

# Industrial Scale Free Flow Plate™ Cross Flow Filtration

Free Flow Plate™ cross flow filtration is an industrial MF and UF solution for applications where low energy consumption, sanitary function, high flux and low capital investment are key words.

Free Flow Plates™ plants utilizes the 2,5 m<sup>2</sup> Free Flow Plate™ module (HP1) and delivers continuous low fouling filtration where the filter is kept clean by cross flow shear.

The open design of the modules results in a very low pressure loss over the modules. The low pressure loss makes the Free Flow Plate™ cross flow plants very energy efficient, as the energy needed to drive the circulation pump is dramatically reduced compared to other cross flow systems e.g. plate and frame and spiral wound systems.

The low pressure loss over the modules also reduces the energy needed to cool the circulating retentate in many applications.

The open module design with no flow dead areas makes the Free Flow Plate™ cross flow plants very sanitary in operation. As no spacers are needed, no flow dead areas are present. Thus, severe fouling and cake build-up has no natural initiation points.

The elimination of flow dead areas also makes the fouling easier to remove in cleaning cycles, where the fouled flow dead areas often is the main challenge. Thus, Free Flow Plate™ modules are very easy and quick to wash with normal CIP chemicals.

The Free Flow Plate™ cross flow plants are fully drainable of both retentate and permeate, which gives shorter cleaning cycles and no loss of valuable products as the plant can be drained completely prior to cleaning.

Due to the open sanitary design of the Free Flow Plate™ Module (HP1), the Free Flow Plates™ cross flow plants can handle very difficult samples with high viscosity, high mass loadings and even high particulates. Often pre-filtration is no longer needed when switching to Free Flow Plate™ technology.

Because of the low pressure loss over the modules the Free Flow Plate™ plants can operate with unprecedented uniform TMP. The uniform TMP's results in sharper membrane cut-offs which again leads to better filtration.

New and improved products with e.g. higher viscosity and sharper cut-offs are made possible by the Free Flow Plate™ technology.

Benchmarking a Free Flow Plate™ cross flow plant with a conventional spiral wound plant typically results in a 40% reduction in energy consumption at the same flux.

Benchmarking a Free Flow Plate cross flow plant with a conventional plate-and-frame plant typically results in an 80% reduction in energy consumption at the same flux.

The footprint of a Free Flow Plate™ cross flow plant is smaller than a plate and frame system and comparable to a spiral wound system with the same membrane area.

All media contacting parts are in durable polymeric materials or stainless steel. Free Flow Plate™ plants can conform to FDA materials and sanitary standards if required.



Part of a MF/UF cascade Free Flow Plate™ cross flow plant



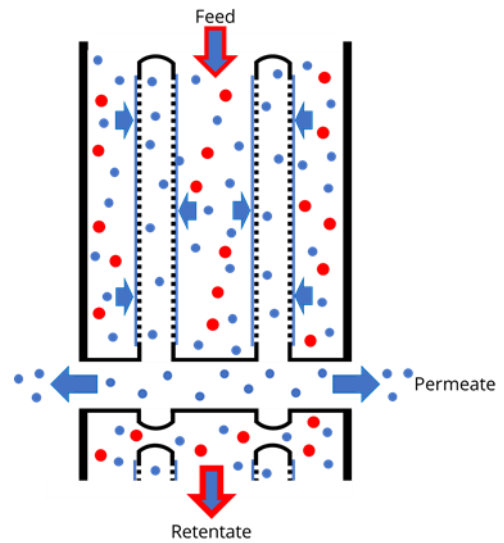
A 160 m<sup>2</sup> Free Flow Plate cross flow plant.

# Technical Data Free Flow Plate™ Systems and Modules

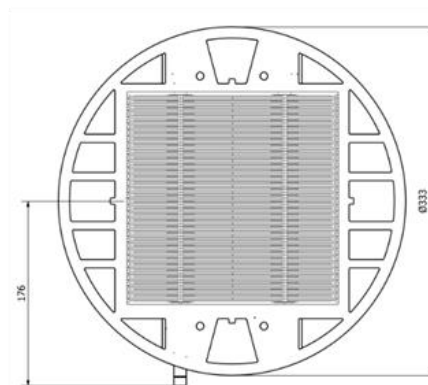
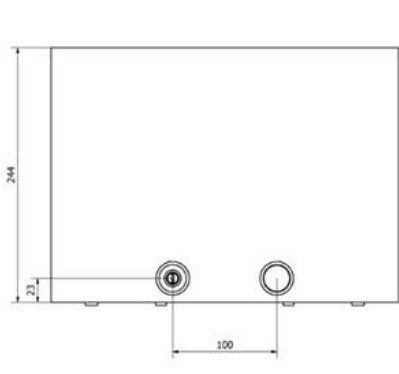
Free Flow Plate™ technology is conceived with excellent sanitary function as the main focus. The result is a very open design with no flow dead areas and an extremely low pressure loss in cross flow settings. The design is fully drainable of both retentate and permeate and very easy and fast to clean.

The patented Free Flow Plate™ technology is built around a hollow polymer plate where the membrane is welded onto. The Free Flow Plates™ are then welded together to form a rigid membrane element. Filtration takes place from the outside of the plate through the membrane to the inner hollow part of the plate.

The open design with parallel membranes fused onto the Free Flow Plates™ gives a membrane to membrane distance of 1,7 mm, creating rectangular flow channels for the feed between the Free Flow Plates™. As no spacers is necessary the feed experience true free flow, and turbulence at the membrane surface is created by fast recirculation of the feed in a loop. The flow speed needed to create the necessary turbulence is however lower in the Free Flow Plate™ configuration than in for example tubular and spiral wound systems.



The open design Free Flow Plate™ Cross Flow



## Free Flow Plate™ Module (HP1) Data

Generic Design	Free Flow Plate™. Fused Polypropylenes
Membrane Type	Most organic membranes (MF, UF, and other filter types)
Membrane Area	2,5 m <sup>2</sup>
Dimensions (D x H)	333 mm x 245 mm
Viscosity Range, Apparent	1-1000 cP (e.g. Cream Cheese+)
Temperature Range	5-85°C
pH Range	1-14
Operating Pressure	0-4 bar
Free Chlorine	Membrane dependent

**The HP1 can be equipped with your membrane of choice.** SANI Membranes have a line of standard MF and UF membranes from Synder, Microdyn-Nadir and others on stock. Most commercial available membranes can however also be used with the HP1. Please, do not hesitate to contact us with your membrane wishes.

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Membranes

MORE FILTRATION, LESS ENERGY

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