



MEMCOR® Membrane Bioreactor System (MBR) Rahr Malting, Minnesota, USA

Background

The Rahr Malting Company is a long established family owned business that produces and distributes malt and related supplies for breweries, distilleries and allied industries around the world.

Their plant in Shakopee, Minnesota, also the company headquarters, produces around 460,000 tonnes of malt per year, or roughly 20 % of the commercial malt produced in the United States.

The Challenge

As plant production has increased over the years the need for expansion of the wastewater treatment facility has also grown.

In 1997 Rahr Malting installed an OMNiFLO® sequencing batch reactor (SBR) so that treated wastewater from the site could be discharged directly to the Minnesota River. This upgrade significantly reduced sewer access charges for the plant in the order of US\$1.5 million a year.

With continuing production growth wastewater flow also increased so that by 2007 a treatment plant upgrade was again required. However, as part of the expansion permit the plant was assessed against more stringent discharge limits and as such, more advanced treatment options needed to be investigated.

The chosen upgrade path involved blending effluent from the existing plant with that of the new expansion to meet effluent quality targets. The selected technology for the expansion therefore needed to produce consistently high quality effluent. Additionally, space at the site was at a premium and a treatment process with a small footprint was necessary.

The Process

MEMCOR® MBR was chosen for the treatment plant expansion, which started operation in April 2008. The MBR plant was designed for peak flows up to 2.25 MGD (8.52 MLD) with three biological trains in parallel and three corresponding membrane tanks. Parallel processing allows individual biological and membrane trains to operate independently, providing large turndown to cater for low to high wastewater flow rates. The system was designed to have one train normally in standby to provide redundancy.

Fast Facts

Location: Shakopee, Minnesota, USA

Technology:

MEMCOR® B40N MBR
PVDF Ultrafiltration Modules
with MemPulse®

Feed Source: Industrial Wastewater

Application: Surface Discharge

MEMCOR® Membrane Filtration Plant:

Three (3) MOS cells/tanks each with twelve x 16 Module MemRACK® Assembly locations. (192 x B40N Modules fitted per Cell. 576 Modules Total) Upgraded to MemPulse® in 2019.

MBR Plant Capacity:

237 m³/h = 1.50 MGD [5.68 MLD] Average
355 m³/h = 2.25 MGD [8.52 MLD] Peak

Commenced Operation: April 2008



Above: The Rahr Malting Wastewater Treatment Facility was expanded and upgraded in 2008 to utilise the MEMCOR® MBR process. The membrane bioreactor plant consists of three Cells, each with 192 x B40N Modules using the MemPulse® process.

Why choose MEMCOR®?

Some of the advantages of the MEMCOR® MBR Membrane Operating System (MOS) are as follows:

- Membranes provide a physical barrier to remove suspended solids and substantially reduce turbidity;
- Membranes provide consistently high quality of filtered water independent of feed quality;
- MEMCOR® MBR reduces organic loading on downstream processes including disinfection, and helps to minimise disinfection by-products;
- The small footprint of MEMCOR® MBR minimises site civil works and building costs;
- The MemPulse® process typically reduces air scour energy requirements by 30 to 60 % over previous generation MBR systems;
- MEMCOR® MBR will help to meet the demands of any anticipated future waste discharge regulations;
- Modular rack design allows provision for simple future capacity expansion;
- MEMCOR® has decades of operating experience in MBR systems.

Sustained Performance

In 2019 after 11 years in operation, the original MEMCOR® MBR plant MemJet™ operating process was upgraded to the significantly more effective MemPulse® process. This upgrade increased system availability by allowing the plant to run at its peak flow capacity for longer periods. It also reduced operating costs associated with MBR system aeration by as much as 50 % because of the efficiency of the large bubble aeration provided by the MemPulse system. Wastewater influent commonly has BOD5 of over 300 mg/L and Total Suspended Solids of over 200 mg/L. Treated effluent from the MEMCOR® MBR plant typically has both BOD5 and Total Suspended Solids of less than 1 mg/L and Turbidity less than 0.1 NTU. MBR plant filtrate is blended with the SBR product water to meet quality requirements for discharge to the river.

MEMCOR® Membrane Solutions

MEMCOR® membranes from DuPont Water Solutions have helped municipalities and industrial customers around the world to protect and improve the world's most fundamental natural resource – water.

To explore the latest in MEMCOR® membrane systems technology use one of the links provided in this document.



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