

CRAFT BEVERAGE PRODUCTION:

Guidelines for Selecting a Wastewater Treatment System





Figure 1: Craft Beverage Industry Companies

Get the Most Out of Your Water

Wastewater treatment is crucial for successfully operating a craft beverage production facility. Craft beverage production facilities have variable flows and loadings (Biological Oxygen Demand (BOD)/Total Suspended Solids (TSS)), therefore careful consideration must be given to select a robust system capable of handling these operating conditions and providing years of trouble free operation. Wastewater treatment systems include several unit processes arranged in series to provide a fully treated effluent suitable for discharge or water reuse. Typical processes include screening, flow equalization / pH adjustment, biological treatment, solids separation and excess sludge storage / removal. The following are recommended guidelines to select a wastewater system for beverage production facilities including breweries, distilleries and wineries.



Figure 2: bioprocessH2O California Vineyard Installation

System Selection Guidelines

- ◆ Select a system that has been proven to provide treatment of high strength waste streams containing BOD concentrations of $\geq 5,000$ mg/L with removal efficiencies consistently in excess of 95% under similar operating conditions.
- ◆ Select a system that is both operator friendly and has low overall maintenance.
- ◆ Select robust biological treatment systems that are capable of dealing with BOD load variations and prolonged periods of no flow. Note that highly varying organic loads and periods of no or low flow are not suitable for most anaerobic treatment technologies.

Aerobic and Anaerobic Treatment

◆ Aerobic Treatment Systems:

- Aerobic biological wastewater treatment processes occur in oxygen rich environments. Under these conditions, microorganisms in the water rapidly consume organic matter and convert it to carbon dioxide and bio-solids.

◆ Anaerobic Systems:

- Anaerobic biological treatment processes allow the breakdown of organic material without supplemental oxygen.
- Anaerobic treatment processes are typically applied to very high strength organic streams with consistent flows and organic loads.

◆ Aerobic vs. Anaerobic Systems:

- Aerobic systems are more robust than anaerobic systems and most suitable for small to medium craft beverage facilities (<50,000 GPD).
- Aerobic treatment reactors are smaller, allow for a quick start up, provide higher BOD removal efficiencies and can easily tolerate varying loading and extended periods of no flow. In addition, MBR's can easily provide water reuse within or around the production facility.

Aerobic Systems Suitable for Biological Treatment

- ◆ Examples of the most robust and suitable biological treatment systems include Moving Bed Biofilm Reactors (MBBR) and Membrane Bioreactors (MBR).
- ◆ The MBBR and MBR Treatment Technologies are described in Appendix A. A bioprocessH2O's Craft Beverage Case Study is referenced in Appendix B.
- ◆ For more information about MBR and MBBR Systems download our Guide: [Does your Process Water Meet Your Company's Needs?](#)



Figure 3: bioPULSE™ MBR California Installation

Equipment Vendor Recommendations and Qualifications

- ◆ Request a reference list from vendors that demonstrates successful performance at facilities treating high strength waste streams with BOD concentrations in excess of 5,000 mg/L. This should include multiple systems that have been operating over several years.
- ◆ Vendors should have the ability to design, fabricate and support suitable technologies.
- ◆ Vendors should have experience with regulatory standards and compliance.
- ◆ Vendor support staff should be comprised of process, mechanical, civil and electrical control engineers that routinely design robust systems and are capable of providing real time support once systems are installed and operating.
- ◆ Request a visit to an existing facility to talk with the vendor's customers.

Be Prepared

The design and installation of an effective treatment system is neither “cheap”, “easy” nor “sexy”. Having stated the obvious, it is a critical aspect of operating a successful and compliant craft beverage production facility. If you are armed with the proper knowledge, it can be a rewarding experience and environmental achievement. Choosing the right equipment vendor and professional team will provide the smoothest path to accomplish these goals and provide years of compliant operation. Contact bioprocessH2O if you would like to meet a qualified vendor and discuss your options for effective wastewater treatment.

Why bioprocessH2O

Whether you need an individual component, a replacement system, or a new water treatment program, bioprocessH2O can customize a solution to fit your facility's specific needs. With over 140 years of experience protecting and providing clean water with installations across the country, bioprocessH2O offers cost effective solutions for both water discharge and reuse. We integrate innovative filtration and treatment technologies to provide cost effective and robust system that provide decades of service. For more information about any of our clean water systems, contact bioprocessH2O today.



Appendix A

MBBR Systems & MBR Systems



Figure 5: bioprocessH2O Virginia MBBR Application

bioFAS™ Moving Bed Biofilm Reactors (MBBR) are commonly used for industrial wastewater treatment applications and provide pretreatment and removal of organics in wastewater streams. MBBR systems can effectively be integrated with industrial and municipal treatment systems for BOD removal, nitrification and denitrification. These systems are durable against toxic shock loads and are easy to operate and maintain.

Process Benefits:

- ◆ Minimal Operator Attention and System Maintenance
- ◆ Single-Pass Biofilm Treatment Process
- ◆ Load Responsive and Self Regulating
- ◆ Robust Biofilm Process
- ◆ Modular and Expandable
- ◆ Fully Automated with Remote Monitoring

Membrane Bioreactors (MBR) are biological wastewater treatment systems most commonly used to provide high quality effluent suitable for compliance, regulations, and water reuse. By installing an MBR system, the quality of effluent produced provides a competitive advantage for your business giving you the capability to discharge into waterways or repurpose for reuse.

Process Benefits:

- ◆ Excellent Water Quality
- ◆ Positive Barrier for TSS
- ◆ Low Energy Consumption
- ◆ Small Footprint
- ◆ Robust Biological Process
- ◆ Simple Operation
- ◆ Modular and Expandable
- ◆ Title 22 Certified for Water Reuse
- ◆ Fully Automated with Remote Monitoring

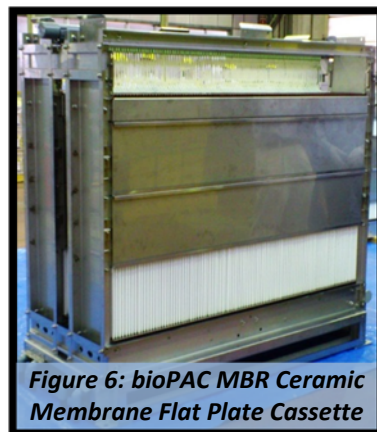


Figure 6: bioPAC MBR Ceramic Membrane Flat Plate Cassette



Figure 7: bioprocessH2O California MBR Installation

Appendix B

bioprocessH₂O Case Study

💧 California Winery

The Problem: The California Vineyard installed a bioprocessH₂O supplied wastewater treatment to reduce BOD/TSS from the wine processing waste and to use the system effluent for vine irrigation.

The Solution: To achieve the Vineyard's objectives, bioprocessH₂O supplied a bioPULSE™ Airlift Containerized Membrane Bioreactor (MBR). The MBR incorporates an energy efficient airlift external tubular and back-washable membrane that significantly

reduces power consumption. Due to site constraints, bioprocess installed the UF membrane system, PLC control panel and chemical feed assemblies within a customized 20 foot long container. The fiberglass process tanks were existing at the vineyard and used for the MBR system. The treatment process is fully automated using an Allen Bradley PLC controller that allows remote monitoring via an internet connection allowing bioprocess to provide operational oversight and assistance. The permeate produced by the MBR is UV disinfected and being used to irrigate the vines.

Status/Results: The bioPULSE™ MBR has proven effective at reducing the BOD, COD and TSS from the vineyard's wastewater. The bioPULSE MBR system allows the facility to reclaim the process water from the winery and reuse it for vineyard irrigation.



Figure 8: California Vineyard bioPULSE™ MBR Water Reuse Installation

Get the most out of your water!

