

MEMBRANE FILTRATION

RO | NF | UF | MF



Spiral-wound **RO, NF, UF, MF** membrane elements in sanitary design for dairy foods processing and hygienic purified water applications

PRODUCT BROCHURE

'TORAY'
Innovation by Chemistry

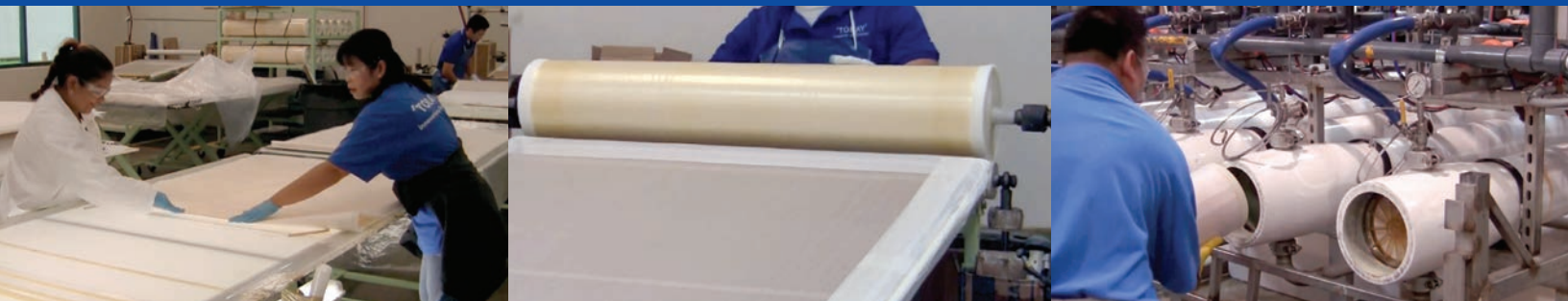
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Toray manufactures **RO**, **NF**, **UF** and **MF** membrane elements in sanitary design for dairy and hygienic purified water applications.

TORAY MEMBRANE USA, INC. (TMUS), located in San Diego, California, manufactures membrane elements in sanitary design for processing of dairy foods and purifying water required for various industrial processes. Finished goods are also stocked in Germany by Toray Membrane Europe AG (TMEu).

Toray maintains high-quality in our products and services through decades of R&D, manufacturing, and proven references. TMUS is an ISO 9001:2015 QMS and 14001:2015 EMS registered facility to ensure quality and compliance with environmental policies.

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MEMBRANE DIVISION

In 1968 TORAY began our membrane development program for water treatment. Fifty years later, the name endures as a leading supplier of membrane technologies continuing to add new solutions for a sustainable future. This constant pursuit of technological innovation has enabled us to strengthen our core assets: R&D know-how, strong customer and supplier bases and the dedicated people that stand behind our products and services. To experience lasting growth, partner with a company that has, for decades, adapted to the changing needs of the market and looks to the horizon for the next big challenge.

TORAY, A NAME YOU CAN TRUST.

Toray RO

Spiral-wound reverse osmosis membrane elements with fully aromatic cross-linked polyamide composite membranes for seawater desalination, brackish water desalination, and water reuse.

Toray NF

Spiral-wound nanofiltration membrane elements and RO elements for point-of-use applications.

Toray UF





Pressurized and submerged PVDF hollow-fiber ultrafiltration modules.

Toray MBR

PVDF flat-sheet membrane bioreactor modules.

Products used for the production of potable water are certified to NSF/ANSI Standards 61 and 58 to comply with drinking water requirements.

MEMBRANE TECHNOLOGIES *by* TORAY

Size	0.001 µm	0.01 µm	0.1 µm	1 µm	10 µm
Separation materials	Ions, low molecular weight organics	High molecular weight polymer			
			Colloid		
				Clay	
	THM	Agricultural & organics	Viruses	Coliform	Cryptosporidium
	Monovalents	Multivalents	Milk protein	Bacteria	
psi	100–800 psi	75 psi		15–50 psi	
Type	Reverse Osmosis (RO)	Nanofiltration (NF)	Ultrafiltration (UF)	Microfiltration (MF)	
Toray's membrane technologies	Ultrapure water, Seawater desalination, Wastewater reclamation	Softening, Removal of toxic substances	Municipal drinking water, Water reuse, Pretreatment for seawater desalination	Sewage water treatment	
					
	ROMEMBRA™ / CSM™		TORAYFIL™	MEMBRAY™	

MEMBRANE FILTRATION

for DAIRY APPLICATIONS

Product series Membrane characteristics

Reverse Osmosis (RO)

TRO Fully cross-linked aromatic polyamide composite membrane for maximum retention of valuable milk solids and COD/BOD contributing compounds.

TRO(D) Toray's next generation 'D-family' polyamide composite membrane for increased durability.

TRO + HP High-pressure and high-rejection polyamide composite membrane with 99.8% NaCl rejection.

Nanofiltration (NF)

TNF Piperazine amide composite membrane for desalting of milk and whey products and maximum retention of lactose and larger organic molecules.

Ultrafiltration (UF)

TUF 10K Standard UF with high flux and protein retention ideal for whey processing at all concentrations and milk protein concentration (MPC)

TUF 10KHR High protein retention membrane with ideal flux for high concentration end of whey and whey protein isolate (WPI) plants

TUF 5K Extra high retention membrane

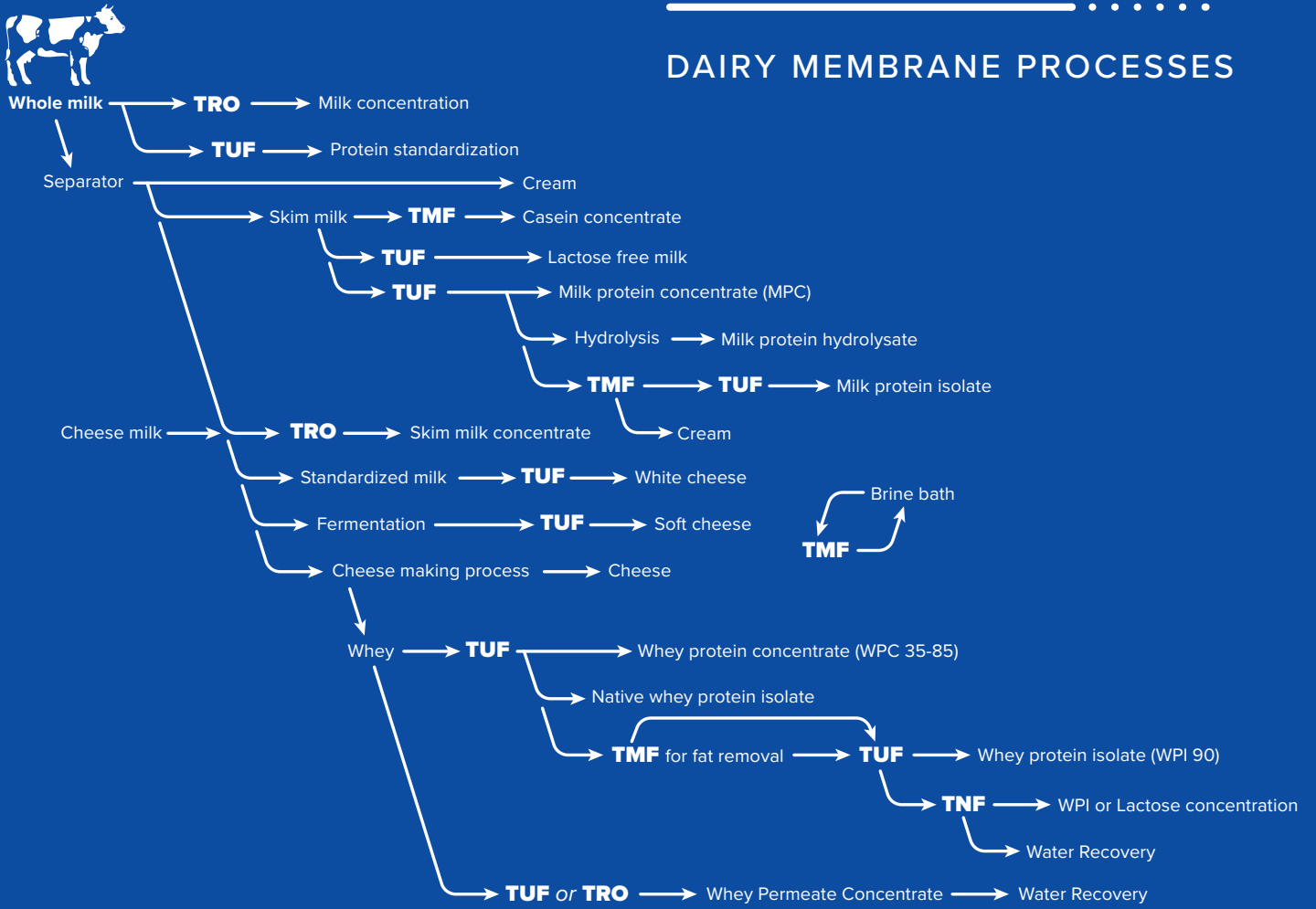
TUF 5KHR Low flux membrane with maximum retention for special applications in dairy, gelatin, sugar and more

Microfiltration (MF)

TMF Polyvinylidene fluoride (PVDF) for de-fatting and casein separation

Toray offers membrane products that cover the entire spectrum of filtration for the processing of dairy foods. Membrane elements are manufactured with precision and available in varying diameters, lengths, and feed spacer thicknesses to meet the specific retention of proteins, organic molecules, and other compounds needed to produce quality dairy products.

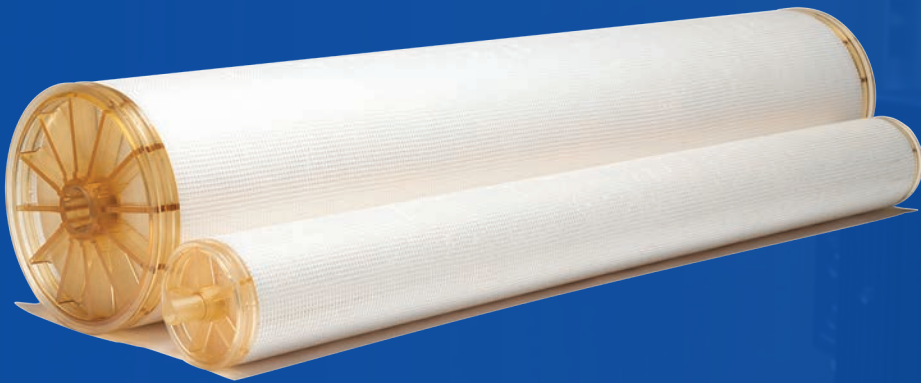
DAIRY MEMBRANE PROCESSES



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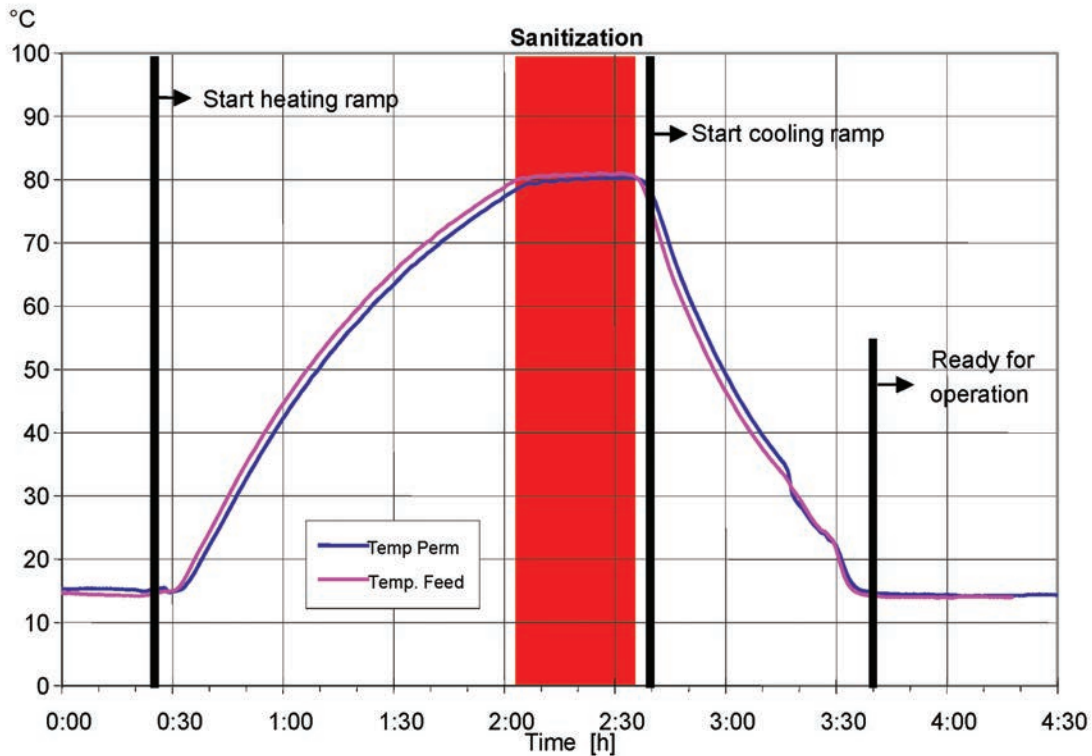
MEMBRANE FILTRATION

for **HYGIENIC PURIFIED WATER**



Toray's manufactures membrane elements in sanitary design for applications requiring hygienic purified water such as those for the food, beverage and pharmaceutical industries. Heat-sanitizable membrane elements are treated to a maximum sanitizing temperature of 185°F (85°C). Membrane element components comply with FDA CFR Title 21.

Temperature progress during sanitization



Membrane model

Performance

Feed water conditions

Heat-sanitizable RO

TMRO 8040HS

9,000 GPD; 99.5% NaCl rejection

Pressure 150 psi (10.3 bar); Temperature 77°F (25°C);
Concentration 2,000 mg/l as NaCl; Recovery rate 15%; pH 7

TMRO 4040HS

1,975 GPD; 99.5% NaCl rejection

Net-wrapped RO & UF

TMRO 8040PS

9,000 GPD; 99.7% NaCl rejection

Pressure 225 psi (15.5 bar); Temperature 77°F (25°C);
Concentration 2,000 mg/l as NaCl; Recovery rate 15%; pH 7

TMUF5 8040PS

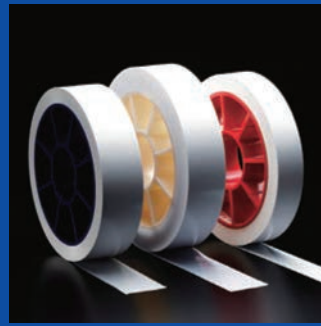
5,000 Daltons MWCO



Fibers & Textiles



Resins & Chemicals



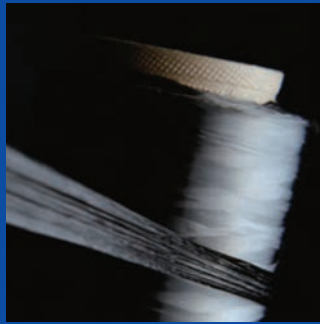
Films



Medical Products



Electronics & IT



Carbon Fiber & Composite
Materials



Housing & Engineering
Materials



Water Treatment &
Environment

GLOBAL MATERIALS INNOVATOR

Founded in 1926, businesses of the Toray Group create innovative materials and technologies in a wide range of fields, including fibers and textiles, plastic resins & chemicals, films, carbon fiber composite materials, water treatment & environmental membrane products, and materials for the electronics & IT industries and pharmaceutical & medical fields, all under the corporate slogan **“Innovation by Chemistry.”**

TORAY Innovation by Chemistry

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