

Ultrafiltration unit

Membrane filtration solution for the treatment of coating effluents

Based on the cross-flow filtration technology with ceramic membranes for liquid/solid separation, the ABB ultrafiltration unit is designed for the treatment of coating effluents in papermaking.

Developed in co-operation with PALL Corporation specially for the paper industry, the ABB ultrafiltration unit is designed for the treatment of effluents (mainly rinsing water) resulting from the coating process (coating colour kitchen and associated equipment) and is based on the tangential liquid/solid separation technology.

The two fractions obtained by the separation are:

- the retentate which is recycled as a subcomponent for the preparation of pre-coat or new coating colour,
- the permeate which is reused as filtered water or process water.

Advantages

Up to 40 % concentration

High performing ultrafiltration with Membralox® ceramic membranes (registered trademark of PALL Corporation).

Reduction of COD by 95 %

Recovery of water perfectly clear.

Optimized investment cost

Fast Return On Investment.

High availability process

Simple, reliable and continuous operation.

Automatic and safe operation

Automated operation with full process control.

Reduced maintenance

Automatic cleaning sequence and long life-time membranes.



Ultrafiltration unit

References

- Cascades Blendecques S.A., France
- Cartiera di Sarego (Burgo Group spa), Italy
- Thai Paper Co., Ltd., Thailand
- Advance Agro Public Co., Ltd., Thailand
- Shandong Huatai Paper Group, China
- Suzano de Papele e Celulose S/A, Brazil

Features and performance

Permeate recovery

The ultrafiltration stage enables to recycle rinsing water by decreasing the COD value and lower the load of the wastewater treatment plant as well as the relating operating and energy costs.

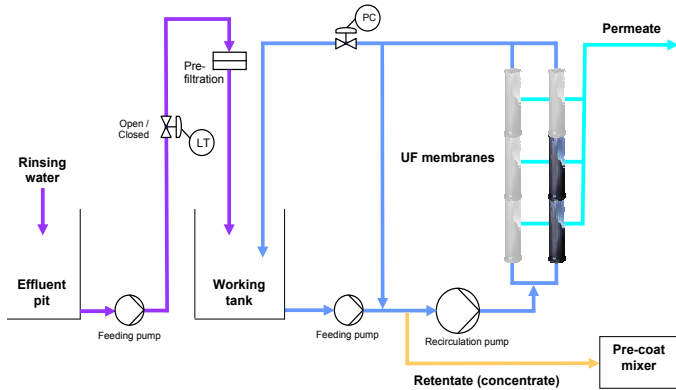
The ultrafiltration unit helps also to minimise the perturbations in the wastewater treatment plant, such as highly variable effluent flow and concentration rates, COD peaks due for instance to a paper break.

Recovered permeate or “clear water” can be used as rinsing or process water in the paper mill.

Retentate recovery

According to the application, solid matters contained in the concentrate slurry can be added as a component to the coating colour or pre-coat directly at the mixing stage.

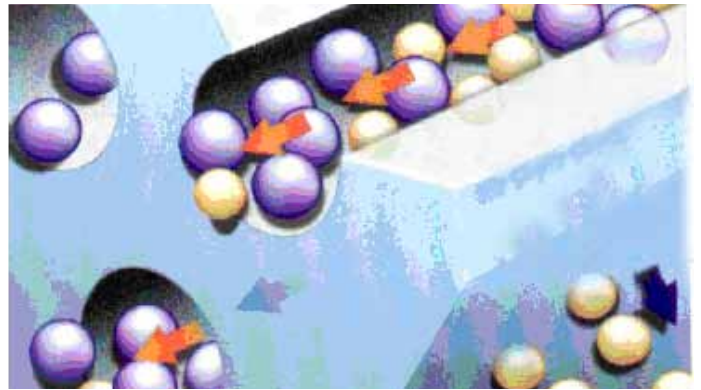
Filtration loop



Cross-flow filtration

The feeding is continuous and the working tank operates at a constant level.

- The feed stream moves parallel to the membrane filtration surface and purified liquid passes through the membrane.
- The separation is driven by the pressure difference from one side of the membrane to the other - referred to as transmembrane pressure.



Cross-flow filtration streams are divided into three parts:

- Feed: product that enters the filtration channels.
- Permeate: solution that passes through the membrane pores (clear water).
- Retentate (concentrate): solution retained by the membrane (raw materials).

Thanks to the turbulence created by the cross-flow velocity, particles are continually swept away to avoid the clogging-up of the membrane surface.

The retentate is the result of the concentration of the original feed stream. It flows through the channel and is recycled back into the feed stream.

Ceramic membranes

Membralox® ceramic elements are asymmetric multi-channel membranes consisting of a porous alumina support and a filtering layer (alumina or zirconia). The ceramic membranes are fitted with a 316L stainless steel housing and this assembly is called module.

They resist to chemical attacks, extreme pH and temperature values and are compatible with organic solvents.

The standard ultrafiltration range is 20-100 nm.

Modular configuration

ABB ultrafiltration systems are composed of several Membralox® modules in series and/or in parallel according to the required filtration area. Each system can be extended by adding new modules.

Range	Number of modules	Volume of treated effluent m3/day	Recovered material (retentate), dry T/day	Production fresh coating colour up to ... dry T/day
Skid size 1	2	60	2.4	96
Skid size 2	3	90	3.7	148
Skid size 3	2x2	120	4.9	196
Skid size 4	2x3	180	7.3	292

Data calculated from an effluent at 4% solid contents, based on 2.5 % losses on fresh coating production.

Membralox® filtration modules with ceramic membranes



Cellier Activity

For more than forty years, Cellier, as an Activity of ABB France, Division Process Automation, has been a process engineering company supplying turnkey production units worldwide. Cellier designs, engineers, assembles and starts up complete automated installations for the paper, lubricant, paint and specialty chemical industries. Cellier has acquired know-how in the various processes and techniques used by its industrial partners for the formulation of liquids and powders:

- receipt and storage of raw materials,
- transfer, dosing,
- dispersion, reaction, mixing (batch and in-line),
- filtration,
- pipe pigging,
- packaging and palletizing,
- treatment and recycling of waste,
- automation and control systems.

We take care of your project and ensure the audit, the training of users, the after-sale service up to the complete maintenance of your plant.

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