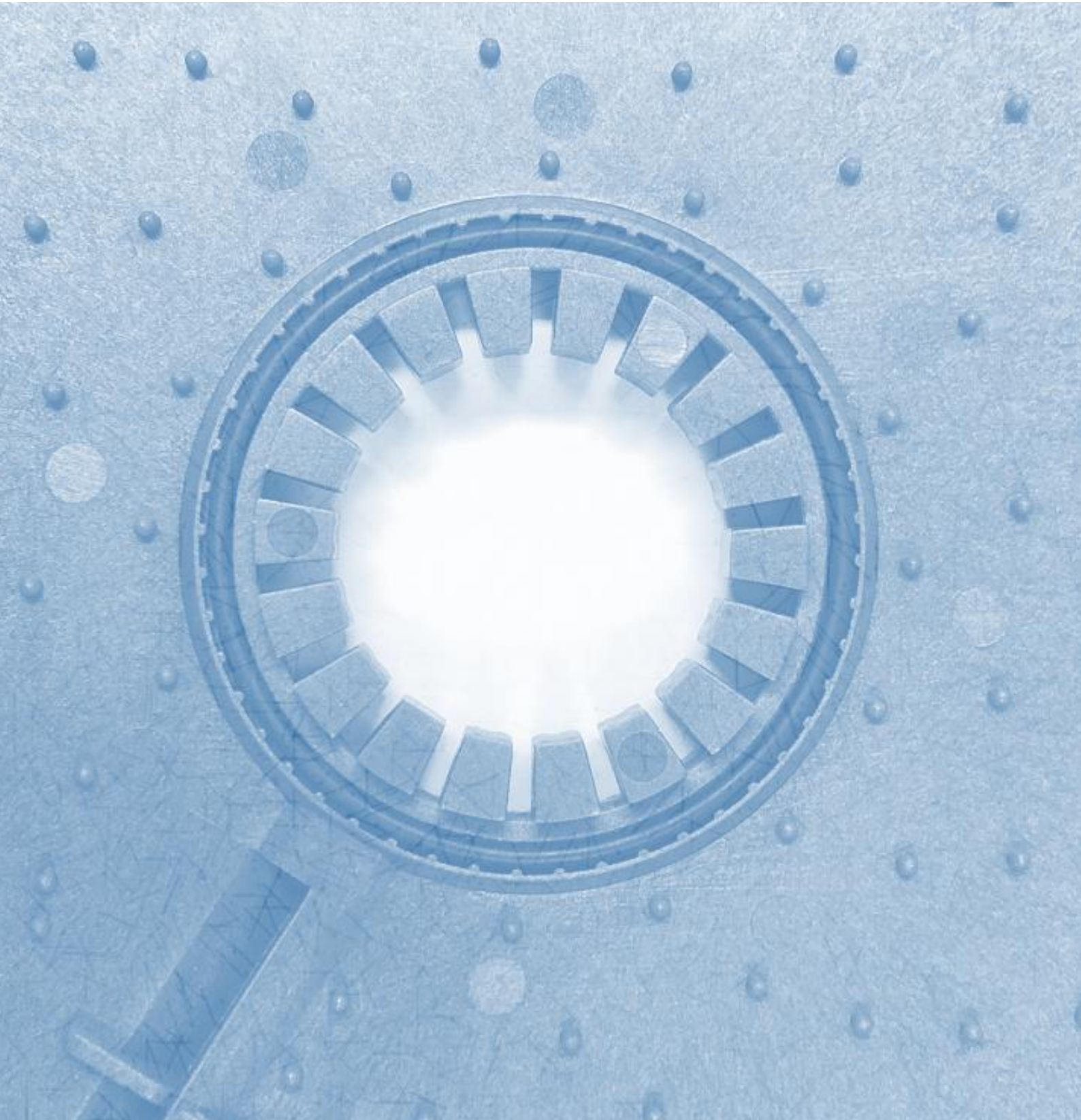


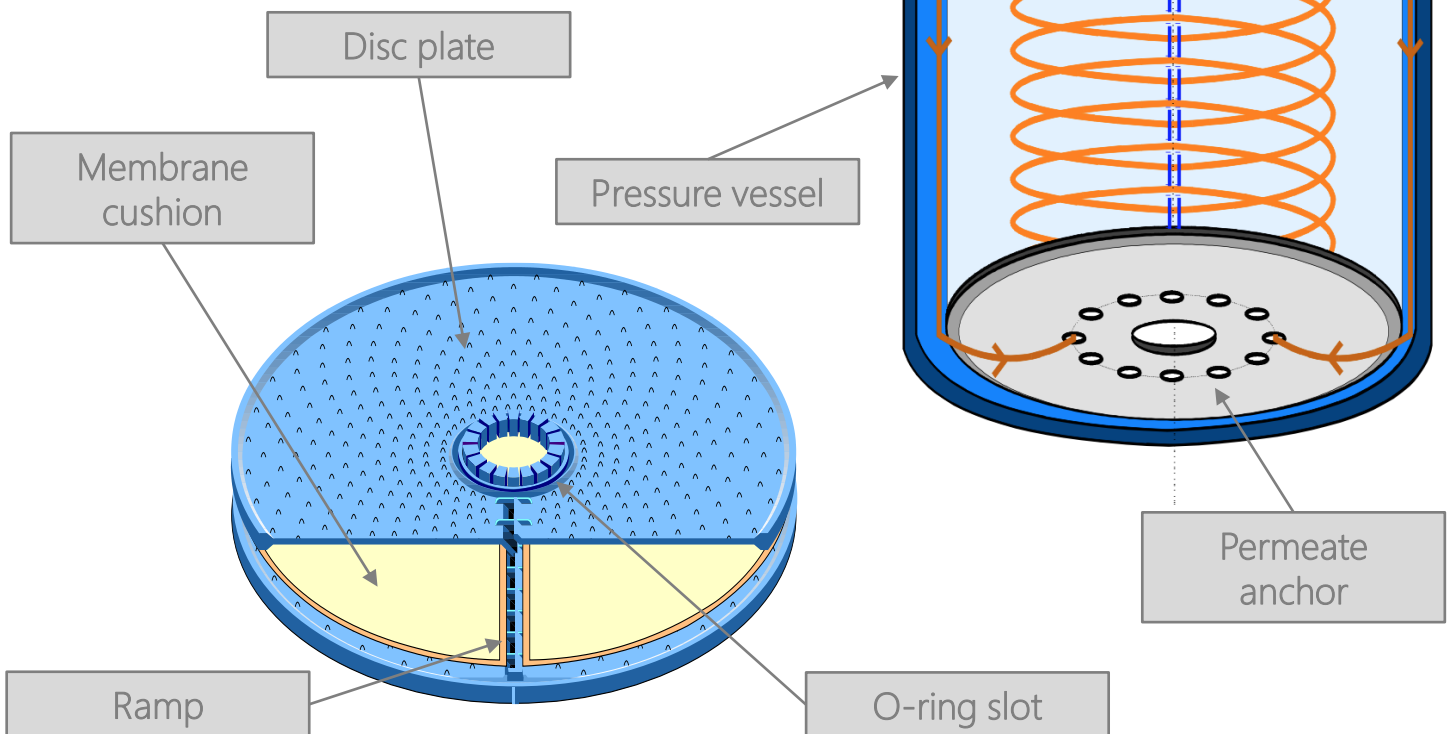
mft Circular Disc Technology

Nanofiltration and Reverse Osmosis Modules



Processes such as MLD (Minimal Liquid Discharge) and ZLD (Zero Liquid Discharge) to minimize or avoid wastewater discharge are one of the outstanding challenges in the field of environmental protection. Our plate-and-frame nanofiltration (NF) or reverse osmosis (RO) solution, the **Circular Disc (CD) module**, allows wastewater to be concentrated to such an extent that its disposal or further treatment (crystallization or evaporation) are economically feasible and acceptable.

By directing the feed flow along a helical pattern through the stack of disc plates, we get a steady and **well-defined flow regimen** on all the membrane surface. The permeate crosses the membrane into the membrane cushion and leaves the support plate to the center of the module.

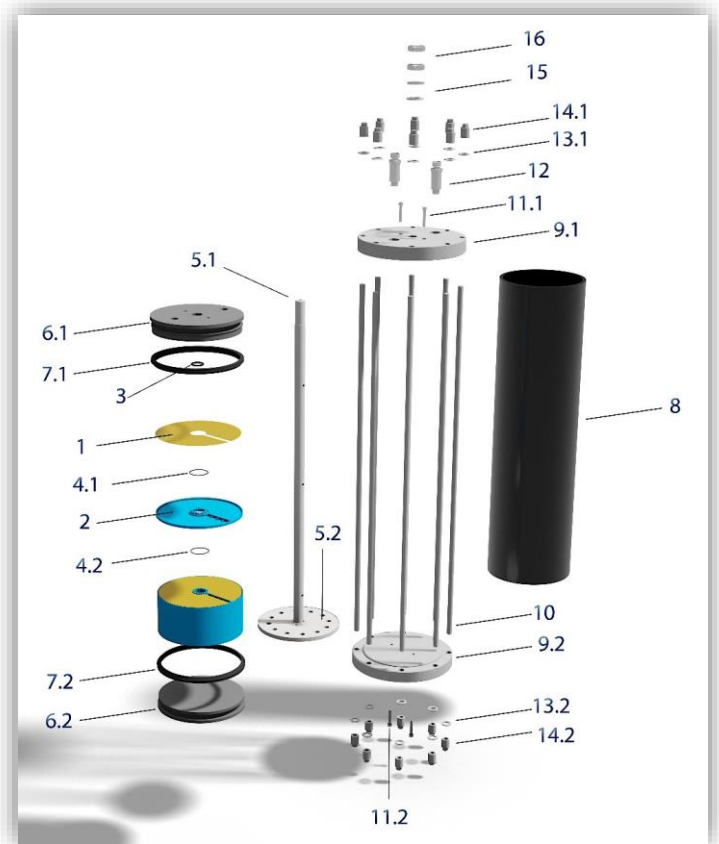


Essentially, CD modules are made of a pressure vessel, of a sealing system and of a stack of support plates and membrane cushions.

The stack of disc plates is installed within a pressure vessel sealed with end plates and tension rods.

O-rings on the disc plates separate the permeate extracted through the membrane cushions from the raw water.

The pressure vessel is connected via hoses to the feed, concentrate and permeate manifolds.

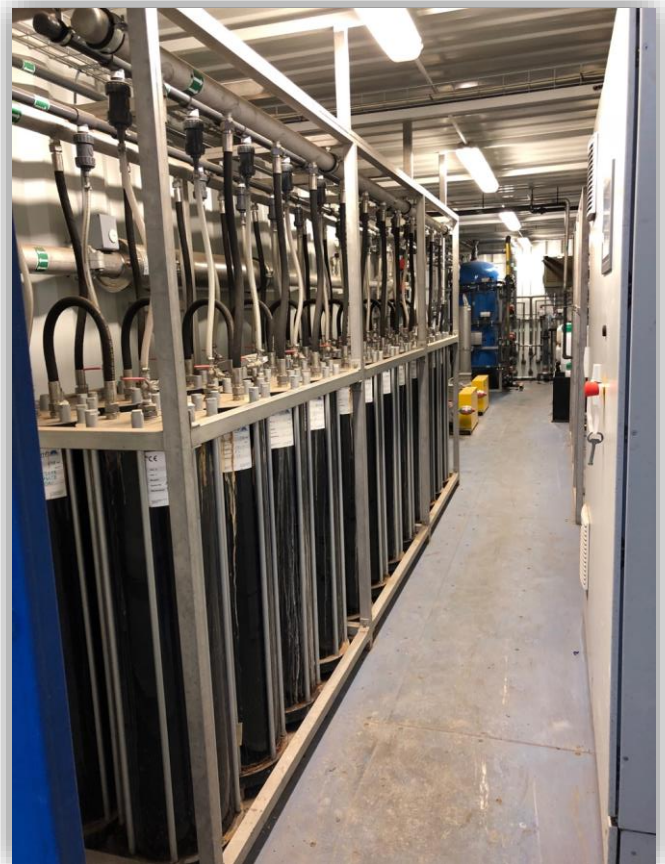


Applications:

- concentration of tough-to-treat wastewater (produced water; mine drainage; landfill and composting leachate; F&B, pharma, distillery, textile, tannery, and metal working effluents);
- wastewater reuse;
- process water recycling (metal industry; deionization wastes; chemical baths);
- brine concentration;
- Minimum and Zero Liquid Discharge (MLD/ZLD).

CD modules specific advantages:

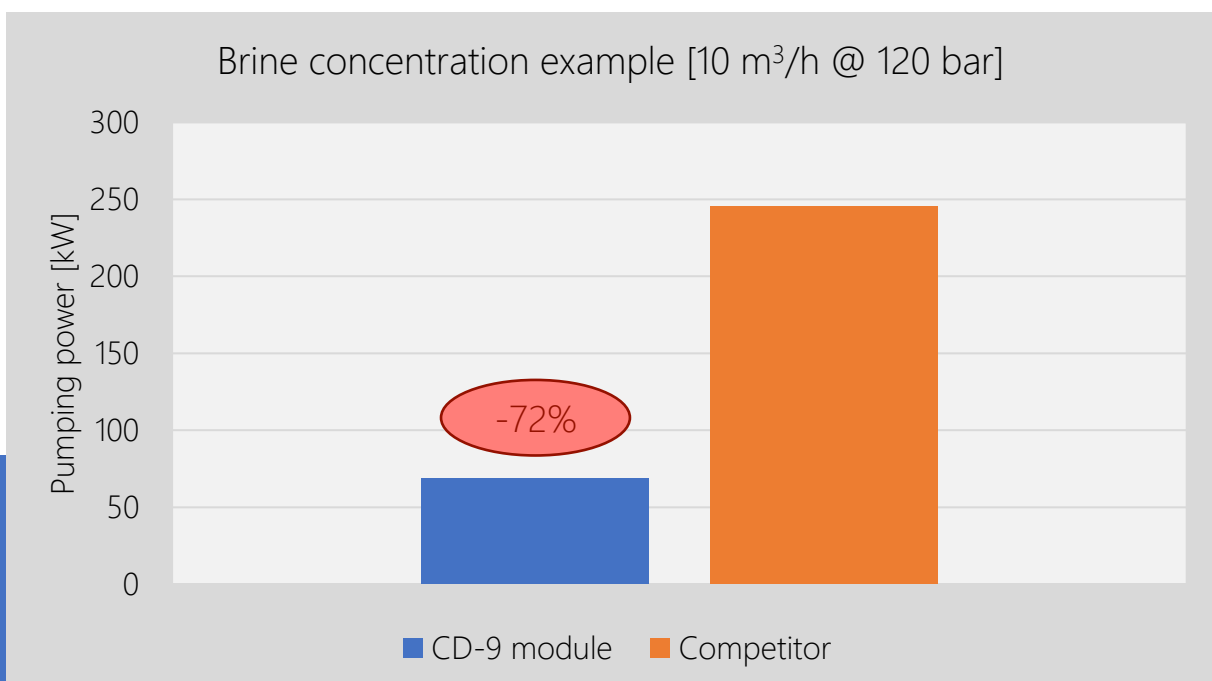
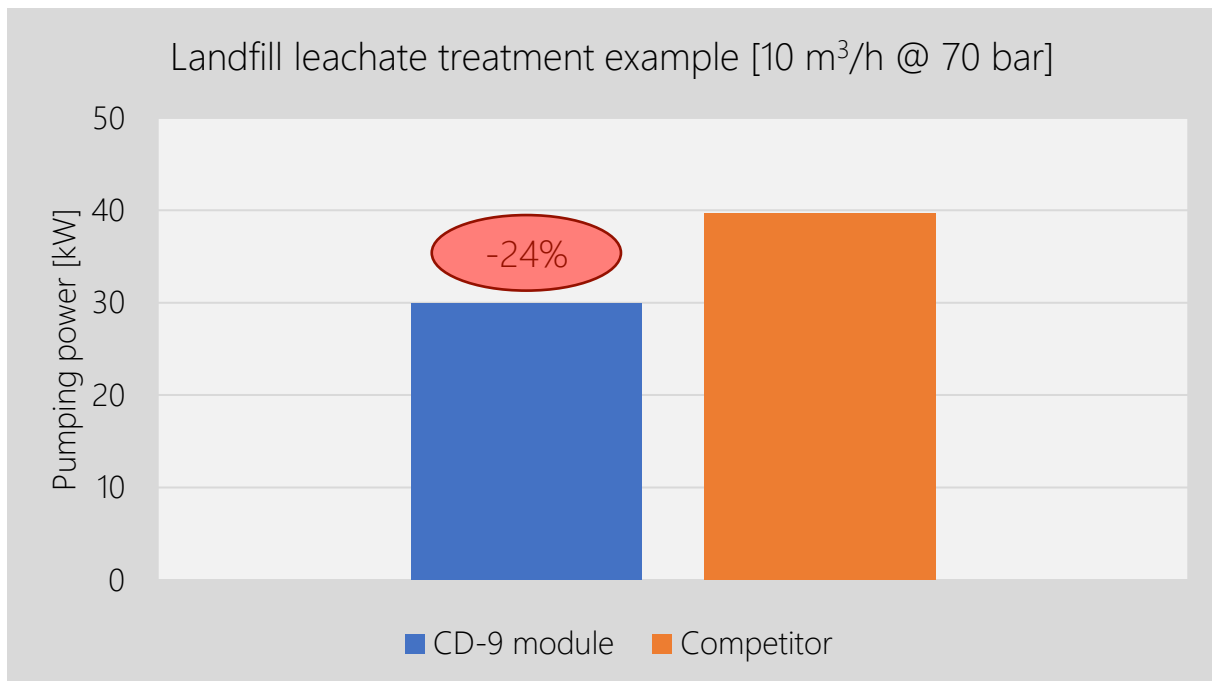
- wide applicability since it is possible to use any membrane material (as long as it can be thermally welded);
- highest water recovery thanks to the high operating pressures and optimized hydraulic regimen;
- simpler pre-treatments compared to spiral-wound elements;
- low energy consumption because of low crossflow requirements (compared to tubular modules) and of low pressure losses (compared to other plate-and-frame modules);
- longer membrane lifetime thanks to the optimized hydraulic regimen (lower mechanical stress, better cake layer and concentration polarization control);
- ease of cleaning due to the optimized hydraulic regimen;
- ease of maintenance due to the simple module construction compared to other plate-and-frame modules;
- clusterization capability to reduce CapEx and OpEx compared to other plate-and-frame modules.



Compared to other plate-and-frame solutions, the **unique CD module design** avoids:

- sharp 180° turns since the flow from one disc to the next follows a 35° flat ramp;
- changes in the size of the flow channel and thus in the flow velocity ($\pm 10\%$).

Therefore, the module pressure losses and, thus, the pumping power demand are considerably lower.



Parameter	Value
Model	CD-9
Applications	NF, RO
Flow direction	Out-to-in
Cushions per module	115
Disc plate material	Glass fiber reinforced plastic
Casing material	FRP, PVC, coated SS 1.0577 and SS 1.4571
Membrane area	9.0 m ²
Packing density	94.5 m ² /m ³
Feed flow channel width	2.5 mm
Average crossflow velocity	0.5 m/s
Crossflow length	50 m
Average crossflow Reynolds number	2,700
Nominal feed flow	750 ÷ 900 L/h
Maximum feed flow	1,200 L/h
Operating temperature range	5 ÷ 40°C
Maximum cleaning temperature	45°C
Maximum operating pressure	90 or 140 bar
Average pressure drop per module	2.0 bar
Average unit pressure drop	0.21 bar/m ²
Operating pH range	4 ÷ 11
Cleaning pH range	2 ÷ 13 (RO) or 2 ÷ 12 (NF)
Maximum inlet SDI	15
Module height	1,170 mm
Module external diameter	322 mm
Weight (empty)	120 kg
Weight (full)	150 kg
Feed connection	G1/2" F
Permeate connection	Rp3/8" F
Concentrate connection	G1/2" F

Parameter	Value
Model	CD-15
Applications	NF, RO
Flow direction	Out-to-in
Cushions per module	195
Disc plate material	Glass fiber reinforced plastic
Casing material	FRP, PVC, coated SS 1.0577 and SS 1.4571
Membrane area	15.0 m ²
Packing density	104.0 m ² /m ³
Feed flow channel width	2.5 mm
Average crossflow velocity	0.5 m/s
Crossflow length	85 m
Average crossflow Reynolds number	2,700
Nominal feed flow	850 ÷ 1,000 L/h
Maximum feed flow	1,200 L/h
Operating temperature range	5 ÷ 40°C
Maximum cleaning temperature	45°C
Maximum operating pressure	30 or 90 bar
Average pressure drop per module	2.5 bar
Average unit pressure drop	0.17 bar/m ²
Operating pH range	4 ÷ 11
Cleaning pH range	2 ÷ 13 (RO) or 2 ÷ 12 (NF)
Maximum inlet SDI	15
Module height	1,770 mm
Module external diameter	322 mm
Weight (empty)	145 kg
Weight (full)	190 kg
Feed connection	G1/2" F
Permeate connection	Rp3/8" F
Concentrate connection	G1/2" F

Parameter	Value
Model	CD-17
Applications	NF, RO
Flow direction	Out-to-in
Cushions per module	226
Disc plate material	Glass fiber reinforced plastic
Casing material	FRP, PVC, coated SS 1.0577 and SS 1.4571
Membrane area	17.3 m ²
Packing density	106.0 m ² /m ³
Feed flow channel width	2.5 mm
Average crossflow velocity	0.5 m/s
Crossflow length	98 m
Average crossflow Reynolds number	2,700
Nominal feed flow	950 ÷ 1,100 L/h
Maximum feed flow	1,200 L/h
Operating temperature range	5 ÷ 40°C
Maximum cleaning temperature	45°C
Maximum operating pressure	30 or 90 bar
Average pressure drop per module	3.0 bar
Average unit pressure drop	0.17 bar/m ²
Operating pH range	4 ÷ 11
Cleaning pH range	2 ÷ 13 (RO) or 2 ÷ 12 (NF)
Maximum inlet SDI	15
Module height	2,000 mm
Module external diameter	322 mm
Weight (empty)	160 kg
Weight (full)	210 kg
Feed connection	G1/2" F
Permeate connection	Rp3/8" F
Concentrate connection	G1/2" F



mft Membran-Filtrations-Technik GmbH

Wegelinstr. 13, 50354 Hürth (Germany)

Phone: +49 (0) 2233 71769 0

e-Mail: info@mft-koeln.de