Active Island Reactor®
Floating Water Treatment Systems
Our Active Island Reactor technology is an engineered floating ecology designed to optimize powerful natural treatment processes within a planted aquatic landscape feature. The AIR combines the latest developments in ecological engineering with new biofilm research and wastewater treatment processes. Whole system engineered ecologies provide an energy efficient, low life cycle cost treatment solution. The system is suitable for contaminated canals, rivers, lakes and reservoirs, as well as providing effective treatment of high strength waste in purpose built treatment cells, ponds or tanks.

**Active Island Reactor™ Technology**

The Active Island Reactor is a floating water treatment system, which provides enhanced natural processes to improve water quality.

**Active Island Reactor Features**

- Marine grade fully cross-braced structure.
- Attractive landscape feature.
- Low capital and operational cost per m³ capacity.
- Low maintenance.
- Moveable island structure.
- Variable operation, adjustable to seasonal requirements.
- Suitable for tropical or temperate climates.

**System Features**

- Water way affected by algae
- Lush landscape attraction
- Photo credit Jackie Brookner
Results

- Advanced treatment standards for BOD, COD, NH3, TSS & TN.
- Improves Dissolved Oxygen.
- Low energy, chemical free treatment.
- Odour filtration.
- Aesthetic cleantech.
- Reduced Algae.

Benefits

- Improved water quality = increased water resource value.
- Improved aquatic biodiversity = increased ecological value.
- Improved water aesthetic = improved amenity and recreation value.
- Improved quality, ecology and amenity = increased economic value.

Applications

- Rivers, canals and lakes.
- Storm water treatment.
- Combined sewage outflows.
- Agricultural and industrial applications.
- Fisheries and aquaculture.
- Urban waterways and waterfront restoration.

Series of Islands in a freshwater lake

Before

Decreased BOD, COD and TSS

After

Before

After
**Products**

**How Treatment Works**

**POWER TRAIN**
Polluted water is drawn into the system from underneath by the aerator circulator power train. The influent water is mixed with air at the centre of the system and a mixture of fine bubbles and water is propelled out from the power train into the Dynamic Media System.

**DYNAMIC MEDIA SYSTEM**
Biomatrix Water’s proprietary Dynamic Media System, used throughout the range of Active Island Reactors, is based on the biomimicry of sea creatures adapted to harvest nutrients and water impurities as food in coral reef environments. The dynamic moving characteristics allow a self cleaning high density and surface area to be achieved. The dynamic media system provides a powerful bioreactor and stable environment for beneficial water cleansing bacteria.

**ACTIVATED ECOLOGY**
As the air/water mix is propelled into the Dynamic Media billions of hungry bacteria trap, consume, breakdown and transform water contaminants. The process calculations and flow design is carried out specifically for each installation to achieve the optimum series of directional and multi-directional reactors in order to maximise recirculation and alternating process zones. As water circulates, the entire aquatic ecology becomes activated, increasing performance.

**LOW COST TREATMENT**
Capital cost per Kg of pollution removed is typically less than half the cost of conventional wastewater treatment plants due to integration and activation of the surrounding waterway environment. Operational costs per Kg removed are typically 15-20% lower than conventional treatment of the same capacity as a result of activated natural treatment processes.

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**Active Island Models** *(Custom Shapes Available)*

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ST-650 Stream Cleaner

The ST-650 Stream Cleaner offers flexibility of installation in narrow width & shallow depth sites. It is suitable for waterways with an overall width less than 3.5m & it has the ability to operate in water depths of 1m.

Key Features and Benefits

- **Suitable for narrow and shallow watercourses**
- **Appropriate for urban or rural locations**
- **Aesthetic natural island appearance**
- **Fully mobile unit can be moved to different areas if required**

- A compact and movable water treatment solution, ideal where space is limited and efficient treatment is required.
- Odours and aerosols are trapped and filtered through the integrated biofilter, allowing installation in dense urban environments.

TT-650 Components

- Locking Security Cover
- Multi-layered Biofilter Filters Pathogens, Odours & Noise
- Splash Plate
- Welded Tough Floats
- Multi-axial Crossed Bracing Planting Media
- Pollution Tolerant Plants
- Aerator Circulator Power Train Inside
- Quad-Chamber, Flow Directional Floats
- Dynamic Media System

Specifications

- Width ~3 to 5.5m, Length: ~8.60 to 9.0m.
- 2.2-5.0 Kw single or three phase motor options.
- Stainless Steel impellor and spray deflector.
- 230 volts, 50/60 hertz/ or to your requirements.
- Integrated control panel, with water resistant mounting box, GCFI, timer, and overload protection.
**ST-700 Active Island Reactor**

The ST-700 provides a 360 degree multi-directional flow pattern, and radial Dynamic Media Array below the water surface for advanced water treatment to suit most water depths.

**Key Features and Benefits**

- Low maintenance plants selected
- Treats pollution naturally without chemicals
- Attractive wildlife habitat
- Shape and size can be customised to particular needs or requirements
- Modular units for easy shipment & construction
- HDPE floats are durable & UV resistant
- Mobile system can be sited in many locations
- Planted dome cover filters pathogens, odours & reduces sound

- The ST-700 offers a powerful water treatment solution, to improve water quality and treat pollutants in-situ.
- The surface turbine creates a 360 degree flow pattern providing high level aeration.
- This oxygenated flow passes through the Dynamic Media System where attached micro-organic biofilms break down pollutants.

**ST-700 Components**

- Pollution Tolerant Plants
- Dome Cover
- Planting Shelves
- Motor Floats
- Multi-axial Crossed Bracing Planting Media
- Extra Buoyancy Floats
- Perforated Planted Dome Cover
- Planted Lined Dome, Filters Pathogens, Odours & Noise
- Impeller Motor
- Welded Tough Floats
- Surface Aerator Impellor
- Dynamic Media System

**Specifications**

- Surface aerator disperses oxygen 360 degrees.
- Designed for ponds, lakes or watercourses, greater than 15m in width.
- Can be installed in water depths of 1.25m or greater.
AT-500 & D-Series Active Island Reactors

The AT-500 is a directional flow active island and can be combined with different or similar units as part of a multi-stage or recirculating treatment approach. Directional flow is established with either non-clogging spiral impellor or directional flow flexible diffuser.

Key Features and Benefits

- Subsurface directional flow aerator can be rotated 360 degrees, allowing targeted treatment and oxygenation of the water.
- Below water aeration means there are no risks from pathogen bearing aerosols or unpleasant odours.
- The locking cover provides easy access for maintenance work.

TT-800 Components

- Structural Cross-beams
- Welded Tough Floats
- Multi-axial Crossed Bracing Planting Media
- Multi-chamber Buoyancy Floats
- Pyramid Maintenance Cover
- Impeller Motor
- Dynamic Media System (DMS)
- Non-Clog Submerged Spiral Impellor or directional diffuser

Specifications

- Width ~5 to 6m, Length: ~8 to 9m.
- 1.1- 5.0Kw motor with non-clogging submerged spiral impellor.
- 230 volts, 50/60 hertz/ or to your requirements.
- Integrated control panel, with water resistant mounting box, GCFI, timer, and overload protection.
About Us

Company Profile

The founding partners of the Biomatrix Water team have over two decades of experience designing and delivering ecological engineering projects for the treatment and recycling of municipal and industrial wastewater and bioremediation and restoration of waterways.

Our design approach applies current best practice in modern wastewater treatment and process control with the latest developments in ecological engineering. The resulting research shows that the wise use of modern materials, biomimicry, and design innovation, provide an effective solution to the problems of urban water pollution and aquatic habitat degradation. The Biomatrix Water head office and research facility is located in Moray, Scotland.