IDEAL MBBR™ - MOVING BED BIOFILM REACTOR
World Water Works is proud to deliver both the Ideal MBBR™ - Moving Bed Biofilm Reactor and Ideal IFAS™ - Integrated Fixed-film Activated Sludge technology to municipal and industrial clients. These robust processes are based on biofilm principles that utilize the advantages of both activated sludge and earlier biofilm based systems without their disadvantages. There are many configurations in which these fixed film media based systems can be applied.

a) **PRE-TREATMENT** – To Reduce High Soluble BOD Concentrations
   * Minimize surcharges
   * Unburden an overloaded activated sludge plant

b) **COMPLETE BOD REMOVAL** – To Achieve Direct Discharge Standards
   * Reduce BOD concentrations to below 30 mg/L
   * Accomplish water reuse

c) **POST NITRIFICATION** – To Comply w/ New Ammonia Standards
   * Save a lagoon system

d) **COMPLETE BOD AND NITRIFICATION** – To Comply w/ New Ammonia Standards

e) **TOTAL NITROGEN REMOVAL** – To Comply w/ New Total Nitrogen Standards
   * IFAS upgrades to allow retro-fit existing system with minimal new tankage
   * Multistage MBBR for new construction allows specialized bacteria growth in each stage

f) **POST DENITRIFICATION** – To Save An Existing Activated Sludge Plant
   * Add a post denitrification MBBR after secondary clarifiers
   * Increase protection of new TN / NO3-N limits
   * Achieve very low nitrates as a stand-alone process regardless of upstream performance

The specially designed biofilm carriers provide a large protected surface area for the biofilm to grow and thrive with an unique design for allowing mass transfer of oxygen and wastewater flow across the biofilm to create optimal conditions for degradation of the BOD, NH3-N or NO3-N. Due to the unique design of the biofilm carriers, the bacterial cultures are protected from operating excursions (pH, temperature, and toxic shocks) to yield a very robust system with variable load fluctuations. The carrier also provides a more stable "home" for the bacteria to grow, so there is less space required compared to other biological systems and far less operator interface required. For configurations a, b, c, d only DO and nutrient levels are the only required controls. For configuration e and f, DO and ammonia and/or nitrate probes are the required controls to maintain efficient operation. The reliability and ease of operation of the Ideal MBBR™ process has been installed in municipal and industrial applications globally.
Our Name reflects our Passion...

**TECHNOLOGY**
Providing fully integrated solutions through connecting the Ideal MBBR™ technology with the Ideal DAF™ technology - Ideal MBBR-DAF™

**INNOVATION**
Maintaining our commitment to research, innovative development and evidence-based design

**EXPERIENCE**
Bringing together the synergy of an internationally recognized team delivering some of the largest MBBRs in the world

**SERVICE**
Continuing our history of delivering unparalleled service and support

**VALUE**
Coupling recycled and innovative materials w/ in-house manufacturing to provide tangible value without compromising integrity
World Water Works manufacturers its IDEAL series™ which is a complete line of wastewater treatment equipment including pre-screening technologies, biological treatment, liquid/solids separation systems, dewatering equipment and instrumentation and controls to operate all these unit processes. These technologies incorporate the latest advances in the industry to provide the most trouble free and cost effective treatment possible. World Water Works often utilizes polypropylene and other non-corrosive materials to assure equipment longevity. With these products, World Water Works can provide complete process and wastewater solutions.

With an experienced staff of qualified project managers and process design engineers, World Water Works is ready to help solve your wastewater treatment problem and make it a success story. Please contact World Water Works to conduct an onsite survey to collect the necessary information to properly design a system. If desired, extended pilot systems are available for testing.

The proprietary IDEAL MBBR™ media is a result of more than a decade of intensive multi-disciplinary research and development. Integrating Fixed Film and Suspended Growth technologies, it is considered the “next-generation” in biological wastewater treatment methods. The IDEAL MBBR™ media combines a unique fully open and fully protected biomass carrier with a highly efficient aeration and mixing design. This results in superior effective surface area for biomass growth, optimal oxygen transfer efficiency and minimizes mass transfer boundary layer effects.

Technical Data
- Protected Surface Area: 650 m²/m³ (198.1 ft²/ft³)
- Oxygen transfer rate effi.: 50-250 mg O₂/L-hr
- BOD Loading Rates: 120 – 900 lb BOD/1000 ft³-day
- Nitrification Removal Rates: 4.8 - 24 lb NH₃-N/1000 ft³-day
- Denitrification Removal Rates: 11.8 - 44.6 lb NO₃-N/1000 ft³-day
In applications which require very specific and/or very rigid nutrient requirements, World Water Works has developed leading edge advanced control mechanisms and logic to closely control operating parameters and any chemical feedrates to achieve highly consistent and quality effluent conditions.

**Media Retention**
Specifically designed stainless steel media retention screens are required in each tank to retain the specialized bacteria in each reactor / zone. The agitation provided by the moving media scours the surface of the sieve eliminating the need for maintenance.

**Aeration Grid**
A stainless steel proprietary aeration grid mounted at the bottom of the reactor provides, the bacteria with the necessary oxygen required in the aerobic zones and the operators with minimal maintenance. This unique grid design provides the necessary turbulence and mixing to enhance the mass transfer of oxygen and wastewater flow across the biofilm creating optimal conditions for degradation of the BOD, NH₃-N or NO₃-N. The grid design will also handle the intense weight of the biofilm carriers if the reactor ever needs to be drained.

**Solids Separation**
To provide efficient removal of the sloughed biomass and solids produced in the Ideal MBBR™, the Idea DAF™ is coupled with the MBBR to provide a very compact treatment system. The Ideal DAF™ requires little chemistry to meet < 2 NTU water while with no chemistry typically achieves < 20 mg/L TSS and the sludge float achieved is greater than 4% allowing it to be sent directly to a digester with no additional thickening required, thus eliminating an operational step.

**Instrumentation and Controls**
In applications which require very specific and/or very rigid nutrient requirements, World Water Works has developed leading edge advanced control mechanisms and logic to closely control operating parameters and any chemical feedrates to achieve highly consistent and quality effluent conditions.
PRE-TREATMENT

MBBR → DAF

STANDARD PROCESS UPGRADE

MBBR → AS → CLARIFIER

COMPLETE BOD REMOVAL

MBBR → MBBR → DAF

POST NITRIFICATION

LAGOON → MBBR → DAF

COMPLETE BOD AND NITRIFICATION

MBBR → MBBR → MBBR → DAF

TOTAL NITROGEN REMOVAL

Anaerobic AS → Anoxic AS → IFAS → AS → CLARIFIER

Anoxic MBBR → MBBR → MBBR → Anoxic MBBR → DAF

POST DENITRIFICATION

AS → CLARIFIER → Anoxic MBBR → DAF