



# TurboClean® Food & Dairy

## TS40 NF

## Heat Sanitizable Series



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
- Most Effective Cleaning
- Longer Operating Life
- Easiest Installation
- Better Performance

### MEMBRANE CHARACTERISTICS

|                                                              |                |
|--------------------------------------------------------------|----------------|
| <b>Membrane</b>                                              | TS40           |
| <b>Membrane Type</b>                                         | Polypiperazine |
| <b>Nominal M.W.C.O. (Da)</b>                                 | 200 – 300      |
| <b>Stabilized MgSO<sub>4</sub> Rejection (%)<sup>a</sup></b> | 99.0           |

a Typical NaCl rejection: 40%

### DESIGN INFORMATION

| Model                          | Part Number | Membrane Area<br>m <sup>2</sup> (ft <sup>2</sup> ) <sup>b</sup> | Feed Spacer<br>Thickness (mil) <sup>c</sup> |
|--------------------------------|-------------|-----------------------------------------------------------------|---------------------------------------------|
| TurboClean® NF 3838-TS40-HS-47 | 192080383   | 4.9 (53)                                                        | 47                                          |
| TurboClean® NF 3840-TS40-HS-31 | 162060384   | 6.5 (70)                                                        | 31                                          |
| TurboClean® NF 8038-TS40-HS-46 | 169012838   | 26.9 (290)                                                      | 46                                          |

b All models on this sheet have TurboClean sanitary outer wrap. 47 mil spacers are parallel feed spacers; all other models have diamond shaped feed spacers.

c Heat-sanitizable elements will experience a one-time flux loss after sanitization.

### OPERATING PARAMETERS

|                                                     |                                                          |
|-----------------------------------------------------|----------------------------------------------------------|
| <b>Maximum Operating Pressure</b>                   | 55 bar (800 psi)                                         |
| <b>Maximum Sanitization Pressure</b>                | 1.7 bar (25 psi)                                         |
| <b>Maximum Operating Temperature</b>                | 50°C (122°F)                                             |
| <b>Maximum Sanitization Temperature<sup>1</sup></b> | 85°C (185°F) at 1.7 bar maximum pressure                 |
| <b>Cleaning pH Range<sup>2</sup></b>                | 1.0 – 12.0                                               |
| <b>Chlorine Tolerance<sup>3</sup></b>               | < 0.1 ppm                                                |
| <b>Maximum Pressure Drop</b>                        | 1.4 bar (20 psi) per element; 6 bar (80 psi) per housing |
| <b>Hydrogen Peroxide Usage Limit<sup>4</sup></b>    | 20 ppm continuous; 1,000 ppm for short-term cleaning     |

<sup>1</sup> Heat-setting procedure must be performed prior to initial use of elements. Refer to Element Start-Up Guide – Heat-Sanitizable Elements (TSG-O-004).

<sup>2</sup> Refer to temperature and pH limits in Membrane Cleaning Guide – Food & Dairy: RO & NF Elements (TSG-C-003).

<sup>3</sup> 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 piperazine membranes may result in shortened operating life or membrane failure. Such oxidation damage is excluded from warranty. Refer to our Membrane Operating Guide (TSG-O-012).

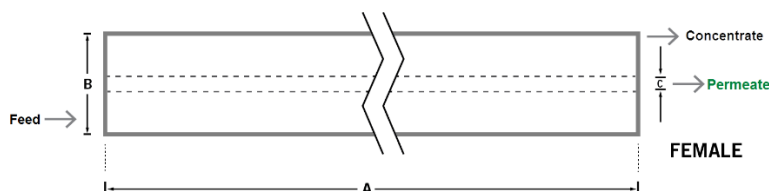
<sup>4</sup> Hydrogen peroxide short term cleaning at 1,000 ppm performed at 25°C (77°F) max. Refer to hydrogen peroxide limits in Membrane Cleaning Guide – Hydrogen Peroxide/Peracetic Acid Mixtures (TSG-C-006).

## PHYSICAL DIMENSIONS

| Model                          | Element Weight<br>kg (lb) <sup>d</sup> | Dim. A<br>mm (inches) | Dim. B<br>mm (inches) | Dim. C <sup>e</sup><br>mm (inches) | Permeate Tube |
|--------------------------------|----------------------------------------|-----------------------|-----------------------|------------------------------------|---------------|
| TurboClean® NF 3838-TS40-HS-47 | 4 (9)                                  | 965 (38.0)            | 96 (3.8)              | 21.2 (0.83)                        | Female        |
| TurboClean® NF 3840-TS40-HS-31 | 4 (9)                                  | 984 (38.75)           | 96 (3.8)              | 21.2 (0.83)                        | Female        |
| TurboClean® NF 8038-TS40-HS-46 | 16 (36)                                | 965 (38.0)            | 201 (7.9)             | 28.6 (1.125)                       | Female        |

<sup>d</sup> Shipping weight is dependent on packaging material and quantity shipped.

<sup>e</sup> Dimension "C" is the Inner Diameter.



## 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 conform to USDA 3A sanitary standard 45-03, use FDA (CFR Title 21) compliant materials, comply with EU regulation (EC) No. 1935/2004 and No. 10/2011, and have Halal and Kosher certifications.

## 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.

## Contact



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