

# Gas Cooling Nozzles for FGD

**For flue-gas desulfurization (FGD) in chemical plants, paper mills, thermal power plants, steel plants, etc.**



## **TWAA series (Bi-directional hollow cone spray)**



- Excellent atomization at low pressures.
- Bi-directional spray contacts gas widely and effectively
- Made of highly wear-resistant SiC (Silicon nitride bonded silicon carbide).
- Large free passage diameter minimizes clogging.

## **TAA series (Hollow cone spray)**



- Excellent atomization at low pressures.
- Made of highly wear-resistant SiC (Silicon nitride bonded silicon carbide).
- Large free passage diameter minimizes clogging.

## **JUXP-AL92 series (Full cone spray)**



- High-purity alumina ceramic material provides excellent wear-resistance.
- An optional socket made of corrosion-resistant material equivalent to Hastelloy<sup>(\*)</sup> is available.

## **AJP-AL92 series (Full cone spray)**



- Made of high-purity alumina ceramic.
- An optional socket made of corrosion-resistant material equivalent to Hastelloy<sup>(\*)</sup> is available.
- No-whirler design minimizes clogging.

(\*1) Hastelloy is the registered trademark of Haynes International



“The Fog Engineers”  
**H. IKEUCHI & CO., LTD.**

## Features

- High corrosion resistance!
- Excellent wear resistance!
- Effective performance with low power!
- Clog-resistant!

In other words, these are the ideal spray nozzles meeting the key demands for FGD equipment!



TWAA / TAA series (Hollow cone spray nozzles)

→ **Finer atomization at low pressures up to 0.07MPa**

JUXP / AJP series (Full cone spray nozzles)

→ **Stable full cone spray pattern at 0.1-0.2MPa**

## Related products

For waste liquid treatment,  
absorbing solution filtration...



Auto Reverse Self-Cleaning Filter  
ARS Filter

Gas Cooling Pneumatic Spray  
Nozzles with low air-water ratio



Large capacity, energy-saving  
GSIM II series

We provide a wide range of spray nozzles to suit your needs, including rotating cleaning nozzles for tanks, and more.

Please feel free to contact us or our local sales office for any question/inquiry.

 "The Fog Engineers"  
**H. IKEUCHI & Co., LTD.**

ISO9001:2008 certified

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Tel: 66-2-328-0392 Fax: 66-2-328-0391 E-mail: [info@ikeuchithai.com](mailto:info@ikeuchithai.com)

**Large flow  
High pressure  
Return Nozzle**

**SPILLBACK NOZZLE**

for circulating fluidized bed flue gas desulfurization

**for CFB-FGD**



**Min. spray capacity**

Supply pressure : 3.5MPa

Spray capacity : 1t/hr (16.7L/min)

Spray angle : 130°



**Max. spray capacity**

Supply pressure : 3.5MPa

Spray capacity : 10t/hr (167L/min)

Spray angle : 90°

IKEUCHI, with over 30 years of experience in gas-cooling nozzles, has developed a new model of hydraulic high-pressure return nozzle in our SBP series:

**GSPB series with large flow of 10t/hr!**

**Turndown ratio of 1:10 with  
minimal variation in spray droplet size**

**Ideal for gas cooling!**



“The Fog Engineers”

**H. IKEUCHI & CO., LTD.**

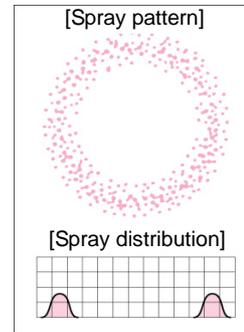
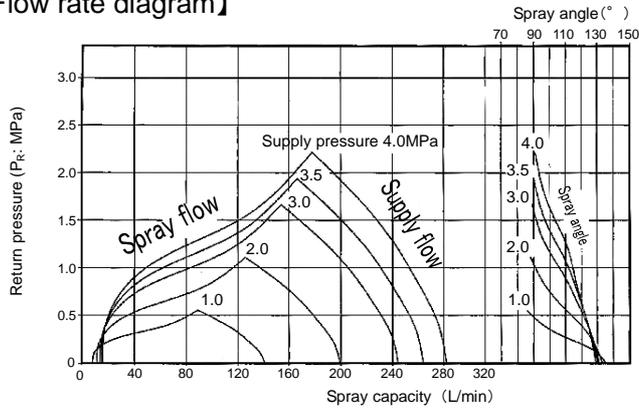
## Specifications

Nozzle description			Spray capacity (L/min) at supply pressure 3.5MPa and Return pressure at				Spray angle (degrees) at supply pressure 3.5MPa and Return pressure at			Free passage diameter (mm)	Sauter mean droplet diameter * (μm)
Thread size	Series	Nozzle code	MAX (1.9MPa) (Return valve fully closed)	1.4MPa	0.7MPa	0MPa (Return valve fully open)	MAX (1.9MPa) (Return valve fully closed)	1.4MPa	0MPa (Return valve fully open)		
1*1/2F	GSPB	35*90/167	167	128	32.3	16.7	90	99	130	5.7	132~151

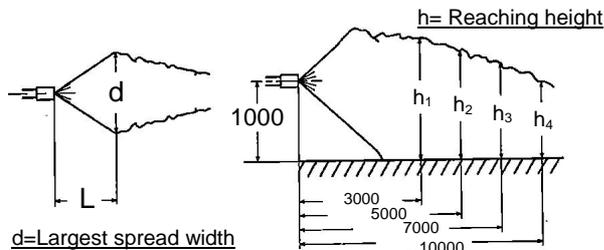
\* Sauter mean droplet diameter measured by phase Doppler particle analyzer

## Spray performance

[Flow rate diagram]

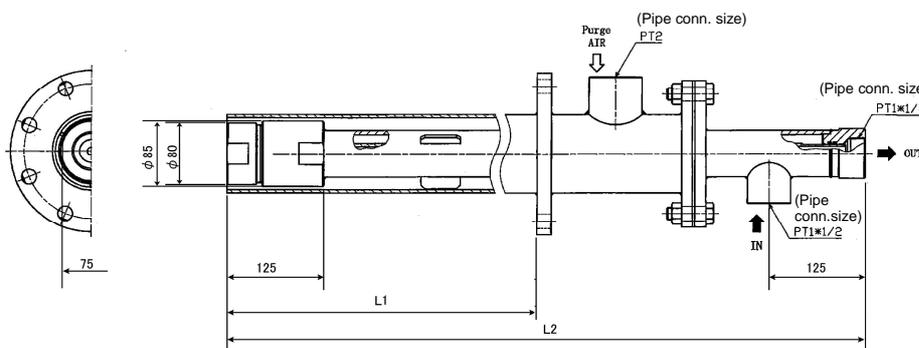


## Spray dimensions



Pressure (MPa)		Spray dimensions (mm)					
Supply pressure Ps	Return pressure Pr	L	d	h1	h2	h3	h4
3.5	1.9 (MAX)	900	1000	1800	1600	1500	1400
	1.4	1100	1200	1600	1500	1400	1200
	0.7	1400	1700	1700	1400	1200	700
	0 (MIN)	1600	2300	1700	1300	1000	300

## Structure, Dimensions and Materials



### [Materials]

Spray tip: Tungsten carbide  
 Other parts: S316L, S304, S440C  
 Protector: S316  
 (In our material code, "S" represents "stainless steel".)

### [Nozzle dimensions]

Please inquire with us for the total length (L2) and the length between the nozzle head and flange (L1).

## How to inquire/order

Please specify the total length (L2), the length between the nozzle head and flange (L1) and the flange size.

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 ISO9001:2008 certified

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# Eliminate *in garbage pits* with Dry Fog & Fine Fog!

Finer fog provides more effective deodorization with a smaller quantity of deodorant.

Fog spraying eliminates odor in...

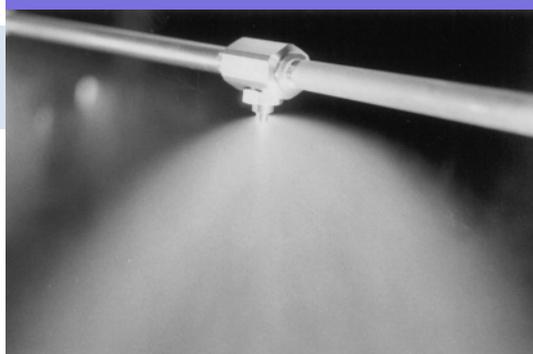
- Garbage pits of waste incineration plants
- Reservoirs in sewerage treatment plants
- Exhaust ducts

Effective odor-elimination using “Dry Fog”, with no wetting  
(Sauter mean droplet diameter:  $7.5 \mu\text{m}$ )



■AKIMist® “E” Dry Fog Humidifiers

Spray patterns available are flat, hollow cone and full cone spray  
(Sauter mean droplet diameter\*:  $20\text{-}100 \mu\text{m}$ )



■BIM series

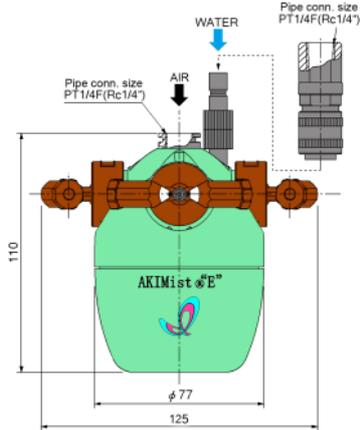
Fine fog spray driven by water pump pressure only  
(Sauter mean droplet diameter\*:  $35\text{-}60 \mu\text{m}$ )



■KBN series



## AKIMist® "E" (Dry Fog humidifier)



### Material

Body	PP, S303
Nozzle	PPS, OPFW, S303
O-ring	NBR, FKM
Packing	NBR

S303 = Stainless steel 303

Mass: 340g (Loaded)

### Spray volume per nozzle

Air pressure (MPa)	Spray volume (L/hr)	Air consumption (L/min, Normal)
0.2	1.3	22
0.3	2.4	29
0.4	3.1	36
0.5	3.6	43

Sauter mean droplet diameter: 7.5µm (measured by laser analyzer)



Up to 4 nozzles can be mounted per body, spraying in 4 directions as in the photo (AE-4).

AE-4 (03C) sprays 9.6L/hr at 0.3MPa air pressure.

## BIM series (Fine fog / Small capacity / Pneumatic spray nozzle)



Photo is BIMK series with T-type adaptor

- Unique design greatly minimizes clogging.
- Designed using fewer parts than typical nozzles for easier maintenance and lower price.
- Available in 3 spray patterns, BIMV flat spray, BIMK hollow cone spray and BIMJ full cone spray.

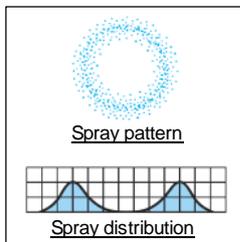
Spray pattern	Liquid feeding system	Spray angle (°)	Spray capacity (L/hr)	Air consumption (L/min, Normal)	Mean droplet diameter* (µm)
Flat spray	Liquid pressure	110, 80, 45	1.0~107	7~245	20~100
	Liquid siphon	80	0.7~4.5	15~92	20~30
Hollow cone spray	Liquid pressure	60	2.0~107	13~245	20~100
	Liquid siphon	60	1.4~5.5	27~92	20~30
Full cone spray	Liquid pressure	70, 20	2.0~107	7~245	20~100

\*Sauter mean droplet diameter measured by Laser Doppler Method

## KBN series (Fine fog / Ultra-small capacity / Hollow cone spray)



Photo of KBN80063



- Low cost plastic nozzle with durable ceramic orifice.
- Light weight; 1/6 that of similar metal nozzles.
- Minimal clogging with free passage diameter 1.3-2.6 times bigger than that of conventional nozzles.

KB series, stainless steel body with ceramic orifice, is also available.

\*Sauter mean droplet diameter measured by Immersion Sampling Method

Spray angle code	Spray capacity code	Spray capacity (L/min)												Mean droplet diameter* (µm)	Free passage diameter (mm)	Strainer mesh size	Nozzle color		
		0.5 MPa			1 MPa			2 MPa			5 MPa								
80	063	50	80	80	1.13	1.36	1.72	2.00	2.35	2.99	4.05	4.75	5.58	35~60	0.2	200	Brown		
	125	60	80	2.29	2.77	3.51	4.10	4.84	6.20	8.43	9.94	11.70	0.3					100	Green
	22	65	80	3.99	4.84	6.18	7.25	8.59	11.10	15.00	18.00	21.30	0.4					100	Purple

### How to order

Please inquire or order for a specific nozzle using this coding system.

Example) 1/4M KBN 80125 TPACVW

1/4M

(PT)

KBN

80

125

TPA

CV

W

Thread type

■ (PT)

■ (NPT)

Spray capacity code

■ 063

■ 125

■ 22

Check valve

CV (with check valve)

-- (without check valve)

For details please feel free to contact a sales office or mail us at [overseas@kirinoikeuchi.co.jp](mailto:overseas@kirinoikeuchi.co.jp).



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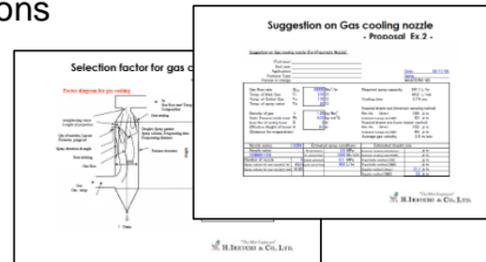
## Technical Support & Service

Based on your gas cooling conditions, we can offer the most suitable nozzle arrangement and spraying conditions. Please request a "Specifications Check Sheet" from us so we can confirm your requirements.

### ■ Providing nozzle selection and spray conditions

Based on the "Specifications Check Sheet" you complete, we select suitable nozzles and send our suggestion report, in which we include suitable spray conditions and spray droplet sizes required for full evaporation confirmed by our original program.

Nozzle lances, flanged connections and other optional mounting systems are custom-built to meet your specifications.



Suggestion report on your gas cooling information

### ■ Test report

In order to support spray conditions, we can provide testing reports of actual measurement of the various parameters such as:

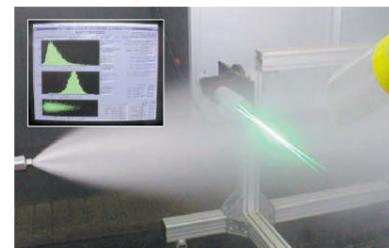
- Droplet size and distribution by laser Doppler particle analyzer
- Spray distribution measurement
- Actual fog simulation test using model cooling tower



Actual simulation in a model cooling tower



Measurement of spray distribution



Measurement of droplet size by Laser Doppler analyzer

# IKEUCHI Spray Nozzles

## For Gas Conditioning Systems



It goes without saying that the most important thing for gas conditioning systems, such as in gas cooling towers, De-Sox process, De-Nox process and gas scrubbers, is stable operation for long periods.

"The Fog Engineers" H. IKEUCHI & Co., specializing in developing and manufacturing spray nozzles for over 50 years, also produces spray nozzles suitable to each gas conditioning system. Our spray nozzles are being used in hundreds of gas conditioning plants.

For gas cooling tower applications, we can offer nozzles that not only are suitable and have ideal droplet sizes for full evaporation without extra drainage, but also realize lower running costs and minimal maintenance downtime with clog-resistant design and materials.

In this leaflet, we introduce some of our leading nozzles in our wide lineup for gas conditioning. Please contact us for details.

We hope that our spray technology will be of service in your gas-conditioning systems.



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#### Manufacturing plants



Nishiwaki plant, Japan



Kure plant, Japan



IKEUCHI VIETNAM, Hanoi, Vietnam



## Innovative Gas Cooling Nozzles

### GBIM and GSIM II series

#### Fine Fog Pneumatic Nozzles for Gas Cooling

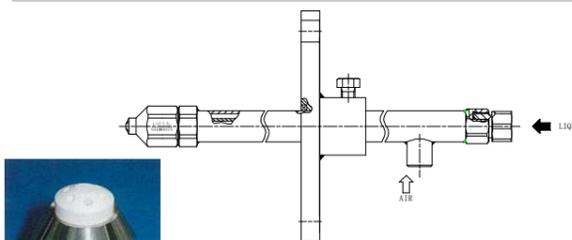
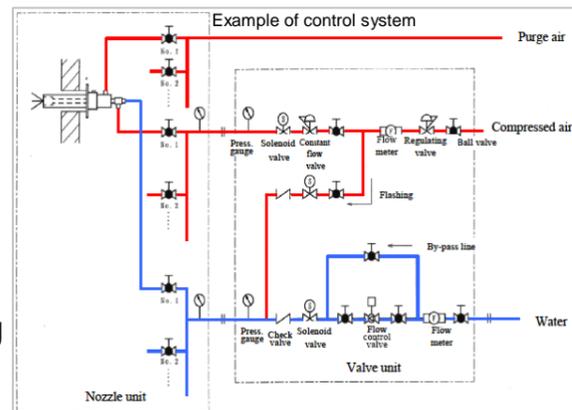
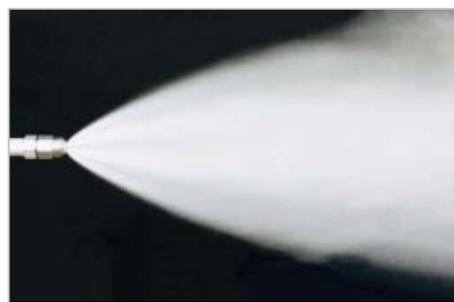
Patent pending



GBIM series



GSIM II series



GSIM\_s with high alumina nozzle tip

#### Downsize gas cooling tower

The number of required nozzles can be minimized with GSIM II and GBIM, which combine large spray capacity and fine fog of 60µm (mean droplet diameter).

This allows smaller gas cooling tower design than normal, reducing construction and maintenance costs.

#### Large spray capacity with excellent atomizing

GSIM II's average droplet size is 50µm (largest droplet size 150µm) with spray capacity 500L/hr at an air-water ratio 130.

GBIM provides 30% finer atomization than conventional nozzles.

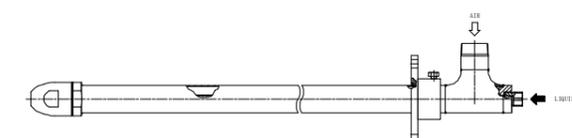
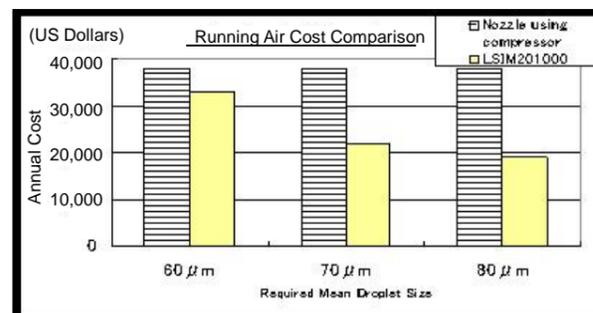
#### Nozzle tip available in optional materials

The standard material is stainless steel but the optional, high-alumina ceramic tip with high wear-resistance is available for drying reacted limestone slurry. Anticorrosion alloy such as Titanium and Hastelloy® is also available.

### LSIM series

#### Fine Fog Nozzles using blower air

Patented



#### Cost savings by using blower air

From 1/3 to 1/2 of standard installation cost and running cost is saved by utilizing blower air for atomization, compared with nozzles requiring compressed air.

#### Fine atomization

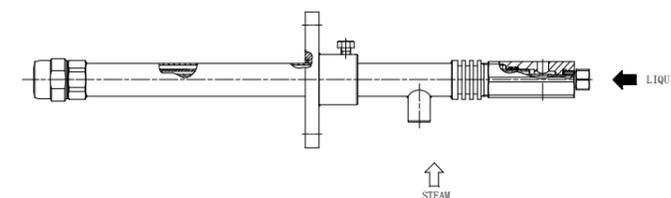
Fine atomization having maximum droplet size of 180µm.

## Innovative Gas Cooling Nozzles

### JOKIJet® series

#### Steam-driven Nozzles

Patented



#### Unique concept: steam-driven

Uses steam instead of compressed air to generate the fine fog of liquid components.

Amazing savings in running costs can be realized by applying surplus steam from an existing boiler facility.

### SPB series

#### Spillback Nozzles for Gas Cooling

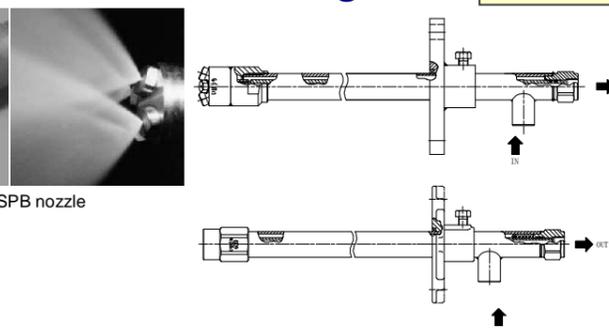
Patented



Single-head SPB nozzle



Multiple-head SPB nozzle



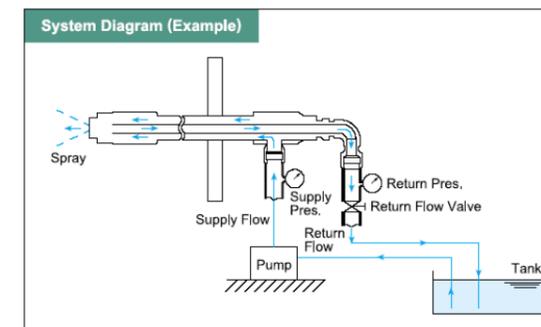
#### Minimal variation in droplet sizes

Spray capacity can be controlled by adjusting return pressure while keeping constant supply pressure.

Turn-down ratio of spray capacity is 1:10. The variation in droplet size of spray is minimal despite the modulation of spray flow.

#### Wide range of spray capacity

Available in 60deg. and 85deg. spray angles, and 15 different spray capacities according to nozzle arrangement and gas conditions in cooling tower. Multiple-head SPB nozzles are suitable when required larger spray capacity but minimal increase in spray droplet size.



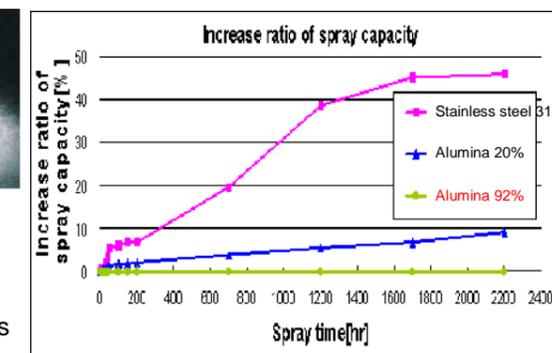
### CERJet® High-Alumina Ceramic Nozzles for Wet Gas Scrubbers



Hydraulic full cone nozzle



Vane-less hollow cone nozzle



\* Spray Tenfold condensed slurry

[Slurry spray wear resistance comparison test]

#### Excellent wear-resistance

High alumina ceramic CERJET® nozzles with outstanding wear-resistance (Mohs' scale 7 hardness) have 20-30 times longer wear life than stainless steel nozzles.

#### Minimal clogging design

Minimal clogging design makes longer and more stable operation possible in wet gas scrubbing systems.

# ***IKEUCHI Spray Nozzles***

## ***For Air Pollution Control Systems***



“The Fog Engineers” H. IKEUCHI & Co., specializing in developing and manufacturing spray nozzles for over 50 years, also produces spray nozzles suitable to each gas conditioning system. Our spray nozzles are being used in hundreds of gas conditioning plants.

For gas cooling tower applications, we can offer nozzles that not only are suitable and have ideal droplet sizes for full evaporation without extra drainage, but also realize lower running costs and minimal maintenance downtime with clog-resistant design and materials.

For Air Quality Control Systems (AQCS), such as FGD process, SCR / SNCR and Wet electrostatic dust precipitator (WEP), these are one of the countermeasure of reducing particulate matter in an exhaust gas from coal fired power plants, steel mills, paper mills and etc. We can offer nozzles that are suitable each AQCS process with tailoring nozzle design and materials

In this leaflet, we introduce some of our leading nozzles in our wide lineup for pollution control industry. Please contact us for details.

We hope that our spray technology will be of service in your gas-conditioning systems.

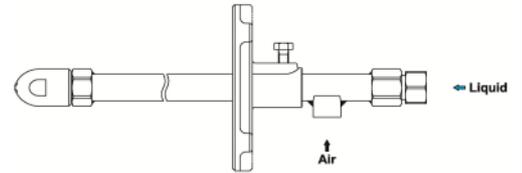
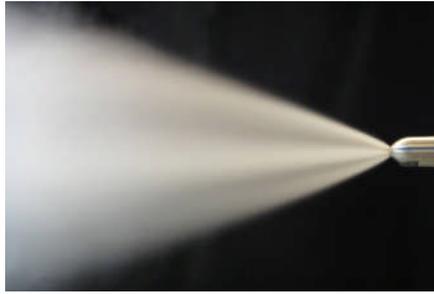


“The Fog Engineers”  
**H. IKEUCHI & Co., LTD.**

## GSIMII series

### Fine Fog Pneumatic Spray Nozzles for Gas Cooling

Patented



#### Downsize gas cooling tower

The number of required nozzles can be minimized with GSIM II, which combine large spray capacity and fine fog of 50 $\mu$ m (mean droplet diameter).

This allows smaller gas cooling tower design than normal, reducing construction and maintenance costs.

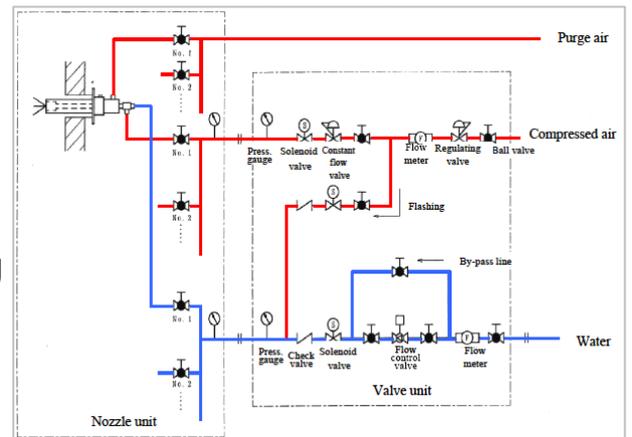
#### Large spray capacity with excellent atomizing

GSIM II's average droplet size is 50 $\mu$ m (largest droplet size 150 $\mu$ m) with spray capacity 500L/hr at an air-water ratio 130.

#### Nozzle tip available in optional materials

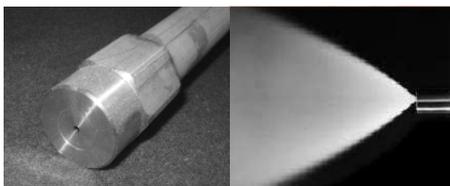
Anticorrosion alloy such as Titanium and Hastelloy® is also available.

Example of control system

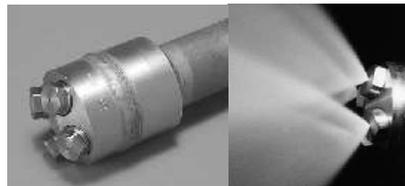


## SPB series Spillback Nozzles for Gas Cooling

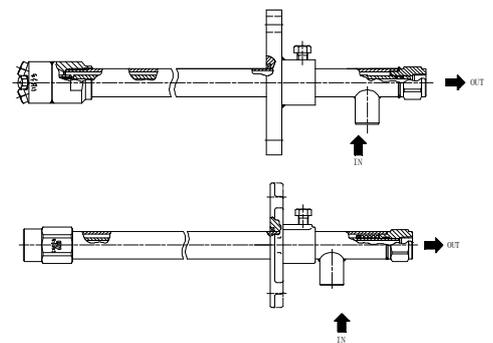
Patented



Single-head SPB nozzle



Multiple-head SPB nozzle



#### Minimal variation in droplet sizes

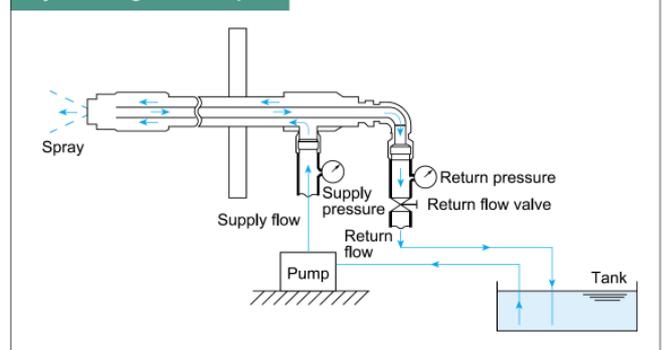
Spray capacity can be controlled by adjusting return pressure while keeping constant supply pressure.

Turn-down ratio of spray capacity is 1:10. The variation in droplet size of spray is minimal despite the modulation of spray flow.

#### Wide range of spray capacity

Available in 60deg. and 85deg. spray angles, and 15 different spray capacities according to nozzle arrangement and gas conditions in cooling tower. Multiple-head SPB nozzles are suitable when required larger spray capacity but minimal increase in spray droplet size.

System Diagram (Example)



## JOKIJet® series

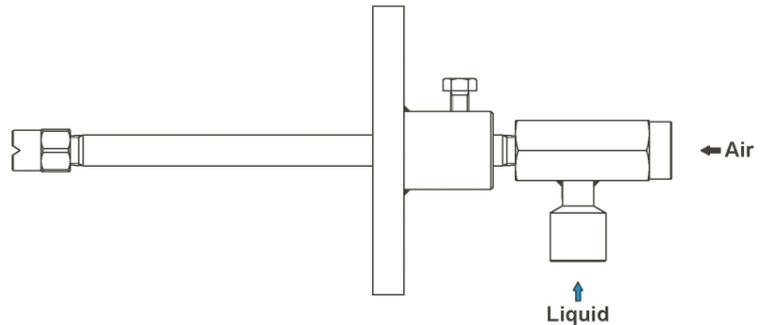
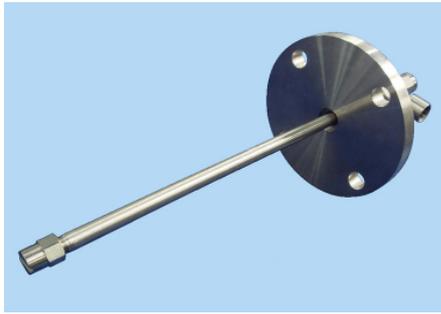
Patented



Steam-driven nozzles, JOKIJet® series, uses steam instead of compressed air to atomize liquid. Please inquire with us for details.

## Clog-resistant SNCR Nozzles

### **DOVVA-G series Flat Spray Pneumatic Spray Nozzles for SNCR**



DOVVA nozzle tip

#### ■ Clog-resistant design

Pneumatic spray nozzle suitable for spraying ammonia water and aqueous urea, and large passage diameter minimizes clogging.

#### ■ Semi-fine atomization

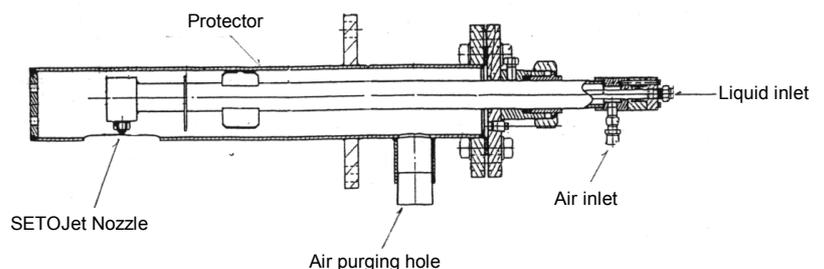
Produces semi-fine atomization with a mean droplet diameter of 80 $\mu$ m or more (measured by Laser Doppler Method).

#### ■ Heat-resistant materials (option)

In addition to the standard material Stainless Steel 316L, nozzle tip is available in heat-resistant steel such as Stainless Steel 310S.

## Fine Atomization SCR Nozzles

### **SETOJet series Clog-resistant Fine Fog Nozzles for SCR**



#### ■ Designed for the application environment

- Liquid pipe is set inside the air pipe so that liquid is not affected by heat.
- Designed to mix air and liquid outside the nozzle, clogging due to precipitated liquid is minimized.
- Protector has an air purging hole to protect the nozzle and liquid from heat.
- Odor-tight structure.

#### ■ Optimal spray lance for your equipment or the environment

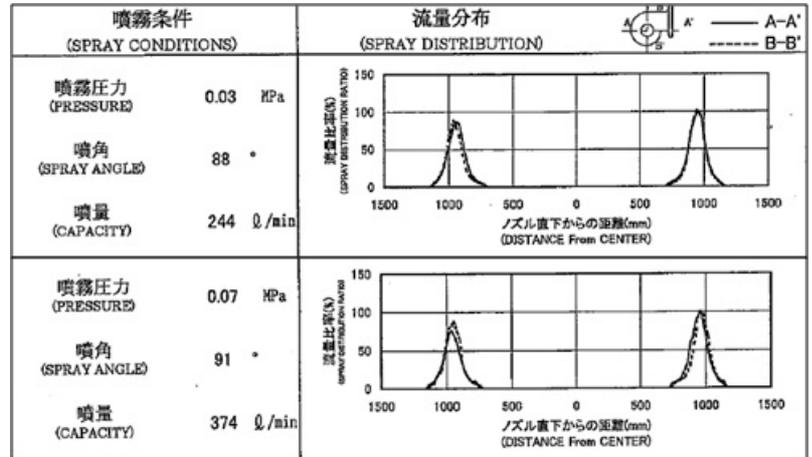
- Integrated spray lance requires no troublesome piping around the nozzle.
- Easy to remove the spray lance from the equipment at site.
- Spray direction can be chosen as desired, straight type or angled type, depending on the equipment and installation position.

#### ■ Selectable from various models

- Available in 18 spray capacity types from 2 L/hr to 120 L/hr.

## TAA series Large Capacity, Hollow Cone Spray Nozzles for FGD

Variation of spray angle and distribution at low pressure



### High wear and acid resistance

Made of wear-/acid- resistant log-resistant SiC (silicon carbide). SiSiC (siliconized silicon carbide) is also available.

### Designed for low-pressure operation

Due to the special inside design, spray angle and spray distribution is stable even at 0.03MPa.

### Large free passage diameter

No inside part for minimal clogging.



## Clog-resistant WEP Spray Nozzles

### AAP series Hollow Cone Spray Nozzles for WEP



### Stable spray pattern

Hollow cone spray nozzles producing stable spray pattern with relatively fine atomization.

### Minimal clogging

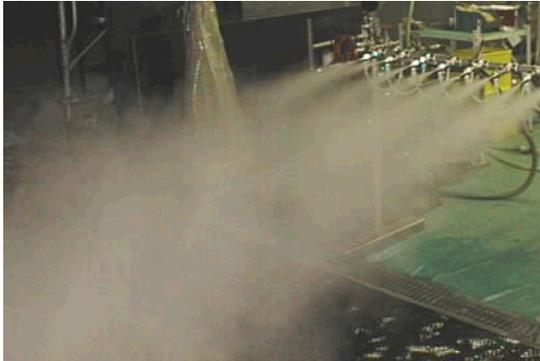
No-whirler design minimized clogging.

### Guarantee of nozzle performance

Guaranteed for the spray capacity within +/- 5% and the spray angle within +/- 5 degrees under the standard pressure (0.2MPa).

## ***BIM / GSIMII series***

### ***Fine Fog Pneumatic Spray Nozzles for dust suppression***



BIM nozzles



GSIMII nozzles

BIM/GSIMII pneumatic spray nozzles are capable of dust suppression without significantly wetting the environment by swiftly spraying a large volume of droplets of 20-100 $\mu$ m diameter.

### ●Actual photos●

Before



After installation of spray units



**After the BIM spray nozzles were installed, the dust content was reduced by more than 90%.**

Product catalogs are available.

For details and any inquiries please feel free to contact a sales office or email us at [overseas@kirinoikeuchi.co.jp](mailto:overseas@kirinoikeuchi.co.jp).



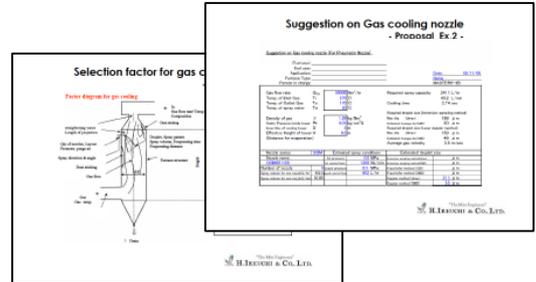
# Technical Support for Gas Cooling Nozzles

Based on your gas cooling conditions, we can offer the most suitable nozzle arrangement and spraying conditions. Please request a "Specifications Check Sheet" from us so we can confirm your requirements.

## ■ Providing nozzle selection and spray conditions

Based on the "Specifications Check Sheet" you complete, we select suitable nozzles and send our suggestion report, in which we include suitable spray conditions and spray droplet sizes required for full evaporation confirmed by our original program.

Nozzle lances, flanged connections and other optional mounting systems are custom-built to meet your specifications.

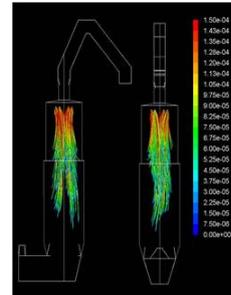


Suggestion report on your gas cooling information

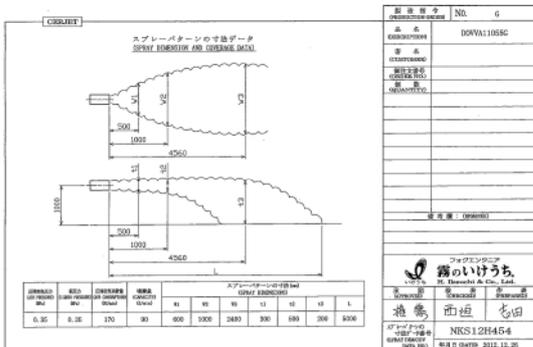
## ■ Test report

In order to support spray conditions, we can provide testing reports of actual measurement of the various parameters such as:

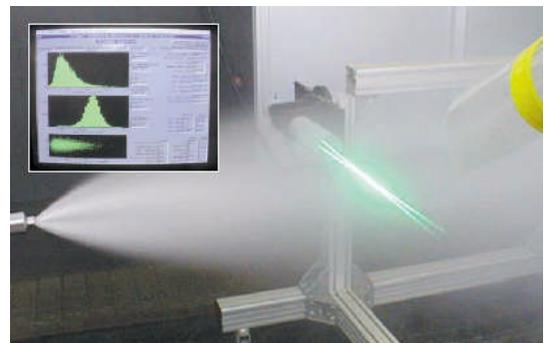
- Droplet size and distribution by laser Doppler particle analyzer
- Spray dimension and coverage measurement
- Computational fluid dynamics (upon discussion to submit)



CFD analysis



Actual spray dimension and coverage data



Measurement of droplet size by Laser Doppler analyzer



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Shenzhen Branch Tel: 86-755-8525-2221 Fax: 86-755-8525-2215

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### Manufacturing plants



Nishiwaki plant, Japan



Kure plant, Japan



IKEUCHI VIETNAM, Hanoi, Vietnam

**For denitrification/  
NO<sub>x</sub> removal equipment**

-Cogeneration plant-

- ◆ **Ammonia water spraying**
- ◆ **Aqueous urea spraying**

## **Reducing Agent Spraying Nozzles**

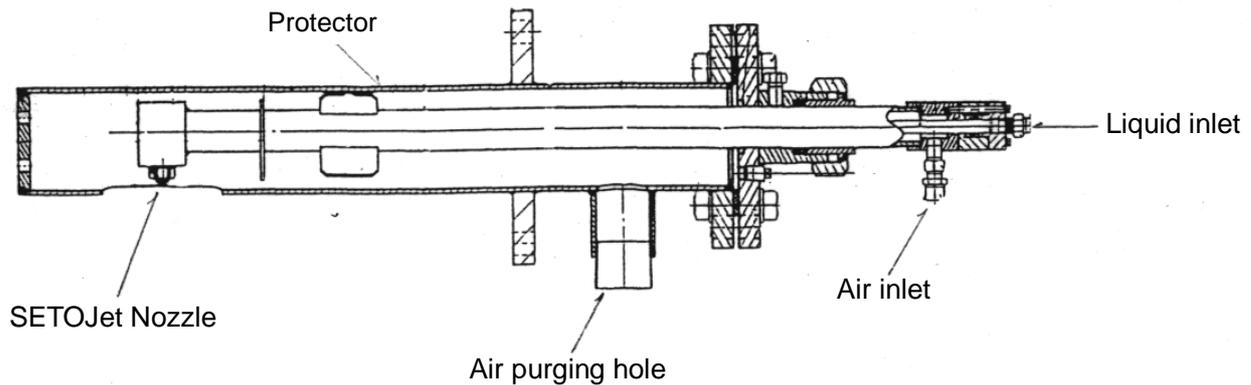
SETOJet series reducing agent spray nozzles, has been developed by the Fog Engineers IKEUCHI, based on our decades of experience and extensive knowledge of atomization. SETOJet has a strong track-record of spraying ammonia water and aqueous urea.

# **SETOJet** series



“The Fog Engineers”  
**H. IKEUCHI & CO., LTD.**

## Basic structure of SETO spray header



## Features

### 1. Designed for the application environment

- Liquid pipe is set inside the air pipe so that liquid is not affected by heat.
- Designed to mix air and liquid outside the nozzle, clogging due to precipitated liquid is minimized.
- Protector has an air purging hole to protect the nozzle and liquid from heat.
- Odor-tight structure.

### 2. Optimal spray header for your equipment or the environment

- Integrated spray header requires no troublesome piping around the nozzle.
- Easy to remove the spray header from the equipment at site.
- Spray direction can be chosen as desired, straight type or angled type, depending on the equipment and installation position.

### 3. Selectable from various models

- Available in 18 spray capacity types from 2 L/hr to 120 L/hr.

We are pleased to offer the most optimal spray nozzles for your applications including gas treatment, flue gas cooling, moisture control, desulfurization, denitrification, and gas absorption. Please feel free to contact our sales representative in your area.



ISO9001:2008 certified

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Tel: 66-2-328-0392 Fax: 66-2-328-0391 E-mail: [info@ikeuchithai.com](mailto:info@ikeuchithai.com)

# Spillback Nozzles for **Gas Cooling**

## Fine fog spray from Compact body



Single-head SPB-R series

### Compact Body

- Lightweight for easy handling.
- The weight was reduced by 25% compared with the prior one (SPB series).

### High Performance

- Fine atomization with uniform distribution.

### Low Price

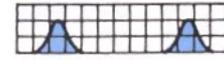
- High-performance spray nozzle with low cost.

The variation in spray droplet sizes is minimized despite the modulation of spray flow, SPILLBACK Nozzles (SPB-R series) is suitable for evaporative cooling in cooling towers where the inlet gas temperature varies.



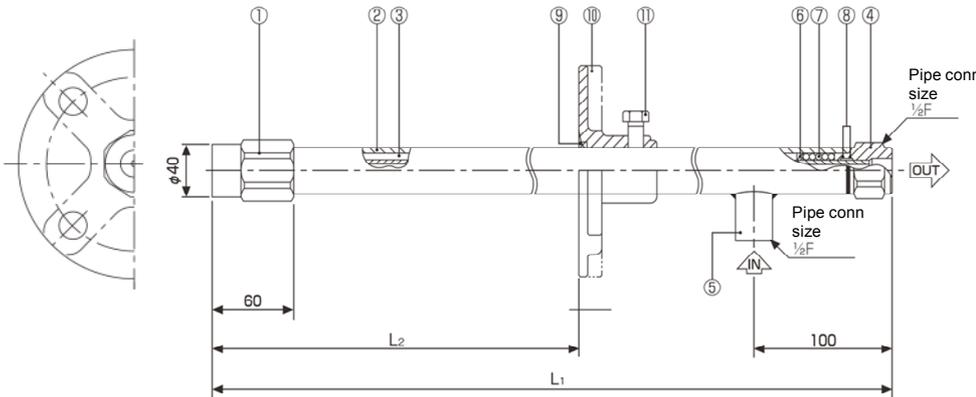


[Spray Pattern]



[Spray Distribution]

Spray capacity can be controlled by only adjusting return pressure while supply pressure is kept constant. Spray capacity is maximized by fully closing the return valve and minimized by fully opening the return valve. The turn-down ratio of spray capacity is 1:10.



Part No.	Description	Material
①	Nozzle body, Whirler	S316L
②	Inlet Pipe	S316LTP
③	Outlet Pipe	S304TP
④	Outlet Socket	S304
⑤	Inlet Socket	S304
⑥	Ring	S304
⑦	Spring	S304
⑧	O-ring	NBR
⑨	Packing	Ceramic fiber+ Stainless steel wire
⑩	Flange	SCS13
⑪	Bolt	S304

\*In our material code, "S" represents "stainless steel".

SPB series		Spray Volume (L/min) at supply pressure 2.0 MPa				Spray Angle (°) at supply pressure 2.0 MPa			Free Passage Diameter (mm)	
Pipe Conn. Size	Nozzle Number	Return Pressure at Max.	Return Pressure at 0.8 MPa	Return Pressure at 0.4 MPa	Return Pressure at Min. (0 MPa)	Return Pressure at Max.	Return Pressure at 0.8 MPa	Return Pressure at Min. (0 MPa)		
1/2F (Rc 1/2")	6003R	3.00	1.80	0.68	0.30	65	85	110	1.5	
	6004R	4.00	2.40	0.90	0.40				2.0	
	6005R	5.00	3.05	1.05	0.50				2.0	
	6006R	6.00	3.10	0.85	0.60				2.0	
	6007R	7.00	3.65	1.00	0.70				2.0	
	6008R	8.00	4.20	1.10	0.80				2.0	
	6010R	10.0	5.20	1.40	1.00	60	84	110	2.5	
	6012R	12.0	6.25	1.70	1.20				2.5	
	6014R	14.0	7.30	1.95	1.40				2.5	
	6016R	16.0	8.30	2.25	1.60				2.5	
	6018R	18.0	9.35	2.50	1.80				2.5	
	6020R	20.0	10.50	2.80	2.00				3.0	
		Return Pressure at Max.	Return Pressure at 0.6 MPa	Return Pressure at 0.3 MPa	Return Pressure at Min. (0 MPa)	Return Pressure at Max.	Return Pressure at 0.6 MPa	Return Pressure at Min. (0 MPa)		
	8505R	5.00	2.97	0.90	0.50	85	105	130	1.3	
	8510R	10.0	4.20	1.50	1.00				100	2.0
	8515R	15.0	5.20	2.25	1.50				2.5	
	8520R	20.0	6.80	3.00	2.00				3.0	
	8525R	25.0	9.25	3.75	2.50				3.0	
	8530R	30.0	14.40	5.60	3.00				3.0	

■ How to order

<Example>

1/2F SPB 6004R    B    S316L + 2T10    S304  
 Nozzle    Type of    Flange Size    Flange  
 Number    Nozzle    Length    Material

Type	Total Length L1 (mm)	Length L2 (mm)	Mass (kg)
A	480	200-300	3.0
B	580	300-400	3.4
C	780	400-600	4.1
D	980	600-800	4.8
E	1180	800-1000	5.5

Mass of flange is not included.



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# Better efficiency for Flue Gas Desulphurization

## Made of SiC

### Bi-directional slurry spray nozzle

**TWAA Series**

#### Features

- High wear-resistance
- Small droplet diameter
- Even spray distribution
- Large free passage diameter

#### Wear-resistant, Lightweight

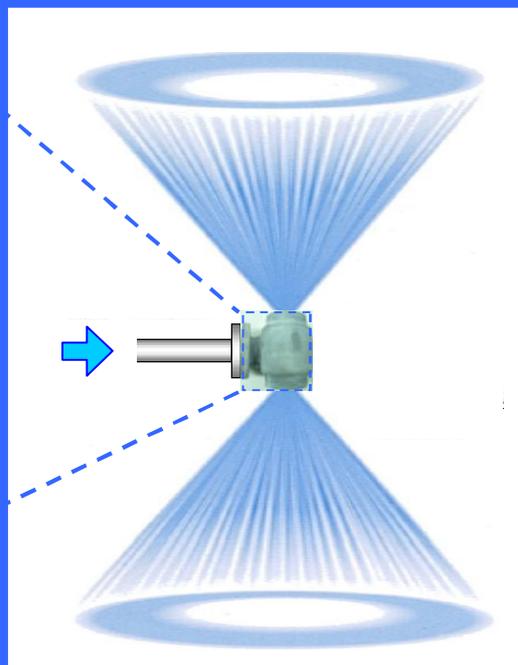


#### Material: SiC

#### **SiC**

(Silicon nitride bonded silicon carbide) has excellent **wear-resistance and chemical durability**. It is also **lightweight**. (Weighs **less than half weight of stainless steel**)

#### Bi-directional spray



The TWAA series is **bi-directional**, so one nozzle unit can take the place of two. The result, **simpler equipment layout**, less maintenance yields **time savings**.

#### Smaller droplets



With 2 orifices, the flow normally sent through 1 orifice is halved, yielding smaller droplets. Best for applications with contact / reactions.

#### **Results!**

**Reliable continuous operation**

*Wear-resistance*

**Easy-maintenance**

*Wear-resistance, Lightweight, Bi-directional (Fewer nozzles)*

**Simpler layout**

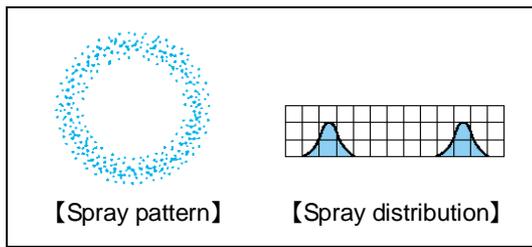
*Lightweight, Bi-directional spray*



"The Fog Engineers"

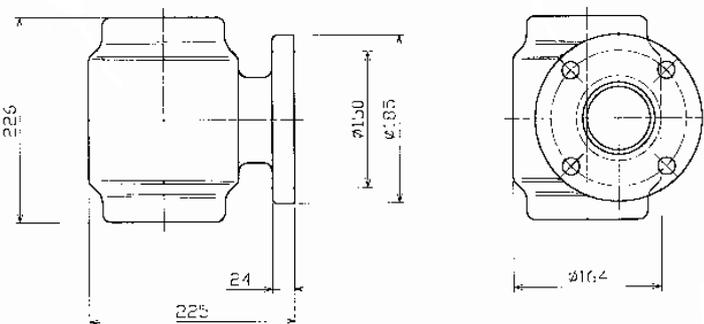
**H. IKEUCHI & CO., LTD.**

## Performance



Standard pressure : 0.07MPa  
 Range of flow rates : 200 - 1,200 L/min  
 Flange sizes : 2T - 4T

## Reference drawing



At left is a reference drawing for the 3 inch size. For more detail, please contact your nearest distributor, listed below. After a consultation on your specific needs, we can provide information best suited for you.

## Flue Gas Desulphurization nozzles

Moderate flow rate alumina hollow cone spray nozzle <b>AP-AL92 series (Alumina ceramic)</b>	Large flow rate flanged hollow cone spray nozzle <b>TAA series (Made of SiC, single direction)</b>	Large flow rate flanged hollow cone spray nozzle <b>TAA series (Made of plastic, single direction)</b>
		

Please feel free to contact our local sales office for any question or inquiry.

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

ISO9001:2008 certified

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