

3M Separation and Purification Sciences Division

# High flow capability in a compact design.

The 3M™ High Flow HF and HFM Series Filter Systems are a result of 3M's extensive filtration experience applied to delivering high flow filter technology in a compact design. Featuring filters from 70 micron all the way down to 0.5 micron, they're ideal for customers who want filtration efficiency and a sustainable, ergonomic solution.



# 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 (113 m<sup>3</sup>/hr) in a single 60" (1,524 mm) 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" (63.5 mm) outer diameter (OD) filter systems where flow rates are 200 gpm (45 m<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 maximize the usable surface area of each filter. Blown microfiber forms the basis of the filter media, which is manufactured to tightly-controlled fiber 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 utilization 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.

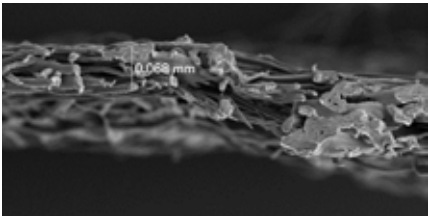
## Lower capital investment costs and compact design

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" (63.5 mm) OD filter cartridge housings for a given flow rate.

## Ease of use and ergonomic design

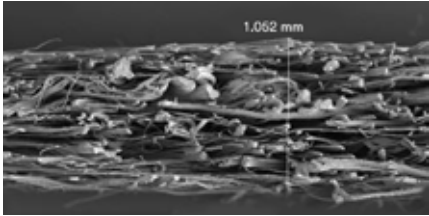
The 3M High Flow filter system is designed with ease-of-use in mind. From a user-friendly, ergonomically designed handle that makes cartridge installation and removal easier without the use of special tools or other hardware, to a 'twist-to-lock' cartridge seating mechanism that provides a positive seal,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

3M™ High Flow Series Filter Cartridges are available in two types of system designs.




3M™ High Flow HF Series Filter Cartridges

These high flow filter cartridges offer great particulate removal and surface filtration for a variety of industrial applications.



3M™ High Flow HFM Series Filter

Featuring a thick media, these high flow filters are designed to filter deformables and organics. They also help prevent premature blinding of the filter’s outer surface, promoting fuller utilization of the media for an optimal combination of particle removal efficiency and contaminant holding capability.

Features	Benefits
<b>High flow capability per cartridge</b> (vs. conventional 2.5" (63.5 mm) 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 microfiber 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 minimizes capital expense requirements</li><li>• Reduces housing diameter</li><li>• 10" version is ideal for lower process flows, batch applications, and modular systems</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>• This product has been tested and found to comply with the following regulations:<ul style="list-style-type: none"><li>• USA FDA 21 CFR Sections 170-186</li><li>• (EC) 1935/2004, (EU) 10/2011, and (EC) 2023/2006</li><li>• China Food Safety Law</li><li>• Japan MHLW - Food Sanitation Act</li></ul></li><li>• For a Declaration of Compliance to applicable food contact materials regulations, use conditions, and limitations, contact your 3M Representative</li></ul>

Applications
<b>Industrial:</b> Municipal water, RO prefiltration, reclaimed water, coolants, nozzle protection, boiler condensate, process water
<b>Chemical:</b> Quench water, aqueous salt solutions, final products
<b>Petrochemicals:</b> Waterflooding, produced water, enhanced oil recovery, completion fluids, amine sweetening, final products
<b>Electronics:</b> RO prefiltration, process cooling water
<b>Food and beverage and bottled water:</b> Process and blending water, D.E. trap filtration, barrel char removal, spring site filtration, membrane protection

**The new 0.5 µm 3M High Flow filter cartridge provides these additional benefits:**

- Microbial reduction for yeast and cryptosporidium
- Up to 30% total cost of filtration reduction
- Greater efficiency gained at high capacity with the tighter micron rating

All of which means the new 0.5 µm High Flow filter can provide excellent downstream membrane filter protection.



# 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

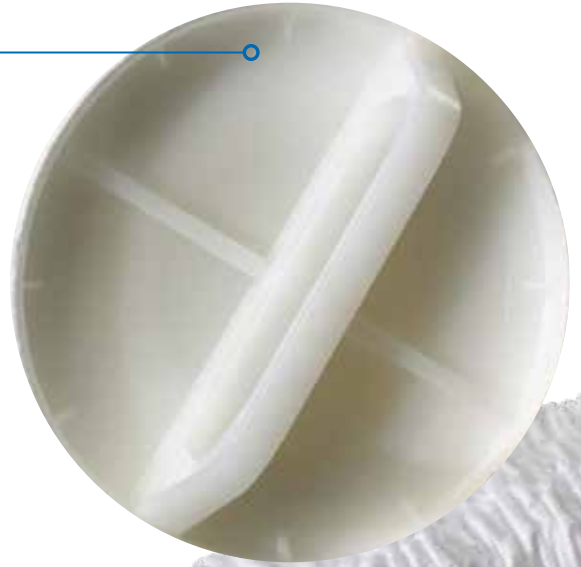
Provides a wide range of compatibility with various fluids.

## Compound radial pleat design

Maximizes the usable surface area per cartridge.

## High flow

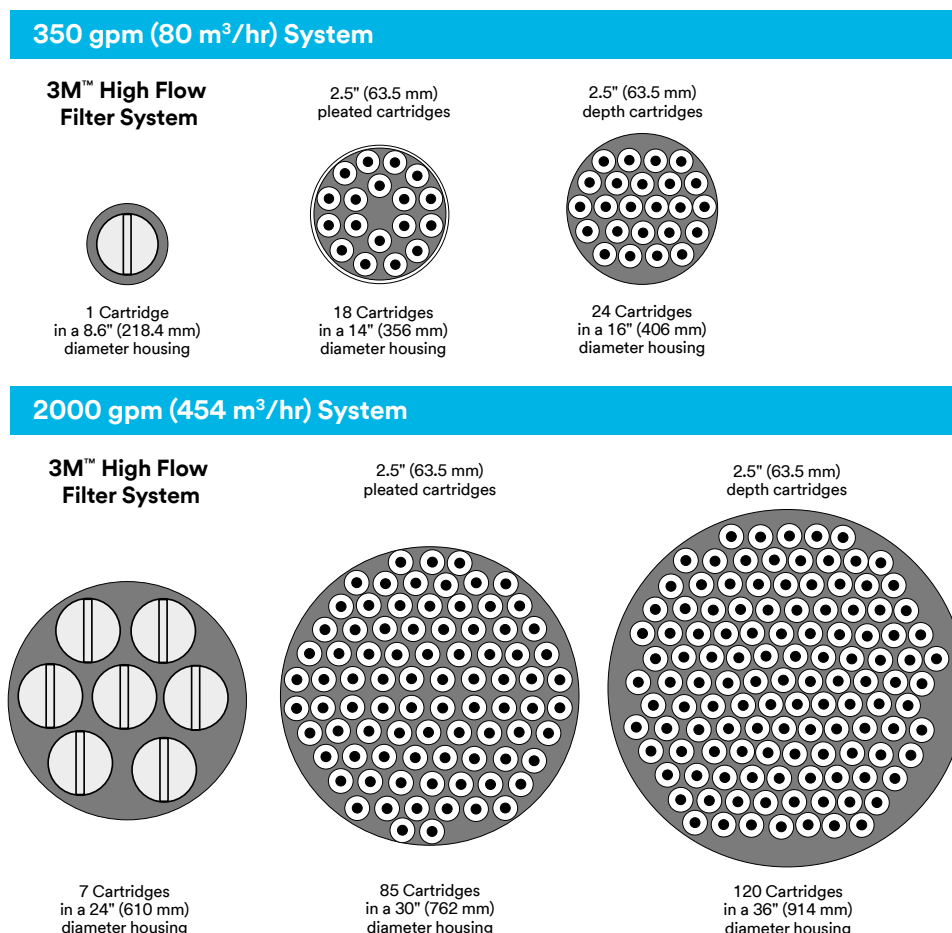
3-inch (76 mm) core permits up to 500 gpm (113 m<sup>3</sup>/hr) through a single 60" (1,524 mm) length cartridge. Seating mechanism uses a 'twist to lock' design to provide a positive seal reducing the possibility of bypass.



# 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 on the requirements. 3M offers housings with 1, 3, 5, and 7 round variations for the 40" (1,016 mm) and the 60" (1,524 mm) versions and a 1 round for our 10" (254 mm) filters in 316 stainless 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" (1,016 mm) length filter cartridges and their housing diameter**



## The bottom line for systems with over 200 gpm (45 m³/hr)

- The 3M™ High Flow Filter System requires 90% fewer cartridges than conventional 2.5" (63.5 mm) OD cartridge systems
- 3M High Flow filter housings are 33% to 50% smaller than filter housings for conventional 2.5" (63.5 mm) 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

<b>Materials of construction</b>	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.
<b>ASME Standard</b>	Section VIII Div2 U-stamp
<b>Australian Standard</b>	AS 1210 Pressure Vessel
<b>Pressure Equipment Directive 2014/68/EU</b>	Article 4.3 'Sound Engineering Practice'
<b>ATEX Directive 2014/34/EU</b>	II 2 GD c IIC/IIIC
<b>Food Contact Compliance</b>	316 and 316L stainless steel construction (wetted parts). Seal options available and compliance varies based on use application; contact your 3M representative.
<b>Maximum recommended flow rate for a single cartridge</b>	10" (254 mm): 85 gpm (19.3 m³/hr), 40" (1,016 mm): 350 gpm (80 m³/hr), 60" (1,524 mm): 500 gpm (113 m³/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 microfiber 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: 0.5, 1, 2, 5, 10, 15, 25, 40, 70 absolute rated HFM Series: 5, 10, 20 µm Absolute, 5 µm Nominal* <i>*Also rated at 70 µm Absolute</i>
Filter media, center core, end caps, outer sleeve	Polypropylene
Sealing O-ring options	Nitrile, Silicone, Fluorocarbon and EPR (See product selection table for details)
O-ring size	338 (3.0"/76.2 mm)

### Cartridge dimensions

Inside diameter (nominal)	3" (76.2 mm)
Outside diameter (nominal)	6.5" (165 mm)
Cartridge length (nominal)	10" (254 mm), 40" (1,016 mm), 60" (1,524 mm)

### Operating conditions

Maximum recommended flow rate in water (@20° C)	85 gpm (19.3 m³/hr), 350 gpm (80 m³/hr), 500 gpm (113 m³/hr)
Maximum continuous operating temperature	160° F (71° C)
Maximum hot water sanitisation temperature	185° F (85° C)
Maximum forward differential pressure	50 psid @ 68° F (3.4 bar @ 20° C)
Recommended change-out differential pressure	35 psid @ 68° F (2.4 bar @ 20° C)
Clean pressure drop	See page 7

## Microbial Control

The 3M High Flow HF Series 0.5 µm and 1 µm filter media demonstrates excellent microbial reduction as presented below.

High Flow Media Grade	Microorganism Used for Challenge	Challenge Level	Organisms in Filtrate	LRV
0.5 µm	Saccharomyces cerevisiae (ATCC-36026)*	$1.3 \times 10^7$ CFU/cm² of media	0 CFU	>8.1
1 µm	Saccharomyces cerevisiae (ATCC-36026)*	$1.3 \times 10^7$ CFU/cm² of media	20 CFU	6.8
0.5 µm	Microspheres as a surrogate for Cryptosporidium Oocyst**	3,286 microspheres / 100 ml	9 microspheres / 100 ml	2.6

**Challenge conditions used in these tests:** \*Microbial concentration  $3 \times 10^5$  –  $5 \times 10^5$  organisms/ml, Flow Rate 0.25 gpm/ft² (10 L/min/m²)

\*\*Microspheres, Flow Rate 55 gpm/HF10 filter, Terminal Differential Pressure 35 psid

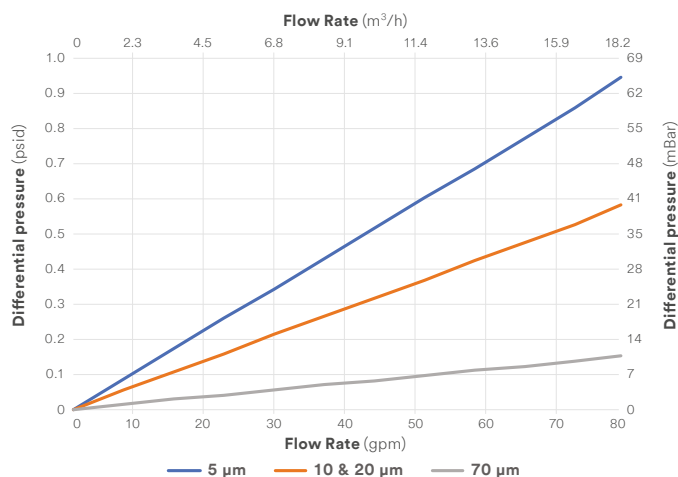
### Fluid compatibility

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

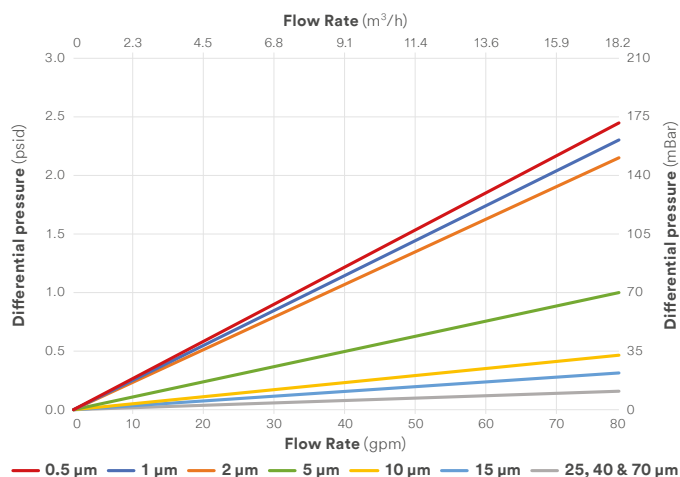
**NOTE:** The thermal and chemical resistance data presented in this brochure is for guidance only. Factors such as duration of exposure, O-ring material, fluid concentration and temperature should also be considered. Thermal and chemical resistance should also be considered when choosing all materials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

### 3M™ High Flow Filter Cartridge specifications (continued)

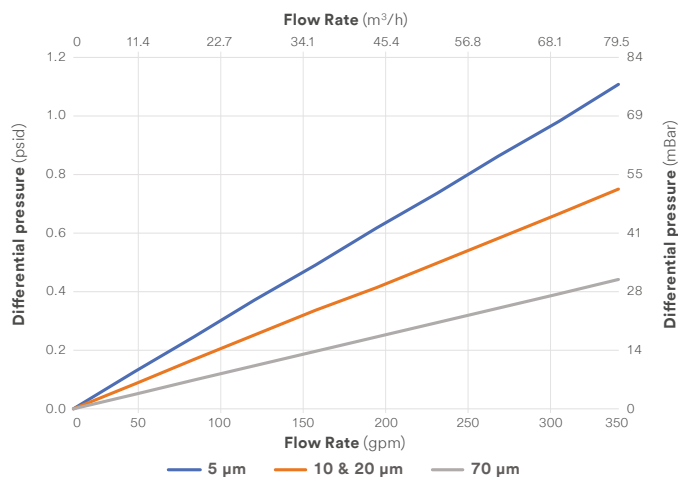
10" HFM flow rate vs differential pressure



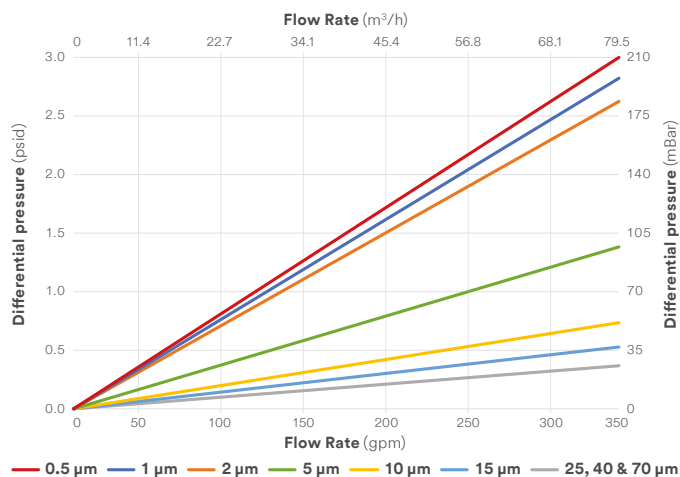
10" HF flow rate vs differential pressure



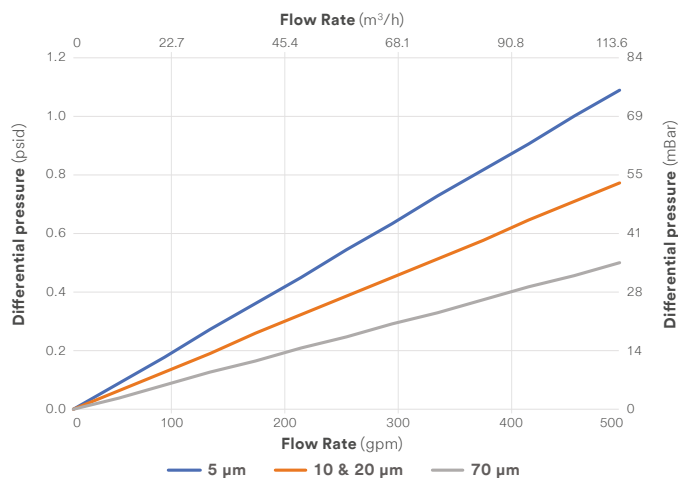
40" HFM flow rate vs differential pressure



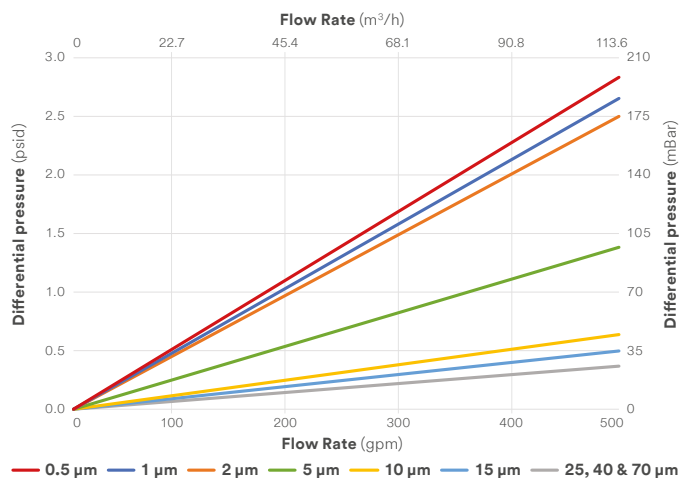
40" HF flow rate vs differential pressure



60" HFM flow rate vs differential pressure



60" HF flow rate vs differential pressure



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" (254 mm) 40 – 40" (1,016 mm) 60 – 60" (1,524 mm)	PP – Polypropylene	0005 – 0.5 µm <sup>5</sup> 001 – 1 µm 002 – 2 µm 005 – 5 µm 010 – 10 µm 015 – 15 µm 025 – 25 µm 040 – 40 µm 070 – 70 µm	A – Silicone <sup>1</sup> B – Fluorocarbon <sup>1,2</sup> C – EPR <sup>3</sup> D – Nitrile <sup>1,4</sup>	01 – 1 Pack
<b>HFM – High Flow Lofted Media</b>	10 – 10" (254 mm) 40 – 40" (1,016 mm) 60 – 60" (1,524 mm)	PP – Polypropylene	A05 – 5 µm A10 – 10 µm A20 – 20 µm N05 – 5 µm (Nominal)* <i>*Also rated at 70 µm absolute</i>	A – Silicone <sup>1</sup> C – EPR <sup>3</sup> D – Nitrile <sup>1,4</sup>	

<sup>1</sup>Only nitrile, silicone, and fluorocarbon O-rings are NSF/ANSI/CAN std. 61 certified by WQA

<sup>2</sup>Fluorocarbon O-rings not available in the 0.5 µm High Flow or in the HFM series filters

<sup>3</sup>EPR O-rings not for use in food contact applications

<sup>4</sup>Nitrile O-rings are not compliant for edible oil and dairy applications

<sup>5</sup>NSF/ANSI 419 certification applicable for 0.5 µm only

**Please Note:** The Ordering Guide above is for reference only. Not all combinations are available. Please consult with your 3M Representative to determine the appropriate part number for your application.



C US



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

Certified to  
NSF/ANSI 419

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

**Intended Use:** 3M High Flow Series Filter Cartridges are intended for use in industrial filtration applications of aqueous fluids in accordance with the applicable product instructions and specifications. 3M High Flow Series Filter Cartridges products are also intended for use with non-aqueous fluids where materials of construction are compatible. Certain limited 3M High Flow Series Filter Cartridges products are also intended for use in Food and Beverage (F&B) applications. For details related to the specific use conditions or limitations for food contact applications please contact your 3M representative for more information. Since there are many factors that can affect a product's use, the customer and user remain responsible for determining whether the 3M product is suitable and appropriate for the user's specific application, including user conducting an appropriate risk assessment and evaluating the 3M product in user's application.

**Restrictions on Use:** 3M advises against the use of these 3M products in any application other than the stated intended use(s) since other applications have not been evaluated by 3M and may result in an unsafe or unintended condition. Do not use in any manner whereby the 3M product, or any extractable or leachable from the 3M product, may become part of or remains in a medical device, drug, cosmetic, supplement, infant formula; or in applications involving life-sustaining medical applications or prolonged contact with internal bodily fluids or tissues.

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