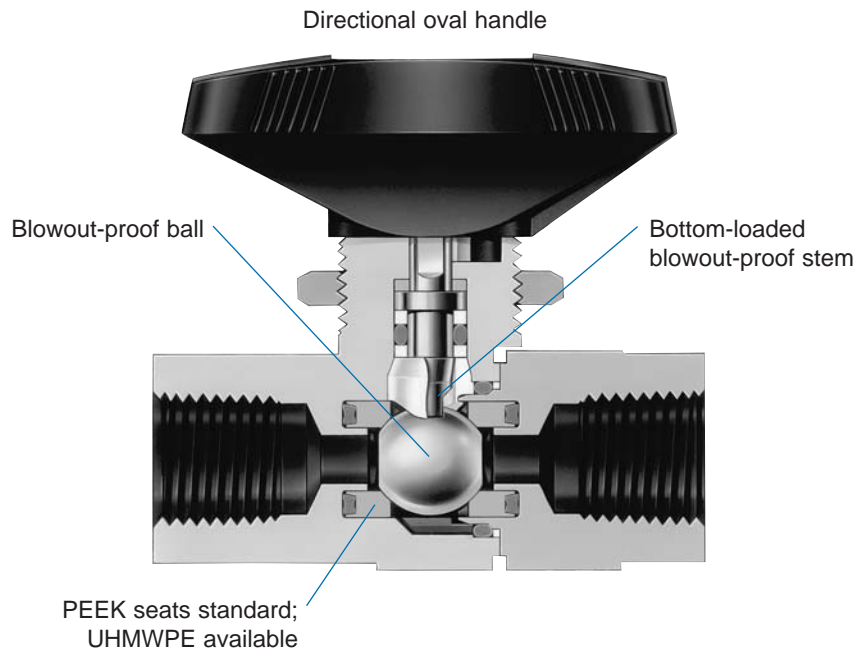


Multipurpose Ball Valves



33 Series

- Working pressures up to 6000 psig (413 bar)
- High flow capacity in a compact design
- Available with PEEK and UHMWPE seats
- Variety of end connections
- Low operating torque



The Swagelok® 33 series ball valve handles high pressure with a quarter-turn design and compact, bolted body, plus a blowout-proof stem and ball for enhanced safety.

Features

- Bidirectional flow
- Flow coefficients (C_v) of 0.9 to 2.4
- Bolted construction that guards against accidental disassembly
- Swagelok gaugeable tube fitting, VCO® O-ring face seal, and NPT and ISO pipe end connections
- Standard panel mounting
- Special-service models:
 - Sour gas
 - Low temperature
 - Fluorocarbon free (UHMWPE-seated valves)

Testing

Every 33 series valve is factory tested at room temperature with nitrogen at 1000 psig (69 bar). Seats have a maximum allowable leak rate of 0.1 std cm³/min. Shell testing is performed to a requirement of no detectable leakage with a liquid leak detector.

Cleaning and Packaging

All 33 series ball valves are cleaned and packaged in accordance with *Swagelok Specification SC-10*. Cleaning in accordance with *Special Cleaning and Packaging (SC-11)* to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C is available as an option.

Pressure-Temperature Ratings

Ratings are limited to:

- 0 to 300°F (–17 to 148°C) with PEEK seats and fluorocarbon FKM O-rings
- –20 to 250°F (–28 to 121°C) with UHMWPE seats and ethylene propylene O-rings.

Valve Seat Material	PEEK	UHMWPE
Temperature, °F (°C)	Working Pressure, psig (bar)	
–20 (–28) to 0 (–17)	—	6000 (413)
0 (–17) to 100 (37)	6000 (413)	6000 (413)
150 (65)	4000 (275)	3000 (206)
200 (93)	2000 (137)	1625 (111)
250 (121)	1700 (117)	250 (17.2)
300 (148)	1400 (96.4)	—

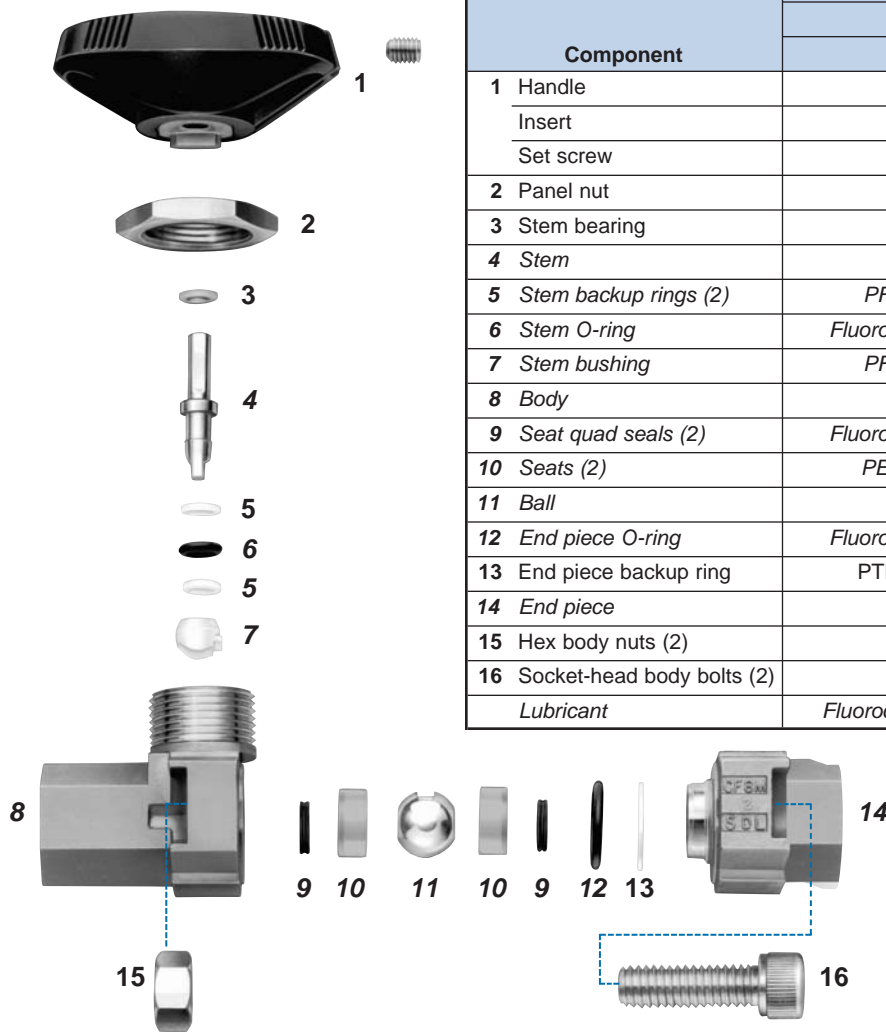
⚠ For valves with UHMWPE seats, high-pressure service may degrade subsequent seat sealing performance in low-pressure service.

⚠ Swagelok ball valves are designed to be used in the fully open or fully closed position.

Oxygen Service Hazards

For more information about hazards and risks of oxygen-enriched systems, see the Swagelok *Oxygen System Safety Technical Report*.

Materials of Construction



Component	Valve Seat Material	
	PEEK	UHMWPE (Fluorocarbon-Free)
	Material Grade/ASTM Specification	
1 Handle	Nylon	
Insert	Powdered metal 300 series SS	
Set screw	18-8 SS	
2 Panel nut	Powdered metal 300 series SS	
3 Stem bearing	PEEK	
4 Stem	316 SS/A276	
5 Stem backup rings (2)	<i>PFA/D3307</i>	<i>UHMWPE</i>
6 Stem O-ring	<i>Fluorocarbon FKM</i>	<i>Ethylene propylene</i>
7 Stem bushing	<i>PFA/D3307</i>	<i>Polyethylene</i>
8 Body	CF8M/A351	
9 Seat quad seals (2)	<i>Fluorocarbon FKM</i>	<i>Ethylene propylene</i>
10 Seats (2)	<i>PEEK/D638</i>	<i>UHMWPE</i>
11 Ball	316 SS/A276	
12 End piece O-ring	<i>Fluorocarbon FKM</i>	<i>Ethylene propylene</i>
13 End piece backup ring	PTFE/D1710	UHMWPE
14 End piece	CF8M/A351	
15 Hex body nuts (2)	Strain-hardened 316 SS, 8M/A194	
16 Socket-head body bolts (2)	Strain-hardened 316 SS, B8M2/A193	
Lubricant	<i>Fluorocarbon-based</i>	<i>Silicone-based</i>

Wetted components listed in *italics*.

Ordering Information and Dimensions

Select an ordering number.

To order valves with UHMWPE seats, replace **P** in the ordering number with **E**.

Example: SS-33ES4

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

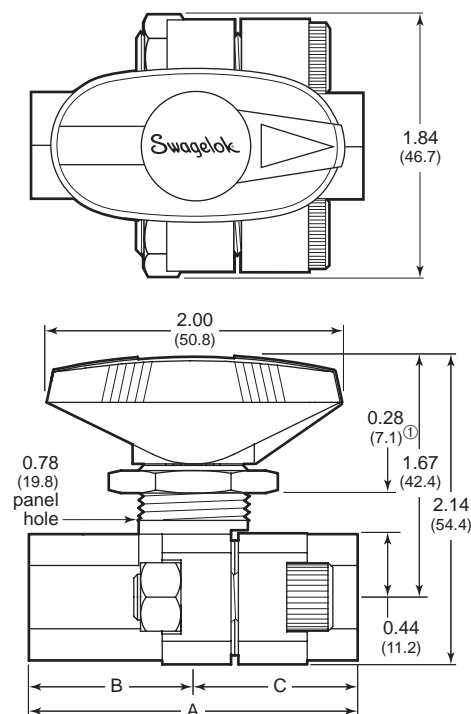
End Connections ^①		Ordering Number	C _v	Dimensions, in. (mm)			
Type	Size			Orifice	A	B	C
Swagelok tube fitting	1/4 in.	SS-33PS4	2.4	0.188 (4.8)	3.16 (80.3)	1.49 (37.8)	1.67 (42.4)
	3/8 in.	SS-33PS6	1.5		3.28 (83.3)	1.55 (39.4)	1.73 (43.9)
	6 mm	SS-33PS6MM	2.4		3.16 (80.3)	1.49 (37.8)	1.67 (42.4)
	8 mm	SS-33PS8MM	1.5		3.22 (81.8)	1.52 (38.6)	1.70 (43.2)
Female NPT	1/4 in.	SS-33PF4	0.9		2.24 (56.9)	1.12 (28.4)	
Female ISO ^②	1/4 in.	SS-33PF4RT					
Male NPT	1/4 in.	SS-33PM4			3.08 (78.2)	1.45 (36.8)	1.63 (41.4)
Male VCO fitting ^③	1/4 in.	SS-33PVCO4	2.4		2.72 (69.1)	1.27 (32.3)	1.45 (36.8)
Male SAE/MS	1/4 in.	SS-33PMS4	0.9		2.16 (54.9)	1.08 (27.4)	

Dimensions shown with Swagelok tube fitting nuts finger-tight.

① Valves with mixed end connections are available. Contact your independent Swagelok sales and service representative.

② See specifications ISO 7/1, BS 21, DIN-2999, and JIS B0203.

③ VCO fittings on standard valves include fluorocarbon FKM O-rings.



① Maximum panel thickness; minimum is 0.13 (3.3).

Options and Accessories

Special Cleaning and Packaging (SC-11)

Swagelok 33 series ball valves are cleaned and packaged in accordance with *Swagelok Specification SC-10*. To order 33 series valves with optional cleaning and packaging to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C, add **-SC11** to the valve ordering number.

Example: SS-33PS4-**SC11**

Valves for Special Applications

Swagelok 33 series valves are available for sour gas and low-temperature service. The materials of construction are the same as those in **Materials of Construction** on page 3, except as shown below.

Sour Gas Service

Materials for wetted valve components are selected in accordance with NACE standard MR0175 for sulfide stress cracking-resistant materials.

Temperature rating: 0 to 250°F (–17 to 121°C) at listed pressures

To order, insert **N** into the ordering number.

Example: SS-**N**33PF4

Component	Material
Ball, stem	Alloy R-405
Seat quad seal, end piece O-ring, stem O-ring	Ethylene propylene

For more information on the use of stainless steel Swagelok tube fittings in sour gas service, see NACE MR0175.

Low-Temperature Service

Temperature rating: –40 to 250°F (–40 to 121°C) at listed pressures

To order, insert **L** into the ordering number.

Example: SS-**L**33PS4

Component	Material
Seat quad seal, end piece O-ring, stem O-ring	Buna C

Optional O-ring Materials

To order valves with optional O-ring materials, add a designator to the valve ordering number.

O-ring Material	Designator	Temperature Rating °F (°C)
Buna	-B	–20 to 200 (–28 to 93)
Ethylene propylene	-E	–20 to 250 (–28 to 121)
Kalrez®	-KZ	50 to 300 (10 to 148)
Silicone	-SI	–20 to 300 (–28 to 148)
Buna C	-BC	–40 to 250 (–40 to 121)

Example: SS-33PS4-**B**

Optional Handles

The standard handle is black nylon. To order valves with nylon handles of other colors or to order valves with stainless steel bar handles, add a handle designator to the ordering number.

Example: SS-33PS4-**BL**

Handle	Designator
Blue nylon	-BL
Green nylon	-GR
Orange nylon	-OG
Red nylon	-RD
Yellow nylon	-YW
Stainless steel bar	-SH

Handle Kits

Black nylon handle kit ordering number: **SS-5K-33K-BK**

To order nylon handles of other colors, replace **-BK** in the kit ordering number with a handle color designator.

Example: SS-5K-33K-**BL**

Stainless steel bar handles are available for use in an operating environment above 250°F (121°C).

Ordering number: **304-5S-33K**

Seal Kits

Kits contain two seats, two seat quad seals, two stem backup rings, end piece O-ring, end piece backup ring, stem bushing, stem O-ring, stem bearing, lubricant, and instructions. To order, select a seal kit ordering number.

Seat Material or Service	Seal Kit Ordering Number
PEEK	PK-91K-33
UHMWPE	PE-91K-33
Sour gas	PK-91K-N33
Low temperature	PK-91K-L33

A seal kit installation tool is needed for seal kit installation.

Ordering number: **MS-LTK-33**

Pneumatic Actuators

Swagelok rack and pinion pneumatic actuators are compact, lightweight, easily mountable, and can be operated with standard shop air.

For technical data, including pressure-temperature ratings and materials of construction, see the *Rack and Pinion Pneumatic Actuators for Swagelok Ball Valves* catalog.

Pneumatic Actuator Performance

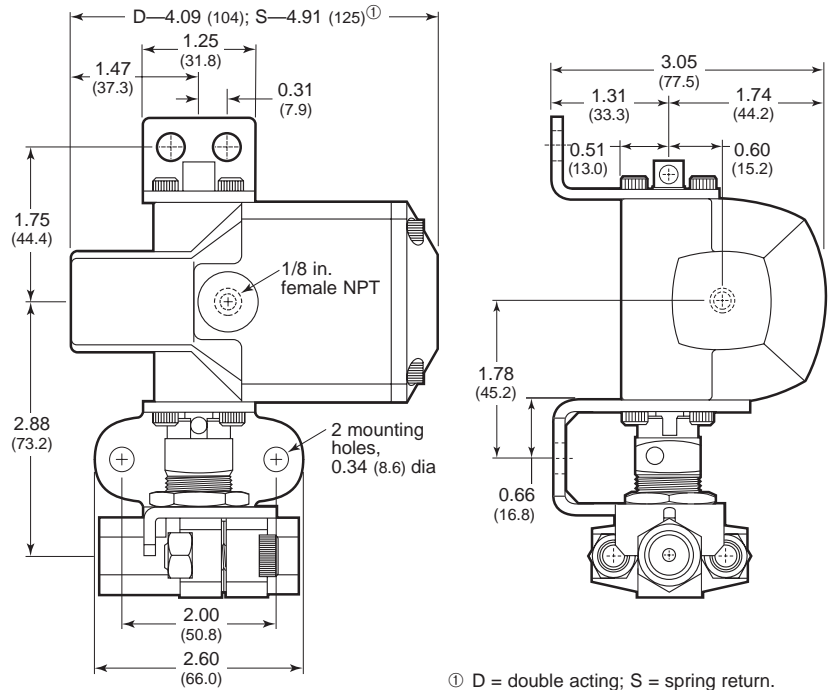
Actuator pressures are based on valve performance using a valve media of pressurized air or nitrogen.

Actuation Mode	Minimum Actuation Pressure, psig (bar)	
	Single	Dual ^①
Double acting	40 (2.8)	70 (4.9)
Normally closed, normally open	80 (5.6)	—

① Two valves mounted to one actuator.

Dimensions

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



① D = double acting; S = spring return.

Ordering Information

Factory Assembly

To order a 33 series valve with factory-assembled pneumatic actuator, add an actuator designator to the valve ordering number.

Actuator	Designator
Double acting	-31D
Normally closed	-31C
Normally open	-31O

Example: SS-33PS4-31D

If other than a standard actuator is desired, add an actuator service designator.

Actuator Service	Temperature Range °F (°C)	Designator
Standard	-20 to 200 (-28 to 93)	—
High temperature	0 to 400 (-17 to 204)	-HT
Low temperature	-40 to 200 (-40 to 93)	-LT
Nonfluorocarbon	-20 to 200 (-28 to 93)	-NF

Example: SS-33PS4-31D-HT

Field Assembly

Pneumatic actuators can be ordered for field assembly. Select an ordering number.

Actuation Mode	Actuator Ordering Number
Double acting	MS-131-DA
Normally closed, normally open	MS-131-SR

If other than a standard actuator is desired, add an actuator type designator.

Example: MS-131-DA-HT

A mounting bracket kit is also required. Bracket kits contain mounting bracket, coupling, lock nut, roll pin, coupling pin, and instructions.

Kit ordering number: **MS-MB-33**

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.