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3M Separation and Purification Sciences Division

# High flow capability in a 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 500 gpm (113m<sup>3</sup>/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 where flow rates are 200gpm (45m<sup>3</sup>/hr) or higher. (see Figure 1).

## High quality, highly efficient design

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. 3M High Flow cartridge's polypropylene end caps, outer sleeve, and core protect the pleat structure integrity and provide a robust filter construction.

## Lower capital investment costs and compact 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.

## Ease of use and ergonomic design

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.

## Select the filter media option needed for your application

3M's High Flow filter family comes in two designs: Standard (HF) and Depth Media (HFM). The HF design is ideal for the removal of general particles and suspended solids. However, if you are filtering biofoulants and deformables then the HFM with its greater depth filtration capability should be your choice. All versions of the 3M High Flow filters are completely interchangeable, so no matter which filter option is needed during different operational conditions, 3M has you covered.

Features	Benefits
<b>High flow capability per cartridge</b> (vs. conventional 2.5" (63.5mm) OD cartridges)	Fewer cartridges required, resulting in: <ul style="list-style-type: none"> <li>• Reduced cartridge handling and disposal</li> <li>• Reduced filter change-out time</li> <li>• Less individual cartridge seal points, reducing chance of fluid bypass</li> </ul>
<b>Compound radial pleat design using 3M blown microfibre polypropylene media</b>	<ul style="list-style-type: none"> <li>• High filter loading capacity</li> <li>• Reproducible filter effluent quality throughout life of filter</li> <li>• Broad chemical compatibility</li> </ul>
<b>Compact system design</b>	<ul style="list-style-type: none"> <li>• Smaller housing minimises capital expense requirements</li> <li>• Reduces housing diameter</li> </ul>
<b>Easy to use</b>	<ul style="list-style-type: none"> <li>• No special tools or hardware required for filter change-out</li> <li>• 'Twist-to-lock' cartridge seating mechanism provides positive seal</li> <li>• Ergonomic designed handle facilitates cartridge installation and removal</li> </ul>
<b>Approved for food contact use</b>	 <ul style="list-style-type: none"> <li>• Complies with applicable US regulations for food contact use. The product is compliant with the requirements of Regulation (EC) 1935/2004 for food contact for use in aqueous, acidic, alcoholic foods, and dairy products.</li> <li>• Consult 3M for detailed regulatory compliance information.</li> </ul>

### Applications

#### Industrial

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

#### 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

### Lower process flow applications

The 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

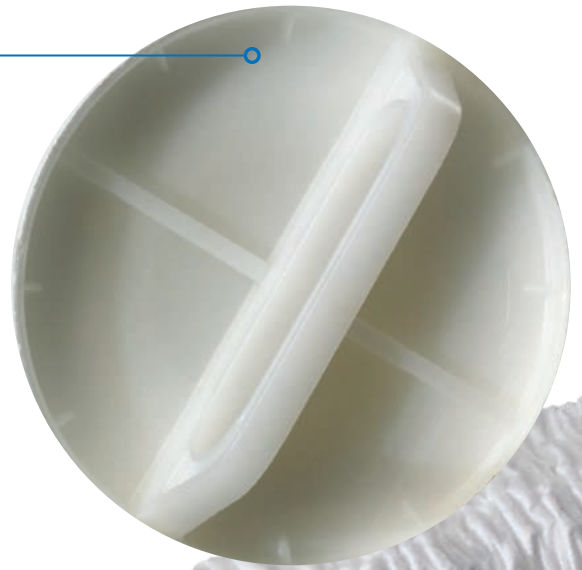
Provides a wide range of compatibility with various fluids.

## Compound radial pleat design

Maximises the usable surface area per cartridge.

## High flow

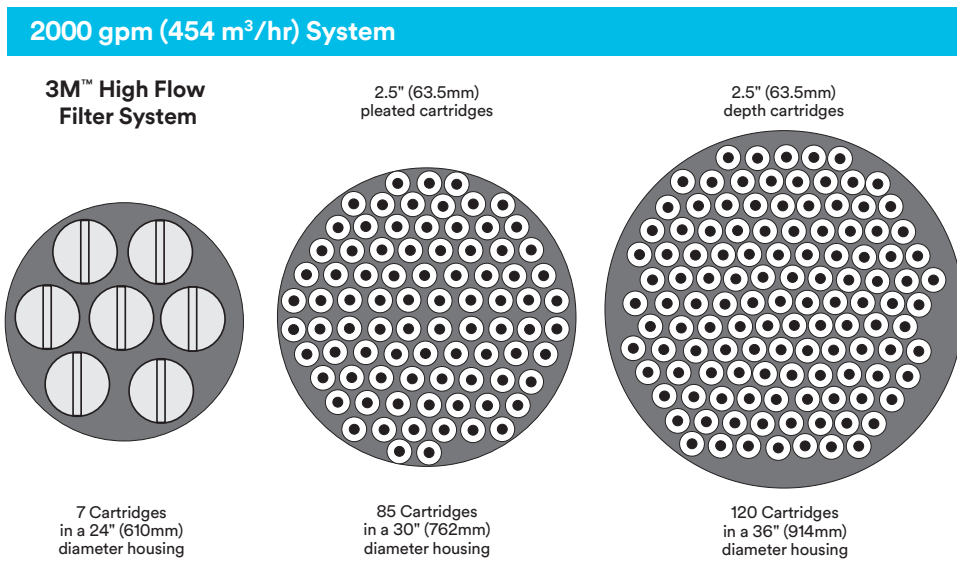
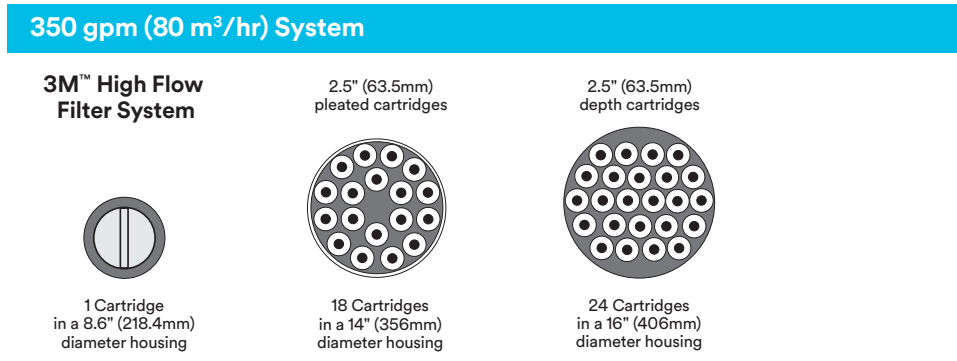
3-inch (76 mm) core permits up to 500 gpm (113 m<sup>3</sup>/hr) through a single 60" (1524mm) length cartridge. Seating mechanism uses a 'twist to lock' design to provide a positive seal reducing the possibility of bypass.



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

The 3M High Flow filter product family also has a supporting family of filter housings that meet most standard applications with the option to engineer custom solutions depending up the requirements. 3M offers housings with 1, 3, 5, and 7 round variations for the 40" (1016mm) and the 60" (1524mm) versions and a 1 round for our 10" (254mm) filters in 316 stainless or in a sanitary housing option for food and beverage applications. For more information on 3M's High Flow housings options, see our brochure or contact your local 3M Sales representative or distributor.

**Figure 1: Comparison of required 40" (1016mm) length filter cartridges and their housing diameter**



**The bottom line for systems with over 200 gpm (45m<sup>3</sup>/hr)**

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

## 3M™ High Flow Filter Housings

3M can provide housings to meet global applications and specifications and is supported by 3M's global engineering team.

Housing specifications			
Materials of construction	Wetted: 316 (castings and forgings) 316L (sheet plate and bar). Non-wetted: 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 Certification	316 and 316L stainless steel construction (wetted parts) and FDA O-rings EU Food contact directive 1935/2004/EU		
Maximum recommended flow rate for a single cartridge	10" (254mm): 85 gpm (19.3m <sup>3</sup> /hr)	40" (1016mm): 350 gpm (80m <sup>3</sup> /hr)	60" (1524mm): 500 gpm (113m <sup>3</sup> /hr)

# 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.

### Construction

Filter micron rating (microns)	HF Series: 1, 2, 5, 10, 15, 25, 40, 70 absolute rated HFM Series: 5, 10, 20µm Absolute, 5µm Nominal* <i>*Also rated at 70µm Absolute</i>
Filter media, center core, end caps, outer sleeve	Polypropylene
Sealing o-ring options	Nitrile, ethylene propylene rubber (EPR), silicone, fluorocarbon HFM series only available with nitrile o-rings
O-ring size/end cap connection	3" NB (76.2mm)

### Cartridge dimensions

Inside diameter (nominal)	3" (76.2mm)		
Outside diameter (nominal)	6.5" (165mm)		
Cartridge length (nominal)	10" (254mm)	40" (1016mm)	60" (1524mm)

### Operating conditions

Maximum recommended flow rate in water (@20° C)	19.3m <sup>3</sup> /hr (85 gpm)	80m <sup>3</sup> /hr (350 gpm)	113m <sup>3</sup> /hr (500 gpm)
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 (50 psid @ 68°F)		
Recommended change-out differential pressure	2.4 bar @ 20°C (35 psid @ 68°F)		
Clean pressure drop	See page 7		

### Regulatory

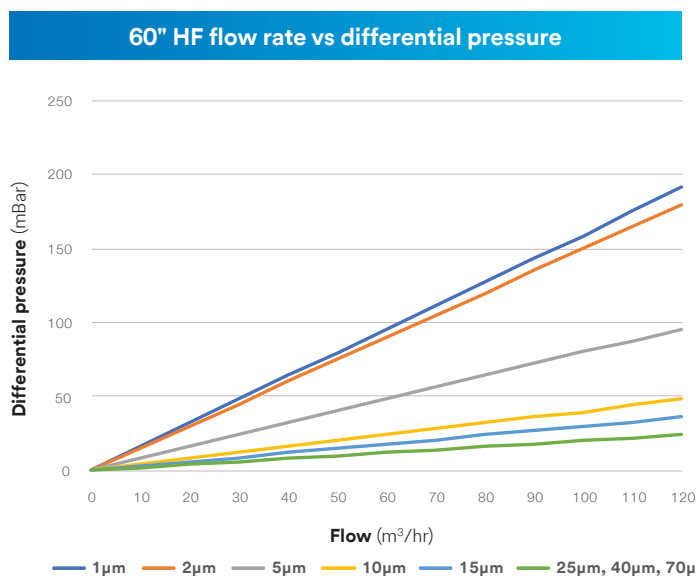
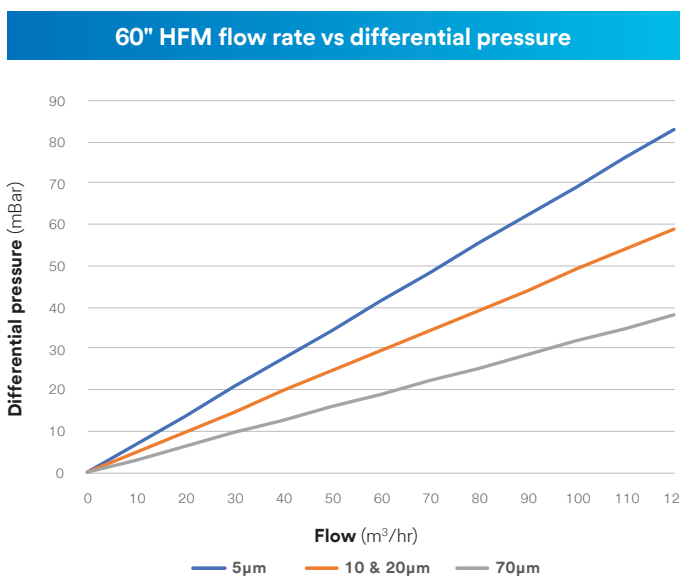
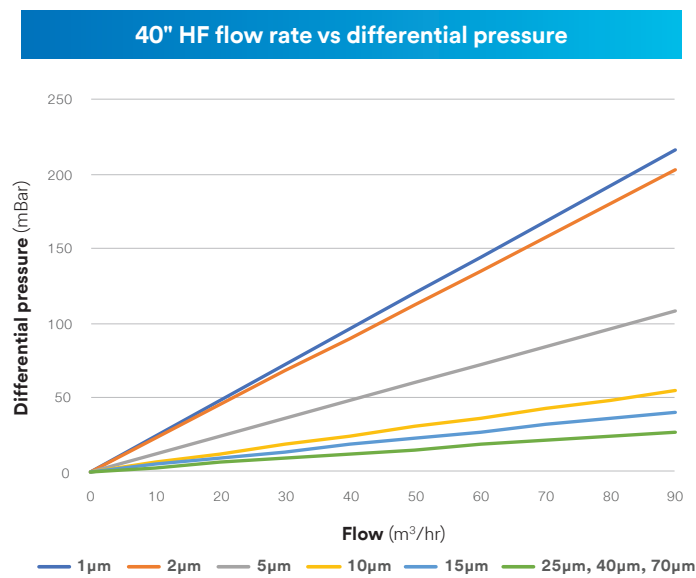
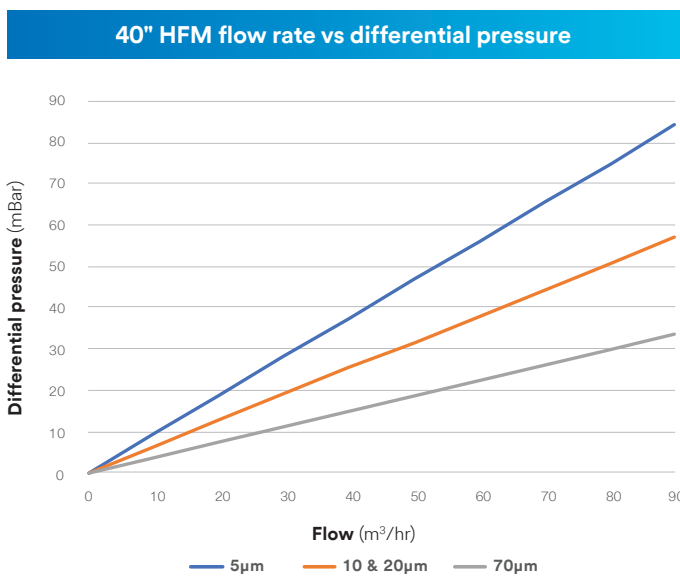
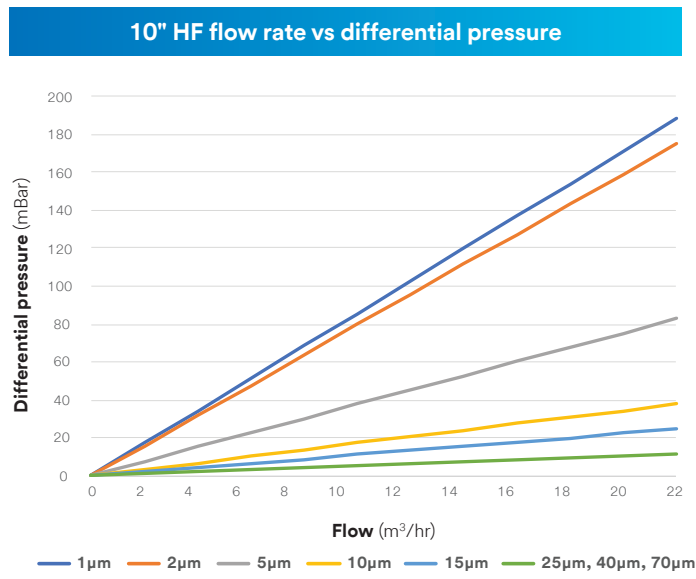
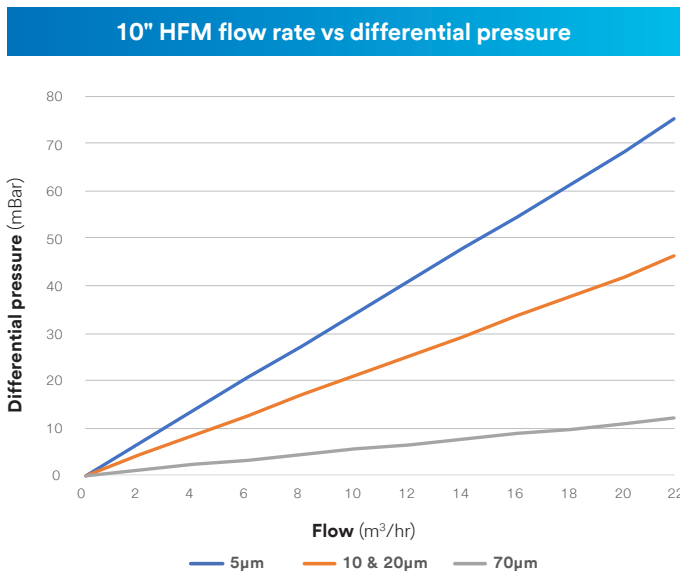
FDA CFR-21 Listed materials of construction	✓	✓	✓
Food Contact Directive (EC) 1935/2004	✓	✓	✓

### 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

**NOTE:** The thermal and chemical resistance data presented in this brochure is for guidance only. Factors such as duration of exposure, O-ring material, 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 (continued)



These data plots are provided for reference only and these graphs represent the pressure drop of the filters only.



# Ordering guides

## 3M™ High Flow Filter Cartridges

Model	Cartridge length	Material of construction	Absolute micron rating	O-ring material*	Packaging
<b>HF – High Flow</b>	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
<b>HFM – High Flow Lofted Media</b>	10 – 10" (254mm) 40 – 40" (1016mm) 60 – 60" (1524mm)	PP – Polypropylene	A05 - 5µm A10 - 10µm A20 - 20µm N05 - 5µm (Nominal)* <i>*Also rated at 70µm absolute</i>	D – Nitrile	

\*Silicone and fluorocarbon O-rings are compliant for all food contact.  
EPR and nitrile O-rings are not compliant for edible oil or dairy applications.



3M™ High Flow and HFM series cartridges are tested and certified by WQA against NSF/ANSI/CAN Standard 61 for material safety requirements only.

## For more information about the 3M™ High Flow Filter System please visit our website or contact your 3M representative.

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