



METEOR®

IFAS SYSTEM



DESCRIPTION AND PROCESS

The METEOR® IFAS/MBBR technology offers flexible solutions to a multitude of biological process upgrade applications such as nitrogen removal, treatment capacity increase and wastewater reuse. The process involves using high surface area media or biofilm carriers to support the growth of a large, stable quantity of micro-organisms i.e. significantly higher biomass per unit volume, thereby enabling increased and improved treatment capacity within the same tankage. Carrier size, geometry and specific internal surface area are critical features. Our unique carriers have been designed with optimal performance in mind. The upgrade to IFAS or MBBR often consists of simply adding carriers and screens to existing basins and can therefore be completed in a cost-effective and timely manner without major civil requirements and no requirement for additional land. Further precision, PLC based control systems optimize the METEOR® IFAS/MBBR process performance by minimizing energy and chemical costs

DESIGN CRITERIA

APPLICATION:

- BOD Removal
- NH₃-N Removal (Nitrification)
- NO₃-N Removal (Denitrification)
- Total Nitrogen Removal
- Phosphorus Removal

SOURCE:

- Municipal Wastewater
- Industrial Wastewater
- Drinking water
- Industrial Process Water

EFFLUENT REQUIREMENTS:

- BOD < 10 mg/L
- NH₃-N < 1 mg/l
- NO₃-N < 1 mg/L
- Total Nitrogen < 3 mg/L

FEATURES	BENEFITS
CAPACITY UPGRADES	Addition of Nutricell™ media allows plants to increase capacity/loading without the need to build additional basins
ADDED TREATMENT CAPABILITY	Adding Nutricell™ media allows plants to expand treatment beyond BOD removal to Nitrification/Denitrification
CUSTOM DESIGN	Able to retrofit any basin geometry and reuse existing tankage to reduce civil construction costs
FLEXIBLE DESIGN AND CONFIGURATIONS	The process is very versatile and flexible to be configured per the treatment requirement. For example Nitrification IFAS/MBBR configuration for Nitrification only, MLE and Four Stage IFAS/MBBR for Total Nitrogen Removal
DECOUPLING OF BIOLOGICAL AND SOLIDS SEPARATION PROCESSES	Due to the attached biomass on the media, higher loads are treated in the biological tanks without the need to upgrade or add the secondary clarifiers/Dissolved Air Floatation systems
FULLY AUTOMATED PROCESS WITH OPERATION SIMILAR TO CONVENTIONAL ACTIVATED SLUDGE SYSTEMS	Reduced operator training requirements and labor i.e. reduced OpEx.
REDUCED MLSS REQUIREMENTS	METEOR® IFAS retrofit results in reduced solids loading on the clarifiers due to lower MLSS in aeration tanks
ROBUST AND RESILIENT PROCESS	IFAS/MBBR systems are much more resilient to process upsets and very robust at demanding conditions such as low temperature
NO RISK OF WASHOUT	Quicker start-up and recovery from upsets with actively maintained biofilm which helps seed the suspended phase MLSS

COMPETITIVE DIFFERENCES

PARAMETER	METEOR®	OTHER IFAS/MBBR PROVIDERS	BENEFIT
Experience and Process Expertise	Built largest IFAS and MBBR plants in the world with several years of experience	Small to medium size plants built	Significant accrued process knowledge and experience to design custom and most optimum systems based on project needs
Aeration System	Coarse and Fine Bubble systems	Medium Bubble only	Flexibility, CapEx and O&M savings on aeration systems; All the existing aeration grids can be reused without any constraints
Media	UV Inhibitors	No UV inhibitors	Much slower degradation of media over time and longer life
Biofilm carrier retention screens	3/8" Screen Openings allowed	Typically 1/4" or lower	Reduced head loss
Pre-Screening	10mm Pre-Screens	5mm Pre-Screens	Less stringent requirement for site; Reduced CapEx and plant head loss
Media Manufacturing	USA	Europe	Less costs and lead time associated with media transportation
Availability of Dissolved Air Floatation System	Yes – AquaDAF® and Sedifloter® systems	Not available	Ability to package systems and provide end to end guarantee

FREQUENTLY ASKED QUESTIONS

Are METEOR® IFAS/MBBR systems applicable to only certain configurations?

No, the METEOR® IFAS/MBBR systems are very versatile, with the widest possible range of configurations. Some common configurations include MLE, four-stage, roughing reactor, tertiary nitrification and/or denitrification.

How are the biofilm carrier retention screens kept clean from debris?

The constant automatic scour by the completely mixed, moving biofilm carriers in the reactor as well as dedicated Air Knife systems for keeping debris away help in keeping the screens clean.

What is the typical head loss across the Meteor® system biofilm carrier retention screens?

Head loss is usually less than 0.5 inches.

What are the shapes and sizes biofilm carrier retention screens?

Anoxic zones usually have flat panel screens of dimensions corresponding to the tank geometry. Aerobic zones typically use cylindrical screens of sizes 12" diameter x 72" length and 36" diameter x 60" length depending on the plant flows.

What is the most economical size/range of application of Meteor® systems?

Meteor® systems are custom designs with the flexibility and applicability over a wide range of flows and loads, therefore economical and attractive choice across the board in terms of flows and range of applications (BOD, NH₃-N and NO₃-N removal).

How are loading rates calculated in case of Meteor® IFAS/MBBR systems?

Loading rates are calculated in terms of g/m²/d, where the influent load is calculated over the total available surface area on the biofilm carriers.

What are the media types available and what are their surface areas?

Four different types of media are available for Meteor® systems. DTi1 (450 m²/m³), DTi2 (515 m²/m³), DTi3 (630 m²/m³) and DTi4 (750 m²/m³).

Is a METEOR pilot unit available and what are the flows that can be tested?

Yes, there are three pilot units available, two for IFAS and one for MBBR applications. The typical flow range for the pilots is 2 – 10 gpm.