

# High-Flow, Springless Diaphragm Valves



## DF Series

- 316L VAR stainless steel body
- Working pressures up to 300 psig (20.6 bar)
- 1/4, 3/8, and 1/2 in.; 10 and 12 mm end connections

## Features

### Valve

- Flow coefficient of 0.62 meets high-flow requirements.
- No springs or threads in wetted areas improves cleanliness.
- Fully swept flow path enhances purging and gas replacement.
- Minimal PCTFE volume minimizes gas adsorption and desorption.
- Fully contained seat insert increases cycle life.
- High-flow Swagelok® “H” Type VCR® fittings, Swagelok VCR fittings, and tube butt weld end connections are available.

### Pneumatic Actuators

- Normally closed and normally open models are available for remote actuation.
- Actuators require low actuation pressure.
- Construction is lightweight aluminum.

### Manual Actuators

- Three-quarter turn actuation
- Choice of seven handle colors

### Round Handle

- Window handle provides visual indication of open and closed positions.

### Integral Lockout Handle

- Standard padlock or lockout device secures handle in closed position.
- Handle orientation provides visual indication of open or closed position.



## Technical Data

Model	Working Pressure psig (bar)		Temperature Rating °F (°C)		Flow Coefficient (C <sub>v</sub> )	Orifice in. (mm)	Internal Volume in. <sup>3</sup> (cm <sup>3</sup> )	Pneumatic Actuator	
	Operating	Burst	Operating <sup>①</sup>	Bakeout <sup>②</sup>				Actuation Pressure psig (bar)	Air Displacement in. <sup>3</sup> (cm <sup>3</sup> )
Manual	Vacuum to 300 (20.6)	3200 (220)	-10 to 150 (-23 to 65)	302 (150) (valve open)	0.62	0.23 (5.8)	0.27 (4.4) body with HVCR fittings	—	—
Pneumatic	Vacuum to 125 (8.6)							70 to 100 (4.9 to 6.8)	0.13 (2.1)

① See **Polyimide Seat Material**, page 4, for operating temperatures up to 270°F (132°C).

② Contact your authorized Swagelok sales and service representative for more information.

## Process Specifications

See Swagelok *Ultrahigh-Purity Process Specification (SC-01)* catalog, MS-06-61; Swagelok *Photovoltaic Process Specification (SC-06)* catalog, MS-06-64; and Swagelok *Special Cleaning and Packaging (SC-11)* catalog, MS-06-63, for details on processes, process controls, and process verification.

Cleaning	Assembly and Packaging	Process Designator	Process Specification	Wetted Surface Roughness (R <sub>a</sub> )	Testing
Ultrahigh-purity cleaning with a continuously monitored, deionized water, ultrasonic cleaning system	Performed in ISO Class 4 work areas; valves are double bagged and vacuum sealed in cleanroom bags.	P	<i>Ultrahigh-Purity Process Specification (SC-01)</i>	Electropolished and finished to an average of 5 μin. (0.13 μm)	Inboard and internal helium leak tested to a maximum leak rate of 1 × 10 <sup>-9</sup> std cm <sup>3</sup> /s in accordance with SEMI F1
High-purity cleaning with a continuously monitored, deionized water, ultrasonic cleaning system	Performed in specially cleaned areas; valves are individually bagged.	P6	<i>Photovoltaic Process Specification (SC-06)</i>		
Special cleaning with non-ozone-depleting chemicals	Performed in specially cleaned areas; valves are individually bagged.	P1	<i>Special Cleaning and Packaging (SC-11)</i>		

## Performance Specifications

Refer to *DF Series Diaphragm Valve Technical Report*, MS-06-14, for additional information on particle counting, moisture analysis, hydrocarbon analysis, ionic cleanliness, and lab cycle testing data.

## Materials of Construction

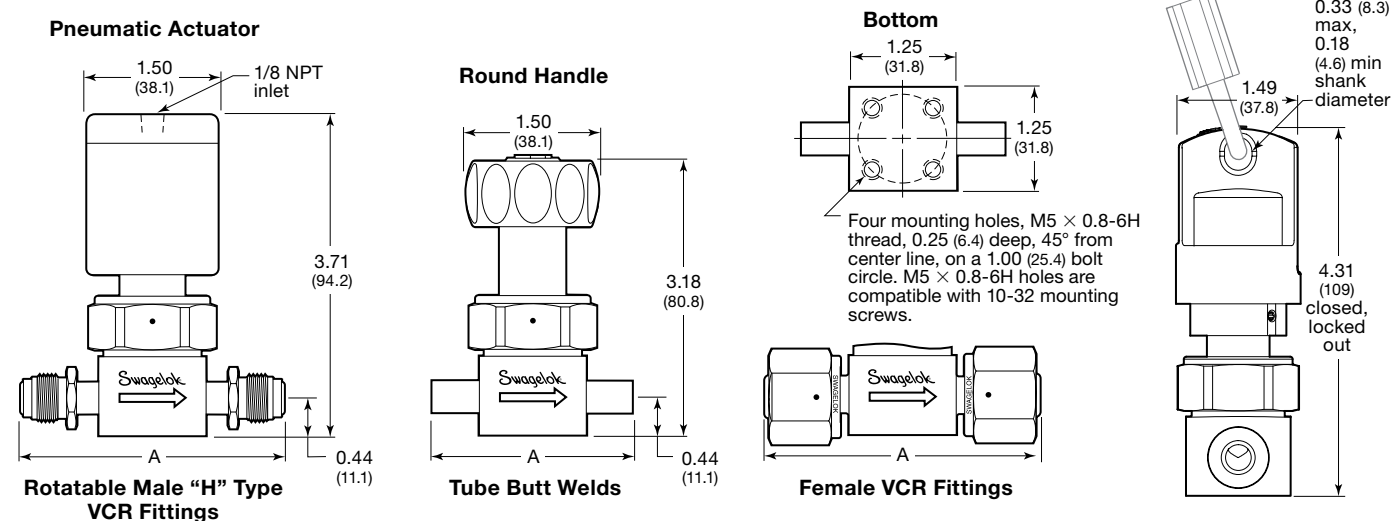
Component	Material Grade/ ASTM Specification	Component	Material Grade/ ASTM Specification
<b>Valve</b>		<b>Round Handle</b>	
<i>Body</i>	<i>316L VAR SS/ SEMI F20 High-Purity<sup>①</sup></i>	Handle	Polyester with SS insert
<i>Seat</i>	<i>PCTFE/AMS 3650</i>	Actuator, bonnet nut	316 SS
<i>Diaphragms</i>	<i>Cobalt-based superalloy (UNS R30003)/AMS 5876</i>	<b>Integral Lockout Handle</b>	
		Handle	Glass-filled nylon
<b>Pneumatic Actuator</b>		Set screws	Alloy steel/F912
Cylinder, cap, pistons	Aluminum	Retaining ring	PH 15-7 Mo® SS
O-rings	Buna N	O-rings	Fluorocarbon FKM
Springs	S17700 SS	Sleeve, base	Powdered metal SS

Wetted components listed in *italics*.

① 20 % minimum elongation allowed.

## Ordering Information and Dimensions

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



End Connections		Basic Ordering Number	A in. (mm)
Inlet/Outlet	Size		
Female "H" type VCR fittings	1/4 in.	6LV-DFHFR4-	2.78 (70.6)
Rotatable male "H" type VCR fittings	1/4 in.	6LV-DFHMR4-	2.96 (75.2)
Female/rotatable male "H" type VCR fitting	1/4 in.	6LV-DFHFR4HMR4-	2.96 (75.2)
Female VCR fittings	1/2 in.	6LV-DFFR8-	4.16 (106)
Rotatable male VCR fittings	1/2 in.	6LV-DFMR8-	4.16 (106)
Tube butt welds	3/8 × 0.035 in.	6LV-DFBW6-	2.25 (57.1)
	1/2 × 0.049 in.	6LV-DFBW8-	
	10 × 1 mm	6LV-DFBW10M-	
	12 × 1 mm	6LV-DFBW12M-	

## Flow Data at 70°F (20°C)

0.23 in. (5.8 mm) orifice, 0.62 C<sub>v</sub>

Pressure Drop to Atmosphere psi (bar)	Water Flow U.S. gal/min (L/min)	Air Flow std ft <sup>3</sup> /min (std L/min)
10 (0.68)	2.0 (7.4)	7.0 (200)
50 (3.4)	4.4 (17)	19 (530)
100 (6.8)	6.2 (23)	33 (930)

### Valves with Round Handles or Pneumatic Actuators

Select a basic ordering number, add a process designator (see page 2), then add a pneumatic actuator or handle color designator.

Examples: 6LV-DFHFR4-**P-BK** for P process, black handle  
 6LV-DFHMR4-**P1-C** for P1 process, normally closed pneumatic actuator

Pneumatic Actuator	Designator
Normally closed	-C
Normally open	-O
Normally closed with indicator switch	-CM

Handle Color	Designator
Black	-BK
Blue	-BL
Green	-GR
Orange	-OR
Red	-RD
White	-WH
Yellow	-YW

### Valves with Integral Lockout Handles

Insert **L** into a basic ordering number, add a process designator (see page 2), then add a handle color designator.

Examples: 6LV-DFLHFR4-**P-BK** for P process, black handle  
 6LV-DFLHMR4-**P6-BL** for P6 process, blue handle

## Options and Accessories

### Polyimide Seat Material

- DF series valves with polyimide seats are rated for operating temperatures from 50 to 270°F (10 to 132°C).
- Pneumatic actuators contain fluorocarbon FKM O-rings.
- All other materials and ratings remain the same.

To order, insert **V** into the valve ordering number.

Example: 6LV-DFLVBW8-P-C

### Indicator Switch

- Transmits a signal to an electrical device indicating either the open or closed position of a pneumatically actuated valve.
- Features a single-pole, single-throw switch rated at:
  - 1/2 A for 115 V (ac) for normally open switch;
  - 1/4 A for 115 V (ac) for a normally closed switch;
  - 40 to 185°F (-40 to 85°C) temperature.
- Includes a 24 in. (61 cm) wire lead with an inline clip.
- Is available assembled on any normally closed, pneumatically actuated DF series valve or for field assembly.



### Factory-Assembled Indicator Switches

To order a valve with an indicator switch, add **M** for a normally open switch or **M-2** for a normally closed switch to the valve ordering number.

Examples: 6LV-DFHFR4-P-CM  
6LV-DFBW8-P-CM-2

### Indicator Switch Kits

To order a kit for an existing valve, use ordering number **MS-ISK-DF-CM** for a normally open switch or **MS-ISK-DF-CM-2** for a normally closed switch.

Kits include actuator and switch.

### Oxygen Service Hazards

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

### Panel Mounting

- Is available for round-handle valves.
- Includes threaded bonnet nut and 1 1/8 in. hex panel mount nut.
- Requires 0.96 in. (24.4 mm) diameter hole.



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

Example: 6LV-DFHFR4-BK-PM

### Maintenance Kits

#### Diaphragm Replacement Kits

Kits include two diaphragms and replacement instructions.

Ordering number: **E-3DK-DF**



#### Actuator Replacement Kits

Kits include all components except body, seat, and diaphragms.

Actuator Kit	Ordering Number
Green round handle	PY-DF-K1-GR
Green integral lockout handle	NY-DFL-K1-GR
Normally closed pneumatic with Buna N O-rings	A-DF-K1-C
Normally open pneumatic with Buna N O-rings	A-DF-K1-O
Normally closed pneumatic with fluorocarbon FKM O-rings, for use with polyimide seat option	A-DFV-K1-C
Normally open pneumatic with fluorocarbon FKM O-rings, for use with polyimide seat option	A-DFV-K1-O

Select a kit ordering number.

To order a kit with a round handle or integral lockout handle of another color, replace **GR** with a handle color designator.

Example: PY-DF-K1-BK

Color	Designator
Black	BK
Blue	BL
Orange	OR
Red	RD
White	WH
Yellow	YW

### Multiport and Elbow Valves and Monoblock Manifolds

DF series valves are available in multiport and elbow configurations and monoblock manifolds; refer to *Bellows- and Diaphragm-Sealed Multiport and Elbow Valves and Monoblock Manifolds* catalog, MS-02-442.

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

## Introduction

Since 1947, Swagelok has designed, developed, and manufactured high-quality, general-purpose and specialty fluid system products to meet the evolving needs of global industries. Our focus is on understanding our customers' needs, finding timely solutions, and adding value with our products and services.

We are pleased to provide this global edition of the book-bound *Swagelok Product Catalog*, which compiles more than 100 separate product catalogs, technical bulletins, and reference documents into one convenient, easy-to-use volume. Each product catalog is up to date at the time of printing, with its revision number shown on the last page of the individual catalog; for example, the Swagelok *Gaugeable Tube Fittings and Tube Adapters* catalog is MS-01-140, RevW. Subsequent revisions will supersede the printed version and will be posted on the Swagelok website and in the Swagelok electronic Desktop Technical Reference (eDTR) tool.

For more information, visit your Swagelok website or contact your authorized Swagelok sales and service representative.

### 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.

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