b>Stem</b>	¼"-2" 17-4 pH Stainless Steel
	3"-6" 316 Stainless Steel
<b>Standards</b>	For fire-safe versions, refer to brochure WCABR1029.
	SE valves meet ANSI B1.20.1
	Flanged valves meet ANSI B16.5, B16.10
	Flanged and ¼"-2" three-piece valves meet ANSI B16.34 (600# class) when hydro test is specified.
<b>Operation</b>	Manual lever handle. Electric or pneumatic actuator available.
<b>Dimensions</b>	Refer to individual product catalogs; WCABR1009, WCABR1010, WCABR1011, WCABR1013, WCABR1041, or dimensional sheets WCASS0013-0016.

	Metal-Seated	Metal-Seated	Resilient-Seated
<b>Seats:</b>	<b>Metal "A"</b>	<b>Metal "G"</b>	<b>High-Per Fill "X"</b>
	TFE impregnated stainless steel with integral graphite seat seal	Graphite impregnated stainless steel with integral graphite seat seal	Proprietary blend of PolyEtherEtherKetone, glass and graphite fillers
<b>Body Seals:</b>	Refer to How to Order Table	Refer to How to Order Table	Refer to How to Order Table
<b>Stem Seal(s):</b>	Polyfill/PEEK	Polyfill/PEEK	Graphite/PEEK
<b>Thrust Bearing:</b>	Polyfill/PEEK	Polyfill/PEEK	PEEK
<b>Ball:</b>	316 Stainless Steel Nickel-coated	316 Stainless Steel Nickel-coated	316 Stainless Steel
<b>Max. Temp:</b>	600°F	650°F	600°F
	1000 psi	1000 psi	1440 psi
<b>Leakage Rate:</b>	Bubbletight	ANSI Class VI	Bubbletight
<b>Steam Service:</b>	For steam service, refer to Worcester Controls Steam Service Data Sheet for ratings. This data sheet is found in the Engineering section of the general catalog binder.		
<b>High-Temp:</b>	For applications to 1000°F, contact Flowserve.		

\*Refer to body ratings, seat and seal ratings and pressure/temperature ratings to determine maximum safe pressure and temperature for the High-Per Mizer valve.

NOTE: Standard Worcester Controls valves are assembled with silicone-based break-in lubricant. For other options consult your distributor or Flowserve.

## Series H71 Ball Valves

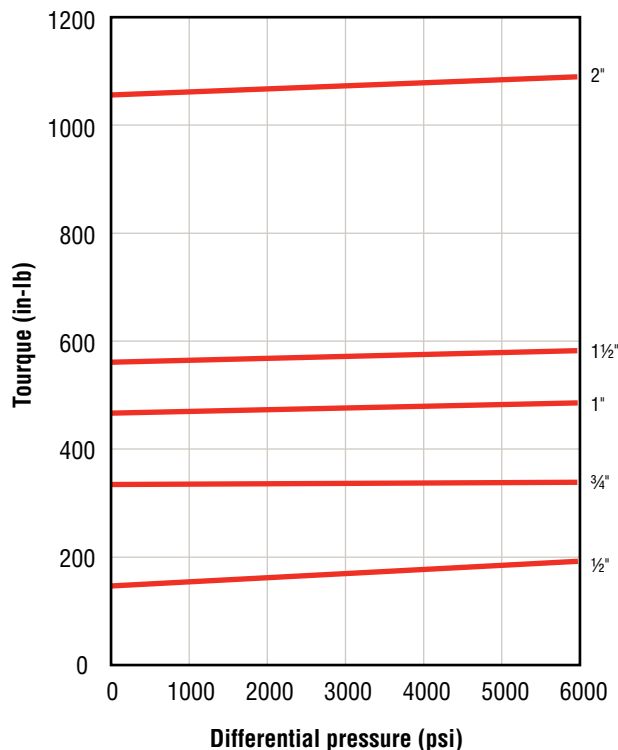
*Exceeding the High-Pressure Technology Requirements of Deep Sea Oil Production, Hydraulic and Compressed Natural Gas Processes*

Worchester Controls Series H71 is a line of safe, durable ball valves for high pressure fluids to 6000 psi. The three-piece design is compact with low torque quarter-turn operation, blowout proof stem and easy repair and maintenance. Series H71 is built for harsh environments, from seabed systems to corrosive chemicals.

### Applications

- High-pressure liquids, gasses, chemicals
- CO<sub>2</sub>/H<sub>2</sub>O injection
- Subsea hydraulic systems
- Production manifolds
- Chemical injections
- CNG storage and distribution
- Flare gas isolation
- Deepwater accumulator
- Shutoff and flushing operations

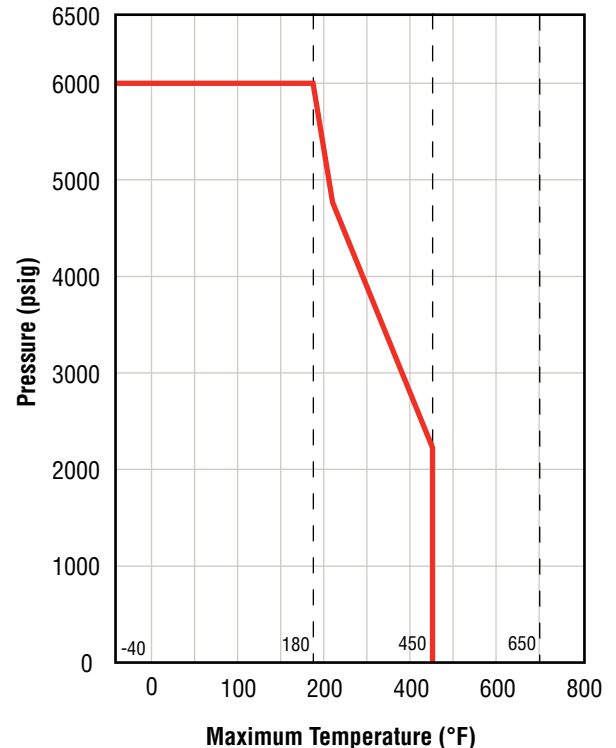
### Pressure Torque Curves



### Specifications

<b>Sizes</b>	1/2", 3/4", 1", 1 1/2", 2"
	1/2" and 3/4" are ANSI B16.34 Class 2500
	1"-2" are ANSI B16.34 Class 1500 (Class 2500 available)
	All are rated to 6000 psi
<b>Material</b>	Carbon steel, stainless steel
<b>Port</b>	Full-port design to schedule 160 pipe
<b>Ends</b>	N.P.T. screwed ends, socket weld, schedule 160 butt weld, SAE screwed ends (SAE J514F)
<b>Valve Temperature Rating</b>	-40°F to 450°F
<b>Documentation</b>	CMTRs for pressure retaining parts upon request
<b>Standards</b>	ANSI B16.34, NACE construction
Completely enclosed body seal allows external pressures to 5000 psi	
<b>Flow Coefficient C<sub>v</sub></b>	1/2"-23
	3/4"-61
	1"-73
	1 1/2"-82
	2"-150

### Pressure/Temperature Ratings



*Note: For temperatures below -20°F use stainless steel valves.*