

Millistak+® CR40 Pod

Activated carbon depth filter system

High adsorption capacity in flexible, modular Pod format

Millistak+® CR40 depth filter media incorporates activated carbon for the removal of color, trace chemical contaminants and smaller polypeptides. Activated carbon has complex and distinct adsorption characteristics, removing bioprocess contaminants that are difficult to remove by other means.

Millistak+® CR40 depth filter media contains activated carbon retained in a rigid structure by a cellulose matrix, that provides important usability and ergonomic advantages over free activated carbon powder.

The Millistak+® CR40 depth filter is available in the disposable Pod format and offers flexibility and easy scale up from lab to pilot to process scale.

Benefits

- Encapsulated and immobilized format, eliminating dust and preventing inhalation for maximum operator safety
- Specific adsorptive behavior provides speed and optimum adsorption for difficult to clear chemical contaminants
- No secondary filtration for removal of bulk carbon required
- Flexible, modular format offers scalability
- Minimum disposal cost



Millistak+® CR40 depth filter media provides advantages over powdered activated carbon

Millistak+® CR40 depth filter media, comprising activated carbon, cellulose fibers and a charged resin binder, form a rigid matrix, which quantitatively retains more contaminants than the equivalent weight of bulk powdered activated carbon (PAC). The rigid matrix of the Millistak+® CR40 depth filter media encourages close contact between the liquid stream and both the surface and pores of the activated carbon particles.

Activated carbon adsorbs impurities from the fluid stream through weak electrostatic interactions known as Van der Waals forces. Filtering can remove the

powdered carbon, but channeling often occurs where the liquid passes through openings in the bed of bulk carbon. Millistak+® CR40 depth filter media offers single-pass operation and high flow rates for increased speed and convenience.

Bulk powdered carbon requires a long contact time between the carbon and the liquid to reach adsorption equilibrium prior to filtration. Millistak+® CR40 depth filter media provides speed, convenience, and optimal performance, particularly when compared to the adsorptive capacity of competitive carbons.

Comparison of Bulk Powdered Carbon and Millistak+® CR40 Pod Filter

	Bulk Powdered Carbon	Millistak+® CR40 Pod Filter
Cleanliness	Very fine powder that is readily dispersed into air when unpacked and handled.	Compressed sheet form eliminates dust.
Health Hazards	Prolonged inhalation of loose carbon can result in lung disease.	Encapsulated to prevent inhalation.
Safety	In certain production environments, PAC dust can be a fire hazard.	No carbon in atmosphere for maximum safety.
Secondary Filtration	After bulk carbon treatment, slurry must be filtered for removal of the spent carbon.	No secondary filtration required.
Labor Intensity	Requires cleaning dosage tanks and piping for the removal of carbon fines before sterile filtration. Residual bulk carbon is difficult to remove and can result in batch-to-batch contamination.	Instant filter disposal after use. No cleaning required.
Process Time	Use of bulk carbon requires mixing slurry for 1 hour or more to reach adsorption equilibrium prior to processing the batch.	Quicker achievement of equilibrium for shorter process time.
Disposal Costs	After filtration of slurry, customer must deal with difficult disposal of the loose carbon retained on the filter septum.	Minimal disposal cost.

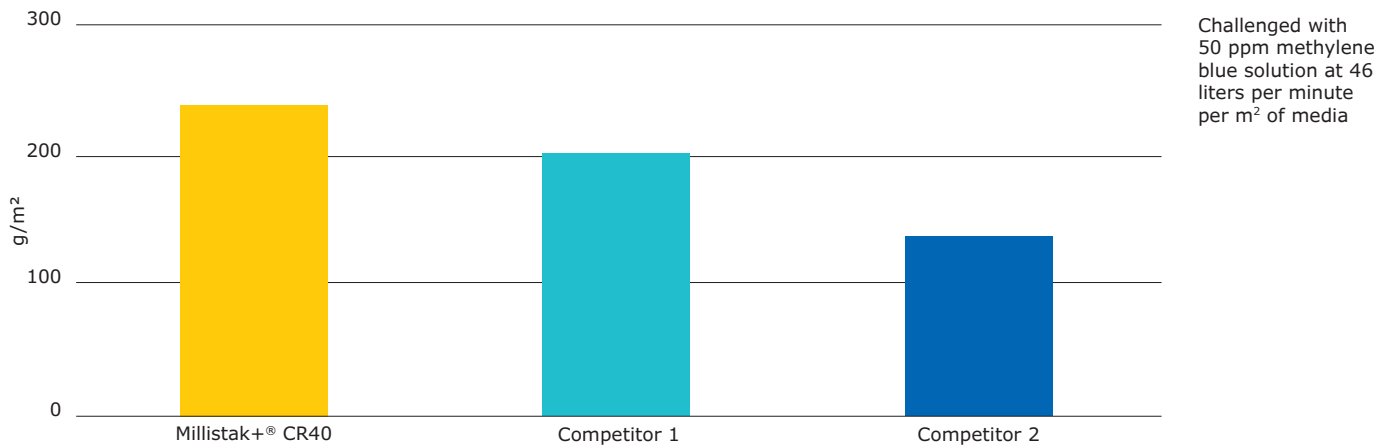
Applications

Millistak+® CR40 depth filters complement other downstream chromatographic purification steps offering an efficient option for contaminant removal through adsorption, without compromising yield.

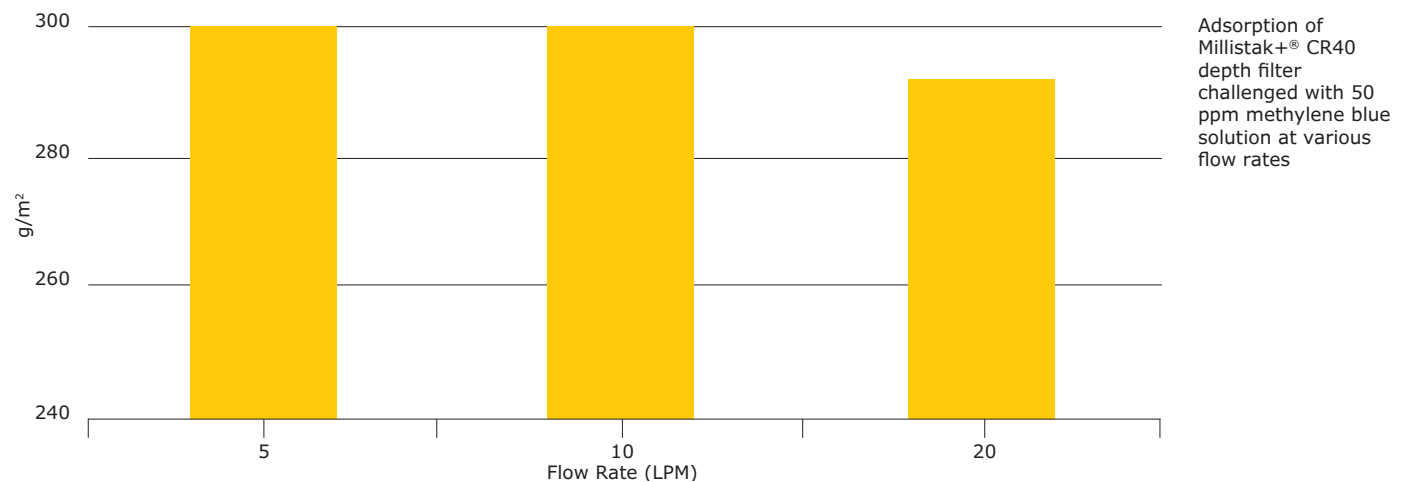
Applications for Millistak+® CR40 Pod Filter

Application	Color Removal	Odor Removal	Haze Removal	Organic Impurities
SVP	X			
LVP	X			
Antibiotic	X			
Vitamin	X	X		
Enzymes	X	X		
Vaccine			X	
Plasma				X
Process Water		X		

Adsorption capacity comparison Millistak+® CR40 depth filter vs. Competitors



Adsorption capacity comparison Millistak+® CR40 depth filter at various flow rates

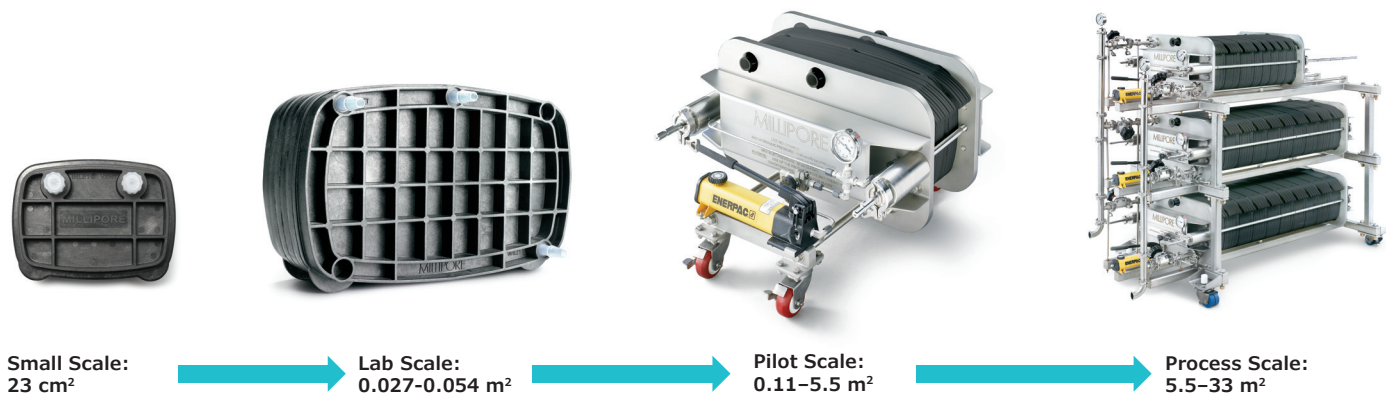
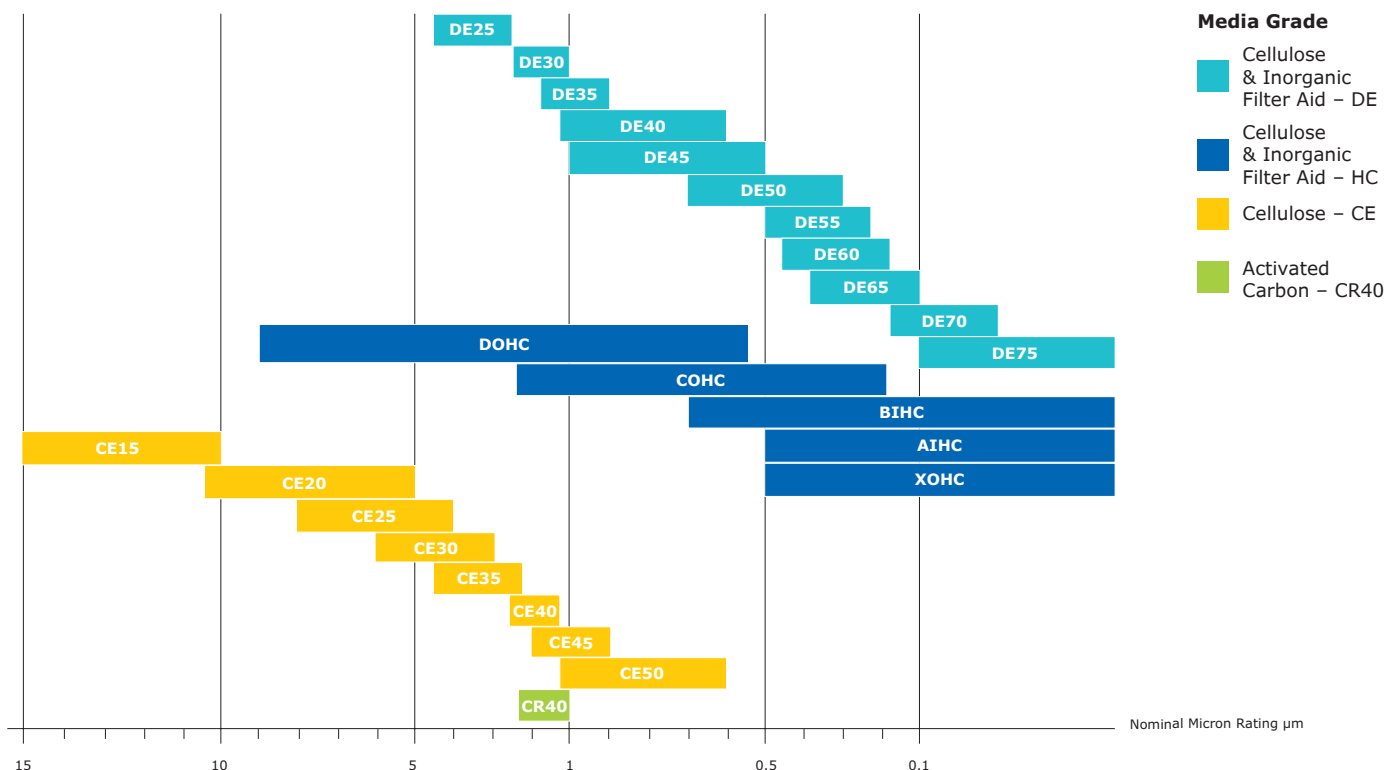


Formats from Lab to Process Scale

Whether you need to do process development, laboratory scale work, pilot studies for scaling or full-scale manufacturing, we have a device size to suit your needs and process volumes.

The μ Pod[®] format offers 23 cm² of surface area for

screening trials. The lab scale Pod (0.027 and 0.054 m²) is available when the process volumes dictate a move to preliminary scaling studies. Finally, pilot and process scale devices (0.11, 0.55 and 1.1 m²) are available for pilot and full-scale manufacturing. The modular Pod holder is available in 1, 2 or 3 rack configurations and enables installation of 5.5 m² - 33 m² of Millistak+[®] CR40 filtration area.



Millistak+® CR40 Depth Filter Specifications

Surface Area	0.025 ft ² (23 cm ²)	0.29 ft ² (0.027 m ²)	0.58 ft ² (0.054 m ²)
Materials of Construction			
Filter Media	Cellulose Fibers with activated carbon		
Pod Housings	Glass-Filled Polypropylene		
Pod Dimensions			
Length	3.5 in. (8.9 cm)	8.5 in. (22 cm)	8.5 in. (22 cm)
Height	2.6 in. (6.6 cm)	5.3 in. (14 cm)	5.3 in. (14 cm)
Thickness	1.6 in (4.1 cm)	2.9 in. (7.4 cm)	3.7 in. (9.4 cm)
Maximum Operating Pressure	50 psid (3.5 bar) at ≤ 40 °C	30 psig (2.1 bar) at 25 °C	30 psig (2.1 bar) at 25 °C
Maximum Differential Pressure			
Forward	30 psid (2.1 bar) at 40 °C	30 psid (2.1 bar) at 37 °C 30 psid (2.1 bar) at 4 °C	30 psid (2.1 bar) at 37 °C 30 psid (2.1 bar) at 4 °C
Reverse	15 psid (1.0 bar) at 40 °C	30 psid (2.1 bar) at 37 °C	30 psid (2.1 bar) at 37 °C
Sterilization	May be autoclaved for 2 cycles of 60 minutes at 123 °C		
Indirect Food Additive	All components meet the FDA indirect food requirements cited in 21 CFR 177–182.		
Toxicity	All component materials meet the criteria for Biological Reactivity Testing. These tests can be any or a combination of the following test methods: USP<88> Class VI (in vivo), USP<87> (in vitro), ISO 10993-5 (in vitro).		
Bacterial Endotoxin	< 0.25 EU/mL, as determined by the Limulus Amebocyte Lysate (LAL) test , according to USP <85>, Ph. Eur. 2.6.14, and JP 4.01.		

*Pilot and process scale only.

Surface Area	1.2 ft ² (0.11 m ²)	5.9 ft ² (0.55 m ²)	11.8 ft ² (1.1 m ²)
Materials of Construction			
Filter Media	Cellulose Fibers with activated carbon		
Pod Housings	Glass-Filled Polypropylene		
Adapters	Glass-Filled Polypropylene*		
Gaskets and Plugs	Thermo Plastic Elastomer (TPE)*		
Pod Dimensions			
Length	24.2 in. (62 cm)	24.2 in. (62 cm)	24.2 in. (62 cm)
Height	12.5 in. (32 cm)	12.5 in. (32 cm)	12.5 in. (32 cm)
Thickness	1.2 in. (3 cm)	2.8 in. (7.1 cm)	4.8 in. (12.2 cm)
Maximum Operating Pressure	50 psig (3.5 bar) at 25 °C 15 psig (1.0 bar) at 80 °C	50 psig (3.5 bar) at 25 °C 15 psig (1.0 bar) at 80 °C	50 psig (3.5 bar) at 25 °C 15 psig (1.0 bar) at 80 °C
Maximum Differential Pressure			
Forward	30 psid (2.1 bar) at 25 °C 15 psid (1.0 bar) at 80 °C	30 psid (2.1 bar) at 25 °C 15 psid (1.0 bar) at 80 °C	30 psid (2.1 bar) at 25 °C 15 psid (1.0 bar) at 80 °C
Reverse	30 psid (2.1 bar) at 25 °C	30 psid (2.1 bar) at 25 °C	30 psid (2.1 bar) at 25 °C
Sterilization	May be autoclaved for 1 cycle of 60 minutes at 123 °C		
Indirect Food Additive	All components meet the FDA indirect food requirements cited in 21 CFR 177–182.		
Toxicity	All component materials meet the criteria for Biological Reactivity Testing. These tests can be any or a combination of the following test methods: USP<88> Class VI (in vivo), USP<87> (in vitro), ISO 10993-5 (in vitro).		
Bacterial Endotoxin	< 0.25 EU/mL, as determined by the Limulus Amebocyte Lysate (LAL) test , according to USP <85>, Ph. Eur. 2.6.14, and JP 4.01.		
CE Pressure Equipment Directive	This filter has been designed and manufactured according to the essential requirements of the Pressure Equipment Directive 97/23/EC. Only 1.1 m ² filters carry the CE mark.		

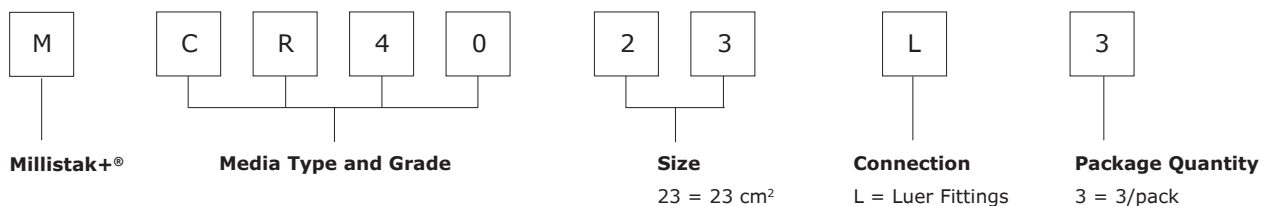
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Millistak+® CR40 Depth Filters

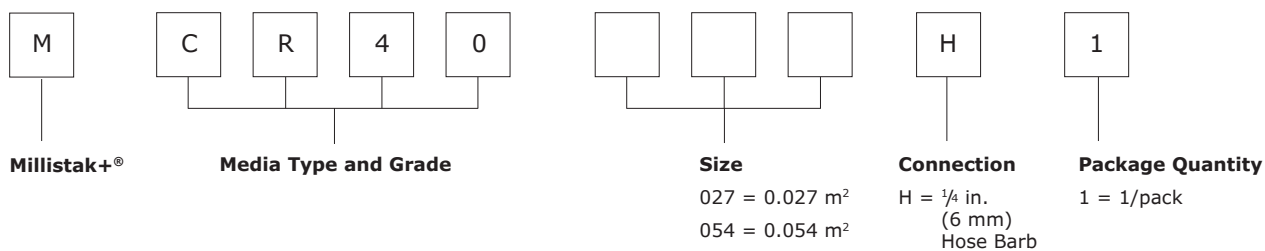
Media Type/Grade	Water Flow Rate L/min/m ² at 10 psid, 23 °C
CR40	73.3 – 597.0

Ordering Information

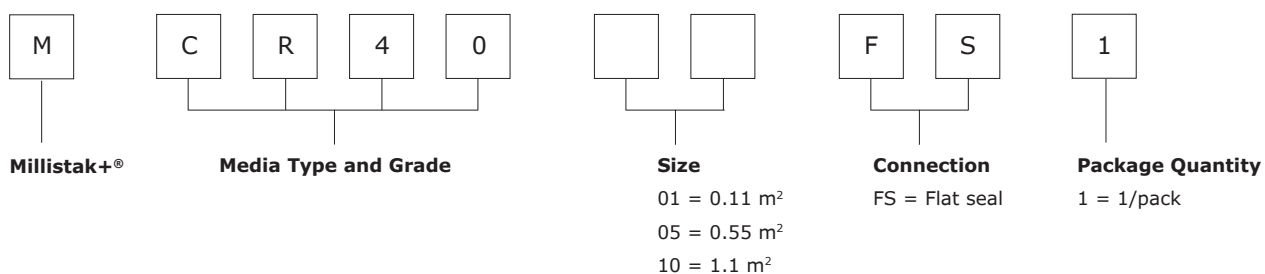
µPod® Filters



Lab Scale Pod Filters



Pilot and Process Scale Pod Filters



Pilot and process scale pods require a pod holder. Lab scale pods and µPod® filters do not require a holder. Please contact your local sales representative for more information.

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