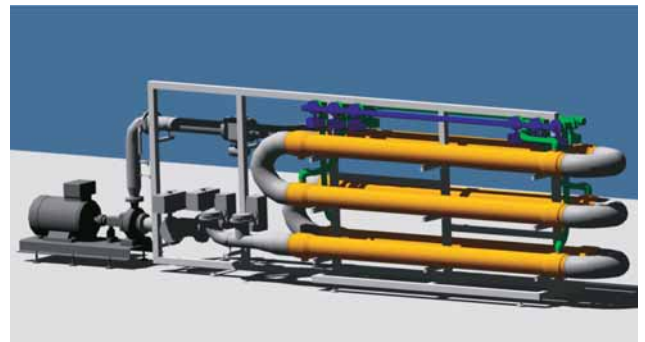


## BioPulse System - Economical MBR based on external tubular membranes

The External **BioPulse** MBR of Berghof positions the membranes outside the bioreactor. This allows safe and easy maintenance, operations and membrane replacement.

The Berghof external **BioPulse** MBR concept is an energy optimized process for reliable and economic treatment of less complex and medium strength waste water.



### ■ A unique Berghof membrane

The **BioPulse** MBR concept is based on the Berghof **HyperFlux-LE** module program. The unique backwashable PVDF LE membrane guarantees an economic and reliable operation due to high flux rates, optimum fouling control and low plugging risk.

### ■ Advantages

- Reduced energy consumption compared to **BioFlow**.
- Optimized fouling control with backwashable PVDF LE membranes
- Safe, easy and economical cleaning
- Maximum flexibility with variable speed pumps
- Reduced installed membrane area at peakflow
- High flux rates at low operating pressure.
- Safe and easy maintenance
- Small footprint
- Suitable for containerized systems

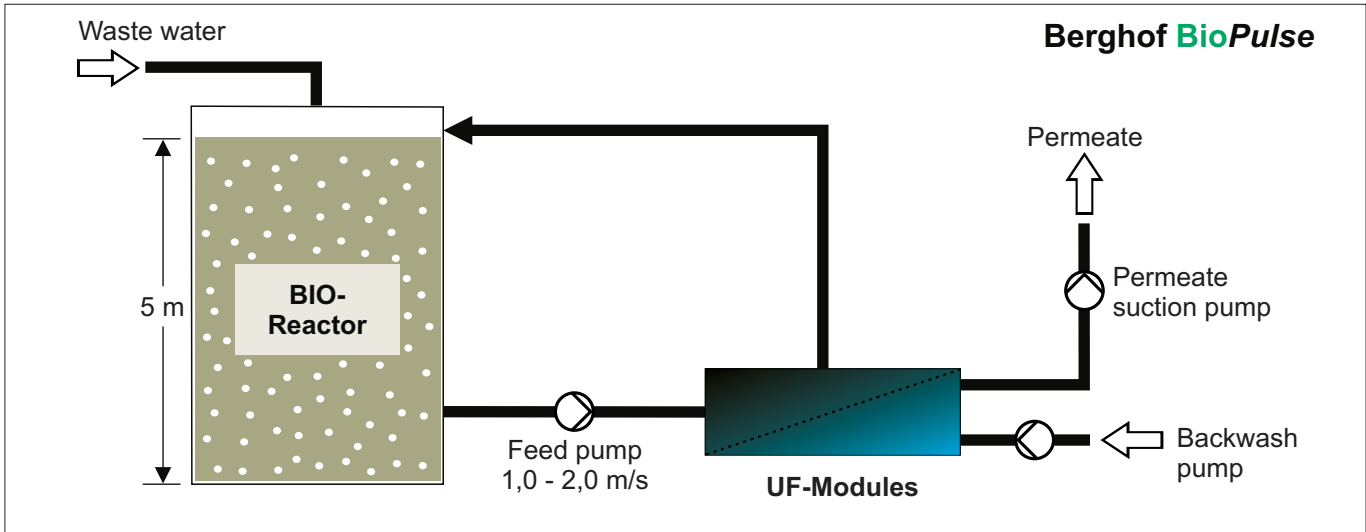
### ■ Applications

The Berghof External MBR technology has proven its reliable & economical operation over the last decades. Today over more than 180 full scale MBR plants are equipped with Berghof products and attest to our success.

Recommended MLSS concentrations up to 15 g/l in the following applications:

#### MBR-filtration

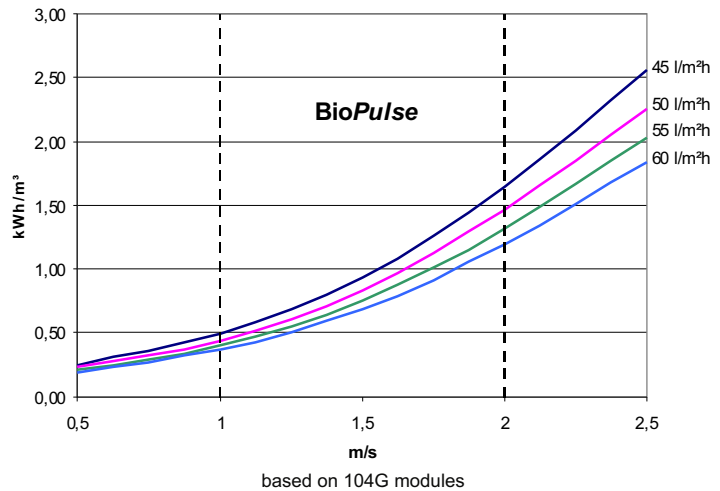
- Low and medium strength industrial wastewater application
- Municipal
- Commercial land development



### ■ Process principle

Activated sludge from the bioreactor is pumped, at an optimized constant flow rate, through the externally positioned tubular 8mm LE membranes. An integrated automatic backwashing program controls the backwash cycle and backwash duration in order to ensure reliable operation under economic conditions. The permeate pump controls the permeate flow from the modules as well as limits trans-membrane pressure.

Velocity: 1,0 - 2,0 m/s  
 Specific fluxrate / gross : 45 - 60 l/m<sup>2</sup>.h  
 Specific energy consumption : 0,4 - 1,7 kWh/m<sup>3</sup>  
 Sludge concentration : up to 15 g/l  
 TMP: 0,1 - 1,0 bar



### ■ Membrane cleaning

#### Automatic BioPulse membrane backwash

Backwash is controlled so that each module receives backwash at the proper flow and pressure to remove the clogging layer on the membrane surface.

- Modules are individually cleaned under optimal conditions
- Backwash pressure is controlled by a safety pressure control
- Backwash flow is controlled by a variable speed pump
- Backwash frequency 5 - 60 min
- Backwash duration 5 - 15 sec

### ■ Membrane chemical cleaning

- Chemical enhanced backwash
- Low chemical costs
- Fast, easy and efficient cleaning
- Chemical cleaning (CIP) of the membranes is indicated when permeate flow rate drops by 30 %.