

EMS-CF-F0.45-40

Pleated depth membrane-grade cartridge, 0.45 µm absolute protection rating, 40 in

High-flow membrane-grade polish stage ahead of the cold plates

A polypropylene pleated depth cartridge rated 0.45 µm absolute, 40 in (1016 mm) long with a 2.70 in (68.6 mm) outside diameter. Absolute-rated media is published up to 99.98% retention, the element changes out at 35 psid (2.4 bar), and the maximum differential pressure is 60 psid (4.1 bar) at 20 °C. The 40 in length provides the media area a large loop needs at this rating, and the element still runs only behind a bulk and a fine stage.

ORDERING INFORMATION

Part number	EMS-CF-F0.45-40
Micron rating	0.45 µm (protection rating, absolute)
Nominal length	40 in (1016 mm)
Outside diameter	2.70 in (68.6 mm)
Media	PP pleated depth
Change-out ΔP	35 psid (2.4 bar)
Maximum temperature	80 °C (176 °F)
Seal options	NBR, EPDM, silicone, FKM, PTFE-encapsulated

FILTRATION RATING AND RETENTION BASIS

Parameter	Value	Notes
Micron rating (protection rating)	0.45 µm	Protection rating: the rating the operating element holds to protect the cold plate. Not a commissioning staging step and not an inlet strainer rating
Retention basis	Absolute, published up to 99.98%	Published removal efficiency for absolute-rated media; nominal-rated media is published at 90%
Removal efficiency at the rated size	Up to 99.98%	Absolute basis, valid for the stated particle size only
Beta ratio basis	$\beta x(c) = \frac{\text{upstream particles}}{\text{downstream particles at size } x}$	Efficiency = $(\beta - 1) \div \beta$
Beta ratio bands published for this category	Poor elements β 2–10; expert-recommended minimum $\beta \geq 75$; top of the published range β 200–2000	Ask for the beta figure at the size you care about rather than a headline efficiency
Beta test method	ISO 16889 multi-pass	Standard designation published as the method the rating is built to
Protection-rating selection rule	Absolute rating 7–10× smaller than the finest cold-plate channel	Cold-plate microchannels run about 100–300 µm; direct-liquid-cooling microchannels are quoted as narrow as 100–400 µm
Channel blockage rule	A hard particle over half the channel width raises blockage probability	At channel entrances and bends
Suspended solids target served	Below 5 µm at the cold plate	Protection-rating target for the operating element; not a commissioning staging step and not an inlet strainer rating

Parameter	Value	Notes
Commissioning staging, a separate category	100 → 50 → 25 µm flush sequence	A commissioning procedure, not a product rating; it is not the rating of this element
Inlet strainer rating, a separate category	500 µm class at a unit inlet	Protects the pump and is not a filtration stage

ELEMENT CONSTRUCTION

Parameter	Value	Notes
Nominal length	40 in (1016 mm)	Longest element in the published 10–40 in (254–1016 mm) family
Nominal outside diameter	2.70 in (68.6 mm)	Published envelope for this element family
Media	PP pleated depth	Media, support, end caps, core and cage all polypropylene
Alternative media	Polypropylene, glass fibre, pleated polyester, stainless steel mesh, PES membrane, resin-bonded	A PES pleated membrane is the published stage-5 medium in this category; confirm the medium at order
End caps	All-polypropylene	End-cap style nomenclature (DOE, SOE, 222, 226, fin, bayonet) is present in the trade but not verified from a readable specification page, so no style code is published here
O-ring and gasket options	NBR (Buna), EPDM, silicone, FKM (Viton), PTFE-encapsulated Viton, PTFE-encapsulated silicone	Specify the seal from the fluid: the published design basis is 25% v/v propylene glycol (PG25) with Hybrid-OAT inhibitors
Housing material	Glass-filled polypropylene	The housing follows the element
Stainless-steel insert	Required for hot-water and steam sanitisation	Not required for normal coolant service

DIFFERENTIAL PRESSURE, TEMPERATURE AND SANITISATION

Parameter	Value	Notes
Clean differential pressure	0.17 bar (2 psid)	Published on a clean 2 µm element; a membrane-grade grade starts above this figure
Recommended change-out ΔP	35 psid (2.4 bar)	The primary element-change trigger
Maximum differential pressure	60 psid (4.1 bar)	At 20 °C (68 °F); past this the element is outside its published differential limit
Maximum temperature	80 °C (176 °F)	Service limit for the element
Hot-water sanitisation	80 °C for 30 min	Stainless-steel insert required
Steam sterilisation	121 °C for 30 min, multiple cycles	Stainless-steel insert required
Headroom, clean to change-out	About 17×	Derived from the two published figures
Headroom, clean to maximum	About 30×	Derived from the two published figures

FLOW, CAPACITY AND CLEANLINESS CLASSIFICATION

Parameter	Value	Notes
Flow range	Open — not published as a curve	The source research publishes no flow-versus-ΔP curve for this element; the published pressure anchors are 0.17 bar (2 psid) clean and 35 psid (2.4 bar) change-out

Parameter	Value	Notes
Resulting pressure drop at the rated flow	Open — confirmed at order	The 40 in element carries more media area than the 20 in element in the same housing bore; no per-model flow curve is published
Dirt-holding capacity	Open — not published	Not verified from a readable source; confirmed against the supplier document at order
Prefiltration requirement	Specify a bulk stage and a fine stage upstream	Published staging rule; 1–10 µm and 0.5–5 µm are the protection ratings of the two upstream stages
Placement in the published five-stage model	Stage 5, final membrane ahead of the cold plates	Stages 1, 2 and 5 are supplied; stage 4 sits inside a CDU and belongs to the CDU maker
Fluid cleanliness classification	ISO 4406	Classification framework developed for hydraulic fluids and applied to coolant loops; no counting volume is published here
Component cleanliness standards	ISO 16232 and VDA 19.1	Flush extraction onto a filter membrane for automatic optical analysis
Change-out record fields	ΔP at change; hours in service; ISO 4406 code trend; fluid appearance	Recorded at every element change

APPLICATIONS

- Final polish ahead of the cold plates on a large loop
- Fewer housings for the same membrane-grade media area
- Second stage behind a 0.5–5 µm fine element
- Loop where the cold-plate protection target is held with margin

COMPATIBLE PRODUCTS

- Glass-filled polypropylene housings for 40 in (1016 mm) elements
- EMS-CF-F5-40 or EMS-CF-F1-40 upstream
- EMS-CF-FP-DP element differential-pressure monitor
- EMS-CF-FP-K filter performance monitoring installation kit

MEMBRANE-GRADE LADDER

Parameter	Value	Notes
EMS-CF-F0.45-20	0.45 µm, absolute	20 in (508 mm)
EMS-CF-F0.45-40	0.45 µm, absolute	40 in (1016 mm)
EMS-CF-F0.2-40	0.2 µm, absolute	40 in (1016 mm)
EMS-CF-F0.1-40	0.1 µm, absolute	40 in (1016 mm)
EMS-CF-F0.05-40	0.05 µm, absolute	40 in (1016 mm)

FULL CARTRIDGE LADDER

Parameter	Value	Notes
EMS-CF-F100-10	100 µm, nominal	10 in (254 mm)
EMS-CF-F10-20	10 µm, nominal	20 in (508 mm)
EMS-CF-F5-10	5 µm, nominal	10 in (254 mm)
EMS-CF-F5-20	5 µm, nominal	20 in (508 mm)

Parameter	Value	Notes
EMS-CF-F5-40	5 µm, nominal	40 in (1016 mm)
EMS-CF-F1-10	1 µm, absolute option	10 in (254 mm)
EMS-CF-F1-20	1 µm, absolute option	20 in (508 mm)
EMS-CF-F1-40	1 µm, absolute option	40 in (1016 mm)
EMS-CF-F0.45-20	0.45 µm, absolute	20 in (508 mm)
EMS-CF-F0.45-40	0.45 µm, absolute	40 in (1016 mm)
EMS-CF-F0.2-40	0.2 µm, absolute	40 in (1016 mm)
EMS-CF-F0.1-40	0.1 µm, absolute	40 in (1016 mm)
EMS-CF-F0.05-40	0.05 µm, absolute	40 in (1016 mm)

NOTES

- The code rule is published: the micron value is written as published, so 0.45 µm appears as 0.45 and 0.05 µm as 0.05, and the trailing number is the length in inches.
- Every micron figure on this datasheet is labelled by category. 0.45 µm is this element's protection rating. The 100 → 50 → 25 µm flush sequence is commissioning staging, a procedure rather than a product rating, and the 500 µm class at a unit inlet is a strainer rating.
- A membrane-grade element has little capacity for bulk debris; the 1–10 µm bag stage and the 0.5–5 µm cartridge stage upstream are part of the specification.
- The 40 in (1016 mm) length changes the media area and the housing, not the 0.45 µm protection rating.

Full specification sheet and current pricing EMS-Trade Cooling · ems-cool.com Typical lead time confirmed on order acknowledgement.	EMS-CF-F0.45-40 Rev. A 2026-09-19
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