

# BIM series Small Capacity Fine Fog Nozzles

Patented

## Raw material process

- Dust suppression on raw material conveyer line
- Spraying reducing agents for denitration

## Steel making process

- Cooling ladle and tundish at maintenance
- Cooling electrodes of electric furnace

## Rolling mill process

- Coil cooling

## Surface finish

- Minimized spangle treatment of continuous galvanized steel
- Cooling steel plates after coating

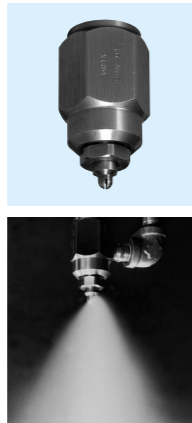
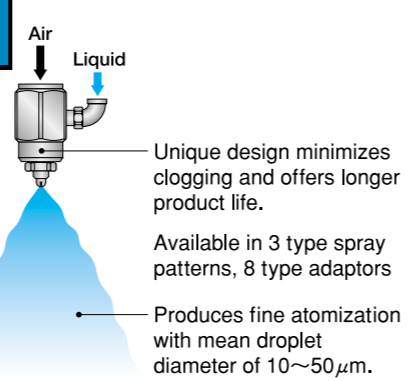


Photo of BIMV flat spray

## FEATURES

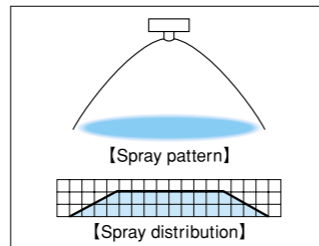


## Spray patterns in three types

### BIMV Flat spray

#### [FEATURES]

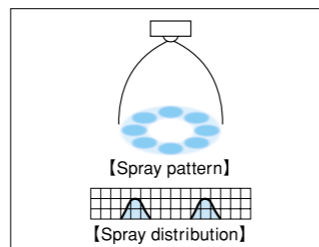
- Pneumatic nozzle producing fine atomization with mean droplet diameter of 10~50 $\mu$ m. (\*1)
- When spraying at a low air-water ratio, BIMV nozzle produces uniform spray distribution. At a high air-water ratio, it produces a mountain-shaped distribution, but a uniform distribution can be achieved by using a multiple nozzle alignment.
- Three spray angles 45°, 80° and 110° are available.
- 8 types of adaptors are available.



### BIMK Hollow cone spray

#### [FEATURES]

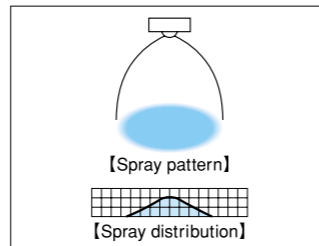
- Pneumatic nozzle producing fine atomization with mean droplet diameter of 10~50 $\mu$ m. (\*1)
- Spray angle is 60°.
- 8 types of adaptors are available.



### BIMJ Full cone spray

#### [FEATURES]

- Pneumatic nozzle producing fine atomization with mean droplet diameter of 10~50 $\mu$ m. (\*1)
- Two spray angles 20° and 70° are available.
- 8 types of adaptors are available.



\*1) Droplet diameter measured by Fraunhofer diffraction method.

\*2) Principal material of BIM series is S303.

## Spray angle and spray capacity code

Operating pressure: Air pressure = 0.2-0.4MPa, Liquid pressure = 0.1-0.3MPa

Series	Spray pattern and Spray angle code (*2)	Air consumption code				
		02	04	075	15	22
BIM	V110°	○	○	○	○	○
	V80°	○	○	○	○	○
	V45°	○	○	○	○	○
	K60°	—	○	○	○	○
	J20°	○	○	○	○	○
	J70°	○	○	○	○	○
Spray capacity range (ℓ/hr)		1~10	2~20	4~40	8~80	11~110
Air consumption per nozzle (ℓ/min, Normal)	Air pressure = 0.2MPa	15	27	54	113	150
	Air pressure = 0.3MPa	20	36	74	150	220
	Air pressure = 0.4MPa	25	46	94	190	250

\*2) Spray angle measured under air pressure of 0.3MPa and liquid pressure of 0.1MPa. Nozzle code should be indicated like "BIMV11002 S303 + ...". Details are shown on page 23.

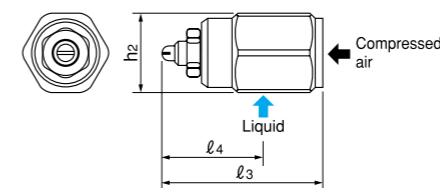
Conversion of unit [Pressure] 0.1MPa  $\approx$  14.50psi [Flow rate] 1ℓ (liter)  $\approx$  0.264 US gal. 10psi  $\approx$  0.069MPa 1US gal.  $\approx$  3.79ℓ (liter)

## BIM series Small Capacity Fine Fog Nozzles

## Types of adaptors and features

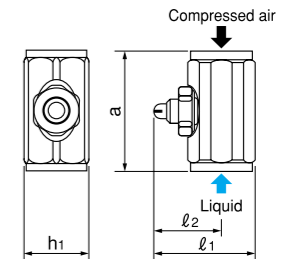
### Type T

Air inlet is on the center line and liquid inlet is on 90° angle line to the center line. Suitable for use in small spaces.



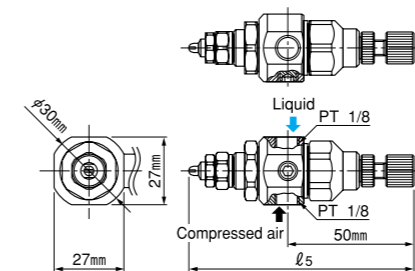
### Type N

Liquid and air enter into adaptor from both sides.



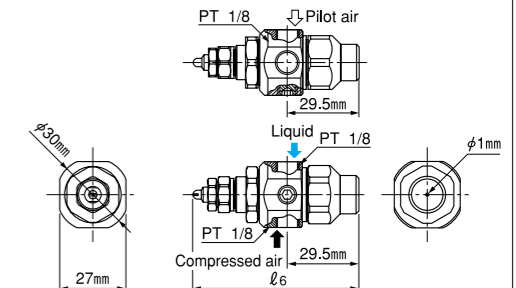
### Type ND

Spray capacity is adjustable with needle valve.



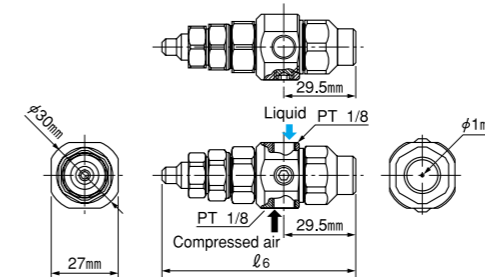
### Type SP

Spray can be regulated by switching the pilot air ON/OFF. The pilot air actuates an internal piston to regulate the spray. (Pilot air pressure more than 0.2MPa required.)



### Type SN

Spray can be regulated by turning compressed air ON/OFF, which actuates an internal piston, to open or close the nozzle. (Pilot air pressure more than 0.2MPa required.)



### Ball Joint (option)



- Spray direction can be adjusted with +/-15° in all directions.
- Accurate spray alignment can be done easily after installation onto a pipe.
- Ball joint is available for SP, SN, ND types. (Adaptor with ball joints are type UND, USP and USN.)

## Pipe connection size and Mass

Air consumption code	Dimensions (mm)								
	ℓ1	ℓ2	ℓ3	ℓ4	ℓ5	ℓ6	a	h1	h2
02	25.3	16.3	40.8	24.8	87.3	66.8	32	17	21
04	26.8	17.8	42.3	26.3	88.8	68.3	32	17	21
BIMJ 2004	27.0	18.0	42.5	26.5	89.0	68.5	32	17	21
075	28.1	19.1	43.6	27.6	90.1	69.6	32	17	21
15	39.1	26.6	60.1	38.1	97.8	77.3	43	23	29
22	41.3	28.8	62.3	40.3	100	79.5	43	23	29

\*Dimensions and designs may be changed without prior notice.

Adaptor	Air consumption code	Pipe connection size			Mass (g)
		Compressed air	Liquid	Pilot air	
N	02,04,075	1/8F	1/8F	—	55
	15,22	1/4F	1/4F	—	130
T	02,04,075	1/8F	1/8F	—	80
	15,22	1/4F	1/4F	—	210
ND (UND)	02,04,075	1/8F	1/8F	—	172
	15,22	1/8F	1/8F	—	193
SP (USP)	02,04,075	1/8F	1/8F	1/8F	146
	15,22	1/8F	1/8F	1/8F	167
SN (USN)	02,04,075	1/8F	1/8F	—	151
	15,22	1/8F	1/8F	—	172

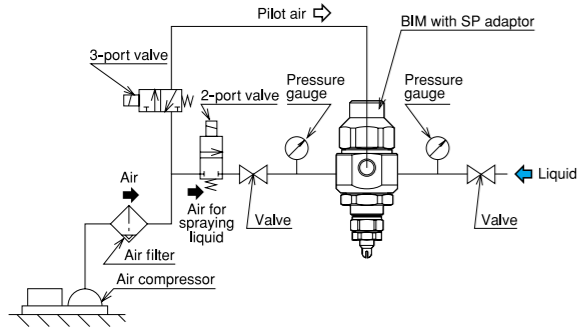
BIM series  
Small Capacity Fine Fog Nozzles

How to use BIM controlling adaptors

■ SP adaptor

Spray can be regulated by switching pilot air ON/OFF. The pilot air actuates an internal piston to regulate the spray. The pilot air pressure must be 0.2MPa or higher. As even low pressure atomizing air can be used, production of a range of fine to coarse mists is possible. Best-suited for when there is concern about scattering droplets.

Connection example



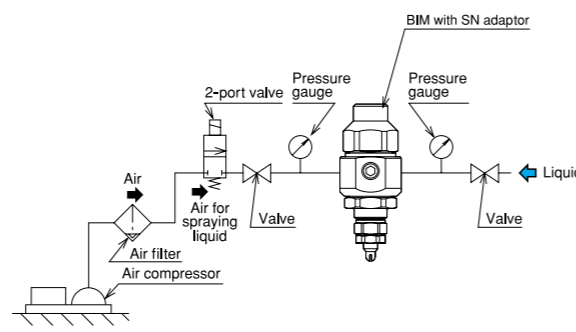
Function chart

Compressed air			ON		
Liquid	Stop	Spray	Stop	Spray	Stop
Pilot air	OFF	ON	OFF	ON	OFF

■ SN adaptor

Spray can be regulated by turning compressed air ON/OFF, which actuates an internal piston, to open or close the nozzle. Air pressure must be 0.2MPa or higher in order to start the spray.

Connection example

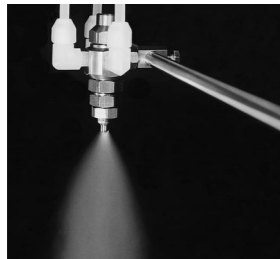


Function chart

Compressed air	OFF	ON	OFF	ON	OFF
Liquid	Stop	Spray	Stop	Spray	Stop

Option

■ Fixing Support



Fixing supports are available for easy installation of BIM nozzle. BIM nozzle can be fixed on a pole at any position and spray direction. Two types are available for pole diameters of 8mm and 10mm.

■ Spray Controller



It is recommended to use the IKEUCHI Spray Controllers, especially designed for utilizing all kinds of adaptors and optimizing operational conditions of BIM nozzles for customer's process.

How to order

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

〈Example〉 BIM V110 02 S303 + N S303

BIM	V110	02	S303 +	N	S303
	Spray pattern & Spray angle code	Air consumption code		Type of adaptor	
	<ul style="list-style-type: none"> <li>■ V110°</li> <li>■ V80°</li> <li>■ V45°</li> <li>■ K60°</li> <li>■ J20°</li> <li>■ J70°</li> </ul>	<ul style="list-style-type: none"> <li>■ 20</li> <li>■ 04</li> <li>■ 075</li> <li>■ 15</li> <li>■ 22</li> </ul>		<ul style="list-style-type: none"> <li>■ N</li> <li>■ T</li> <li>■ ND (UND)</li> <li>■ SP (USP)</li> <li>■ SN (USN)</li> </ul>	

BIM Header Integrated Spray Header with BIM Fine Fog Nozzles

Iron making process

- Cooling refractories of hot metal runner

Steel making process

- Cooling tundish at maintenance

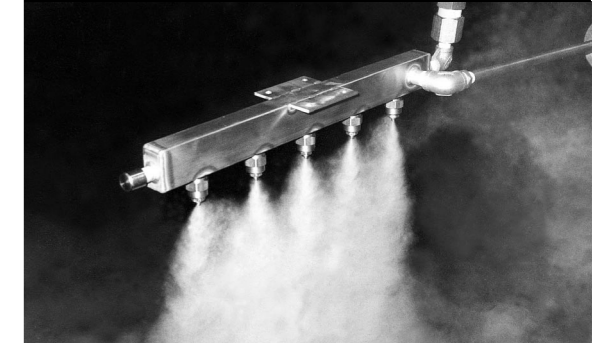
Rolling mill process

- Cold rolled sheets wetting processing

Surface finish

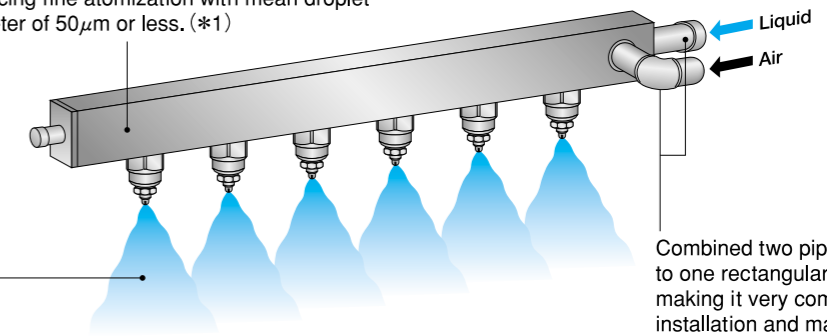
- Minimized spangle treatment of continuous galvanized steel
- Cooling for CGL sheets after alloying furnace
- Fog cooling for EGL sheets

Integrated multiple-nozzle header



FEATURES

Spray header equipped with BIMV nozzles producing fine atomization with mean droplet diameter of 50μm or less. (\*1)

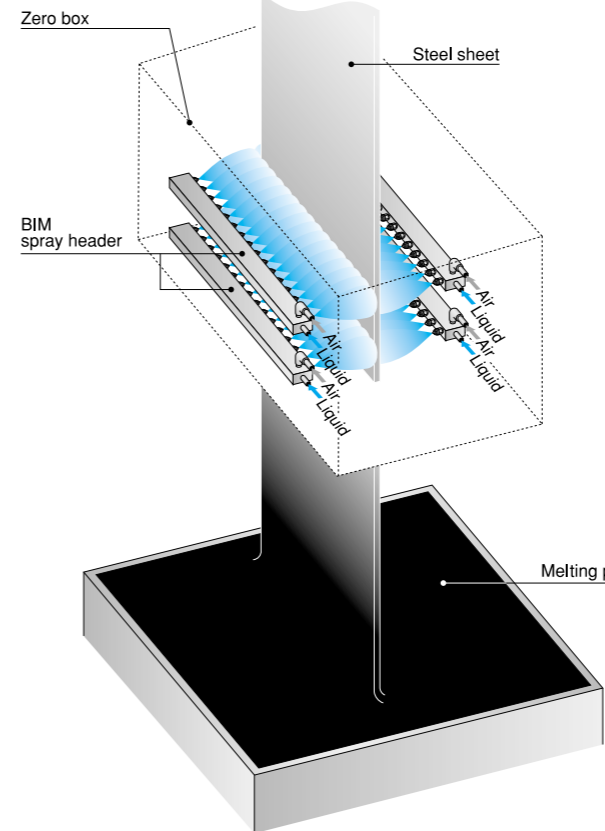


Uniform spray distribution across entire spray area.

Combined two pipes for air and water to one rectangular spray header, making it very compact and easy for installation and maintenance.

\*1) Droplet diameter measured by Fraunhofer diffraction method

BIM spray header used for minimized spangle



BIM nozzle, which atomizes surface treatment liquid, can be sprayed on steel boards effectively and uniformly at high speed. Unique design minimizes clogging and achieves long-time continuous spray.

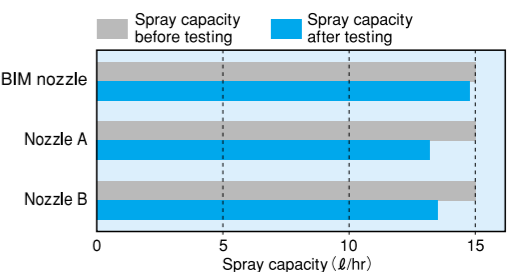
Clogging comparison in pneumatic spray nozzles

Test conditions

- ★ BIM nozzle: Air pressure=0.3MPa, Liquid pressure=0.26MPa, Spray capacity=15ℓ/hr
- Competitor's nozzle A: Air pressure=0.3MPa, Liquid pressure=0.26MPa, Spray capacity=15ℓ/hr
- Competitor's nozzle B: Air pressure=0.3MPa, Liquid pressure=0.22MPa, Spray capacity=15ℓ/hr
- \*Used liquid: Excel 601 10% dilution Continuous spraying

Test results

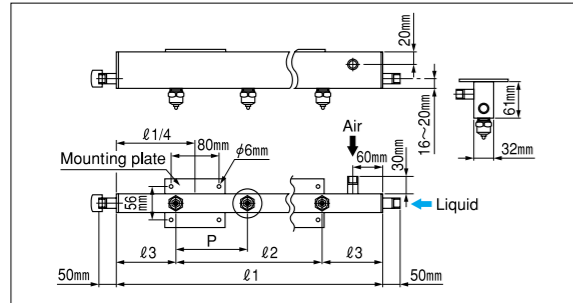
The figure below shows the change in the spray capacity after spraying for 50 hours.



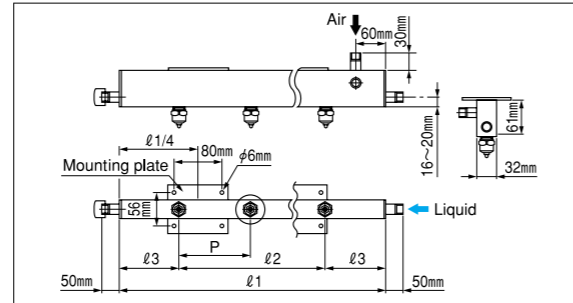
BIM Header Integrated Spray Header with BIM Fine Fog Nozzles

Standard specifications of rectangular spray header with BIM nozzles

Mounting type-A



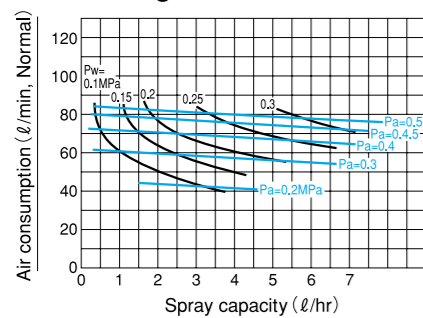
Mounting type-B



Header length code l1 (mm)	Nozzle spacing P (mm)	Nozzle Qty (pcs.)	Spacing (mm)		Pipe connection size (PT threads)						Material	
			l2	l3	BIMV11002		BIMV11004		BIMV110075		Nozzle	Header
1000	100	10	900	50	Air	Liquid	Air	Liquid	Air	Liquid	S303	S304
	200	5	800	100	3/8M	1/4M	3/8M	1/4M	1/2M	3/8M		
2000	100	20	1900	50	1/2M	3/8M	1/2M	3/8M	3/4M	1/2M	S303	S304
	200	10	1800	100	3/8M	1/4M	3/8M	1/4M	1/2M	3/8M		

Specifications of BIMV6006Z nozzle for zero/minimized spangle

Flow-rate diagram

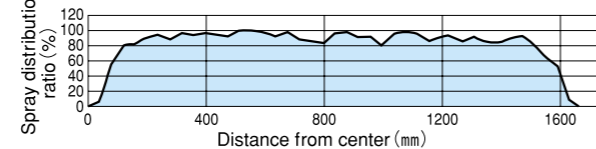


How to read chart

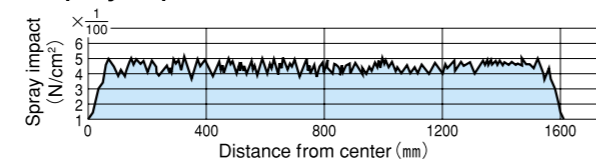
- ① The above spray capacity shown is for one nozzle.
- ② Black line (—) represents liquid pressure (Pw) in MPa.
- ③ Blue line (—) represents compressed air pressure (Pa) in MPa.

Spray distribution

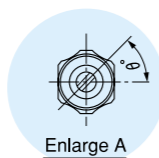
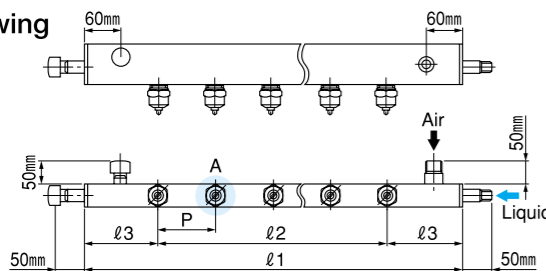
[Spray conditions] Air pressure: 0.4MPa, Liquid pressure: 0.2MPa, Height: 50mm



Spray impact distribution



Drawing



- P: Nozzle spacing
- l1: Length of rectangular spray header
- l2: Distance between nozzles of both sides
- l3: Distance to nozzle from the side of header
- θ: Nozzle angle to axis of header

How to order

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

(Example) BIMV11002 S303 + 10 (P100) A 1000 (Pre-setting 15°)

BIMV11002	S303 +	10	(P100)	A	1000	(Pre-setting 15°)
Nozzle code		Nozzle quantity	Nozzle spacing	Mounting type	Header length code	Nozzle angle to axis (offset angle)
■ BIMV11002		■ 5pcs.	■ 100	■ A	■ 1000	■ 0°
■ BIMV11004		■ 10pcs.	■ 200	■ B	■ 2000	■ 15°
■ BIMV110075		■ 20pcs.				(No indication if 0°)

\*Inquire with us for integrated spray header for zero/minimized spangle control.

GSIM.s series Medium/Large Capacity Fine Fog Nozzles

Patent pending

Iron making process

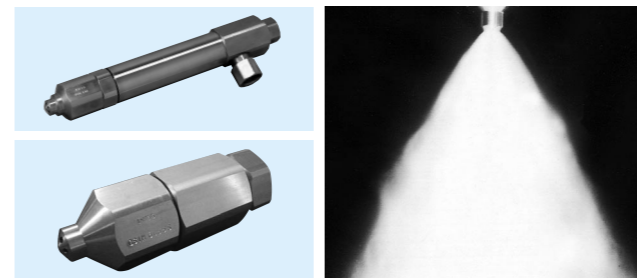
- Gas cooling before turbine
- Cooling refractories of torpedo car before maintenance
- Dust suppression at casting of pig iron

Steel making process

- Cooling converter shell at maintenance
- Cooling flue gas from electric furnace
- Dust suppression at casting of steel

Rolling/Surface finish

- Cooling flue gas from heating furnace
- Dust suppression at rolling mill outlet

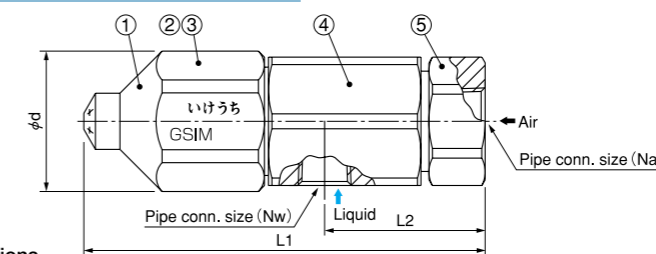


FEATURES

- Simple structure and easy maintenance.
  - Available in spray angle 20° or 60°
  - Fine atomization with the maximum droplet diameter of 150μm. (\*1)
  - Mean droplet diameter is 50μm at spray capacity 1000l/hr with air-water ratio of 150. (\*1)
- \*1) Droplet diameter measured by Laser Doppler method

GSIM.s series

GSIM.s + T-type adaptor (compact type)



MATERIALS

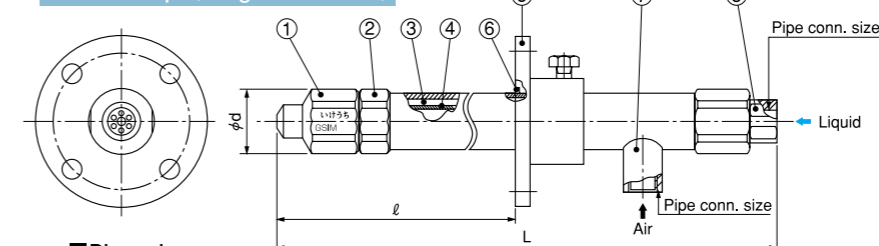
- ① Nozzle tip: S316L
- ② Nozzle core: S316L
- ③ Whirler: S316L
- ④ Nozzle adaptor: S303
- ⑤ Air connection: S303

Dimensions

Spray angle code	Air consumption code	Pipe connection sizes		Outer diameter φd (mm)	Total length L1 (mm)	Length L2 (mm)	Free passage diameter (mm)	
		Air (Na)	Liquid (Nw)				Liquid	Air
20°, 60°	37	3/8F	1/4F	35	100	40	1.9 (2.2)	1.7 (1.7)
	55						2.2 (2.2)	2.0 (2.0)
	75	1/2F	3/8F	45	120	42	2.7 (3.2)	2.3 (2.3)
	110						3.2 (3.2)	3.0 (3.0)
	150	3/4F	1/2F	50	140	44	3.9 (4.0)	3.5 (3.5)
220	4.0 (4.0)						4.3 (4.3)	

\*Free passage diameter in ( ) shows that of GSIM.s with spray angle of 20°.

GSIM.s + Pipe (flange connection)



MATERIALS

- ① Nozzle tip: S316L
- ② Adaptor: S316L
- ③ Outer pipe (for air): S316LTP
- ④ Inner pipe (for liquid): S304
- ⑤ Flange: S304
- ⑥ Packing: Ceramic fiber + stainless steel wire
- ⑦ Air connection: S304
- ⑧ Liquid connection: S304

Dimensions

Spray angle code	Air consumption code	Pipe connection sizes		Outer diameter (φd)	Free passage diameter (mm)
		Air	Liquid		
20°, 60°	37	3/8F	3/8F	35	1.7 (1.9)
	55				2.0 (2.2)
	75	1/2F	45	2.4 (2.7)	
	110			3.2 (3.2)	
	150	3/4F	50	3.7 (3.8)	
220	4.4 (4.5)				

\*Free passage diameter in ( ) shows that of GSIM.s with spray angle of 20°.

Nozzle length

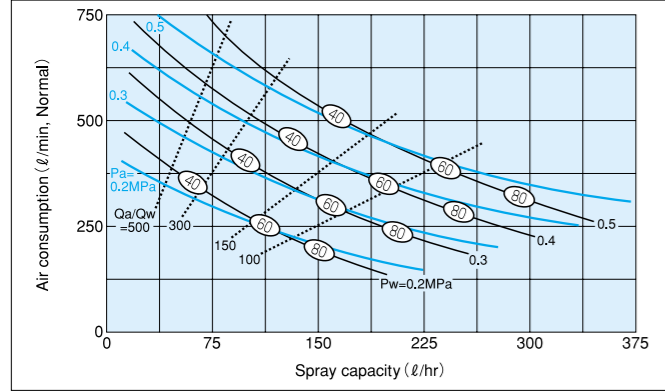
Type	Total length L (mm)	Length l (mm)
A	560	300~380
B	760	400~580
C	960	600~780
D	1160	800~980

GSIM.s series  
Medium/Large Capacity Fine fog Nozzles

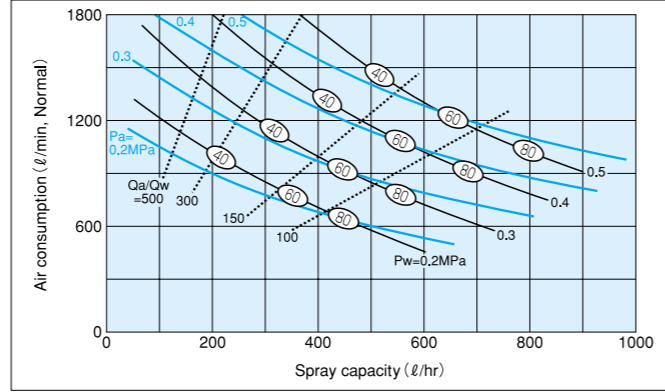
GSIM.s series  
Medium/Large Capacity Fine Fog Nozzles

Conversion of unit [Pressure] 0.1MPa ≅ 14.50psi [Flow rate] 1ℓ (liter) ≅ 0.264 US gal.  
10psi ≅ 0.69MPa 1US gal. ≅ 3.79ℓ (liter)

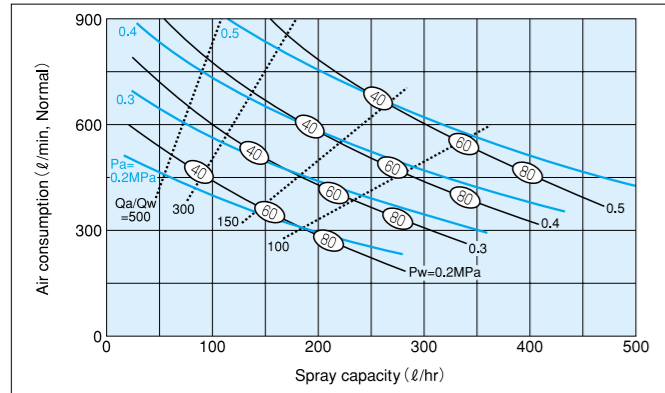
GSIM\*\*37S



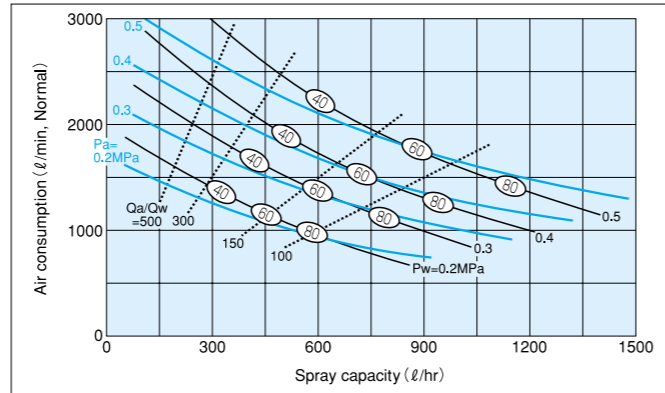
GSIM\*\*110S



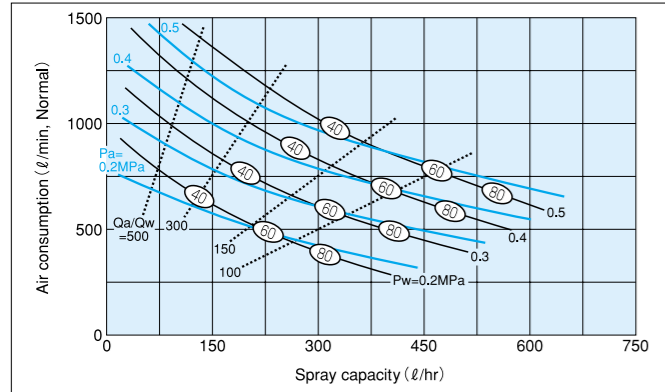
GSIM\*\*55S



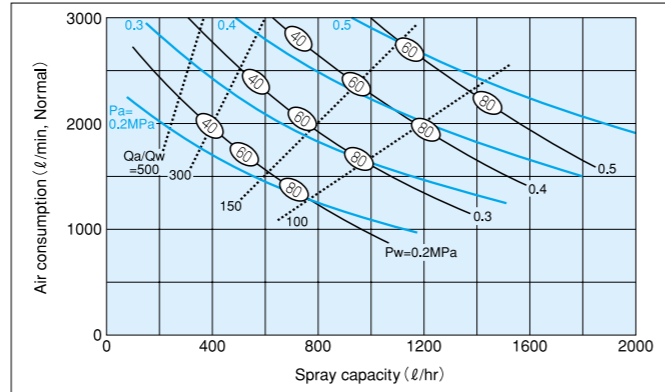
GSIM\*\*150S



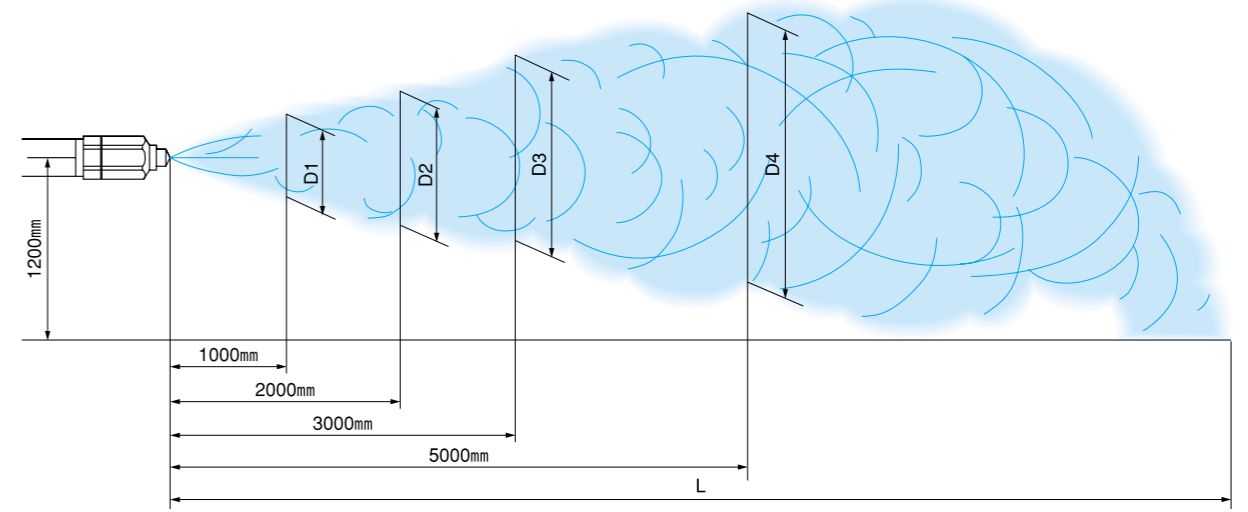
GSIM\*\*75S



GSIM\*\*220S



Spray dimensions



Spray dimensions (Spray angle 20°)

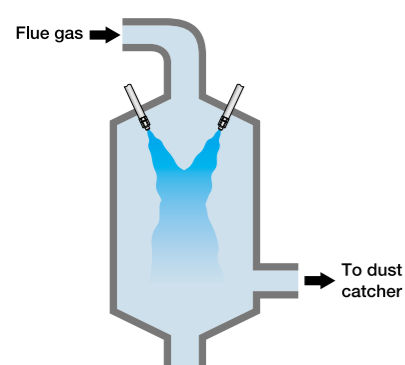
Air consumption code	Air pressure (MPa)	Liquid pressure (MPa)	Spray dimensions (mm)				
			D1	D2	D3	D4	L
37	0.3	0.25~0.35	200	450	750	1,100	9,000
	0.4	0.35~0.45	250	500	850	1,200	10,000
	0.5	0.45~0.55	300	550	900	1,300	10,000
55	0.3	0.25~0.35	250	500	800	1,200	10,000
	0.4	0.35~0.45	300	550	900	1,300	11,000
	0.5	0.45~0.55	350	600	1,000	1,400	11,000
75	0.3	0.25~0.35	300	550	900	1,300	12,000
	0.4	0.35~0.45	350	650	1,000	1,400	13,000
	0.5	0.45~0.55	400	750	1,100	1,500	13,000
110	0.3	0.25~0.35	350	600	1,000	1,400	12,000
	0.4	0.35~0.45	400	700	1,100	1,500	13,000
	0.5	0.45~0.55	450	800	1,200	1,600	13,000
150	0.3	0.25~0.35	400	750	1,100	1,500	13,000
	0.4	0.35~0.45	450	800	1,200	1,600	14,000
	0.5	0.45~0.55	500	850	1,300	1,700	14,000
220	0.3	0.25~0.35	450	800	1,200	1,500	13,000
	0.4	0.35~0.45	500	850	1,250	1,600	14,000
	0.5	0.45~0.55	550	900	1,300	1,700	14,000

Spray dimensions (Spray angle 60°)

Air consumption code	Air pressure (MPa)	Liquid pressure (MPa)	Spray dimensions (mm)				
			D1	D2	D3	D4	L
37	0.3	0.25~0.35	600	900	1,200	1,700	8,000
	0.4	0.35~0.45	550	850	1,100	1,700	8,000
	0.5	0.45~0.55	500	800	1,000	1,700	8,000
55	0.3	0.25~0.35	650	950	1,300	1,800	9,000
	0.4	0.35~0.45	600	900	1,200	1,800	9,000
	0.5	0.45~0.55	550	850	1,100	1,800	9,000
75	0.3	0.25~0.35	700	1,000	1,400	1,900	10,000
	0.4	0.35~0.45	650	950	1,300	1,900	10,000
	0.5	0.45~0.55	600	900	1,200	1,900	10,000
110	0.3	0.25~0.35	700	1,000	1,400	1,900	10,000
	0.4	0.35~0.45	650	950	1,300	1,900	11,000
	0.5	0.45~0.55	600	900	1,200	1,900	11,000
150	0.3	0.25~0.35	800	1,200	1,500	2,000	11,000
	0.4	0.35~0.45	700	1,100	1,400	2,000	12,000
	0.5	0.45~0.55	600	1,000	1,300	2,000	12,000
220	0.3	0.25~0.35	900	1,300	1,600	2,100	11,000
	0.4	0.35~0.45	800	1,200	1,500	2,100	12,000
	0.5	0.45~0.55	700	1,100	1,400	2,100	12,000

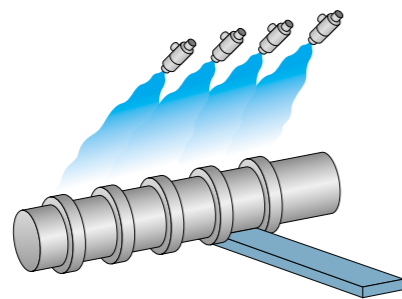
Gas cooling

GSIM.s used in cooling tower  
You can select spray angle 20° or 60° in accordance with furnace size and diameter.



Dust suppression

Dust suppression around exit of rolling mill



Cooling refractories

GSIM spraying unit for cooling refractories



How to order

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

GSIM.s + T-type adaptor

(Example) GSIM 20 37 S S316L + T S303

GSIM	20	37	S S316L	+ T S303
	Spray angle code	Air consumption code	Material of nozzle	Material of adaptor
	■ 20°	■ 37		
	■ 60°	■ 55		
		■ 75		
		■ 110		
		■ 150		
		■ 220		

GSIM.s + Pipe

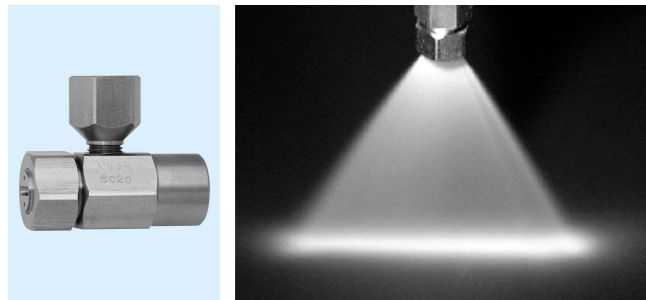
(Example) GSIM 60 110 S B S316L + 3T5 S304 (ℓ)

GSIM	60	110	S B	S316L	+ 3T5	S304	(ℓ)
	Spray angle code	Air consumption code	Nozzle length	Material of nozzle	Flange size	Material of flange	Length between the nozzle head and flange
	■ 20°	■ 37	■ A				
	■ 60°	■ 55	■ B				
		■ 75	■ C				
		■ 110	■ D				
		■ 150					
		■ 220					

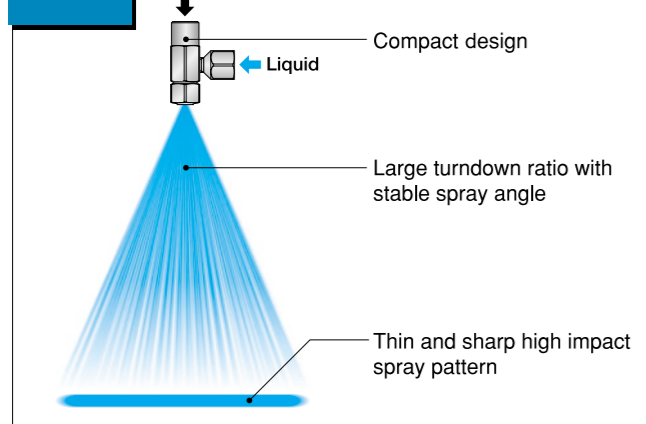
# VVEA series High Impact Flat Spray/Semi-fine, Semi-coarse Fog Nozzles

## Surface finish

- Precision cleaning for steel surface treatment
- Roll cleaning



## FEATURES



### VVEA series

Spray angle 60°

Spray angle 80°

Material: S303

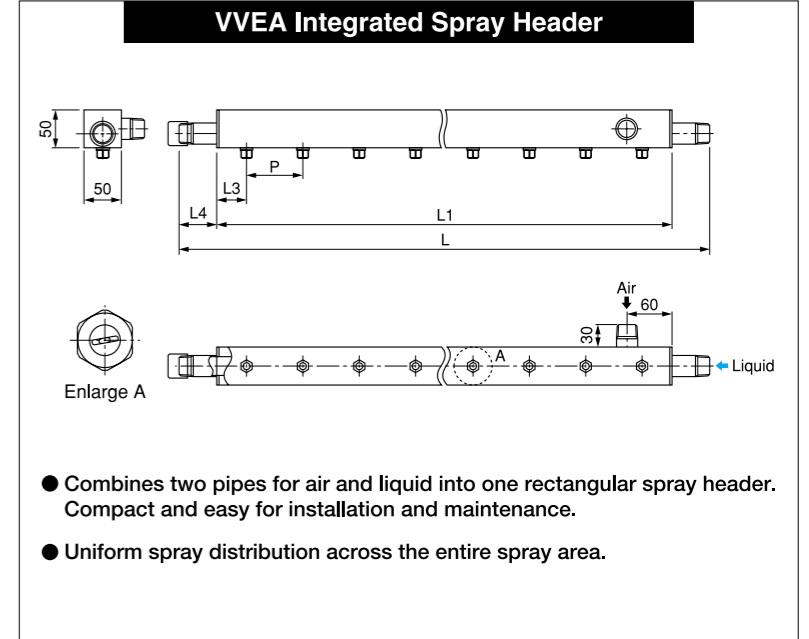
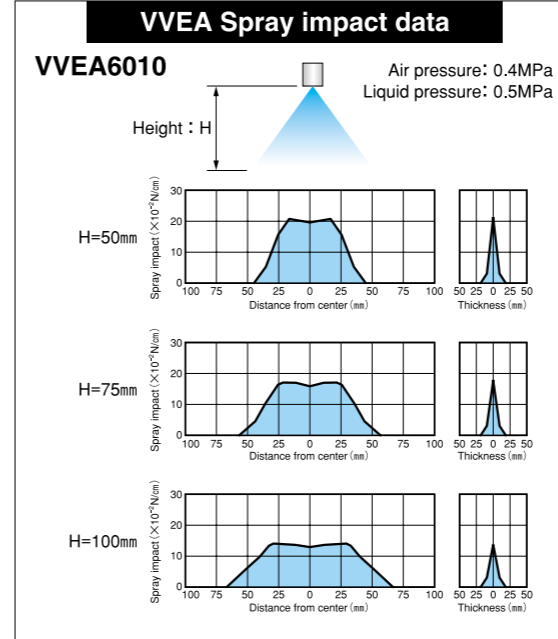
Series	Spray angle code	Pipe conn. size	Dimensions (mm)						Mass (g)
			l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	h	φd	
VVEA	60°	1/8F	34	18	21	28	14	15.5	38
	80°		41						40

[Note] Appearance and dimensions may differ slightly depending on materials and nozzle codes.

Nozzle code	Spray angle code	Spray capacity code	Air pressure (MPa)	Spray capacity (ℓ/min) & Air consumption (ℓ/min, Normal)								Mean droplet diameter (μm)*	Free passage dia. (mm)			
				Liquid pressure (MPa)									Spray tip	Adaptor		
				0.2		0.3		0.5		0.7				Liquid	Air	
6005	60	05	0.2	0.31	17	0.45	14	—	—	—	—	20	1.0			0.8
			0.3	0.23	24	0.36	22	0.58	18	—	—	—				
			0.4	—	—	0.29	29	0.50	25	0.70	20	—		—		
			0.5	—	—	—	—	0.43	33	0.64	27	—		—		
6010	60	10	0.2	0.54	36	0.90	24	—	—	—	—	20	1.4	1.1	1.3	
			0.3	0.30	58	0.60	49	1.28	25	1.78	11	—				—
			0.4	—	—	0.39	74	1.00	50	1.50	32	—				—
			0.5	—	—	—	—	0.81	69	1.28	51	—				—
6020	60	20	0.2	0.96	44	1.98	18	—	—	—	—	30	1.5	1.6	1.6	
			0.3	0.53	81	1.10	59	2.63	19	—	—	—				—
			0.4	—	—	0.53	104	2.00	50	3.50	13	—				—
			0.5	—	—	—	—	1.30	89	2.95	39	—				—
6030	60	30	0.2	1.34	50	—	—	—	—	—	—	40	1.6	1.9	1.9	
			0.3	0.63	100	1.60	64	—	—	—	—	—				—
			0.4	—	—	0.88	128	3.00	50	—	—	—				—
			0.5	—	—	—	—	2.25	85	4.17	33	—				—
8005	80	05	0.2	0.31	17	0.45	14	—	—	—	—	20	0.8	0.7	0.9	
			0.3	0.23	24	0.36	22	0.58	18	—	—	—				
			0.4	—	—	0.29	29	0.50	25	0.70	20	—				—
			0.5	—	—	—	—	0.43	33	0.64	27	—				—
8010	80	10	0.2	0.54	36	0.90	24	—	—	—	—	20	1.0	1.1	1.3	
			0.3	0.30	58	0.60	49	1.28	25	1.78	11	—				—
			0.4	—	—	0.39	74	1.00	50	1.50	32	—				—
			0.5	—	—	—	—	0.81	69	1.28	51	—				—
8020	80	20	0.2	0.96	44	1.98	18	—	—	—	—	30	1.1	1.6	1.6	
			0.3	0.53	81	1.10	59	2.63	19	—	—	—				—
			0.4	—	—	0.53	104	2.00	50	3.50	13	—				—
			0.5	—	—	—	—	1.30	89	2.95	39	—				—
8030	80	30	0.2	1.34	50	—	—	—	—	—	—	40	1.3	1.9	1.9	
			0.3	0.63	100	1.60	64	—	—	—	—	—				—
			0.4	—	—	0.88	128	3.00	50	—	—	—				—
			0.5	—	—	—	—	2.25	85	4.17	33	—				—

\*Figure indicates sauter mean droplet diameter measured by Laser Doppler method.

# VVEA series High Impact Flat Spray/semi-fine, Semi-coarse Fog Nozzles



### How to order

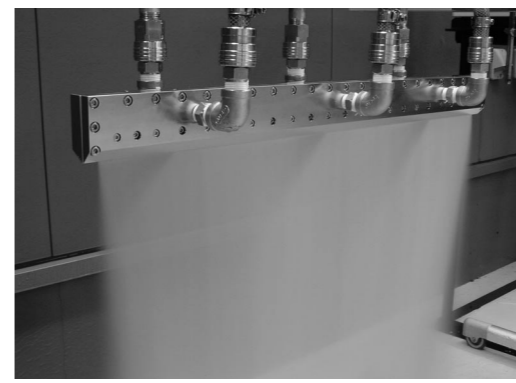
Please inquire or order for a specific nozzle using this coding system.

(Example) 1/8VVEA8010S303

1/8VVEA 80 10 S303

80°    05  
60°    10  
20  
30

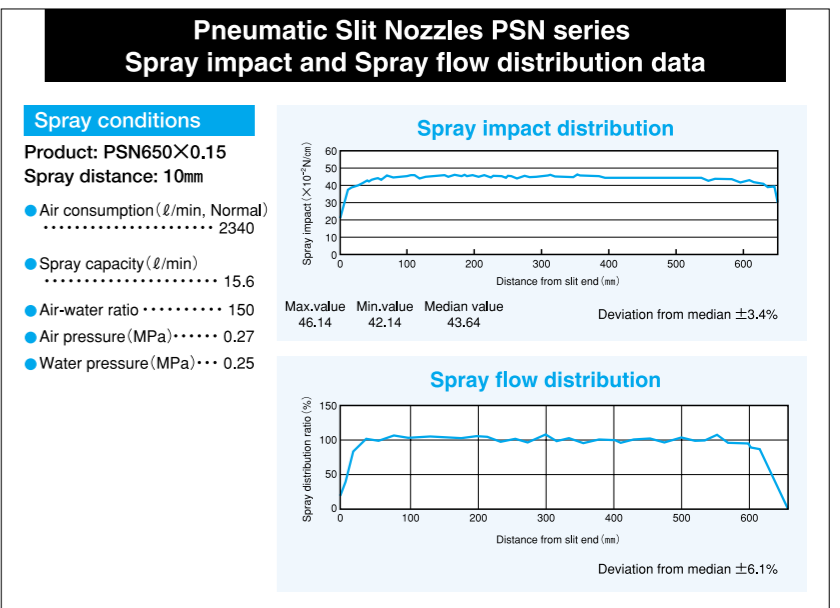
# PSN series Pneumatic Slit Nozzles



### FEATURES

High impact at short spray distance.

Nozzles are arranged to resolve any unevenness to yield a uniform fog spray distribution across the entire width.



### How to order

Please contact our local sales for details.