iQ. MBBR

BNA
BERGMANN NORTH AMERICA INC.

With **iQ.MBBR™** we introduce the **next generation** of **Moving Bed Biofilm Reactor** technology which combines robust, efficient design with smart **iQ.CONTROLS™** – intelligence + quality.

KEY ADVANTAGES ARE:

- Exceptional treatment of varying hydraulic, organic, and nutrient loads
- Very low energy for mixing and oxygen demand*
- Reliable pure biofilm process with minimal operational requirements
- Comprehensive remote monitoring and control = optimum system management

*Dissolved Oxygen (DO) Control as standard on all iQ.MBBR™ systems has been shown to save >50% aeration energy over preset controls

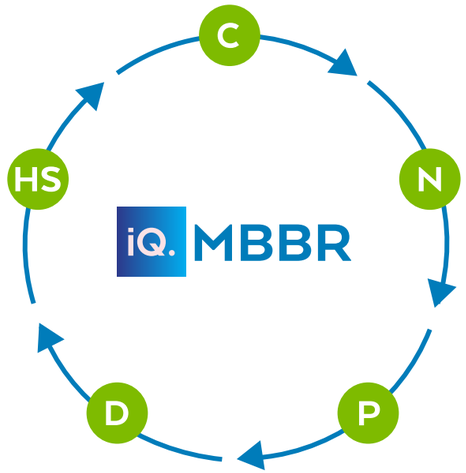
The **iQ.MBBR™** systems offer a custom designed solution which can be installed in a small footprint with low energy and operating costs. The process can also be retrofit in existing tanks or to upgrade existing systems. One of the unique benefits of the **iQ.MBBR™** process is the ease of operating the system; the carrier media in the system is self-cleaning, does not clog and never has to be replaced.

iQ.

click + clean® INSIDE

THE iQ.MBBR™ PROCESS:

The **MBBR** process is based on a specially designed plastic, neutrally buoyant carrier media with a high specific surface area for biofilm attachment and growth; a design proven with over 30 years of use. The **iQ.MBBR™** process specifically includes 2 sequential treatment phases: the Fluidized Bed phase during aeration for oxygen supply, mixing, and biofilm / sludge control; and the Floating Bed Filter phase for adsorption of contaminants, biofilm growth, and simultaneous nitrification / denitrification. Applying the non-aerated phase differs from traditional **MBBR** processes and results in significant energy and performance benefit. This is further enhanced by the use of dissolved oxygen (DO) sensors / control which only provides aeration when needed.



The standard process involves 5 stages:

1. The Sludge Storage is designed to provide combined concentration of primary and secondary sludge. For small plants, the Sludge Storage is generally integrated inline with the process; however, can be designed offline for larger plants. The Primary Clarifier is designed to remove any settleable solids from the sludge supernatant.

2, 3. The aerobic bioreactors are designed as a low-rate **MBBR** process with intermittent aeration via blower(s) and fine bubble diffusers allowing flexible operational settings with minimal energy consumption, either manually set or automated using dissolved oxygen (DO) control.

4. The Secondary Clarifier separates the biological solids (sludge) generated in the bioreactors by simple gravity settling into hoppers, and sludge is pumped to storage. The operational cycle of the sludge return pump(s) are set so the secondary clarifier maintains minimal sludge accumulation. A floating sludge (skimmer) pump is typically included to remove any floating sludge that may accumulate due to denitrification or over-aeration.

5. As effluent discharge standards become more stringent, advanced wastewater treatment is becoming increasingly important, most commonly with respect to nitrogen and phosphorus removal, or disinfection of the effluent. The **iQ.MBBR™** can be designed with a variety of modular treatment process stages which can be added to new plants or retrofit within existing installations.

iQ.MBBR™ TREATMENT PROCESS OPTIONS:

- C1 [Carbon Oxidation + Nitrification: ≤ 10 mg/L CBOD5, ≤ 10 mg/L TSS, ≤ 2 mg/L TAN] – Standard
- C2 [Enhanced Carbon Oxidation + Nitrification: ≤ 5 mg/L CBOD5, ≤ 5 mg/L TSS, ≤ 2 mg/L TAN] – Standard + Tertiary Filtration

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- HS [High Strength for influent > 500 mg/L BOD5] – Standard + Intermediate Clarifier

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- N1 [Nitrogen: 30% - 80% removal] – Pre-anoxic denitrification via recirculation of nitrified secondary process with or without carbon supplementation
- N2 [Nitrogen: 80% - 90% removal] – Pre-anoxic denitrification via recirculation of nitrified secondary process with or without carbon supplementation + side-stream anoxic treatment of recirculated effluent
- N3 [Nitrogen: 90% – 95% + removal] - Pre-anoxic denitrification via recirculation of nitrified secondary process with or without carbon supplementation + tertiary (post-) anoxic treatment

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- P1 [Phosphorus: ≥ 0.5 mg/L TP] – coagulant enhanced secondary precipitation
- P2 [Phosphorus: 0.3 - 0.5 mg/L TP] – coagulant enhanced secondary precipitation with floc reactor
- P3 [Phosphorus: 0.1 - 0.3 mg/L TP] – coagulant enhanced secondary precipitation + tertiary filtration

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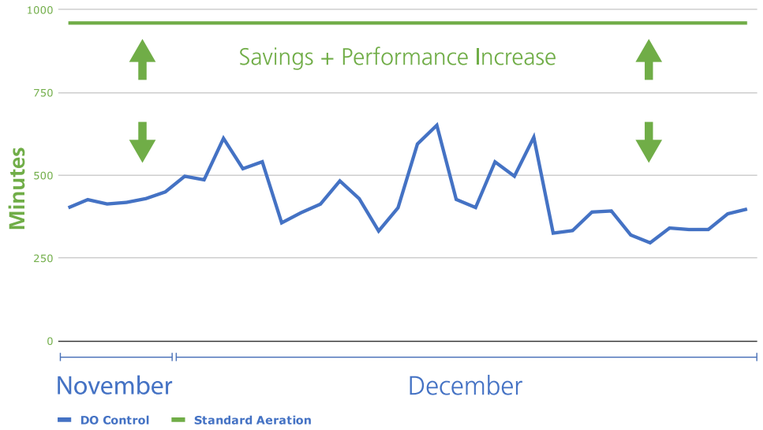
- D1 [Disinfection: ≤ 100 CFU/100 mL E. coli] – standard ultraviolet (UV) disinfection of secondary or tertiary effluent (higher reduction available)

DO CONTROL VS. STANDARD AERATION

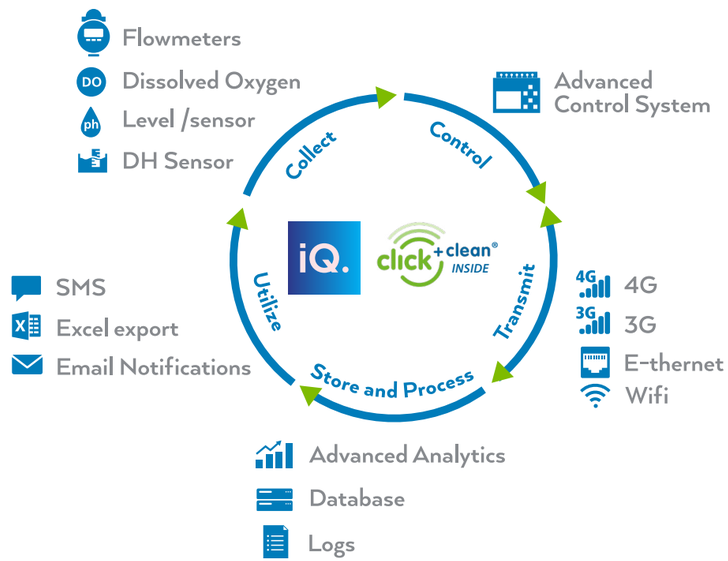


Up to 80% savings in energy cost when used with Dissolved Oxygen Control compared to conventional MBBR systems

CONTROLS AND REMOTE MANAGEMENT:

With the **iQ.CONTROLS™** powered by the **click+clean®** platform **BNA** provides a unique control unit for the power and automatic control of the wastewater treatment system.

Each control panel comes standard with GPRS remote monitoring and data logging. This allows for instant notification of alarms with the capability for the operator to change settings remotely. Each output also monitors current (amperage) instead of relying on floats or sensors alone for mechanical failures. Current sensors can allow for issues to be detected before major problems occur. The control panel also has analog inputs for additional optional sensors (i.e., level, flow, pH, turbidity, dissolved oxygen, etc.). A battery backup is provided for each panel to ensure that notifications are still sent during power outages.



YOUR iQ.MBBR™ ADVANTAGES AT A GLANCE:

The **iQ.MBBR™** system is a robust, compact, cost-effective wastewater treatment process that provides optimal performance year-round. The system allows for significant operational flexibility where influent strengths and flows may vary from anticipated design. The main advantages are:

- **Quality:** design, installation, service and operation
- **Intelligent** controls with fully functional Remote Management
- **Advanced** nutrient reduction and disinfection options
- **Adaptable** biomass that continually regenerates and specializes to the process, is retained during hydraulic overload or organic under-load, and is resilient to seasonal and toxic shock loads
- **Simultaneous** carbon oxidation, nitrification and denitrification – even at low temperatures
- **Combined** storage of primary and secondary sludge enhances digestion and denitrification
- Self-cleaning carrier media which never needs to be replaced – 20 year guarantee
- **Up to 80%** energy savings with automated DO control: < operational cost + < carbon footprint
- **Typically 50%** lower sludge production than conventional activate sludge process
- **Aerobic** bioreactor size typically <50% of conventional activate sludge process
- **Flexibility** to adjust operational settings or add media to adjust to loading changes.

iQ.MBBR™ APPLICATIONS ARE AVAILABE FOR:

Rural Communities

Campgrounds, Resorts, Marinas, RV and Mobile Home Parks

Schools, Churches, and Institutional Facilities

Restaurants, Travel Plazas, and Commercial facilities

Microbreweries, Wineries, Food Processing and select industrial applications

Tell us more about your project and we will find the best solution for you!

Establishing Bergmann North America Inc. (**BNA**), the partners Lars Bergmann, Leroy Robinson, Miles MacCormack, and Felipe Araque have combined decades of technical and practical knowledge in design, build and operation of decentralized wastewater treatment and control systems including the experience of over 50,000 **MBBR** installations in 27 countries. Combined with our promise to offer a reliable and personal customer service it is our objective to serve our clients and the environment with the right wastewater treatment solutions.

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