



**Aeration  
Industries®**

## **TRI-OVAL® System** Optimizing New and Retrofit Ditches

### **The Simplest, Most Efficient Oxidation Ditch System – New or Old**

The Tri-Oval® System provides unsurpassed control of the activated sludge process matched with the cost saving benefits of simplified design, installation, and operation. What makes this possible is our unique, patented Aire-O<sub>2</sub> Triton® process aerator/mixer that drives fine bubble aeration and complete mixing as deep as 33 feet (10 meters). This means we can build a deeper oval with a much smaller footprint and still treat the same volume of wastewater.

Using Aire-O<sub>2</sub> Triton® technology, aeration and mixing horsepower are divided between multiple process aerators providing for inherent equipment redundancy and power distribution around the ditch. This greatly simplifies operations and maximizes treatment efficiency and process control capabilities.



### **TRI-OVAL® Benefits:**

- Designs from 10-33 feet (3-10 m) deep result in a more compact treatment plant footprint.
- 1, 2, and 3 ring systems allow for a variety of design options to customize the system to the treatment needs.
- Aire-O<sub>2</sub> Triton® process aerator/mixer simplifies design and O&M, increases treatment efficiency, and maximizes process control capabilities.
- Complete mixing throughout water column eliminates solids deposition.
- Costly concrete elements are eliminated (aerator structural supports, splash walls, fillets, covers, etc).
- Easy to automate process control using D.O. and/or ORP feedback.
- Quiet operating, environmentally friendly equipment.
- Sub-surface aeration and mixing means improved winter performance and no aerosoling/misting.
- Optional dNO<sub>x</sub> ORP Control System allows for simultaneous Nitrification/Denitrification.
- Additional ancillary equipment can be provided as part of a complete system package including controls, secondary clarifiers, RAS/WAS systems, and/or aerobic digester.
- Retrofits into existing ditches to replace or supplement equipment are quick and easy with virtually no down-time.
- Process guarantees are available.



*The Aire-O<sub>2</sub> Triton® aerator/mixer, the heart of the Tri-Oval® System, integrates fine bubble aeration with a low speed mixer capable of providing complete mixing to 33 feet (10 m) deep.*

# TRI-OVAL® System

## Utilizing Aire-O<sub>2</sub> Triton® Technology

The Tri-Oval® System can be sized for average design flow rates of 75,000 gallons per day and higher. A variety of arrangements are available including 1, 2, or 3 ring Tri-Oval designs depending on the treatment requirements. The Tri-Oval System is separated into distinct zones of treatment for enhanced control and process efficiency.

For example, a 3 ring Tri-Oval System can be arranged as follows:

1. Inner Ring (1-2 hour HRT) Anaerobic Zone → Biological selector for PAO growth and Phosphorus release (1st step in EBNR treatment).
2. Middle Ring (2-4 hour HRT) Anoxic Zone → BNR treatment for Nitrate removal (Denitrification).
3. Outer Ring (18-24 hour HRT) Aerobic Zone → BOD/TSS, Ammonia, and Phosphorus removal with internal recycle to the middle ring.



## TRI-OVAL® Oxidation Oval System Outperforms Conventional Ditch Systems...

	TRI-OVAL®	CONVENTIONAL DITCH (ie: brush/disc rotors and low speed aerators)
Footprint	Capable of maintaining solids in suspension in tanks with depths to 33 ft. (10 m). Deeper tanks allow for reduced land requirements.	Limited depths result in a larger footprint.
Turn-Down Capability	Can turn off entire Aire-O <sub>2</sub> Triton® units (mixing and aeration) or aeration only to match BOD demand and flow fluctuations which improves process operation and minimizes operation costs.	Typically use large Hp aerators in ovals that result in limited turn-down capability and process problems if an aerator fails.
Dual-function Aerator	Aeration can be turned on and off independent of mixing using the Aire-O <sub>2</sub> Triton® units.	N/A
Process Control	On demand aeration allows for complete D.O. control from anaerobic to anoxic to oxidic conditions while maintaining mixing.	Not capable/Additional equipment required.
Mounting Options	Aire-O <sub>2</sub> Triton® aerator can be mounted via: <ul style="list-style-type: none"> <li>• Bridge</li> <li>• Wall</li> <li>• Float</li> </ul>	Limited to fixed concrete structures.
Aerator Maintenance	<ol style="list-style-type: none"> <li>1. Few wear components.</li> <li>2. Up to 5 year warranty, depending on application.</li> <li>3. Routine maintenance quick and easily performed in field.</li> <li>4. Slow speed mixer (900 rpm-60 HZ; 750 rpm-50 HZ)= longer equipment life and less maintenance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Complex gear box requires a lot of maintenance.</li> <li>2. Complicated maintenance, sometimes requiring partial ditch draining.</li> </ol>
Environmental Impact	Subsurface aeration. No aerosol or odors. No icing means a safer environment. Quiet operation	Splashing, aerosols can create odors and icing in winters, as well as release harmful pathogens into the environment.
Energy Efficiency	<ol style="list-style-type: none"> <li>1. Turn down capability allows reduced energy consumption.</li> <li>2. Can result in up to 50% energy savings over other systems.</li> </ol>	Reduction in aerator speed to reduce oxygen addition results in reduction in mixing which can lead to solids deposition.



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