

3M Purification Inc.

3M™ High Flow Series Filter Systems



Innovative  
Filtration  
Solutions

Quality. Consistency. Performance.

## 3M™ High Flow Series Filter System

The 3M™ High Flow series filter system is an advanced design that uses 3M innovation and 3M Purification Inc.'s extensive filtration experience to deliver a high flow filter in a compact housing design. When compared to conventional cartridge systems, this system provides the following advantages:

### High Flow Capability

The construction of 3M High Flow series filter systems permits flow rates of up to 500 gpm in a single cartridge. The result? Fewer filter elements to accommodate your flow requirements. In fact, the 3M High Flow series filter systems requires as few as one-tenth the number of elements as competitive 2.5" pleated cartridges (see Figure 1).

### Compact Design

Using fewer elements combined with an outside-to-in flow path enables a reduction in the size of housing required for your application. The 3M™ High Flow series filter housing takes up as little as one-half the size of competitive housings for a given flow rate. The result is lower capital investment costs and a compact footprint that saves valuable plant space (see Figure 1).

### Ease of Use

The 3M™ High Flow series 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 series filter system facilitates easy operation and maintenance of your filter system. Maximizing surface area reduces recirculation time, while increased contact time improves filtration efficiency.

## Features & Benefits

### High flow capability of up to 500 gpm per cartridge

- Reduced Filter Usage – minimizes product loss, labor, disposal costs, operator exposure, and downtime for filter change-out.

### Compound Radial Pleat design

- High loading capacity for long life and lower cost filtration.

### Compact design

- Smaller housing minimizes capital expense requirements.
- Reduces system footprint.

### Absolute rating

- Reproducible effluent quality throughout the filter's life.

### Easy to Use

- No special tools or hardware required for filter change-out – minimizes downtime.
- "Twist to lock" seating mechanism provides positive seal.
- Ergonomically designed handle – facilitates easy cartridge installation and removal.

### FDA compliant

- Compatible in applications requiring direct food contact in food and beverage processing per 21 CFR.



## Applications

<b>Industrial</b>	Municipal Water, RO Prefiltration, Reclaimed Water, Coolants, Nozzle Protection, Boiler Condensate
<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 Water
<b>Food &amp; Beverage</b>	Process Water
<b>Pharmaceutical</b>	Process Water

## 3M™ High Flow Series Filter System

### High Performance Media in an Innovative Design

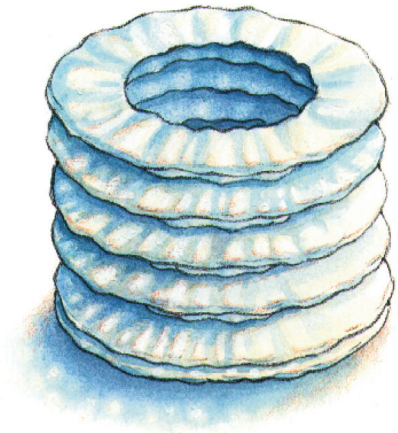
3M™ High Flow series filter systems are designed using state-of-the-art technology, optimizing both performance and effluent quality to ensure customer satisfaction. The elements use a pleat design that results in a high usable filtering surface area per filter.

### Radial Pleat Design

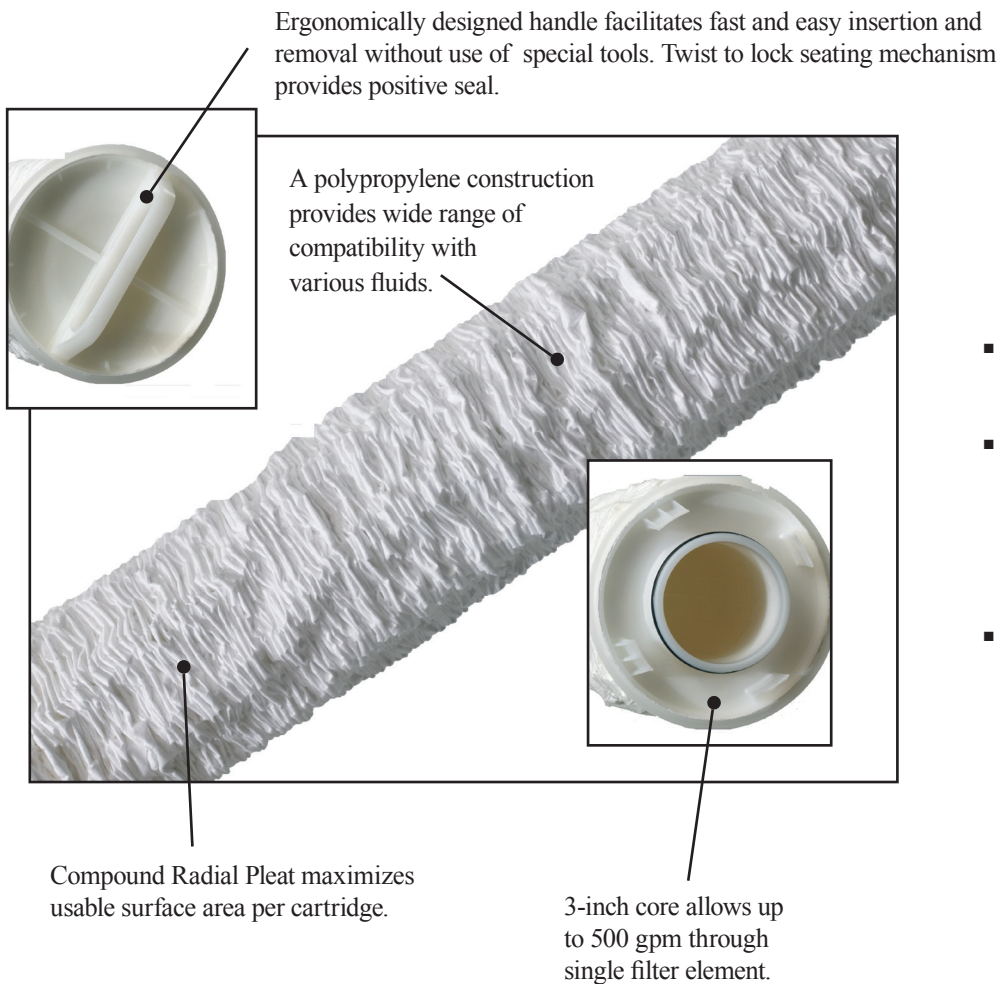
3M innovation is at the heart of the 3M High Flow series filter system. A compound radial pleat design maximizes the usable surface area per filter. Blown microfiber forms the basis of the filter media, which is made to tightly controlled fiber diameter specifications to produce a media with absolute rated particle retention characteristics. Our 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 fluid throughout the entire filter structure. This results in consistent particle retention in a compact, space-saving design.

### Design Features

The 3M High Flow filter High Flow Filter contains several features to combine high performance with easy operation.



Compound Radial Pleat design maximizes usable media surface area

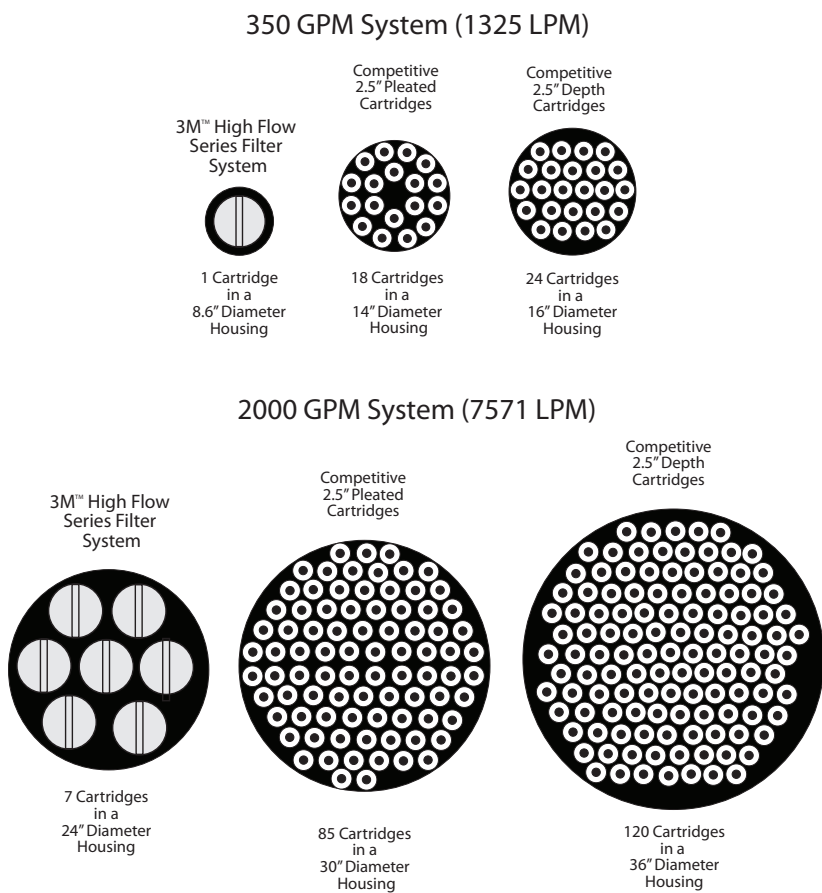


- A large diameter core allows up to 500 gpm through a single filter element.
- An ergonomically designed handle has been designed to facilitate fast and easy insertion and removal without the use of special tools. Cartridges are simply inserted over a built-in guide tube.
- The seating mechanism uses a “twist to lock” design to provide a positive seal.

# Filter Comparison

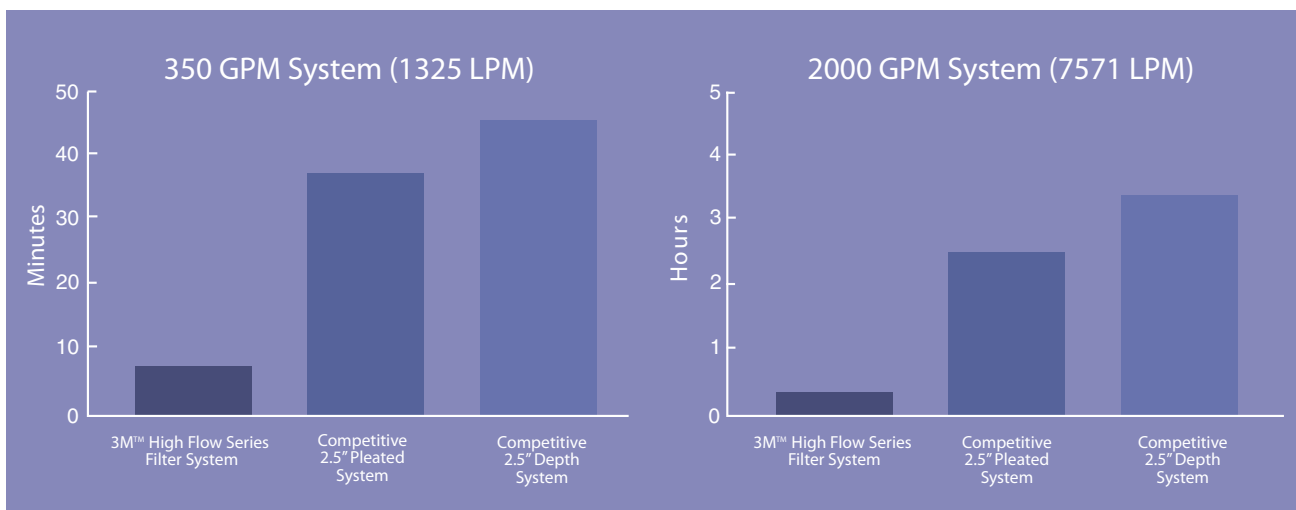
Consider the following benefits of the 3M™ High Flow series filter system over competitive 2.5” cartridges in a 350 gpm (1325 lpm) and a 2000 gpm (7571 lpm) system\*:

Figure 1. - Typical Cartridges Required & Housing Footprint Comparison



- The 3M High Flow series filter system requires 90% fewer cartridges as competitive 2.5” cartridge systems for a given flow rate.
- 3M High Flow series filter housings are 33% to 50% smaller than competitively sized housings for a given flow rate.
- Fewer filters and a user-friendly housing design means faster change-outs than competitively sized systems.

Figure 2. - Typical Time/Labor for Change-Out



## 3M™ High Flow Series Filter System Specifications and Operating Parameters

### Materials of Construction

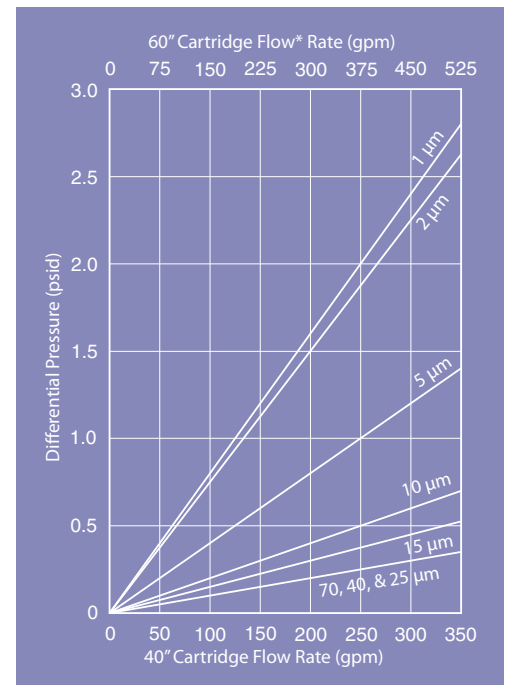
**Filter Media** - Each grade of the 3M™ High Flow series filter system is manufactured from meltblown FDA compliant polypropylene microfiber media, providing high particle reduction efficiency with broad chemical compatibility. No adhesives, binders, or silicone are used in the manufacturing process. The raw materials composing these filters are FDA compliant according to CFR Title 21. All support layers and hardware are constructed with polypropylene.

**O-rings** - are available in a variety of materials to suit your applications, including the standard nitrile, Ethylene Propylene Rubber (EPR), silicone, and fluorocarbon.

3M™ High Flow Series Filter Element Specifications		
Parameter	Elements	
	40" High	60" High
Removal Ratings (microns)	1, 2, 5, 10, 15, 25, 40, and 70	
Flow vs. Differential Pressure	See Figure 3	
Filter Diameter (inches/cm)	6.5 / 16.5	
Filter Length (inches/cm)	40 / 101.6	60 / 152.4

Operating Parameters by Cartridge Length		
Operating conditions	Elements	
	40" High	60" High
Maximum Operating Temperature (°F / °C)	160 / 71	
Maximum Recommended Flow Rate in water @ 70°F (gpm / lpm)	350 / 1325	500 / 1893
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)	
Regulatory Status - All component materials of the 3M High Flow series filter system polypropylene element are listed for food contact per 21 CFR.		

Figure 3. - Typical Cartridge Flow Rates





### Fluid Compatibility

Chemical	Temperature	Chemical	Temperature	Chemical	Temperature
Acetic Acid 20%	160°F (71°C)	Hydrogen Peroxide	100°F (38°C)	Sodium Carbonate	160°F (71°C)
Alkanolamines	140°F (60°C)	Methyl Ethyl Ketone	70°F (21°C)	Sodium Hydroxide 70%	160°F (71°C)
Ammonium Hydroxide 10%	160°F (71°C)	Mineral Oil	70°F (21°C)	Sulfuric Acid 20%	160°F (71°C)
Bleach 5.5%	140°F (60°C)	Nitric Acid 20%	120°F (49°C)	Sulfuric Acid 70%	160°F (71°C)
Ethylene Glycol	160°F (71°C)	Potassium Hydroxide	140°F (60°C)	Urea	160°F (71°C)

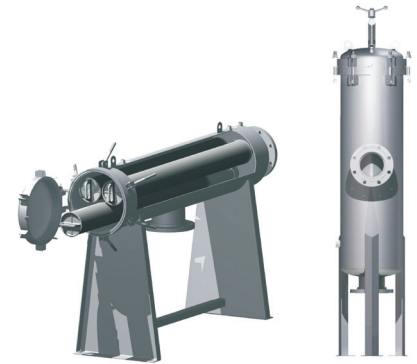
The thermal and chemical resistance data presented in this brochure is for guidance only. Factors such as duration of exposure, fluid concentration, and temperature should also be considered. Thermal and chemical resistance should also be considered when choosing all materials exposed to fluids.

\* estimated

## 3M™ High Flow Series Filter Housings

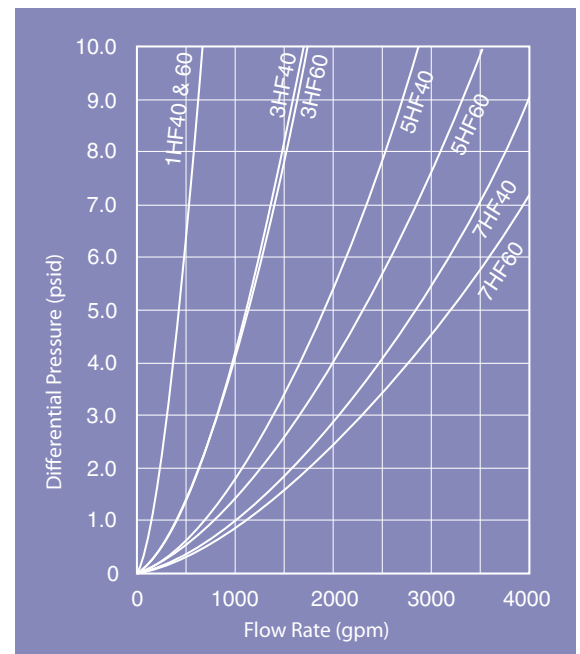
The 3M™ High Flow series filter housings are specifically designed to deliver all of the system's benefits in a compact footprint. Housings are available in standard designs, as well as customizable configurations to suit your specific needs. All standard 3M High Flow series filter housings are designed, manufactured, tested, and code stamped in accordance with ASME Section VIII, Division 1. Stainless steel housing external surfaces are glass-bead blasted for a consistent, easy care finish, while carbon steel units are painted.

The 3M High Flow series filter housing is available in a variety of sizes to accommodate from 1 to 7 filter elements in both 40-inch and 60-inch lengths. Larger housings are available upon request. Housings are also available in horizontal or vertical configurations, depending on your needs. Choose the horizontal option to maximize ease of operation, or the vertical to minimize the system's footprint.



Features	
Horizontal	Vertical
ASME Code design	
Robust cartridge center-post design eliminates bulky support plates providing easy access to housing internals	
Hinged cover for easy element change-outs	User-friendly cover lifting device for easy element change-outs
Handles liquid at pressures and temperatures of up to 150 psig and 250 °F	
Manufactured from 304 or 316L stainless steel for excellent corrosion protection (carbon steel option available in multi-element housing)	
Available for 40" and 60" element lengths	Available for 40" element lengths
Upstream and downstream gauge ports and drains	
Options	
Corrosion allowance for carbon steel housing – consult factory	
Choice of inlet/outlet flange size	

Figure 4. - Typical Housing Flow Rates



# 3M™ High Flow Series Filter System

3M™ High Flow Series ASME Code Housing Specification

Model	Vessel Outside Diameter (in./cm)	Material	Connection Size/Type (all ANSI flanges)		Recommended Maximum Flow (gpm / 1pm)		Maximum Pressure & Temperature	Approximate Shipping Weight (lb/kg)		
			40"	60"	40"	60"		40" Horiz.	40" Vert.	60" Horiz.
1HF	8 5/8 / 21.9	316L SS	4"	4"	350 / 1325	500 / 1893	150 psig @ 250°F (10 bar@121 °C)	340 / 154	305 / 138	375 / 170
3HF	16 / 40.6	Carbon steel, 304, or 316L SS	6"	8"	875 / 3312**	1500 / 5678		625 / 284	575 / 261	750 / 340
5HF	20 / 50.8		8"	10"	1550 / 5867**	2450 / 9274**		975 / 442	825 / 374	1150 / 522
7HF	24 / 61		10"	12"	2450 / 9274	3500 / 13249		1350 / 612	1250 / 567	1550 / 703

Larger housings available, consult factory

\* Pressure drop across cartridge not included (see Figure 3). \*\* Maximum flow rate based on nozzle size.

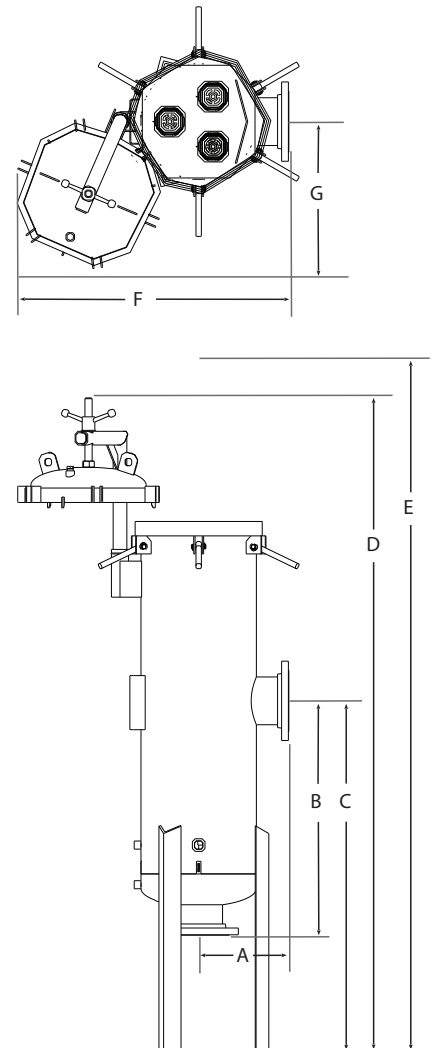
## Housings Dimensions

3M™ High Flow Series ASME Code Filter Housing

Housing Model	Outside Diameter (in.)	Dimensions (inches)						
		A	B	C	D	E	F	G
<b>Vertical Housing Models (available for 40" cartridges only)</b>								
1HF40V	8 5/8	7 1/2	12 1/2	26 1/2	78 5/16	120	28 3/8	5 1/2
3HF40V	16	12 1/2	16 1/2	34 9/16	99 3/8	132	37 1/8	8 20 5/8
5HF40V	20	14 1/2	20 1/2	42 5/8	113	140	45	23 5/8
7HF40V	24	16 1/2	22 3/4	48 11/16	126	150	55	26
<b>Horizontal Housing Models*</b>								
1HF40H	8 5/8	35	7 1/2	12 1/2	64 1/4	108	24 1/2	12
1HF60H		35 9/16	7 1/2	12 1/2	84 1/2	150	24 1/2	12
3HF40H	16	40	12 1/2	16 1/2	73 1/8	115	30	21
3HF60H		40	12 1/2	18 1/2	97 1/4	156	30	21
5HF40H	20	40 15/16	14 1/2	20 1/2	81 3/4	120	36 1/2	25
5HF60H		40 15/16	15 1/2	21 1/4	103 3/4	160	36 1/2	25
7HF40H	24	47 1/32	16 1/2	22 3/4	87	124	40	30
7HF60H		47 1/32	16 1/2	24 5/8	108 11/16	165	40	30

\* Sloped for drainage 1 to 3

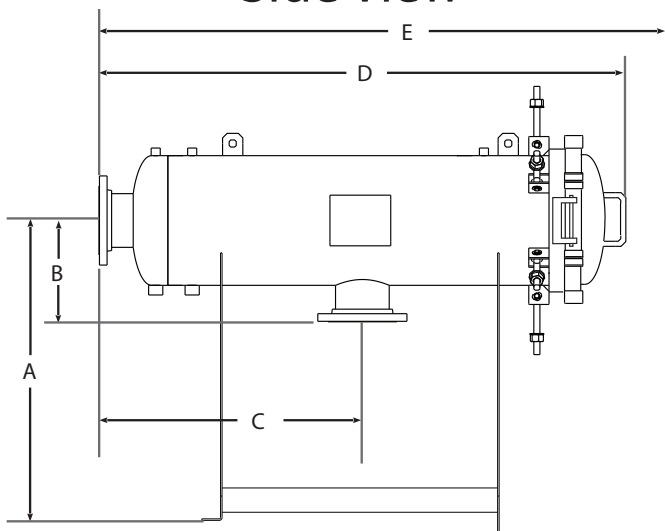
Vertical Housing



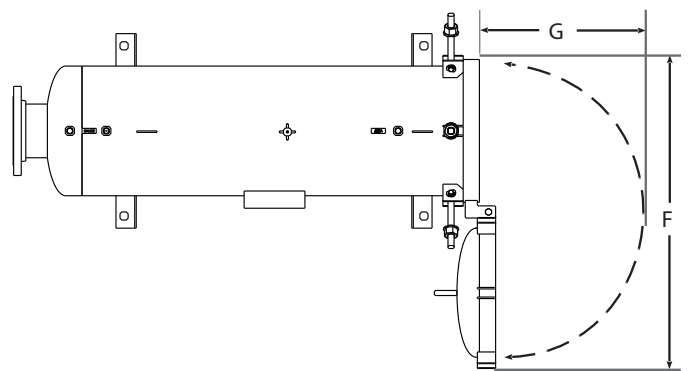
Housing Model	Outside Diameter (cm)	Dimensions (cm)						
		A	B	C	D	E	F	G
<b>Vertical Housing Models (available for 101.6 cm cartridges only)</b>								
1HF40V	21.9	19	31.7	66	198.9	317.5	72	13.9
3HF40V	40.6	31.75	42.06	87.78	252.41	322.58	94.29	52.38
5HF40V	50.8	36.67	52.22	108.26	287.02	351.79	114.3	60
7HF40V	61	41.91	60.96	136.36	320.04	381	139.7	66.04
<b>Horizontal Housing Models*</b>								
1HF40H	21.9	86.3	18.8	32.3	163.1	276.8	62.2	30.4
1HF60H		100.4	18.8	48.2	198.1	363.2	62.2	30.4
3HF40H	40.6	100.6	31.5	42.38	185.73	292.1	76.2	53.3
3HF60H		100.6	31.5	47.30	247.01	406.4	73.6	53.3
5HF40H	50.8	103.9	36.8	52.7	207.6	317.5	92.7	63.5
5HF60H		103.9	36.8	54.6	263.5	419.1	92.7	63.5
7HF40H	61	119.4	40.7	58.8	220.9	330.2	101.6	76.2
7HF60H		120.4	41.7	63.2	276	381	101.6	76.2

### Horizontal Housing

#### Side View



#### Top View





## 3M™ High Flow Series Filter Element Ordering Guide

Filter Designation	Element Length (inches)	Material	Absolute Removal Rating (Microns)	O-Ring	Packaging Options (per box)
HF – High Flow	40 – 40 in.	PP – Polypropylene	001 – 1 µm	A – Silicone	01 - 1 pack
	60 – 60 in.		002 – 2 µm	B – Fluorocarbon	
			005 – 5 µm	C – EPR	
			010 – 10 µm	D – Nitrile	
			015 – 15 µm		
			025 – 25 µm		
			040 – 40 µm		
070 – 70 µm					

## 3M™ High Flow Series ASME Code Housing Ordering Guide

Number of Filter Elements	Model	Size	Configuration	Housing Material	Packaging Options (per box)
1	HF	40 – 40 in.	H – Horizontal	A – Carbon Steel *	GA – Silicone
3		60 – 60 in. **	V – Vertical **	B – 304 SS*	GB – Fluorocarbon
5				C – 316L SS	GC – EPR
7					GD – Nitrile

\* Not available for single element (1-around) housing

\*\* 60 inch vessel not available in vertical configuration

### Important Notice

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### Limitation of Remedies and Liability

If the 3M Purification Inc. product is proved to be defective, THE EXCLUSIVE REMEDY, AT 3M Purification Inc.'S OPTION, SHALL BE TO REFUND THE PURCHASE PRICE OR TO REPAIR OR REPLACE THE DEFECTIVE PRODUCT. 3M Purification Inc. shall not otherwise be liable for loss or damages, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including, but not limited to, contract, negligence, warranty or strict liability.

### Warranty

Seller warrants its equipment against defects in workmanship and material for a period of 12 months from date of shipment from the factory under normal use and service and otherwise when such equipment is used in accordance with instructions furnished by Seller and for purposes disclosed in writing at the time of purchase, if any. Any unauthorized alteration or modification of the equipment by Buyer will void this warranty. Seller's liability under this warranty shall be limited to the replacement or repair, F.O.B., point of manufacture, of any defective equipment or part which, having been returned to the factory, transportation charges prepaid, has been inspected and determined by Seller to be defective. THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, AS TO DESCRIPTION, QUALITY, MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR USE, OR ANY OTHER MATTER. Under no circumstances shall Seller be liable to Buyer or any third party for any loss of profits or other direct or indirect costs, expenses, losses or consequential damages arising out of or as a result of any defects in or failure of its products or any part or parts thereof or arising out of or as a result of parts or components incorporated in Seller's equipment but not supplied by the Seller.



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