

# Heat Sanitizable Membrane

For applications requiring hot water sanitization eliminating sanitization by chemicals.

Toray's Heat Sanitizable RO membrane elements provide superior permeate quality for hygienic purified water applications. RO elements use a cross-linked fully aromatic polyamide composite membrane.



## Product Specifications

Model	NaCl rejection %	Permeate flow rate GPD (m <sup>3</sup> /d)	Feed spacer thickness in. (mm)	Active area ft <sup>2</sup> (m <sup>2</sup> )
TMRO 8040HS	99.5%	9,000* (34.1)	0.028 (0.71)	400 (37.2)
TMRO 4040HS	99.5%	1,975* (7.5)	0.028 (0.71)	85 (7.9)

\*Target flow rate after heat conditioning

If you do not see a configuration or performance requirement that meets your needs, a team of product specialists is ready to develop custom engineered solutions. Please inquire within.

## Standard dimensions in. (mm)

Size	A Diameter	B Length	C Permeate tube
8040	7.9 (201)	40 (1,016)	1.125 (28.6) ID
4040	4.0 (102)	40 (1,016)	0.75 (19.1) OD

## Material Specifications

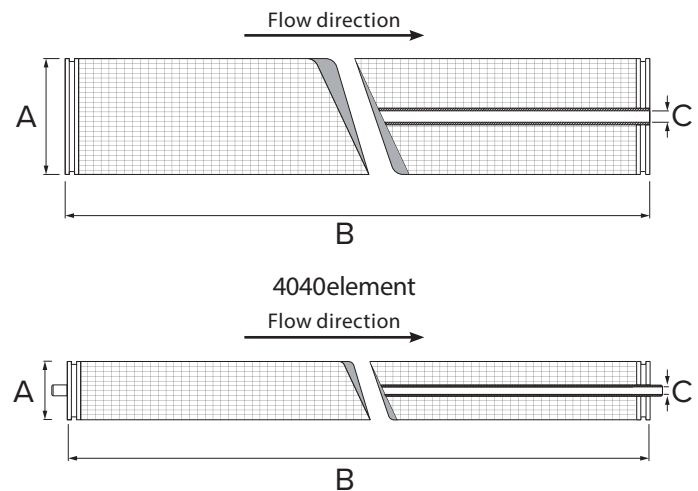
Feed spacer & element outer wrap	Polyethylene
Permeate tubes, Anti-telescoping device (ATD), inter-connectors	Polysulfone
Permeate carrier	Proprietary
Adhesives	Proprietary

## Test Conditions

Feed water pressure psi (bar)	150 (10.3)
Feed water temperature °F (°C)	77 (25)
Feed water concentration mg/l as NaCl	2,000
Recovery rate %	15
Feed water pH	7

## Heat-sanitizable elements (w/ ATD)

Components conform to FDA Regulation CFR Title 21



#### OPERATING LIMITS

Maximum operating pressure <b>psi (bar)</b>	600 (41.4)
Maximum operating temperature °F (°C)	113 (45)
Maximum cleaning temperature °F (°C)	122 (50)
Acceptable operating pH range	2.0–11.0
Acceptable short-term cleaning pH range	1.7–11.5
Maximum pressure drop per element <b>psi (bar)</b>	15 (1.0)
Maximum pressure drop per vessel <b>psi (bar)</b>	60 (4.1)

Consult Toray for pressure limits when operating above ambient temperature

#### OXIDANT TOLERANCE

Chlorine tolerance (short-term cleaning at pH 11)	Non-detect
H <sub>2</sub> O <sub>2</sub> continuous <b>ppm</b>	20*
H <sub>2</sub> O <sub>2</sub> short-term cleaning <77°F (25°C) <b>ppm</b>	1,000*

\*Free chlorine should not be present in feed

#### Conditioning procedure:

1. Flush water to drain with non-scaling water at low pressure, maintaining low permeate rates.
2. Recycle warm water 40–45°C at less than 25 psig (1.7 bar) trans-membrane pressure (TMP). The maximum differential pressure is 2 psi per element or 10 psi per vessel.
3. Introduce hot water to the circulating system to increase the temperature to 175–185°F (80–85°C).
4. Maintain this temperature and a TMP less than 25 psig (1.7 Bar) for 80 minutes.
5. Allow the circulating system to cool to 113°F (45°C).
6. The maximum temperature increase or decrease is 2° C/minute.
7. Flush to drain with clean water maintaining a TMP of <25 psi and a maximum feed pressure of 45 psi (3 bar).
8. Factory pre-conditioned HSRO elements are available. Contact Toray for details.

#### NOTICE

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| 1. Elements are preserved in sodium meta-bisulfite. Appropriate personal protective equipment should be worn when handling.  | to determine the safety and suitability of each product combination for their own purposes.        |
| 2. Toray accepts no responsibility for results obtained by the application of this information or the safety or suitability of Toray's products, either alone or in combination with other products. Users are advised to make their own tests | 3. All data may change without prior notice, due to technical modifications or production changes. |
|  | 4. Consult Toray for element sizes not shown.  |

#### Applications

- Food & beverage
- Pharmaceutical (water for injection)
- Diafiltration
- Sugar concentration
- Flavor concentration
- Aroma concentration
- Wine de-alcoholization
- Beer de-alcoholization

#### Regulatory Information

Toray's membrane elements are certified under:

- ISO 9001:2015 QMS to ensure consistency in product and service quality; and
- ISO 14001:2015 EMS to enhance the environmental performance of our products and services.

#### Heat Sanitization

Toray HSRO-series elements are sanitized with hot water as the preferred method in food and pharmaceutical applications eliminating the need for chemicals and other disposals.

New Toray HSRO-series elements must be pre-conditioned prior to initial use by exposure to hot water. Conditioning water must be high-quality chlorine and oxidant free, non-scaling, non-fouling water. RO permeate is preferred (water from an RO that has been in operation for at least 24 hours).