



Industrial Humidity Control LLC

– Since 2004 –

ABOUT THE COMPANY · THE PRODUCT · THE HISTORY

About Industrial Humidity Control & FanMist

A century of industrial humidification, and the fan-accelerated, 1000-psi high-pressure system that carries it forward.



CONTENTS

- 02 Who We Are
- 03 The Problem We Solve
- 04 A Century of Humidification
- 05 Specialization & Standardization
- 06 High Pressure Meets High Velocity
- 07 The FanMist System
- 08 Accelerated Evaporation
- 09 Engineering the Right System
- 10 Quality, Partners & Support

Who We Are

Industrial Humidity Control LLC — specialists in winter humidity control for manufacturing since 2004

Industrial Humidity Control LLC (IHC) is based in Indianapolis, Indiana. Since 2004 it has specialized in reliable, energy-efficient humidification for industrial manufacturing, focusing exclusively on fan-assisted high-pressure (1000-psi) technology.

That focus produced **FanMist**, an integrated, automated humidity control system. FanMist pairs 1000-psi atomized water with high-velocity 10,000 CFM fans to create a fine moisture plume that evaporates rapidly above plant equipment and workspaces. The result is precise, uniform humidity control without wet spots or drips.

What IHC Provides

- **Complete FanMist systems:** automated pump stations, 36" high-velocity fans, mist rings and nozzles, high-pressure tubing and fittings, humidistat control and fan relays.
- **Engineering & sizing:** load calculations using the FanMist Load Calculator Guide (Practical Method), with industry editions for woodworking, paper and electronics.
- **Documentation:** the FanMist Installation Handbook, User Manual, Parts Price List and a growing library of Technical Data Documents.
- **Support:** direct technical support, plus replacement parts and service kits for every component.

AT A GLANCE

Founded	2004
Headquarters	Indianapolis, Indiana
Specialty	Fan-assisted high-pressure humidification
Product	FanMist automated system
Operating pressure	1000-psi
Fan airflow	≈ 10,000 CFM per fan
Warranty	Pumps 5 yr · equipment 2 yr
Technical support	765-702-4083



The FanMist Automated Pump Station: pump, controls and safety systems in one enclosure.

The Problem We Solve

Why heated manufacturing plants need engineered humidity every winter

Winter manufacturing has always carried the same environmental problem. When cold, dry outdoor air is heated for indoor comfort, its moisture-holding capacity rises sharply while the actual water vapor it contains stays the same. Relative humidity inside the building falls, commonly into the **10 – 20%** range.

This isn't a mechanical failure. It is simple physics: warm air can hold far more water vapor than cold air, so heating cold air without adding moisture back lowers its relative humidity even though its water content hasn't changed. The effects are well documented in every humidity-sensitive industry: static electricity, dimensional instability in hygroscopic materials, fiber breakage, paper curl, poor print registration, slower production and quality defects.

The Industries We Serve

Woodworking, Furniture & Cabinetry

Wood gains and loses moisture with the air. Stable RH holds its equilibrium moisture content (EMC), preventing shrinkage, cracking, warping and joint failure between machining and finishing.

Paper, Print & Label

Dry air causes curl, static and poor registration on press. Controlled humidity keeps stock flat and dimensionally stable from the warehouse to the pressroom.

Electronics

Low RH drives electrostatic discharge (ESD) damage and unpredictable moisture behavior in components. A 40% RH target at 72 °F protects boards and devices through assembly.

A note on textiles: textile mills were among the first users of industrial humidification, but fan-based systems like FanMist are not applied in textile environments because of airborne lint and dust.

Who Decides

Humidity control is decided by plant managers, operations directors, facility engineers and quality supervisors. They treat humidity (typically 35 – 50% RH) as a strategic investment in defect reduction, productivity and employee comfort, and they expect data-backed sizing and a clear return on investment. IHC's documentation is written for them.

A Century of Humidification

First Generation: the birth of engineered humidity control (1902 – 1915)

“That which has been is what will be, that which is done is what will be done, and there is nothing new under the sun.”

— Ecclesiastes 1:9

The story of industrial humidity control is one of necessity driving invention. In the early 20th century, factories—especially textile mills, furniture plants, printing plants and paper facilities—faced crippling winter production problems when heated indoor air dropped relative humidity to damaging levels. A century of continuous innovation followed.

Willis Haviland Carrier · 1902

Carrier installed the world’s first modern spray-type air-conditioning system at a Brooklyn printing plant. In solving a printing problem caused by changing humidity, he established the core principles of **psychrometrics**, the science of moist air that every humidity calculation still rests on.

Stuart W. Cramer · 1906

Textile engineer Stuart Cramer pioneered large-scale humidity systems for cotton mills and coined the term “**air conditioning**” in 1906, describing the conditioning of mill air with moisture.

The Bahnson Brothers · 1915

The Bahnson brothers founded the Normalair Company, later the **Bahnson Company**, in North Carolina. It commercialized the first dedicated electric humidifiers for textile mills.

Early Electric & Isothermal Systems

This first generation relied on electric steam generators and heated pans. These **isothermal** systems added moisture by boiling water into steam, which takes significant outside energy to change water’s phase. They were reliable but energy-intensive and costly to operate, and that drove the search for something better.

Specialization & Standardization

Second Generation: Herrmidifier and the national industrial standard (1945 – 1990s)

After World War II, demand for consistent, off-the-shelf humidification systems grew rapidly in American manufacturing. One company focused exclusively on that need, and its work still shapes how humidity loads are calculated today.

Herrmidifier Co., Inc. - 1945

In 1945 **Paul Herr** founded Herrmidifier Co., Inc. in Lancaster, Pennsylvania. Its tagline was simply “humidification is our only business,” and it became the leading specialist in the field. Herrmidifier developed and refined steam, compressed-air atomizing, electronic and early high-pressure water systems for industrial and commercial use nationwide. It standardized the technology for textiles, printing, paper and woodworking, bringing mature humidity control to thousands of facilities until it was acquired by **Trion, Inc.** in 1996.

The Lasting Contribution: The Load Calculator Guide

Herrmidifier's most lasting contribution was not any single piece of hardware but a disciplined **method for calculating humidification load**. Its Load Calculator Guides, rooted in the psychrometric principles of the **ASHRAE Handbook – Fundamentals**, became a standard reference for engineers and contractors. They emphasized:

- proper plant air balance;
- the difference between controlled ventilation and uncontrolled infiltration;
- sizing by **governing airflow**: the greater of total process exhaust CFM or total makeup-air CFM.

The core formula relating grains of moisture difference to airflow has not changed, because it rests on fixed physical relationships rather than marketing claims.

Carrying the Lineage Forward

The knowledge and culture of that era carried forward through people such as **Rob Clemens**, National Sales Manager at Herrmidifier, who brought direct engineering experience into later work.

Industrial Humidity Control LLC explicitly follows this lineage. The **FanMist Load Calculator Guide** follows and builds on the foundation Herrmidifier laid, which has guided industrial-scale humidity control since 1945.

The Three Foundational Questions

Every project still starts in the same place:

1. How much cubic air is being humidified?
2. How fast is that air turning over?
3. What relative humidity must be maintained?

The answers define the moisture load in pounds per hour, and everything else is built on that figure.

High Pressure Meets High Velocity

Third Generation: high-pressure atomization and the FanMist era (1995 – present)

Adiabatic Humidification

Engineers next developed **adiabatic** systems that add moisture without adding outside heat. Water goes into the air as very fine, micron-sized droplets that evaporate by absorbing sensible heat already in the surrounding air, the same principle as evaporative cooling. The first practical versions combined water with compressed air to make the mist. They worked very well, but carried the cost and maintenance burden of producing and delivering compressed air.

Pure High-Pressure Water

The next step removed the compressed air entirely. High-pressure pumps force water through precision nozzles at about **1,000 psi**, producing an ultra-fine mist that evaporates almost instantly. This pure adiabatic process proved more energy-efficient and lower-maintenance, and by the late 1990s and early 2000s it was one of the most economical options for large industrial spaces.

Adding High-Velocity Fans

Fan-assisted high-pressure systems are a practical refinement, not an invention from scratch. Pairing 1,000-psi misting with high-velocity fans uses moving air to solve the central challenge of adiabatic humidification: making sure the atomized water **fully evaporates before it can fall out of the airstream**. The 36-inch, 10,000 CFM fan proved ideal. The FanMist concept emerged in 2004, and by 2016 Industrial Humidity Control LLC had established FanMist as its integrated high-pressure misting system with high-velocity fans.

Legacy

From Carrier's spray systems and Bahnson's early electric humidifiers, through Herrmidifier's standardization, to today's FanMist technology, industrial humidification has become an efficient, accurate tool for protecting hygroscopic materials and eliminating winter production problems.

TIMELINE

1902

Carrier's spray-type air conditioning

Brooklyn printing plant; birth of psychrometrics

1906

Cramer coins "air conditioning"

Large-scale humidity for cotton mills

1915

Bahnson / Normalair founded

First dedicated electric textile humidifiers

1900s–60s

Isothermal era

Electric steam generators and heated pans

1945

Herrmidifier Co., Inc. founded

Paul Herr · Lancaster, PA · Load Calculator Guides

1970s–90s

Adiabatic era

Compressed-air-and-water atomizers

1995

High-pressure water atomization

1,000 psi pumps replace compressed air

1996

Herrmidifier acquired by Trion, Inc.

2004

Industrial Humidity Control LLC · the FanMist concept

High-pressure mist paired with high-velocity fans

2016

FanMist brand established

Integrated 1,000 psi system with 36" 10,000 CFM fans

2026

FanMist Technical Library

Load Calculator Guides by industry · Technical Data Documents

The FanMist System

An integrated, automated, demand-driven humidity control system

FanMist combines 1000-psi atomized water with 10,000 CFM high-velocity fans to create a fine moisture plume that evaporates rapidly above plant equipment and workspaces. A PLC in the Pump Station coordinates pump and fan operation automatically from a humidistat signal.

How It Works

1. **Sense:** a Neptronic humidistat in the most representative area of the plant calls for humidity when RH falls below its set point.
2. **Air first:** the Omron PLC starts the fans immediately. The pump follows 10 seconds later, so mist always enters moving air.
3. **Atomize:** the General Pump EP Series pump builds 1000-psi. Stainless steel nozzles with ruby orifices open mechanically at 300 psi and atomize the water into each fan's plume.
4. **Protect:** a high-pressure safety switch must prove 550 psi within 25 seconds, or the system shuts down and lights the red FAULT light.
5. **Stop clean:** at set point the pump stops first. The electric drain valve depressurizes the line, closing every nozzle instantly and draining about ¼ gallon. The fans run 10 more seconds to clear the last mist.

Typical cycles run 10 minutes ON / 10 minutes OFF, with seasonal pump runtime of about 1,500 – 2,000 hours.

Built-In Protection & Simple Upkeep

- **Inlet solenoid valve:** water reaches the pump only when it is about to run, so the main supply valve can stay open 24/7.
- **Unloader valve:** holds discharge at 1000-psi and bypasses unused flow. A thermal relief valve protects against overheated bypass water.
- **Status at a glance:** green RUN, red FAULT and amber MAINT lights, plus an hour meter. The PLC calls for service every 500 hours.
- **Maintenance:** oil, 5-micron pre-filter and belt checks every 500 hours. Seals, valves and plungers are serviced on longer intervals.
- **Water treatment:** RO or softening upstream of the pre-filter protects the nozzles and the 5-year pump warranty.



A FanMist 36" fan and mist ring delivering its plume into the warm ceiling zone.

SYSTEM COMPONENTS

Pump Station	APS2501 – APS2504 · 0.25 – 2.5 gpm
Fans	36" · ½ HP · 1Ph or 3Ph
Mist rings	15" – 27" · 304 stainless
Nozzles	303 SS · ruby orifice · 1.85 – 10.58 lbs/hr
Tubing	3/8" & 1/2" nylon · Slip-Lok fittings
Control	Omron PLC · Neptronic HRO20

Accelerated Evaporation

The first principles behind the FanMist design

111

LBS/HR

Each FanMist fan evaporates about **111 lbs of water per hour within 10,000 CFM** of airflow, a normalized rate of **11.1 lbs per 1,000 CFM**. This field-tested balance point gives reliable, drip-free performance. The design rule keeps the fan output ratio above **75 CFM : 1 lb of water** within a 4 ft diameter, 22 ft long plume.

The fans are pointed outward and upward into the ceiling zone, where warmer air collects and evaporation happens more readily, with minimal effect on air temperature at floor level. Once the mist evaporates in the upper air, humidity equalizes throughout the facility by diffusion and normal air movement.

Three Physical Laws

Dalton's Law & the Ideal Gas Law

Water vapor exerts its own independent partial pressure. Once evaporated, it moves freely through the air without displacing anything.

Fick's Laws of Diffusion

Vapor migrates rapidly from high to low concentration along the vapor-pressure gradient until the space reaches equilibrium.

Clausius – Clapeyron

Saturation vapor pressure rises exponentially with temperature ($\approx 7\%$ per $^{\circ}\text{C}$), so warm ceiling air greatly increases moisture-holding capacity.

Matching Moisture to Airflow

The key engineering constraint is matching the moisture delivered at 1,000 psi to the available airflow, so that evaporation is essentially complete within the fan's reach. Going above the loading ratio in a given space risks incomplete evaporation and condensation. Running well below it may need more equipment to meet the load. Every FanMist system is sized against this balance, fan by fan.

Seven Elements of Accelerated Evaporation

1

Extremely fine droplet size

2

High air movement & mixing

3

Strong vapor-pressure gradient

4

Warm ceiling-zone temperature

5

Rapid diffusion & equalization

6

Precise system design & placement

7

Continuous dilution of near-saturated air

High-velocity air + 1000-psi atomization = **accelerated evaporation**

Engineering the Right System

Load calculation, practical sizing, and knowing where FanMist fits

Continuity in Load Calculation

The discipline Herrmidifier established carries straight into the FanMist Load Calculator Guide. Sizing still begins with the same essential inputs:

- **Building volume:** length × width × ceiling height.
- **Governing airflow:** the greater of process exhaust or makeup-air CFM, including the HVAC economizer's minimum winter outdoor-air setting.
- **Target conditions:** for example 40% RH at 70 °F.

The **Practical Method** calculates net load from that governing airflow and adds a **15% safety margin** for colder-than-design days and normal operating variation. Secondary factors such as product moisture regain, process moisture and occupants largely offset one another in real conditions. That is why the ventilation-based approach is accurate enough for most sizing, while the Comprehensive Method remains available when detailed engineering documentation is needed.

Industry Editions

The FanMist Load Calculator Guide is published in editions for **Woodworking, Paper, Print & Label** and **Electronics**. Each has worked examples and target-RH guidance for its industry.

Real-World Design Factors

Ceiling height, overhead obstructions, air temperature in the evaporation zone and the target RH all affect how much moisture can safely be introduced per unit of airflow. Taller spaces with clear, warmer ceiling zones tolerate higher loading. Lower ceilings, dense ductwork or lighting, and cooler conditions call for more conservative ratios or more fans.

Where FanMist Fits, and Where It Doesn't

High-pressure fan-assisted systems perform well in most conventional manufacturing spaces that need winter humidity control, but they are not universal. Facilities with very low ceilings, strict cleanliness requirements that rule out any risk of fallout, or particular process sensitivities may be better served by other technologies. IHC sizes every system honestly against those limits.

Pump Sizing

FanMist pumps are sized for the total moisture required plus room for future needs. The design target is **30 – 40% excess pump capacity**, which avoids extreme bypass and keeps the system efficient.

Quality, Partners & Support

Proven components, protected by warranty and backed by direct technical support

Built on Proven Components

General Pump	EP Series high-pressure plunger pumps (EP1812S17 · EP1508S34)
Omron	Programmable logic controller for sequencing, timers and fault logic
Neptronic	HRO20 humidistat with built-in sensor, 24 VAC control
Danfoss	Electric drain valve for automatic depressurization
CICA	PSS31 high-pressure safety switch
Functional Devices	Relay in a Box (RIB) fan relays
Total Water Treatment Systems	Water treatment and bladder tank resources

Warranty

All pumps are warranted against defects in workmanship and materials for **five years**. All other equipment carries a **two-year** warranty under the same conditions. If a defect is confirmed, IHC and the vendor repair or replace the product, troubleshooting first with your maintenance team for the fastest resolution.

The FanMist Technical Library

- FanMist Parts Price List
- FanMist Installation Handbook
- FanMist User Manual (Guidance Handbook)
- FanMist Load Calculator Guides: Woodworking · Paper · Electronics
- Technical Data Documents: Omron PLC · EP Series Pumps · Electric Drain Valve · Nozzles · Inlet Solenoid Valve · High-Pressure Safety Switch · Unloader Valve · Wiring & Schematics · Pump Station Views & Parts · Troubleshooting · Fan & Pump Delay · Preventive Maintenance
- The Physics of Equilibrium: First Principles

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"Humidification becomes less a battle against the air and more a well-tuned collaboration with it." — FanMist Load Calculator Guide