

▶ POREX® Tubular Membrane Filter Modules for Dewatering Oil/Water Emulsions

Background

Emulsified oil in wastewater can be problematic for industries wanting to discharge or recycle it, such as the Automotive, Aerospace, Textile and Plastics industries.

Oil concentrations from these industries may range from 1,000 to more than 100,000ppm in wastewaters, but discharge limits are often below 100ppm. Today, recycle and reuse are needed for any viable water source. To reuse or recycle wastewater, oil levels of less than 30ppm or lower are required.

Onsite treatment is essential to economically support manufacturing facilities. For industrial applications, no chemical treatment is required, only filtration through the Porex Tubular Membrane Filters (TMF) which are ideal for dewatering oil/water emulsions up to in excess of 50% oil. This oil rich concentrate can

often be used for heating purposes such as in greenhouses and boiler feed. Reuse offers many benefits, including eliminating the high cost of disposal. Treated water (called filtrate or permeate) from the TMF system can be used in a range of applications from degreaser bath top-up, to floor washing, or to be sent to RO membrane systems to generate water for boiler feed.

The Porex TMF modules are specifically designed for this type of high oil treatment system. Our exclusive patented materials and processes provide extremely durable and consistent membrane modules that have been in use for more than twenty years of flow maintenance performance. Porex Filtration will provide system design and operation assistance to OEM partners assuring reliable, cost-effective, efficient treatment system.

Designing a TMF System for Dewatering Oil/Water Emulsions

TMF system design is a crossflow membrane system that uses the filtrate flow inside the membrane module tubes to scour the membrane surface. This action cleans the membrane surface, greatly increasing flux rates when compared to conventional membranes.

The pretreated water, (to remove free oil) flows through a series of membrane modules placed end to end. Over time, the oil concentration increases in the concentration tank. After a week of continuous operation, feed flow to the concentration tank is stopped and the wastewater is allowed to 'batch down' to allow for maximum oil/solids concentration.

Filtrate that passes through the membrane typically has an SDI of less than 1 and can often be used directly for a number of

processes or fed into an RO system for further treatment without any significant additional processing. The TMF system eliminates multiple treatment steps often used to treat oily wastewater such as chemical dosing, clarifier, bag filters, multimedia filters, carbon filters and high energy consumption evaporators. The Porex TMF can often eliminate all the pretreatment steps saving equipment cost, footprint, maintenance, and operating costs.

The Porex TMF system can be designed in a number of different ways according to the requirements of the end user. Clean in Place (CIP) processes as well as complete system automation are common designs. Multiple pore size options and multiple module configurations allow extremely diverse treatment options dependent upon requirements.

POREX® Tubular Membrane Filter™ Modules for Dewatering Oil/Water Emulsions

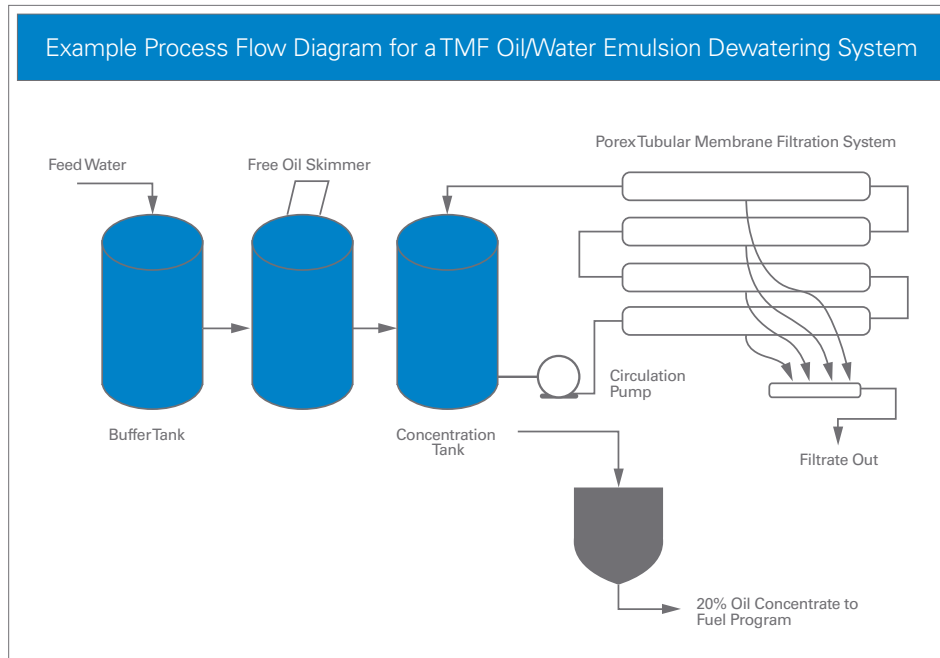


Figure 1 – Process Flow diagram for a TMF oil/Water Emulsion Dewater System

How Long Will TMF Modules Last?

The typical life span of a Tubular Membrane Filter Module is 3 to 5 years or longer with the total TMF system designed for approximately 20 years of operation. The PVDF membranes and the PE or PVDF substrate tubes used in the TMF modules are extremely

robust. They are designed to withstand harsh environments and will resist abrasion, high temperature, and pH environments from 0-14 without a decrease in retention efficiency.



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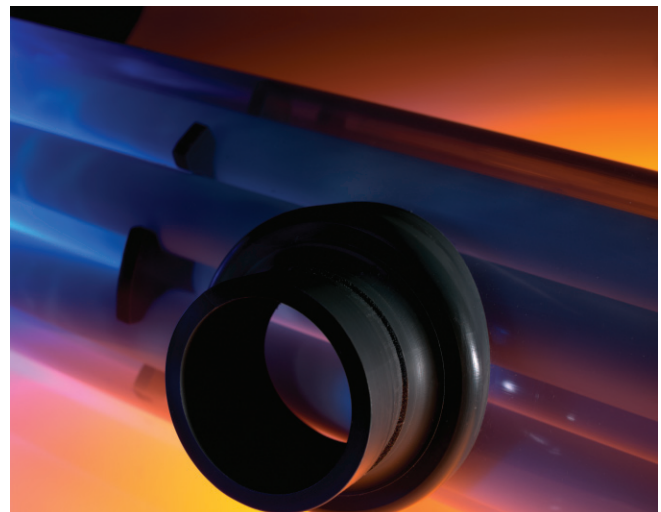
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Summary

Tubular Microfiltration or Ultrafiltration systems using Porex Tubular Membrane Filter Modules offer:

- Easy operation, maintenance and control
- Continuous operation and performance
- Resistance to abrasion and temperature fluctuations
- High flux rates

When used to remove oil for reuse/recycle or to an RO, operating a Tubular Membrane Filter Module system will yield a significant process improvement, typically resulting in efficient recycle reuse or much longer RO module life and reduced cleaning frequency. Tubular Membrane Filter Modules provide a cost effective alternative to dosing chemicals and changing filter bags or cartridge filters on a daily basis. TMF is a filtration technology that can handle process streams with high oil and solids concentration that presents a challenge to other membrane based technologies.



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