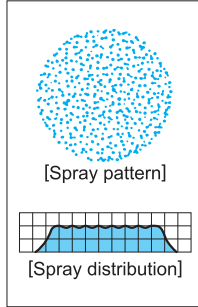
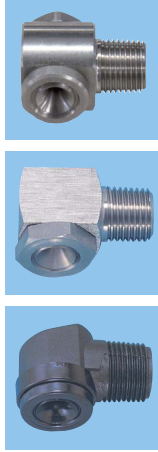


Clog-resistant Vaneless Full Cone Spray Nozzles

AJP/AJP-PPS

Full Cone



[Features]

- Full cone spray pattern with a round impact area and uniform distribution.
- Unique design to produce fine atomization by liquid impinging inside chamber without a whirler.
- No-whirler design with large free passage diameter minimizes clogging.
- Spraying axis 90° from the axis of the nozzle inlet.
- For spraying chemicals such as hydrochloric acid, PPS-injection molded AJP are available for excellent chemical and heat resistance.

[Standard Pressure]

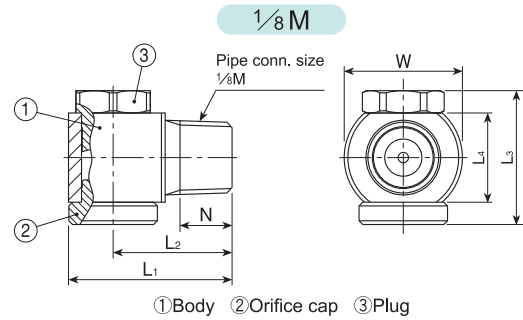
0.2 MPa

[Applications]

Cleaning: Pre-painting treatment, washing booths, machine parts, gas, incinerator fumes
 Cooling: Steel plates, copper pieces, gas
 Spraying: Aeration, foam breaking
 Others: Applications where re-circulated water is being used or clogging is a concern

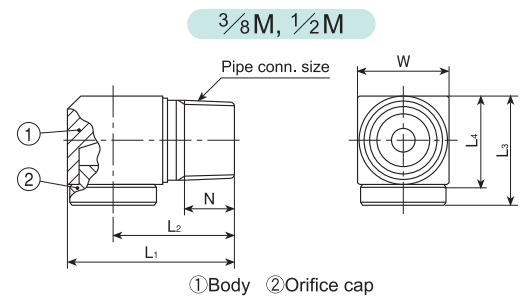
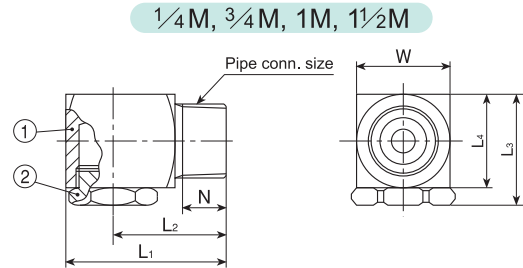
AJP series

AJP series	
Structure	<ul style="list-style-type: none"> • Comprises nozzle body and orifice cap • Only 1/8M size comprises nozzle body, orifice cap, and plug. • Orifice cap of sizes 3/8M and 1/2M are pressed into bodies. • No obstructions in nozzle interior.
Material	<ul style="list-style-type: none"> • Body: S304 or S303 or SCS13 (vary by nozzle code) • Orifice cap: S303 • Optional material: S316



Pipe conn. size	Dimensions (mm)						Mass (g)
	L ₁	L ₂	L ₃	L ₄	W	N	
1/8M	22	16	18	12	15.9	7	23
1/4M	32	23	20.5	16	16	10.5	55
3/8M	36	26	23.5	19	20	11	70
1/2M	46	33.5	31	25	25	14	180
3/4M	55	39	38	32	32	15	340
1M	70	50	48	40	40	18	670
1 1/2M	100	70	72	58.5	58.5	20	2,400

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

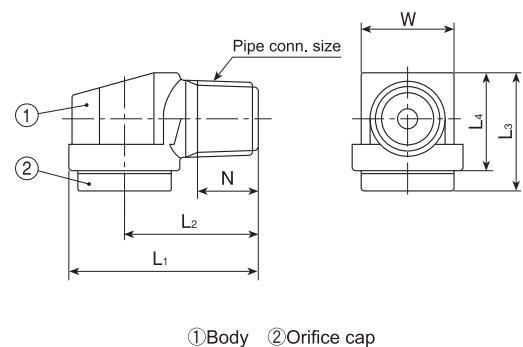


AJP-PPS series

AJP-PPS series	
Structure	<ul style="list-style-type: none"> • One-piece structure with orifice cap electrodeposited to the body. • No obstructions in nozzle interior.
Material	• PPS (polyphenylene sulfide)

Pipe conn. size	Dimensions (mm)						Mass (g)
	L ₁	L ₂	L ₃	L ₄	W	N	
1/4M	32.5	23	20.5	17	16	10.5	6.8
3/8M	37	26	23	20	19	11	10.3

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



Clog-resistant, Vaneless Full Cone Spray Nozzles AJP/AJP-PPS series

Spray Capacity Code	AJP (Metal)							AJP-PPS (Plastic)		Spray Angle (°)			Spray Capacity (ℓ/min)						Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	
	1/8M	1/4M	3/8M	1/2M	3/4M	1M	1 1/2M	1/4M	3/8M	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa			0.5 MPa
02	○									64	75	69	—	1.02	1.43	1.74	2.00	2.35	2.89	640	1.6
03	○									65	75	69	—	1.53	2.14	2.61	3.00	3.53	4.33		1.9
04		○								65	75	68	1.59	2.04	2.86	3.48	4.00	4.70	5.77	}	2.2
05		○								65	75	68	1.99	2.55	3.57	4.35	5.00	5.88	7.21		2.5
06		○								70	80	73	2.39	3.06	4.29	5.22	6.00	7.06	8.66		2.8
07		○								70	80	73	2.79	3.57	5.00	6.09	7.00	8.23	10.1		3.1
08			○							70	80	73	3.19	4.08	5.71	6.96	8.00	9.54	11.9		740
10			○							70	80	73	3.98	5.10	7.14	8.70	10.0	11.9	14.9	}	3.7
12			○							75	85	78	4.78	6.12	8.57	10.4	12.0	14.3	17.9		4.1
14			○							75	85	78	5.57	7.14	10.0	12.2	14.0	16.7	20.9		4.5
16			○							75	85	78	6.37	8.16	11.4	13.9	16.0	19.1	23.8	820	5.0
18				○						76	85	79	7.17	9.18	12.9	15.7	18.0	21.6	27.1	}	5.1
20				○						76	85	79	7.96	10.2	14.3	17.4	20.0	23.9	30.1		5.4
23				○						76	85	79	9.16	11.7	16.4	20.0	23.0	27.5	34.6		6.0
26				○						76	85	79	10.4	13.3	18.6	22.6	26.0	31.1	39.1		6.5
30				○						76	85	79	11.9	15.3	21.4	26.1	30.0	35.9	45.1		900
35				○						83	90	85	13.9	17.9	25.0	30.4	35.0	41.9	52.6	}	7.8
40				○						83	90	85	15.9	20.4	28.6	34.8	40.0	47.9	60.1		8.5
45				○						83	90	85	17.9	23.0	32.1	39.1	45.0	53.9	67.6		9.2
50				○						83	90	85	19.9	25.5	35.7	43.5	50.0	59.9	75.1	9.8	
55					○					83	90	85	21.9	28.1	39.3	47.8	55.0	65.9	82.6	1,000	9.6
60					○					83	90	85	23.9	30.6	42.9	52.2	60.0	71.8	90.2	}	10.1
70					○					83	90	85	27.9	35.7	50.0	60.9	70.0	83.8	105		11.2
80					○					83	90	85	31.9	40.8	57.1	69.6	80.0	95.8	120	}	12.2
90					○					83	90	85	35.8	45.9	64.3	78.3	90.0	108	135		13.0
100						○				83	90	85	39.8	51.0	71.4	87.0	100	120	150	1,120	13.0
120						○				83	90	85	47.8	61.2	85.7	104	120	144	180	}	14.8
150						○				83	90	85	59.7	76.5	107	130	150	180	225		17.4
180							○			83	90	85	71.7	91.8	129	157	180	216	270	1,280	17.8
200							○			83	90	85	79.6	102	143	174	200	239	301	}	18.8
250							○			83	90	85	99.5	128	179	217	250	299	376		1,350

Full Cone

How to order

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

① AJP series (Metal)

〈Example〉...1/4MAJP04S303

1/4M
AJP
04
S303

Pipe Conn. Size
Spray Capacity Code

1/8M
02

}
}

1 1/2M
250

② AJP-PPS series (Plastic)

〈Example〉...3/8MAJP08PPS

3/8M
AJP
08
PPS

Pipe Conn. Size
Spray Capacity Code

1/4M
04

3/8M
}

}
16

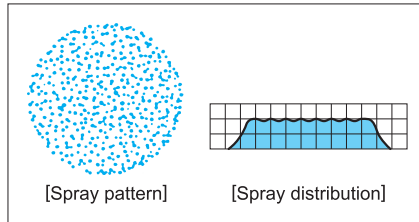
Clog-resistant Vaneless Full Cone Spray Nozzles

AJP-AL92

Related Products

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

Full Cone



[Features]

- Full cone spray pattern with a round impact area and uniform distribution.
- Unique design to produce fine atomization by liquid impinging inside chamber without a whirler.
- No-whirler design with large free passage diameter minimizes clogging.
- Spraying axis 90° from the axis of the nozzle inlet.
- Right angle nozzle suitable for installation in narrow space.

[Standard Pressure]

0.2 MPa

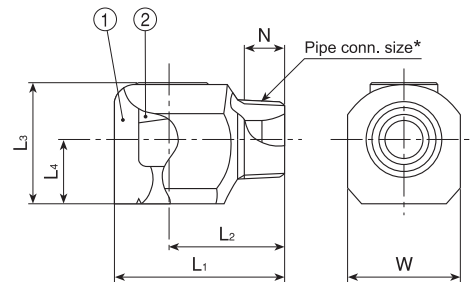
[Applications]

- Spraying slurry
- Absorption tower of flue gas desulfurization equipment
- Spraying water in cooling tower

AJP-AL92 series

AJP-AL92 series	
Structure	<ul style="list-style-type: none"> ● Whole nozzle fired as one piece. ● No obstructions in nozzle interior.
Material	<ul style="list-style-type: none"> ● 92% Alumina

* If installed into a metal header, this nozzle should be used with a socket made of S316, shown on page 85 (otherwise, the thread may be damaged). Please refer to page 85.



①Ceramic body ②Ceramic plate

Pipe conn. size*	Dimensions (mm)						Mass (g)
	L ₁	L ₂	L ₃	L ₄	W	N	
1/2M	49.5	33.5	36	18	32	14	120
3/4M	59	39	44	22	41	15	220
1M	76	50	54	28	50	18	450
1 1/2M	106	70	80.5	43.5	75	20	1,600

* When used with our S316 socket, socket thread for pipe connection is female thread.
Drawing for nozzle with socket is available on request.
(The above drawing is nozzle only)

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

Clog-resistant, Vaneless Full Cone Spray Nozzles AJP-AL92 series

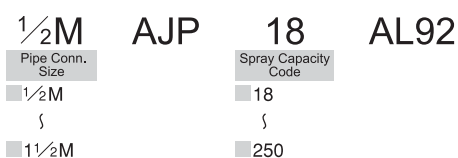
Spray Capacity Code	Pipe Conn. Size				Spray Angle (°)			Spray Capacity (ℓ/min)							Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1/2M	3/4M	1M	1 1/2M	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
18	○				76	85	79	7.16	9.18	12.9	15.7	18.0	21.5	27.1	800	5.1
20	○				76	85	79	7.96	10.2	14.3	17.4	20.0	23.9	30.1		5.4
23	○				76	85	79	9.15	11.7	16.4	20.0	23.0	27.5	34.6		6.0
26	○				76	85	79	10.3	13.3	18.6	22.6	26.0	31.1	39.1		6.5
30	○				76	85	79	11.9	15.3	21.4	26.1	30.0	35.9	45.1		7.1
35	○				83	90	85	13.9	17.9	25.0	30.5	35.0	41.9	52.6		7.8
40	○				83	90	85	15.9	20.4	28.6	34.8	40.0	47.9	60.1	}	8.5
45	○				83	90	85	17.9	23.0	32.1	39.2	45.0	53.9	67.6		9.2
50	○				83	90	85	19.9	25.5	35.7	43.5	50.0	59.9	75.2		9.8
55		○			83	90	85	21.9	28.1	39.3	47.9	55.0	65.8	82.7		9.6
60		○			83	90	85	23.9	30.6	42.8	52.2	60.0	71.8	90.2		10.1
70		○			83	90	85	27.9	35.7	50.0	60.9	70.0	83.8	105		11.2
80		○			83	90	85	31.4	40.8	57.1	69.6	80.0	95.8	120	}	12.2
90		○			83	90	85	35.8	45.9	64.3	78.3	90.0	108	135		13.0
100			○		83	90	85	39.8	51.0	71.4	87.0	100	120	150	}	13.0
120			○		83	90	85	47.8	61.2	85.7	104	120	144	180		14.8
150			○		83	90	85	59.7	76.5	107	131	150	180	226	}	17.4
180				○	83	90	85	71.6	91.8	129	157	180	216	271		17.8
200				○	83	90	85	79.6	102	143	174	200	240	300		18.8
250				○	83	90	85	99.5	128	179	217	250	299	376	1,400	22.3

Full Cone

How to order

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

〈Example〉...1/2MAJP18 AL92



Effective Use of Full Cone Spray Nozzles

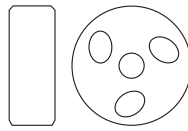
Clogging and Free Passage Diameter

In order to form uniform distribution, full cone spray nozzles are usually fitted with whirlers and this part is the bottleneck of the liquid passage, where clogging problems often occur. Whirlers have several shapes such as X-shaped, disc-shaped and spiral-shaped ones, and the diameter of a sphere that can pass through the whirler is defined as free passage diameter.

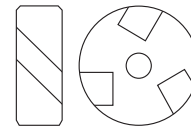
As compared with other whirlers, the **X-shaped whirler** has a larger free passage diameter, which minimizes clogging. Some full cone nozzles without whirlers have been developed to eliminate clogging problems, such as the **AJP series** nozzle which features minimal clogging.



X-shaped whirler



Disc whirler



Spiral-shaped whirler

Wear and Corrosion Resistance

If the liquid contains slurry, the inside of the nozzle exposed to the flow of liquid at high speed will wear out relatively quickly. For these applications, the **JUP series** nozzle is ideal, as the orifice and whirler are made of ceramics. **JUXP, AJP-AL92 and TJJX-SiC series** nozzles are more effective as all parts are made of ceramics. For corrosive applications, nozzles made of special materials such as plastics and titanium alloy are available.

Mass Savings

For arrangements of many large size nozzles, mass savings of the nozzles affects the total production cost for the systems. The **TJJX series** nozzle with a newly developed X-shaped whirler has a 20% shorter overall length and 20% less mass than conventional nozzles. In addition, the mass of TJJX-SiC series nozzle (made of silicon nitride bonded silicon carbide) is less than half of metal nozzles.

Rotation Reaction Force

In full cone spray nozzles with whirlers, rotation torque is generated as a reaction force by the vortex current produced by the whirler, which is determined by the following equation.

$$T \approx C \cdot Q \cdot D \cdot \sqrt{P}$$

[Example]

Nozzle No.	Torque at pressure of 0.2 MPa
¾FJJXP23	0.025 N-m
6TJJX4000	3,000 N-m

T: Torque (N-m)

C: Constant

Q: Spray capacity (ℓ/min)

D: External dimension of whirler (mm)

P: Spray pressure (MPa)

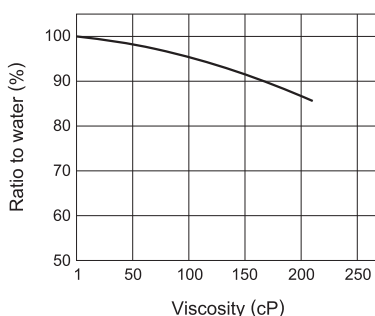
Viscosity

As the viscosity of the liquid increases, generally spray capacity and angle decreases, spray distribution deteriorates and spray droplet size becomes larger.

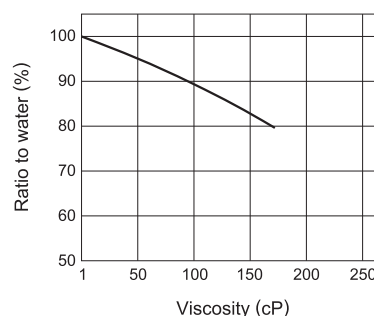
(Spray capacity of hollow cone spray nozzles increases as the viscosity of liquid increases.

See page 55 for details.)

[Relation between viscosity and spray capacity]



[Relation between viscosity and spray angle]


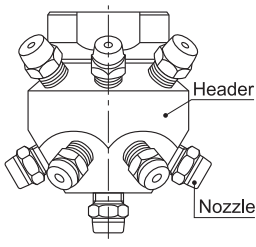


Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

7-head Full Cone Spray Nozzles / Standard type
7JJXP series

Related Products

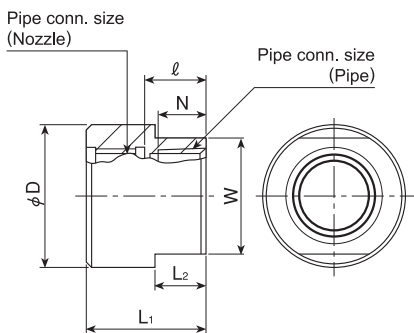
13JJXP series (13-head Full Cone Spray Nozzles)

Series	Appearance	Structure	Features	Applications
13JJXP			<ul style="list-style-type: none"> • Full cone spray pattern with uniform spray distribution. • 13 pcs. of JJXP series full cone spray nozzles are screwed into a very compact header. • Spray droplet diameter is smaller than those of other single-head full cone spray nozzles having the same spray capacity. 	<ul style="list-style-type: none"> • Gas cooling • Moisture control

Socket for Alumina Nozzles

Optional socket available for alumina nozzles (AP-AL92, JUXP-AL92, AJP-AL92 series).

Material of socket: S316



Nominal diameter	Pipe conn. size		Dimensions (mm)							Mass (g)
	Nozzle	Pipe	L ₁	L ₂	l	W	φD	N		
1/2	1/2	1/2	34	10	18	27	30	14	120	
3/4	3/4	3/4	39	14	21	35	40	15	230	
3/4x1	1	3/4	41	18	21	41	50	15	200	
1	1	1	43	18	23	41	50	17	400	
1x1 1/2	1 1/2	1	47	24	24	60	70	17	560	
1 1/2	1 1/2	1 1/2	50	24	27	60	70	19	840	
1 1/2x2	2	1 1/2	54	27	27	70	80	19	680	
2	2	2	58	27	31	70	80	23	1,100	
2x2 1/2	2 1/2	2	62	30	31	90	100	23	1,400	
2 1/2	2 1/2	2 1/2	66	30	35	90	100	27	2,000	
2 1/2x3	3	2 1/2	71	35	36	100	110	27	1,500	
3	3	3	75	35	40	100	110	30	2,200	

* Thread for connecting pipe is female taper thread.