

# Special Alloy Ball Valves



## 60 Series

- 3/8 to 1 in. sizes
- Alloy 625, alloy 825, alloy 2507 super duplex stainless steel, and 6-moly materials
- On-off (2-way) valves
- Compensating seat design
- Live-loaded, two-piece stem packing

## Contents

Important Information About Swagelok® Process Ball Valves . . . . .	2
Features . . . . .	2
Pressure-Temperature Ratings . . . . .	4
Materials of Construction . . . . .	4
Testing . . . . .	5
Cleaning and Packaging . . . . .	5
Dimensions . . . . .	6
Ordering Information . . . . .	6
Options and Accessories . . . . .	7
Pneumatic Actuators . . . . .	8

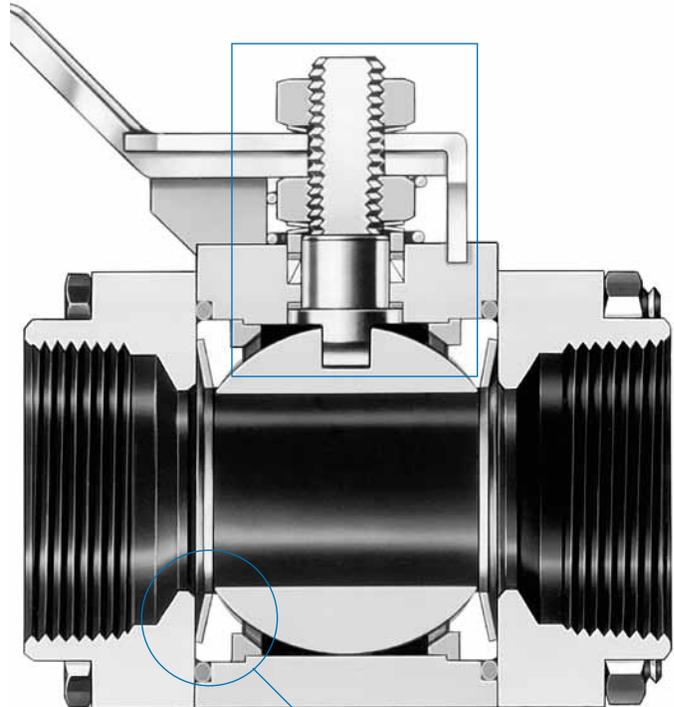
## Important Information About Swagelok Process Ball Valves

- ⚠ Swagelok ball valves are designed to be operated in a fully open or fully closed position.
- ⚠ Packing adjustment may be required during the valve's service life.

## Features

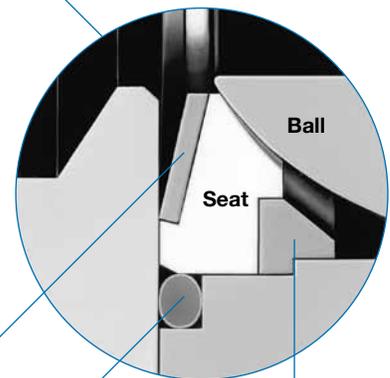
- Quarter-turn actuation
- Alloy 625, alloy 825, alloy 2507 super duplex stainless steel, and 6-moly
- Reinforced PTFE seat materials; other materials available
- Variety of end connections in 3/8 to 1 in. sizes
- Pneumatic and electric actuators
- Optional vent porting

## On-Off (2-Way) Valve



### Unique coned-disc spring-loaded seat

- compensates for seat wear, pressure, and temperature changes
- reduces seat wear from pressure surges
- seals regardless of flow direction



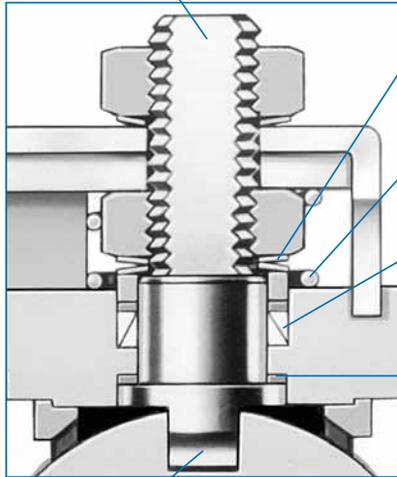
### Coned-disc spring

**Flange seal**  
provides leak-tight seal between flange and center body

**Support ring**  
contains the seat and protects against seat bulge, premature wear, and deformation

## Features

**Directional stem flats**  
show open or closed position



**Stem springs**  
compensate for changes in pressure and temperature, and wear

**Grounding spring**  
grounds stem to provide continuity for antistatic protection

**Live-loaded, 2-piece chevron stem packing**

- requires less operating torque
- improves performance
- compensates for stem wear

**High-strength stem bearing**

- provides smooth actuation
- eliminates galling between valve stem and body
- resists wear

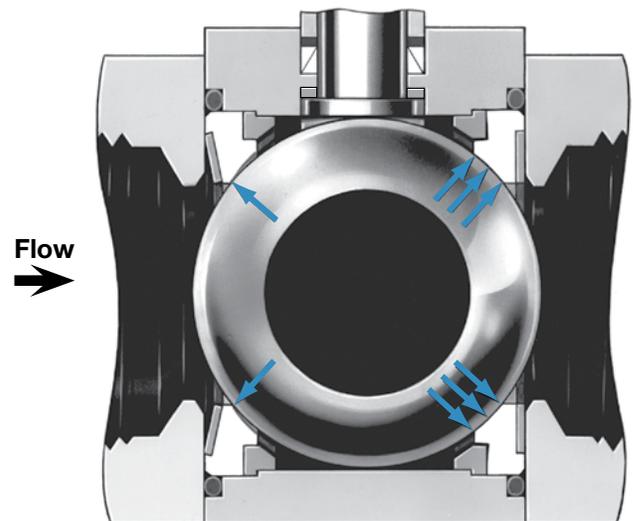
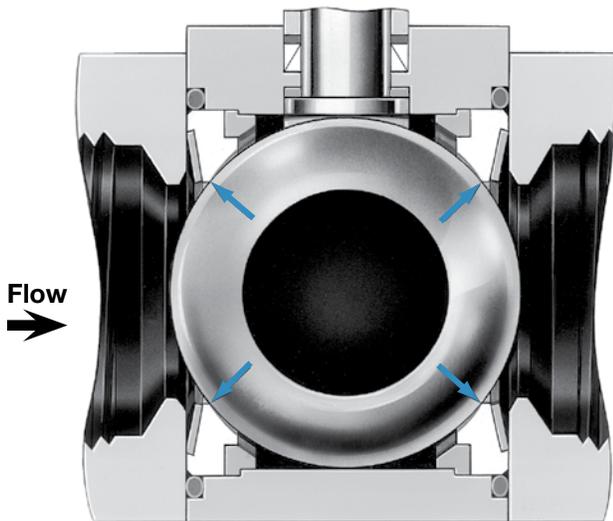
**Bottom-loaded stem**

- prevents stem blowout
- enhances system safety

### Flexing seat design ensures leak-tight seal in both low- and high-pressure systems

Under low pressure, seals are created by the coned-disc spring-loaded seats pushing against the ball. Pressure is not required to create a seal.

Under high pressure, the ball is forced downstream, flexing the downstream seat and creating a seal. The upstream seat also flexes with the ball movement and maintains a seal.



### Pressure-Temperature Ratings

Pressure-temperature ratings for special alloy 60 series valves are based on standard materials of construction as listed in the table to right and in the table notes below.

#### Reinforced PTFE Seats (60T)

Material	Alloy 625, Alloy 825, Alloy 2507, 6-Moly
Temperature, °F (°C)	Working Pressure psig (bar)
-20 (-28) to 100 (37)	2200 (151)
150 (65)	1850 (127)
200 (93)	1500 (103)
250 (121)	1150 (79.2)
300 (148)	800 (55.1)
350 (176)	560 (38.5)
400 (204)	330 (22.7)
450 (232)	100 (6.8)

Ratings based on reinforced PTFE seats and packings, alloy X-750 stem bearings, and fluorocarbon FKM O-rings.

#### Virgin PTFE Seats (60V Series)

Material	Alloy 625, Alloy 825, Alloy 2507, 6-Moly
Temperature, °F (°C)	Working Pressure psig (bar)
-20 (-28) to 100 (37)	1500 (103)
150 (65)	1500 (103)
200 (93)	1500 (103)
250 (121)	1150 (79.2)
300 (148)	800 (55.1)
350 (176)	560 (38.5)
400 (204)	330 (22.7)
450 (232)	100 (6.8)

Ratings based on virgin PTFE seats and packings, alloy X-750 stem bearings, and fluorocarbon FKM O-rings.

#### Carbon/Glass PTFE Seats (60C Series)

Material	Alloy 625, Alloy 825, Alloy 2507, 6-Moly
Temperature, °F (°C)	Working Pressure psig (bar)
-20 (-28) to 100 (37)	2500 (172)
150 (65)	2030 (139)
200 (93)	1560 (107)
250 (121)	1480 (101)
300 (148)	1240 (85.4)
350 (176)	860 (59.2)
400 (204)	480 (33.0)
450 (232)	100 (6.8)

Ratings based on carbon/glass PTFE seats, reinforced PTFE packings, alloy X-750 stem bearings, and fluorocarbon FKM O-rings.

#### Polyethylene Seats (60E Series)

Material	Alloy 625, Alloy 825, Alloy 2507, 6-Moly
Temperature, °F (°C)	Working Pressure psig (bar)
-20 (-28) to 100 (37)	2500 (172)
150 (65)	2030 (139)
200 (93)	1160 (79.9)
250 (121)	250 (17.2)

Ratings based on UHMWPE seats and packings, PEEK stem bearings, and ethylene propylene O-rings.

### Materials of Construction

Component	Valve Body Materials			
	Alloy 625	Alloy 825	Alloy 2507	6-Moly
Material Grade/ASTM Specification				
1 Stem nut	316 SS			
2 Stem spring	Strain-hardened 316 SS/A240			
3 Stop plate	304 SS/A240 or 316 SS/A240			
4 Handle				
5 Handle sleeve	Vinyl			
6 Grounding spring	302 SS/A313			
7 Stem nut	Alloy 400			
8 Stem springs (2)	Strain-hardened 316 SS/A240			
9 Gland	PTFE-coated 316 SS/B783			
10 Packing support	PEEK			
11 Top packing	Reinforced PTFE			
12 Bottom packing				
13 Body	Alloy 625/ B446	Alloy 825/ B425	Alloy 2507/ A479	6-moly/ A276
14 Stem bearing(s)	Alloy X-750/AMS 5542			
15 Stem	Alloy 625/ B446			
16 Ball				
17 Support rings (2)	Alloy 825/ B425	Alloy 2507/ A479	6-moly/ A276	
18 Seats (2)	Reinforced PTFE			
19 Coned-disc springs (2)	Alloy X-750/AMS 5542			
20 Flange seals (2)	Fluorocarbon FKM			
21 Flanges (2)	Alloy 625/ B446	Alloy 825/ B425	Alloy 2507/ A479	6-moly/ A276
22 Body fasteners (4)	Alloy K-500/FED SPEC QQ-N-286			
23 Body hex nuts (8)	Alloy 400/B164			
Lubricants	Silicone-based and PTFE-based; other lubricants available			

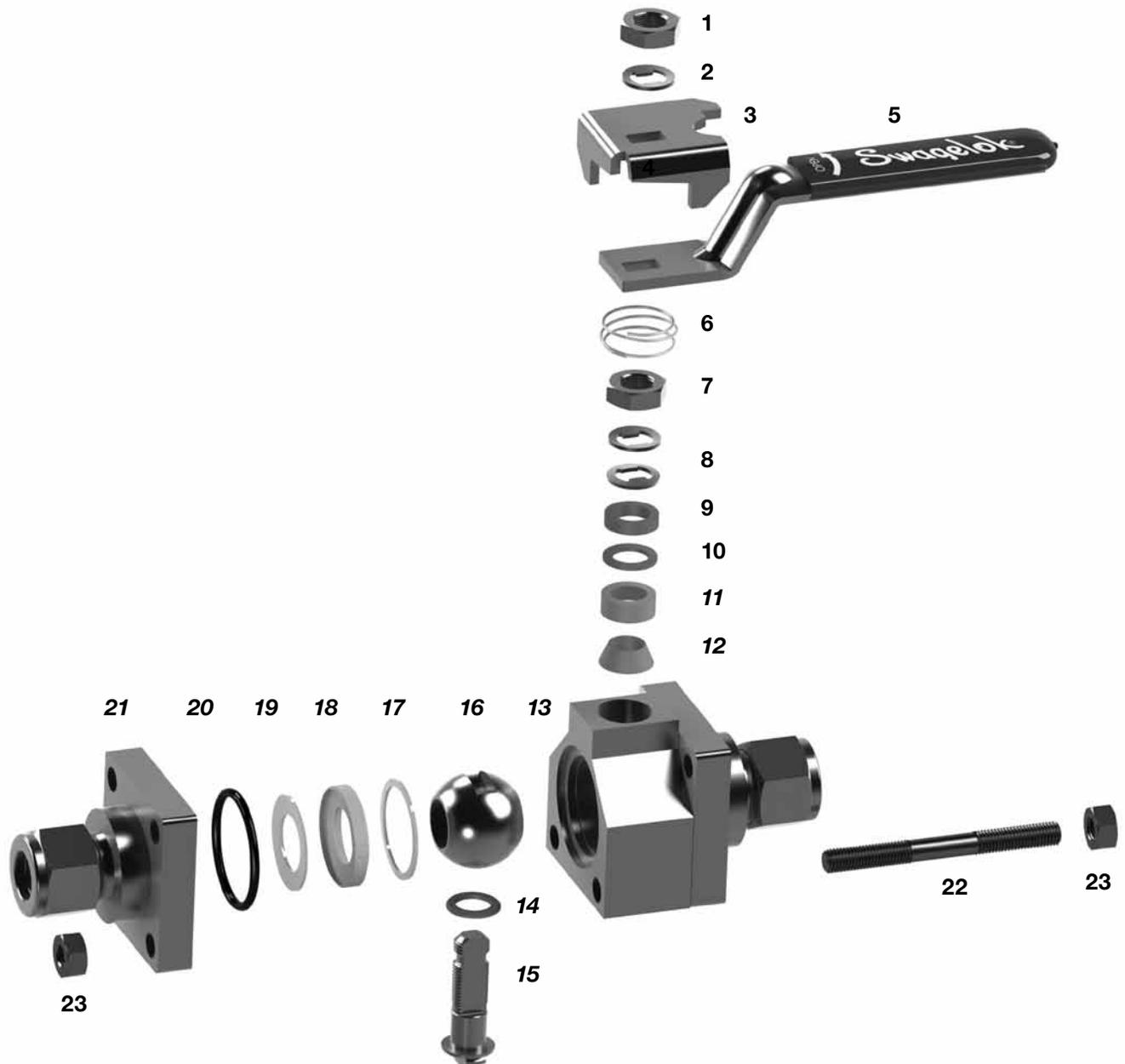
Wetted components listed in italics.

#### Additional Seat Materials

Valves with Seats of...	Also Contain...	And These Lubricants
Carbon/glass PTFE	Same as valves with PTFE seats	
UHMWPE	UHMWPE packing, PEEK stem bearing, <sup>①</sup> ethylene propylene O-rings, and uncoated packing gland	Hydrocarbon-based and silicone-based
Virgin PTFE	Virgin PTFE packing	Silicone-based and PTFE-based

① Molybdenum disulfide coated.

## Materials of Construction



## Testing

Every special alloy 60 series ball valve is factory tested with nitrogen at 1000 psig (69 bar) or its maximum working pressure if less than 1000 psig (69 bar). Seats have a maximum allowable leak rate of 0.1 std cm<sup>3</sup>/min, lower than allowable in FCI 70-2 Specification Class VI.

Shell testing with nitrogen at 1000 psig (69 bar) or the maximum rated pressure if less than 1000 psig (69 bar) is performed to a requirement of no detectable leakage with a liquid leak detector.

Positive Material Identification (PMI) testing is performed on 100% of the products designated as “exotic” materials that are classified as pressure containing or wetted.

## Cleaning and Packaging

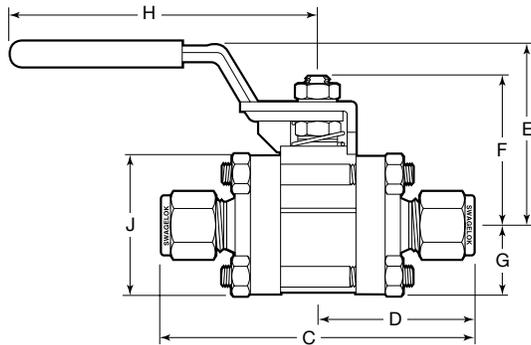
Every special alloy 60 series ball valve is cleaned in accordance with Swagelok *Standard Cleaning and Packaging (SC-10)*, MS-06-62.

## Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

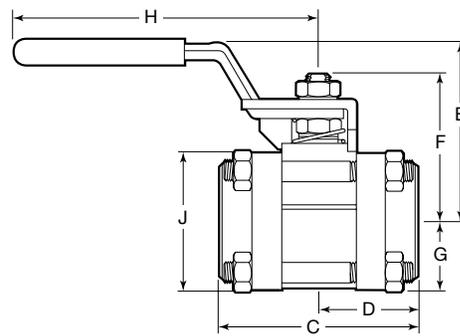
### Swagelok Tube Fitting End Connections

Dimensions shown with Swagelok nuts finger-tight. See **Ordering Information** below.



### Female Pipe Thread End Connections

Female NPT pipe thread dimensions conform to ASME B1.20.1. See **Ordering Information** below.



Size	Ordering Number	Orifice in. (mm)	C <sub>v</sub>	Dimensions, in. (mm)						
				C	D	E	F	G	H	J
<b>Swagelok Tube Fitting</b>										
1/2 in.	-63TS8	0.406 (10.3)	7.5	4.04 (103)	2.02 (51.3)	2.35 (59.7)	1.79 (45.5)	0.89 (22.6)	4.50 (114)	1.78 (45.2)
3/4 in.	-63TS12 <sup>①</sup>	0.516 (13.1)	13.6	4.04 (103)	2.02 (51.3)	2.35 (59.7)	1.79 (45.5)	0.89 (22.6)	4.50 (114)	1.78 (45.2)
1 in.	-65TS16 <sup>②</sup>	0.875 (22.2)	40	5.36 (136)	2.68 (68.1)	2.94 (74.7)	2.52 (64.0)	1.25 (31.8)	6.00 (152)	2.50 (63.5)
<b>Female NPT</b>										
3/8 in.	-63TF6	0.516 (13.1)	12	2.70 (68.6)	1.35 (34.3)	2.35 (59.7)	1.79 (45.5)	0.89 (22.6)	4.50 (114)	1.78 (45.2)
1/2 in.	-63TF8	0.516 (13.1)	12	2.70 (68.6)	1.35 (34.3)	2.35 (59.7)	1.79 (45.5)	0.89 (22.6)	4.50 (114)	1.78 (45.2)
3/4 in.	-65TF12	0.875 (22.2)	31	3.59 (91.2)	1.80 (45.7)	2.94 (74.7)	2.52 (64.0)	1.25 (31.8)	6.00 (152)	2.50 (63.5)
1 in.	-65TF16	0.875 (22.2)	38	3.59 (91.2)	1.80 (45.7)	2.94 (74.7)	2.52 (64.0)	1.25 (31.8)	6.00 (152)	2.50 (63.5)

<sup>①</sup> Available in alloy 825 and alloy 2507 materials only.

<sup>②</sup> Available in alloy 825 materials only.

## Ordering Information

Select a basic ordering number from the **Dimensions** table. Add the valve body material designator from the table below to the basic ordering number.

Examples: **825-63TS8**, **6MO-65TF16**

Valve Body Material	Designator
625	625
825	825
Alloy 2507	2507
6-Moly	6MO

### Additional Seat Materials

Standard valve ordering numbers specify reinforced PTFE seat material. For other seat materials, replace **T** with the desired designator. Not all seat material and flange seal combinations are available. Contact your authorized Swagelok representative.

Examples: 2507-63**CS**8, 6MO-65**EF**12

Seat Material	Designator
Virgin PTFE	V
Carbon/glass PTFE	C
UHMWPE	E

### Additional Flange Seal Materials

Fluorocarbon FKM is standard flange seal material. For other materials, add a flange seal material designator to the valve ordering number. Not all flange seal and seat material combinations are available. Contact your authorized Swagelok representative.

Examples: 625-63TS8-**B**, 6MO-63TF6-**IN**

Flange Seal Material	Designator	Temperature Range °F (°C)
Alloy X-750, PTFE coated	IN	-65 to 450 (-53 to 232)
Buna N	B	-20 to 250 (-28 to 121)
Buna C	BC	-65 to 250 (-53 to 121)
Ethylene propylene	E	-20 to 250 (-28 to 121)
Neoprene	N	-20 to 250 (-28 to 121)
PTFE	T	50 to 150 (10 to 65)

## Options and Accessories

### Handles



**Locking Lever Bracket Handle**



**Oval Handle**

A variety of handle options is available for use with 60 series ball valves. To order a locking lever bracket handle, add **-JL** to the ordering number. To order an oval handle, add **-JK** to the ordering number. For additional information and dimensions, see the Swagelok *Process Ball Valves Handle Options* catalog, MS-01-137.

### Low Dead Space Inserts



- Reduce fluid entrapment around the ball, stem, and seats while the valve is in the open or closed position.
- Made from carbon/glass reinforced PTFE.

To order, add **-LD** to the valve ordering number.

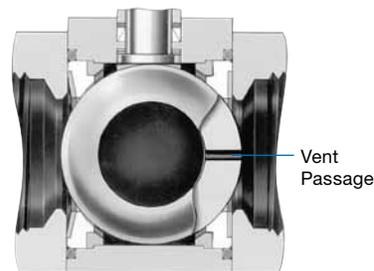
Examples: 625-63TS8-**LD**

### Kits for Field Assembly

Select an ordering number.

Valve Series	Kit Ordering Numbers
63	TGC-91K-63-LD
65	TGC-91K-65-LD

### Vented Valves



**Internal Vent Option**

On-off (2-way) ball valves are available with an internal vent. These vents are available for either upstream or downstream service. To order a valve with an internal vent, insert **NDV** for downstream vent or **NUV** for upstream vent into the valve ordering number.

Example: 625-63T**NDVS**8

### Panel Mount Kits



- Allow vertical or horizontal mounting.
- Can be installed on panels up to 1/4 in. (6.4 mm) thick.
- Fit oval and lever handle.
- Provide template for drilling holes.

### Ordering Information

Select an ordering number.

Kits include self-cinching nut, cover plate, cap screws, panel mount brackets, and instructions.

Valve Series	Kit Ordering Number
63	MS-PMK-S63
65	MS-PMK-S65

### Maintenance Kits

Each kit contains seal, flange seal, lubricant, and fasteners. Contact your Swagelok representative for more information.

## Pneumatic Actuators

Swagelok rack and pinion pneumatic actuators are available for the special alloy, 60 series ball valves. See the Swagelok *General Purpose and Special Application Ball Valves—60 Series* catalog, MS-01-146.

### Options for Pneumatic Actuators

Swagelok can provide factory assemblies with pneumatic actuators, solenoid valves, limit switches, and position sensors, as well as kits for field assembly. For more information, see the *Swagelok Ball Valve Actuation Options* catalog, MS-02-343.



## Oxygen Service Hazards

For more information about hazards and risks of oxygen-enriched systems, see the Swagelok *Oxygen System Safety* technical report, MS-06-13.

### Safe Product Selection

**When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

**Caution: Do not mix or interchange parts with those of other manufacturers.**

## Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit [swagelok.com](http://swagelok.com) or contact your authorized Swagelok representative.