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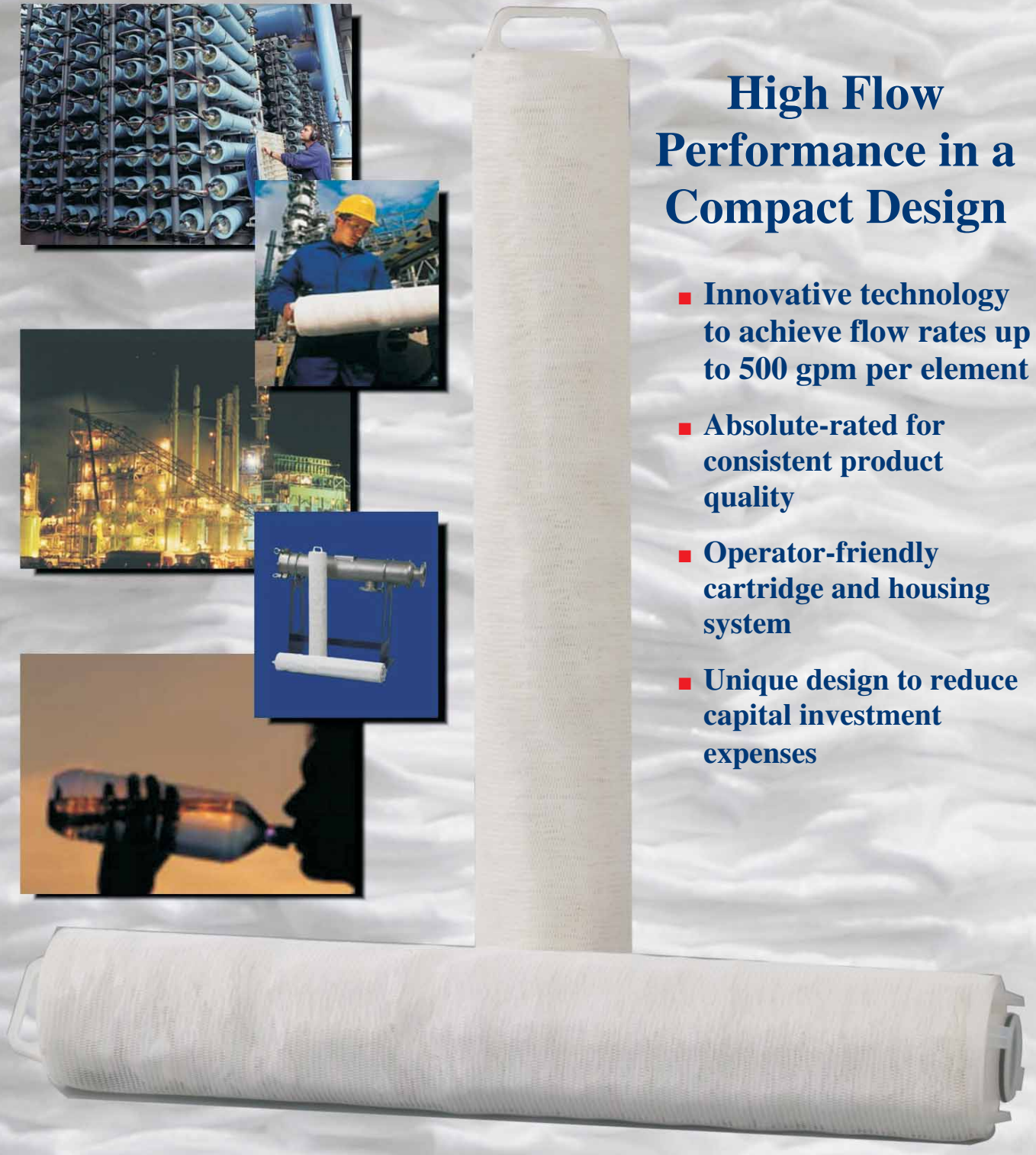
CUNO High Flow Filtration Systems



High Flow Performance in a Compact Design

- Innovative technology to achieve flow rates up to 500 gpm per element
- Absolute-rated for consistent product quality
- Operator-friendly cartridge and housing system
- Unique design to reduce capital investment expenses

CUNO High Flow Filtration System

The CUNO High Flow Filtration System is an advanced design that uses 3M Innovation and CUNO'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 unique construction of CUNO High Flow Filters (patent pending) 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 CUNO High Flow Filtration System 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 CUNO High Flow 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 CUNO High Flow Filtration 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 unique "twist-to-lock" cartridge seating mechanism that provides a positive seal, the CUNO High Flow System facilitates easy operation and maintenance of your filter system.

CUNO High Flow Filter 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 & Beverage - Process Water
Pharmaceutical - Process Water

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
■ Patent Pending 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.

CUNO High Flow Filter

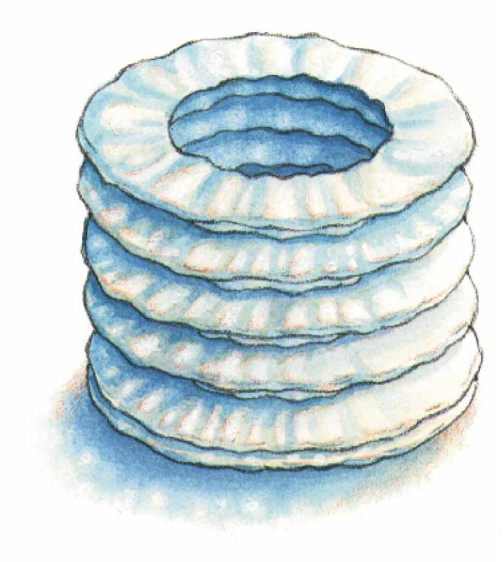
High Performance Media in an Innovative Design

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

Radial pleat design

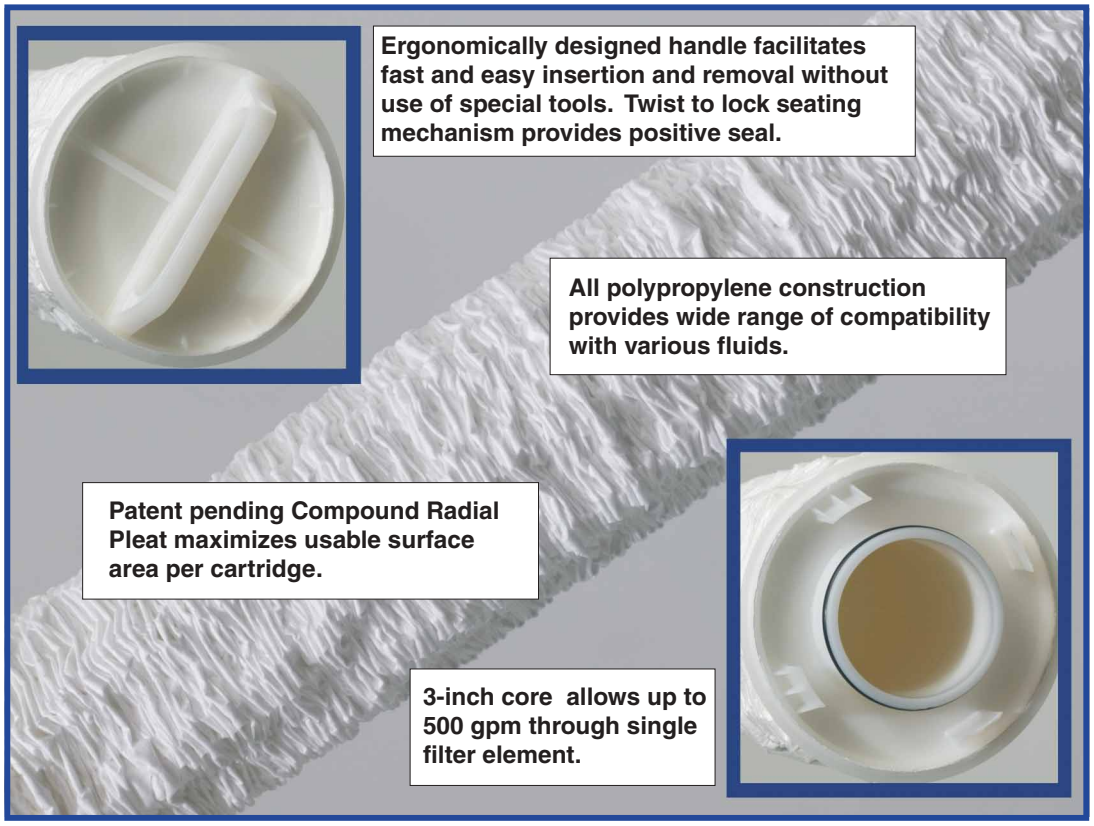
3M Innovation is at the heart of the CUNO High Flow Filter. A patent pending compound radial pleat design maximizes the usable surface area per filter. Blown microfiber forms the basis of the filter media, which is made to tightly controlled fiber diameter specifications to produce a media with absolute rated particle retention characteristics. Our unique 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.

Compound Radial Pleat design maximizes usable media surface area



Design Features

The CUNO High Flow Filter contains several features to combine high performance with easy operation.

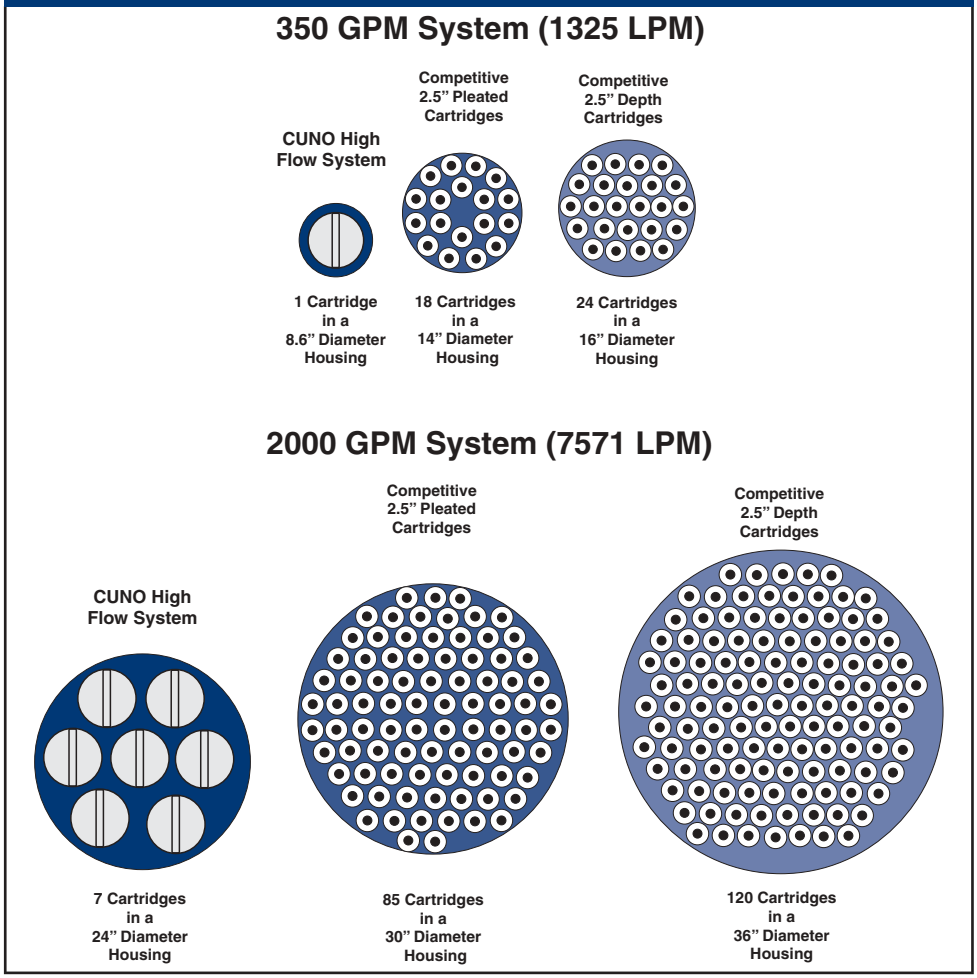


- A large diameter core allows up to 500 gpm through a single filter element.
- An ergonomically designed handle has been designed to facilitate fast and easy insertion and removal without the use of special tools. Cartridges are simply inserted over a built-in guide tube.
- The seating mechanism uses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

Filter Comparison

Consider the following benefits of the CUNO High Flow System over competitive 2.5” cartridges in a 350 gpm (1325 lpm) and a 2000 gpm (7571 lpm) system*:

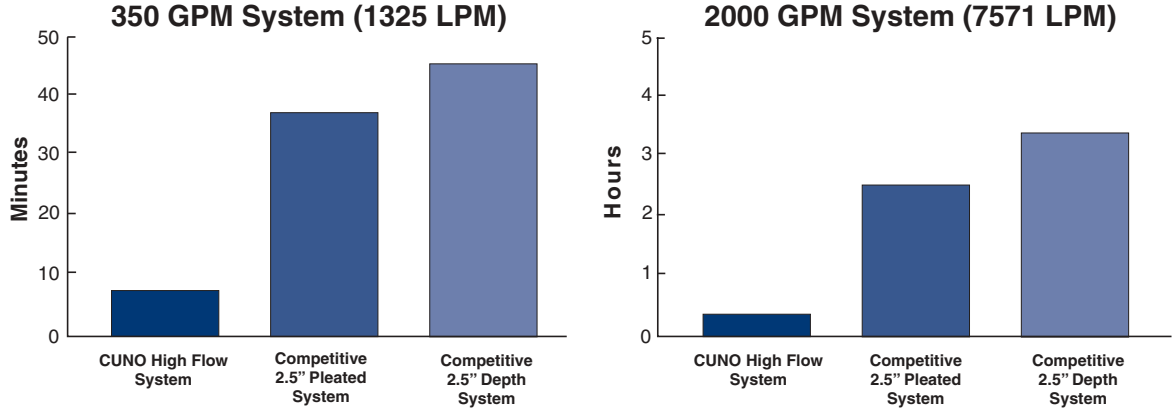
Figure 1 – Typical Cartridges Required & Housing Footprint Comparison



- The CUNO High Flow System requires 90% fewer cartridges as competitive 2.5" cartridge systems for a given flow rate.
- CUNO High Flow 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.

* Comparison assumes fluid viscosity of 1 cp

Figure 2 – Typical Time/Labor for Change-Out



CUNO High Flow Filter Specifications and Operating Parameters

Materials of Construction

Filter Media - Each grade of the CUNO High Flow Filter is manufactured from meltblown FDA compliant polypropylene microfiber media, providing high particle removal 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 - O-rings are available in a variety of materials to suit your applications, including the standard nitrile, Ethylene Propylene Rubber (EPR), silicone, and fluorocarbon.

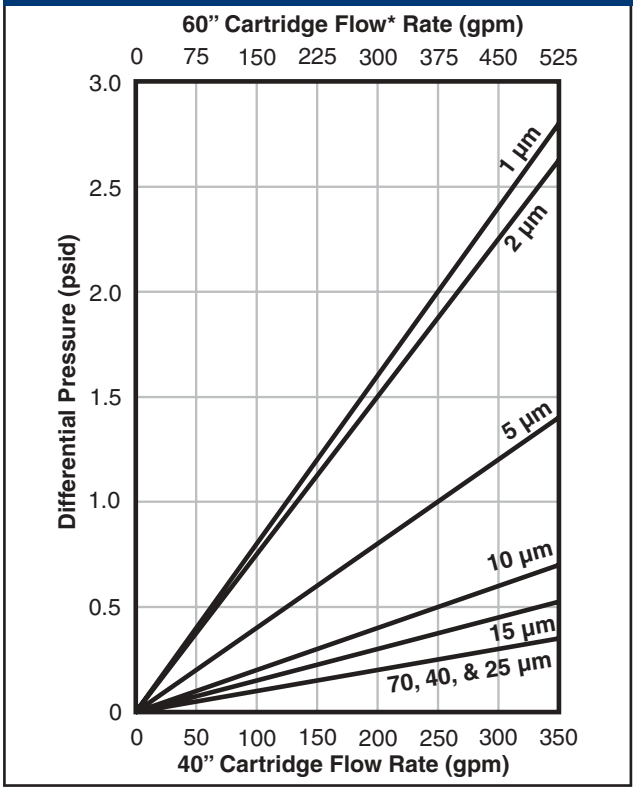
CUNO High Flow Filter Element Specifications

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 (ºF / ºC)	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 CUNO High Flow polypropylene element are listed for food contact per 21 CFR.		

Figure 3 – Typical Cartridge Flow Rates



Fluid Compatibility

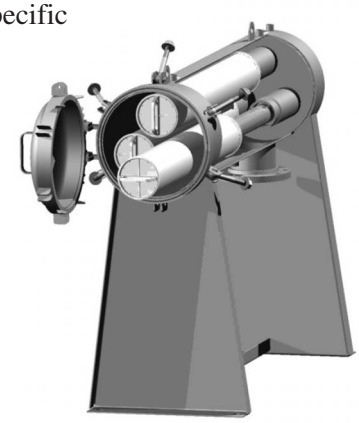
Chemical	Temperature	Chemical	Temperature	Chemical	Temperature
Acetic Acid 20%	160°F (71°C)	Hydrogen Peroxide	100°F (38°C)	Sodium Carbonate	160°F (71°C)
Alkanolamines	140°F (60°C)	Methyl Ethyl Ketone	70°F (21°C)	Sodium Hydroxide 70%	160°F (71°C)
Ammonium Hydroxide 10%	160°F (71°C)	Mineral Oil	70°F (21°C)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

CUNO High Flow Housings

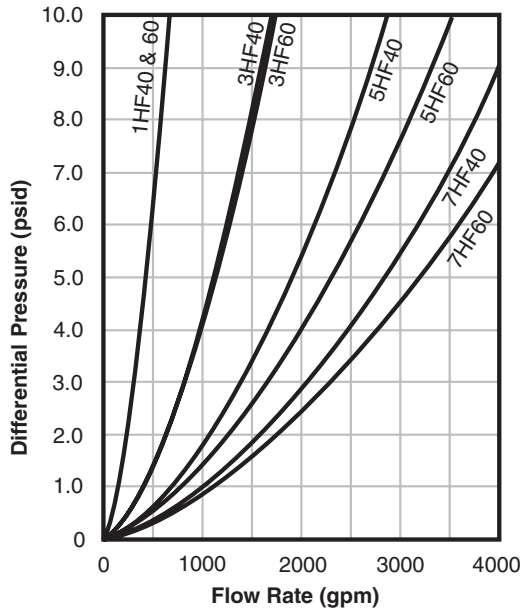
The CUNO High Flow Housings are specifically designed to deliver all of the system's benefits in a compact footprint. Housings are available in standard designs, as well as customizable configurations to suit your specific needs. All standard CUNO High Flow Housings are designed, manufactured, tested, 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 CUNO High Flow 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 ºF	
■ 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



Housing Specifications

CUNO High Flow ASME Code Housing Specification

Model	Vessel Outside Diameter (in. / cm)	Material	Connection Size/Type (all ANSI flanges)		Recommended Maximum Flow (gpm / lpm) *		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 @ 250ºF (10 bar@121 ºC)	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.

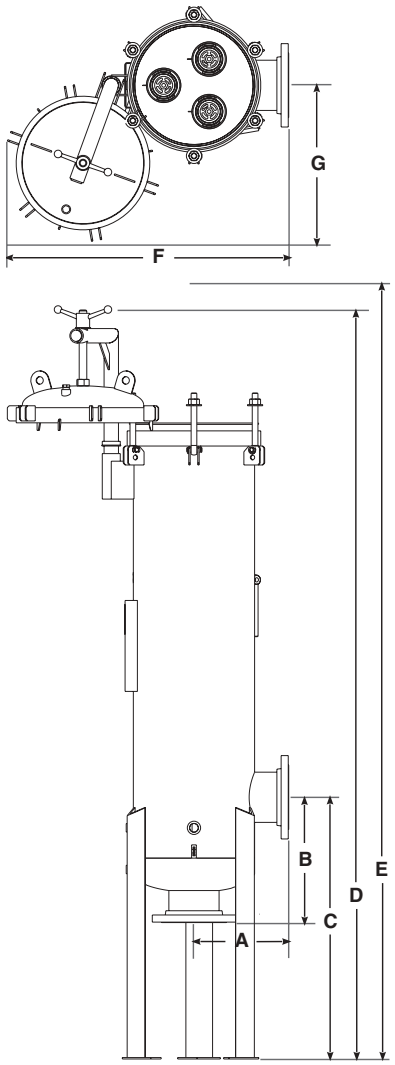
Housing Dimensions

CUNO High Flow ASME Code Model Housing

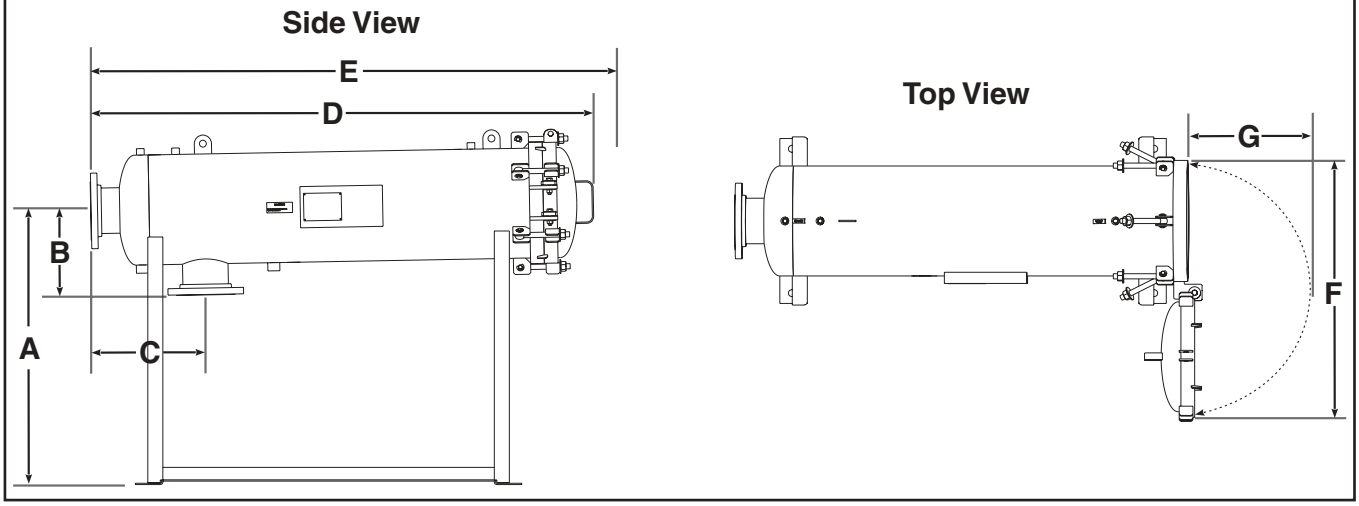
Housing Model	Outside Diameter (in.)	Dimensions (inches)						
		A	B	C	D	E	F	G
Vertical Housing Models (available for 40" cartridges only)								
1HF40V	8 5/8	7 1/2	12 1/2	26 1/2	78 5/16	120	28 3/8	5 1/2
3HF40V	16	12 1/2	16 1/2	34 9/16	99 3/8	132	37 1/8	20 5/8
5HF40V	20	14 1/2	20 1/2	42 5/8	113	140	45	23 5/8
7HF40V	24	16 1/2	22 3/4	48 11/16	126	150	55	26
Horizontal Housing Models*								
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	14 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 7/16	16 1/2	24 5/8	108 11/16	165	40	30
Housing Model	Outside Diameter (cm)	**Dimensions (cm)**						
		A	**B**	**C**	**D**	**E**	**F**	**G**
Vertical Housing Models (available for 101.6 cm cartridges only)								
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
Horizontal Housing Models								
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	101.6	31.5	42.38	185.73	292.1	76.2	53.3
3HF60H		101.6	31.1	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

* Sloped for drainage 1° to 3°

Vertical Housing



Horizontal Housing



CUNO High Flow 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. **60** – 60 in.	**PP** - Polypropylene	**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 **B** – Fluorocarbon **C** – EPR **D** – Nitrile	**01** - 1 pack

CUNO High Flow ASME Code Housing Ordering Guide

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

* Not available for single element (1-around) housing
** 60 inch vessel not available in vertical configuration

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