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# **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



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- 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)



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#### 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.

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# 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

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# **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:
  - o 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)

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## **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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