

MRI PILOT SYSTEMS



MRI Pilot Systems
Optimizing Treatment Strategies



redict treatment efficacy with MRI

MRI MEMBRANE PRE-TREATMENT PILOT SYSTEMS PROVIDE CONSISTENT FEED WATER TO ENSURE RELIABLE TEST RESULTS WHEN COMPARING MULTIPLE MEMBRANE PILOTS AND ARE AVAILABLE IN HORIZONTAL OR VERTICAL (SHOWN) CONFIGURATIONS.



Meurer Research, Inc. (MRI) began building products to enhance water and wastewater treatment processes more than thirty years ago. Since that time, MRI has developed and patented many industry-changing products including stainless steel plate settlers, low profile sludge removal devices, paddle and turbine flocculators, membrane filters, and complete control systems.

Dedicated to optimizing water quality and efficiency, MRI offers a full line of pilot systems designed to help establish parameters for treatment processes—whether utilizing MRI treatment equipment or other brands. The result is improved, consistent water quality and increased efficiency.

MRI Pilot Systems. More variety – less trouble.

MRI's pilot systems are accurate and reliable, enabling treatment strategies to be replicated off-line. Once strategies are optimized, the parameters can be scaled and promptly deployed to the full system.

MRI's pilot equipment comes in a range of sizes and can be mixed and matched for a number of purposes, including:

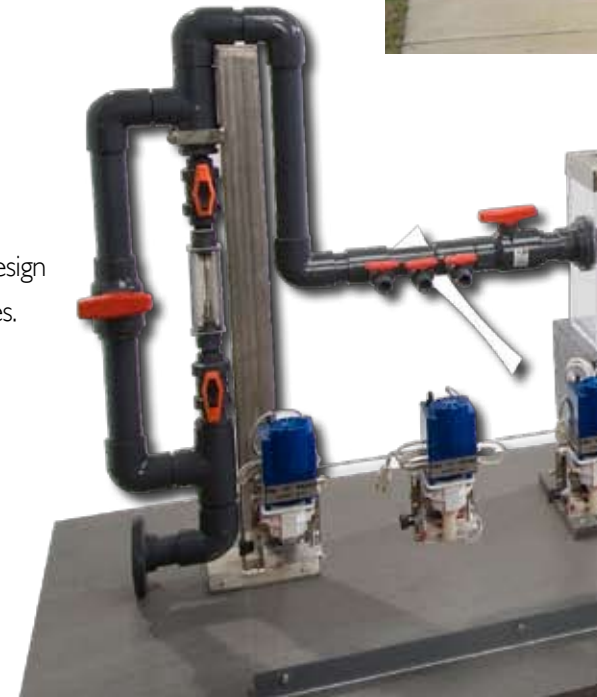
- Pilot test units to establish process protocol
- Large membrane pretreatment units to test multiple subjects
- MBR pilots to test parameters for high-quality effluent

MRI Time Machine. Mini and modular.

The MRI Time Machine is a small-sized, full-capability system. The modular design offers off-the-shelf customization for water treatment plants, labs or universities.

Uses include:

- Manage and optimize coagulants
- Experiment with treatment strategies
- Teach treatment modalities at universities



Pilot Systems.



MRI's large pilot systems available to lease.

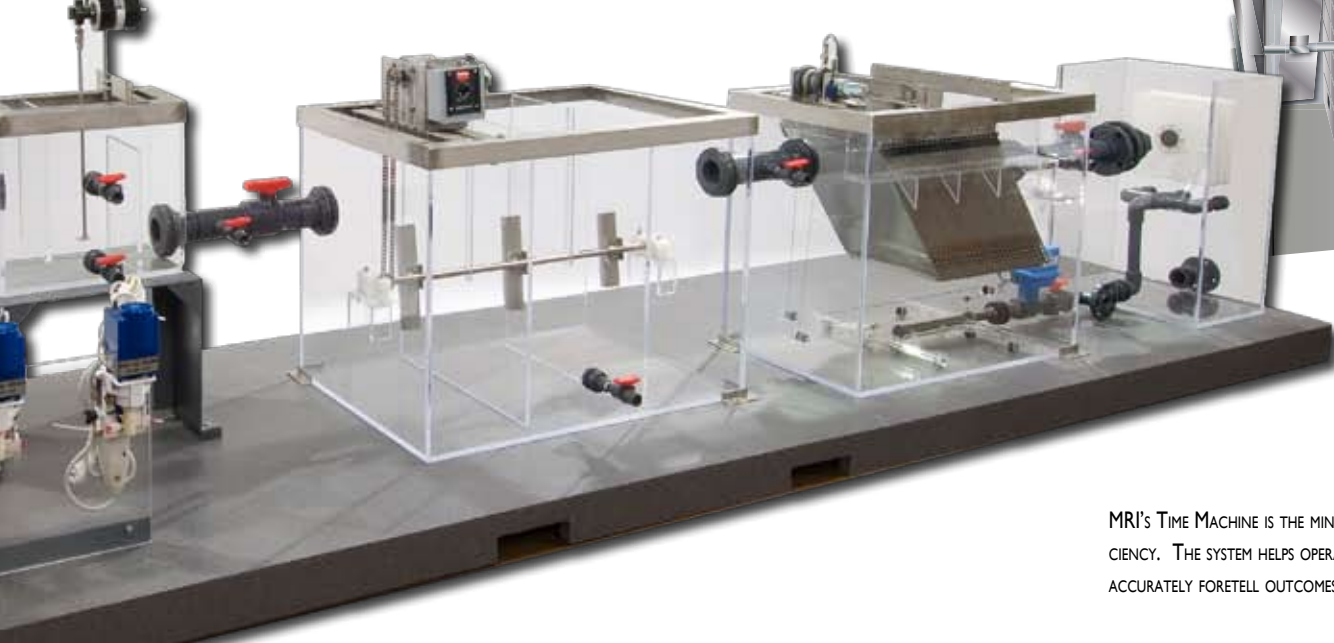
MRI offers large-scale pilot systems to treat flows up to hundreds of gpm. Available to lease on a monthly basis, the systems are generally in stock. Each system includes chemical feed, rapid mix, multi-stage flocculation, inclined plate sedimentation, and sludge removal. Systems are automated with a self-contained control system and have the option of being accessed through the Internet. Long-lasting and durable, the systems are manufactured entirely of stainless steel, including the tank and internal components.

The MRI membrane pretreatment package plant is most popular for providing consistent feed water to multiple membrane pilot units undergoing performance testing. The advantages of utilizing this pilot include providing same-quality feed water to each of the membranes or other filters being tested in order to properly compare performance results.

LARGE MRI PILOT SYSTEMS ARE USED TO ESTABLISH PROCESS PROTOCOLS, WHICH ONCE OPTIMIZED, ARE SCALED AND APPLIED TO THE FULL WATER TREATMENT PLANT.



ILLUSTRATION SHOWS INTERNAL COMPONENTS OF 100 GPM MRI PILOT SYSTEM. ALL PARTS ARE MADE OF HIGH-GRADE STAINLESS STEEL FOR LONG-LIFE AND DURABILITY



MRI'S TIME MACHINE IS THE MINIATURE SYSTEM THAT ENABLES MAXIMUM EFFICIENCY. THE SYSTEM HELPS OPERATORS REPLICATE TREATMENT PROCESSES AND ACCURATELY FORETELL OUTCOMES.

*Patented

Introducing the MRI Time Machine.

The first step toward optimal efficiency.

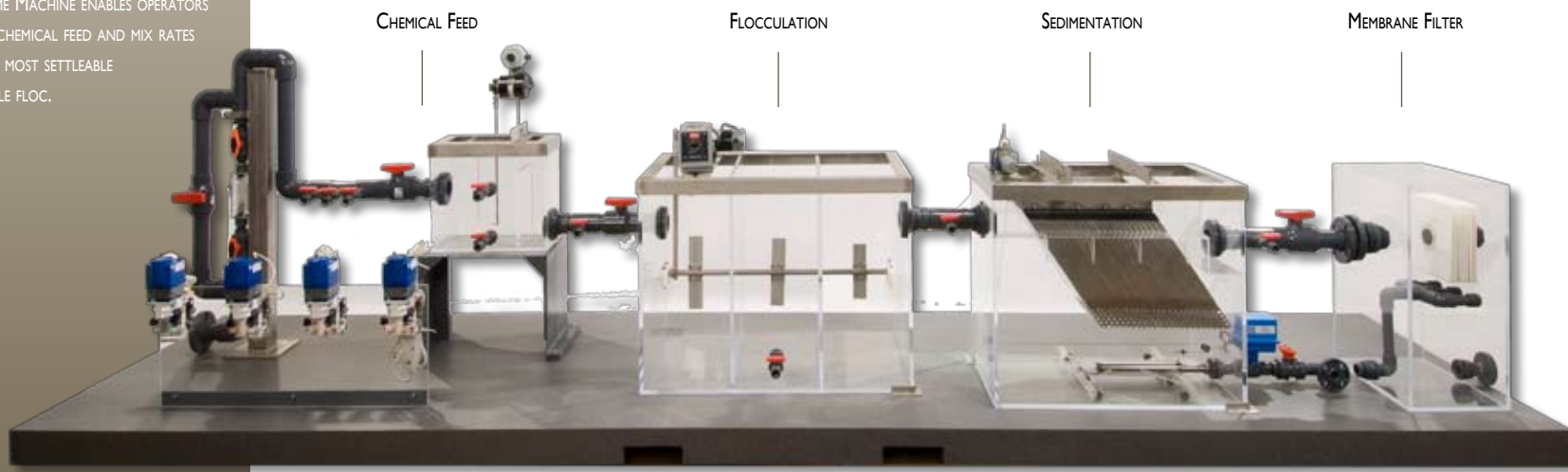
The first step in any water treatment process is to determine a workable set of coagulants and the proper dosage of each to build the most settleable and filterable floc. MRI's Time Machine is the ideal tool to help that determination.

Designed to operate at a low flow rate of 1-5 gpm, the Time Machine is a system of treatment modules used to predict the efficacy of different chemicals and associated parameters such as G-values, specific overflow rates, and amount of sludge withdrawal.



THE MRI TIME MACHINE ENABLES OPERATORS TO OPTIMIZE CHEMICAL FEED AND MIX RATES TO BUILD THE MOST SETTLEABLE AND FILTERABLE FLOC.

MRI TIME MACHINE



BEGINNING WITH THE CHEMICAL FEED PUMP, THE TIME MACHINE REPLICATES EACH TREATMENT STAGE AND ALLOWS FOR OFF-LINE MODIFICATION OF TREATMENT STRATEGIES, FROM MODULATING G-FACTORS IN THE RAPID MIX, TO PREDICTING TURBIDITY CHANGES.

Mix and match modules enable easy customization.

Chemical Module includes variable speed rapid mix chamber.

By providing an early warning system for turbidity changes, the MRI Time Machine permits optimum chemical dosages and reduces chemical costs by enabling consistent dosage control. In some cases, the Time Machine can replace traditional jar tests. The Time Machine consists of four standard modules: rapid mix with chemical feed; flocculation with variable speed paddles or turbines; sedimentation with automatic sludge collection; and membrane filtration. Modules can be computer-controlled and data-monitored, or customized to simulate other processes.



CHEMICAL MODULE

Flocculation Module available as paddle wheel, turbine, or hydraulic.

MRI's standard flocculation module consists of three horizontal paddle wheels mounted on a single longitudinal shaft. The paddle wheel flocculator provides tapered flocculation, which can be adjusted by a variable speed drive. Flow is received from the chemical feed/rapid mix module, which provides specific energy input and detention time to allow growth of flocculant particles. The variable speed motor can be computer controlled by the overall process control system. Other options available include multiple vertical turbines or hydraulic flocculation.



FLOCCULATION MODULE

Sedimentation Module augments or eliminates jar testing.

MRI's standard sedimentation module is based on a scaled version of MRI's full-sized stainless steel inclined plate settlers. The scaled version utilizes the same parameters such as specific overflow rate as the full-size version. As the particulates are removed from the flow stream and eventually settle to the bottom of the tank, a scale module of the MRI Hoseless Cable-Vac removes the sludge, which can also be computer controlled.

The sedimentation module prepares the flow for filtration; however, the turbidity after sedimentation may also be of interest. The module is accurate enough that it can be used to augment or even eliminate jar testing for full-scale sedimentation.



SEDIMENTATION MODULE

Membrane Filter Module replicates full-sized system.

MRI's standard membrane filter module is based on a scaled version of MRI's full-size flexible sheet membrane ultra-filter used in both water and wastewater treatment applications. The module includes the ability to clean membranes using backflush, air scour, and chemical cleaning. The membrane flux can be varied and like the other modules, can be computer automated and computer monitored. Additionally, multiple filters can be placed in the tank and run simultaneously with independent parameters.



MEMBRANE MODULE

*Reduce chemical cost.
Ensure consistently high-quality water.*

By providing an early warning system for turbidity changes, the MRI Time Machine permits optimum chemical dosages and reduces chemical costs by enabling consistent dosage control. In some cases, the Time Machine can replace traditional jar tests.

The Time Machine consists of four standard modules: rapid mix with chemical feed; flocculation with variable speed paddles or turbines; sedimentation with automatic sludge collection; and membrane filtration. Modules can be computer controlled and data monitored, or customized to simulate other processes.



EASY TO OPERATE, MRI'S GRAPHICAL MENU-DRIVEN, TOUCH SCREEN CONTROL SYSTEM IS DESIGNED TO OPERATE THE MRI TIME MACHINE INCLUDING MULTIPLE MEMBRANE FILTERS.





Pilot MBR: fully automated with sophisticated

MRI also manufactures fully automated and instrumented pilot Membrane Biological Reactor plants. The MBR pilot plant accepts raw sewage and provides complete treatment to produce a crystal clear effluent with close to zero turbidity. The pilot plant allows maximum flexibility and ease-of-operation in selecting different parameters and monitoring them. Control and monitoring can be set up on the Internet.



LEFT - INSIDE OF CONTROL PANEL CENTER - MEMBRANE FILTER TANK SHOWS AIR CONTROLS AND INSTRUMENTS. RIGHT - MEMBRANE FILTER TANK IN OPERATION CONTAINS MIXED LIQUOR SUSPENDED SOLIDS UP TO 12,000 PPM.

Web-based controls.

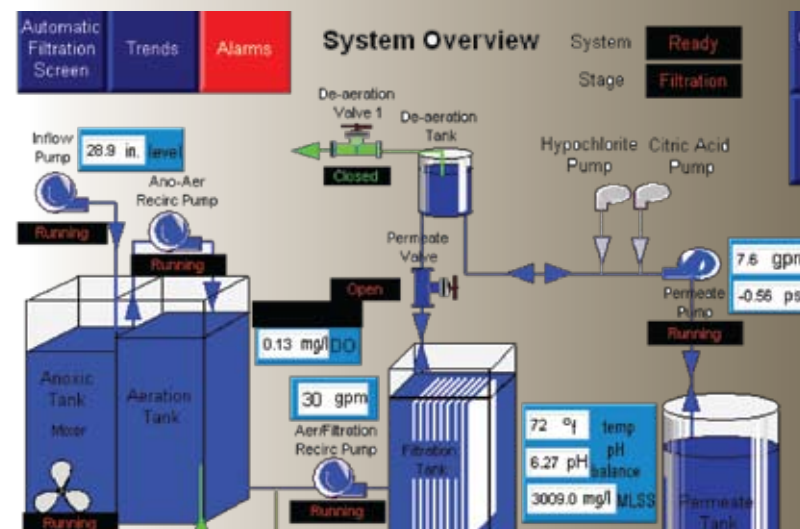
Trust MRI for trend-setting innovation.

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 offer a choice in pilot systems—continuing the innovative and efficient designs in MRI's more than 30-year history of 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.

- Inclined Plate Settlers
- Hoseless Cable-Vac™ Sludge Collectors
- U/S Ultra-Scraper Sludge Collectors
- Paddle Wheel and Turbine Flocculators
- Membrane Pre-Treatment
- Package Plants
- Floating Plate Settlers
- Backwash and Residuals Reclaim
- Baffles for Aeration, Floc and Contact Chambers
- Tube Settlers
- Pilot Plants
- Membrane Filters
- MBRs



REMOTE OPERATION OF THE MBR PILOT PLANT IS SHOWN IN THIS COMPUTER SCREEN CAPTURE.



MEURER RESEARCH, INC.
6270 JOYCE DRIVE
GOLDEN, COLORADO 80403
(303) 279-8373
FAX (303) 279-8429

VISIT WWW.MEURERRESEARCH.COM FOR MORE INFORMATION.