

# IKEUCHI

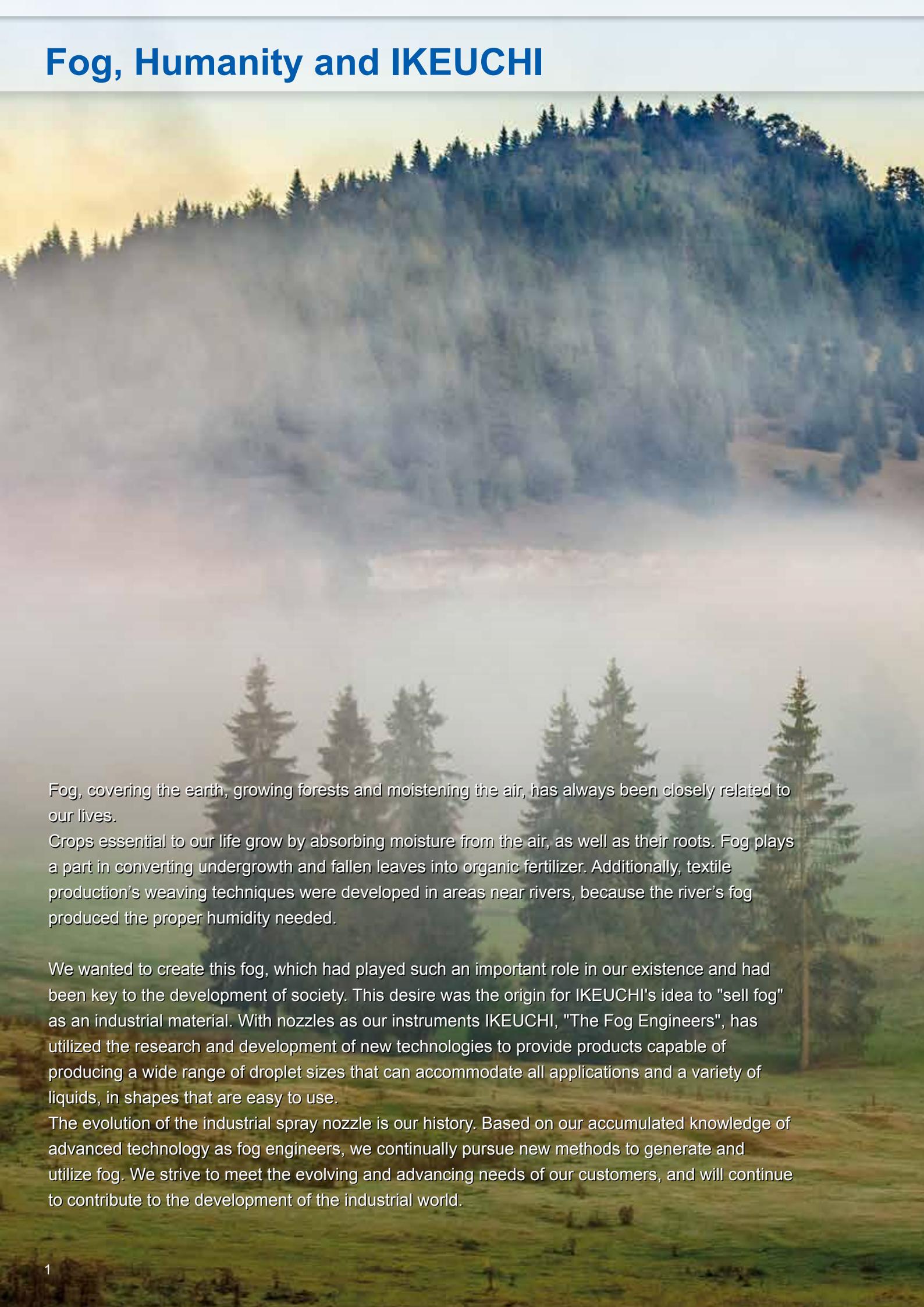
## Hydraulic Spray Nozzles



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

**25H**

# Fog, Humanity and IKEUCHI



Fog, covering the earth, growing forests and moistening the air, has always been closely related to our lives.

Crops essential to our life grow by absorbing moisture from the air, as well as their roots. Fog plays a part in converting undergrowth and fallen leaves into organic fertilizer. Additionally, textile production's weaving techniques were developed in areas near rivers, because the river's fog produced the proper humidity needed.

We wanted to create this fog, which had played such an important role in our existence and had been key to the development of society. This desire was the origin for IKEUCHI's idea to "sell fog" as an industrial material. With nozzles as our instruments IKEUCHI, "The Fog Engineers", has utilized the research and development of new technologies to provide products capable of producing a wide range of droplet sizes that can accommodate all applications and a variety of liquids, in shapes that are easy to use.

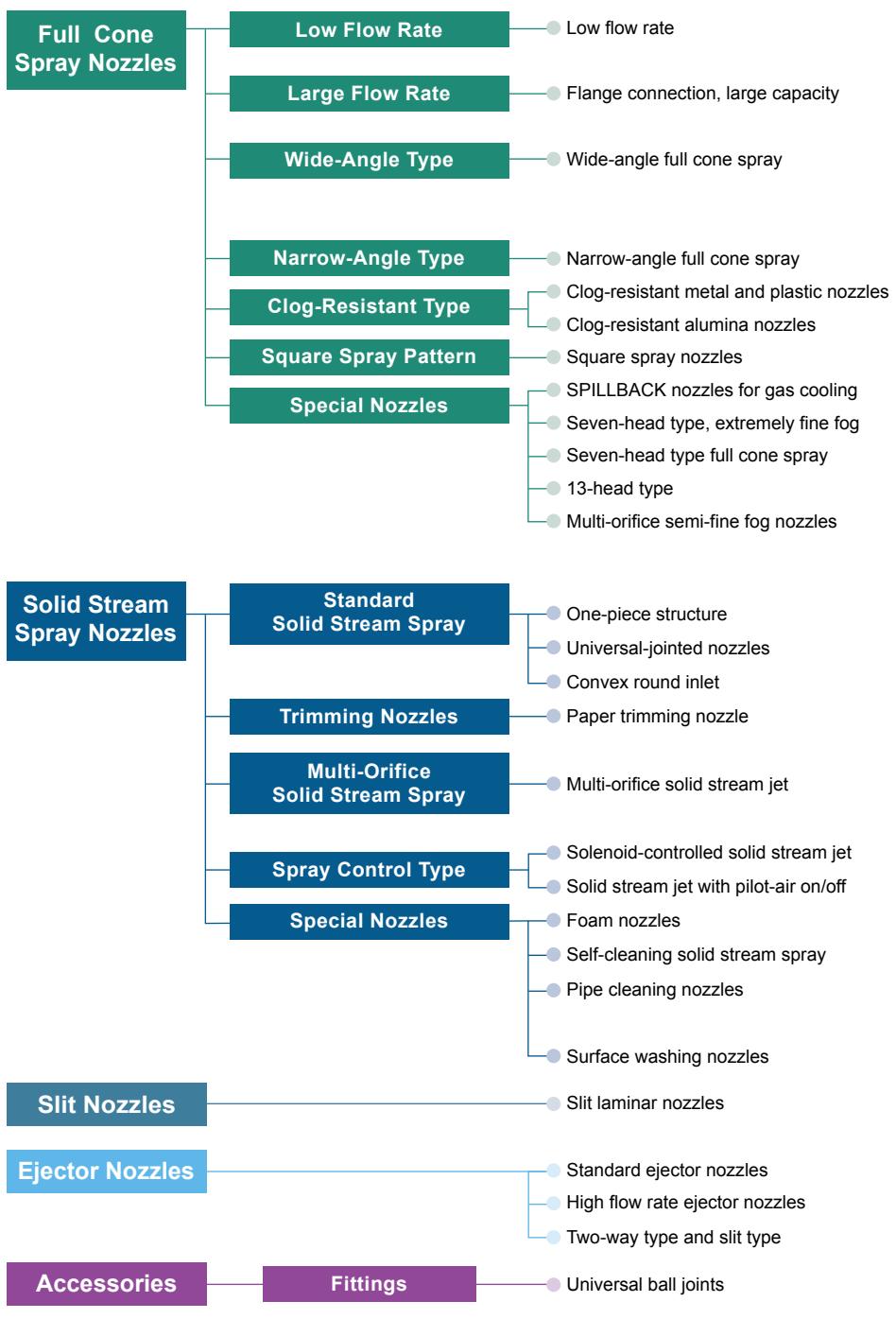
The evolution of the industrial spray nozzle is our history. Based on our accumulated knowledge of advanced technology as fog engineers, we continually pursue new methods to generate and utilize fog. We strive to meet the evolving and advancing needs of our customers, and will continue to contribute to the development of the industrial world.



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Scan the QR code below to explore our digital catalog, which includes links to spray demonstration videos and 3D CAD model previews on our website.

<https://we.kinkosonline.jp/html/kirinoikeuchi/7661434/>

"QR Code" is a registered trademark of DENSO WAVE INCORPORATED.



3D/2D CAD models for our spray nozzles are available for download. Sign up for an account for free. See page 133 for usage instructions.

3D/2D CAD models



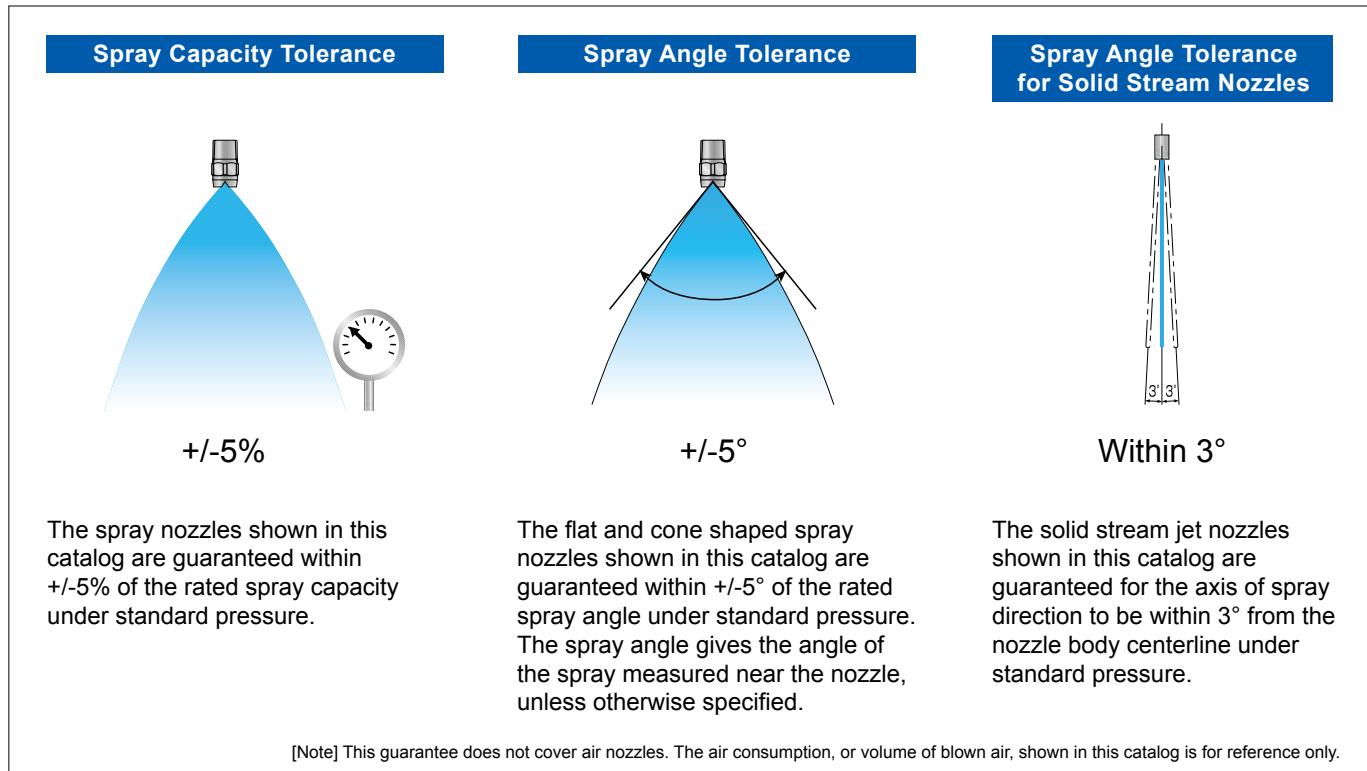
# Spray Nozzle Basics

## Spray Nozzle Precision Guarantee

All IKEUCHI's precision-made hydraulic spray nozzles are guaranteed for spray capacity and spray angle.

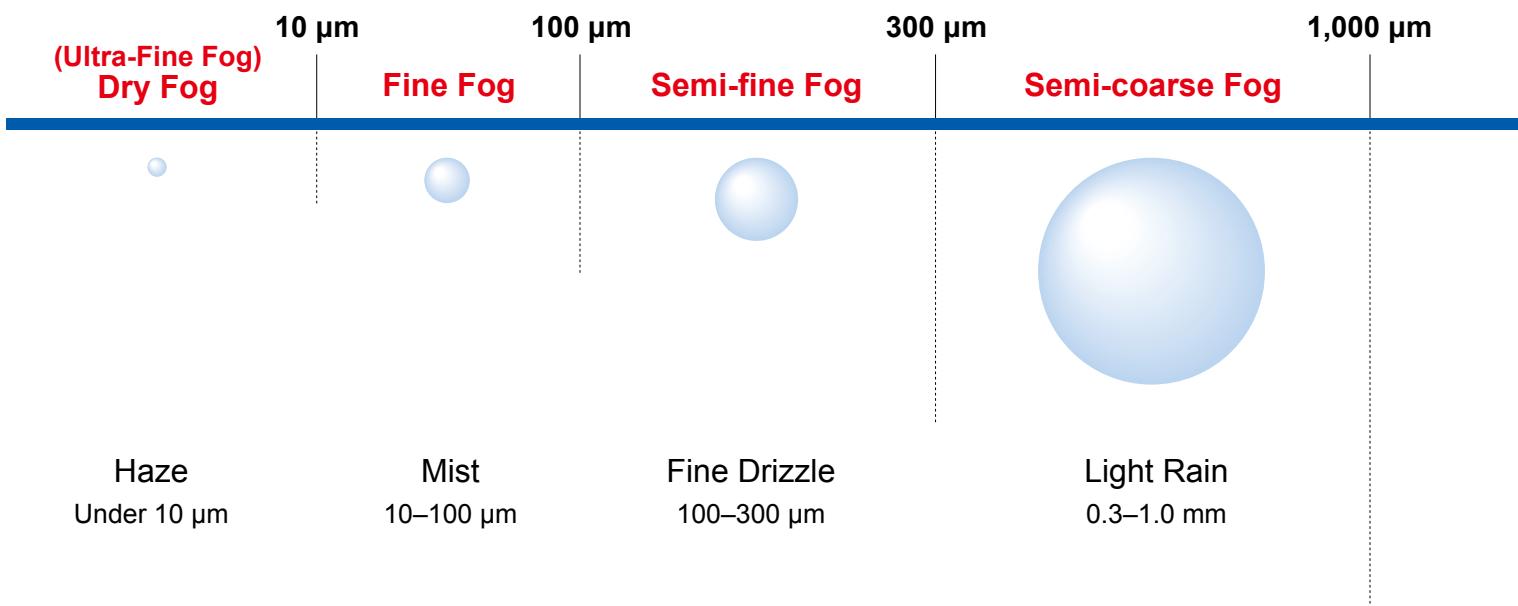
This guarantee covers metal, plastic, and ceramic nozzles.

We also set our own inspection standard for spray pattern and only the nozzles that pass the inspection will be shipped.



## Fog Classification System

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

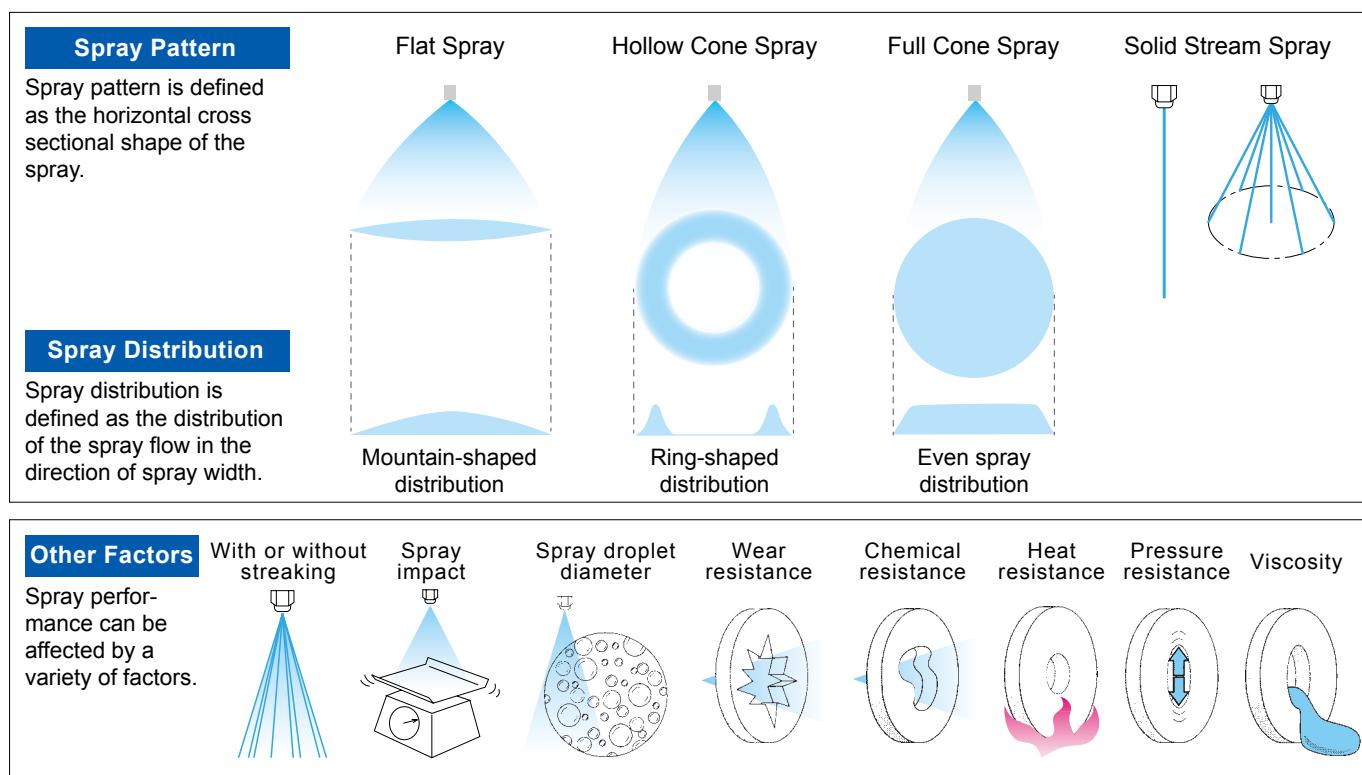


# Spray Pattern and Distribution

Standard pressure, or design pressure, is defined as the most commonly used liquid pressure for each hydraulic spray nozzle series. Our nozzles are designed to provide the specified spray capacity, spray angle, optimal spray pattern, and spray distribution at each standard pressure.

The values in this catalog are based on tap water at room temperature and the liquid pressure is measured right at the nozzle.

For details please see the technical references at the end of this catalog.



Although there are many opinions on the classification of spray droplet sizes, IKEUCHI, "The Fog Engineers", classify them as shown below.

## Coarse Fog

Rain–Storms  
Over 1.0 mm

# Spray Nozzle Materials

Listed below are the materials of nozzles and parts, as well as resistance characteristics of each material against common chemicals. For more information on resistance characteristics, please see the technical references at the end of this catalog.

The standard and optional materials available for the nozzles are shown in the material table of each nozzle series page, using the material codes shown on this page.

If you need a specific nozzle material that is not mentioned in the material table, 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	[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)
Rubbers	[Material code ..... Material] NBR ..... Nitrile rubber FKM ..... Fluororubber FEP ..... 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	

\*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	Trichloroethylene	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
	PTFE	○	○	○	○	○	○	○	○	○	○	○	○	100	150
	PVDF	○	○	○	○	○	○	○	△	○	×	○	○	80	120
	FRPP	○	△	○	×	×	○	△	○	○	○	△	○	90	100
	PA	×	×	×	×	△	△	△	○	○	○	○	△	130	230
	UHMWPE	○	○	○	×	△	×	○	○	○	△	△	○	80	100
	Polyester elastomer	×	×	×	×	×	×	○	△	×	△	△	○	100	120
Rubbers	Araldite®	△	×	△	×	×	×	×	×	×	×	×	×	60	70
	Araldite®H	○	×	○	△	×	×	○	△	○	○	○	○	120	140
	NBR	×	×	×	×	×	×	○	○	○	×	△	○	90	120
	FKM	○	○	○	○	○	○	○	△	×	×	○	○	150	200
Ceramics <sup>*3</sup>	FEP	○	○	○	○	○	○	○	○	×	×	○	○	150	200
	EPDM	○	△	○	△	×	×	○	○	○	○	○	×	90	120
	CERJET® ceramics	○	○	○	○	○	○	○	×	○	○	○	○	700	800
	Alumina ceramics	○	○	○	○	○	○	○	△	○	○	○	○	1,000	1,200
Ceramics <sup>*3</sup>	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

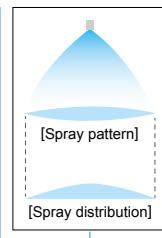
# How to Read the Tables

■ Spray nozzle specifications are shown in the respective tables.

## One-Piece Structure Standard Flat Spray Nozzles

Some Models are Made-to-Order

**VVP/VP**



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.
- Tapered edges overlap to provide uniform spray distribution in multi-nozzle arrangements.

[STANDARD PRESSURE]  
0.3 MPa

[APPLICATIONS]

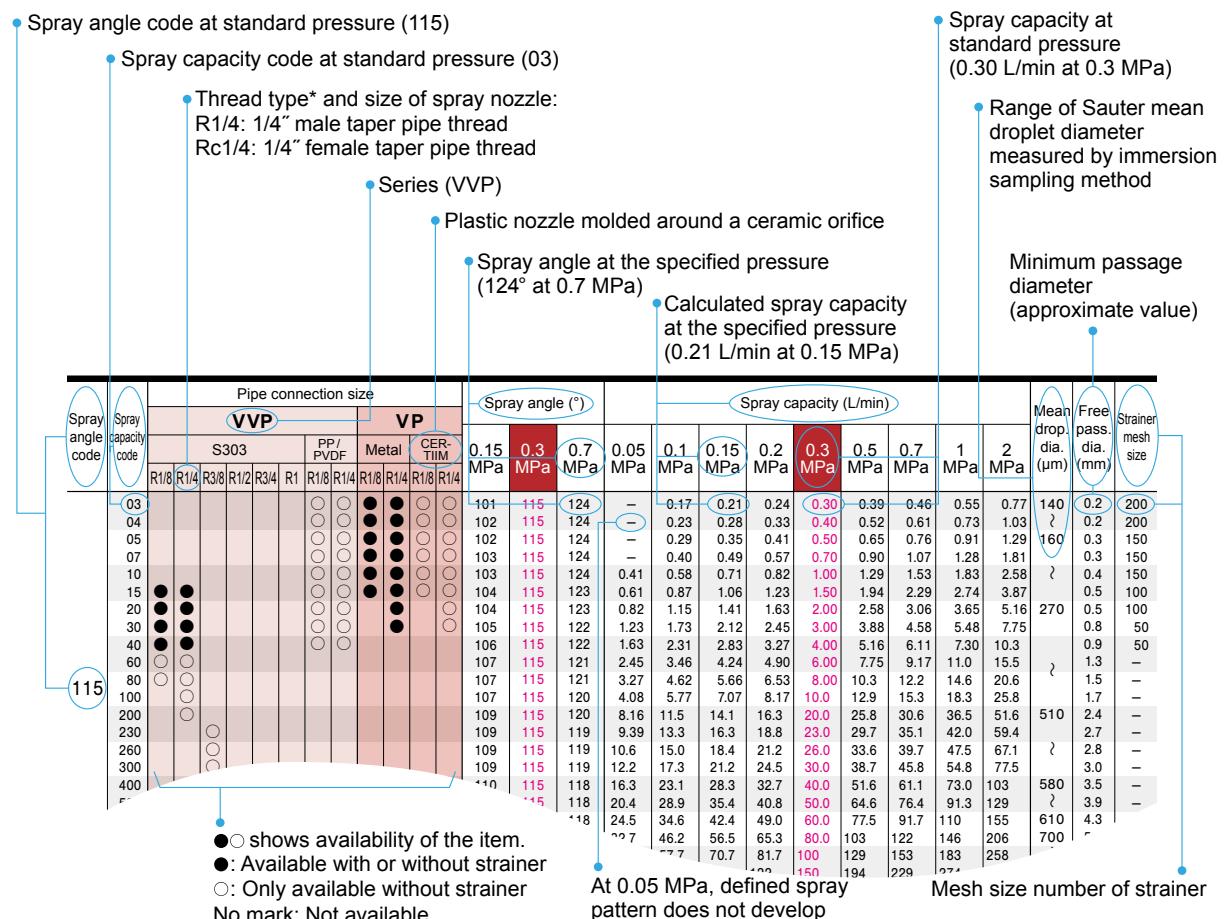
Cleaning: Automotives, containers, films, felts, filters,

- The photo of spray at the standard pressure
- Figures showing stylized/simplified spray pattern and distribution

Structure	<ul style="list-style-type: none"> <li>One-piece structure, made of metal or plastic.</li> <li>Small spray capacity VVP nozzles made of metal come with or without a strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>S303, PP, or PVDF</li> </ul> <p>SPECIAL ORDER MATERIAL: S316, PVC, or others</p>

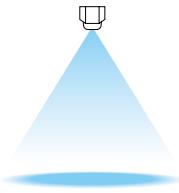
Standard material

Optional material available on made-to-order basis only, limited to specific models and sizes



\*Threads noted in this catalog 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.  
For mixed fractions, our thread size code inserts "\*" after the whole number, for example "1\*1/4M" for "R1 1/4".

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



## Product Lineup

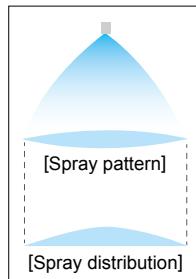
### Flat Spray Nozzles

<b>Standard Flat Spray Nozzles</b>	pp.10–
● One-Piece Structure: <b>VVP / VP</b>	
● Universal-Jointed Type: <b>UT+VP</b>	
● One-Piece Structure Made of UPE: <b>UVVP</b>	
● Coin-Shaped Design: <b>CVVP</b>	
● Three-Piece Structure: <b>VV / V</b>	
● Even Flat Spray Nozzles: <b>VEP / VE</b>	
<b>Quick-Detach Flat Spray Nozzles</b>	pp.23–
● Quick-Detach Plastic Nozzles: <b>INVV</b>	
● Quick-Installation Nozzles: <b>INQB</b>	
● INQB Series Related Products: <b>BAA+QB, QBP, IN PLUG</b>	
● Off-Center Even Flat Spray: <b>INOVVE</b>	
● Quick-Detach Nozzle Connector: <b>INCO</b>	
● Quick-Detach Metal Nozzles: <b>INVV-SS / INV</b>	
● Even Flat Spray Quick-Detach Metal Nozzles: <b>INVE</b>	
<b>High-Pressure Flat Spray Nozzles</b>	pp.34–
● Even Flat Spray Nozzles: <b>VNP</b>	
● Descaling Nozzles: <b>DSP</b>	
<b>Wide-Angle Flat Spray Nozzles</b>	pp.38–
● For Low Pressure Use: <b>YYP</b>	
● For Ultra-Low Pressure Use: <b>LYYP</b>	
<b>Off-Center Even Flat Spray Nozzles</b>	pp.42–
● Off-Center Even Flat Spray Nozzles: <b>OVVEP</b>	
<b>Spray Control Flat Spray Nozzles</b>	pp.44–
● Solenoid-Controlled Pulse Spraying Nozzles: <b>SD-VV / SD-V</b>	
● Pilot Air Controlled Flat Spray Nozzles: <b>SO-V / SO-VV</b>	
<b>Special Flat Spray Nozzles</b>	pp.49–
● Foam Nozzles: <b>AWVV</b>	
● Detergent Foam Spray Nozzle Unit: <b>AWACart</b>	
● Self-Cleaning Flat Spray Nozzles: <b>MOMOJet</b>	
● Air & Steam Spray Nozzles: <b>VZ</b>	

# One-Piece Structure Standard Flat Spray Nozzles

Some Models are Made-to-Order

**VVP/VP**



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.
- Tapered edges overlap to provide uniform spray distribution in multi-nozzle arrangements.

[STANDARD PRESSURE]  
0.3 MPa

## [APPLICATIONS]

Cleaning: Automotives, containers, films, felts, filters, screens, bottles, crushed stone, earth and sand, metal parts, machines, steel plates and pieces  
Spraying: Etchants, oils, lubricants, liquids, solutions, insecticides, herbicides  
Cooling: Gas, heat exchangers, tanks, steel, roofs  
Water screen: Fire protection, heat protection, dust suppression, deodorization

## VVP SERIES

Size R1/2 or larger: made-to-order

Structure	<ul style="list-style-type: none"> <li>One-piece structure, made of metal or plastic.</li> <li>Small spray capacity VVP nozzles made of metal come with or without a strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>S303, PP, or PVDF</li> </ul> <p>SPECIAL ORDER MATERIAL: S316, PVC, or others</p>

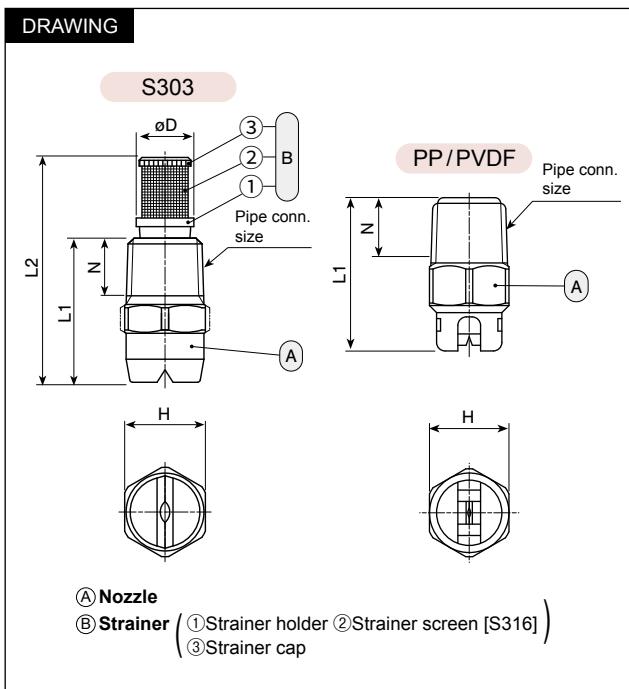
Material	Pipe conn. size	Dimensions (mm)					Weight (g)		
		L1	L2	H	øD	N	S303	PP	PVDF
S303 <sup>1,2</sup>	R1/8	18.5	31	12	7.5	6.5	10	—	—
	R1/4	25	40	14	10	10	21	—	—
	R3/8	30	—	19	—	10.5	37	—	—
	R1/2	38	—	23	—	14	65	—	—
	R3/4	45	—	29	—	15	110	—	—
	R1	55	—	35	—	18	170	—	—
PP	R1/8	22	—	12	—	8.5	—	1.1	2.1
PVDF	R1/4	27	—	14	—	11.5	—	2.2	4.3

\*1) VVP nozzles with a spray capacity code of 20 or smaller differ in dimension (L1, L2) and shape. Contact us for details.

\*2) With strainer, add 2 g for R1/8 and 5 g for R1/4 to the above weight.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Strainer is optional on some models of metal VVP and VP series and can be ordered without it. See table for details.

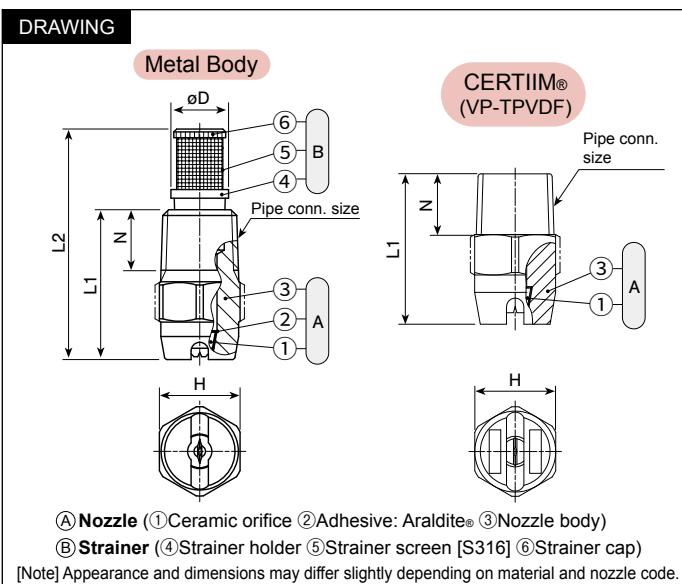


## VP SERIES (with ceramic orifice)

Structure	<ul style="list-style-type: none"> <li>One-piece structure with a ceramic orifice insert.</li> <li>Small spray capacity VP nozzles made of metal come with or without a strainer.</li> <li>CERTIIM is a one-piece plastic nozzle molded around a ceramic orifice.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Metal parts: S303 or B (brass)</li> <li>CERTIIM's plastic body: PVDF</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or others</p>

Body material	Pipe conn. size	Dimensions (mm)					Weight (g)		
		L1	L2	H	øD	N	S303	B	CER-TIIM
Metal <sup>2</sup>	R1/8	16.5	30	12	7.5	6.5	8	9	—
	R1/4	26	40	14	10	10.5	20	22	—
(CERTIIM)	R1/8	22	—	12	—	8.5	—	—	2.1
	R1/4	26	—	14	—	10.5	—	—	6

\*2) With strainer, add 2 g for R1/8 and 5 g for R1/4 to the above weight.



## ■ VVP Series, VP Series

●: Available with or without strainer   ○: Only available without strainer

\*3) The VVP series with thread size R1/2 and larger are made-to-order.

Spray angle code	Spray capacity code	Pipe connection size						Spray angle (°)			Spray capacity (L/min)								Mean drop. dia. (μm)	Free pass. dia. (mm)	Strainer mesh size		
		VVP <sup>3</sup>				VP					0.15 MPa	0.3 MPa	0.7 MPa	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	
		S303		PP/PVDF		Metal	CER-TIIM	R1/8	R1/4	R3/8	R1/2	R3/4	R1	R1/8	R1/4	R1/8	R1/4	R1/8	R1/4	R1/8	R1/4	R1/8	R1/4
		R1/8	R1/4	R3/8	R1/2	R3/4	R1	R1/8	R1/4	R3/8	R1/2	R3/4	R1	R1/8	R1/4	R1/8	R1/4	R1/8	R1/4	R1/8	R1/4	R1/8	R1/4
65	02							52	65	75	—	0.12	0.14	0.16	0.20	0.26	0.31	0.37	0.52	155	0.2	200	
	03							52	65	75	—	0.17	0.21	0.24	0.30	0.39	0.46	0.55	0.77	160	0.3	150	
	04							52	65	75	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	150	0.3	150	
	05							52	65	74	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	190	0.4	150	
	07							53	65	74	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	1.5	100	0.5	100
	10							54	65	73	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	1.6	100	0.6	100
	15	●●	●●					54	65	73	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	1.7	50	0.7	50
	20	●●	●●					55	65	72	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	310	0.8	50	
	30	○○	○○					56	65	72	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	1.1	—	—	
	40	○○	○○					56	65	71	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	1.3	—	—	
	50	○○	○○					57	65	71	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	1.5	—	—	
	60	○○	○○					57	65	71	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	1.6	—	—	
	80	○○	○○					58	65	71	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	1.8	—	—	
	100	○○	○○					58	65	70	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	2.1	—	—	
	120	○○	○○					58	65	70	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	2.3	—	—	
	140	○○	○○					59	65	69	5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	2.5	—	—	
	170	○○	○○					59	65	69	6.94	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	2.8	—	—	
	200	○○	○○					59	65	69	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	580	3.0	—	
	300	○○	○○					60	65	69	12.2	17.3	21.2	24.5	30.0	38.7	45.8	54.8	77.5	650	3.9	—	
	400		○○					60	65	68	16.3	23.1	28.3	32.7	40.0	51.6	61.1	73.0	103	4.7	—	—	
	500		○○					61	65	67	20.4	28.9	35.4	40.8	50.0	64.6	76.4	91.3	129	5.4	—	—	
	600		○○					61	65	67	24.5	34.6	42.4	49.0	60.0	77.5	91.7	110	155	5.7	—	—	
	800		○○					62	65	67	32.7	46.2	56.5	65.3	80.0	103	122	146	206	6.5	—	—	
	1000		○○					62	65	66	40.8	57.7	70.7	81.7	100	129	153	183	258	7.3	—	—	
	1500		○○					62	65	66	61.2	86.6	106	122	150	194	229	274	387	1,000	9.0	—	—
50	03							37	50	60	—	0.17	0.21	0.24	0.30	0.39	0.46	0.55	0.77	180	0.3	150	
	04							37	50	60	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	1.15	0.4	150	
	05	●●	●●					38	50	59	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	210	0.4	150	
	07	●●	●●					38	50	58	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	1.5	100		
	10	●●	●●					40	50	58	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	0.6	100		
	15							40	50	57	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	1.8	50		
	20	○○	○○					41	50	57	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	1.0	—	—	
	30	○○	○○					42	50	56	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	1.2	—	—	
	40	○○	○○					42	50	56	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	1.4	—	—	
	50							43	50	55	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	1.6	—	—	
	60							43	50	55	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	1.7	—	—	
	80	○○	○○					43	50	55	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	2.1	—	—	
	120	○○	○○					44	50	54	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	550	2.5	—	
	200	○○	○○					45	50	53	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	640	3.3	—	
	300							45	50	53	12.2	17.3	21.2	24.5	30.0	38.7	45.8	54.8	77.5	4.2	—	—	
	400							46	50	52	16.3	23.1	28.3	32.7	40.0	51.6	61.1	73.0	103	5.3	—	—	
	500							46	50	52	20.4	28.9	35.4	40.8	50.0	64.6	76.4	91.3	129	5.6	—	—	
	600							47	50	52	24.5	34.6	42.4	49.0	60.0	77.5	91.7	110	155	750	6.1	—	—
	800							47	50	51	32.7	46.2	56.5	65.3	80.0	103	122	146	206	7.1	—	—	
	1000							47	50	51	40.8	57.7	70.7	81.7	100	129	153	183	258	1,000	7.9	—	—
	1500							48	50	51	61.2	86.6	106	122	150	194	229	274	387	1,100	9.7	—	—
40	05	●●	●●					30	40	48	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	230	0.4	150	
	07							30	40	48	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	1.6	100	0.6	100
	10	●●	●●					31	40	47	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	0.7	50	—	—
	20	○○	○○					32	40	46	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	380	1.0	—	—
	30	○○	○○					33	40	46	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	1.3	—	—	
	40	○○	○○					33	40	45	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	1.5	—	—	
	80	○○	○○					34	40	44	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	2.2	—	—	
	120	○○	○○					35	40	44	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	2.8	—	—	
	200	○○	○○					35	40	43	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	710	3.5	—	—
	300																						

**VVP (S316L-IN) SERIES**

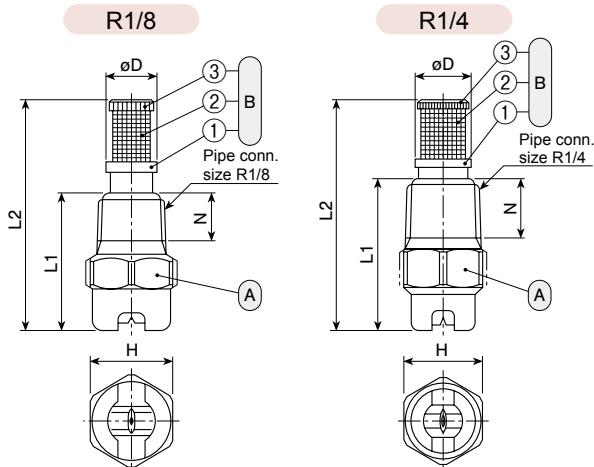
Precision-manufactured stainless steel VVP nozzle with low flow rate.

Structure	• Made of metal. • Available with or without a strainer.
Material	• S316L equivalent • Strainer: S303 or S316

Pipe conn. size	Dimensions (mm)					Weight <sup>2</sup> (g)
	L1	L2	H	øD	N	
R1/8	20	33.5	12	7.5	7	9.6
R1/4	27	41	14	10	10.5	16

\*2) With strainer, add 2g for R1/8 and 5g for R1/4 to the above weight.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING**

Ⓐ Nozzle  
Ⓑ Strainer (①Strainer holder ②Strainer screen ③Strainer cap)

**■VVP (S316L-IN) Series, precision stainless steel nozzle with low flow rate**

Spray angle code	Spray capacity code	Pipe connection size		Spray angle (°)												Spray capacity (L/min)						Mean drop. dia. (µm)	Free pass. dia. (mm)	Strainer mesh size
		R1/8	R1/4	0.15 MPa	0.3 MPa	0.7 MPa	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									
115	03	●	●	101	115	124	—	—	0.21	0.24	0.30	0.39	0.46	0.55	0.77	140	0.2	200	200	200	200	200		
	04	●	●	102	115	124	—	—	0.28	0.33	0.40	0.52	0.61	0.73	1.03	—	0.2	150	150	150	150			
	05	●	●	102	115	124	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	—	0.3	150	150	150	150			
	07	●	●	103	115	124	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	—	0.3	150	150	150	150			
	10	●	●	103	115	124	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	270	0.4	150	150	150	150			
90	03	●	●	76	90	100	—	—	0.21	0.24	0.30	0.39	0.46	0.55	0.77	150	0.2	200	200	200	200	200		
	04	●	●	77	90	100	—	—	0.28	0.33	0.40	0.52	0.61	0.73	1.03	—	0.3	150	150	150	150			
	05	●	●	77	90	100	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	—	0.3	150	150	150	150			
	07	●	●	78	90	100	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	—	0.4	150	150	150	150			
	10	●	●	78	90	99	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	280	0.5	100	100	100	100			
80	07	●	●	68	80	89	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	180	0.4	150	150	150	150	150		
	10	●	●	68	80	89	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	290	0.5	100	100	100	100			
65	03	●	●	52	65	75	—	—	0.21	0.24	0.30	0.39	0.46	0.55	0.77	160	0.3	150	150	150	150	150		
	04	●	●	52	65	75	—	—	0.28	0.33	0.40	0.52	0.61	0.73	1.03	—	0.3	150	150	150	150			
	05	●	●	52	65	74	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	—	0.4	150	150	150	150			
	07	●	●	53	65	74	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	—	0.5	100	100	100	100			
	10	●	●	54	65	73	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	310	0.6	100	100	100	100			
50	03	●	●	37	50	63	—	—	0.21	0.24	0.30	0.39	0.46	0.55	0.77	180	0.3	150	150	150	150			

●: Available with or without strainer

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**VVP****VP**

Example: 1/4M VVP 11515 S303W

1/4M	VVP	115	15	S303	W
Pipe conn. size <sup>4</sup>	Series	Spray angle code	Spray capacity code	Material <sup>5</sup>	Strainer
1/8M 1/4M	VVP VP	115 15	02 1500	S303 B TPVDF PVDF PP-IN	W (with strainer) (Blank indicates "without strainer")

The VVP series with thread size R1/2 and larger are made-to-order.

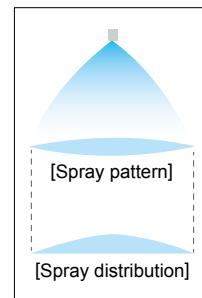
**VVP (S316L-IN)**

Example: 1/4M VVP 6507 S316L-IN + WS303

1/4M	VVP	65	07	S316L-IN+	W	S303
Pipe conn. size <sup>4</sup>	Spray angle code	Spray capacity code	Nozzle material	Strainer	Strainer material	
1/8M 1/4M	115 50	03 04 05 07 10		W (with strainer) (Blank indicates "without strainer")	S303 S316	

<sup>4</sup>) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.<sup>5</sup>) TPVDF and B are only for the VP series. PVDF and PP-IN are only for the VVP series.

# Universal-Jointed Flat Spray Nozzles UT+VP



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.
- Spray direction is adjustable within a range of 40 degrees as needed.

## [STANDARD PRESSURE]

0.3 MPa

Flat Spray

## [APPLICATIONS]

Cleaning: Automotives, containers, films, felts, filters, screens, bottles, crushed stone, earth and sand, metal parts, machines, steel plates, steel pieces

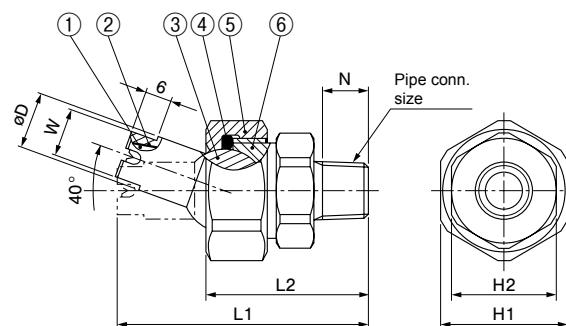
Spraying: Oils, lubricants, liquids, solutions, insecticides, herbicides

Structure	<ul style="list-style-type: none"> <li>Has a ceramic orifice in the nozzle tip.</li> <li>Includes three parts: Nozzle tip, cap, and adaptor. Worn-out nozzle tips can be replaced separately.</li> <li>Nozzle tip has an integrated universal ball joint to adjust the spray direction.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Metal parts: S303</li> </ul>

Pipe conn. size	Dimensions (mm)						Weight (g)	
	L1	L2	H1	H2	W	øD		
R1/4	57.5	37	29	24	11	13	10.5	120
R3/8	63.5	44	35	30	14	17	11	200

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING



Nozzle tip (①Ceramic orifice ②Adhesive: Araldite® ③Ball)  
④O-ring (NBR) ⑤Cap ⑥Adaptor

Spray angle code	Spray capacity code	Pipe conn. size		Spray angle (°)			Spray capacity (L/min)								Free passage diameter (mm)
		R1/4	R3/8	0.15 MPa	0.3 MPa	0.7 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa	
80	30	○		70	80	87	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	1.0
	50	○		71	80	86	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	1.4
	80	○		72	80	86	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	1.5
	100		○	72	80	85	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	1.7
	140		○	73	80	85	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	2.5
	170		○	73	80	85	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	2.7
65	30	○		56	65	72	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	1.1
	50	○		57	65	71	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	1.5
	80	○		58	65	71	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	1.8
	100		○	58	65	70	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	2.1
	140		○	59	65	69	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	2.5
	170		○	59	65	69	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	2.8
50	30	○		42	50	56	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	1.2
	50	○		43	50	55	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	1.6
	80	○		43	50	55	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	2.1
	100		○	44	50	54	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	2.2
	140		○	44	50	54	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	2.7
	170		○	45	50	54	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	3.0

[Note] 1. For spray droplet diameter, please see the chart of VP series nozzles on page 11–12.

2. The spray nozzle performance for this nozzle is NOT guaranteed because it is set at an angle.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M UT+VP 8030 S303
Pipe conn. size*
1/4M
3/8M
Spray angle code
80
65
50
Spray capacity code
30
170
Material
S303

Please contact us to order only the nozzle tip.

\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

## ALSO AVAILABLE!

Universal-Jointed Solid Stream Jet

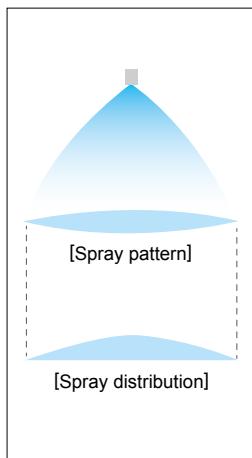
**UT+CP  
SERIES**

See page 97 of this catalog.

# One-Piece Structure Standard Flat Spray Nozzles

**UVVP**

Flat Spray



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.

- Made of ultra-high-molecular-weight polyethylene, the UVVP series features high wear resistance and maintains stable performance as polishing nozzles over prolonged use.

## [STANDARD PRESSURE]

0.3 MPa

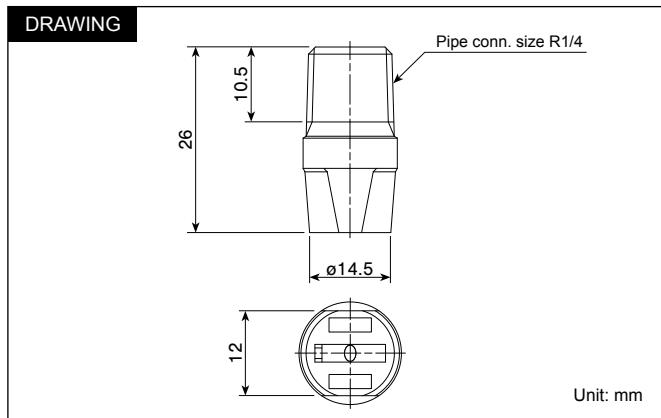
## [APPLICATIONS]

Abrasive spray: Liquid honing, through-hole  
Others: Cleaning, spraying, cooling

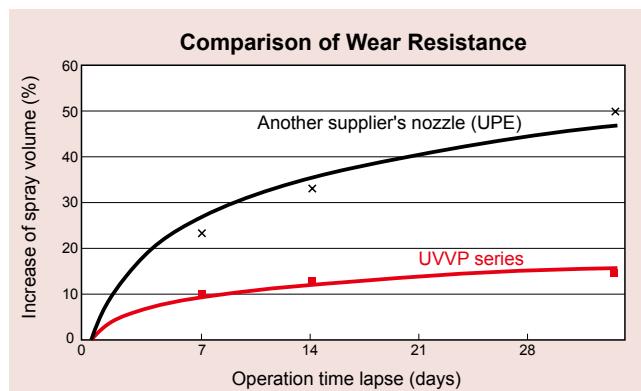
Structure	• Simple one-piece structure.
Material	• Ultra-high-molecular-weight polyethylene (UPE)
Weight	• 2.5g

[Note]

- Appearance and dimensions may differ slightly depending on material and nozzle code.
- The flat spray spread direction is parallel to the surface milling.



Spray capacity code	Spray angle (°)			Spray capacity (L/min)						Mean droplet diameter (μm)	Free passage diameter (mm)
	0.15 MPa	0.3 MPa	0.5 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
40	50	65	70	1.63	2.31	2.83	3.27	4.00	5.16	300	1.3
50	51	65	70	2.04	2.89	3.54	4.08	5.00	6.46	360	1.5



Shown on the right is the comparison of test results between the UVVP series flat spray nozzle and a UPE nozzle made by another manufacturer.

**Test conditions**

Spray pressure: 0.2 MPa  
Test liquid: Al<sub>2</sub>O<sub>3</sub> (#200) in water  
Percentage of Al<sub>2</sub>O<sub>3</sub>: 20wt%

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M UVVP 6540 UPE

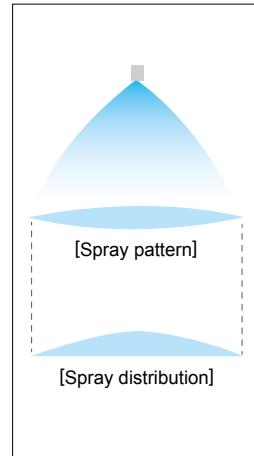
1/4M UVVP 65 40 UPE  
 Pipe conn. size\*      Spray angle code      Spray capacity code      Material  
 40  
 50

\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

# Coin-Shaped Standard Flat Spray Nozzles

Made-to-Order

**CVVP**



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.

- This coin-shaped design facilitates easy multi-nozzle arrangement in tight spaces without the nozzles protruding when threaded into a shower pipe.

## [STANDARD PRESSURE]

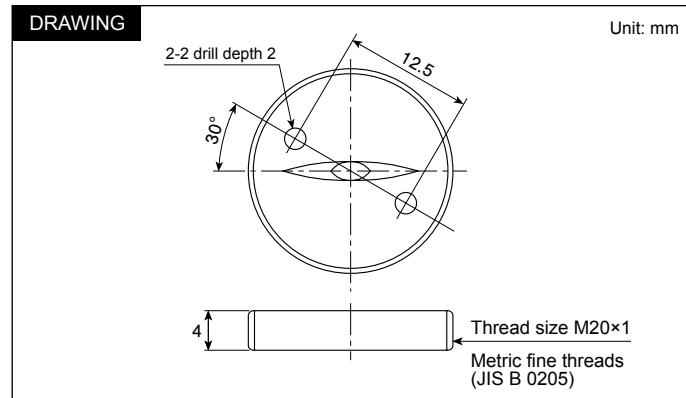
0.3 MPa

## [APPLICATIONS]

Cleaning: Felts, rolls, screens, filters, wires  
Spraying: Lubricants, chemicals  
Cooling: Steel plates and coils

Structure	• One-piece structure with threaded outside edge.
Material	• S303
Weight	• 8.5 g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray angle code	Spray capacity code	Spray angle (°)			Spray capacity (L/min)												Mean droplet dia. (μm)	Free passage dia. (mm)
		0.15 MPa	0.3 MPa	0.7 MPa	0.05 MPa	0.07 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa			
90	10	78	90	99	0.41	0.48	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.24	2.58	210	0.5	
	15	79	90	98	0.61	0.72	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.36	3.87	210	0.6	
	20	80	90	97	0.82	0.97	1.15	1.41	1.63	2.00	2.58	3.06	3.65	4.47	5.16	210	0.7	
	30	82	90	96	1.23	1.45	1.73	2.12	2.45	3.00	3.88	4.58	5.48	6.71	7.75	210	0.9	
	40	83	90	97	1.63	1.93	2.31	2.83	3.27	4.00	5.16	6.11	7.30	8.94	10.3	210	1.1	
	50	83	90	97	2.04	2.42	2.89	3.54	4.08	5.00	6.46	7.64	9.13	11.2	12.9	210	1.2	
	60	83	90	97	2.45	2.90	3.46	4.24	4.90	6.00	7.75	9.17	11.0	13.4	15.5	210	1.3	
	80	84	90	97	3.27	3.86	4.62	5.66	6.53	8.00	10.3	12.2	14.6	17.9	20.6	420	1.5	
80	10	69	80	87	0.41	0.48	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.24	2.58	210	0.5	
	15	70	80	86	0.61	0.72	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.36	3.87	210	0.7	
	20	71	80	86	0.82	0.97	1.15	1.41	1.63	2.00	2.58	3.06	3.65	4.47	5.16	210	0.8	
	30	72	80	84	1.23	1.45	1.73	2.12	2.45	3.00	3.88	4.58	5.48	6.71	7.75	210	1.0	
	40	74	80	83	1.63	1.93	2.31	2.83	3.27	4.00	5.16	6.11	7.30	8.94	10.3	210	1.1	
	50	74	80	83	2.04	2.42	2.89	3.54	4.08	5.00	6.46	7.64	9.13	11.2	12.9	210	1.3	
	60	74	80	83	2.45	2.90	3.46	4.24	4.90	6.00	7.75	9.17	11.0	13.4	15.5	210	1.4	
	80	74	80	83	3.27	3.86	4.62	5.66	6.53	8.00	10.3	12.2	14.6	17.9	20.6	430	1.6	
65	10	53	65	72	0.41	0.48	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.24	2.58	230	0.6	
	15	53	65	72	0.61	0.72	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.36	3.87	230	0.8	
	20	54	65	72	0.82	0.97	1.15	1.41	1.63	2.00	2.58	3.06	3.65	4.47	5.16	230	0.9	
	30	55	65	72	1.23	1.45	1.73	2.12	2.45	3.00	3.88	4.58	5.48	6.71	7.75	230	1.1	
	40	57	65	72	1.63	1.93	2.31	2.83	3.27	4.00	5.16	6.11	7.30	8.94	10.3	230	1.3	
	50	58	65	72	2.04	2.42	2.89	3.54	4.08	5.00	6.46	7.64	9.13	11.2	12.9	230	1.5	
	60	59	65	72	2.45	2.90	3.46	4.24	4.90	6.00	7.75	9.17	11.0	13.4	15.5	230	1.7	
	80	62	65	72	3.27	3.86	4.62	5.66	6.53	8.00	10.3	12.2	14.6	17.9	20.6	450	2.0	

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: M20×1 CVVP 9010 S303

M20×1	CVVP	90	10	S303
Pipe conn. size		Spray angle code	Spray capacity code	Material
	90	10		
	80	80		
	65	80		

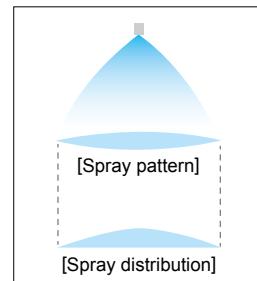
This nozzle series is made-to-order.

# Three-Piece Structure Standard Flat Spray Nozzles

VV: Made-to-Order

**VV / V**

Flat Spray



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.
- Tapered edges overlap to provide uniform spray distribution in multi-nozzle arrangements.

## [STANDARD PRESSURE]

0.3 MPa

## [APPLICATIONS]

Cleaning: Automotives, containers, films, felts, filters, screens, bottles, crushed stone, earth and sand, metal parts, machines, steel plates and pieces  
Spraying: Etchants, oils, lubricants, glues, solutions, insecticides, herbicides  
Cooling: Gas, heat exchangers, tanks, steel, roofs  
Water screen: Fire protection, heat protection, dust suppression, deodorization

## VV SERIES (all metal)

Made-to-Order

Structure	<ul style="list-style-type: none"> <li>• Three-piece structure, made of metal.</li> <li>• Includes three parts: Nozzle tips, cap, and adaptor. Worn-out nozzle tips can be replaced separately.</li> <li>• Small spray capacity models come with or without a strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or others</p>
Weight	<ul style="list-style-type: none"> <li>• Complete assembly<sup>1)</sup>: 47 g</li> <li>• Nozzle tip: 11 g</li> </ul>

<sup>1)</sup>With strainer, add 5g to the above weight and 2 mm to the total length.

Strainer is optional on some models and can be ordered without it. See table for details.

**DRAWING**

Complete Assembly

11505, 9005  
11507, 9007

The others

Nozzle Tip

Nozzle (①Nozzle tip ②Cap ③Adaptor)  
Strainer (④Strainer holder ⑤Strainer screen [S316] ⑥Strainer cap)

Unit: mm

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## V SERIES (with ceramic orifice)

Structure	<ul style="list-style-type: none"> <li>• Three-piece structure with a ceramic orifice insert.</li> <li>• Includes three parts: Nozzle tips, cap, and adaptor. Worn-out nozzle tips can be replaced separately.</li> <li>• Small spray capacity models come with or without a strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: ceramic</li> <li>• Tip retainer: S303</li> <li>• Cap, Adaptor, and Strainer: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or others</p>
Weight	<ul style="list-style-type: none"> <li>• Complete assembly<sup>1)</sup>: 43 g</li> <li>• Nozzle tip: 6.6 g</li> </ul>

<sup>1)</sup>With strainer, add 5g to the above weight and 2 mm to the total length.

Strainer is optional on some models and can be ordered without it. See table for details.

**DRAWING**

Complete Assembly

Nozzle Tip  
(① + ② + ③)

Nozzle (①Ceramic orifice ②Adhesive: Araldite® ③Tip retainer  
④Cap ⑧Adaptor)

Strainer (⑤Strainer holder ⑥Strainer screen [S316] ⑦Strainer cap)

Unit: mm

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray angle code	Spray capacity code	VV <sup>2</sup>	V	Spray angle (°)			Spray capacity (L/min)									Mean drop. dia. (μm)	Free pass. dia. (mm)	Strainer mesh size
				0.15 MPa	0.3 MPa	0.7 MPa	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			
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	160	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	160	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	160	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	160	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	270	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	270	1.0	50
	60	○	○	107	115	121	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	160	1.3	—
	80	○	○	107	115	120	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	160	1.5	—
	100	○	○	107	115	120	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	160	1.7	—
	200	○	○	109	115	120	8.16	11.5	14.1	16.3	20.0	30.6	36.5	51.6	510	2.4	—	
90	02		●	76	90	100	—	0.12	0.14	0.16	0.20	0.26	0.31	0.37	0.52	145	0.2	200
	03		●	76	90	100	—	0.17	0.21	0.24	0.30	0.39	0.46	0.55	0.77	150	0.2	200
	04		●	77	90	100	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	150	0.3	150
	05	●	●	77	90	100	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	170	0.3	150
	07		●	78	90	100	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	150	0.3	150
	10		●	78	90	99	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	160	0.4	100
	15		●	79	90	99	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	160	0.6	100
	20	●	●	79	90	98	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	280	0.8	50
	30	●	●	80	90	97	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	280	1.0	50
	40	○	○	81	90	97	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	120	1.2	—
	50	○	○	81	90	97	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	120	1.2	—
	60	○	○	82	90	96	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	120	1.3	—
	80	○	○	82	90	96	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	120	1.5	—
	100	○	○	82	90	96	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	120	1.7	—
	120	○	○	83	90	95	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	120	2.0	—
	140	○	○	83	90	95	5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	120	2.2	—
	170	○	○	83	90	95	6.94	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	120	2.4	—
	200	○	○	84	90	95	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	540	2.7	—
80	02		●	67	80	90	—	0.12	0.14	0.16	0.20	0.26	0.31	0.37	0.52	150	0.2	200
	03		●	67	80	90	—	0.17	0.21	0.24	0.30	0.39	0.46	0.56	0.77	150	0.3	150
	04		●	67	80	90	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	150	0.3	150
	05	●	●	67	80	90	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	180	0.3	150
	07	●	●	68	80	89	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	150	0.4	150
	10	●	●	68	80	89	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	160	0.5	100
	15		●	69	80	88	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	160	0.7	50
	20	●	●	69	80	88	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	290	0.8	50
	30	○	○	70	80	87	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	290	1.0	—
	40	○	○	71	80	87	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	120	1.1	—
	50	○	○	71	80	86	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	120	1.4	—
	60	○	○	72	80	86	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	120	1.5	—
	80	○	○	72	80	86	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	120	1.5	—
	100	○	○	72	80	85	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	120	1.7	—
	120	○	○	73	80	85	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	120	2.1	—
	200	○	○	74	80	85	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	550	2.9	—
65	02		●	52	65	75	—	0.12	0.14	0.16	0.20	0.26	0.31	0.37	0.52	155	0.2	200
	03		●	52	65	75	—	0.17	0.21	0.24	0.30	0.39	0.46	0.55	0.77	160	0.3	150
	04		●	52	65	75	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	150	0.3	150
	05	●	●	52	65	74	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	190	0.4	150
	07	●	●	53	65	74	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	150	0.5	100
	10	●	●	54	65	73	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	160	0.6	100
	15	●	●	54	65	73	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	160	0.8	50
	20	●	●	55	65	72	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	310	0.9	50
	30	○	○	56	65	72	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	120	1.1	—
	40	○	○	56	65	71	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	120	1.3	—
	50	○	○	57	65	71	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	120	1.5	—
	60	○	○	57	65	71	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	120	1.6	—
	80	○	○	58	65	71	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	120	1.9	—
	100	○	○	58	65	70	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	120	2.1	—
	120	○	○	58	65	70	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	120	2.3	—
	140	○	○	59	65	69	5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	120	2.5	—
	170	○	○	59	65	69	6.94	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	120	2.8	—
	200	○	○	59	65	69	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	580	3.0	—
50	03		●															

Spray angle code	Spray capacity code	VV <sup>2</sup>	V	Spray angle (°)			Spray capacity (L/min)								Mean drop. dia. (µm)	Free pass. dia. (mm)	Strainer mesh size	
				0.15 MPa	0.3 MPa	0.7 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa				
40	05	●		30	40	48	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	230	0.4	150
	07	●		30	40	48	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	—	0.6	100
	10	●		31	40	47	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	—	0.7	50
	20	○		32	40	46	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	380	1.0	—
	30	○		33	40	46	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	—	1.3	—
	40	○		33	40	45	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.5	—
	80	○		34	40	44	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	2.2	—
	120	○		35	40	44	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	—	2.8	—
	200	○		35	40	43	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	710	3.5	—
	05	●		18	25	32	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	270	0.5	100
25	07	●		18	25	32	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	—	0.6	100
	10	●		18	25	32	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	—	0.8	50
	15	○		19	25	31	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	440	1.0	—
	30	○		19	25	30	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	—	1.4	—
	40	○		19	25	30	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.7	—
	80	○		20	25	29	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	2.4	—
	200	○		21	25	27	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	850	4.0	—
	05	●		9	15	22	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	310	0.5	100
15	07	●		9	15	21	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	—	0.6	50
	10	●		9	15	21	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	—	0.8	50
	15	○		10	15	20	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	—	1.1	—
	30	○		10	15	19	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	510	1.5	—
	40	○		10	15	19	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.8	—
	80	○		11	15	18	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	2.6	—
	200	○		11	15	17	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	1,000	4.0	—

●: Available with or without strainer    ○: Only available without strainer

\*2) The VV series is made-to-order.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### ① Complete Assembly

Example: 1/4M V 11505 S303W

1/4M	V	115	05	S303	W
Pipe conn. size <sup>3</sup>	Series	Spray angle code	Spray capacity code	Material	Strainer
■ VV	■ V	■ 115	■ 02	■ W (with strainer)	■ (Blank indicates "without strainer")
■ V	■ 15	■ 200	■ 200		

### ② Nozzle Tip Only

Example: 1/4 V 11505 S303

1/4	V	115	05	S303
Series	Spray angle code	Spray capacity code	Material	
■ VV	■ 115	■ 02	■ W	■ (Blank indicates "without strainer")
■ V	■ 15	■ 200		

\*3) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

The VV series is made-to-order.

# Even Flat Spray Nozzles

VEP / VE

Flat Spray



- Flat spray pattern with uniform distribution across the pattern area.
- Even spray impact across the entire spray area.

[STANDARD PRESSURE]  
0.3 MPa

## [APPLICATIONS]

Cleaning: Automotives, containers, films, felts, filters, screens, bottles, crushed stone, earth and sand, metal parts, machines, steel plates, steel pieces, wires

Spraying: Etchants, oils, lubricants, liquids, solutions, insecticides, herbicides

Cooling: Gas, heat exchangers, tanks, steel, roofs

Water screen: Fire protection, heat protection, dust suppression, deodorization

## VEP SERIES (one-piece structure)

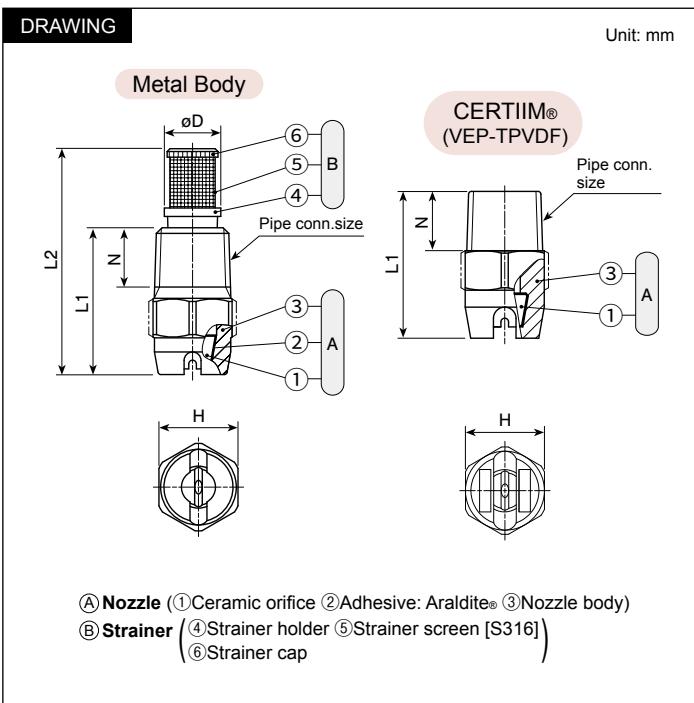
Structure	<ul style="list-style-type: none"> <li>One-piece structure with a ceramic orifice insert.</li> <li>Small spray capacity VEP nozzles made of metal come with or without a strainer.</li> <li>CERTIIM is a one-piece plastic nozzle molded around a ceramic orifice.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Metal parts: S303 or B (brass)</li> <li>CERTIIM's plastic body: PVDF</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or others</p>

Pipe conn. size	Dimensions (mm)					Weight (g)		
	L1	L2	H	øD	N	S303 <sup>1</sup>	B <sup>1</sup>	CER-TIIM
R1/8	16.5	30	12	7.5	6.5	8	9	—
R1/4	26	40	14	10	10.5	20	22	—
R3/8	30	—	19	—	11	33	—	—
R1/2	38	—	23	—	14	57	—	—
CER-TIIM R1/8	22	—	12	—	8.5	—	—	2.1
CER-TIIM R1/4	26	—	14	—	10.5	—	—	6

\*1) With strainer, add 2 g for R1/8 and 5 g for R1/4 to the above weight.  
No strainers for CERTIIM (VEP-TPVDF).

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Strainer is optional on some metal VEP models and can be ordered without it. See table for details.

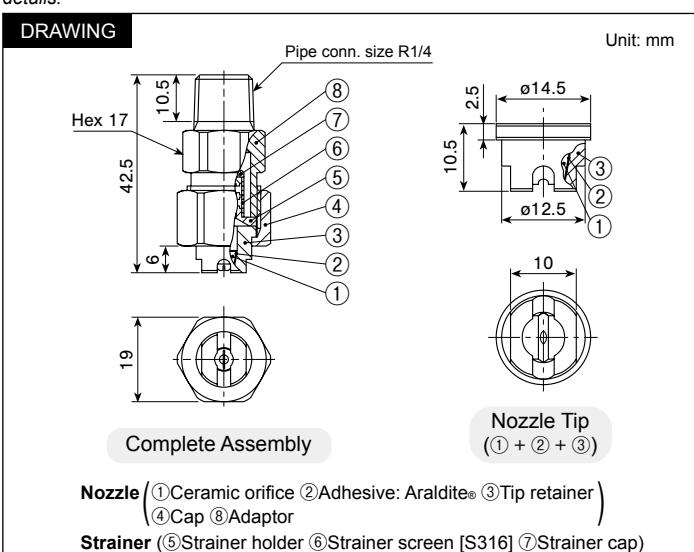


## VE SERIES (three-piece structure)

Structure	<ul style="list-style-type: none"> <li>Three-piece structure with a ceramic orifice insert.</li> <li>Includes three parts: Nozzle tip, cap, and adaptor.</li> <li>Worn-out nozzle tips can be replaced separately.</li> <li>Small spray capacity models come with or without a strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Tip retainer: S303</li> <li>Cap, Adaptor, and Strainer: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or others</p>
Weight	<ul style="list-style-type: none"> <li>Complete assembly<sup>2</sup>: 43 g</li> <li>Nozzle tip: 6.5 g</li> </ul>

\*2) With strainer, add 5 g to the above weight and 2 mm to the total length.

Strainer is optional on some models and can be ordered without it. See table for details.



[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

# VEP / VE

Flat Spray

Spray angle code	Spray capacity code	Pipe connection size				Spray angle (°)			Spray capacity (L/min)										Mean drop. dia. (µm)	Free pass. dia. (mm)	Strainer mesh size					
		VEP				VE	Spray angle (°)			Spray capacity (L/min)																
		Metal Body		CERTIIM			0.15 MPa	0.3 MPa	0.7 MPa	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	3 MPa	5 MPa						
		R1/8	R1/4	R3/8	R1/2	R1/8	R1/4	R1/4	R1/4	R1/8	R1/2	R1/8	R1/4	R1/8	R1/2	R1/8	R1/2	R1/8	R1/2	R1/8	R1/2					
115	19	●	●			○	●	●	●	104	115	122	0.78	1.10	1.34	1.55	1.90	2.45	2.90	3.47	4.91	6.00	7.76	240	0.5	100
	23	●	●			○	●	●	●	105	115	122	0.94	1.33	1.63	1.88	2.30	2.97	3.51	4.20	5.94	7.27	9.39		0.6	100
	31	●	●			○	●	●	●	105	115	122	1.26	1.79	2.19	2.53	3.10	4.00	4.74	5.66	8.00	9.80	12.7		0.6	100
	36	●	●			○	●	●	●	105	115	122	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	11.4	14.6		0.7	50
	39	●	●			○	●	●	●	105	115	122	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	12.3	15.9	?	0.7	50
	59	●	●			○	●	●	●	105	115	122	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	18.6	24.1		0.9	50
	78	○	○			○	○	○	○	106	115	121	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	24.7	31.8		1.0	—
	117	○	○			○	○	○	○	106	115	120	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	37.0	47.8		1.2	—
	157	○	○			○	○	○	○	106	115	120	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	49.6	64.1	450	1.4	—
	196	○	○			○	○	○	○	108	115	120	8.00	11.3	13.9	16.0	19.6	25.3	30.0	35.8	50.6	62.0	80.0		1.6	—
	235	○	○			○	○	○	○	108	115	118	9.54	13.6	16.6	19.2	23.5	30.3	35.9	42.9	60.7	74.3	95.9	?	1.7	—
	274	○	○			○	○	○	○	108	115	118	11.2	15.8	19.4	22.4	27.4	35.4	41.9	50.0	70.7	86.6	112	?	1.9	—
	314	○	○			○	○	○	○	108	115	118	12.8	18.1	22.2	25.6	31.4	40.5	48.0	57.3	81.1	99.3	128	510	2.0	—
	392	○	○			○	○	○	○	108	115	118	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	?	2.2	—
	469	○	○			○	○	○	○	108	115	118	19.1	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	640	2.4	—
90	03	●	●			○	●	●	●	78	90	101	—	0.17	0.21	0.24	0.30	0.39	0.46	0.55	0.77	0.95	1.22	140	0.2	200
	04	●	●			○	●	●	●	79	90	101	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	1.26	1.63		0.2	200
	05	●	●			○	●	●	●	79	90	101	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	1.58	2.04	?	0.3	150
	07	●	●			○	●	●	●	80	90	101	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	2.21	2.86	?	0.3	150
	10	●	●			○	●	●	●	80	90	100	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	3.16	4.08	?	0.4	150
	15	●	●			○	●	●	●	82	90	100	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	4.74	6.12	?	0.4	150
	19	●	●			○	●	●	●	82	90	98	0.78	1.10	1.34	1.55	1.90	2.45	2.90	4.91	6.00	7.76	250	0.7	50	
	23	●	●			○	●	●	●	82	90	98	0.94	1.33	1.63	1.88	2.30	2.97	3.51	4.20	5.94	7.27	9.39	?	0.7	50
	31	●	●			○	●	●	●	83	90	97	1.26	1.79	2.19	2.53	3.10	4.00	4.74	5.66	8.00	9.80	12.7	?	0.9	50
	36	○	○			○	○	○	○	83	90	97	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	11.4	14.6	?	1.0	—
	39	○	○			○	○	○	○	83	90	97	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	12.3	15.9	?	1.0	—
	59	○	○			○	○	○	○	83	90	97	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	18.6	24.1	?	1.2	—
	78	○	○			○	○	○	○	84	90	97	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	24.7	31.8	?	1.4	—
	117	○	○			○	○	○	○	84	90	96	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	37.0	47.8	?	1.7	—
	157	○	○			○	○	○	○	84	90	96	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	49.6	64.1	480	2.0	—
	196	○	○			○	○	○	○	84	90	96	8.00	11.3	13.9	16.0	19.6	25.3	30.0	35.8	50.6	62.0	80.0	490	2.2	—
	235	○	○			○	○	○	○	85	90	95	9.54	13.6	16.6	19.2	23.5	30.3	35.9	42.9	60.7	74.3	95.9	?	2.4	—
	274	○	○			○	○	○	○	85	90	95	11.2	15.8	19.4	22.4	27.4	35.4	41.9	50.0	70.7	86.6	112	?	2.6	—
	314	○	○			○	○	○	○	85	90	94	12.8	18.1	22.2	25.6	31.4	40.5	48.0	57.3	81.1	99.3	128	540	2.8	—
	392	○	○			○	○	○	○	85	90	94	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	?	3.1	—
	469	○	○			○	○	○	○	85	90	94	19.1	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	680	3.4	—
80	19	●	●			○	●	●	●	72	80	84	0.78	1.10	1.34	1.55	1.90	2.45	2.90	3.47	4.91	6.00	7.76	260	0.7	50
	23	●	●			○	●	●	●	72	80	84	0.94	1.33	1.63	1.88	2.30	2.97	3.51	4.20	5.94	7.27	9.39	?	0.8	50
	31	●	●			○	●	●	●	72	80	84	1.26	1.79	2.19	2.53	3.10	4.00	4.74	5.66	8.00	9.80	12.7	?	0.9	50
	36	○	○			○	○	○	○	72	80	84	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	11.4	14.6	?	1.0	—
	39	○	○			○	○	○	○	73	80	84	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	12.3	15.9	?	1.0	—
	59	○	○			○	○	○	○	74	80	84	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	18.6	24.1	?	1.3	—
	78	○	○			○	○	○	○	74	80	84	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	24.7	31.8	?	1.6	—
	117	○	○			○	○	○	○	75	80	84	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	37.0	47.8	?	1.9	—
	157	○	○			○	○	○	○	76	80	84	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	49.6	64.1	490	2.4	—
	196	○	○			○	○	○	○	76	80	83	8.00	11.3	13.9	16.0	19.6	25.3	30.0	35.8	50.6	62.0	80.0	490	2.6	—
	235	○	○			○	○	○	○	76	80	83	9.54	13.6	16.6	19.2	23.5	30.3	35.9	42.9	60.7	74.3	95.9	?	3.1	—

Spray angle code	Spray capacity code	Pipe connection size					Spray angle (°)			Spray capacity (L/min)										Mean drop. dia. (μm)	Free pass. dia. (mm)	Strainer mesh size			
		VEP			VE					Spray capacity (L/min)															
		Metal Body		CER-TIIM		0.15 MPa	0.3 MPa	0.7 MPa	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	3 MPa	5 MPa						
		R1/8	R1/4	R3/8	R1/2	R1/8	R1/4	R1/4																	
50	19	●				○	○	●	43	50	56	0.78	1.10	1.34	1.55	1.90	2.45	2.90	3.47	4.91	6.00	7.76	300	0.9	50
	31	○				○	○	○	43	50	55	1.26	1.79	2.19	2.53	3.10	4.00	4.74	5.66	8.00	9.80	12.7		1.2	—
	39	○				○	○	○	43	50	55	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	12.3	15.9		1.4	—
	59	○				○	○	○	43	50	55	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	18.6	24.1		1.5	—
	78	○				○	○	○	43	50	55	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	24.7	31.8		2.0	—
	117	○				○	○	○	43	50	54	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	37.0	47.8		2.4	—
	157	○				○	○	○	43	50	54	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	49.6	64.1		2.9	—
	196		○			○	○	○	43	50	53	8.00	11.3	13.9	16.0	19.6	25.3	30.0	35.8	50.6	62.0	80.0	570	3.3	—
	235		○			○	○	○	43	50	53	11.2	15.8	19.4	22.4	27.4	35.4	41.9	50.0	70.7	86.6	112		3.7	—
	274		○			○	○	○	44	50	52	12.8	18.1	22.2	25.6	31.4	40.5	48.0	57.3	81.1	99.3	128	650	4.4	—
40	314		○			○	○	○	44	50	52	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	○	4.7	—
	392		○			○	○	○	44	50	52	19.0	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	850	5.0	—
	469		○			○	○	○	44	50	52	19.1	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	850	5.0	—
	23	○				○	○	○	31	40	46	0.94	1.33	1.63	1.88	2.30	2.97	3.51	4.20	5.94	7.27	9.39	350	1.1	—
	36	○				○	○	○	32	40	45	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	11.4	14.6		1.4	—
	59	○				○	○	○	32	40	45	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	18.6	24.1		1.8	—
	78	○				○	○	○	33	40	45	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	24.7	31.8	○	2.1	—
	117	○				○	○	○	33	40	44	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	37.0	47.8		2.6	—
	157	○				○	○	○	33	40	44	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	49.6	64.1		3.0	—
	196		○			○	○	○	33	40	43	8.00	11.3	13.9	16.0	19.6	25.3	30.0	35.8	50.6	62.0	80.0	630	3.6	—
	235		○			○	○	○	33	40	43	9.54	13.6	16.6	19.2	23.5	30.3	35.9	42.9	60.7	74.3	95.9	○	4.1	—
	274		○			○	○	○	33	40	43	11.2	15.8	19.4	22.4	27.4	35.4	41.9	50.0	70.7	86.6	112	720	4.3	—
	314		○			○	○	○	33	40	43	12.8	18.1	22.2	25.6	31.4	40.5	48.0	57.3	81.1	99.3	128	800	4.8	—
	392		○			○	○	○	21	25	31	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	○	5.1	—
	469		○			○	○	○	21	25	31	19.1	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	1,050	5.5	—
25	19	○				○	○	○	18	25	32	0.78	1.10	1.34	1.55	1.90	2.45	2.90	3.47	4.91	6.00	7.76	390	1.1	—
	31	○				○	○	○	19	25	32	1.26	1.79	2.19	2.53	3.10	4.00	4.74	5.66	8.00	9.80	12.7		1.4	—
	39	○				○	○	○	20	25	32	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	12.3	15.9		1.5	—
	59	○				○	○	○	21	25	32	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	18.6	24.1	○	1.9	—
	78	○				○	○	○	21	25	32	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	24.7	31.8	○	2.3	—
	117	○				○	○	○	21	25	32	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	37.0	47.8		2.7	—
	157	○				○	○	○	21	25	32	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	49.6	64.1		3.4	—
	196		○			○	○	○	21	25	32	8.00	11.3	13.9	16.0	19.6	25.3	30.0	35.8	50.6	62.0	80.0	730	3.7	—
	235		○			○	○	○	21	25	31	9.54	13.6	16.6	19.2	23.5	30.3	35.9	42.9	60.7	74.3	95.9	○	4.0	—
	274		○			○	○	○	21	25	31	11.2	15.8	19.4	22.4	27.4	35.4	41.9	50.0	70.7	86.6	112	950	4.5	—
15	314		○			○	○	○	21	25	31	12.8	18.1	22.2	25.6	31.4	40.5	48.0	57.3	81.1	99.3	128	800	4.8	—
	392		○			○	○	○	13	15	19	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	○	5.1	—
	469		○			○	○	○	13	15	18	19.1	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	1,250	5.8	—

●: Available with or without strainer ○: Only available without strainer

\*3) Use CERTIIM (VEP-TPVDF) only at pressures below 2.0 MPa.

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**VEP SERIES (One-Piece Structure)**

Example: 1/4M VEP 11519 S303W

1/4M	VEP	115	19	S303	W
Pipe conn. size <sup>7</sup>	Spray angle code	Spray capacity code <sup>4</sup>	Material <sup>5</sup>	Strainer <sup>6</sup>	
1/8M	115	03	S303	W (with strainer)	
1/4M	15	469	B	(Blank indicates "without strainer")	
3/8M			TPVDF	"without strainer"	
1/2M					

**VE SERIES (Three-Piece Structure)****① Complete Assembly**

Example: 1/4M VE 11519 S303W

1/4M	VE	115	19	S303	W
Pipe conn. size <sup>7</sup>	Spray angle code	Spray capacity code <sup>4</sup>	Material	Strainer	
1/8	115	03	W (with strainer)	(Blank indicates "without strainer")	
1/4	15	157	B	"without strainer"	
3/8			TPVDF		
1/2					

**② Nozzle Tip Only**

Example: 1/4 VE 11519 S303

1/4	VE	115	19	S303
Spray angle code	Spray capacity code <sup>4</sup>	Material		
115	03	S303		
15	157	B		
		TPVDF		

# Quick-Detachable Standard Flat Spray Nozzles

Plastic

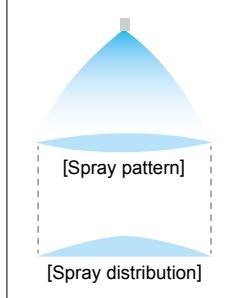
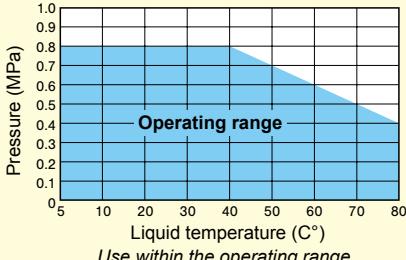
**INVV**

Flat Spray



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.
- Made of highly chemical and heat resistant plastic.
- Quick-detachable design helps to significantly reduce maintenance time.
- Nozzle tips are color-coded by spray capacity for easy identification.
- Adaptors are color-coded by material: gray for PP and black for PPS. (PVDF adaptor is only available on a made-to-order basis.)

[Maximum pressures at various temperatures]



## [STANDARD PRESSURE]

0.3 MPa

## [APPLICATIONS]

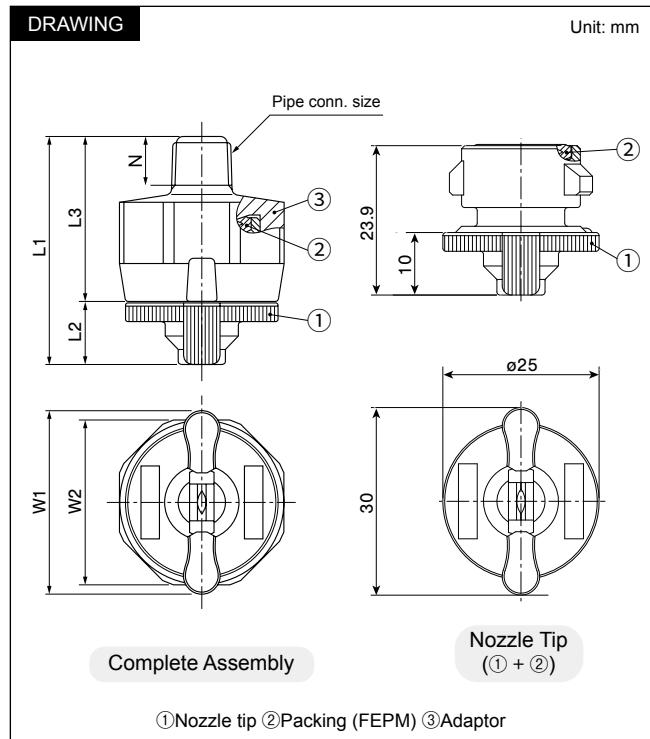
- Cleaning
- Etching
- Stripping
- Chemical treatment
- For periodic maintenance or for applications where precise spray alignment is required

Structure	<ul style="list-style-type: none"> <li>• Two-piece structure including a nozzle tip with packing and an adaptor.</li> <li>• Easy installation and removal of the nozzle tip with a twist of about 60°.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle tip: PP</li> <li>• Adaptor: PP or PPS [SPECIAL ORDER MATERIAL: PVDF]</li> <li>• Packing: FEPM</li> </ul>

Pipe conn. size	Dimensions (mm)						Weight (g)	
	L1	L2	L3	W1	W2	N	PP	PPS
R1/8	37	10	27	30	27	8	9	12
R1/4	40	10	30	30	27	11.5	10	13
R3/8	40	10	30	30	27	12	11	14

[Note]

- INVV series nozzles are not compatible with the discontinued ISVV series.
- Appearance and dimensions may differ slightly depending on material and nozzle code.
- The tabs (wings) are in line with the flat spray spread direction.



Spray angle code	Spray capacity code	Pipe connection size			Spray angle (°)			Spray capacity (L/min)							Mean drop. dia. (µm)	Free pass. dia. (mm)	Nozzle tip color
		R1/8	R1/4	R3/8	0.15 MPa	0.3 MPa	0.7 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa			
115	05	○	○	○	102	115	124	—	0.29	0.35	0.41	0.50	0.65	0.76	160	0.3	[Green]
	07	○	○	○	103	115	124	—	0.40	0.49	0.57	0.70	0.90	1.07		0.3	[Brown]
	10	○	○	○	103	115	124	0.41	0.58	0.71	0.82	1.00	1.29	1.53		0.4	[Red]
	15	○	○	○	104	115	123	0.61	0.87	1.06	1.23	1.50	1.94	2.29		0.5	[Grey]
	20	○	○	○	104	115	123	0.82	1.15	1.41	1.63	2.00	2.58	3.06		0.6	[Black]
	30	○	○	○	105	115	122	1.23	1.73	2.12	2.45	3.00	3.88	4.58		0.8	[Blue]
	40	○	○	○	106	115	122	1.63	2.31	2.83	3.27	4.00	5.16	6.11		0.8	[Orange]
90	50	○	○	○	106	115	122	2.04	2.89	3.54	4.08	5.00	6.46	7.64	300	0.9	[Pink]
	05	○	○	○	77	90	100	—	0.29	0.35	0.41	0.50	0.65	0.76	170	0.3	[Green]
	07	○	○	○	78	90	100	—	0.40	0.49	0.57	0.70	0.90	1.07		0.4	[Brown]
	10	○	○	○	78	90	99	0.41	0.58	0.71	0.82	1.00	1.29	1.53		0.5	[Red]
	15	○	○	○	79	90	99	0.61	0.87	1.06	1.23	1.50	1.94	2.29		0.6	[Grey]
	20	○	○	○	79	90	98	0.82	1.15	1.41	1.63	2.00	2.58	3.06		0.7	[Black]
	30	○	○	○	80	90	97	1.23	1.73	2.12	2.45	3.00	3.88	4.58		0.9	[Blue]
65	40	○	○	○	81	90	97	1.63	2.31	2.83	3.27	4.00	5.16	6.11		1.1	[Orange]
	50	○	○	○	81	90	97	2.04	2.89	3.54	4.08	5.00	6.46	7.64	300	1.2	[Pink]
	05	○	○	○	52	65	74	—	0.29	0.35	0.41	0.50	0.65	0.76	190	0.4	[Green]
	07	○	○	○	53	65	74	—	0.40	0.49	0.57	0.70	0.90	1.07		0.5	[Brown]
	10	○	○	○	54	65	73	0.41	0.58	0.71	0.82	1.00	1.29	1.53		0.6	[Red]
	15	○	○	○	54	65	73	0.61	0.87	1.06	1.23	1.50	1.94	2.29		0.8	[Grey]
	20	○	○	○	55	65	72	0.82	1.15	1.41	1.63	2.00	2.58	3.06		0.9	[Black]
50	30	○	○	○	56	65	72	1.23	1.73	2.12	2.45	3.00	3.88	4.58		1.1	[Blue]
	40	○	○	○	56	65	71	1.63	2.31	2.83	3.27	4.00	5.16	6.11		1.3	[Orange]
	50	○	○	○	57	65	71	2.04	2.89	3.54	4.08	5.00	6.46	7.64	350	1.5	[Pink]

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**① Complete Assembly**

Example: 1/8M INVV 9030 PP (FEPM) + PP

1/8M	INVV	90	30	PP (FEPM) +	PP
Pipe conn. size*	Spray angle code	Spray capacity code	Nozzle tip material (packing: FEPM)	Adaptor material and color	
1/8M	115	05		PP	
1/4M	—	—		PPS	—

③ Adaptor is available for purchase separately.

\* "M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

**② Nozzle Tip Only (with packing)**

Example: INVV 9030 PP (FEPM)

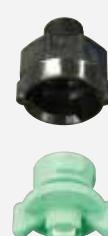
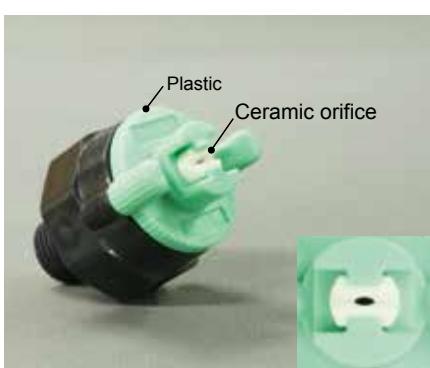
INVV	90	30	PP (FEPM)
Spray angle code	Spray capacity code	Nozzle tip material (packing: FEPM)	
115	05		

**ALSO AVAILABLE!**Quick-Detachable  
Off-Center Even Flat  
Spray Nozzles**INOVVE SERIES**

See page 28 for more details.

Quick-Detachable  
Full Cone  
Spray Nozzles**INJJX SERIES**

See page 72 for more details.

Note: If a plug tip is required instead of a nozzle tip, see page 27 for the quick-detachable **IN PLUG** series.**Custom Order Example Featuring Ceramic Orifice**

In applications where wear resistance is required due to the sprayed liquid, a customized solution, such as using ceramic for the nozzle orifice, may be considered. Contact us for more details.

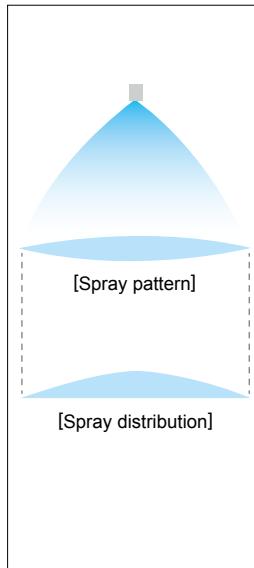
**Key Points:**

- Features a high-purity alumina ceramic orifice in the nozzle tip.
- Improved wear resistance for longer service life and reduced replacement frequency.
- One-piece molded design without adhesive for superior chemical resistance

# Quick-Installation Nozzles

**INQB**

Flat Spray



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.
- Easy to install. Just drill a hole ( $\varnothing 14.3\text{--}14.8$  mm) into the pipe and insert the nozzle.
- The ball joint allows the spray direction adjustable within 50 degrees as desired.
- Nozzle tips are color-coded by spray capacity for easy identification.
- Adaptors are also color-coded by size.
- O-ring seals between the pipe and adaptor for pressures of up to 0.4 MPa.
- An optional spring lock is available to secure fixation.

**[STANDARD PRESSURE]**

0.3 MPa

**[APPLICATIONS]**

Pre-treatment for painting of cars, electric appliances for the home

Cleaning: water rinse after acid treatment of steel plates, water rinsing process in food factory

Structure	• Includes a nozzle tip, ball section, and adaptor. Worn-out nozzle tips can be replaced separately.					
Material	<ul style="list-style-type: none"> <li>• Main parts: FRPP</li> <li>• Nozzle tip: PP</li> <li>• Packing: FEPFM</li> <li>• O-ring: NBR</li> <li>• Spring clip and lock: S304</li> </ul>					

**[QB for metal pipes]**

Pipe size (inch) <sup>1)</sup>	Color of adaptor	Dimensions (mm)					Weight <sup>3)</sup> (g)	
		L1 <sup>2)</sup>	L2	L3	L4	$\varnothing D1$	$\varnothing D2$	
1		111	93	76	59	34	48	54
1 1/4		121	102	80	59	42.7	48	55
1 1/2		126	108	83	59	48.6	48	56
2		138	120	89	59	60.5	48	58

\*1) Use stainless steel pipes compliant with JIS G 3459.

\*2) Without optional spring lock, L1 is reduced by 2 mm.

\*3) With optional spring lock, add 5–7 g to the listed weight.

**[QB for PVC pipes]**

Pipe size (ND) <sup>4)</sup>	Color of adaptor	Dimensions (mm)					Weight <sup>3)</sup> (g)	
		L1 <sup>2)</sup>	L2	L3	L4	$\varnothing D1$	$\varnothing D2$	
25A		109	91	75	59	32	48	54
30A		115	97	78	59	38	48	54
40A		126	108	83	59	48.6	48	56
50A		138	120	89	59	60.5	48	58

\*2) Without optional spring lock, L1 is reduced by 2 mm.

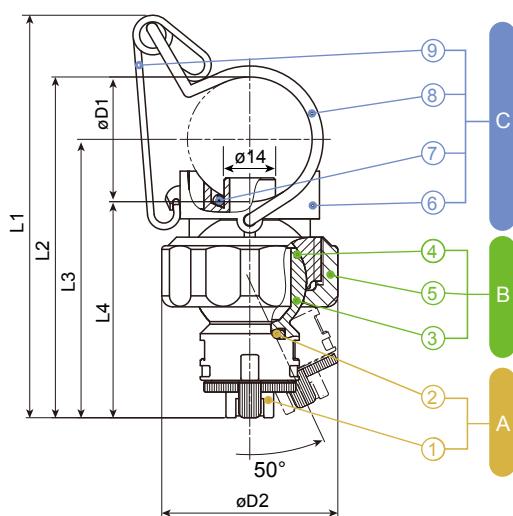
\*3) With optional spring lock, add 5–7 g to the listed weight.

\*4) Use PVC pipes compliant with JIS K 6742.

40A, 50A adaptors for PVC pipes are the same as 1 1/2", 2" adaptors for metal pipes.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING**



**A** Nozzle Tip (①Nozzle tip [PP] ②Packing [FEPFM])

**B** Ball Section (③Ball adaptor ④O-ring [NBR] ⑤Cap)

**C** Adaptor (⑥Adaptor ⑦O-ring [NBR] ⑧Spring clip)  
⑨Spring lock<sup>5)</sup>

\*5) ⑨ is optional at extra cost.

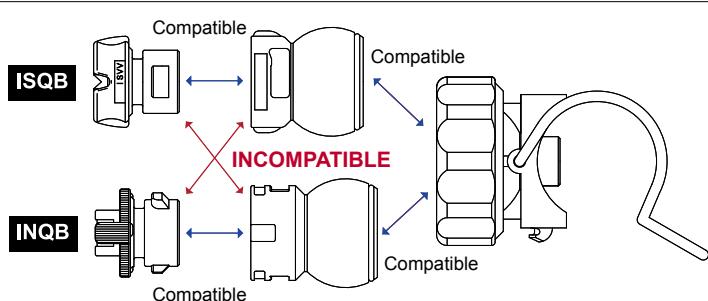
Nozzle tips of INVV and INJJX series are compatible with the INQB series. ISVV/ISJJX series are NOT compatible.

**Model Change: From QB (ISQB) Series to INQB Series**

We have upgraded our quick-installation nozzles to the new **INQB** series.

Note: While the main adaptor (#6) and ball adaptor (#3) are compatible between the old and new models, the ball adaptors and nozzle tips are NOT interchangeable, as shown in the diagram.

For more information, please contact us.



Spray angle code	Spray capacity code	Pipe size		Spray capacity (L/min)				Mean droplet diameter ( $\mu\text{m}$ )	Free passage diameter (mm)	Nozzle tip color
		(inch)	(ND)	0.1 MPa	0.2 MPa	0.3 MPa	0.4 MPa			
80	80	1, 11/4 (1*1/4), 11/2 (1*1/2), or 2	25A, 30A, (40A), or (50A)	4.62	6.53	8.00	9.24	430	1.7	Red
	100			5.77	8.16	10.0	11.5		1.9	Grey
	120			6.93	9.80	12.0	13.9		2.1	Grey
	160			9.24	13.1	16.0	18.5		2.5	Dark Blue
	180			10.4	14.7	18.0	20.8		2.7	Orange
	200			11.5	16.3	20.0	23.1	610	2.9	Teal
	240			13.9	19.6	24.0	27.7		3.2	Brown
	280			16.2	22.9	28.0	32.3		3.5	Red
	390			22.5	31.8	39.0	45.0		4.4	Grey
	80			4.62	6.53	8.00	9.24	460	1.9	Red
65	100	1, 11/4 (1*1/4), 11/2 (1*1/2), or 2	(40A), (50A)	5.77	8.16	10.0	11.5	460	2.1	Grey
	120			6.93	9.80	12.0	13.9		2.4	Grey
	160			9.24	13.1	16.0	18.5		2.8	Dark Blue
	180			10.4	14.7	18.0	20.8		2.9	Orange
	200	1, 11/4 (1*1/4), 11/2 (1*1/2), or 2	(40A), (50A)	11.5	16.3	20.0	23.1	650	3.2	Teal
	240			13.9	19.6	24.0	27.7		3.5	Brown
	280			16.2	22.9	28.0	32.3		3.8	Red
	390			22.5	31.8	39.0	45.0		4.7	Grey
40	120	1, 11/4 (1*1/4), 11/2 (1*1/2), or 2	(40A), (50A)	6.93	9.80	12.0	13.9	560	2.8	Grey
	160			9.24	13.1	16.0	18.5	560	3.2	Dark Blue
	180			10.4	14.7	18.0	20.8		3.5	Orange
	280			16.2	22.9	28.0	32.3	800	4.4	Red

## CAUTIONS

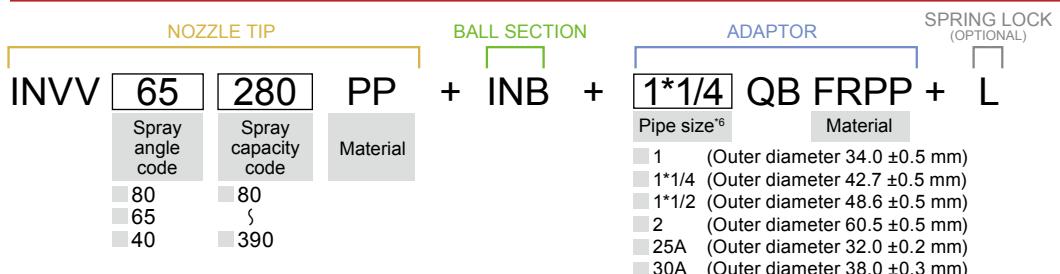
**Maximum operating pressure is 0.4 MPa.**

Do not use under conditions where sudden or drastic changes in water pressure may occur.

### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

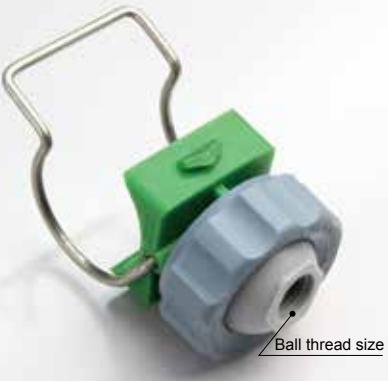
Example: INVV 65280 PP + INB + 1\*1/4 QB FRPP + L



- \*6) • Please check the dimensions of øD1 (page 25).
- Order 1\*1/2 adaptor for 40A (pipe OD 48.0 ±0.3 mm), and 2 adaptor for 50A (pipe OD 60.0 ±0.4 mm).

Note: If a plug is required instead of a nozzle tip, see page 27 for the quick-detachable **IN PLUG** series.

## Related Products

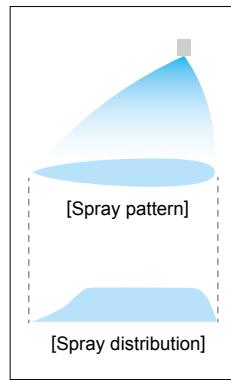
Product	Picture	Features																																							
<b>Hollow Cone Spray Nozzle BAA+QB Series</b>		<ul style="list-style-type: none"> <li>Air washer nozzle made by combining an AA series hollow cone spray nozzle and QB series adaptor.</li> <li>Includes a spring lock to firmly secure the nozzle in place.</li> <li>No-whirler design with a large free passage diameter minimizes clogging.</li> </ul> <p>[Note] The spray direction is NOT adjustable, the ball joint is fixed in place.</p>																																							
<b>Ball Joint Adaptor QBP Series</b>	  (Photo below shows QBP adaptor with a spray nozzle)  	<ul style="list-style-type: none"> <li>IKEUCHI's spray nozzles with R1/4, R3/8, or R1/2 thread are attachable.</li> <li>The ball joint makes the spray direction adjustable within 50 degrees as needed.</li> <li>Easy installation onto a pipe with a spring clip fastener.</li> <li>Main material: FRPP</li> </ul> <table border="1"> <thead> <tr> <th colspan="2">Pipe Size</th> <th colspan="3">Ball Thread Size</th> </tr> </thead> <tbody> <tr> <td rowspan="4">QBP for metal pipes (inch)</td> <td>1</td> <td rowspan="4">QBP for PVC pipes (ND)<sup>†</sup></td> <td>25A</td> <td>Rc1/4, Rc3/8, or Rc1/2</td> </tr> <tr> <td>1 1/4</td> <td>30A</td> <td></td> </tr> <tr> <td>1 1/2</td> <td>40A</td> <td></td> </tr> <tr> <td>2</td> <td>50A</td> <td></td> </tr> </tbody> </table> <p><sup>†</sup> 40A, 50A adaptors for PVC pipes are the same as 1 1/2", 2" adaptors for metal pipes.</p> <p><b>HOW TO ORDER QBP ADAPTOR</b></p> <p>Example: 1 x 1/4F QBP FRPP + L</p> <table border="1"> <tr> <td>1</td> <td>x</td> <td>1/4F</td> <td>QBP FRPP + L</td> </tr> <tr> <td>Pipe size</td> <td>Ball thread size<sup>‡</sup></td> <td>Material</td> <td>Optional spring lock</td> </tr> <tr> <td>1</td> <td>2 (50A)</td> <td>1/4F</td> <td></td> </tr> <tr> <td>1 1/4</td> <td>25A</td> <td>3/8F</td> <td></td> </tr> <tr> <td>1 1/2 (40A)</td> <td>30A</td> <td>1/2F</td> <td><sup>‡</sup> "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/4F = Rc1/4.</td> </tr> </table>	Pipe Size		Ball Thread Size			QBP for metal pipes (inch)	1	QBP for PVC pipes (ND) <sup>†</sup>	25A	Rc1/4, Rc3/8, or Rc1/2	1 1/4	30A		1 1/2	40A		2	50A		1	x	1/4F	QBP FRPP + L	Pipe size	Ball thread size <sup>‡</sup>	Material	Optional spring lock	1	2 (50A)	1/4F		1 1/4	25A	3/8F		1 1/2 (40A)	30A	1/2F	<sup>‡</sup> "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/4F = Rc1/4.
Pipe Size		Ball Thread Size																																							
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	2		50A																																						
1	x	1/4F	QBP FRPP + L																																						
Pipe size	Ball thread size <sup>‡</sup>	Material	Optional spring lock																																						
1	2 (50A)	1/4F																																							
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1 1/2 (40A)	30A	1/2F	<sup>‡</sup> "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/4F = Rc1/4.																																						

## Quick-Detachable IN PLUG SERIES

Picture	Features																					
 IN Plug tip	<ul style="list-style-type: none"> <li>Two-piece structure includes a plug tip with packing and an adaptor.</li> <li>You can change an IN-series nozzle tip to this plug tip, or replace a complete IN nozzle assembly with an IN plug assembly.</li> </ul> <p>IN plug tips are compatible with <b>INVV</b>, <b>INOVVE</b>, <b>INQB</b>, <b>INJJX</b>, and <b>INJJX-Y</b> series adaptors. When ordering use the item names shown in the table below.</p> <table border="1"> <thead> <tr> <th>Pipe conn. size</th> <th>Adaptor material</th> <th>Order item name</th> </tr> </thead> <tbody> <tr> <td rowspan="2">R1/8</td> <td>PPS</td> <td>1/8M INPLUG PP(FEPM)+PPS</td> </tr> <tr> <td>PP</td> <td>1/8M INPLUG PP(FEPM)+PP</td> </tr> <tr> <td rowspan="2">R1/4</td> <td>PPS</td> <td>1/4M INPLUG PP(FEPM)+PPS</td> </tr> <tr> <td>PP</td> <td>1/4M INPLUG PP(FEPM)+PP</td> </tr> <tr> <td rowspan="2">R3/8</td> <td>PPS</td> <td>3/8M INPLUG PP(FEPM)+PPS</td> </tr> <tr> <td>PP</td> <td>3/8M INPLUG PP(FEPM)+PP</td> </tr> <tr> <td colspan="2">Plug tip only, without adaptor</td> <td>INPLUG PP(FEPM)</td> </tr> </tbody> </table>	Pipe conn. size	Adaptor material	Order item name	R1/8	PPS	1/8M INPLUG PP(FEPM)+PPS	PP	1/8M INPLUG PP(FEPM)+PP	R1/4	PPS	1/4M INPLUG PP(FEPM)+PPS	PP	1/4M INPLUG PP(FEPM)+PP	R3/8	PPS	3/8M INPLUG PP(FEPM)+PPS	PP	3/8M INPLUG PP(FEPM)+PP	Plug tip only, without adaptor		INPLUG PP(FEPM)
Pipe conn. size	Adaptor material	Order item name																				
R1/8	PPS	1/8M INPLUG PP(FEPM)+PPS																				
	PP	1/8M INPLUG PP(FEPM)+PP																				
R1/4	PPS	1/4M INPLUG PP(FEPM)+PPS																				
	PP	1/4M INPLUG PP(FEPM)+PP																				
R3/8	PPS	3/8M INPLUG PP(FEPM)+PPS																				
	PP	3/8M INPLUG PP(FEPM)+PP																				
Plug tip only, without adaptor		INPLUG PP(FEPM)																				

# Quick-Detachable Off-Center Even Flat Spray Nozzles

**INOVVE**



- Off-center flat spray pattern with uniform distribution.
- In addition to the benefits of the OVVEP series, INOVVE is easy to install and remove—just turning the nozzle tip until it clicks. No need to adjust the spray direction.
- Made of highly chemical and heat resistant plastic.

**[STANDARD PRESSURE]**

0.3 MPa

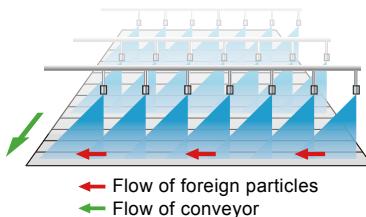
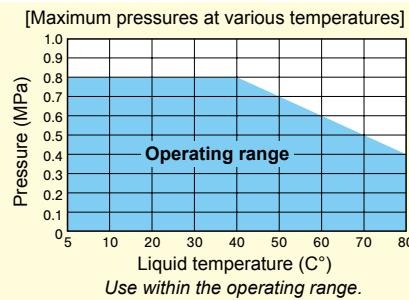
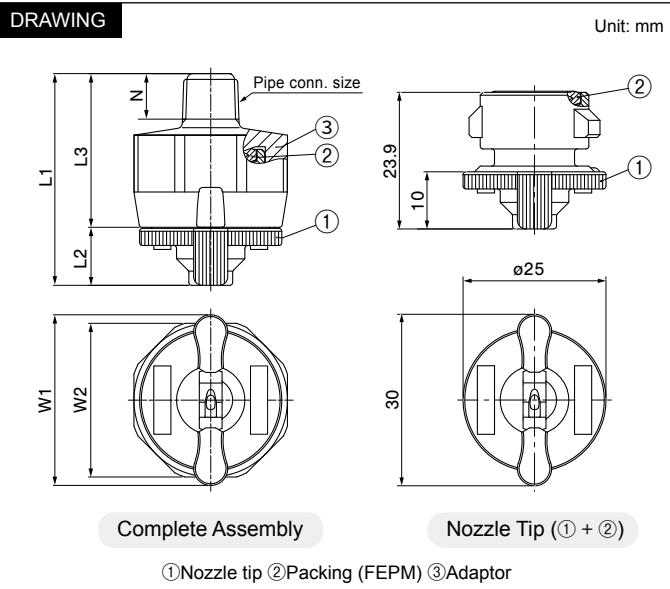
**[APPLICATIONS]**

Cleaning, rinsing, etching

Structure	<ul style="list-style-type: none"> <li>• Two-piece structure including a nozzle tip with packing and an adaptor.</li> <li>• Easy installation and removal of the nozzle tip with a twist of about 60°.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle tip: PP</li> <li>• Adaptor: PP or PPS [SPECIAL ORDER MATERIAL: PVDF]</li> <li>• Packing: FEPM</li> </ul>

Pipe conn. size	Dimensions (mm)						Weight (g)	
	L1	L2	L3	W1	W2	N	PP	PPS
R1/8	37	10	27	30	27	8	9	12
R1/4	40	10	30	30	27	11.5	10	13
R3/8	40	10	30	30	27	12	11	14

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spraying in one direction prevents accumulation of spray fluid and foreign particles.

← Flow of foreign particles  
→ Flow of conveyor

Spray capacity code	Pipe connection size			Spray angle (°)			Spray capacity (L/min)				Mean droplet diameter (μm)	Free passage diameter (mm)	Nozzle tip color
	R1/8	R1/4	R3/8	0.15 MPa	0.3 MPa	0.5 MPa	0.15 MPa	0.3 MPa	0.5 MPa	0.7 MPa			
30	○	○	○	42	45	46	2.12	3.00	3.88	4.58	600	1.0	■
50	○	○	○	42	45	46	3.54	5.00	6.46	7.64	800	1.3	■■■

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### ① Complete Assembly

Example: 1/4M INOVVE 45 30 PP (FEPM) + PP

1/4M	INOVVE 45	30	PP (FEPM) +	PP
Pipe conn. size*	Spray capacity code	Nozzle tip material (packing: FEPM)	Adaptor material and color	
1/8M	30	PP		
1/4M	50	PP		
3/8M		PPS		

### ② Nozzle Tip Only (with packing)

Example: INOVVE 45 30 PP (FEPM)

INOVVE 45	30	PP (FEPM)
Spray capacity code	Nozzle tip material (packing: FEPM)	
30	PPS	

③ Adaptor is available for purchase separately.

④ You can change a nozzle tip to a plug tip if needed.

See page 27 for the quick-detachable **IN PLUG** series.

\* "M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

# Quick-Detachable Nozzle Connector INCO

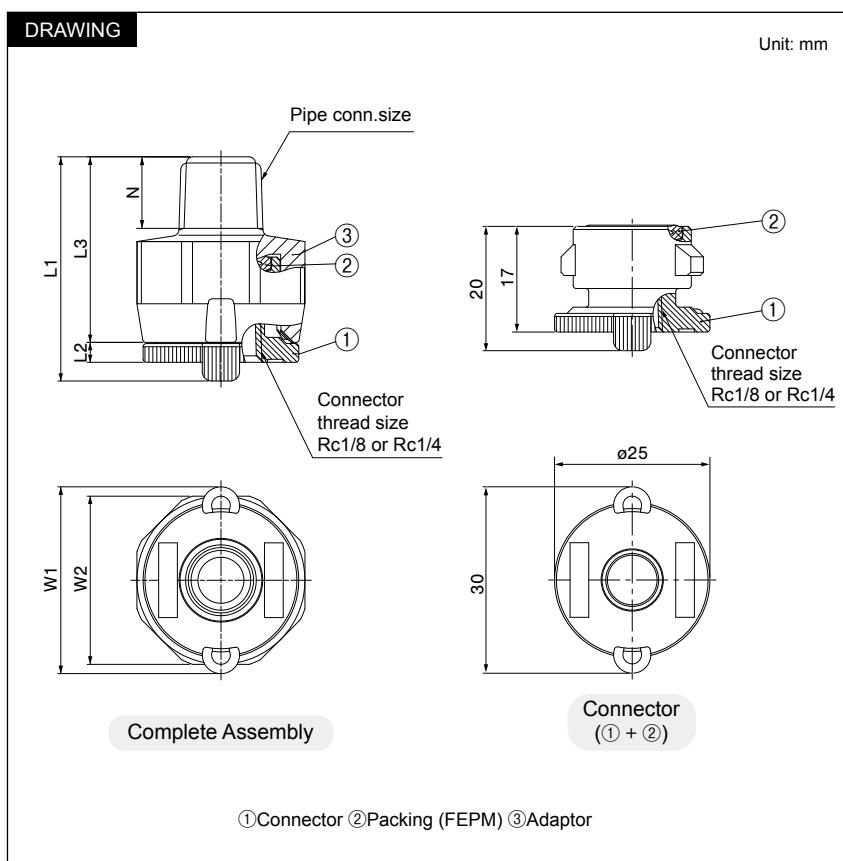
Flat Spray



Photo is INCO with a wide-angle flat spray nozzle YYP series.

- Easy installation and removal by attaching a nozzle to this connector.
- Made of highly chemical and heat resistant plastic.
- Quick-detachable design helps to significantly reduce maintenance time.
- R1/4 or R1/8 threaded nozzle is attachable.
- Adaptors are color-coded by material: gray for PP and black for PPS. (PVDF adaptor is only available on a made-to-order basis.)

Structure	<ul style="list-style-type: none"> <li>• Two-piece structure including a connector with packing and an adaptor.</li> <li>• Easy installation and removal of the connector with a twist of about 60°.</li> </ul>																																				
Material	<ul style="list-style-type: none"> <li>• Connector: PP</li> <li>• Adaptor: PP or PPS [SPECIAL ORDER MATERIAL: PVDF]</li> <li>• Packing: FEPM</li> </ul>																																				
Pipe conn. size	<b>Dimensions (mm)</b> <table border="1"> <thead> <tr> <th></th> <th>L1</th> <th>L2</th> <th>L3</th> <th>W1</th> <th>W2</th> <th>N</th> <th>PP</th> <th>PPS</th> </tr> </thead> <tbody> <tr> <td>R1/8</td> <td>33</td> <td>3</td> <td>27</td> <td>30</td> <td>27</td> <td>8</td> <td>9</td> <td>12</td> </tr> <tr> <td>R1/4</td> <td>36</td> <td>3</td> <td>30</td> <td>30</td> <td>27</td> <td>11.5</td> <td>10</td> <td>13</td> </tr> <tr> <td>R3/8</td> <td>36</td> <td>3</td> <td>30</td> <td>30</td> <td>27</td> <td>12</td> <td>11</td> <td>14</td> </tr> </tbody> </table>		L1	L2	L3	W1	W2	N	PP	PPS	R1/8	33	3	27	30	27	8	9	12	R1/4	36	3	30	30	27	11.5	10	13	R3/8	36	3	30	30	27	12	11	14
	L1	L2	L3	W1	W2	N	PP	PPS																													
R1/8	33	3	27	30	27	8	9	12																													
R1/4	36	3	30	30	27	11.5	10	13																													
R3/8	36	3	30	30	27	12	11	14																													



[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## HOW TO ORDER

To inquire about or order a specific connector please refer to this coding system.

### ① Complete Assembly

Example: INCO 1/4M×1/8F PP (FEPM) + PP

INCO	<b>1/4M</b>	×	<b>1/8F</b>	PP (FEPM)	+	<b>PP</b>
	Pipe conn. size*		Connector thread size*	Connector material (packing: FEPM)		Adaptor material and color
	1/8M		1/8F		PP	
	1/4M		1/4F		PPS	
	3/8M					

③Adaptor is available for purchase separately.

### ② Connector Only (with packing)

Example: INCO 1/8F PP (FEPM)

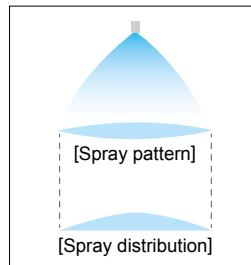
INCO	<b>1/8F</b>	PP (FEPM)
	Connector thread size*	Connector material (packing: FEPM)
	1/8F	
	1/4F	

\*"M" indicates male thread ("R" of the ISO standard) and "F" indicates female thread ("Rc" of the ISO standard).

# Quick-Detachable Standard Flat Spray Nozzles

Stainless Steel

**INVV-SS**  
**INV**



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.
- The unique design accommodates easy installation and removal.
- Quick-detachable design helps to significantly reduce maintenance time.

**[STANDARD PRESSURE]**  
0.3 MPa

**[APPLICATIONS]**

Cleaning: Automotives, containers, films, felts, filters, screens, bottles, crushed stone, earth and sand, metal parts, machines, steel plates and pieces

Spraying: Oils, lubricants, glues, insecticides, herbicides

Cooling: Tanks, roofs

Water screen: Dust suppression, deodorization

## INVV-SS SERIES

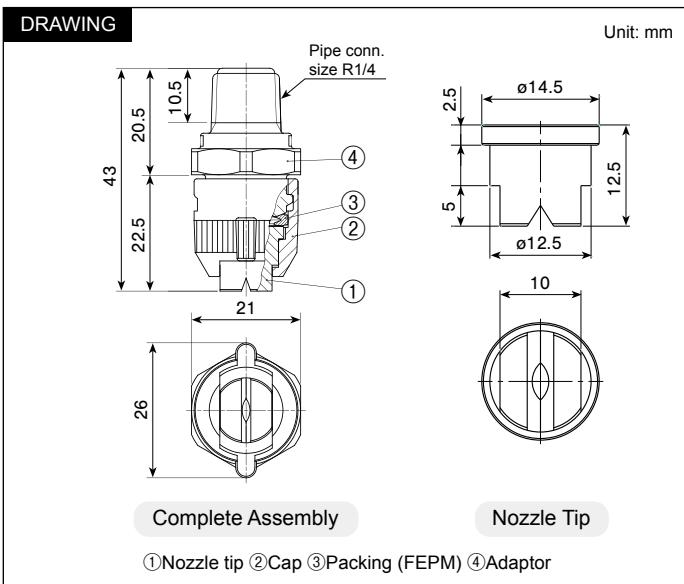
Structure	<ul style="list-style-type: none"> <li>Includes a nozzle section (nozzle tip + cap + packing) and an adaptor.</li> <li>Worn-out nozzle tips and other parts are available separately for replacement.</li> <li>Easy installation and removal of the nozzle section with a twist of about 90°.</li> <li>Tip or packing will not fall out when the nozzle section is removed.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle tip: S303</li> <li>Cap and Adaptor: S316L equivalent</li> <li>Packing: FEPM</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Complete assembly: 57 g</li> <li>Nozzle tip: 11 g</li> </ul>

Max. temperature: 150°C

Max. operating pressure: 2.0 MPa

The flat spray spread direction is parallel to the surface milling.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



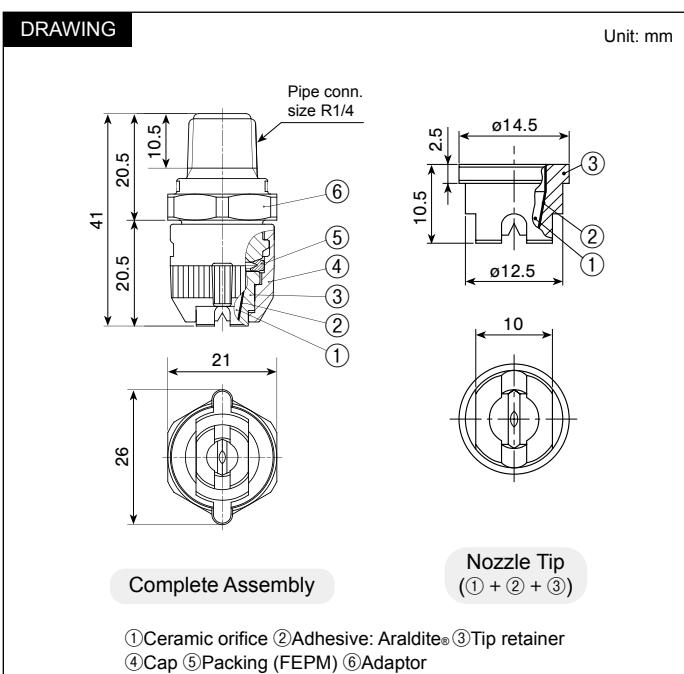
## INV SERIES (with ceramic orifice)

Structure	<ul style="list-style-type: none"> <li>Has a ceramic orifice in the nozzle tip.</li> <li>Includes a nozzle section (nozzle tip + cap + packing) and an adaptor.</li> <li>Worn-out nozzle tips and other parts are available separately for replacement.</li> <li>Easy installation and removal of the nozzle section with a twist of about 90°.</li> <li>Tip or packing will not fall out when the nozzle section is removed.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Tip retainer: S303</li> <li>Cap and Adaptor: S316L equivalent</li> <li>Packing: FEPM</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Complete assembly: 51 g</li> <li>Nozzle tip: 6.5 g</li> </ul>

Max. temperature: 60°C

Max. operating pressure: 2.0 MPa

The flat spray spread direction is parallel to the surface milling.



[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray angle code	Spray capacity code	INVV-SS	INV	Spray angle (°)			Spray capacity (L/min)								Mean droplet diameter (μm)	Free passage diameter (mm)	
				0.15 MPa	0.3 MPa	0.7 MPa	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		
115	60	○		107	115	121	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	340	1.3
	80	○		107	115	121	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	1.5
	100	○		107	115	120	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	—	1.7
	200	○		109	115	120	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	510	2.4
90	40	○		81	90	97	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	300	1.2
	50	○		81	90	97	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	—	1.2
	60	○		82	90	96	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	—	1.3
	80	○		82	90	96	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	1.5
	100	○		82	90	96	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	—	1.7
	120	○		83	90	95	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	—	2.0
	140	○		83	90	95	5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	—	2.2
	170	○		83	90	95	6.94	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	—	2.4
	200	○		84	90	95	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	540	2.7
80	30	○		70	80	87	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	290	1.0
	40	○		71	80	87	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.1
	80	○		72	80	86	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	1.5
	100	○		72	80	85	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	—	1.7
	120	○		73	80	85	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	—	2.1
	200	○		74	80	85	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	550	2.9
65	30	○		56	65	72	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	310	1.1
	40	○		56	65	71	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.3
	50	○		57	65	71	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	—	1.5
	60	○		57	65	71	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	—	1.6
	80	○		58	65	71	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	1.9
	100	○		58	65	70	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	—	2.1
	120	○		58	65	70	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	—	2.3
	140	○		59	65	69	5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	—	2.5
	170	○		59	65	69	6.94	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	—	2.8
	200	○		59	65	69	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	580	3.0
50	20	○		41	50	57	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	320	1.0
	30	○		42	50	56	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	—	1.2
	40	○		42	50	56	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.4
	80	○		43	50	55	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	2.0
	120	○		44	50	54	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	—	2.5
	200	○		45	50	53	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	640	3.3
40	20	○		32	40	46	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	380	1.0
	30	○		33	40	46	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	—	1.3
	40	○		33	40	45	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.5
	80	○		34	40	44	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	2.2
	120	○		35	40	44	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	—	2.8
	200	○		35	40	43	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	710	3.5
25	15	○		19	25	31	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	440	1.0
	30	○		19	25	30	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	—	1.4
	40	○		19	25	30	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.7
	80	○		20	25	29	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	2.4
	200	○		21	25	27	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	850	4.0
15	15	○		10	15	20	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	500	1.1
	30	○		10	15	19	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	—	1.5
	40	○		10	15	19	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	—	1.8
	80	○		11	15	18	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	—	2.6
	200	○		11	15	17	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	1,000	4.0

#### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

##### ① Complete Assembly

Example: 1/4M INVV 11560 S303 (FEPM) + S316L-IN

1/4M	INVV	115	60	S303 (FEPM)	+ S316L-IN
Pipe conn. size <sup>1</sup>	Series	Spray angle code	Spray capacity code	Nozzle tip material	Packing material
INVV	INVV	115	60	S	S
INV	INV	15	200	S	S

##### ② Nozzle Tip Only<sup>2</sup>

Example: 1/4 VV 11560 S303

1/4	VV	115	60	S303
Series	Spray angle code	Spray capacity code	Material	
VV	115	60	S	S
V	15	200	S	S

③ Adaptor (R1/4), cap, and packing are available separately for purchase.

\*2) Nozzle tips for the INVV-SS series are the same as those used for the VV series.  
Nozzle tips for the INV series are the same as those used for the V series.

\*1) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

ALSO AVAILABLE!

Stainless Steel

Quick-Detachable Even Flat Spray Nozzles **INVE SERIES** >> See page 32 of this catalog.

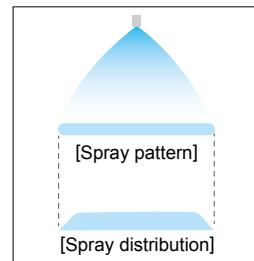
Quick-Detachable Full Cone Spray Nozzles **INJJK-SS SERIES** >> See page 74 of this catalog.

# Quick-Detachable Even Flat Spray Nozzles

Stainless Steel

**INVE**

Flat Spray



- Flat spray pattern with uniform distribution across the pattern area.
- The unique design accommodates easy installation and removal.
- Quick-detachable design helps to significantly reduce maintenance time.

#### [STANDARD PRESSURE]

0.3 MPa

#### [APPLICATIONS]

Cleaning: Automotives, containers, films, felts, filters, screens, bottles, crushed stone, earth and sand, metal parts, machines, steel plates and pieces, wires  
 Spraying: Oils, lubricants, glues, insecticides, herbicides  
 Cooling: Tanks, roofs  
 Water screen: Dust suppression, deodorization

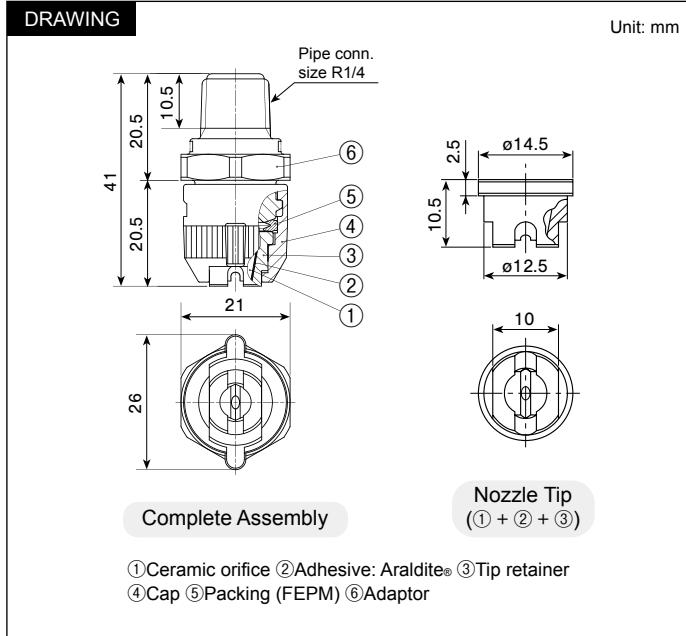
Structure	<ul style="list-style-type: none"> <li>• Has a ceramic orifice in the nozzle tip.</li> <li>• Includes a nozzle section (nozzle tip + cap + packing) and an adaptor.</li> <li>• Worn-out nozzle tips and other parts are available separately for replacement.</li> <li>• Easy installation and removal of the nozzle section with a twist of about 90°.</li> <li>• Tip or packing will not fall out when the nozzle section is removed.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: ceramic</li> <li>• Tip retainer: S303</li> <li>• Cap and Adaptor: S316L equivalent</li> <li>• Packing: FEPM</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• Complete assembly: 51 g</li> <li>• Nozzle tip: 6.5 g</li> </ul>

Max. temperature: 60°C

Max. operating pressure: 2.0 MPa

The flat spray spread direction is parallel to the surface milling.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Safe design prevents parts from falling out

Parts do not fallout

Quick-detachable

Common Features of INVV-SS, INV, INVE, and INJJX-SS Series

Easy to install and remove by hand

For more details see page 30 for the INVV-SS and INV series flat spray nozzles and page 74 for the INJJX-SS series full cone spray nozzles.

Spray angle code	Spray capacity code	Spray angle (°)			Spray capacity (L/min)									Mean droplet diameter (μm)	Free passage diameter (mm)
		0.15 MPa	0.3 MPa	0.7 MPa	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		
115	78	106	115	121	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	350	1.0
	117	106	115	120	4.78	6.75	9.55	11.7	15.1	17.8	21.4	30.2	350	1.2	
	157	106	115	120	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	450	1.4
90	36	83	90	97	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	300	1.0
	39	83	90	97	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	300	1.0
	59	83	90	97	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	300	1.2
	78	84	90	97	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	300	1.4
	117	84	90	96	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	300	1.7
80	36	72	80	84	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	310	1.0
	39	73	80	84	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	310	1.0
	59	74	80	84	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	310	1.3
	78	74	80	84	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	310	1.6
	117	75	80	84	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	310	1.9
	157	76	80	84	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	490	2.4
65	31	57	65	73	1.26	1.79	2.19	2.53	3.10	4.00	4.74	5.66	8.00	310	1.1
	36	57	65	73	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	310	1.2
	39	57	65	73	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	310	1.3
	59	58	65	72	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	310	1.4
	78	58	65	72	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	310	1.8
	117	58	65	69	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	310	2.3
	157	58	65	69	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	520	2.7
50	31	43	50	55	1.26	1.79	2.19	2.53	3.10	4.00	4.74	5.66	8.00	350	1.2
	39	43	50	55	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	350	1.4
	59	43	50	55	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	350	1.5
	78	43	50	55	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	350	2.0
	117	43	50	54	4.76	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	350	2.4
	157	43	50	54	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	570	2.9
40	23	31	40	46	0.94	1.33	1.63	1.88	2.30	2.97	3.51	4.20	5.94	350	1.1
	36	32	40	45	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	350	1.4
	59	32	40	45	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	350	1.8
	78	33	40	45	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	350	2.1
	117	33	40	44	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	350	2.6
	157	33	40	44	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	630	3.0
25	19	18	25	32	0.78	1.10	1.34	1.55	1.90	2.45	2.90	3.47	4.91	390	1.1
	31	19	25	32	1.26	1.79	2.19	2.53	3.10	4.00	4.74	5.66	8.00	390	1.4
	39	20	25	32	1.59	2.25	2.76	3.18	3.90	5.03	5.96	7.12	10.1	390	1.5
	59	21	25	32	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	390	1.9
	78	21	25	32	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	390	2.3
	117	21	25	32	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	390	2.7
	157	21	25	32	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	730	3.4
15	23	10	15	19	0.94	1.33	1.63	1.88	2.30	2.97	3.51	4.20	5.94	500	1.3
	36	10	15	19	1.47	2.08	2.55	2.94	3.60	4.65	5.50	6.57	9.30	500	1.6
	59	10	15	19	2.40	3.41	4.17	4.82	5.90	7.62	9.01	10.8	15.2	500	2.0
	78	10	15	19	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2	20.1	500	2.4
	117	10	15	19	4.78	6.75	8.27	9.55	11.7	15.1	17.8	21.4	30.2	500	3.0
	157	12	15	19	6.41	9.06	11.1	12.8	15.7	20.3	24.0	28.0	40.5	850	3.5

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**① Complete Assembly**

Example: 1/4M INVE 11578 S303 (FEPM) + S316L-IN

1/4M INVE	115	78	S303 (FEPM) + S316L-IN
Pipe conn. size <sup>1</sup>	Spray angle code	Spray capacity code	Nozzle tip material
115 15	19 157	19 157	Packing material Material of cap & adaptor

**② Nozzle Tip Only\***

Example: 1/4 VE 11578 S303

1/4 VE	115	78	S303
Spray angle code	Spray capacity code	Material	
115 15	19 157	19 157	

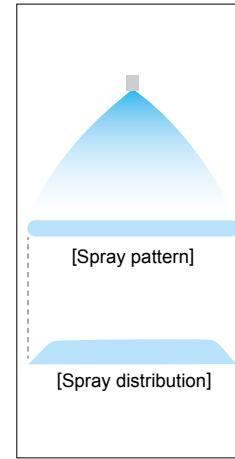
③ Adaptor (R1/4), cap, and packing are available separately for purchase.

\*1) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

\*2) Nozzle tips for the INVE series are the same as those used for the VE series.

# High Pressure Cleaning Even Flat Spray Nozzles

VNP



- Flat spray pattern with uniform distribution across the pattern area.
- Small R1/4 and R1/8 pipe connection sizes for high pressure cleaning.

## [STANDARD PRESSURE]

3.0 MPa

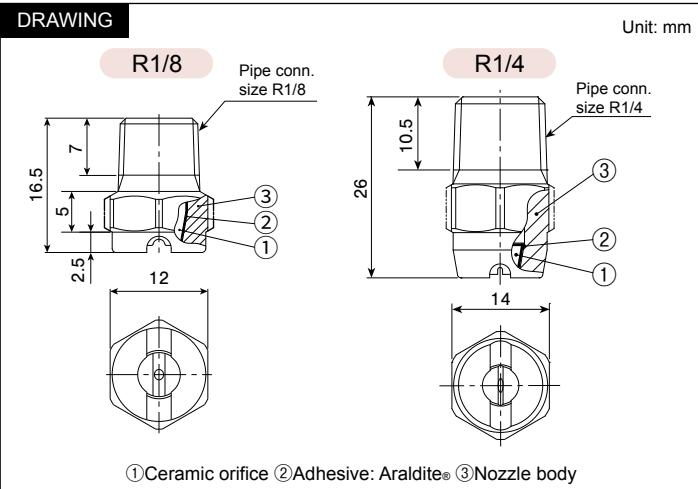
## [APPLICATIONS]

High pressure cleaning:

Automotives, containers, tanks, wire and felt parts of paper making machines, wire cylinders, filter presses, other industrial cleaning and degreasing

Structure	• One-piece structure with a ceramic orifice insert.
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Metal parts: S303 or B (brass)</li> </ul>
SPECIAL ORDER MATERIAL: S316	
Weight	<ul style="list-style-type: none"> <li>R1/8... S303: 7 g, B (brass): 7.4 g</li> <li>R1/4... S303: 20 g, B (brass): 22 g</li> </ul>

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



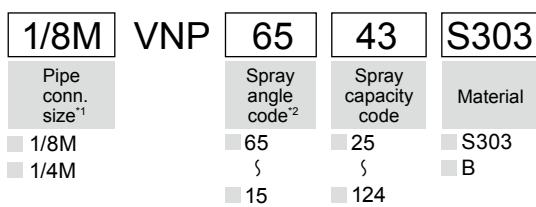
Spray angle code	Spray capacity code	Pipe conn. size		Spray angle (°)			Spray capacity (L/min)												Free pass. dia. (mm)
		R1/8	R1/4	1 MPa	3 MPa	5 MPa	1 MPa	2 MPa	2.5 MPa	3 MPa	3.5 MPa	4 MPa	4.5 MPa	5 MPa	6.5 MPa	8 MPa	10 MPa	15 MPa	
65	43	○	○	60	65	65	2.50	3.54	3.96	4.33	4.68	5.00	5.30	5.59	6.37	7.06	7.91	9.67	0.7
	49	○	○	60	65	65	2.86	4.04	4.52	4.94	5.34	5.71	6.06	6.38	7.28	8.07	9.04	11.1	0.8
	56	○	○	60	65	65	3.22	4.54	5.08	5.56	6.01	6.42	6.81	7.18	8.19	9.08	10.2	12.4	0.9
	62	○	○	60	65	65	3.57	5.05	5.65	6.18	6.68	7.14	7.57	7.98	9.10	10.1	11.3	13.8	0.9
	68	○	○	60	65	65	3.93	5.55	6.21	6.80	7.35	7.85	8.33	8.79	10.0	11.1	12.4	15.2	1.0
	74	○	○	60	65	65	4.29	6.06	6.78	7.42	8.01	8.56	9.09	9.58	10.9	12.1	13.6	16.6	1.0
	80	○	○	60	65	65	4.65	6.56	7.35	8.04	8.68	9.28	9.85	10.4	11.8	13.1	14.7	18.0	1.0
	87	○	○	60	65	65	5.00	7.07	7.91	8.66	9.35	10.0	10.6	11.2	12.8	14.1	15.8	19.4	1.1
	99	○	○	60	65	65	5.72	8.08	9.04	9.89	10.7	11.4	12.1	12.8	14.6	16.2	18.1	22.1	1.1
	124	○	○	60	65	65	7.15	10.1	11.3	12.4	13.4	14.3	15.2	16.0	18.2	20.2	22.6	27.7	1.3
40	25	○	○	35	40	40	1.43	2.02	2.25	2.47	2.67	2.85	3.03	3.19	3.64	4.03	4.51	5.52	0.6
	31	○	○	35	40	40	1.78	2.52	2.82	3.09	3.34	3.57	3.78	3.99	4.55	5.05	5.64	6.91	0.7
	37	○	○	35	40	40	2.14	3.03	3.39	3.71	4.01	4.28	4.54	4.79	5.46	6.06	6.77	8.30	0.7
	43	○	○	35	40	40	2.50	3.54	3.96	4.33	4.68	5.00	5.30	5.59	6.37	7.06	7.91	9.67	0.8
	49	○	○	35	40	40	2.86	4.04	4.52	4.94	5.34	5.71	6.06	6.38	7.28	8.07	9.04	11.1	1.0
	56	○	○	35	40	40	3.22	4.54	5.08	5.56	6.01	6.42	6.81	7.18	8.19	9.08	10.2	12.4	1.0
	62	○	○	35	40	40	3.57	5.05	5.65	6.18	6.68	7.14	7.57	7.98	9.10	10.1	11.3	13.8	1.1
	68	○	○	35	40	40	3.93	5.55	6.21	6.80	7.35	7.85	8.33	8.79	10.0	11.1	12.4	15.2	1.1
	74	○	○	35	40	40	4.29	6.06	6.78	7.42	8.01	8.56	9.09	9.58	10.9	12.1	13.6	16.6	1.1
	80	○	○	35	40	40	4.65	6.56	7.35	8.04	8.68	9.28	9.85	10.4	11.8	13.1	14.7	18.0	1.2
30	87	○	○	35	40	40	5.00	7.07	7.91	8.66	9.35	10.0	10.6	11.2	12.8	14.1	15.8	19.4	1.2
	99	○	○	35	40	40	5.72	8.08	9.04	9.89	10.7	11.4	12.1	12.8	14.6	16.2	18.1	22.1	1.4
	124	○	○	35	40	40	7.15	10.1	11.3	12.4	13.4	14.3	15.2	16.0	18.2	20.2	22.6	27.7	1.5

Spray angle code	Spray capacity code	Pipe conn. size		Spray angle (°)			Spray capacity (L/min)											Free pass. dia. (mm)	
		R1/8	R1/4	1 MPa	3 MPa	5 MPa	1 MPa	2 MPa	2.5 MPa	3 MPa	3.5 MPa	4 MPa	4.5 MPa	5 MPa	6.5 MPa	8 MPa	10 MPa	15 MPa	
25	25	○	○	22	25	25	1.43	2.02	2.25	2.47	2.67	2.85	3.03	3.19	3.64	4.03	4.51	5.52	0.7
	31	○	○	22	25	25	1.78	2.52	2.82	3.09	3.34	3.57	3.78	3.99	4.55	5.05	5.64	6.91	0.7
	37	○	○	22	25	25	2.14	3.03	3.39	3.71	4.01	4.28	4.54	4.79	5.46	6.06	6.77	8.30	0.8
	43	○	○	22	25	25	2.50	3.54	3.96	4.33	4.68	5.00	5.30	5.59	6.37	7.06	7.91	9.67	0.9
	49	○	○	22	25	25	2.86	4.04	4.52	4.94	5.34	5.71	6.06	6.38	7.28	8.07	9.04	11.1	1.0
	56	○	○	22	25	25	3.22	4.54	5.08	5.56	6.01	6.42	6.81	7.18	8.19	9.08	10.2	12.4	1.0
	62	○	○	22	25	25	3.57	5.05	5.65	6.18	6.68	7.14	7.57	7.98	9.10	10.1	11.3	13.8	1.1
	68	○	○	22	25	25	3.93	5.55	6.21	6.80	7.35	7.85	8.33	8.79	10.0	11.1	12.4	15.2	1.2
	74	○	○	22	25	25	4.29	6.06	6.78	7.42	8.01	8.56	9.09	9.58	10.9	12.1	13.6	16.6	1.2
	80	○	○	22	25	25	4.65	6.56	7.35	8.04	8.68	9.28	9.85	10.4	11.8	13.1	14.7	18.0	1.2
	87	○	○	22	25	25	5.00	7.07	7.91	8.66	9.35	10.0	10.6	11.2	12.8	14.1	15.8	19.4	1.3
15	99	○	○	22	25	25	5.72	8.08	9.04	9.89	10.7	11.4	12.1	12.8	14.6	16.2	18.1	22.1	1.4
	124	○	○	22	25	25	7.15	10.1	11.3	12.4	13.4	14.3	15.2	16.0	18.2	20.2	22.6	27.7	1.6

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/8M VNP 6543 S303

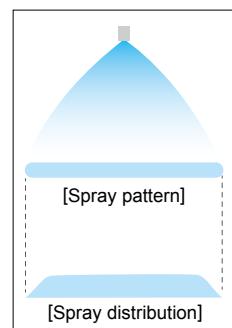
<sup>1</sup> "M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.<sup>2</sup> Material of ceramic orifice differs depending on the nozzle code.

When the spray angle code is 25 or 15 and the spray capacity code is between 43–124, it is marked by "AL99-" before the material code.

Example: 1/8M VNP 2543 AL99-S303

# Descaling Nozzles

DSP


**[STANDARD PRESSURE]**

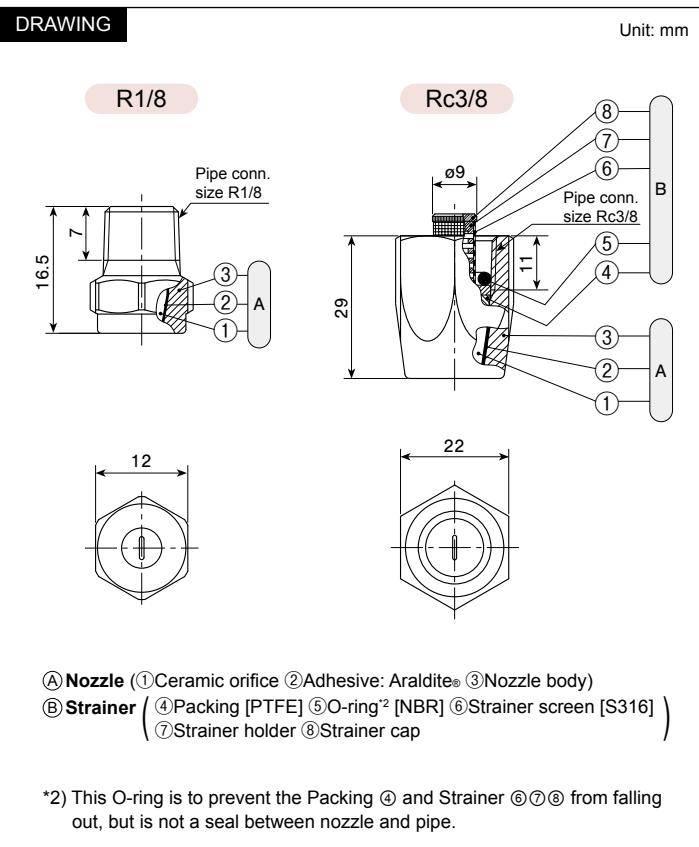
5.0 MPa

**[APPLICATIONS]**

High pressure cleaning, descaling, rust-removal, degreasing

Structure	<ul style="list-style-type: none"> <li>One-piece structure with a ceramic orifice insert.</li> <li>From the inlet to the throat the ceramic orifice is round and then draws together into a rectangular slit towards the outlet.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Metal parts: S303</li> </ul>
Weight <sup>*1</sup>	<ul style="list-style-type: none"> <li>R1/8: 7 g</li> <li>Rc3/8: 52 g</li> </ul>

\*1) With strainer, add 5 g to the above weight.



[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Strainer is optional on some models of Rc3/8 DSP series and can be ordered without it. See table for details. The strainer version is made-to-order.

Spray angle code	Spray capacity code	Pipe conn. size		Spray angle (°)			Spray capacity (L/min)										Free pass. dia. (mm)
		R1/8	Rc3/8	3 MPa	5 MPa	10 MPa	3 MPa	3.5 MPa	4 MPa	4.5 MPa	5 MPa	6.5 MPa	8 MPa	10 MPa	15 MPa	20 MPa	
15	56	○		14	15	15	4.33	4.68	5.00	5.30	5.59	6.37	7.06	7.91	9.67	11.2	0.4
	64	○		14	15	15	4.94	5.34	5.71	6.06	6.38	7.28	8.07	9.04	11.1	12.8	0.4
	72	○		14	15	15	5.56	6.01	6.42	6.81	7.18	8.19	9.08	10.2	12.4	14.4	0.4
	80	○		14	15	15	6.18	6.68	7.14	7.57	7.98	9.10	10.1	11.3	13.8	16.0	0.4
	88	○		14	15	15	6.80	7.35	7.85	8.33	8.79	10.0	11.1	12.4	15.2	17.6	0.4
	96	○		14	15	15	7.42	8.01	8.56	9.09	9.58	10.9	12.1	13.6	16.6	19.1	0.5
	104	○		14	15	15	8.04	8.68	9.28	9.85	10.4	11.8	13.1	14.7	18.0	20.8	0.5
	112	○		14	15	15	8.66	9.35	10.0	10.6	11.2	12.8	14.1	15.8	19.4	22.4	0.5
	120	○		14	15	15	9.26	10.0	10.7	11.4	12.0	13.7	15.2	17.0	20.8	24.0	0.6
	128	○		14	15	15	9.89	10.7	11.4	12.1	12.8	14.6	16.2	18.1	22.1	25.6	0.6
	144	○		14	15	15	11.1	12.0	12.9	13.6	14.4	16.4	18.2	20.3	24.9	28.8	0.7
	160	○		14	15	15	12.4	13.4	14.3	15.2	16.0	18.2	20.2	22.6	27.7	32.0	0.8

Spray angle code	Spray capacity code	Pipe conn. size		Spray angle (°)		Spray capacity (L/min)										Free pass. dia. (mm)	
		R1/8	Rc3/8	3 MPa	5 MPa	10 MPa	3 MPa	3.5 MPa	4 MPa	4.5 MPa	5 MPa	6.5 MPa	8 MPa	10 MPa	15 MPa	20 MPa	
12	83	● <sup>3)</sup>	11	11	12	12	6.43	6.94	7.42	7.87	8.30	9.46	10.5	11.7	14.4	16.6	0.4
	103	● <sup>3)</sup>	11	11	12	12	7.98	8.62	9.21	9.77	10.3	11.7	13.0	14.6	17.8	20.6	0.4
	148	○	11	12	12	12	11.5	12.4	13.2	14.0	14.8	16.9	18.7	20.9	25.6	29.6	0.5
	166	○	11	12	12	12	12.9	13.9	14.8	15.7	16.6	18.9	21.0	23.5	28.8	33.2	0.5
	189	○	11	12	12	12	14.6	15.8	16.9	17.9	18.9	21.5	23.9	26.7	32.7	37.8	0.6
	224	○	11	12	12	12	17.4	18.7	20.0	21.3	22.4	25.5	28.2	31.6	38.8	44.7	0.7
	250	○	11	12	12	12	19.4	20.9	22.4	23.7	25.0	28.5	31.6	35.4	43.3	50.0	0.7
	300	○	11	12	12	12	23.2	25.1	26.8	28.5	30.0	34.2	37.9	42.4	52.0	60.0	0.9
	332	○	11	12	12	12	25.7	27.8	29.7	31.5	33.2	37.9	42.0	46.9	57.5	66.4	1.0
	478	○	11	12	12	12	37.0	40.1	42.8	45.3	47.8	54.5	60.5	67.7	82.8	95.7	1.5
	865	○	11	12	12	12	67.0	72.5	77.4	82.1	86.5	98.6	110	123	150	173	2.6

●: Available with or without strainer (strainer mesh size #150) ○: Only available without strainer

\*3) Made-to-order model

#### Attention:

Please make sure to only use clean water to prevent the nozzles from clogging.

#### Cleaning Power

The factors that determine the cleaning power of a nozzle are complex. To evaluate the effectiveness, we use the spray impact and the amount of erosion. In general, with an equal liquid pressure, spray capacity and distance, the solid stream jet nozzle has the strongest cleaning power, followed by the flat spray nozzle and the cone spray nozzle. Below is a comparison between our VNP and DSP flat spray nozzles.

#### [Spray Impact]

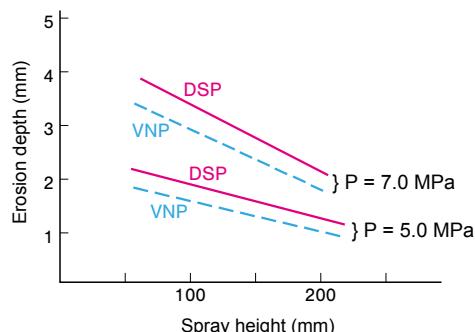
	Spray impact ( $\times \frac{1}{100}$ N/cm)	
	Max.	Average
1/8M DSP 15104	560	503
1/8M VNP 1580	460	390



#### [Amount of Erosion]

The amount of erosion is the depth of the depression on a sample piece dug out by the flat spray nozzle.

Specifications	1/8M DSP 15104	1/8M VNP 1580
Pressure (MPa)	5.0	7.0
Spray angle (°)	16.0	16.0
Spray capacity (L/min)	9.9	11.7



#### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/8M DSP 1556 BR-S303

1/8M	DSP	15	56	BR-S303	
Pipe conn. size <sup>4)</sup>	Spray angle code	Spray capacity code	Material	Strainer	
1/8M 3/8F	15 12	56 S 865			

W (with strainer)  
(Blank indicates "without strainer")

\*4) "M" indicates male thread ("R" of the ISO standard) and "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/8M = R1/8, 3/8F = Rc3/8.

Rc3/8 DSP with strainer is made-to-order.

# Wide-Angle Flat Spray Nozzles

YYP



[Spray pattern]

Flat Spray

## [STANDARD PRESSURE]

0.15 MPa

- Wide-angle flat spray nozzle to use at low pressure.
- Compared to other flat spray nozzles with the same spray flow rate, the free passage diameter is large and clogging is less likely to occur.
- Compared to other flat spray nozzles, the atomization, spray pattern and distribution are rough, and the spray impact is low.

## [APPLICATIONS]

Cleaning: Conveyor belts, film, eliminator plates, plate glass, planks

Foam breaking: Waste water treatment, paper making

Cooling: Conveyor belts, roofs, tanks

Water screen: Fire protection, heat protection, deodorization

Others: Applications which require wide angle flat spray at low pressures

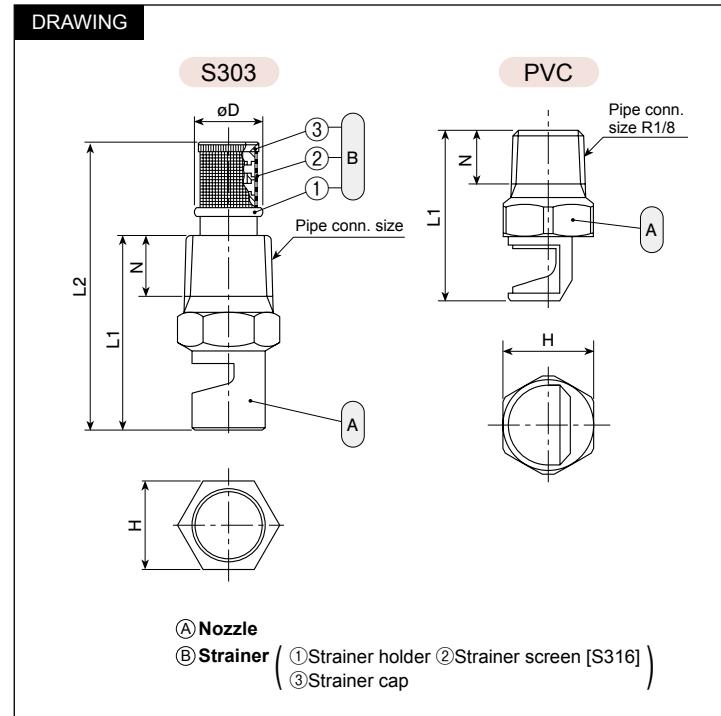
Structure	<ul style="list-style-type: none"> <li>• One-piece structure, made of metal or plastic.</li> <li>• Small spray capacity models come with or without a strainer. (No strainers for YYP-PVC.)</li> </ul>
Material	<ul style="list-style-type: none"> <li>• S303 or PVC</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or others</p>

Material	Pipe conn. size <sup>1</sup>	Dimensions (mm)					Weight (g)	
		L1	L2	H	øD	N	S303 <sup>2</sup>	PVC
Metal (S303)	R1/8 (03-13)	23	35.5	10	7.5	7	7.5	—
	R1/8 (16-60)	25	—	10	—	7	9.3	—
	R1/4	34	—	14	—	10.5	28	—
	R3/8	44	—	19	—	11	65	—
	R1/2	50	—	22	—	14	105	—
	R3/4 (620)	55	—	27	—	15	175	—
	R3/4 (1000)	65	—	36	—	15	345	—
	R1	75	—	41	—	18	510	—
PVC	R1/8 (03-13)	21.5	—	12	—	7	—	1.5
	R1/8 (16-30)	22.5	—	12	—	7	—	1.9

\*1) Figures in ( ) after the pipe connection sizes indicate the spray capacity codes.

\*2) With strainer, add 2 g to the above weight.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

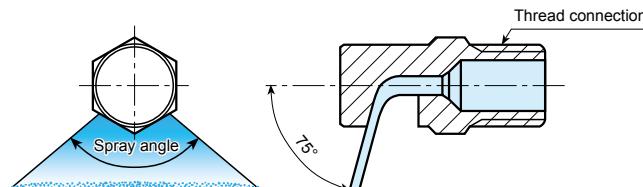


Strainer is optional on some metal YYP models and can be ordered without it.  
See table for details.

## Spray Angle and Elevation Angle

Wide-angle flat spray nozzles spray at an angle of 75° to the axis of the nozzle.

For installation, the elevation (inclination) angle of 75° should be taken into consideration.



## ■ YYP Series (metal)

Spray capacity code	Pipe connection size						Spray angle (°)			Spray capacity (L/min)					Mean droplet dia. (µm)	Free passage dia. (mm)	Strainer mesh size
	R1/8	R1/4	R3/8	R1/2	R3/4	R1	0.05 MPa	0.15 MPa	0.2 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa			
03	●						—	100	107	—	—	0.25	0.30	0.35	190	0.6	100
04	●						—	120	126	—	—	0.33	0.40	0.46		0.6	50
05	●						—	130	136	—	—	0.41	0.50	0.58		0.7	50
07	○						—	130	136	—	—	0.57	0.70	0.81	~	0.9	—
10	○						103	130	135	—	0.58	0.82	1.00	1.15		1.1	—
13	○						108	130	135	—	0.75	1.06	1.30	1.50		1.2	—
16	○						110	130	134	—	0.92	1.31	1.60	1.85	280	1.4	—
20	○						116	135	139	0.89	1.15	1.63	2.00	2.31		1.5	—
25	○						117	135	139	1.12	1.44	2.04	2.50	2.89		1.7	—
30	○						118	135	139	1.34	1.73	2.45	3.00	3.46	~	1.9	—
40	○						119	135	139	1.79	2.31	3.27	4.00	4.62		2.2	—
50	○						120	135	138	2.24	2.89	4.08	5.00	5.77		2.4	—
60	○						121	135	138	2.68	3.46	4.90	6.00	6.93	470	2.6	—
70		○					125	140	144	3.13	4.04	5.72	7.00	8.08	480	2.9	—
100		○					128	140	143	4.47	5.77	8.16	10.0	11.5	~	3.4	—
140		○					130	140	143	6.26	8.08	11.4	14.0	16.2	610	4.1	—
180		○					131	140	142	8.05	10.4	14.7	18.0	20.8	~	4.8	—
230							133	140	142	10.3	13.3	18.8	23.0	26.6	650	5.2	—
320							134	140	142	14.3	18.5	26.1	32.0	37.0	~	6.3	—
450							135	140	142	20.1	26.0	36.7	45.0	52.0	850	7.4	—
620							135	140	142	27.7	35.8	50.6	62.0	71.6	~	8.8	—
1000							135	140	141	44.7	57.7	81.6	100	115	1,150	11.5	—
1500							136	140	140	67.1	86.6	122	150	173	1,100	14.0	—
2500							136	140	140	112	155	204	250	289	1,550	18.4	—

●: Available with or without strainer ○: Only available without strainer

## ■ YYP-PVC Series

Spray capacity code	Spray angle (°)			Spray capacity (L/min)					Mean droplet diameter (µm)	Free passage diameter (mm)
	0.05 MPa	0.15 MPa	0.2 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa		
03	—	115	122	—	—	0.25	0.30	0.35	190	0.6
04	—	120	126	—	—	0.33	0.40	0.46		0.6
05	—	130	136	—	—	0.41	0.50	0.58		0.7
07	—	130	136	—	—	0.57	0.70	0.81	~	0.9
10	103	130	135	—	0.58	0.82	1.00	1.15		1.0
13	108	130	135	—	0.75	1.06	1.30	1.50		1.2
16	110	130	134	—	0.92	1.31	1.60	1.85	280	1.3
20	116	135	139	0.89	1.15	1.63	2.00	2.31	~	1.5
25	117	135	139	1.12	1.44	2.04	2.50	2.89	~	1.6
30	118	135	139	1.34	1.73	2.45	3.00	3.46	380	1.8

[Note] No strainers for YYP-PVC.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

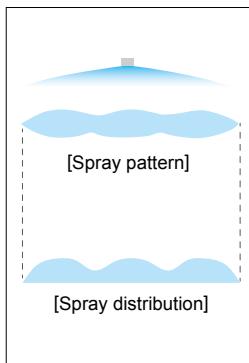
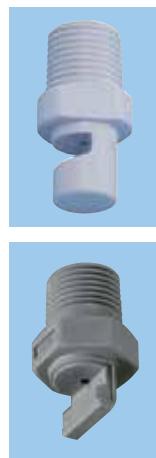
Example: 1/8M YYP 03 S303W

1/8M	YYP	03	S303	W	Pipe conn. size <sup>3</sup>	Spray capacity code	Material	Strainer
1/8M		03	S303		1/8M	03	S303	W (with strainer)
1M					1M	2500	PVC (Injection molded)	(Blank indicates "without strainer")

<sup>3</sup>) "M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

# Wide-Angle Flat Spray Nozzles for Ultra-Low Pressure Spraying

**LYYP**



- Wide-angle flat spray nozzle that can maintain a fan-shaped spray pattern at ultra-low pressure, even as low as 0.015 MPa.
- The low spray impact and volume, create a bubble-free spray surface.
- Compared to other flat spray nozzles with the same spray flow rate, the free passage diameter is large and clogging is less likely to occur.
- Oil-free product.

## [STANDARD PRESSURE]

0.015 MPa

## [APPLICATIONS]

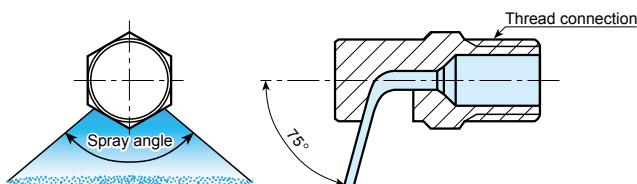
Spraying developing solution in semi-conductor manufacturing processes, ultra-low volume spray for pharmaceutical manufacturing processes, chemical spraying to surface treated steel plates

Structure	• One-piece structure made of plastic.
Material	• PVC SPECIAL ORDER MATERIAL: S316 or PCTFE
Weight	• 1.5 g (Injection-molded LYYP weigh 1.4 g)

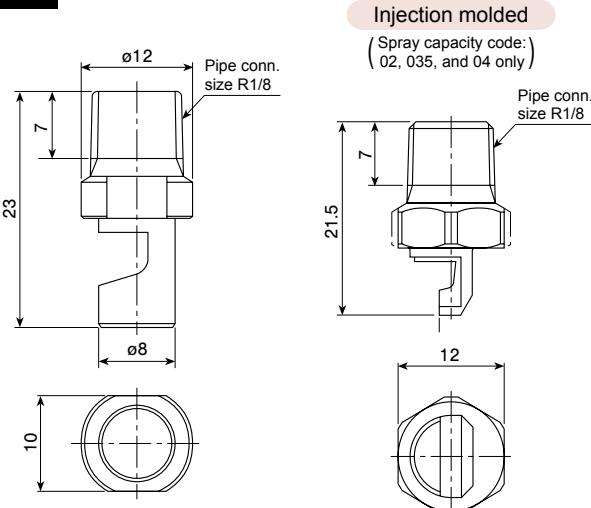
## Spray Angle and Elevation Angle

Wide-angle flat spray nozzles spray at an angle of 75° to the axis of the nozzle.

For installation, the elevation (inclination) angle of 75° should be taken into consideration.



## DRAWING



Unit: mm

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray capacity code	LYYP	LYYP (Injection molded)	Spray angle (°)			Spray capacity (L/min)							Mean droplet diameter (μm)	Free passage diameter (mm)
			0.01 MPa	0.015 MPa	0.02 MPa	0.008 MPa	0.01 MPa	0.012 MPa	0.015 MPa	0.02 MPa	0.03 MPa	0.04 MPa		
02	○	○	—	70	77	—	—	0.18	0.20	0.23	0.28	0.33	850	0.9
025	○	○	67	80	87	—	0.20	0.22	0.25	0.29	0.35	0.41		1.0
03	○	○	77	90	97	0.22	0.24	0.27	0.30	0.35	0.42	0.49		1.0
035	○	○	87	100	107	0.26	0.29	0.31	0.35	0.40	0.49	0.57		1.1
04	○	○	88	100	108	0.29	0.33	0.36	0.40	0.46	0.57	0.65		1.3
05	○	○	97	110	117	0.37	0.41	0.45	0.50	0.58	0.71	0.82		1.3
06	○	○	107	120	127	0.44	0.49	0.54	0.60	0.69	0.85	0.98		1.4
07	○	○	107	120	127	0.51	0.57	0.63	0.70	0.81	0.99	1.14		1.6
08	○	○	108	120	128	0.58	0.65	0.72	0.80	0.92	1.13	1.31		1.7
10	○	○	108	120	128	0.73	0.82	0.89	1.00	1.15	1.41	1.63	1,350	1.9

[Note] The LYYP series nozzles are guaranteed for a spray angle within -5° to +10° of the rated angle and for a spray capacity within +/-10% of the rated capacity under standard pressure.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### LYYP

Example: 1/8M LYYP 025 PVC

1/8M LYYP **025** PVC

Pipe conn. size <sup>1</sup>	Spray capacity code	Material
025	025	
10		

### LYYP (injection molded)

Example: 1/8M LYYP 02 PVC-IN

1/8M LYYP **02** PVC-IN

Pipe conn. size <sup>1</sup>	Spray capacity code	Material
02	02	
035 <sup>2</sup>	035 <sup>2</sup>	
10	04	

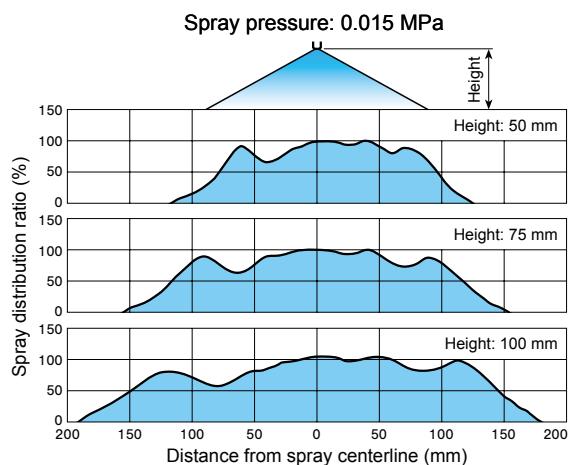
\*2) With a spray capacity code of 035, the nozzle description is 1/8M LYYP 035 PVC (injection-molded).

<sup>1)</sup> "M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

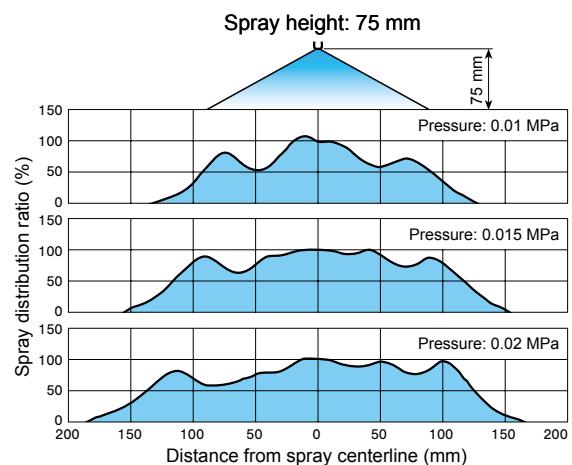
## Spray Distribution of LYYP Series Wide-Angle Flat Spray Ultra-Low Pressure Nozzles

The variation in spray distribution is minimal despite changes in the spray height and spray pressure.

■Nozzle: 1/8MLYYP07PVC

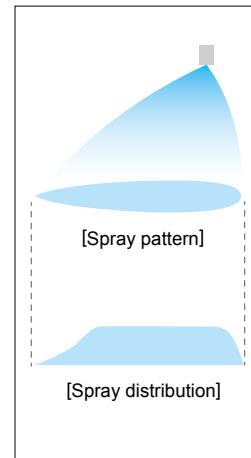


Relation between spray height and spray distribution



Relation between spray pressure and spray distribution

# Off-Center Even Flat Spray Nozzles OVVEP



- Off-center flat spray pattern with uniform distribution across the pattern area.
- In a multi-nozzle arrangement the diagonal spray of the OVVEP series prevents liquid puddles.
- No need to install the nozzles at an angle, as the angle is already built into the nozzle design.

## [STANDARD PRESSURE]

0.3 MPa

## [APPLICATIONS]

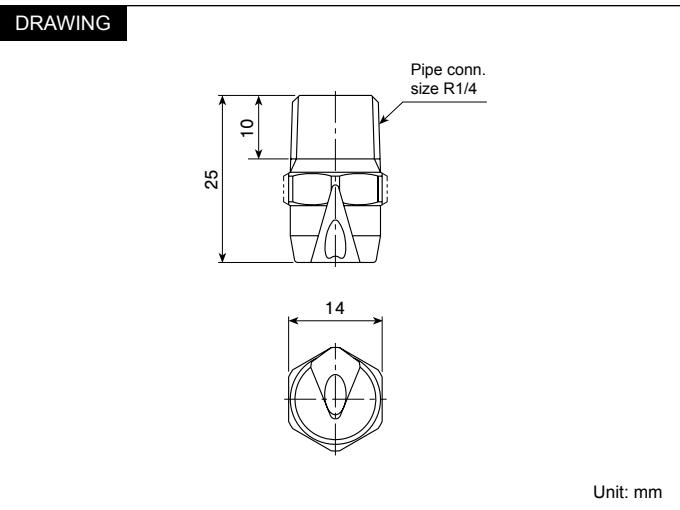
Cooling: Steel plates, steel pieces

Spraying: Etchants, oils, lubricants, glues, acids, insecticides, herbicides

Cleaning: Steel plates, steel pieces, filters, felts, screens

Structure	<ul style="list-style-type: none"> <li>• One-piece structure, made of metal.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or others</p>
Weight	<ul style="list-style-type: none"> <li>• 17 g</li> </ul>

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray angle code	Spray capacity code	Spray angle (°)			Spray capacity (L/min)										Mean droplet dia. (µm)	Free passage dia. (mm)	
		0.05 MPa	0.3 MPa	0.7 MPa	0.05 MPa	0.07 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa		
60	200	56	60	62	8.2	9.7	11.5	14.1	16.3	20.0	25.8	30.6	36.5	44.7	51.6	540	3.1
	250	57	60	61	10.2	12.1	14.4	17.7	20.4	25.0	32.3	38.2	45.6	55.9	64.5	64.5	3.3
	300	57	60	61	12.2	14.5	17.3	21.2	24.5	30.0	38.7	45.8	54.8	67.1	77.5	670	3.2
45	200	41	45	48	8.2	9.7	11.5	14.1	16.3	20.0	25.8	30.6	36.5	44.7	51.6	600	3.1
	250	42	45	47	10.2	12.1	14.4	17.7	20.4	25.0	32.3	38.2	45.6	55.9	64.5	64.5	3.4
	300	42	45	47	12.2	14.5	17.3	21.2	24.5	30.0	38.7	45.8	54.8	67.1	77.5	750	3.9

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M OVVEP 60200 S303

1/4M OVVEP **60** **200** **S303**

Pipe conn. size\*

Spray angle code

- 60
- 45
- 200
- 250
- 300

Spray capacity code

Material

## ALSO AVAILABLE!

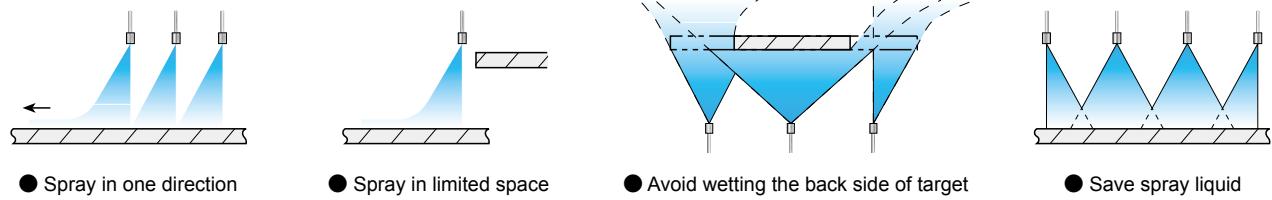
Quick-Detachable  
Off-Center Even Flat  
Spray Nozzles

**INOVVE**  
**SERIES**

See page 28 for  
more details.

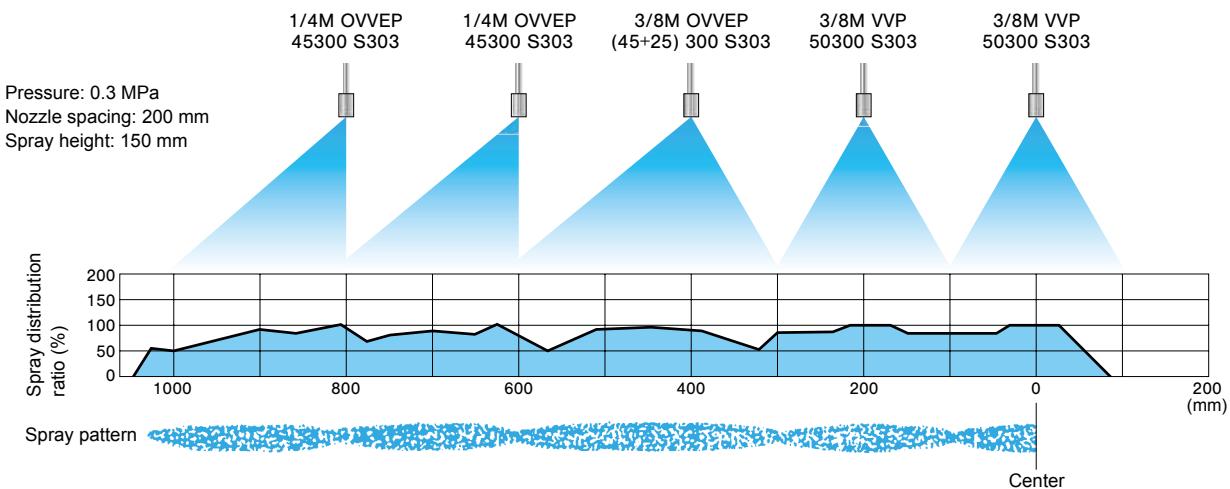
\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

### How to Use Off-Center Even Flat Spray Nozzles



### Combined Use with Standard Flat Spray Nozzles

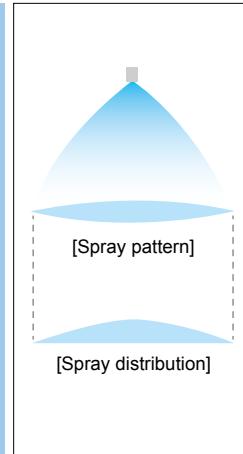
For applications such as cooling steel plates, the direction of flow can be controlled by using a combination of OVVEP series nozzles and standard flat spray nozzles.



# High-Frequency Pulse Spraying Solenoid-Controlled Flat Spray Nozzles

Made-to-Order

**SD-VV/SD-V**



- Controls the spray ON/OFF with electrical signal ON/OFF. Intermittent spray with min. 0.05 sec/shot and as little as 0.17 cc/shot is possible.
- Ideal for applying a small amount of coating or marking with minimal splatter, saving liquid used.
- Changing the spray ON/OFF time setting can adjust the spray flow rate while maintaining the spray pattern and droplet size.

## [STANDARD PRESSURE]

0.3 MPa

## [APPLICATIONS]

- Coating: Water, oil, lubricant, insecticide, herbicide, aqueous solution
- Moisture control: Paper, food
- Cooling: glass plate

### SD-VV SERIES

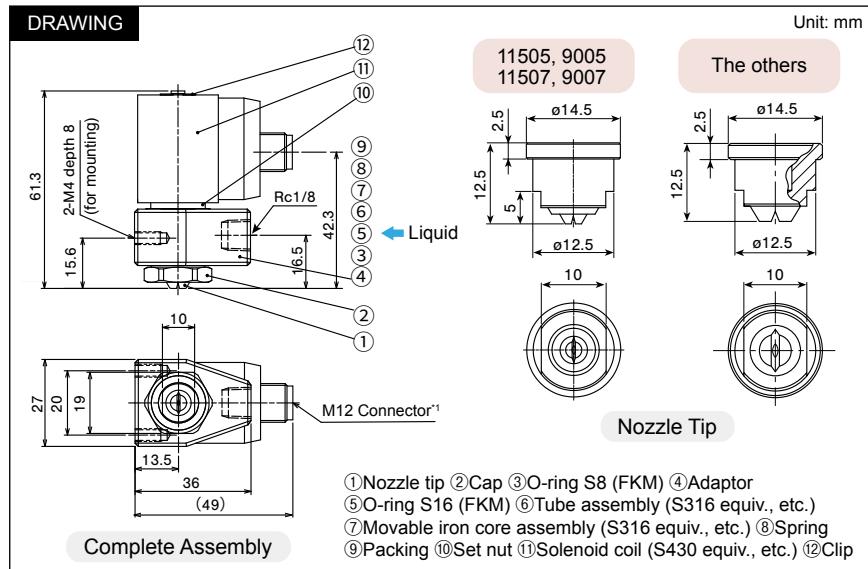
Structure	<ul style="list-style-type: none"> <li>Includes a nozzle tip, cap, and adaptor-solenoid section.</li> </ul> <p>Nozzle tips can be replaced for wear or changed to achieve a different spray capacity and angle.</p>
Material	<ul style="list-style-type: none"> <li>Nozzle tip: S303</li> <li>Cap, Adaptor: S304</li> <li>Solenoid section: Various materials</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Complete assembly: 220 g</li> <li>Nozzle tip: 10 g</li> </ul>

Max. temperature: 60°C

Protection Structure IP67

SD-VV: The materials used in the parts that come into contact with liquids comply with the Food Sanitation Law in Japan.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



\*1) Cable for M12 connector not included. Please use SMC Corporation's "JSX022-30-1-length" cable (length: 1m, 2m, or 5m).

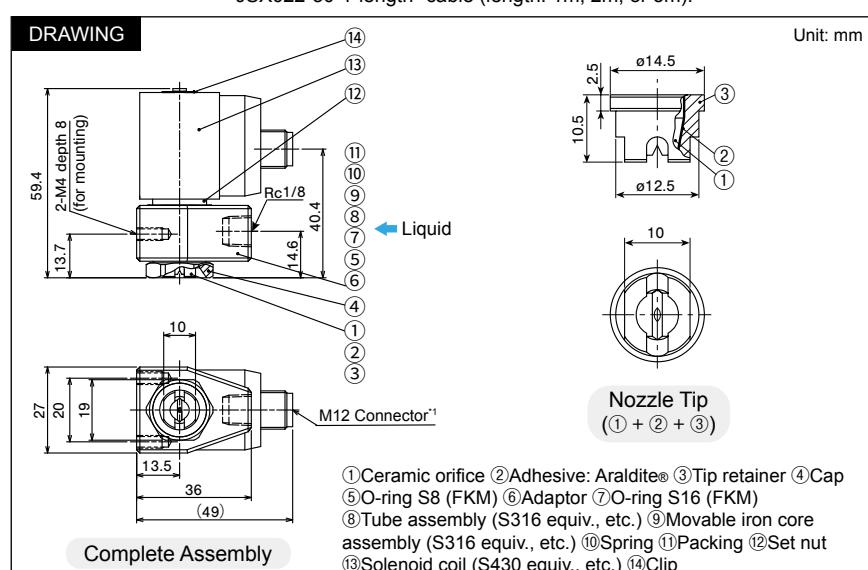
### SD-V SERIES (with ceramic orifice)

Structure	<ul style="list-style-type: none"> <li>Has a ceramic orifice in the nozzle tip.</li> <li>Includes a nozzle tip, cap, and adaptor-solenoid section. Nozzle tips can be replaced for wear or changed to achieve a different spray capacity and angle.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle tip: S303 with ceramic orifice</li> <li>Cap, Adaptor: S304</li> <li>Solenoid section: Various materials</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Complete assembly: 220 g</li> <li>Nozzle tip: 6.6 g</li> </ul>

Max. temperature: 60°C

Protection Structure IP67

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



### Solenoid Specifications (for SD-VV and SD-V Series)

#### Valve

Valve structure	Direct acting poppet
Orifice diameter	ø1.6 mm
Pressure resistance	2.0 MPa
Max.operating pressure difference	0.9 MPa
Ambient temperature	-20~60°C
Operating fluid temperature (water)	1~60°C
Operating fluid temperature (oil)	-5~60°C (w/ dynamic viscosity of 50mm²/s or less)
Materials	Body: Stainless steel, Seal: FKM
Protection structure	IP67

#### Coil

Rated voltage	24 VDC
Allowable voltage fluctuation	±10% of rated voltage
Allowable leakage voltage	Less than 2% of rated voltage
Electrical circuit	N.C.
Temperature rise value	65°C
Power consumption	4W

Spray angle code	Spray capacity code	SD-VV	SD-V	Spray angle (°)			Spray capacity (L/min) <sup>2</sup>								Mean droplet diameter (μm)	Free passage diameter (mm)
				0.15 MPa	0.3 MPa	0.7 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	0.9 MPa		
115	03			100	114	124	—	0.17	0.21	0.24	0.29	0.38	0.45	0.51	160	0.2
	04			100	114	124	—	0.22	0.28	0.32	0.39	0.50	0.59	0.67	170	0.2
	05			101	114	124	—	0.28	0.34	0.39	0.48	0.62	0.74	0.84	180	0.3
	07			101	113	124	—	0.38	0.47	0.54	0.67	0.86	1.02	1.15	190	0.3
	10			101	112	123	0.38	0.54	0.66	0.76	0.93	1.20	1.42	1.61	200	0.4
	15			101	111	122	0.54	0.77	0.94	1.08	1.33	1.71	2.02	2.30	250	0.5
90	02			74	89	100	—	0.11	0.14	0.16	0.20	0.25	0.30	0.34	150	0.2
	03			74	89	100	—	0.17	0.21	0.24	0.29	0.38	0.45	0.51	170	0.2
	04			75	89	100	—	0.22	0.28	0.32	0.39	0.50	0.59	0.67	180	0.3
	05			76	89	99	—	0.28	0.34	0.39	0.48	0.62	0.74	0.84	190	0.3
	07			76	88	99	—	0.38	0.47	0.54	0.67	0.86	1.02	1.15	200	0.4
	10			76	87	98	0.41	0.54	0.66	0.76	0.93	1.20	1.42	1.61	210	0.5
80	15			75	86	97	0.61	0.77	0.94	1.08	1.33	1.71	2.02	2.30	270	0.5
	02			65	79	90	—	0.11	0.14	0.16	0.20	0.25	0.30	0.34	160	0.2
	03			65	79	90	—	0.17	0.21	0.24	0.29	0.38	0.45	0.51	170	0.3
	04			65	79	90	—	0.22	0.28	0.32	0.39	0.50	0.59	0.67	180	0.3
	05			66	78	89	—	0.28	0.34	0.39	0.48	0.62	0.74	0.84	200	0.3
	07			66	78	88	—	0.38	0.47	0.54	0.67	0.86	1.02	1.15	210	0.4
65	10			66	77	88	0.41	0.54	0.66	0.76	0.93	1.20	1.42	1.61	220	0.5
	15			65	76	87	0.61	0.77	0.94	1.08	1.33	1.71	2.02	2.30	280	0.5
	02			51	64	75	—	0.11	0.14	0.16	0.20	0.25	0.30	0.34	160	0.2
	03			51	64	75	—	0.17	0.21	0.24	0.29	0.38	0.45	0.51	170	0.3
	04			50	64	75	—	0.22	0.28	0.32	0.39	0.50	0.59	0.67	180	0.3
	05			51	64	74	—	0.28	0.34	0.39	0.48	0.62	0.74	0.84	210	0.4
50	07			51	63	73	—	0.38	0.47	0.54	0.67	0.86	1.02	1.15	220	0.5
	10			52	62	72	0.41	0.54	0.66	0.76	0.93	1.20	1.42	1.61	230	0.5
	15			51	61	72	0.61	0.77	0.94	1.08	1.33	1.71	2.02	2.30	290	0.5
	03			36	49	60	—	0.17	0.21	0.24	0.29	0.38	0.45	0.51	200	0.3
	04			36	49	60	—	0.22	0.28	0.32	0.39	0.50	0.59	0.67	210	0.4
	05			37	48	59	—	0.28	0.34	0.39	0.48	0.62	0.74	0.84	230	0.4
40	07			37	48	58	—	0.38	0.47	0.54	0.67	0.86	1.02	1.15	240	0.5
	10			38	48	57	0.38	0.54	0.66	0.76	0.93	1.20	1.42	1.61	250	0.5
	15			37	47	56	0.54	0.77	0.94	1.08	1.33	1.71	2.02	2.30	320	0.5
	05			29	39	48	—	0.28	0.34	0.39	0.48	0.62	0.74	0.84	250	0.4
	07			29	38	48	—	0.38	0.47	0.54	0.67	0.86	1.02	1.15	260	0.5
	10			29	38	46	0.38	0.54	0.66	0.76	0.93	1.20	1.42	1.61	310	0.5
25	05			17	24	32	—	0.28	0.34	0.39	0.48	0.62	0.74	0.84	290	0.5
	07			17	24	32	—	0.38	0.47	0.54	0.67	0.86	1.02	1.15	300	0.5
	10			17	23	31	0.38	0.54	0.66	0.76	0.93	1.20	1.42	1.61	310	0.5
	15			17	22	30	0.54	0.77	0.94	1.08	1.33	1.71	2.02	2.30	460	0.5
	05			8	14	22	—	0.28	0.34	0.39	0.48	0.62	0.74	0.84	340	0.5
	07			8	14	21	—	0.38	0.47	0.54	0.67	0.86	1.02	1.15	350	0.5
15	10			8	13	20	0.38	0.54	0.66	0.76	0.93	1.20	1.42	1.61	360	0.5
	15			8	13	19	0.54	0.77	0.94	1.08	1.33	1.71	2.02	2.30	540	0.5

\*) These values are for continuous spraying.

## ALSO AVAILABLE!

Solenoid-Controlled  
Solid Stream Jet**SD-CC**  
**SERIES**

See page 106 of this catalog.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

These nozzle series are made-to-order.

## ① Complete Assembly

Example: VV 11505 S303 + SD S304

VV	115	05	S303 + SD S304
Series	Spray angle code	Spray capacity code	Nozzle tip Material
VV	115	05-15	for SD-VV
V	15	02-04	for SD-V

## ② Nozzle Tip Only

Example: 1/4 VV 11505 -SD S303

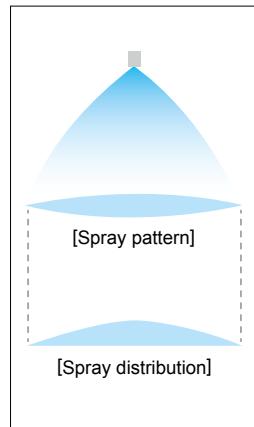
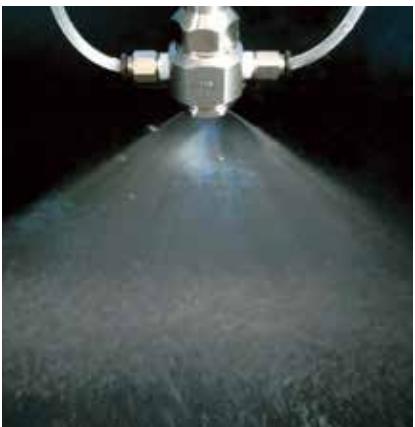
1/4	VV	115	05	- SD S303
Series	Spray angle code	Spray capacity code		
VV	115	05-15		
V <sup>3</sup>	15	02-04		

\*) For the SD-V Series, omit "-SD" from the nozzle tip product name.

# Flat Spray Nozzles with Pilot Air On-Off Control

SO-VV: Made-to-Order

**SO-V/SO-VV**



- Flat spray pattern with a mountain-shaped spray distribution and gradually tapered edges.
- Features a responsive spray ON/OFF function. Connecting the pilot air allows for quick and precise control of spray activation and deactivation.
- Anti-drip design.

**[STANDARD PRESSURE]**

0.3 MPa

**[APPLICATIONS]**

Coating: Release agent, lubricant, food additive such as seasoning  
Moisture control: Paper, food

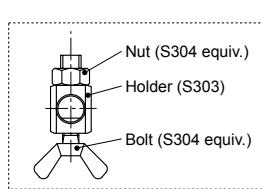
**SO-V SERIES (with ceramic orifice)**

Structure	<ul style="list-style-type: none"> <li>Spray ON/OFF can be regulated by switching the pilot air ON/OFF. The pilot air activates an internal piston to regulate the spray.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Metal parts: S303</li> </ul>
Weight	<ul style="list-style-type: none"> <li>150g</li> </ul>

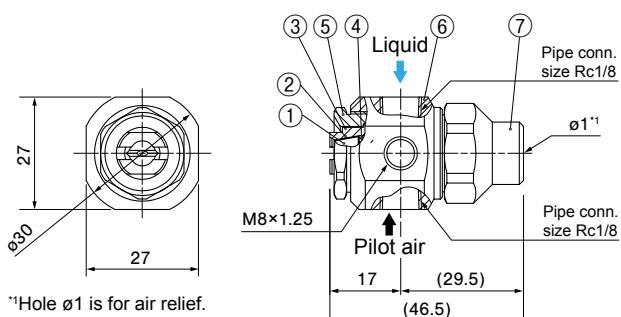
Max. operating pressure: 0.5 MPa

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING**



The above frame shows the parts included in the optional mounting bracket.



- ①Ceramic orifice ②Adhesive: Araldite® ③Tip retainer ④Packing (PTFE)  
⑤Cap ⑥Adaptor ⑦Spring cap ⑧O-ring (FKM) ⑨Lock nut  
⑩Y-packing (NBR) ⑪Piston ⑫Sleeve (UHMWPE) ⑬Spring (S304)

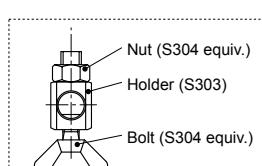
**SO-VV SERIES** Made-to-Order

Structure	<ul style="list-style-type: none"> <li>Spray ON/OFF can be regulated by switching the pilot air ON/OFF. The pilot air activates an internal piston to regulate the spray.</li> </ul>
Material	<ul style="list-style-type: none"> <li>S303</li> </ul>
Weight	<ul style="list-style-type: none"> <li>170g</li> </ul>

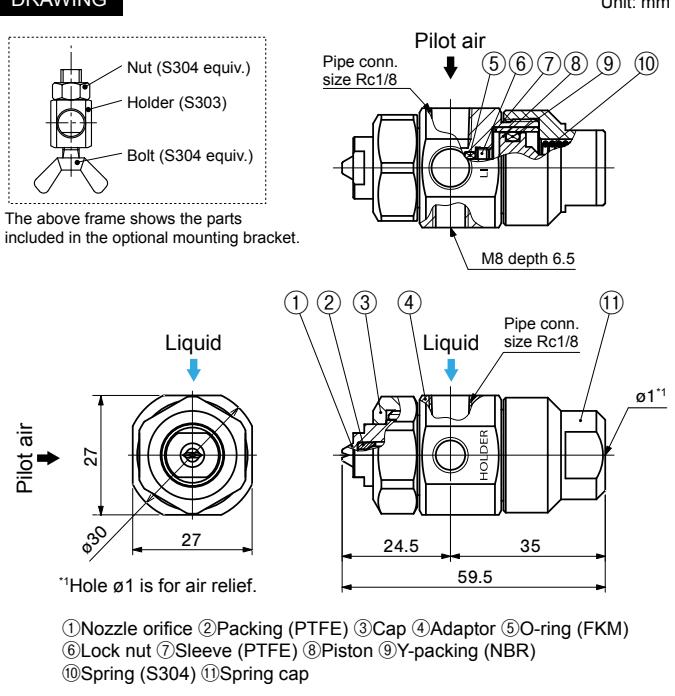
Max. operating pressure: 1.0 MPa

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING**



The above frame shows the parts included in the optional mounting bracket.



- ①Nozzle orifice ②Packing (PTFE) ③Cap ④Adaptor ⑤O-ring (FKM)  
⑥Lock nut ⑦Sleeve (PTFE) ⑧Piston ⑨Y-packing (NBR)  
⑩Spring (S304) ⑪Spring cap

**SO-V/SO-VV**

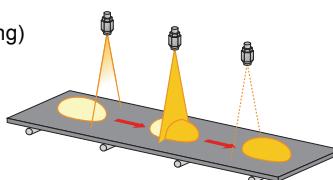
Flat Spray

**■ SO-V Series**

Spray angle code	Spray capacity code	Spray angle (°)		Spray capacity (L/min)						Mean droplet diameter (μm)	Free passage diameter (mm)
		0.15 MPa	0.3 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
115	03	101	115	—	0.17	0.21	0.24	0.30	0.39	140	0.2
	04	102	115	—	0.23	0.28	0.33	0.40	0.52	—	0.2
	05	102	115	—	0.29	0.35	0.41	0.50	0.65	160	0.3
	07	103	115	—	0.40	0.49	0.57	0.70	0.90	—	0.3
	10	103	115	0.41	0.58	0.71	0.82	1.00	1.29	—	0.4
	15	104	115	0.61	0.87	1.06	1.23	1.50	1.94	—	0.5
	20	104	115	0.82	1.15	1.41	1.63	2.00	2.58	270	0.6
90	02	76	90	—	0.12	0.14	0.16	0.20	0.26	145	0.2
	03	76	90	—	0.17	0.21	0.24	0.30	0.39	150	0.2
	04	77	90	—	0.23	0.28	0.33	0.40	0.52	—	0.3
	05	77	90	—	0.29	0.35	0.41	0.50	0.65	170	0.3
	07	78	90	—	0.40	0.49	0.57	0.70	0.90	—	0.3
	10	78	90	0.41	0.58	0.71	0.82	1.00	1.29	—	0.4
	15	79	90	0.61	0.87	1.06	1.23	1.50	1.94	—	0.6
	20	79	90	0.82	1.15	1.41	1.63	2.00	2.58	280	0.8
80	02	67	80	—	0.12	0.14	0.16	0.20	0.26	150	0.2
	03	67	80	—	0.17	0.21	0.24	0.30	0.39	—	0.3
	04	67	80	—	0.23	0.28	0.33	0.40	0.52	—	0.3
	05	67	80	—	0.29	0.35	0.41	0.50	0.65	180	0.3
	07	68	80	—	0.40	0.49	0.57	0.70	0.90	—	0.4
	10	68	80	0.41	0.58	0.71	0.82	1.00	1.29	—	0.5
	15	69	80	0.61	0.87	1.06	1.23	1.50	1.94	—	0.7
	20	69	80	0.82	1.15	1.41	1.63	2.00	2.58	290	0.8
65	02	52	65	—	0.12	0.14	0.16	0.20	0.26	155	0.2
	03	52	65	—	0.17	0.21	0.24	0.30	0.39	160	0.3
	04	52	65	—	0.23	0.28	0.33	0.40	0.52	—	0.3
	05	52	65	—	0.29	0.35	0.41	0.50	0.65	190	0.4
	07	53	65	—	0.40	0.49	0.57	0.70	0.90	—	0.5
	10	54	65	0.41	0.58	0.71	0.82	1.00	1.29	—	0.6
	15	54	65	0.61	0.87	1.06	1.23	1.50	1.94	—	0.8
	20	55	65	0.82	1.15	1.41	1.63	2.00	2.58	310	0.9
50	03	37	50	—	0.17	0.21	0.24	0.30	0.39	180	0.3
	04	37	50	—	0.23	0.28	0.33	0.40	0.52	—	0.4
	05	38	50	—	0.29	0.35	0.41	0.50	0.65	210	0.4
	07	38	50	—	0.40	0.49	0.57	0.70	0.90	—	0.5
	10	40	50	0.41	0.58	0.71	0.82	1.00	1.29	—	0.6
	15	40	50	0.61	0.87	1.06	1.23	1.50	1.94	—	0.8
	20	41	50	0.82	1.15	1.41	1.63	2.00	2.58	340	1.0
40	05	30	40	—	0.29	0.35	0.41	0.50	0.65	230	0.4
	07	30	40	—	0.40	0.49	0.57	0.70	0.90	—	0.6
	10	31	40	0.41	0.58	0.71	0.82	1.00	1.29	—	0.7
	20	32	40	0.82	1.15	1.41	1.63	2.00	2.58	380	1.0
25	05	18	25	—	0.29	0.35	0.41	0.50	0.65	270	0.5
	07	18	25	—	0.40	0.49	0.57	0.70	0.90	—	0.6
	10	18	25	0.41	0.58	0.71	0.82	1.00	1.29	—	0.8
	15	19	25	0.61	0.87	1.06	1.23	1.50	1.94	440	1.0
15	05	9	15	—	0.29	0.35	0.41	0.50	0.65	310	0.5
	07	9	15	—	0.40	0.49	0.57	0.70	0.90	—	0.6
	10	9	15	0.41	0.58	0.71	0.82	1.00	1.29	—	0.8
	15	10	15	0.61	0.87	1.06	1.23	1.50	1.94	510	1.1

**Example of Use**

Coating (seasoning)



**■ SO-VV Series**

Spray angle code	Spray capacity code	Spray angle (°)			Spray capacity (L/min)								Mean droplet diameter (μm)	Free passage diameter (mm)
		0.15 MPa	0.3 MPa	0.7 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
115	05	102	115	124	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	180	0.3
	07	103	115	124	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	200	0.3
	10	103	115	124	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	220	0.4
90	05	77	90	100	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	190	0.3
	07	78	90	100	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	210	0.3
	10	78	90	99	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	230	0.4
80	05	67	80	90	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	200	0.3
	07	68	80	89	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	220	0.4
	10	68	80	89	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	240	0.5
65	05	52	65	74	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	210	0.4
	07	53	65	74	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	230	0.5
	10	54	65	73	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	250	0.6
50	05	38	50	59	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	230	0.4
	07	38	50	58	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	250	0.5
	10	40	50	58	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	270	0.6
40	05	30	40	48	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	250	0.4
	07	30	40	48	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	280	0.6
	10	31	40	47	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	300	0.7
25	05	18	25	32	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	350	0.5
	07	18	25	32	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	390	0.6
	10	18	25	32	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	420	0.8
15	05	9	15	22	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	680	0.5
	07	9	15	21	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	740	0.6
	10	9	15	21	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	820	0.8

**Operation Time Chart**

The pilot air ON/OFF controls the spray operation.

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

**Mounting Bracket (Optional)**

This mounting bracket allows for easy installation of SO-V/SO-VV series nozzles to a pole in the desired spray direction. Available in two sizes for pole diameters of 8 mm and 10 mm.



When ordering the optional Mounting Bracket, please specify  
"BIM ø8 MBW" for ø8 mounting bracket, or  
"BIM ø10 MBW" for ø10 mounting bracket.

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**SO-V**

Example: 1/8 SO-V 11503 S303

1/8" SO-V **115** **03** S303  
 Spray angle code      Spray capacity code  
 115                    02  
 15                    20

**SO-VV**

Example: 1/8 SO-VV 11505 S303

1/8" SO-VV **115** **05** S303  
 Spray angle code      Spray capacity code  
 115                    05  
 15                    10

(The SO-VV series is made-to-order.)

\*2) Indicates Rc1/8 for the liquid and pilot air connection thread size.

**ALSO AVAILABLE!**

Solid Stream Jet  
with ON/OFF Control

**SO-CC**  
**SO-CM**  
SERIES

See page 108 for  
more details.

**CAUTIONS**

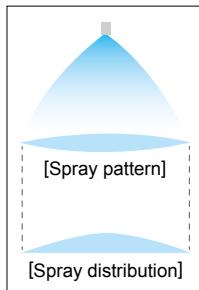
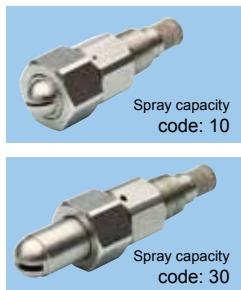
- Supply liquid pressure at 0.5 MPa or less for the SO-V series, and 1.0 MPa or less for the SO-VV series.
- Supply pilot air pressure between 0.2 and 0.5 MPa.
- For better shut off and to prevent dripping, purge the air between the solenoid valve and the nozzle when it is shut off, using a 3-way solenoid valve.

# Flat Pattern Foaming Spray Nozzles

Made-to-Order

**AWVV**

Flat Spray



- Flat fan spray nozzle for spraying detergent.
- Compressor-free, it generates a large amount of foam using only liquid pressure to draw in air.
- The long-lasting foam helps to increase the cleaning performance.
- The wide spray angle covers a larger cleaning area.

Structure	<ul style="list-style-type: none"> <li>• Made of metal.</li> <li>• Comprises a nozzle tip, cap, adaptor, and strainer.</li> </ul>
Material	• S303
Weight	<ul style="list-style-type: none"> <li>• Spray capacity code 10: 60g</li> <li>• Spray capacity code 30 and 50: 65g</li> </ul>

## [STANDARD PRESSURE]

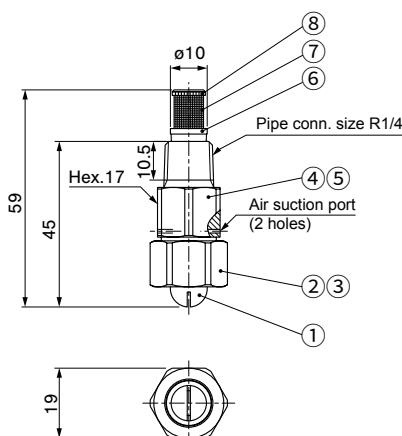
0.3 MPa

## [APPLICATIONS]

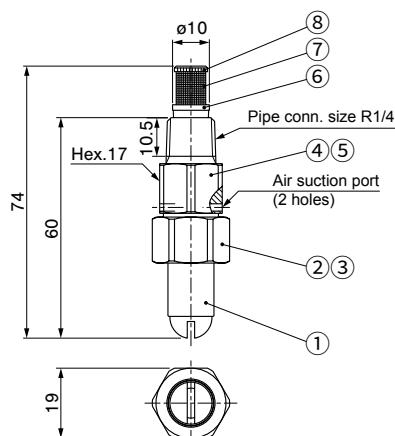
- Cleaning: conveyors, outer surface of vehicles, factory floors/walls

## DRAWING

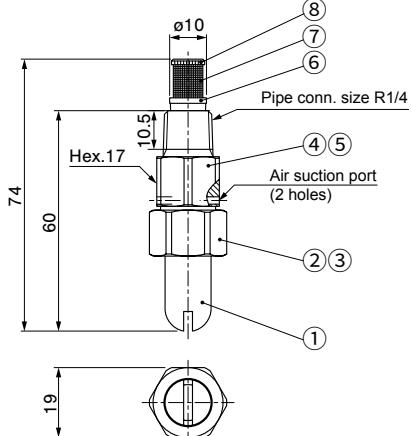
Spray capacity code 10



Spray capacity code 30



Spray capacity code 50



①Nozzle tip ②Cap ③Strainer screen ④Adaptor ⑤Whirler ⑥Strainer holder ⑦Strainer screen (#50) ⑧Strainer cap

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray angle code	Spray capacity code	Liquid	Spray angle <sup>1</sup> (°)			Spray capacity <sup>2</sup> (L/min)						Strainer mesh size
			0.1 MPa	0.3 MPa	0.6 MPa	0.1 MPa	0.2 MPa	0.3 MPa	0.4 MPa	0.5 MPa	0.6 MPa	
100	10	Water	50	105	116	0.58	0.82	1.00	1.15	1.29	1.41	50
		Detergent	55	100	116							
	30	Water	75	105	113	1.73	2.45	3.00	3.46	3.87	4.24	50
		Detergent	82	100	113							
	50	Water	75	105	113	2.89	4.08	5.00	5.77	6.45	7.07	50
		Detergent	82	100	113							
80	10	Water	40	80	100	0.58	0.82	1.00	1.15	1.29	1.41	50
		Detergent	—	80	100							
	30	Water	57	80	95	1.73	2.45	3.00	3.46	3.87	4.24	50
		Detergent	57	80	95							
	50	Water	57	80	95	2.89	4.08	5.00	5.77	6.45	7.07	50
		Detergent	57	80	95							

\*1) The spray angle for detergent is for reference only, spraying commercial dishwasher detergent that is diluted by a factor of 100.

"—" indicates a value outside of the operating range.

\*2) Spray liquid is tap water. The performance guarantee does not apply when spraying detergent.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M AWVV 10010 S303W

1/4M	AWVV	100	10	S303	W
Pipe conn. size <sup>3</sup>	Spray angle code	Spray capacity code	Material	Strainer	
100 80	100 80	10 10 30 50			

<sup>3</sup>) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

This nozzle series is made-to-order.

## ALSO AVAILABLE!

Solid Stream Jet  
Foaming Spray Nozzles

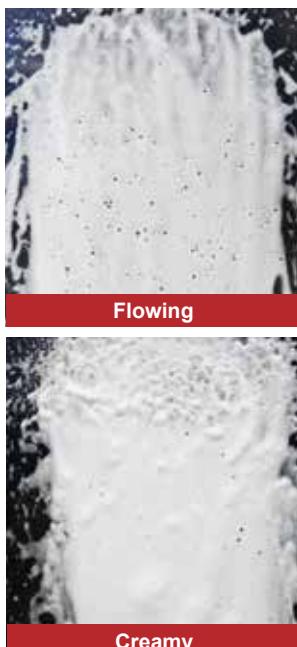
**AWCC**  
**SERIES**

See page 110 of this catalog.

# Detergent Foam Spray Unit

**AWACart**

Flat Spray



- A portable spray unit with a specialized low-pressure foam nozzle that converts detergent into fine foam for spraying, minimizing splashing.

- By replacing the nozzle tip, the spray pattern<sup>\*1</sup> can be switched between a fan-shaped spray and an optional solid stream spray.

<sup>\*1</sup> Standard Flat spray

<sup>\*1</sup> Optional Solid stream

- Adjusting spray capacity with the needle valve and air consumption with the throttle valve can change foam properties, as shown on the left. (The adjustment depends on factors such as detergent type and concentration.)

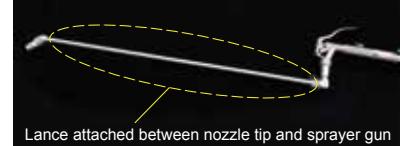
## [APPLICATIONS]

- Cleaning: conveyors, food processing machinery, factory walls

Standard Spray Gun

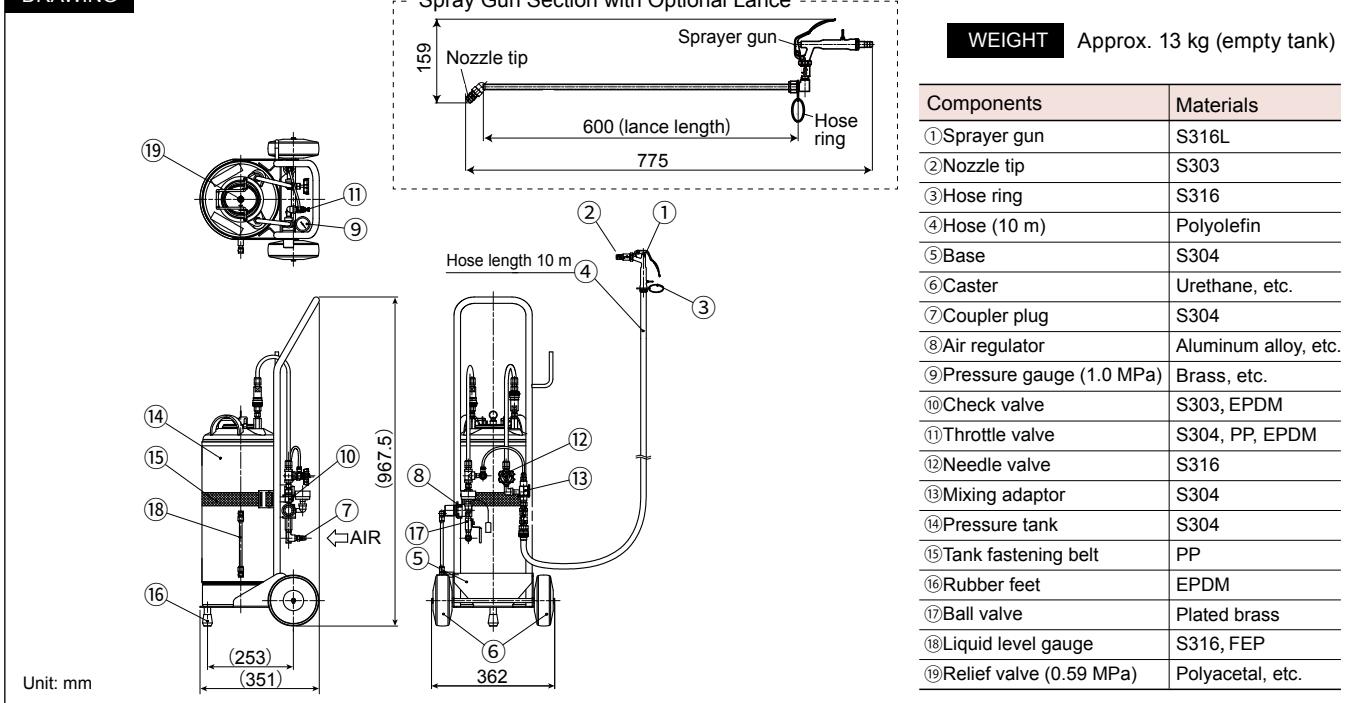


Optional Lance Type



The parts which come in contact with the liquids are resistant to strong alkaline solution.

## DRAWING



## SPECIFICATIONS

Air pressure (MPa)	Throttle valve <sup>*2</sup>	Needle valve <sup>*2</sup>	Spray capacity <sup>*3</sup> (L/min)	Air consumption (L/min, Normal)
0.3	Half turn	Half turn	2.0	17
	1 turn		1.8	24
	4 turns		1.6	57

<sup>\*2</sup>) Indicates the number of rotations from the fully closed position. The throttle valve adjusts the air consumption, and the needle valve adjusts the spray capacity.  
<sup>\*3</sup>) Spray liquid is tap water. The actual flow rate will vary depending on factors such as the type and concentration of detergent.

## PRESSURE TANK SPECIFICATIONS

Tank capacity	18 liters
Max. operating pressure	0.49 MPa
Relief valve activating pressure	0.59 MPa

## HOW TO ORDER

Please use these product codes for inquiries and orders.

The spray gun section can be selected as either the standard type or lance type, depending on the application.

Standard AWACart

**AWACart-S-A**

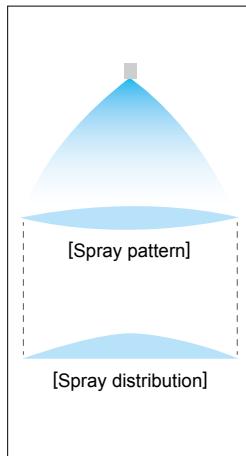
AWACart with Optional Lance

**AWACart-S-A-L**

# Self-Cleaning Flat Spray Nozzles

**MOMOJet**

Flat Spray



- When the liquid pressure is reduced to 0.03 MPa or lower, the nozzle tip retracts and purges any clogged foreign particles. By increasing the water pressure to 0.2 MPa or higher, normal spraying resumes.
- The design aligns the nozzle and spray axes, making multi-nozzle set-up easier.

#### [STANDARD PRESSURE]

0.3 MPa

#### [APPLICATIONS]

Cleaning: Paper making (wire, felt parts and rollers), steel plates, PCB

Cooling: Steel plates

Foam breaking: Waste water treatment

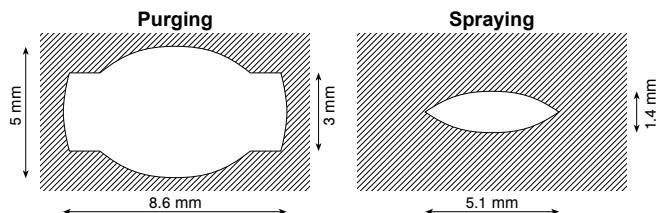
Others: Applications where recirculated water is being used

Structure	<ul style="list-style-type: none"> <li>By changing the liquid pressure, a built-in spring moves the split nozzle tip up and down and opens the orifice for purging.</li> <li>Nozzle tips are made by metal injection molding.</li> </ul>
Material	• S303
Weight	• 45g

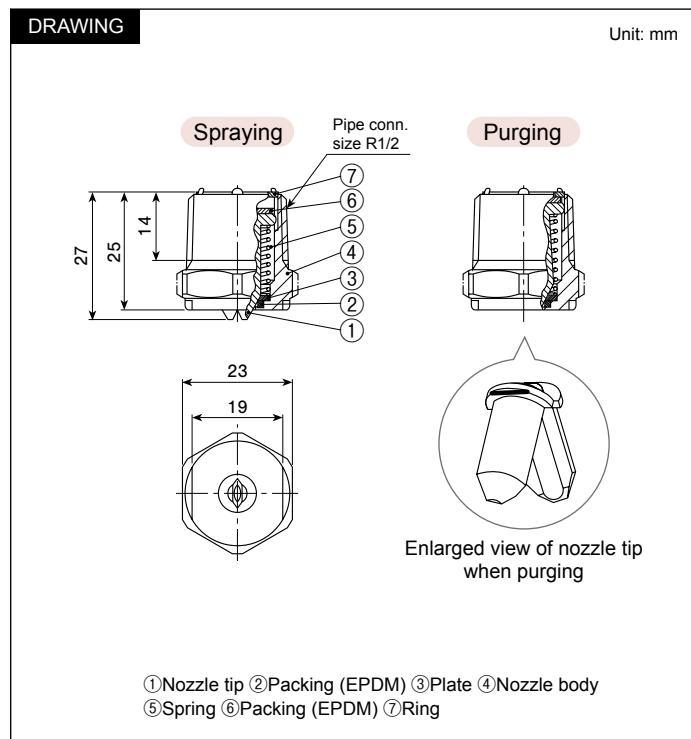
#### Precautions for Use of MOMOJet

When purging, the nozzle tip opens wide and the spray capacity increases.

This should be taken into consideration when selecting a pump.



[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray capacity code	Spray angle (°)		Spray capacity (L/min)							Mean droplet diameter (μm)	Free passage diameter	
	0.3 MPa	0.7 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa		Spraying (mm)	Purging (mm)
20	80	86	1.63	2.00	2.58	3.06	3.65	4.47	5.16	300	0.8	3.0
40	80	83	3.27	4.00	5.16	6.11	7.30	8.94	10.3	3	1.2	3.3
60	80	83	4.90	6.00	7.75	9.17	11.0	13.4	15.5	490	1.3	3.5

#### Attention:

- To start spraying, a flow rate of about 9 L/min at 0.02–0.03 MPa is required for all models. Make sure to select an appropriate pump.
- MOMOJet is designed to start spraying when the pressure is greater than 0.1 MPa. Use MOMOJet at a pressure of 0.2 MPa or higher.
- Since MOMOJet series nozzles have moving nozzle tips, the spray capacity is only guaranteed within +/-10% and the spray angle within +/-10° at standard pressure.

#### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/2 Momo 8020 S303

1/2\* Momo 80

20

S303

Spray angle code

Spray capacity code

Material

20  
40  
60

\*Indicates R1/2, nozzle thread size.

#### ALSO AVAILABLE!

Self-Cleaning Solid Stream Jet

**MOMOJet "C"**  
**SERIES**

See page 111 of this catalog.

# Air & Steam Flat Spray Nozzles

VZ



[Note] Water is sprayed here to better show the spray pattern.



- Produces a flat spray pattern of air or steam.
- Air flow volume can be adjusted by changing the nozzle tip.
- An effective spray angle cannot be maintained long, as air and steam disperse very quickly.

## [STANDARD PRESSURE]

0.3 MPa

## [APPLICATIONS]

Compressed air: Cleaning, dust suppression,

drying, air curtain

Steam: Humidification, temperature control, moisture control

[Spray pattern]

Structure	<ul style="list-style-type: none"> <li>• Three-piece structure including a nozzle tip, cap, and adaptor.</li> <li>• Worn-out nozzle tips can be replaced separately.</li> <li>• The cap and adaptor are interchangeable with those of three-piece structure standard flat spray nozzles for liquids.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316</p>

## [Complete Assembly]

Pipe conn. size	Dimensions (mm)					Weight (g)
	L1	H1	H2	N	a	
R1/4	43	19	17	10.5	6.5	41
R3/8	48.5	23	21	11	9.5	69

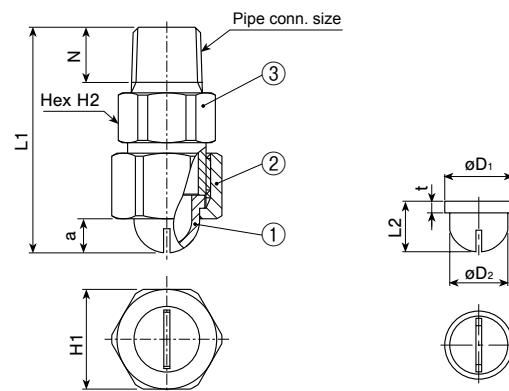
## [Nozzle Tip]

Pipe conn. size <sup>1</sup>	Dimensions (mm)				Weight (g)
	L2	øD1	øD2	t	
R1/4	11	14.5	12.5	2.5	5.1
R3/8	14	18	16	2.5	8

\*1) Pipe connection size of the complete assembly

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING



Complete Assembly

Nozzle Tip

①Nozzle tip ②Cap ③Adaptor

Air capacity code	Pipe conn. size		Air capacity (L/min, Normal)						Steam capacity (kg/hr)						Free passage diameter (mm)
	R1/4	R3/8	0.05 MPa	0.1 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	0.05 MPa	0.1 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	
150	○		55.7	77.6	116	154	230	307	2.62	3.56	5.27	6.97	10.3	13.7	0.2
200	○		73.1	102	152	202	302	402	3.44	4.67	6.92	9.14	13.6	17.9	0.4
250	○		90.5	126	188	250	374	498	4.26	5.78	8.57	11.3	16.8	22.2	0.5
300	○		108	150	224	298	446	594	5.08	6.90	10.2	13.5	20.0	26.5	0.6
350	○		125	175	261	346	518	690	5.90	8.00	11.9	15.7	23.2	30.7	0.7
400	○		143	199	297	394	590	786	6.72	9.12	13.5	17.9	26.5	35.0	0.8
450	○		160	223	333	443	662	882	7.54	10.2	15.2	20.0	29.7	39.3	0.9
500	○		178	248	369	491	734	977	8.36	11.3	16.8	22.2	32.9	43.5	1.1
550	○	○	199	278	414	551	823	1,096	9.38	12.7	18.8	24.9	36.9	48.8	0.9
600	○	○	219	305	455	605	905	1,205	10.3	14.0	20.7	27.4	40.6	53.7	1.0
650		○	235	328	489	650	972	1,295	11.1	15.0	22.3	29.4	43.6	57.7	1.1
700		○	253	353	526	700	1,047	1,394	11.9	16.2	24.0	31.7	46.9	62.1	1.1
750		○	272	380	566	753	1,126	1,500	12.8	17.4	25.8	34.1	50.5	66.8	1.2
900		○	326	454	677	901	1,347	1,794	15.3	20.8	30.8	40.7	60.4	79.9	1.5
1130		○	406	566	844	1,122	1,678	2,235	19.1	25.9	38.4	50.8	75.2	99.5	1.9

[Note] The above air and steam capacity are for reference only and are not guaranteed.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### ① Complete Assembly

Example: 1/4M VZ 150 S303

1/4M

VZ

150

S303

Pipe conn. size<sup>2</sup>

1/4M

3/8M

1130

### ② Nozzle Tip Only

Example: 1/4 VZ 150 S303

1/4

VZ

150

S303

Pipe conn. size<sup>1</sup>

1/4

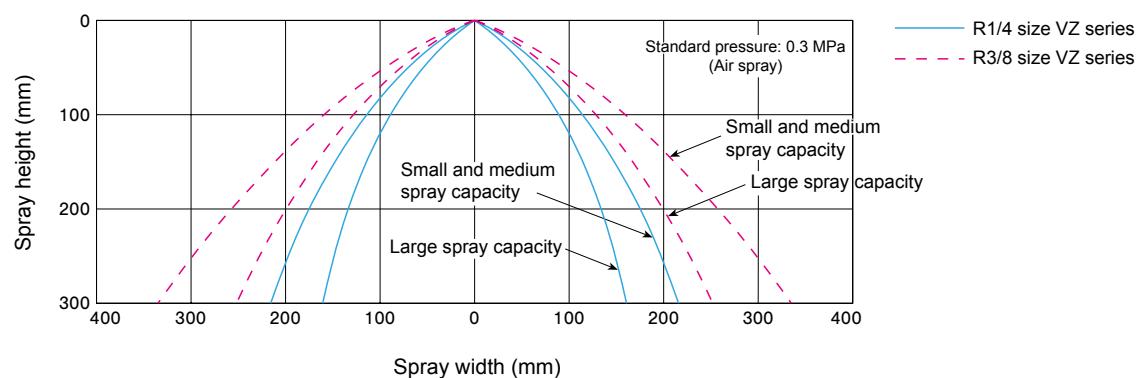
3/8

1130

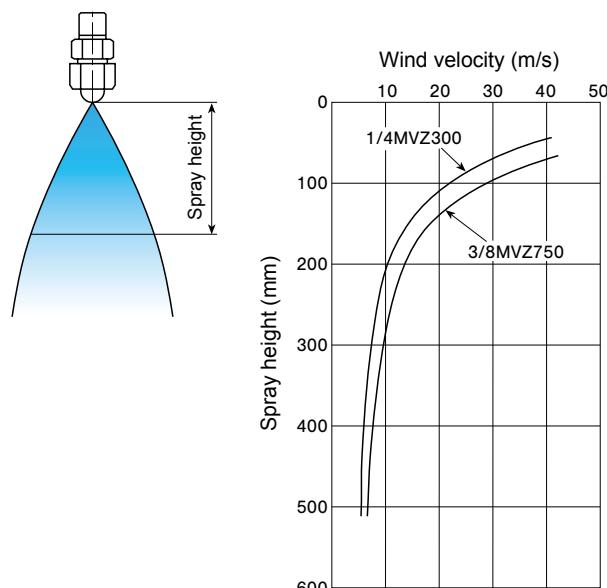
\*2) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

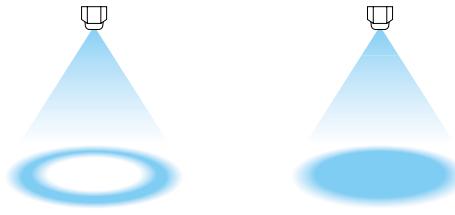
## Spray Height and Width of VZ Series Air & Steam Flat Spray Nozzles

The graph below shows the spray width at various spray heights.



Shown below is the wind velocity at various spray heights.





## Product Lineup

### Hollow Cone Spray Nozzles

### Full Cone Spray Nozzles

#### Hollow Cone Spray Nozzles

- Extremely Fine Fog and Ultra-Low Flow Rate Nozzles : **KB, KBN**
- Semi-fine Fog and Low Flow Rate Nozzles: **K, KKBP**
- Low Flow Rate Nozzles: **KD**
- Medium Capacity Nozzles: **AAP**
- Alumina Ceramic Nozzles: **AP-AL92**
- Flange Connection, Large Capacity Nozzles: **TAA**

#### Standard Full Cone Spray Nozzles

- Metal One-Piece Structure: **JJXP**
- Plastic One-Piece Structure: **JJXP-PVDF, JJXP-HTPVC/PVC**
- Ceramic Orifice and Whirler Inserted: **JUP**
- Alumina Ceramic Nozzles: **JUXP-AL92**

#### Quick-Detach Full Cone Spray Nozzles

- Quick-Detach Plastic Nozzles: **INJJX, INJJX-Y**
- Quick-Detach Metal Nozzles: **INJJX-SS**

#### Other Full Cone Spray Nozzles

- Low Flow Rate Nozzles: **JJRP, J**
- Flange Connection, Large Capacity Nozzles: **TJJX**
- Wide-Angle Type: **BBXP, BBXP-PVDF/PVC, UZUJP**
- Narrow-Angle Type: **NJJP**
- Clog-Resistant Vaneless Nozzles: **AJP, AJP-PPS, AJP-AL92**

#### Square Spray Nozzles

- Square Full Cone Spray Nozzles: **SSXP, SSXP-HTPVC**

#### Special Cone Spray Nozzles

- SPILLBACK Nozzles for Gas Cooling: **SPB**
- Multi-Head Full Cone Spray Nozzles: **7KB, 7JJXP, 13JJXP**
- Multi-Orifice Semi-fine Fog Nozzles: **TSP**

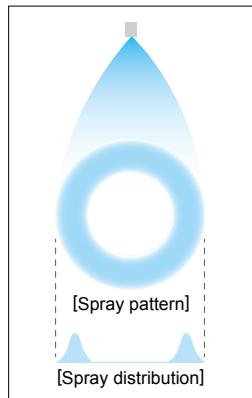
Hollow Cone

Full Cone

# Extremely Fine Fog and Ultra-Low Flow Rate Hollow Cone Spray Nozzles

KB

Hollow Cone



- Ultra-low flow rate hollow cone spray nozzle with the finest atomization among our hydraulic nozzles.

- Capable of generating an extremely fine spray.

- The whirl chamber is formed by a ceramic orifice and closer,<sup>1)</sup> providing excellent wear resistance.

## [STANDARD PRESSURE]

0.7 MPa

## [APPLICATIONS]

Humidifying: Air handling units, greenhouses

Cooling: Gas, thin plates, poultry

Spraying: Alcohol, chemicals

Structure	<ul style="list-style-type: none"> <li>Nozzle orifice and closer are made of ceramics.<sup>1)</sup></li> <li>Male parallel pipe thread (G1/4B).</li> <li>All models include a built-in strainer.</li> <li>It can accommodate an optional check valve.</li> </ul>						
Material	<ul style="list-style-type: none"> <li>Nozzle orifice &amp; closer: ceramic<sup>1)</sup></li> <li>Metal parts: S303 or B (brass)</li> </ul>						

Series	Dimensions (mm)					Weight (g)	
	L1	L2	H	øD	N	S303	B
KB (w/o check valve)	22.5	31	17 (S303) 16 (B)	10.5	6	24.8	25
KB**CV (w/ check valve)	22.5	32	17 (S303) 16 (B)	10.5	6	25.3	25.5

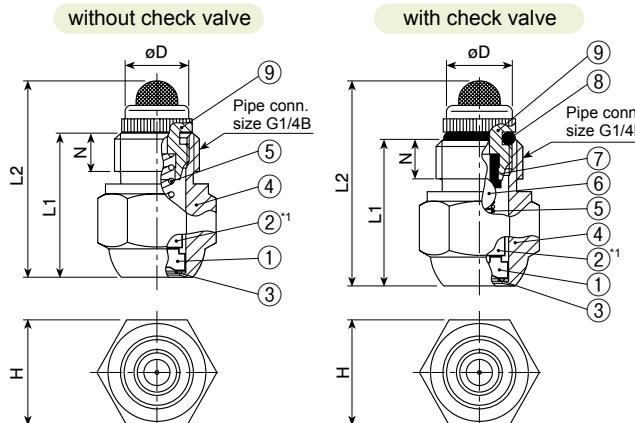
<sup>1)</sup>For KB nozzles with N in the spray capacity code (page 56), the closer is made of polyester elastomer instead of ceramic.

## [Note]

1. Appearance and dimensions may differ slightly depending on material and nozzle code.

2. A thread conversion adaptor is required for connections with tapered pipe threads. An optional O-ring P11 is recommended for use above 0.5 MPa (page 56).

## DRAWING



①Orifice disc ②Closer<sup>1)</sup> ③Packing (PTFE) ④Nozzle body  
 ⑤Spring ⑥Ball (S304) ⑦Packing (NBR) ⑧O-ring (NBR)  
 ⑨Strainer (S303+S304 or B+S304 for mesh size #100,  
 S303+S304+S316 or B+S304+S316 for mesh size #150, #200)

Spray angle code	Spray capacity code <sup>*2</sup>	Spray capacity (L/hr) <sup>*3</sup>										Mean drop. dia. (µm)	Free pass. dia. (mm)	Strainer mesh size		
		0.3 MPa	0.7 MPa	2 MPa	0.3 MPa	0.4 MPa	0.5 MPa	0.6 MPa	0.7 MPa	1 MPa	1.2 MPa	1.5 MPa	2 MPa			
80	063N	65	80	80	1.36	1.55	1.72	1.86	2.00	2.35	2.56	2.83	3.22	45	0.20	200
	071	—	80	80	—	1.70	1.90	2.08	2.25	2.69	2.95	3.29	3.81	—	0.15	200
	08	—	80	80	—	1.97	2.20	2.41	2.60	3.11	3.40	3.80	4.40	—	0.15	200
	09	—	80	80	—	2.23	2.49	2.73	2.95	3.53	3.86	4.32	4.99	—	0.15	200
	10N	65	80	80	2.19	2.51	2.78	3.03	3.25	3.84	4.18	4.63	5.30	—	0.25	200
	125N	65	80	80	2.77	3.16	3.51	3.82	4.10	4.84	5.27	5.84	6.68	60	0.30	200
	14	—	80	80	—	3.48	3.89	4.26	4.60	5.50	6.02	6.73	7.78	50	0.15	200
	16N	65	80	80	3.51	4.02	4.47	4.88	5.25	6.22	6.79	7.55	8.66	—	0.35	150
	20N	65	80	80	4.41	5.06	5.62	6.13	6.60	7.82	8.53	9.49	10.9	—	0.40	150
	22N	65	80	80	4.84	5.55	6.18	6.74	7.25	8.59	9.37	10.4	12.0	—	0.40	150
	25	70	80	80	5.40	6.24	6.97	7.64	8.25	9.87	10.8	12.1	14.0	—	0.25	150
	28	70	80	80	6.05	6.99	7.82	8.56	9.25	11.1	12.1	13.5	15.7	—	0.30	150
	32	70	80	80	6.94	8.01	8.96	9.82	10.6	12.7	13.9	15.5	17.9	75	0.30	150
	38	70	80	80	8.25	9.52	10.7	11.7	12.6	15.1	16.5	18.4	21.3	65	0.40	150
	45	70	80	80	9.79	11.3	12.6	13.9	15.0	17.9	19.6	21.9	25.3	—	0.40	100
	50	70	80	80	10.9	12.6	14.0	15.4	16.6	19.9	21.8	24.3	28.1	—	0.40	100
	56	70	80	80	12.2	14.1	15.7	17.2	18.6	22.3	24.4	27.2	31.5	—	0.40	100
	63	72	80	80	13.7	15.8	17.7	19.4	21.0	25.1	27.5	30.7	35.5	—	0.40	100
	71	72	80	80	15.5	17.8	20.0	21.9	23.6	28.2	30.9	34.6	39.9	—	0.50	100
	80	72	80	80	17.5	20.2	22.6	24.7	26.7	31.9	35.0	39.0	45.1	—	0.50	100
	90	73	80	80	19.6	22.7	25.4	27.8	30.0	35.9	39.3	43.9	50.8	110	0.50	100
	100	73	80	80	21.8	25.2	28.2	30.9	33.3	39.9	43.7	48.8	56.4	90	0.50	100
	1250	73	80	80	27.2	31.5	35.2	38.5	41.6	49.8	54.5	60.9	70.4	—	0.50	100
	180	74	80	80	39.2	45.3	50.6	55.5	59.9	71.6	78.5	87.6	101	—	0.60	100
	200	74	80	80	43.6	50.4	56.3	61.7	66.6	79.7	87.3	97.5	113	—	0.60	100
	320	75	80	80	69.7	80.5	90.0	98.6	107	127	140	156	180	210	0.60	100
60	063	—	60	60	—	1.51	1.69	1.85	2.00	2.39	2.62	2.93	3.38	45	0.15	200
	14	—	60	60	—	3.48	3.89	4.26	4.60	5.50	6.02	6.73	7.78	—	0.15	200
	32	—	60	60	—	8.01	8.96	9.82	10.6	12.7	13.9	15.5	17.9	—	0.30	150
	56	50	60	60	12.2	14.1	15.7	17.2	18.6	22.3	24.4	27.2	31.5	90	0.40	100
	140	53	60	60	30.5	35.2	39.4	43.2	46.6	55.7	61.0	68.2	78.8	130	0.50	100
	280	54	60	60	61.0	70.5	78.8	86.4	93.2	112	122	136	158	190	0.60	100

<sup>\*2)</sup> The KB series nozzles with "N" in the spray capacity code can be used at pressures of 0.2 to 10 MPa. See the next page for more features and information.

<sup>\*3)</sup> The values above are for the KB series without the check valve. For spray capacity with the check valve, please request the flow-rate diagram. The spray capacity of KB series is listed in liters per hour (L/hr), not in L/min. The spray capacity code does not correspond with the spray capacity at standard pressure.

## Features of the KB series, identified with "N" in the spray capacity code

### ● Anti-clogging design

- It features a larger orifice diameter, about 1.3–2.6 times the size compared to the conventional KB models, making it clog-resistant.

### ● Available for a wide range of pressures, from low (0.2 MPa) to high (10 MPa)

- Capable of spraying from 0.2 MPa, for a low spray capacity.
- Also designed to withstand pressures of up to 10 MPa, making it suitable for finer atomization.<sup>4)</sup>

<sup>4)</sup> When spraying at pressures of 2 MPa or higher, use S303 nozzles.

### ■ Spray capacity (at 0.2 MPa and 3–10 MPa)

Spray angle code	Spray capacity code	Spray capacity (L/hr)						Mean droplet dia. at 10 MPa (μm)
		0.2 MPa	3 MPa	5 MPa	6 MPa	7 MPa	10 MPa	
80	063N	1.13	3.88	4.89	5.31	5.70	6.70	33
	10N	1.82	6.40	8.11	8.83	9.48	11.2	33
	125N	2.29	8.07	10.2	11.1	12.0	14.1	33
	16N	2.89	10.5	13.4	14.6	15.7	18.6	33
	20N	3.64	13.2	16.8	18.4	19.8	23.4	33
	22N	3.99	14.5	18.5	20.2	21.7	25.7	40

Hollow Cone

## Check Valve (Option)

To prevent dripping after shut-off, KB series nozzles can be equipped with an optional built-in ball check valve.

The check valve operates at 0.4 MPa. The required supply pressure is the spray pressure plus the check valve pressure, with a minimum of 0.5 MPa to ensure reliable activation due to a ±0.1 MPa deviation. Nozzle spray angle and capacity are not guaranteed with check valves.

### HOW TO ORDER

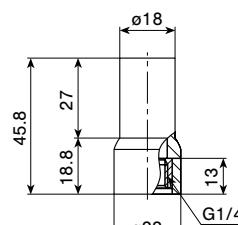
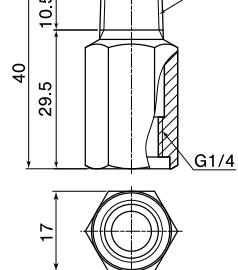
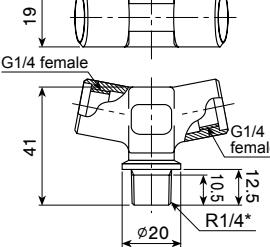
To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M KB 80071 S303 CV-RW

1/4M KB	80	071	S303	CV	-RW
Pipe conn. size <sup>5)</sup>	Spray angle code	Spray capacity code	Material	Check valve	Strainer
80	063N	S303	S303	CV (with check valve)	
60	320	B	(Blank indicates "without check valve")		

<sup>5)</sup> "M" indicates male parallel pipe thread ("G" of the ISO standard) in the KB series.

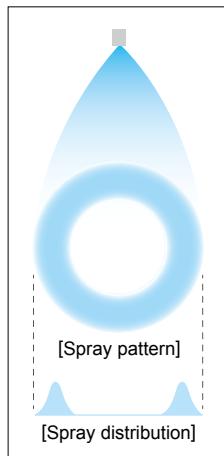
## Optional Accessories for KB series

Product	Picture	Structure (unit: mm)	Features
Fitting for PVC Pipe 13AKB Adaptor			<ul style="list-style-type: none"> <li>Fitting for KB series nozzle to 13A (1/2") Tee connectors.</li> <li>Material: PVC</li> <li>O-ring is required.</li> </ul>
1/4M(R)x1/4F(G) KB Adaptor			<ul style="list-style-type: none"> <li>Adaptor to convert thread connection from G1/4 to R1/4.</li> <li>Material: S303</li> <li>Product ID: #168846 (Requires O-ring) #1011 (Metal-to-metal seal)</li> </ul> <p>Use adaptor #168846 for pressures over 0.5 MPa. Adaptor #168846 requires an O-ring P11 (ID #44) for connection, while adaptor #1011 does not.</p>
Two-Way Adaptor			<ul style="list-style-type: none"> <li>Adaptor for connecting 2 pcs. of KB series nozzles.</li> <li>Material: chrome-plated brass</li> <li>O-ring is required.</li> </ul> <p>*Two types of threads for pipe connection are available: male tapered thread (R1/4) or male parallel thread (G1/4).</p>

# Extremely Fine Fog and Ultra-Low Flow Rate Hollow Cone Spray Nozzles

KBN

Hollow Cone



- Ultra-low flow rate hollow cone spray nozzle with the finest atomization among our hydraulic nozzles.
- Minimal clogging with free passage diameter 1.3–2.6 times bigger than that of conventional nozzles.
- High-purity alumina ceramic tip provides stable performance with longer life even under high pressure conditions.

## [STANDARD PRESSURE]

1.0 MPa

## [APPLICATIONS]

Cooling: Poultry farms, outside cooling

Humidifying: Air handling units, greenhouses

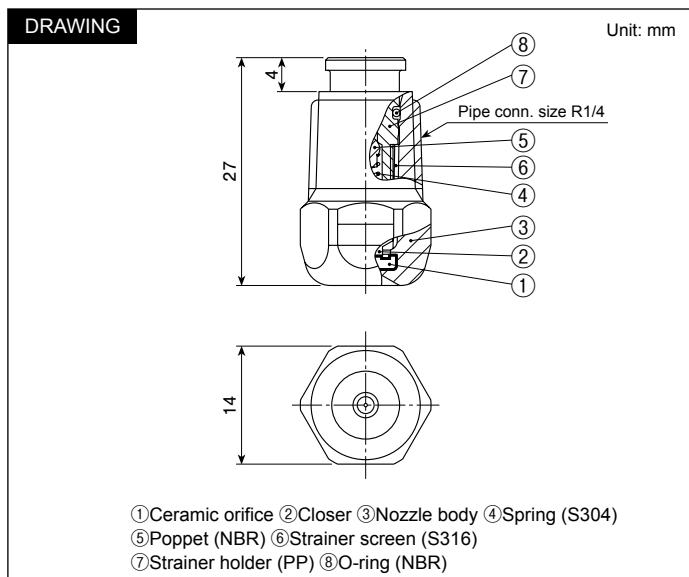
Spraying: Alcohol, disinfectant

Others: Dust suppression, irrigation for greenhouse

Structure	<ul style="list-style-type: none"> <li>• One-piece plastic nozzle molded around a high-purity ceramic orifice.</li> <li>• Thread is R1/4 (BSPT 1/4 male) or NPT 1/4 male.</li> <li>• All models includes a built-in strainer and check valve.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: ceramic</li> <li>• Closer: polyester elastomer</li> <li>• Nozzle body: PA</li> </ul>
Weight	• 4 g

Max. operating pressure: 7.0 MPa

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray angle code	Spray capacity code	Spray angle (°)				Spray capacity (L/hr)							Mean drop. dia. (μm)	Free pass. dia. (mm)	Strainer mesh size	Nozzle body color		
		0.5 MPa	1 MPa	1.3 MPa	2 MPa	0.5 MPa	0.8 MPa	1 MPa	1.3 MPa	2 MPa	3.5 MPa	5 MPa	6 MPa	7 MPa				
80	063	50	80	80	80	1.13	1.72	2.00	2.35	2.99	3.99	4.75	5.19	5.58	35	0.2	200	
	125	60	80	80	80	2.29	3.51	4.10	4.84	6.19	8.31	9.94	10.9	11.7	27	0.3	100	
	22	65	80	80	80	3.99	6.18	7.25	8.59	11.1	15.0	18.0	19.7	21.3	65	0.4	100	

[Note]

1. The spray capacity of the KBN series is listed in liters per hour (L/hr), not in L/min.

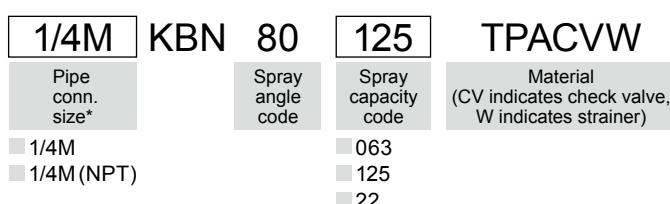
2. A check valve which closes and opens at 0.3 MPa is built into all nozzles.

3. KBN series nozzles are not guaranteed for spray angle and spray capacity because of the check valve.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M KBN 80125 TPACVW

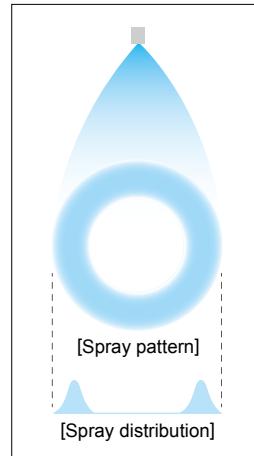


\*\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4 (BSPT 1/4 male).

In case NPT 1/4 male thread is required, please specify the pipe connection size as 1/4M (NPT).

# Semi-fine Fog and Low Flow Rate Hollow Cone Spray Nozzles

K



- Low flow rate hollow cone spray nozzle.
- Semi-fine atomization.
- The whirl chamber is formed by a ceramic orifice and closer, providing excellent wear resistance.

## [STANDARD PRESSURE]

0.3 MPa

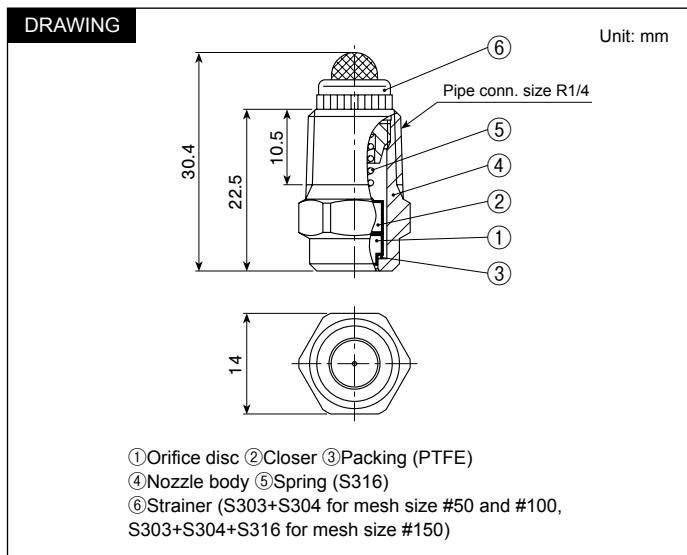
## [APPLICATIONS]

Humidifying: Air handling units  
Cooling: Gas, metals  
Spraying: Chemicals

Hollow Cone

Structure	<ul style="list-style-type: none"> <li>Nozzle orifice and closer are made of ceramic.</li> <li>All models include a built-in strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Orifice disc and closer: ceramic</li> <li>Nozzle body: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316</p>
Weight	<ul style="list-style-type: none"> <li>17.5 g</li> </ul>

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray capacity code	Spray angle (°)			Spray capacity (L/min)									Mean droplet diameter (µm)	Free passage diameter (mm)	Strainer mesh size
	0.15 MPa	0.3 MPa	0.7 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa	2.5 MPa			
006	—	80	80	—	—	0.06	0.08	0.09	0.11	0.13	0.15	0.16	80	0.4	150
008	—	80	80	—	—	0.08	0.10	0.12	0.14	0.17	0.20	0.22	—	0.4	150
010	—	80	80	—	—	0.10	0.13	0.15	0.18	0.22	0.25	0.27	—	0.5	100
012	—	80	80	—	—	0.12	0.15	0.18	0.21	0.26	0.30	0.33	—	0.5	100
015	—	80	80	—	0.12	0.15	0.19	0.22	0.27	0.32	0.37	0.41	—	0.6	100
020	70	80	80	0.14	0.16	0.20	0.26	0.30	0.35	0.43	0.49	0.55	—	0.7	50
025	70	80	80	0.18	0.21	0.25	0.32	0.37	0.44	0.54	0.62	0.69	—	0.7	50
030	70	80	80	0.22	0.25	0.30	0.38	0.45	0.53	0.65	0.74	0.82	—	0.9	50
040	70	80	80	0.29	0.33	0.40	0.51	0.60	0.71	0.86	0.99	1.10	—	0.9	50
050	70	80	80	0.36	0.41	0.50	0.64	0.75	0.89	1.08	1.23	1.37	200	1.0	50
060	70	80	80	0.43	0.49	0.60	0.77	0.90	1.06	1.29	1.48	1.65	220	1.0	50
070	70	80	80	0.50	0.58	0.70	0.89	1.05	1.24	1.51	1.73	1.92	—	1.0	50
080	70	80	80	0.58	0.66	0.80	1.02	1.20	1.42	1.72	1.97	2.20	—	1.2	50
100	70	80	80	0.72	0.82	1.00	1.28	1.50	1.77	2.15	2.47	2.74	—	1.3	50
120	70	80	80	0.86	0.99	1.20	1.53	1.80	2.13	2.58	2.96	3.29	—	1.3	50
140	70	80	80	1.01	1.15	1.40	1.79	2.10	2.48	3.01	3.46	3.84	—	1.5	50
160	70	80	80	1.15	1.32	1.60	2.04	2.40	2.84	3.44	3.95	4.39	—	1.5	50
180	70	80	80	1.29	1.48	1.80	2.30	2.69	3.19	3.87	4.44	4.94	380	1.7	50

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M K 006 N S303 W

1/4M K 006 N S303 W

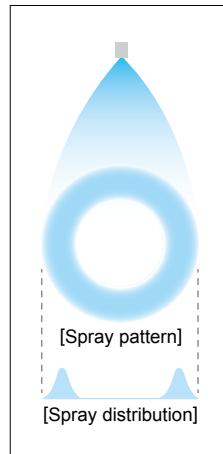
Pipe conn. size*	Spray capacity code	Material	Strainer
006	—	—	—
—	—	—	—
180	—	—	—

\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

# Semi-fine Fog and Low Flow Rate Hollow Cone Spray Nozzles

**KKBP**

Hollow Cone



- Low flow rate hollow cone spray nozzle.
- Unique whirler design with large free passage diameter minimizes clogging.
- Semi-fine atomization.
- Compact, lightweight design with a small number of parts.
- Maintenance is easy as whirler is detachable.

**[STANDARD PRESSURE]**

0.3 MPa

**[APPLICATIONS]**

Humidifying: Air handling units

Cooling: Gas, metals

Spraying: Chemicals

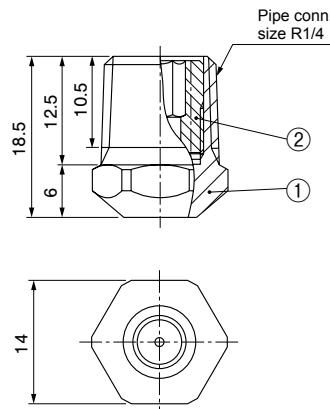
Snow making (for snow machines)

Structure	<ul style="list-style-type: none"> <li>Includes a nozzle body and whirler.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle body: S303</li> <li>Whirler: S316L equivalent</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or S316L</p>
Weight	<ul style="list-style-type: none"> <li>15g</li> </ul>

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING**

Unit: mm



①Nozzle body ②Whirler

Spray capacity code	Spray angle (°)			Spray capacity (L/min)								Mean droplet diameter (μm)	Free passage diameter (mm)
	0.2 MPa	0.3 MPa	1.0 MPa	0.2 MPa	0.3 MPa	0.5 MPa	1 MPa	1.5 MPa	2 MPa	3 MPa	5 MPa		
050	63	65	68	0.41	0.50	0.64	0.89	1.08	1.24	1.51	1.93	160	1.0
060	65	68	70	0.49	0.60	0.77	1.07	1.30	1.49	1.82	2.32	160	1.0
070	60	63	65	0.58	0.70	0.89	1.25	1.52	1.74	2.12	2.71	170	1.2
080	63	65	68	0.66	0.80	1.02	1.43	1.73	1.99	2.42	3.09	180	1.2
100	55	58	60	0.82	1.00	1.28	1.78	2.17	2.49	3.03	3.87	250	1.4
120	58	60	63	0.99	1.20	1.53	2.14	2.60	2.99	3.63	4.64	260	1.4
140	55	58	60	1.15	1.40	1.79	2.50	3.04	3.49	4.24	5.41	250	1.6
160	55	58	60	1.32	1.60	2.05	2.85	3.47	3.98	4.84	6.19	260	1.6
180	50	53	55	1.48	1.80	2.30	3.21	3.90	4.48	5.45	6.96	250	1.8
200	53	55	58	1.65	2.00	2.56	3.57	4.34	4.98	6.05	7.73	360	1.8

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M KKB P 050 S303

1/4M KKB P 050 S303

Pipe conn. size\*      Spray capacity code      Material

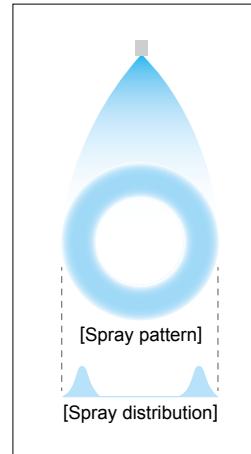
050  
S  
200

\*\*M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

# Low Flow Rate Hollow Cone Spray Nozzles

Made-to-Order

**KD**



- Low flow rate hollow cone spray nozzle in a three-piece structure.
- Combines compact design and semi-fine atomization capability.
- The whirl chamber is made up of a ceramic orifice and whirler, providing excellent wear resistance.

## [STANDARD PRESSURE]

0.3 MPa

## [APPLICATIONS]

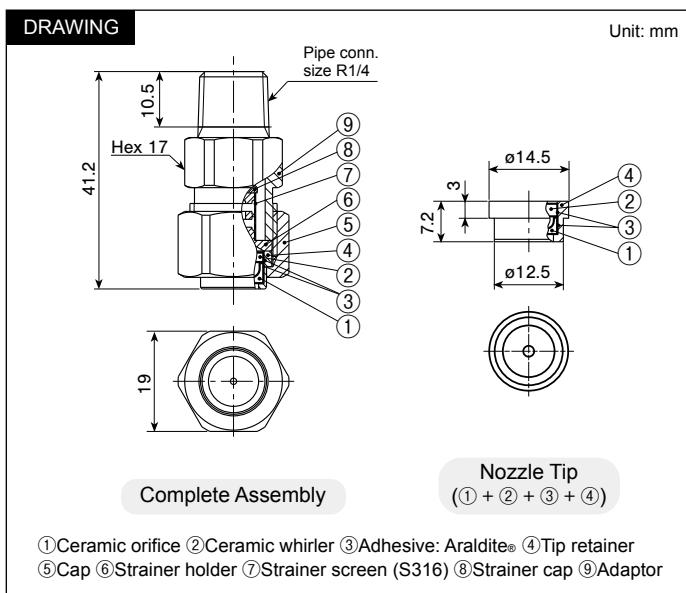
Cooling: Gas

Spraying: Chemicals, dust suppression

Hollow Cone

Structure	<ul style="list-style-type: none"> <li>Nozzle orifice and whirler are made of ceramic.</li> <li>Includes three parts: Nozzle tip, cap, and adaptor.</li> <li>Worn-out nozzle tips can be replaced separately.</li> <li>Small spray capacity models (KD03, 033 and 042) come with or without a strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice and whirler: ceramic</li> <li>Metal parts: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or others</p>
Weight	<ul style="list-style-type: none"> <li>Complete assembly*: 46 g</li> <li>Nozzle tip: 3 g</li> </ul>

\*1) With strainer, add 5 g to the above weight and 2 mm to the total length.



①Ceramic orifice ②Ceramic whirler ③Adhesive: Araldite® ④Tip retainer  
⑤Cap ⑥Strainer holder ⑦Strainer screen (S316) ⑧Strainer cap ⑨Adaptor

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray capacity code	Pipe conn. size	Spray angle (°)			Spray capacity (L/min)								Mean droplet diameter (μm)	Free passage diameter (mm)	
		R1/4	0.15 MPa	0.3 MPa	0.7 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa	
03	●	—	80	85	—	—	0.25	0.30	0.38	0.44	0.52	0.63	0.72	130	0.7
033	●	—	80	88	—	—	0.27	0.33	0.42	0.49	0.58	0.69	0.79	130	0.7
037	○	—	70	75	—	—	0.31	0.37	0.47	0.55	0.64	0.77	0.88	130	1.0
042	●	90	93	97	—	0.30	0.35	0.42	0.53	0.62	0.73	0.88	1.00	130	0.7
057	○	78	85	90	—	0.41	0.47	0.57	0.72	0.84	0.99	1.19	1.36	130	1.1
068	○	90	95	99	—	0.49	0.56	0.68	0.86	1.01	1.18	1.42	1.62	200	1.1
084	○	90	95	103	0.50	0.61	0.70	0.84	1.05	1.21	1.42	1.69	1.92	130	1.1
116	○	66	70	72	0.70	0.84	0.96	1.16	1.45	1.68	1.96	2.34	2.65	260	1.3
146	○	74	78	80	0.88	1.06	1.21	1.46	1.85	2.16	2.54	3.05	3.49	310	1.8
176	○	71	73	75	1.06	1.27	1.46	1.76	2.22	2.60	3.06	3.68	4.20	310	1.7
182	○	81	87	91	1.10	1.32	1.51	1.82	2.30	2.69	3.17	3.81	4.34	310	1.8
211	○	83	88	92	1.27	1.53	1.75	2.11	2.67	3.12	3.67	4.41	5.04	310	1.8
224	○	75	80	82	1.34	1.62	1.85	2.24	2.83	3.31	3.90	4.69	5.35	310	1.7
262	○	75	80	83	1.57	1.90	2.17	2.62	3.31	3.87	4.56	5.48	6.25	310	1.7
316	○	93	97	97	1.90	2.29	2.62	3.16	3.99	4.67	5.50	6.61	7.54	310	1.8
394	○	83	87	91	2.36	2.85	3.26	3.94	4.98	5.82	6.86	8.24	9.40	420	1.7

●: Available with or without strainer (mesh size #50) ○: Only available without strainer

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### ① Complete Assembly

Example: 1/4M KD 03 S303W

1/4M	KD	03	S303	W
Pipe conn. size <sup>2</sup>	Spray capacity code	Material	Strainer	
03	394			

W (with strainer)	(Blank indicates "without strainer")
-------------------	--------------------------------------

### ② Nozzle Tip Only

Example: 1/4 KD 03 S303

1/4 KD	03	S303
Spray capacity code	Material	
03	394	

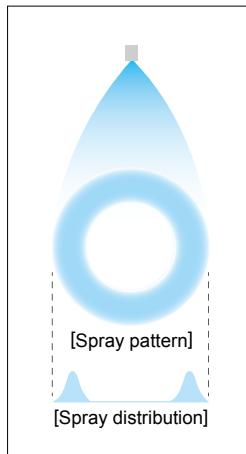
<sup>2</sup>) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

This nozzle series is made-to-order.

# Medium Capacity Hollow Cone Spray Nozzles

AAP

Hollow Cone



- Hollow cone spray nozzle with relatively fine atomization and stable spray pattern at both low and high pressure.
- No-whirler design minimizes clogging.
- Spraying axis at 90° angle from the nozzle inlet.

## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

Cleaning: Gas, air, machines, pre-paint treatment

Cooling: Gas, air handling unit, roofs, machineries, foods, warm water

Spraying: Aeration, humidification

Structure	<ul style="list-style-type: none"> <li>• Includes a nozzle body and orifice cap.</li> <li>• Orifice cap is screwed into the nozzle body.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle body: S304</li> <li>• Orifice cap: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316 or S316L</p>

Pipe conn. size	Dimensions (mm)						Weight (g)
	L1	L2	L3	L4	W	N	
R1/4	32	23	20.5	16	16	10.5	49
R3/8	36	26	23.5	19	19	11	72
R1/2	46	33.5	31	25	25	14	160

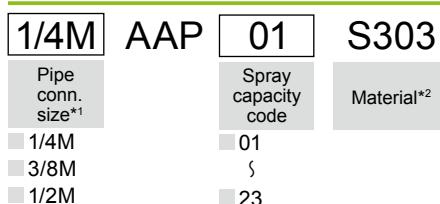
[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray capacity code	Pipe conn. size			Spray angle (°)		Spray capacity (L/min)							Mean droplet diameter (μm)	Free passage diameter (mm)	
	R1/4	R3/8	R1/2	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
01	○			71	75	77	0.40	0.51	0.72	0.87	1.00	1.22	1.55	260	2.0
02	○			71	75	77	0.80	1.03	1.43	1.74	2.00	2.43	3.11		2.5
03	○			71	75	77	1.21	1.54	2.15	2.61	3.00	3.65	4.66		3.2
04	○			76	80	82	1.61	2.05	2.87	3.48	4.00	4.86	6.21		3.7
05	○			76	80	82	2.01	2.57	3.58	4.35	5.00	6.08	7.77	500	4.2
06		○		76	80	82	2.41	3.08	4.30	5.22	6.00	7.29	9.32	470	4.8
07		○		76	80	82	2.81	3.59	5.02	6.10	7.00	8.51	10.9		5.0
08		○		76	80	82	3.21	4.11	5.73	6.97	8.00	9.72	12.4		5.2
10		○		76	80	83	4.02	5.14	7.17	8.71	10.0	12.2	15.5		5.4
12		○		76	80	83	4.82	6.16	8.60	10.4	12.0	14.6	18.6	650	5.9
14			○	76	80	83	5.62	7.19	10.0	12.2	14.0	17.0	21.7	580	6.8
18			○	76	80	83	7.23	9.24	12.9	15.7	18.0	21.9	28.0		7.5
23			○	76	80	83	9.24	11.8	16.5	20.0	23.0	28.0	35.7	800	8.0

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M AAP 01 S303



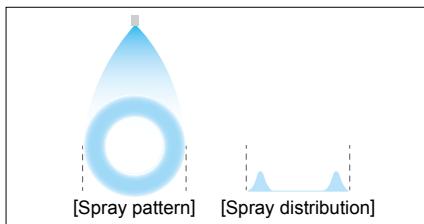
\*1) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

\*2) S303 refers to the material of the orifice cap and the nozzle body is S304.

# Alumina Ceramic and Medium Capacity Hollow Cone Spray Nozzles

Made-to-Order

**AP-AL92**



- Hollow cone spray nozzle made of alumina ceramic with excellent wear-resistance and relatively fine atomization.
- Spray pattern is stable at both low and high pressures.
- No-whirler design minimizes clogging.
- Spraying axis at 90° angle from the nozzle inlet.

## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

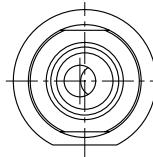
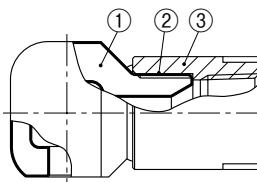
Cleaning: Gas, air, machines, pre-paint treatment  
Cooling: Gas, air handling unit, roofs, machinery, foods, warm water  
Spraying: Aeration, humidification

Structure	<ul style="list-style-type: none"><li>• Alumina ceramic one-piece structure.</li><li>• No obstructions in the nozzle interior.</li></ul>
Material	<ul style="list-style-type: none"><li>• Nozzle body: 92% Alumina</li><li>• Socket: S316</li></ul>

The AP-AL92 series is available with a socket made of S316 to prevent damage to the delicate alumina threads.

The S316 socket is female threaded turning the male nozzle thread into a female connection.

## DRAWING



①Nozzle body ②Adhesive: Araldite®H ③Socket (S316)

Nozzle thread size	Spray angle (°) at 0.2 MPa	Spray capacity (L/min) at 0.2 MPa	Mean droplet diameter (μm)	Free passage diameter (mm)
R1/2	80	14.0–23.0	580–800	6.4–8.1
R3/4	80	26.0–40.0	670–850	9.2–11.0
R1	85	45.0–70.0	750–1,000	11.9–14.4
R1½	85	80.0–150	1,000–1,400	15.9–19.4
R2	85	200–250		24.2–26.1
R2½	85	300–400	1,500–1,800	31.0–32.9
R3	85	500–600		39.7–42.6

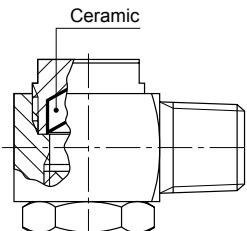
## HOW TO ORDER

IKEUCHI will help select the best model for the specific applications and requirements of each customer. Contact us for more details.

## Metal AP Series Made-to-Order

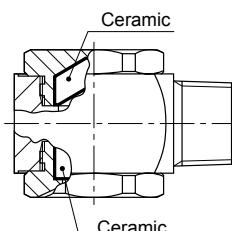
For applications requiring wear resistant nozzles, such as spraying slurry, the AP series with highly wear-resistant ceramics are available. Contact us for details.

### AP SERIES



- Metal hollow cone spray nozzle using ceramic for the inner bottom part of the nozzle body.

### AP SERIES with ceramic orifice



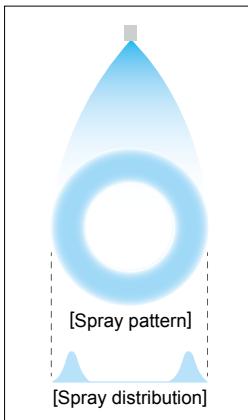
- Metal hollow cone spray nozzle including a ceramic orifice and ceramic inner bottom part.

# Flange-connection, Large Capacity Hollow Cone Spray Nozzles

Made-to-Order

**TAA**

Hollow Cone



- Stable hollow cone spray pattern, even at low pressures, because of the unique vortex chamber design.
- Made of highly wear-resistant SiC (silicon nitride bonded silicon carbide).
- Flange connection.
- Lightweight, weighing less than half of comparable metal nozzles.

#### [STANDARD PRESSURE]

0.07 MPa

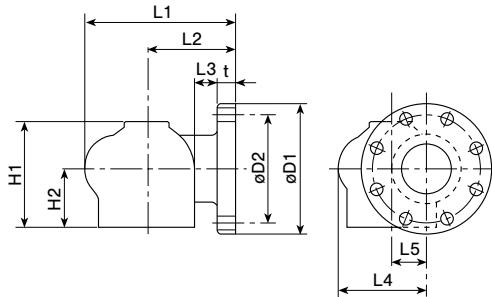
#### [APPLICATIONS]

- Absorption tower of flue gas desulfurization equipment
- Spraying slurry

Structure	<ul style="list-style-type: none"> <li>• One-piece cast-molded ceramic.</li> <li>• Flanged connection.</li> </ul>											
Material	<ul style="list-style-type: none"> <li>• SiC (silicon nitride bonded silicon carbide)</li> </ul> <p>SPECIAL ORDER MATERIAL: SiSiC (sintered reaction-bonded silicon carbide)</p>											

Flange size (inch)	Spray capacity code	Dimensions (mm)								Flange bolt holes (JIS 10K)	Weight (kg)			
		L1	L2	L3	L4	L5	H1	H2	øD1	øD2				
2	200	151	99	37	74	28	102	57	155	120	22	4	19	1.8
	300	169	106	37	90	35	112	62	155	120	22	4	19	2.0
3	400	184	114	37	100	38	129	71	185	150	24	8	19	3.1
	500	202	122	37	116	45	145	82	185	150	24	8	19	3.7
4	650	210	125	36	124	49	150	85	185	150	24	8	19	4.0
	800	210	125	36	124	49	150	85	185	150	24	8	19	4.0
4	1000	253	154	55	143	56	177	100	210	175	24	8	19	6.0
	1200	271	161	55	159	63	187	105	210	175	24	8	19	6.8

#### DRAWING



[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray capacity code	Flange connection size (inch)			Spray angle (°)			Spray capacity (L/min)					Mean droplet diameter (µm)	Free passage diameter (mm)
	2	3	4	0.03 MPa	0.07 MPa	0.1 MPa	0.03 MPa	0.05 MPa	0.07 MPa	0.1 MPa	0.15 MPa		
200	○			62	67	69	133	170	200	237	288	1,800	28
300		○		62	67	69	199	255	300	356	432	2,100	31
400		○		62	67	69	266	340	400	474	576	2,100	38
500		○		62	67	69	332	425	500	592	720	2,100	41
650		○		62	67	69	432	552	650	770	936	2,100	50
800		○		75	80	82	532	680	800	950	1,154	3,600	57
1000			○	75	80	82	665	850	1,000	1,187	1,442	3,600	68
1200			○	75	80	82	798	1,020	1,200	1,424	1,731	3,800	68

[Note] 1. Since TAA series nozzles are cast molded, the spray capacity is guaranteed within +/-10% and the spray angle within +/-7° under standard pressure.

2. The tightening torque to connect the flange should not exceed 30 N·m per bolt.

#### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 2 TAA 200 SiC

2	TAA	200	SiC
Flange connection size	Spray capacity code	Material	
2	200		
3	3		
4	4		
		200	
		3	
		4	

This nozzle series is made-to-order.

#### TWAA, TAA-PP SERIES Made-to-Order

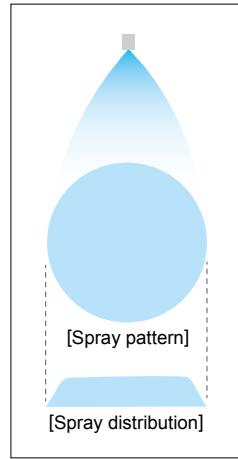
Also available are TWAA series nozzles for two-directional spray and TAA series nozzles made of chemical-resistant PP.

Series	Picture	Structure	Features	Series	Picture	Structure	Features
TWAA-Sic			<ul style="list-style-type: none"> <li>• Two-directional (opposite directions) jet nozzle made of SiC ceramic.</li> </ul>	TAA-PP			<ul style="list-style-type: none"> <li>• Hollow cone spray nozzle made of PP.</li> <li>• Chemical-resistant and lightweight.</li> </ul>

# Standard Type Full Cone Spray Nozzles

Some Models are Made-to-Order

JJXP



- Full cone spray pattern with a round impact area and uniform distribution.
- Spray capacity ranges from small to medium.
- X-shaped whirler provides a large free passage diameter, minimizing clogging.

## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

Cleaning: Gas, incinerator fumes, machinery, eliminators, screens, tanks, parts, crushed stone, earth and sand

Cooling: Gas, machineries, tanks, steel

Spraying: Waste water treatment, aeration, foam breaking, fire prevention and extinguishing, dust suppression, sea water desalination equipment

Full Cone

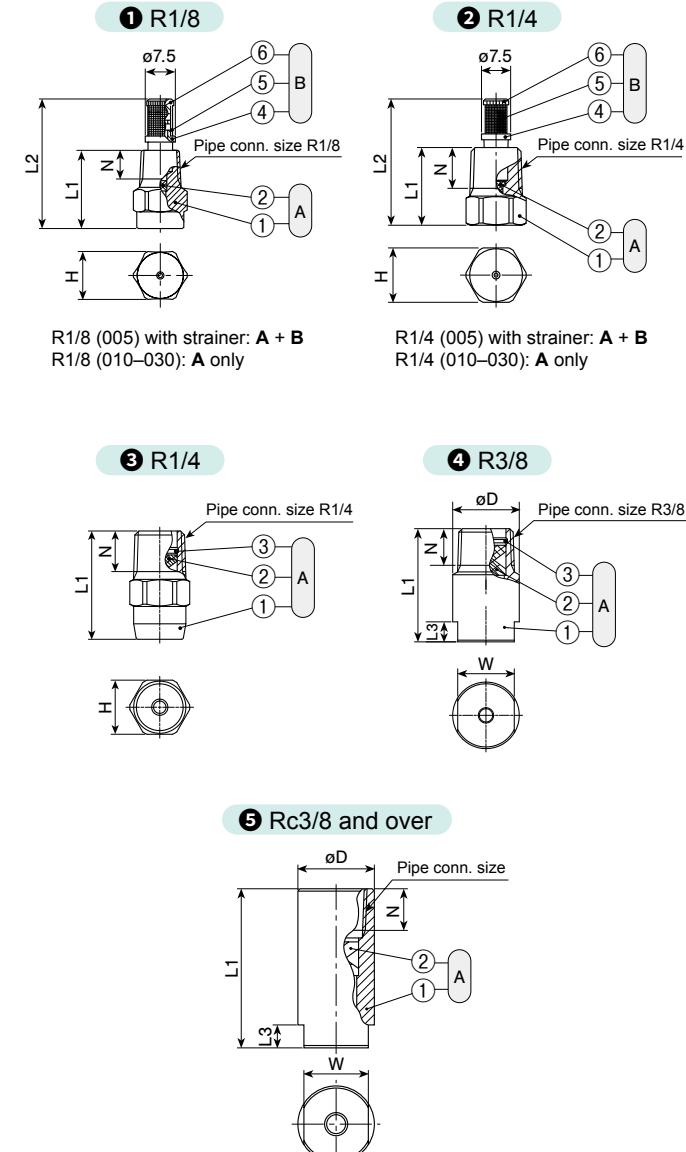
Structure	<ul style="list-style-type: none"> <li>• One-piece structure with a press-fitted X-shaped whirler. Size R1/4 with spray capacity codes 040–060 and size R3/8 standard models include a C-ring.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Sizes R1/8–Rc1: S303</li> <li>• Sizes Rc1 1/2 or larger: S316</li> <li>• Depending on nozzle code, S316L equivalent or SCS16 whirlers are also used.</li> </ul> <p>SPECIAL ORDER MATERIAL<sup>1)</sup>: S316L, S316L, PP, or PTFE (PP and PTFE for Rc3/8 sizes and larger only)</p> <p>*1) Thread size of special order material may differ depending on the material.</p>

DWG No.	Pipe conn. size <sup>2)</sup>	Dimensions (mm)							Weight (g)
		L1	L2	L3	H	W	øD	N	
<b>①</b>	R1/8 (005)	20	32.5	—	12	—	—	7	9.5 <sup>3)</sup>
	R1/8 (010–030)	20	—	—	12	—	—	7	11
<b>②</b>	R1/4 (005)	20	32.5	—	14	—	—	10.5	18 <sup>3)</sup>
	R1/4 (010–030)	20	—	—	14	—	—	10.5	18
<b>③</b>	R1/4 (040–060)	28	—	—	14	—	—	10.5	21
<b>④</b>	R3/8	34	—	6	—	17	20	11	50
<b>⑤</b>	Rc3/8	43	—	6	—	17	20	11	61
	Rc1/2	54	—	8	—	22	25	14	140
	Rc3/4	69	—	10	—	27	32	15	270
	Rc1	89	—	14	—	34	40	17	515
	Rc1½	124	—	20	—	50	58	19	1,520
	Rc2 (250–350)	160	—	24	—	60	70	23	2,600
	Rc2 (400–500)	118.5	—	24	—	60	70	23	2,050
	Rc2½	147.5	—	27	—	80	90	27	4,360
	Rc3 (920)	163.5	—	30	—	90	105	30	6,700
	Rc3 (1200)	170.5	—	30	—	90	105	30	6,500

\*2) Figures in ( ) after the pipe connection size indicate the spray capacity code.

\*3) For JJXP005 with strainer, add 2 g to the above weight.

## DRAWING



Ⓐ Nozzle (①Nozzle body ②Whirler ③C-ring)

Ⓑ Strainer (④Strainer holder ⑤Strainer screen [S316] ⑥Strainer cap)

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray capacity code	Pipe connection size				Spray angle (°)			Spray capacity (L/min)										Mean drop. dia. (µm)	Free pass. dia. (mm)
	R1/8	R1/4	R3/8	Rc3/8	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa			
005	●	●			—	55	65	—	—	0.36	0.44	0.50	0.59	0.73	0.83	0.96	270	0.4	
010	○	○			50	55	45	—	0.53	0.73	0.88	1.00	1.18	1.45	1.67	1.93	290	0.7	
015	○	○			60	65	55	—	0.79	1.09	1.31	1.50	1.77	2.18	2.50	2.89	—	0.8	
020	○	○			60	65	55	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86	—	1.4	
030	○	○			65	70	60	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	410	1.4	
040		○			60	65	55	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67	7.72	380	1.7	
050		○			65	70	60	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34	9.64	—	1.7	
060		○			70	75	65	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	11.6	520	1.7	
070			○	○	60	65	60	2.93	3.71	5.09	6.13	7.00	8.26	10.2	11.7	13.5	480	1.9	
080			○	○	65	70	65	3.35	4.24	5.82	7.01	8.00	9.44	11.6	13.3	15.4	—	1.9	
10			○	○	75	80	75	4.19	5.29	7.28	8.76	10.0	11.8	14.5	16.7	19.3	—	2.6	
12			○	○	80	85	80	5.03	6.35	8.73	10.5	12.0	14.2	17.4	20.0	23.1	660	2.6	

Full Cone

Spray capacity code	Pipe connection size <sup>*4</sup>							Spray angle (°)			Spray capacity (L/min)									Mean drop. dia. (µm)	Free pass. dia. (mm)
	Rc 1/2	Rc 3/4	Rc 1	Rc 1½	Rc 2	Rc 2½	Rc 3	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
14	○							65	70	55	5.86	7.41	10.2	12.3	14.0	16.5	20.3	23.3	27.0	590	3.5
16	○							70	75	60	6.70	8.47	11.6	14.0	16.0	18.9	23.3	26.7	30.9	—	3.5
18	○							75	80	65	7.54	9.53	13.1	15.8	18.0	21.2	26.2	30.0	34.7	—	3.5
20	○							80	85	70	8.38	10.6	14.6	17.5	20.0	23.6	29.1	33.4	38.6	740	3.5
23		○						70	75	60	9.63	12.2	16.7	20.2	23.0	27.1	33.4	38.4	44.4	630	4.7
26		○						75	80	65	10.9	13.8	18.9	22.8	26.0	30.7	37.8	43.4	50.1	—	4.7
30			○					80	85	70	12.6	15.9	21.8	26.3	30.0	35.4	43.6	50.0	57.9	—	4.7
35			○					85	90	75	14.7	18.5	25.5	30.7	35.0	41.3	50.9	58.4	67.5	—	4.7
40			○					90	95	80	16.8	21.2	29.1	35.1	40.0	47.2	58.1	66.7	77.2	—	4.7
45			○					90	95	80	18.8	23.8	32.7	39.4	45.0	53.1	65.4	75.0	86.8	950	4.7
50			○					70	75	60	20.9	26.5	36.4	43.8	50.0	59.0	72.7	83.4	96.4	800	6.0
60			○					80	85	70	25.1	31.8	43.7	52.6	60.0	70.8	87.2	100	116	—	6.0
80			○					90	95	80	33.5	42.4	58.2	70.1	80.0	94.4	116	133	154	—	6.0
90			○					90	95	80	37.7	47.7	65.5	78.9	90.0	106	131	150	174	1,150	6.6
100			○					80	85	70	41.9	52.9	72.8	87.6	100	118	145	167	193	1,000	8.4
150			○					85	90	75	62.8	79.4	109	131	150	177	218	250	289	—	10.3
200			○					90	95	80	83.8	106	146	175	200	236	291	334	386	1,350	10.3
250			○					85	90	75	105	132	182	219	250	295	363	417	482	1,200	12.7
300			○					90	95	80	126	159	218	263	300	354	436	500	579	—	12.7
350			○					90	95	80	147	185	255	307	350	413	509	584	675	—	12.7
400			○					75	80	65	168	212	291	351	400	472	581	667	772	1,320	14.1
500			○					95	95	80	209	265	364	438	500	590	727	834	964	1,500	14.1
600			○					75	80	65	251	318	437	526	600	708	872	1,001	1,157	1,500	16.9
700			○					85	90	75	293	371	509	613	700	826	1,017	1,167	1,350	1,800	16.9
920			○					100	100	85	385	487	669	806	920	1,086	1,337	1,534	1,775	1,660	18.1
1200			○					105	105	90	503	635	873	1,052	1,200	1,416	1,744	2,001	2,315	1,950	20.0

●: Available with or without strainer (mesh size #100) ○: Only available without strainer

\*4) The JJXP series with thread size Rc2 1/2 and Rc3 are made-to-order.

For spraying slurry, the nozzle material should be wear-resistant. For such applications, the **JUXP-AL92 series** nozzles made of high-purity alumina are available (see page 71).

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/8M JJXP 005 S303 W

<b>1/8M</b>	<b>JJXP</b>	<b>005</b>	<b>S303</b>	<b>W</b>
Pipe conn. size <sup>5</sup>	Spray capacity code	Material <sup>6</sup>	Strainer	
1/8M	005	S303	W (with strainer: JJXP005 only)	
3F	1200	S316	(Blank indicates "without strainer")	

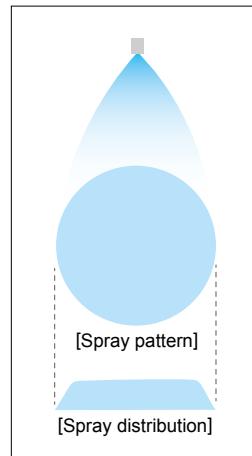
\*5) "M" indicates male thread ("R" of the ISO standard) and "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/8M = R1/8.

\*6) See "Material" information on page 64 for standard material (S303 or S316) for each size.

The JJXP series with thread size Rc2 1/2 and Rc3 are made-to-order.

# Standard Type Full Cone Spray Nozzles

JJXP-PVDF



- Full cone spray pattern with a round impact area and uniform distribution.
- X-shaped whirler provides a large free passage diameter, minimizing clogging.

## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

Cleaning: Machinery, screens, tanks, crushed stone, earth and sand

Cooling: Machinery, tanks

Spraying: Waste water treatment, aeration, foam breaking, dust suppression, etching, chemicals

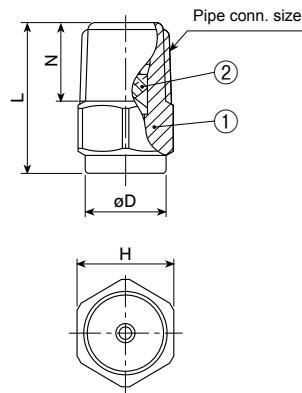
Full Cone

Structure	• One-piece structure with a press-fitted X-shaped whirler.
Material	• PVDF

Pipe conn. size	Dimensions (mm)				Weight (g)
	L	H	øD	N	
R1/8	18	12	11	8	2.2
R1/4	22	14	12	11.5	4.1

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING



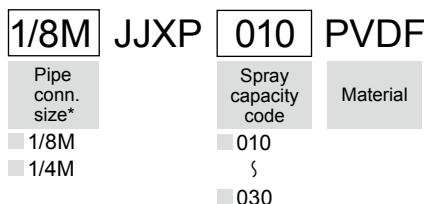
①Nozzle body ②Whirler

Spray capacity code	Pipe conn. size		Spray angle (°)		Spray capacity (L/min)										Mean droplet diameter (µm)	Free passage diameter (mm)
	R1/8	R1/4	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
010	○	○	60	65	55	—	0.53	0.73	0.88	1.00	1.18	1.45	1.67	1.93	290	0.8
015	○	○	60	65	55	—	0.79	1.09	1.32	1.50	1.77	2.18	2.50	2.89	—	1.0
020	○	○	60	65	55	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86	—	1.5
025	○	○	60	65	55	—	1.32	1.82	2.20	2.50	2.95	3.62	4.17	4.82	—	1.5
030	○	○	60	65	55	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	410	1.5

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/8M JJXP 010 PVDF



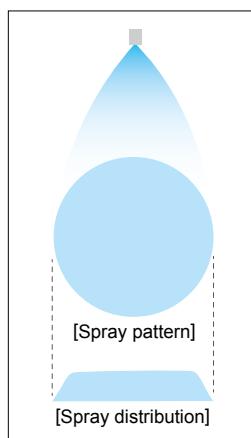
\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

# Standard Type Full Cone Spray Nozzles

JJXP-HTPVC  
JJXP-PVC

For spraying chemicals such as hydrochloric acid, heat-treated HTPVC injection-molded [JJXP-HTPVC series] nozzles are available.

Full Cone



- Full cone spray pattern with a round impact area and uniform distribution.
- X-shaped whirler provides a large free passage diameter, minimizing clogging.

## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

Spraying: Etchants, chemicals  
Cleaning: Printed circuit boards

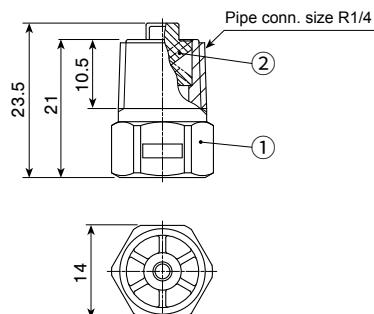
### JJXP-HTPVC SERIES

Structure	• One-piece structure with an X-shaped whirler.
Material	• HTPVC
Weight	• 2.5 g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING

Unit: mm



①Nozzle body ②Whirler

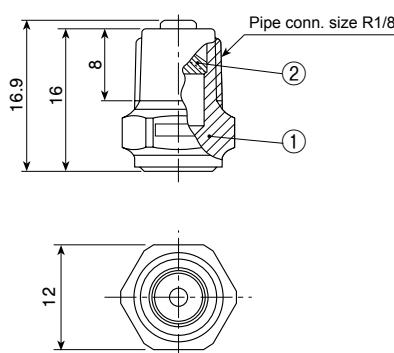
### JJXP-PVC

Structure	• One-piece structure with an X-shaped whirler.
Material	• PVC
Weight	• 1.4 g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING

Unit: mm



①Nozzle body ②Whirler

**■JJXP-HTPVC Series**

Spray capacity code	Spray angle (°)			Spray capacity (L/min)										Mean droplet diameter (μm)	Free passage diameter (mm)
	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa			
040	60	65	55	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67	7.72	380	2.1	
050	65	70	60	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34	9.64	—	2.1	
060	70	75	65	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	11.6	520	2.1	

**■JJXP-PVC [1/8M JJXP 2\*75/2 PVC]**

Spray angle (°)			Spray capacity (L/min)										Mean droplet diameter (μm)	Free passage diameter (mm)
0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa			
70	75	66	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86	350	1.5	

Full Cone

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**JJXP-HTPVC**

Example: 1/4M JJXP 040 HTPVC

1/4M JJXP **040** HTPVC

Pipe conn. size*	Spray capacity code	Material
040	050	060

**JJXP-PVC**

1/8M JJXP 2\*75/2 PVC

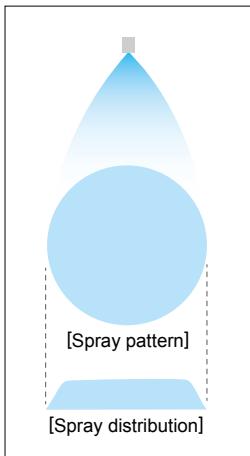
Pipe conn. size*	Spray angle & capacity code	Material
------------------	-----------------------------	----------

\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

# Ceramic Orifice and Whirler Inserted Full Cone Spray Nozzles

Made-to-Order

**JUP**



- Full cone spray pattern with a round impact area and uniform distribution.
- Ceramic disc whirler and orifice forming a vortex chamber provide excellent wear resistance.
- Medium spray capacity range.

## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

Cleaning: Gas, incinerator fumes, machinery, eliminators, screen, tanks, crushed stone, earth and sand

Cooling: Gas, machinery, tanks, steel

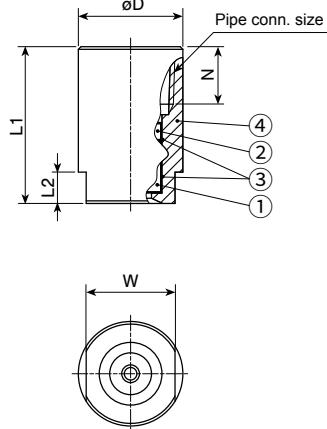
Spraying: Waste water treatment, aeration, foam breaking, dust suppression

Full Cone

Structure	• One-piece nozzle with a ceramic whirler and orifice that form a ceramic vortex chamber inside.				
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice &amp; whirler: ceramic</li> <li>• Nozzle body: Sizes Rc1 or smaller: S303 Sizes Rc1 1/2 or larger: S316</li> </ul>				
SPECIAL ORDER MATERIAL: S316 (for sizes Rc1 or smaller), S316L					
Pipe conn. size	Dimensions (mm)				Weight (g)
	L1	L2	W	øD	N
Rc3/8	30	6	17	20	11
Rc1/2	39	8	22	25	14
Rc3/4	49	10	27	32	15
Rc1	59	14	34	40	17
Rc1 1/2	80	20	50	58	19
					860

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING



①Ceramic orifice ②Ceramic whirler  
③Adhesive: Araldite® H ④Nozzle body

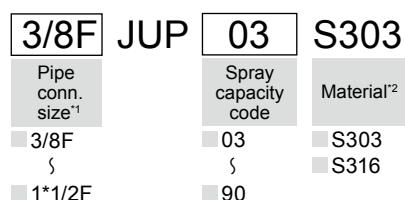
Spray capacity code	Pipe connection size					Spray angle (°)			Spray capacity (L/min)							Mean drop. dia. (µm)	Free pass. dia. (mm)
	Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/2	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
03	○					50	60	52	—	1.57	2.17	2.62	3.00	3.55	4.37	380	1.2
04	○					50	60	52	—	2.09	2.89	3.50	4.00	4.73	5.83	380	1.4
05	○					55	65	55	—	2.61	3.61	4.37	5.00	5.91	7.29	490	1.5
06		○				50	60	52	2.46	3.13	4.33	5.24	6.00	7.09	8.75	470	2.0
07		○				55	63	55	2.87	3.65	5.05	6.12	7.00	8.27	10.2	470	2.0
08		○				55	65	55	3.28	4.18	5.78	6.99	8.00	9.46	11.7	470	2.0
10		○				60	70	58	4.10	5.22	7.22	8.74	10.0	11.8	14.6	470	2.2
12		○				63	70	60	4.92	6.26	8.66	10.5	12.0	14.2	17.5	600	2.3
14			○			63	70	60	5.74	7.31	10.1	12.2	14.0	16.5	20.4	580	2.8
16			○			63	70	60	6.56	8.35	11.6	14.0	16.0	18.9	23.3	580	2.8
18			○			70	77	65	7.38	9.40	13.0	15.7	18.0	21.3	26.2	580	3.0
20			○			75	80	68	8.20	10.4	14.4	17.5	20.0	23.6	29.2	580	3.0
23			○			75	80	68	9.43	12.0	16.6	20.1	23.0	27.2	33.5	580	3.2
26			○			78	83	70	10.7	13.6	18.8	22.7	26.0	30.7	37.9	580	3.2
30			○			78	83	72	12.3	15.7	21.7	26.2	30.0	35.5	43.7	730	3.4

Spray capacity code	Pipe connection size					Spray angle (°)			Spray capacity (L/min)							Mean drop. dia. (µm)	Free pass. dia. (mm)
	Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1½	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
35				○		80	83	70	14.4	18.3	25.3	30.6	35.0	41.4	51.0	700	4.0
40				○		80	83	70	16.4	20.9	28.9	35.0	40.0	47.3	58.3		4.0
45				○		83	85	70	18.5	23.5	32.5	39.3	45.0	53.2	65.6	~	4.0
50				○		83	85	72	20.5	26.1	36.1	43.7	50.0	59.1	72.9		4.0
55				○		83	85	72	22.6	28.7	39.7	48.1	55.0	65.0	80.2	900	4.0
60				○		75	80	70	24.6	31.3	43.3	52.4	60.0	70.9	87.5	800	5.0
70				○		78	83	70	28.7	36.5	50.5	61.2	70.0	82.7	102	~	5.0
80				○		80	83	72	32.8	41.8	57.8	69.9	80.0	94.6	117	~	5.0
90				○		82	85	72	36.9	47.0	65.0	78.7	90.0	106	131	1,000	5.0

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

Example: 3/8F JUP 03 S303

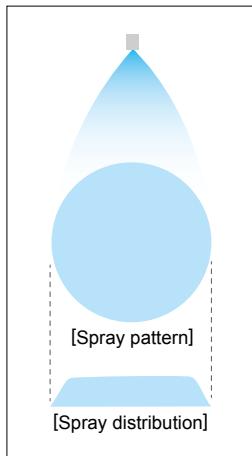
<sup>1</sup>) "F" indicates female thread ("Rc" of the ISO standard), e.g. 1\*1/2F = Rc1 1/2.<sup>2</sup>) See "Material" information on page 69 for standard material (S303 or S316) for each size.

This nozzle series is made-to-order.

# Alumina Ceramic Full Cone Spray Nozzles

Made-to-Order

JUXP-AL92



- X-shaped whirler provides a large free passage diameter, minimizing clogging.
- Made of high-purity alumina ceramic, offering excellent wear resistance.
- Spray capacity ranges from medium to large.

#### [STANDARD PRESSURE]

0.2 MPa

#### [APPLICATIONS]

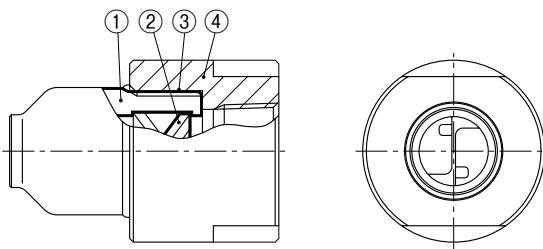
- Absorption tower of flue gas desulfurization equipment
- Spraying slurry

Structure	• Alumina ceramic one-piece structure.
Material	• Nozzle body: 92% Alumina • Socket: S316

The JUXP-AL92 series is available with a socket made of S316 to prevent damage to the delicate alumina threads.

The S316 socket is female threaded turning the male nozzle thread into a female connection.

#### DRAWING



①Nozzle body ②Whirler ③Adhesive: Araldite®H ④Socket (S316)

Nozzle thread size	Spray angle (°) at 0.2 MPa	Spray capacity (L/min) at 0.2 MPa	Mean droplet diameter (μm)	Free passage diameter (mm)
R1	75–95	23.0–45.0	630–950	4.7–5.0
R1½	75–95	50.0–90.0	800–1,150	6.0–6.6
R2	85–95	100–200	1,000–1,350	8.4–10.3
R2½	80–100	250–550	1,200–1,550	12.6–13.4
R3	80 or 90	600–700	1,500–1,800	17.6–17.8

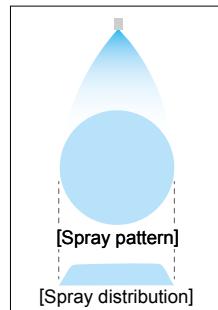
#### HOW TO ORDER

IKEUCHI will help select the best model for the specific applications and requirements of each customer. Contact us for more details.

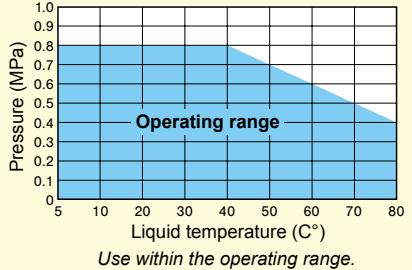
# Quick-Detachable Standard Full Cone Spray Nozzles

Plastic

INJJX



[Maximum pressures at various temperatures]



## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

- Cleaning • Etching • Stripping
- Chemical treatment
- For periodic maintenance or for applications where precise spray alignment is required

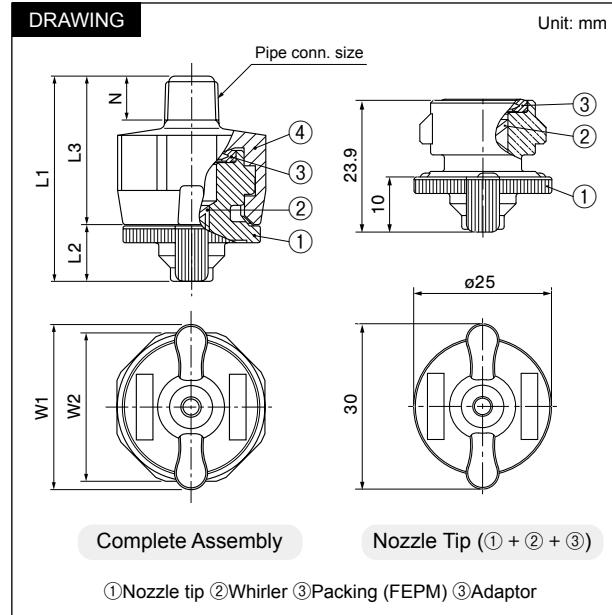
Structure	<ul style="list-style-type: none"> <li>• Two-piece structure including a nozzle tip, with whirler and packing, and an adaptor.</li> <li>• Easy installation and removal of the nozzle tip with a twist of about 60°.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle tip and whirler: PP</li> <li>• Adaptor: PP or PPS [SPECIAL ORDER MATERIAL: PVDF]</li> <li>• Packing: FEPM</li> </ul>

Pipe conn. size	Dimensions (mm)						Weight (g)	
	L1	L2	L3	W1	W2	N	PP	PPS
R1/8	37	10	27	30	27	8	9	12
R1/4	40	10	30	30	27	11.5	10	13
R3/8	40	10	30	30	27	12	11	14

[Note]

• INJJX series nozzles are not compatible with the discontinued ISJJX series.

• Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray capacity code	Pipe conn. size			Spray angle (°)			Spray capacity (L/min)								Mean drop. dia. (µm)	Free pass. dia. (mm)	Nozzle tip color
	R1/8	R1/4	R3/8	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa			
010	○	○	○	60	65	55	—	0.53	0.73	0.88	1.00	1.18	1.48	1.67	290	0.8	█
015	○	○	○	60	65	55	—	0.79	1.09	1.32	1.50	1.77	2.18	2.50	218	1.0	█
020	○	○	○	60	65	55	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	344	1.5	█
025	○	○	○	60	65	55	—	1.32	1.82	2.20	2.50	2.95	3.62	4.17	417	1.5	█
030	○	○	○	60	65	55	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	500	1.5	█
040	○	○	○	60	65	55	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67	667	2.0	█
050	○	○	○	65	70	60	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34	834	2.0	█
060	○	○	○	70	75	65	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	520	2.0	█

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### ①Complete Assembly

Example: 1/8M INJJX 040 PP (FEPM) + PP

1/8M INJJX 040 PP (FEPM) + PP

Pipe conn. size*	Spray capacity code	Nozzle tip material (packing: FEPM)	Adaptor material and color
1/8M	010	PP (FEPM)	PP
1/4M	015		PP
3/8M	020		PPS

### ②Nozzle Tip Only (including packing and whirler)

Example: INJJX 040 PP (FEPM)

INJJX 040 PP (FEPM)

Spray capacity code	Nozzle tip material (packing: FEPM)
010	PP (FEPM)
015	
020	
025	
030	
040	
050	
060	

## ALSO AVAILABLE!

Quick-Detachable

Standard

Flat Spray Nozzles

**INVV SERIES**

See page 23 of this catalog.

Stainless steel

quick-detachable

**INJJX-SS SERIES**

See page 74 of this catalog.

③Adaptor is available for purchase separately.

④You can change a nozzle tip to a plug tip if needed. See page 27 for the quick-detachable **IN PLUG** series.

\*\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

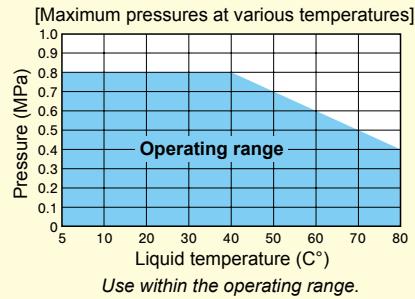
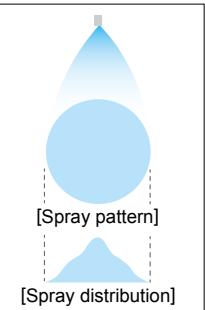
# Quick-Detachable Mountain-Shaped Full Cone Spray Nozzles

Plastic

**INJJX-Y**



Full Cone



- Full cone spray nozzle with mountain-shaped spray distribution and high impact, offering a high etch factor.
- Spray distribution remains remarkably stable even when spray pressure is adjusted.
- Quick-detachable design significantly reduces maintenance time, and the whirler inside the nozzle is removable.

**[STANDARD PRESSURE]**

0.2 MPa

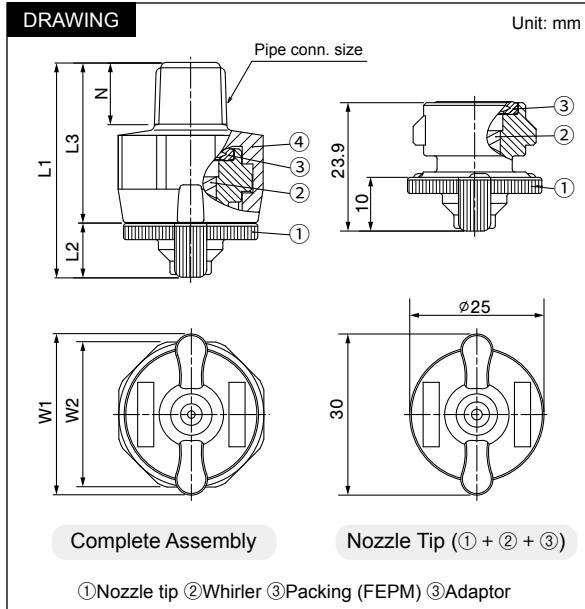
**[APPLICATIONS]**

- High-precision etching for lead frames, PCBs, and TAB
- For periodic maintenance or for applications where precise spray alignment is required

Structure	<ul style="list-style-type: none"> <li>• Two-piece structure including a nozzle tip, with whirler and packing, and an adaptor.</li> <li>Nozzle tips are color-coded by spray capacity for easy identification.</li> <li>• Easy installation and removal of the nozzle tip with a twist of about 60°.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle tip and whirler: PP</li> <li>• Adaptor: PP or PPS [SPECIAL ORDER MATERIAL: PVDF]</li> <li>• Packing: FEPM</li> </ul>

Pipe conn. size	Dimensions (mm)						Weight (g)	
	L1	L2	L3	W1	W2	N	PP	PPS
R1/8	37	10	27	30	27	8	9	12
R1/4	40	10	30	30	27	11.5	10	13
R3/8	40	10	30	30	27	12	11	14

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray capacity code	Pipe conn. size			Spray angle (°)									Spray capacity (L/min)					Mean drop. dia. (μm)	Free pass. dia. (mm)	Nozzle tip color
	R1/8	R1/4	R3/8	0.05 MPa	0.2 MPa	0.5 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa							
010Y	○	○	○	54	65	64	0.53	0.73	0.88	1.00	1.18	1.45	1.67	290	0.8	0.8				
015Y	○	○	○	54	65	64	0.79	1.09	1.32	1.50	1.77	2.18	2.50		1.0	1.0				
020Y	○	○	○	54	65	64	1.06	1.46	1.75	2.00	2.36	2.91	3.34		1.5	1.5				
025Y	○	○	○	54	65	64	1.32	1.82	2.20	2.50	2.95	3.62	4.17		1.5	1.5				
030Y	○	○	○	54	65	64	1.59	2.18	2.63	3.00	3.54	4.36	5.00		1.5	1.5				
040Y	○	○	○	54	65	64	2.10	2.90	3.50	4.00	4.79	6.01	6.98		1.6	1.6				
050Y	○	○	○	54	65	64	2.62	3.62	4.37	5.00	5.99	7.51	8.73	520	2.0	2.0				

**HOW TO ORDER** To inquire about or order a specific nozzle please refer to this coding system.

**①Complete Assembly**

Example: 1/8M INJJX 010Y PP (FEPM) + PP

1/8M	INJJX	010Y	PP (FEPM) +	PP
Pipe conn. size*	Spray capacity code	Nozzle tip material (packing: FEPM)	Adaptor material and color	
1/8M	010Y	PP	PP	
1/4M	○			
3/8M	○			

**②Nozzle Tip Only (including packing and whirler)**

Example: INJJX 010Y PP (FEPM)

INJJX	010Y	PP (FEPM)
Spray capacity code	○	Nozzle tip material (packing: FEPM)
010Y	○	PP

③Adaptor is available for purchase separately.

④You can change a nozzle tip to a plug tip if needed. See page 27 for the quick-detachable **IN PLUG** series.

**ALSO AVAILABLE!**

Quick-Detachable Standard Flat Spray Nozzles

**INVV**  
**SERIES**

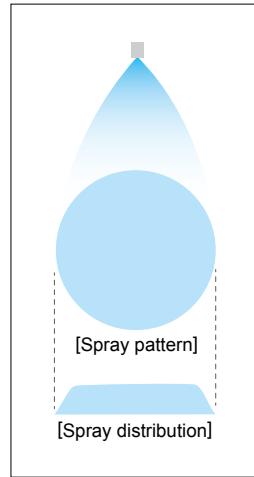
\*\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

See page 23 of this catalog.

# Quick-Detachable Standard Flat Spray Nozzles

Stainless Steel

**INJJX-SS**



- Full cone spray pattern with a round impact area and uniform distribution.
- The unique design accommodates easy installation and removal.
- Quick-detachable design helps to significantly reduce maintenance time.
- X-shaped whirler provides a large free passage diameter, minimizing clogging.

#### [STANDARD PRESSURE]

0.2 MPa

#### [APPLICATIONS]

Cleaning: Machinery, eliminators, screens, tanks, parts, crushed stone, earth and sand, steel plates and pieces

Cooling: Tanks, roofs

Spraying: Waste water treatment, aeration, foam breaking, dust suppression

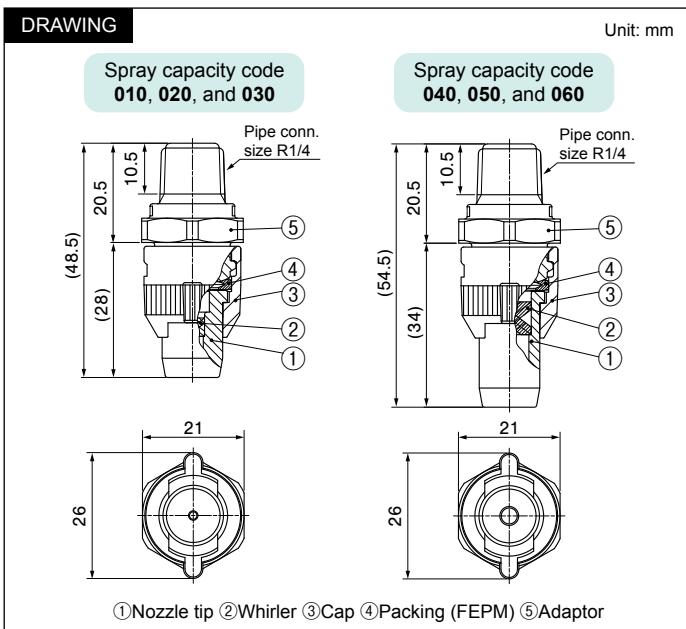
Full Cone

Structure	<ul style="list-style-type: none"> <li>Includes a nozzle section (nozzle tip + whirler + cap + packing) and an adaptor.</li> <li>Worn-out nozzle tips and other parts are available separately for replacement.</li> <li>Easy installation and removal of the nozzle section with a twist of about 90°.</li> <li>Tip or packing will not fall out when the nozzle section is removed.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: S303</li> <li>Whirler, cap and adaptor: S316L equivalent</li> <li>Packing: FEPM</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Complete assembly: 62 g</li> <li>Nozzle tip: 18 g</li> </ul>

Max. temperature: 150°C

Max. operating pressure: 2.0 MPa

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray capacity code	Spray angle (°)			Spray capacity (L/min)								Mean droplet diameter (μm)	Free passage diameter (mm)	
	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
010	50	55	45	—	0.53	0.73	0.88	1.00	1.18	1.45	1.67	1.93	290	0.7
020	60	65	55	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86	320	1.4
030	65	70	60	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	410	1.4
040	60	65	55	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67	7.72	380	1.7
050	65	70	60	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34	9.64	380	1.7
060	70	75	65	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	11.6	520	1.7

#### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

##### ① Complete Assembly

Example: 1/4M INJJX 010 S303 (FEPM) + S316L-IN

1/4M INJJX **010** S303 (FEPM) + S316L-IN

Pipe conn. size*	Spray capacity code	Nozzle tip material	Packing material	Material of cap & adaptor
010				
060				

##### ② Nozzle Tip Only

Example: 1/4 JJX 010 S303

1/4 JJX **010** S303

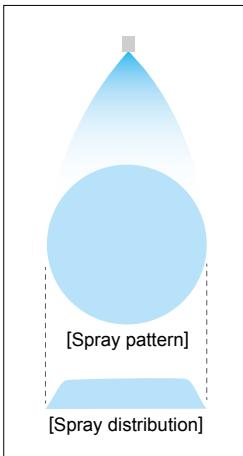
Spray capacity code	Material
010	
060	

③ Adaptor (R1/4), cap, and packing are available separately for purchase.

\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

# Low Flow Rate Full Cone Spray Nozzles

JJRP



- Low flow rate full cone spray nozzles made of excellent wear-resistant PTFE or injection molded PVDF.

- Disc whirler is designed to provide uniform spray distribution at small spray capacity.

## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

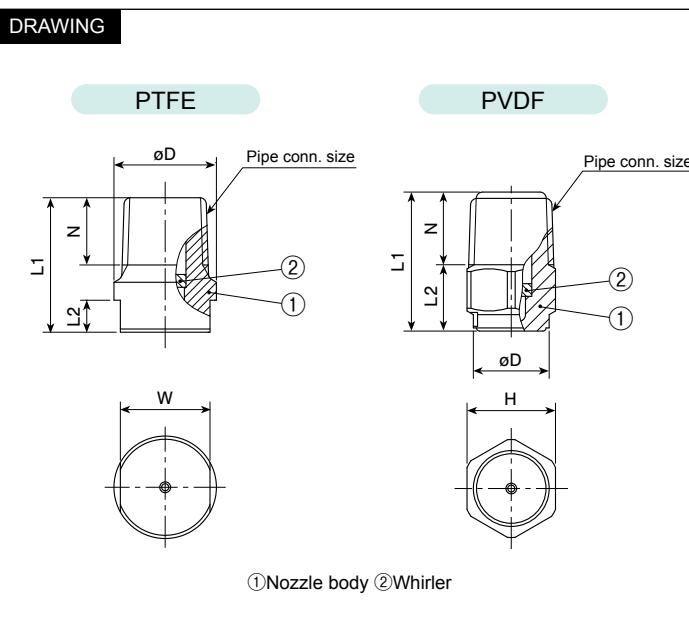
Spraying: Etchants, acid liquids  
Cleaning with pure water

Structure	• One-piece structure with a press-fitted disc whirler.
Material	• PTFE or PVDF

Material	Pipe conn. size	Dimensions (mm)						Weight (g)
		L1	L2	H	W	øD	N	
PTFE	R1/8	16	4	—	10	12	7	2
	R1/4	21	5	—	14	16	10.5	6 <sup>1</sup>
PVDF	R1/8	18	10	12	—	11	8	2
	R1/4	22	10.5	14	—	12	11.5	4.1

<sup>1)</sup> JJRP with spray capacity code 040–060 weigh 5g.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray capacity code	Pipe connection size				Spray angle (°)				Spray capacity (L/min)								Mean drop. dia. (µm)	Free pass. dia. (mm)	
	PTFE		PVDF																
	R1/8	R1/4	R1/8	R1/4	0.15 MPa	0.2 MPa	0.5 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa				
005	○	○	○	○	56	60	60	—	0.36	0.44	0.50	0.59	0.74	0.85	0.99	260	0.4		
007	○	○	○	○	60	65	62	—	0.51	0.61	0.70	0.83	1.03	1.19	1.39	—	0.6		
010	○	○	○	—	63	65	62	—	0.73	0.88	1.00	1.19	1.48	1.70	1.98	—	0.8		
015	○	○	—	—	64	70	72	0.79	1.09	1.31	1.50	1.78	2.22	2.56	2.98	—	1.0		
020	○	○	—	—	64	70	72	1.06	1.45	1.75	2.00	2.38	2.95	3.41	3.97	—	1.2		
030	○	○	—	—	75	80	78	1.58	2.18	2.63	3.00	3.56	4.43	5.11	5.95	410	1.3		
040	—	○	—	—	67	70	65	2.11	2.91	3.50	4.00	4.75	5.91	6.82	7.93	380	1.4		
050	—	○	—	—	76	80	70	2.64	3.63	4.38	5.00	5.94	7.38	8.52	9.92	—	1.6		
060	—	○	—	—	88	90	80	3.17	4.36	5.26	6.00	7.13	8.86	10.2	11.9	520	1.6		

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### JJRP-PTFE

Example: 1/8M JJRP 005 PTFE

1/8M	JJRP	005	PTFE
Pipe conn. size <sup>2</sup>	Spray capacity code	Material	
1/8M	005		

### JJRP-PVDF

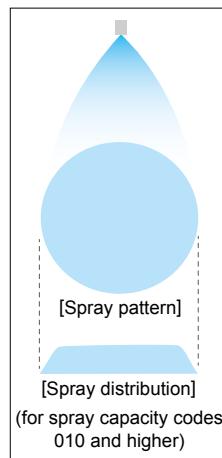
Example: 1/8M JJRP 007 PVDF

1/8M	JJRP	007	PVDF
Pipe conn. size <sup>2</sup>	Spray capacity code	Material	
1/8M	005		

<sup>2)</sup> "M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

# Low Flow Rate Full Cone Spray Nozzles

J



- Full cone spray pattern with a round impact area and even distribution.
- Spray capacity codes 006 and 008 produce a round impact area and mountain-shaped spray distribution.
- Features lowest flow rate among our full cone spray nozzles.
- Ceramic orifice and closer provide excellent wear resistance.

## [STANDARD PRESSURE]

0.5 MPa for spray capacity codes 006 and 008.  
0.2 MPa for spray capacity codes 010 and higher.

## [APPLICATIONS]

Spraying: Oils, lubricants, glues, etchants  
Cleaning: Galvanizing, gas  
Cooling: Machinery, gas

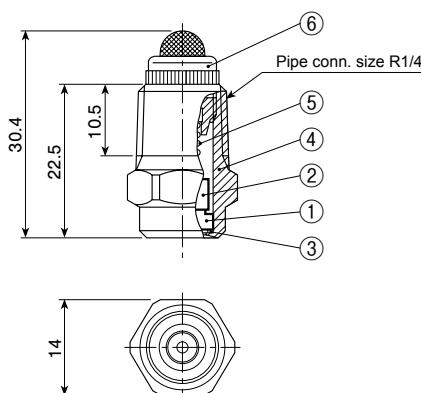
Full Cone

Structure	<ul style="list-style-type: none"> <li>Nozzle orifice and closer are made of ceramic. Spray capacity code 006 has a high-purity ceramic orifice.</li> <li>All models include a built-in strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Orifice disc and closer: ceramic</li> <li>Nozzle body: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316</p>
Weight	• 17.5g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING

Unit: mm



①Orifice disc ②Closer ③Packing (PTFE)  
④Nozzle body ⑤Spring (S316)  
⑥Strainer (S303+S304 for mesh size #50 and #100,  
S303+S304+S316 for mesh size #150 and #200)

Spray capacity code	Spray angle (°)			Spray capacity (L/min)									Mean droplet diameter (μm)	Free passage diameter (mm)	Strainer mesh size
	0.1 MPa	0.2 MPa	0.5 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa			
006	—	—	70	—	—	—	0.07	0.09	0.10	0.12	0.14	0.16	170~190	0.1	200
008	—	—	70	—	—	—	0.09	0.12	0.14	0.16	0.19	0.22	140	0.1	200
010	—	70	65	—	0.09	0.10	0.12	0.15	0.17	0.20	0.24	0.28	160	0.2	200
012	—	70	65	—	0.10	0.12	0.14	0.18	0.21	0.25	0.29	0.33	190	0.2	200
015	—	70	65	—	0.13	0.15	0.18	0.23	0.26	0.31	0.37	0.42	170	0.2	200
020	60	70	65	0.14	0.17	0.20	0.24	0.30	0.35	0.41	0.49	0.56	170	0.3	200
025	65	70	67	0.18	0.22	0.25	0.30	0.38	0.44	0.51	0.61	0.70	230	0.3	200
030	67	70	68	0.22	0.26	0.30	0.36	0.45	0.52	0.61	0.73	0.83	220	0.3	150
040	67	70	68	0.29	0.35	0.40	0.48	0.60	0.70	0.82	0.98	1.11	170	0.3	150
050	68	70	68	0.36	0.44	0.50	0.60	0.75	0.87	1.02	1.22	1.39	290	0.4	150
060	68	70	68	0.43	0.52	0.60	0.72	0.90	1.05	1.23	1.47	1.67	280	0.5	150
070	68	70	68	0.51	0.61	0.70	0.84	1.05	1.22	1.43	1.71	1.95	170	0.6	150
080	68	70	68	0.58	0.70	0.80	0.95	1.19	1.38	1.61	1.92	2.18	350	0.6	150
100	68	70	68	0.72	0.87	1.00	1.19	1.49	1.72	2.01	2.40	2.72	170	0.7	100
120	68	70	68	0.87	1.05	1.20	1.43	1.79	2.07	2.42	2.88	3.27	170	0.8	50
140	68	70	68	1.01	1.22	1.40	1.67	2.09	2.41	2.82	3.36	3.81	440	0.9	50

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M J 006 N S303W

1/4M J [006] N S303 W

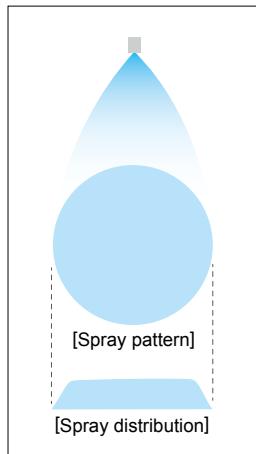
Pipe conn. size*	Spray capacity code	Material	Strainer
006	006		
	↓		
	140		

\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

# Flange Connection, Large Capacity Full Cone Spray Nozzles

Made-to-Order

**TJJX**



- Full cone spray pattern with a round impact area and uniform distribution.
- Flange connection.
- X-shaped whirler provides a large free passage diameter, minimizing clogging.

## [STANDARD PRESSURE]

0.2 MPa

## [APPLICATIONS]

Cooling: Gas, liquids

Reacting: Chemical plants

Spraying: Aeration, sea water desalination equipment

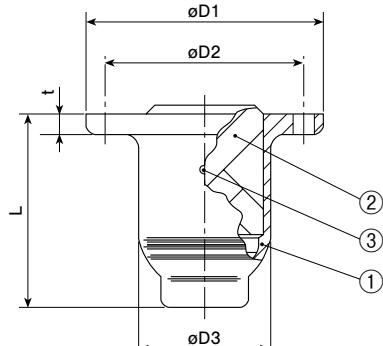
Full Cone

Structure	<ul style="list-style-type: none"> <li>Includes a nozzle body, X-shaped whirler, and lock bolt for securing the whirler to the nozzle body. The whirler is removable.</li> <li>Flanged connection.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle body: S304, S316, SCS13, or SCS14</li> <li>Whirler: SCS13 or SCS14</li> <li>Lock bolt: S316</li> </ul> <p>SPECIAL ORDER MATERIAL: S316L, SCS16</p>

Flange size (inch)	Dimensions (mm)					Flange bolt holes (JIS 10K)		Weight (kg)
	L	øD1	øD2	øD3	t	Number of holes	Diameter (mm)	
4	171	210	175	117	18	8	19	9.3
5	211	250	210	143	20	8	23	11.4
6	253	280	240	169	22	8	23	22.7

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING



①Nozzle body ②Whirler ③Lock bolt

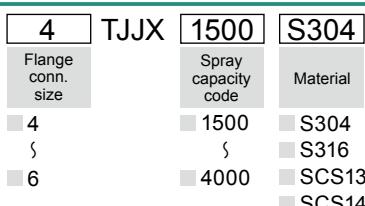
Spray capacity code	Flange connection size (inch)			Spray angle (°)			Spray capacity (L/min)							Mean droplet diameter (µm)	Free passage diameter (mm)
	4	5	6	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
1500	○			90 100	90 100	75 85	628 838	794 1,059	1,091 1,455	1,315 1,753	1,500 2,000	1,770 2,360	2,180 2,907	1,850	28
2000	○			90 100	90 100	75 85	1,047 1,257	1,324 1,588	1,819 2,183	2,191 2,629	2,500 3,000	2,950 3,540	3,634 4,361	2,500	36
2500		○		90 100	90 100	75 85	1,324 1,588	1,819 2,183	2,191 2,629	2,500 3,000	2,950 3,540	3,634 4,361	2,500	36	
3000		○		90 100	90 100	75 85	1,853 2,118	2,547 2,911	3,067 3,505	3,500 4,000	4,130 4,720	5,087 5,814	2,650	43	
3500			○	90 95	90 95	75 80	1,466 1,675	1,853 2,118	2,547 2,911	3,067 3,505	3,500 4,000	4,130 4,720	5,087 5,814	2,650	43
4000			○	95	95	80	1,675	2,118	2,911	3,505	4,000	4,720	5,814	2,650	43

[Note] Please contact IKEUCHI for TJJX series nozzles with larger flow rate and/or larger flange size.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 4 TJJX 1500 S304

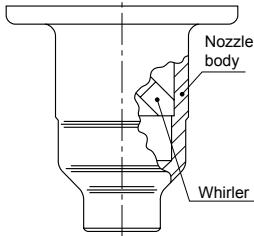


This nozzle series is made-to-order.

**TJJX-SiC SERIES** Made-to-Order

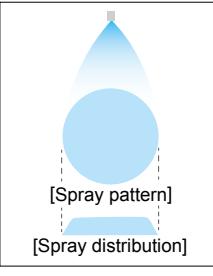
For spraying slurry, wear resistance of nozzles should be considered. [TJJX-SiC series] nozzles made of highly wear-resistant SiC (silicon nitride bonded silicon carbide) are available for such applications.

Please contact us for details.

Series	Picture	Structure	Features	Applications
TJJX-SiC			<ul style="list-style-type: none"> <li>• Full cone spray pattern with a round impact area and uniform distribution.</li> <li>• X-shaped whirler provides a large free passage diameter, minimizing clogging.</li> <li>• Whole nozzle is fired as one piece.</li> <li>• Made of highly wear-resistant SiC. Lightweight, weighing less than half of comparable metal nozzles.</li> </ul> <p>[Note] Since TJJX-SiC series nozzles are cast molded, the spray capacity is guaranteed within +/-10% and the spray angle within +/-7° under standard pressure.</p>	<ul style="list-style-type: none"> <li>• Spraying recirculated water for water granulation</li> <li>• Other applications: spraying slurry</li> </ul>

# Wide-Angle Full Cone Spray Nozzles

Some Models are Made-to-Order **BBXP**  
**BBXP-PVDF/PVC**



- Wide-angle full cone spray pattern with a round impact area and uniform distribution.
- The 120° spray angle provides a larger spray coverage than other nozzles.
- Spray capacity ranges from small to medium.
- X-shaped whirler provides a large free passage diameter, minimizing clogging.

#### [STANDARD PRESSURE]

0.2 MPa for spray capacity codes 008–060.  
0.35 MPa for spray capacity codes 10 and higher.

#### [APPLICATIONS]

Cleaning: Gas, incinerator fumes, machinery, eliminators, screen, tanks, parts, crushed stone, earth and sand

Cooling: Gas, machineries, tanks, steel plates

Spraying: Water treatment, aeration, foam breaking, fire extinguishing, dust suppression, sea water desalination equipment

Full Cone

#### BBXP SERIES

Size Rc4: Made-to-Order

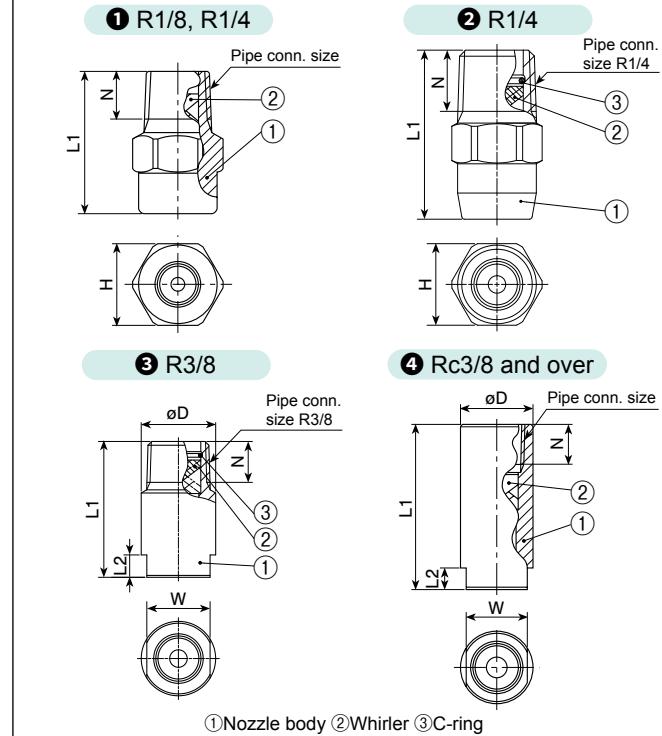
Structure	<ul style="list-style-type: none"> <li>One-piece structure with a press-fitted X-shaped whirler.</li> </ul>						
	Size R1/4 with spray capacity codes 040–060 and size R3/8 standard models include a C-ring.						
Material	<ul style="list-style-type: none"> <li>Sizes R1/8–Rc1: S303</li> <li>Sizes Rc1 1/2 or larger: S316</li> </ul>						
	SPECIAL ORDER MATERIAL: S316L or others						

DWG No.	Pipe conn. size <sup>(1)</sup>	Dimensions (mm)					Weight (g)
		L1	L2	H	W	øD	
<b>①</b>	R1/8	21	—	12	—	—	7
	R1/4 (015, 020)	21	—	14	—	—	10.5
	R1/4 (030)	21.5	—	14	—	—	10.5
<b>②</b>	R1/4 (040–060)	29	—	14	—	—	10.5
<b>③</b>	R3/8	36.5	6	—	17	20	11
<b>④</b>	Rc3/8	45.5	6	—	17	20	11
	Rc1/2	56	8	—	22	25	14
	Rc3/4	73	10	—	27	32	15
	Rc1	94	14	—	34	40	17
	Rc11/2	131	20	—	50	58	19
	Rc2	168	24	—	60	70	23
	Rc21/2	199	27	—	80	90	27
	Rc3	220	30	—	90	105	30
	Rc4	278	40	—	115	130	36
							16,100

\*1) Figures in ( ) after the pipe connection size indicate the spray capacity code.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

#### DRAWING



①Nozzle body ②Whirler ③C-ring

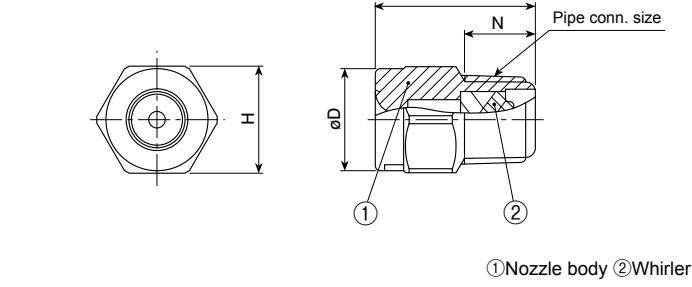
#### BBXP-PVDF SERIES

Structure	<ul style="list-style-type: none"> <li>One-piece structure with a press-fitted X-shaped whirler.</li> </ul>				
Material	<ul style="list-style-type: none"> <li>PVDF</li> </ul>				

Pipe conn. size	Dimensions (mm)				Weight (g)
	L	H	øD	N	
R1/8	18	12	11	8	2
R1/4	22	14	12	11.5	4.1

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

#### DRAWING



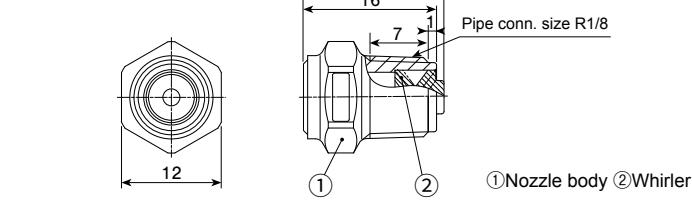
①Nozzle body ②Whirler

#### BBXP-PVC

Structure	<ul style="list-style-type: none"> <li>One-piece structure with an X-shaped whirler.</li> </ul>				
Material	<ul style="list-style-type: none"> <li>PVC</li> </ul>				
Weight	<ul style="list-style-type: none"> <li>1.4 g</li> </ul>				

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

#### DRAWING



①Nozzle body ②Whirler

**■BXBP Series (metal)**

Spray capacity code	Pipe conn. size		Spray angle (°)			Spray capacity (L/min)										Mean drop. dia. (μm)	Free pass. dia. (mm)
	R1/8	R1/4	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.35 MPa	0.5 MPa	0.7 MPa	1 MPa			
015	○	○	—	120	112	—	—	1.09	1.32	1.50	1.88	2.18	2.50	2.89	300	0.7	
020	○	○	110	120	112	—	1.06	1.46	1.75	2.00	2.51	2.91	3.34	3.86	300	0.9	
030	○	○	112	120	113	—	1.59	2.18	2.63	3.00	3.77	4.36	5.00	5.79	340	1.3	
040		○	110	120	112	—	2.12	2.91	3.51	4.00	5.03	5.81	6.67	7.72	350	1.4	
050		○	112	120	113	—	2.65	3.64	4.38	5.00	6.28	7.27	8.34	9.64	300	1.7	
060		○	114	120	114	2.51	3.18	4.37	5.26	6.00	7.54	8.72	10.0	11.6	450	1.7	

Full Cone

Spray capacity code	Pipe connection size <sup>2</sup>									Spray angle (°)			Spray capacity (L/min)							Mean drop. dia. (μm)	Free pass. dia. (mm)		
	R 3/8	Rc 3/8	Rc 1/2	Rc 3/4	Rc 1	Rc 1½	Rc 2	Rc 2½	Rc 3	Rc 4	0.15 MPa	0.35 MPa	0.7 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.35 MPa	0.5 MPa	0.7 MPa	1 MPa	
10	○	○								123	120	111	3.34	4.21	5.79	6.98	7.96	10.0	11.6	13.3	15.3	390	2.0
12	○	○								124	120	112	4.00	5.06	6.95	8.37	9.55	12.0	13.9	15.9	18.4	300	2.0
14	○	○								124	120	112	4.67	5.90	8.10	9.77	11.1	14.0	16.2	18.6	21.5	340	2.3
16	○	○								125	120	113	5.33	6.74	9.25	11.2	12.7	16.0	18.5	21.2	24.6	510	2.6
18			○							123	120	111	6.00	7.58	10.4	12.6	14.3	18.0	20.8	23.9	27.6	450	2.8
20			○							123	120	111	6.67	8.43	11.6	14.0	15.9	20.0	23.1	26.5	30.7	300	2.8
23			○							124	120	112	7.67	9.69	13.3	16.0	18.3	23.0	26.6	30.5	35.3	340	2.8
26			○							124	120	112	8.67	11.0	15.1	18.1	20.7	26.0	30.1	34.5	39.9	580	2.8
30			○							123	120	111	10.0	12.6	17.4	20.9	23.9	30.0	34.7	39.8	46.0	520	3.8
40			○							124	120	112	13.3	16.9	23.2	27.9	31.8	40.0	46.3	53.1	61.4	300	4.7
50			○							125	120	113	16.7	21.0	29.0	34.9	39.8	50.0	57.8	66.3	76.7	690	4.7
60			○							124	120	112	20.0	25.3	34.7	41.9	47.7	60.0	69.4	79.6	92.1	630	5.4
80			○							125	120	113	26.7	33.7	46.3	55.8	63.7	80.0	92.5	106	123	300	6.0
100			○							123	120	111	33.3	42.1	57.9	69.8	79.6	100	115	135	155	340	7.2
150			○							124	120	112	50.0	63.2	86.9	105	120	150	175	200	230	940	8.4
200					○					124	120	112	66.7	84.3	115	140	160	200	230	265	310	880	8.9
300					○					125	120	113	100	125	175	210	240	300	350	400	460	300	10.2
400						○				124	120	112	135	170	235	280	320	400	465	530	615	1,300	14.3
500							○			125	120	113	170	210	290	350	400	500	580	665	770	1,300	14.3
600								○		124	120	112	200	255	350	420	480	600	695	795	920	1,180	19.0
700									○	125	120	113	235	295	405	490	550	700	810	930	1,070	1,180	19.0
900										124	120	112	300	380	520	630	720	900	1,041	1,195	1,380	1,650	19.8
1200										125	120	113	400	505	695	840	955	1,200	1,390	1,590	1,840	1,650	21.7

\*) BBXP900 and BBXP1200 (with thread size Rc4) are made-to-order.

**■BXBP-PVDF Series**

Spray capacity code <sup>3</sup>	Pipe conn. size		Spray angle (°)			Spray capacity (L/min)										Mean droplet diameter (μm)	Free passage diameter (mm)	Nozzle body color
	R1/8	R1/4	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.35 MPa	0.5 MPa	0.7 MPa	1 MPa				
008	○	—	120	112	—	—	0.58	0.70	0.80	1.00	1.16	1.33	1.54	280	0.5	280	0.5	
015	○	○	—	120	112	—	—	1.09	1.32	1.50	1.88	2.18	2.50	2.89	340	0.8	340	0.8
020	○		110	120	113	—	1.06	1.46	1.75	2.00	2.51	2.91	3.34	3.86	340	1.2	340	1.2

\*) Nozzle body color differs depending on the spray capacity code: BBXP008 and BBXP020 are black (BLA), BBXP015 is gray (GRA).

**■BXBP-PVC [1/8M BXBP 030 PVC-IN]**

Spray angle (°)			Spray capacity (L/min)										Mean droplet diameter (μm)	Free passage diameter (mm)	
0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa				
115	120	110	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	350	1.5	350	1.5

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**BBXP (metal)**

Example: 1/8M BXBP 015 S303

1/8M	BBXP	015	S303
Pipe conn. size <sup>4</sup>	Spray capacity code	Material <sup>5</sup>	
1/8M	015	S303	

**BBXP-PVDF**

Example: 1/8M BXBP 020 PVDF (BLA)

1/8M	BBXP	020	PVDF (BLA)
Pipe conn. size <sup>4</sup>	Spray capacity code	Material	Nozzle color
1/8M	008	S303	BLA (BXBP008, 020)

**BBXP-PVC**

1/8M BXBP 030 PVC-IN

Pipe conn. size <sup>4</sup>	Spray capacity code	Material
1/8M	015	S303

The BXBP series with thread size Rc4 are made-to-order.

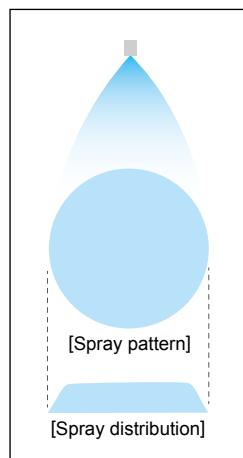
\*) "M" indicates male thread ("R" of the ISO standard) and "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/8M = R1/8.

\*) See "Material" information on page 79 for standard material (S303 or S316) for each size.

# Wide-Angle Full Cone Spray Nozzles

UZUJP

Full Cone



- The spray covers a large area even at low water pressure.
- The number of nozzles is minimized, reducing installation costs.
- The compact shape without a whirler enables high spray flow and reduces clogging.

## [STANDARD PRESSURE]

0.1 MPa

## [APPLICATIONS]

- Fire extinguishing and spraying at lime kilns, conveyors, and around fuel tanks
- Flue gas cleaning and cooling in scrubbers and desulfurization units
- Dust suppression in recycling plants and raw material yards
- Other applications where clogging is a concern



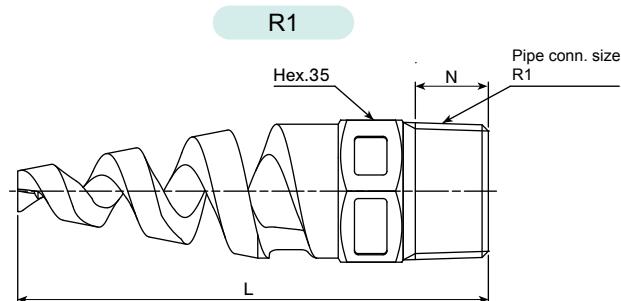
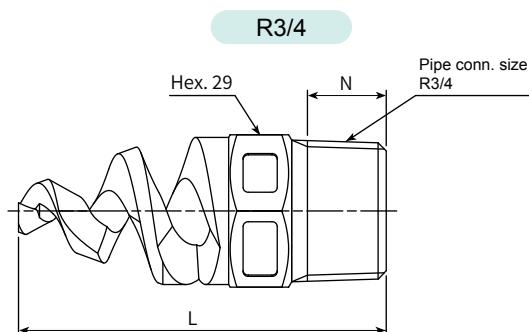
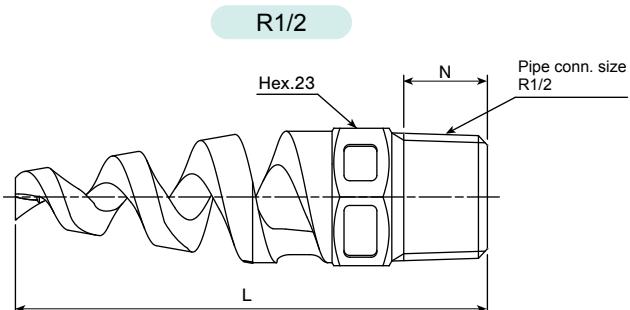
Structure	• Metal one-piece structure.
Material	• SCS16

A protective cap with or without a anti-drop strap is available as options.

Pipe conn. size	Spray angle code	Spray capacity code	Dimensions (mm)		Approx. weight (g)
			N	L	
R1/2	120	75	14	63.5	75
	170	75 100	14	79	80
R3/4	120	100	15	70	140
R1	170	220	18	116	250

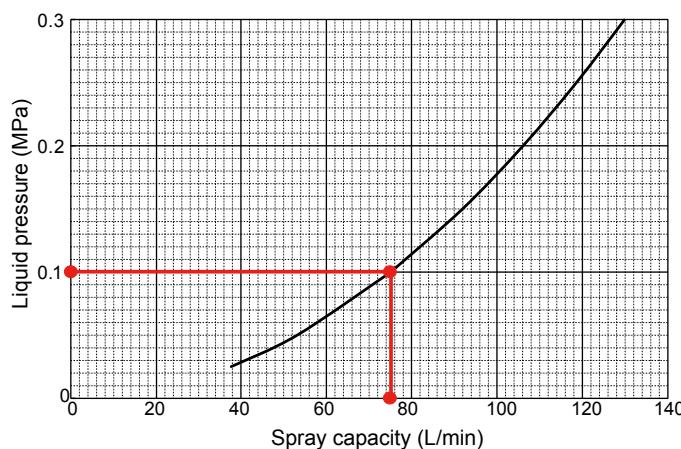
[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING

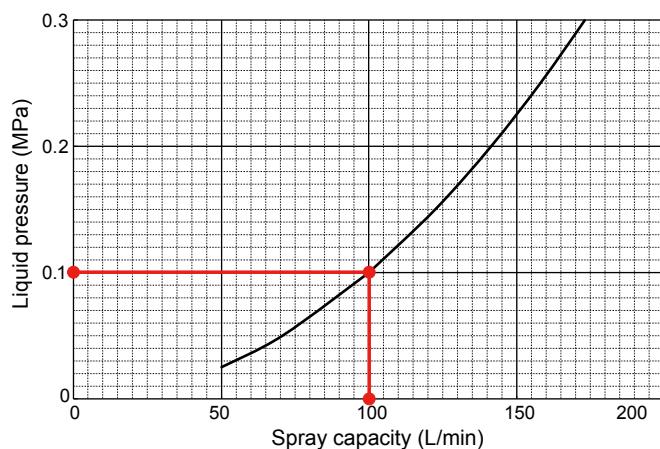


## FLOW-RATE DIAGRAM

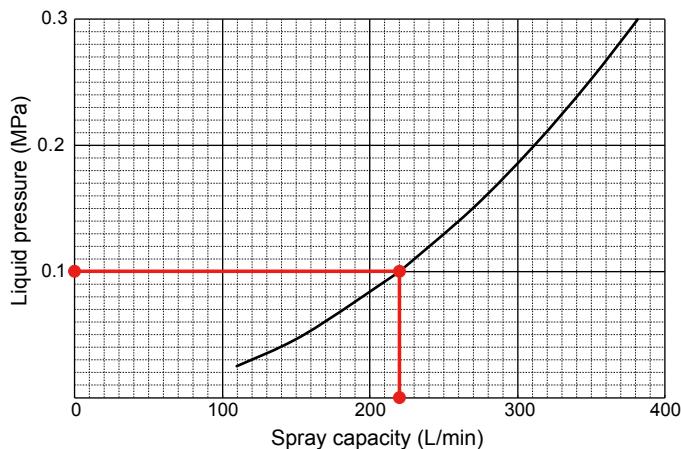
## ■ UZUJP 12075 / 17075



## ■ UZUJP 120100 / 170100



## ■ UZUJP 170220



Spray angle code	Spray capacity code	Pipe conn. size	Spray angle (°)				Spray capacity (L/min)					Free passage diameter (mm)
			0.03 MPa	0.05 MPa	0.1 MPa	0.3 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.2 MPa	0.3 MPa	
120	75	R1/2	109	120	120	120	41.1	53.0	75.0	106	130	4.3
	100	R3/4	109	117	120	120	54.8	70.7	100	141	173	5.1
170	75	R1/2	159	167	170	170	41.1	53.0	75.0	106	130	5.0
	100	R1/2	159	167	170	170	54.8	70.7	100	141	173	5.2
	220	R1	159	167	170	170	120	156	220	311	381	7.3

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/2M UZUJP 17075 SCS16

1/2M UZUJP 170 75 SCS16

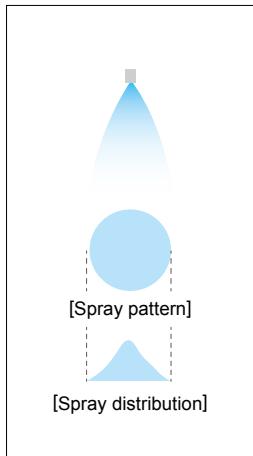
Pipe conn. size*	Spray angle code	Spray capacity code
1/2M	120	75
3/4M	170	100
1M	220	220

\* "M" indicates male thread ("R" of the ISO standard), e.g. 1/2M = R1/2.

# Narrow-Angle Full Cone Spray Nozzles

NJJP

Full Cone



- Narrow-angle full cone spray pattern with a round impact area.
- Unique design produces fine atomization without a whirler.
- No-whirler design with a large free passage diameter minimizes clogging.

## [STANDARD PRESSURE]

0.3 MPa

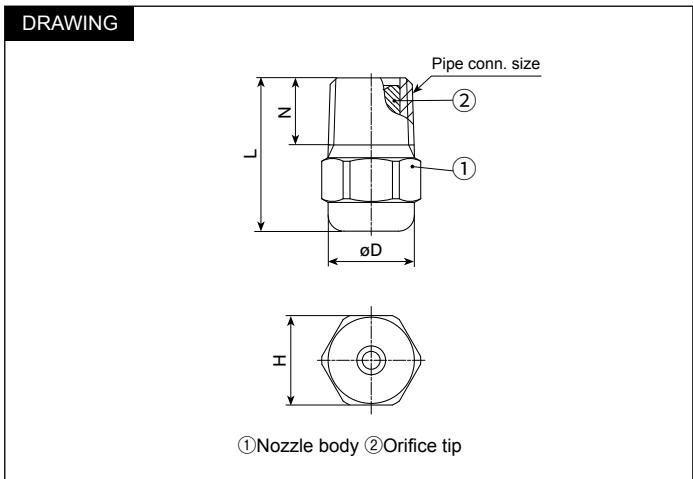
## [APPLICATIONS]

Cleaning: Pipes, bottles, containers, filters  
Cooling: Steel plates

Structure	<ul style="list-style-type: none"> <li>One-piece structure with a press-fitted orifice tip.</li> <li>No obstructions in the nozzle interior.</li> </ul>			
Material	<ul style="list-style-type: none"> <li>S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316</p>			

Pipe conn. size	Dimensions (mm)				Weight (g)
	L	H	øD	N	
R1/4	24	14	13.5	10.5	19.5
R3/8	32	19	18	11	48

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



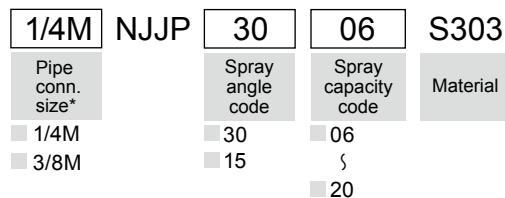
Spray angle code	Spray capacity code	Pipe conn.size		Spray angle (°)			Spray capacity (L/min)						Mean droplet diameter (µm)	Free passage diameter (mm)
		R1/4	R3/8	0.15 MPa	0.3 MPa	0.7 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
30	06	○		26	30	32	4.80	5.26	6.00	7.42	8.54	9.91	750	2.3
	08	○		26	30	32	6.40	7.02	8.00	9.90	11.4	13.2		2.7
	14		○	26	30	32	11.2	12.3	14.0	17.3	19.9	23.1		3.8
	20		○	26	30	32	16.0	17.5	20.0	24.7	28.5	33.0	970	4.4
15	06	○		12	15	16	4.80	5.26	6.00	7.42	8.54	9.91	925	2.3
	08	○		12	15	16	6.40	7.02	8.00	9.90	11.4	13.2		2.7
	14		○	12	15	16	11.2	12.3	14.0	17.3	19.9	23.1		3.8
	20		○	12	15	16	16.0	17.5	20.0	24.7	28.5	33.0	1,200	4.4

[Note] Use NJJP series nozzles at 0.15 MPa or higher for a stable spray pattern; below 0.15 MPa, the spray becomes unstable.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

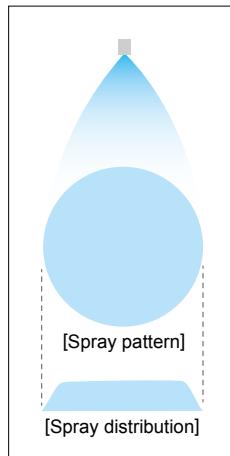
Example: 1/4M NJJP 30 06 S303



\*\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

# Clog-Resistant Vaneless Full Cone Spray Nozzles

AJP/AJP-PPS



- Full cone spray pattern with a round impact area and uniform distribution.
- Without using a whirler, the liquid is atomized by collision inflow inside the nozzle.
- No-whirler design with a large free passage diameter minimizes clogging.
- Nozzle sprays at a 90° angle to the nozzle inlet.
- Highly chemical and wear resistant AJP-PPS series is available for spraying hydrochloric acid and other chemicals.

[STANDARD PRESSURE] 0.2 MPa

[APPLICATIONS]

Cleaning: Pre-paint treatment, washing booths, machine parts, gas, incinerator fumes

Cooling: Steel plates, copper pieces, gas

Spraying: Aeration, foam breaking

Others: Applications where re-circulated water is being used or clogging is a concern

Full Cone

## AJP SERIES

Structure	<ul style="list-style-type: none"> <li>Includes a nozzle body and orifice cap.</li> <li>Orifice cap for sizes R1/8, R3/8, and R1/2 is pressed into the nozzle body. Orifice cap for the other sizes are screwed in.</li> <li>No obstructions in the nozzle interior.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle body: S304, S303, or SCS13, depending on the spray capacity code.</li> <li>Orifice cap: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316</p>

Pipe conn. size	Dimensions (mm)						Weight (g)
	L1	L2	L3	L4	W	N	
R1/8	23	16	16	14	14	7	25
R1/4	32	23	20.5	16	16	10.5	55
R3/8	36	26	23.5	19	20	11	70
R1/2	46	33.5	31	25	25	14	180
R3/4	55	39	38	32	32	15	340
R1	70	50	48	40	40	18	670
R1½	100	70	72	58.5	58.5	20	2,400

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

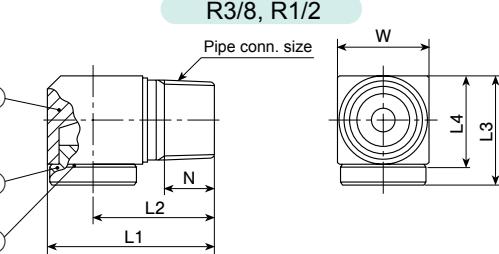
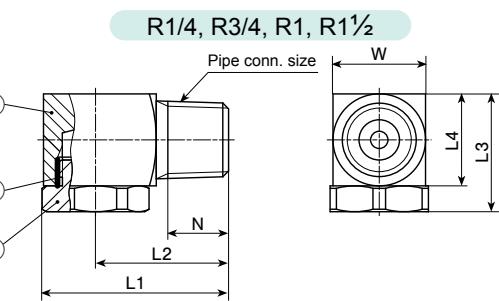
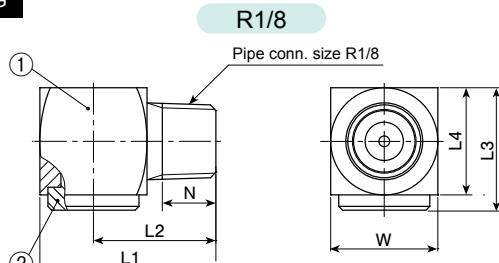


### Cautions for use (sizes R1/8, R3/8, and R1/2)

In extreme temperatures, high or low, the AJP press-fitted orifice cap for sizes R1/8, R3/8 and R1/2 may come off.

- For these conditions, order the AJP nozzles in S316 with the screw-in orifice caps.
- Do not use AJP size R1/8 in these conditions, the screw-in orifice cap is not available for size R1/8.

## DRAWING



①Nozzle body ②Orifice cap ③Adhesive

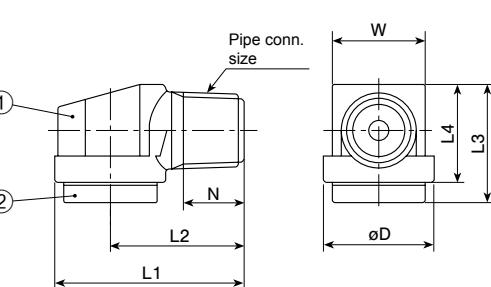
## AJP-PPS SERIES

Structure	<ul style="list-style-type: none"> <li>Includes a nozzle body and orifice cap.</li> <li>Orifice cap and nozzle body are ultrasonically welded together.</li> <li>No obstructions in the nozzle interior.</li> </ul>
Material	• PPS

Pipe conn. size	Dimensions (mm)						$\varnothing D$	Weight (g)
	L1	L2	L3	L4	W	N		
R1/4	32.5	23	20.5	17	16	19	10.5	6.8
R3/8	37	26	23	20	19	22	11	10.3

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING



①Nozzle body ②Orifice cap

Spray capacity code	Pipe connection size							Spray angle (°)			Spray capacity (L/min)							Mean drop. dia. (μm)	Free pass. dia. (mm)		
	AJP (metal)						AJP-PPS														
	R1/8	R1/4	R3/8	R1/2	R3/4	R1	R1½	R1/4	R3/8	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
02	○									64	75	69	—	1.02	1.43	1.74	2.00	2.35	2.89	640	1.5
03	○									65	75	69	—	1.53	2.14	2.61	3.00	3.53	4.33		1.9
04		○						○		65	75	68	1.59	2.04	2.86	3.48	4.00	4.70	5.77		2.2
05		○						○		65	75	68	1.99	2.55	3.57	4.35	5.00	5.88	7.21		2.5
06		○						○		70	80	73	2.39	3.06	4.29	5.22	6.00	7.06	8.66		2.8
07		○						○		70	80	73	2.79	3.57	5.00	6.09	7.00	8.23	10.1		3.1
08			○						○	70	80	73	3.19	4.08	5.71	6.96	8.00	9.54	11.9	740	3.1
10			○						○	70	80	73	3.98	5.10	7.14	8.70	10.0	11.9	14.9		3.5
12			○						○	75	85	78	4.78	6.12	8.57	10.4	12.0	14.3	17.9		4.0
14			○						○	75	85	78	5.57	7.14	10.0	12.2	14.0	16.7	20.9		4.4
16			○						○	75	85	78	6.37	8.16	11.4	13.9	16.0	19.1	23.8	820	4.8
18			○							76	85	79	7.17	9.18	12.9	15.7	18.0	21.6	27.1		5.0
20			○							76	85	79	7.96	10.2	14.3	17.4	20.0	23.9	30.1		5.4
23			○							76	85	79	9.16	11.7	16.4	20.0	23.0	27.5	34.6		5.7
26			○							76	85	79	10.4	13.3	18.6	22.6	26.0	31.1	39.1		6.0
30			○							76	85	79	11.9	15.3	21.4	26.1	30.0	35.9	45.1	900	6.4
35			○							83	90	85	13.9	17.9	25.0	30.4	35.0	41.9	52.6		7.1
40			○							83	90	85	15.9	20.4	28.6	34.8	40.0	47.9	60.1		7.7
45			○							83	90	85	17.9	23.0	32.1	39.1	45.0	53.9	67.6		8.5
50			○							83	90	85	19.9	25.5	35.7	43.5	50.0	59.9	75.1		9.0
55			○							83	90	85	21.9	28.1	39.3	47.8	55.0	65.9	82.6	1,000	9.0
60			○							83	90	85	23.9	30.6	42.9	52.2	60.0	71.8	90.2		9.4
70			○							83	90	85	27.9	35.7	50.0	60.9	70.0	83.8	105		10.2
80			○							83	90	85	31.9	40.8	57.1	69.6	80.0	95.8	120		11.1
90			○							83	90	85	35.8	45.9	64.3	78.3	90.0	108	135		11.4
100			○							83	90	85	39.8	51.0	71.4	87.0	100	120	150	1,120	12.2
120			○							83	90	85	47.8	61.2	85.7	104	120	144	180		13.0
150			○							83	90	85	59.7	76.5	107	130	150	180	225		15.0
180			○							83	90	85	71.7	91.8	129	157	180	216	270	1,280	15.5
200			○							83	90	85	79.6	102	143	174	200	239	301		17.9
250			○							83	90	85	99.5	128	179	217	250	299	376	1,350	19.8

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### AJP (metal)

Example: 1/4M AJP 04 S303

1/4M	AJP	04	S303
Pipe conn. size <sup>*1</sup>	Spray capacity code	Material of orifice cap <sup>*2</sup>	
1/8M S 1*1/2M	02 S 250		

### AJP-PPS

Example: 3/8M AJP 08 PPS

3/8M	AJP	08	PPS
Pipe conn. size <sup>*1</sup>	Spray capacity code	Material	
1/4M 3/8M	04 S 16		

\*1) "M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8, 1\*1/2M = R1 1/2.

\*2) The material of nozzle body is S304, S303, or SCS13, depending on the spray capacity code.

## Wide-Angle AJP SERIES

Made-to-Order

Clog-Resistant Wide-Angle Full Cone Spray Nozzles



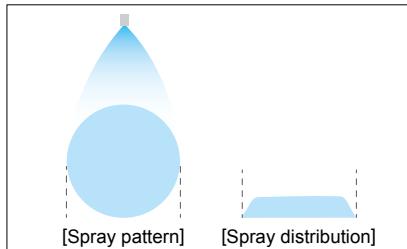
Features	Applications
<ul style="list-style-type: none"> <li>The unique no-whirler design prevents clogging.</li> <li>The 120° wide spray angle is ideal for spraying in tight spaces with broader coverage.</li> </ul>	<ul style="list-style-type: none"> <li>Cooling of electric furnace cover</li> <li>Cooling of electric furnace steel shell</li> </ul>

# Clog-Resistant Alumina Ceramic Full Cone Spray Nozzles

Made-to-Order

AJP-AL92

Clog-resistant full cone nozzle made of highly wear- and chemical-resistant alumina ceramic.



- Full cone spray pattern with a round impact area and uniform distribution.
- Without using a whirler, the liquid is atomized by collision inflow inside the nozzle.
- No-whirler design with a large free passage diameter minimizes clogging.
- Nozzle sprays at a 90° angle to the nozzle inlet. This right angle nozzle is suitable for installation in small spaces.

#### [STANDARD PRESSURE]

0.2 MPa

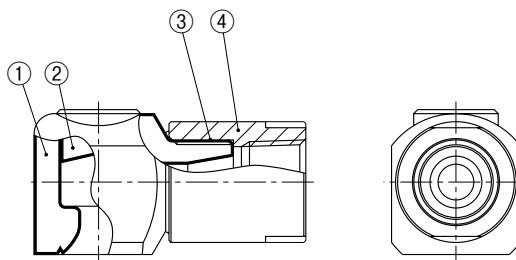
#### [APPLICATIONS]

- Spraying slurry
- Absorption tower of flue gas desulfurization equipment
- Spraying water in cooling tower
- Applications where re-circulated water is being used or clogging is a concern

Structure	<ul style="list-style-type: none"><li>• Alumina ceramic one-piece structure.</li><li>• No obstructions in the nozzle interior.</li></ul>
Material	<ul style="list-style-type: none"><li>• Nozzle body: 92% Alumina</li><li>• Socket: S316</li></ul>

The AJP-AL92 series is available with a socket made of S316 to prevent damage to the delicate alumina threads. The S316 socket is female threaded turning the male nozzle thread into a female connection.

#### DRAWING



①Nozzle body ②Plate ③Adhesive: Araldite®H ④Socket (S316)

Nozzle thread size	Spray angle (°) at 0.2 MPa	Spray capacity (L/min) at 0.2 MPa	Mean droplet diameter (μm)	Free passage diameter (mm)
R1/2	85 or 90	18.0–50.0	800–1,400	5.1–9.5
R3/4	90	55.0–90.0		9.6–12.9
R1	90	100–150		13.3–16.1
R1½	90	180–250		17.2–21.3

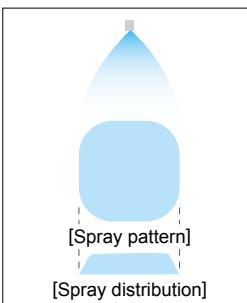
#### HOW TO ORDER

IKEUCHI will help select the best model for the specific applications and requirements of each customer. Contact us for more details.

# Square Spray Nozzles

SSXP

SSXP-HTPVC



- Square full cone spray pattern with uniform distribution.
- Wide spray angle of 90–100° provides large spray coverage.
- Square full cone spray pattern leaves no gaps in multi-nozzle arrangements.
- X-shaped whirler provides a large free passage diameter, minimizing clogging.

**[STANDARD PRESSURE]**

SSXP (metal): 0.2 MPa

SSXP-HTPVC: 0.15 MPa

**[APPLICATIONS]**

Cleaning: Gas, incinerator fumes, machinery, eliminators, screen, tanks, crushed stone, earth and sand

Cooling: Gas, machinery, tanks, steel

Spraying: Waste water treatment, foam breaking, fire extinguishing, dust suppression

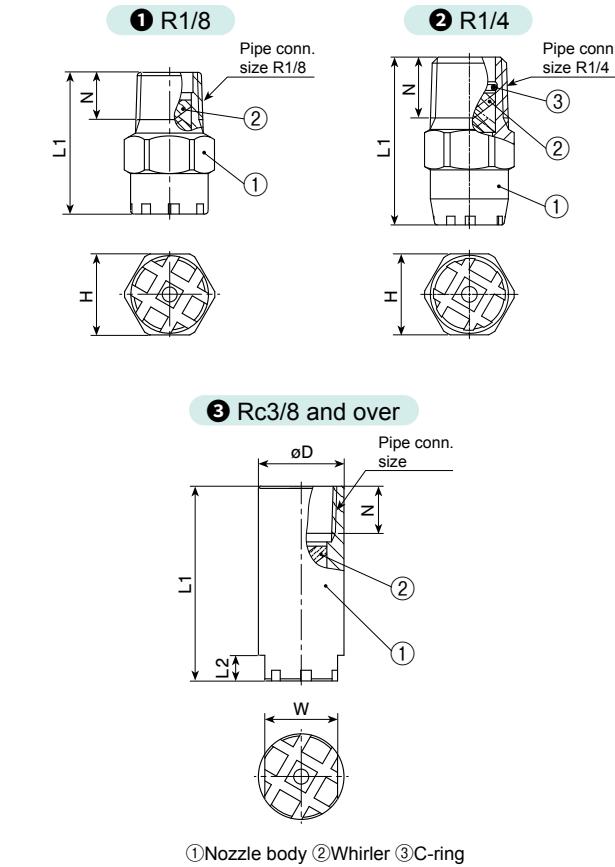
Full Cone

**SSXP SERIES**

Sizes Rc1 1/2 or larger: Made-to-Order

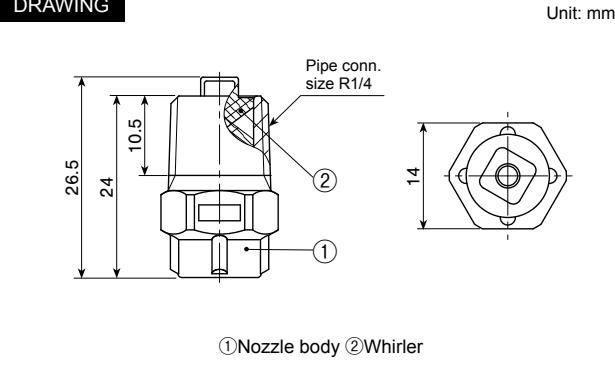
Structure	Dimensions (mm)						Weight (g)	
	Pipe conn. size	L1	L2	H	W	øD		
①	R1/8	21	—	12	—	—	7	11.5
②	R1/4	29	—	14	—	—	10.5	20
	Rc3/8	45.5	6	—	17	20	11	70
	Rc1/2	56	8	—	22	25	14	150
	Rc3/4	73	10	—	27	32	15	300
③	Rc1	94	14	—	34	40	17	575
	Rc1½	131	20	—	50	58	19	1,690
	Rc2	168	24	—	60	70	23	2,910
	Rc2½	199	27	—	80	90	27	5,860
	Rc3	220	30	—	90	105	30	9,420

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING****SSXP-HTPVC**

Structure	• One-piece structure with an X-shaped whirler.
Material	• HTPVC
Weight	• 3.1 g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING**

**■ SSXP Series (metal)**

Spray capacity code	Pipe conn. size		Spray angle (°)			Spray capacity (L/min)									Mean droplet diameter (μm)	Free passage diameter (mm)
	R1/8	R1/4	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
020	○		86	90	81	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86	330	0.9
030	○		86	90	81	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	380	1.2
040		○	90	95	85	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67	7.72	360	1.3
050		○	91	95	86	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34	9.64	370	1.7
060		○	91	95	86	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	11.6	490	1.7

Spray capacity code	Pipe connection size <sup>1</sup>								Spray angle (°)			Spray capacity (L/min)							Mean drop. dia. (μm)	Free pass. dia. (mm)		
	Rc 3/8	Rc 1/2	Rc 3/4	Rc 1	Rc 1½	Rc 2	Rc 2½	Rc 3	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
070	○								94	100	89	2.93	3.71	5.09	6.14	7.00	8.26	10.2	11.7	13.5	440	2.0
080	○								95	100	90	3.35	4.24	5.82	7.01	8.00	9.44	11.6	13.3	15.4	380	2.0
10	○								96	100	91	4.19	5.29	7.28	8.77	10.0	11.8	14.5	16.7	19.3	360	2.6
12	○								97	100	92	5.03	6.35	8.73	10.5	12.0	14.2	17.4	20.0	23.1	630	2.6
16		○							95	100	90	6.70	8.47	11.6	14.0	16.0	18.9	23.3	26.7	30.9	380	2.8
20		○							96	100	91	8.36	10.6	14.6	17.5	20.0	23.6	29.1	33.4	38.6	710	3.5
30			○						96	100	91	12.6	15.9	21.8	26.3	30.0	35.4	43.6	50.0	57.9	380	3.8
40			○						97	100	92	16.8	21.2	29.1	35.1	40.0	47.2	58.1	66.7	77.2	480	4.8
50				○					95	100	90	20.9	26.5	36.4	43.8	50.0	59.0	72.7	83.4	96.4	750	5.4
60				○					96	100	91	25.1	31.8	43.7	52.6	60.0	70.8	87.2	100	115	1,000	5.4
80				○					97	100	92	33.5	42.4	58.2	70.1	80.0	94.4	115	135	155	600	6.0
100					○				96	100	91	41.9	52.9	72.8	87.7	100	120	145	170	195	290	7.1
150					○				97	100	92	62.8	79.4	110	130	150	180	220	250	290	10.2	10.2
300						○			97	100	92	125	160	220	265	300	355	435	500	580	1,350	12.7
500						○			97	100	92	210	265	365	440	500	590	730	835	965	1,500	16.8
700						○			97	100	92	290	370	510	615	700	826	1,020	1,170	1,350	1,700	19.6

\*1) The SSXP series with thread size Rc1 1/2 and larger are made-to-order.

**■ SSXP-HTPVC [1/4M SSXP 1.5\*65/4.5 HTPVC]**

Spray angle (°)			Spray capacity (L/min)										Mean droplet diameter (μm)	Free passage diameter (mm)
0.05 MPa	0.15 MPa	0.5 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa				
56	65	65	2.72	3.74	4.50	5.14	6.06	7.46	8.56	9.90	450	2.2		

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**SSXP (metal)**

Example: 1/8M SSXP 020 S303

1/8M	SSXP	020	S303
Pipe conn. size <sup>2</sup>	Spray capacity code	Material <sup>3</sup>	
1/8M	020	S303	
3F	700	S316	

**SSXP-HTPVC**

1/4M SSXP 1.5\*65/4.5 HTPVC

Pipe conn. size <sup>2</sup>	Spray angle & capacity code	Material
------------------------------	-----------------------------	----------

The SSXP series with thread size Rc1 1/2 and larger are made-to-order.

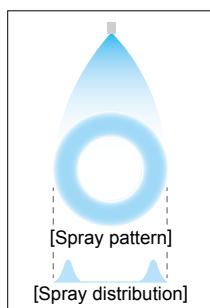
\*2) "M" indicates male thread ("R" of the ISO standard) and "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/8M = R1/8.

\*3) See "Material" information on page 87 for standard material (S303 or S316) for each size.

# SPILLBACK Nozzles for Gas Cooling

SPB

## Single-Head Return-Flow Nozzles SPB-R SERIES



### [STANDARD PRESSURE]

Supply pressure: 2.0 MPa (with return flow valve totally closed)

### [APPLICATIONS]

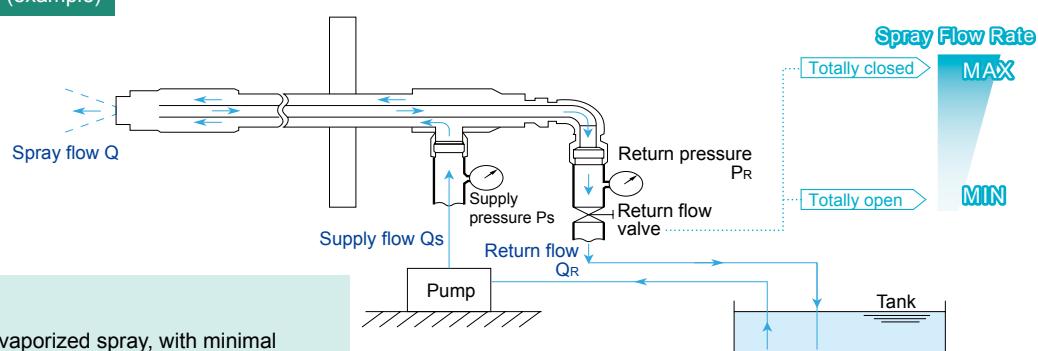
Cooling: Incinerators, cement factories, glass factories, blast furnaces, iron works  
Moisture control: Blast furnaces

Multi-tip head return-flow nozzles are also available.  
Please contact us for further information.

Full Cone

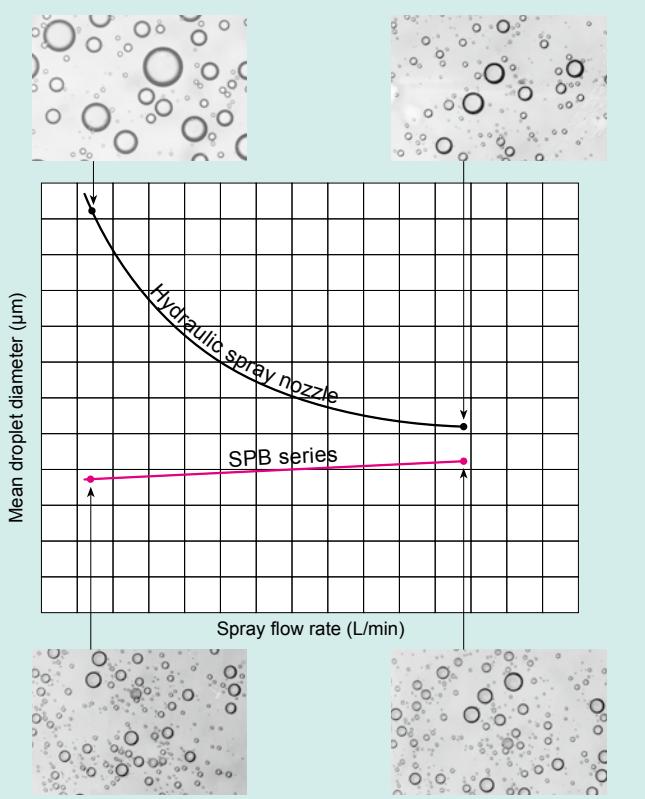
- Variable capacity hollow cone spray nozzles, generate fine atomization with uniform spray distribution (single-head).
- Spray capacity can be controlled by simply adjusting the return pressure while the supply pressure is kept constant. Spray capacity is maximized by fully closing the return flow valve and minimized by fully opening the return flow valve. The turn-down ratio of the spray capacity is 1:10 (except for SPB8530R).
- Part of the supplied liquid flows back when the return flow valve is opened, causing the supply flow to increase. The increase of supply flow is within 40–50% of the maximum spray capacity.
- Minimal variation in spray droplet diameter, regardless of the spray flow rate, makes the SPILLBACK nozzles ideal for gas cooling where the temperature of the inlet gas varies.
- Multi-tip head SPILLBACK nozzles are suitable for applications requiring a large spray capacity and minimal increase in spray droplet diameter.

System diagram (example)



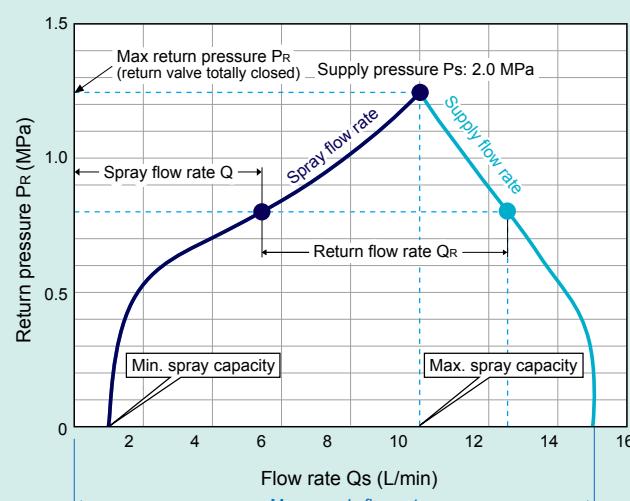
## Fine Atomization

SPB series produces a fully vaporized spray, with minimal variation in spray droplet diameter, even with changing spray flow rate.



## Turn-down Ratio of 1:10

The spray capacity is maximized by fully closing the return flow valve and minimized by fully opening the return flow valve. (Min. spray capacity:Max. spray capacity = 1:10, except for SPB8530R)

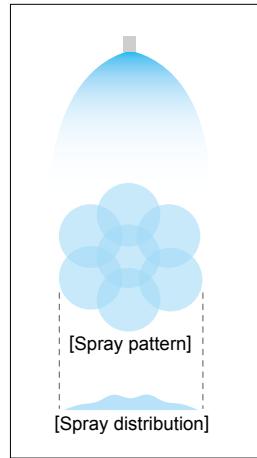


Supply flow rate Qs = Spray flow rate Q (Spray capacity) +  
Return flow rate QR

# Seven-Head Full Cone Spray Nozzles

## Extremely Fine Atomization

7KB



- Multi-nozzle compact spray headers create a nearly round spray area by overlapping individual spray patterns, resulting in fine atomization.

- Each nozzle whirl chamber is formed by a ceramic orifice and closer, providing excellent wear resistance.

### [STANDARD PRESSURE]

0.7 MPa

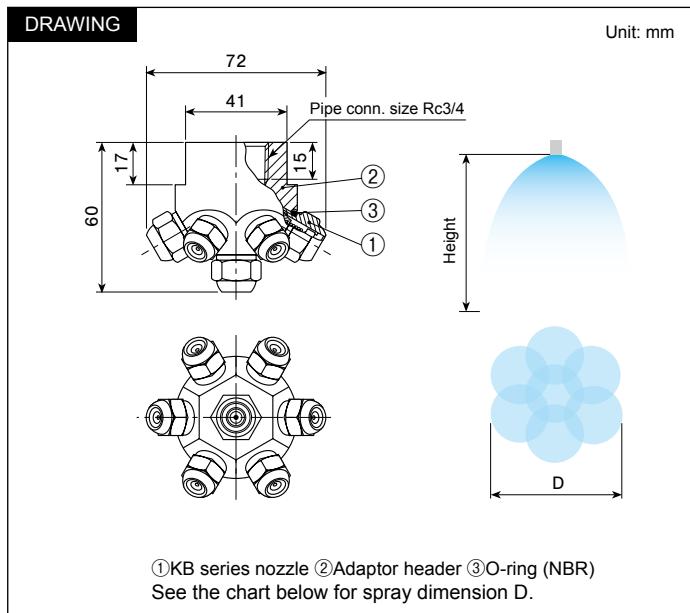
### [APPLICATIONS]

- Gas cooling • Cleaning
- Moisture control • Humidification
- Dust suppression

Full Cone

Structure	<ul style="list-style-type: none"> <li>Seven (7) KB series hollow cone spray nozzles, with a 60° spray angle, are screwed into an adaptor header.</li> <li>Nozzle orifice and closer are made of ceramic.</li> <li>Each KB series nozzle has a built-in strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice &amp; closer: ceramic</li> <li>Metal parts: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316</p>
Weight	• 370g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Spray capacity code	Spray angle (°)			Spray dimension D (m) at each spray height (at 0.7 MPa)				Spray capacity (L/min)								Mean drop. dia. (μm)	Free pass. dia. (mm)	Strainer mesh size	
	0.3 MPa	0.7 MPa	1 MPa	0.5 m	1.0 m	1.5 m	2.0 m	0.3 MPa	0.4 MPa	0.5 MPa	0.6 MPa	0.7 MPa	1 MPa	1.2 MPa	1.5 MPa	2 MPa			
023	—	180	180	0.51	0.65	0.66	—	0.18	0.20	0.22	0.23	0.28	0.31	0.34	0.39	45	0.15	200	
054	—	180	180	0.56	0.75	0.80	0.80	—	0.41	0.45	0.50	0.54	0.64	0.70	0.79	0.91	50	0.15	200
124	—	180	180	0.61	0.82	0.88	0.88	—	0.93	1.05	1.15	1.24	1.48	1.62	1.81	2.09	75	0.30	150
544	173	180	180	0.80	1.14	1.32	1.40	3.56	4.11	4.60	5.04	5.44	6.50	7.12	7.96	9.19	—	0.50	100
1087	174	180	180	0.99	1.37	1.60	1.70	7.12	8.22	9.19	10.1	10.9	13.0	14.2	15.9	18.4	210	0.60	100

[Note] 7KB series nozzles are guaranteed only for the spray capacity at standard pressure.

### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 3/4F 7KB 023 S303

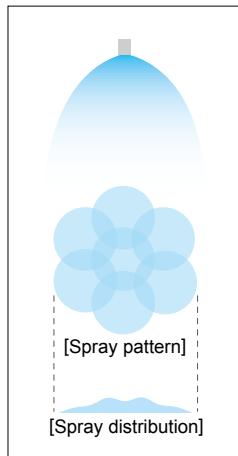
3/4F 7KB 023 S303

Pipe conn. size*	Spray capacity code	Material
023 ↓ 1087	023	S303

\*"F" indicates female thread ("Rc" of the ISO standard), e.g. 3/4F = Rc3/4.

# Seven-Head Full Cone Spray Nozzles

7JJXP



- Full cone spray nozzle with an almost round-shaped spray area.
- Seven (7) JJXP full cone spray nozzles are installed on a very compact adaptor header.
- Mean spray droplet diameter is about half the size of other single-head full cone spray nozzles with the same spray capacity.
- X-shaped whirler provides a large free passage diameter, minimizing clogging.

**[STANDARD PRESSURE]**

0.2 MPa

**[APPLICATIONS]**

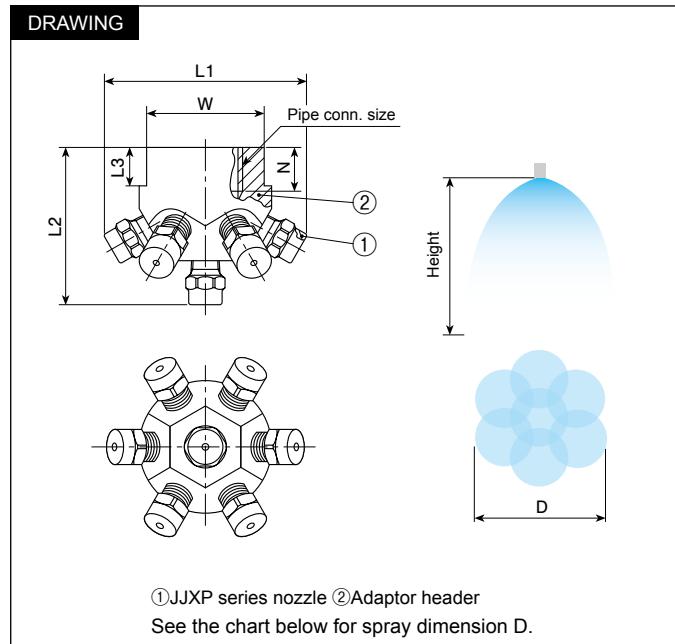
- Gas cooling • Cleaning • Moisture control
- Dust suppression

Structure	<ul style="list-style-type: none"> <li>• Seven (7) JJXP series full cone spray nozzles are screwed into an adaptor header.</li> <li>• JJXP series full cone spray nozzles have a one-piece structure with a press-fitted X-shaped whirler.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316</p>

Pipe conn. size <sup>1</sup>	Dimensions (mm)					Weight (g)
	L1	L2	L3	W	N	
Rc3/4	71	55	13	40	15	380
Rc1 (280)	89	67.5	17	46	17	620
Rc1 (490, 840)	103	75	20	55	17	1,080
Rc1½	128	92.5	20	70	19	1,860
Rc2	166	121.5	27	85	23	3,650

\*1) Figures in ( ) after the pipe connection size indicate the spray capacity code.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

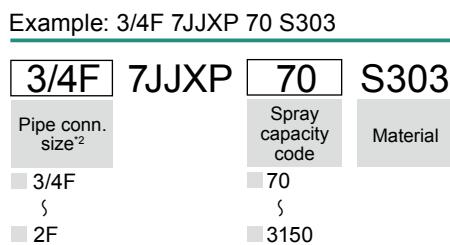


Spray capacity code	Pipe conn. size				Spray angle (°)		Spray dimension D (m) at each spray height (at 0.2 MPa)					Spray capacity (L/min)										Mean drop. dia. (μm)	Free pass. dia. (mm)		
	Rc 3/4	Rc 1	Rc 1½	Rc 2	0.05 MPa	0.2 MPa	0.5 MPa	1 m	1.5 m	2 m	2.5 m	3 m	3.5 m	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa		
70	(○)				—	175	165	1.9	2.4	2.8	3.0	3.1	3.1	—	5.11	6.16	7.00	8.26	10.2	11.7	13.5	15.9	17.9	290	0.7
140	(○)				—	185	175	2.7	3.3	3.8	4.2	4.5	4.7	—	10.2	12.3	14.0	16.5	20.4	23.4	27.0	31.9	35.8	2	1.4
280		(○)			180	185	175	3.4	3.9	4.4	4.8	5.2	5.4	14.8	20.4	24.6	28.0	33.0	40.7	46.7	54.0	63.7	71.7	380	1.7
490		(○)			180	185	180	4.3	4.8	5.4	5.8	6.2	6.4	26.0	35.6	43.0	49.0	57.8	71.4	81.9	94.5	112	125	480	1.9
840		(○)			200	205	200	5.2	5.8	6.3	6.8	7.2	7.5	44.5	61.1	73.5	84.0	99.4	122	140	162	191	215	660	2.6
1120			(○)		190	195	180	5.6	6.3	6.9	7.4	7.8	8.1	59.3	81.2	98.0	112	132	163	187	216	255	287	2	3.5
1400			(○)		200	205	190	6.0	6.7	7.3	7.8	8.3	8.6	74.2	102	123	140	165	204	234	270	319	358	740	3.5
1820				(○)	195	200	185	6.2	6.9	7.5	8.0	8.5	8.8	96.6	132	160	182	215	265	304	351	414	466	2	4.7
2450				(○)	205	210	195	6.4	7.1	7.7	8.2	8.7	9.0	130	179	215	245	289	356	409	473	558	627	2	4.7
3150				(○)	210	215	200	6.6	7.3	7.9	8.4	8.9	9.2	167	229	277	315	372	458	525	608	717	806	950	4.7

[Note] 7JJXP series nozzles are guaranteed only for the spray capacity at standard pressure.

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

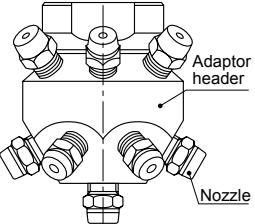


\*2) "F" indicates female thread ("Rc" of the ISO standard), e.g. 3/4F = Rc3/4.

This nozzle series is made-to-order.

# 13-Head Full Cone Spray Nozzles

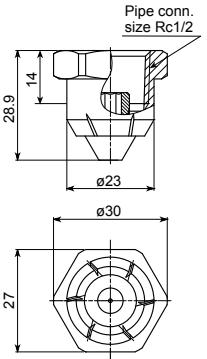
**13JJXP**

Series	Picture	Structure	Features	Applications
13JJXP			<ul style="list-style-type: none"> <li>Full cone spray nozzle with an almost round-shaped spray area.</li> <li>Thirteen (13) JJXP series full cone spray nozzles are screwed into a very compact adaptor header.</li> </ul> <p>This nozzle series is made-to-order.</p>	<ul style="list-style-type: none"> <li>Gas cooling</li> <li>Moisture control</li> </ul>

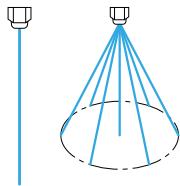
Full Cone

# Multi-Orifice Semi-fine Fog Nozzles for Fire Extinguishing

**TSP**

Series	Picture	Structure		
TSP	 	 Unit: mm	Made-to-Order	
			[Spray pattern] [Spray distribution]	
Features		Applications		
<ul style="list-style-type: none"> <li>Produces a hollow cone spray pattern from the tip of the nozzle and flat spray patterns from the side slits of the nozzle, resulting in a nearly round impact area at a spray height of 2–3 m.</li> <li>With an ultra-wide spray angle produced from multiple nozzle orifices, a single TSP nozzle provides a large spray width coverage from 2.8 m up to 4 m.</li> <li>Produces semi-fine atomization with a mean droplet diameter of 100–200 µm.</li> <li>Compact design.</li> </ul>		<ul style="list-style-type: none"> <li>Fire extinguishing, dust suppression, spraying</li> <li>Tank cleaning</li> </ul>		
<p>This nozzle series is made-to-order.</p>				

## Product Lineup



### Solid Stream Spray Nozzles

#### Slit Laminar Nozzles

#### Ejector Nozzles

#### Accessories

##### Standard Solid Stream Spray Nozzles

- One-Piece Structure: **CCP/CP**
- Universal-Jointed Type: **UT+CP**
- Convex Round Inlet Solid Stream Nozzles: **CCRP/CRP**

##### Paper Trimming Nozzle

- **CM-FB/2CM-FB**
- **CMP-T/CM/CTM**

##### Multi-Orifice Solid Stream Spray Nozzles

pp.104–

- **2CCP•7CCP/2CP•7CP**

##### Spray Control Solid Stream Spray Nozzles

pp.106–

- Solenoid-Controlled Pulse Spraying Nozzles: **SD-CC**

- Pilot Air Controlled Solid Stream Spray Nozzles: **SO-CC/SO-CM**

##### Special Solid Stream Spray Nozzles

pp.110–

- Foam Nozzles: **AWCC**
- Self-Cleaning Solid Stream Nozzles: **MOMOJet "C"**
- Pipe Cleaning Nozzles: **RSP**
- High-Pressure Rotating Pipe Cleaning Nozzles: **RSP-R**
- Surface Washing Nozzles

##### Slit Laminar Nozzles

pp.116–

- **SLNH-H/SLNHA-H**
- **SLNH-K**

##### Ejector Nozzles

pp.118–

- Standard Type: **EJX**
- High Flow Rate: **EJX-H**
- Two-Way/Slit Type: **EJX-2/EJX-S**

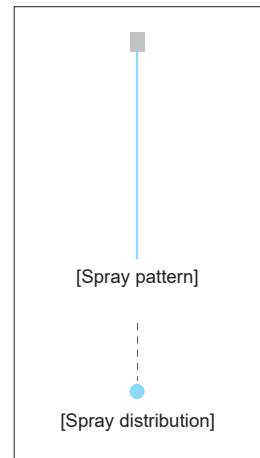
##### Accessories

pp.121–

- Universal Ball Joints: **UT, WUT**

Some Models are Made-to-Order

# Standard Solid Stream Jet

**CCP/CP/CP-STB**


- Highest impact solid stream nozzle. Interior design featuring minimal pressure drop generates much larger flow of solid stream jet as compared with other solid stream nozzles having the same orifice diameters.

**[STANDARD PRESSURE]**

3.0 MPa

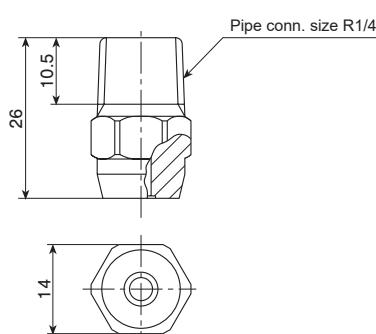
**[APPLICATIONS]**

High pressure cleaning:  
Wire and felt parts of paper making  
machines, vehicles, returnable containers,  
machinery, parts  
Trimming: Paper making

**CCP SERIES (all metal)**

Structure	• Metal one-piece structure.
Material	• S303 [Note] Use CCP series nozzles for pressures below 3.5 MPa.  SPECIAL ORDER MATERIAL: S316
Weight	
Weight	• 20g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING**

Unit: mm

**CP SERIES (with ceramic orifice)**

Made-to-order models: Ø0.1 to Ø0.8 (see next page)

Structure	• One-piece structure with a ceramic orifice insert. High-purity ceramic is used for the orifice of R1/8 and R1/4 models with spray capacity codes 25–210 and the small orifice diameter CP series with code 0.5–0.8. • Small spray capacity models come with or without a strainer.
Material	• Nozzle orifice: ceramic • Metal parts: S303  SPECIAL ORDER MATERIAL: S316

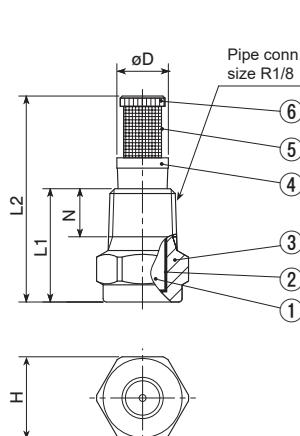
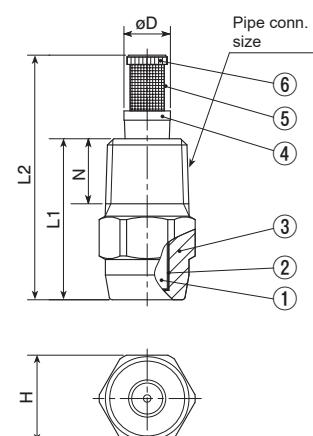
Pipe conn. size	Dimensions (mm)					Weight (g)*1
	L1	L2	H	øD	N	
R1/8	16.5	30	12	7.5	7	8
R1/4	26	39.5	14	7.5	10.5	19.5
R3/8	30	—	19	—	11	38

\*1) With strainer, add 2g for R1/8 and 5g for R1/4 to the above weight.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING**

Strainer is optional on some models and can be ordered without it. See table for details.

**R1/8****R1/4, R3/8**

①Ceramic orifice ②Adhesive: Araldite® ③Nozzle body  
④Strainer holder ⑤Strainer screen ⑥Strainer cap

No strainer available for size R3/8.

Some Models are Made-to-Order

# CCP/CP/CP-STB

Spray capacity code	Pipe connection size				Spray capacity (L/min)												Free pass. dia. (mm)	Strainer mesh size	
	CCP		CP		0.1 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa	3 MPa	4 MPa	5 MPa	6.5 MPa	8 MPa	10 MPa	15 MPa		
	R1/4	R1/8	R1/4	R3/8															
25		●	●		0.45	0.78	1.01	1.19	1.43	2.02	2.47	2.85	3.19	3.64	4.03	4.51	5.52	0.8	50
31		●	●		0.56	0.98	1.26	1.49	1.78	2.52	3.09	3.57	3.99	4.55	5.05	5.64	6.91	0.9	50
37		○	○		0.68	1.17	1.51	1.79	2.14	3.03	3.71	4.28	4.79	5.46	6.06	6.77	8.30	1.0	—
43		○	○		0.79	1.37	1.77	2.09	2.50	3.54	4.33	5.00	5.59	6.37	7.06	7.91	9.67	1.1	—
49		○	○		0.90	1.56	2.02	2.39	2.86	4.04	4.94	5.71	6.38	7.28	8.07	9.04	11.1	1.2	—
56		○	○		1.02	1.76	2.27	2.69	3.22	4.54	5.56	6.42	7.18	8.19	9.08	10.2	12.4	1.2	—
62		○	○		1.13	1.95	2.52	2.99	3.57	5.05	6.18	7.14	7.98	9.10	10.1	11.3	13.8	1.3	—
68		○	○		1.24	2.15	2.78	3.28	3.93	5.55	6.80	7.85	8.79	10.0	11.1	12.4	15.2	1.4	—
74		○	○		1.35	2.35	3.03	3.58	4.29	6.06	7.42	8.56	9.58	10.9	12.1	13.6	16.6	1.4	—
80		○	○		1.47	2.54	3.28	3.88	4.65	6.56	8.04	9.28	10.4	11.8	13.1	14.7	18.0	1.5	—
87		○	○		1.58	2.74	3.54	4.18	5.00	7.07	8.66	10.0	11.2	12.8	14.1	15.8	19.4	1.6	—
93		○	○		1.69	2.93	3.79	4.48	5.36	7.58	9.28	10.7	12.0	13.7	15.2	17.0	20.8	1.6	—
99		○	○		1.81	3.13	4.04	4.78	5.72	8.08	9.89	11.4	12.8	14.6	16.2	18.1	22.1	1.7	—
111		○	○		2.03	3.51	4.53	5.36	6.43	9.09	11.1	12.9	14.4	16.4	18.2	20.3	24.9	1.8	—
124		○	○		2.26	3.92	5.06	5.99	7.15	10.1	12.4	14.3	16.0	18.2	20.2	22.6	27.7	1.9	—
136	○	○	○		2.48	4.30	5.55	6.57	7.85	11.1	13.6	15.7	17.6	20.0	22.2	24.8	30.4	2.0	—
148		○	○		2.70	4.68	6.04	7.15	8.57	12.1	14.8	17.1	19.2	21.8	24.2	27.1	33.2	2.0	—
161		○	○		2.94	5.09	6.57	7.78	9.28	13.1	16.1	18.6	20.8	23.7	26.2	29.3	35.9	2.1	—
173		○	○		3.16	5.47	7.06	8.36	9.99	14.1	17.3	20.0	22.4	25.5	28.3	31.6	38.7	2.2	—
186		○	○		3.40	5.88	7.59	8.98	10.1	15.2	18.6	21.4	24.0	27.3	30.3	33.9	41.5	2.3	—
198		○	○		3.61	6.26	8.08	9.56	11.4	16.2	19.8	22.8	25.5	29.1	32.3	36.1	44.2	2.4	—
210		○	○		3.83	6.64	8.57	10.1	12.1	17.2	21.0	24.3	27.1	30.9	34.3	38.4	47.0	2.4	—
223	○		○		4.07	7.05	9.10	10.8	12.9	18.2	22.3	25.7	28.7	32.8	36.3	40.6	49.8	2.5	—
247			○		4.51	7.81	10.1	11.9	14.3	20.2	24.7	28.6	31.9	36.4	40.4	45.2	55.3	2.6	—
272			○		4.97	8.60	11.1	13.1	15.7	22.2	27.2	31.4	35.1	40.0	44.4	49.7	60.8	2.7	—
297			○		5.42	9.39	12.1	14.3	17.1	24.2	29.7	34.3	38.3	43.7	48.5	54.2	66.4	2.9	—
322	○		○		5.88	10.2	13.1	15.6	18.6	26.3	32.2	37.1	41.5	47.3	52.5	58.7	71.9	3.0	—
346			○		6.32	10.9	14.1	16.7	20.0	28.3	34.6	40.0	44.7	51.0	56.5	63.2	77.4	3.1	—
371			○		6.77	11.7	15.1	17.9	21.4	30.3	37.1	42.8	47.9	54.6	60.6	67.7	82.9	3.2	—
396			○		7.23	12.5	16.2	19.1	22.8	32.3	39.6	45.7	51.1	58.2	64.6	72.2	88.5	3.3	—
420			○		7.67	13.3	17.1	20.3	24.3	34.3	42.0	48.5	54.3	61.9	68.7	76.8	94.0	3.4	—
445	○		○		8.12	14.1	18.2	21.5	25.7	36.3	44.5	51.4	57.5	65.5	72.7	81.3	99.5	3.5	—
470			○		8.58	14.9	19.2	22.7	27.1	38.4	47.0	54.3	60.7	69.2	76.7	85.8	105	3.6	—
495			○		9.04	15.7	20.2	23.9	28.6	40.4	49.5	57.1	63.8	72.8	80.8	90.3	111	3.7	—
519			○		9.48	16.4	21.2	25.1	30.0	42.4	51.9	60.0	67.0	76.4	84.8	94.8	116	3.8	—
544			○		9.93	17.2	22.2	26.3	31.4	44.4	54.4	62.8	70.2	80.1	88.8	99.3	122	3.9	—
569	○		○		10.4	18.0	23.2	27.5	32.8	46.4	56.9	65.7	73.4	83.7	92.9	104	127	4.0	—
594			○		10.8	18.8	24.2	28.7	34.3	48.5	59.4	68.5	76.6	87.4	96.9	108	133	4.1	—
717	○		○		13.1	22.7	29.3	34.6	41.4	58.6	71.7	82.8	92.6	106	117	131	160	4.5	—
767			○		14.0	24.3	31.3	37.0	44.3	62.6	76.7	88.5	99.0	113	125	140	171	4.6	—
890	○		○		16.2	28.1	36.3	43.0	51.4	72.7	89.0	103	115	131	145	163	199	5.0	—
1040	○		○		19.0	32.9	42.5	50.2	60.0	84.8	104	120	134	153	170	190	232	5.4	—

●: Available with or without strainer ○: Only available without strainer

## CP Series with Small Orifice Diameter Made-to-Order

### Small orifice diameter CP Series

Orifice diameter code	Pipe connection size		Spray capacity (L/min)												Strainer mesh size
	R1/8	R1/4	1 MPa	2 MPa	2.5 MPa	3 MPa	3.5 MPa	4 MPa	4.5 MPa	5 MPa	6.5 MPa	8 MPa	10 MPa	15 MPa	
Φ0.1	●	●	0.020	0.028	0.031	0.034	0.037	0.039	0.042	0.044	0.050	0.056	0.062	0.076	200
Φ0.15	●	●	0.044	0.063	0.070	0.077	0.083	0.089	0.094	0.099	0.113	0.126	0.141	0.172	200
Φ0.2	●	●	0.08	0.11	0.13	0.14	0.15	0.16	0.17	0.18	0.20	0.22	0.25	0.31	200
Φ0.25	●	●	0.12	0.18	0.20	0.22	0.23	0.25	0.26	0.28	0.32	0.35	0.39	0.48	200
Φ0.3	●	●	0.18	0.25	0.28	0.31	0.33	0.36	0.38	0.40	0.46	0.51	0.56	0.69	150
Φ0.4	●	●	0.32	0.45	0.50	0.55	0.59	0.63	0.67	0.71	0.81	0.90	1.00	1.23	150
Φ0.5	●	●	0.50	0.70	0.79	0.86	0.93	0.99	1.05	1.11	1.27	1.40	1.57	1.92	100
Φ0.6	●	●	0.72	1.01	1.13	1.24	1.34	1.43	1.52	1.60	1.83	2.02	2.26	2.77	100
Φ0.7	●	●	0.97	1.37	1.53	1.68	1.81	1.94	2.06	2.17	2.47	2.74	3.07	3.76	50
Φ0.8	●	●	1.27	1.80	2.01	2.20	2.38	2.54	2.69	2.84	3.24	3.59	4.02	4.92	50

●: Available with or without strainer

[Note] The above nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

## CP-STB SERIES NEW

Made-to-order

## Stabilized Spray After Pipe Bends—New CP-STB Series with Built-in Straighteners.

- Provides a longer and more stable solid stream, even after bends where turbulence is prone to occur.
- The excellent flow-stabilizing function maintains a long-distance solid stream even in sideways installations.
- Ideal for applications requiring a high-impact, turbulence-free solid stream spray.

Structure	<ul style="list-style-type: none"> <li>One-piece structure with a ceramic orifice insert. High-purity ceramic is used for the orifice of models with spray capacity codes 25–210.</li> <li>The built-in flow straightener improves solid stream stability, delivering stronger impact than the standard CP Series.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: ceramic</li> <li>Metal parts: S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S316</p>
Weight	<ul style="list-style-type: none"> <li>R1/8: 11 g</li> <li>R1/4: 20 g</li> </ul>

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

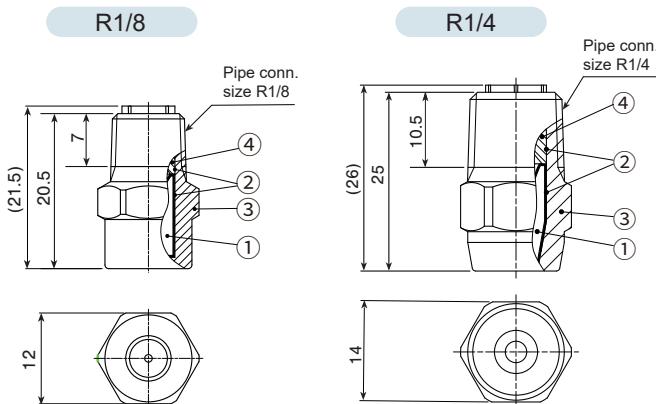
## CP-STB Series Lineup

The CP-STB Series covers spray capacity codes 25–544, based on the CP Series chart (see previous page) for R1/8 and R1/4 thread sizes.

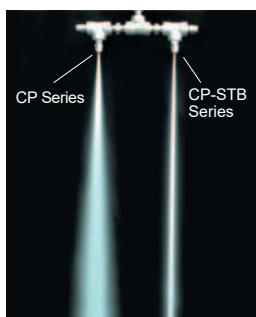
For spray capacity codes 80 to 544, the CP-STB Series has a free passage diameter of 1.5 mm, unlike the CP Series.

Note: Strainers are not available for CP-STB models.

## DRAWING



## Spray Comparison on Bent Pipe



When installed immediately after a bend, turbulence inside the pipe may affect the spray performance of the standard CP Series. The CP-STB Series is effective in such cases.

The standard CP Series delivers sufficient performance in the absence of turbulence.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

## CCP CP

Example: 1/8M CP 25 AL99-S303 W

1/8M	CP	25	AL99-S303	W
Pipe conn. size <sup>2</sup>	Series	Spray capacity code	Material <sup>3</sup>	Strainer
1/8M 1/4M 3/8M	CCP CP	25 S 1040	S303 AL99-S303	W (with strainer) (Blank indicates "without strainer")

## Small orifice diameter CP

Example: 1/8M CP ø0.1 S303 W

1/8M	CP	ø0.1	S303	W
Pipe conn. size <sup>2</sup>	Orifice diameter code	Material <sup>3</sup>	Strainer	
1/8M 1/4M	ø0.1 S ø0.8	S303 AL99-S303	W (with strainer) (Blank indicates "without strainer")	

## CP-STB

Example: 1/8M CP 25 STB AL99-S303

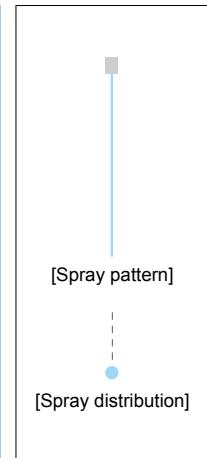
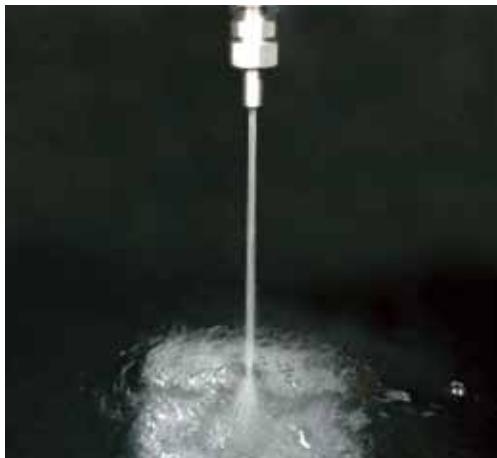
1/8M	CP	25	STB	AL99-S303
Pipe conn. size <sup>2</sup>	Spray capacity code		Material <sup>3</sup>	
1/8M 1/4M	25 S 544		S303 AL99-S303	

The small orifice diameter CP and CP-STB series are made-to-order.

<sup>2</sup>) "M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

<sup>3</sup>) Material code "AL99-S303" is for the CP/CP-STB series with spray capacity code 25–210 or orifice diameter code ø0.5–ø0.8.

# Universal-Jointed Solid Stream Jet UT+CP



- High impact force solid stream flow.
- Internal design keeps flow resistance to a minimum, generating a large flow volume.
- Spray direction is adjustable within a range of 40 degrees as needed.

## [STANDARD PRESSURE]

0.3 MPa

## [APPLICATIONS]

Cleaning: High pressure cleaning, wire and felt parts of paper making machines, vehicles, returnable containers, machinery, parts

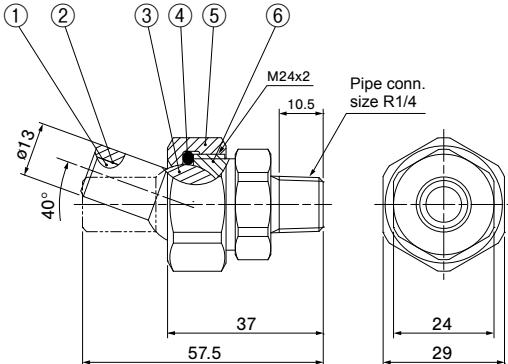
Trimming: Paper making

Structure	<ul style="list-style-type: none"> <li>• Has a ceramic orifice (high-purity ceramic orifice for spray capacity codes 37–136) in the nozzle tip.</li> <li>• Includes three parts: Nozzle tip, cap, and adaptor. Worn-out nozzle tips can be replaced separately.</li> <li>• Nozzle tip has an integrated universal ball joint to adjust the spray direction.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: ceramic</li> <li>• Metal parts: S303</li> </ul>
Weight	• 125g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING

Unit: mm



Nozzle tip (①Ceramic orifice ②Adhesive: Araldite® ③Ball)  
④O-ring (NBR) ⑤Cap ⑥Adaptor

Spray capacity code	Spray capacity (L/min)								Free passage diameter (mm)
	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa	
37	0.68	0.83	0.96	1.17	1.51	1.79	2.14	3.03	1.0
49	0.90	1.10	1.28	1.56	2.02	2.39	2.86	4.04	1.2
80	1.47	1.80	2.08	2.54	3.28	3.88	4.65	6.56	1.5
111	2.03	2.48	2.87	3.51	4.53	5.36	6.43	9.09	1.8
136	2.48	3.04	3.51	4.30	5.55	6.57	7.85	11.1	2.0
247	4.51	5.52	6.38	7.81	10.1	11.9	14.3	20.2	2.6
322	5.88	7.20	8.31	10.2	13.1	15.6	18.6	26.3	3.0
445	8.12	9.95	11.5	14.1	18.2	21.5	25.7	36.3	3.5

[Note] Precision guarantee for the UT+CP series is only for spray angle; the axis of spray direction to be within 3° from nozzle centerline.

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M UT+CP 37 AL99-S303

1/4M UT+CP **37** AL99-S303

Pipe conn. size <sup>1</sup>	Spray capacity code	Material
37	37	S303
445	445	AL99-S303 <sup>2</sup>

Please contact us to order only the nozzle tip.

\*1) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

\*2) When spray capacity code is 37–136, material code is described as "AL99-S303".

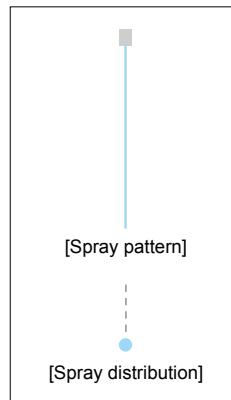
## ALSO AVAILABLE!

Universal-Jointed  
**Flat Spray** Nozzles

**UT+VP**  
SERIES

See page 14 of this catalog.

# Convex Round Inlet Solid Stream Jet



- High impact solid stream nozzle.
- The cone shaped inlet penetrates further into the supply pipe than regular nozzles. This prevents floating particles from flowing into the nozzle, thereby reducing clogging.
- The CRP series features high-purity alumina ceramic orifice providing stable performance with longer life.

## [STANDARD PRESSURE]

2.0 MPa

## [APPLICATIONS]

Cleaning: Wire and felt parts of paper making machines, machinery, parts, vehicles, returnable containers, bottles

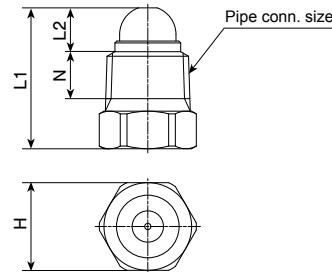
### CCRP SERIES (all metal)

Structure	• Metal one-piece structure.			
Material	• S303			

Pipe conn. size	Dimensions (mm)				Weight (g)
	L1	L2	H	N	
R1/8	18.5	5.5	12	6	8.5
R1/4	22.5	7	14	7.5	17

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING



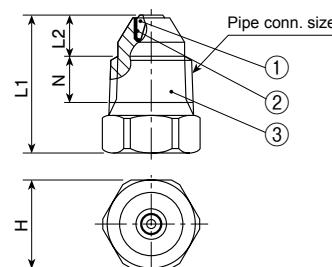
### CRP SERIES (with ceramic orifice)

Structure	• One-piece structure with a high-purity ceramic orifice insert.			
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: alumina ceramic</li> <li>• Nozzle body: S303</li> </ul>			

Pipe conn. size	Dimensions (mm)				Weight (g)
	L1	L2	H	N	
R1/8	18	5	12	6	7
R1/4	22	6.5	14	7.5	15

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING



①Ceramic orifice ②Adhesive: Araldite® ③Nozzle body

Orifice diameter code	Pipe connection size				Spray capacity (L/min)					
	CCRP		CRP							
	R1/8	R1/4	R1/8	R1/4	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa	3 MPa
ø0.5	○	○	○	○	0.20	0.26	0.31	0.37	0.52	0.63
ø0.6	○	○	○	○	0.29	0.37	0.44	0.53	0.74	0.91
ø0.7	○	○	○	○	0.39	0.51	0.60	0.72	1.01	1.24
ø0.8	○	○	○	○	0.51	0.66	0.78	0.94	1.32	1.62
ø0.9	○	○	○	○	0.65	0.84	0.99	1.18	1.67	2.05
ø1.0	○	○	○	○	0.80	1.03	1.22	1.46	2.07	2.53
ø1.1	○	○	○	○	0.97	1.25	1.48	1.77	2.50	3.06
ø1.2	○	○	○	○	1.15	1.49	1.76	2.10	2.98	3.64
ø1.3	○	○	○	○	1.35	1.75	2.07	2.47	3.49	4.28
ø1.4	○	○	○	○	1.57	2.02	2.40	2.86	4.05	4.96
ø1.5	○	○	○	○	1.80	2.32	2.75	3.29	4.65	5.69
ø1.7	○	○	○	○	2.31	2.99	3.53	4.22	5.97	7.31
ø2.0	○	○	○	○	3.20	4.13	4.89	5.84	8.26	10.1

[Note] The above nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

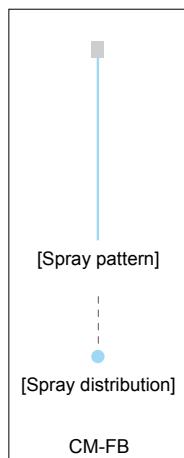
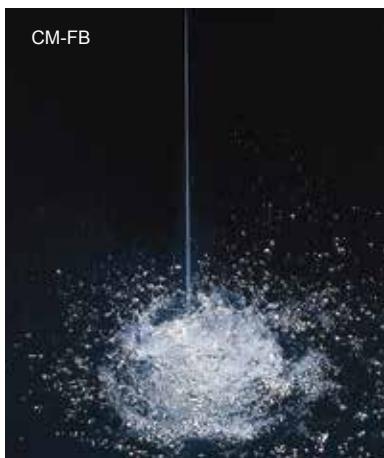
Example: 1/8M CRP ø0.6 AL99-S303

1/8M	CRP	ø0.6	AL99-S303
Pipe conn. size*	Series	Orifice diameter code	Material
1/8M	CRP	ø0.5	AL99-S303: CRP series
1/4M	CCRP	ø1.0	S303: CCRP series

\*\*"M" indicates male thread ("R" of the ISO standard),  
e.g. 1/8M = R1/8.

# Paper Trimming Nozzles

## CM-FB/2CM-FB



- Non-turbulent clear solid stream nozzles with high cutting force.
- Prevents paper dust from clogging the nozzle orifice.
- Small, tapered nose of the CM-FB series minimizes adhesion of paper dust to the nozzle body.
- The position of the nozzle orifices can be adjusted by turning the tab on the 2CM-FB series.

**[STANDARD PRESSURE]**  
2.0 MPa

**[APPLICATIONS]**

Trimming: Paper making  
Foot cutting, cleaning of precision machine parts,  
injection of chemicals, deburring, foaming of beer

### CM-FB SERIES (Single Orifice)

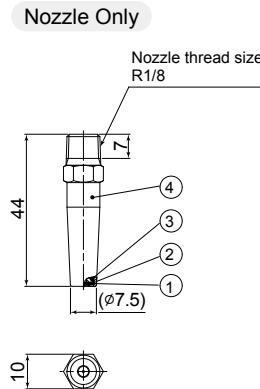
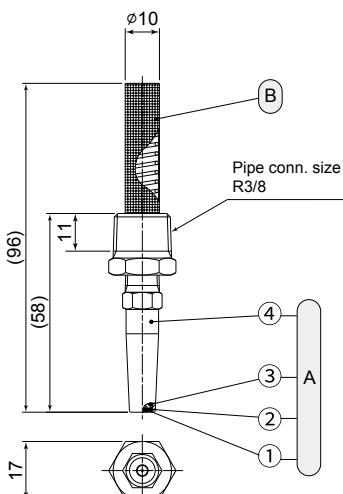
Structure	<ul style="list-style-type: none"> <li>• Has a high-purity ceramic orifice in the nozzle.</li> <li>• Includes a nozzle and a strainer integrated with an adaptor. Worn-out nozzles can be replaced separately.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: alumina ceramic</li> <li>• Main metal parts: S303</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• Complete assembly: 40g</li> <li>• Nozzle only: 15g</li> </ul>

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING

Unit: mm

#### Complete Assembly



- Ⓐ Nozzle (①Alumina ceramic orifice ②Adhesive: Araldite® H ③Sleeve ④Nozzle body)  
Ⓑ Strainer [S303+S304]

### 2CM-FB SERIES (Two Orifices)

Made-to-Order

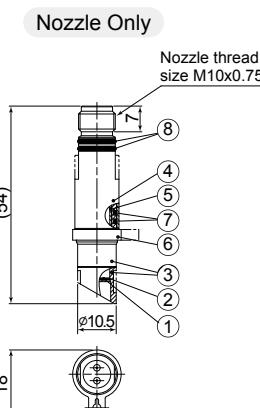
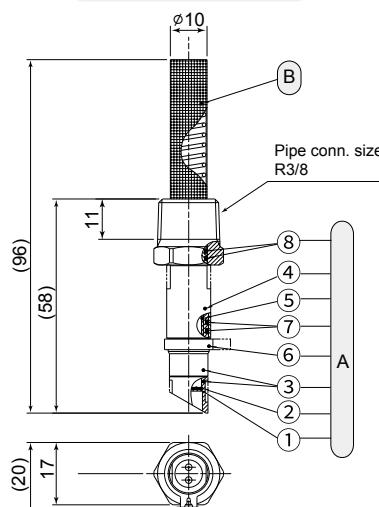
Structure	<ul style="list-style-type: none"> <li>• Has a high-purity ceramic orifice in the nozzle.</li> <li>• Includes a nozzle and a strainer integrated with an adaptor. Worn-out nozzles can be replaced separately.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: alumina ceramic</li> <li>• Main metal parts: S303</li> <li>• O-ring: NBR</li> <li>• Coating of nozzle: Teflon (PTFE)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• Complete assembly: 45g</li> <li>• Nozzle only: 21g</li> </ul>

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING

Unit: mm

#### Complete Assembly



- Ⓐ Nozzle (①Alumina ceramic orifice ②Adhesive: Araldite® H ③Nozzle body ④Adaptor ⑤Sleeve [S304] ⑥Tab [S304] ⑦⑧O-ring [NBR])  
Ⓑ Strainer [S303+S304]

Teflon coating is applied to the outer surface of the nozzle body below part ⑧.

**■ CM-FB Series (single-orifice nozzles)**

Orifice diameter code	Spray capacity (L/min)						Strainer mesh size
	0.5 MPa	1 MPa	2 MPa	3 MPa	4 MPa	5 MPa	
ø0.3	0.09	0.12	0.17	0.21	0.24	0.27	80
ø0.4	0.15	0.22	0.31	0.37	0.43	0.48	80
ø0.5	0.24	0.34	0.48	0.58	0.67	0.75	80
ø0.6	0.34	0.49	0.69	0.84	0.97	1.09	80
ø0.7	0.47	0.66	0.93	1.14	1.32	1.48	50
ø0.8	0.61	0.86	1.22	1.49	1.73	1.93	50
ø0.9	0.77	1.09	1.54	1.89	2.18	2.44	50
ø1.0	0.95	1.35	1.91	2.33	2.70	3.01	50

[Note] The above nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

**■ 2CM-FB Series (two-orifice nozzles)**

Orifice diameter code	Spray capacity (L/min)				Strainer mesh size
	0.5 MPa	1 MPa	2 MPa	3 MPa	
ø0.3	0.17	0.24	0.34	0.42	80
ø0.4	0.30	0.43	0.61	0.75	80
ø0.5	0.48	0.67	0.95	1.17	80

[Note] The above nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**CM-FB****① Complete Assembly**

Example: 3/8M CM ø0.4 FB S303 W

3/8M CM **ø0.4** FB S303 W  
 Pipe conn. size\* Series Orifice diameter code Material Strainer  
 ø0.3  
 ø1.0

**② Nozzle Only**

Example: 1/8M CMP ø0.4 FB S303

1/8M CMP **ø0.4** FB S303  
 Nozzle thread size\* Orifice diameter code Material  
 ø0.3  
 ø1.0

**2CM-FB****① Complete Assembly**

Example: 3/8M 2CM ø0.4 FB S303 W

3/8M 2CM **ø0.4** FB S303 W  
 Pipe conn. size\* Series Orifice diameter code Material Strainer  
 ø0.3  
 ø0.4  
 ø0.5

**② Nozzle Only**

Example: M10x0.75M 2CMP ø0.4 FB S303

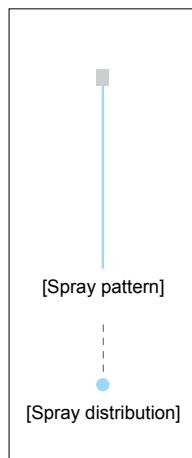
M10x0.75M 2CMP **ø0.4** FB S303  
 Nozzle thread size\* Orifice diameter code Material  
 ø0.3  
 ø0.4  
 ø0.5

\*"M" indicates male thread ("R" of the ISO standard), e.g. 3/8M = R3/8.

The 2CM-FB series is made-to-order.

# Paper Trimming Nozzles

## CMP-T/CM/CTM



- Extra fine straight solid stream nozzles with high impact cutting force.

### [STANDARD PRESSURE]

1.0 MPa

### [APPLICATIONS]

Trimming: Paper making  
Cutting: Food  
Others: Cleaning of precision machine parts, injection of chemicals, deburring, foaming of beer

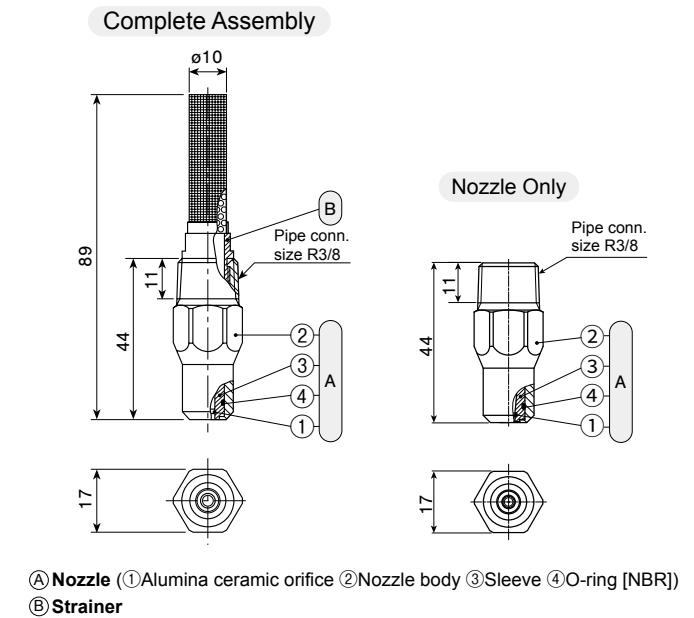
### CMP-T SERIES (with alumina ceramic orifice)

Structure	<ul style="list-style-type: none"> <li>• Features a high-purity ceramic orifice. Polyamide sleeve molded around a ceramic orifice is pressed into the tip of the nozzle.</li> <li>• Includes a nozzle and a strainer. Worn-out nozzles can be replaced separately.</li> <li>• The sleeve of the CMP-T series is color-coded by orifice diameter (see table on p.102).</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: alumina ceramic</li> <li>• Sleeve: PA</li> <li>• Metal parts: S303</li> <li>• O-ring: NBR</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• Complete assembly: 47 g</li> <li>• Nozzle only: 40 g</li> </ul>

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING

Unit: mm



(A) Nozzle (①Alumina ceramic orifice ②Nozzle body ③Sleeve ④O-ring [NBR])  
(B) Strainer

### CM SERIES (with ceramic orifice)

Structure	<ul style="list-style-type: none"> <li>• Features a ceramic orifice.</li> <li>• Includes a nozzle and a strainer integrated with an adaptor. Worn-out nozzles can be replaced separately.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: ceramic</li> <li>• Metal parts: S303</li> </ul>

### [Complete Assembly]

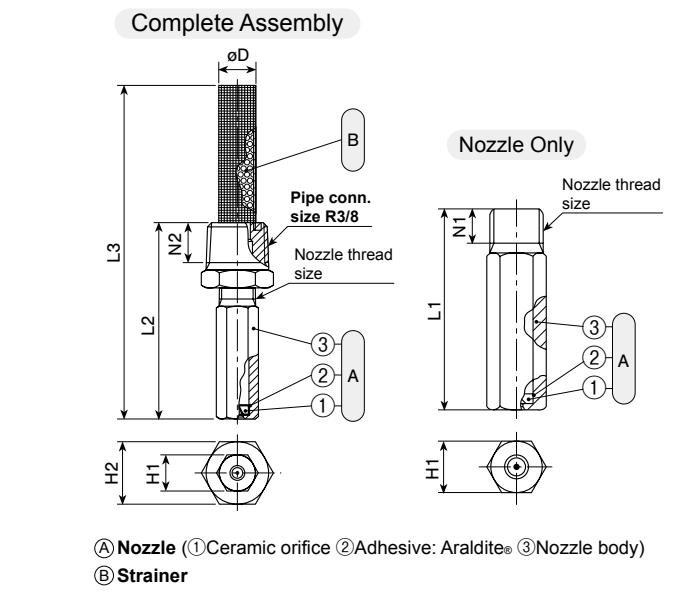
Orifice diameter code	Pipe conn. size	Dimensions (mm)					Weight (g)	
		L2	L3	H1	H2	øD		
ø0.1–ø0.9	R3/8	54	92	10	17	10	11	39
ø1.0–ø1.5	R3/8	52	90	14	17	10	11	47

### [Nozzle Only]

Orifice diameter code	Nozzle thread size	Dimensions (mm)			Weight (g)
		L1	H1	N1	
ø0.1–ø0.9	R1/8	40	10	7	16.5
ø1.0–ø1.5	R1/4	40	14	10.5	30

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING



(A) Nozzle (①Ceramic orifice ②Adhesive: Araldite® ③Nozzle body)  
(B) Strainer

**CTM SERIES (with tungsten carbide orifice)**

Structure	<ul style="list-style-type: none"> <li>Features a tungsten carbide orifice.</li> <li>Includes a nozzle and a strainer integrated with an adaptor.</li> <li>Worn-out nozzles can be replaced separately.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle orifice: tungsten carbide</li> <li>Metal parts: S303</li> </ul>

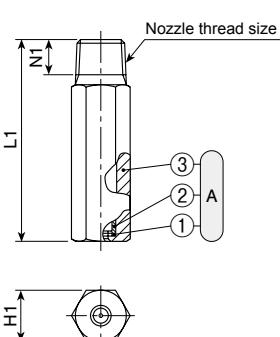
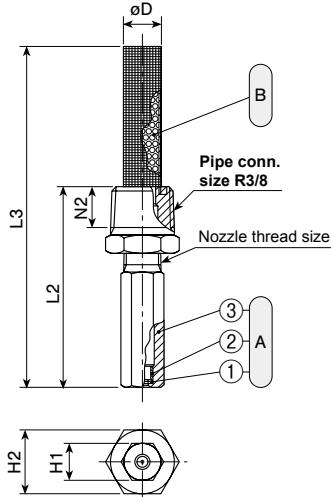
**[Complete Assembly]**

Orifice diameter code	Pipe conn size	Dimensions (mm)					Weight (g)	
		L2	L3	H1	H2	øD		
Ø0.2~Ø0.9	R3/8	54	92	10	17	10	11	39
Ø1.0~Ø1.5	R3/8	52	90	14	17	10	11	47

**[Nozzle Only]**

Orifice diameter code	Nozzle thread size	Dimensions (mm)			Weight (g)
		L1	H1	N1	
Ø0.2~Ø0.9	R1/8	40	10	7	16.5
Ø1.0~Ø1.5	R1/4	40	14	10.5	30

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

**DRAWING****Complete Assembly**

Ⓐ Nozzle (①Tungsten carbide orifice ②Sleeve ③Nozzle body)  
Ⓑ Strainer

**CMP-T, CM SERIES**

Orifice diameter code	CMP-T <sup>*2</sup>	CM	Spray capacity (L/min)						Strainer mesh size
			0.5 MPa	1 MPa	2 MPa	3 MPa	4 MPa	5 MPa	
Ø0.1		● <sup>*1</sup>	0.010	0.014	0.019	0.024	0.027	0.03	200
Ø0.15		● <sup>*1</sup>	0.02	0.03	0.04	0.05	0.06	0.07	200
Ø0.2		● <sup>*1</sup>	0.04	0.05	0.08	0.09	0.11	0.12	200
Ø0.25		● <sup>*1</sup>	0.06	0.09	0.12	0.15	0.17	0.19	200
Ø0.3	●	●	0.09	0.12	0.17	0.21	0.25	0.27	150
Ø0.4	●	●	0.15	0.22	0.31	0.38	0.44	0.49	150
Ø0.5	●	●	0.25	0.35	0.49	0.60	0.68	0.76	80
Ø0.6	●	●	0.36	0.51	0.71	0.86	0.99	1.10	80
Ø0.7	●	●	0.49	0.69	0.96	1.17	1.34	1.49	50
Ø0.8	●	●	0.62	0.87	1.23	1.51	1.75	1.95	50
Ø0.9	●	●	0.78	1.10	1.56	1.91	2.21	2.47	50
Ø1.0	●	● <sup>*1</sup>	0.96	1.36	1.93	2.36	2.73	3.05	50
Ø1.1		● <sup>*1</sup>	1.17	1.65	2.33	2.86	3.30	3.69	50
Ø1.2		● <sup>*1</sup>	1.39	1.96	2.78	3.40	3.93	4.39	50
Ø1.3		● <sup>*1</sup>	1.63	2.30	3.26	3.99	4.61	5.15	50
Ø1.4		● <sup>*1</sup>	1.89	2.67	3.78	4.63	5.34	5.98	50
Ø1.5		● <sup>*1</sup>	2.17	3.07	4.34	5.31	6.14	6.86	50

\*1) Made-to-order model    \*2) The color of ● (filled circle) in the CMP-T series indicates the sleeve color coded by orifice diameter.

[Note] The above nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

**CTM SERIES**

Orifice diameter code	CTM	Spray capacity (L/min)						Strainer mesh size
		0.5 MPa	1 MPa	2 MPa	3 MPa	4 MPa	5 MPa	
Ø0.2	● <sup>*1</sup>	0.04	0.05	0.07	0.09	0.10	0.12	200
Ø0.25	● <sup>*1</sup>	0.06	0.08	0.11	0.14	0.16	0.18	200
Ø0.3	●	0.08	0.12	0.16	0.20	0.23	0.26	150
Ø0.4	●	0.15	0.21	0.29	0.36	0.41	0.46	150
Ø0.5	●	0.23	0.32	0.46	0.56	0.64	0.72	80
Ø0.6	●	0.33	0.46	0.66	0.80	0.93	1.04	80
Ø0.7	●	0.45	0.63	0.89	1.09	1.26	1.41	50
Ø0.8	●	0.58	0.82	1.16	1.43	1.65	1.84	50
Ø0.9	●	0.74	1.04	1.47	1.81	2.08	2.33	50
Ø1.0	● <sup>*1</sup>	0.91	1.29	1.82	2.23	2.57	2.88	50
Ø1.1	● <sup>*1</sup>	1.10	1.56	2.20	2.70	3.11	3.48	50
Ø1.2	● <sup>*1</sup>	1.31	1.85	2.62	3.21	3.71	4.14	50
Ø1.3	● <sup>*1</sup>	1.54	2.18	3.08	3.77	4.35	4.86	50
Ø1.4	● <sup>*1</sup>	1.78	2.52	3.57	4.37	5.05	5.64	50
Ø1.5	● <sup>*1</sup>	2.05	2.90	4.10	5.02	5.79	6.48	50

\*1) Made-to-order model

[Note] The above nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**CMP-T****① Complete Assembly (Nozzle and Strainer)**

Example: 3/8M CMP ø0.3 T S303 W

<b>3/8M</b>	<b>CMP</b>	<b>ø0.3</b>	<b>T</b>	<b>S303</b>	<b>W</b>
Pipe conn. size <sup>3</sup>		Orifice diameter code		Material	Strainer
ø0.3					
ø1.0					

**② Nozzle Only**

Example: 3/8M CMP ø0.3 T S303

<b>3/8M</b>	<b>CMP</b>	<b>ø0.3</b>	<b>T</b>	<b>S303</b>
Pipe conn. size <sup>3</sup>		Orifice diameter code		Material
ø0.3				
ø1.0				

**CM****① Complete Assembly (Nozzle and Strainer)**

Example: 3/8M CM ø0.1 S303 W (PM-Strainer ø10)

<b>3/8M</b>	<b>CM</b>	<b>ø0.1</b>	<b>S303</b>	<b>W (PM-Strainer ø10)</b>
Pipe conn. size <sup>3</sup>	Series	Orifice diameter code <sup>4</sup>	Material	Strainer
ø0.1				
ø1.5				

**② Nozzle Only**

Example: 1/8M CMP ø0.1 S303

<b>1/8M</b>	<b>CMP</b>	<b>ø0.1</b>	<b>S303</b>
Nozzle thread size <sup>3</sup>	Series	Orifice diameter code <sup>4</sup>	Material
1/8M (for ø0.1–ø0.9)		ø0.1	
1/4M (for ø1.0–ø1.5)		ø1.5	

**CTM****① Complete Assembly (Nozzle and Strainer)**

Example: 3/8M CTM ø0.2 S303 W (PM-Strainer ø10)

<b>3/8M</b>	<b>CTM</b>	<b>ø0.2</b>	<b>S303</b>	<b>W (PM-Strainer ø10)</b>
Pipe conn. size <sup>3</sup>	Series	Orifice diameter code <sup>4</sup>	Material	Strainer
ø0.2				
ø1.5				

**② Nozzle Only**

Example: 1/8M CTMP ø0.2 S303

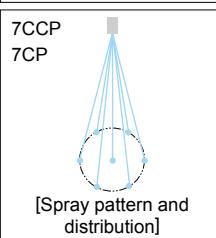
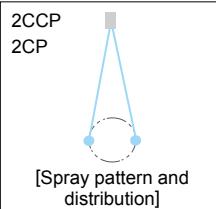
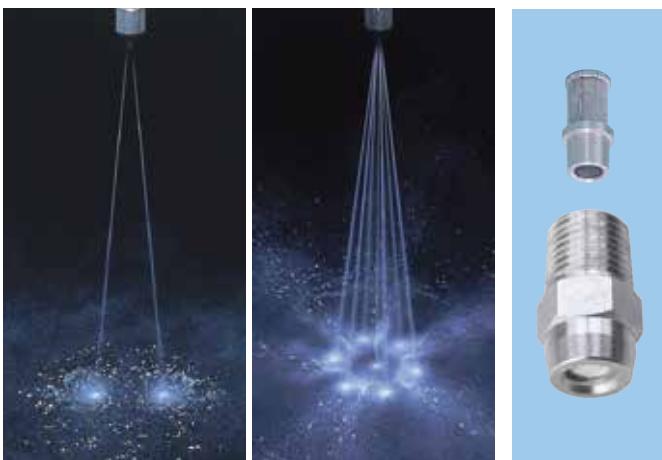
<b>1/8M</b>	<b>CTMP</b>	<b>ø0.2</b>	<b>S303</b>
Nozzle thread size <sup>3</sup>	Series	Orifice diameter code <sup>4</sup>	Material
1/8M (for ø0.2–ø0.9)		ø0.2	
1/4M (for ø1.0–ø1.5)		ø1.5	

<sup>3</sup>) "M" indicates male thread ("R" of the ISO standard), e.g. 3/8M = R3/8.<sup>4</sup>) The CTM/CM series with orifice diameters of ø0.1–0.25 and ø1.0–1.5 are made-to-order. ø0.1 and ø0.15 are available only for the CM series.

# Multi-Orifice Solid Stream Jet

Made-to-Order

**2CCP·7CCP/2CP·7CP**



- Multiple solid streams with high impact force.
- 2-orifice and 7-orifice nozzles are available.
- Compact design.

#### [STANDARD PRESSURE]

1.0 MPa

#### [APPLICATIONS]

Cleaning: Wire and felt parts of paper making machines, dandy rolls, machine parts, bottles, vehicles, returnable containers

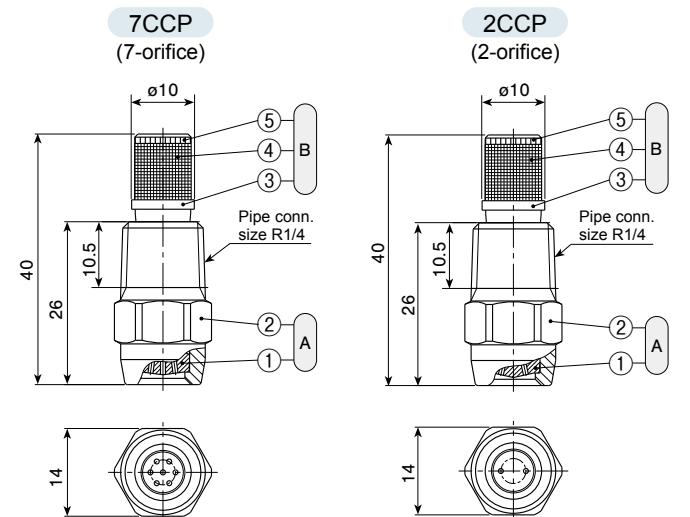
#### 2CCP, 7CCP SERIES (all metal)

Structure	<ul style="list-style-type: none"> <li>• Metal one-piece structure. Some models are available with strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• S303</li> </ul> <p>SPECIAL ORDER MATERIAL: S420J2 (nozzle orifice only)</p>
Weight <sup>*1</sup>	<ul style="list-style-type: none"> <li>• 16 g</li> </ul>

\*1) With strainer, add 2 g to the above weight.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

#### DRAWING



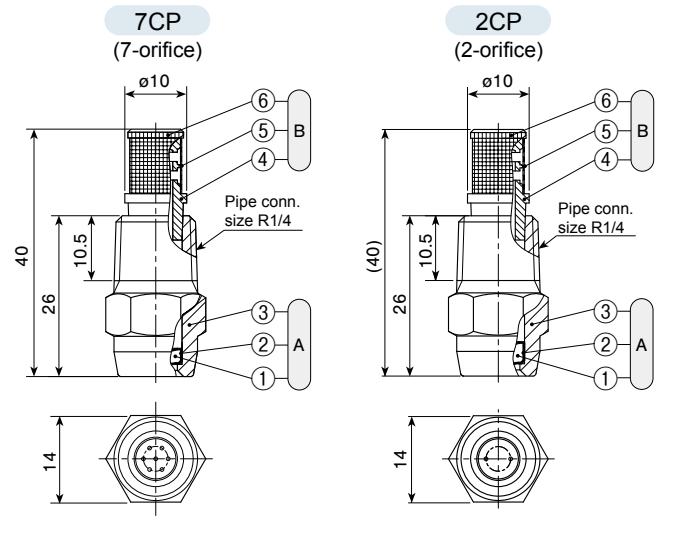
#### 2CP, 7CP SERIES (with ceramic orifice)

Structure	<ul style="list-style-type: none"> <li>• One-piece structure with a ceramic orifice insert. Almost all models are available with strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle orifice: ceramic</li> <li>• Metal parts: S303</li> </ul>
Weight <sup>*2</sup>	<ul style="list-style-type: none"> <li>• 17 g</li> </ul>

\*2) With strainer, add 5 g to the above weight.

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

#### DRAWING



**2CCP·7CCP/2CP·7CP****■2CCP/2CP Series (two-orifice nozzles)**

Spreading angle code	Spray capacity code	2CCP (metal)	2CP with ceramic orifice	Spreading angle <sup>*3</sup> (°)			Spray capacity (L/min)						Free passage diameter (mm)	Strainer mesh size	
				0.5 MPa	1 MPa	2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa	3 MPa		
25	09		●	25	25	25	0.47	0.61	0.72	0.86	1.05	1.22	1.49	0.5	100
	12			25	25	25	0.68	0.88	1.04	1.24	1.52	1.75	2.15	0.6	100
	17			25	25	25	0.92	1.19	1.41	1.68	2.06	2.38	2.91	0.7	50
	22			25	25	25	1.19	1.54	1.82	2.18	2.67	3.08	3.78	0.8	50
	34			25	25	25	1.87	2.42	2.86	3.42	4.19	4.84	5.92	1.0	—
15	09		●	15	15	15	0.47	0.61	0.72	0.86	1.05	1.22	1.49	0.5	100
	12			15	15	15	0.68	0.88	1.04	1.24	1.52	1.75	2.15	0.6	100
	17			15	15	15	0.92	1.19	1.41	1.68	2.06	2.38	2.91	0.7	50
	22			15	15	15	1.19	1.54	1.82	2.18	2.67	3.08	3.78	0.8	50
	34			15	15	15	1.87	2.42	2.86	3.42	4.19	4.84	5.92	1.0	—
10	09		●	10	10	10	0.47	0.61	0.72	0.86	1.05	1.22	1.49	0.5	100
	12			10	10	10	0.68	0.88	1.04	1.24	1.52	1.75	2.15	0.6	100
	17			10	10	10	0.92	1.19	1.41	1.68	2.06	2.38	2.91	0.7	50
	22			10	10	10	1.19	1.54	1.82	2.18	2.67	3.08	3.78	0.8	50
	34			10	10	10	1.87	2.42	2.86	3.42	4.19	4.84	5.92	1.0	—

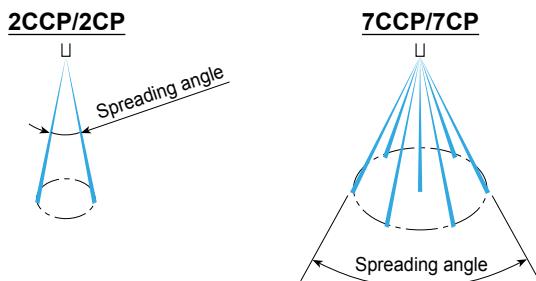
●: Available with or without strainer ○: Only available without strainer

**■7CCP/7CP Series (seven-orifice nozzles)**

Spreading angle code	Spray capacity code	7CCP (metal)	7CP with ceramic orifice	Spreading angle <sup>*3</sup> (°)			Spray capacity (L/min)						Free passage diameter (mm)	Strainer mesh size	
				0.5 MPa	1 MPa	2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa	3 MPa		
15	30		●	15	15	15	1.65	2.13	2.52	3.01	3.69	4.26	5.21	0.5	100
	43			15	15	15	2.38	3.07	3.63	4.34	5.32	6.14	7.52	0.6	100
	59			15	15	15	3.22	4.16	4.92	5.88	7.20	8.32	10.2	0.7	50
	76			15	15	15	4.18	5.40	6.38	7.63	9.34	10.8	13.2	0.8	50
	119			15	15	15	6.52	8.41	9.96	11.9	14.6	16.8	20.6	1.0	—

●: Available with or without strainer ○: Only available without strainer

\*3) The spreading angle is the angle between the solid streams. For a seven-orifice nozzle it is the angle between the two streams directly opposite to each other and the furthest apart.

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

**Two-Orifice Nozzles**

Example: 1/4M 2CP 2517 S303W

1/4M	2CP	25	17	S303	W
Pipe conn. size <sup>*4</sup>	Series	Spreading angle code	Spray capacity code	Material	Strainer
■ 2CCP	■ 25	■ 09			
■ 2CP	■ 15	■ 1			
	■ 10	■ 34			

■ W (with strainer)  
■ (Blank indicates "without strainer")

**Seven-Orifice Nozzles**

Example: 1/4M 7CP 1559 S303W

1/4M	7CP	15	59	S303	W
Pipe conn. size <sup>*4</sup>	Series		Spray capacity code	Material	Strainer
■ 7CCP	■ 30		■ W (with strainer)		
■ 7CP	■ 1	■ 119	■ (Blank indicates "without strainer")		

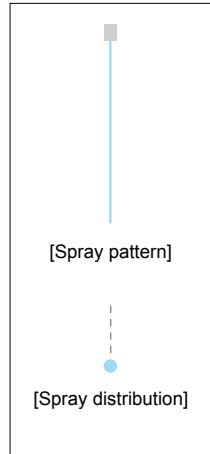
\*4) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

These nozzle series are made-to-order.

# High-Frequency Pulse Spraying Solenoid-Controlled Solid Stream Jet

Made-to-Order

**SD-CC**



- Controls the spray ON/OFF with electrical signal ON/OFF. Intermittent spray with min. 0.05 sec/shot and as little as 0.05 cc/shot is possible.
- Ideal for applying a small amount of coating or marking with minimal splatter, saving liquid used.
- Nozzle tips can be replaced with a different orifice diameter code to adjust the spray flow rate.

#### [STANDARD PRESSURE]

0.3 MPa

#### [APPLICATIONS]

- Coating: Water, oil, lubricant, insecticide, herbicide, aqueous solution
- Moisture control: Paper, food
- Cooling: glass plate
- Suited for minimizing liquid splatter

#### SD-CC SERIES

Structure	<ul style="list-style-type: none"> <li>Includes a nozzle tip, cap, and adaptor-solenoid section.</li> <li>Worn-out nozzle tips can be replaced separately.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Nozzle tip: S303</li> <li>Cap, Adaptor: S304</li> <li>Solenoid section: Various materials</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Complete assembly: 220 g</li> <li>Nozzle tip: 13 g</li> </ul>

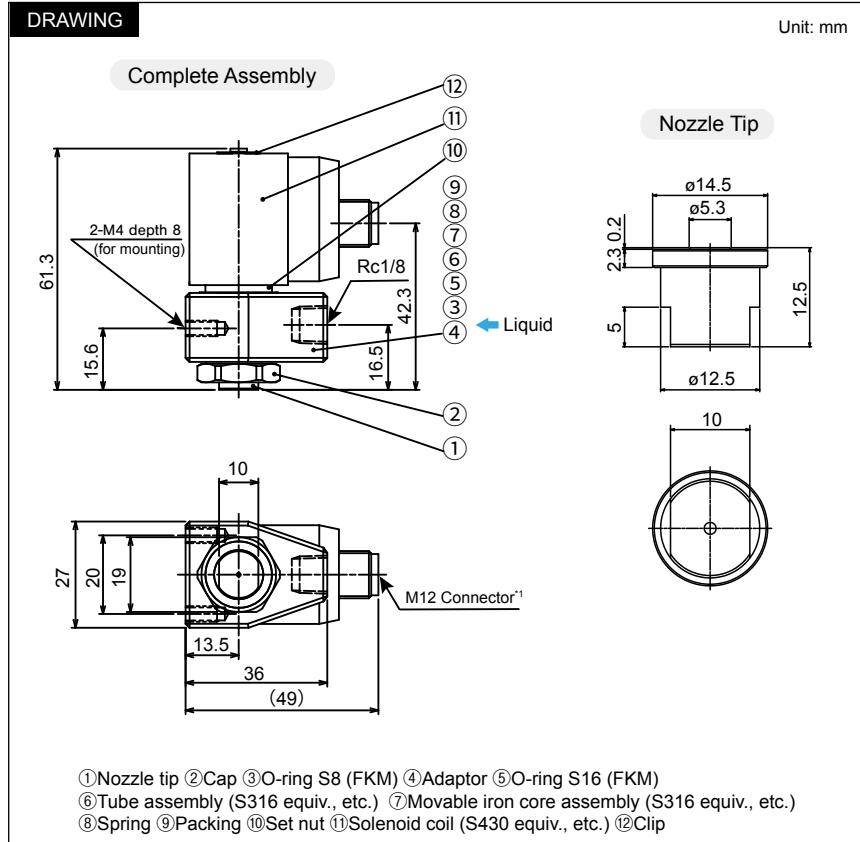
Max. temperature: 60°C

Protection Structure IP67

The materials used in the parts that come into contact with liquids comply with the Food Sanitation Law in Japan.

#### [Note]

- Appearance and dimensions may differ slightly depending on material and nozzle code.



\*4) Cable for M12 connector not included. Please use SMC Corporation's "JSX022-30-1-length" cable (length: 1m, 2m, or 5m).

#### Solenoid Specifications

Valve	Coil
Valve structure	Direct acting poppet
Orifice diameter	ø1.6 mm
Pressure resistance	2.0 MPa
Max.operating pressure difference	0.9 MPa
Ambient temperature	-20–60°C
Operating fluid temperature (water)	1–60°C
Operating fluid temperature (oil)	-5–60°C (w/ dynamic viscosity of 50mm²/s or less)
Materials	Body: Stainless steel, Seal: FKM
Protection structure	IP67
	Rated voltage
	Allowable voltage fluctuation
	Allowable leakage voltage
	Electrical circuit
	Temperature rise value
	Power consumption

Orifice diameter code	Spray capacity (L/min) <sup>2</sup>							
	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	0.9 MPa
ø0.3	0.04	0.05	0.06	0.07	0.09	0.12	0.14	0.16
ø0.4	0.07	0.10	0.12	0.14	0.17	0.22	0.26	0.29
ø0.5	0.11	0.16	0.19	0.22	0.27	0.35	0.41	0.47
ø0.6	0.16	0.22	0.27	0.31	0.38	0.49	0.58	0.66
ø0.7	0.21	0.29	0.36	0.42	0.51	0.66	0.78	0.88
ø0.8	0.27	0.38	0.47	0.54	0.66	0.85	1.01	1.14
ø0.9	0.33	0.47	0.58	0.67	0.82	1.06	1.25	1.42
ø1.0	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.73

<sup>2)</sup> These values are for continuous spraying.

[Note] The above nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

### Operation Time Chart

The electrical signal ON/OFF controls the spraying.

Electrical signal	OFF	ON	OFF	ON	OFF
Liquid	Stop	Spray	Stop	Spray	Stop

### ALSO AVAILABLE!

Solenoid-Controlled  
Flat Spray Nozzles

**SD-VV**  
**SERIES**

See page 44 of this catalog.

### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

#### ① Complete Assembly

Example: CC ø0.3 S303 + SD S304

**CC**    **ø0.3**    **S303** + **SD S304**

Series	Orifice diameter code	Nozzle tip material
<input type="checkbox"/> ø0.3	↓	
<input type="checkbox"/> ø1.0		

#### ② Nozzle Tip Only

Example: 1/4 CC ø0.3 -SD S303

**1/4**    **CC**    **ø0.3**    **-SD S303**

Series	Orifice diameter code	Nozzle tip material
<input type="checkbox"/> ø0.3	↓	
<input type="checkbox"/> ø1.0		

(This nozzle series is made-to-order.)

# Solid Stream Jet with Pilot Air On-Off Control

SO-CC: Made-to-Order

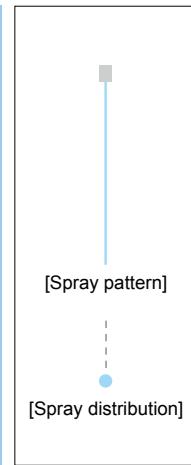
## SO-CC/SO-CM



SO-CC



SO-CM



- Extra-fine solid stream nozzles with high spray impact.
- Feature a responsive spray ON/OFF function. Connecting the pilot air allows for quick and precise control of spray activation and deactivation.
- Anti-drip design.

### [STANDARD PRESSURE]

0.3 MPa

### [APPLICATIONS]

Trimming: Paper making  
Food cutting, cleaning of precision machine parts, injection of chemicals, deburring, marking

### SO-CC SERIES

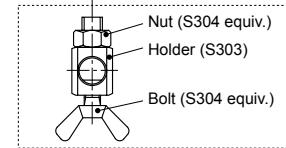
Made-to-Order

Structure	• Spray ON/OFF can be regulated by switching the pilot air ON/OFF. The pilot air activates an internal piston to regulate the spray.
Material	• S303
Weight	• 170g

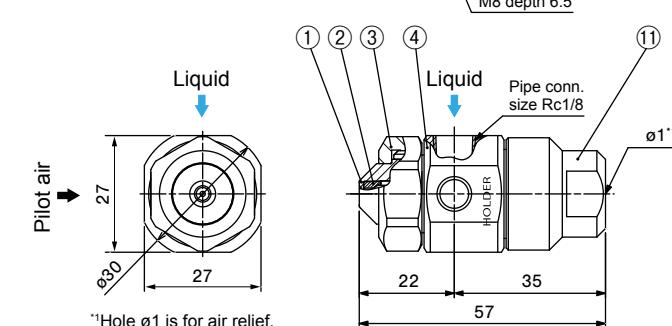
Max. operating pressure: 1.0 MPa

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING



The above frame shows the parts included in the optional mounting bracket.



- ①Nozzle orifice ②Packing (PTFE) ③Cap ④Adaptor ⑤O-ring (FKM)  
⑥Lock nut ⑦Sleeve (PTFE) ⑧Piston ⑨Y-packing (NBR)  
⑩Spring (S304) ⑪Spring cap

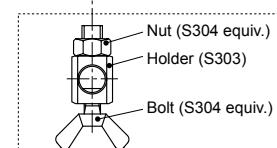
### SO-CM SERIES (with ceramic orifice)

Structure	• Spray ON/OFF can be regulated by switching the pilot air ON/OFF. The pilot air activates an internal piston to regulate the spray.
Material	• Nozzle orifice: ceramic • Metal parts: S303
Weight	• 150g

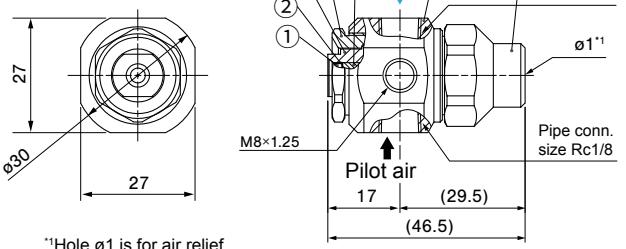
Max. operating pressure: 0.5 MPa

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING



The above frame shows the parts included in the optional mounting bracket.



- ①Ceramic orifice ②Adhesive: Araldite® ③Tip retainer ④Packing (PTFE)  
⑤Cap ⑥Adaptor ⑦Spring cap ⑧O-ring (FKM) ⑨Lock nut  
⑩Y-packing (NBR) ⑪Piston ⑫Sleeve (UHMWPE) ⑬Spring (S304)

**■ SO-CC Series**

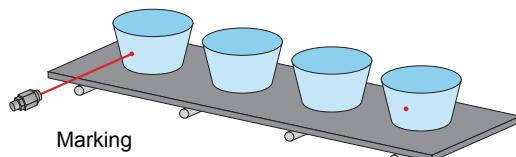
Orifice diameter code	Spray capacity (L/min)				
	0.1 MPa	0.3 MPa	0.5 MPa	0.8 MPa	1.0 MPa
ø0.3	0.04	0.07	0.09	0.11	0.13
ø0.4	0.07	0.12	0.16	0.20	0.22
ø0.5	0.11	0.18	0.24	0.30	0.34
ø0.6	0.15	0.27	0.34	0.43	0.49
ø0.7	0.21	0.36	0.46	0.58	0.65
ø0.8	0.27	0.47	0.60	0.76	0.85
ø0.9	0.34	0.59	0.76	0.96	1.07
ø1.0	0.42	0.73	0.94	1.19	1.33

[Note] These nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

**■ SO-CM Series**

Orifice diameter code	Spray capacity (L/min)	
	0.3 MPa	0.5 MPa
ø0.3	0.08	0.10
ø0.4	0.14	0.17
ø0.5	0.20	0.25
ø0.6	0.29	0.36
ø0.7	0.39	0.49
ø0.8	0.51	0.65
ø0.9	0.61	0.78
ø1.0	0.75	0.97

[Note] These nozzles are manufactured for specific orifice diameters, therefore the spray capacity is not guaranteed.

**Example of Use****Operation Time Chart**

The pilot air ON/OFF controls the spray operation.

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

**Mounting Bracket (Optional)**

This mounting bracket allows for easy installation of SO-CC/SO-CM series nozzles to a pole in the desired spray direction. Available in two sizes for pole diameters of 8 mm and 10 mm.

When ordering the optional Mounting Bracket, please specify "BIM ø8 MBW" for ø8 mounting bracket, or "BIM ø10 MBW" for ø10 mounting bracket.

**HOW TO ORDER**

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/8 SO-CC ø0.3 S303

1/8<sup>\*2</sup>    SO-CC    ø0.3    S303  
 Series              Orifice diameter code      Material  
 SO-CC              ø0.3  
 SO-CM              ↴  
 ↴              ø1.0

\*2) Indicates Rc1/8 for the liquid and pilot air connection thread size.

The SO-CC series is made-to-order.

**ALSO AVAILABLE!**

**Flat Spray Nozzles with ON/OFF Control**

**SO-V  
SO-VV  
SERIES**

See page 46 for more details.

**CAUTIONS**

- Supply liquid pressure at 0.5 MPa or less for the SO-CM series, and 1.0 MPa or less for the SO-CC series.
- Supply pilot air pressure between 0.2 and 0.5 MPa.
- For better shut off and to prevent dripping, purge the air between the solenoid valve and the nozzle when it is shut off, using a 3-way solenoid valve.

# Solid Stream Foaming Spray Nozzles

Made-to-Order

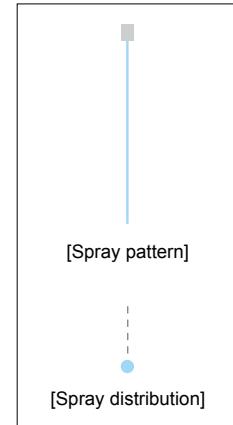
**AWCC**



AWCC10



AWCC30/50



- Solid stream nozzle for spraying detergent.
- Compressor-free, it generates a large amount of foam using only liquid pressure to draw in air.
- The long-lasting foam helps to increase the cleaning performance.
- Capable of high-pressure cleaning.

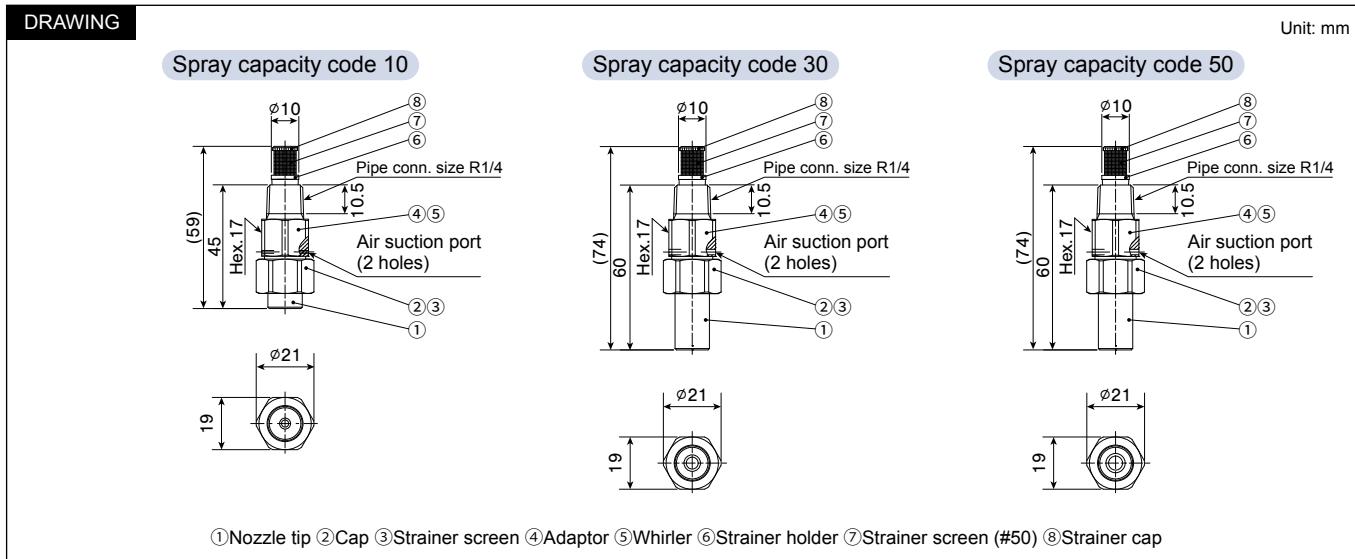
#### [STANDARD PRESSURE]

0.3 MPa

#### [APPLICATIONS]

- Cleaning: conveyors, outer surface of vehicles, factory floors/walls

Structure	<ul style="list-style-type: none"> <li>• Made of metal.</li> <li>• Comprises a nozzle tip, cap, adaptor, and strainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• S303</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• Spray capacity code 10: 66 g</li> <li>• Spray capacity code 30 and 50: 74 g</li> </ul>



[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray capacity code	Spray capacity <sup>*1</sup> (L/min)						Strainer mesh size
	0.1 MPa	0.2 MPa	0.3 MPa	0.4 MPa	0.5 MPa	0.6 MPa	
10	0.58	0.82	1.00	1.15	1.29	1.41	
30	1.73	2.45	3.00	3.46	3.87	4.24	
50	2.89	4.08	5.00	5.77	6.45	7.07	50

\*1) Spray liquid is tap water. The performance guarantee does not apply when spraying detergent.

#### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/4M AWCC 10 S303W

1/4M	AWCC	10	S303	W
Pipe conn. size <sup>*2</sup>	Spray capacity code	Material	Strainer	
<input type="checkbox"/> 10	<input type="checkbox"/> 30	<input type="checkbox"/> 50		

\*2) "M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

This nozzle series is made-to-order.

#### ALSO AVAILABLE!

**Flat Pattern**  
Foaming Spray Nozzles

**AWVV  
SERIES**

See page 49 of this catalog.

# Self-Cleaning Solid Stream Jet

## MOMOJet "C"



- High impact solid stream.
- When the liquid pressure is reduced to 0.03 MPa or lower, the nozzle tip retracts and purges any clogged foreign particles. By increasing the water pressure to 0.2 MPa or higher, normal spraying resumes.
- The design aligns the nozzle and spray axes, making it easier to arrange multiple nozzles.

### [STANDARD PRESSURE]

1.0 MPa

### [APPLICATIONS]

Cleaning: Paper making (wire, felt parts and rollers)  
steel plates, PCB

Cooling: Steel plates

Foam breaking: Waste water treatment

Others: Applications where recirculated water is being used

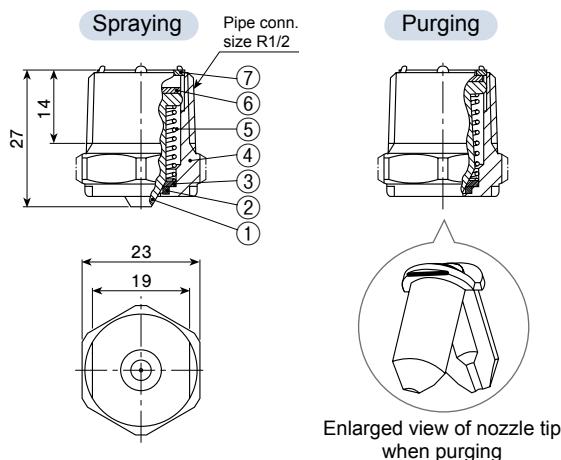
Solid Stream

Structure	• By changing the liquid pressure, a built-in spring moves the split nozzle tip up and down and opens the orifice for purging.
Material	• S303
Weight	• 52 g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

### DRAWING

Unit: mm



①Nozzle tip ②Packing (EPDM) ③Plate ④Nozzle body  
⑤Spring ⑥Packing (EPDM) ⑦Ring

Spray capacity code	Spray capacity (L/min)					Free passage diameter (mm)	
	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa	Spraying	Purging
10	0.55	0.71	0.84	1.00	1.41	0.7	1.8
16	0.88	1.13	1.34	1.60	2.26	0.9	1.9
23	1.26	1.63	1.93	2.30	3.25	1.1	2.0
32	1.75	2.26	2.68	3.20	4.53	1.2	2.0
47	2.58	3.32	3.93	4.70	6.65	1.5	2.2
65	3.56	4.60	5.44	6.50	9.19	1.8	2.4

### Attention:

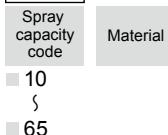
1. To start spraying, a flow rate of about 9 L/min at 0.02–0.03 MPa is required for all models. Make sure to select an appropriate pump.
2. MOMOJet is designed to start spraying when the pressure is greater than 0.1 MPa. Use MOMOJet at a pressure of 0.2 MPa or higher.
3. Since MOMOJet series nozzles have moving nozzle tips, the spray capacity is only guaranteed within +/-10% at standard pressure.

### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 1/2 MOMOC 10 S303

1/2\* MOMOC 10 S303



\*Indicates R1/2, nozzle thread size.

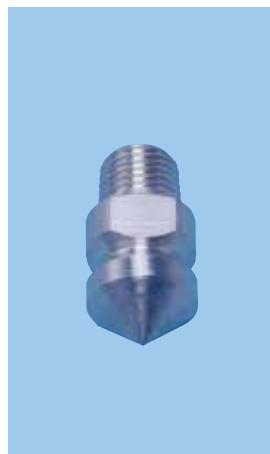
### ALSO AVAILABLE!

Self-Cleaning Flat Spray Nozzles

**MOMOJet**  
SERIES

See page 51 of this catalog.

# Pipe Cleaning Nozzles



- A pipe cleaning nozzle with powerful jets in various directions—forward, sideways, and diagonally—that self-propels through the pipe using reactive force.
- High impact jets effectively remove scale and debris from inside the pipes.

#### [STANDARD PRESSURE]

Not specified, the RSP series is a made-to-order nozzle.

#### [APPLICATIONS]

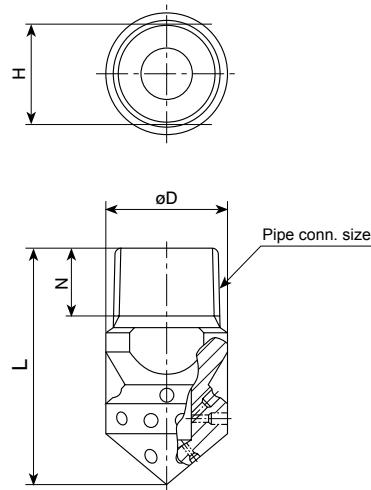
Cleaning the inside of pipes, water and sewage drains, tubes of heat exchangers and cooling machines  
Removing scale and rust

Structure	• One-piece structure, made of metal.
Material	• S303 SPECIAL ORDER MATERIAL: S420J2

Pipe conn. size	Dimensions (mm)				Weight (g)
	L	H	øD	N	
R1/8	26	10.5	12	7	14
R1/4	34	14	17	9	30
R3/8	38	16	19	11	48
R1/2	42	22	25	14	88

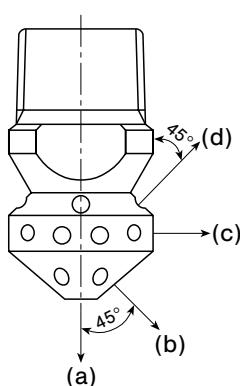
[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

#### DRAWING



#### HOW TO ORDER

The RSP series is made-to-order. Please select pipe connection size, orifice diameter, and the number of orifices for each direction according to **HOW TO SELECT RSP SERIES** on the next page.



Example: 1/2M RSP 0.6 + 0.6x3 / 0.6x4 + 0.6x4 S303

1/2M RSP 0.6 + 0.6x3 / 0.6x4 + 0.6x4 S303

A + B × N<sub>1</sub> / C × N<sub>2</sub> + D × N<sub>3</sub> Material

Pipe conn.  
size\*

- 1/8M
- 1/4M
- 3/8M
- 1/2M

A: Orifice diameter for directions (a)

B: Orifice diameter for directions (b)

C: Orifice diameter for directions (c)

D: Orifice diameter for directions (d)

N<sub>1</sub>–N<sub>3</sub>: Number of orifices for each direction

[Note] To indicate that there are no orifices in a certain direction, use "0".

For example, if there are 6 orifices of diameter 0.7 mm for direction (d) only, the nozzle description would be:

1/8M RSP 0 + 0 / 0 + 0.7x6 S303

\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/8M = R1/8.

**HOW TO SELECT RSP SERIES****1. Pipe connection size**

Refer to the table to select the pipe connection size suitable for the spray capacity required.

Pipe conn. size	Max. spray capacity by pipe connection size (L/min)								
	1 MPa	3 MPa	5 MPa	7 MPa	10 MPa	15 MPa	20 MPa	25 MPa	30 MPa
R1/8	14	24	31	37	44	54	62	70	76
R1/4	56	96	124	147	176	216	249	278	305
R3/8	56	96	124	147	176	216	249	278	305
R1/2	61	105	135	160	191	234	270	302	331

**2. Orifice diameter and the number of orifices**

Refer to the table to select the orifice diameter and the number of orifices required.

Orifice diameter (mm)	Spray capacity per one orifice (L/min)								
	1 MPa	3 MPa	5 MPa	7 MPa	10 MPa	15 MPa	20 MPa	25 MPa	30 MPa
0.6	0.4	0.7	0.9	1.1	1.3	1.6	1.9	2.1	2.3
0.7	0.6	1.0	1.3	1.5	1.8	2.2	2.5	2.8	3.1
0.8	0.7	1.3	1.7	2.0	2.3	2.9	3.3	3.7	4.1
0.9	0.9	1.6	2.1	2.5	3.0	3.6	4.2	4.7	5.1
1.0	1.2	2.0	2.6	3.1	3.7	4.5	5.2	5.8	6.4
1.2	1.7	2.9	3.7	4.4	5.3	6.5	7.5	8.3	9.1
1.5	2.6	4.5	5.8	6.9	8.2	10.1	11.7	13.0	14.3
2.0	4.6	8.0	10.4	12.3	14.7	18.0	20.7	23.2	25.4

**3. Spray direction and the number of orifices in each direction**

Refer to the table and specify the desired number of orifices in each direction (b), (c), and (d).

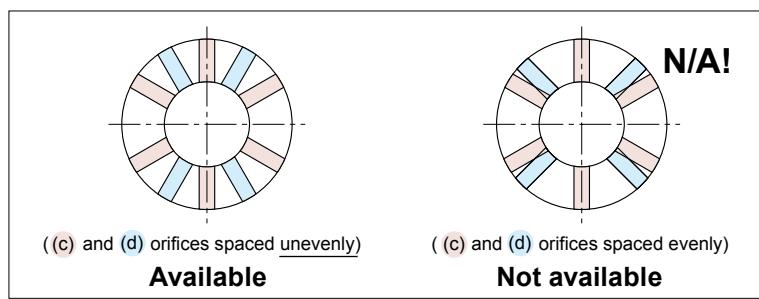
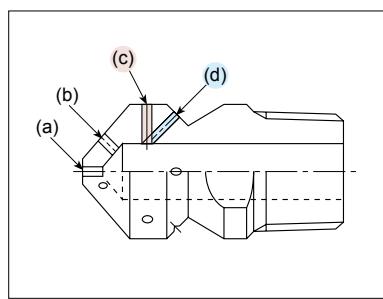
Pipe conn. size	Max. number of orifices in the direction of (b), [(c)+(d)] (see Remarks)							
	ø0.6	ø0.7	ø0.8	ø0.9	ø1.0	ø1.2	ø1.5	ø2.0
R1/8	6	6	6	6	6	4	—	—
R1/4	10	10	10	10	10	8	8	—
R3/8	10	10	10	10	10	8	8	6
R1/2	12	10	10	10	10	8	8	6

**Remarks**

- The number of orifices in direction (b), referred to as N1 on the previous page, should not exceed the value in the above table.
  - The total number of orifices in directions (c) + (d) should not exceed the value in the above table.
  - Odd numbers, except three (3), are not recommended. Seven (7) is not acceptable.
  - The numbers of orifices for (c) and (d), referred to respectively as N2 and N3 on the previous page, should be the same or one should be a multiple number of the other.
- For any other combinations, please contact us.

**Note**

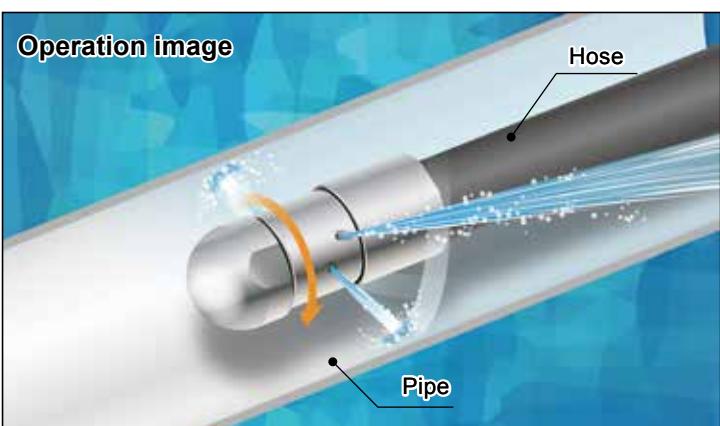
Should the numbers for (c) and (d) be 6 and 4, it is possible to make, but orifices for (c) and (d) are not evenly spaced. Please refer to the sketch below.



# High-Pressure Rotating Pipe Cleaning Nozzles

RSP-R

Operation image



- Self-propelled in the pipe and rotating due to spray reaction force.
- Rotating solid stream jets with a high spray impact thoroughly clean the inner surface of a pipe.
- Compact design, made of special stainless steel with excellent wear resistance.

[STANDARD PRESSURE]

1.0 MPa

[APPLICATIONS]

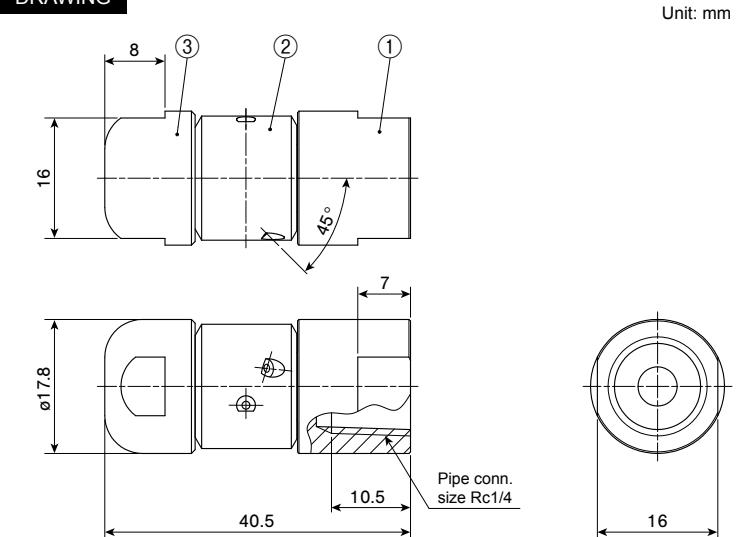
Cleaning the inside of pipes, water and sewage drains, tubes of heat exchangers and cooling machines  
Removing scale and rust

Structure	<ul style="list-style-type: none"> <li>• Made of metal.</li> <li>• Includes a connecting adaptor, nozzle body, and cap.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• HS (Hardened stainless steel)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• 40g</li> </ul>

Max. temperature: 150°C

Max. operating pressure: 10.0 MPa

DRAWING

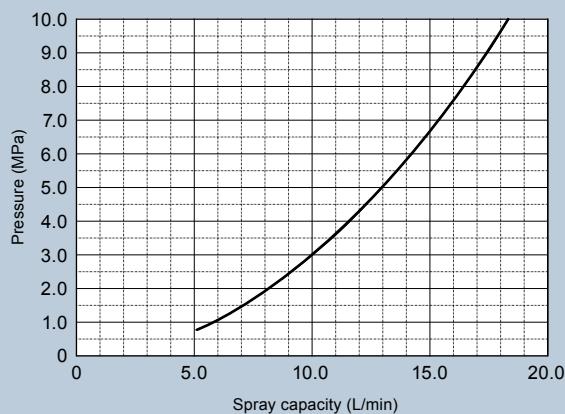


①Connecting adaptor ②Nozzle body (rotating part) ③Cap (bearing)

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Spray capacity (L/min)			
1 MPa	2 MPa	5 MPa	10 MPa
5.8	8.2	13.0	18.3

FLOW-RATE DIAGRAM



HOW TO ORDER

Please inquire or order using this product code.

1/4F RSP 58R HS

Pipe conn.  
size\*

Spray capacity  
code

Material

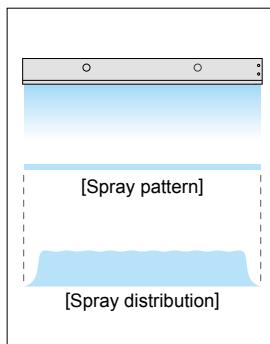
\*"F" indicates female thread ("Rc" of the ISO standard), e.g. 1/4F = Rc1/4.

# Surface Washing Nozzles

Series	Picture	Features	Applications
<b>Surface washing nozzles</b>		<ul style="list-style-type: none"><li>• Produces solid stream spray from a hemispherical nozzle body in a radial pattern.</li><li>• High impact solid streams effectively stir the sand filter bed in water.</li></ul>	<ul style="list-style-type: none"><li>• Cleaning sand filter bed at water purification plant</li></ul>

# Slit Nozzles

## SLNH-H/SLNHA-H



- Water or air sprayed from slit nozzles is uniform in width direction.
- SLNH-H series for liquid spraying with even spray flow distribution.
- SLNHA-H series for air spraying with even spray impact distribution.
- Thin liquid film spray saves cost for chemicals and water.

### [APPLICATIONS]

Blow-off drying, cleaning, developing, etching

Material • S304 or PVC

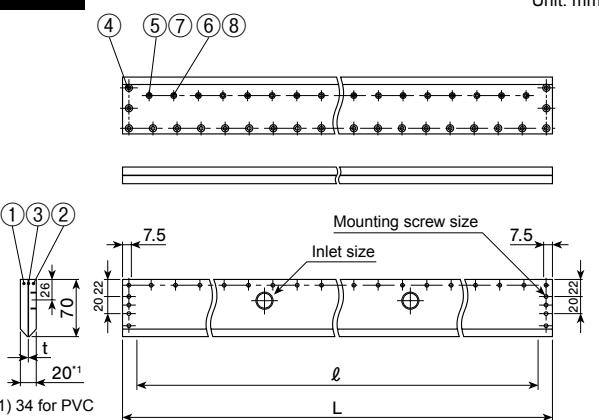
Series	Slit length <i>l</i> (mm)	Slit opening <i>t</i> (mm)	Effective liquid film width (mm) at 10 mm height	Number of inlets	Thread size		Total length <i>L</i> <sup>2</sup> (mm)	Weight (kg)			
					Inlet	Mounting		S304	PVC		
SLNH-H (Liquid spraying)	460	0.1	410	2	Rc3/8	S304: M5 (depth 8 mm)	490	4.3	1.3		
	600		550				630	5.5	1.6		
	700		650				730	6.4	1.9		
	780		730				810	7.1	2.1		
	1,200	0.3	1,150	3	Rc1/2	PVC: M5 (depth 10 mm)	1,230	11.0	3.1		
	460		410	2			490	4.3	1.3		
	600		550	3			630	5.5	1.6		
	700		650	4			730	6.4	1.9		
	780		730	4			810	7.1	2.1		
	1,200		1,150	5			1,230	11.0	3.1		
SLNHA-H (Air spraying)	530	0.1	—	2	Rc3/8	S304: M5 (depth 10 mm)	560	5.0	1.5		
	700		—				730	6.5	1.9		
	810		—				840	7.5	2.2		
	900	0.3	—	Rc1/2			930	8.0	2.5		
	1,400		—				1,430	12.0	4.0		

\*2) S304: Customizable total length from 250 mm to 3,950 mm.

PVC: Customizable total length from 250 mm to 2,950 mm.

[Note] Appearance and dimensions are subject to change due to product improvement.

### DRAWING



- ① Body plate A (S304) ② Body plate B (S304) ③ Packing (PE)  
 ④ Bolt [M5x10] (S304 equivalent) ⑤ Bolt [M4x8] (S304 equivalent)  
 ⑥ Bolt [M4x10] (S304 equivalent) ⑦ O-ring [P4] (FKM) ⑧ O-ring (FKM)

The above drawing is of the stainless steel SLNH-H series with slit length of 1500 mm or less.

Series	Slit length (mm)	Slit opening (mm)	Spray capacity (L/min) <sup>3</sup>								
			0.01 MPa	0.02 MPa	0.03 MPa	0.04 MPa	0.05 MPa	0.06 MPa	0.07 MPa	0.08 MPa	0.1 MPa
SLNH-H (Liquid spraying)	0.1	460	7.2	10.7	13.4	15.7	17.8	19.7	21.4	23.1	26.1
			9.4	13.9	17.4	20.5	23.2	25.7	27.9	30.1	34.1
			11.0	16.2	20.3	23.9	27.0	29.9	32.6	35.1	39.7
			12.3	18.1	22.7	26.6	30.1	33.3	36.3	39.1	44.3
			18.9	27.8	34.9	40.9	46.4	51.3	55.9	60.2	68.1
	0.3	460	21.7	32.0	40.1	47.1	53.3	59.0	64.3	69.2	78.3
			28.3	41.7	52.3	61.4	69.5	77.0	83.8	90.3	102
			33.0	48.7	61.0	71.7	81.1	89.8	97.8	105	119
			36.8	54.2	68.0	79.8	90.4	100	109	117	133
			56.6	83.4	105	123	139	154	168	181	204
SLNHA-H (Air spraying)	0.1	530	201	353	465	564	656	736	812	884	1,011
		600	265	466	614	745	867	972	1,072	1,168	1,335
		700	306	539	710	862	1,003	1,125	1,240	1,351	1,545
		810	341	599	789	958	1,114	1,250	1,378	1,502	1,717
		900	530	932	1,228	1,491	1,733	1,945	2,144	2,336	2,671

\*3) The above spray capacity indicates liquid flow rate for the SLNH-H series, and air flow rate for the SLNHA-H series.

▪ The measure for air flow rate is L/min at normal conditions (0°C, 1 atm).

▪ The above spray capacities are for reference only and subject to design changes.

### HOW TO ORDER

Total length can be tailored to your needs within the customizable range (see \*2 above). Inquiry drawing forms for each series and material are available to verify dimensional specifications. Contact us for details.

These nozzle series are made-to-order.

# Slit Nozzles

SLNH-K

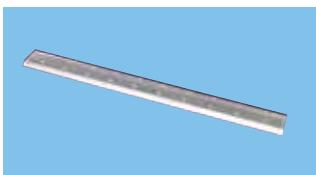
**SLNH-K SERIES for Etching/Developing** Made-to-Order

Picture	Features	Applications
	<ul style="list-style-type: none"> <li>• Made of PVC.</li> <li>• Quick on/off spray response.</li> <li>• No bolts in the liquid flow path, ensuring smooth spray formation of a liquid film.</li> </ul>	<ul style="list-style-type: none"> <li>• Developing solution coating</li> <li>• Etching solution coating</li> <li>• Water curtain</li> </ul>

We offer a wide range of slit nozzles for air blowing. For more details, please refer to our Air Nozzle Catalog.

**SLNHA-NA SERIES**

No need to adjust the slit after maintenance, enabling self-maintenance.

**SLNB SERIES**

Blower-type air slit nozzle uses only one-third of the energy compared to compressed air nozzles.

**SAP SERIES**

Compact design, ideal for tight spaces. Can be used with either compressor or blower air.

**VZ SERIES**

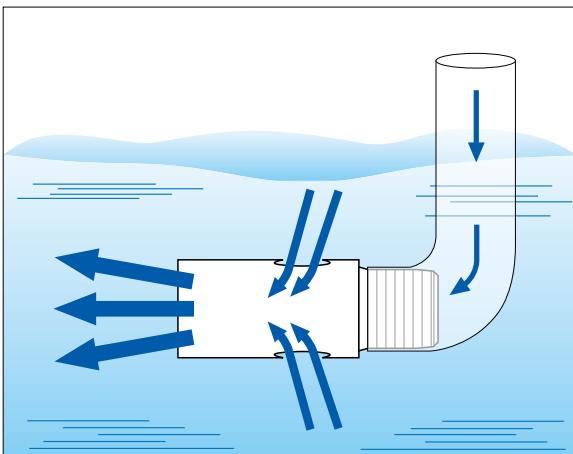
Flat blow pattern with a wide angle. Steam spraying is also possible.



# Ejector Nozzles for Solution Agitation

Some Models are Made-to-Order

**EJX**



- EJX shoots out 3 to 4 times the amount of liquid supplied, by suctioning additional liquid from its surroundings through negative pressure.
- Simple one-piece structure with a compact, lightweight design.

#### [STANDARD PRESSURE]

0.05 MPa

#### [APPLICATIONS]

- Solution agitation (even mixing, preventing deposition)
- Cleaning in liquids
- Submerged etching and plating

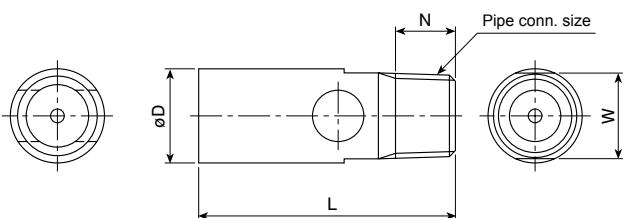
Structure	• One-piece structure, made of metal or plastic.
Material	<ul style="list-style-type: none"> <li>• S303 (S304 for sizes R1 and R1 1/2)</li> <li>• PP (PVC for sizes R1 and R1 1/2)</li> </ul>

Pipe conn. size	Dimensions (mm)				Weight (g)	
	L	W	øD	N	S303 S304	PP PVC
R1/8	30	10 (11) <sup>2</sup>	11	7	11	1.3 <sup>1</sup>
R1/4	48	14 (16) <sup>2</sup>	16	10.5	26	3.2 <sup>1</sup>
R3/8	72	22	24	11	80	10
R1/2	93	27	31	14	170	20
R3/4	126	34	42	15	420	48
R1	172	60	76.3 (80) <sup>2</sup>	18	2,200	460
R1 1/2	212	80	89.1 (90) <sup>2</sup>	20	3,200	540

\*1) Sizes R1/8 and R1/4 are made of PP and are injection molded.

\*2) Dimensions in ( ) show those of plastic EJX series nozzles.

#### DRAWING



[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

Supplied volume code	Pipe conn. size <sup>3</sup>	Supply flow rate (L/min)						Discharge flow rate (L/min) [Reference only]						Free passage diameter (mm)
		0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	
1	R1/8	0.85	1.10	1.56	1.91	2.20	2.69	2.2	3.1	5.0	6.6	9.2	10	1.4
4	R1/4	3.10	4.00	5.66	6.93	8.00	9.80	8.1	11	18	24	34	38	2.9
9	R3/8	6.97	9.00	12.7	15.6	18.0	22.0	18	26	41	54	75	85	4.3
16	R1/2	12.4	16.0	22.6	27.7	32.0	39.2	33	46	72	95	134	151	5.7
30	R3/4	23.2	30.0	42.4	52.0	60.0	73.5	61	86	140	180	250	280	7.9
90	R1	69.7	90.0	127	156	180	220	180	260	410	540	760	850	13.5
160	R1 1/2	124	160	226	277	320	392	330	460	720	950	1,340	1,510	17.9

\*3) The EJX series with thread size R1 and R1 1/2 are made-to-order.

#### HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

Example: 3/8M EJX 1- 9 PP

3/8M EJX 1 - 9 PP

Pipe conn.  
size<sup>4</sup>

1/8M

1\*1/2M

Supplied  
volume  
code

1

160

Material

S303

S304 (for sizes 1M and 1\*1/2M)

PP

(PP-IN for sizes 1/8M and 1/4M)

PVC (for sizes 1M and 1\*1/2M)

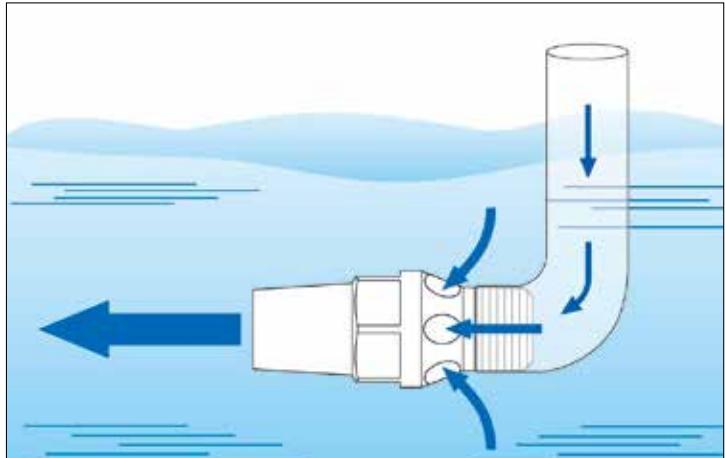
\*4) "M" indicates male thread ("R" of the ISO standard), e.g. 1\*1/2M = R 1 1/2.

Sizes R1 and R1 1/2 are made-to-order.

# High Flow Rate Ejector Nozzles for Solution Agitation

Made-to-Order

**EJX-H**



- High flow rate EJX series effectively agitates liquids for cleaning and promoting reactions, featuring 1.5-2 times higher spray impact (flow velocity) compared to the conventional EJX series.

## [STANDARD PRESSURE]

0.1 MPa

## [APPLICATIONS]

- Solution agitation (even mixing, preventing deposition)
- Cleaning in liquids
- Submerged etching and plating

Structure	• One-piece structure, made of plastic.
Material	• PP

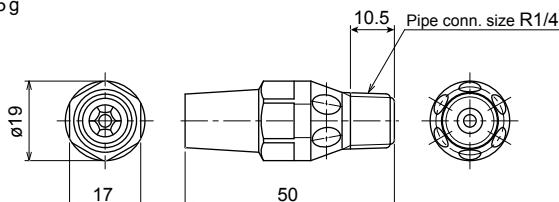
Pipe conn. size	Dimensions (mm)				Weight (g)
	L	øD1	øD2	N	
R1/2	110	32	25	14	30
R3/4	160	45	41	15	90

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.

## DRAWING

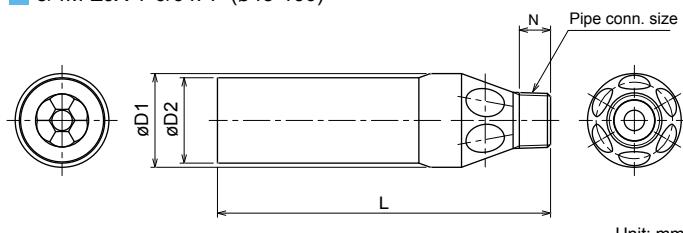
■ 1/4M EJX 1\*0/5.8PP-IN (ø19-50, ø6)

Weight: 5 g

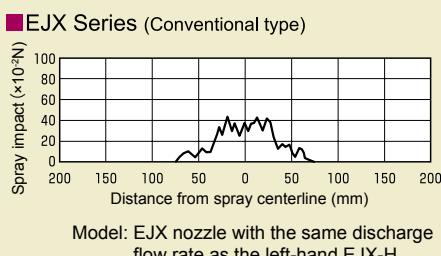
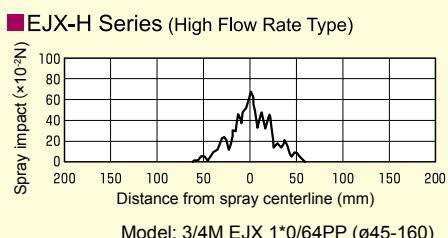


■ 1/2M EJX 1\*0/22PP (ø32-110)

■ 3/4M EJX 1\*0/64PP (ø45-160)



## SPRAY IMPACT COMPARISON



■ Measurement conditions  
Spray pressure: 0.1 MPa  
Supply flow rate: 64 L/min  
Measurement distance: 300 mm  
Spray impact value: Total spray impact measured by a ø3 mm contact terminal

Product description	Supply flow rate (L/min)						Discharge flow rate (L/min) [Reference only]						Free passage diameter (mm)
	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	
1/4M EJX 1*0/5.8PP-IN (ø19-50, ø6)	3.20	4.00	5.80	7.10	8.20	10.0	10.5	13.4	18.8	23.2	27.0	34.5	2.8
1/2M EJX 1*0/22PP (ø32-110)	12.0	16.0	22.0	27.5	32.0	39.0	36.0	47.0	73.0	95.0	111	134	5.5
3/4M EJX 1*0/64PP (ø45-160)	36.0	46.0	64.0	77.0	90.6	109	103	140	206	260	301	380	9.1

## HOW TO ORDER

Please use these product codes for inquiries and orders.

- 1/4M EJX 1\*0/5.8PP-IN (ø19-50, ø6)
- 1/2M EJX 1\*0/22PP (ø32-110)
- 3/4M EJX 1\*0/64PP (ø45-160)

"M" in the nozzle description indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

This nozzle series is made-to-order.

# Two-Way and Slit Jets for Solution Agitation

Made-to-Order

**EJX-2/EJX-S**

## EJX-2 Series: Two-Way Jet



- Two-way spray from a single nozzle with an approximately 45-degree angle between the two streams.

### [STANDARD PRESSURE]

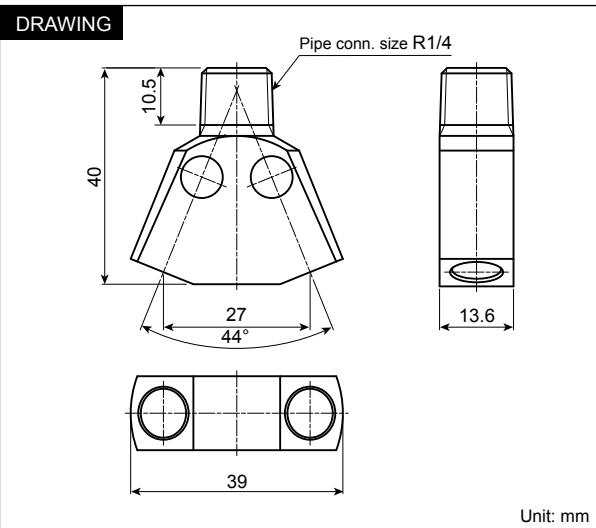
0.05 MPa

### [APPLICATIONS]

- Solution agitation (even mixing, preventing deposition)
- Cleaning in liquids
- Submerged etching and plating

Structure	• One-piece structure, made of plastic or metal.
Material	• PP or S303
Weight	• PP: 7 g, S303: 60 g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



## EJX-S Series: Slit Jet



- Slit-type ejector nozzle that boosts spray volume by drawing in surrounding liquid and ejecting it through a 70-mm slit.

### [STANDARD PRESSURE]

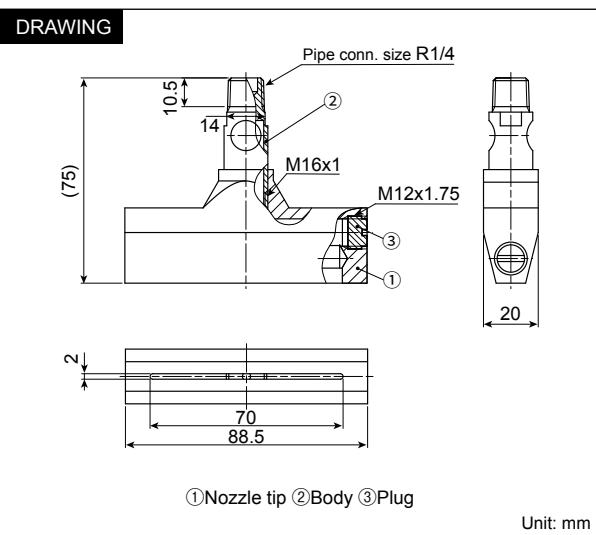
0.05 MPa

### [APPLICATIONS]

- Solution agitation (even mixing, preventing deposition)
- Cleaning in liquids
- Submerged etching and plating

Structure	• Consists of a nozzle tip, body, and plug.
Material	• PP or S303
Weight	• PP: 30 g, S303: 264 g

[Note] Appearance and dimensions may differ slightly depending on material and nozzle code.



Series	Nozzle Code	Supply flow rate (L/min)						Discharge flow rate (L/min) [Reference only]						Free passage diameter (mm)
		0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	
EJX-2	2-3	2.32	3.00	4.24	5.20	6.00	7.35	6.6	10	14	18	21	25	1.4
EJX-S	S70 x 2-4	3.10	4.00	5.66	6.93	8.00	9.80	9.5	12	16	20	23	28	1.9

## HOW TO ORDER

To inquire about or order a specific nozzle please refer to this coding system.

### EJX-2 Two-Way Jet

Example: 1/4M EJX 2-3 PP

1/4M EJX 2-3 PP  
Pipe conn. size\*

Material  
S303  
PP

### EJX-S Slit Jet

Example: 1/4M EJX S70 x 2-4 PP

1/4M EJX S70 x 2-4 PP  
Pipe conn. size\*

Material  
S303  
PP

\*"M" indicates male thread ("R" of the ISO standard), e.g. 1/4M = R1/4.

These nozzle series are made-to-order.

# Universal Ball Joints

UT



Metal UT with spray nozzle



Plastic UT with spray nozzle

- Allows for precise alignment and adjustment of the nozzle and spray direction after installation within a range of 50°.

## Metal UT Ball Joints

- Accurate nozzle alignment is possible after connecting to a pipe.
- Available in variety of pipe connection sizes from 1/8" to 3/4".
- Stainless steel UT Ball Joints are designed to withstand pressures up to 15 MPa.

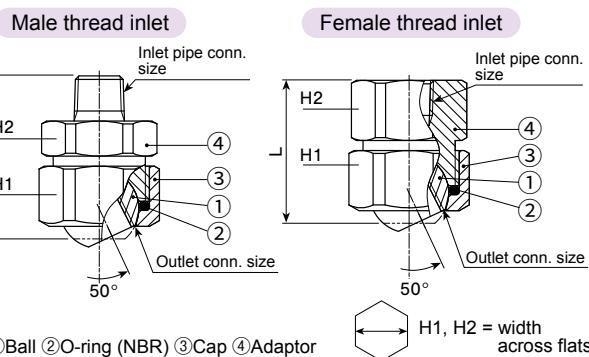
## Plastic UT-FRPP Ball Joints

- Spray direction is adjustable while spraying at a pressure up to 0.3 MPa.
- Easy installation, no tools required. No O-ring.
- Cost saving, injection-mold construction.
- Lightweight, weighing less than half of the metal ball joint.

### UT SERIES (metal)

Material	• S303 or B (brass) SPECIAL ORDER MATERIAL: S316 or others
----------	---

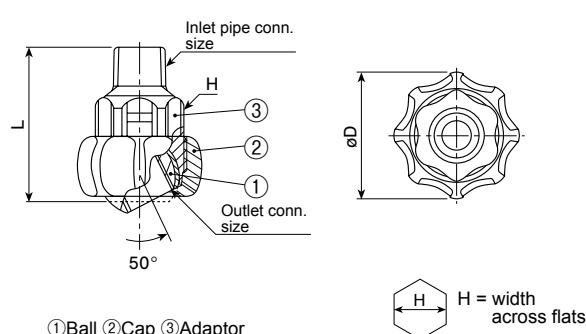
#### DRAWING



### UT SERIES (plastic)

Material	• Adaptor and Cap: FRPP • Ball: FRPP + PP + EPDM
----------	---

#### DRAWING



Ball joint code (Inlet x Outlet)	Inlet pipe conn. size	Outlet conn. size	Dimensions (mm)			Weight (g)
			L	H1	H2	
UT 1/8M × 1/8F	R1/8	Rc1/8	32.5	22	21	56
UT 1/4M × 1/8F	R1/4	Rc1/8	36.0	22	21	60
UT 1/4M × 1/4F	R1/4	Rc1/4	39.5	29	24	100
UT 3/8M × 1/4F	R3/8	Rc1/4	40.0	29	24	110
UT 3/8M × 3/8F	R3/8	Rc3/8	47.5	35	30	190
UT 1/2M × 1/2F	R1/2	Rc1/2	54.5	41	41	325
UT 3/4M × 3/4F	R3/4	Rc3/4	61.5	50	46	490
UT 1/8F × 1/8F	Rc1/8	Rc1/8	28.5	22	21	63
UT 1/4F × 1/8F	Rc1/4	Rc1/8	28.5	22	21	58
UT 1/4F × 1/4F	Rc1/4	Rc1/4	33.5	29	24	110
UT 3/8F × 1/4F	Rc3/8	Rc1/4	33.5	29	24	100
UT 3/8F × 3/8F	Rc3/8	Rc3/8	44.5	35	30	220
UT 1/2F × 1/2F	Rc1/2	Rc1/2	48.5	41	41	375
UT 3/4F × 3/4F	Rc3/4	Rc3/4	55.5	50	46	560

Note: UT-B (brass) series are not available for sizes of "—" in the weight column.

#### HOW TO ORDER

To inquire about or order a specific metal ball joint please refer to this coding system.

Example: UT 1/8M × 1/8F S303

UT	1/8M	×	1/8F	S303
Inlet pipe connection size*	1/8M	Outlet connection size*	1/8F	Material
1/8M	1/8F	1/8F	1/8F	S303
1/4M	1/4F	1/4F	1/4F	B
3/8M	3/8F	3/8F	3/8F	
1/2M	1/2F	1/2F	1/2F	
3/4M	3/4F	3/4F	3/4F	

\*"M" indicates male thread ("R" of the ISO standard) and "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/8M = R1/8, 1/8F = Rc1/8.

#### HOW TO ORDER

To inquire about or order a specific plastic ball joint please refer to this coding system.

Example: UT 1/8M × 1/8F FRPP-IN

UT	1/8M	×	1/8F	FRPP-IN
Inlet pipe connection size*	1/8M	Outlet connection size*	1/8F	Material
1/8M	1/8F	1/8F	1/8F	
1/4M	1/4F	1/4F	1/4F	

\*"M" indicates male thread ("R" of the ISO standard) and "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/8M = R1/8, 1/8F = Rc1/8.



#### Cautions

**Metal UT** Use UT-S303 only at pressures below 15 MPa, UT-B (brass) below 4 MPa.

**Plastic UT** Use UT-FRPP only at pressures below 1 MPa (at room temperature).

- Do not use UT ball joint adaptors if sudden changes in water pressure can occur.
- A different type of UT Ball Joints is required for the KB series or other nozzles with parallel pipe threads. Contact us for details.

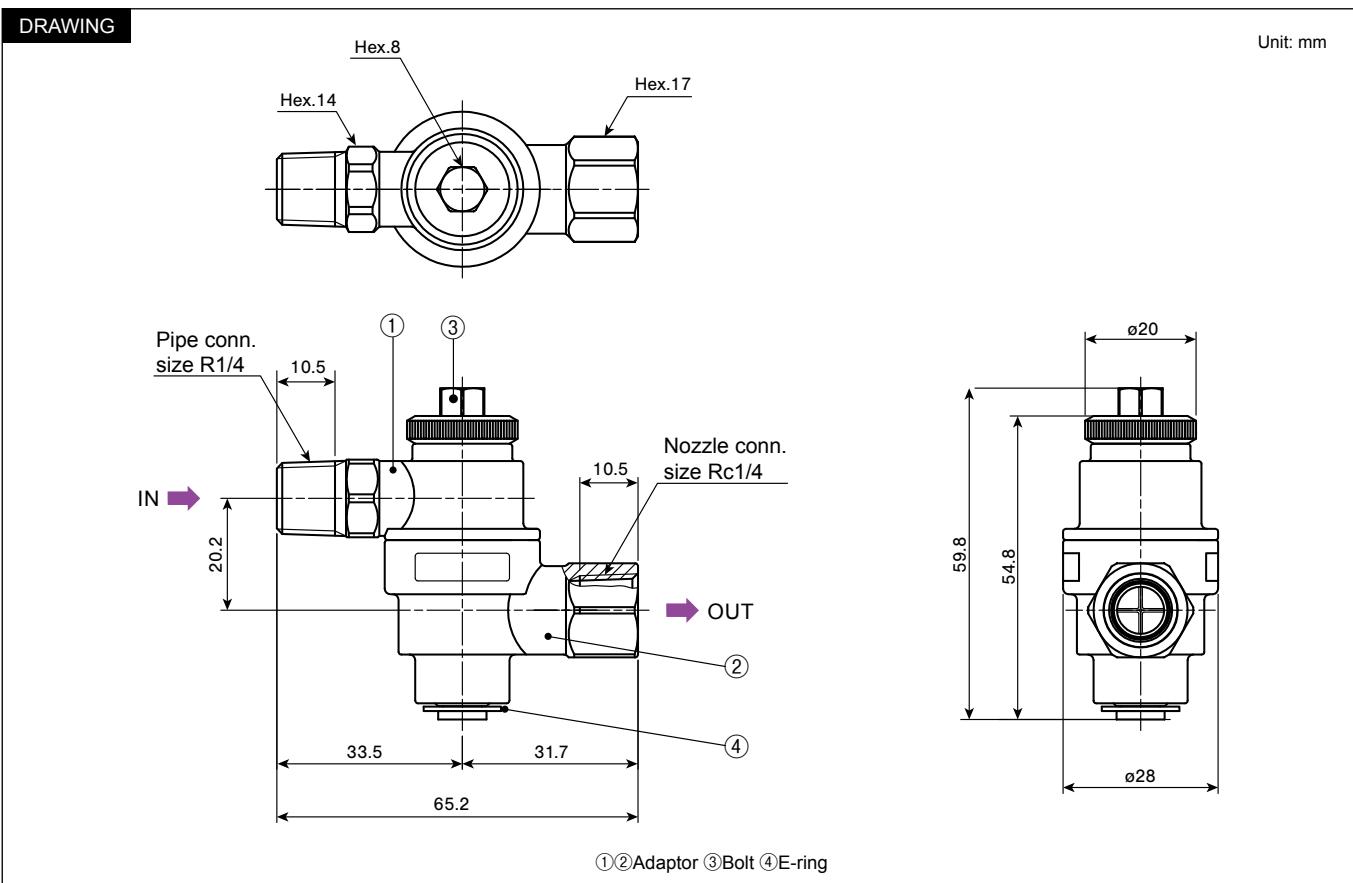
# 360° Rotatable Universal Joints

**WUT**



- Able to rotate 360° to adjust the spray direction. Desired position can be locked in place with bolt.
- Stabilizing function suppresses internal turbulences.
- Withstands pressures of up to 3.0 MPa.
- Safe design prevents parts from falling off when the lock is released.
- R1/4 threaded nozzle is attachable.

Material	<ul style="list-style-type: none"> <li>• Adaptor: SCS13</li> <li>• Bolt: S303</li> <li>• E-ring: S304 equivalent</li> <li>• O-ring: NBR</li> </ul>
Weight	• 146g



Accessories

## ⚠ Cautions for use

- Hand tightened bolts may loosen if there is a lot of vibration. Tighten with a torque-wrench to 6 N·m.
- Max. operating pressure: 3.0 MPa
- Max. temperature: 90°C
- When used with a solid stream jet nozzle, slightly turbulent flow occurs.

## HOW TO ORDER

Please inquire or order using this product code.

**WUT 1/4M × 1/4F SCS13**

Pipe connection size\*

Nozzle connection size\*

Material

\*"M" indicates male thread ("R" of the ISO standard) and "F" indicates female thread ("Rc" of the ISO standard), e.g. 1/4M = R1/4, 1/4F = Rc1/4.

# Technical Data for Nozzles

## Spray Performance to Consider

### ■ Changes in Spray Pattern According to Water Pressure

The spray pattern describes the cross sectional shape of the spray. By selecting the spray pattern most suitable for the particular application the most efficient spray performance will be achieved.

The spray pattern changes with the gradual increase in spray pressure.

Flat spray



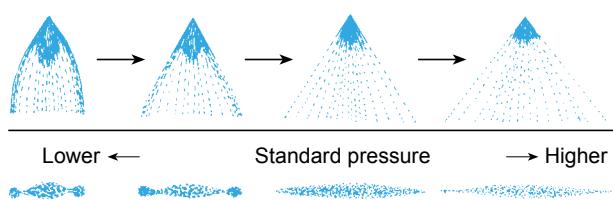
Hollow cone spray



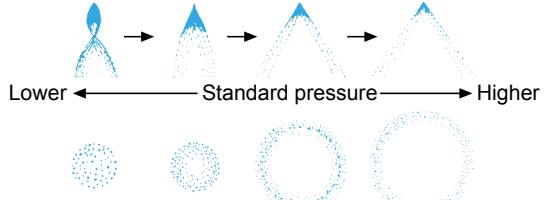
Full cone spray



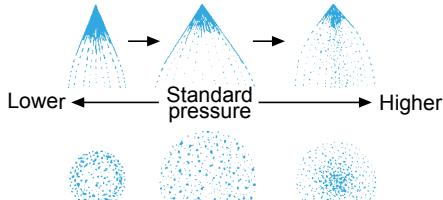
#### ● Changes in Flat Spray Pattern ●



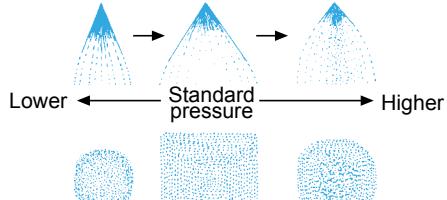
#### ● Changes in Hollow Cone Spray Pattern ●



#### ● Changes in Full Cone Spray Pattern ●



#### ● Changes in Square Full Cone Spray Pattern ●



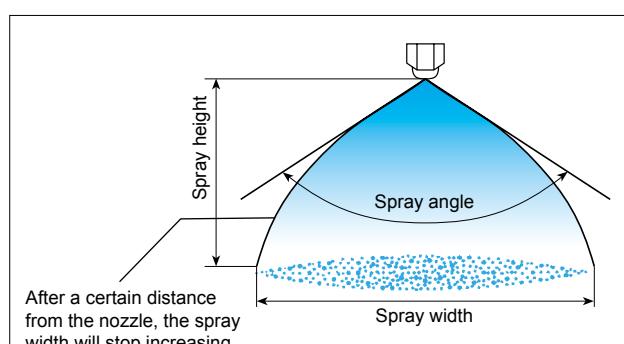
### ■ Spray Angle and Width

The spray angle is the angle of spray measured near the nozzle orifice.

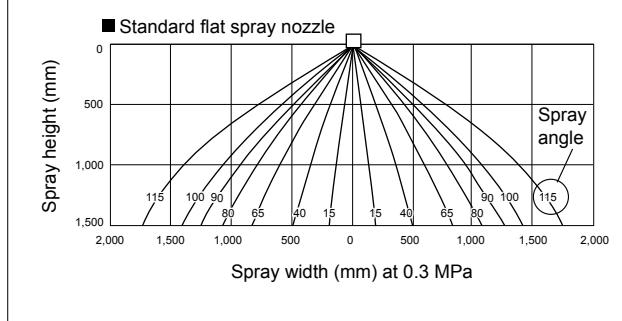
The table below shows the calculated spray width, based on the spray angle.

The spray width varies depending on the spray height. As the spray goes farther from the nozzle, the droplets gradually lose momentum and the covered area will not continue to increase at a certain distance from the nozzle orifice.

Be aware that the actual spray width is smaller than the calculated values. This needs to be considered when designing a nozzle layout.



	Calculated values of spray width (mm)												
Spray height (mm)	150°	140°	130°	115°	100°	90°	80°	65°	50°	40°	25°	15°	12°
10	74.6	54.9	42.9	31.4	23.8	20	16.8	12.7	9.3	7.3	4.4	2.6	2.1
20	149	110	85.8	62.8	47.7	40	33.6	25.5	18.7	14.6	8.9	5.3	4.2
50	373	275	214	157	119	100	83.9	63.7	46.6	36.4	22.2	13.2	10.5
70	522	385	300	220	167	140	117	89.2	65.3	51.0	31.0	18.4	14.7
100	746	549	429	314	238	200	168	127	93.3	72.8	44.3	26.3	21.0
150	1,120	824	643	471	358	300	252	191	140	109	66.5	39.5	31.5
200	1,492	1,099	858	628	477	400	336	255	187	146	88.7	52.7	42.0
250	1,866	1,374	1,072	785	596	500	420	319	233	182	111	65.8	52.6



# Technical Data for Nozzles

## ■ Calculating Spray Capacity

### Spray Capacity vs. Liquid Density

The spray capacities listed in this catalog are based on tap water at room temperature.

The spray capacity changes depending on the liquid density.

In general, the spray capacity increases when either the liquid density decreases or the spray pressure increases.

The spray capacity is inversely proportional to the square root of the liquid density.

To determine the spray capacity of a liquid having density ( $\gamma$ ), multiply the spray capacity value shown in our catalog by  $\frac{1}{\sqrt{\gamma}}$ .

### Spray Capacity vs. Liquid Pressure

The spray capacity increases and decreases proportionally to the square root of the liquid pressure.

If the spray capacity ( $Q_x$ ) at a certain pressure ( $P_x$ ) is not listed in the catalog, an approximate value can be calculated by using the following equation:

$$Q_x = Q \sqrt{\frac{P_x}{P}}$$

P: Known pressure

Q: Spray capacity at the pressure of P (see the catalog table)

P<sub>x</sub>: Pressure to be applied  
Q<sub>x</sub>: Expected spray capacity (approximate value)

Example:

Calculate spray capacity for the capacity code 20 at a pressure of 0.4 MPa.

Spray capacity code	Spray angle (°)		Spray capacity (L/min)			
	0.3 MPa	0.7 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa
20	80	86	1.63	2.00	2.58	3.06
40	80	83	3.27	4.00	5.16	6.11
60	80	83	4.90	6.00	7.75	9.17

$$Q_x = 2.00 \times \sqrt{\frac{0.4}{0.3}} \approx 2.31 \text{ L/min}$$

Enter 0.3 MPa\* as P and 2.00 L/min as Q.  
(\*Select the value nearest to  $P_x$  from the catalog table as P)

## ■ Changes in Spray Distribution

Spray distribution is defined as the distribution of the spray flow in the direction of spray width.

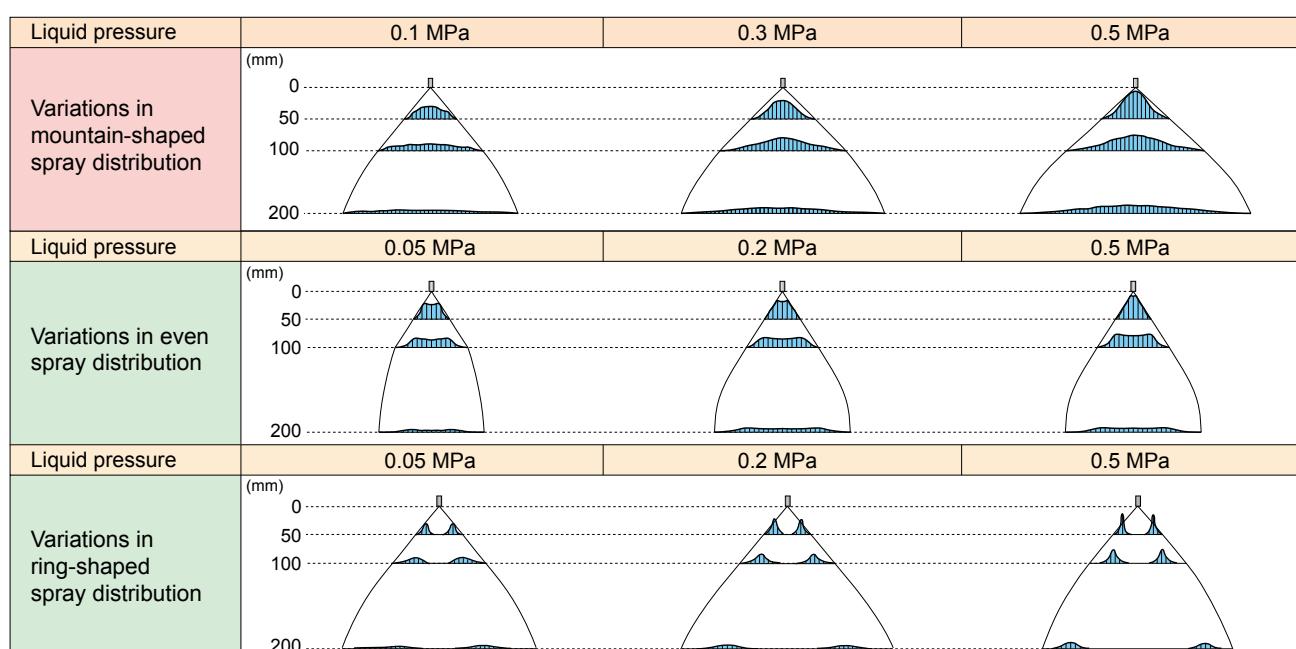
The spray distribution varies depending on the spray height and pressure.



Ring-shaped distribution



Even distribution



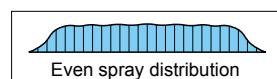
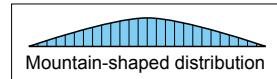
# Technical Data for Nozzles

## ■ Spray Distribution in a Multi-Nozzle Arrangement

The characteristics of the spray distribution differ depending on the type of flat spray nozzle.

A mountain-shaped spray distribution is strong in the center and gradually tapers and weakens towards the edges. It is useful in producing a uniform spray distribution across the entire spray width in a multi-nozzle arrangement by overlaying patterns, but the spray impact is not distributed evenly.

On the other hand, an even spray distribution, produced by an even flat spray nozzle, provides a spray flow rate and impact that is distributed evenly across the entire spray width. This distribution is suitable for cleaning when the cleaning power should be distributed evenly across the entire spray width with a single nozzle.

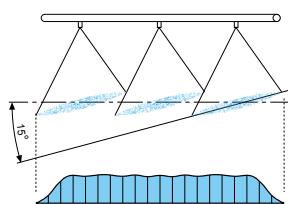


### Standard Flat Spray Nozzle (Mountain-Shaped Distribution)

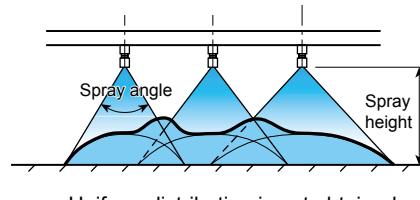
IKEUCHI's standard flat spray nozzles are designed to produce a mountain-shaped distribution in order to obtain a uniform spray distribution in a multi-nozzle arrangement. Spray distribution depends on the spray height, nozzle spacing, liquid pressure and nature, as well as the quality of the nozzles. It is not possible to achieve a uniform spray distribution if the individual nozzles have variations in product quality (see Fig. A).

IKEUCHI guarantees their spray nozzle for spray angle and spray capacity, which makes uniform distribution possible as designed (see Fig. B).

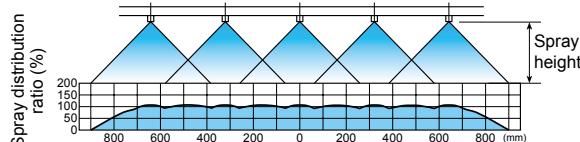
In a multi-nozzle set-up a more even spray distribution can be obtained by arranging the nozzles with an offset angle. This will avoid interferences where sprays would overlap.



(A) Spray distribution of nozzles with no quality guarantee

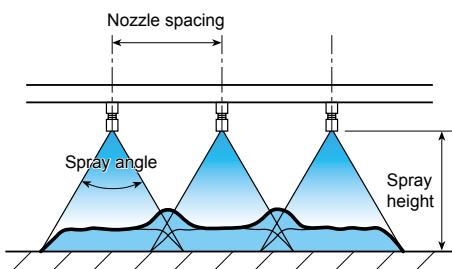


(B) Spray distribution of IKEUCHI nozzles with quality guarantee



When using nozzles with a spray performance guarantee, uniform distribution can be obtained by overlapping mountain-shaped distribution.

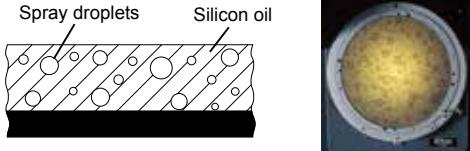
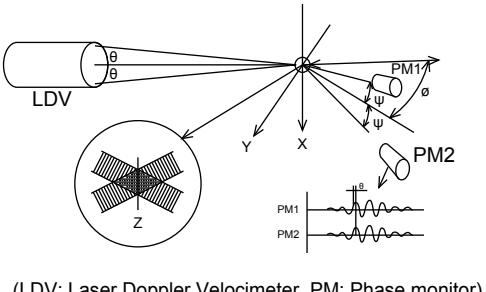
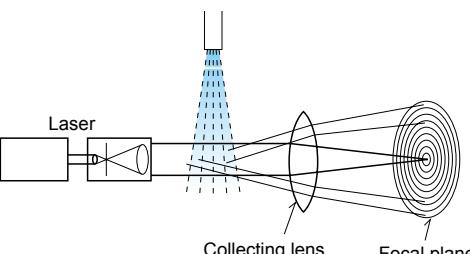
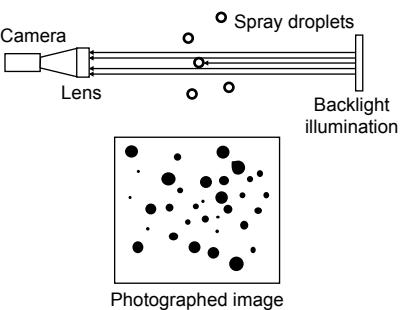
(C) Multi-nozzle arrangement using even flat spray nozzles



# Technical Data for Nozzles

## ■ Methods to Measure Spray Droplet Diameter

We use the immersion sampling method and the laser analyzer method to measure spray droplet size. The values shown for spray droplet diameters in this catalog are measured with the immersion sampling method.

Measuring method	Principle and features	Range of measured droplet size
<b>Immersion Sampling Method</b>		
Droplets are collected on a glass plate coated with silicon oil and a magnified photo is taken immediately for subsequent scanning. The collected droplets remain suspended as perfect circles. This method is less affected by distance and droplet concentration. However, ultra-fine droplets are unable to break the surface tension of the oil and evaporate. This results in an average droplet size larger than the actual value.		10–5,000 µm
<b>Laser Analyzer</b>		
<b>1. Laser Doppler Method</b>	<p>This method forms interference fringes by crossing two laser beams. Then, the spray droplet size is calculated from the phase difference at the time of detecting scattered light, which has resulted from droplets having passed through these interference fringes, by multiple photo detectors provided at a given distance. This method is less affected by droplet concentration because each droplet is measured one by one, while enabling simultaneous measurement of droplet velocity. However, measurement is only possible at a single point in the spray.</p>  <p>(LDV: Laser Doppler Velocimeter PM: Phase monitor)</p>	0.5–2,500 µm
<b>2. Fraunhofer Diffraction Method</b>	<p>A laser beam scatters at the surface of droplets to form a diffracted image behind the droplets due to the interference of the scattered light (Fraunhofer diffraction). This method can simultaneously measure all droplets on the laser beam path, but if the droplet concentration is too high, the laser beam once scattered may be scattered again by other droplets (multiple scattering). This phenomenon may cause the measured droplet size to be smaller than the actual droplet size.</p> 	1–1,000 µm
<b>Shadowgraph Method</b>	<p>Backlight illuminated shadows of droplets in various sizes are photographed and converted to circular shapes, from which the droplet diameters are calculated. This method enables the measurement of non-spherical coarse droplets that cannot be measured by the laser analyzer. However, it is not suitable for measuring fine droplets due to the low magnification of the camera. Also, when the droplets are dense, the overlapped multiple droplets could be measured as a single droplet, thus its droplet size may appear larger than the actual size.</p> 	10–8,000 µm

# Technical Data for Nozzles

## ■ Mean Droplet Diameter

The mean droplet diameter is an important factor in selecting nozzles and designing nozzle-related equipment. It varies depending on the type of spray nozzle, liquid pressure, and spray capacity.

If the spray conditions, such as spray pressure, capacity and angle, are kept the same, the mean droplet diameter of a hollow cone spray nozzle is the smallest among hydraulic nozzles.

The smaller the mean droplet diameter, the larger the surface area that contacts air, increasing the contact efficiency and effect on chemical reactions, absorption, adsorption, etc.

Hollow cone spray nozzles are suitable for cooling and purifying gases, humidifying, and chemical reactions.

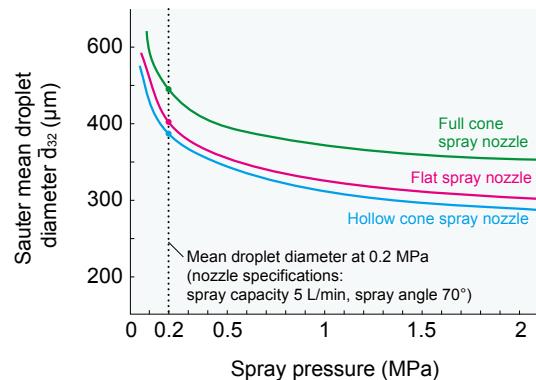
Generally, the following average value models are used for mean droplet sizes:

- Sauter Mean Diameter ( $\bar{d}_{32}$ ) .....  $\sum nd^3 / \sum nd^2$
- Volume Mean Diameter ( $\bar{d}_v$ ) .....  $(\sum nd^3 / \sum n)^{1/3}$
- Mass Median Diameter ( $D_{v.5}$ ) .....  $f_0^{D_{v.5}} dv/v = f_{D_{v.5}}^\infty dv/v = 50\%$

In chemical processes such as cooling, evaporation, combustion and drying, the surface-to-volume ratio, i.e. specific surface area, is used to determine the efficiency.

Because the rate of reaction is influenced more by a small number of large droplets than a large number of small droplets, it is advisable to use the Sauter Mean Diameter as a representative value for the droplet size.

The Sauter Mean Diameter is used most often and is the one used in this catalog.



### ■ Example of calculation of Sauter mean diameter

Range (μm)	Median d (μm)	Quantity n	$nd^2$	$nd^3$
0–100	50	1,664	4,160,000	208,000,000
100–200	150	2,072	46,620,000	6,993,000,000
200–300	250	444	27,750,000	6,937,500,000
300–400	350	161	19,722,500	6,902,875,000
400–500	450	73	14,782,500	6,652,125,000
500–600	550	35	10,587,500	5,823,125,000
600–700	650	17	7,182,500	4,668,625,000
700–800	750	4	2,250,000	1,687,500,000
Total	4,470	133,055,000	3.987275×10 <sup>10</sup>	

$$\bar{d}_{32} = \frac{\sum nd^3}{\sum nd^2} = \frac{3.987275 \times 10^{10}}{133,055,000} = 300 \text{ } \mu\text{m}$$

## ■ Correlation of Spray Droplet Diameter

Results will differ, depending on the method used to measure. If the Sauter mean droplet diameter measured with the immersion sampling method equals 1, as relative coefficient number, this value will be different when measured with other methods, as shown on the right.

Nozzle type \ Measuring method	Immersion sampling method	Fraunhofer diffraction method	Laser Doppler method	Shadowgraph method
Hydraulic spray nozzles	1	0.45	0.7–0.9	0.8–0.9
Pneumatic spray nozzles				

# Technical Data for Nozzles

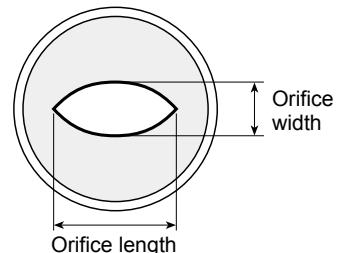
## Spray Nozzle Characteristics

### ■ Free Passage Diameter and Clog Prevention

The free passage diameter gives the approximate minimum dimension for a liquid to freely pass through a nozzle.

#### Flat Spray Nozzle

The flat spray nozzle orifice is cat-eye shaped and the free passage diameter is the orifice width multiplied by a safety factor.

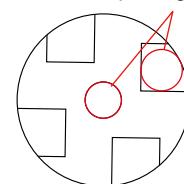


#### Cone Spray Nozzle

The typical full cone spray nozzle includes a whirler which forms a round spray area with uniform distribution. The smallest dimension of liquid passage in the nozzle depends on the whirler.

The diameter of a sphere that can pass through the whirler is defined as free passage diameter.

For hollow cone spray nozzles without whirler and solid stream spray nozzles, the free passage diameter is either the diameter of the nozzle inlet or of the orifice, whichever is smaller.



Either one of these, whichever is smaller, is the free passage diameter

#### Clog Prevention

The whirler is the bottleneck in the liquid passage and where clogging can occur. There are several types of whirlers such as X-shaped, disc-shaped, and spiral shaped.

The X-shaped whirler has the largest free passage diameter and therefore has the least risk of clogging.

The hollow cone spray nozzles AAP (p. 61), the TAA series (p. 63), and the full cone spray nozzles AJP series (p. 84) have no whirler or other obstructions in the nozzle interiors and are therefore the most clog-resistant.

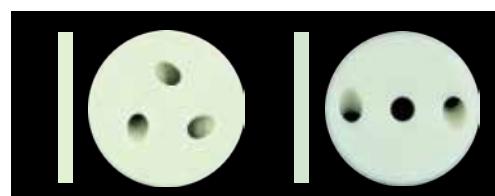
X-shaped whirler



Spiral-shaped whirler



Disc whirler



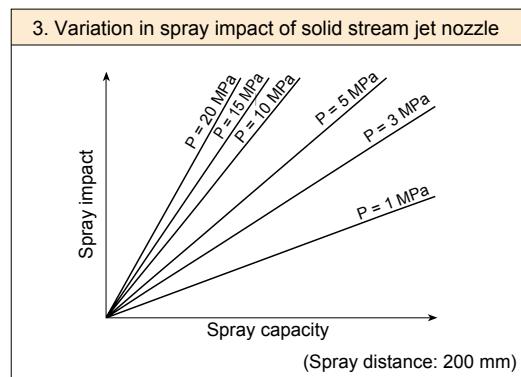
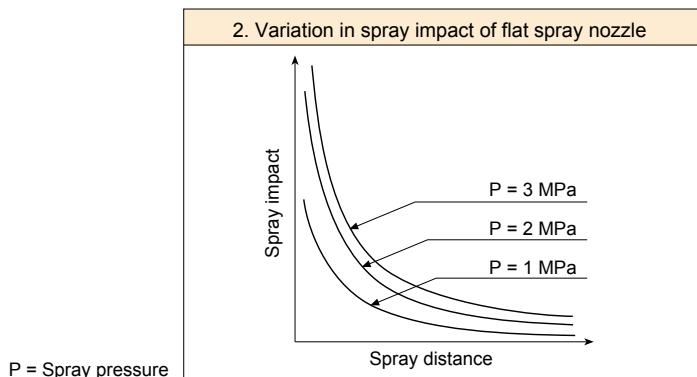
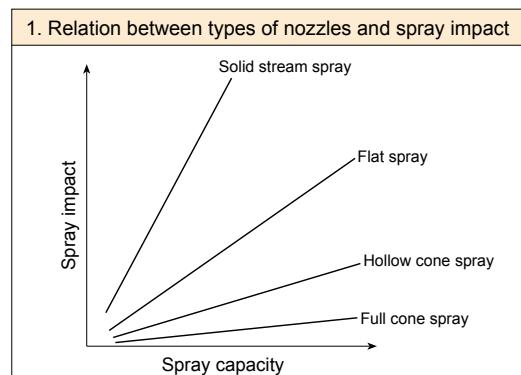
# Technical Data for Nozzles

## Spray Impact

Spray impact describes the force with which the spray droplets hit the target surface. The stronger the spray impact, the better the cleaning effect.

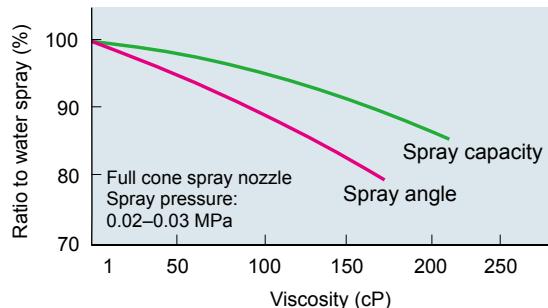
Solid stream jet nozzles have the strongest spray impact (see Fig. 1). The wider the spray angle and the larger the spray area becomes, the weaker the spray impact. The spray impact also decreases as the distance between the nozzle and the object increases (see Fig. 2).

Given the same pressure, the larger the spray capacity the nozzle has, the stronger the spray impact and cleaning effect (see Fig. 3).



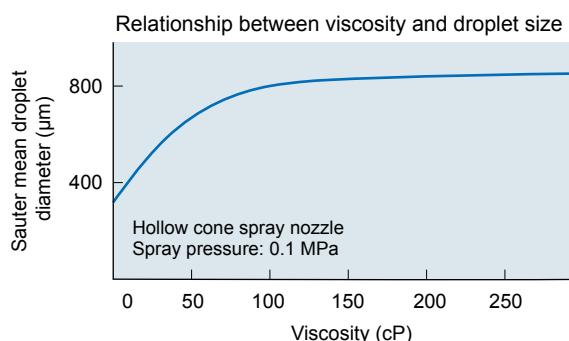
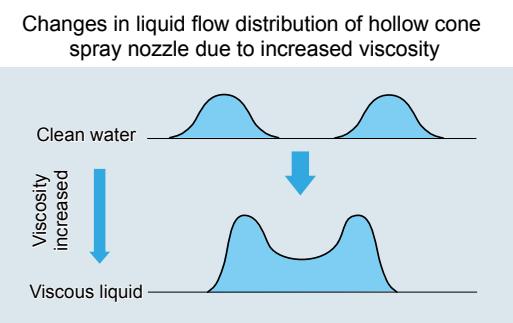
## Viscosity

In general, as the liquid viscosity increases, the spray capacity and angle decrease, the spray distribution loses uniformity and the droplet size increases. High liquid viscosity increases the resistance inside the pipe supplying the nozzle, causing a drop in the liquid pressure which also needs to be considered.



Increased viscosity in hollow cone spray nozzles decreases the movement of the whirler, deteriorating the spray distribution. The spray capacity of a hollow cone spray nozzle increases but the spray angle decreases as the viscosity of the liquid increases.

Please contact us for details as the results may differ depending on the nozzle type.



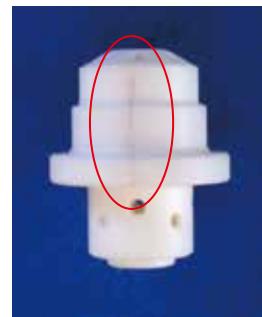
# Technical Data for Nozzles

## ■ Heat Resistance

The temperature a spray nozzle can withstand varies greatly depending on the environmental conditions and the properties of the spray liquid. Please refer to page 7 for the heat resistance of materials. For nozzles including adhesives it is important to also consider the heat resistance of the adhesive.

The ceramic tips of CERJET will crack if abruptly cooled down from high temperatures (200°C). Alumina ceramics will crack due to temperature changes of 100°C or more.

Nozzles made of special materials are available on request.



Nozzle cracked due to abrupt cooling

## ■ Pressure Resistance

Each nozzle series is carefully designed to withstand specific pressures. Depending on the operating system, sudden pressure can be three to five times as much as the spray pressure. Consider measures to prevent these sudden pressure increases or surges in water pressure. For high pressure use, metal nozzles are recommended over plastic nozzles.

### Tightening torque

Cautions for the CERJET nozzles with ceramic orifice:  
Avoid screwing CERJET nozzles in too tight. Possible nozzle body distortions can cause cracks in the ceramic orifice.  
Tighten only to the recommended torque, not exceeding the following values:

8 N·m for size R1/8

15 N·m for size R1/4

(For stainless steel or brass body)

## ■ Chemical Resistance

When spraying chemicals or using spray nozzles in a corrosive environment, chemical-resistant materials should be used to avoid deterioration of nozzles.

Please refer to page 7 for the chemical resistance of materials.

For nozzles including adhesives, also consider the chemical resistance of the adhesive.

Besides the optional materials, nozzles are available in special materials upon request.

### Advantages of Ceramic Nozzle

CERJET is a metal nozzle with a ceramic orifice. The standard material used for the body is stainless steel 303. The ceramic orifice is highly resistant to wear and chemicals, not damaged by most acids and other highly corrosive chemicals, except hydrofluoric acid and alkali liquids of pH12 and above.

However, the epoxy resin adhesive Araldite® is used for bonding the ceramic orifices into the metal body. For those applications possibly corroding adhesives or metal nozzle bodies, it is recommended to use a CERTIIM nozzle, an engineered plastic body molded around a ceramic orifice. CERTIIM includes VP-TPVDF (page 10) and VEP-TPVDF (page 20).

# Technical Data for Nozzles

## ■ Wear Resistance

### Nozzle Wear

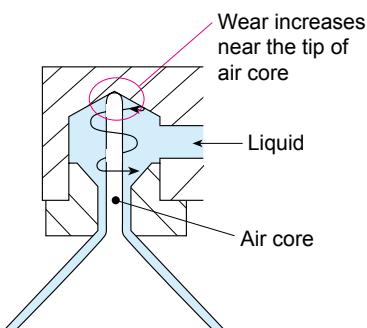
Nozzle tips and orifices are constantly subjected to the flow of high speed liquid exposing them to wear. If the liquid is circulated and re-used, slurry and other dirt particles will enter, wearing tips and orifices out even faster.

Increased wear will narrow the spray angle of a flat spray nozzle and worsen its spray distribution. In high-pressure cleaning, worn nozzles cause the pump pressure to drop and the cleaning effect will rapidly degraded.



Orifice worn out by slurry

In hollow cone spray nozzles an air core is generated in the center of a vortex. This can cause wear at the tip of the air core, especially if the spraying liquid contains slurry or the like. To maintain optimum nozzle performance selecting a wear-resistant material is recommended.



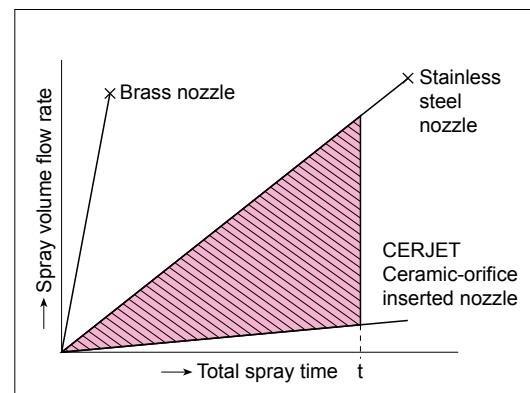
### Difference in Wear Resistance by Material

The figure shows the increase in flow for each nozzle due to worn orifices.

The shaded area indicates the excess spray flow from a stainless steel nozzle relative to a CERJET during the same spray time ( $t$ ).

The ceramic orifice of CERJET spray nozzle has an outstanding wear resistance, with a hardness of 7 on the Mohs scale. It can last 20–30 times longer than stainless steel nozzles and several hundred times longer than brass ones.

CERJET is recommended for applications requiring wear-resistant nozzles, including high-pressure cleaning and for use with liquids containing slurry.



# Technical Data for Nozzles

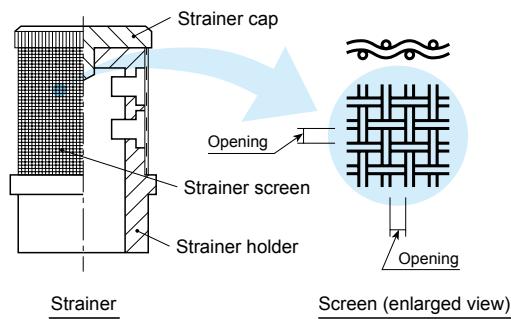
## ■ Strainer

Not all nozzles are equipped with strainers, some nozzles have the option of adding a strainer.

Strainer usually includes a strainer holder, a strainer screen, and a strainer cap.

When ordering a strainer be sure to select an appropriate mesh size according to the free passage diameter of the nozzle.

Strainer screen		Free passage diameter of nozzle (mm)
Mesh size	Opening (mm)	
#200	0.07	Less than 0.3
#150	0.10	0.3 to under 0.5
#100	0.15	0.5 to under 0.8
#50	0.30	0.8 to under 1.0



## ■ Nozzle Reaction Force

When spraying high-pressure water, a reaction force acts in the direction opposite to the direction of spray.

To calculate the approximate reaction force (F) use the following equation.

$$F = 0.745 \cdot Q \cdot \sqrt{P}$$

F: Reaction force (N)  
Q: Spray capacity (L/min)  
P: Spray pressure (MPa)

## ■ Rotation Reaction Force

In a full cone spray nozzle with whirler, a rotation torque (T) is generated as a reaction force to the vortex current produced by the whirler.

Rotation torque acts in the same direction as tightening the nozzle.

The rotation torque (T) can be calculated with the following equation.

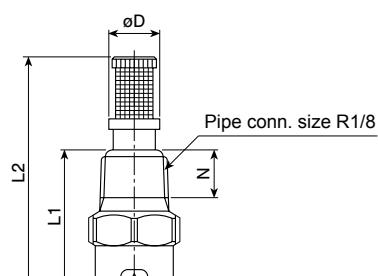
$$T \approx C \cdot Q \cdot D \cdot \sqrt{P}$$

T: Torque (N-m)  
C: Constant  
Q: Spray capacity (L/min)  
D: External diameter of whirler (mm)  
P: Spray pressure (MPa)

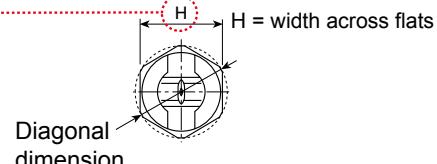
## ■ Diagonal Dimension Calculation

To calculate the approximate diagonal dimension of a hexagon, multiply the width across flats by 1.16.

Example: Drawing of VVP series



Dimensions of VVP series				
Dimensions (mm)				
L1	L2	H	øD	N
18.5	31	12	7.5	6.5



## ■ How to Use the CAD Data Website

Some products have 3D/2D CAD data available for download from the website. Feel free to explore this service. The following is a brief introduction on the use of the CAD data website. Free account registration is necessary to download data and update previews.

### 1. Jump to the Website and Search the Series

#### Via Smartphone

Scan the 2D code on the right.

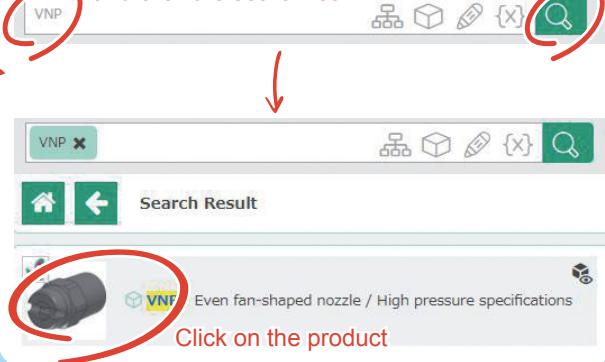


#### Via PC

Access it through the download page of IKEUCHI's website.  
<https://www.dry-fog.com/en/documents/cad/>

Download >  
Catalogs & Leaflets > Case Studies > Instruction Manuals > **3D CAD Models** Digital Catalog >  
<https://www.dry-fog.com/en/>  
Download > 3D CAD Models

Enter the specific nozzle series in the box and click the search icon



### 2. Choose Product Specifications

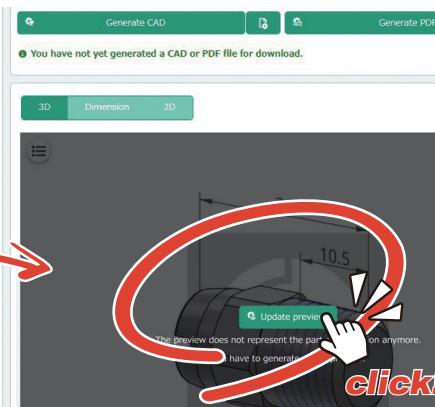
The product page will be displayed.

Select specifications such as thread size, spray angle/capacity code, material, then update the preview.

If a list of items is shown instead of a drop-down, check the circle next to the corresponding product name to select it.

Selectable products: 1	
Company	IKUECHI
Description	VNP - Even fan-shaped nozzle / High pressure specifications
Bill of material	1/8MVNP2599BR-S303
CNSORDERNO Order number	1/8MVNP2599BR-S303
Series	VNP
PCS Pipe conn. size	F1/8
CJA Classification of jet angle	25
SCC Spray capacity code	99
MM Main material	S303
L1 Dimension	16.5
H Dimension	12
N Dimension	7.0
MA Mass	7

The yellow boxes offer different options in the drop-down menus



After selecting the specifications, click here to update the preview

### 3. Generate and Download CAD data

Select the file format for the CAD data in the **Generate CAD** section.

After setting the format, download the data.



## ■ Reference Data

### ■ Conversion of Units

	$\mu\text{m}$	mm	cm	m	in	ft
Length	1	$1\times10^3$	$1\times10^{-4}$	$1\times10^{-6}$	$3.94\times10^{-5}$	$3.28\times10^{-6}$
	$1\times10^3$	1	0.1	$1\times10^{-3}$	$3.94\times10^{-2}$	$3.28\times10^{-3}$
	$1\times10^4$	10	1	$1\times10^{-2}$	$3.94\times10^{-1}$	$3.28\times10^{-2}$
	$1\times10^6$	$1\times10^3$	100	1	$3.94\times10$	3.28
	$2.54\times10^4$	25.4	2.54	$2.54\times10^{-2}$	1	$8.33\times10^{-2}$
	$3.05\times10^5$	$3.05\times10^2$	$3.05\times10$	$3.05\times10^{-1}$	12	1

### ■ Others

Viscosity	$1 \text{ P} = 100 \text{ cP}$ $1 \text{ St} = 100 \text{ cSt}$
Weight	$1 \text{ kg} \approx 2.21 \text{ lb}$ $1 \text{ lb} \approx 0.454 \text{ kg}$
Temperature	$[^\circ\text{F}] \approx ([^\circ\text{C}] \times 9/5) + 32$ $[^\circ\text{C}] \approx 5/9 ([^\circ\text{F}] - 32)$

	$\text{cm}^2$	$\text{m}^2$	$\text{in}^2$	$\text{ft}^2$
Area	1	$1\times10^{-4}$	0.155	$1.08\times10^{-3}$
	$1\times10^4$	1	$1.55\times10^3$	10.8
	6.45	$6.45\times10^{-4}$	1	$6.94\times10^{-3}$
	$9.30\times10^2$	$9.30\times10^{-2}$	$1.44\times10^2$	1

	$\text{cm}^3$	L (Liter)	$\text{m}^3 (\text{kL})$	$\text{ft}^3$	imperial gal.	U.S. gal.
Volume	1	$1\times10^{-3}$	$1\times10^{-6}$	$3.53\times10^{-5}$	$2.2\times10^{-4}$	$2.64\times10^{-4}$
	$1\times10^3$	1	$1\times10^{-3}$	$3.53\times10^{-2}$	0.220	0.264
	$1\times10^6$	$1\times10^3$	1	35.3	220	264
	$2.83\times10^4$	28.3	$2.83\times10^{-2}$	1	6.23	7.48
	$4.55\times10^3$	4.55	$4.55\times10^{-3}$	0.16	1	1.2
	$3.79\times10^3$	3.79	$3.79\times10^{-3}$	0.134	0.833	1

### ■ Water flow rate and proper pipe size

Nominal size		Steel pipe	Flow rate (L/min) when pressure loss is 0.01–0.03 MPa per pipe length of 10 m	
A	B	Inside dia. (mm)	Outside dia. (mm)	
6A	1/8B	6.5	10.5	1.3–2.2
8A	1/4B	9.2	13.8	3–5.2
10A	3/8B	12.7	17.3	7–12
15A	1/2B	16.1	21.7	12–21
20A	3/4B	21.6	27.2	22–38
25A	1B	27.6	34.0	38–65
32A	1 1/4B	35.7	42.7	70–120
40A	1 1/2B	41.6	48.6	120–210
50A	2B	52.9	60.5	215–370
65A	2 1/2B	67.9	76.3	410–700
80A	3B	80.7	89.1	680–1,200
100A	4B	105.3	114.3	1,200–2,100
125A	5B	130.8	139.8	2,100–3,600
150A	6B	155.2	165.2	3,300–5,700

	MPa	bar	$\text{kg}/\text{cm}^2$	psi (lb/in <sup>2</sup> )	atm	mmHg	mmH <sub>2</sub> O (mmAq)
Pressure	1	10	10.2	145	9.87	$7.5\times10^3$	$1.02\times10^5$
	0.1	1	1.02	14.5	0.987	750	$1.02\times10^4$
	0.098	0.981	1	14.2	0.968	736	$1\times10^4$
	$6.89\times10^{-3}$	0.069	0.070	1	0.068	51.7	703
	0.101	1.01	1.03	14.7	1	760	$1.03\times10^4$
	$1.33\times10^{-4}$	$1.33\times10^{-3}$	$1.36\times10^{-3}$	0.019	$1.32\times10^{-3}$	1	13.6
	$9.81\times10^{-6}$	$9.81\times10^{-5}$	$1\times10^{-4}$	$1.42\times10^{-3}$	$9.68\times10^{-5}$	0.074	1

	L/min	$\text{m}^3/\text{min}$	$\text{m}^3/\text{hr}$	$\text{in}^3/\text{hr}$	$\text{ft}^3/\text{hr}$	Imperial gal./min	U.S. gal./min
Flow rate	1	$1\times10^{-3}$	0.06	$3.66\times10^3$	2.12	0.22	0.264
	$1\times10^3$	1	60	$3.66\times10^6$	$2.12\times10^3$	220	264
	16.7	0.017	1	$6.10\times10^4$	35.3	3.67	4.40
	$2.73\times10^{-4}$	$2.7\times10^{-7}$	$1.64\times10^{-5}$	1	$5.79\times10^{-4}$	$6.01\times10^{-5}$	$7.22\times10^{-5}$
	0.472	$4.72\times10^{-4}$	0.028	$1.73\times10^3$	1	0.104	0.125
	4.55	$4.55\times10^{-3}$	0.273	$1.66\times10^4$	9.63	1	1.20
	3.79	$3.79\times10^{-3}$	0.227	$1.39\times10^4$	8.02	0.833	1



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



ISO9001: 2015 certified  
(H. IKEUCHI & CO., LTD., Japan only)

#### Contact Us



#### Headquarters

Daiichi kyogyo Bldg., 1-15-15, Awaza, Nishi-ku  
Osaka 550-0011, Japan  
Tel: 81-6-6538-4015 Fax: 81-6-6538-4022  
Email: overseas@kirinoikeuchi.co.jp  
URL: <https://www.dry-fog.com/en/>

#### Overseas Network

##### IKEUCHI USA, INC.

4722 Ritter Avenue, Blue Ash, OH 45242, USA  
Tel: 1-513-942-3060  
sales@ikeuchi.us  
<https://www.dry-fog.com/en/>

##### PT. IKEUCHI INDONESIA

Ruko Rodeo Drive, Jl. Hollywood Boulevard Blok B6 No. 18 & 19,  
Jababeka, Bekasi, Jawa Barat 17530 Indonesia  
Tel: 62-21-8938-4201 (or 4202)  
sales@ikeuchi.id  
<https://www.ikeuchi.id/>

##### IKEUCHI (SHANGHAI) CO., LTD.

Room C, 21F, Electrical & Mechanical Bldg.,  
600 Hengfeng Road, Shanghai 200070, P.R.China  
Tel: 86-21-6140-9731  
mist@kirinoikeuchi.com  
<http://www.kirinoikeuchi.com/>

Tianjin Branch Tel: 86-22-2320-1676  
Shenzhen Branch Tel: 86-755-8525-2221  
Wuhan Branch Tel: 86-27-8558-8299

##### IKEUCHI EUROPE B.V.

Merwedeweg 6, 3621 LR, Breukelen, The Netherlands  
Tel: 31-20-820-2175  
info@ikeuchi.eu  
<https://www.ikeuchi.eu/>

##### SIAM IKEUCHI CO., LTD.

909 Ample Tower Bldg. 8FL., Unit 8/2, 8/3, Debaratana Road,  
Bangna Nuea, Bangna, Bangkok 10260 Thailand  
Tel: 66-2-348-3801 Fax: 66-2-348-3802  
thai@ikeuchi.co.th  
<https://www.ikeuchi.co.th/>

##### IKEUCHI TAIWAN CO., LTD.

11F-1, No.27, Sec.1, Chung Shan N. Road, Taipei 10441,  
Taiwan, R.O.C.  
Tel: 886-2-2511-6289 Fax: 886-2-2541-6392  
sales@ikeuchi.com.tw  
<http://www.ikeuchi.com.tw/>