

Product Overview



➔ TORAY® Membranes

➔ TORAY® Submerged Membrane Module (MBR)



➔ TORAY® Hollow Fiber (PVDF) Module

➔ ROPUR® Membranes



➔ ROPUR® Components
WaveCyber Pressure Vessels

➔ ROPUR® Reverse Osmosis
RPI-Antiscalants



➔ ECOLAB® Cleaning Chemicals

Visit our *NEW*- Internet Website @



www.toraywater.com

- Latest Toray Membrane Europe News & Updates •
- Powerful & Simple Product Search •
- Comprehensive Product Information Database •
- Technical Support & Service Documents •
- Download of CAROL RO Design Software •
- Download of CATRON RO Normalization Software •

Toray 8" - Membrane Series

Model	Type	Flow m ³ /d	NaCl Rej. %	Remarks
TMH20-430	BW	48	99.3	Ultra Low Pressure ¹⁾
TMH20-400	BW	45.5	99.3	Ultra Low Pressure ¹⁾
TMH20-370	BW	43.5	99.3	Ultra Low Pressure ¹⁾
TMG20-430	BW	42	99.5	Low Pressure, Higher Surface ¹⁾
TMG20-400	BW	39	99.5	Low Pressure ¹⁾
TM720L-400	BW	32	99.5	Low Pressure ¹⁰⁾
TM720-430	BW	42	99.5	Standard BW Element, Higher Surface ²⁾
TM720-400	BW	39	99.7	Standard BW Element, Higher Surface ²⁾
TM720-370	BW	36	99.7	Standard BW Element ²⁾
TM720R-400	BW	23	99.7	High Rejection, lower flow Element ²⁾
TML20-400	BW	39	99.7	Low Fouling Membrane, Higher Surface ²⁾
TML20-370	BW	36	99.7	Low Fouling Membrane ²⁾
TM820L-400	SW	38	99.7	Seawater Element, High Flow ³⁾
TM820L-370	SW	34	99.7	Seawater Element, High Flow ³⁾
TM820E-400	SW	28.5	99.75	Energy saving, High Rejection ³⁾
TM820-400	SW	25	99.75	Standard Seawater Element, High Rejection ³⁾
TM820-370	SW	23	99.75	Standard Seawater Element, High Rejection ³⁾
TM820H-400	SW	22.5	99.75	High Pressure & Temperature & High Rejection ³⁾
TM820H-370	SW	21	99.75	High Pressure & Temperature & High Rejection ³⁾
TM820A-400	SW	22.5	99.75	High Boron Rejection (94%) ¹¹⁾
TM820A-370	SW	21	99.75	High Boron Rejection (94%) ¹¹⁾
TM820C-400	SW	24.5	99.75	Energy saving, High Boron Rejection (93%) ¹¹⁾

Model	Type	Flow m ³ /d	NaCl Rej. %	Remarks
SUL-G20FTS	BW	30.0	99.5	Resistant to Hot Water Disinfection, Low Pressure ⁵⁾
SUL-G20TS	BW	26.0	99.5	Resistant to Hot Water Disinfection, Low Pressure ⁵⁾
SU-720TS	BW	26.0	99.4	Hot Water Resistant ⁶⁾
SUL-G20P	UP	32.0	32.0	Short Rinse Up, Special Materials ¹²⁾
SU-720P	UP	32.0	32.0	Short Rinse Up, Special Materials ⁷⁾
SU-820BCM	SW	16.0	99.7	Ultra High Pressure, High Rejection ⁸⁾
SU-620F	NF	22.0	55.0	Hardness & Sulphate Removal, Chlorine Tolerant ⁹⁾
SU-620	NF	18.0	55.0	Hardness & Sulphate Removal, Chlorine Tolerant ⁹⁾

BW = Brackish Water, SW = Seawater, UP = Ultra Pure Water, NF = Nanofiltration

Test Conditions:

- 1) Feed 500 ppm NaCl, 0.75 MPa, 25 °C, pH 7, 15% recovery
- 2) Feed 2'000 ppm NaCl, 1.6 MPa, 25 °C, pH 7, 15% recovery
- 3) Feed 32'000 ppm NaCl, 5.5 MPa, 25 °C, pH 7, 8% recovery
- 4) Feed 500 ppm NaCl, 0.70 MPa, 25 °C, pH 7, 15% recovery
- 5) Feed 500 ppm NaCl, 0.75 MPa, 25 °C, pH 6.5, 4.8m³/h Brine flow
- 6) Feed 1'500 ppm NaCl, 1.5 MPa, 25 °C, pH 6.5, 4.8m³/h Brine flow
- 7) Feed pure water, 1.5 MPa, 25 °C, pH 6.5, 0.72 m³/h Brine flow
- 8) Feed 58'000 ppm Seawater, 8.82 MPa, 25°C, pH 6.5, 4.8 m³/h Brine flow
- 9) Feed 500 ppm NaCl, 0.35 MPa, 25 °C, pH 6.5, 4.8 m³/h Brine flow
- 10) Feed 2'000 ppm NaCl, 1.0 MPa, 25 °C, pH 7, 15% recovery
- 11) Feed 32'000 ppm NaCl, 5.5 MPa, 25 °C, pH 8, 8% recovery, Typical Boron rejection as specified on individual specification sheet
- 12) Feed pure water, 0.75 MPa, 25 °C, pH 6.5, 0.72 m³/h Brine flow

TORAY_8_inch_overview..pmd

Note: Test conditions do not always correspond to the test conditions on published data sheets
General disclaimer applies, as per note on the back cover page. Above data are average values.

Toray 4" - Membrane Series

TM element type features :

- ⇒ New Membrane Types: Ultra Low Pressure, SWRO High Flux
- ⇒ Larger Membrane Surface Area
- ⇒ Superior Mechanical Strength

Model	Type	Flow m ³ /d	NaCl Rej. %	Remarks
TMH10	BW	10.5	99.3	Ultra Low Pressure ¹⁾
TMG10	BW	7.6	99.5	Low Pressure ²⁾
TM710	BW	8.3	99.7	Standard BW Element ³⁾
TM810	SW	4.5	99.75	Standard SW Element, High Rejection ⁴⁾
TM810L	SW	6.0	99.75	High Flux SW Element ⁴⁾
SUL-G10TS	BW	5.0	99.5	Resistant to Hot Water Disinfection, Low Pressure ⁶⁾
SUL-G10P	UP	7.5	--	Short Rinse Up, Special Materials ⁷⁾
SU-710P	UP	8.0	--	Short Rinse Up, Special Materials ⁸⁾
SU-610	NF	4.5	55.0	Hardness & Sulphate Removal, Chlorine Tolerant ⁹⁾

NF = Nanofiltration, BW = Brackish Water, SW = Seawater, UP = Ultrapure Water

Test Conditions:

- 1) Feed 500 ppm NaCl, 0.75 MPa, 25 °C, pH 7, 15% recovery
- 2) Feed 2'000 ppm NaCl, 1.6 MPa, 25 °C, pH 7, 15% recovery
- 3) Feed 32'000 ppm NaCl, 5.5 MPa, 25 °C, pH 7, 8% recovery
- 4) Feed 500 ppm NaCl, 0.70 MPa, 25 °C, pH 7, 15% recovery
- 5) Feed 500 ppm NaCl, 0.75 MPa, 25 °C, pH 6.5, 4.8m³/h Brine flow
- 6) Feed 1'500 ppm NaCl, 1.5 MPa, 25 °C, pH 6.5, 4.8m³/h Brine flow
- 7) Feed pure water, 1.5 MPa, 25 °C, pH 6.5, 0.72 m³/h Brine flow
- 8) Feed 58'000 ppm Seawater, 8.82 MPa, 25°C, pH 6.5, 4.8 m³/h Brine flow
- 9) Feed 500 ppm NaCl, 0.35 MPa, 25 °C, pH 6.5, 4.8 m³/h Brine flow

Note: Test conditions do not always correspond to the test conditions on published data sheets
General disclaimer applies, as per note on the back cover page. Above data are average values.

ISO9001

Management System Certificate



Certificate Number : JQA-0683

Organization :

TORAY INDUSTRIES, INC.

EHIME PLANT

1515 TSUTSUI, MASAKI-CHO, IYO-GUN, EHIME, JAPAN



JAB
OS Accreditation
R009



JQA certifies that the above organization operates the Quality Management System, within the scope of the Appendix attached, which has been assessed and found to comply with the requirements of;

ISO 9001 :2000 / JIS Q 9001 :2000

Registration Date : November 25, 1994

Last Renewal Date : December 27, 2005

Expiry Date : December 26, 2008

M. Ueda

MATAHIRO UEDA
PRESIDENT

JAPAN QUALITY ASSURANCE ORGANIZATION

To be used in conjunction with attached Appendix.

TOKYO, JAPAN



ISO9001

Appendix



Certificate Number : JQA-0683

1 / 1

Organization :

TORAY INDUSTRIES, INC.
EHIME PLANT

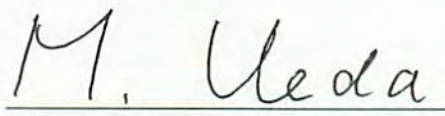
Scope of Registration:

THE DESIGN / DEVELOPMENT AND MANUFACTURE OF:

- TETORON® (POLYESTER STAPLE FIBER)
- TORCON® (POLYPHENYLENE SULFIDE STAPLE FIBER)
- TORAYLON® (POLYACRYLIC STAPLE FIBER)
- POLYESTER RESIN CHIP
 - (1)PBT CHIP (POLYBUTYLENE TEREPHTHALATE CHIP)
 - (2)HYTREL® CHIP (POLYESTER ELASTOMER CHIP)
 - (3)SIVERAS® CHIP (LIQUID CRYSTAL POLYESTER CHIP)
- TORAYCA® (CARBON FIBER) EXCEPT FOR CUT FIBER AND MILLED FIBER
- TORAYCA® PREPREG (PREPREG) EXCEPT FOR PREPLIED PREPREG
- ROMEMBRA® (REVERSE OSMOSIS MEMBRANES AND REVERSE OSMOSIS MEMBRANE ELEMENTS)
- CFRP (CARBON FIBER-REINFORCED PLASTICS) AUTOMOTIVE STRUCTURAL COMPOSITES
- CFRP STRUCTURAL COMPOSITES FOR CIVIL ENGINEERING, CONSTRUCTION AND GENERAL INDUSTRY APPLICATION
- CARBON FIBER-REINFORCED THERMOPLASTIC PELLETS

Registration Date : November 25, 1994
Last Renewal Date : December 27, 2005

Expiry Date : December 26, 2008


MATAHIRO UEDA
PRESIDENT

JAPAN QUALITY ASSURANCE ORGANIZATION

This Appendix is an integral part of the Certificate and should only be used in conjunction with the Certificate.

JQA

DVGW¹ TEST CERTIFICATE
for
‘TORAY’ RO Membrane Elements

‘TORAY’ RO Membrane Elements comply with the BAG²-standard
for synthetic material in the drinking water field

Toray Membrane Europe AG possesses an official admission of the German Association for Gas and Water (DVGW) for TORAY spiral wound polyamid membranes. The tests were made according to the recommendations of KTW (Kunststoffe im Trinkwasserbereich/synthetic material in the drinking water field) of the German Health Department. The test was made at the Engler-Bunte-Institut of the University of Karlsruhe under the guidance of Dr. I. Wagner.

On an untreated and at random chosen element was examined whether the membrane and all other materials used in a spiral wound element comply with the KTW-standards.

The test results show that ‘TORAY’ membrane elements meet all limits as required by the law for consumer goods. The values measured in extracted materials are mostly clearly below the allowed limits and correspond to the analytically proved limits. The test certificate confirms that ‘TORAY’ membrane elements can be applied without restrictions for the conditioning of drinking water and of water for food and beverage industry.

¹ Deutscher Verein des Gas- und Wasserfaches (German Association for Gas and Water)

² Bundesamt für Gesundheit (Federal Department for Health)



Tap Water and Home Drinking Water Reverse Osmosis Membranes

(2.0 / 2.5 / 4.0 Inch Diameter)

	Type	Flow liter / day	NaCl rej. %	Testcond.	Remarks
TRH-4040	BW	10'300	99.0	A	Low Pressure, High Flow
TRH-4021	BW	4'700	99.0	A	Low Pressure, High Flow
TRH-4014	BW	2'400	99.0	A	Low Pressure, High Flow
TRH-2540	BW	3'200	99.0	A	Low Pressure, High Flow
TRH-2521	BW	1'400	99.0	A	Low Pressure, High Flow
TRH-2514	BW	700	99.0	A	Low Pressure, High Flow
TR70-2012-110	BW	416	96.0	C	Tap Water
TR70-2012-75	BW	290	98.0	C	Tap Water
TR70-2012-60	BW	230	98.0	C	Tap Water
TR70-2012-50	BW	190	98.0	C	Tap Water
TR70-2012-35	BW	130	98.0	C	Tap Water

TR = Tape Wrap (Fiberglass Wrap, optionally for all 4" Elements)

Test Conditions

A = 7.5 bar, 25°C, 500 ppm NaCl, pH 6.5 - 7.5, 15 % Recovery

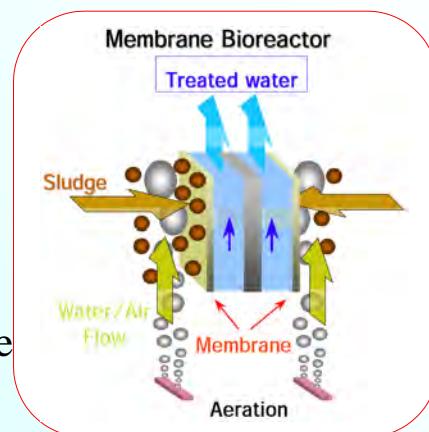
C = 4.5 bar 25°C, 500 ppm NaCl, pH 6.5 - 7.5, 15 % Recovery

Notes: Test conditions do not always correspond to the test conditions on published data sheets.
Above data are average values.

TORAY Submerged Membrane Module



Toray's new Submerged Membrane Modules can effectively remove suspended solids when used as part of a MBR (Membrane Bioreactor) system. Long-term, stable operation and high permeate flow rates make this the module of choice for your MBR system.



TORAY's Submerged Membrane Module is a product of our over 25 years of experience with membrane products. Our R&D, manufacturing and applications expertise has led to the development of this new product. This is a micro-filtration module in a flat sheet, plate and frame configuration.

TORAY's Submerged Membrane Module offers the following advantages:

1. Guaranteed High Water Permeability and High Quality Effluent

Thousands and thousands of 0.08 micron pores on the membrane surface effectively remove all particle larger than 0.1 micron. Pore size is uniform throughout the membrane surface.

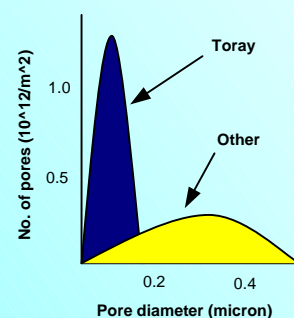
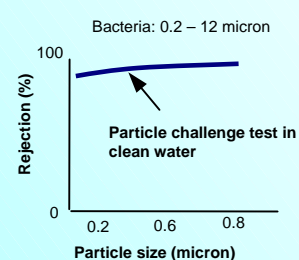
2. Stable Filtration without Clogging

It is difficult to clog the pores of the membrane because of their uniform size.

(Average: 0.08 micron, Standard Deviation: 0.03 micron)

3. Stable Filtration with Fewer Chemical Cleaning Required

Flat sheet, plate and frame configurations are inherently more robust than hollow fiber membrane systems, resulting in fewer chemical cleanings and more on-line availability.



Membrane Element Specifications

Type No.		TSP-50150
Shape		Flat plate
Size&Weight	Pore size (micrometer)	0.08
	Membrane Area (m ²)	1.4
	Width Height Thickness (mm)	515 1,608 13.5
	Weight (kg)	5 (dry)
		8 (wet)
Material	Membrane	PVDF reinforced with PET non-woven fiber
	Supporting Plate	ABS resin

Module Specifications

Type No.		TMR140-050S	TMR140-100S	TMR140-200W	TMR140-200D
Standard Flow Rate (m ³ /day)*		42	84	168	143
Number of Membrane Elements		50	100	200	200 (Double Deck)
Total Membrane Area (m ²)		70	140	280	280
Dimension	Width (mm)	810	810	840	810
	Length (mm)	950	1,620	3,260	1,620
	Height (mm)	2,100	2,100	2,100	4,160
Weight (kg)		400	695	1,430	1,365
Material	Frame	304 stainless steel			
	Permeate Water Manifold	304 stainless steel			
	Aeration Diffuser	304 stainless steel			

* These are reference figures with typical municipal waste water, not guaranteed results.

Edition : Aug-10

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Water Treatment Division

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Toray Industries (Singapore) Pte. Ltd.

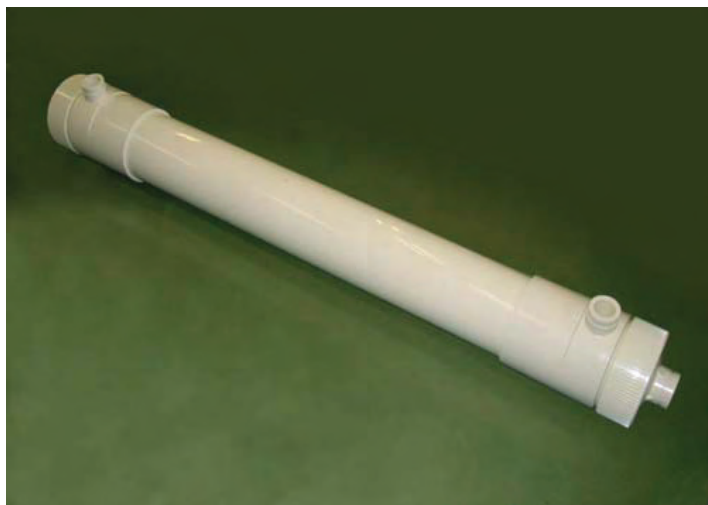
31c Exeter Road, #03-01 Comcentre III Atrium,

Singapore 239734, Republic of Singapore

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All specifications may change without prior notice, due to technical modifications or production changes.

PVDF Hollow Fiber UF Membrane Module



Toray PVDF Hollow Fiber UF (ultra filtration) membrane module has large membrane area. As nominal pore size is 0.05 micron meter, it is suitable for removing Colon Bacillus and Pathogenetic Microzoon such as Cryptosporidium, and it is applicable to wide varieties of water treatment processes.

Characteristics

1.High Flux

Special spinning method with PVDF enables high mechanical strength and high permeability at the same time.

2.Small Pore Size & Best Pathogens Removal

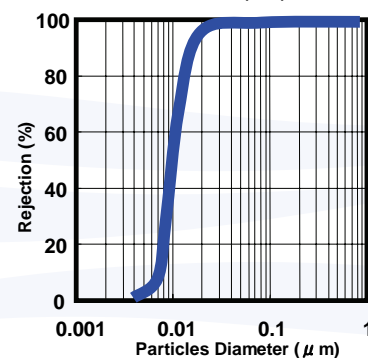
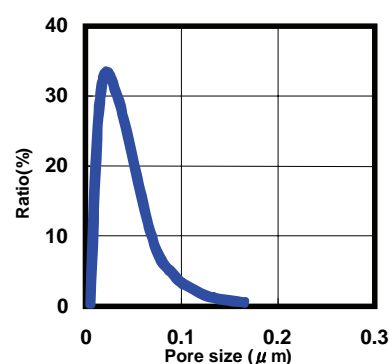
The integrity of membrane with 0.05 micron meter of nominal pore size provides a stable quality of filtrate water.

3.High Mechanical Strength

Its excellent mechanical strength ensures sufficient durability against hundreds thousand times of air scrubbing operations.

4.High Chemical Strength

The outstanding chemical resistance of PVDF as membrane material allows chemical cleaning with strong acid or strong oxidation agent.



Rejection Property and
Pore Size Distribution

Applications

1. Production of Municipal Drinking Water
2. Reuse of Waste Water
(Treatment of secondary effluent)
3. Pretreatment for RO Membrane process
(Sea Water Desalination, Waste Water Reuse)
4. Crud Removal in Condensate of Boiler Water
5. Treatment of Industrial Water



Drinking Water Production Plant
(Capacity 5,000m³/d)

Advantage of Toray Membrane Module

1.Large Size Module for Large Scale Plants (Type:HFS-2020)

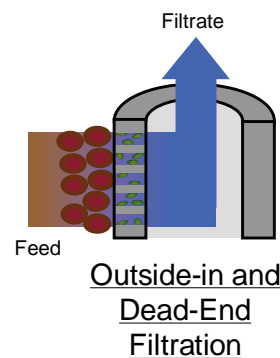
Large membrane area per module allows to treat a large amount of water with fewer number of modules.

2.Outside-in and Dead-End Filtration Method

An external pressure type and dead-end filtration method offer simple operating control and less energy required.

3.High Safeness

The module is made of safe elements and can be applied for drinking water production.



Specifications

Membrane

Membrane Material	PVDF (Polyvinylidene fluoride)
Nominal Pore Size	0.05 micron meter

Module Specifications

Module Type		HFS-2020	HFS-2315	HFS-1020	HFS-1010
Membrane Surface Area (Outer Surface)		72m ²	50m ²	29m ²	7m ²
Pure Water Flow Rate (at 50kPa,25°C)		20m ³ /h and over (88gpm and over)	14m ³ /h and over (62gpm and over)	10m ³ /h and over (44gpm and over)	2.5m ³ /h and over (11gpm and over)
Dimensions	diameter	216mm (8 inches)	165mm (6 inches)	216mm (8 inches)	114mm (4 inches)
	length	2,160mm (88 inches)	2,338mm (90 inches)	1,120mm (44 inches)	1,078mm (42 inches)
Weight	full of water	110kg	85kg	60kg	15kg
	dry	50kg	40kg	30kg	8kg

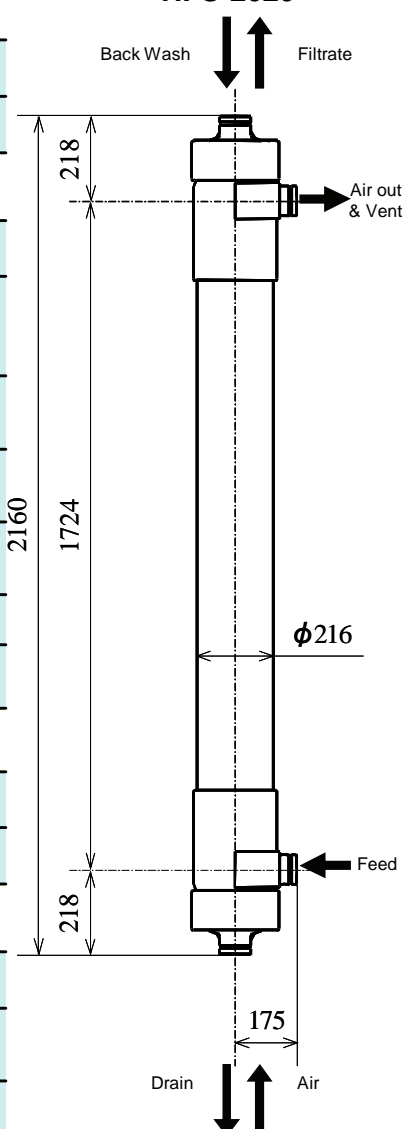
Materials

Housing	Polyvinylchloride
Potting Material	Epoxy Resin

Operating Conditions

Max. Inlet Pressure	300kPa (44 psi)
Max. Transmembrane Pressure	300kPa (44 psi)
Max. Operating Temperature	40°C (104°F)
pH Range	1-10 at Filtration, 0-12 at Chemical Cleaning

Module Configuration HFS-2020



TORAY

Exportation of the product may need an approval for security control laws and regulations of government. Exporters are requested to adhere to such regulations. All specifications may change without prior notice, due to technical modifications or production changes.

Toray Membrane Europe AG

Grabenackerstrasse 8, Munchenstein 1 CH-4142,
Switzerland (P.O. Box815)
Tel:(41)61-415-8710 Fax:(41)61-415-8720
<http://www.toraywater.com>

ROPUR antiscalants

Improve your desalination process and membrane lifetime with ROPUR RPI® antiscalants

Ratings chart is based on equal
concentration of antiscalant in
RO brine

	RPI 2000	RPI 2800	RPI 3000A	RPI 4000A	RPI 4500A	RPI 4900	 RPI 5000A	 RPI 6000
Feedwater source	BW/SW	SW	BW/SW	BW	BW	BW/SW	BW	BW
CaCO ₃	***	**	***	***	**	***	*	**
CaSO ₄	**	*	***	***	*	***	⊙	***
BaSO ₄ / SrSO ₄	*	⊙	***	***	*	**	⊙	**
SiO ₂	○	○	○	•	*	⊙	***	•
CaF ₂	⊙	○	*	*	⊙	**	○	*
Fouling Inhibition	*	**	*	•	•	○	*	•

*** Excellent

** Very Good

* Good

⊙ Fair

○ Limited

• Not Effective

BW = Brackish water
SW = Sea water

Highly effective on poorly soluble Silica (MgSiO₂), resulting
in concentrate saturation of up to 250 mg/l.

RPI-6000 only available on special request



RPI - Antiscalants comply with EU regulation
CEN/TS 164, EN 15039, EN 15040 and EN 15040
Chemicals used for treatment of water intended for
human consumption



Benefits:

ROPUR RPI® antiscalants are designed to support plant designers, OEM's and end-users to optimize reverse osmosis membrane plant performance by:

- Saving energy and reducing water consumption
- Reducing cleaning frequency
- Minimizing system downtime
- Optimizing plant recovery/conversion



NSF International

RECOGNIZES

TORAY MEMBRANE EUROPE AG
SWITZERLAND

AS COMPLYING WITH NSF/ANSI 60.
PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE
AUTHORIZED TO BEAR THE NSF MARK.



Certification Program
Accredited by the
American National
Standards Institute



Certification Program
Accredited by the
Standards Council
of Canada

This certificate is the property of NSF International and must be returned upon request. For the most current and complete information, please access NSF's website (www.nsf.org).

January 30, 2005
Certificate# 0H070 - 02

David Purkiss, General Manager
Water Distribution Systems



OFFICIAL LISTING

NSF International Certifies that the products appearing on this Listing conform to the requirements of
NSF/ANSI Standard 60 - Drinking Water Treatment Chemicals - Health Effects

This is the Official Listing recorded on April 7, 2005.

TORAY MEMBRANE EUROPE AG
GRABENACKERSTRASSE 8B
P.O. BOX 815
MÜNCHENSTEIN 4142
SWITZERLAND
41 61 415 8710

Facility: KIRCHBERG, GERMANY

Chemical/ Trade Designation	Function	Max Use
Miscellaneous Water Supply Products ⁽¹⁾		
RPI-3000A	Reverse Osmosis Antiscalant	30 mg/L
RPI-4900	Reverse Osmosis Antiscalant	30 mg/L
Sodium Polyacrylate		
RPI-2800	Reverse Osmosis Antiscalant	20 mg/L

(1) Certified for addition to the feed water for reverse osmosis applications only.

Note: Additions shall not be made to this document without prior evaluation and acceptance by NSF International.

Number	K21462/01	Replaces	--
Issued	2001-06-01	Dated	--

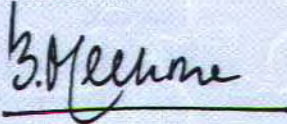
**Kiwa-ATA
RPI-4000A**

Based on pre-certification tests as well as periodic inspections by Kiwa, the product referred to in this certificate and marked with the Kiwa-ATA-mark as indicated under 'Marking', manufactured by

Ingenieurbüro Wolfram

may, on delivery, be relied upon to comply with the Kiwa-ATA-criteria, as laid down in the Kiwa-ATA-certification agreement no. K21462.

Kiwa N.V.



ing. B. Meekma
Director
Certification and Inspection

This certificate is issued in accordance with the "Kiwa-Regulations for the ATA (Assessment on Toxicological Aspects) Product Certificate" validation January 1, 1994, and consists of 2 pages.
Publication of the certificate is permitted.

Kiwa N.V.
Certification and Inspection
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Supplier
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Switzerland

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Fax +41 61 4158720

RPI-4000A

PRODUCT SPECIFICATION

RPI-4000A is a sodium salt of an organic phosphate.

APPLICATION AND USE

RPI-4000A is an antiscalant for reverse osmosis membrane systems for the production of drinking water. The dosage is max. 10 mg/l in feed.

CHEMICAL COMPOSITION

The chemical composition is specified in the annex of the Kiwa-ATA-certification agreement no. K21462.

It is not to be changed without written permission by Kiwa after approval according to the ATA-approval-procedures

CRITERIA/REQUIREMENTS

For this product are relevant the requirements of the "Guideline quality of materials and chemicals for drinking water supplies", publication 94-01, by the Inspectorate of Public Health and Environmental Protection.

The product has to meet the product-specific requirements that are listed in the annex to the Kiwa-ATA-certification agreement no. K21462.

APPROVAL

The accordance of the Chief Inspector of Public Health and Environmental Protection has been given by the means of his letter dated October 1, 1999, reference DWL/99213851.

MARKING

Form of the specified Kiwa-ATA-mark:

- Kiwa-ATA, in ink or seal.

Location of the mark:

- on the delivery receipt/packaging or on the product itself.

Required additional marking:

- Kiwa-ATA;
- RPI-4000A.

TIPS FOR THE CUSTOMER

1. Check at the time of delivery whether:
 - 1.1 the producer has delivery in accordance with the agreement;
 - 1.2 the mark and the marking method are correct;
 - 1.3 the products show no visible defects as a result of transport etc.
2. If you should reject a product on the basis of the above, please contact:
 - 2.1 Ingenieurbüro Wolfram
and, if necessary,
 - 2.2 Kiwa N.V.
3. Consult the producer's processing guidelines for the proper storage and transport methods.
4. Check whether this certificate is still valid by consulting the Kiwa guide.

LOGISTICS

For the transportation, storage and packing are in force the directives in relation to the application of the product as given by the customers.

P3-Aquaclean - cleaning chemicals

Products	Acid soluble Scaling	Acid insoluble Scaling	Fouling	Biofouling
P3-Aquaclean SCR	X			
P3-Aquaclean ACS	X			X
P3-Aquaclean BUF		X		
P3-Aquaclean LST		X		
P3-Aquaclean ENZ			X	X
P3-Aquaclean LAC			X	X
P3-Aquaclean SAL		X	X	

P3-Aquaclean SCR

P3-Aquaclean SCR is a cleaner for reverse osmosis (RO), nano filtration (NF), ultra filtration (UF) and micro filtration (MF) membranes applied in water treatment. P3-Aquaclean SCR is a blend of inorganic acids. It has been developed to remove calcium carbonate and sulphate scaling.

P3-Aquaclean ACS

P3-Aquaclean ACS is a cleaner for reverse osmosis (RO), nano filtration (NF), ultra filtration (UF) and micro filtration (MF) membranes applied in water treatment. P3-Aquaclean ACS is a blend of organic acids and anionic surfactants. It has been developed to remove scaling and organic colloidal fouling. P3-Aquaclean ACS is able to decrease the difference pressures in spiral wound membrane systems, which very often is a strong limitation factor in processing of plants.

P3-Aquaclean LAC

P3-Aquaclean LAC is an alkaline liquid blend of dispersants, inorganic and organic builders with anionic and nonionic surfactants. It has been developed for cleaning of reverse osmosis (RO), nano filtration (NF), ultra filtration (UF) and micro filtration (MF) membranes applied in water treatment. P3-Aquaclean LAC is a special alkaline cleaning formulation for removing organic residues and biofouling. P3-Aquaclean LAC should always be used as recommended by the membrane manufacturer in respect of temperature and pH. Compatibility with all membranes must not be assumed.

P3-Aquaclean SAL

P3-Aquaclean SAL is an alkaline liquid blend of dispersants, inorganic and organic builders with anionic surfactants. It has been developed for cleaning of reverse osmosis (RO), nano filtration (NF), ultra filtration (UF) and micro filtration (MF) membranes applied in water treatment. P3-Aquaclean SAL is a special alkaline cleaning formulation for removing organic residues and biofouling.

P3-Aquaclean BUF

P3-Aquaclean BUF is a cleaner for reverse osmosis (RO), nano filtration (NF), ultra filtration (UF) and micro filtration (MF) membranes applied in water treatment. P3-Aquaclean BUF is a blend of complexing and sequestering agents. It has been developed to assist in the cleaning of acidic insoluble sulphates of calcium, barium and strontium. P3-Aquaclean BUF is effective in removing calcium carbonate and calcium phosphate, though P3-Aquaclean ACS or P3-Aquaclean SCR are preferred for these scalents.

P3-Aquaclean LST

P3-Aquaclean LST has been developed for cleaning of reverse osmosis (RO), nano filtration (NF), ultra filtration (UF) and micro filtration (MF) membranes applied in water treatment. P3-Aquaclean LST is a blend of anionic and nonionic surfactants, being highly effective against colloidal and other organic matter. When used in conjunction with microbicides, it is effective against biofilm. P3-Aquaclean LST should always be used as recommended by the membrane manufacturer. It should never be used on RO or NF plants under acidic conditions but can be mixed in use solutions with the neutral and alkaline P3-Aquaclean products.

P3-Aquaclean ENZ

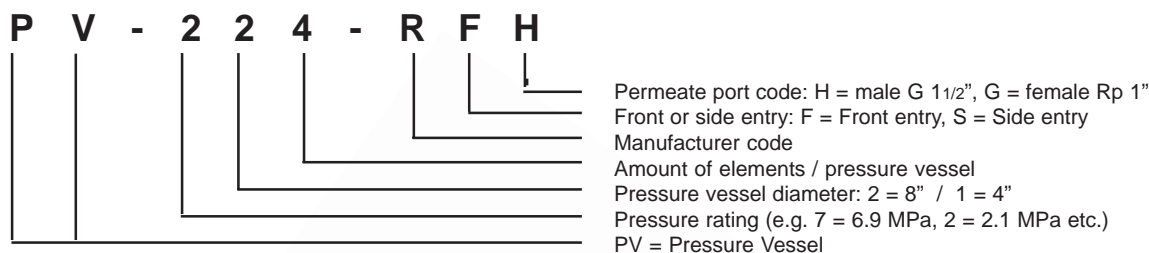
P3-Aquaclean ENZ has been developed for cleaning of reverse osmosis (RO), nano filtration (NF), ultra filtration (UF) and micro filtration (MF) membranes applied in water treatment. P3-Aquaclean ENZ is a blend of anionic surfactants and different enzymes, being highly effective against colloidal and other organic matter. P3-Aquaclean ENZ should always be used as recommended by the membrane manufacturer. It can be mixed in use solutions with the neutral and alkaline P3-Aquaclean products.

Pressure vessels - Summary -

1/2

- Pressure Vessels are for standard 8" and 4" spiral wound elements
- Individually ASME stamped on request
- Saddles and straps included with 8" vessels

Order Code explanation:



For ordering, replace the "x" in the Pressure Vessel Code as per subject list with the number of elements per vessel



8" pressure vessels

Options:

- Larger (2" or 2.5") high pressure Victaulic port for side entry vessels
- Clocking and multi-port configurations for side entry vessels

8", front entry type			
pressure	order code	length	remarks
1 MPa (150 psi)	PV-12x-RFH	1 to 7 elements	Machined high pressure ports 1 1/2" for flexible couplings (Victaulic style), SS 316L . Option "G" for permeate ports available. Bearing plate Aluminum 6061 T6 , hard anodized. Available permeate adaptors for 29 and 38 mm permeate tube. Standard shell color blue; other colors on request. 2 saddles & straps for 1-4 element length, 3 saddles & straps for 5-7 element length
2.1 MPa (300 psi)	PV-22x-RFH	1 to 7 elements	
3.1 MPa (450 psi)	PV-32x-RFH	1 to 7 elements	
4.2 MPa (600 psi)	PV-42x-RFH	1 to 7 elements	
6.9 MPa (1000 psi)	PV-72x-RFH	1 to 7 elements	Machined high pressure ports 1 1/2" for flexible couplings (Victaulic style), SS 00Cr22Ni15MoSN. Option "G" for permeate ports available. Bearing plate Aluminum 6061 T6 , hard anodized. Standard shell color blue; other colors on request. 2 saddles & straps for 1-4 element length, 3 saddles & straps for 5-7 element length
8.4 MPa (1200 psi)	PV-82x-RFH	1 to 7 elements	

Pressure Vessels - Summary -

2/2

8", side entry type			
pressure	order code	length	remarks
2.1 MPa (300 psi)	PV-22x-RSH	1 to 7 elements	Machined high pressure ports 1 1/2" for flexible couplings (Victaulic style), SS 316L . Option "G" for permeate ports available. Bearing plate Aluminum 6061 T6 , hard anodized. Available permeate adaptors for 29 and 38 mm permeate tube. Standard shell color blue; other colors on request. 2 saddles & straps for 1-4 element length, 3 saddles & straps for 5-7 element length. Multi-port configurations: available on request; use subject drawing for order clarification.
2.8 MPa (400 psi)	PV-32x-RSH	1 to 7 elements	
4.2 MPa (600 psi)	PV-42x-RSH	1 to 7 elements	
6.9 MPa (1000 psi)	PV-72x-RSH	1 to 7 elements	Machined high pressure ports 1 1/2" for flexible couplings (Victaulic style), SS 00Cr22Ni15MoSN. Option "G" for permeate ports available. Bearing plate Aluminum 6061 T6 , hard anodized. Standard shell color blue; other colors on request. 2 saddles & straps for 1-4 element length, 3 saddles & straps for 5-7 element length. Multi-port configurations: available on request; please contact for configuration advice and order clarification.
8.4 MPa (1200 psi)	PV-82x-RSH	1 to 7 elements	

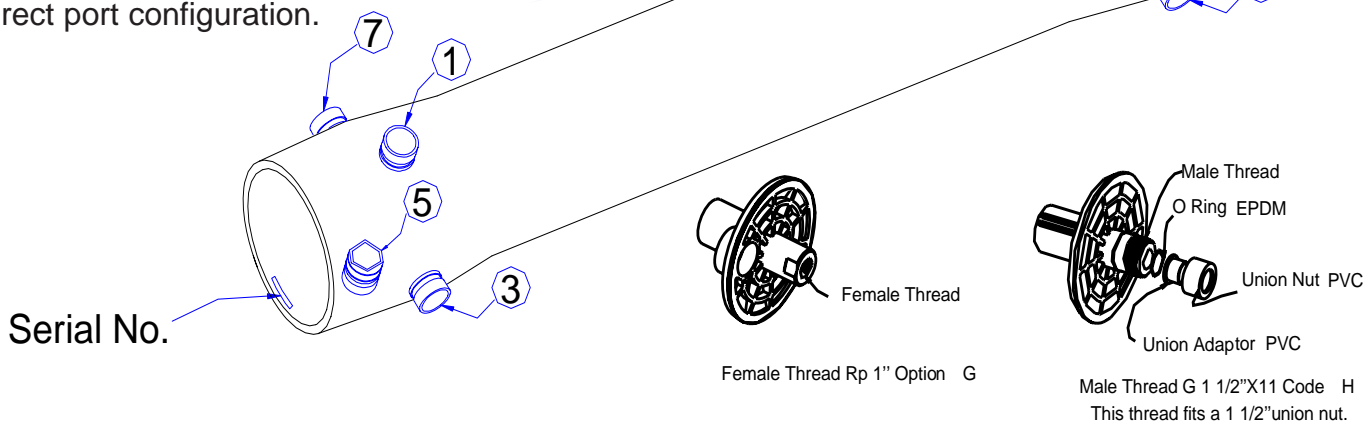
Available port sizes for side entry types:

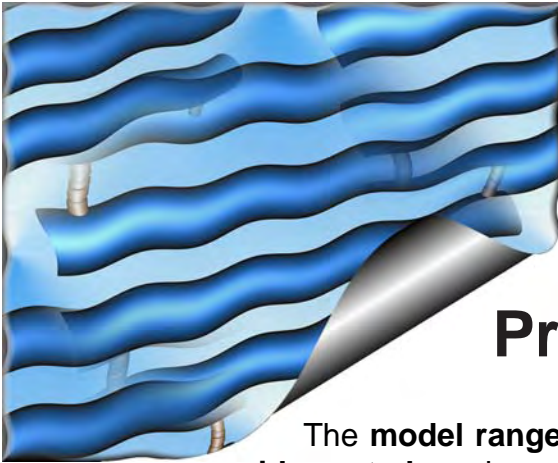
	1.5"	2"	2.5"
300 psi	+	+	+
450 psi	+	+	-
600 psi	+	+	-
1000 psi	+	+	-
Note:			
-	not more than 3 ports per end.		
-	no 2.5" ports at 90° position		



Ref. No. 1 - 8 are for clarification of exact port configuration.

Please call Toray Membrane Europe and / or your local Distributor for verification of correct port configuration.





4" Side Ported Pressure Vessels

The **model range** of pressure vessels is being extended to encompass a **side ported** version of the **popular 4" design**. These vessels, at an operating pressure up to **300 psi (21 bar)**, offer superior possibilities for configuration of your units. The **180° "clocking"** of the **port arrangement** enables connection of vessels in sequence **without additional piping**.

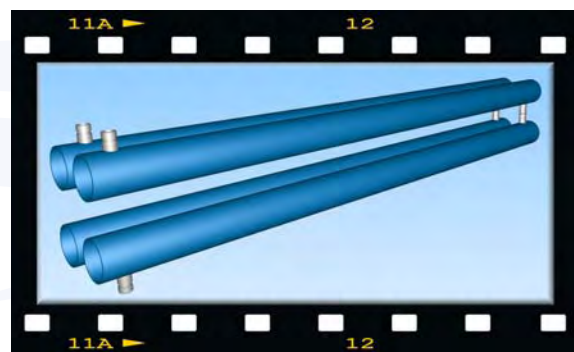
The advanced design allows to **connect without threaded joints**, using flexible pipe couplings ("Victaulic" style 77), **reducing pressure losses, vibrations and noise as well as mechanical stress** on the pressure vessel and piping.

In addition to this, the new design allows, at a **very competitive cost**, optimized removal of entrapped air from the system upon system startup. The system down times for e.g. element **replacement are significantly shorter** compared to end-ported versions.

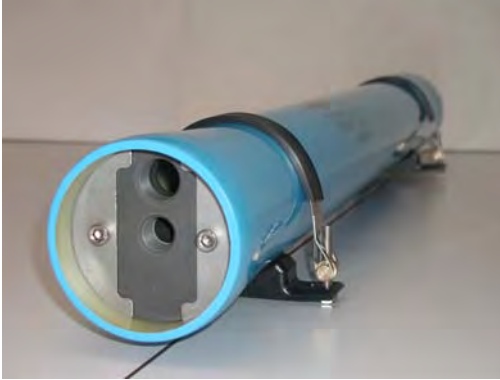
The new vessel type has been developed and tested according to **ASME X**

The vessels are stocked in **1,2,3 and 4 element length, color blue**

A few **example configurations** show some of the **advantages and possibilities** of this design:



Model No.	Description
PV-211-RSD	> Side ported, with two ports 180° clocking, max. 300 psi, single element length.
PV-212-RSD	> Side ported, with two ports 180° clocking, max. 300 psi, double element length.
PV-213-RSD	> Side ported, with two ports 180° clocking, max. 300 psi, triple element length.
PV-214-RSD	> Side ported, with two ports 180° clocking, max. 300 psi, four element length.



4" Front Ported Pressure Vessel >>20 bar & 70 bar <<

These state of the art membrane pressure vessels are manufactured by computer-controlled filament winding machines and associated high performance processing equipment. Based on the high speed and precision manufacturing process provided by these machines and skilful technical personnel, a range of quality products are made. The vessels meet the increasing demand for high quality membrane pressure vessels through a comprehensive in-house quality assurance program. For our customers this means lowest vessel maintenance costs and fast, easy access to membrane elements.

Design features

- Incredibly simple configuration
- Highly polished outer surface appearance (blue as standard colour)
- 30% less parts
- Safety bolt
- High Pressure Port G $\frac{3}{4}$ ", Permeate G Port $\frac{1}{2}$ "
- Half moon locking device
- Highly polished inner surface for easy membrane loading and unloading
- Fits all standard 4" membrane elements

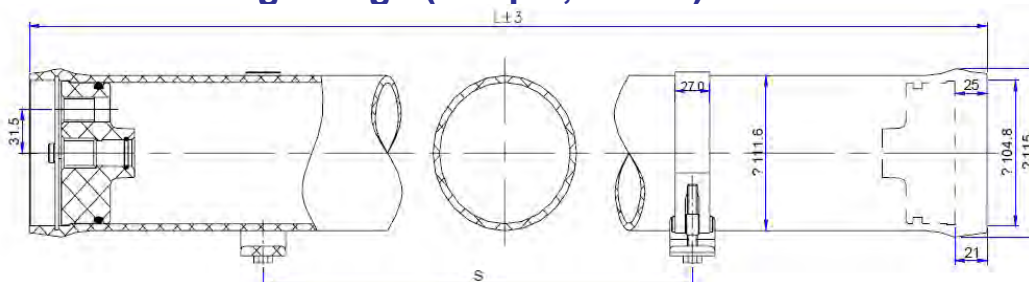


Quality Assurance

Our ROPUR Components team is committed to provide most reliable products, sound quality assurance and best customer service. All 4" 300 psi (20 bar) & 1000 psi (bar) membrane pressure vessel designs are tested at 100,000 cycles, followed by a burst test to min. 600% of rated operating pressure.

ROPUR Components safe and durable membrane pressure vessels meet customers' requirements. All of our employees embrace our quality system standards and are active participants in our continual improvement program. We continue to strive for perfection.

4" Membrane Housing Design (300 psi, 20 bar)



MODEL NO.	LINCH (MM)	SINCH (MM)	EMPTY WEIGHTPOUND (KG)
PV-211-RFD	44 (1118)	28 (711)	9 (4.1)
PV-212-RFD	84 (2134)	66 (1700)	15.4 (7)
PV-213-RFD	124 (3150)	102 (2600)	24.1 (11)



CERTIFICATE OF AUTHORIZATION

This certificate accredits the named company as authorized to use the indicated symbol of the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the Code symbol and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this symbol shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

**WAVE CYBER (SHANGHAI) CO., LTD.
NO. 2, SONGCHUN ROAD
QINGPU INDUSTRIES ZONE
SHANGHAI NEW CITY, QINGPU DISTRICT
SHANGHAI 201703
PEOPLES REPUBLIC OF CHINA**

SCOPE:

**MANUFACTURE OF CLASS I REINFORCED PLASTIC PRESSURE VESSELS AT THE
ABOVE LOCATION ONLY**

AUTHORIZED: FEBRUARY 8, 2005

EXPIRES: FEBRUARY 8, 2008

CERTIFICATE NUMBER: 34,943

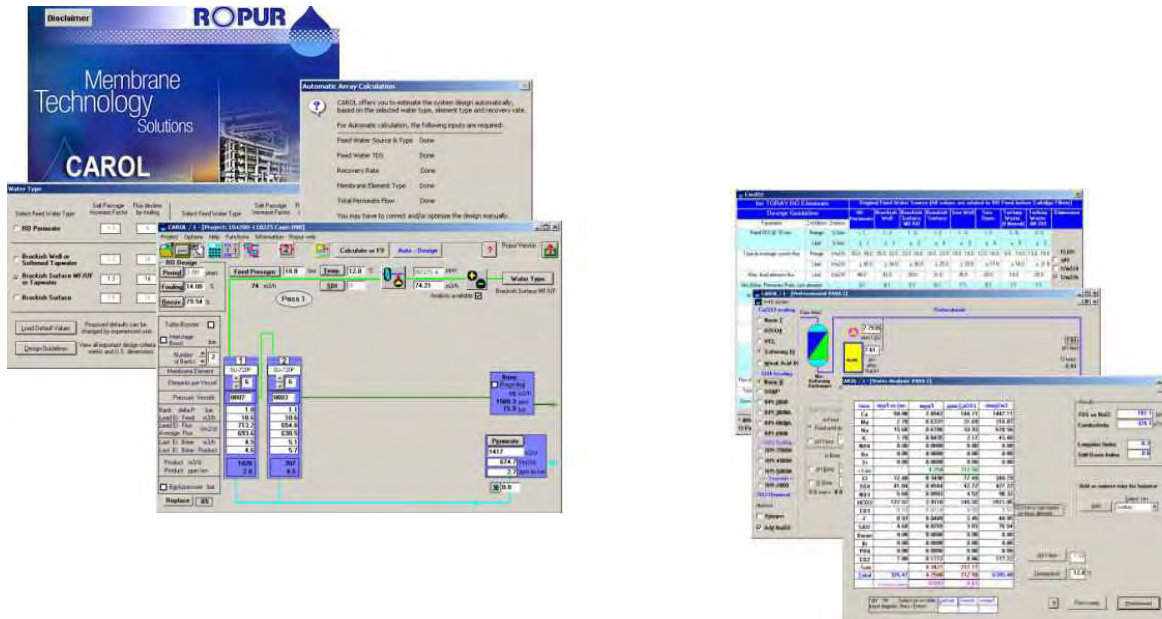
Chairman of The Boiler
And Pressure Vessel Committee

Director, Accreditation and Certification



CAROL

The Reverse Osmosis Design Software for TORAY RO & NF membrane elements



Computer Aided Reverse Osmosis Layout

Ropur introduces the **new version** of its reverse osmosis system design software. The program is **designed to the market needs** and continues to **set the software standard** for designing, optimizing, and checking system performance for reverse osmosis and nanofiltration systems.

Features:

- ⇒ **SWRO Split Calculation** = taking front and back permeate of pressure vessel separately (Boron rejection issue)
- ⇒ **Average Membrane Life** calculation, optimize salt passage and fouling rate by adjusting replacement rate
- ⇒ **Auto Design** Function. This tool allows automatic quick array calculation to increase **design efficiency**
- ⇒ **Integrated Guidelines** to design and build successful RO plants
- ⇒ **Integrated product data sheets** (PDF) of all RO & NF elements **and all other Ropur products**
- ⇒ **Integrated Internet Browser** to view PDF/HTML pages directly from within CAROL
- ⇒ Link to Toray Membrane Homepage to **quickly check for Updates of the CAROL Software**
- ⇒ Run up to **3 instances of CAROL** for immediate comparison of different RO design
- ⇒ Updated and **precise pH, CO₂, CO₃ and HCO₃** equilibria calculation
- ⇒ **Boron calculation**
- ⇒ **High pH** input options for **automatic calculation of Caustic dosing**
- ⇒ **Tool Tip Texts** added for direct explanation of buttons, input fields and labels
- ⇒ **Multilanguage Design Preview** and **Print Output**
- ⇒ **Compatible with all version of Windows** (95,98,ME,NT,2000,XP)

The data and information contained in the data sheets are based on technical data and tests we believe to be reliable. They are offered in good faith for use by persons having appropriate technical skill at their own discretion and risk. Toray Membrane Europe AG does not have control of design and operating conditions and consequently cannot assume any reliability for results obtained or damage incurred through the use of the product presented. Toray Membrane Europe AG continuously improves its products and reserves the right to modify or amend specifications without prior notice. Our general terms of sales and terms of warranty make integral part of these informations and cannot be disclaimed.

New

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