engineered solutions.

EDI engineered solutions are the result of over 38 years experience in the water and wastewater treatment industry. By applying our advanced technology principles of aeration and biological treatment to challenges facing their customers, EDI has earned the reputation of being an innovator and industry leader.

Environmental Dynamics International
5601 Paris Road
Columbia MO 65202 USA
1+573.474.9456
www.environmentaldynamics.com
www.wastewater.com

EDI provides municipal and industrial treatment solutions in over 100 countries, has 6,000+ installations and treats the wastewater needs for more than 300 million people.

the global leader in industrial aeration solutions

comprehensive industrial aeration solutions from

Environmental Dynamics International
we know industrial aeration...

EDI's Industrial Aeration Solutions™ division has been the worldwide leader for industrial wastewater aeration needs since 1975. We have designed, installed and serviced aeration systems for:

- Pulp & Paper
- Food & Beverage (Beef, Pork, Poultry, Dairy)
- Pharmaceutical
- Chemical
- Petroleum
- Oil & Gas among others.

Some of our clients include: Chevron, 3M, Abbott Labs, Kimberly Clark, Scott Paper, Eastman Kodak, Garber, Leprino Foods and Coca Cola.

---

**industrial design**

EDI's team of highly certified engineers have designed hundreds of industrial wastewater aeration systems worldwide.

---

**industrial service**

Aeration Works™ (the service division of EDI) is the largest and most respected aeration service company in the world.

---

**industrial systems**

The patented StreamLine™ panel was engineered to meet the demanding needs of all industrial applications.

---

*By far, the most superior and reliable aeration system package we have ever used. Thank you!*  
—Greg  
Pulp & Paper Plant Owner
Capabilities

Environmental Dynamics International (EDI) specializes in the research, development and application of advanced technology aeration and biological treatment solutions for municipal and industrial wastewater treatment. The company’s value solutions support new plant construction, existing facility upgrades and long term infrastructure demands. EDI supports a staff of qualified professionals and engineers to provide a high level of value added service, technology development, process application and system design support. EDI also offers aftermarket parts for all brands and field services for equipment installation and maintenance through the AW division, with demonstrated success in over 7,000 installations in over 100 countries across all 7 continents - equivalent to 300 million people.

Global Activities

The corporate office in Columbia, MO is the technology and manufacturing center for the organization. The facility supports the research and development, and engineering functions of the organization and features world-class test facilities for oxygen transfer, material performance, and product design.

EDI serves the global market through direct sales and local independent partners. In addition to sales support from the corporate offices, EDI maintains international offices in Japan, China, India, Mexico, United Kingdom, Germany, and Singapore. The UK, China, and India locations include warehousing and manufacturing to better support the needs of the surrounding region. For direct customer contact, EDI maintains an extensive network of representatives covering each major market to provide the highest level of support to our customers.
Industry Excellence

EDI is recognized for excellence in exports and has received numerous awards including: State of Missouri “Small Business Exporter of the Year” Award in 2001, and US Dept. of Commerce President’s “E” Award for Excellence in 2002 followed by the “E-Star” Award in 2008. The E-Star Award has been granted to a select 300 companies since the inception of the program by President John F. Kennedy in 1961. EDI was also recognized on the Inc 5000 fastest growing privately held companies in the US for both 2008 & 2009, Environmental Business Journal Award winner for International Expansion in 2009, and SBA Top 100 Award recipient in 2011.

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Columbia MO 65202 USA

+1 573.474.9456
www.EnvironmentalDynamics.com
www.wastewater.com
The Aeration Works™ division of EDI maintains special equipment, tools and skilled Field Service professionals for installation & service on any aeration installation project.

Contractors, owners and operating companies can better utilize their own personnel, equipment and resources by enlisting the support of the EDI Aeration Works Division.

Professional, efficient, and cost effective aeration services

- Experienced installers have the training, knowledge and tools to do a job quickly and exactly to the manufacturer’s specifications.
- Superior products and experts with years of experience can help clients save money and time.
- Familiarity with products and exceptional use of teamwork reduces time and increases quality.

Continued on back...
Diffuser Express® is committed to excellence in supplying aftermarket diffusers, membranes, and specialty diffuser items (all major brands) for new and existing water and wastewater treatment applications.

Whether it’s parts, service, or questions about your aeration system – Diffuser Express ® can help.

www.diffuserexpress.com
Brakebush Brothers
Kimberly Clark
International Paper
Daphne Utility
USX Corporation
Bluegrass Dairy
Striker Paper Mill
Fruit of the Loom
Aquaturbo Systems, Inc.
Corp of Engineer
Mena Eye Care
McArthur Dairy
Dolomite Industries
Florida Distillers
Pro-Water Systems, Inc.
Randazza Enterprises, Inc.
Butterball
Sun Group Enterprises
Hunter Army Air Field
Water Reclaim Systems
Colony Regional WWTP
Cargill Meat Solutions
Hidratek Industrial
Wood Fiber Industries
ARCADIS
Cagle’s, Inc.
Peco Foods

Wennington Poultry
Douglasville Sheet Metal
B & W Tobacco Corp
Tip Top Poultry
Friendship Dairy
Laurel Cookie Factory
Somerset Refinery Inc
Bluegrass Dairy
Magnolia Shrimp LLC
Calumet Lubricants
Schmidt Farms
NRT Industries
Hybrid Catfish Company
National Beef
Smithfield Foods, Inc.
Leprino Foods
Braums Dairy Farm
Valero Three Rivers Refinery
Natural Shrimp Corporation
Southwest Fluid Products, Inc.
Texas Agrilife Research Station
Mars Candy
Campbells Soup
Total Petro Chemicals Inc
Tyson Foods
Aqua Texas
Perdue Farms

Environmental Evolutions de Mexico
Richloam State Fish Hatchery
Southeastern Cheese Corp.
FutureFuel Chemical Company
Eastman Chemical Company
Southern Aquaculture Supply
Condo Electric Ind. Supply Inc
International Paper - Riverdale
Amfine Chemical Corporation
Santiago Internacional LTDA
Coca Cola of North America
William Wrigley Jr. Company
Bluegrass Dairy & Food LLC
Fina Oil and Chemical Company
Conoco - Oil Movements
O’Steen Meat Specialties Inc
Valero Refining Company, TX
Siemens Water Technology (USFilter/Davco)
Water Equipment Technologies of Southwest
Environmental Management Corp. (EMC)
Mabim International Suppliers, Inc
DynMcdermott Petroleum Operations
American Dehydrated Foods, Inc.
Boise Cascade, Pine City Fiber Co.
Sawcross Inc
M&M Farms

Testimonials on back

and 100’s MORE
Our feeling on the project is that it has been a great success, proving EDI technology is not only reliable, but also simple and easy to install. The project will serve as an important reference for future projects not only in Finland, but in all of Scandinavia as well.

_Bengt Lindqvist, Managing Director_  
_Bentrex Oy_

EDI has successfully demonstrated in the design, supply and commissioning of fine bubble diffused aeration systems in refinery applications. To date, the EDI systems have performed excellently and continue to provide the level of service expected and as designed.

_Doug W. Baker, P.E._  
_Brown & Gay Engineers_

The EDI diffuser system is a superior aeration mixing system for use in refinery and petro-chemical activated sludge applications. We continue to coordinate with EDI routinely when diffuser systems are required.

_Luc Ceyssens, President_  
_Keppel Seghers_

It was obvious from the beginning that EDI equipment is designed with the contractor and operator in mind. My crew was shocked with the ease of fabrication for the diffuser assemblies. This of course, translated to savings on the contractor’s part and made a very happy customer.

_Dwight Witcher_  
_Environmental Process Systems_

We have worked together with EDI on the process, design, and supply of SBR and biological treatment systems globally. Environmental Dynamics has been supportive of our company and customers in presales, commercial activities, as well as after-sale services. In addition, the equipment when purchased and installed has always functioned as promised and advertised.

Napier-Reid Ltd. is pleased to present EDI in our projects and had a favorable relationship with the company over the past 10 years while installing multiple advanced wastewater treatment systems. We will continue using products from EDI in our future projects and will have no hesitation in recommending them to any one in need of aeration/mixing products.

_Frank Li, P. Eng, Vice President_  
_Napier-Reid Ltd._

SFC has been working together with EDI for many years. In hundreds of plants we have installed the EDI Diffuser Systems, the performance of which has proved to be excellent. Furthermore, EDI has always been a responsive company to support us and our customers during design, installation, and operation of numerous plants all over the world.

_Dr –Ing. Gunnar Demoulin, Managing Director_  
_SFC Umwelttechnik GmbH_
CHALLENGE

Bucky Walters, lead wastewater operator, was having difficulty maintaining dissolved oxygen levels in the lagoon during cold weather with his existing surface aerators. During often-brutal Wisconsin winters, the lagoon experienced freeze-outs. The old aerators would flip over from ice displacement, causing a decrease in the delivery of oxygen to the basin and thus treatment.

Even when functioning, the aeration process wasn’t powerful enough to meet the plant’s treatment needs.

Another development would soon overwhelm the lagoon’s aeration capacity altogether: Brakebush was about to significantly increase production. The current system utilized splash aerators, the performance of which was simply inadequate to meet the oxygen demands of the treatment process. In addition to the oxygen delivery shortcomings, the combined 475 h.p. in aerators were eating electricity like it was going out of style. Utilities manager David Meyer dreaded the bills they would generate trying to keep up with the higher volume waste streams from production increases.

There was no more putting it off: it was time to upgrade the aeration system.

EXECUTION

After two months researching viable aeration replacements, Meyer consulted with Neenah-based architectural engineering firm The McMahon Group on technical specifications. Once they’d identified their needs, he contacted Energenecs Inc., an industrial water pollution control equipment wholesaler in Cedarburg, to identify potential vendors. Energenecs specified Environmental Dynamics International (EDI), which designs and manufactures water aeration systems at their Columbia, Mo., headquarters. EDI offered a fine bubble, high-efficiency diffused aeration system that could be configured to the Brakebush plant’s specific requirements.

The team settled on EDI’s floating lateral system with FlexAir® 88S diffuser assemblies, outfitted with Magnum™ Diffusers. The upgrade installation took less than a week, performed by Lee’s Contracting out of Little Chute, Wis. To prevent any disruption in treatment during the upgrade, the plant stayed online by leaving the old aerators in place while new laterals were installed. Old aerators were removed as each new aeration floating lateral came online.
RESULTS

Meyer and Walters were impressed by the FlexAir system’s ability to perform superior oxygen transfer through the production of ultra-high-density micro-bubbles, while running on less than half the power required by the plant’s old system. Total operating power requirements were dropped to 200 h.p., total, with this efficient new system.

A year after the original upgrade, some settling was noticed around the lagoon’s edges, evidenced by a lot of clear water over solids in the shallows. Meyer and Walters realized they had undersized the equipment scope, and needed to extend the laterals into the shallower edge areas with what they call a “corner system.” EDI responded with a turnkey design for the additional equipment requirements with the new system installed by its Aeration Works division.

Total cost for the aeration upgrade project was a small fraction compared to the additional profits generated by the manufacturing plant’s increased production. Much of the capital cost was paid through significant electricity savings enabled by the system’s performance. It’s a shining example of whole-plant increases in efficiency and cost-effectiveness through targeted key systems upgrades.
Case Study: F&A Dairy - Dresser, WI

PROJECT HISTORY

F&A Dairy, founded in 1958, began manufacturing cheese at their Dresser, Wisconsin facility in 1974. Five years after the plant’s opening, F&A Dairy constructed an aerated lagoon Wastewater Treatment Plant (WWTP) with land irrigation, employing a static tube coarse bubble aeration. The system was originally designed to process approximately 3000 ppd BOD. The system operated with satisfactory levels of dissolved oxygen for many years.

PROBLEM FACED

By April 2009, F&A Dairy had outgrown its WWTP. With significant increases in production, the static tube aeration system was unable to deliver sufficient oxygen to the lagoon treatment system. The plant was now processing close to 1 million pounds of milk per day. The 35-year old system was not originally designed to handle such a large load and could not keep up with the plant’s needs.

The original static tube aeration system was at capacity with all four 50 Hp blowers (3000 cfm each.) Even at capacity, the system was only able to maintain a dissolved oxygen level of 0.1mg/l which resulted in operational troubles and odors.

For a short-term fix while F&A Dairy searched for a solution, the plant purchased an Ultra V 30 Hp aspirating pump and rented two more powered by a portable diesel generator. This added a 90 Hp load onto the electricity consumption in addition to the four 50Hp blowers by a portable diesel generator to handle peak summer conditions.
Case Study: F&A Dairy continued

City of Dresser

EDI’s Solution & Outcome

For a permanent solution, F&A Dairy hired Symbiont, a prominent consulting firm located in Milwaukee, WI, to develop a long-term solution. Symbiont specializes in the design of industrial and municipal wastewater treatment facilities. Symbiont studied the plant wastewater and its existing treatment processes in addition to viable aeration system technology. They also evaluated F&A Dairy’s other plant in Las Cruces, NM which already employed EDI’s Floating lateral system.

After the evaluation was complete, Symbiont recommended utilizing a fine bubble aeration system that could be installed without dewatering the existing treatment lagoons, and would provide an energy efficient system to meet the demands of the 1 million lbs/day production.

F&A purchased a fine bubble aeration system from EDI. The system employed floating HDPE air lateral assemblies with suspended tubular fine bubble flexible membrane diffuser assemblies. The system was installed in the summer of 2010 with great success. The new system has reduced power consumption, handled peak loads, maintained dissolved oxygen, and provided operating flexibility.

System Highlights:
High-density polyethylene pipe for maximum durability.

Diffuser assemblies are retrievable without taking basin off-line for maximum process reliability.

Heavy wall piping and all-welded construction including inline and branch transitions for maximum mechanical integrity.

Designed to withstand significant external forces from wind, heat, ice, and varying water level conditions.

Results

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PROBLEM FACED

In 2009, the city of Menominee, Michigan decided its wastewater treatment plant was consuming excessive electrical power and faced a much needed upgrade. The plant was using a 1044-unit ceramic disc system with an acid gas cleaning system. This system, installed in 1988, was deteriorating and needed to be replaced. The city worked with Honeywell Energy Services Group to reduce the city’s electrical power consumption under a guaranteed contract. The city’s wastewater treatment plant had a significant potential to reduce power consumed, specifically in the activated sludge process. However, with the existing ceramic disc system, it was consuming 1,800 kw-hrs per day.

EDI’S SOLUTION

Honeywell contracted with Energenecs and Environmental Dynamics International (EDI) to provide a cost effective solution. The City wanted a new system offering operating flexibility and low power consumption. Honeywell evaluated several options, and selected the option providing the highest system efficiency. EDI installed a MiniPanel Fine Bubble Aeration System with a membrane density exceeding 30 percent, greater than the old ceramic disc system. Energenecs provided new Kaeser positive displacement blowers and an advanced dissolved oxygen monitoring system. This new control system allows the plant to monitor the levels of dissolved oxygen in the basin, so that it can more accurately gage the amount of air the pumps are required to provide throughout a 24-hour period. This further reduces the electric power consumption during periods of low oxygen demand.
Initially, the new EDI aeration system paired with the existing blowers and controls reduced the electrical power consumption from 97 Bhp to 43 Bhp. Once the new blowers and control system were in operation, the electrical power consumption was reduced by an additional 12 percent, bringing the total reduction to 56 percent. This translated into an **average annual savings of $29,000.** The new system is expected to pay for itself by 2016.

**Before Improvements**
- Ceramic disc w/gas cleaning system
- Power consumption: 97 Bhp
- DO level: 5 - 7 mg/l

**After Improvements**
- **EDI MiniPanel™** Aeration System
- Power consumption: 43 Bhp
- DO level: 5 - 7 mg/l

**Realized Power Savings**
- $26,000 - $32,000 Annually
- Installed system cost: $150,000
- Estimated ROI: 2016
CHALLENGE
When approached with the design requirements for the treatment basin, EDI evaluated facility characteristics and product options they could design around. “Given the relatively high organic loading of the brewing process flows,” recalls EDI Product Manager Darin Starr, “the use of a (standard) 9-inch-diameter disc product was perceived to provide low value to the customer.”

That configuration would have yielded only adequate SOTE performance and would require operating the aeration system in the upper range of its capacity. This would have required installing the maximum possible number of diffusers in the basin, equivalent to floor coverage of 35 percent. Since product geometry limited the ability to increase the number of installable disc diffuser units, this design would not offer the brewery plant an optimal operating system in terms of aeration efficiency or turn-up capacity, should future plant loading need to increase.

EXECUTION
Given the needs of the aeration design, EDI promoted its StreamLine diffuser. Its geometry allows for higher installable diffuser densities—equal to 50% floor coverage—and operating efficiencies greater than that of the 9-inch disc diffuser. The StreamLine diffuser allowed the aeration system to meet the plant’s initial performance objectives while providing flexibility to increase process capacity of the treatment system, should the brewery expand production in the future.
RESULTS

The operating performance of the StreamLine diffuser system is greater than what could have been achieved by a disc diffuser. With more than 70 percent greater diffuser active membrane area, the brewery now has the capacity to significantly increase production with minimal changes to the operation of the wastewater treatment plant.

“EDI’s service, pricing and product are very good,” says Buttles. “Their systems seem to run very well when installed properly. We are very happy with the results.”

The entire build lasted nine months. Of that, 4 days were spent installing the EDI StreamLine Diffuser aeration system. Total project budget for the plant was $1.2 million, with about $30,000 of that allocated to the aeration elements and installation.
**CHALLENGE**

Bucky Walters, lead wastewater operator, was having difficulty maintaining dissolved oxygen levels in the lagoon during cold weather with his existing surface aerators. During often-brutal Wisconsin winters, the lagoon experienced freeze-outs. The old aerators would flip over from ice displacement, causing a decrease in the delivery of oxygen to the basin and thus treatment.

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Case Study: Menominee, MI

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continued on back...
OUTCOME

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Case Study: Ommegang Brewery

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StreamLine™ - Panel System

The StreamLine panel system can be engineered for any application, in 3 easy steps:

**Step 1: Choose Your Piping**

<table>
<thead>
<tr>
<th>Composite Resin</th>
<th>Stainless Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life expectancy: Superior</td>
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</tr>
<tr>
<td>Upper temperature limit: 210°F / 99°C</td>
<td>Upper temperature limit: 250°F / 121°C</td>
</tr>
</tbody>
</table>

Applications: Industrial waste, High temperatures, Salt water, High chemical, High energy

**Step 2: Choose Your Membrane**

<table>
<thead>
<tr>
<th>EPDM</th>
<th>Matrix Plus™</th>
<th>High-Temp Polyurethane</th>
</tr>
</thead>
<tbody>
<tr>
<td>The industry standard for municipal applications</td>
<td>PTFE embedded within top layer of the membrane</td>
<td>Scientifically engineered polyurethane designed for extreme heat conditions</td>
</tr>
<tr>
<td>Mechanical strength -</td>
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</tr>
<tr>
<td>Durability -</td>
<td>Durability -</td>
<td>Durability -</td>
</tr>
<tr>
<td>Applications - Light mix of industrial influent, all municipal waste</td>
<td>Applications - High mix of industrial influent, improved pressure stability, minimum fouling, all domestic waste</td>
<td>Applications - Oil &amp; gas, food processing, animal by-products, all domestic waste</td>
</tr>
</tbody>
</table>

**Step 3: Choose Your Perforation**

<table>
<thead>
<tr>
<th>Nano Pore</th>
<th>Micro Pore</th>
<th>Mega Pore</th>
</tr>
</thead>
<tbody>
<tr>
<td>High efficiency 0.5mm - 0.75mm</td>
<td>Standard 1.0mm - 1.75mm</td>
<td>High volume ≤ 2.0mm</td>
</tr>
</tbody>
</table>

Most reliable panel on the market
Proven to increase productivity
Highest wire to water rating of any panel diffuser on the market

Stainless Steel StreamLine

continued on back...
### Industrial StreamLine - Comparison

Before you commit to any aeration system, please ask yourself the following questions.

<table>
<thead>
<tr>
<th></th>
<th>StreamLine</th>
<th>Brand X</th>
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<tbody>
<tr>
<td>Has a profiled top surface and no side edges, eliminating the chance of retained coarse solids?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Lowest panel system back pressure available on the market?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Offers a panel membrane with PTFE fully embedded throughout the material?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Can panel be used in aeration basins without grit removal upstream?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Does panel have less than 3’ of edge seal to minimize diffuser breach?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Does panel offer triple back flow prevention?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Can membrane be replaced in the field, and carry a manufacturer’s warranty?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Offers high temperature resistant options?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Offers a complete non-metallic option available for corrosive environments?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Can system function at optimum without frequent venting or air-bumping?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Is there a panel option that can be safely acid cleaned?</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

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**Composite Resin StreamLine**

[Image: Composite Resin StreamLine]