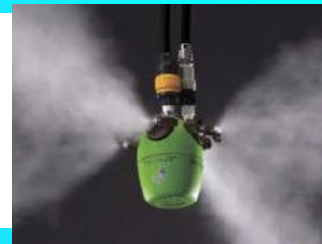


# AirAKI® DRY Fog humidification system for Electronics industry

## About AirAKI®

In 1979, H. IKEUCHI & Co., Ltd invented the AirAKI® industrial humidification system utilizing the AKIMist® that sprays non-wet fog "Dry Fog". This is the world's first system that guaranties the humidity of the factories. We design the system installation suits to factory's layout and air conditions and check the humidity after installation.



## Sales reference

We have delivered to Japanese leading electronics parts manufacturers, such as Sharp, Sony, Hitachi, Panasonic, etc, who produce cell-phones, communications devices, LCD TVs, and car electronics products. They installed AirAiki® systems in SMT processes to protect these products from problems caused by static electricity and dust particles.

Customer's products	Customers	Customer's products	Customers
<b>Communication device (Cellular phone)</b> Electronic component, like a IC and condenser Assembling process and SMT for cellular phone and communication instrument	NEC Corporation	<b>FPD (LED, PDP)</b> LED module assembly Backlight assembly LED glass panel	Sharp Corporation
	Panasonic Corporation		Hitachi, Ltd.
	Sharp Corporation		TOSHIBA CORPORATION
	Hitachi Kokusai Electric Inc.		Panasonic Corporation
	EPSON TOYOCOM Corporation		GEOMATEC Co., Ltd.
	ICOM Incorporated		Stanlay Electric Co., Ltd.
<b>Electronic component for PC</b> Crystal oscillator, condenser, IC, Parts for HDD (magnetoresistive head)	Japan Radio Co., Ltd.	<b>Car electronics</b> Car navigator Air-bag system Front panel	Asahi Glass Company, Limited
	Panasonic Corporation		Nippon Sheet Glass Company, Limited
	NIHON DEMPA KOGYO Co., Ltd.		Nippon Electric Glass Co., Ltd.
	Taiyo Yuden Co., Ltd.		DENSO Corporation
	DAISHINKU Corp.		KEIHIN Corporation
	EPSON TOYOCOM Corporation		CALSONIC KANSEI CORPORATION
<b>Audio-Video Equipment</b> DVD player, DVD laser pickup	NEC Corporation		Clarion Co., Ltd.
	Hitachi, Ltd.		Panasonic Corporation
	TDK Corporation		ALPS ELECTRIC Co., Ltd.
	Panasonic Corporation		ALPINE ELECTRONICS, Inc.
	SONY Corporation		TOKAI RIKA Co., Ltd.
	JVC KENWOOD Holdings, Inc.		ASTI Corporation
	Sharp Corporation		JVC KEMWOOD Holdings, Inc.
	PIONEER Corporation		

## Installation

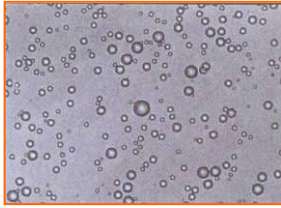
The AirAKI® system can be set up according to a factory's layout and air conditioning systems.



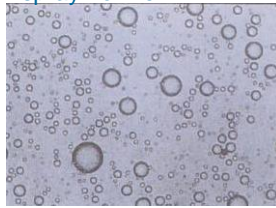
## Features of AKIMist®"E"

By utilizing AKIJet®, AKIMist®"E" sprays Dry Fog; highly-uniform droplet fog with mean diameter of 7.5 μ m. It can humidify without wetting targets.

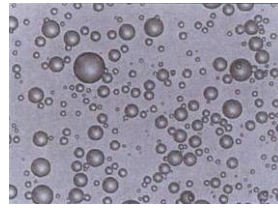
AKIMist®"E"



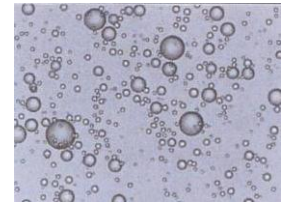
Conventional pneumatic spray nozzle



Spinning disk type

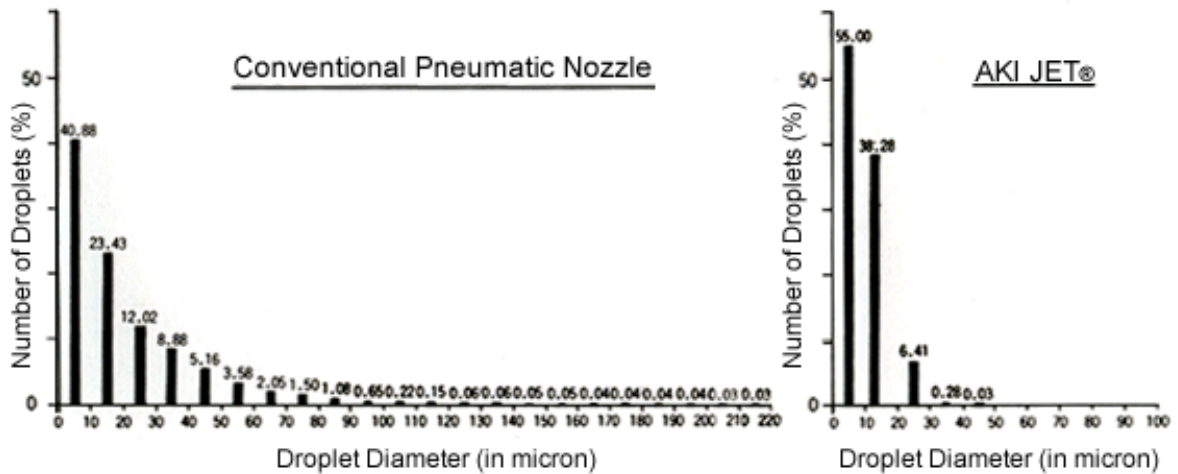


Ultra sonic type



## The finest fog with droplet sizes distributed in a very tight range.

As shown below, there is a significant difference between the droplet sizes sprayed by the conventional pneumatic nozzle and by the AKIJet® under the same conditions. Large sized droplets cause problems during humidification; hitting objects and making them wet.

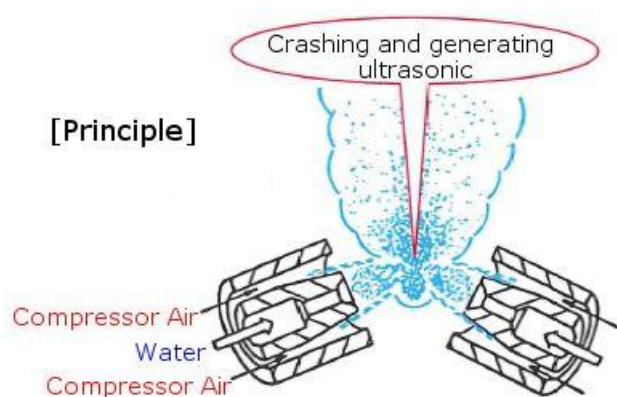


## How generate Dry Fog

Atomized droplet flow from nozzle crashes into flow from the other nozzle.

This couple of flow repeats shearing droplets.

Simultaneously they generate ultrasonic at 3.3~4MHz to further atomize droplets and homogenize size.



## Advantages of AKIMist®"E" in the Electronics Industry


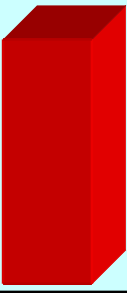
AKIMist®"E" can be installed inside clean rooms where wetting surfaces is strictly prohibited. It can be installed according to a manufacturing lines layout for effective humidification.

By humidifying the entire target area, it creates an environment that does not generate static charge. AKIMist®"E" can be another approach to humidifying when compared with other solutions, such as the removal of static electricity by ionizer or anti-static charge instruments. This system leads to the improvement of a factory's reliability and product quality.

Another advantage of our system is that it consumes only about 1/5 ~ 1/8 of the energy used by conventional steam humidification. It can be one of biggest energy saving and CO<sub>2</sub> reducing assets in a factory.


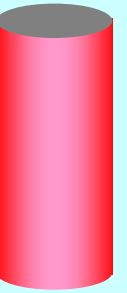
## An example of energy cost and CO<sub>2</sub> reduction comparison with steam humidification method

### ○ Energy-Saving effect of AKIMist®"E"

	AKIMist®"E"	Steam Humidifier (Electrode vapor)
Energy cost		
For example (Amount of humidification: 100kg/hr)	Approx. 10kW	Approx. 75kW
Annual electricity	Approx. EUR 3,000-	Approx. EUR 22,500-

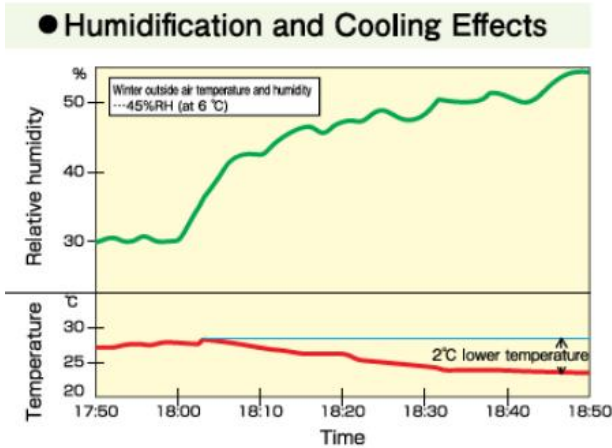
Energy cost for Dry Fog humidification is only 1/5~1/8 of that used for steam humidification.

### ○ CO<sub>2</sub> reduction

	AKIMist®"E"	Steam Humidifier (Bunker A-fired boiler)
CO <sub>2</sub> emission		
For example (Amount of humidification: 100kg/hr, 3000hr/year)	Electricity: Approx. 33,750 kWh/year	Bunker A: Approx. 35,714 L/year
Annual CO <sub>2</sub> emission	Approx. 12.7 ton <sup>CO<sub>2</sub></sup> /year	Approx. 96.8 ton <sup>CO<sub>2</sub></sup> /year

CO<sub>2</sub> emission for Dry Fog humidification is only 1/7~1/8 of that used for steam humidification (Bunker A-fired boiler).

Electronic parts manufacturing process such as SMT is consuming large energy for cooling air not only in summer but also in winter season and this shares the one of biggest ratio of energy cost of the plant. AKIMist® "E" sprays water direct into the room and it's adiabatic cooling effect is 625W / water 1kg. Generally speaking, it can cool down room temperature about 2degreeC and this cooling effect leads about 20% of energy saving of air cooler. Steam humidification does not have adiabatic cooling effect. On the contrary, steam has possibility of makes condensation in the duct of air conditioner because the temperature inside of the duct is lower than room temperature. It means energy conffliction happens in the duct and it is not efficient energy usage.

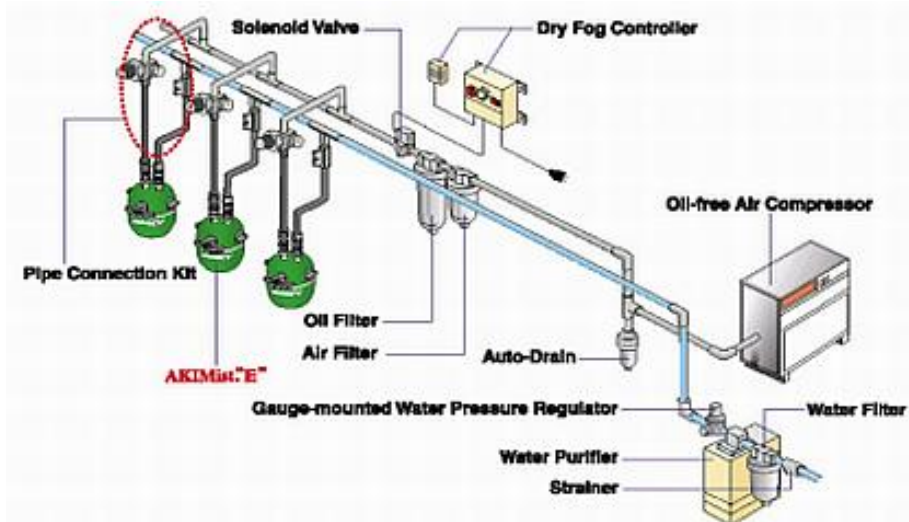


	AKIMist® "E"	Steam Humidification System
Humidification Characteristics	<p>100%RH</p> <p>Absolute Humidity</p> <p>Temperature</p>	<p>100%RH</p> <p>Absolute Humidity</p> <p>Temperature</p>
Efficiency	<p>Isoenthalpic Variation (Thermo-Moisture Ratio 0)</p> <p>100%</p> <p>(Key: Droplet size)</p>	<p>Isothermal Variation (Thermo-Moisture Ratio 640)</p> <p>100%</p> <p>(Key: Temperature &amp; distance of evaporation)</p>
Cooling effect	<p>Humidification of 1kg saves energy equivalent to appr. 625W to be consumed to treat sensible heat. (Less running cost for air-conditioner)</p>	<p>No cooling effect</p>

**Features of AirAKI® system**

- Simple structure. AKIMist® "E" sprays only by water and compressed air supply. No electric driven parts.
- Because multiple AKIMist® "E" can be installed on one pipeline, it is easily installed over the whole area of a factory.
- No need for fine tuning of air and water pressure regulators to avoid wetting, like conventional air atomizing nozzles.
- No need to install spray units in high positions, like high-pressure nozzles, to avoid wetting.
- In general, AKIMist® "E" is installed in 2m or 3m height and sprays to the target directly.
- No use of high-pressure hydraulic components and low frequency of parts exchange or maintenance.
- Structure is simple and customers can easily maintain by themselves.

## Typical System Flow



## Specifications of AKIMist®“E”

### AKIJet spray nozzle AKI03C

#### ■ Performance ■

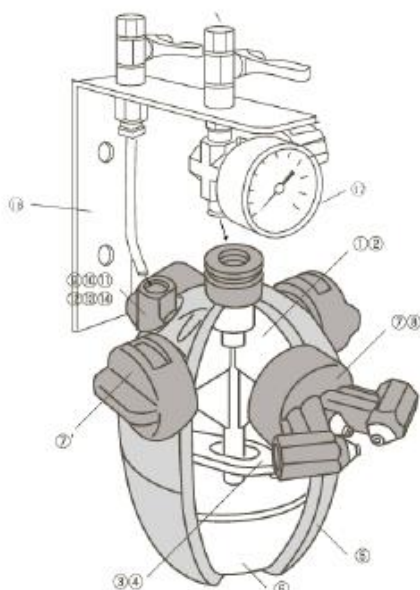
Air pressure (bar)	Spray volume (L/hr)	Air consumption (L/min, Normal)
2	1.3	22
3	2.4	29
4	3.1	36
5	3.6	43

### AKIMist®“E” with AKI03C

#### ■ Specifications ■

Model No.	Qty. spray nozzles	At air pressure 3bar	
		Spray volume (L/hr)	Air consumption (L/min, Normal)
AE-1(03C)	1	2.4	29
AE-2(03C)	2	4.8	58
AE-3(03C)	3	7.2	87
AE-4(03C)	4	9.6	116

## Structure of AKIMist®“E”



No.	Description	Material
1	Upper Half	PP
2	Top Cover	PP
3	Valve Lever	PP
4	Lever Pin	SUS304
5	Under Body	PP
6	Float	PP
7	AKIJet 03C Nozzle	Mix
7'	Stop Plug	PPS
8	Packing	NBR
9	Needle Valve	SUS303
10	Valve Seat	NBR
11	Liquid Nipple	SUS303
12	O-ring	NBR
13	Strainer Holder	SUS303
14	Strainer	SUS316
16	Taps 1/4"	Mix
17	Reducer and manometer	Mix
18	Fitting support	SUS303