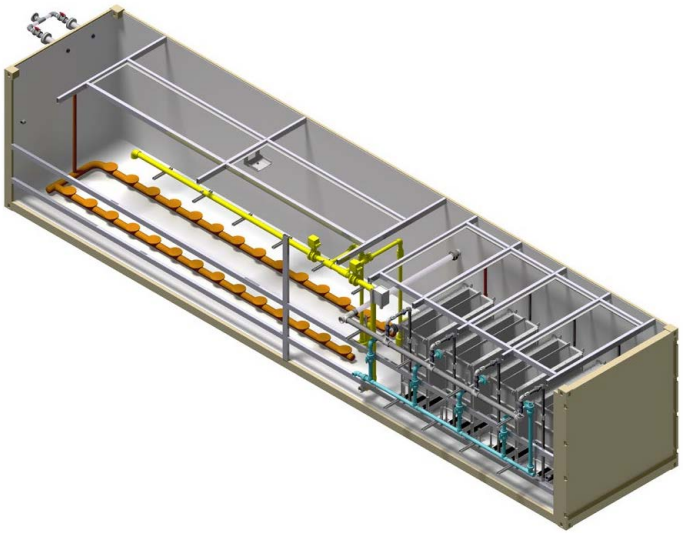
Packaged Wastewater Treatment Systems

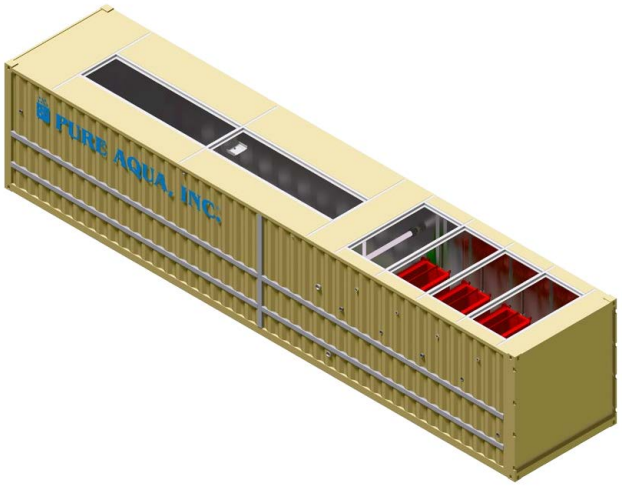
Mobile Modular Sewage Treatment

MBR-C SERIES

The smart way to treat municipal and industrial wastewater

Pure Aqua's Containerized Membrane Bioreactor (MBR-C) utilizes best-in-class hollow fiber (HF) ultrafiltration (UF) membranes with nominal pore size of 0.04 µm to produce permeate of superior quality in order to comply with stringent discharge requirements. MBR-C offers an advanced wastewater treatment solution with minimal space requirement, no major construction or civil work, and suitable for wide range of applications including sewage and industrial wastewater.





Submerged Hollow Fiber Technology

MBR-C utilizes submerged membrane modules (SMM) products featuring thermally induced phase separation (TIPS) Polyvinylidene difluoride (PVDF), and innovative module and skid designs to provide the most compact, simple, and reliable solution for clients.

Standard Features

- 40' and 20' high cube (HC) containers
- Insulated container walls
- Zero water leakage
- Enhanced container structure
- Seaworthy containers
- Pre-treatment using drum screen (1.5 mm)
- Aeration tank with fine bubble diffusers for biomass growth
- Submerged HF membrane modules equipped with coarse bubble diffusers
- Built-in membrane cleaning and air scouring system

Operating conditions

- Electrical supply: 460V/3Ph/60Hz
- Operating temperature: 68-86°F (20-30°C)
- Design temperature: 68°F (20°C)

Available Options

- Anoxic zone to achieve denitrification (NO_3 removal)
- Additional pre and/or post-treatment processes to meet effluent quality requirements
- Standby pumps for redundancy
- Remote monitoring
- Feed water pump

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Advantages of MBR-C

MBR-C Process provides numerous advantages over all known biological treatment processes presently in use:

Enhanced Membrane Technology

- TIPS spinning method= high tensile strength and extended lifetime.
- PVDF membrane material= stable under strong oxidation conditions.
- High packing density= fewer skids, smaller footprint, and higher productivity.
- Modules equipped with patented air scouring technologies= low energy consumption.
- Extreme caustic and oxidant tolerance= long life and suitable for challenging applications.

Economy

- Integration of bio-treatment and membrane filtration eliminates the need for a sedimentation tank and allows for compact design and installation.
- Minimal pumping requirements lower equipment and operational costs.
- Lower sludge production rate, due to higher sludge age (i.e., SRT), compared to conventional activated sludge processes results in savings on disposal expenses.

Smaller Aeration Tank and Footprint

- High mixed liquor suspended solids (MLSS) concentration and volumetric loading rate translate into compact footprint.

Water of Superior Quality

- Membranes are capable of retaining activated sludge at high (MLSS) concentrations, leading to more effective BOD and nitrogen removal.
- UF membranes are capable of removing small colloids and viruses in addition to suspended solids and bacterial flocs.

Ease of Operation and Maintenance

- MBR-C can operate largely unattended except for occasional routine performance checks and maintenance of mechanical components.
- Segregated bioreactor and membrane tanks will allow for easy operation and maintenance.

Typical Feed and Effluent Water Quality

Parameter	Feed Water Quality	Expected Permeate Quality*
pH	6.5-7.5 S.U.	6.5-7.5 S.U.
Alkalinity (as $CaCO_3$)	125 mg/L	≥100 mg/L
Temperature Range	20-30°C	20-30°C
TSS	200	<5 mg/L
Biochemical Oxygen Demand (BOD)	250	< 10 mg/L
Chemical Oxygen Demand (COD)	400	<50 mg/L
Ammonium-Nitrogen (NH_4)	30	<2 mg/L

*Values presented here do not represent guarantees.

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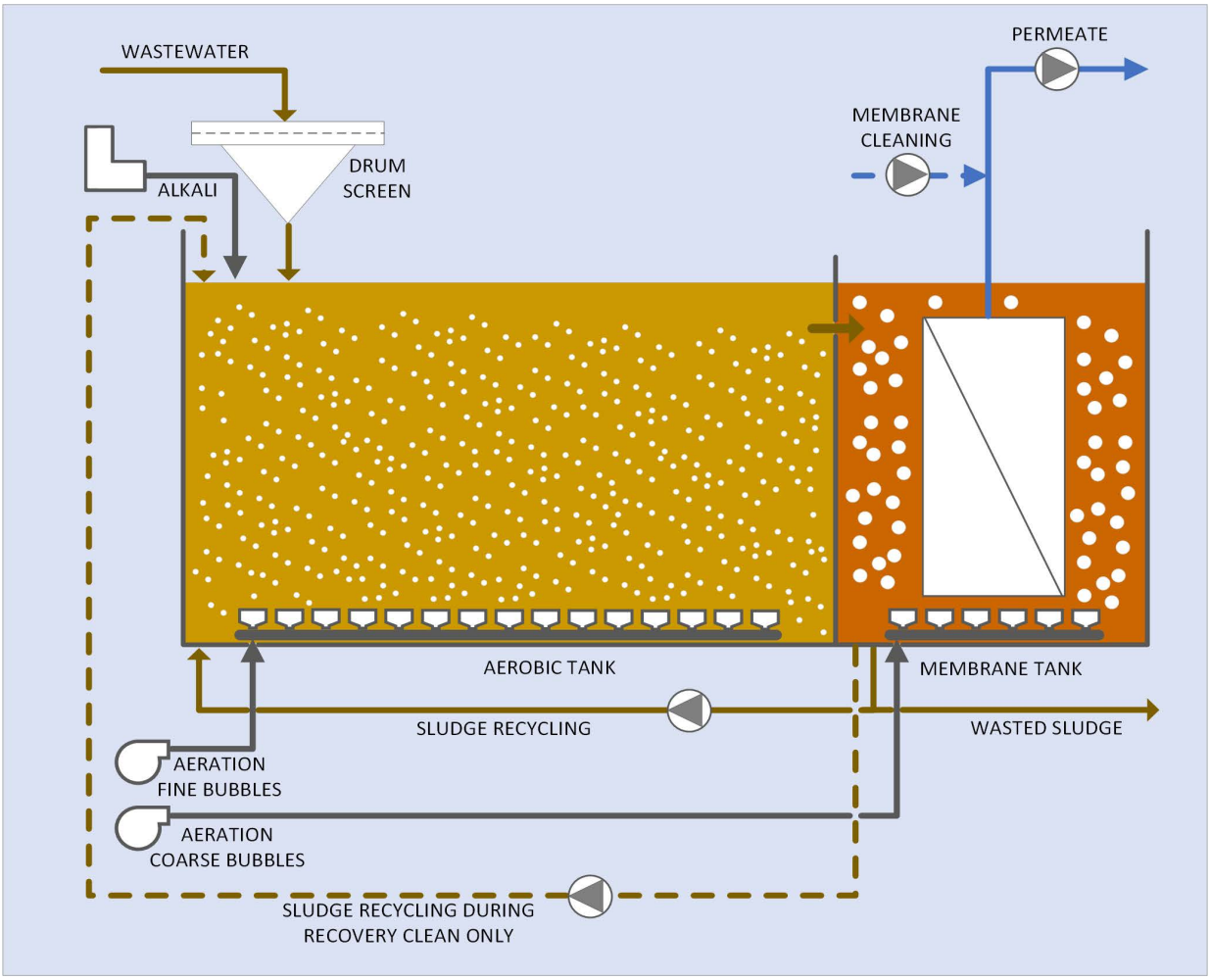
Typical Process Flow Diagram



Process Description

Wastewater passes through a drum screen to remove aggregates of hair and other debris, and to protect membrane's surface. The water then overflows to aeration tank, where air (fine bubbles) is injected to the tank to provide oxygen for microorganisms in order to decompose organic contents to CO_2, H_2O, and to convert ammonium/ammonia to nitrate (i.e., nitrification). Alkali is also added to water to maintain acceptable alkalinity levels. Thereafter, the water flows to membrane tank(s) through gravity to remove bacterial flocs, suspended solids, and viruses. Membranes are cleaned through chemical cleaning and air scouring (coarse bubbles) to mitigate fouling propensity and maintain acceptable transmembrane pressure (TMP) values.

Some fraction of the sludge is discharged on a daily basis to maintain consistent solid retention time (SRT), while some portion will be returned to the aeration tank.

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- Limited site work
- Quick installation
- Easy to relocate

Applications

- Municipal wastewater treatment
- Residential and commercial wastewater treatment (e.g., camps, hospitals, office complexes, restaurants, car washes and golf courses)
- Water reclamation (e.g., irrigation of gardens or agricultural fields)
- Pre-treatment for reverse osmosis (RO) systems
- Industrial wastewater treatment

Model #	Flow Rate		Approximate Population (50 gpd per Capita)	Membranes		Skid Material	# of Containers
	gpd	m^3/d		# of Skids	# of Modules		
MBR-C-13.2K-06	13,211	50	265	2	3	316 SS	1 x 20'
MBR-C-26.4K-10	26,421	100	529	2	5	316 SS	1 x 40'
MBR-C-39.6K-16	39,631	150	793	2	8	316 SS	1 x 40'
MBR-C-50.2K-20	50,198	190	1004	2	10	316 SS	1 x 40'

Pure Aqua also supplies: standard and custom engineered solutions, multimedia pretreatment, activated carbon pretreatment, ultrafiltration, nanofiltration, water conditioning, chemical dosing systems, ultraviolet (UV) sterilizers, ozonation systems, mobile & containerized water treatment solutions and water reuse systems using reverse osmosis technology.

PURE AQUA, INC.®
Water Treatment & Reverse Osmosis Systems
sales@pureaqua.com Tel: +1.714.432.9996
www.pureaqua.com Fax: +1.714.432.9898

ISO 9001

MEMBER Water Quality Association

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