TurboClean® Process
Sanitary Style NF Elements

TRISEP

MANN+HUMMEL Water & Fluid Solutions offers a wide range of nanofiltration elements ranging from our tightest NF membrane, TS80, to our most open, UA60. TurboClean® elements feature a patented sanitary hard-shell design that delivers better system performance due to about 60% less bypass flow than other sanitary elements. Lower bypass flow results in energy savings and/or higher flux rates as more of the feed flows across the membrane surface instead of around the outside of the element. Higher cross-flow velocity also results in the most effective membrane cleaning. TurboClean elements are stronger than net-wrapped sanitary elements and are able to withstand higher pressure drops. And with the tightest OD tolerance and optimal circularity, TurboClean elements are the easiest elements to load and unload.

- Strongest Sanitary Element
- Longer Operating Life
- Better Performance
- Most Effective Cleaning
- Easiest Installation

MEMBRANE CHARACTERISTICS

Membrane	Membrane Type	Stabilized $MgSO_4$ Rejection (%)	$MgSO_4$ Rejection Bounds (%)
TS80	Polyamide	99.2%	98.5 – 100.0
TS40	Polypiperazine	99.0%	98.5 – 100.0
XN45	Polypiperazine	96.0%	94.0 – 98.0
UA60	Polypiperazine	80.0%	70.0 – 80.0

DESIGN INFORMATION

Model	Part Number	Membrane Area m^2 (ft^2)	Feed Spacer Thickness (mil)[a]
TurboClean® 4040-TS80-31-M	164840442	7.4 (80)	31
TurboClean® 4040-TS80-31-F	164055444	7.4 (80)	31
TurboClean® 4040-TS40-31-M	164340442	7.4 (80)	31
TurboClean® 4040-TS40-31-F	164040444	7.4 (80)	31
TurboClean® 4040-XN45-31-M	164540442	7.4 (80)	31
TurboClean® 4040-XN45-31-F	164063444	7.4 (80)	31
TurboClean® 4040-UA60-31-M	164940442	7.4 (80)	31
TurboClean® 4040-UA60-31-F	164067444	7.4 (80)	31

a All models on this sheet have TurboClean sanitary outer wrap and parallel feed spacers. All models on this sheet include anti-telescoping devices (ATDs) attached to the ends of the element and one interconnector. A brine seal is not included and is not required.

OPERATING PARAMETERS

Maximum Operating Pressure	55 bar (800 psi)
Maximum Operating Temperature	50°C (122°F)
Cleaning pH Range[1]	1.0 – 12.0
Chlorine Tolerance[2]	< 0.1 ppm
Maximum Pressure Drop	1.4 bar (20 psi) per element; 6 bar (80 psi) per housing

1 Refer to temperature and pH limits in Membrane Cleaning Guide – Food & Dairy: RO & NF Elements (TSG-C-003).

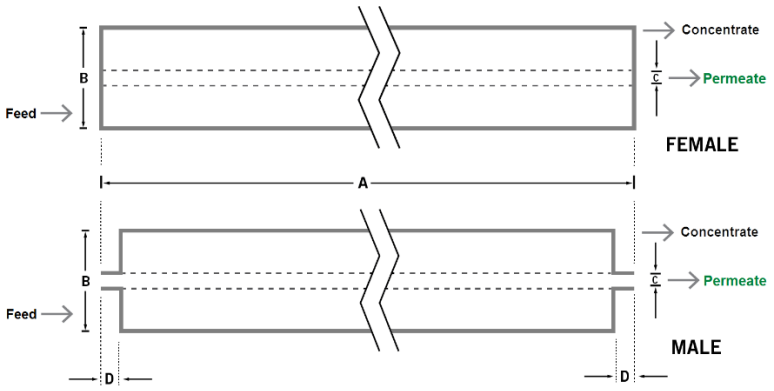
2 Pretreatment is recommended for the removal of free chlorine and other oxidizing agents to prevent damage to membranes. Oxidizing agents, such as free chlorine, in contact with polyamide membranes may result in shortened operating life or membrane failure. Such oxidation damage is excluded from warranty. Refer to Membrane Operating Guide - Recommendations for Water Purification (TSG-O-012).

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PHYSICAL DIMENSIONS

Model	Element Weight kg (lb)[b]	Dim. A mm (inches)	Dim. B mm (inches)	Dim. C[c] mm (inches)	Permeate Tube[d]
TurboClean® 4040-TS80-31-M	4 (9)	1,016 (40.0)	99 (3.9)	19.1 (0.75)	Male
TurboClean® 4040-TS80-31-F	4 (9)	1,016 (40.0)	99 (3.9)	15.9 (0.625)	Female
TurboClean® 4040-TS40-31-M	4 (9)	1,016 (40.0)	99 (3.9)	19.1 (0.75)	Male
TurboClean® 4040-TS40-31-F	4 (9)	1,016 (40.0)	99 (3.9)	15.9 (0.625)	Female
TurboClean® 4040-XN45-31-M	4 (9)	1,016 (40.0)	99 (3.9)	19.1 (0.75)	Male
TurboClean® 4040-XN45-31-F	4 (9)	1,016 (40.0)	99 (3.9)	15.9 (0.625)	Female
TurboClean® 4040-UA60-31-M	4 (9)	1,016 (40.0)	99 (3.9)	19.1 (0.75)	Male
TurboClean® 4040-UA60-31-F	4 (9)	1,016 (40.0)	99 (3.9)	15.9 (0.625)	Female

b Shipping weight is dependent on packaging material and quantity shipped.
c Diameters for Dimension "C" are as follows. For Female elements, "C" is the Inner Diameter. For Male elements, "C" is the Outer Diameter.
d Male elements have a protruding permeate tube, indicated as "D" in the diagram. Dimension "D" is 25.4 mm (1.0 in).



IMPORTANT INFORMATION

Start-up: MANN+HUMMEL Water & Fluid Solutions recommends flushing elements for 30 minutes at low pressure and discarding permeate during the flush prior to operation. For a more detailed start-up procedure, please see Element Start-Up Guide – System Start-Up (TSG-O-005).

Cleaning: TurboClean® membrane elements must be cleaned periodically to ensure proper operation and to prevent membrane damage. Please see Membrane Cleaning Guide – Food & Dairy: RO & NF Elements (TSG-C-003).

Storage: TurboClean membrane elements must be stored appropriately to ensure proper operation and to prevent membrane damage. Please see Element Storage Guides (TSG-O-009 & TSG-O-010).

Regulatory: All models on this sheet use FDA (CFR Title 21) compliant materials.

CUSTOMIZABLE SPECIALTY ELEMENTS

MANN+HUMMEL Water & Fluid Solutions offers a full range of membranes and element designs for challenging water and process applications. Technologies include low-fouling RO, submerged UF, continuous high temperature, ultra-high pressure, unique sanitary designs and more. Contact us to customize a product that satisfies your specific requirements.

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