

MORE FILTRATION, LESS ENERGY

SANI Membranes

Vibro[™] Technology for Micro- and Ultrafiltration Ideal Separation from Laboratory to Production







Vibro Technology – What is it?

New and simple solution for continuous

Micro- and Ultrafiltration with

Unique control of separation parameters

- High Transmission, Recovery and Yield
- Sharp Separation
- Low Shear
- High Concentration





From Lab scale to Production



Laboratory series:

Unique scalable continuous filtration solutions





Industrial series:

Unequaled performance in simple continuous MF & UF solutions





From **8 ml** dead volume retentate

Unit size from 35 to 3.500 cm²



Microfiltration with up to **100% API Transmission**

Unit size from 7.5 to 80 m² System size as big as you want

The Free Flow Plate[™] Technology



- New patented membrane module design
- 100% polypropylene and membrane
- All fusing is done by welding, No glues



Cross Flow Filtration vs. Vibro[™] Filtration



- Fast flow creates turbulence and pressure loss
- Circulation pump affects product and uses energy
- Energy extensive cooling is needed



Vibration of the membrane relative to the media

- Vibration creates turbulence on surfaces
- No pressure loss uniform TMP
- Turbulence only where needed! minimal cooling needed

Ideal separation - Unique process control



Unique Vibro™ Technology Features

• Increased yield – high recovery. Outstanding Micro Filtration.

High transmission through very low and uniform TMP in the entire system

• High concentrations, viscosities and solids loads

Concentrates to high cell density; fast buffer exchange; simple debris separation

- Very **gentle** product handling No fast cross flow pump
- **Easy** maintenance, simple systems, Clean In Place or replace
- **Sharper separation** 100% uniform TMP leading to new MF and UF opportunities
- 100% drainable, no dead volumes, Low Energy consumption, No cooling needed, small footprint etc. etc....



The Vibro[™]-Lab35P

Extreme low volume, super simple process

- Benchtop system with **8 ml dead volume**
- Filter with 35 cm² membrane for all thinkable MF and UF applications
- Process development, membrane selection, CIP studies etc.
- Portable and easy to use. Start-up in 5 min.
- High viscosity, high concentration and high solids load
- Simple feed system with for batch or continuous filtration, diafiltration etc.
- Sterilizable filter element



The Vibro[™]-Lab3500

Disruptive in size, simplicity and process

- Benchtop system with **0.35 m²** membrane
- For any MF and UF application
- Full observation membrane surfaces during operation
- Process development, membrane selection, CIP studies etc.
- Portable and easy to use. Start-up in 5 min.
- High viscosity, high concentration and high solids load
- Flexible feed systems with countless process possibilities: with or without feed pump, batch or continuous filtration, diafiltration etc.



The Vibro[™]-Lab

Harvest & Concentration of Micro Algae 3 g/l → 150 g/l



High Transmission Apple juice clarification



Vibro[™]-I MF & UF Pilot units



Vibro-I Flexible Pilot



Biotech Cross Flow Production Unit

20 m² MF unit for Biotech Production

Installed September 2017

The unit can be used for:

- Cell removal
- Cell debris reduction
- Protein fractionation

Daily production since 2017 with original filter modules still in

place





Biotech Industry

MF Application Clarification of a protein stream



MF Application Yeast harvesting



UF Application Concentration of a protein stream



Biotech Industry

Vibro-I for Pharma Production, Shipped out April 2020

MF Application

HIGH Transmission of Active protein stream



UF Application Concentration of a protein stream



Recovery: Cell/Debris and API separation

Micro Filtration



Permeate pump

- High transmission
- Higher yield & product concentration
- Simple system solution
- No shear stress
- Reduced consumption for diafiltration
- All cell cultures also mammalian cell

Concentration of API/protein

Ultra Filtration



Single Pass with positive pumps

- Higher product concentration
- Improved separation
- Simple system solution
- Reduced energy by 50-90%
- No cooling required
- Low CAPEX

API/Protein Processing from Cell Culture



Recovery process to get a + 95% API/Protein product

Buffer can be changed during the process

- Higher yield
- Re-usable filters
- CIP cleanable
- Simple solution

API/Protein Processing from Cell Culture



Mammalian Cell Culture



Tomorrows Separation Technology!









Vibro[™] technology is vastly improving performance while being cost competitive







The SANI Membranes Team

Team of 10 people and some friendly robots in Allerød



Free Flow Plate[™] and Vibro[™] technology

The Future of MF and UF

More Filtration, Less Energy

Thank You!





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