FRESENIUS
MEDICAL CARE

Home Haemodialysis

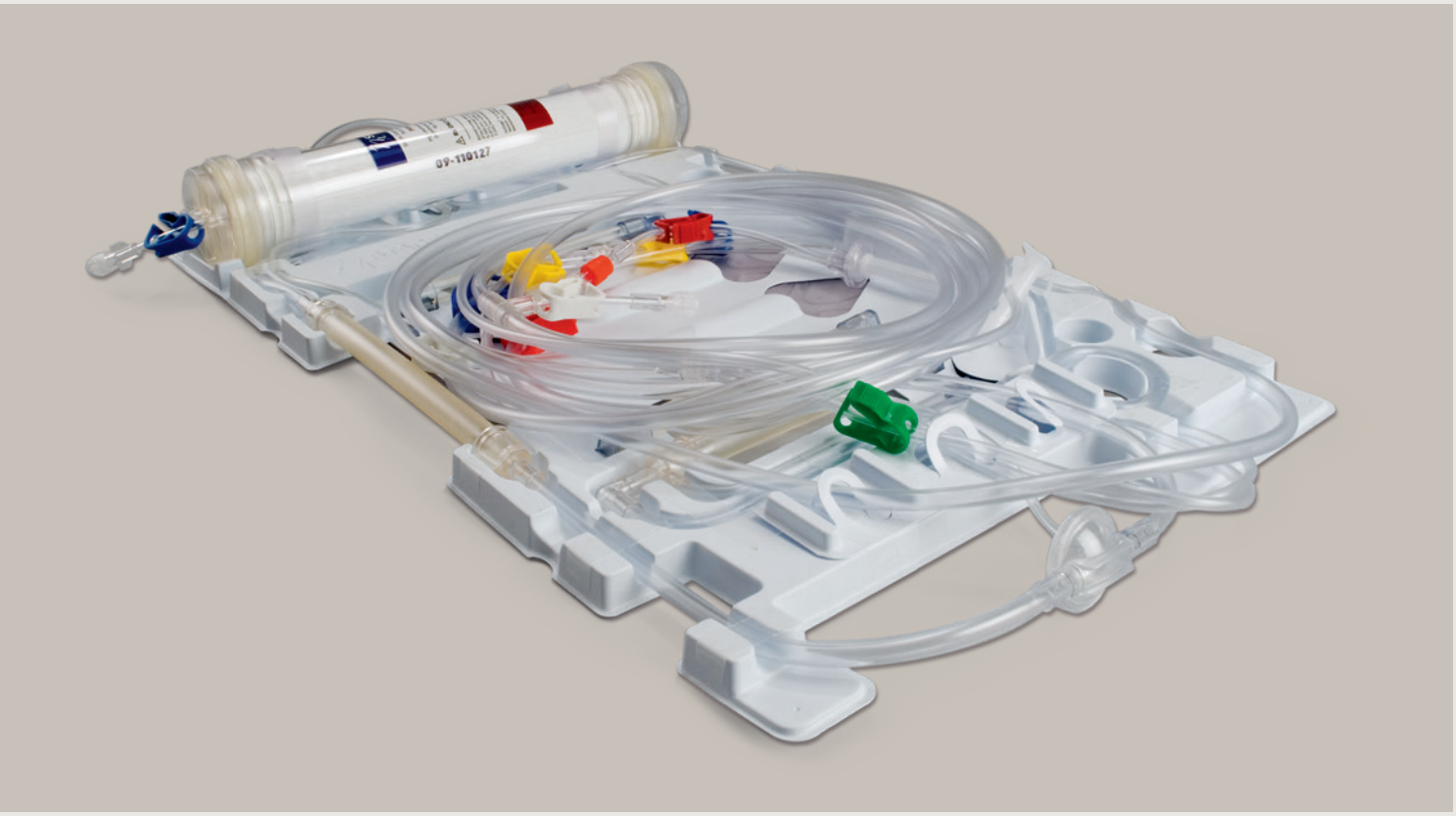
NxStage® Cartridge Express

The cartridge

Supporting Home Haemodialysis (HHD) with SystemOne™ and System One™ S, NxStage Cartridge Express products are single-use, gamma sterilised and manufactured from glycerin-free polyethersulfone membranes (PUREMA® H), which are known for biocompatibility.[1,2]

Potential benefits of Cartridge Express products include the following:

- All Cartridge Express Sets include the integrated NxStage dialyser, which facilitates easy set-up.
- Eliminated need for flushing during priming, due to biocompatible materials and the processes used during manufacturing and sterilisation.[2]
- Possible reduced risk of dialyser clotting due to the elimination of blood-air interfaces.[3,7]
- Reduced risk for user errors related to dialyser connections due to the connection of the dialyser to the cartridge during manufacturing (followed by integrity testing).
- Reduced risk for touch point contamination sites.
- Potential risk of blood leaks and excessive air is reduced.
- Simpler, less time-consuming stocking levels for inventory management.[4]

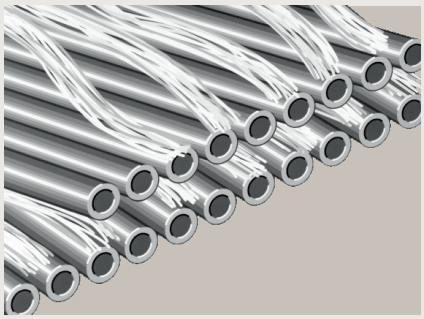


The cartridge

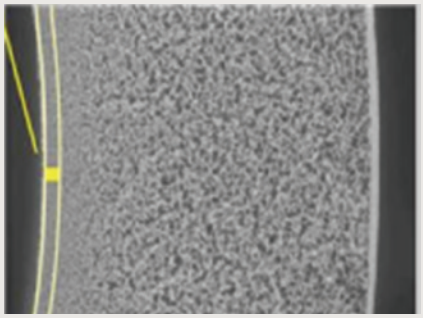
The membrane

Utilised in dialysis treatment worldwide, PUREMA® H is a polyethersulfone membrane designed with performance-enhancing technology. Multifilament threads (spacer yarns – polyethylene terephthalate [PET]) have been integrated into the fibre bundles in order to increase clearance.

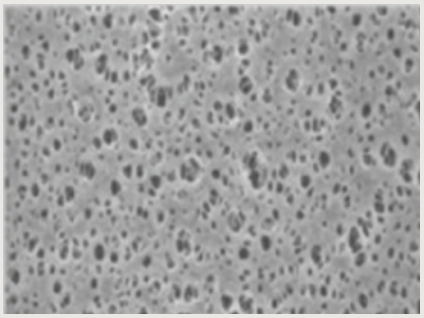
PET: clearance-enhancing design[6]



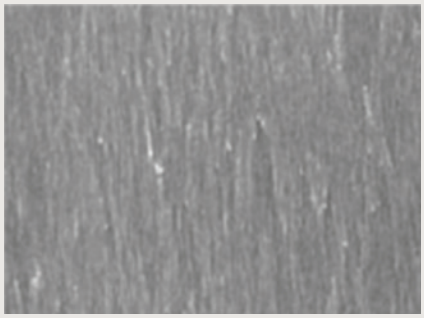
PUREMA® H: membrane pore structure[6]



Cross section
Reduced membrane thickness

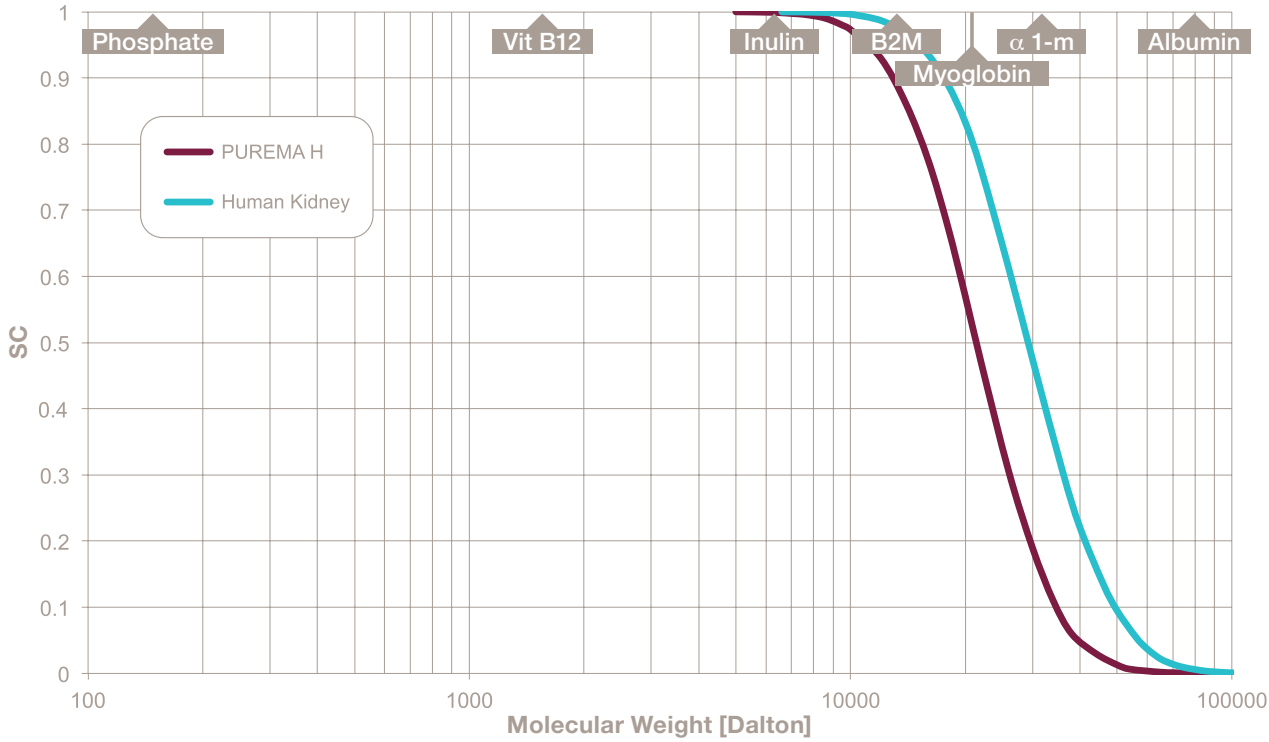


Outer surface
Improved membrane structure



Inner surface
Blood surface properties

Sieving Enhancing Technology, or S.E.T., is also incorporated during the manufacturing of the PUREMA® H membrane. S.E.T. provides fibres with properties that limit protein adsorption to the membrane and pores, while allowing middle molecular toxins to pass through the pores more easily. This is designed to create active centres on blood surface side of the fibre that mediate electrostatic, polar and hydrophobic interactions of proteins and middle molecular toxins with the membrane wall.[4]



Sieving coefficients are tested per DIN 58353: 5% bovine albumin-containing saline; flow conditions are Q(B)=200mL/min*m^2 and Q(F)=30mL/min*m^2 for high flux membranes.

Schematic graph

Courtesy of Membrana GmbH

The dialyser's even dialysate distribution, excellent biocompatibility and low protein adsorption (which limits performance drop for the duration of treatment), also contribute to the:[1]

- Effective removal of small and middle molecular toxins.[1]
- Simultaneous retention of valuable proteins.[1]
- Achievement of high clearances.[1]

To expand the choices for physicians prescribing renal replacement therapy, we also offer standard cartridge sets without pre-attached dialysers.

To learn more about these options, please contact your Fresenius Medical Care sales representative or distribution partner.

Technical data

These data represent typical in vitro performance. Actual in vivo performance may differ.

Dialyser specifications	
Overall dialyser unit length	27 cm
Effective fibre length	23 cm
Membrane area (nominal)	1.6 m^2
Blood flow ranges	50–600 mL/min
Priming volume	91 mL
Pressure drop, blood compartmenta	<100 mmHg @ 300 mL/min
Pressure drop, dialysate compartment	17 mmHg @ 200 mL/min
Housing material	PETG
Caps material	ABS
Potting material	Polyurethane

[a] End-to-end pressure drop @ 300 mL/min with bovine blood at TMP = 0 mmHg.

PUREMA® H membrane specifications	
Average number of fibres	10,900 +/– 200
Fiber wall thickness	30 microns
Hollow fibres	Polyethersulfone with PET spacers
Fibre internal diameter	200 microns

Sieving coefficients

Solute	(M.W.) dalton	Sieving coefficients
Urea	60	1.0
Creatinine	113	1.0
Vitamin B12	1355	1.0
Albumin	65000	≤ 0.005

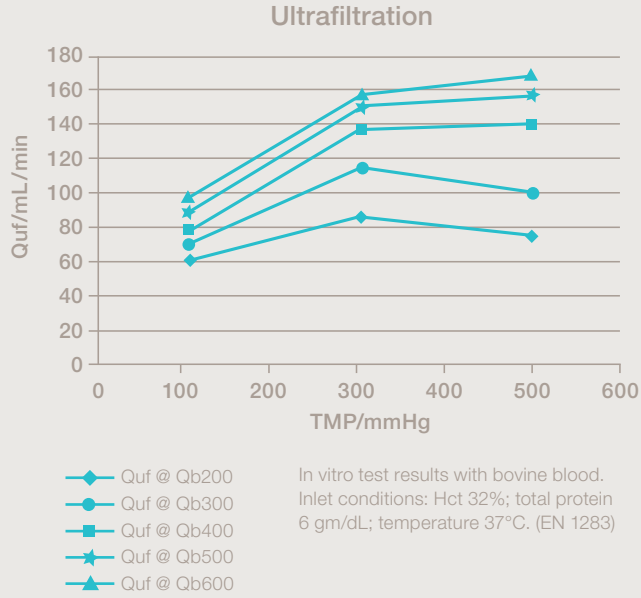
Average in vitro results in human plasma (Q_B 200–600 mL/min: Q_{UF} 40–120 mL/min) (protein 6 gm/dL; temperature = 37°C)

Performance data	Clearance in mL/min, Q_{UF}1 = 0 mL/min				
Q_D[2] in mL/min	100	100	100	200	200
Q_B[3] in mL/min	200	300	400	400	500
Urea	100	100	100	196	196
Creatinine	99	100	100	184	185
Vitamin B12	86	92	93	145	150

In vitro test results in accordance with EN 1283.

1. Q_{UF} = Ultrafiltration rate
2. Q_D = Dialysate flow rate
3. Q_B = Blood flow rate

Ultrafiltration rate[2]



In vitro test results with bovine blood. Inlet conditions: Hct 32%; total protein 6 gm/dL; temperature 37°C. (EN 1283)

FRESENIUS MEDICAL CARE

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