

Cargill Malt replaces competitor product with ZeeWeed* 500D membrane technology equipped with LEAPmbr*

Application: Wastewater treatment

Product: ZeeWeed (ZW) 500D LEAPmbr

Capacity: 0.55 MGD (2,100 m³/day)

Location: Perth, Australia

Commissioned: 2006

Upgraded to SUEZ: August 2016

challenge

Cargill Malt, Australia's largest malt producer, expanded the production capacity of its Perth malting facility in 2006. During the expansion, the customer commissioned a wastewater treatment and water recycling facility equipped with a competitor membrane bioreactor (MBR) system.



Figure 1: Cargill Malt's Perth Malting Facility

After several years of operation, the MBR system's performance declined due to fiber abrasion and sludging. The MBR system was replaced by the competitor

in 2011; however the new system experienced the same issues as before and struggled to meet flow rate requirements.

The competitor MBR system utilized a single header design that uses bands to secure the membrane fibers instead of a second header. This left the fibers loose and a significant number of individual fibers were separated from their respective fiber bundles. The separation resulted in damaged fibers and is believed to be a primary cause for the MBR system's reoccurring fiber abrasion and sludging issues. The breached membranes allowed particles and solids to escape into the UF filtered water which caused fouling in the downstream RO membranes resulting in increased cleaning frequency and higher operating cost. The increased cleaning frequency reduced the plant's uptime which limited the production capacity of the malt plant.

In 2016, Cargill Malt began to search for an alternative MBR replacement solution since they were disappointed in the competitor's MBR performance and limited local support. The customer also wanted the ability to expand plant capacity in the future without having to increase their footprint.

solution

Based on SUEZ Water Technologies & Solutions' decades of experience in the membrane industry, proven membrane performance, and commitment to reliable customer support, the customer's contracted engineering procurement company asked SUEZ to find the optimal solution for the Cargill Malt facility. SUEZ recommended ZeeWeed 500D (ZW 500D) membranes equipped with LEAPmbr aeration technology.

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Figure 2: ZW500D membrane system

The ZW500D reinforced hollow-fiber membrane is known for long life and high performance in the harsh, high-solids environment of a bioreactor. With its nominal pore size of 0.04 micron, ZW500D virtually ensures a particulate-free effluent. The ZW500D membranes also have top and bottom headers which properly secure the membrane fibers to prevent damage.

LEAPmbr aeration technology offers significant advantages as well. Larger air bubbles are used which increases shear along the membrane surface, reducing fouling and thus lengthening cleaning intervals. Blower energy consumption costs are reduced by approximately 30% due to decreased membrane air scour requirements. With LEAPmbr, air is delivered on a continuous basis. This eliminates the need for high-frequency cyclic valves and their associated maintenance costs. The competitor cassettes on the other hand, used two aeration valves per cassette. With the upgraded membranes, only one valve per cassette is required, reducing the inventory cost of spare parts and maintenance. Additionally, LEAPmbr cassettes use only two cleaning chemicals eliminating the use of a third chemical (i.e. sodium hydroxide) to provide additional savings and a safer working environment.

Cargill Malt will also have access to SUEZ's over 2,500 field engineers for local support throughout the system's lifecycle. Additional on-site technical support services such as scheduled and unscheduled service visits, plant audits, and training, are also available.

results

In August 2016, Cargill Malt replaced its two competitor MBR trains with two trains of ZW500D membranes equipped with LEAPmbr. SUEZ provided on-site support to assist with the installation of the membranes, PLC modifications, drawing updates, and overall on-site implementation.

The upgraded membrane trains were equipped with one fully populated and one partially populated 48 module cassette. The partially populated cassette allows Cargill Malt to increase plant capacity in the future without having to increase plant footprint. The upgrade increased plant capacity from 1,900 m³/day to 2,100 m³/day while also giving the customer the ability to further increase capacity to 2,900 m³/day once the cassettes have all been fully populated.

