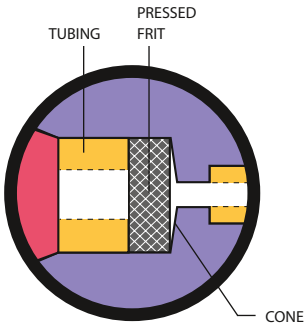
VALCO FITTINGS

There are many flow elements of analytical instruments which require protection from foreign particles, such as orifices that may become plugged or surfaces that may get scratched. However, conventional filtering devices may have too large a volume to be consistent with good system performance – particularly in chromatographic applications.

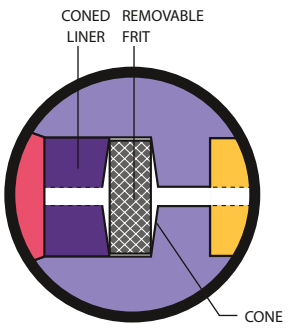
Valco's unique filter design results in extremely low internal volume and simplifies filter element replacement. Filter bodies are "coned" for uniform flow and maximum filter surface area. The filters are made entirely of metal, so they can be used at any instrumentation temperature. While the standard metal is 316 series stainless, filters can be made from alloys that can be used in virtually any application.

We offer a choice of three different filtering elements. All styles are available in bulkhead configurations for mounting on a panel or instrument wall. (Please note that since frits and screens have significantly different thicknesses, they cannot be used interchangeably in the same filter body.)

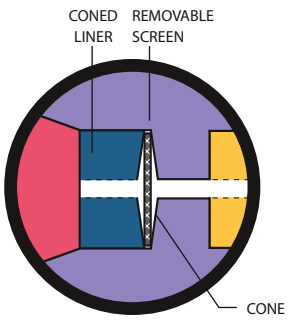
- **Pressed frits**, permanently installed in the filter, are recommended where contaminants are the exception and not the rule. The frits are 2µ stainless.
- **Removable frits** are the best choice for maximum filtration, or if the application requires Hastelloy C or titanium. However, they allow more mixing and tend to clog more than screens. A 2µ frit is included with the filter, but 0.5, 2, and 10µ replacement frits are available in three materials.
- **Removable screens** plug less rapidly and provide lower pressure drop than frits. Since they are thinner, there is less mixing and dispersal than might occur with a frit, but frits provide better filtration. A 2µ screen is included with the filter, and 2 and 10µ stainless replacement screens may be ordered.



Pressed frit



Removable frit



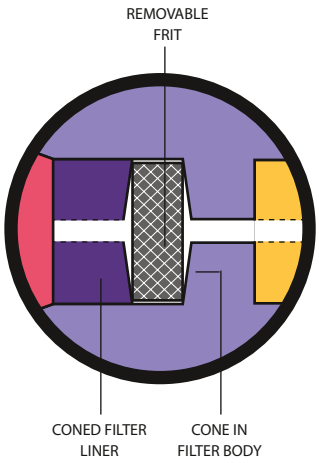
Removable screen

MORE INFORMATION

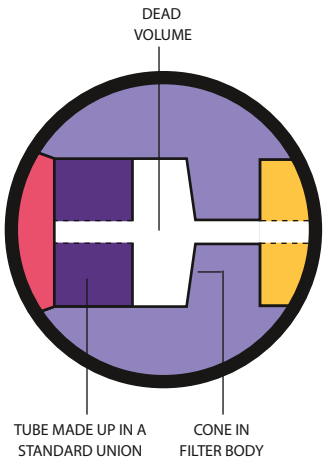
Biocompatible filter . p 78
In-line filters for 1/4-28 fittings 78
Mobile phase filters 79-80

Filters with removable frits are designed to compensate for the thickness of the filter element – the resulting pilot depths are identical with the rest of the Valco product line, facilitating interchangeability of *made up* fittings. Therefore, although our filters look very much like our unions,they are not interchangeable with unions; a filter with its frit removed should not be substituted for a union, because the space designed for the frit introduces dead volume into the system. In addition, since filter bodies are coned, they will have dead volume when used as a union even if the tubing is made up in the filter with a longer, non-standard pilot length.

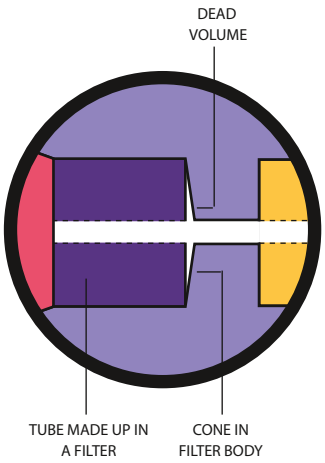
An arrow imprinted on all filter bodies serves to differentiate them from unions and to indicate recommended flow direction.



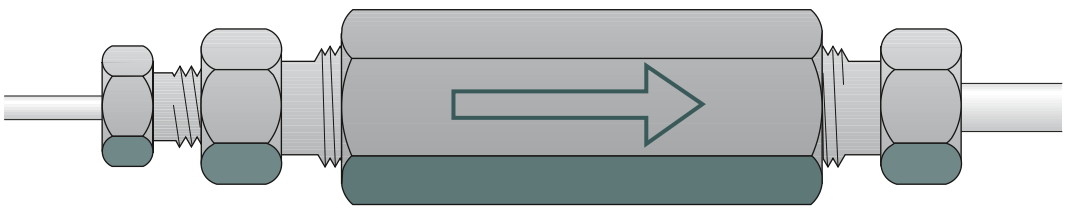
Filter with removable frit
Coned for uniform flow and maximum filter surface



Filter with frit removed being used as a reducing union
Dead volume is created where frit should be



Filter with frit removed being used as a reducing union
Cone in filter body creates dead volume



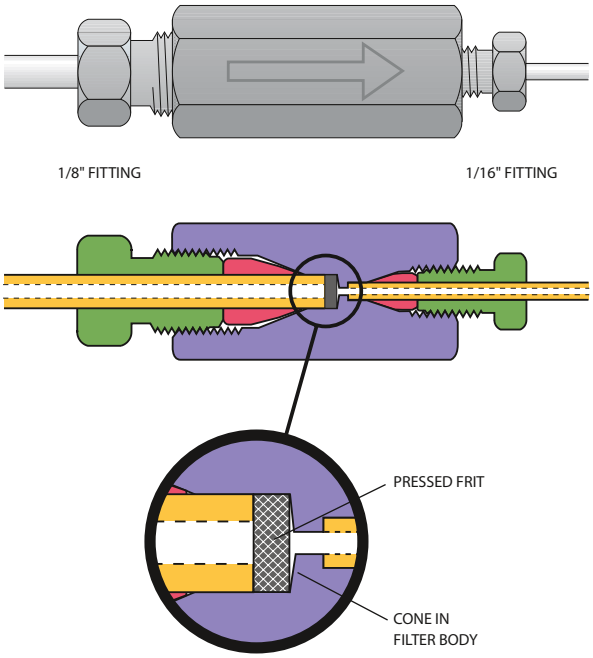
Arrow imprinted on filter body showing recommended direction of flow

VALCO FITTINGS

Filters with a pressed frit

Pressed frit filters contain a permanently installed stainless steel 2µ frit, and are recommended for applications where contaminants are the exception and not the rule – that is, when the sample is generally clean but you wish to guard against the stray burr from a carelessly prepared tube end that might find its way into the flowpath. Standard material is Type 316 stainless.

Description	*Bore*	**Standard** *Prod No*	**Bulkhead** *Prod No*
1/16" to 1/32"	0.25 mm	ZRUF1.5	ZBRUF1.5
1/16" to 1/16"	0.75 mm	ZUF1	ZBUF1
1/8" to 1/16"	0.75 mm	ZRUF21	ZBRUF21
1/8" to 1/8"	0.75 mm	ZUF2	ZBUF2
1/4" to 1/8"	2.00 mm	ZRUF42	ZBRUF42
1/4" to 1/4"	4.60 mm	ZUF4	ZBUF4



Reducing filter with a pressed frit
1/8" to 1/16"
(ZRUF21)

CONVERSIONS

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

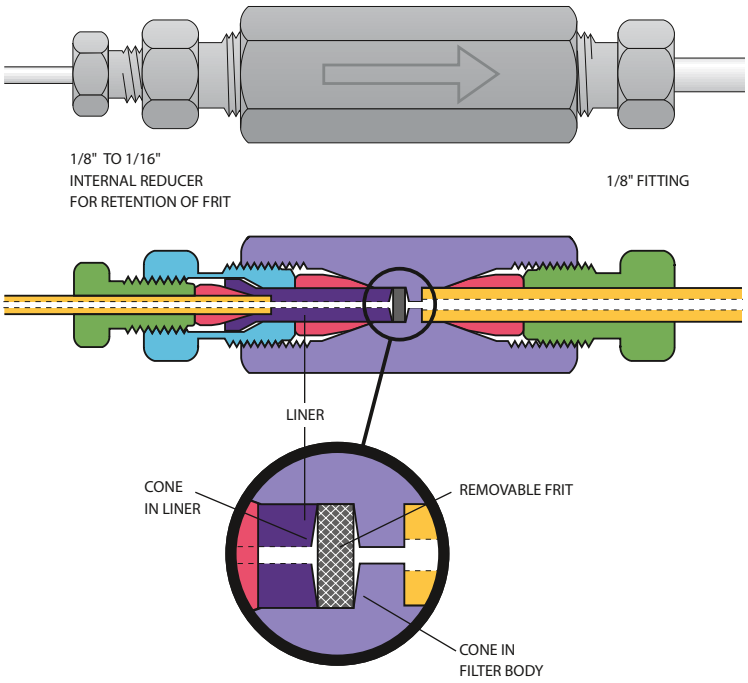
1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

Filters with a removable frit

These filters come with a removable 2µ frit. The standard frit can be replaced with any frit of the proper diameter, *but not by a screen*. These filters are suitable for streams with frequent contamination, since the filtering element is easily changed. Standard material is Type 316 series stainless.

Description	*Bore*	**Standard** *Prod No*	**Bulkhead** *Prod No*
1/32" to 1/32"	0.25 mm	ZUFR.5F	ZBUFR.5F
1/16" to 1/32"	0.25 mm	ZRUFR1.5F	ZBRUFR1.5F
1/16" to 1/16"	0.25 mm	ZUFR1CF	ZBUFR1CF
	0.50 mm	ZUFR1F	ZBUFR1F
1/8" to 1/16"	0.75 mm	ZRUFR21F	ZBRUFR21F
1/8" to 1/8"	2.00 mm	ZUFR2F	ZBUFR2F
1/4" to 1/16"	1.00 mm	ZRUFR41F	ZBRUFR41F
1/4" to 1/8"	2.00 mm	ZRUFR42F	ZBRUFR42F



Reducing filter with a removable frit
1/8" to 1/16"
(ZRUFR21F)

TECH TIP
Should you use a filter with a frit or one with a screen?

Screens have much higher flow capacity (Cv), but frits are the best choice for maximum filtration or if your application requires Hastelloy C or titanium. However, since they are thicker than screens, frits allow more mixing, and the downside of their superior filtration is that they clog more often than screens.

Note! The difference in thickness also means that frits and screens cannot be used interchangeably in the same fitting body:

A frit must always be replaced with a frit.

A screen must always be replaced with a screen.

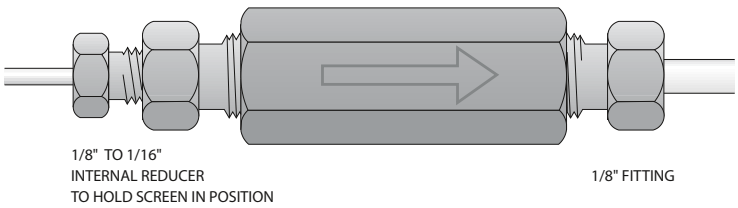
Replacement frits ..... page 53

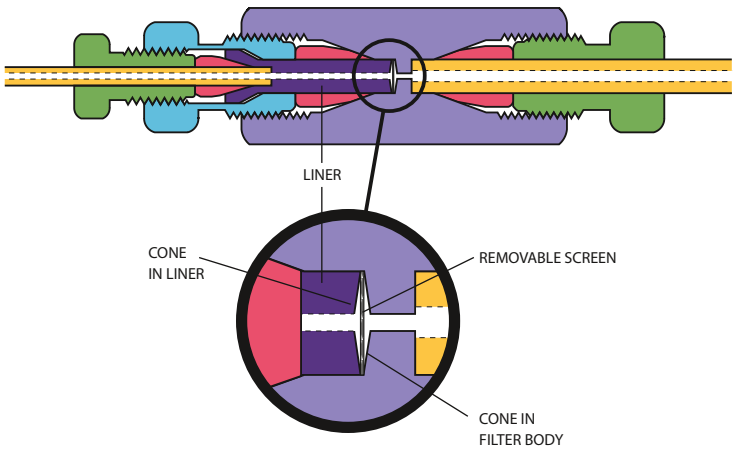
VALCO FITTINGS

Filters with a removable screen

These filters come with a removable 2µ screen. The standard screen can be replaced with any screen of the proper diameter, *but not by a frit*. These filters are suitable for streams with frequent contamination, since the filtering element is easily changed. Standard material is Type 316 series stainless.

Description	*Bore*	**Standard** *Prod No*	**Bulkhead** *Prod No*
1/32" to 1/32"	0.25 mm	ZUFR.5	ZBUFR.5
1/16" to 1/32"	0.25 mm	ZRUFR1.5	ZBRUFR1.5
1/16" to 1/16"	0.25 mm	ZUFR1C	ZBUFR1C
	0.50 mm	ZUFR1	ZBUFR1
1/8" to 1/16"	0.75 mm	ZRUFR21	ZBRUFR21
1/8" to 1/8"	2.00 mm	ZUFR2	ZBUFR2
1/4" to 1/16"	1.00 mm	ZRUFR41	ZBRUFR41
1/4" to 1/8"	2.00 mm	ZRUFR42	ZBRUFR42





Reducing filter with a removable screen
1/8" to 1/16"
(ZRUFR21)

TECH TIP
Should you use a filter with a frit or one with a screen?

Screens have much higher flow capacity (Cv), but frits are the best choice for maximum filtration or if your application requires Hastelloy C or titanium. However, since they are thicker than screens, frits allow more mixing, and the downside of their superior filtration is that they clog more often than screens.

Note! The difference in thickness also means that frits and screens cannot be used interchangeably in the same fitting body:

A frit must always be replaced with a frit.

A screen must always be replaced with a screen.

Replacement screens . . . . . page 53

CONVERSIONS

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

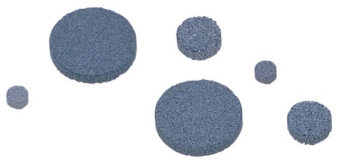
27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

5/16" = .312" = 7.9 mm
3/8" = .375" = 9.5 mm
7/16" = .437" = 11.1 mm

Replacement frits



Other sizes may be available or special ordered in OEM quantities.
Note: If a filter was ordered with a removable frit, the frit ***cannot*** be replaced with a screen.

		Pore Size	*Frit Thickness*	**Stainless Steel** *Prod No*	**Hastelloy C** *Prod No*	**Titanium** *Prod No*
Pkg of 5:	1/32" frits	0.2µ	0.25 mm	.2FR.5-5	—	—
		0.5µ	0.25 mm	.5FR.5-5	—	—
		2µ	0.25 mm	2FR.5-5	—	—
Pkg of 10:	1/16" frits	0.5µ	0.75 mm	.5FR1-10	.5FR1HC-10	—
		2µ	0.75 mm	2FR1-10	2FR1HC-10	2FR1TI-10
		10µ	0.75 mm	10FR1-10	—	—
Pkg of 10:	1/8" frits	0.5µ	1.00 mm	.5FR2-10	.5FR2HC-10	—
		1µ	1.00 mm	1FR2-10	1FR2HC-10	—
		2µ	1.00 mm	2FR2-10	2FR2HC-10	2FR2TI-10
		10µ	1.00 mm	10FR2-10	—	—
Pkg of 10:	1/4" frits	0.5µ	1.00 mm	.5FR4-10	—	—
		2µ	1.00 mm	2FR4-10	2FR4HC-10	2FR4TI-10
		10µ	1.00 mm	10FR4-10	10FR4HC-10	—

WHICH FRIT FITS MY FILTER?

1/16" frit fits:

ZUFR.5F
ZBUFR.5F

ZRUFR1.5F
ZBRUFR1.5F

1/8" frit fits:

ZUFR1CF
ZBUFR1CF

ZUFR1F
ZBUFR1F

ZRUFR21F
ZBRUFR21F

1/4" frit fits:

ZUFR2F
ZBUFR2F

ZRUFR41F
ZBRUFR41F

ZRUFR42F
ZBRUFR42F

WHICH SCREEN FITS MY FILTER?

1/16" screen fits:

ZUFR.5
ZBUFR.5

ZRUFR1.5
ZBRUFR1.5

1/8" screen fits:

ZUFR1C
ZBUFR1C

ZUFR1
ZBUFR1

ZRUFR21
ZBRUFR21

1/4" screen fits:

ZUFR2
ZBUFR2

ZRUFR41
ZBRUFR41

ZRUFR42
ZBRUFR42

Replacement screens

Other sizes may be available or special ordered in OEM quantities. 20µ and 75µ screens are also available.
Note: If a filter was ordered with a removable screen, the screen ***cannot*** be replaced with a frit.

Package of 10:	*Pore Size*	*Screen Thickness*	**Stainless Steel** *Prod No*
1/32" screens	<1µ	0.040 mm	.5SR.5-10
	1µ	0.050 mm	1SR.5-10
	2µ	0.075 mm	2SR.5-10
	10µ	0.125 mm	10SR.5-10
1/16" screens	<1µ	0.040 mm	.5SR1-10
	1µ	0.050 mm	1SR1-10
	2µ	0.075 mm	2SR1-10
	10µ	0.125 mm	10SR1-10
1/8" screens	<1µ	0.040 mm	.5SR2-10
	1µ	0.050 mm	1SR2-10
	2µ	0.075 mm	2SR2-10
	10µ	0.125 mm	10SR2-10
1/4" screens	<1µ	0.040 mm	.5SR4-10
	1µ	0.050 mm	1SR4-10
	2µ	0.075 mm	2SR4-10
	10µ	0.125 mm	10SR4-10

TECH TIP

Our screen materials are described in terms of *nominal* micron retention. For example, a screen with a 2 µ pore size will retain *most* particles 2 µ or larger, but the *absolute* retention will be of particles 7-8 µ in diamter or larger. This is true only of the smallest pore screens:

Pore size	*Nominal* retention	*Absolute* retention
<1µ	<1µ	5-6µ
1µ	1µ	6-7µ
2µ	2µ	7-8µ
10µ	10µ	11-13µ