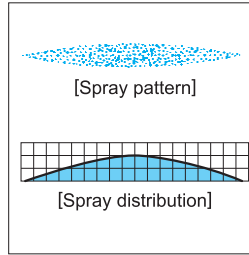


# Three-piece Structure Standard Flat Spray Nozzles

VV / V

Flat Spray



### [Features]

- Flat spray pattern with a mountain-shaped spray distribution having gradually tapered edges.
- Tapered edges overlap to provide uniformity of spray distribution in multiple-nozzle arrangements.

### [Standard Pressure]

0,3 MPa

### [Applications]

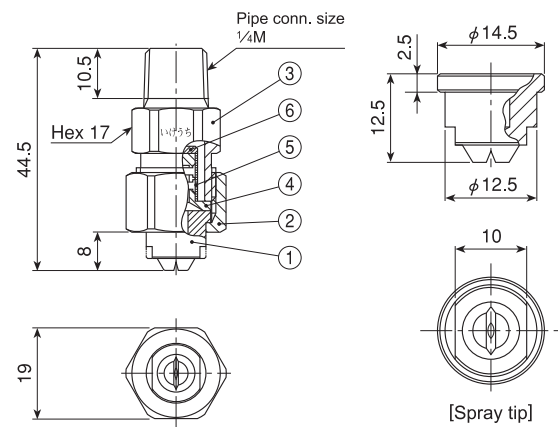
- Cleaning: Automotives, containers, films, felts, filters, screens, bottles, crushed stones, earth and sand, metal parts, machines, steel plates and pieces
- Spraying: Etchants, oils, lubricants, glues, solutions, insecticides, herbicides
- Cooling: Gas, smokes, heat exchangers, tanks, steels, roofs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

## VV series

VV series	
Structure	<ul style="list-style-type: none"> <li>● Made of metal, three-piece structure.</li> <li>● Comprises three parts: Spray tip, cap, and adaptor.</li> <li>● Worn-out spray tip can be replaced separately.</li> <li>● Removable strainer is fitted and supplied as standard part with small capacity nozzle.</li> </ul>
Material	<ul style="list-style-type: none"> <li>● S303 or B (brass)</li> <li>● Optional material: S316 or others</li> </ul>
Mass	<ul style="list-style-type: none"> <li>● Complete nozzle S303: 56 g B (brass): 60 g</li> <li>● Spray tip S303: 13 g B (brass): 14 g</li> </ul>

(When with a strainer, add 2–5 g to the mass for a complete nozzle and 2 mm to the total length.)

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



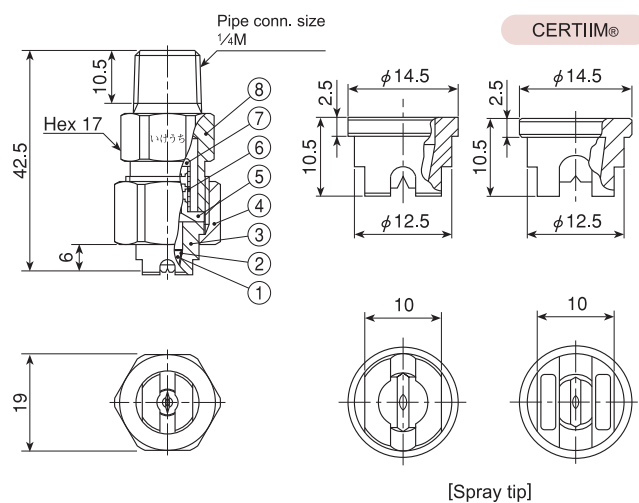
- ① Spray tip ② Cap ③ Adaptor ④ Strainer holder  
⑤ Strainer screen (S316) ⑥ Strainer cap

## V series

V series (with ceramic orifice inserted)	
Structure	<ul style="list-style-type: none"> <li>● Three-piece structure with ceramic orifice inserted.</li> <li>● Comprises three parts: Spray tip, cap, and adaptor.</li> <li>● Worn-out spray tip can be replaced separately.</li> <li>● Removable strainer is fitted and supplied as standard part with small capacity nozzle.</li> <li>● CERTIIM® is one-shot injection molded spray tip created by molding the precision-made ceramic orifice into a plastic retainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>● Spray orifice: ceramic</li> <li>● Tip retainer: S303 or B (brass) or PVDF (polyvinylidene fluoride)</li> <li>● Cap, Adaptor and Strainer: S303 or B (brass)</li> <li>● Optional material: S316 or others</li> </ul>
Mass	<ul style="list-style-type: none"> <li>● Complete nozzle S303: 49 g B (brass): 53 g</li> <li>● Spray tip S303: 6.5 g B (brass): 7 g CERTIIM®: 2 g</li> </ul>

(When with a strainer, add 2–5 g to the mass for a complete nozzle and 2 mm to the total length.)

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



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

# Three-piece Structure Standard Flat Spray Nozzles

## VV / V series

Flat Spray

Spray Angle Code	Spray Capacity Code	VV			V			Spray Angle (°)			Spray Capacity (ℓ/min)						Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	Strainer Mesh Size
		All Metal	Metal	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			
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	150	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	170	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	180	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	210	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	340	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	420	0.8	50
	60	○	○	○	107	115	121	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	510	1.0	—
	80	○	○	○	107	115	121	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	640	1.2	—
100	○	○	○	107	115	120	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	800	1.4	—	
200	○	○	○	109	115	120	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	1000	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	160	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	180	0.4	150
	10	●	●	○	78	90	99	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	190	0.5	100
	15	●	●	○	79	90	99	0.61	0.87	1.06	1.23	1.50	1.94	2.29	2.74	3.87	210	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	270	0.7	50
	30	●	●	○	80	90	97	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	340	0.9	50
	40	○	○	○	81	90	97	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	420	1.1	—
	50	○	○	○	81	90	97	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	510	1.2	—
	60	○	○	○	82	90	96	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	640	1.3	—
	80	○	○	○	82	90	96	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	800	1.5	—
	100	○	○	○	82	90	96	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	1000	1.8	—
120	○	○	○	83	90	95	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	1250	1.9	—	
140	○	○	○	83	90	95	5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	1500	2.1	—	
170	○	○	○	83	90	95	6.94	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	2000	2.3	—	
200	○	○	○	84	90	95	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	2500	2.4	—	
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	0.55	0.77	160	0.3	150
	04		●	○	67	80	90	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	170	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	190	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	200	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	210	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	270	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	340	1.0	—
	40	○	○	○	71	80	87	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	420	1.2	—
	50	○	○	○	71	80	86	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	510	1.4	—
	60	○	○	○	72	80	86	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	640	1.5	—
	80	○	○	○	72	80	86	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	800	1.7	—
	100	○	○	○	72	80	85	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	1000	2.0	—
120	○	○	○	73	80	85	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	1250	2.3	—	
200	○	○	○	74	80	85	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	1500	2.8	—	
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	170	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	200	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	210	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	220	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	270	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	340	1.1	—
	40	○	○	○	56	65	71	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	420	1.3	—
	50	○	○	○	57	65	71	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	510	1.5	—
	60	○	○	○	57	65	71	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	640	1.6	—
	80	○	○	○	58	65	71	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	800	1.9	—
	100	○	○	○	58	65	70	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	1000	2.1	—
120	○	○	○	58	65	70	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	1250	2.3	—	
140	○	○	○	59	65	69	5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	1500	2.5	—	
170	○	○	○	59	65	69	6.94	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	2000	2.8	—	
200	○	○	○	59	65	69	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	2500	3.0	—	
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	190	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	220	0.5	100
	10	●	●	○	40	50	58	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	230	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	240	0.8	50
	20	○	○	○	41	50	57	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	270	1.0	—
	30	○	○	○	42	50	56	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	340	1.2	—
	40	○	○	○	42	50	56	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	420	1.4	—
	50	○	○	○	43	50	55	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	510	1.6	—
	60	○	○	○	43	50	55	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	640	1.7	—
	80	○	○	○	43	50	55	3.27	4.62	5.66	6.53	8.00	10.3	12.2					

## Three-piece Structure Standard Flat Spray Nozzles VV / V series

Flat Spray

Spray Angle Code	Spray Capacity Code	Series			Spray Angle (°)			Spray Capacity (ℓ/min)								Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	Strainer Mesh Size		
		VV All Metal	V Metal	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	
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	∫	0.5	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	∫	2.1	—	
	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	05	●			18	25	32	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	270	0.5	100
07		●			18	25	32	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	∫	0.6	50	
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	∫	2.3	—	
200		○			21	25	27	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6	850	3.9	—	
15		05	●			9	15	22	—	0.29	0.35	0.41	0.50	0.65	0.76	0.91	1.29	310	0.5	100
		07	●			9	15	21	—	0.40	0.49	0.57	0.70	0.90	1.07	1.28	1.81	∫	0.7	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	∫	1.0	—	
	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	∫	1.7	—	
	80	○			11	15	18	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	∫	2.4	—	
	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	—	

●.....With strainer    ○.....Without strainer

### How to order

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

#### ① Complete nozzle

〈Example〉... ¼MVV11505S303W

¼M	VV	115	05	S303	W
Series	Spray Angle Code	Spray Capacity Code	Material	Strainer	
■ VV	■ 115	■ 02	■ S303	■ W (with Strainer)	
■ V	∫	∫	■ B	■ – (without Strainer)	
■ 15	■ 200				

#### ② Spray tip only

〈Example〉... ¼VV11505S303

¼	VV	115	05	S303
Series	Spray Angle Code	Spray Capacity Code	Material	
■ VV	■ 115	■ 02	■ S303	
■ V	∫	∫	■ B	
	■ 15	■ 200	■ TPVDF*	

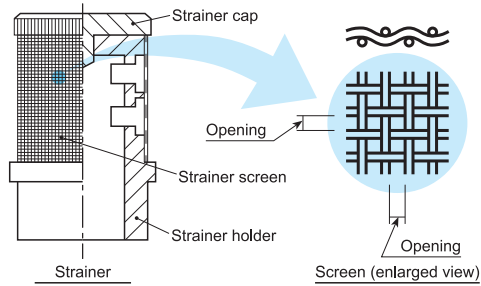
\*TPVDF for V series spray tip only

# Effective Use of Standard Flat Spray Nozzles

## Strainer Mesh Size

The strainer fitted inside the nozzle comprises strainer holder, strainer screen and strainer cap.

Strainer mesh size	Opening (mm)	Free passage diameter (mm)
#200	0.07	below 0.2
#150	0.10	0.3–0.4
#100	0.15	0.5–0.7
#50	0.30	0.8–0.9

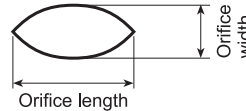


## Advantages and Disadvantages of Ceramic Nozzles

- CERJET® Ceramic Nozzle can resist most acids and strong corrosive liquid except for hydrofluoric acid and strong alkalis (pH 12 or higher).
- CERJET® Ceramic Nozzle has high wear resistance (its hardness Mohs scale 7), several hundred times that of brass and 20–30 times that of stainless steel. It is well-suited for high pressure cleaning. However, it is brittle and may crack by quenching or sudden temperature drops of more than 200°C.
- For attaching the ceramic orifice to the metal body or retainer, epoxy resin adhesive (Araldite®) is used. In applications where epoxy resin is not suitable, CERTIIM® with the ceramic orifice inserted into a plastic body or retainer by injection molding is recommended.

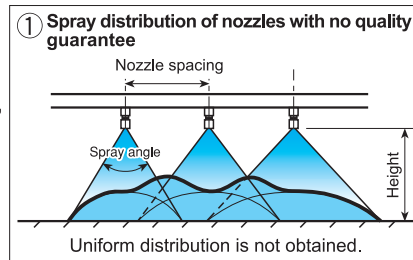
## Free Passage Diameter

The standard flat spray nozzle orifice has a cat-eye shape. The free passage diameter is the orifice width multiplied with a safety factor.



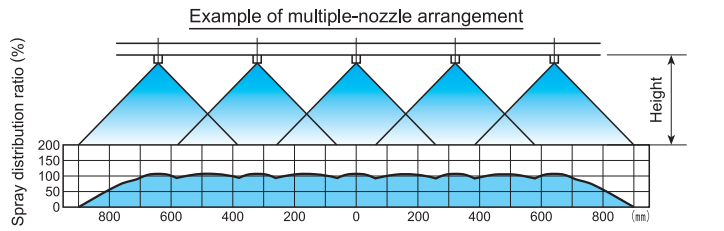
## Spray Distribution

The standard flat spray nozzles are designed to produce a mountain-shaped distribution in order to obtain a uniform spray distribution in a multiple-nozzle arrangement. Although the distribution depends on spray height, nozzle spacing, liquid pressure and liquid nature, you need spray nozzles guaranteed in spray performance to get the desired superimposed spray distribution. IKEUCHI nozzles have guaranteed spray angles and spray capacities in order to maintain uniform distribution.



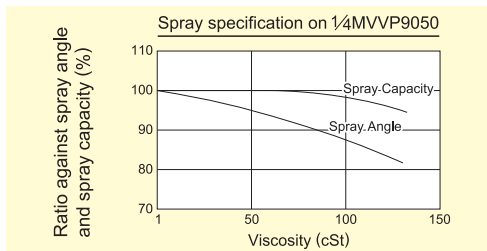
## 2 Spray distribution of nozzles guaranteed in spray performance

Uniform distribution is formed by overlapping mountain-shaped distributions.



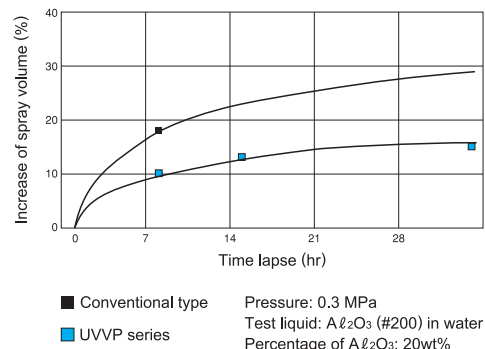
## Viscosity

There is a tendency for spray capacity and spray angle to be decreased and also for spray distribution to deteriorate if the viscosity of the liquid is increased. The resistance of liquid in the pipe is also increased. When spraying such liquids, pressure drop in the pipe must be also taken into consideration.



## Comparison of Wear-resistance

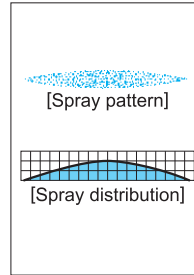
The comparison of wear-resistance between a UVVP series flat spray nozzle and our conventional type is shown here.



# One-piece Structure Standard Flat Spray Nozzles

## VVP / VP

Flat Spray



### [Features]

- Flat spray pattern with a mountain-shaped spray distribution having gradually tapered edges.
- Tapered edges overlap to provide uniformity of spray distribution in multiple-nozzle arrangements.

### [Standard Pressure]

0.3 MPa

### [Applications]

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

## VVP series

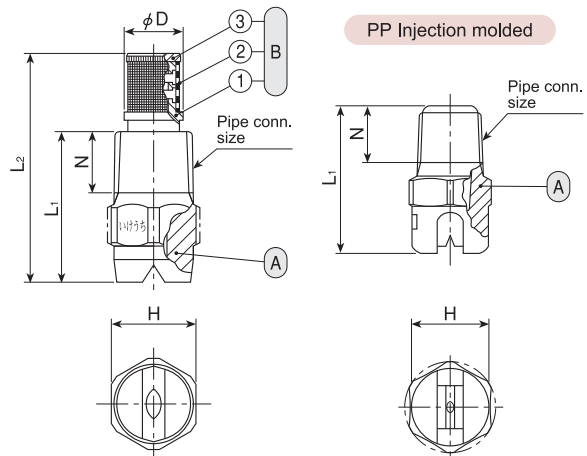
VVP series	
Structure	<ul style="list-style-type: none"> <li>● Made of metal or plastic.</li> <li>● Simple one-piece structure to be screwed into pipe.</li> <li>● Removable strainer (metal nozzle only) is fitted and supplied as standard part with small capacity nozzle.</li> </ul>
Material	<ul style="list-style-type: none"> <li>● S303 or B (brass), PP (injection-molded polypropylene)</li> <li>● S316L equivalent (precision-molded stainless steel)*2</li> <li>● Strainer for precision-molded stainless steel: S303 or S316</li> <li>● Optional material: S316, PVC, PVDF, Ultrahigh molecular weight polyethylene or others</li> </ul>

Series	Pipe conn. size	Dimensions (mm)					Mass (g)*1			
		L <sub>1</sub>	L <sub>2</sub>	H	φD	N	S303	B	S316L equiv.	PP
VVP	1/8 M	18.5	31	12	7.5	6.5	10	11	—	—
	1/4 M	26	40	14	10	10.5	21	23	—	—
	3/8 M	30	—	19	—	10.5	37	40	—	—
	1/2 M	38	—	23	—	14	65	70	—	—
	3/4 M	45	—	29	—	15	110	120	—	—
1 M	55	—	35	—	18	170	180	—	—	
VVP (Precision-molded stainless steel)*2	1/8 M	20	33.5	12	7.5	7	—	—	9.6	—
	1/4 M	27	41	14	10	10.5	—	—	16	—
VVP-PP (Injection molded)	1/8 M	22	—	12	—	8.5	—	—	—	1.1
	1/4 M	27	—	14	—	11.5	—	—	—	2.2

\*1) When with a strainer, add 2–5 g to the above mass.

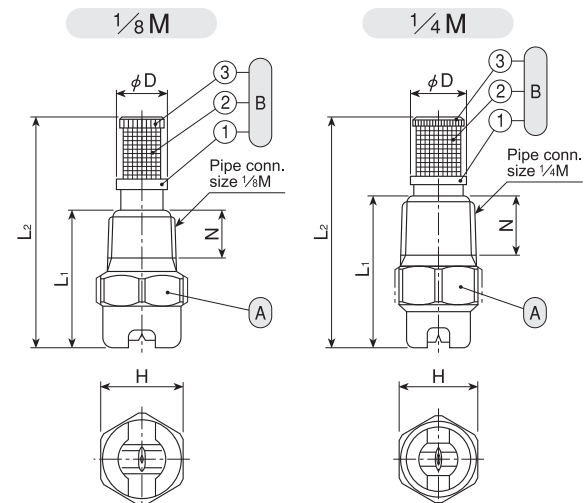
\*2) Please refer to the chart on page 18 for availability.

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



① Strainer holder ② Strainer screen [S316] ③ Strainer cap

### Precision-molded stainless steel



① Strainer holder ② Strainer screen [S316] ③ Strainer cap



# One-piece Structure Standard Flat Spray Nozzles

## VVP / VP series

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	
		VVP						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
		All Metal			All Plastic			Metal		CER-TII <sub>Me</sub>																		
		1/8M	1/4M	3/8M	1/2M	3/4M	1M	1/8M	1/4M	1/8M	1/4M	1/8M	1/4M															
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	0.55	0.77	180	0.3	150	
	04								●	●	○	○	67	80	90	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	180	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	180	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	180	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	180	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	180	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	290	1.2	—
	50									○	○	○	○	71	80	86	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	290	1.4	—
	60									○	○	○	○	72	80	86	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	290	1.5	—
	80	○	○							○	○	○	○	72	80	86	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	290	1.7	—
	100	○	○							○	○	○	○	72	80	85	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	290	1.8	—
	120	○	○							○	○	○	○	73	80	85	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	290	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	—
	300		○							○	○	○	○	74	80	84	12.2	17.3	21.2	24.5	30.0	38.7	45.8	54.8	77.5	570	3.7	—
	400		○	○						○	○	○	○	75	80	83	16.3	23.1	28.3	32.7	40.0	51.6	61.1	73.0	103	600	4.1	—
500		○	○	○					○	○	○	○	75	80	83	20.4	28.9	35.4	40.8	50.0	64.6	76.4	91.3	129	600	4.8	—	
600		○	○	○	○				○	○	○	○	76	80	83	24.5	34.6	42.4	49.0	60.0	77.5	91.7	110	155	600	5.1	—	
800		○	○	○	○	○			○	○	○	○	76	80	82	32.7	46.2	56.5	65.3	80.0	103	122	146	206	600	6.1	—	
1000		○	○	○	○	○	○		○	○	○	○	76	80	82	40.8	57.7	70.7	81.7	100	129	153	183	258	600	6.2	—	
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	190	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	190	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	190	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	190	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	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	310	1.3	—
	50	○	○							○	○	○	○	57	65	71	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	310	1.5	—
	60	○	○							○	○	○	○	57	65	71	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	310	1.6	—
	80	○	○							○	○	○	○	58	65	71	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	310	1.9	—
	100	○	○							○	○	○	○	58	65	70	4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	310	2.1	—
	120	○	○							○	○	○	○	58	65	70	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0	310	2.3	—
	140	○	○							○	○	○	○	59	65	69	5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	310	2.5	—
	170	○	○							○	○	○	○	59	65	69	6.94	9.82	12.0	13.9	17.0	22.0	26.0	31.1	43.9	310	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	650	4.7	—	
500	○	○							○	○	○	○	61	65	67	20.4	28.9	35.4	40.8	50.0	64.6	76.4	91.3	129	650	5.3	—	
600	○	○							○	○	○	○	61	65	67	24.5	34.6	42.4	49.0	60.0	77.5	91.7	110	155	650	5.7	—	
800	○	○							○	○	○	○	62	65	67	32.7	46.2	56.5	65.3	80.0	103	122	146	206	650	6.5	—	
1000	○	○							○	○	○	○	62	65	66	40.8	57.7	70.7	81.7	100	129	153	183	258	650	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	180	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	210	0.5	100
	10	●	●							●	●	○	○	40	50	58	0.41	0.58	0.71	0.82	1.00	1.29	1.53	1.83	2.58	210	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	210	0.8	50
	20	○	○							○	○	○	○	41	50	57	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65	5.16	210	1.0	—
	30	○	○							○	○	○	○	42	50	56	1.23	1.73	2.12	2.45	3.00	3.88	4.58	5.48	7.75	340	1.2	—
	40	○	○							○	○	○	○	42	50	56	1.63	2.31	2.83	3.27	4.00	5.16	6.11	7.30	10.3	340	1.4	—
	50									○	○	○	○	43	50	55	2.04	2.89	3.54	4.08	5.00	6.46	7.64	9.13	12.9	340	1.6	—
	60									○	○	○	○	43	50	55	2.45	3.46	4.24	4.90	6.00	7.75	9.17	11.0	15.5	340	1.7	—
	80	○	○							○	○	○	○	43	50	55	3.27	4.62	5.66	6.53	8.00	10.3	12.2	14.6	20.6	340	2.0	—
	120	○	○							○	○																	



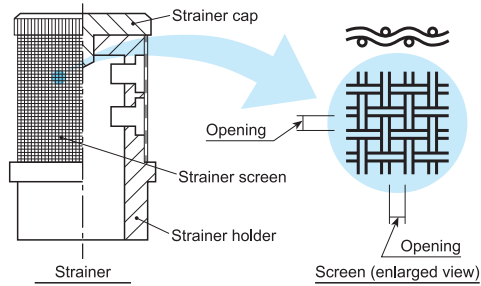


# Effective Use of Standard Flat Spray Nozzles

## Strainer Mesh Size

The strainer fitted inside the nozzle comprises strainer holder, strainer screen and strainer cap.

Strainer mesh size	Opening (mm)	Free passage diameter (mm)
#200	0.07	below 0.2
#150	0.10	0.3–0.4
#100	0.15	0.5–0.7
#50	0.30	0.8–0.9

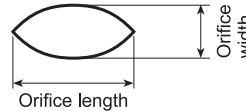


## Advantages and Disadvantages of Ceramic Nozzles

- CERJET® Ceramic Nozzle can resist most acids and strong corrosive liquid except for hydrofluoric acid and strong alkalis (pH 12 or higher).
- CERJET® Ceramic Nozzle has high wear resistance (its hardness Mohs scale 7), several hundred times that of brass and 20–30 times that of stainless steel. It is well-suited for high pressure cleaning. However, it is brittle and may crack by quenching or sudden temperature drops of more than 200°C.
- For attaching the ceramic orifice to the metal body or retainer, epoxy resin adhesive (Araldite®) is used. In applications where epoxy resin is not suitable, CERTIIM® with the ceramic orifice inserted into a plastic body or retainer by injection molding is recommended.

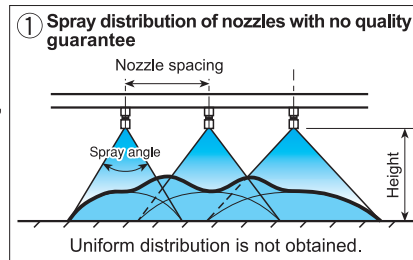
## Free Passage Diameter

The standard flat spray nozzle orifice has a cat-eye shape. The free passage diameter is the orifice width multiplied with a safety factor.



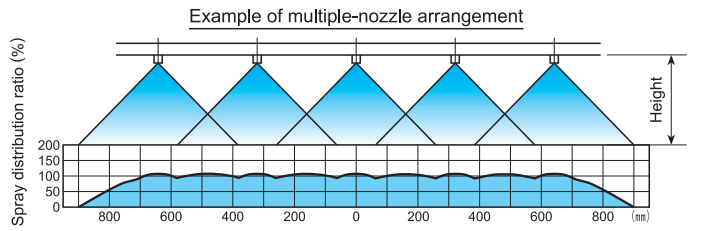
## Spray Distribution

The standard flat spray nozzles are designed to produce a mountain-shaped distribution in order to obtain a uniform spray distribution in a multiple-nozzle arrangement. Although the distribution depends on spray height, nozzle spacing, liquid pressure and liquid nature, you need spray nozzles guaranteed in spray performance to get the desired superimposed spray distribution. IKEUCHI nozzles have guaranteed spray angles and spray capacities in order to maintain uniform distribution.



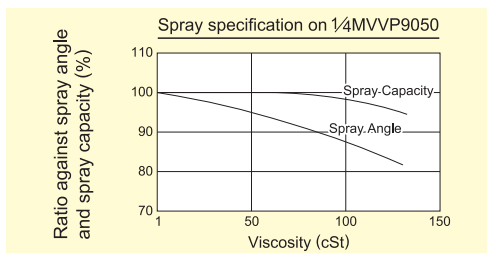
## 2 Spray distribution of nozzles guaranteed in spray performance

Uniform distribution is formed by overlapping mountain-shaped distributions.



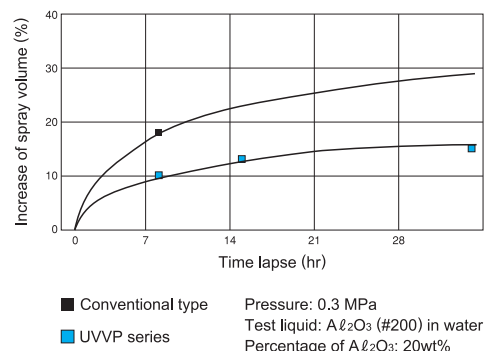
## Viscosity

There is a tendency for spray capacity and spray angle to be decreased and also for spray distribution to deteriorate if the viscosity of the liquid is increased. The resistance of liquid in the pipe is also increased. When spraying such liquids, pressure drop in the pipe must be also taken into consideration.



## Comparison of Wear-resistance

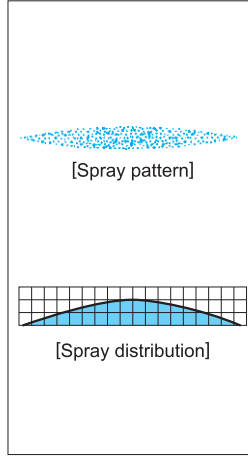
The comparison of wear-resistance between a UVVP series flat spray nozzle and our conventional type is shown here.



# One-piece Structure Standard Flat Spray Nozzles

## UVVP

Flat Spray



### [Features]

- Flat spray pattern with a mountain-shaped spray distribution having gradually tapered edges.
- UVVP series made of ultrahigh molecular weight polyethylene features high wear resistance and keep stable performance as polishing nozzles over prolonged use.

### [Standard Pressure]

0.3 MPa

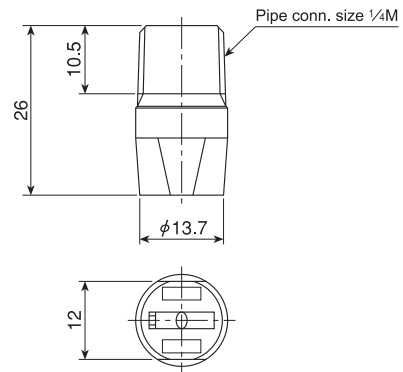
### [Applications]

Polishing: Liquid honing, through-hole  
Others: Washing, spraying, cooling

### UVVP series

UVVP series	
Structure	• Simple one-piece structure to be screwed into pipe.
Material	• Ultrahigh molecular weight polyethylene
Mass	• 2.5 g

[Note] • Appearance and dimensions may differ slightly depending on materials and nozzle codes.  
• The spread of the flat spray is parallel to the grooves.



Spray Capacity Code	Pipe Conn. Size	Spray Angle (°)			Spray Capacity (ℓ/min)						Mean Drop. Dia. (μm)	Free Pass. Dia. (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	1/4M	50	65	70	1.63	2.31	2.83	3.27	4.00	5.16	300 360	1.3
50		51	65	70	2.04	2.89	3.54	4.08	5.00	6.46		1.5

### How to order

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

(Example) ... 1/4MUVVP6540UPE

1/4M UVVP 65 40 UPE

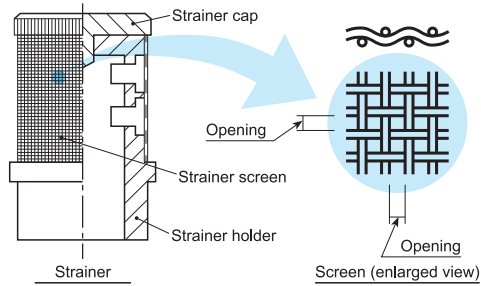
Spray Capacity Code  
40  
50

# Effective Use of Standard Flat Spray Nozzles

## Strainer Mesh Size

The strainer fitted inside the nozzle comprises strainer holder, strainer screen and strainer cap.

Strainer mesh size	Opening (mm)	Free passage diameter (mm)
#200	0.07	below 0.2
#150	0.10	0.3–0.4
#100	0.15	0.5–0.7
#50	0.30	0.8–0.9

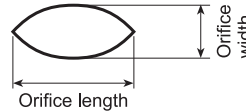


## Advantages and Disadvantages of Ceramic Nozzles

- CERJET® Ceramic Nozzle can resist most acids and strong corrosive liquid except for hydrofluoric acid and strong alkalis (pH 12 or higher).
- CERJET® Ceramic Nozzle has high wear resistance (its hardness Mohs scale 7), several hundred times that of brass and 20–30 times that of stainless steel. It is well-suited for high pressure cleaning. However, it is brittle and may crack by quenching or sudden temperature drops of more than 200°C.
- For attaching the ceramic orifice to the metal body or retainer, epoxy resin adhesive (Araldite®) is used. In applications where epoxy resin is not suitable, CERTIIM® with the ceramic orifice inserted into a plastic body or retainer by injection molding is recommended.

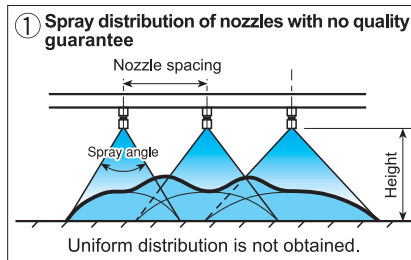
## Free Passage Diameter

The standard flat spray nozzle orifice has a cat-eye shape. The free passage diameter is the orifice width multiplied with a safety factor.



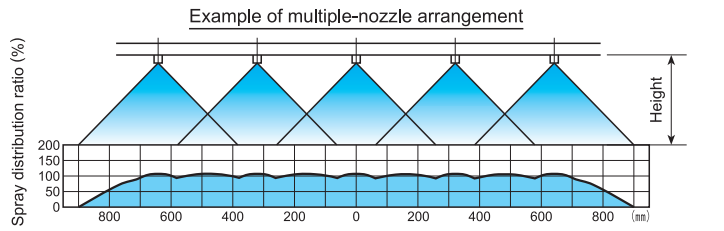
## Spray Distribution

The standard flat spray nozzles are designed to produce a mountain-shaped distribution in order to obtain a uniform spray distribution in a multiple-nozzle arrangement. Although the distribution depends on spray height, nozzle spacing, liquid pressure and liquid nature, you need spray nozzles guaranteed in spray performance to get the desired superimposed spray distribution. IKEUCHI nozzles have guaranteed spray angles and spray capacities in order to maintain uniform distribution.



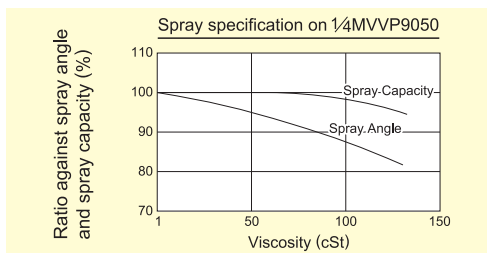
## ② Spray distribution of nozzles guaranteed in spray performance

Uniform distribution is formed by overlapping mountain-shaped distributions.



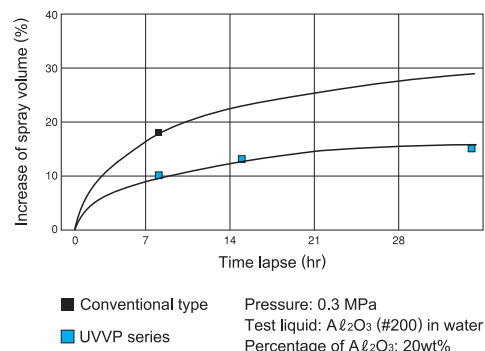
## Viscosity

There is a tendency for spray capacity and spray angle to be decreased and also for spray distribution to deteriorate if the viscosity of the liquid is increased. The resistance of liquid in the pipe is also increased. When spraying such liquids, pressure drop in the pipe must be also taken into consideration.



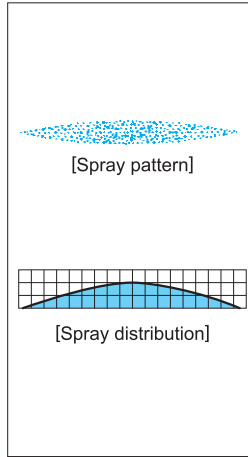
## Comparison of Wear-resistance

The comparison of wear-resistance between a UVVP series flat spray nozzle and our conventional type is shown here.



# Coin-shaped Standard Flat Spray Nozzles

# CVVP



### [Features]

- Flat spray pattern with a mountain-shaped spray distribution having gradually tapered edges.
- In the shape of a thin coin, this nozzle does not protrude out of a pipe-surface, which makes it easy to accommodate nozzle headers in narrow spaces.

### [Standard Pressure]

0.3 MPa

### [Applications]

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

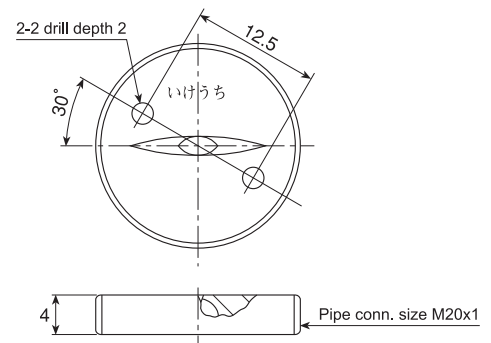
Flat Spray

## CVVP series

CVVP series	
Structure	• One-piece structure with threaded outside edge.
Material	• S303 or S316
Mass	• 8,5 g

\*Metric fine threads (JIS B 0207)

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



Spray Angle Code	Spray Capacity Code	Spray Angle (°)			Spray Capacity (ℓ/min)											Mean Drop. Dia. (μm)	Free Pass. 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		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		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		}
	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	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	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	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		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		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		}
	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	1.2	
	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	1.4	
	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	1.5	
	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	1.7
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		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		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		}
	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	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	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	1.6	
	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	1.9

### How to order

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

<Example>...M20x1 CVVP 9010 S303

M20x1 CVVP

90	10	S303
Spray Angle Code	Spray Capacity Code	Material
■ 90	■ 10	■ S303
■ 80	}	■ S316
■ 65	■ 80	

# Quick-detachable Standard Flat Spray Nozzles

# INVV

Patented

Flat Spray



### [Features]

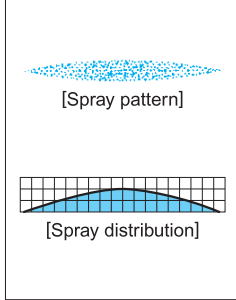
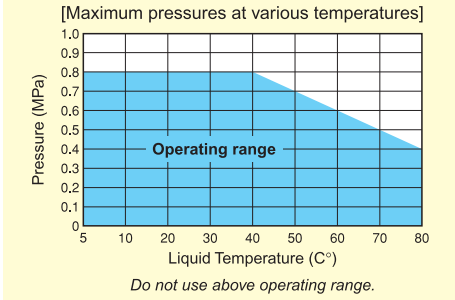
- Flat spray pattern with a mountain-shaped spray distribution having gradually tapered edges.
- Made in highly chemical and heat resistant PP (nozzle tip) and PPS (adaptor).
- Quick installation and removal by just turning the nozzle 60° by hand.
- Nozzle bodies are color-coded by spray capacity for easy identification.

### [Standard Pressure]

0.3 MPa

### [Applications]

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



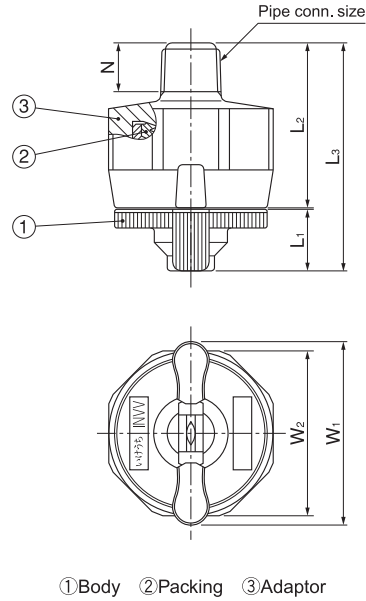
## INVV series

INVV series	
Structure	<ul style="list-style-type: none"> <li>• Two-piece structure comprising nozzle and adaptor.</li> <li>• Easy installation and removal by just turning a nozzle 60°.</li> </ul>
Material	<ul style="list-style-type: none"> <li>• Nozzle: PP</li> <li>• Adaptor: PPS</li> <li>• Packing: FEPM</li> </ul>

Pipe conn. size	Dimensions (mm)						Mass (g)
	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	W <sub>1</sub>	W <sub>2</sub>	N	
1/8M	10	27	37	30	27	8	12
1/4M	10	30	40	30	27	11.5	12
3/8M	10	30	40	30	27	12	14

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

• **INVV series nozzles are not compatible with the discontinued ISVV series.**



Spray Angle Code	Spray Capacity Code	Pipe Conn. Size			Spray Angle (°)			Spray Capacity (ℓ/min)							Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	Color of Nozzle Body
		1/8M	1/4M	3/8M	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	}	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	05	○	○	○	77	90	100	—	0.29	0.35	0.41	0.50	0.65	0.76	}	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
	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	1.2	Pink		

Quick-detachable Standard Flat Spray Nozzles  
**INVV series**

Flat Spray

Spray Angle Code	Spray Capacity Code	Pipe Conn. Size			Spray Angle (°)			Spray Capacity (ℓ/min)							Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	Color of Nozzle Body													
		1/8M	1/4M	3/8M	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																
65	05	○	○	○	52	65	74	—	0.29	0.35	0.41	0.50	0.65	0.76	190	0.4														
	07	○	○	○	53	65	74	—	0.40	0.49	0.57	0.70	0.90	1.07				0.5												
	10	○	○	○	54	65	73	0.41	0.58	0.71	0.82	1.00	1.29	1.53						0.6										
	15	○	○	○	54	65	73	0.61	0.87	1.06	1.23	1.50	1.94	2.29								0.8								
	20	○	○	○	55	65	72	0.82	1.15	1.41	1.63	2.00	2.58	3.06										350	0.9					
	30	○	○	○	56	65	72	1.23	1.73	2.12	2.45	3.00	3.88	4.58													1.1			
	40	○	○	○	56	65	71	1.63	2.31	2.83	3.27	4.00	5.16	6.11															1.3	
	50	○	○	○	57	65	71	2.04	2.89	3.54	4.08	5.00	6.46	7.64																
50	05	○	○	○	38	50	59	—	0.29	0.35	0.41	0.50	0.65	0.76	210	0.4														
	07	○	○	○	38	50	58	—	0.40	0.49	0.57	0.70	0.90	1.07				0.5												
	10	○	○	○	40	50	58	0.41	0.58	0.71	0.82	1.00	1.29	1.53						0.6										
	15	○	○	○	40	50	57	0.61	0.87	1.06	1.23	1.50	1.94	2.29								0.8								
	20	○	○	○	41	50	57	0.82	1.15	1.41	1.63	2.00	2.58	3.06										400	1.0					
	30	○	○	○	42	50	56	1.23	1.73	2.12	2.45	3.00	3.88	4.58													1.2			
	40	○	○	○	42	50	56	1.63	2.31	2.83	3.27	4.00	5.16	6.11															1.4	
	50	○	○	○	43	50	55	2.04	2.89	3.54	4.08	5.00	6.46	7.64																

**How to order**

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

① Complete unit

(Example) ...1/8M(PT)INVV9030PP(FEPM)+PPS

1/8M (PT) INVV 90 30 PP (FEPM) + PPS

Pipe Conn. Size	Thread type	Spray Angle Code	Spray Capacity Code
1/8M	(PT)	115	05
1/4M	(NPT)	5	5
3/8M		50	50

② Nozzle only

(Example) ... INVV9030PP(FEPM)

INVV 90 30 PP (FEPM)

Spray Angle Code	Spray Capacity Code
115	05
5	5
50	50

**ALSO AVAILABLE!**

Quick-detachable  
Full Cone  
Spray Nozzles

**INJXX  
series**

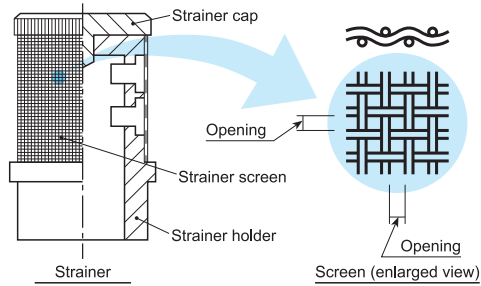
See p.63 of this catalog.

# Effective Use of Standard Flat Spray Nozzles

## Strainer Mesh Size

The strainer fitted inside the nozzle comprises strainer holder, strainer screen and strainer cap.

Strainer mesh size	Opening (mm)	Free passage diameter (mm)
#200	0.07	below 0.2
#150	0.10	0.3–0.4
#100	0.15	0.5–0.7
#50	0.30	0.8–0.9

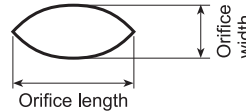


## Advantages and Disadvantages of Ceramic Nozzles

- CERJET® Ceramic Nozzle can resist most acids and strong corrosive liquid except for hydrofluoric acid and strong alkalis (pH 12 or higher).
- CERJET® Ceramic Nozzle has high wear resistance (its hardness Mohs scale 7), several hundred times that of brass and 20–30 times that of stainless steel. It is well-suited for high pressure cleaning. However, it is brittle and may crack by quenching or sudden temperature drops of more than 200°C.
- For attaching the ceramic orifice to the metal body or retainer, epoxy resin adhesive (Araldite®) is used. In applications where epoxy resin is not suitable, CERTIIM® with the ceramic orifice inserted into a plastic body or retainer by injection molding is recommended.

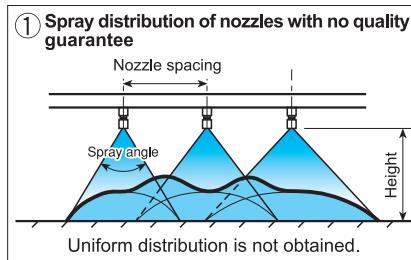
## Free Passage Diameter

The standard flat spray nozzle orifice has a cat-eye shape. The free passage diameter is the orifice width multiplied with a safety factor.



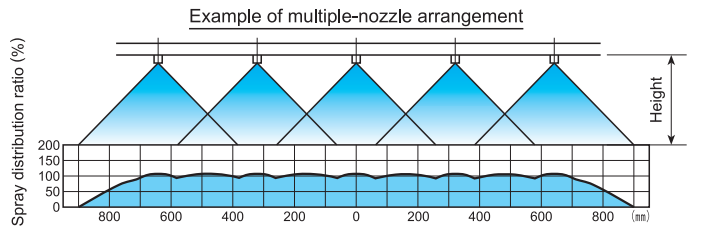
## Spray Distribution

The standard flat spray nozzles are designed to produce a mountain-shaped distribution in order to obtain a uniform spray distribution in a multiple-nozzle arrangement. Although the distribution depends on spray height, nozzle spacing, liquid pressure and liquid nature, you need spray nozzles guaranteed in spray performance to get the desired superimposed spray distribution. IKEUCHI nozzles have guaranteed spray angles and spray capacities in order to maintain uniform distribution.



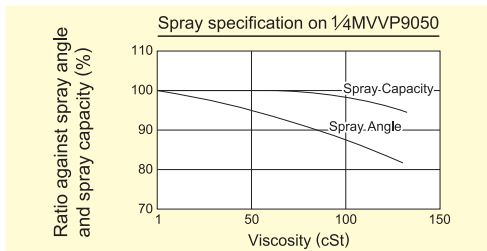
## ② Spray distribution of nozzles guaranteed in spray performance

Uniform distribution is formed by overlapping mountain-shaped distributions.



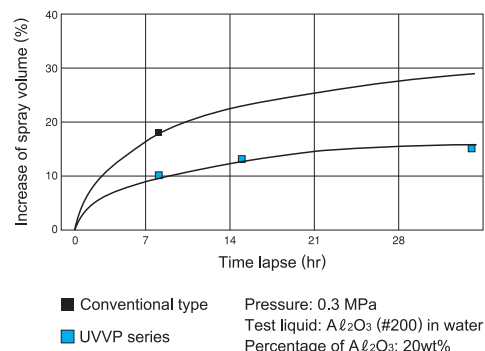
## Viscosity

There is a tendency for spray capacity and spray angle to be decreased and also for spray distribution to deteriorate if the viscosity of the liquid is increased. The resistance of liquid in the pipe is also increased. When spraying such liquids, pressure drop in the pipe must be also taken into consideration.



## Comparison of Wear-resistance

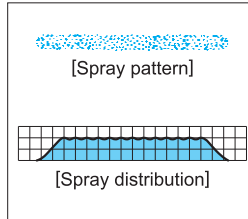
The comparison of wear-resistance between a UVVP series flat spray nozzle and our conventional type is shown here.



# Even Flat Spray Nozzles

# VE / VEP

Flat Spray



### [Features]

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

### [Standard Pressure]

0,3 MPa

### [Applications]

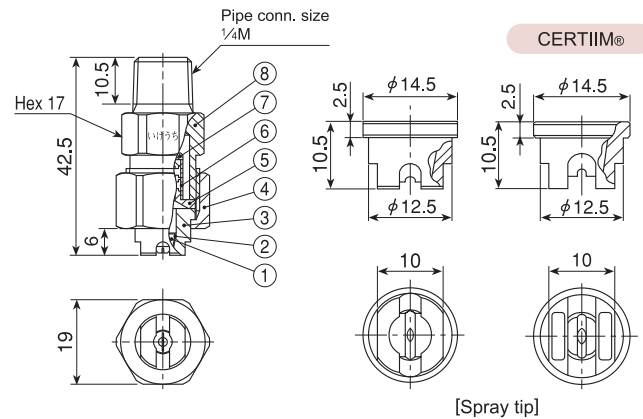
- Cleaning: Automotives, containers, films, felts, filters, screens, bottles, crushed stones, earth and sand, metal parts, machines, steel plates, steel pieces, wires
- Spraying: Etchants, oils, lubricants, liquids, solutions, insecticides, herbicides
- Cooling: Gas, smokes, heat exchangers, tanks, steels,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

## VE series

VE series (three-piece structure)	
Structure	<ul style="list-style-type: none"> <li>● Three-piece structure with ceramic orifice inserted.</li> <li>● Comprises three parts: Spray tip, cap, and adaptor. Worn-out spray tip can be replaced separately.</li> <li>● Removable strainer is fitted and supplied as standard part with small capacity nozzle.</li> <li>● CERTIIM® is one-shot injection molded spray tip created by molding the precision-made ceramic orifice into a plastic retainer.</li> </ul>
Material	<ul style="list-style-type: none"> <li>● Spray orifice: ceramic</li> <li>● Tip retainer: S303 or B (brass) or PVDF (polyvinylidene fluoride)</li> <li>● Cap, Adaptor and Strainer: S303 or B (brass)</li> <li>● Optional material: S316 or others</li> </ul>
Mass	<ul style="list-style-type: none"> <li>● Complete nozzle S303: 49 g B (brass): 53 g</li> <li>● Spray tip S303: 6.5 g B (brass): 7 g CERTIIM®: 2 g</li> </ul>

(When with a strainer, add 2–5 g to the mass for a complete nozzle and 2 mm to the total length.)

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



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

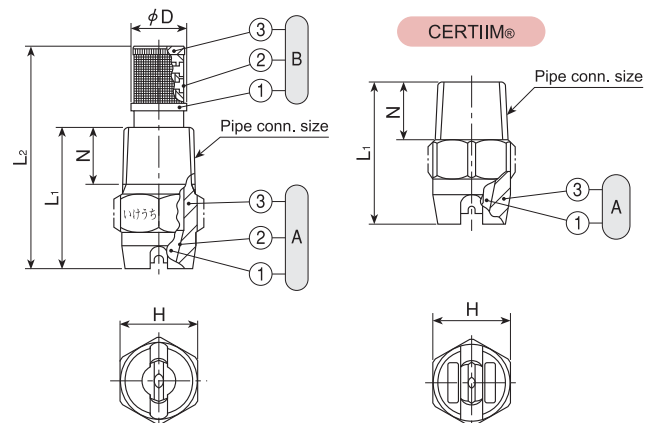
## VEP series

VEP series (one-piece structure)	
Structure	<ul style="list-style-type: none"> <li>● Ceramic orifice inserted and adhered into metal or plastic body.</li> <li>● CERTIIM® is a plastic spray nozzle with a one-shot injection molded ceramic orifice.</li> </ul>
Material	<ul style="list-style-type: none"> <li>● Spray orifice: ceramic</li> <li>● Metal parts: S303 or B (brass)</li> <li>● CERTIIM®'s plastic body: PVDF (polyvinylidene fluoride)</li> <li>● Optional material: S316 or others</li> </ul>

Pipe conn. size	Dimensions (mm)					Mass (g)		
	L <sub>1</sub>	L <sub>2</sub>	H	φD	N	S303	B	CERTIIM®
1/8M	16.5	30	12	7.5	6.5	8	9	—
1/4M	26	40	14	10	10.5	20	22	—
3/8M	30	—	19	—	11	33	35	—
1/2M	38	—	23	—	14	57	62	—
CERTIIM® 1/8M	22	—	12	—	8.5	—	—	2.1
CERTIIM® 1/4M	26	—	14	—	10.5	—	—	6

(When with a strainer, add 2–5 g to the above mass.)

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



- A Nozzle** (① Ceramic orifice ② Adhesive: Araldite® ③ Body)  
**B Strainer** (① Strainer holder ② Strainer screen [S316] ③ Strainer cap)



# Even Flat Spray Nozzles VE / VEP series

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					
		VE		VEP				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				
		Metal	CERTIMs	Metal																					CERTIMs			
1/4M	1/4M	3/8M	1/2M	3/4M	1M	1 1/4M	1 1/2M	1 3/4M	2M	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					
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				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				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	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	3.47	4.91	6.00	7.76				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	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	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	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	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				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				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	—
	274	○	○	○	○					76	80	83	11.2	15.8	19.4	22.4	27.4	35.4	41.9	50.0	70.7	86.6	112				3.3	—
	314	○	○	○	○					76	80	83	12.8	18.1	22.2	25.6	31.4	40.5	48.0	57.3	81.1	99.3	128				3.3	—
	392	○	○	○	○					76	80	83	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160				3.7	—
469	○	○	○	○					76	80	83	19.1	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	4.3	—				
65	03	●	○	●	●					54	65	76	—	0.17	0.21	0.24	0.30	0.39	0.46	0.55	0.77	0.95	1.22	150	0.3	150		
	04	●	○	●	●					54	65	76	—	0.23	0.28	0.33	0.40	0.52	0.61	0.73	1.03	1.26	1.63				0.3	150
	05	●	○	●	●					54	65	75	—	0.29	0.35	0.41	0.5											

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			
		VE		VEP						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
		Metal	CERTIM <sub>®</sub>	Metal			CERTIM <sub>®</sub>																			
1/4M	1/4M	1/8M	1/4M	3/8M	1/2M	3/4M	1M	1.5M	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa			
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	300	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	300	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	300	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	300	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	300	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	300	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	9.54	13.6	16.6	19.2	23.5	30.3	35.9	42.9	60.7	74.3	95.9	300	3.7	—	
	274	○	○	○	○	○	○	○	43	50	53	11.2	15.8	19.4	22.4	27.4	35.4	41.9	50.0	70.7	86.6	112	300	4.0	—	
	314	○	○	○	○	○	○	○	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	—	
	392	○	○	○	○	○	○	○	44	50	52	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	300	4.7	—	
469	○	○	○	○	○	○	○	44	50	52	19.1	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	300	5.0	—		
40	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	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	18.6	24.1	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	24.7	31.8	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	37.0	47.8	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	49.6	64.1	350	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	350	3.7	—	
	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	350	4.1	—	
	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	720	4.3	—	
	392	○	○	○	○	○	○	○	33	40	43	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	350	4.8	—	
	469	○	○	○	○	○	○	○	34	40	43	19.1	27.0	33.2	38.4	46.9	60.7	71.8	85.6	121	149	192	350	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	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	12.3	15.9	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	18.6	24.1	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	24.7	31.8	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	37.0	47.8	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	49.6	64.1	390	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	390	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	390	4.5	—	
	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	○	○	○	○	○	○	○	21	25	31	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	390	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	—		
15	23	○	○	○	○	○	○	○	10	15	19	0.94	1.33	1.63	1.88	2.30	2.97	3.51	4.20	5.94	7.27	9.39	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	11.4	14.6	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	18.6	24.1	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	24.7	31.8	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	37.0	47.8	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	49.6	64.1	500	3.5	—	
	196	○	○	○	○	○	○	○	13	15	19	8.00	11.3	13.9	16.0	19.6	25.3	30.0	35.8	50.6	62.0	80.0	850	3.8	—	
	235	○	○	○	○	○	○	○	13	15	19	9.54	13.6	16.6	19.2	23.5	30.3	35.9	42.9	60.7	74.3	95.9	500	4.3	—	
	274	○	○	○	○	○	○	○	13	15	19	11.2	15.8	19.4	22.4	27.4	35.4	41.9	50.0	70.7	86.6	112	500	4.7	—	
	314	○	○	○	○	○	○	○	13	15	19	12.8	18.1	22.2	25.6	31.4	40.5	48.0	57.3	81.1	99.3	128	950	5.2	—	
	392	○	○	○	○	○	○	○	13	15	19	16.0	22.6	27.7	32.0	39.2	50.6	60.0	71.6	101	124	160	500	5.4	—	
	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	—	

●.....With strainer ○.....Without strainer

How to order VE series

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

① Complete nozzle

Example...1/4MVE11519S303W

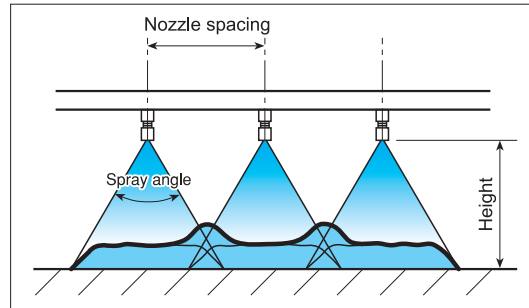
1/4MVE	115	19	S303	W
Spray Angle Code	Spray Capacity Code	Material	Strainer	
115	03	S303	W (with Strainer)	
15				

# Effective Use of Even Flat Spray Nozzles

## Spray Distribution

Even flat spray nozzles are designed to produce an even spray distribution to even out the cleaning power in the spray width direction and are suitable for cleaning when using one nozzle.

When using even flat spray nozzles in multiple-nozzle arrangements, the overlapping spray distribution may be inferior to that of standard flat spray nozzles.



## Tightening Torque

For high-pressure cleaning, highly wear-resistant CERJET® nozzles with ceramic orifice inserted are most suitable. However, if screwed too tight, the nozzle body, especially small ones such as 1/8" size, may be damaged which results in cracking the ceramic orifice. Please apply the recommended torque. Tightening torque should not exceed the following.

8 N-m for size 1/8M (stainless steel body and brass body)

15 N-m for size 1/4M (stainless steel body and brass body)

## Cleaning Force

The factors for showing cleaning efficiency of a nozzle are complex. To evaluate them, we use the spray impact and the amount of cavitation erosion. At a given liquid pressure, spray capacity and spray distance, the cleaning force of the solid stream jet nozzle is the strongest followed by the flat spray nozzles and the cone spray nozzles.

### [Spray Impact]

Nozzle	Spray impact (x $\frac{1}{100}$ N/cm)	
	Max.	Average
1/8 MDSP15104	560	503
1/8 MVNP1580	460	390

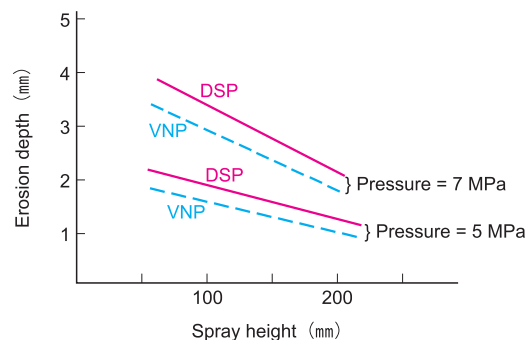
■ Pressure: 5 MPa  
■ Spray height: 150 mm



### [Amount of Cavitation Erosion]

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

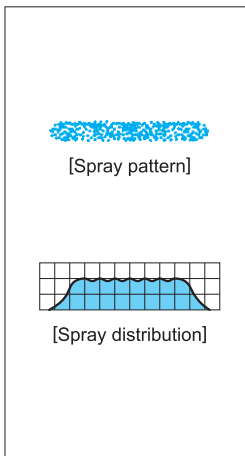
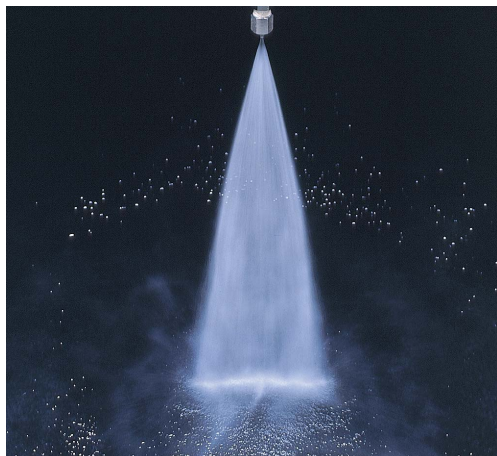
Specifications	1/8 MDSP15104		1/8 MVNP1580	
Pressure (MPa)	5.0	7.0	5.0	7.0
Spray angle (°)	16.0	16.0	16.5	17.0
Spray capacity (ℓ/min)	9.9	11.7	10.1	12.0



# High Pressure Cleaning Even Flat Spray Nozzles

# VNP

Flat Spray



### [Features]

- Flat spray pattern with uniform distribution throughout pattern area.
- Small 1/8" pipe connection size for high pressure cleaning.

### [Standard Pressure]

3 MPa

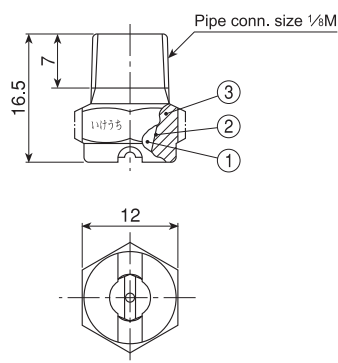
### [Applications]

High pressure cleaning:

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

## VNP series

VNP series (with ceramic orifice inserted)	
Structure	● Ceramic orifice inserted and adhered into metal body.
Material	● Spray orifice: ceramic ● Metal parts: S303 or B (brass) ● Optional material: S316
Mass	● S303: 7 g ● B (brass): 7.4 g



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

Spray Angle Code	Spray Capacity Code	Pipe Conn. Size	Spray Angle (°)			Spray Capacity (ℓ/min)												Free Pass. Dia. (mm)
			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	1/8M		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	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	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	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	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	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	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	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	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	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	1/8M		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	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	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	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	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	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	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	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	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	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
			87	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	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	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			
30	1/8M		26	30	30	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	30	30	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	30	30	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	30	30	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	30	30	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	30	30	3.22	4.54	5.08	5.56	6.01	6.42	6.81	7.18	8.19	9.08	10.2	12.4	1.1
			62	30	30	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	30	30	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	30	30	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	30	30	4.65	6.56	7.35	8.04	8.68	9.28	9.85	10.4	11.8	13.1	14.7	18.0	1.3
			87	30	30	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
			99	30	30	5.72	8.08	9.04	9.89	10.7	11.4	12.1	12.8	14.6	16.2	18.1	22.1	1.5
			124	30	30	7.15	10.1	11.3	12.4	13.4	14.3	15.2	16.0	18.2	20.2	22.6	27.7	1.7

Spray Angle Code	Spray Capacity Code	Pipe Conn. Size	Spray Angle (°)			Spray Capacity (ℓ/min)												Free Pass. Dia. (mm)
			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	1/8M	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	1.1
	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	1.3
	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	1.3
	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	1.4
	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	1.5
	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	1.7
	15		25	1/8M	12	15	15	1.43	2.02	2.25	2.47	2.67	2.85	3.03	3.19	3.64	4.03	4.51
31		12	15		15	1.78	2.52	2.82	3.09	3.34	3.57	3.78	3.99	4.55	5.05	5.64	6.91	0.8
37		12	15		15	2.14	3.03	3.39	3.71	4.01	4.28	4.54	4.79	5.46	6.06	6.77	8.30	0.9
43		12	15		15	2.50	3.54	3.96	4.33	4.68	5.00	5.30	5.59	6.37	7.06	7.91	9.67	1.0
49		12	15		15	2.86	4.04	4.52	4.94	5.34	5.71	6.06	6.38	7.28	8.07	9.04	11.1	1.1
56		12	15		15	3.22	4.54	5.08	5.56	6.01	6.42	6.81	7.18	8.19	9.08	10.2	12.4	1.1
62		12	15		15	3.57	5.05	5.65	6.18	6.68	7.14	7.57	7.98	9.10	10.1	11.3	13.8	1.2
68		12	15		15	3.93	5.55	6.21	6.80	7.35	7.85	8.33	8.79	10.0	11.1	12.4	15.2	1.3
74		12	15		15	4.29	6.06	6.78	7.42	8.01	8.56	9.09	9.58	10.9	12.1	13.6	16.6	1.3
80		12	15		15	4.65	6.56	7.35	8.04	8.68	9.28	9.85	10.4	11.8	13.1	14.7	18.0	1.4
87		12	15		15	5.00	7.07	7.91	8.66	9.35	10.0	10.6	11.2	12.8	14.1	15.8	19.4	1.5
93		12	15		15	5.36	7.58	8.48	9.28	10.0	10.7	11.4	12.0	13.7	15.2	17.0	20.8	1.5
99		12	15		15	5.72	8.08	9.04	9.89	10.7	11.4	12.1	12.8	14.6	16.2	18.1	22.1	1.6
111		12	15		15	6.43	9.09	10.2	11.1	12.0	12.9	13.6	14.4	16.4	18.2	20.3	24.9	1.6
124	12	15	15	7.15	10.1	11.3	12.4	13.4	14.3	15.2	16.0	18.2	20.2	22.6	27.7	1.7		

How to order

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

<Example>...1/8MVNP6543S303

1/8MVNP      65      43      S303

	Spray Angle Code	Spray Capacity Code	Material
65	65	25	S303
∫	∫	∫	B
■ 15		■ 124	

[Note] Color of ceramic orifice differs depending on nozzle codes.

When Spray Angle Code is 25 or 15 and Spray Capacity Code is in the range of 43–124, "Brown tip" or "Brown" is indicated after material code.

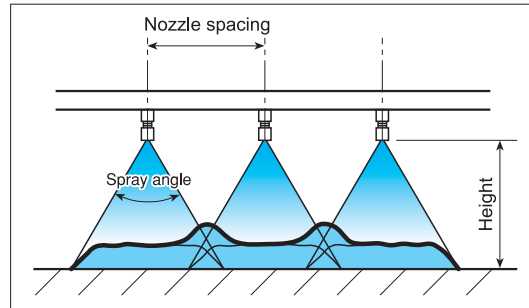
<Example> 1/8MVNP2543S303 (Brown tip)

# Effective Use of Even Flat Spray Nozzles

## Spray Distribution

Even flat spray nozzles are designed to produce an even spray distribution to even out the cleaning power in the spray width direction and are suitable for cleaning when using one nozzle.

When using even flat spray nozzles in multiple-nozzle arrangements, the overlapping spray distribution may be inferior to that of standard flat spray nozzles.



## Tightening Torque

For high-pressure cleaning, highly wear-resistant CERJET® nozzles with ceramic orifice inserted are most suitable. However, if screwed too tight, the nozzle body, especially small ones such as 1/8" size, may be damaged which results in cracking the ceramic orifice. Please apply the recommended torque. Tightening torque should not exceed the following.

8 N-m for size 1/8M (stainless steel body and brass body)

15 N-m for size 1/4M (stainless steel body and brass body)

## Cleaning Force

The factors for showing cleaning efficiency of a nozzle are complex. To evaluate them, we use the spray impact and the amount of cavitation erosion. At a given liquid pressure, spray capacity and spray distance, the cleaning force of the solid stream jet nozzle is the strongest followed by the flat spray nozzles and the cone spray nozzles.

### [Spray Impact]

Nozzle	Spray impact (x $\frac{1}{100}$ N/cm)	
	Max.	Average
1/8 MDSP15104	560	503
1/8 MVNP1580	460	390

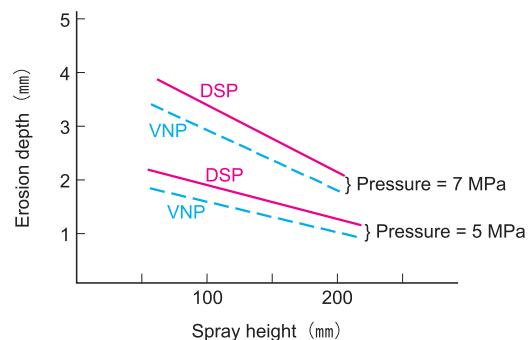
■ Pressure: 5 MPa  
■ Spray height: 150 mm



### [Amount of Cavitation Erosion]

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

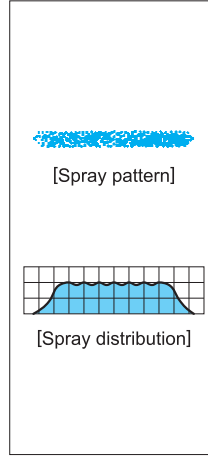
Specifications	1/8 MDSP15104		1/8 MVNP1580	
Pressure (MPa)	5.0	7.0	5.0	7.0
Spray angle (°)	16.0	16.0	16.5	17.0
Spray capacity (ℓ/min)	9.9	11.7	10.1	12.0



# Descaling Nozzles

# DSP

Flat Spray



### [Features]

- World-rare flat spray nozzle engineered especially for powerful cleaning and descaling. Producing a thin flat spray pattern like a sharp razor blade, these nozzles have more powerful cleaning effects than any other flat spray nozzles.

### [Standard Pressure]

5 MPa

### [Applications]

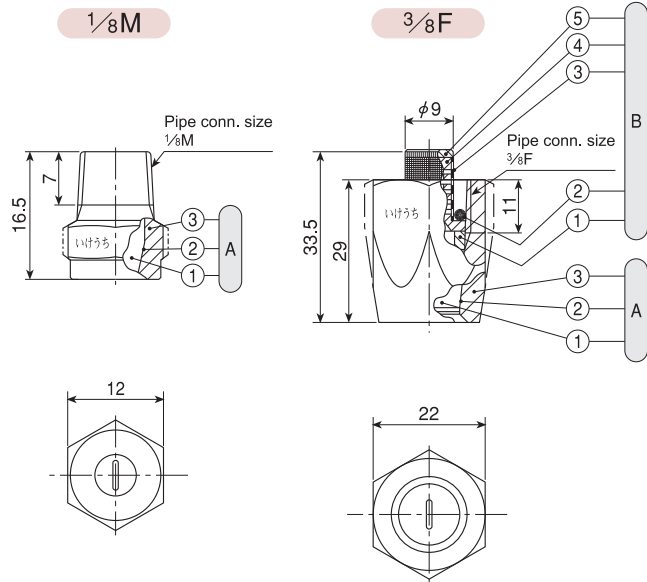
High pressure cleaning, descaling, rust-removal, degreasing

## DSP series

DSP series (with ceramic orifice inserted)	
Structure	<ul style="list-style-type: none"> <li>Ceramic orifice inserted and adhered into metal body.</li> <li>Opening of ceramic orifice is circular from inlet to throat and it gradually contracts to a longer rectangle towards the outlet.</li> </ul>
Material	<ul style="list-style-type: none"> <li>Spray orifice: ceramic</li> <li>Metal parts: S303</li> </ul>
Mass	<ul style="list-style-type: none"> <li>1/8M: 7 g</li> <li>3/8F: 52 g</li> </ul>

(When with a strainer, add 2–5 g to the above mass.)

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



- Ⓐ **Nozzle** (①Ceramic orifice ②Adhesive: Araldite® ③Body)  
 Ⓑ **Strainer** (①Packing [PTFE] ②O-ring [NBR] ③Strainer screen [S316])  
 (④Strainer holder ⑤Strainer cap)

Spray Angle Code	Spray Capacity Code	Pipe Conn. Size		Spray Angle (°)			Spray Capacity (ℓ/min)										Free Pass. Dia. (mm)
		1/8M	3/8F	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)
		1/8M	3/8F	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		●	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		●	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	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	12.9	13.9	14.8	15.7	16.6	18.9	21.0	23.5	28.8	33.2	0.5
	189		○	11	12	12	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	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	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	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	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	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	67.0	72.5	77.4	82.1	86.5	98.6	110	123	150	173	2.6

●.....With strainer (mesh size #150) ○.....Without strainer

**Precautions for use**

Please use clean water to prevent the nozzles from clogging.

**How to order**

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

〈Example〉...1/8MDSP1556S303 (Brown)

1/8M	DSP	15	56	S303	(Brown)
<small>Pipe Conn. Size</small>		<small>Spray Angle Code</small>	<small>Spray Capacity Code</small>		<small>Strainer</small>
1/8M		15	56		W (with Strainer)
3/8F		12	5		- (without Strainer)
			865		

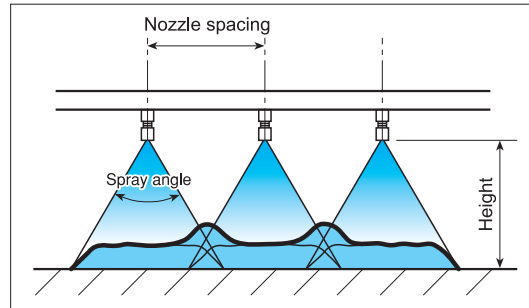


# Effective Use of Even Flat Spray Nozzles

## Spray Distribution

Even flat spray nozzles are designed to produce an even spray distribution to even out the cleaning power in the spray width direction and are suitable for cleaning when using one nozzle.

When using even flat spray nozzles in multiple-nozzle arrangements, the overlapping spray distribution may be inferior to that of standard flat spray nozzles.



## Tightening Torque

For high-pressure cleaning, highly wear-resistant CERJET® nozzles with ceramic orifice inserted are most suitable. However, if screwed too tight, the nozzle body, especially small ones such as 1/8" size, may be damaged which results in cracking the ceramic orifice. Please apply the recommended torque. Tightening torque should not exceed the following.

8 N-m for size 1/8M (stainless steel body and brass body)

15 N-m for size 1/4M (stainless steel body and brass body)

## Cleaning Force

The factors for showing cleaning efficiency of a nozzle are complex. To evaluate them, we use the spray impact and the amount of cavitation erosion. At a given liquid pressure, spray capacity and spray distance, the cleaning force of the solid stream jet nozzle is the strongest followed by the flat spray nozzles and the cone spray nozzles.

### [Spray Impact]

Nozzle	Spray impact (x $\frac{1}{100}$ N/cm)	
	Max.	Average
1/8 MDSP15104	560	503
1/8 MVNP1580	460	390

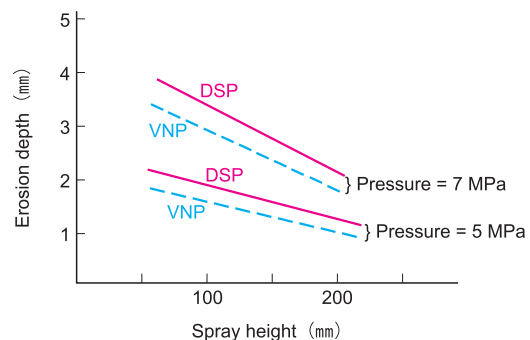
■ Pressure: 5 MPa  
■ Spray height: 150 mm



### [Amount of Cavitation Erosion]

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

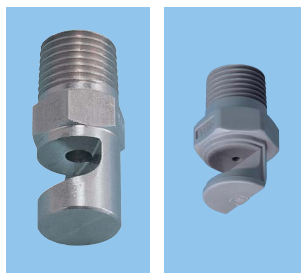
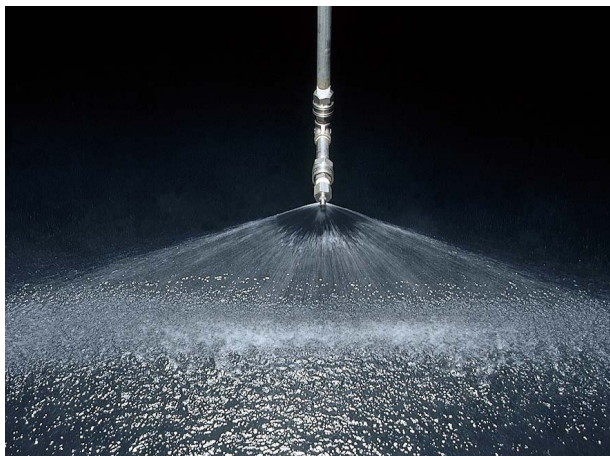
Specifications	1/8 MDSP15104		1/8 MVNP1580	
Pressure (MPa)	5.0	7.0	5.0	7.0
Spray angle (°)	16.0	16.0	16.5	17.0
Spray capacity (ℓ/min)	9.9	11.7	10.1	12.0



# Wide-angle Flat Spray Nozzles

YYP

Flat Spray



### [Features]

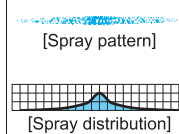
- Capable of generating wide-angle flat spray even at low liquid pressure.
- YYP clogs the least compared with other flat spray nozzles, although the spray impact is less strong.
- Spray direction is 75° to the nozzle axis.

### [Standard Pressure]

0.15 MPa

### [Applications]

- Cleaning: Conveyor belts, film, eliminator plates, plate glass, planks
- Foam breaking: Waste water treatment, paper manufactures
- Cooling: Conveyor belts, roofs, tanks
- Water screen: Fire protection, heat protection, deodorization
- Others: Applications which require wide angle flat spray at low pressures



## YYP series

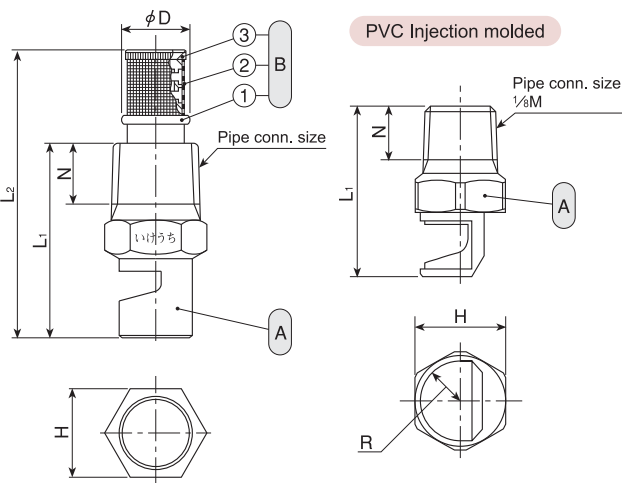
YYP series	
Structure	• Made of metal or plastic, one-piece structure.
Material	• S303 or B (brass), Injection-molded PVC (polyvinyl chloride) • Optional material: S316 or others

Series	Pipe conn. size *2	Dimensions (mm)						Mass (g)*1		
		L <sub>1</sub>	L <sub>2</sub>	H	φD	N	R	S303	B	PVC
YYP	1/8M (03-13)	23	35.5	10	7.5	7	—	7.5	8	—
	1/8M (16-60)	25	—	10	—	7	—	9.3	10	—
	1/4M	34	—	14	—	10.5	—	28	30	—
	3/8M	44	—	19	—	11	—	65	72	—
	1/2M	50	—	22	—	14	—	105	112	—
	3/4M (620)	55	—	27	—	15	—	175	187	—
	3/4M (1000)	65	—	36	—	15	—	345	370	—
YYP (Injection molded)	1/8M (03-13)	21.5	—	12	—	7	4.5	—	—	1.8
	1/8M (16-30)	22.5	—	12	—	7	5.25	—	—	1.8

\*1) When with a strainer, add 2-5 g to the above mass.

\*2) Figures in ( ) after the pipe connection sizes indicate the spray capacity codes.

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



Ⓐ Nozzle

Ⓑ Strainer (1) Strainer holder (2) Strainer screen [S316] (3) Strainer cap

## YYP series (Metal)

Spray Capacity Code	Pipe Conn. Size						Spray Angle (°)			Spray Capacity (ℓ/min)					Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	Strainer Mesh Size
	1/8M	1/4M	3/8M	1/2M	3/4M	1 M	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		0.7	50
05	●						—	130	136	—	—	0.41	0.50	0.58		0.8	50
07	○						—	130	136	—	—	0.57	0.70	0.81	∩	1.0	—
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		1.3	—
16	○						110	130	134	—	0.92	1.31	1.60	1.85	280	1.5	—
20	○						116	135	139	0.89	1.15	1.63	2.00	2.31		1.7	—
25	○						117	135	139	1.12	1.44	2.04	2.50	2.89		1.8	—
30	○						118	135	139	1.34	1.73	2.45	3.00	3.46	∩	2.0	—
40	○						119	135	139	1.79	2.31	3.27	4.00	4.62		2.4	—
50	○						120	135	138	2.24	2.89	4.08	5.00	5.77		2.6	—
60	○						121	135	138	2.68	3.46	4.90	6.00	6.93	470	2.8	—

●.....With strainer ○.....Without strainer

# Wide-angle Flat Spray Nozzles YYP series

Flat Spray

## YYP series (Metal)

Spray Capacity Code	Pipe Conn. Size						Spray Angle (°)			Spray Capacity (ℓ/min)					Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	Strainer Mesh Size
	1/8M	1/4M	3/8M	1/2M	3/4M	1M	0.05 MPa	0.15 MPa	0.2 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa			
70		○					125	140	144	3.13	4.04	5.72	7.00	8.08	480	3.1	—
100		○					128	140	143	4.47	5.77	8.16	10.0	11.5	∫	3.6	—
140		○					130	140	143	6.26	8.08	11.4	14.0	16.2	610	4.3	—
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	5.3	—
320				○			134	140	142	14.3	18.5	26.1	32.0	37.0	∫	6.4	—
450				○			135	140	142	20.1	26.0	36.7	45.0	52.0	850	7.6	—
620					○		135	140	142	27.7	35.8	50.6	62.0	71.6	∫	9.0	—
1000					○		135	140	141	44.7	57.7	81.6	100	115	1,150	11.4	—
1500						○	136	140	140	67.1	86.6	122	150	173	1,100	14.5	—
2500						○	136	140	140	112	155	204	250	289	1,550	18.5	—

●.....With strainer ○.....Without strainer

## YYP-PVC series (Injection molded)

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		0.7
05	—	130	136	—	—	0.41	0.50	0.58		0.8
07	—	130	136	—	—	0.57	0.70	0.81	∫	1.0
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		1.3
16	110	130	134	—	0.92	1.31	1.60	1.85	280	1.5
20	116	135	139	0.89	1.15	1.63	2.00	2.31		1.7
25	117	135	139	1.12	1.44	2.04	2.50	2.89	∫	1.8
30	118	135	139	1.34	1.73	2.45	3.00	3.46	380	2.0

[Note] No strainers for injection-molded YYP-PVC series.

### How to order

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

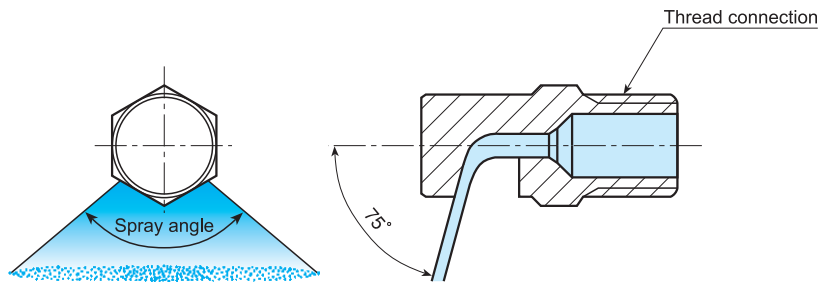
〈Example〉...1/8MYYP03S303W

<b>1/8M</b>	<b>YYP</b>	<b>03</b>	<b>S303</b>	<b>W</b>
Pipe Conn. Size		Spray Capacity Code	Material	Strainer
1/8M		03	S303	W (with Strainer)
∫		∫	B	— (without Strainer)
1M		2500	PVC (Injection molded)	

# Effective Use of Wide-angle Flat Spray Nozzles

## Spray Angle and Inclination Angle

Wide-angle flat spray nozzles spray at an angle of  $75^\circ$  to the axis of the nozzle. For installation, the inclination angle of  $75^\circ$  must be taken into consideration.

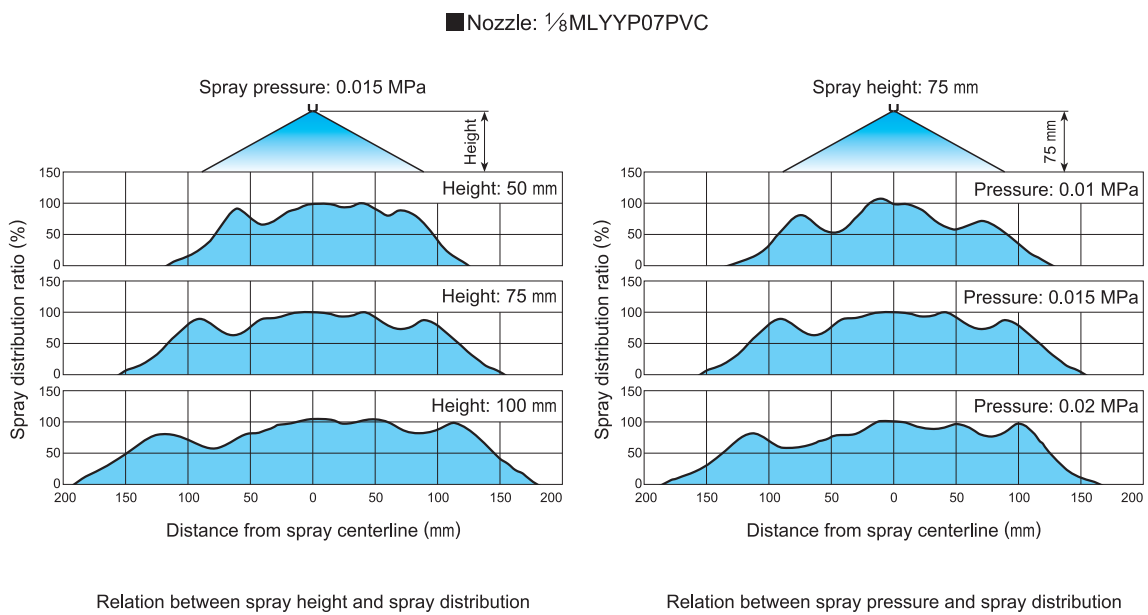


## Free Passage Diameter

The free passage diameter shows the approximate diameter of the spray orifice. Wide-angle flat spray nozzles have the largest free passage diameters among all the flat spray nozzles having the same spray capacity and are more suitable for spraying when water quality is a problem.

## Spray Distribution of LYYP series Wide-angle Flat Spray Nozzle for Ultra-low Pressure Spraying

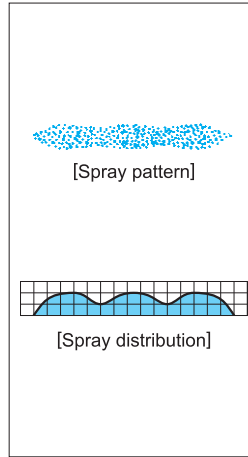
The variation in spray distribution is minimal despite changes in the spray height and spray pressure.



# Wide-angle Flat Spray Nozzles for Ultra-low Pressure Spraying

Patented

# LYYP



### [Features]

- Wide-angle flat spray with uniform distribution.
- Capable of low operating pressures (0.015 MPa).
- Low volume spray has such a low impact force that no bubbles nor foam will appear on the spray surface. All LYYP products are treated oil-free.

### [Standard Pressure]

0.015 MPa

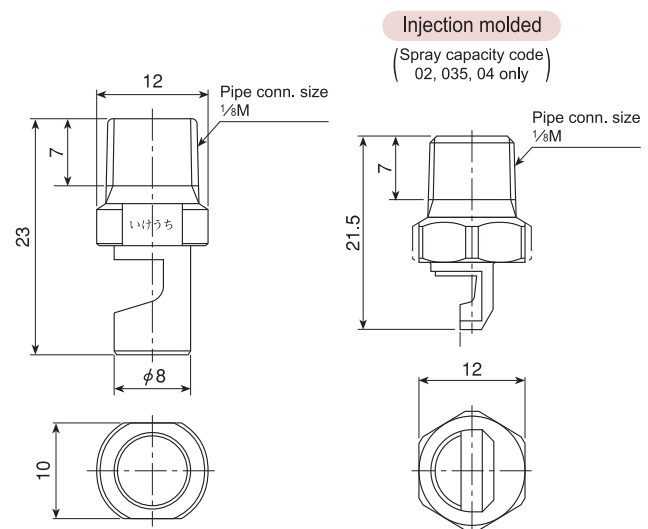
### [Applications]

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

Flat Spray

## LYYP series

LYYP series	
Structure	● Made of plastic, one-piece structure.
Material	● PVC (polyvinyl chloride) ● Optional material: S316 or PCTFE
Mass	● 1.5 g



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

Spray Capacity Code	LYYP	LYYP (Injection molded)	Spray Angle (°)			Spray Capacity (ℓ/min)							Mean Drop. Dia. (μm)	Free Pass. Dia. (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	0.29	0.35	0.41	1.0		
03	○		77	90	97	0.22	0.24	0.27	0.35	0.42	0.49	1.0		
035		○	87	100	107	0.26	0.29	0.31	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

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

### How to order

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

#### ① LYYP series

〈Example〉... 1/8 MLYYP025PVC

1/8 M LYYP 025 PVC

Spray Capacity Code
025
}
10

#### ② LYYP (Injection molded) series

〈Example〉... 1/8 MLYYP02PVC-IN

1/8 M LYYP 02 PVC-IN

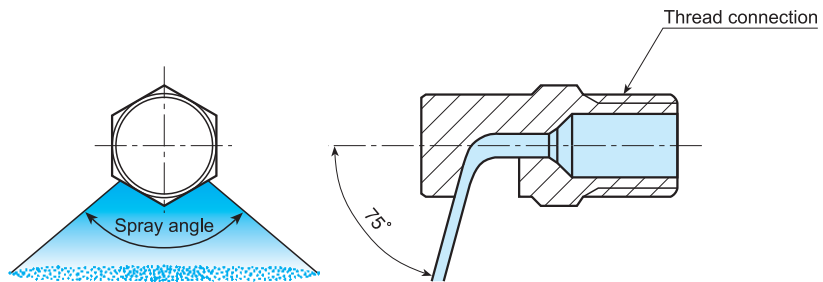
Spray Capacity Code
02
035*
04

\*When Spray Capacity Code is 035, the nozzle description is 1/8MLYYP035PVC (Injection-molded).

# Effective Use of Wide-angle Flat Spray Nozzles

## Spray Angle and Inclination Angle

Wide-angle flat spray nozzles spray at an angle of  $75^\circ$  to the axis of the nozzle. For installation, the inclination angle of  $75^\circ$  must be taken into consideration.

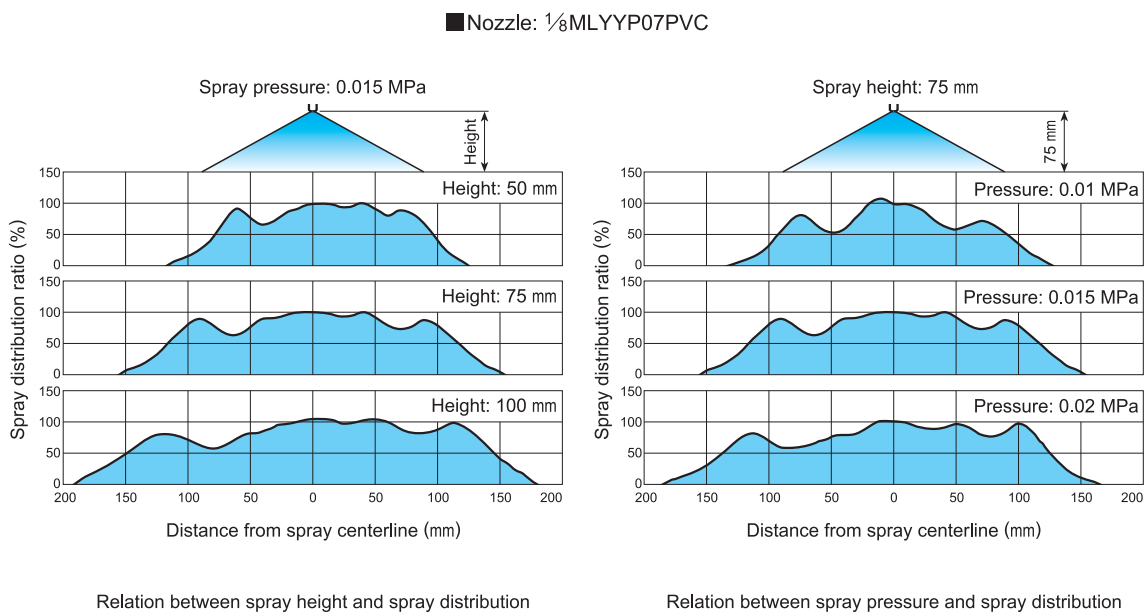


## Free Passage Diameter

The free passage diameter shows the approximate diameter of the spray orifice. Wide-angle flat spray nozzles have the largest free passage diameters among all the flat spray nozzles having the same spray capacity and are more suitable for spraying when water quality is a problem.

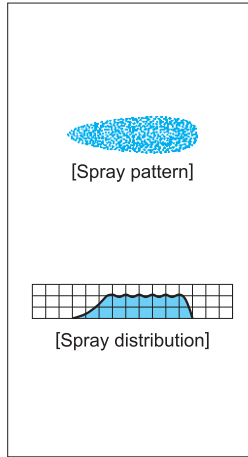
## Spray Distribution of LYYP series Wide-angle Flat Spray Nozzle for Ultra-low Pressure Spraying

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



# Off-center Even Flat Spray Nozzles

# OVVEP



### [Features]

- Off-center flat spray with uniform distribution throughout entire spray pattern solves the problem of accumulation of spray fluid in multiple-nozzle arrangements.
- No need for oblique installation, as the angle is built-in.

### [Standard Pressure]

0.3 MPa

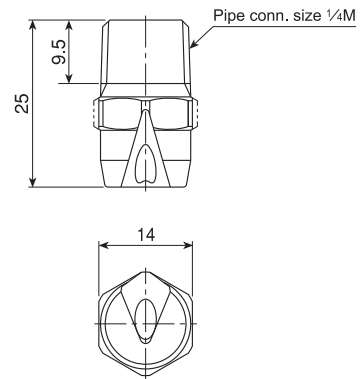
### [Applications]

- Cooling: Steel plates, steel pieces  
 Spraying: Etchants, oils, lubricants, glues, acids, insecticides, herbicides  
 Cleaning: Steel plates, steel pieces, filters, felts, screens

Flat Spray

## OVVEP series

OVVEP series	
Structure	• Made of metal, one-piece structure.
Material	• S303 or B (brass) • Optional material: S316 or others
Mass	• S303: 17 g • B (brass): 18 g



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

Spray Angle Code	Spray Capacity Code	Spray Angle (°)			Spray Capacity (ℓ/min)											Mean Drop. Dia. (μm)	Free Pass. 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	2.4
	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	5	2.7
	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	3.0
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	3.2
	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	5	3.6
	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	4.0

### How to order

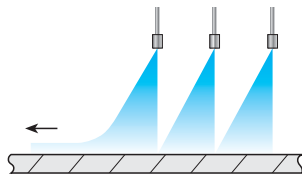
Please inquire or order for a specific nozzle using this coding system.

⟨Example⟩...1/4MOVVEP60200S303

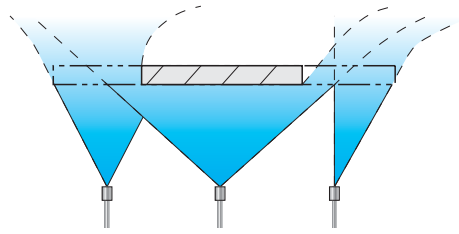
1/4M OVVEP	60	200	S303
	<small>Spray Angle Code</small>	<small>Spray Capacity Code</small>	<small>Material</small>
	60	200	S303
	45	250	B
		300	

# Effective Use of Off-center Even Flat Spray Nozzles

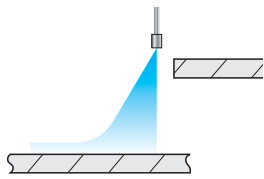
## How to Use Off-center Even Flat Spray Nozzles



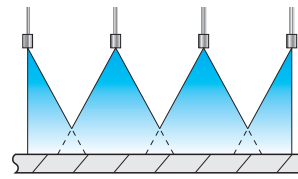
● Spray in one direction



● Avoid spraying on the reverse side



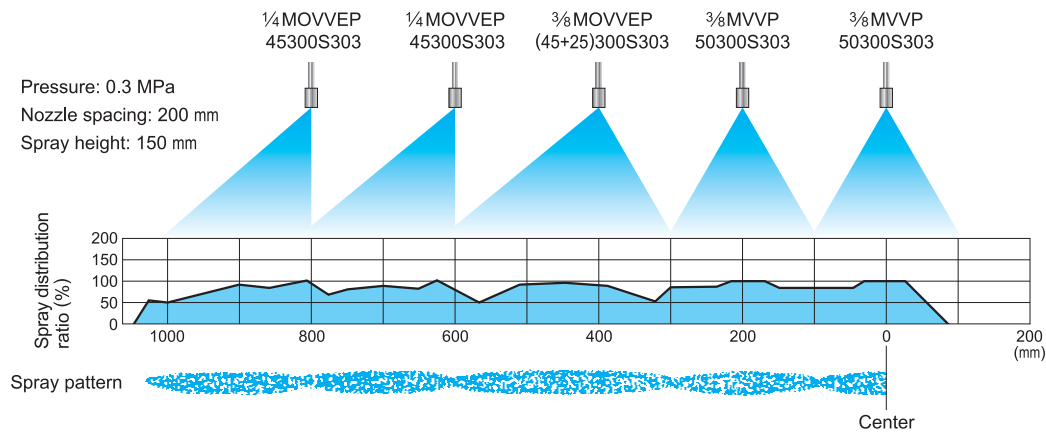
● Spray in a limited space



● Save spray liquid

## Combining Use of OVVEP and Standard Flat Spray Nozzles

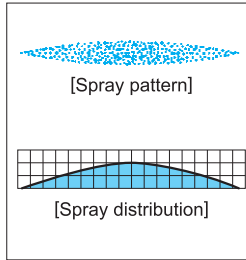
Cooling steel plates; the direction of flow can be controlled by using a combination of OVVEP series nozzles and standard flat spray nozzles.





# Self-cleaning Flat Spray Nozzles

MOMOJet®



**[Features]**

- If clogged, by reducing the pressure to 0.03 MPa, the spray tip is retracted and purges foreign particles. By increasing the pressure to 0.2 MPa and greater, normal spraying is restored.
- Straight-through orifice is suitable for multiple-nozzle arrangement.

**[Standard Pressure]**

0.3 MPa

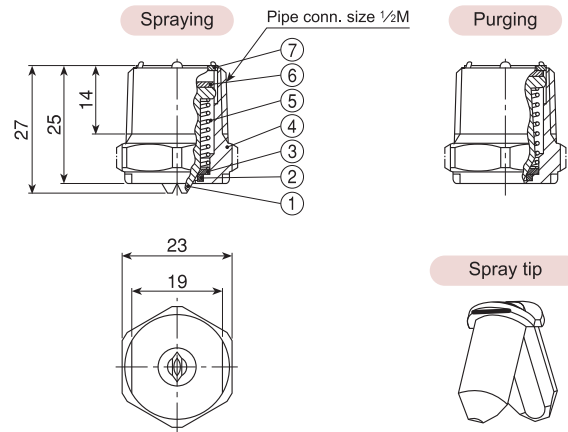
**[Applications]**

- Cleaning: Wire, felt parts and rollers of paper making machines, steel plates, PCB
- Cooling: Steel plates
- Foam breaking: Waste water treatment
- Others: Applications where recirculated water is being used

Flat Spray

**MOMOJet® series**

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



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

- ① Spray Tip
- ② Packing (EPDM)
- ③ Plate
- ④ Body
- ⑤ Spring
- ⑥ Packing (EPDM)
- ⑦ Ring

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	350	1.2	3.3
60	80	83	4.90	6.00	7.75	9.17	11.0	13.4	15.5	490	1.5	3.5

**Precautions for use**

1. To start spraying a flow rate of about 9 ℓ/min at 0.05 MPa is required for all models because the spray tip opens wide. Select an appropriate pump.
2. MOMOJet® is designed to start spraying at the pressure of 0.1 MPa. Use MOMOJet® at 0.2 MPa and greater.
3. Since MOMOJet® series nozzles have active spray tips, the spray capacity is only guaranteed within ±10% and the spray angle within ±10° under standard pressure.

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

⟨Example⟩...1/2MOMO8020S303

1/2 MOMO 80 20 S303

Spray Capacity Code  
 20  
 40  
 60

ALSO AVAILABLE!

Self-cleaning  
Solid Stream Jet  
**MOMOJet® "C"**

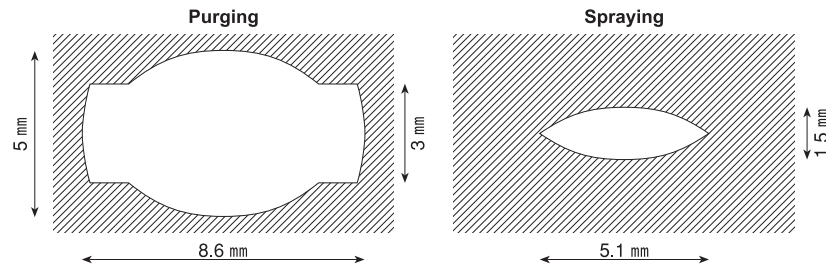
See p.95 of this catalog.

# Effective Use of Self-cleaning Flat Spray Nozzles

## Precaution for MOMOJet® Self-cleaning Nozzles

When purging, the spray tip opens wide and the spray capacity increases. This must be taken into consideration when selecting a pump.

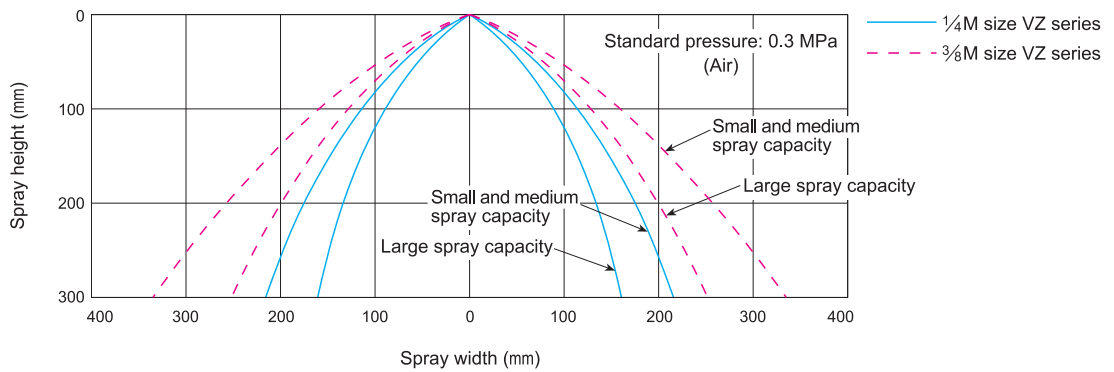
■ Nozzle: 1/2 MOMO8060S303



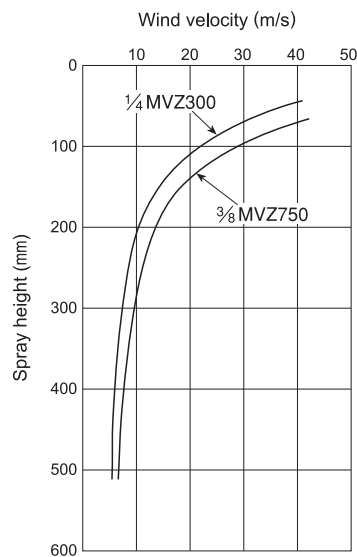
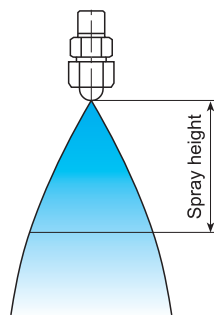
# Effective Use of Air & Steam Spray Nozzles

## VZ series Air & Steam Flat Spray Nozzles / Spray Height and Spray Width

The spray coverage at various spray heights is shown as follows.



The wind velocity at various spray heights is shown as follows.



# Air & Steam Spray Flat Spray Nozzles

VZ

Flat Spray



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



**[Features]**

- Produces a flat spray pattern of air or steam.
- Effective spray angle does not hold long, as air and steam disperse very quickly.

**[Standard Pressure]**

0.3 MPa

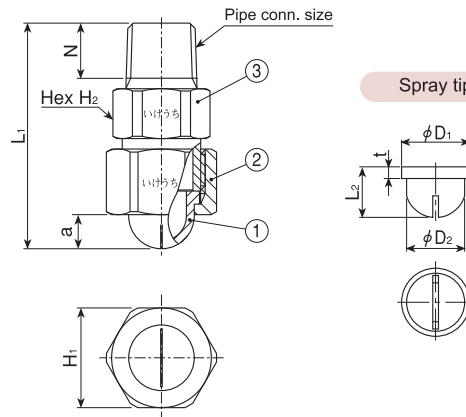
**[Applications]**

Compressed air: Cleaning, dust suppression, drying, air curtain

Steam: Humidification, temperature control, moisture control

**VZ series**

VZ series (three-piece structure)	
Structure	<ul style="list-style-type: none"> <li>● Made of metal, three-piece structure.</li> <li>● Comprises three parts: Spray tip, cap, and adaptor.</li> <li>● Worn-out spray tip can be replaced separately.</li> <li>● Cap and adaptor are exchangeable with those of three-piece structure standard flat spray nozzles for liquids.</li> </ul>
Material	<ul style="list-style-type: none"> <li>● S303 or B (brass)</li> <li>● Optional material: S316</li> </ul>



**[Complete nozzle]**

Pipe conn. size	Dimensions (mm)					Mass (g)	
	L <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	N	a	S303	B
1/4M	43	19	17	10.5	6.5	44	47
3/8M	48.5	23	21	11	9.5	73	78

**[Spray tip]**

Pipe conn. size of complete nozzle	Dimensions (mm)				Mass (g)	
	L <sub>2</sub>	φD <sub>1</sub>	φD <sub>2</sub>	t	S303	B
1/4M	11	14.5	12.5	2.5	4.7	5.0
3/8M	14	18	16	2.5	7.7	8.1

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

Spray Angle Code	Air Capacity Code	Pipe Conn. Size		Air Capacity (ℓ/min, Normal)						Steam Capacity (kg/hr)						Free Pass. Dia. (mm)
		1/4M	3/8M	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	
90	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	0.3
	250	○		90.5	126	188	250	374	498	4.26	5.78	8.57	11.3	16.8	22.2	0.4
	300	○		108	150	224	298	446	594	5.08	6.90	10.2	13.5	20.0	26.5	0.5
	350	○		125	175	261	346	518	690	5.90	8.00	11.9	15.7	23.2	30.7	0.6
	400	○		143	199	297	394	590	786	6.72	9.12	13.5	17.9	26.5	35.0	0.7
	450	○		160	223	333	443	662	882	7.54	10.2	15.2	20.0	29.7	39.3	0.8
	500	○		177	247	369	491	734	977	8.36	11.3	16.8	22.2	32.9	43.5	0.9
	550		○	199	278	414	551	823	1,096	9.38	12.7	18.8	24.9	36.9	48.8	0.6
	600		○	219	305	455	605	905	1,205	10.3	14.0	20.7	27.4	40.6	53.7	0.7
	650		○	235	328	489	650	972	1,295	11.1	15.0	22.3	29.4	43.6	57.7	0.8
	700		○	253	353	526	700	1,047	1,394	11.9	16.2	24.0	31.7	46.9	62.1	0.8
	750		○	272	380	566	753	1,126	1,500	12.8	17.4	25.8	34.1	50.5	66.8	0.9
	900		○	326	454	677	901	1,347	1,794	15.3	20.8	30.8	40.7	60.4	79.9	1.1
1130		○	406	566	844	1,122	1,678	2,235	19.1	25.9	38.4	50.8	75.2	99.5	1.4	

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

**How to order**

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

① Complete nozzle

<Example>...1/4MVZ150S303

1/4M	VZ	150	S303
Pipe Conn. Size	Air Capacity Code		Material
1/4M	150		S303
3/8M	∫		B
	1130		

② Spray tip only

<Example>...1/4VZ150S303

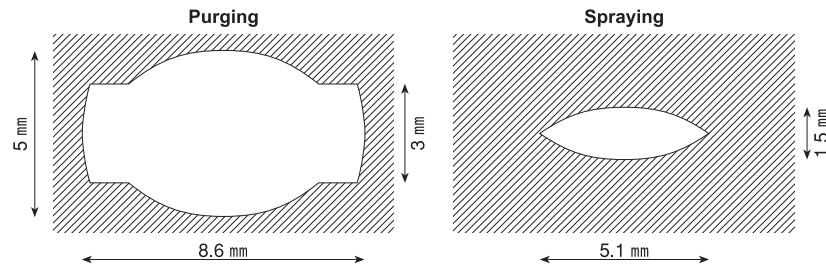
1/4	VZ	150	S303
Pipe Conn. Size	Air Capacity Code		Material
1/4	150		S303
3/8	∫		B
	1130		

# Effective Use of Self-cleaning Flat Spray Nozzles

## Precaution for MOMOJet® Self-cleaning Nozzles

When purging, the spray tip opens wide and the spray capacity increases. This must be taken into consideration when selecting a pump.

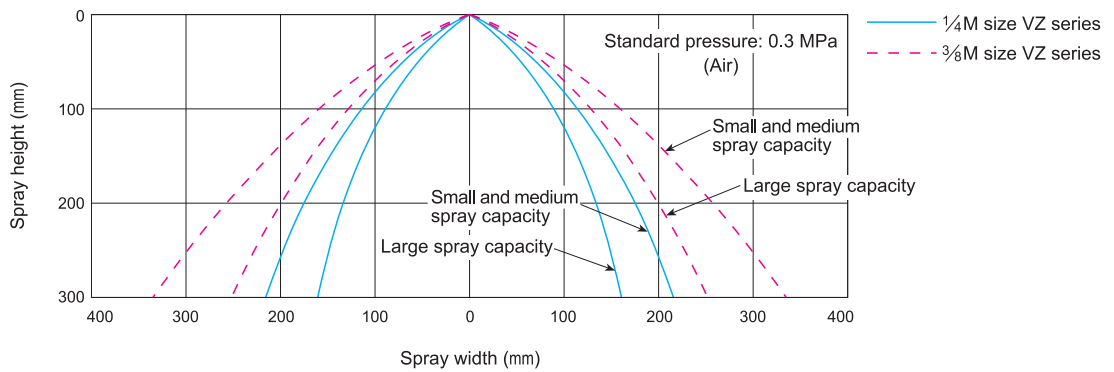
■ Nozzle: 1/2 MOMO8060S303



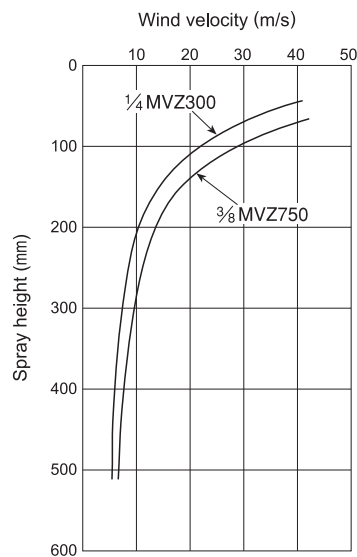
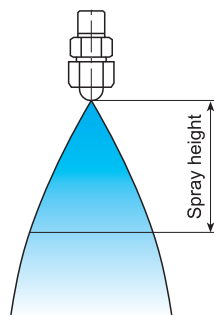
# Effective Use of Air & Steam Spray Nozzles

## VZ series Air & Steam Flat Spray Nozzles / Spray Height and Spray Width

The spray coverage at various spray heights is shown as follows.



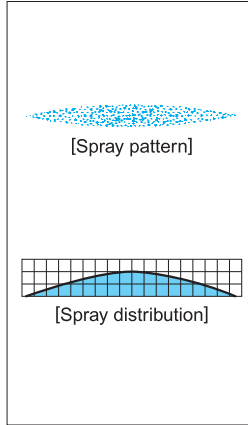
The wind velocity at various spray heights is shown as follows.



# Flat Spray Nozzles with ON/OFF Control

# SO-V

Flat Spray



### [Features]

- Flat spray pattern with a mountain-shaped spray distribution having gradually tapered edges.
- Prevents dripping after spraying stops.
- Quick response ON/OFF spray.
- Spray ON/OFF can be regulated by pilot air ON/OFF.

### [Standard Pressure]

0.3 MPa

### [Applications]

Coating: Release agent, lubricant, food additive (seasoning)

Moisture control: Paper, food

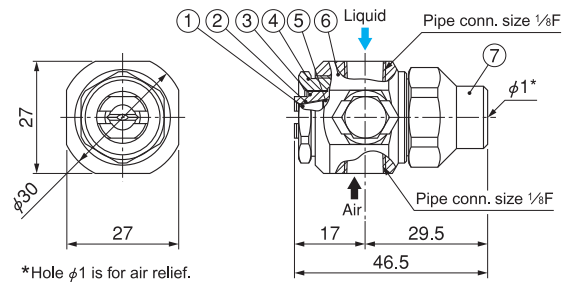
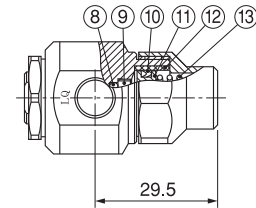
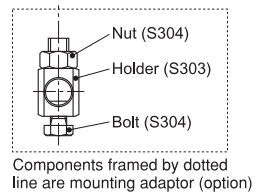
## SO-V series

SO-V series	
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>• Spray orifice: ceramic</li> <li>• Metal parts: S303</li> </ul>
Mass	<ul style="list-style-type: none"> <li>• 150 g</li> </ul>

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

### Mounting adaptor (Optional)

A mounting adaptor is available for fixing SO-V series nozzle onto a pole to spray in the desired direction. Please specify "(with  $\phi 10$  mounting adaptor)" at the end of the product code to order.

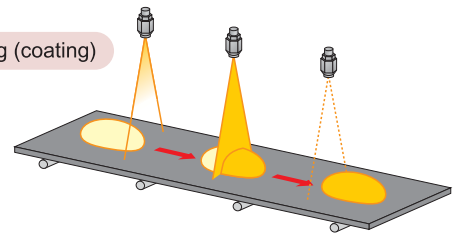


- ①Ceramic orifice ②Adhesive: Araldite® ③Tip retainer ④Cap  
 ⑤Packing (PTFE) ⑥Adaptor ⑦Spring cap ⑧O-ring (FKM) ⑨Lock nut  
 ⑩Y-packing (NBR) ⑪Piston ⑫Sleeve (UHMWPE) ⑬Spring (S304)

Spray Capacity Code	Spray Angle Code								Spray Capacity (ℓ/min)
	0.3 MPa								
	115	90	80	65	50	40	25	15	
02		○	○	○	○	○	○	○	0.20
03	○	○	○	○	○	○	○	○	0.30
04	○	○	○	○	○	○	○	○	0.40
05	○	○	○	○	○	○	○	○	0.50
07	○	○	○	○	○	○	○	○	0.70
10	○	○	○	○	○	○	○	○	1.00
15	○	○	○	○	○	○	○	○	1.50
20	○	○	○	○	○	○	○	○	2.00

For the spray angle and spray capacity at pressures other than 0.3 MPa, please refer to the chart of V series nozzles on pages 13–14.

### Seasoning (coating)



### ■ Operation time chart

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

### How to order

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

<Example> ...1/8SO-V11503S303 (with  $\phi 10$  mounting adaptor)

1/8 SO-V 115 03 S303 (with  $\phi 10$  mounting adaptor)

Spray Angle Code	Spray Capacity Code	(Option)
115	02	
15	20	

### ALSO AVAILABLE!

Solid Stream Jet with ON/OFF Control  
**SO-CM series**

See p.98 of this catalog.

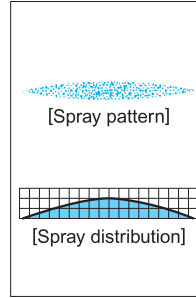
### ⚠ CAUTIONS

- Supply liquid pressure at 0.5 MPa or less. • Supply pilot air pressure at between 0.2 and 0.5 MPa.
- Pilot air ON/OFF regulates spray ON/OFF.
- Recommend use with a 3-way solenoid valve to purge the air inside/between the solenoid valve and SO-V series nozzle at OFF time, for better shut-off and preventing dripping.

# Universal-joint Type Flat Spray Nozzles

# UT+VP

Flat Spray



### [Features]

- Flat spray pattern with a mountain-shaped spray distribution having gradually tapered edges.
- Spray direction is adjustable over a range of 40 degrees as desired.

### [Standard Pressure]

0.3 MPa

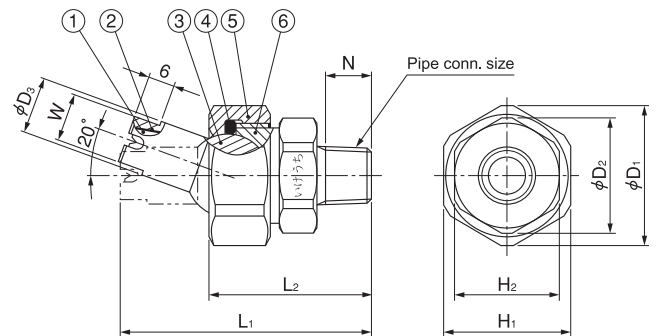
### [Applications]

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

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

## UT+VP series

UT+VP series																																											
Structure	<ul style="list-style-type: none"> <li>● Three-piece structure with ceramic orifice inserted.</li> <li>● Comprises three parts: Nozzle, cap, and adaptor.</li> <li>● Nozzle unit has integrated universal ball joint for adjusting spray direction.</li> </ul>																																										
Material	<ul style="list-style-type: none"> <li>● Spray orifice: ceramic</li> <li>● Metal parts: S303</li> </ul>																																										
Pipe conn. size	<table border="1"> <thead> <tr> <th colspan="10">Dimensions (mm)</th> <th rowspan="2">Mass (g)</th> </tr> <tr> <th>L<sub>1</sub></th> <th>L<sub>2</sub></th> <th>H<sub>1</sub></th> <th>H<sub>2</sub></th> <th>W</th> <th>φD<sub>1</sub></th> <th>φD<sub>2</sub></th> <th>φD<sub>3</sub></th> <th>N</th> </tr> </thead> <tbody> <tr> <td>1/4M</td> <td>57.5</td> <td>37</td> <td>29</td> <td>24</td> <td>11</td> <td>32</td> <td>26.5</td> <td>13</td> <td>10.5</td> <td>120</td> </tr> <tr> <td>3/8M</td> <td>63.5</td> <td>44</td> <td>35</td> <td>30</td> <td>14</td> <td>38.5</td> <td>33</td> <td>17</td> <td>11</td> <td>200</td> </tr> </tbody> </table>	Dimensions (mm)										Mass (g)	L <sub>1</sub>	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	W	φD <sub>1</sub>	φD <sub>2</sub>	φD <sub>3</sub>	N	1/4M	57.5	37	29	24	11	32	26.5	13	10.5	120	3/8M	63.5	44	35	30	14	38.5	33	17	11	200
Dimensions (mm)										Mass (g)																																	
L <sub>1</sub>	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	W	φD <sub>1</sub>	φD <sub>2</sub>	φD <sub>3</sub>	N																																			
1/4M	57.5	37	29	24	11	32	26.5	13	10.5	120																																	
3/8M	63.5	44	35	30	14	38.5	33	17	11	200																																	



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

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

Spray Angle Code	Spray Capacity Code	Pipe Conn. Size		Spray Angle (°)			Spray Capacity (ℓ/min)								Free Pass. Dia. (mm)
		1/4M	3/8M	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	1.7
	100		○	72	80	85	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8	2.0
	140		○	73	80	85	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1	2.5
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	1.9
	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
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	2.0
	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. Spray nozzle performance is guaranteed only when the nozzle is set at no angle.  
2. For spray droplet diameter, please refer to the chart of VP series nozzles on page 17.

### How to order

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

<Example> ...1/4MUT+VP8030S303

1/4M	UT+VP	80	30	S303
<small>Pipe Conn. Size</small>		<small>Spray Angle Code</small>	<small>Spray Capacity Code</small>	
1/4M		80	30	
3/8M		65	50	
		50	170	

ALSO AVAILABLE!

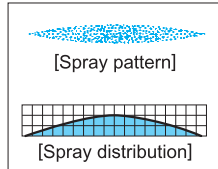
Universal-joint Type  
Solid Stream Jet  
**UT+CP series**

See p.99 of this catalog.



### [Features]

- Flat spray pattern with stable distribution having tapered spray pattern edges.
- Easy installation just by drilling a hole ( $\phi 14.3$  mm) on a pipe and inserting a nozzle.
- Adaptors, color-coded by size, are available in 1", 1 1/4", 1 1/2", 2", 25A and 30A.
- O-ring seals between pipe and adaptor for pressures up to 0.4 MPa.
- Adjust spray direction within 50 degrees as desired.
- Spray tips are color-coded by spray capacity for easy identification.
- Caps are interchangeable for all sizes.
- Easy maintenance with quickly detachable nozzle.
- Double locked by fitting spring lock (option).



### [Standard Pressure]

0.3 MPa

### [Applications]

Pre-treatment for painting: Car, home electric appliances  
 Cleaning: water rinsing after acid treatment of steel plates, water rinsing process in food factory

## QB series

QB series	
Structure	<ul style="list-style-type: none"> <li>● Comprises three parts: Nozzle, ball and adaptor.</li> <li>● Worn-out nozzle can be replaced separately.</li> </ul>
Material	<ul style="list-style-type: none"> <li>● Main parts: FRPP (glass-fiber reinforced polypropylene)</li> <li>● Packing: FEPM</li> <li>● O-ring: NBR</li> <li>● Spring clip and spring lock: S304</li> </ul>

### [QB for metal pipes]

Pipe size (inch)	Color of adaptor	Dimensions (mm)						Mass (g)
		L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	$\phi D_1$	$\phi D_2$	
1	Red	105	89	72	55	34	48	61
1 1/4	Green	114	98	76	55	42.7	48	
1 1/2	Yellow	120	104	79	55	48.6	48	
2	Blue	132	116	85	55	60.5	48	

\*Pipes should be stainless steel pipes compliant with JIS G 3459.

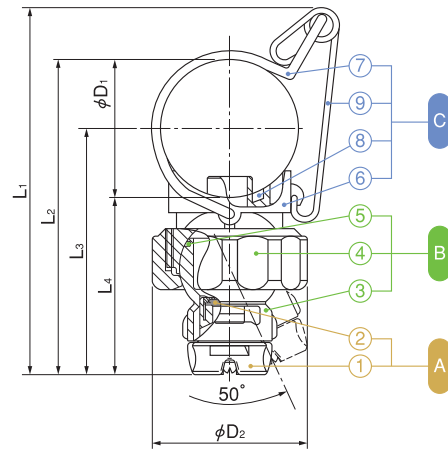
### [QB for PVC pipes]

Pipe size (ND)	Color of adaptor	Dimensions (mm)						Mass (g)
		L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	$\phi D_1$	$\phi D_2$	
25A	Red	103	87	71	55	32	48	61
30A	Green	109	93	74	55	38	48	
40A	Yellow	120	104	79	55	48.6	48	
50A	Blue	132	116	85	55	60.5	48	

\*Pipes should be 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 materials and nozzle codes.



- A Nozzle** (1 Nozzle 2 Packing [FEPM])
- B Ball** (3 Ball 4 Cap 5 O-ring [NBR])
- C Adaptor** (6 Adaptor 7 Spring clip 8 O-ring [NBR] 9 Spring lock\*)

\*⑨ is an optional extra.

Spray Angle Code (at 0.3 MPa)	Spray Capacity Code	Pipe Size		Spray Capacity (ℓ/min)				Mean Droplet Diameter (μm)	Free Passage Diameter (mm)	Color of Nozzle Body	
		(inch)	(ND)	0.1 MPa	0.2 MPa	0.3 MPa	0.4 MPa				
80	80	1	25A	4.62	6.53	8.00	9.24	430	1.7	Red	
	100		5.77	8.16	10.0	11.5	2.0		Grey		
	120	1 1/4	30A	6.93	9.80	12.0	13.9		2.3	Black	
	160		9.24	13.1	16.0	18.5	2.7		Blue		
	180	1 1/2	(40A)	10.4	14.7	18.0	20.8		5	2.8	Orange
	200			11.5	16.3	20.0	23.1			2.8	Cyan
	240			13.9	19.6	24.0	27.7			3.2	Light Blue
	280			16.2	22.9	28.0	32.3			3.6	Red
	390	22.5	31.8	39.0	45.0	4.3	Grey				

Spray Angle Code (at 0.3 MPa)	Spray Capacity Code	Pipe Size		Spray Capacity (ℓ/min)				Mean Droplet Diameter (μm)	Free Passage Diameter (mm)	Color of Nozzle Body
		(inch)	(ND)	0.1 MPa	0.2 MPa	0.3 MPa	0.4 MPa			
65	80	1 • 1¼ • 1½ • 2	25A • 30A • (40A) • (50A)	4.62	6.53	8.00	9.24	460	1.8	Red
	100			5.77	8.16	10.0	11.5		2.2	Grey
	120			6.93	9.80	12.0	13.9		2.4	Black
	160			9.24	13.1	16.0	18.5	560	2.8	Blue
	180			10.4	14.7	18.0	20.8		3.0	Orange
	200			11.5	16.3	20.0	23.1		3.3	Green
	240			13.9	19.6	24.0	27.7	800	3.6	Light Blue
	280			16.2	22.9	28.0	32.3		3.8	Red
	390			22.5	31.8	39.0	45.0		4.5	Grey
40	80	1 • 1¼ • 1½ • 2	25A • 30A • (40A) • (50A)	4.62	6.53	8.00	9.24	560	2.2	Red
	100			5.77	8.16	10.0	11.5		2.5	Grey
	120			6.93	9.80	12.0	13.9		2.8	Black
	160			9.24	13.1	16.0	18.5	800	3.2	Blue
	180			10.4	14.7	18.0	20.8		3.3	Orange
	200			11.5	16.3	20.0	23.1		3.6	Green
	240			13.9	19.6	24.0	27.7	800	3.9	Light Blue
	280			16.2	22.9	28.0	32.3		4.3	Red
	390			22.5	31.8	39.0	45.0		5.1	Grey

[Note] INVV and INJXX series nozzles (p.21, p.63) are not attachable to QB series.

 <b>CAUTIONS</b>	<b>Maximum operating pressure is 0.4 MPa.</b>	* Do not use under conditions where water hammer or sudden change of water pressure may occur.
---	---	--


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

**<Example> ...ISVV65280FRPP+ISB+1¼QBFRPP+L**

NOZZLE PART	BALL PART	ADAPTOR PART	SPRING LOCK (OPTION)																						
ISVV 65 280 FRPP + ISB +		1¼ QB FRPP + L																							
<table border="0"> <tr> <td style="text-align: center;">Spray Angle Code</td> <td style="text-align: center;">Spray Capacity Code</td> </tr> <tr> <td>40</td> <td>80</td> </tr> <tr> <td>65</td> <td>∅</td> </tr> <tr> <td>80</td> <td>390</td> </tr> </table>	Spray Angle Code	Spray Capacity Code	40	80	65	∅	80	390		<table border="0"> <tr> <td style="text-align: center;">Pipe Size*</td> <td></td> </tr> <tr> <td>1"</td> <td>(Outer diameter 34.00 ±0.5 mm)</td> </tr> <tr> <td>1¼"</td> <td>(Outer diameter 42.7 ±0.5 mm)</td> </tr> <tr> <td>1½"</td> <td>(Outer diameter 48.6 ±0.5 mm)</td> </tr> <tr> <td>2"</td> <td>(Outer diameter 60.5 ±0.5 mm)</td> </tr> <tr> <td>25A</td> <td>(Outer diameter 32.00 ±0.5 mm)</td> </tr> <tr> <td>30A</td> <td>(Outer diameter 38.00 ±0.5 mm)</td> </tr> </table>	Pipe Size*		1"	(Outer diameter 34.00 ±0.5 mm)	1¼"	(Outer diameter 42.7 ±0.5 mm)	1½"	(Outer diameter 48.6 ±0.5 mm)	2"	(Outer diameter 60.5 ±0.5 mm)	25A	(Outer diameter 32.00 ±0.5 mm)	30A	(Outer diameter 38.00 ±0.5 mm)	
Spray Angle Code	Spray Capacity Code																								
40	80																								
65	∅																								
80	390																								
Pipe Size*																									
1"	(Outer diameter 34.00 ±0.5 mm)																								
1¼"	(Outer diameter 42.7 ±0.5 mm)																								
1½"	(Outer diameter 48.6 ±0.5 mm)																								
2"	(Outer diameter 60.5 ±0.5 mm)																								
25A	(Outer diameter 32.00 ±0.5 mm)																								
30A	(Outer diameter 38.00 ±0.5 mm)																								

\*[Note] 1. Please refer to the dimensions of φD<sub>1</sub> (outer diameter).  
2. Order 1½" adaptor for 40A, and 2" adaptor for 50A.

### Related Products

Series	Appearance	Features
<b>BAA+QB series</b>		<ul style="list-style-type: none"> <li>● Air washer (air conditioning humidification) nozzle made by combining AA series nozzle (hollow cone spray nozzle) with QB series adaptor and ball parts.</li> <li>● Easy installation. Just open an orifice (φ14.3 mm) into existing piping, then insert the nozzle.</li> <li>● Includes a spring lock to firmly secure the nozzle in place.</li> <li>● Clog-resistant structure.</li> </ul>