



Vitus Nanobubble Generator

Technical Brief

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Technology Summary

The Vitus Nanobubble Generator Series is a high-efficiency, compact gas-to-liquid nanobubble mixing system designed for process industries, wastewater treatment, and precision agriculture. It produces ultra-fine, stable nanobubbles (~80 nm) using air, oxygen, or other gases, achieving an oxygen transfer efficiency of 75–80%. By dramatically increasing solubility and mass transfer, it improves chemical reactions, enhances solid-liquid separation, and reduces reliance on external chemicals.

Background

Traditional aeration and dissolved air flotation (DAF) systems face efficiency bottlenecks, requiring higher energy inputs and chemical dosing to achieve desired water quality. Industries and farms alike struggle with scaling, biofilm, and nutrient distribution challenges. Vitus addresses these gaps by delivering stable nanobubbles that persist longer in solution, ensuring more uniform oxygenation and higher productivity across diverse environments.

Technology Description

Vitus uses a centrifugal pump with a gas compressor to infuse gases into water, creating nanobubbles at densities $>1\times10^8/\text{ml}$. The compact design supports plug-and-play operation, with flow capacities ranging from 5 m³/hr (Vitus 5) to 20 m³/hr (Vitus 20). Units are built with SS304/cast iron construction for durability, and operate at low power footprints, making them compatible with both small farms and pilot industrial setups.

Applications

- Process Industries: Improved mixing and aeration in chemical, pharmaceutical, and food sectors.
- Wastewater Treatment: Boosts performance of dissolved air flotation (DAF) and effluent treatment plants.
- Agriculture & Greenhouses: Enhances oxygenation, nutrient uptake, and suppresses root pathogens.
- Food & Beverage: Ensures more efficient cleaning, mixing, and disinfection.

Applications

- Process Industries: Enhances mixing, aeration, and reaction efficiency in chemical, pharma, and food sectors.
- Wastewater Treatment: Improves DAF performance, reduces chemical use, and lowers operational costs.
- Agriculture & Greenhouses: Boosts root oxygenation, nutrient absorption, and plant health.
- Food & Beverage: Improves cleaning, disinfection, and mixing efficiency.

Value Proposition

- Cuts chemical usage while lowering OPEX in ETPs and STPs.
- Improves root oxygenation and plant vigor in irrigation systems.
- Suppresses algae, pathogens, and biofilm in industrial water systems.
- Compact and robust, integrates seamlessly into existing setups with minimal modification.

Technology Status

- TRL 8–9: Commercial units deployed in agriculture and industrial pilots.
- Field validation shows improved dissolved oxygen, reduced chemical use, and stable long-term performance.



Market Potential / Proposed Deployment

- Growing demand in industrial wastewater treatment and precision irrigation under sustainability mandates.
- Aligns with global push for chemical-free and energy-efficient water treatment.
- Suitable for both developing and developed market adoption.