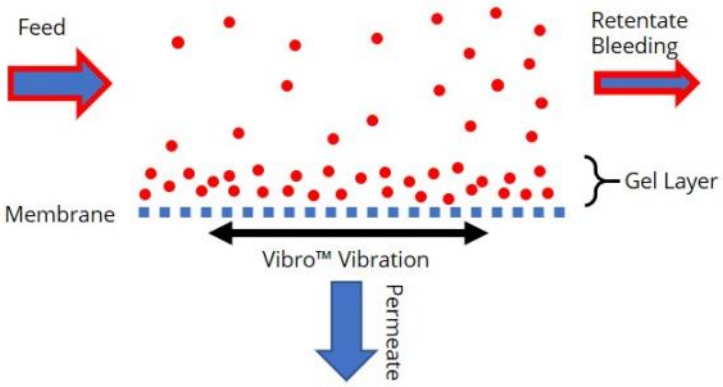
Vibro™-I

Industrial MF & UF



Disruptive in size, simplicity and process: sanitary, energy efficient, fully drainable, no dead volumes, easy to clean, easy to service and simple to operate.

SANI Membranes

MORE FILTRATION, LESS ENERGY

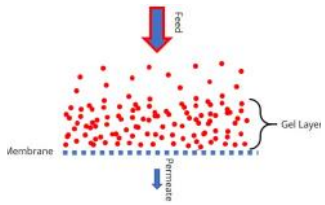
Vibro™-I

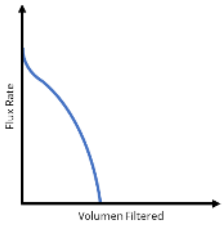
Vibro™ is the perfect filtration solution for industrial filtration applications where **low energy consumption**, high flux, sanitary function, **low capital investment,** reduced CIP costs and gentle filtration are key words. Vibro™-I systems deliver low fouling continuous filtration, where the filter is kept clean by vibration shear.

Description of filtration principals

Dead-End Filtration

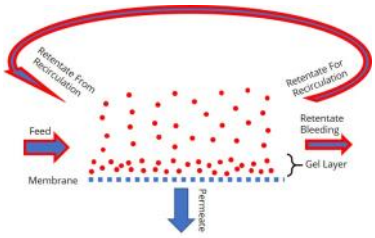
The feed is pressurized against the membrane. Particles and molecules form a growing gel layer that clogs the membrane.

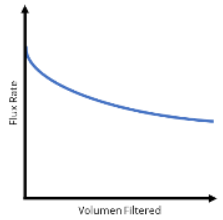




Tangential Crossflow Filtration

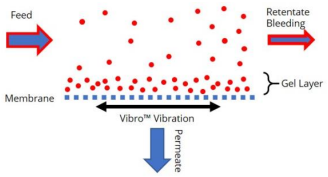
Pressurized feed flows fast along the membrane surface creating turbulence in the stream. The turbulence keeps the gel layer from growing.

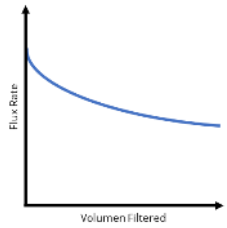




Vibro™ Filtration

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.





Vibro™ technology

A Free Flow Plate™ membrane element is fixed rigidly inside a flexibly supported retentate chamber. By vibrating the membrane element relative to the media, an optimal turbulence is created in the media at the membrane surface by the patented Vibro™ technology. The vibrating membrane enables the Vibro™ systems to filtrate the most demanding media with high viscosity and high solids with unpreceded results in terms of less fouling, higher flux, higher degree of up-concentration.

The Vibro™ can be operated as vibration driven dead-end-like filtration, where the media is concentrated in the retentate chamber and discharged continuously or at end of operation.

The Vibro™ can also be operated as continuous filtration, with a feed pump feeding in media and continuous discharging of permeate and retentate.

The vibrating membrane will diminish fouling and create a higher flux than conventional cross flow filtration.

A 'slow' circulation pump with minimum shear can be used for mixing/ homogenizing the retentate in the system if necessary.

unique filtration devices for micro- and ultrafiltration

The Vibro™-I is an 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 delivers continuous low fouling filtration where the filter is kept clean by vibration shear.

The membrane module vibrates vertically while the patented Vibro™ technology makes the media inside the module stationary. The relative vibration of media and membrane creates turbulence on the membrane surface and thereby keeps the fouling layer at a minimum. The turbulence is only created at vertical surfaces. Thus, the energy required to create the turbulence at the membrane surfaces is minimized. Because the Vibro-I only creates turbulence at the membrane surfaces, the need to cool the retentate is reduced and most often eliminated which again adds to the energy savings.

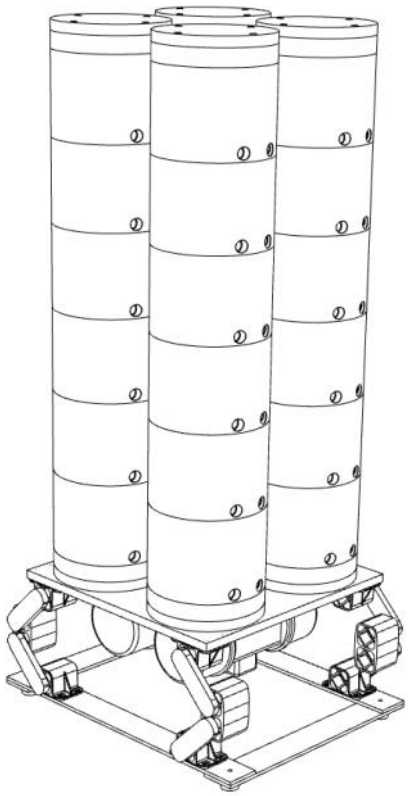
The Vibro™-I handles the feed solution very gently as no large circulation pump is needed. A conventional circulation pump can damage cells, molecules etc. during operation. By eliminating the circulation pump Vibro™-I has become the most product gentle industrial scale MF and UF system on the marked.
The elimination of the circulation pump also gives you virtually uniform trans membrane pressures throughout the unit. The uniform TMP gives you the sharpest membrane cut-offs of any industrial system.

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.

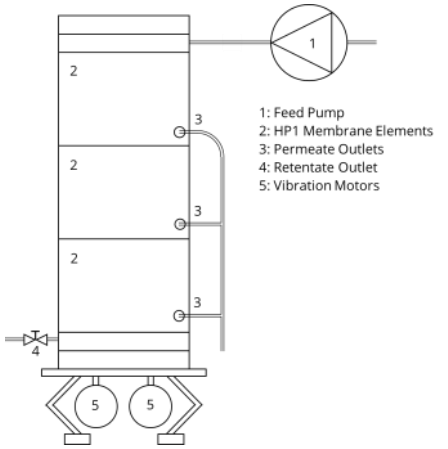
The Vibro™-I is fully drainable of both retentate and permeate. Thus, no product loss and faster CIP cycles.

The Vibro™-I utilizes the 2,5 m^2 Free Flow Plate™ module (HP1) and comes with 7,5; 15 or 20 m^2 membrane as 1-tower units and with 60 or 80 m^2 membrane as a 4-tower unit. The units can be connected in series or parallel depending on your needs.

The tower configuration and the elimination of circulation pumps, cooling aggregates, booster pumps and intricate piping layout gives the Vibro™-I systems a small footprint. All media contacting parts are in durable polymeric materials or stainless steel. The Vibro™-I can conform to FDA materials and sanitary/GMP standards if required.



A 60 m^2 Vibro™-I system



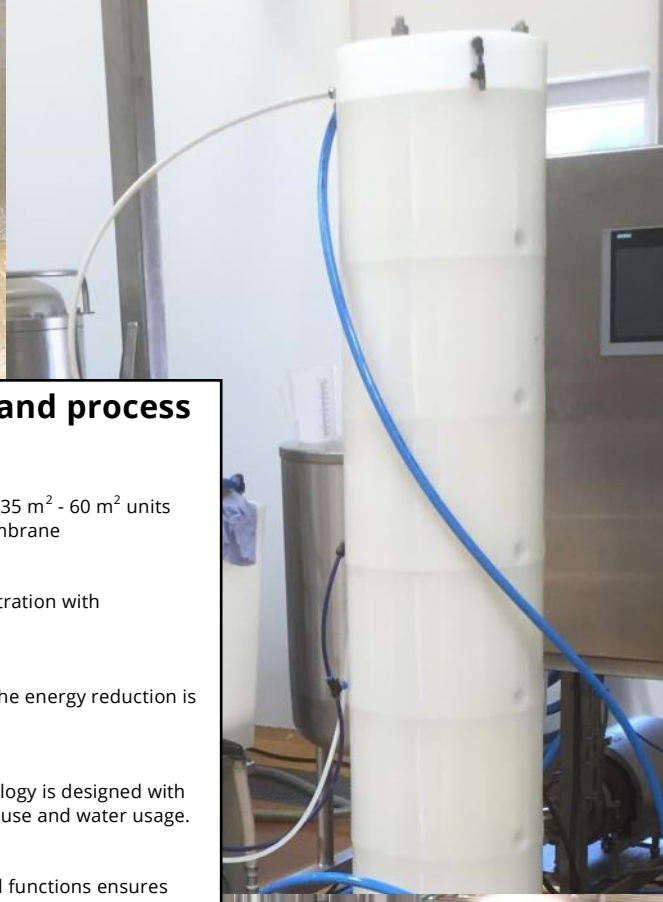
An example of a Vibro™-I system in operation

A 7,5 m^2 Vibro™-I system

Typical applications

Sanitary:	Biotech, pharma, cell harvesting, broth filtration, enzyme concentration, biomass fractionation etc.
Food & Beverages:	Dairy, milk fractionation, whey concentration, wine filtration, beer filtration, juice filtration, juice concentration etc.
Water:	Sterile water, drinking water, pre-filtration, industrial waste water, municipal waste water etc.
Industrial:	Fuel oil, lubrication media, gear box oils, hydraulic oils, waste streams etc.





Disruptive in size, simplicity and process

Compact Solution
Vibro™ systems has a small footprint and comes in 0,35 m^2 - 60 m^2 units with virtually any commercial available MF or UF membrane

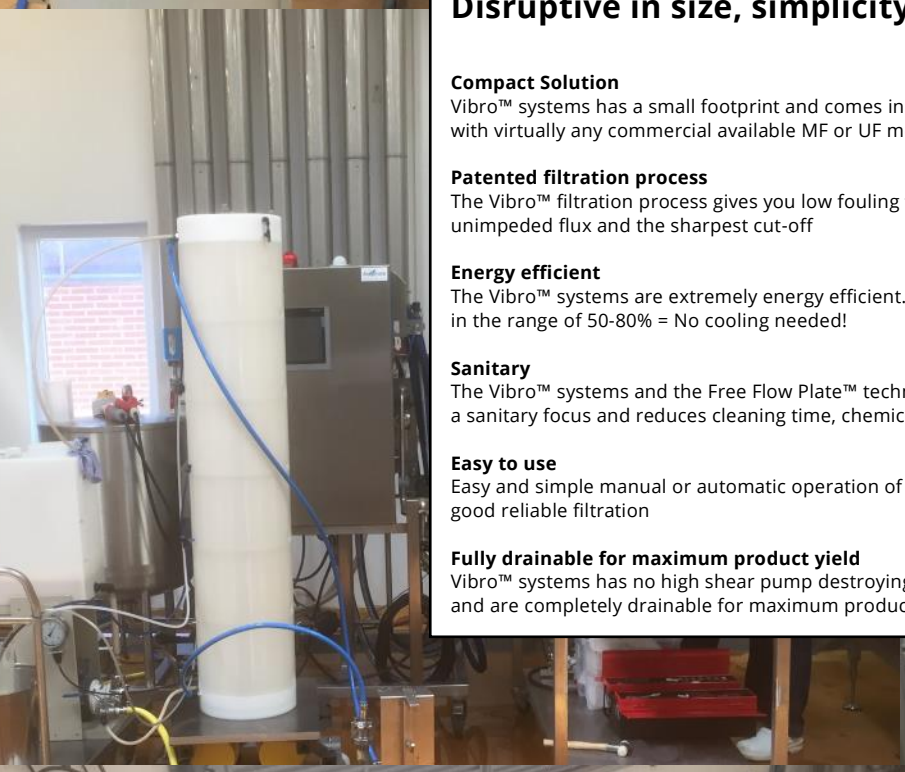
Patented filtration process
The Vibro™ filtration process gives you low fouling filtration with unimpeded flux and the sharpest cut-off

Energy efficient
The Vibro™ systems are extremely energy efficient. The energy reduction is in the range of 50-80% = No cooling needed!

Sanitary
The Vibro™ systems and the Free Flow Plate™ technology is designed with a sanitary focus and reduces cleaning time, chemical use and water usage.

Easy to use
Easy and simple manual or automatic operation of all functions ensures good reliable filtration

Fully drainable for maximum product yield
Vibro™ systems has no high shear pump destroying your valuable product and are completely drainable for maximum product yield



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