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

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Published in the Water Europe Marketplace