

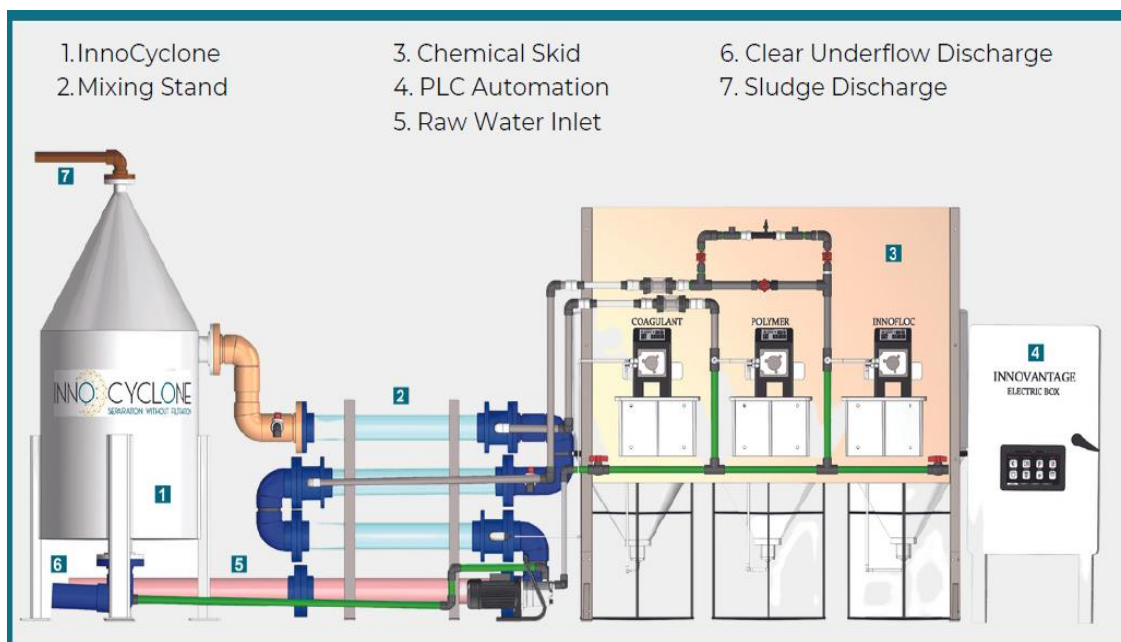
Technical Sheet

Innovantage is a Canadian-based technology development company that delivers customized solutions to address challenges related to wastewater, lagoon, and sludge management. We also provide highly effective and cost-efficient clarification solutions for the reuse and/or discharge of industrial wastewater.

InnoCyclone Technology

The InnoCyclone Wastewater Treatment and Clarification Unit relies on the formation of perfectly floating flocs. The waste particles formed in flocs are trapped in bubbles that can be separated by the InnoCyclone unit, as depicted in the figure below. The InnoCyclone operates based on two key principles:

- 1. Chemical Conditioning of Wastewater - Innovative and Accelerated Flocculation:** The wastewater undergoes a chemical conditioning process, starting with the injection of a coagulant (such as alum or ferric) to initiate floc formation. Next, polymer is introduced to agglomerate the flocs into larger structures. Finally, the tailored InnoFloc solution is injected, which induces the formation of bubbles that entrap the flocs. These buoyant flocs rise rapidly and float to the water's surface.
- 2. Separation Without Filtration:** The chemically conditioned wastewater is injected into the InnoCyclone unit, which separates the formed flocs from the water, discharging clean water at the bottom and thickened sludge at the overflow of the InnoCyclone.



The InnoCyclone System



Targeted Pollutants and Wastewaters

The InnoCyclone finds applications in areas similar to those where a Dissolved Air Flotation (DAF) tank can be applied. The InnoCyclone is designed to operate for the removal of all contaminants that can be chemically coagulated and flocculated. These include:

- Phosphorus
- Total Suspended Solids (TSS)
- COD and BOD
- Algae
- Oil, Fats and Grease



The InnoCyclone technology can be used for municipal wastewater treatment and industrial wastewater clarification for reuse and clarified discharge purposes. It is the right fit for lagoon wastewater treatment for Phosphorus and TSS removal. It is effective for the treatment of the following types of wastewaters:

- **Municipal Wastewater:** Biological solids clarification, Phosphorus removal, and WAS thickening.
- **Lagoon Wastewater:** Phosphorus removal
- **Industrial Wastewater:** Pretreatment for the removal of TSS, oil and grease, BOD, COD, Phosphorus, etc. Examples of Wastewater industrial wastewater include:
 - Food industry: Removal of TSS, fats, oil, and grease from food processing effluents for water reuse or to meet discharge criteria.
 - Industrial laundry effluents: Removal of Oil and grease to meet sewer discharge limit.

Advantages of the InnoCyclone

The closest technology to the InnoCyclone is the Dissolved Air Flotation (DAF) tank. Similar to the InnoCyclone, the performance of a DAF tank relies on the quality of the flocs. In a DAF tank, the injection of air allows the formation of bubbles, inducing flotation. However, the InnoCyclone injects InnoFloc in addition to air, resulting in the formation of better and more stable floating flocs.



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Comparing the InnoCyclone to an DAF tank for wastewater treatment and clarification reveals several advantages and specific benefits of InnoCyclone as shown in the table below:

Comparison	DAF	InnoCyclone	Remarks
HLR (LPM/m ²)	40-200	>700	InnoCyclone can operate with a higher HLR compared to a DAF tank. A higher HLR allows for more volume of water to be treated by the same tank size.
SLR (Kg.solids/m ² /h)	10-100	10-100	
Footprint	Moderate	Lower	InnoCyclone uses a cylindrical tank with a smaller volume compared to a DAF tank. This reduced tank size resulting in a smaller footprint and is more space efficient.
Flexibility and Adaptability	Moderate	High	The compact nature of InnoCyclone allows for greater flexibility for system integration, making it suitable for various industrial, municipal, and commercial applications.
Skimmer	Required	Not Required	The absence of a skimmer in InnoCyclone simplifies the system design, reduces maintenance, and lowers operational costs.
Energy Efficiency	Moderate	Lower	With a smaller tank volume and no skimmer, InnoCyclone is more energy-efficient compared to DAF tanks. It could lead to lower energy consumption during operation, which is not only cost-effective but also environmentally friendly.
Capital and Operating Costs	Moderate	Lower	The combination of reduced tank size, no skimmer, simplified design, and potentially lower energy consumption translates into cost savings for both the initial installation and ongoing operational costs of the InnoCyclone compared to a DAF tank.

HLR - Hydraulic Loading Rate

SLR - Solids Loading Rate

LPM – Liter Per Minute



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InnoCyclone Performance and Models

InnoCyclone Performance

Contaminant	Wastewater Characteristics	Clean Underflow	Removal Rate
TP	16.1	0.357	97.8%
BOD	22	10.9	50.5%
TSS	343	16.2	95.3%
TN	53.2	52.3	1.7%
TOC	27	23.8	11.9%

InnoCyclone Models

Model Number	Flow Rate		INNOCyclone Capacity Gallons
	GPM	LPS	
IC80	80	5	160
IC160	160	10	320
IC320	320	20	640
IC500	500	30	1,000
IC1000	1000	60	2,000
IC3000	3000	180	6,000

- Fully automated plug and play system
- Reduced chemical use with precision dosing
- Increased efficiency
- Reduced public works time during the busiest season
- Turn your waste phosphorus into a high-quality fertilizer



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