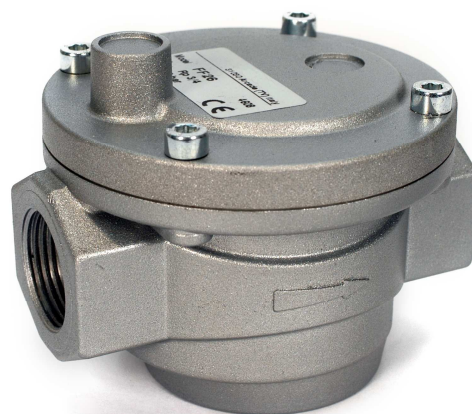




FF

**Fuel Filters
DN15 ... DN25**

FF

Fuel Filters

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Description

The FF type is a filter for fuel pipelines with very high holding capacity of dust and impurities, suitable for the protections of devices installed downstream.

Features

The filters are made of aluminum alloy die-cast, with a range for inlet/outlet connections from DN15 up to DN 50.

Suitable for fuel oil in liquid state or gaseous media.

The incorporated filtering cartridge is a steel support frame covered with a double-layer high performance nonwoven made of polyolefine fibers, which satisfy the stringent requirements of Fire Class F1 according to DIN 53438 and are thus self-extinguishing.

FFS1-FFS2 models are provided with a mesh filter cartridge.

Considering the same connection, the FFS are smaller models of FF filters: the body is more compact with a reduced filtering surface.

Optionally provided with pressure gauges for both inlet and outlet chamber (excluded FFS1-FFS2 models).

All components are designed to withstand any mechanical, chemical and thermal condition occurring during typical service. Effective impregnation and surface treatments have been used to improve mechanical sturdiness, sealing and resistance to corrosion of the components.

Filters are 100% tested by computerized testing machineries and are fully warranted.



WARNING

This appliance must be installed in compliance with the rules in force.

Functioning and application

The FF type filter is designed for installation in fuel lines, to protect downstream fittings.

The filtering cartridge made of nonwoven polypropylene fibers with a metal support frame, is suitable to retain dust and other impurities with size $\geq 30\mu\text{m}$ ($50\mu\text{m}$ for mesh filter of FFS1-FFS2).

When the dust storage capacity is exceeded or if there is an excessive pressure difference, the filter loses its protective function. In this case the filter element must be cleaned or replaced.

The mesh filter cartridge of FFS1-FFS2 models is easy washable.

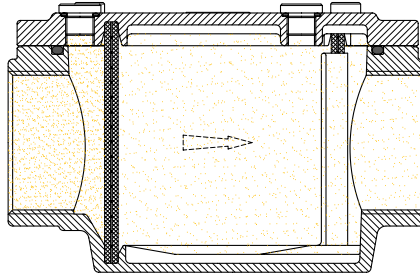


Fig.1



WARNING

Location and mode of installation must be in compliance with local rules in force.

Accessories and optionals

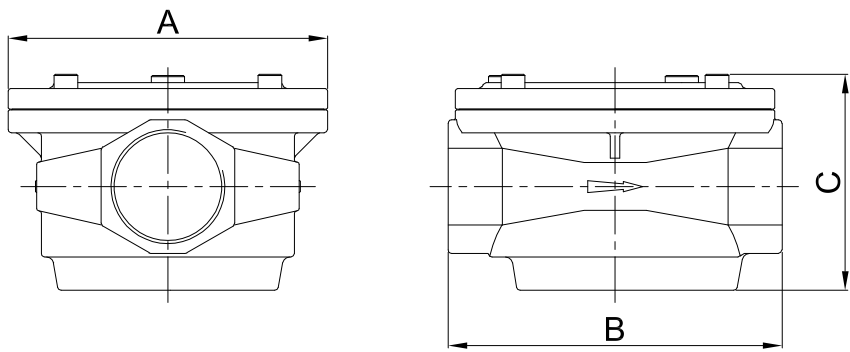
Inlet and outlet pressure chambers can be provided with pressure gauges, to connect a differential pressure switch to monitor the pressure difference.

On request a test point fitting can be provided (mounting in charge of the user).

Technical specifications

Tab. 1

Connections	Gas threaded ISO 7-1 from Rp1/2 to Rp2
Max. operating pressure	2 bar (200 kPa)
Ambient temperature	-15°C / +80°C
Flow capacity	see charts
Pore width of filter element	$\leq 50\mu\text{m}$ (mesh filter cartridge FFS1, FFS2) $\leq 30\mu\text{m}$ (double-layer polypropylene cartridge)
Filtration class	G4 according to EN 779
Pressure gauges (when provided)	Inlet and outlet chambers G1/8 onto threaded models (except FFS1-FFS2)
Installation	Into horizontal and vertical pipeline
Materials in contact with media	Aluminium alloy Plated steel Polypropylene fibers Nitrile rubber (NBR) Fluoroelastomer (FPM) (optional)



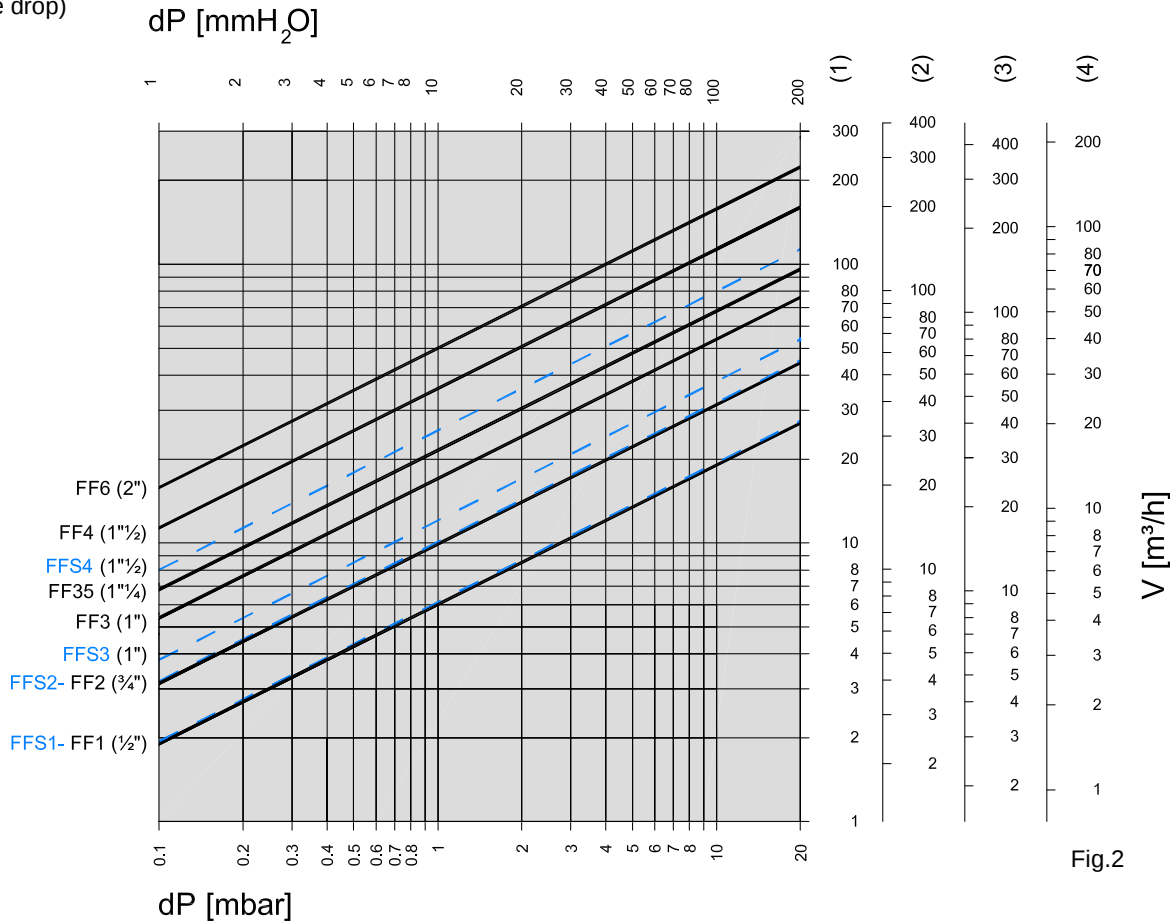
Tab. 2

Model	Connection	Flow factor Kvs (*) [m ³ /h]	Overall dimensions [mm]					Weight [Kg]	Filtering area [cm ²]
			A	B	C	Int	h		
FFS1	Rp 1/2	6,8	60	70	60			0,24	17
FF1	Rp 1/2	6,8	88	96	84			0,39	55
FFS2	Rp 3/4	11	60	70	60			0,22	17
FF2	Rp 3/4	11	88	96	84			0,38	55
FFS3	Rp 1	14	88	96	84			0,36	55
FF3	Rp 1	19	134	140	91			0,97	145
FF35	Rp 1 1/4	24	134	140	91			0,91	145
FFS4	Rp 1 1/2	28	134	140	91			0,85	145
FF4	Rp 1 1/2	40	182	208	128			2,2	330
FF6	Rp 2	56	182	208	128			2,0	330

(*) in the hypothesis of working with gaseous media

Flow chart for gaseous media

(Pressure drop)



Formula of conversion

from air to other gas media

Tab. 3

$$V_{GAS} = k \cdot V_{AIR}$$

Gas type	Specific gravity ρ [Kg/m ³]	$k = \sqrt{\frac{125}{\rho_{GAS}}}$
(1) Air	1,25	1,00
(2) Natural gas	0,80	1,25
(3) Town gas	0,57	1,48
(4) LPG	2,08	0,77

15°C, 1013 mbar, dry

When the flow read on the diagram is referred to operating pressure instead of standard conditions, the pressure drop Δp read on the diagram must be multiplied for the factor (1+ relative pressure in bar):

Example:

In the 1/2" filter with an air flow of 10 Nm³/h there is a pressure drop $\Delta p = 3$ mbar.

If we consider that 10 m³/h is the flow at 2 bar of inlet pressure, then the pressure drop to be consider is:

$$\Delta p = 3 \times (1 + 2) = 9 \text{ mbar}$$



Filter must be selected considering the following:

- Pressure drops $\Delta p \leq 10$ mbar
- Flow velocities $w \leq 20$ m/s

Normally, pressure drop and flow rate for the filters are read from the gas flow diagram. However, the filters can also be chosen in accordance with the characteristic "Kvs value" which is shown in table 2.

The selection of the filter requires the calculation of the Kv under the operating conditions.

Considering only subcritical pressure drops:

$$\Delta p < \frac{p_1}{2}$$

Kv can be calculated with the formula:

$$Kv = \frac{V}{514} \sqrt{\frac{\rho(t + 273)}{\Delta p \cdot p_2}}$$

where

- V = flow rate [Nm³/h]
- Kv = flow factor [m³/h]
- ρ = density [Kg/m³]
- p_1 = absolute inlet pressure [bar]
- p_2 = absolute outlet pressure [bar]
- Δp = differential pressure $p_1 - p_2$ [bar]
- t = media temperature [°C]

To the Kv value calculated from operating conditions we add an allowance of 20%, to obtain the minimum Kvs value which the filter should have:

$$Kvs > 1,2 Kv$$

Example:

We need a filter with a capacity of 10 Nm³/h of air at 15°C, with an inlet pressure $p_1 = 2$ bar. Considering a pressure drop $\Delta p_{max} = 10$ mbar, we obtain:

$$K_v = \frac{10}{514} \sqrt{\frac{1.25(15 + 273)}{0.010 \cdot (1 + 2)}} = 2.13 \text{ m}^3 / \text{h}$$

The filter with $K_v > (1.2 \times 2.13) = 2.5 \text{ m}^3/\text{h}$ is the Rp1/2, which has $K_v=6.8 \text{ m}^3/\text{h}$ (table 2).
The diagram shows that in a Rp1/2 filter with $10 \text{ Nm}^3/\text{h}$ of air there is a pressure drop:

$$\Delta p = 9 \text{ mbar}$$

Ordering information

Tab.4

	FF	3	2	-
Filter type FF or FFS				
Connections size				
1 = 1/2"				
2 = 3/4"				
3 = 1"				
35 = 1"1/4				
4 = 1"1/2				
6 = 2"				
Max pressure: 2 bar				
Special version				
+: FFS12 or FFS22 with 30µm filtering element				
A: pressure gauges 1/8" (except FFS12 and FFS22)				

Example:

FFS22: fuel filter with connection 3/4" (max pressure 2 bar, mesh filtering element $\leq 50 \mu\text{m}$)

FF352: fuel filter with connection 1"1/4 (max pressure 2 bar, filtering element $\leq 30 \mu\text{m}$)

FFS12+: fuel filter with connection 1/2", filtering element $\leq 30 \mu\text{m}$ (max pressure 2 bar)

FF62A: fuel filter with connection 2", pressure gauges 1/8" at inlet and outlet (max pressure 2 bar, filtering element $\leq 30 \mu\text{m}$)



Manufacturer reserves the right to update or make technical changes without prior notice.

Standards and approvals

Quality Management System is certified according to UNI EN ISO 9001 and the monitoring is carried out by the notified body:

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