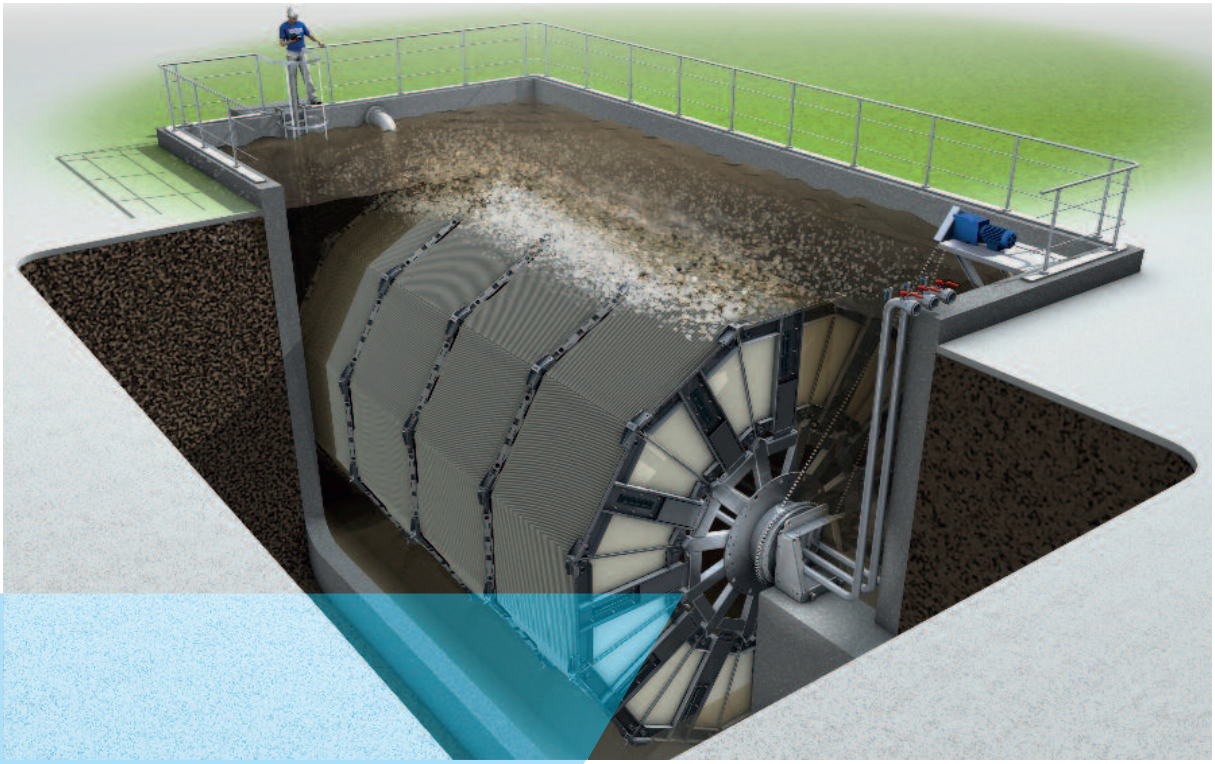
HUBER TECHNOLOGY
WASTE WATER Solutions

HUBER Membrane Filtration VRM®



– Unique, rotating membrane filtration for MBR applications
– Maximum throughputs – minimized energy consumption
– Insensitive to minor membrane damage

Cases of application for MBR systems

- **High demand of service water:** Drinking water substitution and reuse as servcice water (irrigation, climatisation, toilet flushing, cleaning, process water, ...) to save expensive fresh water
- **High requirements on effluent quality:** "4th" treatment stage (microplastics, nanoparticles, multi-resistant germs), karst areas and protected nature reserves, groundwater recharge
- **Water shortage:** closing small decentralized water loops for service water recovery or groundwater recharge
- **Uneconomical centralized treatment:** remote villages, temporary camps
- **Scarce space for new installations,** lack of space for expansion

HUBER Membrane Filtration VRM® – Unique system solution for MBR plants

MBR plants are a combination of a biological treatment stage and a subsequent filtration unit, such as the HUBER Membrane Filtration VRM®. This combination eliminates the need for conventional secondary clarification in a settling tank. The combined process is called "membrane bioreactor" (MBR).

In the aeration system, bacteria decompose the organic pollutants contained in the mechanically pretreated wastewater under aerobic conditions and convert them to biomass.

In the subsequent HUBER Membrane Filtration VRM®, high-quality ultrafiltration membranes with 38 nm pore size separate the clear water from the activated sludge. The biomass and virtually all germs and bacteria are reliably retained by the membrane as a physical barrier.

The produced permeate is hygienically safe, odourless and free of particles and thus can be reused without problems.

Technical data:

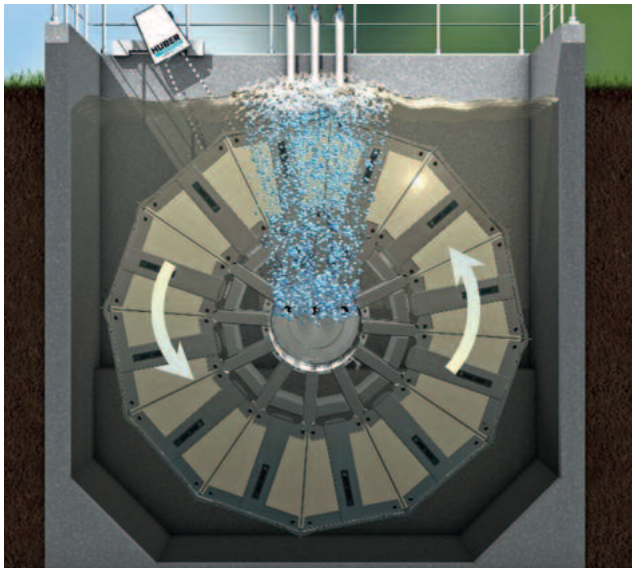
- Membrane surface: up to 9,200 m² per plant
- Membrane type: ultrafiltration (38 nm)
- Diameter: 4.5 m
- Length: 7.0 m
- Weight empty: 8.3 to
- Throughput capacity: up to 300 m³/h
- Scouring air flow: < 200 l/m² h
- Energy consumption: < 0.15 kWh/m³

Rotating Air Boost – energy-efficient, intensive membrane cleaning

To prevent the formation of covering layers on the membrane, a powerful cross flow with high turbulences is generated on the membrane surfaces by introducing air. The HUBER Membrane Filtration VRM® uses a unique and highly energy-efficient cleaning method for this purpose: the rotating air boost.

The trapezoidal membrane segments slowly rotate (at 1 rpm) around a centrally arranged air distributor. One after the other, the segments are exposed to the powerful air stream. Fouling and particles are removed effectively and reliably.

Compared to static plate systems the air can be blown in at only half the depth required otherwise and also only half the scouring air flow is necessary. As a result, total energy consumption of large VRM® units can be reduced to below 100 Wh/m³.



Rotating air boost – energy-efficient, intensive membrane cleaning

Innovative BIO-CEL® membrane laminate

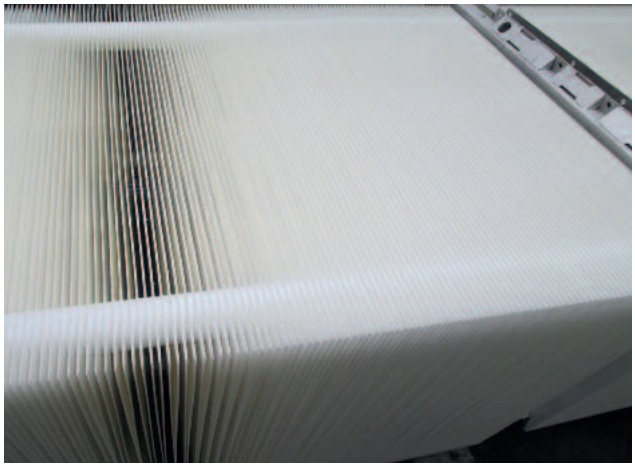
We use the unique BIO-CEL® membrane laminate of MICRODYN-NADIR for our HUBER Membrane Filtration VRM® units.

In contrast to real plate membranes the membrane laminates are not welded onto a carrier plate but laminated onto a spacer fabric (see photo) and then tight welded to obtain trapezoidal membrane modules.

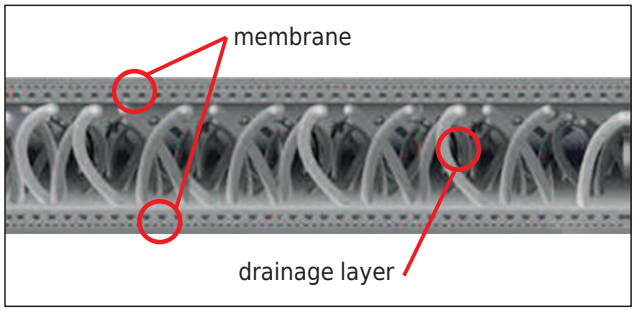
The high-quality BIO-CEL® modules of MICRODYN-NADIR excel for their long life and are inexpensive to clean. As ultrafiltration membranes they guarantee excellent effluent quality.

In contrast to conventional flat membrane modules BIO-CEL® membrane modules can be backwashed like hollow fibre modules but are hardly susceptible to blockage.

Moreover, BIO-CEL® membrane laminate excels with its unique self-healing mechanism which, even in case of laminate damage, ensures a constantly high effluent quality and a stable and reliable plant operation.



High-quality, robust membrane laminate



Cross section through BIO-CEL® membrane laminate (Source: MYCRODYN-NADIR)

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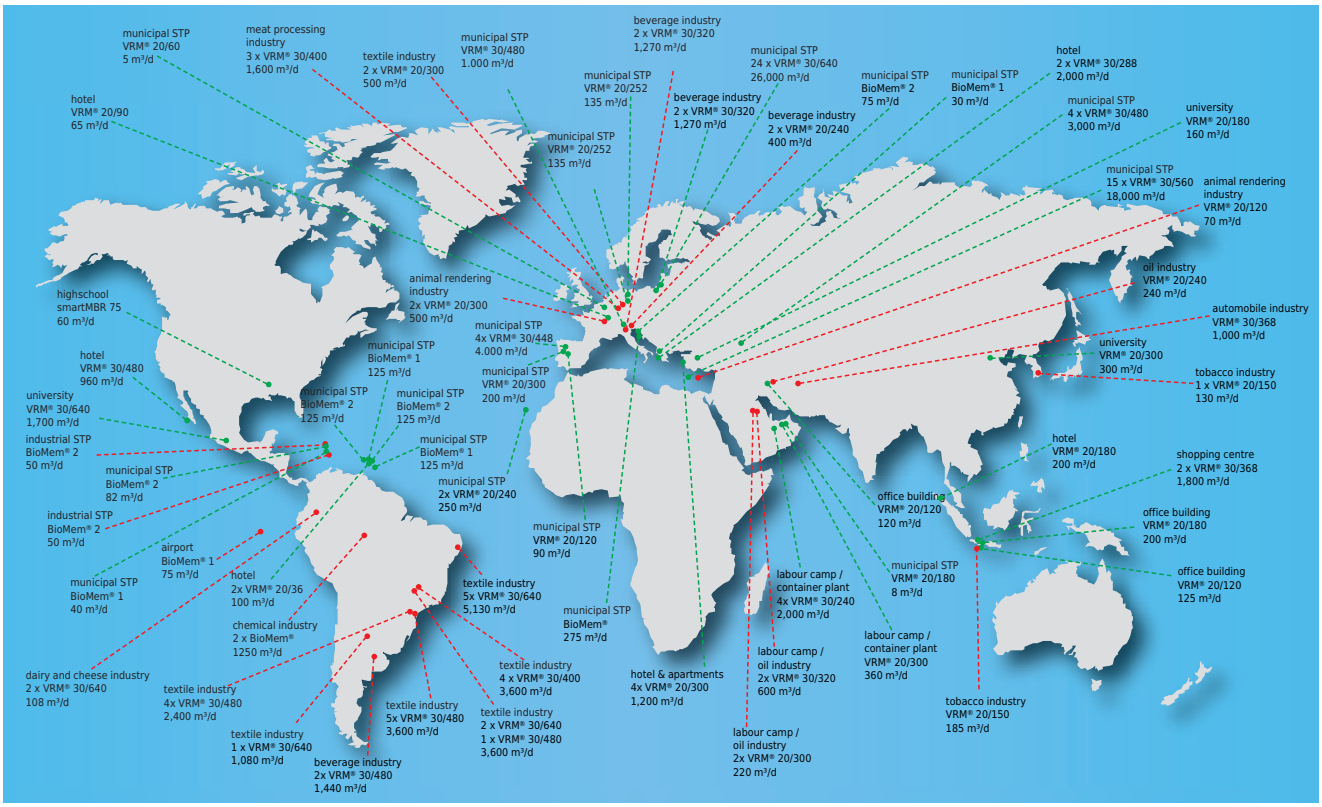
Unique product benefits:

- Unique, rotating filtration unit with highly efficient, centrally introduced scouring air
- Extremely high throughput capacities of up to 300 m³/h per unit
- Well-proven backwash-type ultrafiltration membranes of robust, high-quality membrane laminate
- Effluent in compliance with the presently applicable discharge standards (e.g. European Directive for Bathing Water, US Title 22)
- Ideal for municipal and industrial wastewater treatment and "green building" applications

Maximum customer benefit:

- Minimized scouring air demand through efficient rotating air boost technology (< 200 l/m²h)
- Low specific energy consumption due to reduced air injection depth (up to < 0.1 kWh/m³ permeate)
- Insensitive to clogging, sludge sediments and membrane damage ("self-healing" membrane)
- Minimum space requirements due to very high packing density
- Reliable retention of all solids (e.g. microplastics) and bacteria (e.g. multi-resistant germs)
- Complete MBR solutions from one source with 48h service

Full customer confidence in HUBER Membrane Filtration – worldwide



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