

3M Science. Applied to Life.™

3M Separation and Purification Sciences Division

High flow capability; compact design.

The 3M™ High Flow Filter System is a result of 3M's extensive filtration experience applied to delivering high flow filter technology in a compact design. Ideal for those customers who want filtration efficiency and a small footprint.

High performance media in an innovative design.



3M™ High Flow single round filter system range



3M Compound radial pleat design



'Twist-to-lock' cartridge seating mechanism

High flow capability

The 3M™ High Flow Filter System is designed to accommodate flow rates of up to 113m³/hr in a single 60" (1524mm) length filter cartridge.

The result? Fewer filter cartridges to maintain your process flow requirements. In fact, 3M High Flow filter systems require as few as one-tenth the number of filter cartridges as conventional 2.5" (63.5mm) outer diameter (OD) filter systems. (see Figure 1).

3M high efficiency filter media in a compound radial pleat structure

3M innovation is at the heart of the 3M High Flow filter. A compound radial pleat design helps maximise the usable surface area of each filter. Blown microfibre forms the basis of the filter media, which is manufactured to tightly-controlled fibre diameter specifications, producing a media with absolute-rated particle retention characteristics. The 3M manufacturing process embosses the media to produce a more uniform pleat pattern, which, in turn, allows greater utilisation of the media by evenly distributing the process fluid throughout the entire filter structure. This results in consistent particle retention in a compact, space-saving design. 3M High Flow cartridge's polypropylene end caps, outer sleeve, and core protect the pleat structure integrity and provide a robust filter construction.

Compact system design

Fewer required filter cartridges combined with an outside-to-inside flow path reduces the size of housing required for your application. The 3M High Flow filter housing takes up as little as one-half the size of conventional 2.5" (63.5mm) OD filter cartridge housings for a given flow rate. The result is lower capital investment costs and a compact footprint that saves valuable plant space.

Ease of use with twist-to-lock

The 3M High Flow filter system is designed with ease-of-use in mind. From a user-friendly, ergonomically designed handle that makes cartridge installation and removal easier without the use of special tools or other hardware, to a 'twist-to-lock' cartridge seating mechanism that provides a positive seal, the 3M High Flow filter system facilitates easy operation and maintenance of your filter system.

Features	Benefits
High flow capability per cartridge (vs. conventional 2.5" (63.5mm) OD cartridges)	Fewer cartridges required, resulting in: ▸ Reduced cartridge handling and disposal ▸ Reduced filter change-out time ▸ Less individual cartridge seal points, reducing chance of fluid bypass
Compound radial pleat design using 3M blown microfibre polypropylene media	▸ High filter loading capacity ▸ Reproducible filter effluent quality throughout life of filter ▸ Broad chemical compatibility
Compact system design	▸ Smaller housing minimises capital expense requirements ▸ Reduces system footprint
Easy to use	▸ No special tools or hardware required for filter change-out ▸ 'Twist-to-lock' cartridge seating mechanism provides positive seal ▸ Ergonomic designed handle facilitates cartridge installation and removal
Approved for food contact use 	▸ Complies with European regulations (Food Contact Directive (EC) 1935/2004) and US regulations (FDA CFR-21)

Applications

Industrial
Municipal water, RO prefiltration, reclaimed water, coolants, nozzle protection, boiler condensate

Chemical
Quench water, aqueous salt solutions, final products

Petrochemicals
Waterflooding, produced water, enhanced oil recovery, completion fluids, amine sweetening, final products

Electronics
RO prefiltration, process water

Food and beverage
Process and blending water, D.E. trap filtration, barrel char removal, final bottling

Pharmaceutical
Process water

Lower process flow applications

The new High Flow 10" (254mm) filter system allows users to take advantage of all of the benefits of the High Flow technology for lower process flow applications (such as modular water treatment systems and product filling lines).

3M™ High Flow Filter Cartridge design features

Ease of use

An ergonomically designed handle facilitates fast and easy insertion and removal without the use of special tools. Cartridges are simply inserted over a built-in guide tube. Fewer cartridges mean filter change-outs are quicker and easier.

Polypropylene construction

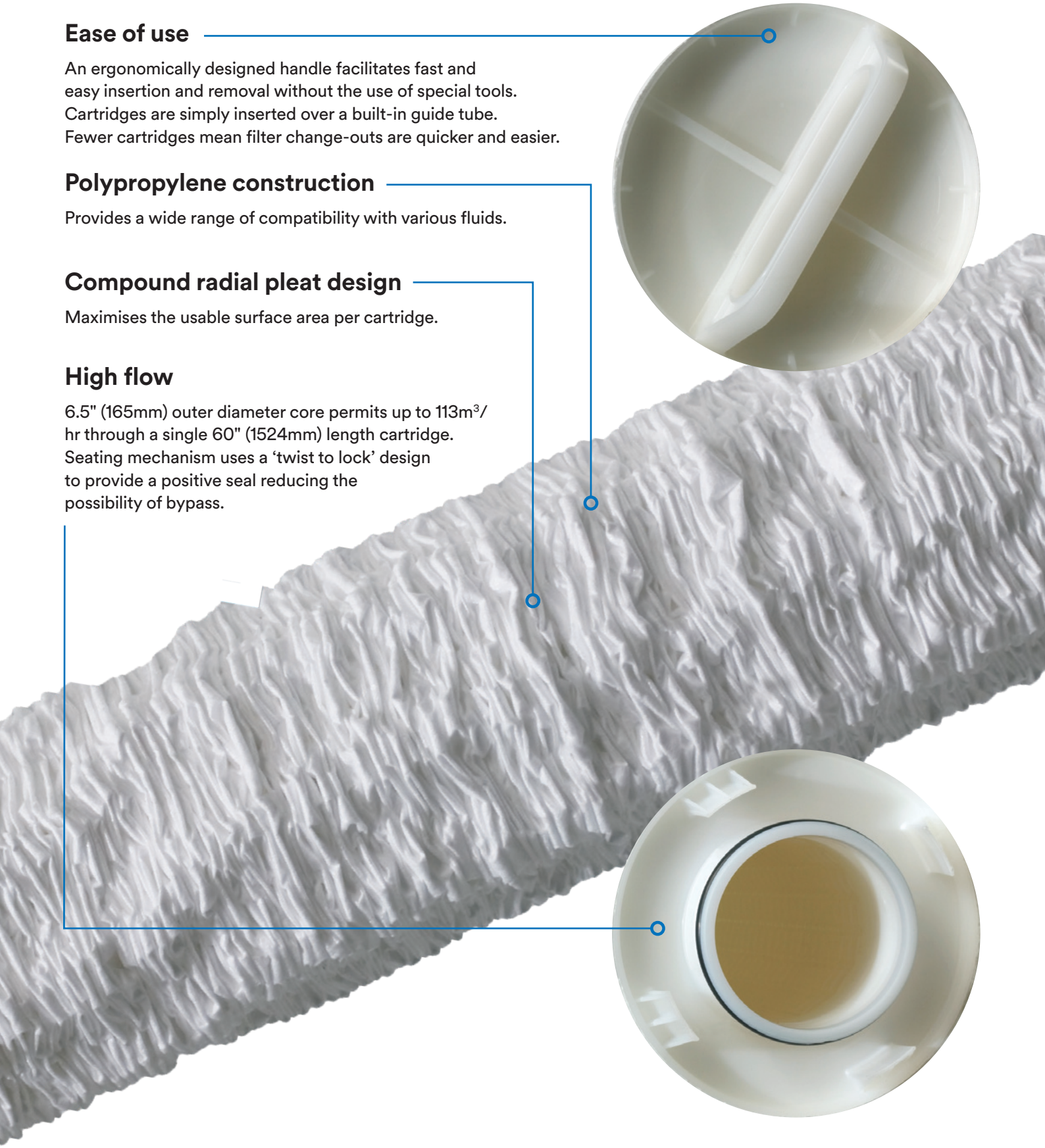
Provides a wide range of compatibility with various fluids.

Compound radial pleat design

Maximises the usable surface area per cartridge.

High flow

6.5" (165mm) outer diameter core permits up to 113m^3/hr through a single 60" (1524mm) length cartridge. Seating mechanism uses a 'twist to lock' design to provide a positive seal reducing the possibility of bypass.



3M™ High Flow Filter System vs. conventional filter system comparison

3M High Flow filter system vs. conventional 2.5" (63.5mm) outer diameter (OD) filter systems comparison basis

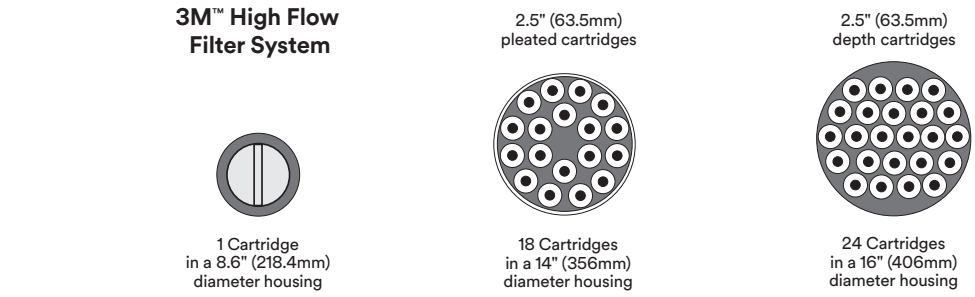
- 40" (1016mm) length cartridges
- Fluid viscosity: 1 cP

Flow rates per cartridge

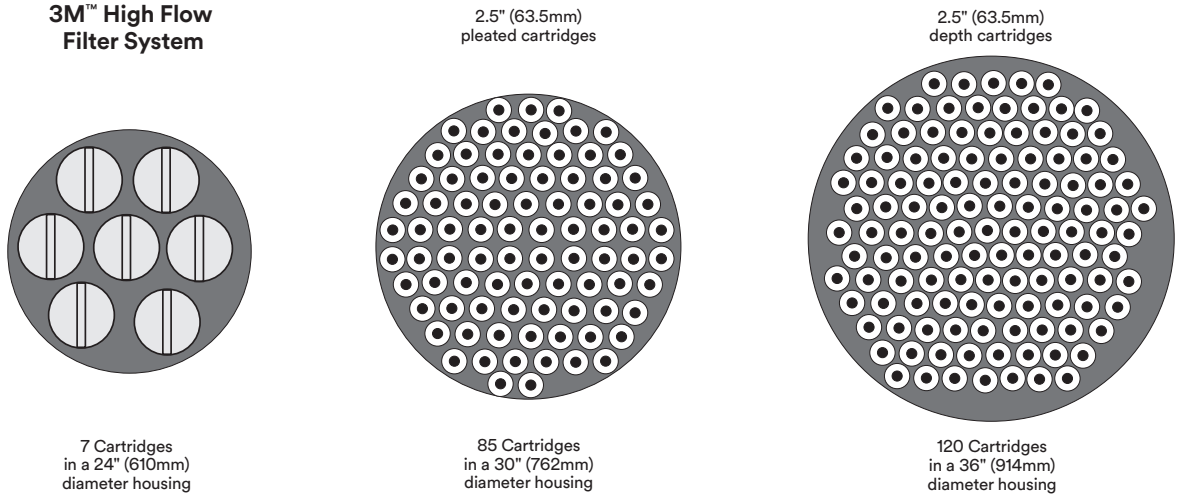
- 6.5" (165mm) OD 3M™ High Flow Cartridge: 80 m^3/hr
- 2.5" (63.5mm) OD conventional pleated cartridge: 5 m^3/hr
- 2.5" (63.5mm) OD conventional depth cartridge: 3 m^3/hr

Figure 1: Comparison of required filter cartridges and housing footprint.

80 m^3/hr System



454 m^3/hr System



The bottom line

- The 3M™ High Flow Filter System requires 90% fewer cartridges than conventional 2.5" (63.5mm) OD cartridge systems for a given flow rate
- 3M High Flow filter housings are 33% to 50% smaller than filter housings for conventional 2.5" (63.5mm) OD cartridges for a given flow rate
- Fewer filters and a user-friendly housing design mean easier and faster filter change-outs

3M™ High Flow Filter Cartridge specifications

Materials of construction

Filter media

Each grade of 3M High Flow filter is manufactured from food contact compliant meltblown polypropylene microfibre media, providing high particle removal efficiency with broad chemical compatibility. No adhesives, binders or silicone are used in the manufacturing process. All support layers are constructed with polypropylene.

O-rings

O-rings are available in a variety of materials to suit your application including the standard nitrile, ethylene propylene rubber (EPR), silicone and fluorocarbon.

Cartridge length			
Nominal	10" (254mm)	40" (1016mm)	60" (1524mm)
Construction			
Absolute rating (microns)	1, 2, 5, 10, 15, 25, 40, 70		
Filter media, center core, end caps, outer sleeve	Polypropylene		
Sealing o-ring options	Nitrile, ethylene propylene rubber (EPR), silicone, fluorocarbon		
O-ring size/end cap connection	3" NB (76.2mm)		
Cartridge dimensions			
Inside diameter (nominal)	3" (76.2mm)		
Outside diameter (nominal)	6.5" (165mm)		
Operating conditions			
Maximum recommended flow rate in water (@20° C)	19.3m³/hr	80m³/hr	113m³/hr
Maximum continuous operating temperature	71°C (160 °F)		
Maximum hot water sanitisation temperature	90°C (194 °F)		
Maximum forward differential pressure	3.4 bar @ 20°C		
Recommended change-out differential pressure	2.4 bar @ 20°C		
Clean pressure drop	See page 7		
Regulatory			
FDA CFR-21 Listed materials of construction	✓	✓	✓
Food Contact Directive (EC) 1935/2004	✓	✓	✓

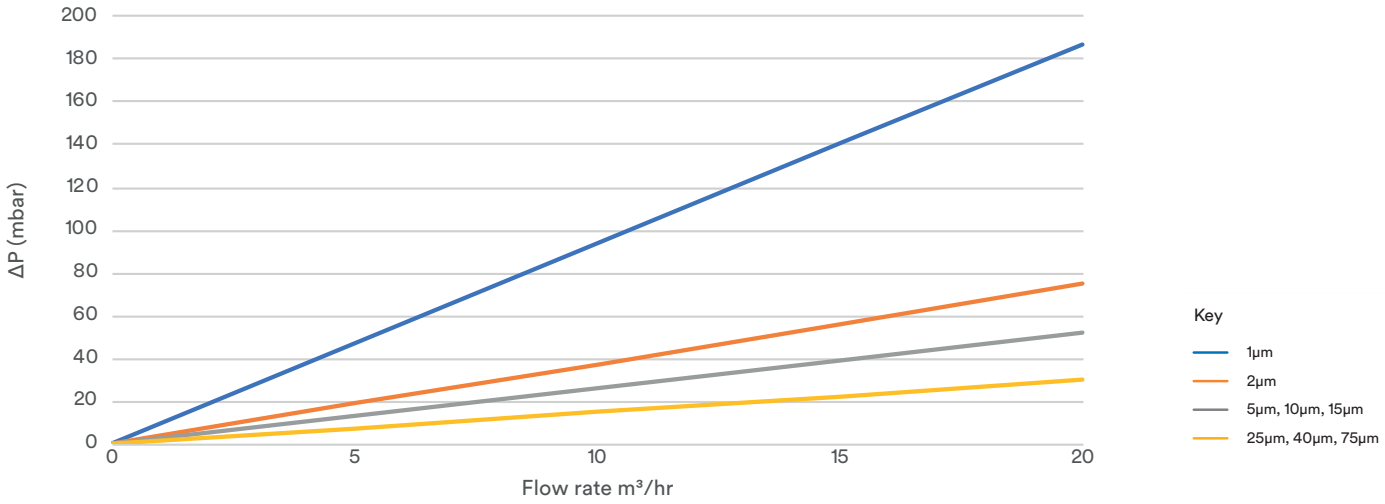
Fluid compatibility

Chemical	Temperature	Chemical	Temperature	Chemical	Temperature
Acetic acid 20%	71°C	Hydrogen peroxide	38°C	Sodium carbonate	71°C
Alkanolamines	60°C	Methyl ethyl ketone	21°C	Sodium hydroxide 70%	71°C
Ammonium hydroxide	71°C	Mineral oil	21°C	Sulphuric acid 20%	71°C
Bleach 5.5%	49°C	Nitric acid 20%	49°C	Sulphuric acid 70%	71°C
Ethylene glycol	71°C	Potassium hydroxide	60°C	Urea	71°C

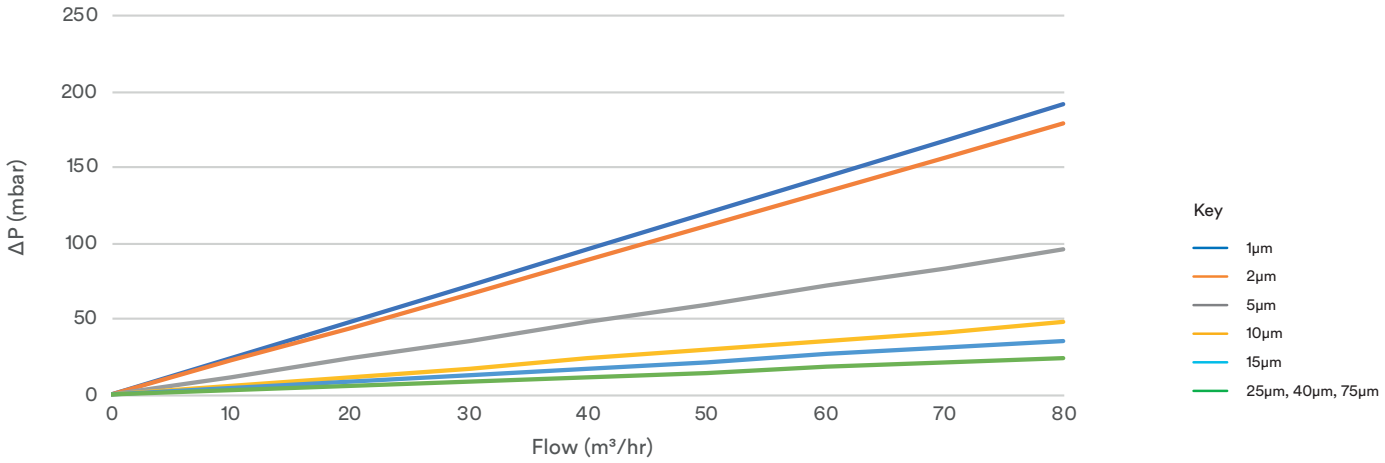
The thermal and chemical resistance data presented in this brochure is for guidance only. Factors such as duration of exposure, fluid concentration and temperature should also be considered. Thermal and chemical resistance should also be considered when choosing all materials exposed to fluids.

3M™ High Flow Filter Cartridge specifications

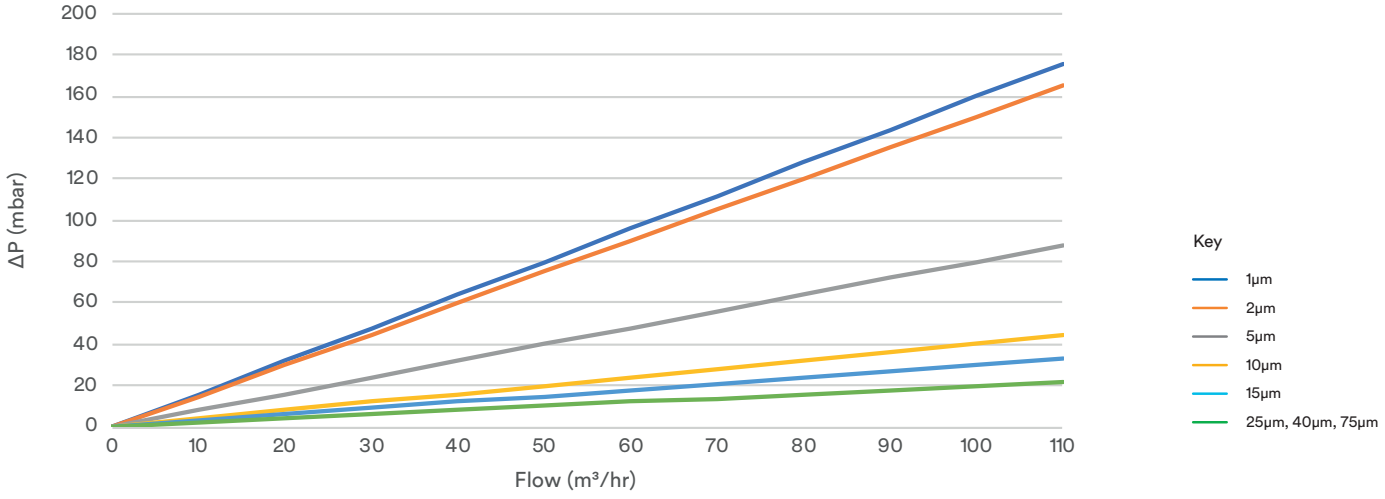
3M High Flow 10” (254mm) Filter Cartridge Clean Pressure Drop*



3M High Flow 40” (1016mm) Filter Cartridge Clean Pressure Drop*



3M High Flow 60” (1524mm) Filter Cartridge Clean Pressure Drop*



* Indicative



3M™ High Flow Filter Housings

3M High Flow filter housings are specifically designed to deliver all of the system's benefits in a compact footprint in your production site. The range is constructed from 316 grade stainless steel (wetted parts in contact) and has a maximum allowable working pressure of 10 barg for use with temperatures up to 120°C (110°C for 01HFN Coreline single cartridge housing only).

Pressure Equipment Directive 2014/68/EU

3M High Flow filter housings are fully compliant with and built to PED 2014/68/EU Article 4.3 'Sound Engineering Practice' as standard.

ATEX Directive 2014/34/EU

The 3M High Flow filter housings are ATEX approved as standard for use in ATEX condition II 2 GD c IIC/IIIC.

Marking and documentation

The housings are clearly marked and delivered with a EN10204 Certificate of Comformity 2.2. The user of these housings must ensure that they are used in accordance with the requirements of these PED and ATEX directives at all times, and in accordance with the instruction manual supplied.

Food Contact Directive (EC) 1935/2004

The housings are constructed from 316 and 316L stainless steel (wetted parts in contact) and delivered with O-rings that are compliant to FDA 21CFR Part. 11 (there are no other non-316 parts in contact).

Design

In addition to the standard 01HF Coreline single cartridge housing range, 3M High Flow filter housings can be built upon request to a wide range of specifications and design and construction standards. These routinely include PED Category IV and for use with Hazardous (Group 1) liquids and Gas/Vapour.

Design and constructions codes can include (but are not limited to) EN13445, AD Merkblatter, ASME Div VIII & U Stamp and CODAP. Materials can include in addition to 316 (but not limited to) 304 and Uranus B6 Super Duplex steels.

Please contact your 3M representative for any other classification or further information.

Features and benefits

Compact design

- Smaller housing minimises capital expense requirements
- Reduces system footprint

Robust cartridge centre-post design

- Eliminates bulky support plates providing easy access to housing internals

Manufactured from 316 or 316L stainless steel

- Excellent corrosion protection (carbon steel option available in multi-element housing)

Upstream gauge ports and drains

- Hinged cover (single-round housings) and user-friendly cover lifting device (multi-round housings)
- For easy element change-outs



3M™ High Flow 01HF Coreline Filter Housing Range

3M™ High Flow Filter Housings

Table 1: Housing specifications	
Materials of construction	In contact: 316 (castings and forgings) 316L (sheet plate and bar). Non-contact: typically 304 & 304L (legs and mountings). Other grades of steel are also possible.
Pressure Equipment Directive 2014/68/EU	Article 4.3 'Sound Engineering Practice'
ATEX Directive 2014/34/EU	II 2 GD c IIC/IIIC
Food contact Directive 1935/2004/EU	316 and 316L stainless steel construction (wetted parts) and FDA O-rings
Maximum recommended flow rate for a single cartridge	10" (254mm): 19.3m³/hr 40" (1016mm): 80m³/hr 60" (1524mm) 113m³/h

Table 2: Other specifications

Model	Nominal diameter (mm)	Material	Inlet and outlet connection (DIN)			Recommended maximum flow m³/hr[1]			Maximum pressure and temperature	Vent and drain connections Horizontal (H) and Vertical (V) housings			
			10"	40"	60"	10"	40"	60"		H vent	H drain	V vent	V drain
01HFN	203	316 and 316L stainless steel	DN50	NA[3]	NA[3]	19.3[3]	NA[3]	NA[3]	10 bar at **110°C** (with full vacuum)	NA[3]	NA[3]	1/4"	3/4"
01HFB	216		NA[3]	DN100	DN100	NA[3]	80[2]	113[2]	10 bar at **120°C** (with full vacuum)	3/4"	3/4"	1/4"	1/4"
03HFB	450		NA[3]	DN150	DN200	NA[3]	198[2]	339		3/4"	3/4"	1/4"	1/4"
05HFB	500		NA[3]	DN200	DN250	NA[3]	352[2]	556[2]		3/4"	3/4"	1/4"	1/4"
07HFB	600		NA[3]	DN250	DN300	NA[3]	556[2]	791[2]		3/4"	3/4"	1/4"	1/4"

[1] Pressure drop across cartridge not included.
[2] Maximum flow rate based on nozzle size.
[3] Not applicable.

3M™ High Flow 01HF Coreline Filter Housing Range

The High Flow 01HF coreline filter housing range of standard single cartridge housings has four product types:

Table 3: Filter housing orientation			
Position	10" (254mm) Cartridge	40" (1016mm) Cartridge	60" (1524mm) Cartridge
Vertical	✓	✓[1]	✗
Horizontal	✗	✓[2]	✓[2]

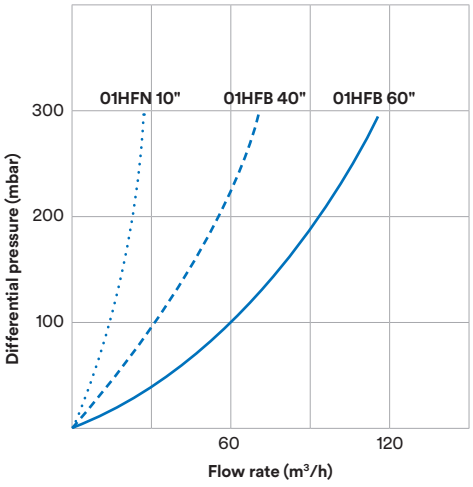
[1] With legs.
[2] Without mounting legs. This allows the operator to make their own arrangements for mounting the housings in their installation however they feel most suitable. A set of standard mounting legs for these are available as an optional accessory and can be obtained separately. The one design of mounting legs fits 40" and 60" vessels. Leg assemblies for the housing for the 40" housing in the vertical orientation are available as a spare.

Flow rates and dimensions

Table 4: Dimensions in mm					
Model	**Vertical housings**	**Horizontal housings**		**Model**	**Vertical housings**
	01HFB1V (40" only)	**01HFB1H (40")**	**01HFB2H (60")**		**01HFN (10" only)**
Top to outlet	1428[1]	1428[1]	1938[1]	**Inlet to outlet**	311[1]
Inlet to outlet	1873[1]	203[1]	203[1]	**Clearance height**	880[1]
Clearance height	2600[1]	2600[1]	3100[1]	**Floor (without legs) to inlet**	159[1]
Vent to drain	–	256[1]	256[1]	**Floor (without legs) to outlet**	76[1]
Total legs height	704	922	922	**Bottom to flange of closure system**	484[1]
				Total legs height	32[1]

Note: All dimensions approximately for guidance only.
[1] Maximum height.

Housing flow / pressure drop curves*



* Indicative

Ordering guides

3M™ High Flow Filter Cartridges

Model	Cartridge length	Micron rating (@ 99.9% PRE)	Micron rating	O-ring material	Packaging
HF –High Flow	10 – 10" (254mm) 40 – 40" (1016mm) 60 – 60" (1524mm)	PP – Polypropylene	001 – 1µm 002 – 2µm 005 – 5µm 010 – 10µm 015 – 15µm 025 – 25µm 040 – 40µm 070 – 70µm	A – Silicone B – Fluorocarbon C – EPR D – Nitrile	01 – 1 Pack

3M™ High Flow 01HF Coreline Filter Housings

Number of filter elements	Model	Closing	Size	Configuration*	Housing material	Gasket material**	Surface finish	Connections***	Outlet	Elbow
01	**HF** = High Flow	N = clamp closure	= 10"	**V** = vertical	**6** = 316 and 316L	**NB** = nitrile	**F0** = acid pickled and passivated/ glass bead blasted + electropolished externally	**BP** = flanged (ISO PN16)	**D** = bottom outlet	**N** = none
01	**HF** = High Flow	**B** = bolted	**1** = 40" **2** = 60"	**H** = horizontal **V** = vertical						

*60" 01HFB Housing is only available as a horizontal housing.
**For other gasket materials, please contact your 3M representative.
***Flange size will vary with number of filter cartridges and cartridge length.

Examples: 01 HFB 2 H 6 NB F0 BP D N
or 01 HFB 1 V 6 NB F0 BP D N
or 01HFN V 6 NB F0 BP DN

High flow filter housings for multi-cartridge and special applications

Bespoke design and build projects

The 3M Hardware team have extensive experience in designing bespoke housings for filter applications. They can produce them to a wide variety of design and construction codes (including ASME U Stamp). Bespoke housings can range from simple modifications of standard designs up to large multiple housing skid mounted units with associated accessories and with both second shell heating jackets and electrical trace heating.

Bespoke 3M High Flow filter housings can be produced from single cartridge units up to housings holding 40 cartridges each. The operating conditions for the housings can be configured to handle liquids at pressures and temperatures according to the customer's specific needs.

PED 2014/68/EU

Bespoke 3M High Flow filter housings are routinely produced for categories up to and including PED Cat IV. These can be for applications using Group 1 (Hazardous) Gas and Vapour products at high temperature and pressures as needed.

Design and construction codes

Design and constructions codes used routinely include (but are not limited to) EN13445, AD Merkblatter, ASME Div VIII & U Stamp, and CODAP. This includes full Non Destructive Testing (NDT) including dye penetrant and X-ray inspections as specified by the code used.

Materials of construction

Materials used routinely include in addition to 316 (but not limited to) 304 and Uranus B6 Super Duplex steels.

For more information about the 3M™ High Flow Filter System please visit our website at 3M.com.es/highflow

Product Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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