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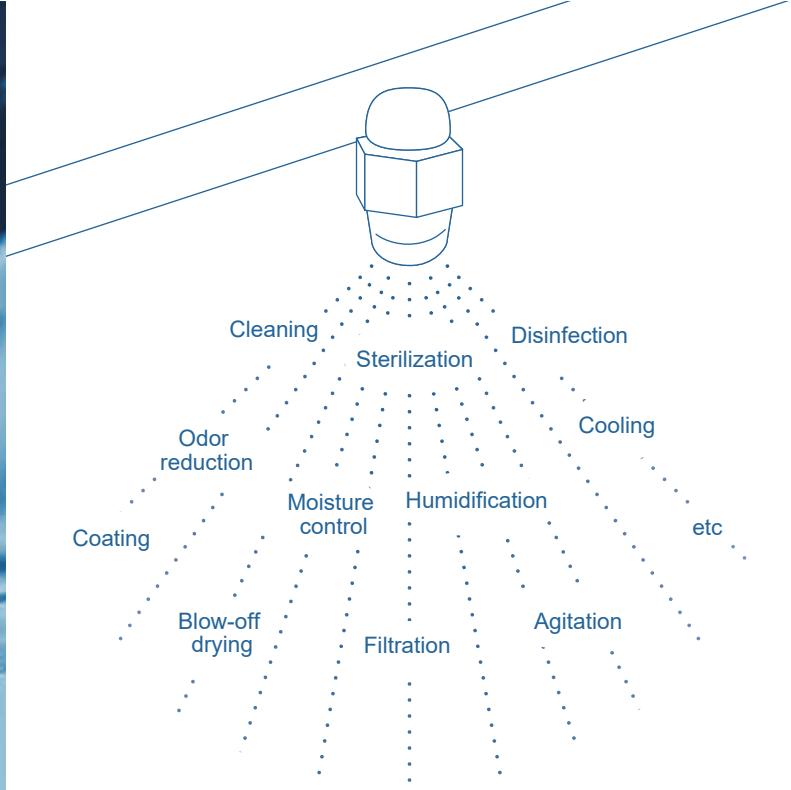
"The Fog Engineers"
H.IKEUCHI & CO., LTD.

Spray Nozzle Products for Food Processing Industry



We deliver the perfect fit for your needs.

In the industrial sector, spray nozzles are essential for product manufacturing. They are utilized throughout the manufacturing process for tasks such as cleaning, cooling, humidification, and air blowing, covering a wide range of applications. Additionally, spray nozzles play a crucial role in maintaining hygiene, quality, and safety.

Using the right nozzle for each specific purpose allows you to achieve water and energy savings, promote recycling, reduce costs, and enhance manufacturing efficiency.

To provide the 'perfect fit' spray nozzles that meet our customers' needs, we develop a wide range of products, units, and systems, and collaborate with our customers to tackle challenges from various perspectives.

How to optimize your process

There are various ways to achieve efficient results. One approach is to not only switch spray nozzles but also pursue automation and mechanization.

By delegating manual tasks to spray nozzles and implementing mechanization, you can significantly reduce operational costs.

Automating the previously manual operation of the nozzles and integrating them into units or systems allows for labor reduction and improved efficiency.

Benefit from our extensive technology and experience in designing units and automated systems that utilize our spray nozzles.

If you are considering automation or streamlining processes, please feel free to consult with us.

Tips 01.

MOVIES

YouTube Channel (packed with 'I see" moments)

Explore the IKEUCHI Channel on YouTube for a variety of videos covering spray nozzles.
Discover insightful content including product demonstrations, usage guides for units and systems, maintenance tips, and insights into humidity and static electricity relationships.

IKEUCHI channel

Tips 02.

CASE STUDIES

Review Our Case Studies

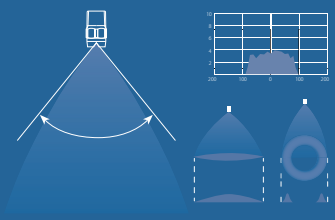
Dive into real-life examples showcasing the effectiveness of spray nozzles, offering detailed insights beyond what's covered in our catalog. Our team is ready to assist with specific nozzle applications and specifications not listed. The applications and spray nozzles in this catalog are just a few examples. For any not covered, please feel free to reach out to us.

IKEUCHI food case study

Tips 03.

BASICS

Master the Basics of Nozzles



Spray nozzles can produce various effects depending on how they are used. We will share key tips for effective use of nozzles. Please refer to pages 25–30 and visit our website for more information.

3D/2D CAD models of IKEUCHI's products can be previewed and downloaded for free on the PARTcommunity website.
Feel free to explore this service.
To view some products an account is required. Registration is free of charge.

https://ikeuchi.partcommunity.com/3d-cad-models/?languageIso=en&info=ikeuchi/metric_unit

●Note: Specifications of the products and contents of this catalog are subject to change without prior notice for purpose of product improvement.

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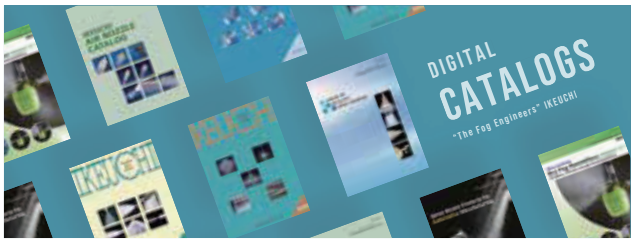
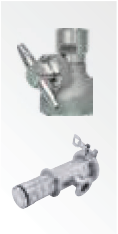
Links to Digital Catalogs

Digital catalogs for our products are available on our website. Click on the banner on the right or scan the QR code to access each of our e-catalogs.

https://we.kinkosonline.jp/apps/home/kirinoikeuchi

IKEUCHI digital catalog





Tank Cleaning Nozzle Catalog

RJ Series, RJ3-MD Series,
JA Series, ES Series,
ES/ESV-PTFE Series,
SR Series, SWB Series,
RJ2-PON Series, etc.

Hydraulic Spray Nozzle Catalog

VVP / VP Series, UVVP Series,
INVV Series, AWVV Series,
SO-VV/SO-V Series,
SD-VV Series, SD-CC Series,
VEP / VE Series, VNP Series,
YYP Series, INQB Series,
KB Series, KBN Series,
JJXP Series, INJJX Series, BBXP Series,
AJP Series, 7JJXP Series,
CCP / CP Series, 2CCP / 7CCP Series,
2CP / 7CP Series, EJX Series,
UT / WUT Joint Adaptors, etc.

Dry Fog Humidifier AKIMist "E"

Pneumatic Spray Nozzle Catalog

BIM Series, CBIM Series,
SCBIM Series,
SETOJet Series,
SETOV Series,
SETOV-C Series,
YYA Series, etc.

Air Nozzle Catalog

TAIFUJet Series (including
TF-F, TF-FS, TF-PF and
TF-R Series), CCP-A Series,
SLNHA-H Series,
EJA Series, etc.

Auto-strainer ARS Filter

Note: Please confirm that any food-contact surfaces of our products comply with the applicable food safety regulations and standards.

Tank Cleaning and Thermal Sterilization

Containers, vessels, and sanitary cans

Trust us with CIP cleaning and HACCP compliance. Automate and optimize your tank cleaning for greater efficiency.

- A wide range of nozzles is available for cleaning tanks of any size, catering to various types of dirt and cleaning methods.
- With high cleaning power and large spray coverage, our nozzles ensure complete cleaning with no spots left unwashed while using less water. They deliver efficient results and achieve significant water savings.
- Automating manual tank cleaning with our nozzles eliminates uneven performance and reduces cleaning time.
- For cleaning large surfaces, our SR and ES Series nozzles, which provide 360° spray coverage, are highly effective.
- For processes prone to residue or stubborn dirt, we recommend nozzles with strong cleaning power, such as the RJ and JA Series.

● Application

Cleaning of conveyors, storage tanks, barrels, sanitary cans, reactor vessels, mixing tanks, and various containers

Note: For CIP applications, please confirm that any wetted surfaces of our products comply with the applicable food safety regulations and standards.

Nozzle automatically moved up and down

Automatic Nozzle Lifting System
NLD Series

An automatic lifting device for cleaning tall tanks.
Connect a tank cleaning nozzle (ES or SR Series) to the tip of the device, which ascends and descends with a maximum stroke of about 1.7 m.
Contact us for more details.

For Hard-to-Remove Dirt

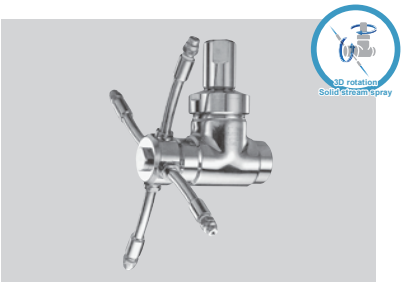
3D Rotation Type: Solid stream jet powerfully cleans the inside of a tank

RJ Series

Low-speed rotation

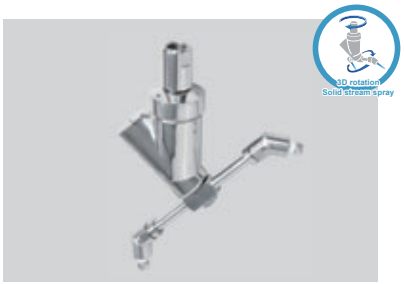
- Heat-resistant up to 80°C, with custom options for higher resistance.
- Compact design allows for easy installation even if the inlet is small.

JA3 Series



- Two or four solid stream jets powerfully clean the inside of a tank.
- Available for low to medium pressure use.

JA3-D180 Series



- 180° downward spray coverage is ideal to clean inside of open-topped tanks.

For Easy-to-Remove Dirt

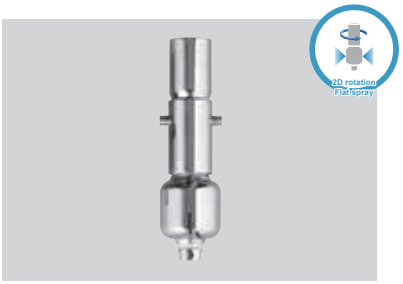
2D Rotation Type: Flat spray patten quickly cleans a large area

SR Series

Low-speed rotation

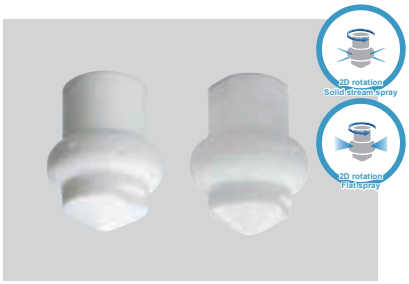
- Low-speed rotation of 3–15 rpm at 0.3 MPa for effective cleaning.
- Heat resistant up to 150°C.

ES Series



- Unique design ensures hygiene with self-cleaning features.
- Can be mounted in any direction, vertically, horizontally or diagonally.

ES/ESV-PTFE Series



- Highly resistant to chemicals.
- Can be mounted in any direction, vertically, horizontally or diagonally.

Suitable for permanent installation

Pressure-open Nozzle

RJ2-PON Series

- Pressure-activated nozzle with the tip protruding only during spraying and closing flush with the inner wall when not in use.
- Ideal for duct cleaning.

Simple structure

Fixed Type

SWB Series

- Non-rotating shower ball nozzle spraying radially. The simplest design.
- Chemical-resistant PTFE option available.

Watch Our Tank Cleaning Nozzles in Action!

IKEUCHI Channel on YouTube

Cleaning, Disinfection & Deodorization of Conveyors

Nets, conveyors, and filter cloths

Stubborn dirt? Hard-to-clean nets? No challenge! Our efficient, water-saving nozzles make cleaning easy.

- In conveyor cleaning, flat spray nozzles use less water yet deliver the same spray impact as cone spray nozzles, resulting in improved water efficiency.
- Using flat spray nozzles that provide even spray distribution in a multi-nozzle arrangement ensures uniform cleaning, even for wide conveyors.
- In the multi-nozzle arrangement, adjusting the nozzle spacing and spray height facilitates the use of an appropriate number of nozzles, resulting in water savings and cost reductions.
- For disinfecting and deodorizing conveyors, the BIM and KB series cone spray nozzles deliver excellent performance and save liquids by spraying a small volume uniformly over a wide area.
- For clogged nets or stubborn dirt, the VNP series flat spray nozzles for high-pressure cleaning are recommended.

● Application

Cleaning: Conveyors, nets, baking sheets, cases, rolls, and filter cloths.
Disinfection and Deodorization: Conveyors, nets, and food containers.

Foam cleaning: effective for stubborn dirt and odor

Detergent Foam Spray Unit
AWA Cart Series

The unit can switch to produce foam with any of three properties: flowing, creamy, or mousse-like.
Replacing the nozzle tip allows for switching the spray pattern between flat and straight types. The spray gun is available either in the standard type or the long-handled lance model.
Contact us for further details.

Cleaning Conveyors

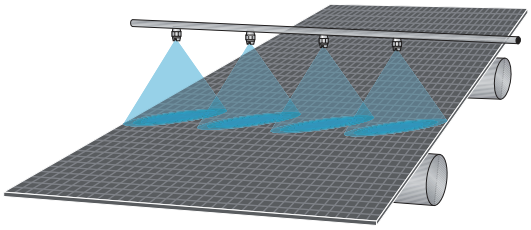
A multi-nozzle arrangement ensuring uniform cleaning even for wide conveyor belts

VVP Series

- Flat spray nozzles with a mountain-shaped spray distribution.
- A multi-nozzle arrangement ensures uniform spray distribution across the entire spray width.

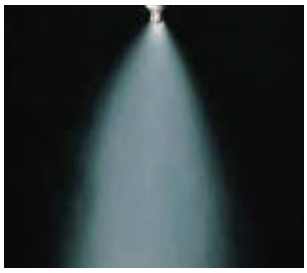
INVV Series

- Flat spray nozzles featuring quick-detachable nozzle tips that reduce maintenance time.
- Made of highly chemical and heat resistant plastic.



Disinfecting & Deodorizing Conveyors

BIM Series

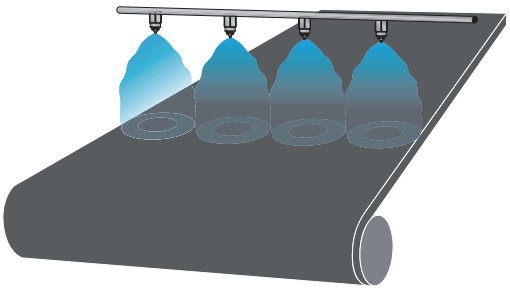


- Produces fine fogs with a mean droplet diameter of 100 μm or less.
- Clog-resistant design available in a wide variety of models.

KB Series

- Hollow cone spray nozzles capable of producing the finest fog among all hydraulic spray nozzles.
- Features a wear-resistant ceramic orifice.

Fine fogs achieving uniform disinfection, deodorization, and quick drying

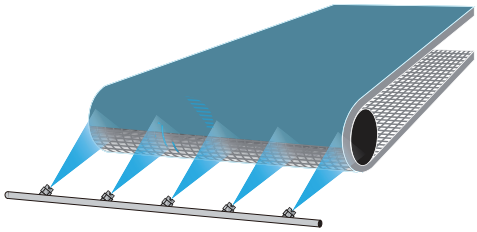


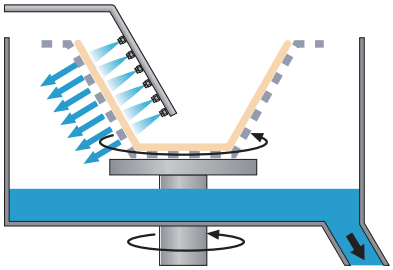
Cleaning Nets and Filter Cloths

Cleaning clogged drt, stubborn dirt

VNP Series

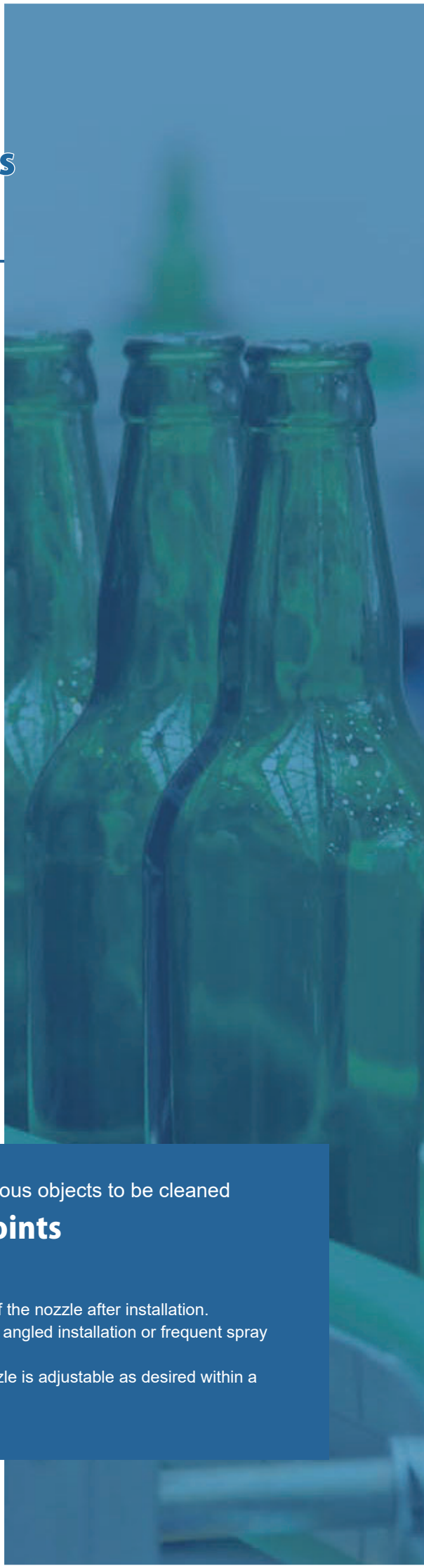
- For high-pressure cleaning of containers, tanks, and filters.
- Features a wear-resistant ceramic orifice.





Cleaning Complex-shaped Objects

Bottles, returnable containers, pallets



No problem with hard-to-clean objects like bottles and cans. Effective cleaning with nozzles suited to the objects.

- For cleaning bottles and cans, solid stream jet nozzles provide powerful spray impact and excellent performance.
  They effectively eliminate blind spots with a force that reaches the bottom.
- It is also effective to enhance cleaning performance by selecting nozzle types suited to the specific cleaning targets or by using a combination of several types.
- To clean different points after installing the nozzles, we recommend using universal joints, which allow spray direction adjustment by hand and reduce work time.

● Application

Cleaning: Bottles, cups, containers, and food containers.

Quickly adaptable to various objects to be cleaned

Universal Ball Joints
UT Series

Allows for precise alignment of the nozzle after installation.
Ideal for applications requiring angled installation or frequent spray direction adjustments.
The spray direction of the nozzle is adjustable as desired within a range of 50°.

Cleaning Bottles and Cans

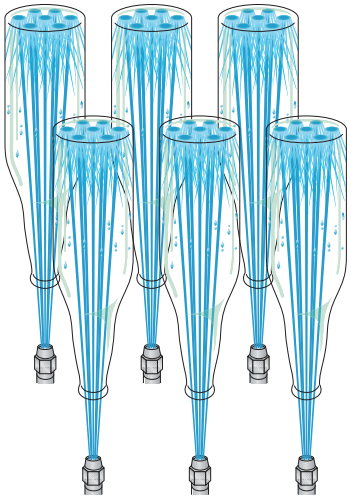
Thoroughly cleaning bottles and cans down to the bottom with solid stream jets

CP Series

- Solid stream nozzles that produce straight liquid jets.
- Features a wear-resistant ceramic orifice.

7CP Series

- The nozzles that produce seven solid stream jets.
- Features a wear-resistant ceramic orifice.



Cleaning Returnable Retainers

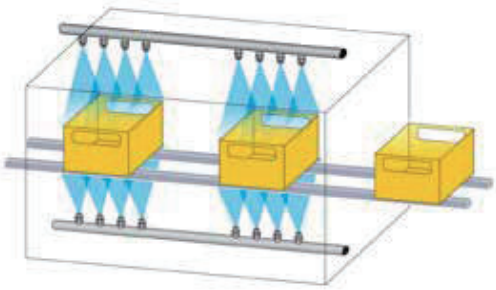
Nozzles and joints with easy angle adjustment enhancing versatility

INQB Series

- Quick-connect adaptors for easy attachment to pipes, and nozzle tips that are easily attachable.
- Allows for adjusting the spray direction within a range of 50 degrees.

WUT Series

- Universal joints for connecting spray nozzles, enabling a 360-degree spray direction adjustment.



Cleaning Surfaces of Finished Product Packages

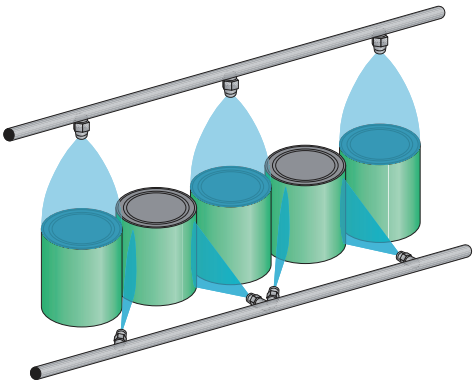
Combining nozzles with different spray patterns ensuring no narrow spots left uncleaned

VEP Series

- Flat spray nozzles with a uniform spray distribution across the pattern area, featuring a wear-resistant ceramic orifice.

JJXP Series

- Full cone spray nozzles with a round-shaped spray area with uniform distribution.
- A large free passage diameter minimizes clogging.



Air Blowing

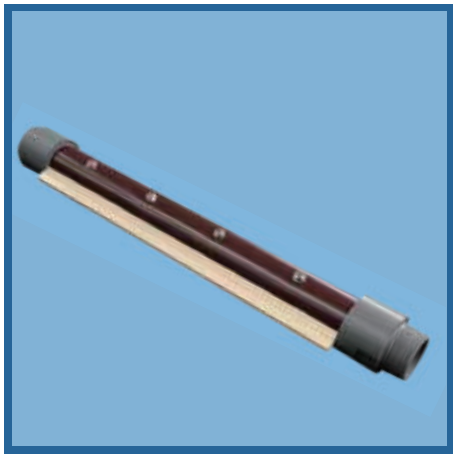
Drying and blowing off

**Air blowing is essential in every process.
Optimizing your air blowing process can help lower operating costs.**

- In general manufacturing facilities, improving the air blowing process, which consumes a significant amount of electricity, can effectively achieve energy savings.
- Simply replacing basic pipes, which have only squeezed outlets, with our nozzles exclusively designed for air blowing can reduce your operating costs.
- Switching from nozzles that use compressed air to those that use blower air can reduce operating costs more effectively.
- Our air nozzle lineup includes various types, each suited for different object sizes or blowing spaces.
- The TAIFUJet series, featuring a low-noise design, improves the noise issues associated with air blowing operations.

● Application

**Blowing off water droplets, dirt, and defective products for sorting.
Blow-off drying after washing, detaching workpieces during conveying, and transferring powder.**



Long, energy-saving blower air nozzles

TF-BPF Series

Long, flat blower air nozzles designed to uniformly cover wide areas.
Lowers energy costs to one-third of those consumed by compressed air nozzles.
The structure, designed to accommodate 42-mm wide nozzle tips arranged in a line, allows for manufacturing the nozzle to any desired length.
Contact us for further details.

Blowing Off Water Droplets

An extensive lineup of air nozzles featuring various air blowing patterns

TAIFUJet

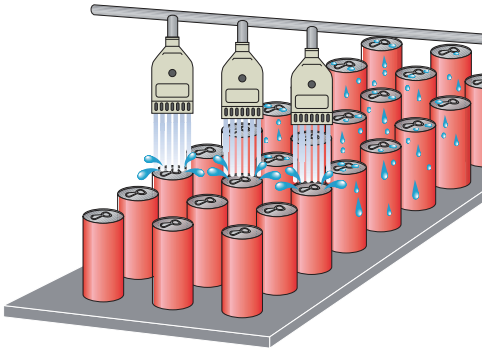
TF-FS Series

- Capable of uniform, high-impact, and powerful air blowing.
- Low noise level.
- Compact size suitable for use in tight spaces.
- A blower air type (TF-BF) is also available.

TAIFUJet

TF-R Series

- Capable of powerful air blowing from eight orifices.
- High-impact and powerful air blowing.
- Low noise level.
- A blower air type (TF-BR) is also available.



Blowing off Defective Products

Blowing off defective products for sorting

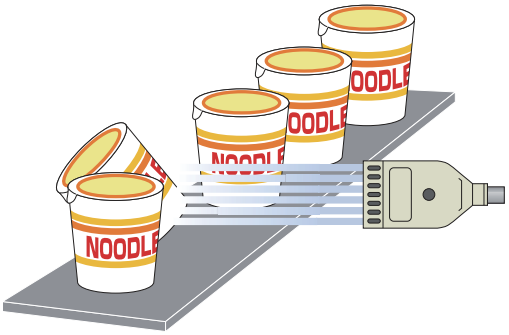
TAIFUJet

TF-FS Series

- Capable of uniform, high-impact, and powerful air blowing.
- Low noise level.
- Compact size suitable for use in tight spaces.
- A blower air type (TF-BF) is also available.

CCP-A Series

- Blows a single straight air stream.
- Highly cost-effective.
- Compact size ideal for use in multiple quantities.
- Blowing off water droplets with air knives.



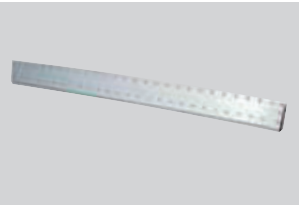
Air Knives

TAIFUJet

TF-PF Series

- Air knives capable of covering a wide area.
- Available air blow widths from 200 mm to 1,200 mm.

SLNHA-H Series



- Blows air in a curtain shape from a slit in the nozzle.
- Designed for air blowing with uniform impact distribution in the width direction.

Powder Transfer

EJA Series

- Air injection and suction volumes are adjustable.
- Effective not only for air blowing but also for powder transfer.

See Our Air Nozzles in Action!

Humidity Control in Food Processing

Dough, noodles, cheese / Fermentation rooms and storage

Environmental control always comes first in food storage facilities.
Appropriate humidity control maintains high quality and reduces defect rates.

- Humidity control prevents quality deterioration due to insufficient humidity and minimizes production volume decreases due to dryness.
- Humidity can be controlled in a manner suited for each purpose, from humidifying the entire room to specific areas or production lines where needed.
- For example, mounting multiple pneumatic nozzles that can spray a small volume onto a header enables moisture conditioning of products on a production line only.
- When humidifying a large space, we recommend using the humidity control function. This ensures optimal humidity levels and creates a stable environment.
- When humidifying or moisture conditioning local spots only, using adaptors that can adjust spray directions is an effective approach.

● Application

Moisture conditioning of dough, and humidification in fermentation rooms, storage facilities, and aging rooms for liquor such as wine.
Humidity control in mushroom cultivation rooms.

Angle-adjustable

AE-UT Adaptor

Universal adaptors for the Dry Fog Humidifier AKIMist "E", enabling adjustment of its spray direction horizontally or vertically as desired. They can be used for applications where spraying is desired in the upward or downward direction, or when intensive spraying from multiple nozzles in the same direction is needed.

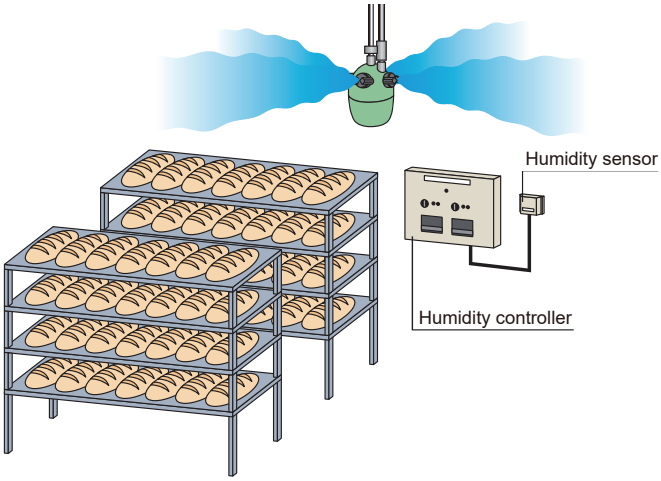
Humidification in Fermentation Rooms

Precise humidity control with Dry Fog

AKIMist "E"

AE Series

- Produces ultra-fine fog with a mean droplet diameter of 10 μm or less.
- Non-wetting Dry Fog reaches over four meters horizontally, effectively covering a large space.



Humidification in Cold Storage Warehouses

During the curing treatment

AKIMist "E"

AE Series

Humidity Control in Mushroom Cultivation

For drip-free humidity control

AKIMist "E"

AE Series

Moisture and Humidity Control for Packaging

Labels, films, packages, and product bagging

Damage caused by static electricity and dryness cannot be ignored.
For improved product yield and stable operations, humidity control is essential.

- Defects in the final production line can be minimized by addressing static electricity and dryness. Humidity control is one of the key measures.
- For comprehensive humidity management, we recommend implementing a humidity control system, while nozzles and humidification units are effective solutions for localized humidity control.
- Just slightly moistening labels and stickers before attaching them prevents defects in the final products caused by cracking, thereby increasing yield rates.
- Localized humidification close to the production line is also an effective solution for preventing bagging failures caused by products and bags sticking together due to static charge.
- Maintaining an appropriate humidity level prevents static electricity, reduces double-feeding of packaging films in the packing process, and ensures stable operations.

● Application

Moisture conditioning for packaging, labels, and stickers.
Humidification in packing and film feeding processes.

Portable humidifier unit

AE-T Set

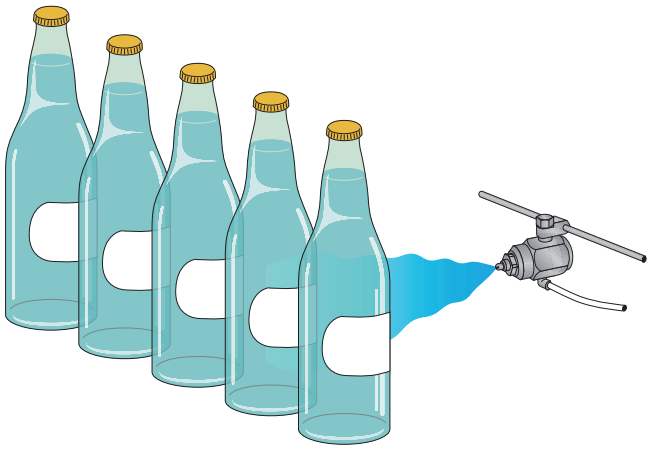
A portable humidifier unit, integrating a humidifier (AKIMist "E"), a water pressure tank, and a stand, requires no plumbing work. Simply place it anywhere and just supply compressed air to start its operation.
Equipped with caster wheels, this unit can be easily moved and installed wherever needed within a factory.

Moistening Label Stickers

Slightly moistening labels with spray nozzles prevents label cracking and promotes adhesion to products

BIM Series

- Produces fine fogs with a mean droplet diameter of 100 μm or less.
- Clog-resistant design available in a wide variety of models.



Preventing Static Electricity in Packaging

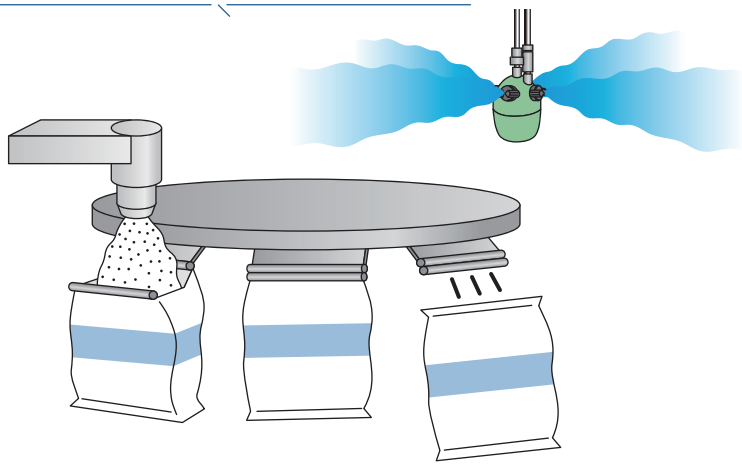
AKIMist "E"

AE Series

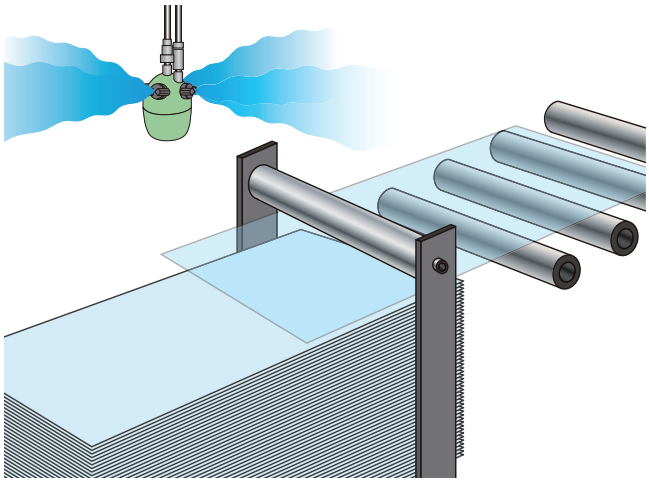
Dry Fog enables precise humidity control and prevents in-process failures caused by static electricity.

- Produces ultra-fine fog with a mean droplet diameter of 10 μm or less.
- Non-wetting Dry Fog reaches over four meters horizontally, effectively covering a large space.

Prevents powder adhesion and bagging failures due to static charge on powder or bags



Prevents film sheets from sticking together and avoids double-feeding failures due to static charge



Disinfection & Deodorization of Objects & Spaces

Bottles, cans, returnable containers, pallets & factory spaces

Sanitation management is crucial in food processing. It is vital not only to keep everything clean but also to make the work environment even cleaner.

- Maintaining cleanliness at processing sites is essential for ensuring production output and high yield rates. Deodorizing and disinfecting these spaces are effective measures.
- Disinfecting the spaces helps maintain good sanitation in compartments and rooms, and integrating with the control system ensures that the environment remains at optimal levels.
- Disinfecting inside the ducts is also an effective solution for keeping the air at worksites clean. The BIM series performs efficient disinfection while conserving disinfectant.
- For localized disinfection on a production line, the BIM series, which can apply alcohol or disinfectant in a fine fog, delivers effective performance.
- Pasteurization requires a large volume of water. For water conservation, the full cone spray nozzle AJP series, which can spray over a wide area, is ideal.

● Application

Disinfection and deodorization of containers, bottles, cans, and products before packing.
Disinfection and deodorization in entrances and exits, within factories, inside ducts, and in cooling rooms.

DIY humidifier unit

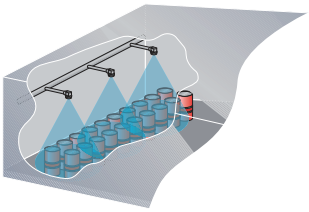
AE-KIT

A DIY kit, comprising a spray unit, a control unit, a water unit, a filter unit, and a piping unit, can be easily wall-mounted and operated.
It is capable of humidifying an area of up to 800 m³.

Pasteurization of Containers

Automatic spraying is possible with sensors

AJP Series



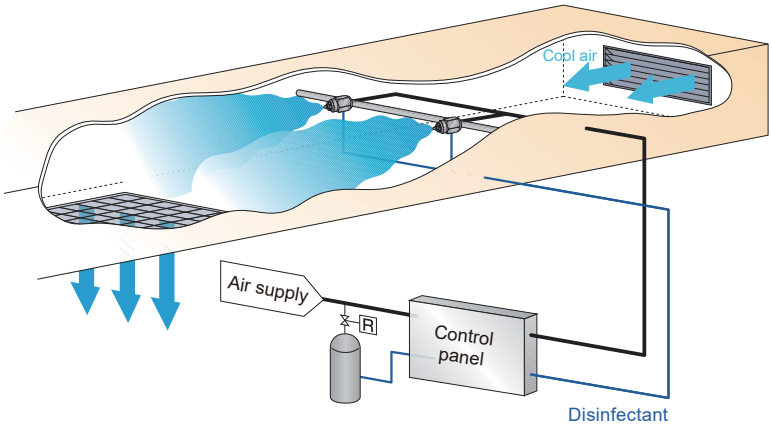
- The design without a whirler allows for a large free passage diameter, making the nozzle clog-resistant.
- Features a tangential design with the spraying axis at a 90-degree angle from the nozzle inlet.

Disinfection & Deodorization in Ducts and Cooling Rooms

Fine fog spray ensures thorough disinfection and deodorization

BIM Series

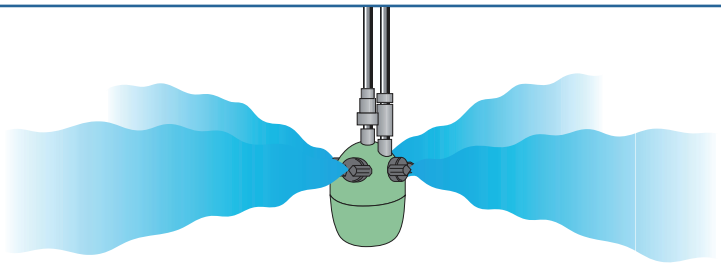
- Produces fine fogs with a mean droplet diameter of 100 μm or less.
- Clog-resistant design available in a wide variety of models.



Disinfecting and Deodorizing Spaces

AKIMist "E"

AE Series



- Produces ultra-fine fog with a mean droplet diameter of 10 μm or less.
- Non-wetting Dry Fog reaches over four meters horizontally, effectively covering a large space.

A chemical-resistant type, AE-TN Series is available, featuring titanium material for the parts that come into contact with chemical liquids.

Cooling and Heat Treatment

Cooling after heat treatment and defrosting

Uniform cooling and defrosting are crucial for product quality.
Achieve an even and effective spray with our nozzles.

- When cooling heat-sterilized products, the nozzle effectively cools each layer of products arranged on shelves.
- When frost forms in a freezer, it can reduce freezing efficiency and increase electricity costs. The nozzle evenly sprays warm water to defrost.
- To efficiently cool or defrost the interiors of shelf-like and large compartments, we recommend using a nozzle header with multiple nozzles arranged along the piping.

● Application

Cooling of retort pouches and packaged products after heat sterilization.
Defrosting freezers and thawing frozen foods.

Integrated spray header

Hydraulic Spray Nozzle Header

A pipe header mounted with multiple spray nozzles, tailored to meet specific requirements.
The nozzle spacing and header length can be customized based on the spray pattern, spray angle, and spray flow rate of the nozzles used.
Contact us for further details.

Cooling After Heat Treatment

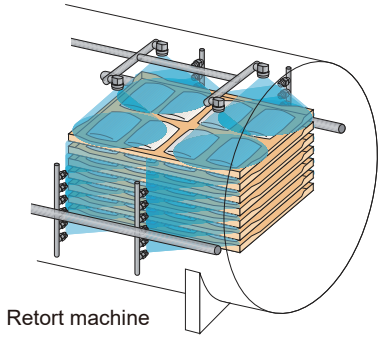
Effectively cools products after heat treatment, reducing cooling time

AJP Series

- The design without a whirler allows for a large free passage diameter, making the nozzle clog-resistant.
- Features a tangential design with the spraying axis at a 90-degree angle from the nozzle inlet.

VEP Series

- Flat spray nozzles with a uniform spray distribution across the pattern area, featuring a wear-resistant ceramic orifice.



Defrosting in Freezer

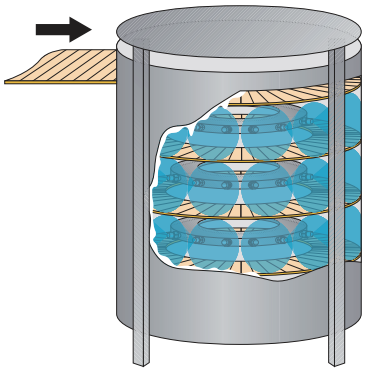
Spraying warm water to reduce the time needed for defrosting or ice removal

JJXP Series

- Full cone spray nozzles with a round-shaped spray area with uniform distribution.
- A large free passage diameter minimizes clogging.

BBXP Series

- Full cone spray nozzles with a wide 120° spray angle.
- A large free passage diameter minimizes clogging.



Water Filtration and Liquid Agitation

Reuse of cleaning and circulating water and sediment agitation

Automatic self-cleaning features resolve filter maintenance issues, achieving efficient filtration for reusing cooling water and cleaning wastewater.

- The automatic strainer ARS series automatically cleans the filtration filter, lowering operational costs by reducing maintenance frequency.
- Factory wastewater cannot be discharged as it is. It is recommended to use the ARS series to filter out impurities before discharge.

Achieve uniform liquid concentration and temperature with submerged agitation nozzles.

- For processing seasoning liquids and in similar applications, uneven liquid concentration and temperature can be issues. The submerged agitation nozzle EJX series prevents sedimentation and ensures homogenization of the liquid.

● Application

Reuse of cleaning and circulating water, and filtration of wastewater.
Agitation of sediment. Homogenization of liquid temperature and concentration.

Auto Reverse Self-cleaning Filter

Automatic Strainer
ARS Filter Series

The jet spray from the equipped nozzles automatically cleans foreign particles that accumulate through filtration.
This automatic strainer eliminates the need for manual cleaning by operators, reduces maintenance tasks and labor costs, and ensures long-term durability of its filtration performance through non-contact high-pressure cleaning with wear-resistant nozzles.

Reuse of Circulating Water

Removing foreign particles from cleaning water and cooling water for their recirculation and reuse

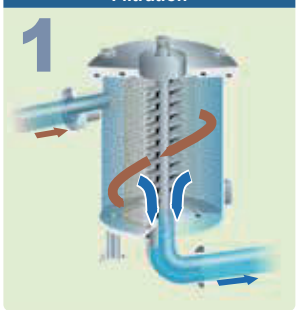
Automatic Strainer

ARS Filter Series

- Automatically cleans foreign particles that accumulate due to filtration and maintains its filtration performance.
- Significantly reduces maintenance costs.

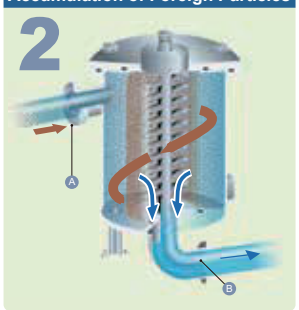
Watch How the ARS Filter Works!

Filtration



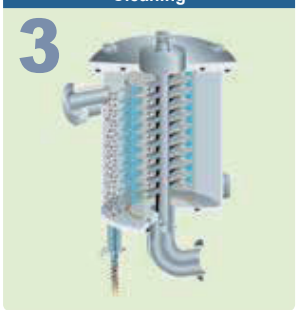
Unfiltered water flows from outside to inside of the filter that catches foreign particles.

Accumulation of Foreign Particles



ARS filter detects the pressure difference between inlet **A** and outlet **B** caused by accumulated foreign particles on the filter.

Cleaning



After suspending water supply, ARS starts jet spray cleaning then discharges foreign particles from the drain.

Completion of Cleaning

After the pre-set duration, cleaning stops, and supply of unfiltered water starts again (back to the step 1).

Liquid Agitation

Agitating the liquid to prevent sedimentation and to homogenize the liquid concentration and temperature

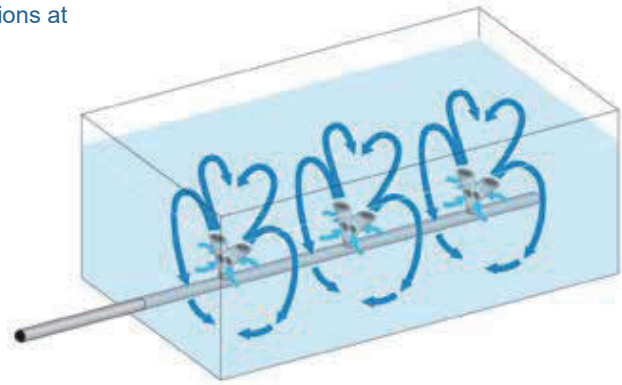
EJX Series

- The submerged nozzles eject 3 to 4 times the volume of supplied liquid while intaking the surrounding liquid.

Two-direction Jet

EJX-2 Series

- The submerged nozzles eject the liquid in two directions at a 45-degree angle for enhanced agitation. Contactus for details.

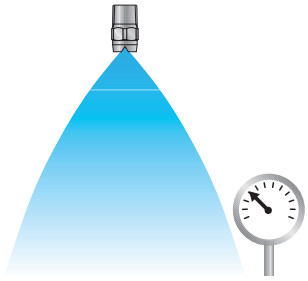


For Effective Use of Nozzles

Spray Nozzle Precision Guarantee

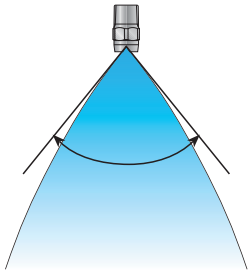
All IKEUCHI's precision-made hydraulic spray nozzles are guaranteed for spray capacity and spray angle.
Additionally, the spray pattern is inspected according to our own standards, and only the nozzles that pass inspection are shipped. This precision guarantee ensures that we can provide a reliable, safe product that consistently meets all customer need.

Spray Capacity Tolerance for Flat and Cone Spray Pattern Nozzles



+/-5%

Spray Angle Tolerance for Flat and Cone Spray Pattern Nozzles



+/-5°

Spray Angle Tolerance for Solid Stream Nozzles

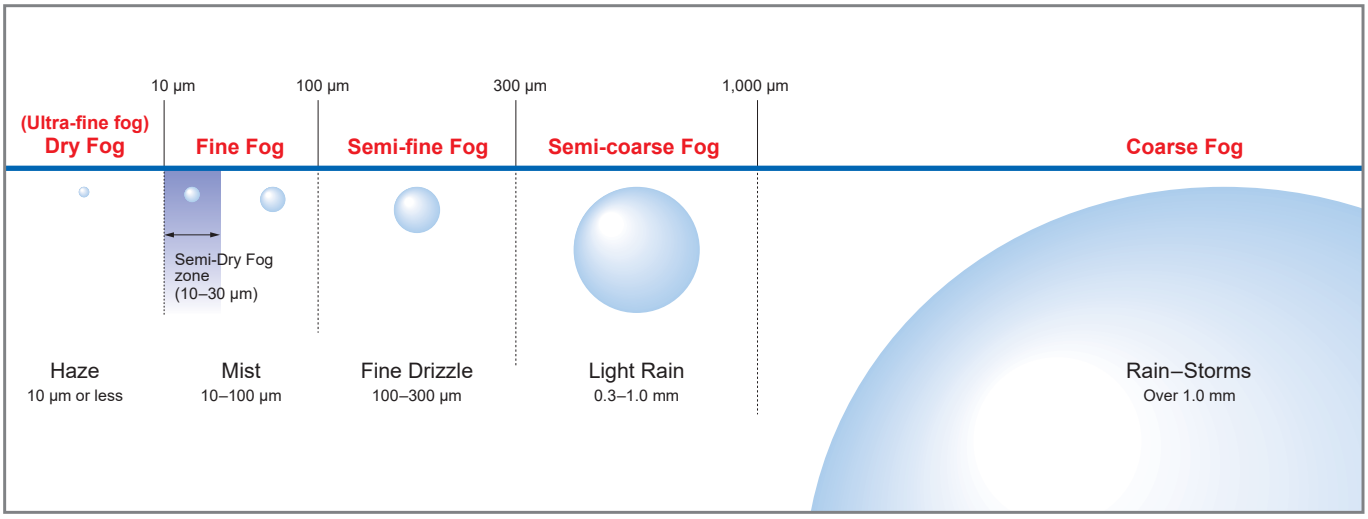
Within 3°

The spray angle gives the angle of the spray measured near the nozzle, unless otherwise specified.
Each pneumatic spray nozzle series also has a spray capacity inspection standard at each standard pressure.
This guarantee does not cover air nozzles. The shown air consumption, or volume of blown air, is for reference only.

Fog Classification System

IKEUCHI has utilized a proprietary fog classification system based on spray droplet size, as outlined below.
While there are various opinions on droplet size classification, we use the system described here to provide fog solutions tailored to customer applications and operating environments.
Terms such as 'Dry Fog' and 'fine fog' in our catalogs are derived from this classification.

This classification is based on the spray droplet size, by measuring the spray droplet diameter with the immersion sampling method.



Spray Nozzle Selection

When selecting a nozzle, it is important to choose one that matches your specific application in terms of material, type, and spray pattern.

Nozzle Type

Hydraulic Spray Nozzles

These nozzles spray using liquid only. With a wide variety of nozzle types available, you can select the appropriate spray pattern and spray flow rate to suit your needs.

For water savings, slurry or high-volume spraying

Pneumatic Spray Nozzles

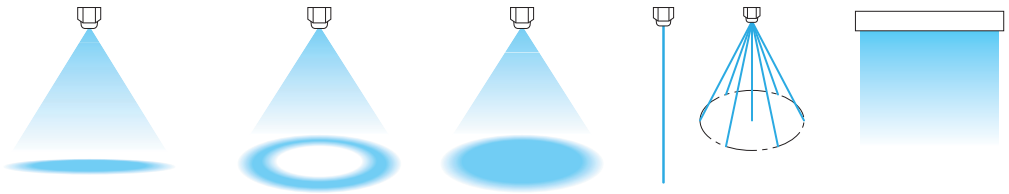
These nozzles utilize a high-velocity flow of compressed air to produce fine spray droplets at low flow rates, allowing significant liquid savings. They have a wide free passage diameter, which helps to prevent clogging.

For great water saving, precise cleaning

Spray Pattern

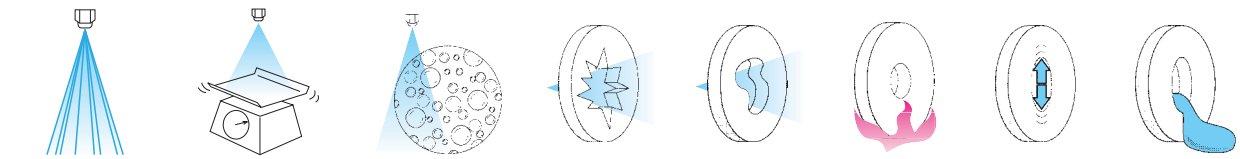
Main Use for:	Powerful cleaning	Wide spray coverage		Strong, pinpoint spray	Film-like stream with no gap
Spray Pattern:	Flat Spray	Hollow Cone Spray	Full Cone Spray	Solid Stream Spray	Slit Spray

Spray pattern is defined as the horizontal cross sectional shape of the spray.



Other Factors

Spray performance can be affected by a variety of factors. Choose a nozzle material suited to the operating environment and liquid properties.



For Effective Use of Nozzles

Benefits of Switching Nozzles

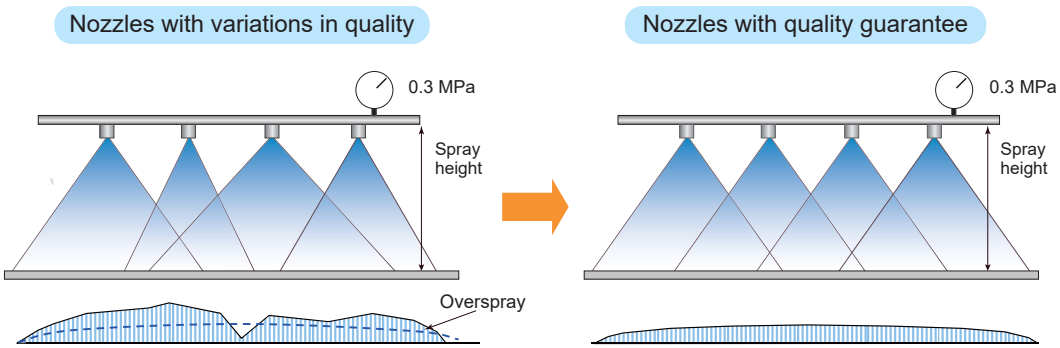
Effective use of nozzles can save both water and energy.
Here are some effective ways to utilize them.

Eliminating Variations to Achieve Even Distribution

When using nozzles in a multi-nozzle arrangement as shown below, variations in each nozzle's performance can lead to uneven flow distribution, resulting in inconsistent cooling or incomplete cleaning, which can ultimately affect product quality.

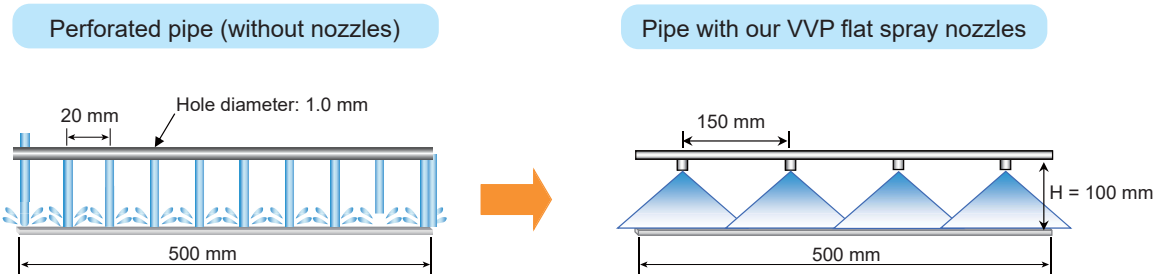
This issue can be resolved by using our precision-guaranteed nozzles.
Our spray nozzles provide reliable performance, enabling uniform cleaning that not only enhances product quality but also optimizes water usage, eliminating waste.

Comparison of Spray Distribution in Multi-nozzle Arrangements:



Use Nozzles Over Perforated Pipes

If you are using pipes with just holes instead of nozzles, you may be wasting a significant amount of water.
Even for rough cleaning or simple water supply, running water through perforated pipes can consume a surprisingly large volume of water.
Using appropriate nozzles with optimal spacing can significantly enhance water-saving efficiency.



For a target width of 500 mm, with a hole diameter of 1.0 mm, hole spacing of 20 mm, and a pressure of 0.3 MPa:

Spray flow rate = **50 L/min** (2 L/min × 25 holes)

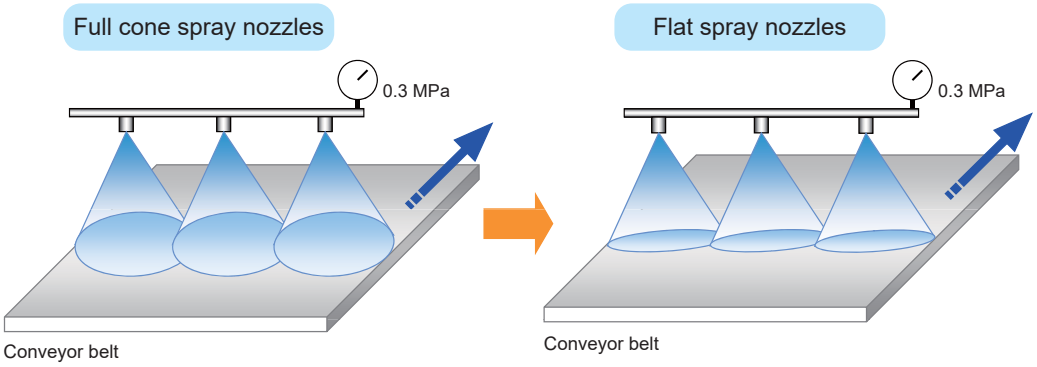
For a target width of 500 mm, using VVP nozzles with a spray angle of 90°, a spray height of 100 mm, a nozzle spacing of 150 mm, and a pressure of 0.3 MPa:

Spray flow rate = **20 L/min** (5 L/min × 4 nozzles)

This results in a water saving of 30 L/min compared to using a perforated pipe, leading to significant water conservation.

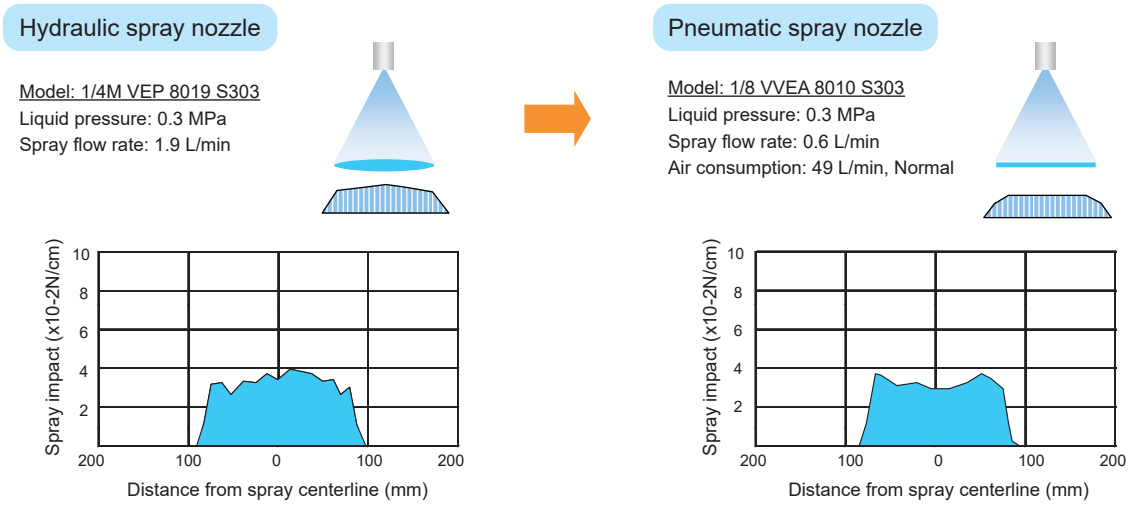
Selecting Optimal Spray Patterns

With the same pressure and flow rate, the spray impact increases in the following order: full cone spray pattern < flat spray pattern < solid stream spray pattern. Therefore, for applications such as conveyor cleaning where the target is moving, using a flat spray nozzle instead of a full cone nozzle allows you to achieve the same spray impact with less water.



Switching Nozzle Types

If your site has access to compressed air, you might consider changing the type of nozzle to achieve greater water-saving efficiency. For example, switching from hydraulic spray nozzles to pneumatic spray nozzles has reduced water usage by up to 70% in some cases (though costs for supplied air power are required).



Spray Nozzle Materials

The standard and optional materials available for nozzles are shown in the material section of each nozzle series, using the material codes listed below.
If you need a specific nozzle material that is not mentioned in each series page, please contact us.

Material List

Metals

[Material code ····· Material]
S303 ····· Stainless steel 303
S304 ····· Stainless steel 304
S316 ····· Stainless steel 316
S316L ····· Stainless steel 316L
SCS13 ····· Die-cast stainless steel equiv. to S304
SCS14 ····· Die-cast stainless steel equiv. to S316
SCS16 ····· Die-cast stainless steel equiv. to S316L
S420J2 ····· Hardened stainless steel 420J2
B ····· Brass C3604

Rubbers

[Material code ····· Material]
NBR ····· Nitrile rubber
FKM ····· Fluororubber
FEPM ····· Tetrafluoroethylene-propylene rubber
EPDM ····· Ethylene-propylene rubber

Ceramics

CERJET® Ceramics
Alumina ceramics (Alumina 92%, etc.)
[Material code ····· Material]
SiC ····· Silicon nitride bonded silicon carbide
SiSiC ····· Sintered reaction-bonded silicon carbide

Plastics

[Material code ····· Material]
PP ····· Polypropylene
PPS ····· Polyphenylene sulfide
PVC ····· Polyvinyl chloride
HTPVC ····· Heat-treated polyvinyl chloride
PTFE ····· Polytetrafluoroethylene
PCTFE ····· Polychlorotrifluoroethylene
PVDF ····· Polyvinylidene fluoride
FRPP ····· Glass-fiber reinforced polypropylene
PA ····· Polyamide
PE ····· Polyethylene
Ultrahigh molecular weight polyethylene (UHMWPE)
Polyester elastomer
Araldite®*1 ····· Epoxy resin (Adhesive)
Araldite®H ····· High-temperature epoxy resin (Adhesive)

*1) Araldite is the registered trademark of Huntsman Advanced Materials.

Oil-free options are available at additional cost.
Contact us for details.

Table of Chemical and Heat Resistance

Materials \ Items		Chemical resistance												Heat resistance*2	
		Hydrochloric acid	Concentrated Hydrochloric acid	Sulfuric acid (35%)	Concentrated sulfuric acid	Nitric acid (35%)	Concentrated nitric acid	Acetic acid	Sodium hydroxide (caustic soda)	Aqueous ammonia	Acetone	Trichloro-ethylene	Ethyl alcohol	Suitable (°C)	Short-term use only (°C)
Metals	S303	×	×	×	×	○	△	△	○	○	○	○	○	400	800
	S304	×	×	×	×	○	○	○	○	○	○	○	○	400	800
	S316, S316L	×	×	×	○	○	△	○	○	○	○	○	○	400	800
	B	×	×	×	×	×	×	×	△	△	○	○	○	200	400
Plastics	PP	○	△	○	×	×	×	○	○	○	○	△	○	80	90
	PPS	○	○	○	△	△	×	○	○	○	○	○	○	170	180
	PVC	○	○	○	○	○	×	○	○	○	×	×	○	40	50
	HTPVC	○	○	○	○	○	×	○	○	○	×	×	○	50	70
	PTFE	○	○	○	○	○	○	○	○	○	○	○	○	100	150
	PVDF	○	○	○	○	○	○	○	△	○	×	○	○	80	120
	FRPP	○	△	○	×	×	×	○	△	○	○	△	○	90	100
	PA	×	×	×	×	△	△	△	○	○	○	○	△	130	230
	UHMWPE	○	○	○	×	△	×	○	○	○	△	△	○	80	100
	Polyester elastomer	×	×	×	×	×	×	○	△	×	△	△	○	100	120
	Araldite®	△	×	△	×	×	×	×	×	×	×	×	×	60	70
	Araldite®H	○	×	○	△	×	×	○	△	○	○	○	○	120	140
Rubbers	NBR	×	×	×	×	×	×	○	○	○	×	△	○	90	120
	FKM	○	○	○	○	○	○	○	△	×	×	○	○	150	200
	FEPM	○	○	○	○	○	○	○	○	×	×	○	○	150	200
	EPDM	○	△	○	△	×	×	○	○	○	○	×	○	90	120
Ceramics*3	CERJET® ceramics	○	○	○	○	○	○	○	×	○	○	○	○	700	800
	Alumina ceramics	○	○	○	○	○	○	○	△	○	○	○	○	1,000	1,200
	SiC	○	○	○	○	○	○	○	△	○	○	○	○	1,550	1,550
	SiSiC	○	○	○	○	○	○	○	△	○	○	○	○	1,350	1,350

*2) The heat resistance (operating temperature limit) of spray nozzles varies widely depending on the operating conditions, environment, liquid sprayed, etc.
*3) Ceramic should be used at temperatures under 100˚C to avoid a crack caused by heat shock.
Note: As for the spray nozzles including adhesive, please also take into account the heat/chemical resistance of the adhesive.

○··· Suitable
△··· Possible for short term
×··· Unusable

How to Read the Catalog Charts

Pneumatic Spray Nozzles

- Spray angle code (110)
- Air consumption code (02)
- Estimated air consumption at the specified pressures. In this example, air consumption is 25 normal liters per minute at air pressure 0.4 MPa and liquid pressure 0.15 MPa.
- Spray width at the specified pressures (280 mm at air pressure of 0.2 MPa and liquid pressure of 0.1 MPa)
- Approx. minimum passage diameters for each flow channel

Spray angle code *2	Air consumption code	Air pressure (MPa)	Spray capacity (L/hr) & Air consumption (L/min, Normal) — Liquid pressure (MPa) 0.1 Liquid	0.1 Air	0.15 Liquid	0.15 Air	0.2 Liquid	0.2 Air	0.25 Liquid	0.25 Air	0.3 Liquid	0.3 Air	Spray width*3 (mm) — Liquid press. (MPa) 0.1	0.15	0.25	Mean droplet dia. (μm) Laser Doppler method	Free passage diameter (mm) Tip orifice	Adaptor Liquid	Adaptor Air
110	02	0.2	2.2	14	5.3	11	—	—	—	—	—	—	280	340	—	20–100	0.2	0.9	0.7
		0.3	1.0	20	2.5	19	4.6	17	8.3	12	14.3	7	220	250	420				
		0.4	—	—	1.4	25	2.3	24	4.0	23	6.3	20	—	230	340				
	04	0.2	4.5	25	9.5	20	17.0	13	—	—	—	—	300	360	—	20–100	0.3	0.9	0.9
		0.3	2.0	36	4.7	35	8.5	31	13.1	27	19.6	20	230	270	430				
		0.4	—	—	2.8	45	4.8	44	7.7	41	11.4	37	—	250	350				
	075	0.2	8.7	51							—	—	320	380	—	20–100	0.5	1.2	1.4
													240	300	450				

- Calculated spray capacity at the specified pressures. In this example, spray capacity is 4.7 liters per hour at air pressure 0.3 MPa and liquid pressure 0.15 MPa.
- At air pressure of 0.2 MPa and liquid pressure of 0.3 MPa, defined spray pattern does not develop (with coarse droplets, wheezing, etc.)
- Range of Sauter mean diameters measured by laser Doppler method

Hydraulic Spray Nozzles

- Spray angle code at standard pressure (115)
- Spray capacity code at standard pressure (03)
- Thread type* and size of spray nozzle: R1/4: 1/4″ male taper pipe thread Rc1/4: 1/4″ female taper pipe thread
- Plastic nozzle molded around a ceramic orifice
- Spray angle at the specified pressure (124° at 0.7 MPa)
- Calculated spray capacity at the specified pressure (0.21 L/min at 0.15 MPa)
- Series (VVP)
- Spray capacity at standard pressure (0.30 L/min at 0.3 MPa)
- Range of Sauter mean droplet diameter measured by immersion sampling method
- Approx. minimum passage diameter

Spray angle code	Spray capacity code	Pipe connection size — VVP All metal R1/8	VVP All metal R1/4	VVP All metal R3/8	VVP All metal R1/2	VVP All metal R3/4	VVP All metal R1	VVP All plastic R1/8	VVP All plastic R1/4	VP Metal R1/8	VP Metal R1/4	VP CER-TIIM R1/8	VP CER-TIIM R1/4	Spray angle (°) 0.15 MPa	0.3 MPa	0.7 MPa	Spray capacity (L/min) 0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa	Mean drop. dia. (μm)	Free pass. dia. (mm)	Strainer mesh size
115	03							○	○	●	●	○	○	101	115	124	–	0.17	0.21	0.24	0.30	0.39	0.46	0.55	0.77	140	0.2	200
	04							○	○	●	●	○	○	102	115	124	–	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	~	0.2	200
	05							○	○	●	●	○	○	102	115	124	–	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	160	0.3	150
	07							○	○	●	●	○	○	103	115	124	–	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81		0.3	150
	10							○	○	●	●	○	○	103	115	124	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	~	0.4	150
	15	●	●					○	○	●	●	○	○	104	115	123	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87		0.5	100
	20	●	●					○	○		●		○	104	115	123	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	270	0.6	100
	30	●	●					○	○		●		○	105	115	122	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75		0.8	50
	40	●	●					○	○					106	115	122	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3		0.8	50
	60	○	○														2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	~	1.0	–
	80	○	○															4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6		1.2	
	100		○																7.07	8.17	10.0	12.9	15.3	18.3	25.8		1.7	
	200		○																		20.0	25.8	30.6	36.5	51.6	510		

- ●○ shows availability of the item.
  - ●: Available with or without strainer
  - ○: Only available without strainer
  - No mark: Not available
- At 0.05 MPa, defined spray pattern does not develop
- Mesh size number of strainer

Threads noted in our catalogs are tapered pipe threads unless otherwise specified. The connection thread size and type are described according to the ISO standard. When ordering our nozzles, please specify the thread size using our thread code as shown on the right.

Thread type	ISO standard	British standard	Our thread code
Male tapered pipe threads	R1/4	1/4 BSPT male	1/4M
Female tapered pipe threads	Rc1/4	1/4 BSPT female	1/4F

"The Fog Engineers"

H. IKEUCHI & CO., LTD.

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