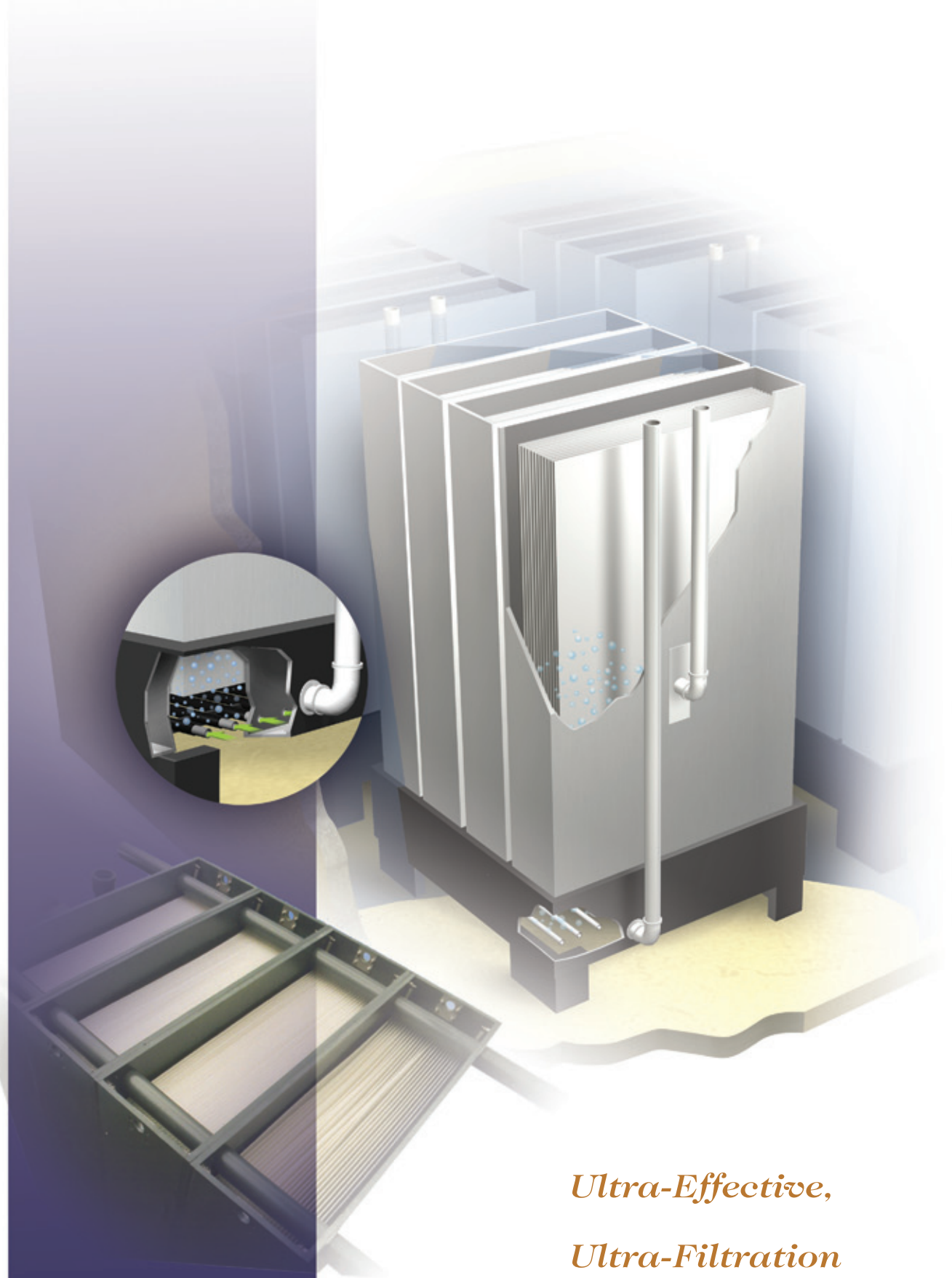


# MRI BIO-CEL<sup>®</sup> MBR



*Ultra-Effective,  
Ultra-Filtration  
MRI Bio-Cel<sup>®</sup> MBR*



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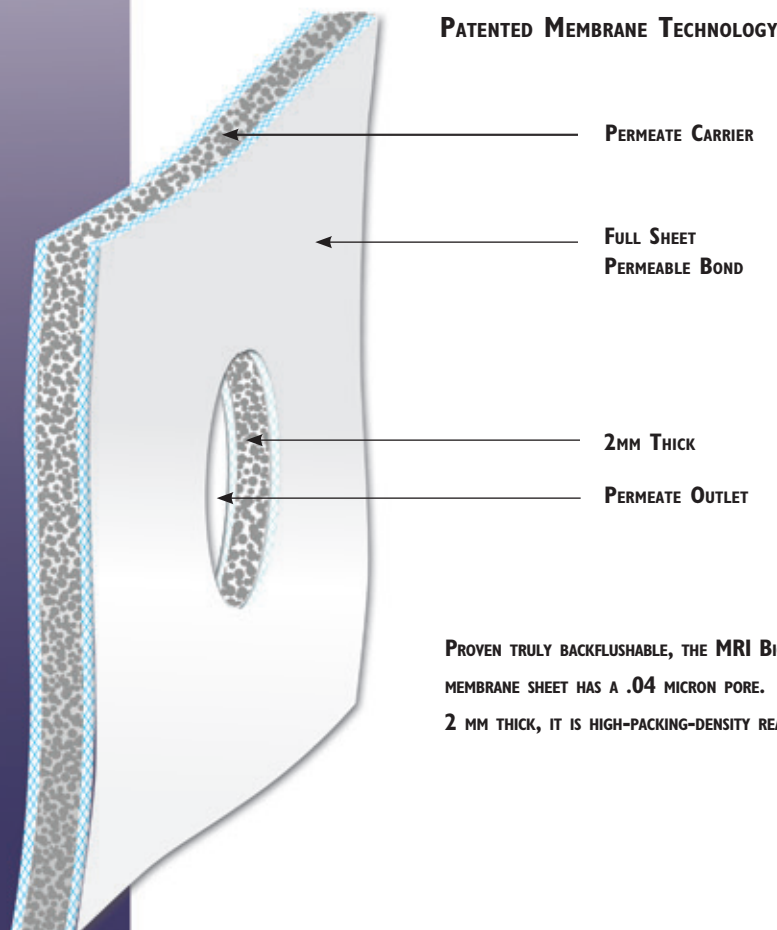
VISIT [WWW.MEURERRESEARCH.COM](http://WWW.MEURERRESEARCH.COM) FOR MORE INFORMATION.

*The future of wastewater treatment is here.*

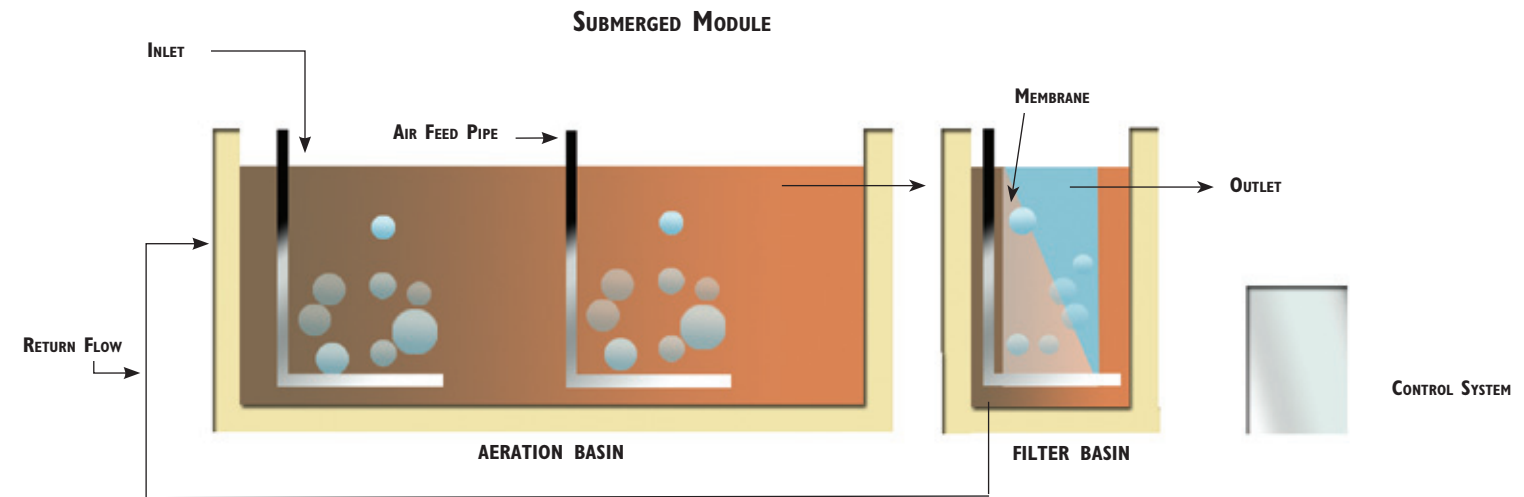
Today water and wastewater treatment facilities face tough challenges. Regulatory requirements are increasingly stringent, demand ever growing, and new facility construction fraught with difficulties. Overcoming these issues requires vast improvements in our water treatment systems' efficiency, reliability and economy.

The solution? Meurer Research, Inc.'s new ultra-effective, ultra-filtration Bio-Cel<sup>®</sup> Membrane Bio Reactor. This innovative, new membrane filtration system, exclusively from MRI, delivers the simple answer to effective wastewater treatment for today and tomorrow. Increased capacity, optimal flow rate and significantly higher effluent quality are gained—all in a reliable, automatic system with a 50% smaller footprint.

THE NEXT GENERATION IN MEMBRANE FILTRATION, THE MRI BIO-CEL IS PERMANENTLY HYDROPHILIC, ROBUST, BACKFLUSHABLE AND HAS HIGH-PACKING-DENSITY PROPERTIES. THE PATENTED SYSTEM IS EXCLUSIVELY AVAILABLE IN THE U.S. FROM MRI.



PROVEN TRULY BACKFLUSHABLE, THE MRI BIO-CEL FLEXIBLE MEMBRANE SHEET HAS A .04 MICRON PORE. MEASURING 2 MM THICK, IT IS HIGH-PACKING-DENSITY READY.



**HIGH-QUALITY EFFLUENT, SIGNIFICANTLY GREATER CAPACITY, 50% SMALLER FOOTPRINT, AND RELIABLE AUTOMATIC CONTROLS SET A NEW PERFORMANCE STANDARD FOR MEMBRANE BIO REACTORS.**

*Superior technology delivers optimal performance.*

Through a strategic partnership with Microdyn-Nadir, Germany's leading innovator in membrane filtration technology, Meurer Research has engineered the next great advancement in submerged membrane bio reactors. Using Microdyn-Nadir's patented flexible sheet membrane, the MRI Bio-Cel MBR combines biological wastewater treatment with membrane filtration, reducing impound time and yielding cleaner effluent.

**The system includes:**

**Biological Treatment Section** —This section includes the aeration basin and anoxic zone with mixers, blowers and air diffusers and is uniquely designed to work with ultra-filter modules.

A high level of bacteria and efficient oxygen transfer enable faster biodegradation and reduced impound time.

**Membrane Ultra-Filtration Unit**—Made with patented Bio-Cel flexible sheet membrane, this unit takes effluent quality and treatment capacity to a new level. The unit can be housed either in a separate basin (as shown above) or in the aeration tank depending on capacity needs and installation footprint.

**Control System**—Engineered for automation, the controls package is the heart of MRI's reliable wastewater treatment system. Powered by Rockwell Automation/Allen-Bradley, it includes Endress Hauser instrumentation, motor controllers and communications equipment. Efficiency gains can be significant and result in cost-savings.

# Patented design sets new performance standard.

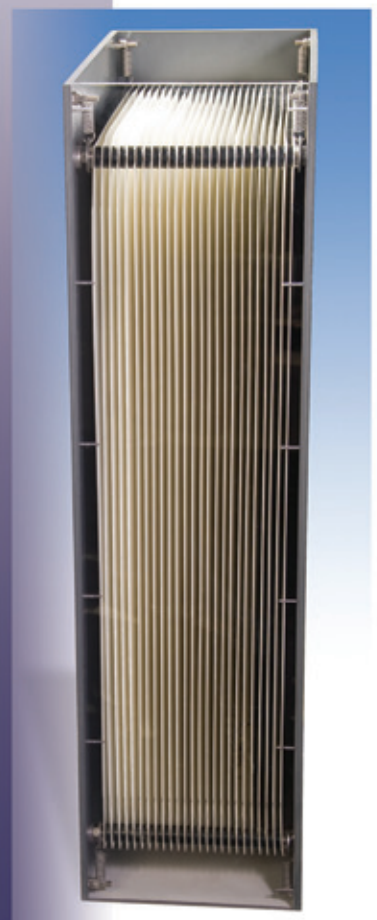
Only MRI Bio-Cel offers all the advantages of both rigid plate and hollow fiber membranes, while eliminating the disadvantages. Plus the MRI Bio-Cel offers benefits unique to the technological superiority of the new Bio-Cel flexible sheet membrane.

The result is more than the best of both worlds—it sets a new standard for reliability, efficiency, effluent quality and economy.

### Compare the advantages.

Like a reinforced hollow fiber, MRI Bio-Cel can be backflushed, has a high packing density, is self-healing and highly flexible.

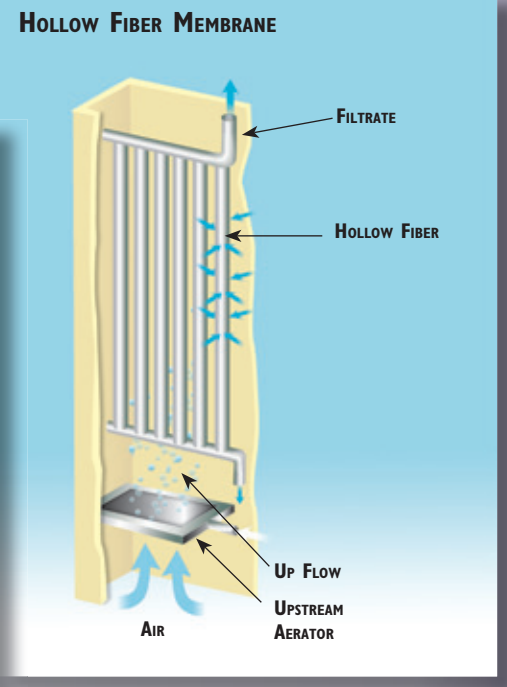
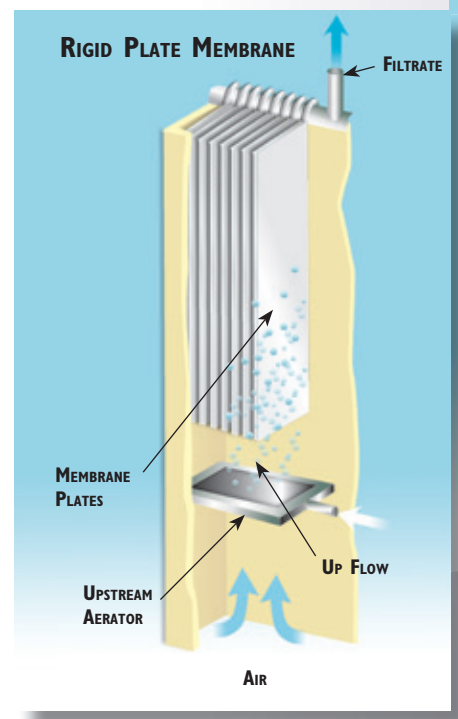
ONLY MRI BIO-CEL DELIVERS ALL THE ADVANTAGES OF RIGID PLATE AND HOLLOW FIBER MEMBRANES.



Like a conventional rigid plate, the MRI Bio-Cel flexible sheet has low-pressure operation, better clean-ability, less tendency for braiding and silting, and good hydraulic flow characteristics. Air sparge is introduced through a straight path, resulting in fewer chemical cleans.

Additional advantages of the MRI Bio-Cel flexible sheet are even flux and consistent transmembrane pressure over the entire membrane surface, low transmembrane pressure, less tendency to foul, fewer cleaning cycles, superior chemical cleaning due to the ability to backflush, and less stringent screening requirements compared to hollow fiber membranes.

CONVENTIONAL RIGID PLATE MEMBRANES OFFER LOW-PRESSURE OPERATION AND GOOD HYDRAULIC FLOW BUT CANNOT BE BACKFLUSHED.



HOLLOW FIBER OFFERS HIGH PACKING DENSITY AND CAN BE BACKFLUSHED BUT SILTING AND BRAIDING MAKE CLEANING INFERIOR AND BREAKAGE IS COMMON.

### THE BEST OF BOTH WORLDS – ONLY BETTER

	MRI Bio-Cel <sup>®</sup>	HOLLOW FIBER	RIGID PLATE
HIGH PACKING DENSITY	■	■	
BACKFLUSHABLE	■	■	
SELF-HEALING	■	■	
HIGHLY FLEXIBLE	■	■	
ULTRA-FILTRATION (.04 MICRONS)	■	■	
LOW BRAIDING	■		■
LOW SILTING	■		■
LOW PRESSURE OPERATION	■		■
HIGH CLEAN-ABILITY	■		■
HIGH HYDRAULIC FLOW	■		■
FEW CHEMICAL CLEANINGS NEEDED	■		■
EVEN FLUX OVER ENTIRE SYSTEM	■		
VERY LOW TRANSMEMBRANE PRESSURE	■		
LESS FOULING	■		
SUPERIOR IN-SITU CHEMICAL CLEANING	■		
LOW SCREENING REQUIREMENTS	■		
FILTERS MOST VIRUSES	■		
NO SLIME LAYER REQUIRED	■		

# The ultra-effective solution for high-quality effluent.

Engineered for rugged precision, MRI's cutting-edge Bio-Cel Membrane Bio Reactor combines biological wastewater treatment with membrane filtration to produce high-quality effluent free of biomass, bacteria and particles. It meets standards such as the California Title 22 and EU Bathing Water Standard and is suitable for effluent recycling, or use with nanofiltration, RO, U.V. and other treatments.

## MEMBRANE MODULE

The module contains the complete assembly needed for high-quality effluent, including membrane cassettes and frames with diffusers.

## MEMBRANE CASSETTE

Made with durable PVC, the membrane cassette houses densely packed membrane sheets.

## FLEXIBLE MEMBRANE SHEET

MRI Bio-Cel sheets enable safe rejection of biomass, bacteria and particles due to pores measuring 1/1200 the size of a human hair and they are self-healing.

## FRAME

The rugged structure is designed to contain a specified number of cassettes and diffusers.

## PERMEATE PORT

MRI Bio-Cel MBR's elongated oval port design delivers optimal hydrodynamics and connects the permeate layer of each membrane sheet.

## PERMEATE TUBE

The permeate tube connects permeate ports on the membrane sheets to the outlet manifold for high-quality effluent discharge.

## DIFFUSER AIR FEED

Sealed lines direct air to the fine bubble diffusers.

## FINE BUBBLE DIFFUSER GRID

Unique fine bubble diffusers deliver more efficient oxygen transfer for faster biodegradation and create turbulent cross-flow to clean the membrane.

## OPERATION OF THE MRI BIO-CEL MEMBRANE BIO REACTOR.

Screened Influent enters the aeration basin and is treated by bacteria and oxygen, then flows to the filtration basin where it enters the membrane filter cassettes. The flow then moves rapidly upward, driven by a stream of fine air bubbles introduced by the diffuser, and enters the flexible membrane sheet through .04 micron pores. Biomass, bacteria, most viruses and all solids are filtered. Suction pulls filtered water through the permeate layer into the permeate tube. Discharge is high-quality effluent, ready for recycling, further treatment, or return to the environment.

MRI BIO-CEL® MBR

# Precise engineering. Proven technology.

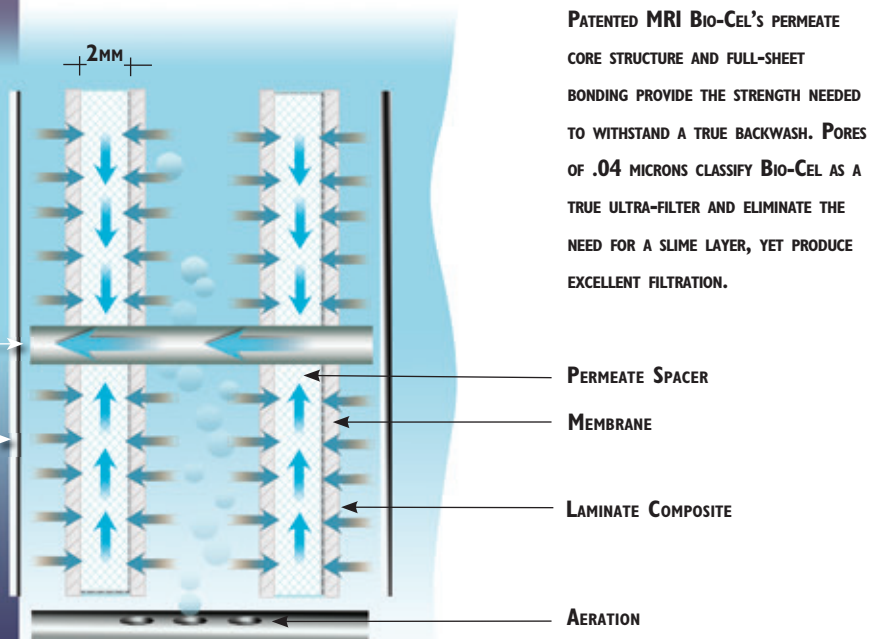
Proven in hundreds of successful installations, the MRI Bio-Cel utilizes large flexible sheets manufactured by Microdyn-Nadir, GmbH. In a highly developed process, the sheets are made by casting polyether sulfone onto non-woven polyester substrates. The result is the strong, robust UP-150 membrane, the basis of the MRI Bio-Cel.

The uniquely superior Bio-Cel flexible sheet is made by bonding two UP-150 membranes to a woven polyester permeate core. The permeate core structure coupled with the full-sheet bonding process give the membranes a high degree of strength. This strength allows the membrane to be backwashed without breakage, tearing or ballooning.

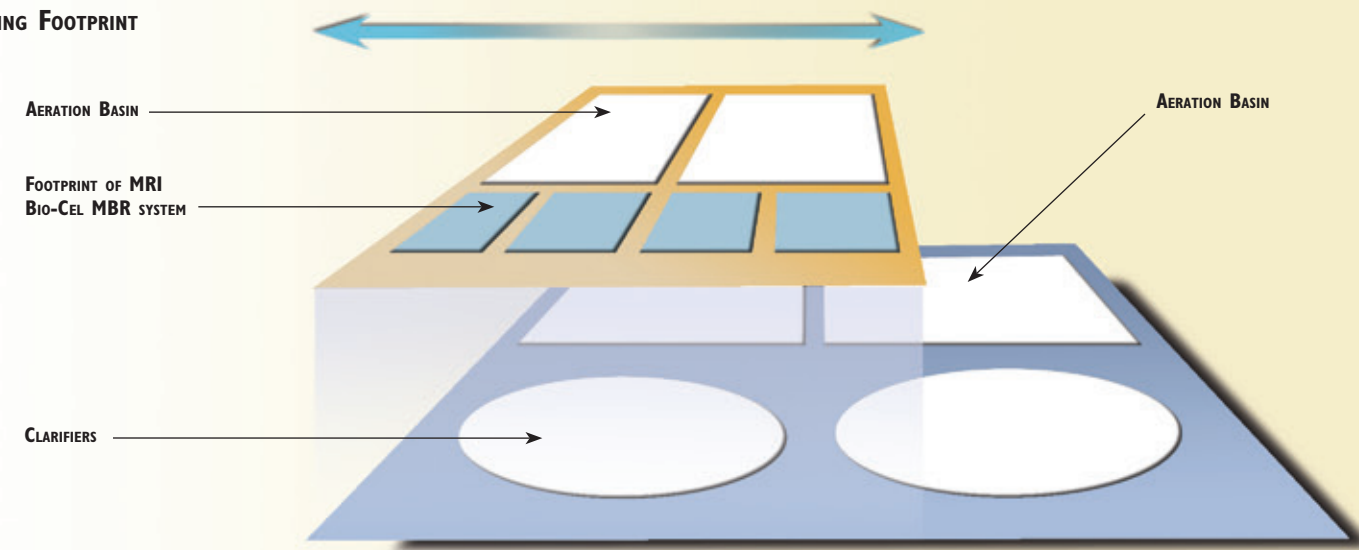
Available exclusively from MRI, the patented Bio-Cel flexible sheet has advantages over the conventional rigid plate membrane. Its robust PES (polyether sulfone) membrane has pores of 0.04 microns, classifying it as a true ultra-filter. Unlike the 0.4 micron pores of polyethylene membranes, the MRI Bio-Cel does not require a slime layer to provide excellent filtration, which simplifies operation and cleaning.



THIN FLEXIBLE SHEET MEMBRANES ALLOW COMPACT MODULE DESIGN.



## SPACE-SAVING FOOTPRINT



THE 50% FOOTPRINT REDUCTION ACHIEVED BY THE MRI BIO-CEL MBR SYSTEM IS MADE POSSIBLE BY A HIGH LEVEL OF BACTERIA IN THE AERATION PROCESS, WHICH INCREASES THE SPEED OF BIODEGRADATION. THIS ALLOWS THE AERATION TANK SIZE TO BE CUT BY HALF AND ELIMINATES THE NEED FOR ALL SETTLING BASINS.

## Reliable automatic operation. Space-saving solution.

Today virtually every treatment plant is upstream to the next town's water source. As a result, high-quality effluent is increasingly important. MRI's Bio-Cel MBR provides an environmentally sound solution that requires 50% less space than a conventional wastewater treatment plant. Computerized control systems enable automatic operation for reliable output and greater cost-efficiency.

### ADVANTAGES OF THE MRI BIO-CEL MBR:

- DECREASES FOOTPRINT BY 50% OR MORE
- ENHANCED, CONSTANT AND RELIABLE QUALITY OF TREATED WATER
- POSSIBLE RECYCLE OF EFFLUENT
- SAFE REJECTION OF BIOMASS, BACTERIA AND PARTICLES
- TREATMENT OF DIFFICULT SUBSTANCES DUE TO LONG SLUDGE RETENTION TIME
- POSSIBLE TREATMENT OF NITROGEN AND PHOSPHOROUS
- HIGHER TREATMENT EFFICIENCY DUE TO INCREASED CONCENTRATION OF BIOMASS IN THE ACTIVATED SLUDGE PROCESS
- OPTIMIZATION AND CAPACITY INCREASE FOR CONVENTIONAL PLANTS THROUGH RETROFITTING
- ELIMINATION OF SECONDARY AND FINAL SEDIMENTATION
- EFFLUENT SUITABLE FOR USE IN NANOFILTRATION, R.O., AND U.V.
- USES CROSS-FLOW FILTRATION WITH AIR SCOURING TO PREVENT FOULING
- EASY IN-SITU CHEMICAL CLEANING WITH SODIUM HYPOCHLORITE FOR ORGANIC FOULING OR CITRIC ACID FOR INORGANIC FOULING
- AUTOMATED CONTROLS FOR SIMPLE OPERATION AND CONSISTENT AND RELIABLE PERFORMANCE
- HIGH OXYGEN TRANSFER RATE THROUGH THE USE OF FINE BUBBLE AERATORS UNDER THE MEMBRANES FOR CLEANING AND CROSS-FLOW

*American Ingenuity. German Innovation.*

*Trust MRI for trend-setting innovation.*

Experience, reliability, creativity and know-how. These are the qualities that have enabled Meurer Research to lead advancements in water and wastewater treatment solutions since 1978.

Now Meurer Research is pleased to be a strategic partner with Microdyn-Nadir, as the sole U.S. provider of the MRI Bio-Cel Membrane Bio Reactor—another innovation in MRI's more than 30-year history of cutting edge advancements.

With over 50 patents and thousands of installations, from design, engineering and production to installation, education and after-market customer service, MRI has helped utility companies, municipalities and engineers find solutions to complex issues.

THE MRI BIO-CEL MBR DELIVERS THE EFFICIENCY, RELIABILITY, COST-SAVINGS AND HIGH-QUALITY EFFLUENT NEEDED TO SOLVE COMPLEX WASTEWATER TREATMENT ISSUES.



**OTHER PRODUCTS AVAILABLE FROM MEURER RESEARCH ARE:**

- INCLINED PLATE SETTLERS
- HOSELESS CABLE-VAC™ SLUDGE COLLECTORS
- ULTRA-SCRAPER SLUDGE COLLECTORS
- PADDLE WHEEL AND TURBINE FLOCCULATORS
- MEMBRANE PRE-TREATMENT
- MEMBRANE FILTERS
- PACKAGE PLANTS
- PILOT PLANTS
- FLOATING PLATE SETTLERS
- BACKWASH AND RESIDUALS RECLAIM
- TUBE SETTLERS
- BAFFLES
- SUPPORT STRUCTURES
- TROUGHS
- BASIN INLET INFUSERS

**MRI BIO-CEL MODULES**

PRODUCT CODE TYPE	FRAME SIZE	CASSETTE SIZE	MEMBRANE MATERIAL
BC50F-C25-UP150	538 SQ. FT.	270 SQ. FT.	ULTRA-FILTRATION 150 kDa
BC100F-C25-UP150 Bio-CEL® MODULE	1076 SQ. FT.	270 SQ. FT.	
BC400F-C100-UP150	4300 SQ. FT.	1076 SQ. FT.	

**MEMBRANE MATERIAL**

POLYMER	MWCO	PORE SIZE	SUPPORT LAYER	DRAINAGE	CHLORINE RESISTANCE
POLYETHER SULFONE (PES)	150 kDa	0.04 UM	POLYESTER	POLYESTER	100,000 PPMH

**MODULE AND OPERATING DATA**

PARAMETERS	BC50F-C25-UP150	BC100F-C25-UP150	BC400F-C100-UP150
MEMBRANE SURFACE	PES	PES	PES
FRAME MATERIAL	PE	PE	PE
CASSETTE MATERIAL	PVC	PVC	PVC
DIMENSIONS (IN)	30 x 28 x 63	55 x 28 x 63	57 x 46 x 107
OPERATING PRESSURE	.44 – 5.8 PSI	.44 – 5.8 PSI	.44 – 5.8 PSI
BACKWASH PRESSURE	MAX. 2.2 PSI	MAX. 2.2 PSI	MAX. 2.2 PSI
MAX. OPERATING TEMPERATURE	130° F	130° F	130° F

*Microdyn-Nadir.  
Proven leader in membrane filtration.*

For more than four decades Microdyn-Nadir, GmbH, located in Wiesbaden, Germany has successfully developed and produced membrane filtration products for a variety of applications.

MRI is pleased to partner with Microdyn-Nadir to bring this groundbreaking innovation to the United States. MRI Bio-Cel MBR is a solution for engineers and facility managers as they face increased demand for wastewater treatment and ever higher regulatory standards and cost constraints.

