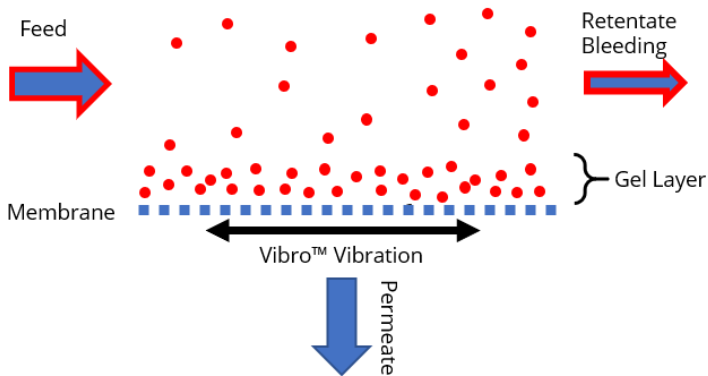


# Vibro™ Technology

a unique Micro- and Ultrafiltration solution by **SANI Membranes**

Ideal Separation  
Less Energy  
Easy Maintenance  
Sanitary



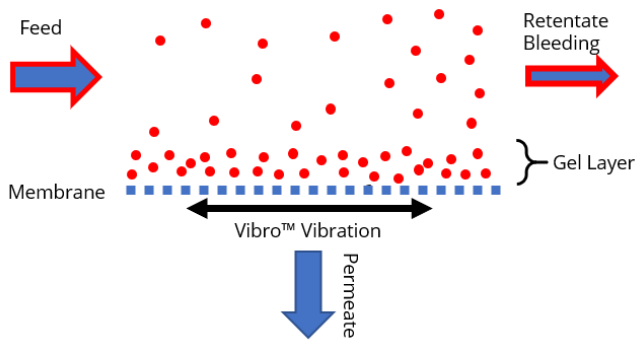
## Vibro™ Filtration

The Membrane is kept clean by vibration shear induced turbulence. The solution is engineered to be simple, robust and highly sanitary, with extreme low energy consumption and improved separation.

**SANI**   
Membranes

MORE FILTRATION, LESS ENERGY

# Vibro™ Technology



## How does the Vibro™ Technology Work?

The patented Vibro™ technology creates the needed turbulence on all membrane surfaces by vibrating the membrane relative to the media. Vibro™ technology eliminates the need for a cross flow pump and delivers uniform TMP throughout the system at exceptional low energy consumption. Vibro™ systems utilize the Free Flow Plate™ modules and has all the benefits of the sanitary Free Flow Plate™ technology.

Free Flow Plate™ technology is an innovative module design with free flow filtration on flat membrane surfaces. The sanitary Free Flow Plate™ technology is engineered to reduce energy consumption and improve separation.

## Vibro™ Technology Benefits

Vibro™ technology is a Micro- and Ultra filtration solution with several benefits compared to cross flow systems.

**Ideal Separation** - Vibro™ technology improves separation due to a sharper cut-off. Eliminating the cross flow pump leads to a system with no pressure loss. The result is a uniform TMP in the entire system securing a completely uniform cut-off over the entire membrane surface.

**Unique Microfiltration** - Vibro™ technology ensures the ability to run efficient microfiltration at extremely low TMP in the entire system (e.g. 0.1bar). The low TMP reduces fouling and compaction, and delivers low fouling microfiltration with extremely high transmission of your target molecules.

**Less Energy** - Vibro™ technology reduces the energy consumption by 50-90%. A cross flow system creates turbulence in the entire system whereas Vibro™ technology only creates turbulence on the membrane surface where it is needed to reduce fouling.

**High Concentration, Viscosity and Solid Load** - Vibro™ technology is ideal for membrane filtration of high viscous media and media with a high solid load due to the patented Free Flow Plate™ modules which have a fully open free flow channel design with no spacers.

**Better Product Quality** - Vibro™ technology handles the product very gently as the elimination of the cross flow pump eliminates the pump shear.

**Higher Yield** - The Free Flow Plate™ modules are fully drainable of both permeate and retentate which means that all product can be recovered.

**Sanitary** - Vibro™ technology sets a new sanitary standard with the open and clean design of the Free Flow Plate™ modules with no spacers and no flow dead areas. Fouling starts later on flat surfaces and is easier to remove when formed.

## Free Flow Plate™ Module key features

- The modules hold 0.35 or 2.5 m<sup>2</sup> MF or UF membrane (10µm to 1kDa)
- The membrane filter is integrated in pressure housings
- The modules can be stacked into large industrial systems
- The module is 100% PP and membrane
- The module has individual easy connectable permeate outlets
- The module has no feed or permeate spacers
- All bonding is done by welding

> Reusable PP - no glues - no spacers - sanitary



# SANI Membranes

MORE FILTRATION, LESS ENERGY



- **Industrial scale MF and UF membrane solution**
- **Membranes area: 7.5m<sup>2</sup> 15m<sup>2</sup> and 20m<sup>2</sup>; modular**
- **Robust, easy to Use and simple maintenance**

## Vibro™-I

The industrial filtration solution for applications where low energy consumption, high flux, sanitary function, low capital investment and gentle filtration are key words.

The Vibro™-I is fully drainable of both retentate and permeate. Thus, no product loss and faster CIP cycles.

The Vibro™-I utilizes the 2.5m<sup>2</sup> Free Flow Plate™ module (HP1) and comes with 7.5; 15 or 20m<sup>2</sup>. The units can be connected in series or parallel depending on your needs.

Due to the open design of the Free Flow Plate™ Module (HP1), the Vibro™-I can handle very difficult products with high viscosity, high mass loadings and even high particulates. When extremely difficult feeds are processed, it is possible to homogenize the retentate in the Vibro™ systems by attaching a 'slow' mix pump.

The Vibro-I has opened up for new applications and improvement of current applications for everyone using traditional MF and UF systems today

The tower configuration and the elimination of the cross flow pump, cooling aggregates and intricate piping layout gives the Vibro™-I systems a small footprint. All media contacting parts are in durable polymeric materials (PP) or stainless steel. The Vibro™-I can conform to FDA, EC and GMP requirements for materials in food contact and all engineering solutions are sanitary.

## Vibro™-LE

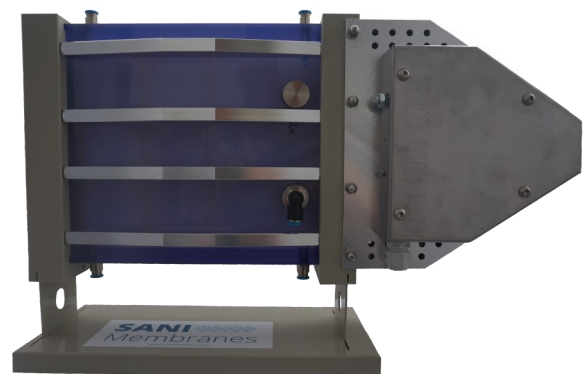
The perfect benchtop filtration solution for process development and small-scale filtration applications. Low fouling continuous filtration where the filter is kept clean by vibration shear.

The transparent retentate chamber gives excellent visibility of the membrane during operation and cleaning. A groundbreaking feature that makes it possible to visually follow fouling build-up and membrane cleaning processes.

The Vibro™-LE is exceptional for gaining insight into filtration processes, for selecting the right membranes and for filtering the most demanding media with continuous membrane filtration. The ability to work with small samples makes it the perfect tool for process development in biotech, pharma, food etc.

The Vibro™-LE can be operated as continuous filtration with a feed pump or as batch filtration where no feed pump is necessary. This means that valuable samples can be filtered extremely gentle without any damage from pump shear.

The Vibro™-LE system can be cleaned-in-place with your preferred CIP chemicals and cleaning conditions.



- **Benchtop system for MF and UF (0.35 m<sup>2</sup>)**
- **Disruptive in size, simplicity and process**
- **Process development, CIP studies etc.**
- **Transparent membrane housing**

## Vibro™ Benefits



- **Ideal Separation with a sharper cut-off**  
100 % uniform TMP in the entire system leading to new MF and UF opportunities
- **High concentrations, viscosity and solids**  
Free Flow channels between membranes
- **Reduces energy consumption by 50-90%**  
No pressure loss and turbulence only where needed
- **Gentle product handling**  
No cross flow pump required
- **Higher yield**  
The modules are fully drainable both on permeate and retentate side
- **Sanitary**  
Open and clean design with no dead areas
- **Unique Microfiltration**  
Uniform and low TMP ensures long up-time and exceptional transmission

### Novozymes about the Vibro™-I:

*"The Vibro-I filter is a robust solution, simple to use with no technical issues and with good flux. Power consumption under all operations (MF/UF) are much lower than in any known filter technology."*