

# 3M™ High Flow HFR Series Filters

3M™ High Flow HFR Series Filters are high flow capacity, high efficiency, inside to outside flow direction, liquid filtration cartridges designed for the applications listed below with large flow requirements.

3M High Flow HFR Series Filters fit into the standard Pall Ultipleat® High Flow HFU Filter Housings.

The large diameter, pleated depth media filter design permits flow rates of up to 100 m<sup>3</sup>/hr (440 gpm) in a single 60" length filter. This results in significantly fewer required filters for a given flow as compared to standard 2.5" diameter filters.

The 3M-developed polypropylene microfiber forms the basis of the filtration media utilized in the 3M High Flow HFR Series Filter. The manufacturing processes allow for tightly controlled specifications resulting in a filter media with absolute rated particle retention characteristics.

The 3M High Flow HFR Series Filter helps to remove particles and other contaminants from water, compatible industrial chemicals, and liquid food & beverage fluids with absolute retention rating.

The 3M High Flow HFR Series Microfiber Filter Media is optimized for use in process water applications containing organic contaminants, as well as particulate. The lofted media design helps prevent premature blinding of the filter outer surface, promoting fuller utilization of the media, resulting in an optimum combination of particle removal efficiency and contaminant holding capability.

The 3M High Flow HFR Series Filter has not been evaluated or certified for compliance to EU Food Contact Regulation 1935/2004, and is NOT intended for Food and Beverage applications in the European Union. Use in any other applications, such as pharmaceutical applications, have not been evaluated by 3M and may lead to an unsafe condition.

# **Features & Benefits**

#### Faster Flow Rates Compared to Conventional 2.5" Filters

- Fewer filters required at a given flow rate
- Reduced filter handling
- Fewer filter seal points reducing chance of fluid bypass

#### 3M Lofted Microfiber Filtration Media

- High particle removal efficiencies throughout filter life
- High contaminant capacity
- Extended service life, especially for fluids with a mixture of particles and deformables

#### **Advanced Pleat Technology**

- Increased usable filtration area
- Helps to limit blinding effect of the filter media

# **FDA Compliant Materials**

 All materials of construction used in the 3M High Flow HFR Series Filter are listed for food contact in the US FDA 21 CFR Parts 174-186.



# **Applications**

- Pre-RO water
- Condensing water filtration
- Process waters
- · Injection and produced waters
- Ground/reclaimed/waste waters
- Refining (amine sweetening, final product)
- Coolants
- Utility water
- Part washing (OEM)
- Beverage grade water and fluids

Outer Wrap Band
Outer Netting Sleeve
Outlet
Top Endcap
Pleated Media
Core
Handle

#### **Absolute Retention Ratings**

Consistent and reproducible contaminant reduction can best be provided by the use of absolute-rated filters. The  $3M^{\text{TM}}$  High Flow HFR Series Filter absolute ratings are based upon the particle size (x) providing a Beta Ratio ( $\beta x$ ) = 1000. At this Beta Ratio, the removal efficiency is equal to 99.9%. The 3M High Flow HFR Series Filter ratings are provided in Table 1.

Care should be taken when comparing absolute rated filters with nominally rated filters, as nominally rated filters have no industry standard in terms of retention.

## **Advanced Pleat Technology (APT)**

The service life of a pleated filter is often dictated by the accessible surface area. Conventional pleated filters may offer a large gross surface area, but when the media is packed too tightly into the filter, only part of the surface area is usable. This can result in both flow restrictions and limited contaminant holding capacity.

The 3M High Flow HFR Series Filter features Advanced Pleat Technology (APT), a staggered pleat arrangement, that results in more open space between the pleats. This design increases the usable filtration area and helps to limit blinding effect of the filter media.

#### **Filter Construction**

3M High Flow HFR Series Filters, constructed of polypropylene microfiber media, provide high particle removal efficiency. The filter media is constructed from continuous microfibers that are precisely controlled to provide a uniform matrix and consistent effluent quality. The filter incorporates a polypropylene support upstream of the media to provide optimum flow characteristics and long service life.

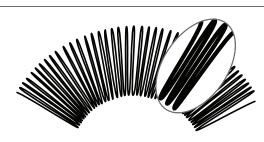
The filter components are thermally bonded to provide a structurally integral filter without the use of resins, binders or adhesives. Available in six distinct micron ratings and three integral lengths of 20, 40 and 60 inches to fit common filter housing designs, 3M High Flow HFR Series Filters are ideal for a wide variety of applications.

Table 1. 3M™ High Flow HFR Series Filter Ratings

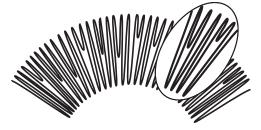
Grade	Absolute Rating (μm)*	
A05	5	
A10	10	
A20	20	
A40	40	
A70	70	
A100	100	

<sup>\*</sup>Tested at ambient temperature.

Figure 2. Conventional Pleat Design vs. Advanced Pleat Technology



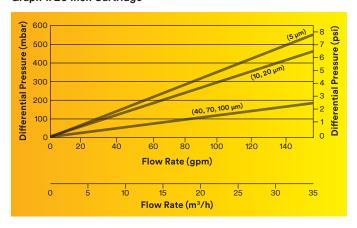
Conventional pleat designs, with full-depth densely packed pleats, fill the upstream pleat surface with contaminant that quickly constrict flow at the pleat's inside diameter.



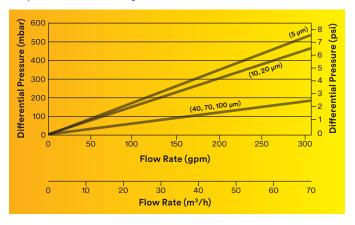
3M™ High Flow HFR Advanced Pleat Technology utilizes a special configuration to increase the accessible surface area for greater filter media utilization.

## 3M™ High Flow HFR Series Filter Flow Rates

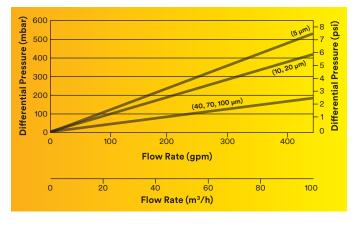
Graph 1. 20 Inch Cartridge



Graph 2. 40 Inch Cartridge



Graph 3. 60 Inch Cartridge



Material of Construction				
Filter Media, Support Materials, Core and End Caps	Polypropylene			
Outer Sleeve	Polyethylene			
Outer Wrap Band	Polyethylene and Polypropylene			
Handle	Polyphenylene ether and Polystyrene blend with glass fiber			
O-ring	Nitrile, Silicone or EPDM			
Operating Conditions				
Flow Direction	Inside-outside flow path			
Maximum Flow Rate	100 m³/h (440 gpm) – 60 in. 70 m³/h (310 gpm) – 40 in. 35 m³/h (150 gpm) – 20 in.			
Maximum Operating Temperature	70 °C (160 °F)			
Maximum Forward Differential Pressure	3.5 bar @ 20 °C (50 psid @ 68 °F) 1.5 bar @ 70 °C (20 psid @ 160 °F)			
Recommended Change-out Differential Pressure	2.5 bar @ 20 °C (35 psid @ 68 °F)			
Nominal Cartridge Dimensions				
Outside Diameter	160 mm (6.3 in.)			
Cartridge Length	1524 mm (60 in.) 1016 mm (40 in.) 508 mm (20 in.)			

## Regulatory

All materials of construction are listed for food contact in the US FDA 21 CFR Parts 174–186.

## **Chemical Compatibility**

The 3M™ High Flow HFR Series Filter is primarily composed of polypropylene and polyethylene materials of construction, which offer broad chemical compatibility. Note that compatibility is always a function of time, operating temperature and chemical concentration. Consult 3M Purification Inc. or your local technical representative for more information.

# 3M™ High Flow HFR Series Filters Ordering Guide

Filter	Cartridge	Material	Absolute	O-Ring
Designation	Length	(Media)	Removal Rating	
HFR	<b>20</b> – 20" <b>40</b> – 40" <b>60</b> – 60"	PP - Polypropylene	A05 – 5 μm A10 – 10 μm A20 – 20 μm A40 – 40 μm A70 – 70 μm A100 – 100 μm	A – Silicone C – EPDM D – Nitrile

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.

#### **Technical Information**

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