IN-LINE

Filters for Mass Flow Meters / Controllers

> General

Inherent to its construction, a thermal mass flow meter or controller for gases is sensitive to contamination. To increase the MTBF (Mean Time Between Failure) it is important to make sure that the gas entering the instrument to clean. The IN-LINE Filter Assembly, screwed into the inlet of the instrument, provides this service. It contains a 316L sintered metal filter cartridge that is suitable for general purpose filtration and can be cleaned with a suitable solvent. If the gas contains a large particulate content, we advise the use of a pre-filter.

> Selection

- Choose a low-flow or medium-flow style filter for instruments with $^1/_4$" female thread at the inlet; the high-flow filter is suitable for mounting into instruments with $^1/_2$" female thread.
- In principle select finest porosity with low ΔP; preferable ΔP not higher than 250 to 500 mbar, and porosity not bigger than 5 µm.

> Pressure rating

Models M-410 and M-411: 100 bar.
Models M-422 and M-423: 200 bar.

> Pressure drop

The approximate pressure drop across a filter assembly can be calculated as follows:

Example:
Flow 80 l_n/min air, pressure 5 bara, filter selected: M-422-17 (5 µm).

At P1 = 1 bara, ΔP across filter = 389 mbar (see graph).

At P1 = 5 bara, $\Delta P = \frac{389}{5} = 78$ mbar.

For other gases than air the pressure drop is difficult to calculate, because the total pressure drop is built up from both laminar and turbulent pressure losses; therefore contact factory regarding exact pressure losses, if so required.

> Material of construction

Housing: AISI 316
O-rings: Viton; optional EPDM and FFKM (Kalrez).

Style	Model no.	Average porosity	Type / area	Connections in / out
Ultra-low-flow	M-410-13	0,5 µm	316L / 2,5 cm²	1/8" female / 1/8" male
	M-410-16	2 µm	316L / 2,5 cm²	1/8" female / 1/8" male
	M-410-18	7 µm	316L / 2,5 cm²	1/8" female / 1/8" male
	M-410-20	15 µm	316L / 2,5 cm²	1/8" female / 1/8" male
Low-flow	M-411-13	0,5 µm	316L / 2,5 cm²	1/4" female / 1/4" male
	M-411-16	2 µm	316L / 2,5 cm²	1/4" female / 1/4" male
	M-411-18	7 µm	316L / 2,5 cm²	1/4" female / 1/4" male
	M-411-20	15 µm	316L / 2,5 cm²	1/4" female / 1/4" male
Medium-flow	M-422-16	2 µm	316L / 5 cm²	1/4" female / 1/4" male
	M-422-17	5 µm	316L / 5 cm²	1/4" female / 1/4" male
	M-422-19	10 µm	316L / 5 cm²	1/4" female / 1/4" male
	M-422-21	20 µm	316L / 5 cm²	1/4" female / 1/4" male
High-flow	M-423-16	2 µm	316L / 5 cm²	1/2" female / 1/2" male
	M-423-17	5 µm	316L / 5 cm²	1/2" female / 1/2" male
	M-423-19	10 µm	316L / 5 cm²	1/2" female / 1/2" male
	M-423-21	20 µm	316L / 5 cm²	1/2" female / 1/2" male
	M-423-22	40 µm	316L / 5 cm²	1/2" female / 1/2" male

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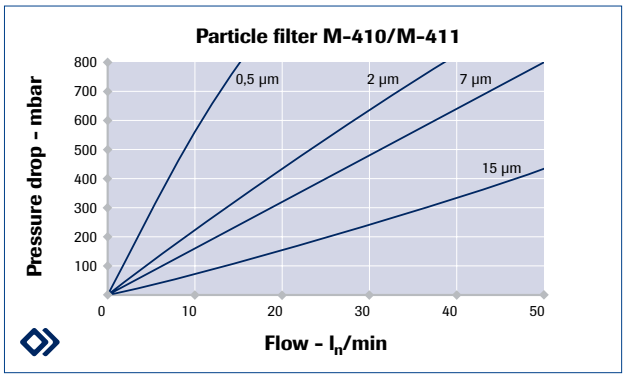
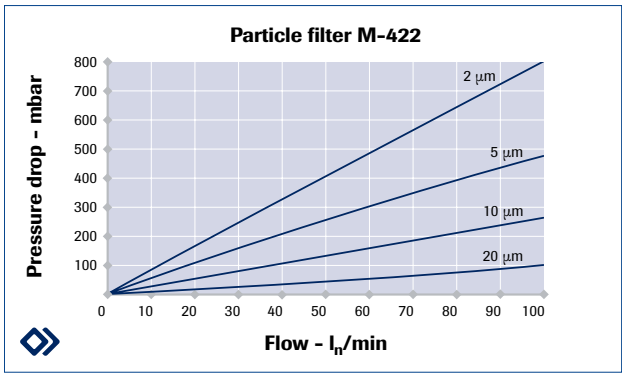
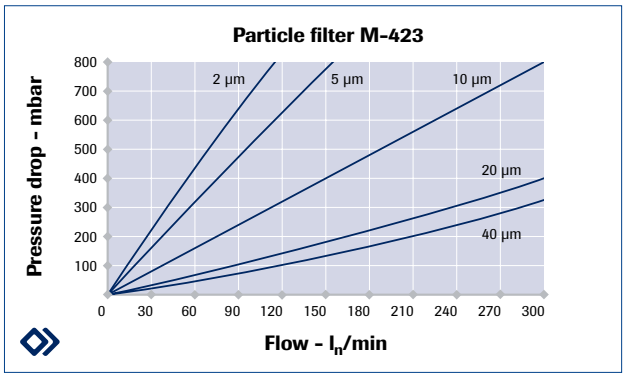
> Pressure drop

(Air at 1 bar, 20 °C, pressure vs. flow)







> Model number identification

M - NNN - NN - N0 - A

Filter housing

410	Ultra-low-flow (max. 100 bar)
411	Low-flow (max. 100 bar)
422	Medium-flow (max. 200 bar)
423	High-flow (max. 200 bar)

Filter cartridge

13	0,5	micron sintered metal
16	2	micron sintered metal
17	5	micron sintered metal
18	7	micron sintered metal
19	10	micron sintered metal
20	15	micron sintered metal
21	20	micron sintered metal
22	40	micron sintered metal

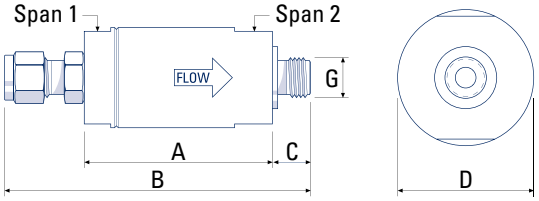
Inlet adaptor

00	none
10	1/8" OD compression type
20	1/4" OD compression type
30	6 mm OD compression type
40	12 mm OD compression type
50	1/2" OD compression type
60	20 mm OD compression type
80	1/4" Face seal male
90	other

Seals

E	EPDM
F	FFKM (Kalrez)
V	Viton (factory standard)

> Dimensions



Model	A	B	C	D	G	Span 1	Span 2
M-410	53	89	10	ø 24	1/8"	20	20
M-411	53	91	10	ø 24	1/4"	20	20
M-422	70	106	10	ø 35	1/4"	30	32
M-423	80	129	14	ø 35	1/2"	30	32

Dimensions in mm. Technical specifications and dimensions subject to change without notice.

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