EMS-CF-F1-20

Pleated depth filter cartridge, 1 µm absolute protection rating, 20 in

Fine polishing element inside the below-5 µm cold-plate target, in a mid-length housing

A polypropylene pleated depth cartridge rated 1 µm on the absolute option, 20 in (508 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. It holds the fine polishing stage on a secondary loop, protecting cold-plate channels that run about 100–300 µm wide.

ORDERING INFORMATION

Part number	**EMS-CF-F1-20**
Micron rating	**1 µm (protection rating, absolute option)**
Nominal length	**20 in (508 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)	**1 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 option, 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	**βx(c) = upstream particles ÷ downstream particles at size x**	Efficiency = (β – 1) ÷ β
Beta ratio bands published for this category	**Poor elements β 2–10; expert-recommended minimum β ≥ 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 reference point	**β3 above 200 corresponds to 99.5% efficiency at 3 µm**	Published worked reference; the 3 µm figure is the beta test particle size, not a protection rating, a commissioning staging step or an inlet strainer rating. Beta is valid only at the stated size and only for a new element
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

Parameter	Value	Notes
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
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	**20 in (508 mm)**	Element length 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**	Selected by duty; confirm 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 1 µm grade starts at or 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
Resulting pressure drop at the rated flow	**Open — confirmed at order**	Pressure drop follows the housing and the flow; no per-model 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 1–10 µm bulk stage upstream**	The 1–10 µm figure is the protection rating of the upstream bulk stage; two stages are specified rather than one fine element, because a fine element is the most expensive way to hold first-month grit
Downstream stage	**Membrane-grade polish, 0.45 µm and finer**	Membrane-grade protection ratings; stage 5 of the published placement model, ahead of the cold plates
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

- Fine polishing on a secondary loop with a 20 in (508 mm) housing
- Cold-plate protection inside the below-5 µm target
- Second stage behind a 1–10 µm bulk element
- Prefiltration ahead of a membrane-grade 0.45 µm stage

COMPATIBLE PRODUCTS

- Glass-filled polypropylene housings for 20 in (508 mm) elements
- EMS-CF-F10-20 or EMS-CF-F5-20 as the stage upstream
- EMS-CF-FP-DP element differential-pressure monitor
- EMS-CF-FP-K filter performance monitoring installation kit

CARTRIDGE LADDER AT 1 ΜM (ABSOLUTE OPTION)

Parameter	Value	Notes
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)

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)

Parameter	Value	Notes
EMS-CF-F5-10	**5 µm, nominal**	10 in (254 mm)
EMS-CF-F5-20	**5 µm, nominal**	20 in (508 mm)
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. 1 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.
- 1 µm is offered as an absolute option; the efficiency row applies to the absolute-rated build and is valid for the stated particle size and a new element.
- The 99.98% figure is a retention rating, not a beta value. Ask for the beta figure at the particle size that matters to the installation.
- Dirt-holding capacity in grams and end-cap style nomenclature are not published in the source research; both rows stay open and are confirmed against the supplier document at order.

Full specification sheet and current pricing
EMS-Trade Cooling · ems-cool.com
Typical lead time confirmed on order acknowledgement.

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