Tubular Membranes

Tubular membranes are particularly suited to fluids with high viscosity and/or suspended solids, as their wide flow paths make them highly resistant to blocking. Pre-treatment requirements are minimal, and are often completely avoided – a benefit that makes membranes the most cost effective choice for many small systems.

Membrane Development
Our development chemists continuously refine product performance to expand our range, extending the benefits to users to offer. Our in-house development and manufacturing capability enables us to provide customised membranes tailored for specific applications. This can prove highly beneficial vwhere short process development times are the key. New developments include hydrophilic membranes for lower fouling, improved selectivity, increased solvent, acid and base resistance, improved flux and strengthened membrane supports.

Proprietary Tubular Membranes
All membranes are produced “in-house” in our purpose-built facility, operating under the international Quality Assurance standard ISO 9001:2015. The table (opposite) provides a technical summary of our range of modules which are fully compatible with our tubular membranes.

Cleaning
The choice of cleaning chemicals and cleaning frequency depend upon the nature of the process and the membrane type. Acids, Alkalis and Detergents are used as required. Typical cleaning procedures are indicated on the below table. The C10 type applications can also be cleaned mechanically using an automated “pigging” process that uses foam balls and can significantly reduce the need for cleaning chemicals.

Membrane Type	Chemical	Concentration	Temp °C
AFC99	Alkaline Detergent Nitric Acid	0.25% 0.3%	50 50
AFCC80, 40,30	Enzyme Nitric Acid	0.5% 0.3%	45 45
CA/AN	Enzyme Nitric Acid	0.5% pH2.0	30 30
ES/PU/FP FPN (Excluding FPA/FPT/ LPA/ LMA)	Chlorinated Alkaline detergent Nitric acid	1% 0.3%	45 45

Applications
Applications where tubular membranes have been selected as the best process solution include:

- Wood pulp bleach wastewater separation
- Lignosulphonate fractionation
- Side-stream (external) membrane bioreactors (MBRs)
- Landfill leachate treatment
- Metal finishing wastewater separation
- Active Pharmaceutical Ingredient manufacture
- Manufacture of fine chemicals (various)
- Dairy applications (e.g. milk concentration)
- Fruit juice clarification
- Drinking water treatment
- Textile dye processing (e.g. desalting)
- Textile process wastewater treatment/ reuse
- Clean In Place (CIP) solution recovery
- Product recovery
- Acid purification
- Process R & D (academic and industrial)

Our range of over 22 tubular membranes incorporates products that are suitable for all these applications. The variety of materials employed provides a range of chemical compatibilities, with their exhaustive development delivering unmatched performance. The range also incorporates products with UK Drinking Water Inspectorate approval, proving their suitability for municipal applications.

Quality Assurance
Applications where tubular membranes have PCI Membranes designs, manufactures and provides supply and servicing of equipment for liquid separation.

to the quality standard: BS EN ISO 9001:2015 Destructive testing is carried out on samples of every membrane batch, as well as 100% performance testing of all RO and NF membranes. Finished membranes are preserved and stored under carefullycontrolled conditions to prevent deterioration during storage. A computerised records and bar-coding system provides for complete traceability of each membrane produced, and facilitates traceability to confirm that the membranes meet PCI Membranes high quality standards.

PCI Membrane products are offered with guarantees commensurate with their application and conditions of use. Additionally our experience of delivering membrane solutions allows us to provide extensive process performance guarantees when offering complete systems.

PCI Membranes supplies its products as components to OEM systems builders, directly to end users (either as components or as complete membrane solutions),and as spares for our own and others’ tubular membrane systems.

PCI Membranes® Filtration Group®

Corporate Office:
PCI Membranes Sp. z o.o.
ul. Polna 1B, 62-025 Kostrzyn Wlkp,
Poland

Contact Us:
https://www.pcimembranes.com/contactus

Online:
www.pcimembranes.com

PRODUCT SHEET

PCI Membranes®
Pilot Scale Production and Processing

Type	Application	Length	Diameter	Membrane Area	Standard Options/Comments
A5	UF	3.1m 3.7m	83mm 83mm	4.0m² 4.75m²	Shroud AISI 316 stainless steel
A19	UF	3.1m 3.7m	83mm 83mm	2.1m² 2.5m²	Shroud AISI 316 stainless steel
A37	UF	3.7m	119mm	5.2m²	Shroud AISI 316 stainless steel
B1 Parallel Flow	UF	1.2m 2.4m 3.7m	100mm 100mm 100mm	0.9m² 1.7m² 2.6m²	For highly viscous materials, and low pressure drop
B1 Twin-Entry	UF	1.2m 2.4m 3.7m	100mm 100mm 100mm	0.9m² 1.7m² 2.6m²	End-caps in epoxy or AISI 316 stainless steel. Shroud AISI 316 stainless steel
B1 Series Flow	RO, NF, UF	1.2m 2.4m 3.7m	100mm 100mm 100mm	0.9m² 1.7m² 2.6m²	End-caps in epoxy or AISI 316 stainless steel. Shroud AISI 316
C10	NF, UF	0.9m 1.8m 3.7m	210mm 210mm 210mm	2.5m² 5.0m² 10.5m²	DWI approved ABS wetted parts
Micro 240	RO, NF, UF	.03m	63.5mm	0.024m²	AISI 316 stainless steel module (2 membrane tubes). Membrane micropacks available.
Micro 960	RO, NF, UF	1.2m	63.5mm	0.096m²	AISI 316 stainless steel module (2 membrane tubes). Membrane micropacks available.
Single Tube	RO, NF, UF	1.2m	12.5mm	0.283m²	For comparing up to 6 membrane types

Membrane Type	Material	pH Range	Operating Pressure	Operating Temperature	Nominal Retention Character[1]	Generic Specification	Hydrophilicity[2]	Solvent Resistance[3]	Applicable Module/s
AFC99	Polyamide Film	1.5-12	64[5]	80°C	99% NaCl	RO	3	++	B1
AFC80	Polyamide Film	1.5-10.5	60	70°C	80% NaCl	RO	4	++	B1
AFC40	Polyamide Film	1.5-9.5	60	60°C	60% CaCl2	NF	4	++	B1
AFC30	Polyamide Film	1.5-9.5	60	60°C	75% CaCl2	NF	4	++	B1/C10
CA202	Cellulose Acetate	2-7.25	25	30°C	2,000 MW	UF	5	+	B1/C10
ESP04	Modified PES	1-14	30	65°C	4,000 MW	UF	2	++	B1
ES404	Polyethersulphone	1.5-12	30	80°C	4,000 MW	UF	2	++	B1/C10
EM006	Modified PES	1.5-12	30	80°C	6,000 MW	UF	4	++	B1
PU608	Polysulphone	1.5-12	30	80°C	8,000 MW	UF	2	++	B1
ES209	Polyethersulphone	1.5-12	30	80°C	9,000 MW	UF	2	++	B1
PU120	Polysulphone	1.5-12	15	80°C	20,000 MW	UF	2	++	B1
FPT03	PVDF	1.5-10.5	10	60°C	20,000 MW	UF	1	+++	A5
FPA020	PVDF	1.5-10.5	7	60°C	20,000 MW	UF	1	+++	A19/A37
AN620	Polyacrylonitrile	2-10	10	60°C	25,000 MW	UF	5	+++	B1
ES625	Polyethersulphone	1.5-12	15	80°C	25,000 MW	UF	2	++	B1
FPT10	PVDF	1.5-10.5	10	60°C	100,000 MW	UF	1	+++	A5
FPA10	PVDF	1.5-10.5	7	60°C	100,000 MW	UF	1	+++	A19/A37
FP100	PVDF	1.5-12	10	80°C	100,000 MW	UF	1	+++	B1
FPT20	PVDF	1.5-10.5	10	60°C	200,000 MW	UF	1	+++	A5
FPA20	PVDF	1.5-10.5	7	60°C	200,000 MW	UF	1	+++	A19/A37
FP200	PVDF	1.5-12	10	80°C	200,000 MW	UF	1	+++	B1
FPN200[6]	PVDF	1.5-12	10	65°C	200,000 MW	UF	1	+++	B1
LPA450	PVDF	1.5-10.5	7	60°C	450,000 MW	UF	1	+++	A19/A37
LMA02	PVDF	1.5-10.5	7	60°C	0.2µm	MF	1	+++	A19/A37

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