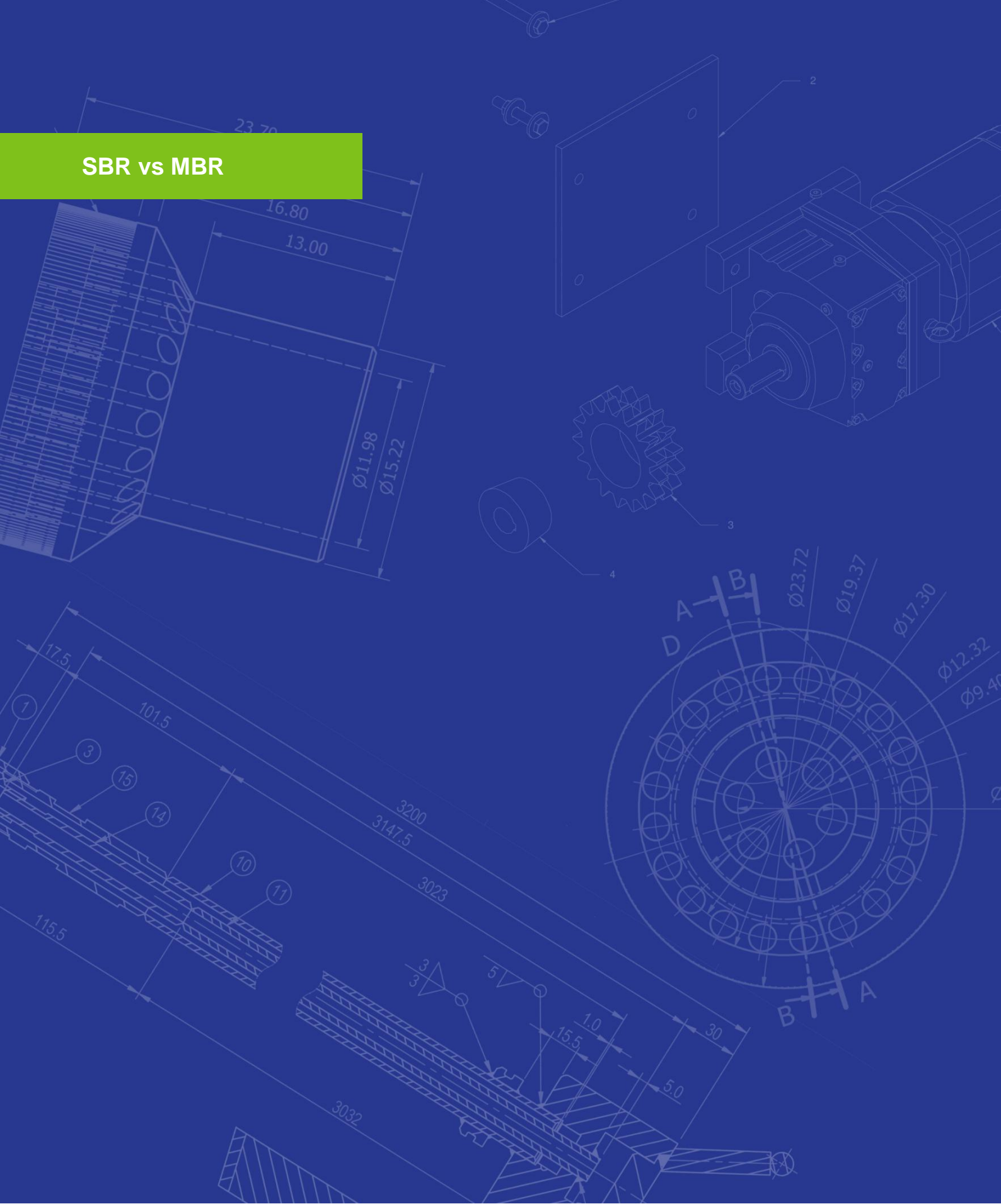


# SBR vs MBR





# Product Information

## SBR vs MBR

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## Comparing MBR and SBR Technologies

While there are similarities between MBR and SBR (both are forms of the activated sludge process), there is one fundamental difference – the method of separating the mixed liquor from the treated wastewater. SBR technology relies on gravity settling (or phase separation), while MBR technology uses the membrane as a physical barrier for separation. On the surface this may seem like a subtle difference, however, by using a physical barrier for separation, MBR technology provides numerous advantages.

### Reduced Footprint

One of the benefits of MBR technology over other activated sludge processes is its ability to operate at high biomass concentrations (MLSS). A typical MBR design will operate at an MLSS of 12,000 mg/l, while a typical SBR design will have an MLSS in the range of 3,000 mg/l. This difference in biomass concentration leads to much smaller process basins for MBR technology, and results in the MBR system having an overall plant footprint 50 – 70% smaller than an SBR system.

Further, because it relies on phase separation, the SBR cannot operate at elevated biomass concentrations, as the sludge loses its ability to settle into distinct layers once the MLSS gets above 6,000 – 8,000 mg/l. Settling characteristics are not relevant with MBR technology because it utilises a physical barrier for separation.

### Superior Effluent Quality

During operation, the effective opening of the Ultrafiltration membrane is less than 0.1µm. The membrane achieves 6-log removal of bacteria and 3-log removal of virus without disinfection. Effluent turbidity is < 0.2 NTU. SBR technology, even when followed by tertiary filtration, won't achieve values this low. The typical opening for most tertiary filters is on the order of 10µm, 100x larger than the membrane. In this regard, MBR technology reduces the burden on the final disinfection system (typically UV or Chlorine).

### Reduced Sludge Production

An MBR system will produce less waste sludge than an SBR system. The reason for this is the MBR's ability to operate at much longer sludge retention times (SRT). Again, the reason a SBR can't operate at longer SRTs is the negative impact on the settling of sludge.

### Ease of Operation

Ease of operation is often the least appreciated aspect of MBR technology. Put simply, eliminating phase separation (sludge settling) from the process greatly reduces the operator oversight required to keep the system running efficiently. Most operators of activated sludge facilities will tell you they spend the majority of their time focused on the settling characteristics of the sludge at their plant. There are many factors that impact settling characteristics and these can change from one day to the next. Not only does this require time spent in the lab analysing sludge samples, but also subsequent adjustments to the plant (i.e. adjusting process cycles in an SBR) to maintain good settling characteristics. If the sludge doesn't settle into a distinct layer, the plant runs the risk of compromised effluent quality. Again, this lab and plant adjustment work is greatly reduced with an MBR system since settling of sludge is not an issue.

To achieve reuse quality water, the SBR system will need to be followed by a higher level and complexity of tertiary filtration system, than a MBR system.

By comparison, in many cases MBR technology may not require tertiary filtration or further treatment processes to meet required standards for suspended solids and turbidity. This reduction in the number of unit processes further improves system reliability and reduces process oversight by the operator. Further indicating the ease of operation, MBR installations may be monitored and maintained from a remote location, utilising the full SCADA control systems.

### Summary

There is nothing wrong with the SBR approach; if there are no reuse considerations on a project, and no footprint constraints, then SBR technology can be a cost-effective choice. However, the majority of clients will benefit from the reduction in unit processes and lower operational requirements for the MBR, and know that the high quality effluent and reduced footprint will help them meet future growth and permit requirements better than any other technology on the market.



## Membrane Bio Reactors (MBR)

### Packaged wastewater Treatment System

The MemPAK MBR® is an advanced 'plug and play' packaged MBR wastewater treatment system featuring the flat sheet submerged MBR ultrafiltration modules. The MemPAK MBR® is engineered to provide a high quality effluent, treated to Class A standards and suitable for a variety of reuse applications.

The fully pre-assembled and factory tested MemPAK MBR® plant is supplied in an ISO shipping container format for ease of transportation. Primary and bioreactor tanks are open topped with safety railings around access points. Permeate pumps, aeration blower, dosing systems, monitoring and control systems are housed in a lockable control room located at the front of the plant.

The pre-programmed PLC system includes full process monitoring and data logging functions. Full telemetry including remote control is available as an option. The MemPAK MBR® is designed to require minimal operator supervision making it ideal for installation in remote locations.

### Key features

- ~ Plug and play packaged system
- ~ Automatic fine influent screen
- ~ Flat sheet MBR module
- ~ 0.04µm Ultrafiltration membrane
- ~ Automatic cyclic membrane backwash and CIP System
- ~ Proven design
- ~ Fully Factory Tested
- ~ Systems available from 10 - 500KL/day
- ~ Compact and easy to transport
- ~ Optional UV disinfection
- ~ Optional chlorine disinfection with safety eyewash, signage and bunded chemical storage
- ~ Optional effluent monitoring system with remote telemetry

### Treatment stages

The MemPAK MBR® package plant is a fully self-contained MBR wastewater treatment system incorporating the following process stages:

1. Inlet screening
2. Primary / Anoxic tank - Denitrification
3. Aeration / Membrane Bioreactor tank - Nitrification
4. BIO-CEL® membrane filtration modules
5. Permeate receiving and disinfection
6. RAS and sludge removal



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