HOW IT CAN MEET YOUR NEEDS:

- Meets the Most Stringent Effluent Nutrient Requirements
- Simple to Operate and Easy to Maintain
- Eliminate Chemical Dependency
- Reduce Energy Use
- Proven Technology – 700+ U.S. installations

MAXIMUM TREATMENT, MINIMUM EFFORT
THE CARROUSEL® PROCESS FAMILY

<table>
<thead>
<tr>
<th>1-STAGE</th>
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<th>5-STAGE</th>
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<tbody>
<tr>
<td>BASIC CARROUSEL® SYSTEM</td>
<td>denitIR® CARROUSEL® SYSTEM</td>
<td>AlternatIR™ SYSTEM</td>
<td>A²C™ SYSTEM</td>
<td>BARDENPHO® CARROUSEL® SYSTEM</td>
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<td><strong>ANAEROBIC</strong></td>
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<td><strong>1ST ANOXIC</strong></td>
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<td><strong>2ND ANOXIC</strong></td>
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<td><strong>RE-AERATION</strong></td>
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<tr>
<td><strong>EFFLUENT (mg/L)</strong></td>
<td>BOD≤5</td>
<td>NH3-N≤0.5</td>
<td>BOD≤5</td>
<td>NH3-N≤0.5</td>
<td>BOD≤5</td>
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<td>NH3-N≤0.5</td>
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<td>TN≤5-8</td>
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*May require trim doses of metal salts

**OVIVO: AN ENGINEERING PROCESS POWERHOUSE**

The Ovivo Carrousel Process Team, which consists of decades of biological wastewater treatment plant design and innovation, has provided expertise and design assistance for wastewater treatment plants consisting of all shapes, sizes, and effluent permits.

**CAPABILITIES:**

- Detail Design Support
- Process Guarantees
- Process Calculations
- Equipment Startup
- Equipment Sizing
- Extended Warranties
- Retrofit Expertise
- Process Training
- Ovivo Connect (Asset Management)
In the denitIR® Carrousel® System an integral anoxic basin is added for Total Nitrogen removal without supplemental carbon addition. The internal recycle (IR) is large (6-15Q) and requires no additional power, taking advantage of the propulsion generated by the Excell® Aerator.

The automatically controlled EliminatIR™ Gate can be used to create anaerobic cycles in the anoxic zone in order to achieve phosphorus removal as well. This is called the AlternatIR™ System.

In the aerobic (Carrousel®) stage, BOD and ammonia oxidation (nitrification) proceed to completion. The Excell® Aerator provides all aeration and mixing required for the aerobic stage at all influent loading conditions.

**OVIVO: A HISTORY OF EXCELLENCE**

- **1979**: Installs 1st Carrousel® System in the USA
- **1983**: Installs 1st BNR System in the USA
- **1988**: Develops and installs 1st denitIR® Carrousel® System
- **1991**: Develops and installs 1st Dual-Impeller Aerator
- **1998**: Develops and installs 1st ACE™ Control System to conserve energy
EXCELL® AERATOR
- Efficiently provides all of the aeration and mixing required for the Carrousel Basin.
- 3.85 lb O2/HP-hr
- Power Turndown Up to 90%
- 1 man day of maintenance/year
- You Stay Clean! - No maintenance below the deck

3.85 lb O2/HP-hr
Power Turndown Up to 90%
1 man day of maintenance/year
You Stay Clean! - No maintenance below the deck

ELIMINATIR™ GATE
- Internal Recycle (IR) Control
- Automatically adjusts to maximize Denitrification
- IR rates between 0-12Q
- Anaerobic Cycling for Phosphorus Removal

OCULUS™ SYSTEM
- The Process “All Seeing Eye”
- User Friendly Interface
- Efficient Aeration Control
- Optimized Nutrient Removal
- Save Energy
- Reduce Chemical Dependency
- Remote Access

2001
Develops and installs 1st Deep Tank Carrousel® System: 23 ft-SWD

2006
Installs 600th Carrousel® System in the USA

2007
Introduces the Excell® Aerator II: Our most efficient Dual-Impeller Aerator for BNR Systems to date!

2009
Introduces the EliminaIR™ Gate to maximize, optimize and automate BNR

2010
Introduces the Oculus™ BNR Control System

2012
Develops and installs the first Full BNR optimization Oculus™ MCC

2013
Introduces Ovivo® Connect™ Asset Management System

2014
Introduces Carrousel® SwingIR™ System
A leading technology in wastewater treatment and biological nutrient removal, the Carrousel® system is universally praised for its durability, operational simplicity, low operating and maintenance costs, and consistently high effluent quality.

Carrousel Systems offer the lowest number of aerators per basin compared to other oxidation ditch systems, such as those that use horizontal shaft aerators. This greatly simplifies installation and maintenance requirements.

At a minimum, a Carrousel System consists of a “racetrack” style reactor basin with at least one vertical shaft, low-speed mechanical aerator, the Excell® Aerator, installed in the center of one of the turns. The basic Carrousel System is capable of full BOD and Ammonia reduction. Nutrient removal is easily added to a Carrousel System via the addition of anoxic and anaerobic selector zones, or even with simple, optimized operational strategies.

The Carrousel System utilizes the Modified Lutzack-Ettinger (MLE) configuration for highly efficient denitrification. This process is known as the denitIR® System, where internal recycle (IR) flow is directed into the anoxic zone via a slip-stream channel using propulsion generated by the Excell Aerator. No additional energy for IR pumping is required. IR flow rate is varied by the EliminatIR™ Gate. The Oculus™ Control System automatically controls the aeration rate and IR flow.

Top: The Excell® Aerator is installed at one or more of the channel turns and provides all aeration and mixing required for full nitrification and BOD removal.

Bottom: Anoxic and anaerobic basins are easily added for Total Nitrogen and Total Phosphorus removal in Ovivo’s denitIR® configuration.

 ACTIVATED SLUDGE TREATMENT AND BIOLOGICAL NUTRIENT REMOVAL

35 YEARS OF CARROUSEL® SYSTEMS
1979 - present

Total Phosphorus ≤ 0.3 mg/L
Total Nitrogen ≤ 3 mg/L

- Virtually eliminates NO₃-N
- Dedicated environments maximize N and P removal
- Optimization eliminates or greatly reduces metal salt addition
- No IR pumps required
- No supplemental carbon required
- Full nitrification to NH₃-N < 0.5 mg/L in all U.S. climates
RETROFITS:

Ovivo® Connect™ portal is an innovative and intuitive application that allows our customers to use ‘SmartTags’ installed on our equipment (or a web URL) to access a personalized customer zone. Access your equipment documentation, find contract references, track service logs, manage spare parts, and plan your next maintenance to get the most out of your equipment.

Upgrading your existing Carrousel System has never been easier or more worthwhile. Improve your efficiency, reduce your maintenance, or automate your process. Ovivo provides estimates for services and return on investment with a custom-made appraisal of your existing infrastructure.

You won’t be disappointed you called.

OVIVO OFFERS COMPETITIVE TURNKEY AND TRADITIONAL UPGRADE AND RETROFIT PATHWAYS FOR YOUR EXISTING SYSTEMS, EVEN IF YOU DON’T ALREADY HAVE A CARROUSEL SYSTEM.

NEED ACCESS TO YOUR O&M MANUAL?
NEED SPARE PARTS?
WANT THE LATEST TIPS AND NEWS ON YOUR ASSET?

GET CONNECTED!
ovivo.co

WATCH VIDEO
The Ovivo Carrousel System
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info@ovivowater.com
ovivowater.com