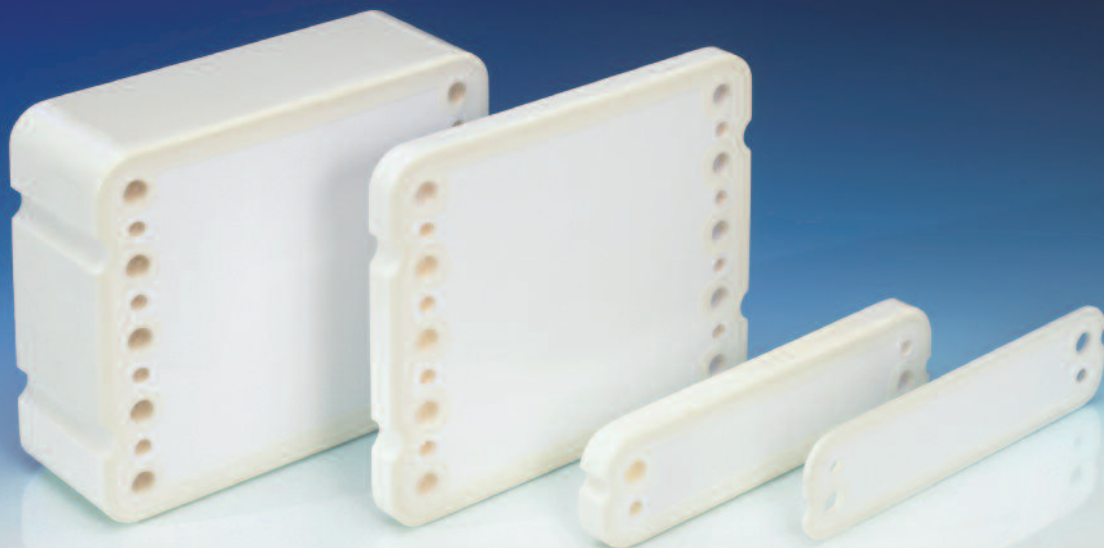




Life Sciences

T-Series TFF Cassettes with Omega™ Membrane



High performance Omega PES membrane combined with significant material and design improvements deliver highly reliable fluid dynamics and better process economics

- ▶ **Easy implementation into your process.** The new T-Series cassettes offer significant improvements in construction and design while utilizing the same proven Omega polyethersulfone (PES) membrane to reduce revalidation requirements.
- ▶ **Increased safety, reliability, and reproducibility.** Superior new materials of construction are durable and stable, exhibit very low extractables, and offer broad chemical compatibility.
- ▶ **High flux, high selectivity, and low protein binding.** Omega PES membrane provides superior performance and is stable against biological and physical degradation.
- ▶ **Improved process performance.** Cassettes are designed to deliver optimal mass transfer to improve your process economics.
- ▶ **Easy scale up for robust purification processes.** Available in scalable formats with the same materials of construction from development to production-scale processes.
- ▶ **Enhanced validation.** T-Series cassettes surpass the latest biopharmaceutical and regulatory standards, such as biological reactivity, extractables, and TOC. Product claims are backed by extensive validation documentation to support the use of T-Series cassettes in your process.

Filtration. Separation. Solution.™

Applications

T-Series cassettes with Omega membrane are ideal for development, pilot, and production-scale TFF applications in diverse biological and biopharmaceutical processes. They are especially useful in:

- ▶ Vaccine and conjugate concentration and diafiltration
- ▶ Purification and recovery of monoclonal antibodies (mAb) or recombinant proteins
- ▶ Blood plasma fractionation and purification

Product Platforms

T-Series cassettes complement Pall's highly successful Centramate™ and Centrasette™ products, and have been developed following years of experience designing and optimizing our customers' biotech and biopharmaceutical processes.

T-Series cassettes for Centramate holders are offered in scalable membrane formats with effective filtration areas (EFA) as low as 200 cm² (0.215 ft²) to 0.5 m² (5.4 ft²), making them ideal for process development and small-scale production of 0.1 L to 125 L. Centrasette T-Series cassettes, in combination with Centrasette holders, can process thousands of liters with installations incorporating hundreds of square meters of EFA.

Proven Omega Membrane

Pall's Omega polyethersulfone (PES) membranes offer high flux and selectivities. They have been specifically modified to minimize protein binding to the surface and interstitial structure of the membrane. This polymeric membrane is stable against biological and physical degradation due to the unique chemical properties of PES.

Omega membranes are cast on a highly porous, non-woven polyolefin support. They have an anisotropic structure, a thin skin-like top layer with a highly porous underlying support. The structure of the skin determines the porosity and permeability characteristics of the membrane and can typically be cleaned quicker and easier than membranes with a uniform, sub-micron depth structure. This membrane is compatible with acids, bases and a variety of other cleaning agents. Omega membranes are available in a wide range of nominal molecular weight cut-offs (NMWC).

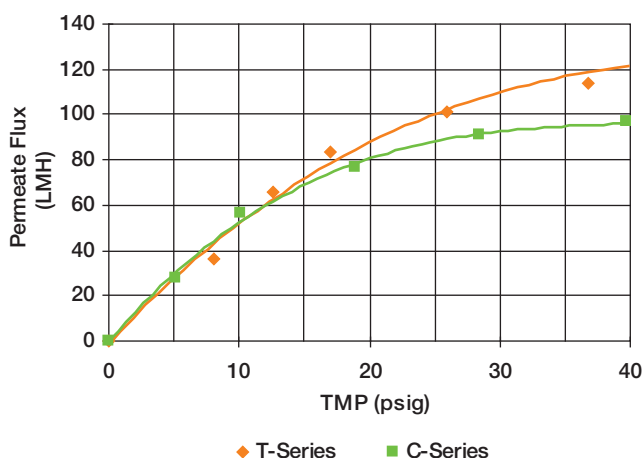
The T-Series Advantage

Superior new materials of construction and improved cassette design increase process safety, reliability, reproducibility, and productivity:

- ▶ The feed and permeate screen material for T-Series cassettes is made from polypropylene, which is highly resistant to sodium hydroxide.
- ▶ Larger feed and permeate ports provide lower pressure drops.
- ▶ T-Series cassettes have been designed to provide maximum mass transfer through the membrane, resulting in faster processing times or reduced area installations compared to existing similar cassette formats.

Figure 1

Omega 10 kD Membrane, Centramate C vs. T-Series Membrane Cassettes at a 5 L/min/m² Cross Flow Rate



Technical Specifications

Materials of Construction

Membrane	Omega polyethersulfone
Support	Polyolefin
Screens	Polypropylene
Encapsulant	Polyurethane with white pigment (TiO ₂)
Permeate Seals	Platinum cured silicone
Gaskets	Medical grade, platinum cured silicone

Operating Limits

Maximum Pressure ¹	6 barg (90 psig) @ 23 °C (73 °F) 4 barg (60 psig) @ 55 °C (131 °F)
Maximum TMP	4 barg (60 psig) @ 55 °C (131 °F)
Temperature Range ²	-5 – 55 °C (23 – 131 °F)
pH Range	2 – 14

¹ Pressure rating will be dependant on rating of the lowest system component.

² Cassettes must not be allowed to freeze.

Typical Operating Parameters

Cross Flow Rate for Processing	5 – 7 L/min/m ² (0.5 – 0.7 L/min/ft ²)
Cross Flow Rate for Cleaning	8 – 10 L/min/m ² (0.8 – 1.0 L/min/ft ²)

Integrity Test

Test Pressure	2 barg (30 psig)
Maximum Air Forward Flow	< 1600 sccm/m ² (< 150 sccm/ft ²)

Shelf Life

The shelf life of cassettes packaged in 0.3 N sodium hydroxide is expected to be one year from the date of manufacture when the cassettes are stored unopened in the original packaging at 4 – 25 °C (39 – 77 °F) and protected from direct light. Extended shelf life studies are ongoing.

Biological Safety

All materials of construction in the T-Series cassettes have been tested and meet requirements for United States Pharmacopeia (USP) Biological Reactivity Test, *In Vivo* <88> at 70 °C (158 °F).

Documentation

Each T-Series membrane cassette has a unique serial number for full traceability. Each cassette is supplied with:

- ▶ Certificate of Quality
- ▶ Membrane Cassette Care and Use Procedures
- ▶ Material Safety Data Sheet (MSDS) for cassette preservative
- ▶ Two platinum cured silicone gaskets

The full Validation Guide is available on request from your local Pall contact. Pall also offers a comprehensive Validation Service for specific tests (such as compatibility) in your process fluid. As always, Pall's Downstream Processing Specialists are available to train and support you in the optimization of your TFF processes.

To test T-Series cassettes in your process, contact Pall today when you call 1.800.521.1520, or send an email to LabCustomerSupport@pall.com.



Ordering Information

Centramate Cassette with Omega Membrane (0.02 m² or 0.2 ft² EFA)

Part Number	NMWC
OS001T02	1 kD
OS005T02	5 kD
OS010T02	10 kD
OS030T02	30 kD
OS050T02	50 kD
OS070T02	70 kD
OS100T02	100 kD
OS300T02	300 kD

Centramate Cassette with Omega Membrane (0.1 m² or 1.1 ft² EFA)

Part Number	NMWC
OS001T12	1 kD
OS005T12	5 kD
OS010T12	10 kD
OS030T12	30 kD
OS050T12	50 kD
OS070T12	70 kD
OS100T12	100 kD
OS300T12	300 kD



Pall has the most comprehensive family of scalable separation products.



Life Sciences

Pall Life Sciences

600 South Wagner Road
Ann Arbor, MI 48103-9019 USA

1.800.521.1520 USA and Canada
(+800).PALL.LIFE Outside USA and Canada
1.734.665.0651 phone
1.734.913.6114 fax

Visit us on the Web at www.pall.com/lab

E-mail us at LabCustomerSupport@pall.com

Australia – Cheltenham, VIC
Tel: 03 9584 8100
1800 635 082 (in Australia)
Fax: 1800 228 825

Austria – Wien
Tel: 00 1 49 192 0
Fax: 00 1 49 192 400
Brazil – São Paulo, SP
Tel: +55 11 5501 6000
Fax: +55 11 5501 6025

Canada – Ontario
Tel: 905-542-0330
800-263-5910 (in Canada)
Fax: 905-542-0331

Canada – Québec
Tel: 514-332-7255
800-435-6268 (in Canada)
Fax: 514-332-0996

800-808-6268 (in Canada)
China – P. R., Beijing
Tel: 86-10-6780 2288
Fax: 86-10-6780 2238

France – St. Germain-en-Laye
Tel: 01 30 61 32 32
Fax: 01 30 61 58 01
Lab-FR@pall.com

Germany – Dreieich
Tel: 06103-307 333
Fax: 06103-307 399
Lab-DE@pall.com

India – Mumbai
Tel: 91 (0) 22 67995555
Fax: 91(0) 22 67995556
Italy – Buccinasco
Tel: +3902488870.1
Fax: +39024880014

Japan – Tokyo
Tel: 03-6901-5800
Fax: 03-5322-2134

Korea – Seoul
Tel: 82-2-560-8711
Fax: 82-2-569-9095

Malaysia – Selangor
Tel: +60 3 5569 4892
Fax: +60 3 5569 4896

Poland – Warszawa
Tel: 22 510 2100
Fax: 22 510 2101

Russia – Moscow
Tel: 5 01 787 76 14
Fax: 5 01 787 76 15

Singapore
Tel: 65 6 389-6500
Fax: 65 6 389-6501

South Africa – Johannesburg
Tel: +27-11-2662300
Fax: +27-11-3253243

Spain – Madrid
Tel: 91-657-9876
Fax: 91-657-9836


Sweden – Lund
Tel: (0)46 158400
Fax: (0)46 320781

Switzerland – Basel
Tel: 061-638 39 00
Fax: 061-638 39 40

Taiwan – Taipei
Tel: 886 2 2545 5991
Fax: 886 2 2545 5990

Thailand – Bangkok
Tel: 66 2937 1055
Fax: 66 2937 1066

United Kingdom – Farlington
Tel: 02392 302600
Fax: 02392 302601
Lab-UK@europe.pall.com

© 2010, Pall Corporation. Pall, , Centramate, Centrasette and Omega are trademarks of Pall Corporation.
® indicates a trademark registered in the USA. **Filtration. Separation. Solution.**SM and UpScale are service marks of Pall Corporation.