

FG

**Gas Filters
DN15 ... DN300**

FG

Gas Filters

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Description

The FG type is a filter for gas pipelines according to DIN 3386, 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 wide range for inlet/outlet connections from DN15 up to DN 300.

Suitable for natural gas, town gas, LPG (gaseous) and air. On request the filters can be provided with special seals suitable for aggressive gases.

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.

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

FGS1-FGS2 models are provided with a mesh filter cartridge.

FG98-FG910-FG912 models are provided with a 2-stage single-layer filtering cartridge.

Provided with pressure gauges for both inlet and outlet chamber (optional for threaded 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.

Functioning and application

The FG type filter is designed for installation in gas lines and compressed air 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 $\geq 30\mu\text{m}$.

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 replaced.

FGS1-FGS2 models are provided with a mesh filter cartridge ($50\mu\text{m}$), which is easy washable.

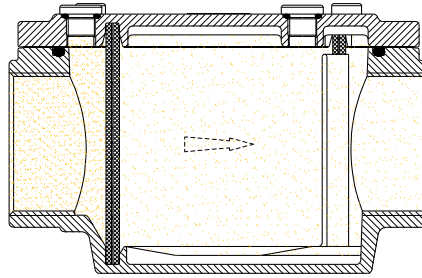


Fig.1

Figure 2 shows an example of installation.

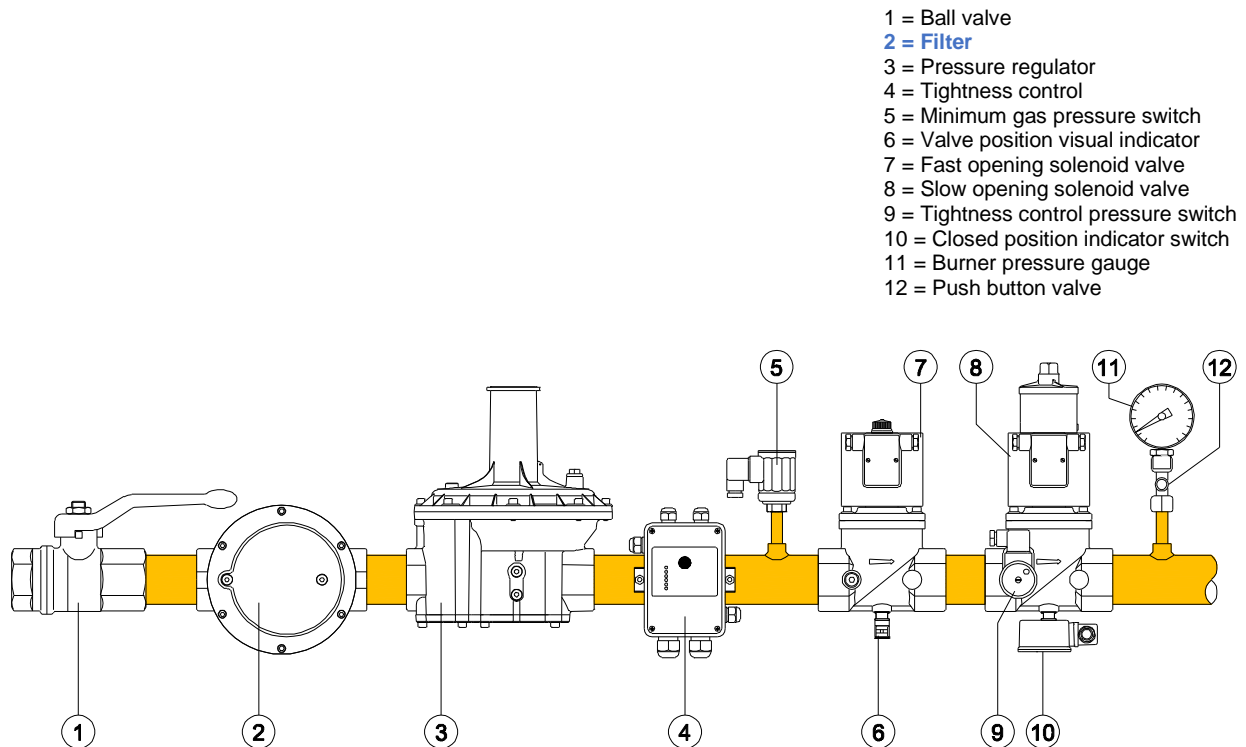


Fig.2

Technical specifications

Tab. 1

Connections	Gas threaded ISO 7-1 from Rp1/2 to Rp2 or ANSI-ASME B1.20 from 1/2"NPT to 2"NPT Flanged PN16 – ISO 7005 from DN65 to DN300 or ANSI-ASA-ASME B16.5 class 150 from 2" to 10"
Max. operating pressure	2 bar (30 psig) 6 bar* (90 psig)
Body test pressure	3 bar (45 psig) 9 bar* (130 psig)
Ambient temperature Media temperature	-40°C / +80°C (-40°F to +176°F)
Flow capacity	see charts
Pore width of filter element	≤ 50 µm (mesh filter cartridge FGS1, FGS2) ≤ 30 µm (double-layer polypropylene cartridge) ≤ 5 µm (optional - polypropylene cartridge)
Filtration class	G4 according to EN 779
Pressure gauges (when provided)	Inlet and outlet chambers 1/8" onto threaded models (except FGS1-FGS2) 1/4" onto flanged models
Installation	Into horizontal and vertical pipeline
Gas type	Natural gas, town gas, LPG (gaseous) of families 1,2,3 biologically produced methane and air On request special version for aggressive gases

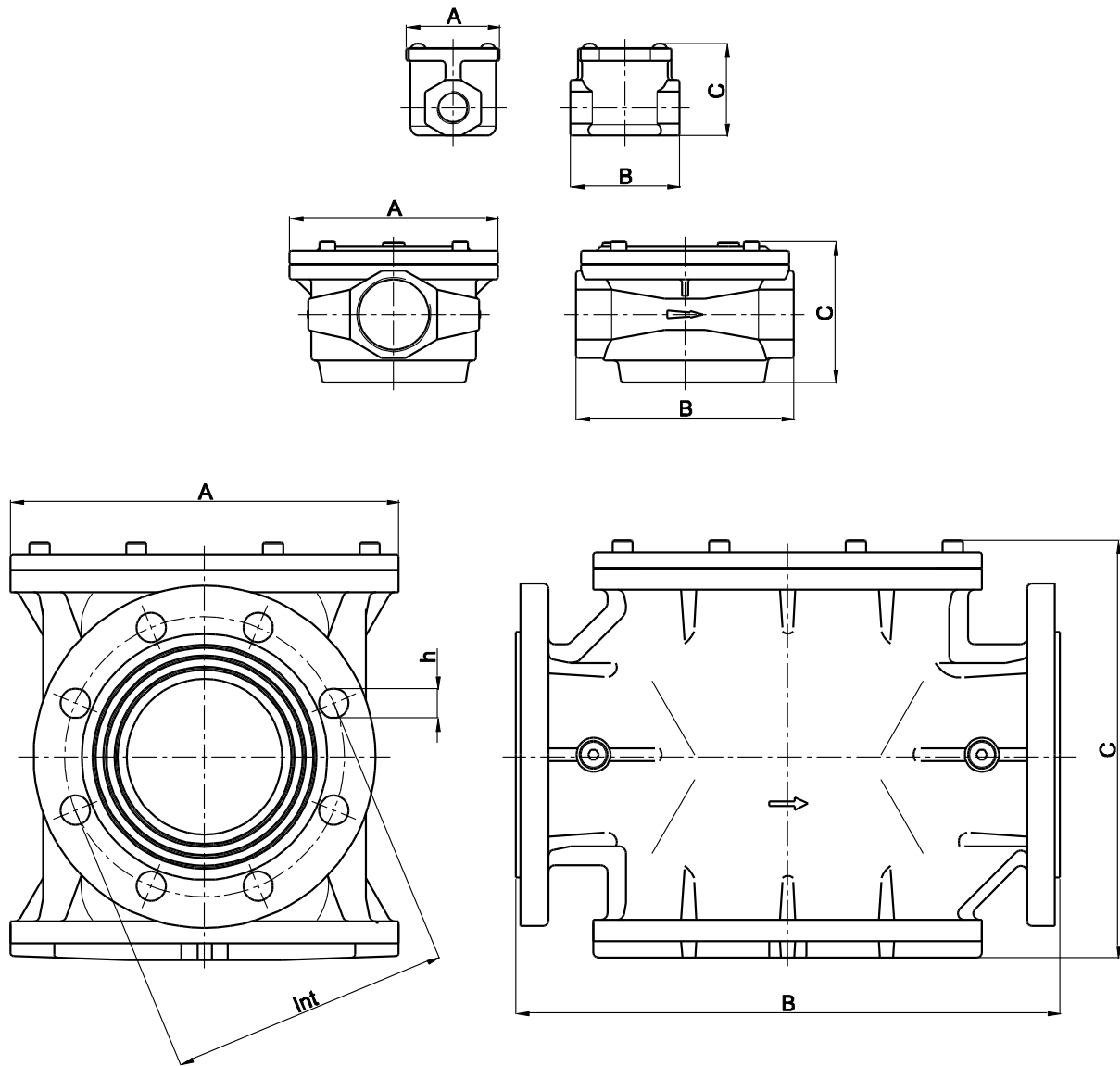


Fig.3

Tab. 2

Model	Connection	Flow factor Kvs [m ³ /h]	Overall dimensions [mm]					Weight [Kg]	Filtering area [cm ²]
			A	B	C	Int	h		
FGS1	Rp 1/2	6,8	60	70	60			0,24	17
FGS2	Rp 3/4	11	60	70	60			0,22	17
FG1	Rp 1/2	6,8	88	96	84			0,39	55
FG2	Rp 3/4	11	88	96	84			0,38	55
FGS3	Rp 1	16	88	96	84			0,36	55
FG3	Rp 1	22	134	140	91			0,97	145
FG35	Rp 1 1/4	26	134	140	91			0,91	145
FGS4	Rp 1 1/2	30	134	140	91			0,85	145
FG4	Rp 1 1/2	50	182	208	128			2,2	330
FG6	Rp 2	70	182	208	128			2,0	330
FG4 ⁽¹⁾	DN 40	50	182	260	165	110	4x18	3,6	330
FG6 ⁽¹⁾	DN 50	70	182	260	165	125	4x18	3,8	330
FG7	DN 65	110	200	304	217	145	4x18	8,6	535
FG8	DN 80	150	200	304	217	160	8x18	8,5	535
FG9	DN 100	200	250	350	265	180	8x18	13,5	860
FG93	DN 125	350	315	460	347	210	8x18	22,8	1540
FG95	DN 150	450	315	460	347	240	8x23	24,5	1540
FG98	DN 200	460	370	546	420	295	12x23	47	2760 ⁽²⁾
FG910	DN 250	550	405	600	466	355	12x28	69	3100 ⁽²⁾
FG912	DN 300	820	460	700	537	410	12x28	96	4200 ⁽²⁾

(1) flanged kit (2) filtering area is the sum of the two stages

Gas flow chart

(Pressure drop)

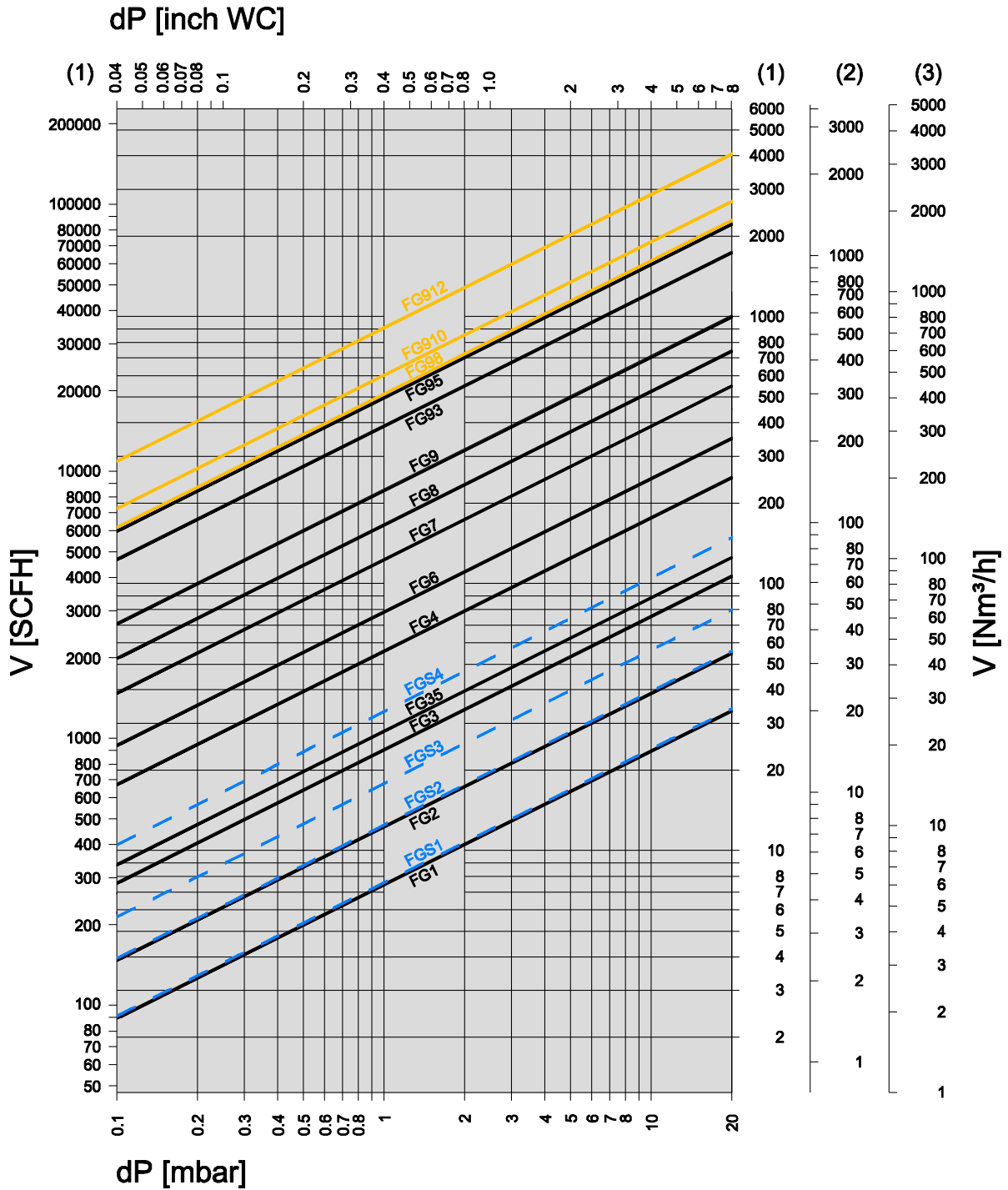


Fig. 4

Formula of conversion from air to other gases

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

Tab. 3

Gas type	Specific gravity ρ [Kg/m³]	$k = \sqrt{\frac{1.25}{\rho_{GAS}}}$
(1) Natural gas	0,80	1,25
(2) LPG	2,08	0,77
(3) Air	1,25	1,00

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:

For a filter with size 1"½ and a natural gas flow of 80 Nm³/h the pressure drop is $\Delta p = 2$ mbar. If we consider that 80 m³/h is the flow at 2 bar of gas pressure, then the effective pressure drop to be consider is:

$$\Delta p = 2 \times (1 + 2) = 6 \text{ mbar}$$



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 100 m³/h of natural gas, with a pressure of 2 bar and a temperature of 15°C, corresponding to 300 Nm³/h at standard conditions. Considering an actual pressure drop $\Delta p_{max} = 10$ mbar, we obtain:

$$Kv = \frac{300}{514} \sqrt{\frac{0.8 \cdot (15 + 273)}{0.010 \cdot (1 + 2)}} = 51 \text{ m}^3/\text{h}$$

The filter with Kvs > (1,2 x 51) = 61 m³/h is the size 2", which has Kvs=70 m³/h (table 2). By applying the inverse formula, the effective pressure drop can be obtained:

$$\Delta p = 5,2 \text{ mbar}$$

Ordering information

Tab.4

				FG	2	2	A	.J	
Filter type									
Size									
S1	1/2" small								
S2	3/4" small								
S3	1" small								
S4	1"½ small								
1	1/2"	8	3"						
2	3/4"	9	4"						
3	1"	93	5"						
35	1"¼	95	6"						
4	1"½ ⁽¹⁾	98	8"						
6	2" ⁽¹⁾	910	10"						
7	2"½	912	12"						
Max. Operating pressure									
2	2 bar (30 psig)								
6	6 bar (90 psig)								
Connection									
none	Rp internal thread / ISO flange								
A	Rp internal thread / ISO flange with pressure gauges								
N	NPT internal thread / ANSI flange								
NA	NPT internal thread / ANSI flange with pressure gauges								
Special versions									
J	special seals for aggressive gases								
K	special seals with metal cartridge								
M	5 µm cartridge								
+	FGS1-2 with nonwoven cartridge								

(¹) Flanged connections with optional kit

Accessories and optionals

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

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

The threaded models 1"½ and 2" can be provided with flanged connections using an optional kit.

Standards and approvals

The product complies with the essential requirements of the following European Directives and their amendments:



2014/68/EU (Pressure Equipment Directive)
2011/65/EU (RoHS II)

CE-Reg.-No. PED/0497/2875/14



The product complies with the Technical Regulation RT UD 032/2013 of Russia, Belarus and Kazakhstan.

Declaration of Conformity No.: **CN № RU Д-IT.PA01.B.40716**

Quality Management System is certified according to UNI EN ISO 9001.



Elektrogas is a brand name of:

Elettromeccanica Delta S.p.A.
Via Trieste 132
31030 Arcade (TV) – ITALY

tel +39 0422 874068
fax +39 0422 874048
www.delta-elektrogas.com
info@delta-elektrogas.com

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