

# Non-wetting Dry Fog Humidifiers AKIMist® "E"

Patented



“The Fog Engineers”

IKEUCHI EUROPE B.V.



**Compact, efficient, energy-saving humidifiers**



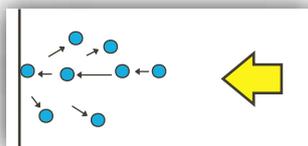
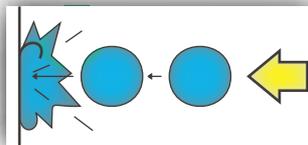
# IKEUCHI's Atomization Technology

## 1

### What is Dry Fog?

Dry Fog is ultra-fine "non-wetting" fog, which doesn't wet the objects it touches. AKIMist® "E" produces a large amount of Dry Fog.

### Large droplets



### Dry Fog, fine fog droplets

## 2

### Why is Dry Fog non-wetting?

Small droplets rebound from an object, but large droplets burst and wet the object.

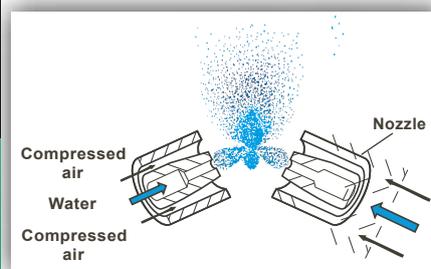
Dry Fog droplets are so fine that they do not burst or wet the objects it touches.

## 3

### How is our Dry Fog produced ?

Atomized droplets, sprayed out from the two orifices apart, collide with each other in the center. Simultaneously they generate ultrasonic waves of 33–40 kHz to further atomize the droplets and homogenize their size.

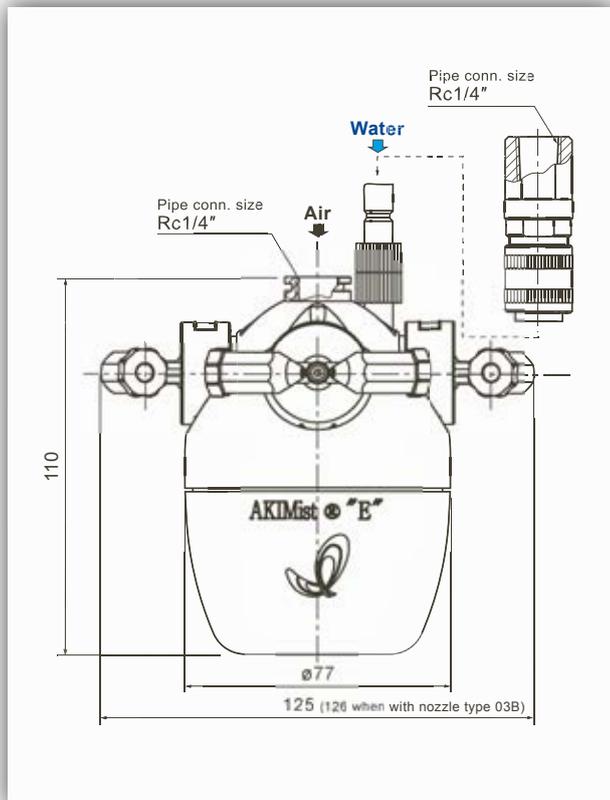
### Atomization principle



# AKIMist® "E" Dry Fog Humidifiers

Compact, efficient, energy-saving humidifiers create quality fog with low air consumption!

## Dimensions



## Materials

- Body: PP, Stainless steel 303
- Nozzle: Stainless steel 303, PPS, fluorocarbon resin
- Other parts: NBR, FKM (O-ring, Packing)

## Mass

- Approx. 340 g (Loaded)

## Note:

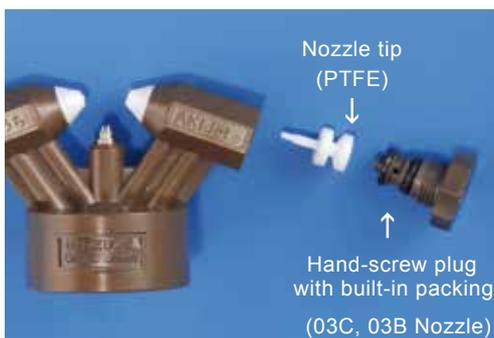
- Before disassembling, close the water valve.
- As main parts are made of plastic, handle AKIMist® "E" with care.  
(For details, see Instruction Manual.)
- Stop plugs are enclosed to reduce the number of nozzles used.



## Features

- Quality fog reaches over four meters horizontally, providing effective humidification.\*1
- Up to four nozzles can be mounted per body.
- Compact body structure keeps free from bacteria.
- Automatic humidity control is available with a humidity controller.

\*1Spray length depends on the surrounding air temperature and humidity conditions.



## Long life technology

- PTFE nozzle tip is highly resistant to clogging.
- Main parts are quickly detachable by hand.  
Hand-screw plug with built-in packing makes maintenance easier.

## Applications

- Humidification: Textile factory, mushroom nursery, poultry incubation, fermentation room, cold storage for food, and more
- Moisture control: Textile, paper, plywood, etc.
- Preventing dust adhesion: Plastic molding, bag-making, painting line
- Dust suppression: Painting line, foundry, ceramic fabrication
- Curing: Concrete
- ESD prevention/Static electricity control: Printing, textile, painting line, plastic film, plastic molding, assembly line of electronics, paper, and more

## AKIMist® "E" Installation Example in Many Industries



## High quality, silky Dry Fog

Nozzle type 03C

Sauter mean droplet diameter: **7.5  $\mu\text{m}$**  measured by a laser analyzer  
 Spray volume: **2.4 L/hr** at 0.3 MPa (per nozzle) (air pressure)

03C nozzle type with clog-resistant nozzle tip produces non-wetting Dry Fog (ultra-fine fog) of uniform quality.

Our Dry Fog, with its ability to humidify target spaces without wetting nearby machines or products, is ideal for use in electronics factories or where wetting is not allowed.

### 03C Nozzle Performance

(per nozzle)

### Specifications

(per body)

Air pressure			Spray volume in L/hr (GPH)	Air consumption in L/min, Normal (SCFM)
MPa	bar	psi		
0.2	2	29	1.3 (0.34)	22 (0.82)
0.3	3	44	2.4 (0.63)	29 (1.08)
0.4	4	58	3.1 (0.82)	36 (1.34)
0.5	5	73	3.6 (0.95)	43 (1.60)

Note: Use under the air pressure of between 0.2 and 0.5 MPa (29 and 73 psi).

Model No.	Number of nozzles	at air pressure of 0.3 MPa (44 psi)	
		Spray volume in L/hr (GPH)	Air consumption in L/min, Normal (SCFM)
AE-1 (03C)	1	2.4 (0.63)	29 (1.08)
AE-2 (03C)	2	4.8 (1.27)	58 (2.16)
AE-3 (03C)	3	7.2 (1.90)	87 (3.24)
AE-4 (03C)	4	9.6 (2.54)	116 (4.32)

One 03C nozzle should be good for spaces of 100 m<sup>3</sup> (3,500 ft<sup>3</sup>), though it depends on various conditions.

## Large volume fog

Nozzle type 04E

Sauter mean droplet diameter: **10  $\mu\text{m}$**  measured by a laser analyzer  
 Spray volume: **3.0 L/hr** at 0.3 MPa (per nozzle) (air pressure)

04E nozzle type: Scratch-resistant nozzle tip, made of metal.

### 04E Nozzle Performance

(per nozzle)

### Specifications

(per body)

Air pressure			Spray volume in L/hr (GPH)	Air consumption in L/min, Normal (SCFM)
MPa	bar	psi		
0.2	2	29	1.9 (0.50)	27 (1.00)
0.3	3	44	3.0 (0.79)	36 (1.34)
0.4	4	58	3.8 (1.00)	45 (1.67)
0.5	5	73	4.5 (1.19)	54 (2.00)

Note: Use under the air pressure of between 0.2 and 0.5 MPa (29 and 73 psi).

Model No.	Number of nozzles	at air pressure of 0.3 MPa (44 psi)	
		Spray volume in L/hr (GPH)	Air consumption in L/min, Normal (SCFM)
AE-1 (04E)	1	3.0 (0.79)	36 (1.34)
AE-2 (04E)	2	6.0 (1.58)	72 (2.67)
AE-3 (04E)	3	9.0 (2.38)	108 (4.00)
AE-4 (04E)	4	12.0 (3.17)	144 (5.34)

03B type with PTFE nozzle tip and spray volume of 3.3 L/hr per nozzle is also available. For details please contact us.

# Optional/Related products

## AE-UT Adaptor (optional)



■ Aiming Dry Fog where needed



■ Intensive large volume spraying

AE-UT Adaptor enables you to adjust spray direction as desired, just by installing it between the nozzle and the humidifier body. You can easily attach and remove it by hand.

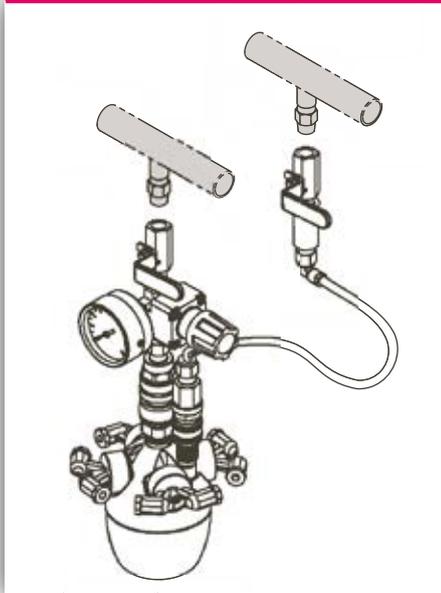
Chemical-resistant type is also available.

Note: Stop spraying before you change the direction.

## Pipe Connection Kits (optional)

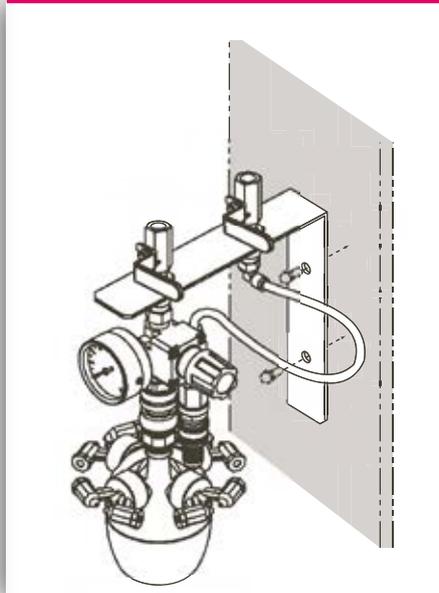
Convenient pipe connection kits for easy installation of AKIMist® "E". These kits come assembled.

### Hanging-down (NP) Kit (w/o plate)



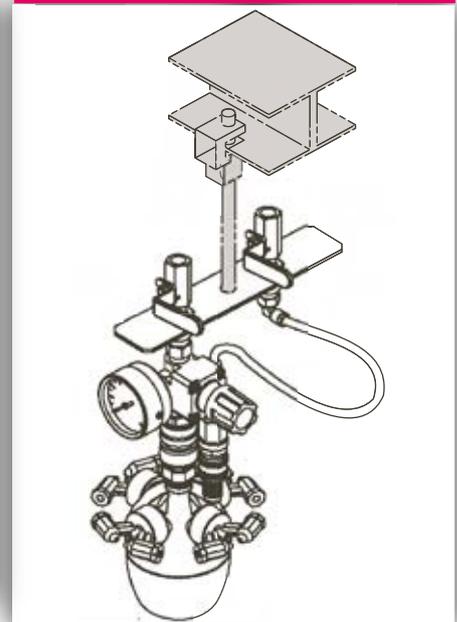
● Rc 1/4" threaded connection.

### Wall Mounting Kit



- Bolts for fixing mounting plate are not included and need to be prepared by customers.
- The diameters of holes on the plate are 9 mm.
- Rc 1/4" threaded connection.

### Hanging-down Kit



- Bolts and hanging fixture are not included and need to be prepared by customers.
- The diameter of hole on the plate is 11 mm.
- Rc 1/4" threaded connection.

Note: Gray parts are NOT included in the kit.

These pipe connection kits are not chemical resistant.

## How to order

Please use this coding system to send an inquiry or to order for a specific model. To add a pipe connection kit, please specify the connection kit type in [ ].

<Example> AE-1 (03C) + [Hanging-down Kit]

Note: Up to four nozzles can be mounted on one AKIMist® "E".

AE-	<b>1</b>	<b>(03C)</b>	+	<b>Hanging-down Kit</b>
	<b>Number of nozzles</b>	<b>Nozzle type</b>		<b>Type of pipe connection kit</b>
	■ 1	■ (03C)		■ Hanging-down (NP) Kit (w/o plate)
	■ 2	■ (03B)		■ Wall Mounting Kit
	■ 3	■ (04E)		■ Hanging-down Kit
	■ 4			

## Chemical-resistant AKIMist® "E" TN



(Available only with nozzle type 03C)

Titanium is applied to the liquid contact parts, for spraying of chemical solution.

Note: This product is sold without pipe connection kit.

### Applications

- Disinfection, sterilization in food factories, hospitals/ pharmaceutical plants
- Disinfection, deodorization in egg farms, livestock barns

### Easy DIY Kit

## Dry Fog Humidifier Kit

### AE-KIT



All the components for an efficient humidification system in one DIY kit. Just supply the electricity and compressed air.

- You can choose the contents of AE-KIT freely to suit your factory size and layout.
- Includes piping and connectors for tap water and air, you can install them easily, and keep optimal humidity. (AKIMist® "E" is installed on a wall.)
- One AE-KIT is good for spaces of up to 800 m<sup>3</sup>. Please contact us for an inquiry sheet.

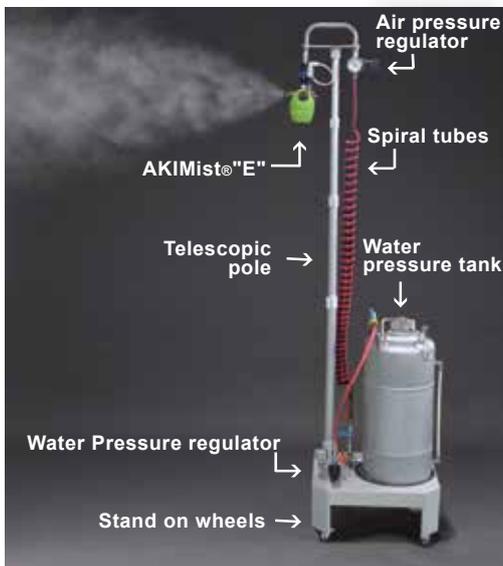
Includes:

Nozzle unit (AKIMist® "E"), Control unit, Water (filter) unit, and Piping unit

### No piping work!

## Portable Dry Fog Humidifier Set

### AE-T set



No piping work necessary.

Easy, convenient humidification for immediate usage in any place with an air supply.

- AKIMist® "E" portable humidifier set with a stand unit and water pressure tank. No installation work required.
- Easy automatic control with a humidity controller (optional).
- Ideal for spot humidification around machinery and use in a small space up to 100 m<sup>3</sup>.

Includes:

AKIMist® "E", Stand with wheels, Telescopic pole, Water tank, Gauge-mounted pressure regulators, and Mounting unit

**Option** Compact humidity controller set

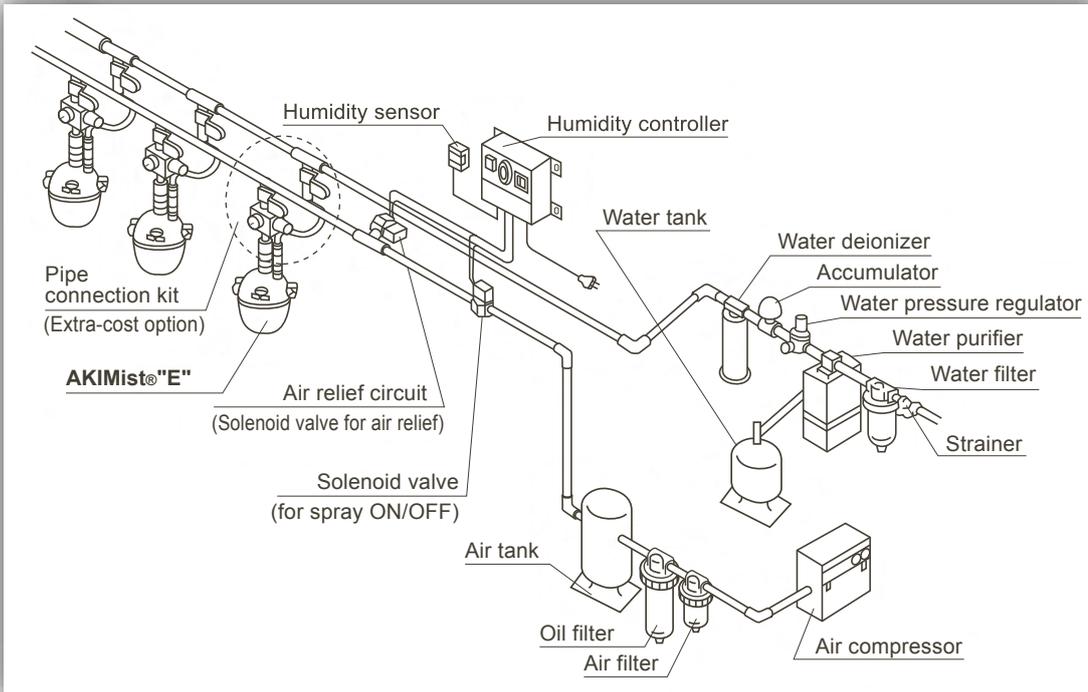
### Specifications

Tank capacity	Material	Max. pressure	Mass	Pole height
18 L (4.8 gal)	Stainless steel 304 etc.	0.7 MPa (100 psi)	12.4 kg (loaded: 30.4 kg) 28 lb (loaded: 67 lb)	Min. 1,000– Max. 2,380 mm

Note: Safety valve is set at 0.4 MPa.

# Installation & Ancillary Devices

For minimal maintenance and long life, clean air and purified water must be supplied to the system. IKEUCHI, having vast expertise, provides a wide range of ancillary devices for purifying water/air and automatic humidity control.



## Air relief circuit

When the solenoid valve unit is installed far from AKIMist®E", spray may become coarse when stopping. In such cases, please install another solenoid valve for air relief between the solenoid valve for spray ON/OFF and AKIMist®E". The solenoid valve for air relief should operate in reverse with the spray-ON/OFF solenoid valve.

## Humidity Controllers

Humidity controller, humidity sensor, and solenoid valve unit work together to provide automated control that maintains the specified humidity level.

### Humidity Controller (RHC-C11)

(Compact type with humidity sensor)



- Digital display of present humidity and target humidity
- Compact size to fit any place
- Measurement accuracy: +/-3%
- Supply voltage: 100-240 VAC
- Range of operation 0-85% RH (0-50°C)

### Humidity Controller (RHC-D\*\*B)

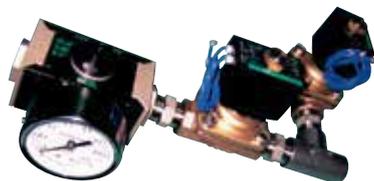
(Controller model numbers are entered in \*\*.)



\*Humidity sensor is sold separately. (This photo is RHC-D22B)

- Digital display of present humidity and target humidity
- Measurement accuracy: +/-3%
- Supply voltage: 100-110 VAC or 200-220 VAC
- Using a single controller, up to four zones spread over a wide area can be controlled individually.

### Solenoid Valve Unit



A solenoid valve and reducing valve are bundled together as a unit for pressure relief. When the humidifier stops spraying, the remaining air pressure in the piping is instantly relieved, so that only fine fog is sprayed.

## Air Filter

- For removal of dust and moisture contents over 0.3 μm from the compressed air with micro-fiber.
- Available in a variety of sizes.
- Air ancillary device set includes an air filter and oil filter with a manual discharging drain and nipple.



## Water Filter

- For removal of foreign particles over 5 μm.
- Available in a variety of sizes.
- Water ancillary device set includes a water filter, a pressure regulator and nipple.

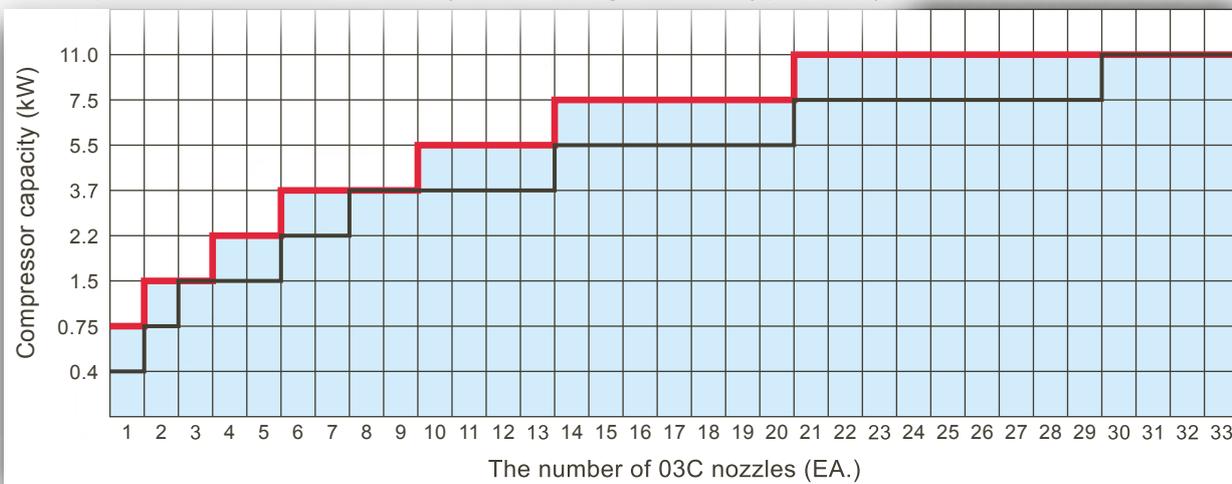


## Recommended pipe size chart (when using nozzle type 03C)

The total number of 03C nozzles		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Air consumption	L/min, Normal (SCFM)	29 L/min, Normal (1.08 SCFM) × the number of nozzles																																
Water consumption	L/hr (GPH)	2.4 L/hr (0.63 GPH) × the number of nozzles																																
Recommended pipe size (Stainless steel pipes should be used)	Air	1/4" or over			3/8" or over			1/2" or over						3/4" or over																				
	Water	1/4" or over			3/8" or over															1/2" or over														

If you plan to use 03B or 04E nozzles, please contact us.

## Air compressor selection chart (when using nozzle type 03C)



- Notes: 1. When spraying at 0.3 MPa air pressure, please refer to the black line ( — ).  
 When spraying at 0.5 MPa air pressure, please refer to the red line ( — ).  
 2. Type of compressor: reciprocating compressor for 0.4–7.5 kW and a screw compressor for 11 kW.  
 3. Using this chart as a target, consult your compressor catalog and confirm the output capacity.

## For minimal maintenance and long life, supply clean air and pure water

The following table shows the required air and water quality specifications to prevent nozzle clogging.

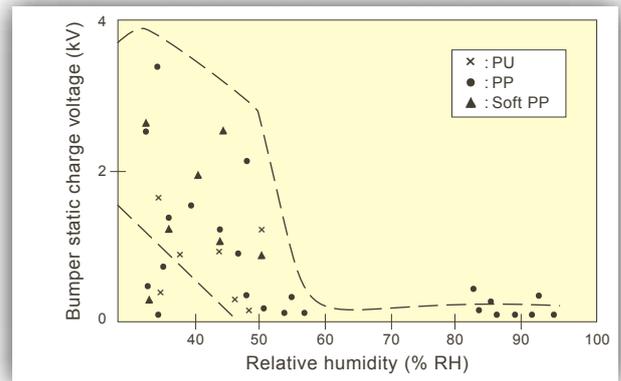
	Air	Water
Pressure	0.2–0.5 MPa (29–73 psi) for 03C/04E 0.3–0.35 MPa (44–51 psi) for 03B at point of use	0.05–0.2 MPa (8–29 psi) Note: Even if set within given range, water pressure may temporarily exceed 0.2 MPa due to operating and other conditions. The recommended setting is 0.1 MPa (15 psi).
Temperature	5°C (41°F)–Room temperature	Room temperature
Quality	Air without moisture, oil mist, or dust; Dew point 10°C.	No particles. Electric conductivity = 0.07–10 micro-S/cm (Resistance 14–0.1 M ohm/cm)

# Benefits of Humidification

## 1. Static Charge Prevention

Helps to **eliminate static electricity problems**, improve product quality, and reduce the number of defects.

■ Relation between humidity and static charge

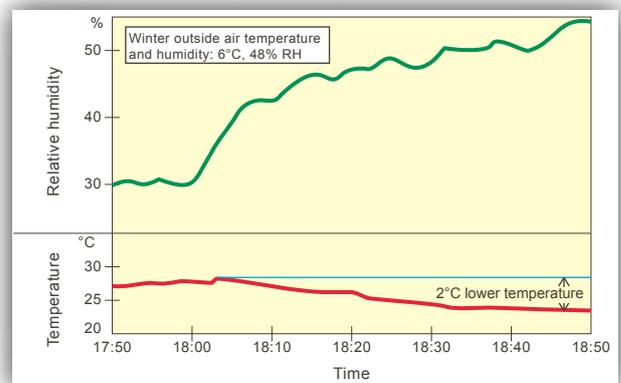


## 2. Energy-Saving Effect

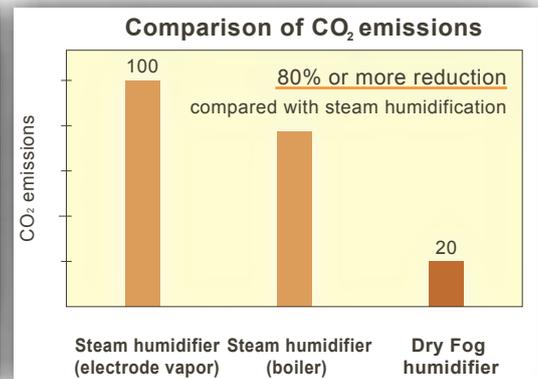
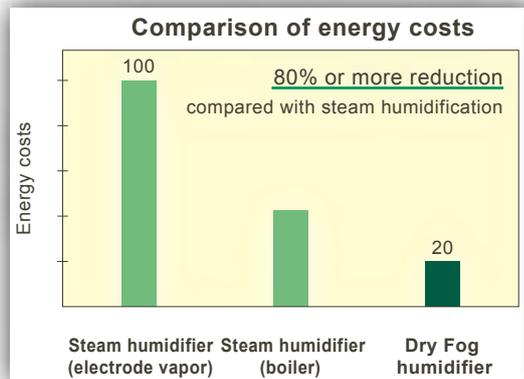
Our Dry Fog humidification system also yields a cooling of about 2°C, which helps to reduce air conditioning cooling costs.

Energy cost for Dry Fog humidification is **only one-fifth** of that for steam humidification.

■ Humidification and cooling effects



■ Comparison of the operating cost of humidification methods

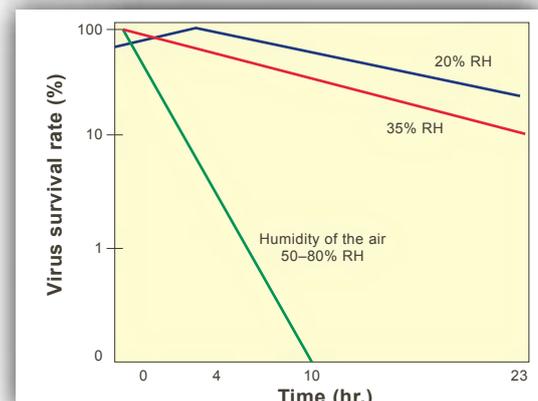


## 3. Promoting better worker health

Many of our customers say, "Worker absences caused by illness has reduced after the installation of AKIMist® "E"."

Maintaining a relative humidity level over 50% dramatically reduces cold viruses, flu viruses and so forth, and creates more comfortable working environments.

Humidity over 50% RH cuts the lifespan of cold and flu viruses, helping to reduce worker's sick days.



# Customer Case Studies

## 1. Printing Web Offset Printing Process

Humidity control suited to each printing press type and process has a big impact.

- AKIMist® has quickly gained acceptance as nozzle-type humidification systems are becoming popular in the printing industry.
- AKIMist® has the best track record in the Japanese printing industry, with over 30 years of strong experience.
- For sheet-fed printing, UV printing, Flexo printing and others, we have the best-suited solutions for all kinds of printing presses.



Improved productivity and quality, reduced waste paper

Paper jams, poor folds, etc. ➡ Solved by controlling humidity to around 50% RH

## 2. Electronics SMT Process

A humidification method that can save energy has become the strongest focus of attention.

- By maintaining humidity at an appropriate level, it is possible to prevent the various problems caused by static electricity.
- The Dry Fog cooling effect reduces the building cooling load.
- With the No. 1 track record as well as 30 years of remarkably good results, we have optimal solutions for a wide range of processes and environments.
- It is also well-suited for clean room humidification.



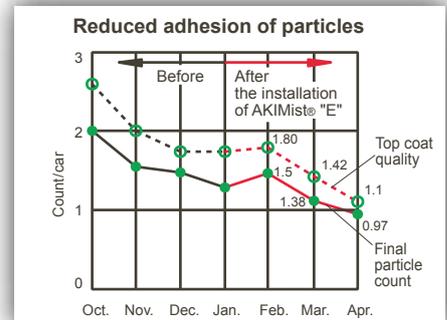
Reduced pickup and mount errors by 60% and cooling load by 20%

Internal part damage ➡ Solved by controlling humidity to around 45% RH

## 3. Painting Painting Process for Cars

Control ambient humidity to eliminate static electricity and limit airborne waste.

- By keeping appropriate humidity, dust is suppressed and static electricity is reduced.
- Humidification is the first step to reduce the adhesion of dust to products.
- Starting with the car industry, AKIMist® is now used in many kinds of industry as the solution for dust problems.
- We can find solutions to meet the needs of your factory.



Reduced adhesion of dust by 20% and maintaining operators' health

Defective painting by adhesion of dust ➡ Solved by controlling humidity to about 50% RH

## Other Installations

Field	Goal	Examples of actual results
Textiles	Improved productivity	<ul style="list-style-type: none"> <li>● Thread breakage is prevented and productivity improved.</li> <li>● Prevented pass weft from sticking.</li> <li>● Prevented defects due to static electricity.</li> </ul>
Chemicals	Safety precautions	<ul style="list-style-type: none"> <li>● Reduced the risk of ignition in paint and ink mixing processes.</li> <li>● Allowed humidification for processes where it had been previously thought impossible.</li> <li>● Reduced risk of fire, which could lead to loss of life and loss of public trust.</li> </ul>

We have numerous proven solutions for industries beyond the above cases.

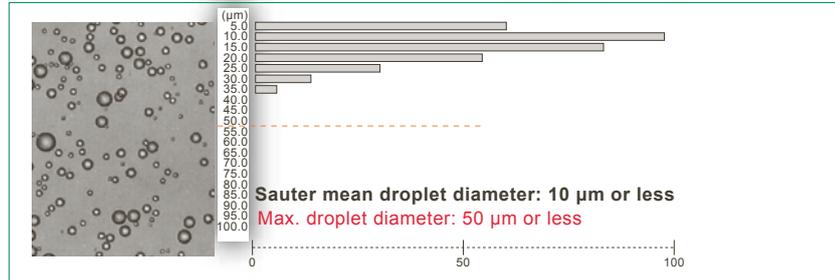
These effects depend on factory conditions.

# Spray Droplet Size by Various Humidifiers

Shown below are pictures of droplets collected by Immersion Sampling and droplet diameter distribution measured by the laser analyzer.

(The vertical axis is for droplet diameter, and the horizontal for the proportional number of droplets.)

## AKIMist® "E" 03C/04E nozzle type (Dry Fog)

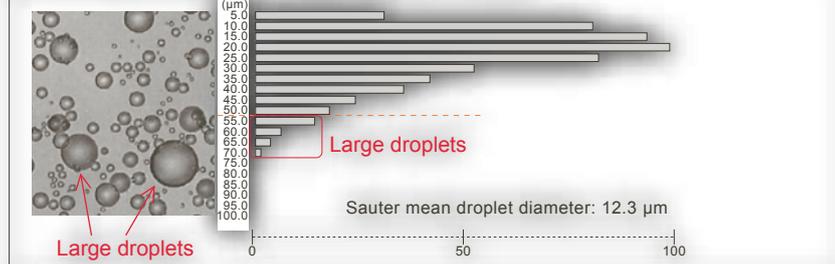


### Why Dry Fog doesn't get things wet:

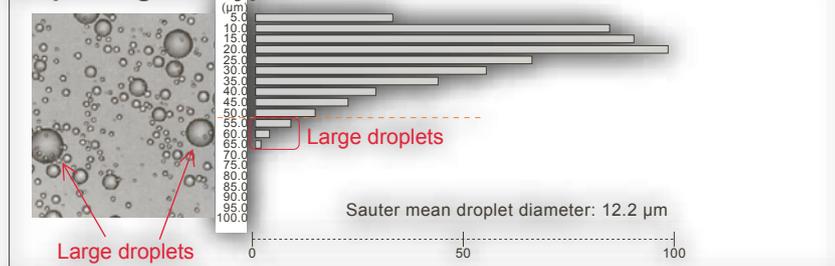
Uniform fog, **having no large droplets**, humidifies target spaces effectively without getting anything wet. We define Dry Fog as a very fine fog with a uniform, mean droplet diameter (average fog droplet size) of 10 µm or less.

### Other kinds of humidifiers

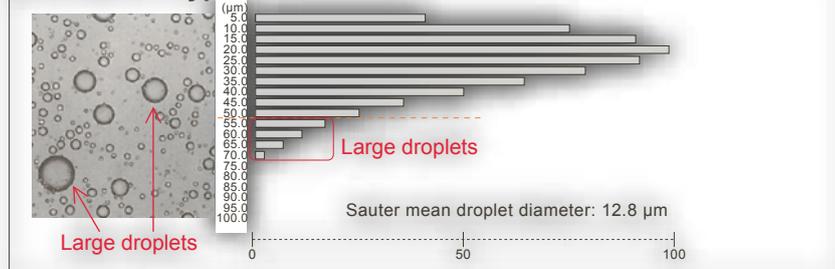
#### ● Conventional pneumatic spray nozzle



#### ● Spinning disk type



#### ● Ultrasonic type



### Why other humidifiers wet things:

Even though the mean droplet diameter is small, large droplets included in spray distributions will eventually cause wetting.

Note: Specifications and contents noted in this catalog are subject to change without prior notice.

“The Fog Engineers”  
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