

Product factsheet Industrial Vortex Generator applied to Cooling Towers

Hardware product or technological device



Description

IVG-CT – Sustainable Water Treatment for Cooling Towers

The **IVG-CT** is a breakthrough **non-chemical** water treatment device for **industrial cooling towers**. It uses **hydrodynamic cavitation**, generated through a precisely engineered **vortex flow**, to treat water **without chemicals**, electricity, or moving parts.

Key Components

- 3D-Printed Vortex Core Maximizes cavitation for optimal water conditioning
- Robust Housing Industrial-grade, easy-to-integrate
- Bypass Loop Option Simple, non-invasive installation
- Zero-Maintenance Design Passive operation, no wear-and-tear

Benefits at a Glance



- Save up to 50% water by increasing cycles of concentration
- Lower energy use via improved heat transfer
- Eliminate all chemicals: minimize biocides, scale & corrosion inhibitors
- Reduce downtime: less scaling, fouling & maintenance
- ROI in 24–36 months
- Drives sustainability goals & ESG performance

Applications

- Cooling towers (industrial, HVAC, data centers, utilities)
- · Seamless retrofitting across industries

How It Works

The IVG-CT spins water into a **controlled vortex**, generating **localized cavitation**. This disrupts biofilm, reduces scale, and improves heat exchange—**naturally** and **sustainably**.

Target audience

Any commercial and industrial cooling tower operation

Actors, their roles and interactions

Actors & Roles in the IVG-CT Ecosystem

1. Industries & End-Users

Role:

- Operate **cooling towers** in sectors like manufacturing, data centers, food & beverage, chemicals, energy, and commercial HVAC.
- Main beneficiaries of IVG-CT through water savings, reduced energy use, and lower OPEX.

Interactions:

- Purchase or lease IVG-CT systems via direct sales, distributors, or engineering firms.
- Provide site data for custom sizing and installation.
- Monitor performance KPIs (water/energy use, maintenance logs).

2. Water Utilities

Role:

- Indirect stakeholders benefiting from reduced water withdrawal and wastewater discharge.
- May act as **advocates** or partners in promoting non-chemical treatment solutions to industrial clients.

Interactions:

- Collaborate on water-saving initiatives or sustainability pilot projects.
- Support reporting for **regulatory or ESG compliance**.

3. Technology Provider (e.g., H2oVortex)



Role:

- Design, manufacture, and continuously improve the IVG-CT.
- Provide technical expertise, installation guidance, and after-sales support.
- Drive **R&D** and global **deployment strategies**.

Interactions:

- Partner with engineering firms, OEMs, and local installers.
- Train and certify service providers.
- Track and report system impact metrics for clients.

4. Engineering Firms & Installers

Role:

- Manage site audits, installation, commissioning, and maintenance (when needed).
- · Adapt IVG-CT systems to local infrastructure and regulatory needs.

Interactions:

- Act as **channel partners/resellers** for the technology provider.
- Serve as key technical liaisons with industrial clients.

5. Distributors & Commercial Agents

Role:

- Promote IVG-CT within specific geographies or verticals.
- Manage customer acquisition, logistics, and local regulatory requirements.

Interactions:

- Serve as frontline commercial partners.
- Coordinate with tech provider and installers for project delivery.

6. Regulators & Certifiers

Role:

- Define water discharge, treatment, and chemical use regulations.
- May provide certification or green labels for IVG-CT technology.

Interactions:

- Influence market adoption via regulation and incentives.
- Recognize IVG-CT as a **Best Available Technology (BAT)** in water-intensive sectors.



Unique selling points

Problems the IVG-CT Solves

- Excessive water consumption in cooling towers
- High chemical dependency (biocides, anti-scalants, corrosion inhibitors)
- Costly maintenance and downtime from scaling, fouling, and biofilm
- Energy inefficiency due to poor heat exchange
- Environmental concerns and non-compliance with ESG goals
- Limited adoption of sustainable solutions due to complexity or high CapEx

Unique Selling Points & Innovation Highlights

- Chemical-free water treatment
- Reduced water usage by up to 50%
- · Handles any quantity and quality of incoming water
- Zero energy use passive device driven by flow
- **3D-printed vortex core** precision-engineered for optimal cavitation
- No moving parts low risk of failure, near-zero maintenance
- Fast ROI payback in 24-36 months
- Plug-and-play installation adaptable to existing systems
- Improves heat exchange and reduces energy costs
- Extends equipment lifespan by mitigating corrosion and scale
- Supports ESG compliance and sustainable operations
- Scalable and modular for various industrial applications



Technical requirements

Technical Requirements for IVG-CT

To Assess

- Cooling tower system specifications:
 - Flow rate (m³/h or GPM)
 - Piping diameter and material
 - System pressure and temperature ranges
 - Cycles of concentration and water quality data (optional)
- Site assessment by the engineering partner or distributor (optional remote audit)

To Install

- Straight piping section:
 - Preferably horizontal or vertical pipe run with sufficient length before and after the IVG-CT unit
 - Standard flange or threaded connections (customized per site)
- Space availability:
 - Minimal footprint required
 - Bypass loop recommended for non-invasive integration into recirculation system
- No electrical or control integration needed

To Run

- Standard flow and pressure from the cooling tower circulation loop
- No power source or automation system required
- Operates passively under normal system flow conditions
- Zero maintenance: periodic visual inspection only (e.g., during routine system checkups)



Publications

1. DataCenter Dynamics – Cooling Supplement (2024)

- Title: Next-Gen Cooling Innovation: Vortex Technology Slashes Water & Energy Use in Data Centers
- **Highlight**: IVG-CT featured as a sustainable cooling solution reducing operational costs and improving ESG metrics in mission-critical infrastructure.

2. White Paper – H2oVortex

- **Title**: Hydrodynamic Cavitation as a Sustainable Alternative to Chemical Water Treatment in Cooling Towers
- **Summary**: Technical white paper detailing the physics of the vortex effect, case studies, and performance metrics.

3. H2oVortex Case Study Series

- Various sectors: Real-life installations across industrial cooling systems with quantifiable savings in water, energy, and chemical usage.
- Available on request or through the H2oVortex website and partner networks.

4. Environmental Technology Journal (In Submission)

• Upcoming peer-reviewed article on the environmental performance of cavitation-based non-chemical treatment systems in industrial cooling.

URL

http://www.h2ovortex.com

Technology applied by the product

• Water recovery technologies for water reuse

Costs

Cost will depend on quantity and quality of water as well as size of Cooling Tower (€250k - €5 million) however ROI < 3 years Last update: 2025-04-14

Technology Readiness Level

Level 9 (Last update: 2025-04-14)

Downloads

The following file can be downloaded from the online page of the product: https://mp.watereurope.eu/d/product/163

H2ovortex Water Europe presentation