

## **SANI** Membranes Disruptive Filtration Solutions



### The SANI Membranes ApS Timeline



August 2017: Biotech cell harvesting



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2018

Releasing Vibro solutions for labscale and industrial filtration

Grow sales team Add markets Expand production

### The Free Flow Plate technology



### The Free Flow Plate technology

The Free Flow Plate technology delivers several **benefits**:

- Reduces energy consumption by 30-50% in cross flow and 50-80% in Vibro™
- Opens up for **new products** & applications
- Sets new sanitary standards **improving cleanability** and inspection



## Filtration modes

**Dead-End Filtration** 

The feed is pressurized against the membrane. Particles and molecules form a growing gel layer clogging filtration.

#### **Tangential Crossflow Filtration**

Pressurized feed flows fast along the membrane surface creating turbulence in the stream. The turbulence keeps the gel layer from growing.



#### Vibro<sup>™</sup> Filtration - shear driven turbulence

A vibrating motion of the membrane relative to the pressurized feed creates turbulence at the membrane surface. The turbulence keeps the gel layer from growing.





- Fast flow creates the turbulence and pressure loss
- Circulation pump affects product

- Vibration creates the turbulence uniform TMP
- One pass up-concentration

### The Vibro<sup>™</sup> units: MF & UF up to 4 Bar



## The SANI Vibro<sup>TM</sup>-L A unique free flow filtration device

#### **Disruptive in size, simplicity and process**

- Benchtop MF and UF system with **0,35 m<sup>2</sup>** membrane
- Process development, membrane selection and CIP studies
- Full observation of media and membrane surfaces

Customer feedback, Golgi: "We have used Sani Membranes vibration driven 0.35 m<sup>2</sup> Vibro™ unit for small scale production and various filtration tests. The unit is compact and easy to use and result of CIP cleaning instantly visible"



#### Skim milk fractionation pilot test

### The SANI Vibro<sup>™</sup>-L

- Batch or Continuous production
- Directly scalable to the industrial Vibro<sup>™</sup>-I
- High viscosity, high concentration and high solids load





Customer feedback, Chromologics: "Using Vibro™-L in biofractionation process development and even in a small scale production setups has been easy and the continuous Vibro™ filtration process runs remarkably well.

### A unique free flow filtration device





### The SANI Vibro<sup>™</sup>-I

- Turbulence exactly where needed •
- The Vibro<sup>™</sup>-I is 7,5; 15 or 60 m<sup>2</sup> membrane ٠
- The Vibro<sup>™</sup>-I has unpreceded uniform TMP's ٠





Vibro<sup>™</sup>-I with 60 m<sup>2</sup> membrane

Vibro<sup>™</sup>-I with 7,5 m<sup>2</sup> membrane

### The SANI Vibro<sup>™</sup>-I

#### Plug flow mode

<200 cSt: Replacing any present MF or UF application



#### Mix flow mode

> 200 cSt: High viscous / high solids MF or UF application



### The Vibro<sup>™</sup> technology

#### Unique **Operation** key features of the Free Flow Plate Module:

- **Energy efficient** the Vibro<sup>™</sup> technology reduces energy consumption by 50-80%
- Free Flow in either direction 1.7 mm membrane to membrane distance
- Sharper cut-off and optimal flux on all membrane area (5 kDa to 10 μm)
- Very low and uniform TMP leading to new MF and UF opportunities
- Higher concentration, viscosity and solids load
- 100% Drainable no product loss





### The Vibro<sup>™</sup> technology

Unique **Sanitary** key features of the Free Flow Plate Module:

- **Open and Clean design** Sanitary
- No feed or permeate spacers Sanitary
- No flow dead areas Sanitary
- 100% Drainable **faster CIP**, reduced water & chemical consumption
- 100% FDA approved materials





### The Free Flow Plate technology SANI Membranes **pilot tested** application examples (cross flow and Vibro<sup>TM</sup>)



#### Microfiltration and Ultrafiltration :

- Protein fractionation
- Milk fractionation
- Whey concentration
- Bacteria removal
- Yeast removal
- Aquaculture intake
- Cell debris reduction
- Clarification of beverages
- Water cleaning
- Particulate removal
- Biomass fractionation and concentration



### Dairy 30 m<sup>2</sup> Industrial Cross Flow Pilot Nov. 2017





### Dairy 7,5 m<sup>2</sup> Industrial Vibro<sup>™</sup> Pilot April 2018







### **Biotech Cross Flow Production Unit**

20 m<sup>2</sup> MF unit for Biotech Production

Installed September 2017

The unit can be used for:

- Cell removal
- Cell debris reduction
- Protein fractionation





#### SANI Membranes

### The SANI Membranes Team

Team of 7 people and some friendly robots in Allerød



# WHY choose the Free Flow Plate technology??













### **Great products**

- but are they sanitary enough?
- is the energy demand acceptable?

Free Flow Plate solution is vastly improving performance and is competitive on price

### The Free Flow Plate technology

The Future of MF and UF

More Filtration, Less Energy

Thank You!





