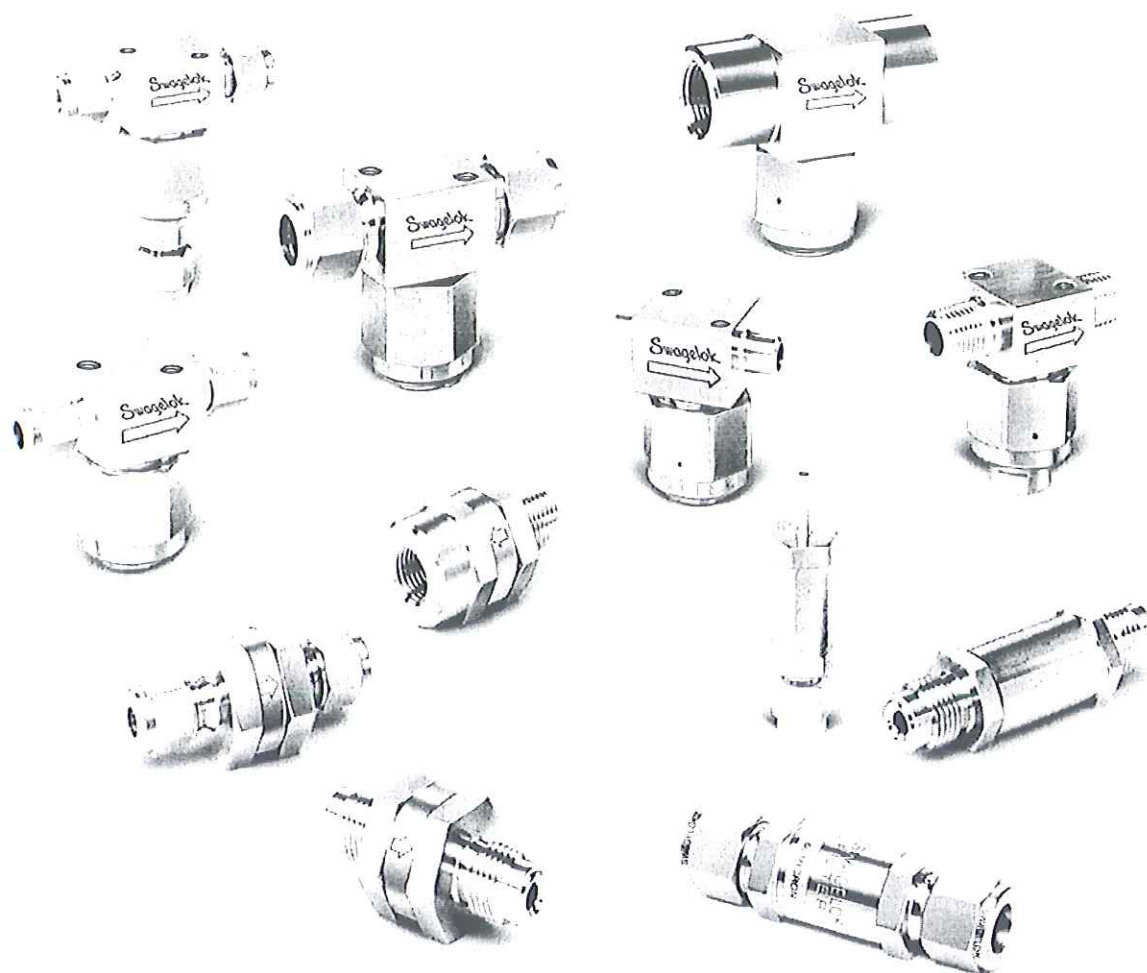


## Filters



### FW, F, and TF Series

- Remove system particulate contaminants
- Gas and liquid service
- 1/8 to 1/2 in. and 3 to 12 mm end connections
- Stainless steel and brass materials

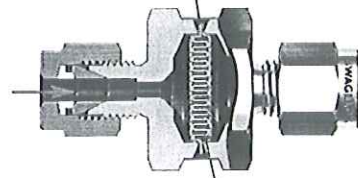
Swagelok®

## Features

### All-Welded In-line Filters (FW Series)

- All-welded construction provides reliable fluid containment.
- In-line filters are for use where space is limited.
- Filter is easily cleaned by backflushing.
- Sintered element is available in 0.5  $\mu\text{m}$  nominal pore size; pleated mesh elements are available in 2, 7, and 15  $\mu\text{m}$  nominal pore sizes.
- End connections include Swagelok tube fittings, NPT, and male VCR® face seal fittings.

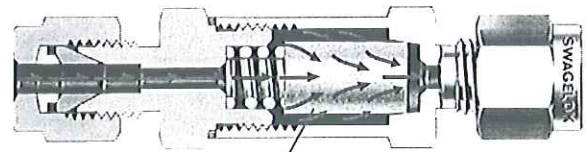
Full-penetration weld between body and element prevents bypass flow



Pleated element shown; sintered element available

### In-line Filters (F Series)

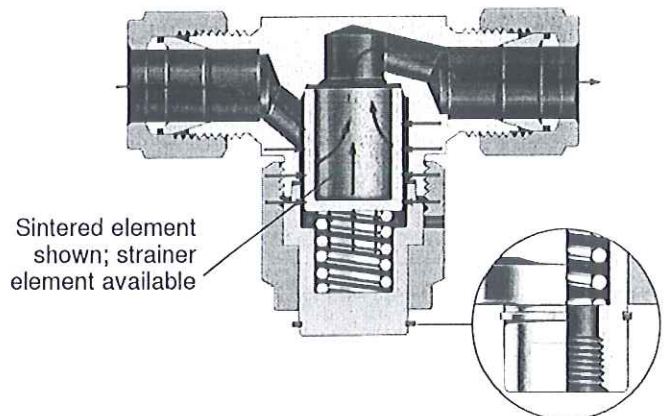
- In-line filters are for use where space is limited.
- Replaceable sintered elements are available in 0.5, 2, 7, 15, 60, and 90  $\mu\text{m}$  nominal pore sizes; replaceable strainer elements are available in 40, 140, 230, and 440  $\mu\text{m}$  nominal pore sizes.
- End connections include Swagelok tube fittings, NPT, tube adapter, and male VCR face seal fittings.



Sintered element shown; strainer element available

### Tee-Type Filters (TF Series)

- Filter element can be replaced without removing body from system.
- Replaceable sintered elements are available in 0.5, 2, 7, 15, 60, and 90  $\mu\text{m}$  nominal pore sizes; replaceable strainer elements are available in 40, 140, 230, and 440  $\mu\text{m}$  nominal pore sizes.
- End connections include Swagelok tube fittings, NPT, and tube socket or tube butt weld ends.



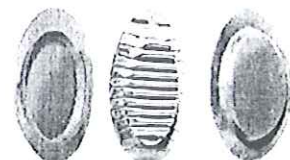
Sintered element shown; strainer element available

Bypass port available; see page 8

## Filter Elements

### FW Series

#### Pleated Mesh



Retainer screen Pleated mesh element Retainer screen

- Offers larger filtration area
- Stainless steel construction

#### Sintered

- Traps particles as small as 0.5  $\mu\text{m}$  in diameter
- 316L SS construction

### F and TF Series



Magnified 13x

#### Sintered

- Traps fine particles in a dense matrix
- 316 SS construction

#### Strainer



Magnified 2x

- Removes larger particles
- 316 SS construction

## Pressure-Temperature Ratings

For more information about ratings, see the *Swagelok Valve Pressure-Temperature Ratings* technical bulletin.

Ratings are based on standard materials of construction. Ratings for TF series filters with PCTFE gaskets are limited to 200°F and 3000 psig (93°C and 206 bar). See page 8.

Filter Series	FW, TF	2F, 4F	6F, 8F	F	TF
Material	316 SS			Brass	
Temperature, °F(°C)	Working Pressure, psig (bar)				
−20 (−28) to 100 (37)	6000 (413)	3000 (206)	2500 (172)	1000 (68.9)	2000 (137)
200 (93)	5160 (355)	2580 (177)	2150 (148)	780 (53.7)	1730 (119)
300 (148)	4660 (321)	2330 (160)	1940 (133)	680 (46.8)	1470 (101)
400 (204)	4280 (294)	2140 (147)	1780 (122)	—	—
500 (260)	3980 (274)	1990 (137)	1660 (114)	—	—
600 (315)	3760 (259)	1880 (129)	1560 (107)	—	—
650 (343)	3700 (254)	1845 (127)	1540 (106)	—	—
700 (371)	2600 (248)	1800 (124)	1500 (103)	—	—
750 (398)	3520 (242)	1760 (121)	1460 (100)	—	—
800 (426)	3460 (238)	1725 (118)	1440 (99.2)	—	—
850 (454)	3380 (232)	1690 (116)	1410 (97.1)	—	—
900 (482)	3280 (225)	1640 (112)	1360 (93.7)	—	—

## Differential Pressure Ratings

Series	Maximum Differential Pressure psi (bar)		
	Sintered Element	Strainer Element	Pleated Element
FW	600 (41.3)	—	100 (6.8)
F, TF	1000 (68.9)	—	—

## Materials of Construction

Component	Filter Series	Filter Body Materials	
		Brass <sup>①</sup>	316 SS
		Material Grade/ASTM Specification	
Bonnet nut	TF	Brass/B16	316 SS/A479
Bonnet	TF	Brass/B16	316 SS/A479
Retainer screens (2)	FW	—	316 SS
Element	FW	—	0.5 µm size— 316L SS
			2 µm size— 304 SS
			7 and 15 µm size—316 SS
	F, TF	Sintered—316 SS Strainer—316 SS with silver solder	
Spring	F, TF	302 SS	
Gasket	F, TF	Aluminum/B209	Silver-plated 316 SS/A240
Body	All	Brass/B16	316 SS/A479
Retaining ring	TF	PH 15-7 Mo® SS	
Lubricant	F	Silicone-based	

Wetted components listed in *italics*.

① FW series filters not available in brass.

## Filtration Area

Filter Series	Sintered Element in. <sup>2</sup> (mm <sup>2</sup> )	Strainer Element in. <sup>2</sup> (mm <sup>2</sup> )	Pleated Element in. <sup>2</sup> (mm <sup>2</sup> )
FW	0.44 (283)	—	2.25 (1450)
2F	0.55 (350)	—	—
4F, 2TF, 4TF	1.3 (830)	1.0 (640)	—
6F, 8F, 6TF, 8TF	2.0 (1280)	1.7 (1090)	—



## Flow Data at 70°F (20°C)

## FW Series

End Connections		Element Nominal Pore Size µm	Inlet Pressure, <sup>①</sup> psig (bar)			Pressure Drop, psi (bar)		
			5 (0.34)	10 (0.68)	15 (1.0)	10 (0.68)	50 (3.4)	100 (6.8)
Type	Size		Air Flow, std ft <sup>3</sup> /min (std L/min)			Water Flow, U.S. gal/min (L/min)		
Swagelok tube fitting, male VCR fitting	1/4 in., 6 mm	0.5	0.04 (1.1)	0.06 (1.7)	0.12 (3.4)	0.01 (0.03)	0.04 (0.15)	0.12 (0.45)
		2, 7, 15				1.7 (6.4)	5.5 (20)	8.3 (31)
Female NPT	1/4 in.	2, 7, 15	5.6 (150)	10 (280)	14 (390)	4.5 (17)	14 (52)	18 (68)
Male NPT, male to female NPT	1/4 in.	2, 7, 15				3.5 (13)	11 (41)	14 (52)

① Outlet is discharged to atmosphere.

## F Series

Element Nominal Pore Size µm	Inlet Pressure, <sup>①</sup> psig (bar)			Pressure Drop, psi (bar)		
	5 (0.34)	10 (0.68)	15 (1.0)	10 (0.68)	50 (3.4)	100 (6.8)
	Air Flow, std ft³/min (std L/min)			Water Flow, U.S. gal/min (L/min)		
2F Series						
0.5	0.04 (1.1)	0.06 (1.7)	0.12 (3.4)	0.01 (0.03)	0.04 (0.15)	0.12 (0.45)
2	0.20 (5.6)	0.40 (11)	0.60 (17)	0.08 (0.30)	0.24 (0.91)	0.40 (1.5)
7	0.50 (14)	0.90 (25)	1.2 (34)	0.10 (0.37)	0.30 (1.1)	0.48 (1.8)
15	0.80 (22)	1.3 (36)	1.5 (42)	0.12 (0.45)	0.36 (1.3)	0.58 (2.1)
60	1.7 (48)	2.2 (62)	2.4 (68)	0.15 (0.56)	0.50 (1.8)	0.70 (2.6)
90	1.8 (51)	2.2 (62)	2.6 (73)	0.20 (0.75)	0.50 (1.8)	0.60 (2.2)
4F Series						
0.5	0.12 (3.4)	0.26 (7.3)	0.48 (13)	0.04 (0.15)	0.17 (0.64)	0.29 (1.0)
2	0.60 (17)	1.4 (39)	2.3 (65)	0.24 (0.90)	0.86 (3.2)	1.3 (4.9)
7	1.4 (39)	2.9 (82)	4.7 (130)	0.40 (1.5)	1.3 (4.9)	2.0 (7.5)
15	1.2 (34)	2.9 (82)	4.7 (130)	0.50 (1.8)	1.3 (4.9)	2.1 (7.9)
60	3.1 (87)	5.9 (160)	8.5 (240)	0.90 (3.4)	3.3 (12)	4.6 (17)
90	4.1 (110)	7.5 (210)	10 (280)	1.2 (4.5)	4.2 (15)	6.1 (23)
40, 140, 230, 440	4.7 (130)	8.8 (250)	12 (340)	1.7 (6.4)	5.6 (21)	7.8 (29)
6F and 8F Series						
0.5	0.36 (10)	0.86 (24)	1.6 (45)	0.09 (0.34)	0.40 (1.5)	0.76 (2.8)
2	1.4 (39)	2.8 (79)	4.0 (110)	0.26 (0.98)	1.1 (4.1)	1.6 (6.0)
7	1.8 (51)	4.2 (119)	6.8 (190)	0.64 (2.4)	2.2 (8.3)	3.5 (13)
15	1.8 (51)	4.9 (130)	7.9 (220)	0.84 (3.1)	2.6 (9.8)	4.1 (15)
60	5.1 (140)	10 (280)	15 (420)	2.0 (7.5)	6.7 (25)	10 (37)
90	6.1 (170)	11 (310)	16 (450)	2.3 (8.7)	7.6 (28)	11 (41)
40, 140, 230, 440	7.2 (200)	14 (390)	20 (560)	4.8 (18)	15 (56)	19 (71)

① Outlet is discharged to atmosphere.

## TF Series

Element Nominal Pore Size µm	Inlet Pressure, <sup>①</sup> psig (bar)			Pressure Drop, psi (bar)		
	5 (0.34)	10 (0.68)	15 (1.0)	10 (0.68)	50 (3.4)	100 (6.8)
	Air Flow, std ft³/min (std L/min)			Water Flow, U.S. gal/min (L/min)		
2TF Series						
0.5	0.04 (1.1)	0.06 (1.7)	0.12 (3.4)	0.04 (0.15)	0.17 (0.64)	0.29 (1.0)
2	0.20 (5.6)	0.40 (11)	0.60 (17)	0.08 (0.30)	0.24 (0.90)	0.40 (1.5)
7	0.50 (14)	0.90 (25)	1.2 (34)	0.10 (0.37)	0.30 (1.1)	0.48 (1.8)
15	0.80 (22)	1.3 (36)	1.5 (42)	0.12 (0.45)	0.36 (1.3)	0.58 (2.1)
60	1.7 (48)	2.2 (62)	2.4 (68)	0.15 (0.56)	0.50 (1.8)	0.70 (2.6)
90	1.8 (51)	2.2 (62)	2.6 (73)	0.20 (0.75)	0.50 (1.8)	0.60 (2.2)
40, 140, 230, 440	1.8 (51)	2.3 (65)	2.6 (73)	0.20 (0.75)	0.50 (1.8)	0.60 (2.2)
4TF Series						
0.5	0.12 (3.4)	0.26 (7.3)	0.48 (13)	0.04 (0.15)	0.17 (0.64)	0.29 (1.0)
2	0.60 (17)	1.4 (39)	2.3 (65)	0.24 (0.90)	0.86 (3.2)	1.3 (4.9)
7	1.4 (39)	2.9 (82)	4.7 (130)	0.40 (1.5)	1.3 (4.9)	2.0 (7.5)
15	1.2 (34)	2.9 (82)	4.7 (130)	0.50 (1.8)	1.3 (4.9)	2.1 (7.9)
60	3.1 (87)	5.9 (160)	8.5 (240)	0.80 (3.0)	2.7 (10)	3.9 (14)
90	4.1 (110)	7.5 (210)	10 (280)	1.1 (4.1)	3.4 (12)	4.9 (18)
40, 140, 230, 440	4.7 (130)	8.8 (250)	12 (340)	1.2 (4.5)	4.2 (15)	5.6 (21)
6TF and 8TF Series						
0.5	0.36 (10)	0.86 (24)	1.6 (45)	0.09 (0.34)	0.40 (1.5)	0.76 (2.8)
2	1.4 (39)	2.8 (79)	4.0 (110)	0.26 (0.98)	1.1 (4.1)	1.6 (6.0)
7	1.8 (51)	4.2 (119)	6.8 (190)	0.64 (2.4)	2.2 (8.3)	3.5 (13)
15	1.8 (51)	4.9 (130)	7.9 (220)	0.84 (3.1)	2.6 (9.8)	4.1 (15)
60	5.1 (140)	10 (280)	15 (420)	1.50 (5.6)	4.8 (18)	6.7 (25)
90	6.1 (170)	11 (310)	16 (450)	1.70 (6.4)	5.5 (20)	7.6 (28)
40, 140, 230, 440	7.2 (200)	14 (390)	20 (560)	2.40 (9.0)	7.2 (27)	10 (37)

① Outlet is discharged to atmosphere.

## Testing

Every Swagelok filter is factory tested with nitrogen at 1000 psig (69 bar) to a requirement of no detectable leakage with a liquid leak detector.

## Cleaning and Packaging

Swagelok filters with VCR end connections are processed in accordance with *Swagelok Special Cleaning and Packaging (SC-11)* to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C.

Swagelok filters with other end connections are processed in accordance with *Swagelok Specification SC-10*; special cleaning and packaging are available as an option.

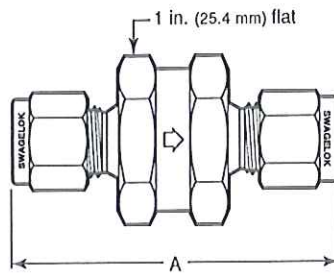
## Ordering Information and Dimensions

Dimensions are for reference only and are subject to change.

### FW Series

Add an element designator to the basic ordering number.

Example: SS-4FWS-05



### FW Series

End Connections		Element Nominal Pore Size $\mu\text{m}$	Basic Ordering Number	Dimensions, in. (mm)	
Type	Size			Orifice	A
Swagelok tube fitting	1/4 in.	0.5	SS-4FWS-	0.187 (4.75)	2.09 (53.1)
	1/4 in.	2, 7, 15	SS-4FW-		2.15 (54.6)
	6 mm	0.5	SS-6FWS-MM-		2.13 (54.1)
	6 mm	2, 7, 15	SS-6FW-MM-		2.15 (54.6)
Female NPT	1/4 in.	2, 7, 15	SS-4FW4-	0.453 (11.5)	1.57 (39.9)
Male NPT	1/4 in.		SS-4FW2-	0.281 (7.14)	1.89 (48.0)
Male to female NPT	1/4 in.		SS-4FW5-	0.281 (7.14)	1.72 (43.7)
Male VCR fitting	1/4 in.	0.5	SS-4FWS-VCR-	0.187 (4.75)	1.95 (49.5)
	1/4 in.	2, 7, 15	SS-4FW-VCR-		2.04 (51.8)

Dimensions shown with Swagelok tube fitting nuts finger-tight.

### FW Series Elements

Elements remove 95 % of particles larger than the nominal pore size.

Nominal Pore Size $\mu\text{m}$	Pore Size Range $\mu\text{m}$	Element Type	Element Designator
0.5	0.5 to 2	Sintered	05
2	—	Pleated	2
7	—		7
15	—		15

### F Series and TF Series

#### Stainless Steel Filters

Add an element designator to the basic ordering number.

Example: SS-2F-2

#### Brass Filters

Replace SS with B in the ordering number.

Example: B-2F-2

Filters with VCR fitting end connections are not available in brass.

### F and TF Series Elements

Elements remove 95 % of particles larger than the nominal pore size.

Nominal Pore Size $\mu\text{m}$	Pore Size Range $\mu\text{m}$	Element Type	Element Designator
0.5	0.5 to 2	Sintered	05
2	1 to 4		2
7	5 to 10		7
15	11 to 25		15
40 <sup>①</sup>	—	Strainer	40
60	50 to 75	Sintered	60
90	75 to 100		90
140 <sup>①</sup>	—	Strainer	140
230 <sup>①</sup>	—		230
440 <sup>①</sup>	—		440

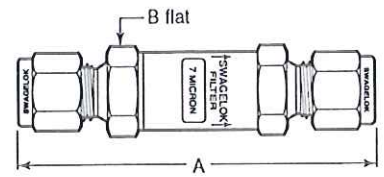
<sup>①</sup> Not available for 2F series.



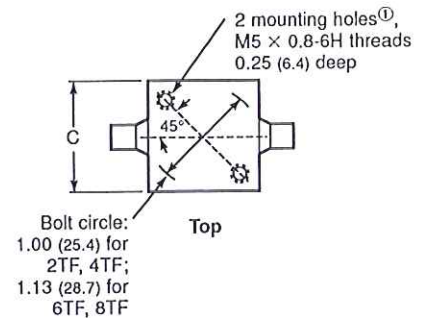
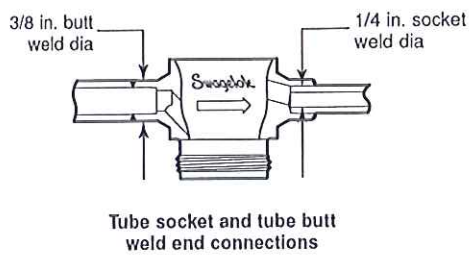
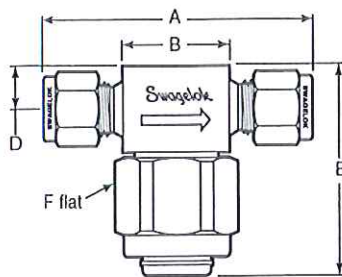
## F Series

End Connections		Basic Ordering Number	Filter Series	Dimensions, in. (mm)		
Inlet/Outlet	Size			Orifice	A	B
Swagelok tube fittings	1/8 in.	SS-2F-	2F	0.094 (2.39)	2.35 (59.7)	9/16 (14.3)
	1/4 in.	SS-4F-	4F	0.187 (4.75)	2.95 (74.9)	3/4 (19.0)
	3/8 in.	SS-6F-	6F	0.281 (7.14)	3.21 (81.5)	1 (25.4)
	1/2 in.	SS-8F-	8F	0.406 (10.3)	3.49 (88.6)	
	3 mm	SS-3F-MM-	2F	0.094 (2.39)	2.38 (60.5)	9/16 (14.3)
	6 mm	SS-6F-MM-	4F	0.187 (4.75)	2.96 (75.2)	3/4 (19.0)
Female NPT	1/8 in.	SS-2F4-	2F	0.094 (2.39)	2.16 (54.9)	9/16 (14.3)
	1/4 in.	SS-4F4-	4F	0.187 (4.75)	2.87 (72.9)	3/4 (19.0)
Male NPT	1/4 in.	SS-4F2-	4F		2.69 (68.3)	
Male VCR fittings	1/4 in.	SS-4F-VCR-	4F		2.82 (71.6)	
Swagelok tube fitting/tube adapter	1/8 in.	SS-2F-T7-	2F	0.094 (2.39)	2.29 (58.2)	9/16 (14.3)
	1/4 in.	SS-4F-T7-	4F	0.187 (4.75)	2.91 (73.9)	3/4 (19.0)

Dimensions shown with Swagelok tube fitting nuts finger-tight.



## TF Series



End Connections		Basic Ordering Number	Filter Series	Dimensions, in. (mm)						
Type	Size			Orifice	A	B	C	D	E	F
Swagelok tube fitting	1/8 in.	SS-2TF-	2TF	0.094 (2.39)	2.27 (57.7)	1.07 (27.2)	1.00 (25.4)	0.38 (9.7)	1.87 (47.5)	1 (25.4)
	1/4 in.	SS-4TF-	4TF	0.174 (4.41)	2.47 (62.7)	1.06 (26.9)				
	3/8 in.	SS-6TF-	6TF	0.213 (5.41)	2.84 (72.1)	1.32 (33.5)	1.13 (28.7)	0.46 (11.7)	2.20 (55.9)	1 1/8 (28.6)
	1/2 in.	SS-8TF-	8TF	0.250 (6.35)	3.04 (77.2)	1.31 (33.3)				
	6 mm	SS-6TF-MM-	4TF	0.172 (4.36)	2.46 (62.5)	1.06 (26.9)	1.13 (28.7)	0.46 (11.7)	2.20 (55.9)	1 (25.4)
	8 mm	SS-8TF-MM-	6TF	0.213 (5.41)	2.84 (72.1)	1.38 (35.1)				
	10 mm	SS-10TF-MM-	8TF	0.250 (6.35)	2.86 (72.6)	1.32 (33.5)				1 1/8 (28.6)
	12 mm	SS-12TF-MM-	8TF		3.04 (77.2)	1.31 (33.3)				
Female NPT	1/8 in.	SS-2TF4-	2TF	0.174 (4.41)	2.00 (50.8)	1.00 (25.4)	1.00 (25.4)	0.38 (9.7)	1.87 (47.5)	1 (25.4)
	1/4 in.	SS-4TF4-	4TF		2.13 (54.1)					
Male NPT	1/4 in.	SS-4TF2-	4TF	0.174 (4.41)	2.13 (54.1)	1.00 (25.4)	1.00 (25.4)	0.38 (9.7)	1.87 (47.5)	
	3/8 in.	SS-6TF2-	6TF	0.250 (6.35)	2.38 (60.5)	1.25 (31.8)	1.13 (28.7)	0.46 (11.7)	2.20 (55.9)	1 1/8 (28.6)
	1/2 in.	SS-8TF2-	8TF		2.75 (69.9)					
Tube socket weld and tube butt weld	1/4 and 3/8 in.	SS-4TF-TW-	4TF	0.174 (4.41)	1.68 (42.7)	1.00 (25.4)	1.00 (25.4)	0.38 (9.7)	1.87 (47.5)	1 (25.4)

Dimensions shown with Swagelok nuts finger-tight.

① Mounting holes not available with 1/4 in. female NPT end connections.

## Options and Accessories

### All Filters

#### Special Cleaning and Packaging (SC-11)

Swagelok filters with VCR end connections are processed in accordance with *Swagelok Special Cleaning and Packaging (SC-11)* to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C.

To order special cleaning and packaging for filters with other end connections, add **-SC11** to the valve ordering number.

Example: SS-4FWS-05-SC11

### F and TF Series

#### Element Kits

Kits include element and instructions.

Select a basic kit ordering number and add an element designator.

Example:

SS-2F-K4-05

Filter Series <sup>①</sup>	Basic Kit Ordering Number
2F	SS-2F-K4-
4F, 2TF, 4TF	SS-4F-K4-
6F, 8F, 6TF, 8TF	SS-8F-K4-

<sup>①</sup> See Dimensions tables, page 7, for filter series information.

Nominal Pore Size μm	Pore Size Range μm	Element Type	Element Designator
0.5	0.5 to 2	Sintered	05
2	1 to 4		2
7	5 to 10		7
15	11 to 25		15
40 <sup>①</sup>	—	Strainer	40
60	50 to 75	Sintered	60
90	75 to 100		90
140 <sup>①</sup>	—	Strainer	140
230 <sup>①</sup>	—		230
440 <sup>①</sup>	—		440

<sup>①</sup> Not available for 2F series.

#### Gasket Kits

Kits include gasket and instructions. To order a stainless steel gasket kit, select a kit ordering number. For other gasket materials, replace **SS** with **A** for aluminum or **KF** for PCTFE (TF series only).

Example: A-2F-K3

Filter Series <sup>①</sup>	Kit Ordering Number
2F	SS-2F-K3
4F	SS-4F-K3
6F, 8F	SS-8F-K3
2TF, 4TF	SS-4TF-K2
6TF, 8TF	SS-8TF-K2

<sup>①</sup> See Dimensions tables, page 7, for filter series information.

#### 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.

### F Series

#### Special Alloys

Filters of alloy C-276 are available in some sizes. Contact your independent Swagelok sales and service representative for more information.

### TF Series

#### Bypass Port

The bypass port at the filter bottom enables sampling or purging. To order, insert a designator into the filter ordering number.

Example:

SS-2TF-F1-05

Filter Series	Bypass Port End Connection	Designator	Overall Height in. (mm)
2TF, 4TF	1/8 in. Swagelok tube fitting	-F1	2.36 (59.9)
	1/8 in. female NPT	-F2	2.09 (53.1)
	1/4 in. Swagelok tube fitting	-F3	2.82 (71.6)
	1/4 in. tube weld	-F8	2.21 (56.1)
6TF, 8TF	1/8 in. female NPT	-F4	2.46 (62.5)
	1/4 in. Swagelok tube fitting	-F5	3.14 (79.8)
	3/8 in. Swagelok tube fitting	-F6	3.20 (81.3)
	1/2 in. Swagelok tube fitting	-F7	3.42 (86.9)

#### Filters Without Elements

TF series filters can be ordered without elements. Add **LE** to the basic ordering number.

Example: SS-2TF-LE

### Oxygen Service

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