

ULTRAFILTRATION

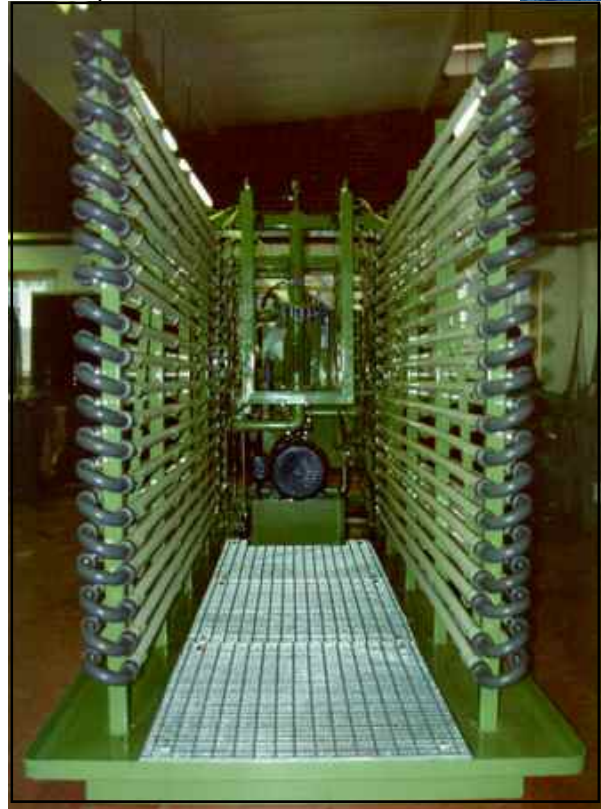
Low Pressure Membrane Separation Process

- Waste Emulsion Disposal
- Liquid Recycle

Ultrafiltration is a low pressure membrane process for separating emulsified oils and suspended and colloidal matter from waste water. The key element is the modules which incorporate the semi-permeable microporous membranes that carry out the separation.

The waste water feed is introduced into an array of these membrane modules. Water and low molecular weight solutes (for example, salts and many surfactants) pass through the membrane and are recovered as permeate. Emulsified oils and suspended solids are rejected by the membrane and are removed as concentrate.

In ultrafiltration, the waste liquid is passed across the membrane surface at a turbulent flow velocity. This prevents the build-up of a filter 'cake', keeps the contaminants dispersed throughout the liquid phase and enables high filtration rates to be achieved and maintained.



APPLICATIONS

Waste Soluble Oil Disposal

Plants capable of treating between 1m³ and 500m³ per week of soluble oil waste can be supplied. The systems are most suitable for hydrocarbon-based emulsions but can often be used with synthetic materials.

Wash Water Recycle

Alkaline and neutral wash liquors usually pass through the membrane unaffected and can be recovered for re-use either in the original process or in a preceding stage.

Pigments & Printing Inks

Wastes containing mineral dispersions can readily be treated by the ultrafiltration process, providing a good clean permeate for recycle or disposal.

Electrophoretic Paint

Membranes are widely used for the recovery of paint from rinses and for the collection of permeate for recycle as the rinse medium.

Dairy & Pharmaceutical

Many applications exist in these industries for treatment of effluents, concentration of precipitates and removal of specific molecular weight fractions.

High Quality Water Production

Ultrafiltration often removes contaminants from mains water, improving its suitability for subsequent ion exchange treatment.

Dye-Penetrant Rinsings

Removes contaminants from rinsings to enable discharge of water to drain or for recycle.

The technology of Ultrafiltration is developing rapidly and its costs are reducing. As the availability of new membranes makes the process increasingly efficient, the application possibilities are extending.

WASTE EMULSION DISPOSAL

This range of larger semi-standard plants is suitable for treating volumes between 4m³ and 80m³ per week of aqueous waste. The plants use a standard flow layout and components but are otherwise built to order, allowing wide flexibility in content and specification.

Operating automatically with only a few minutes' attendance per week, these plants separate emulsified oil and solid contaminants from water by an entirely mechanical method.

In waste treatment applications, the plant eliminates costly tankering of the major portion of the wastes. Where there is sufficient volume to justify it, the remaining oil concentrate can be further treated for recovery.

The treated water is almost always suitable for discharge to the drains or, where an appropriate requirement exists, it may be used as a general wash liquor.

Synthetic coolants can be completely renovated by the ultrafiltration units, on either a continuous or batch basis, for re-use.

LIQUID RECYCLE INCLUDING WASH LIQUORS

Ultrafiltration membranes remove molecules above a design molecular weight cut-off point, usually 5-10,000 moles. Bacteria, colloidal suspensions and solid particles are all removed. This leaves surfactants and other dissolved material to pass through the membrane.

In the case of washes, this permeate basically consists of hot soapy water and obviously has considerable potential for re-use. It can be utilised as process water or clean-down water or, if the process is one of cleaning, be recycled back to the originating cleaning equipment.

Where the continuous phase is water rather than detergent and the dispersed material to be removed is of a more particulate nature, higher rates can usually be obtained than would be normal in other ultrafiltration applications. This makes the process viable over a wider range of flows.

Hodge Separators Limited will be pleased to discuss applications and to recommend schemes and plants which will both reduce disposal costs and offer savings on chemical consumption.

MEMBRANE SELECTION

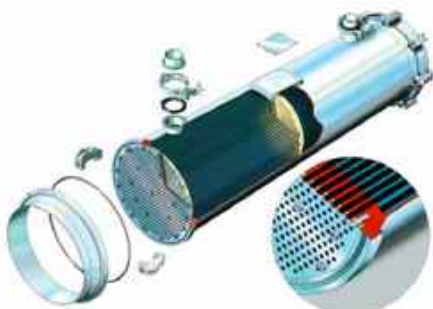
Several different types of membrane are available for use in ultrafiltration systems. Many of these are based on organic polymers which, while suitable for cold applications, cannot be operated at high temperatures.

Recent developments have brought forward a new generation of mineral membranes manufactured from a layer of zirconium oxide on a carbon base. These materials are suitable for all pH levels from 0 to 14, at any temperature up to 300°C. The membranes maintain their efficiency even at high viscosity levels and under pressures of more than 10 bar. They are impervious to the action of solvents and oxidising agents, do not age in storage and are unaffected by micro-organisms. In addition to the selection of the membrane material, an important factor to be considered with any application is the mechanical configuration of the membrane. Many membranes are available as either flat plate or tubular arrays and there is a wide choice of sizes.

The dimensions of the tubular form often determine its suitability for pumping contaminants through it without the risk of blockage. Usually a compromise must be made between the maximum membrane density and ease of cleaning.

In larger plants the consumption of power by the pumping system will also need to be considered.

The use of pre-filters and separation systems largely removes the possibility of blockage and improves the suitability of the plant for cleaning cycles.



Stetfield Separators Limited

Parkengue,
Kernick Industrial Estate,
Penryn, Cornwall, TR10 9EP
United Kingdom
Tel: +44 (0)1326 375888
Fax: +44 (0)1326 375637

Web Site: www.stetfield.com
email: sales@stetfield.com