

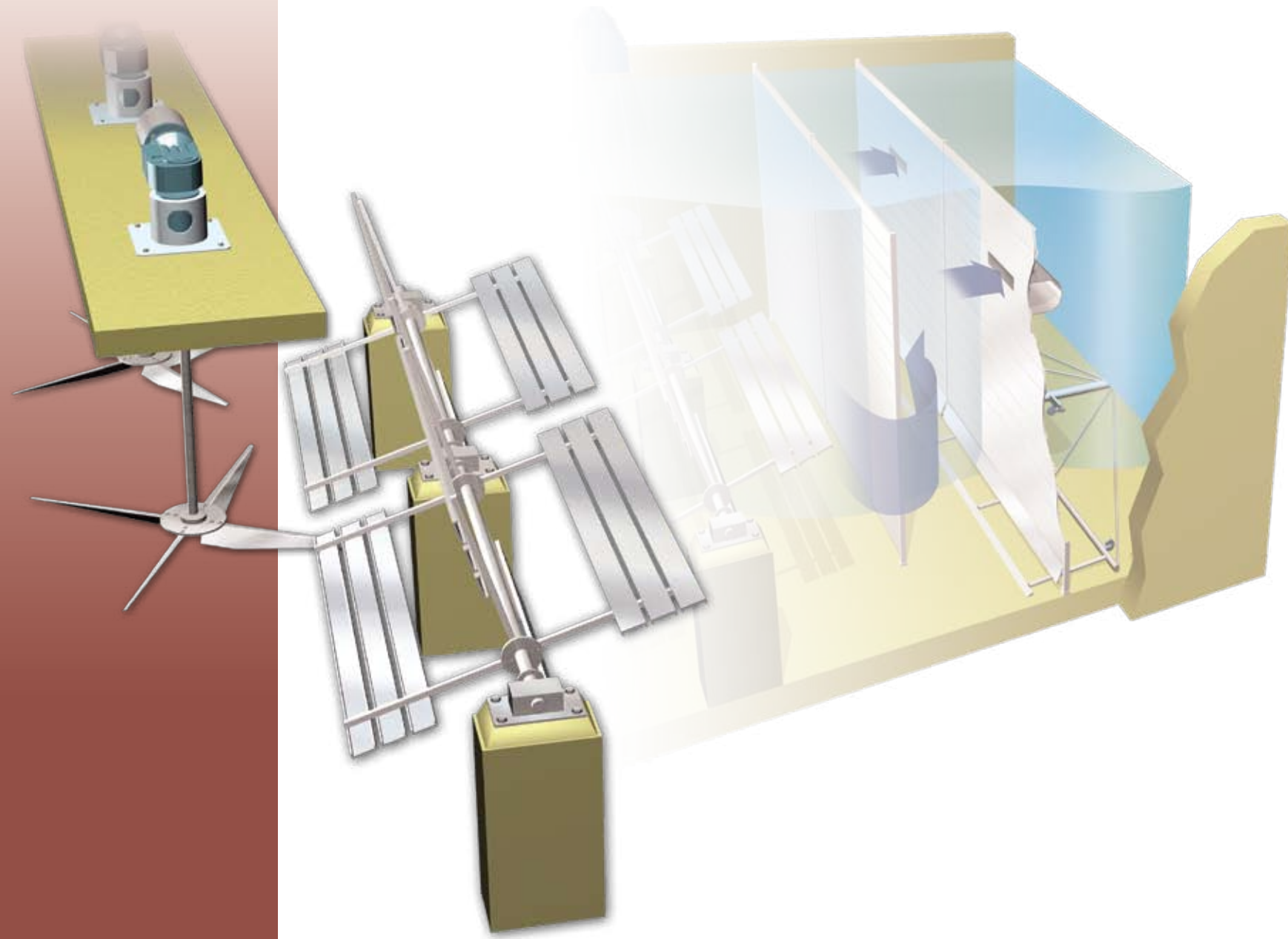


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MRI FLOCCULATION



MRI Flocculation Systems™

Mix & Match for Maximum Pretreatment Control

Presenting a new era in flocculation.

Today, with increasingly stringent regulations and the quick adoption of membrane filtration, the pressure is on for all stages of pretreatment—chemical feed, flocculation, sedimentation and filtration—to act in concert.

In response, Meurer Research, Inc. has developed MRI Flocculation Systems™—integrating essential flocculation components into multi-stage systems with self-cleaning hydraulic final stages, maximizing versatility and performance.

Optimize pretreatment with multi-stage MRI Flocculation Systems.

MRI's innovative multi-stage flocculation system eliminates the trade-offs typically associated with G-value turbulence and delivers maximum control and efficiency for every pretreatment stage. By staging mechanical and hydraulic flocculators and leveraging a maximum range of G-values—from 2,000 to 0—MRI Flocculation Systems help operators fine-tune flocculation. In addition, MRI partners with specialty chemical manufacturers to provide systems with superior ability to accommodate seasonal changes in raw water conditions.

MRI Flocculation Systems include:

- Extremely high-G vertical turbine mixers for rapid mix stage
- High-G vertical turbine for first-stage flocculation
- Mid-G horizontal paddle wheel mixers for second and third stages
- Extremely low-G hydraulic mixer for combined final stage and buffer zone
- MRI Scraper with hinged bottom plank for final stage sediment clean-up
- Ported or serpentine baffles for stage separation
- Option to mix & match for enhanced effectiveness

MIX & MATCH — ONLY FROM MRI				
	HIGHEST G-VALUE	MID G-VALUE	LOWEST G-VALUE	SELF-CLEANING HYDRAULIC FINAL STAGE
TURBINE FLOCCULATOR	■			■
PADDLE WHEEL FLOCCULATOR		■		■
HYDRAULIC FLOCCULATOR			■	■
MIX & MATCH OPTION	■	■	■	■
SINGLE SOURCE MANUFACTURER	MRI	MRI	MRI	MRI

Go full-G. Only with MRI Flocculation Systems.

Optimizing G-values for each pretreatment stage is essential—from extremely high in the rapid mix stage to extremely low in the hydraulic final stage. Only MRI's Flocculation Systems enable maximal outcomes through a choice of variable speed turbine, paddle, and hydraulic mixers, and the option of mixing flocculator styles. The result—mechanical mixers can operate at higher speeds without impacting quiet zones in the sedimentation basin.

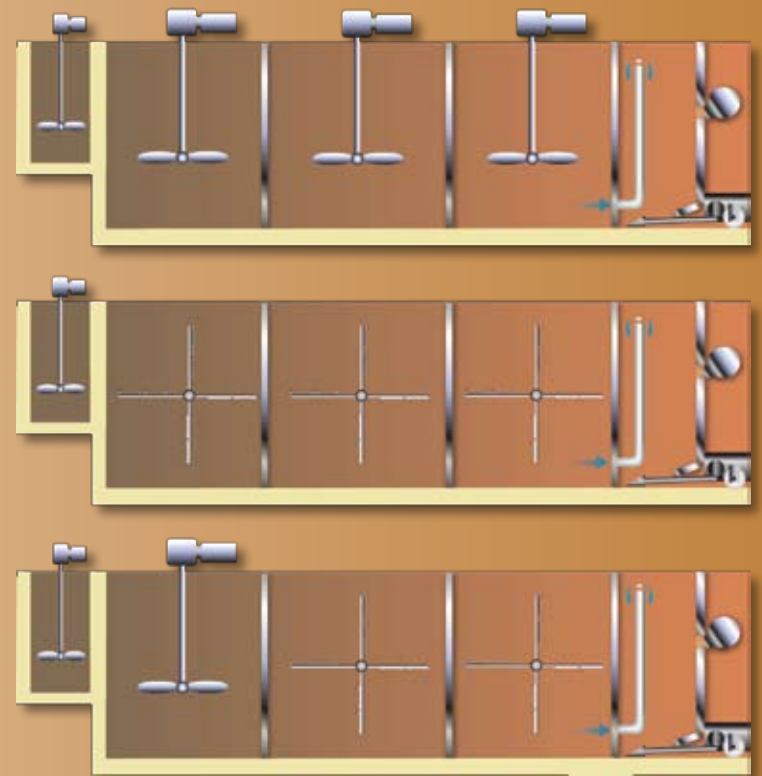
Alleviate clarifier turbulence with the self-cleaning hydraulic stage.

MRI Flocculation Systems™ utilize hydraulic mixing to reach new G-value lows in the final pre-sedimentation stage, which quiets turbulence and creates a buffer zone. Self-cleaning, the MRI hydraulic final stage is equipped with a patented hinged bottom plank* which allows a scraper mounted to the MRI Sludge Collector to travel into the final stage and remove incidental sediment. In addition, the hydraulic stage consumes zero energy, and is very low maintenance.

ONLY MRI SYSTEMS PROVIDE FULL RANGE OF G-VALUES								
G-VALUES	2000	100	80	60	40	20	10	0
FLOCCULATOR TYPE	RAPID MIX		TURBINE			PADDLE WHEEL		HYDRAULIC

MIX & MATCH FOR BEST RESULTS

MRI FLOCCULATION SYSTEMS CAN USE VERTICAL TURBINE, HORIZONTAL PADDLE WHEEL, OR HYDRAULIC FLOCCULATION OR A COMBINATION IN THE FIRST THREE STAGES, ALLOWING FOR A WIDE RANGE OF G-VALUES. BASIN CONFIGURATION OR PREFERENCE CAN DETERMINE WHICH DEVICE IS BEST SUITED. THE MRI ULTRA-SCRAPER OR HOSELESS CABLE-VAC™ REMOVES SETTLED SOLIDS FROM THE HYDRAULIC FINAL STAGE.



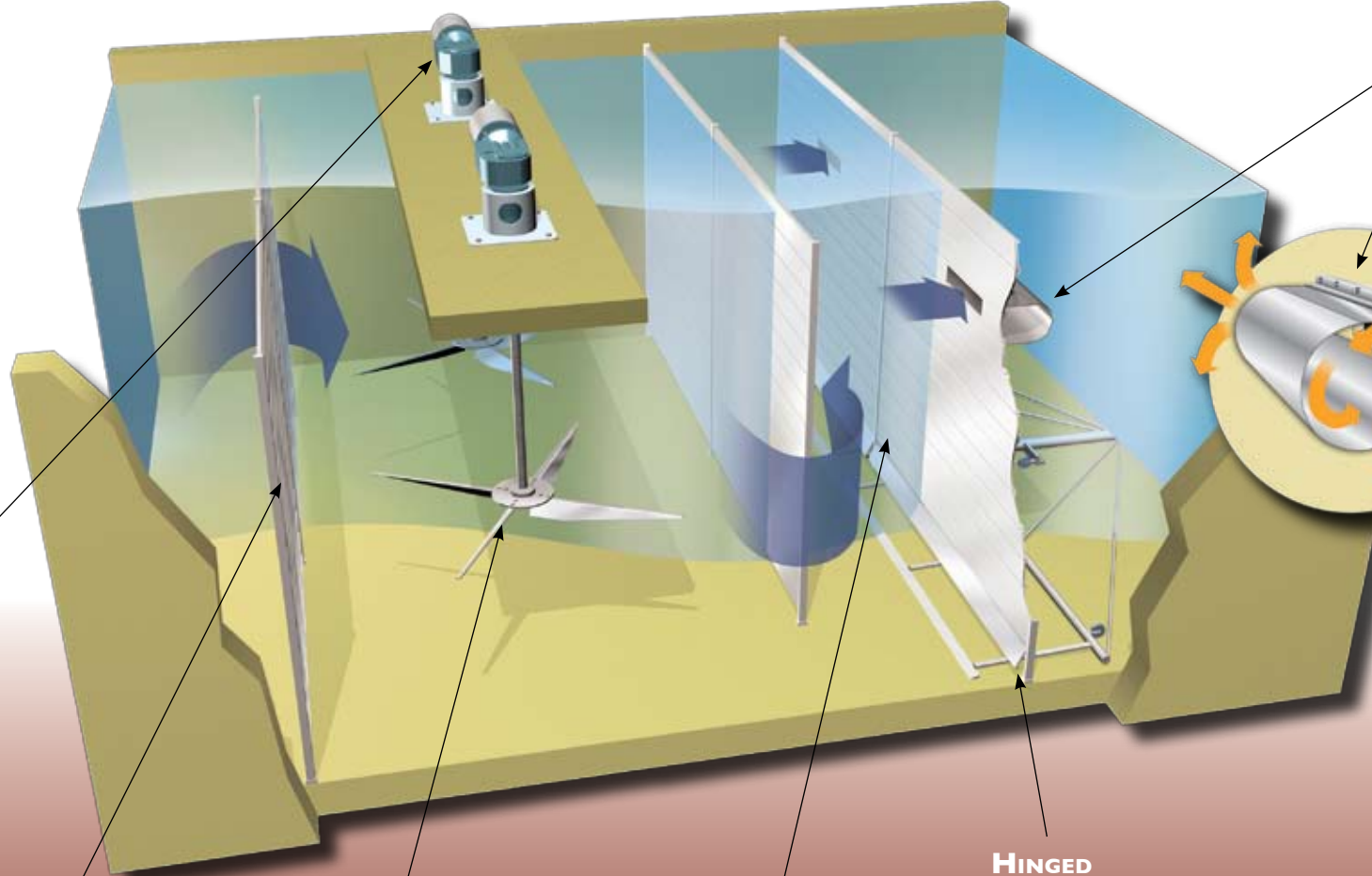
MRI MANUFACTURES VERTICAL TURBINES (SHOWN), HORIZONTAL PADDLE WHEELS AND HYDRAULIC BAFFLES TO MIX AND MATCH.

*Patented

The new standard in flocculation: a systemized approach.

Vertical turbine flocculators deliver wide variable ranges.

MRI's vertical turbine flocculators offer high collision rates while using less energy. By producing an axial flow pattern, vertical turbines provide more efficient use of the flocculation area and prevent incidental settling. Each paddle has a unique drive allowing more versatility in mixer speeds and flow directions. Combined with a self-cleaning, low-G final hydraulic stage, as found exclusively in MRI Flocculation Systems™, the vertical turbine flocculator is flexible and efficient.



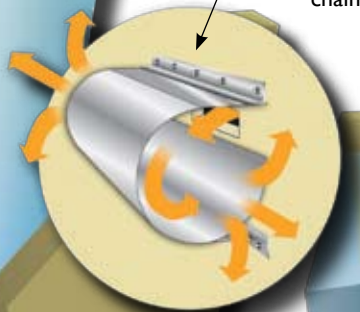
DRIVE UNIT
Each vertical turbine mixer comes with its own drive unit, which can be adjusted individually.

STAGING BAFFLES
Ported or Serpentine MRI staging baffles provide maximum flexibility and hydraulic control.

TURBINE
Axial, radial, or mixed flow impellers are available.

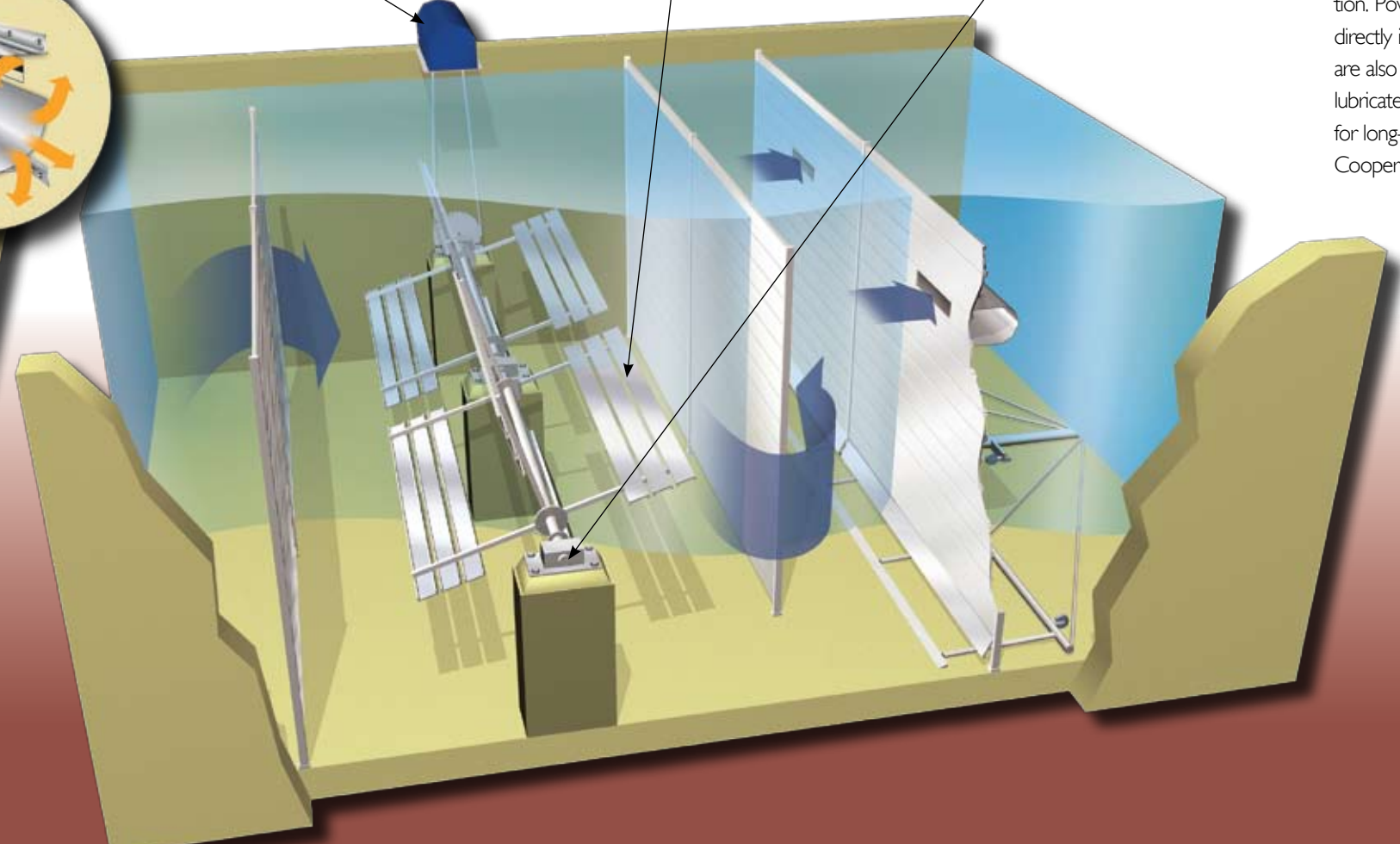
HYDRAULIC FINAL STAGE
MRI's unique self-cleaning hydraulic final stage flocculator allows low-G with minimal cleaning maintenance.

HINGED BOTTOM PLANK
Patented design opens to allow automated cleaning by MRI Sludge Collector.



INLET DIFFUSER
Quick and easy to install, MRI's diffusers take the energy out of flow entering the sedimentation basin so floc particles settle faster.

DRIVE UNIT
MRI's drive unit is provided with stainless steel chain to transmit power to the underwater shaft.



STAINLESS STEEL PADDLES
MRI's all stainless system avoids wood or FRP deterioration.

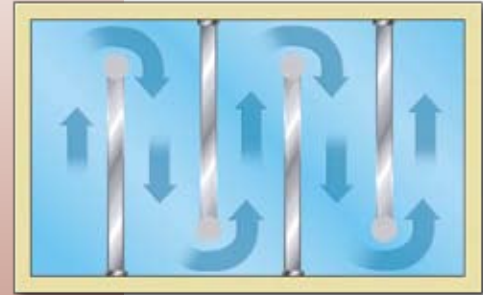
SHAFT BEARING
MRI standard shaft bearings are water lubricated, UHMW polyethylene for years of nearly zero maintenance service.

Horizontal paddle wheel flocculators enable lower mixing speeds.

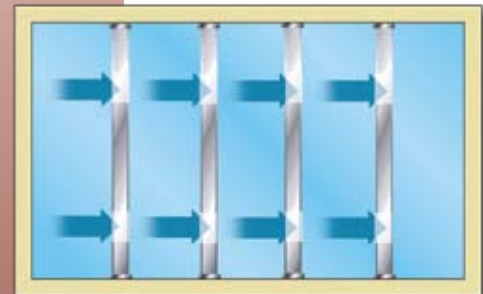
MRI's horizontal paddle wheel flocculators consist of stainless steel shafts, structures and paddles. Typically, paddle wheels operate in the mid-G range with low rotating speeds. Since the paddles are large and move a great deal of water, the stages are completely mixed even at low speeds. Made of stainless steel rather than FRP, MRI blades avoid glass-shard contamination and the possible negative affects on downstream membrane filtration. Powered by stainless steel chain that enters directly into the mixing basin, through-wall seals are also avoided. Underwater bearings are water-lubricated, ultra-high molecular weight polyethylene for long-life and nearly zero maintenance. Greased Cooper sealed ball bearings can be provided.

Complete flocculation systems offer clear advantages.

MRI offers a comprehensive and versatile approach to the design of flocculation systems. MRI manufactures the needed assortment of mechanical mixers, flocculators, and hydraulic tools such as staging baffles, diffusers and jets. Combining these elements with the patented, self-cleaning, low-G, hydraulic final stage flocculation and buffer zone between the flocculator and clarifier, MRI is the single source for a complete flocculation system. MRI's electronic control system tracks conditions and modulates flocculator rotational speeds and other variables, and can be monitored and controlled via the Internet.



TOP VIEW OF SERPENTINE AND PORTED BAFFLES.



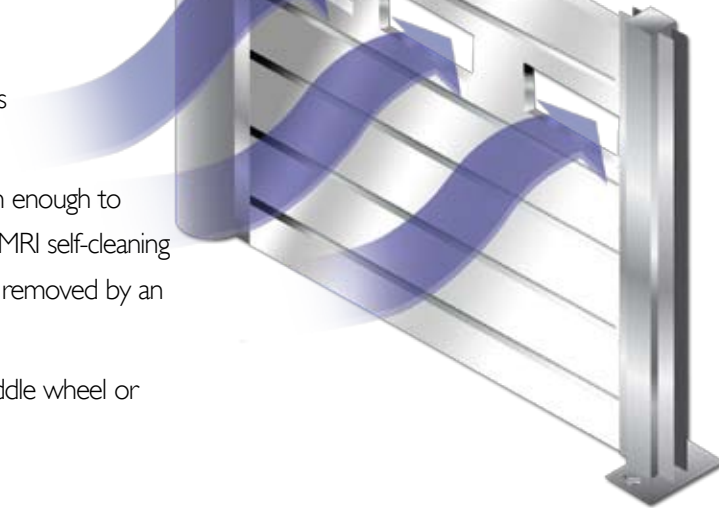
MRI BUILDS THE MOST COMMONLY USED HYDRAULIC FLOCCULATORS SUCH AS THE BAFFLE CHANNEL TYPE.

PORTED BAFFLES ARE USED TO DISTRIBUTE FLOW EVENLY ACROSS A BASIN. THESE ARE MRI STAINLESS STEEL BAFFLES.

Fine-tune flocculation.

Precisely engineered, only MRI Flocculation Systems™ enable flocculation outcomes to be fine-tuned for a significant increase in efficiency. By combining mechanical and hydraulic stage flocculation and leveraging maximum range G-values, MRI systems provide operational benefits, including:

- Hydraulic final stage allows more aggressive mixing in previous three mechanical stages.
- Typically, mechanical flocculators must operate at an rpm high enough to prevent solids from settling in the final flocculation stage. The MRI self-cleaning hydraulic final stage provides a low G-value. Settled solids are removed by an attached scraper mounted to the MRI Sludge Collector.
- MRI flocculators are available in vertical turbine, horizontal paddle wheel or all hydraulic (jet) mixers.



ADVANCED BAFFLING TECHNIQUES LEVERAGE PRETREATMENT STAGES. MRI OFFERS PORTED BAFFLES WITH SERPENTINE PATTERNS AND PARALLEL HINGED-DOOR BAFFLES. (TOP LEFT)

MRI'S SELF-CLEANING HYDRAULIC FLOCCULATORS USE LITTLE ENERGY AND HAVE NO MOVING PARTS. (TOP)

Hydraulic flocculators combine the advantages of low energy consumption and simplicity.

With considerable experience in baffle manufacturing, MRI designs hydraulic flocculators proven to use less energy than their mechanical counterparts, while operating with greater simplicity and flexibility. To overcome the narrow range of flows typically associated with hydraulic flocculators, MRI's innovative model features an automatically self-adjusting design to provide constant G-factors during fluctuating flow conditions, when desired.

Trust MRI for trend-setting innovation.

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.

Other products available from Meurer Research are:

- | | |
|--|---|
| Inclined Plate Settlers | Floating Plate Settlers |
| Hoseless Cable-Vac™ Sludge Collectors | Backwash and Residuals Reclaim |
| Ultra-Scraper Sludge Collectors | Baffles for aeration, floc and contact chambers |
| Paddle Wheel, Turbine and Hydraulic Flocculators | Tube Settlers |
| Membrane Pretreatment | Pilot Plants |
| Package Plants | Membrane Filters |
| Internet Monitoring and Control | MBRs |