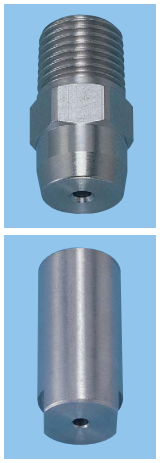
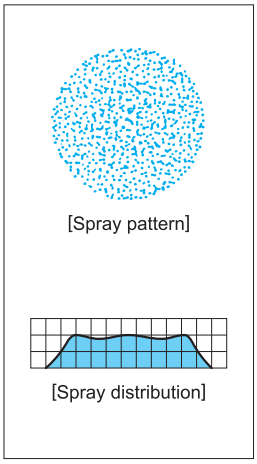
Standard Type
Full Cone Spray Nozzles

JJXP





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

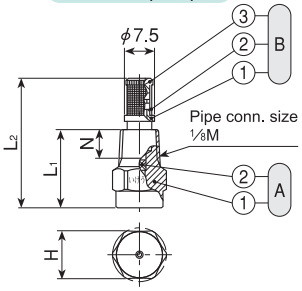
[Standard Pressure]
0.2 MPa

[Applications]
Cleaning: Gas, incinerator fumes, machinery, eliminators, screen, tanks, parts, crushed stones, earth and sand
Cooling: Gas, machineries, tanks, steels
Spraying: Waste water treatment, aeration, foam breaking, fire extinguishing, dust suppression, sea water desalination

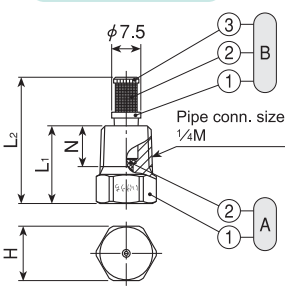
JJXP series

	JJXP series
Structure	● One-piece structure with press-fit X-shaped whirler.
Material	● Sizes ⅛M–⅜M (⅜F): S303 ● Sizes ½F–1F: S303 or B (brass) ● Sizes 1½F or larger: S316 ● Whirler material is mainly S316L equivalent, but depending on nozzle codes, S316 equivalent or SCS16 whirlers are used. ● Optional material: S316, S316L PP, PTFE (for ⅜F sizes and over) [Note] Thread size of optional material may differ depending on materials.

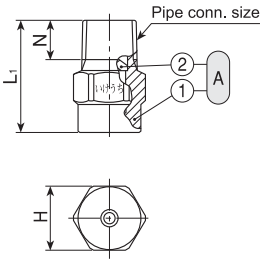
⅛M (005)



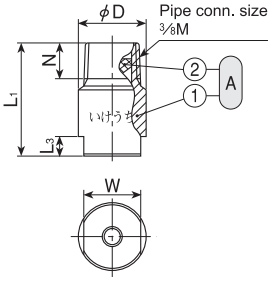
¼M (005–030)



⅛M, ¼M



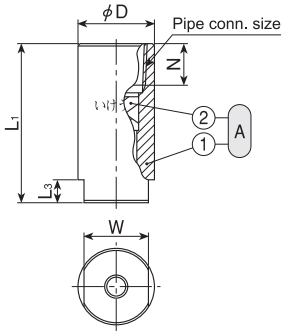
⅜M



Pipe conn. size*1	Dimensions (mm)							Mass (g)	
	L_1	L_2	L_3	H	W	ϕD	N	S303 S316	B
⅛M (005)	32.5	20	—	12	—	—	7	9.5*2	—
⅛M (010–030)	20	—	—	12	—	—	7	11	—
¼M (005–030)	20	32.5	—	14	—	—	10.5	18	—
¼M (040–060)	28	—	—	14	—	—	10.5	21	—
⅜M	34	—	6	—	17	20	11	50	—
⅜F	43	—	6	—	17	20	11	61	—
½F	54	—	8	—	22	25	14	140	150
¾F	69	—	10	—	27	32	15	270	290
1F	89	—	14	—	34	40	17	515	550
1½F	124	—	20	—	50	58	19	1,520	—
2F (250–350)	160	—	24	—	60	70	23	2,600	—
2F (400–500)	118.5	—	24	—	60	70	23	2,050	—
2½F	147.5	—	27	—	80	90	27	4,360	—
3F (920)	163.5	—	30	—	90	105	30	6,700	—
3F (1200)	170.5	—	30	—	90	105	30	6,500	—

*1) Figures in ( ) after the pipe connection sizes indicate the spray capacity codes.
*2) For JJXP005 with strainer, add 2 g to the above mass.

⅜F and over



Ⓐ **Nozzle** (①Body ②Whirler [S316L equivalent])
Ⓑ **Strainer** (①Strainer holder ②Strainer screen [S316] ③Strainer cap)

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

Spray Capacity Code	Pipe Conn. Size				Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1/8M	1/4M	3/8M	3/8F	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
005	●	●			—	55	65	—	—	0.36	0.44	0.50	0.59	0.73	0.83	0.96	270	0.4
010	○	○			50	55	45	—	0.53	0.73	0.88	1.00	1.18	1.45	1.67	1.93	290	0.7
015	○	○			60	65	55	—	0.79	1.09	1.31	1.50	1.77	2.18	2.50	2.89	〃	0.8
020	○	○			60	65	55	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86		1.4
030	○	○			65	70	60	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	410	1.4
040		○			60	65	55	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67	7.72	380	1.7
050		○			65	70	60	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34	9.64	〃	1.7
060		○			70	75	65	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	11.6	520	1.7
070			○	○	60	65	60	2.93	3.71	5.09	6.13	7.00	8.26	10.2	11.7	13.5	480	1.9
080			○	○	65	70	65	3.35	4.24	5.82	7.01	8.00	9.44	11.6	13.3	15.4	〃	1.9
10			○	○	75	80	75	4.19	5.29	7.28	8.76	10.0	11.8	14.5	16.7	19.3		2.6
12			○	○	80	85	80	5.03	6.35	8.73	10.5	12.0	14.2	17.4	20.0	23.1	660	2.6

Spray Capacity Code	Pipe Conn. Size							Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1/2F	3/4F	1F	1 1/2F	2F	2 1/2F	3F	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
14	○							65	70	55	5.86	7.41	10.2	12.3	14.0	16.5	20.3	23.3	27.0	590	3.5
16	○							70	75	60	6.70	8.47	11.6	14.0	16.0	18.9	23.3	26.7	30.9	〃	3.5
18	○							75	80	65	7.54	9.53	13.1	15.8	18.0	21.2	26.2	30.0	34.7		3.5
20	○							80	85	70	8.38	10.6	14.6	17.5	20.0	23.6	29.1	33.4	38.6	740	3.5
23		○						70	75	60	9.63	12.2	16.7	20.2	23.0	27.1	33.4	38.4	44.4	630	4.7
26		○						75	80	65	10.9	13.8	18.9	22.8	26.0	30.7	37.8	43.4	50.1		4.7
30		○						80	85	70	12.6	15.9	21.8	26.3	30.0	35.4	43.6	50.0	57.9	〃	4.7
35		○						85	90	75	14.7	18.5	25.5	30.7	35.0	41.3	50.9	58.4	67.5		4.7
40		○						90	95	80	16.8	21.2	29.1	35.1	40.0	47.2	58.1	66.7	77.2		4.7
45		○						90	95	80	18.8	23.8	32.7	39.4	45.0	53.1	65.4	75.0	86.8	950	4.7
50			○					70	75	60	20.9	26.5	36.4	43.8	50.0	59.0	72.7	83.4	96.4	800	6.0
60			○					80	85	70	25.1	31.8	43.7	52.6	60.0	70.8	87.2	100	116	〃	6.0
80			○					90	95	80	33.5	42.4	58.2	70.1	80.0	94.4	116	133	154		6.0
90			○					90	95	80	37.7	47.7	65.5	78.9	90.0	106	131	150	174	1,150	6.6
100				○				80	85	70	41.9	52.9	72.8	87.6	100	118	145	167	193	1,000	8.4
150				○				85	90	75	62.8	79.4	109	131	150	177	218	250	289	〃	10.3
200				○				90	95	80	83.8	106	146	175	200	236	291	334	386	1,350	10.3
250					○			85	90	75	105	132	182	219	250	295	363	417	482	1,200	12.7
300					○			90	95	80	126	159	218	263	300	354	436	500	579		12.7
350					○			90	95	80	147	185	255	307	350	413	509	584	675	〃	12.7
400					○			75	80	65	168	212	291	351	400	472	581	667	772		13.2
500					○			95	95	80	209	265	364	438	500	590	727	834	964	1,500	13.2
600						○		75	80	65	251	318	437	526	600	708	872	1,001	1,157	1,500	16.9
700						○		85	90	75	293	371	509	613	700	826	1,017	1,167	1,350	1,800	16.9
920							○	100	100	85	385	487	669	806	920	1,086	1,337	1,534	1,775	1,660	18.1
1200							○	105	105	90	503	635	873	1,052	1,200	1,416	1,744	2,001	2,315	1,950	20.0

●……With strainer (#100 mesh only)　○……Without strainer

For spraying slurry, the nozzle material should be wear-resistant. For this purpose, the JUXP-AL92 series nozzles made of 92% alumina are available (see page 66).

How to order

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

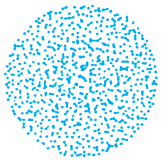
〈Example〉…1/8MJJXP005S303W

1/8M	JJXP	005	S303	W
Pipe Conn. Size (*3)		Spray Capacity Code	Material (*4)	Strainer
1/8M		005	S303	W (with Strainer: JJXP005 only)
〃		〃	B	– (without Strainer)
3F		1200	S316	

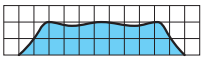
*3) When spray capacity code is 005–030, pipe connection size for 1/4M is indicated as "1/4x1/8M".
*4) See "Material" information on page 57 for standard materials by each size.

Standard Type
Full Cone Spray Nozzles

JJXP-PP / JJXP-PVDF



[Spray pattern]



[Spray distribution]

[Features]
- Full cone spray pattern with a round impact area and uniform distribution.
- X-shaped whirler provides large free passage diameter for minimal clogging.

[Standard Pressure]
0.2 MPa

[Applications]
Cleaning: Machinery, screens, tanks, crushed stones, earth and sand

Cooling: Machinery, tanks

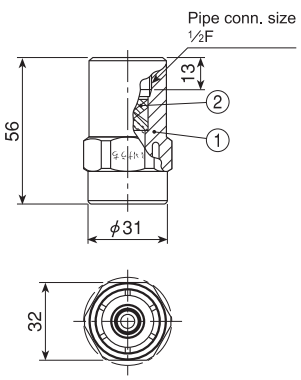
Spraying: Waste water treatment, aeration, foam breaking, dust suppression, etching, chemicals

JJXP-PP series

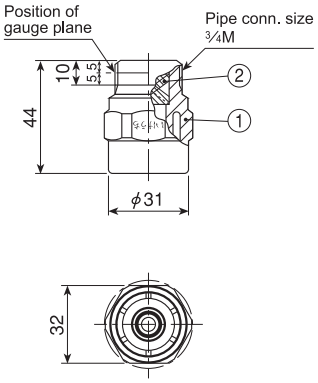
	JJXP-PP series
Structure	● One-piece structure with press-fit X-shaped whirler.
Material	● PP (polypropylene)
Mass	● Size ½F: 25.3 g ● ¾M: 17.9 g

[Note]
- Appearance and dimensions may differ slightly depending on materials and nozzle codes.
- Please note that the position of standard diameter for male thread type has been changed.

½F



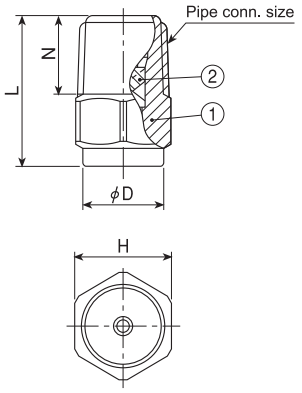
¾M



①Body ②Whirler

JJXP-PVDF series

	JJXP-PVDF series
Structure	● One-piece structure with press-fit X-shaped whirler.
Material	● PVDF (polyvinylidene fluoride)



①Body ②Whirler

Pipe conn. size	Dimensions (mm)				Mass (g)
	L	H	φD	N	
⅛ M	18	12	11	8	2.2
¼ M	22	14	12	11.5	4.1

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

JJXP-PP series

Spray Capacity Code	Pipe Conn. Size		Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1/2F	3/4M	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
$2\frac{100}{12}$		○	96	100	92	5.03	6.35	8.73	10.5	12.0	14.2	17.4	20.0	23.1	570	3.1
$2\frac{100}{13}$		○	96	100	92	5.44	6.88	9.46	11.4	13.0	15.3	18.9	21.7	25.1		3.1
$2\frac{100}{14}$	○	○	96	100	92	5.86	7.41	10.2	12.3	14.0	16.5	20.3	23.3	27.0		3.5
$2\frac{100}{15}$	○	○	96	100	92	6.28	7.94	10.9	13.1	15.0	17.7	21.8	25.0	28.9	≀	3.5
$2\frac{100}{16}$	○	○	96	100	92	6.70	8.47	11.6	14.0	16.0	18.9	23.3	26.7	30.9		3.5
$2\frac{100}{18}$	○	○	96	100	92	7.54	9.53	13.1	15.8	18.0	21.2	26.2	30.0	34.7		3.5
$2\frac{100}{20}$	○	○	96	100	92	8.38	10.6	14.6	17.5	20.0	23.6	29.1	33.4	38.6	740	3.5

JJXP-PVDF series

Spray Capacity Code	Pipe Conn. Size		Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1/8M	1/4M	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
010	○	○	60	65	55	—	0.53	0.73	0.88	1.00	1.18	1.45	1.67	1.93	290	0.8
015	○	○	60	65	55	—	0.79	1.09	1.32	1.50	1.77	2.18	2.50	2.89		1.0
020	○	○	60	65	55	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86	≀	1.5
025	○	○	60	65	55	—	1.32	1.82	2.20	2.50	2.95	3.62	4.17	4.82		1.5
030	○	○	60	65	55	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	410	1.5

How to order

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

① JJXP-PP series

〈Example〉···1/2FJJXP$2\frac{100}{14}$PP

1/2F	JJXP	$2\frac{100}{14}$	PP
Pipe Conn. Size		Spray Capacity Code	
1/2 F		$2\frac{100}{12}$	
3/4M		≀	
		$2\frac{100}{20}$	

② JJXP-PVDF series

〈Example〉···1/8MJJXP010PVDF

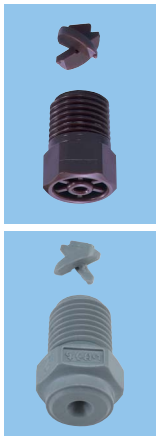
1/8M	JJXP	010	PVDF
Pipe Conn. Size		Spray Capacity Code	
1/8M		010	
1/4x1/8M(*1)		≀	
		030	

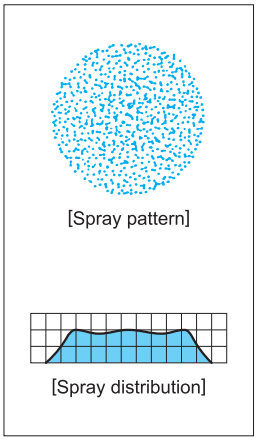
*1) Pipe Connection Size code for 1/4M is "1/4x1/8M" in JJXP-PVDF series.

Standard Type
Full Cone Spray Nozzles

JJXP-HTPVC/JJXP-PVC

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





[Features]
- Full cone spray pattern with a round impact area and uniform distribution.
- X-shaped whirler provides large free passage diameter for minimal clogging.
- X-shaped whirler is removable for easy maintenance.

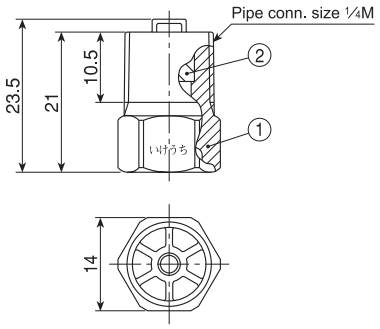
[Standard Pressure]
0.2 MPa

[Applications]
Spraying: Etchants, chemicals
Cleaning: Printed circuit boards

JJXP-HTPVC series

	JJXP-HTPVC series
Structure	● One-piece structure with removable X-shaped whirler.
Material	● HTPVC (heat-treated polyvinyl chloride)
Mass	● 2.5 g

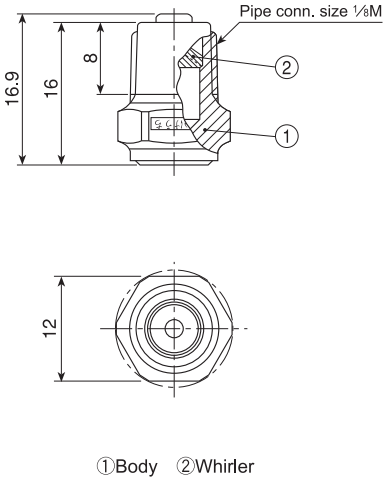
[Note] Appearance and dimensions may differ slightly depending on materials and nozzle codes.



JJXP-PVC series

	JJXP-PVC series
Structure	● One-piece structure with removable X-shaped whirler.
Material	● PVC (polyvinyl chloride)
Mass	● 1.4 g

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



JJXP-HTPVC series

Spray Capacity Code	Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
040	60	65	55	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67	7.72	380	2.2
050	65	70	60	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34	9.64	〃	2.2
060	70	75	65	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	11.6	520	2.2

JJXP-PVC series

Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
70	75	66	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86	350	1.5

How to order

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

① JJXP-HTPVC series

〈Example〉…¼MJJXP040HTPVC

¼M JJXP 040 HTPVC

Spray Capacity Code
- 040
- 050
- 060

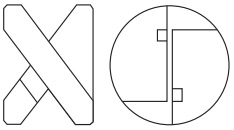
② JJXP-PVC series

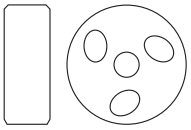
⅛M JJXP $2\frac{75}{2}$ PVC

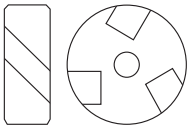
Effective Use of Full Cone Spray Nozzles

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.

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

T: Torque (N-m)
C: Constant
Q: Spray capacity (ℓ/min)
D: External dimension of whirler (mm)
P: Spray pressure (MPa)

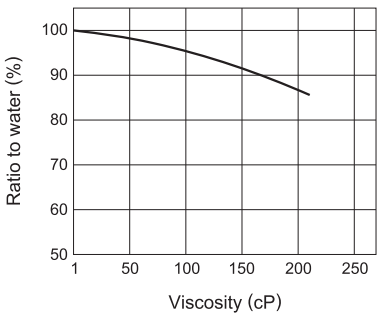
[Example]

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

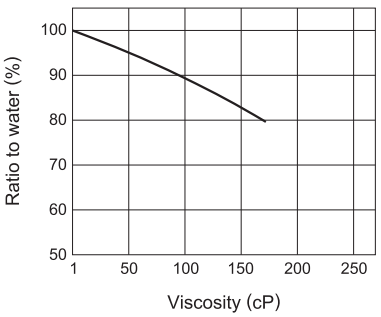
Viscosity

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]

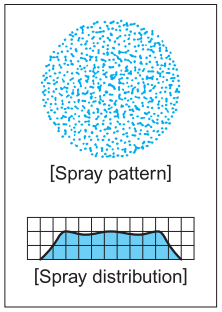


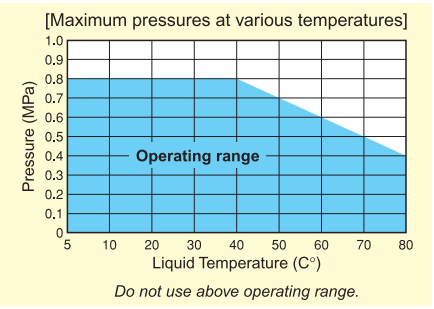
Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

Quick-detachable
Standard Full Cone Spray Nozzles

Patented

INJJX





Do not use above operating range.

[Features]

- Full cone spray nozzle with a removable whirler.
- 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]

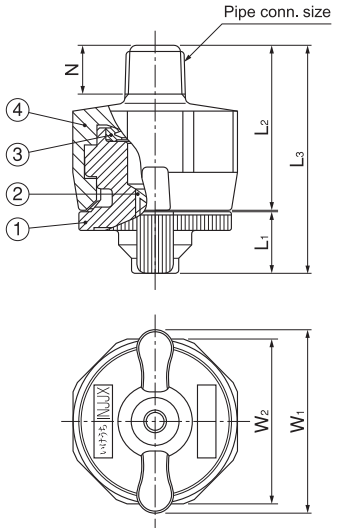
0.2 MPa

[Applications]

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

INJJX series

	INJJX series
Structure	● Two-piece structure comprising nozzle and adaptor. ● Easy installation and removal by just turning the nozzle 60°.
Material	● Nozzle: PP ● Adaptor: PPS ● Packing: FEPM



①Body ②Whirler ③Packing ③Adaptor

Pipe conn. size	Dimensions (mm)						Mass (g)
	L_1	L_2	L_3	W_1	W_2	N	
1/8M	10	27	37	30	27	8	12
1/4M	10	30	40	30	27	11.5	13
3/8M	10	30	40	30	27	12	14

[Note]
- Appearance and dimensions may differ slightly depending on materials and nozzle codes.
- **INJJX series nozzles are not compatible with the discontinued ISJJX series.**

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	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa			
010	○	○	○	60	65	55	—	0.53	0.73	0.88	1.00	1.18	1.45	1.67	290	0.8	
015	○	○	○	60	65	55	—	0.79	1.09	1.32	1.50	1.77	2.18	2.50		1.0	
020	○	○	○	60	65	55	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34		1.5	
025	○	○	○	60	65	55	—	1.32	1.82	2.20	2.50	2.95	3.62	4.17		1.5	
030	○	○	○	60	65	55	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00		1.5	
040	○	○	○	60	65	55	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67		2.0	
050	○	○	○	65	70	60	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34		2.0	
060	○	○	○	70	75	65	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	520	2.0	

How to order

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

① Complete unit

〈Example〉···1/8M(PT)INJJX040PP(FEPM)+PPS

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

Pipe Conn. Size	Thread type	Spray Capacity Code
1/8M	(PT)	010
1/4M	(NPT)	⟆
3/8M		060

② Nozzle only

〈Example〉··· INJJX040PP(FEPM)

INJJX 040 PP (FEPM)

Spray Capacity Code
010
⟆
060

ALSO AVAILABLE!

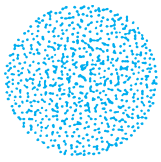
Quick-detachable Standard Flat Spray Nozzles

INVV series

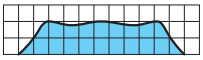
See p.21 of this catalog.

Ceramic Orifice and Whirler Inserted
Full Cone Spray Nozzles

JUP



[Spray pattern]



[Spray distribution]

[Features]
- Full cone spray pattern with a round impact area and uniform distribution.
- Ceramic disc whirler and ceramic orifice forming vortex chamber provide excellent wear resistance.
- Medium spray capacity is available.

[Standard Pressure]
0.2 MPa

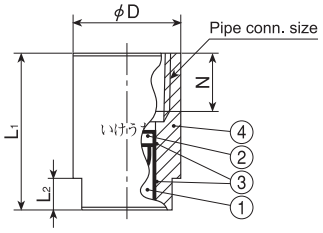
[Applications]
Cleaning: Gas, incinerator fumes, machinery, eliminators, screen, tanks, crushed stones, earth and sand

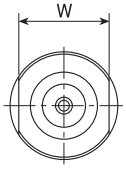
Cooling: Gas, machinery, tanks, steels

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

JUP series

	JUP series (with ceramic orifice inserted)
Structure	● One-piece structure with ceramic whirler and orifice forming vortex chamber.
Material	● Sizes 1F or smaller: S303 or B (brass) ● Sizes 1½F or larger: S316 ● Optional material: S316L





①Ceramic orifice ②Ceramic whirler
③Adhesive: Araldite® ④Body

Pipe conn. size	Dimensions (mm)					Mass (g)	
	L_1	L_2	W	ϕD	N	S303 S316	B
⅜F	30	6	17	20	11	41	44
½F	39	8	22	25	14	115	125
¾F	49	10	27	32	15	167	177
1F	59	14	34	40	17	300	320
1½F	80	20	50	58	19	860	—

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

Spray Capacity Code	Pipe Conn. Size					Spray Angle (°)			Spray Capacity (ℓ/min)							Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	⅜F	½F	¾F	1F	1½F	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
03	○					50	60	52	—	1.57	2.17	2.62	3.00	3.55	4.37	380	1.2
04	○					50	60	52	—	2.09	2.89	3.50	4.00	4.73	5.83	〃	1.4
05	○					55	65	55	—	2.61	3.61	4.37	5.00	5.91	7.29	490	1.5
06		○				50	60	52	2.46	3.13	4.33	5.24	6.00	7.09	8.75	470	2.0
07		○				55	63	55	2.87	3.65	5.05	6.12	7.00	8.27	10.2		2.0
08		○				55	65	55	3.28	4.18	5.78	6.99	8.00	9.46	11.7	〃	2.0
10		○				60	70	58	4.10	5.22	7.22	8.74	10.0	11.8	14.6		2.2
12		○				63	70	60	4.92	6.26	8.66	10.5	12.0	14.2	17.5	600	2.3
14			○			63	70	60	5.74	7.31	10.1	12.2	14.0	16.5	20.4	580	2.8
16			○			63	70	60	6.56	8.35	11.6	14.0	16.0	18.9	23.3		2.8
18			○			70	77	65	7.38	9.40	13.0	15.7	18.0	21.3	26.2		3.0
20			○			75	80	68	8.20	10.4	14.4	17.5	20.0	23.6	29.2	〃	3.0
23			○			75	80	68	9.43	12.0	16.6	20.1	23.0	27.2	33.5		3.2
26			○			78	83	70	10.7	13.6	18.8	22.7	26.0	30.7	37.9		3.2
30			○			78	83	72	12.3	15.7	21.7	26.2	30.0	35.5	43.7	730	3.4

Ceramic Orifice and Whirler Inserted / Full Cone Spray Nozzles
JUP series

Spray Capacity Code	Pipe Conn. Size					Spray Angle (°)			Spray Capacity (ℓ/min)							Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	3/8F	1/2F	3/4F	1F	1 1/2F	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
35				○		80	83	70	14.4	18.3	25.3	30.6	35.0	41.4	51.0	700	4.0
40				○		80	83	70	16.4	20.9	28.9	35.0	40.0	47.3	58.3		4.0
45				○		83	85	70	18.5	23.5	32.5	39.3	45.0	53.2	65.6	〃	4.0
50				○		83	85	72	20.5	26.1	36.1	43.7	50.0	59.1	72.9		4.0
55				○		83	85	72	22.6	28.7	39.7	48.1	55.0	65.0	80.2	900	4.0
60					○	75	80	70	24.6	31.3	43.3	52.4	60.0	70.9	87.5	800	5.0
70					○	78	83	70	28.7	36.5	50.5	61.2	70.0	82.7	102	〃	5.0
80					○	80	83	72	32.8	41.8	57.8	69.9	80.0	94.6	117		5.0
90					○	82	85	72	36.9	47.0	65.0	78.7	90.0	106	131	1,000	5.0

How to order

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

〈Example〉··· 3/8FJUP03S303

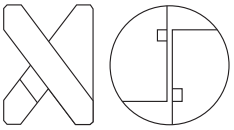
3/8F	JUP	03	S303
Pipe Conn. Size		Spray Capacity Code	Material*
3/8F		03	S303
〃		〃	B
1 1/2F		90	S316

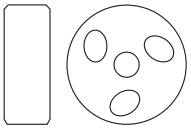
*See "Material" information on page 64 for standard materials by each size.

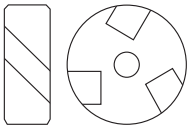
Effective Use of Full Cone Spray Nozzles

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.

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

T: Torque (N-m)
C: Constant
Q: Spray capacity (ℓ/min)
D: External dimension of whirler (mm)
P: Spray pressure (MPa)

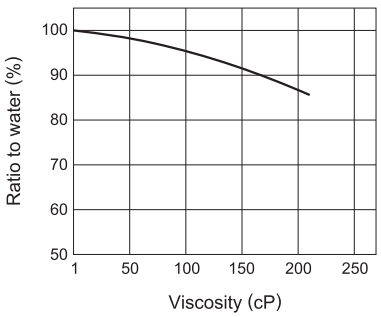
[Example]

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

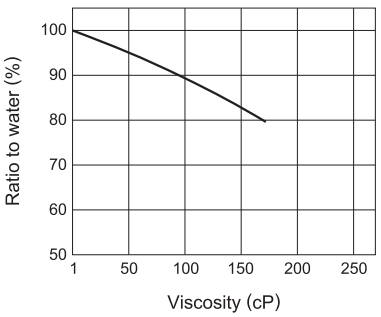
Viscosity

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]

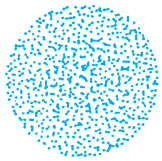


Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

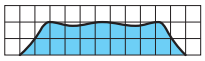
All Alumina Ceramic
Full Cone Spray Nozzles

JUXP-AL92

(JUXP-AL92 nozzle with S316 socket)



[Spray pattern]



[Spray distribution]

[Features]
- X-shaped whirler provides large free passage diameter for minimal clogging.
- Made of high-purity alumina and provide excellent wear-resistance.
- Spray capacity ranges from medium to large.

[Standard Pressure]
0.2 MPa

[Applications]
- Absorption tower of flue gas desulfurization equipment.
- Spraying slurry

JUXP-AL92 series

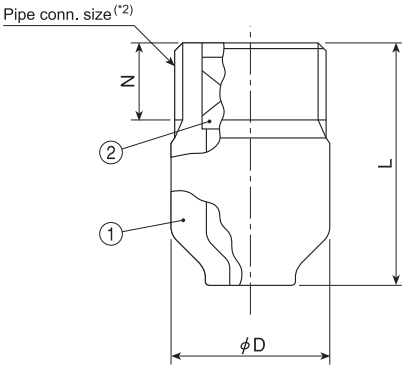
	JUXP-AL92 series
Structure	● Whole nozzle fired as one piece.
Material	● 92% Alumina

* 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.

Pipe conn. size*1,2	Dimensions (mm)			Mass (g)
	L	ϕD	N	
1M	53	35	18	110
1½M	67	50	20	350
2M	100	65	24	760
2½M (250–350)	136	80	29	1,520
2½M (400–550)	94	80	29	1,130
3M	120	90	31	1,690

*1) 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.



①Body ②Ceramic whirler

*2) 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)

Spray Capacity Code	Pipe Conn. Size					Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1M	1½M	2M	2½M	3M	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
23	○					70	75	60	9.63	12.2	16.7	20.2	23.0	27.1	33.4	38.4	44.4	630	4.7
26	○					75	80	65	10.9	13.8	18.9	22.8	26.0	30.7	37.8	43.4	50.1		4.7
30	○					80	85	70	12.6	15.9	21.8	26.3	30.0	35.4	43.6	50.0	57.9	〃	4.7
35	○					85	90	75	14.7	18.5	25.5	30.7	35.0	41.3	50.9	58.4	67.5		4.7
40	○					90	95	80	16.8	21.2	29.1	35.1	40.0	47.2	58.1	66.7	77.2		4.7
45	○					90	95	80	18.8	23.8	32.7	39.5	45.0	53.1	65.4	75.0	86.8	950	4.7
50		○				70	75	60	20.9	26.5	36.4	43.8	50.0	59.0	72.7	83.4	96.4	800	6.0
55		○				75	80	65	23.0	29.1	40.0	48.2	55.0	64.9	79.9	91.7	105		6.0
60		○				80	85	70	25.1	31.8	43.7	52.6	60.0	70.8	87.2	100	115	〃	6.0
70		○				85	90	75	29.3	37.1	50.9	61.4	70.0	82.6	100	120	135		6.0
80		○				90	95	80	33.5	42.4	58.2	70.1	80.0	94.4	115	135	155		6.6
90		○				90	95	80	37.7	47.7	65.5	78.9	90.0	106	130	150	175	1,150	6.6
100			○			80	85	70	41.9	52.9	72.8	87.7	100	120	145	170	195	1,000	8.7
120			○			80	85	70	50.3	63.5	82.3	105	120	140	175	200	230		8.7
150			○			85	90	75	62.8	79.4	110	130	150	180	220	250	290	〃	8.7
180			○			90	95	80	75.4	95.3	130	160	180	210	260	300	350		10.3
200			○			90	95	80	83.8	105	145	175	200	240	290	335	385	1,350	10.7
250				○		85	90	75	105	130	180	220	250	295	360	420	480	1,200	12.7
300				○		90	95	80	125	160	220	265	300	355	435	500	580	〃	12.7
350				○		90	95	80	150	185	255	310	350	415	510	585	675	1,450	12.7

All Alumina Ceramic / Full Cone Spray Nozzles

JUXP-AL92 series

Spray Capacity Code	Pipe Conn. Size					Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1M	1½M	2M	2½M	3M	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
400				○		80	80	65	170	210	290	350	400	470	580	670	770	1,300	13.4
450				○		90	90	75	190	240	330	395	450	530	655	750	870	≀	13.4
500				○		95	95	80	210	265	365	440	500	590	730	835	965		13.4
550				○		100	100	85	230	290	400	480	550	650	800	920	1,060	1,550	13.4
600					○	80	80	65	250	320	440	525	600	710	870	1,000	1,160	1,500	17.0
700					○	90	90	75	290	370	510	615	700	826	1,020	1,170	1,359	1,800	17.0

How to order

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

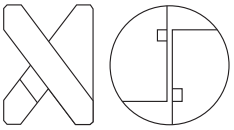
〈Example〉···1MJUXP23AL92

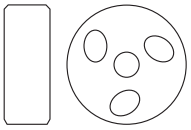
1M	JUXP	23	AL92
Pipe Conn. Size		Spray Capacity Code	
1M		23	
≀		≀	
3M		700	

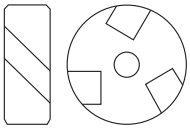
Effective Use of Full Cone Spray Nozzles

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.

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

T: Torque (N-m)
C: Constant
Q: Spray capacity (ℓ/min)
D: External dimension of whirler (mm)
P: Spray pressure (MPa)

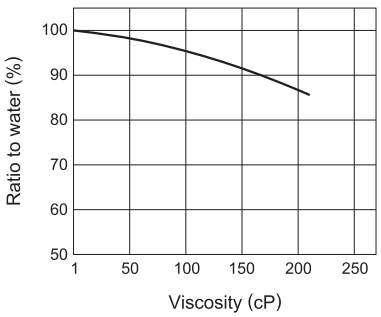
[Example]

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

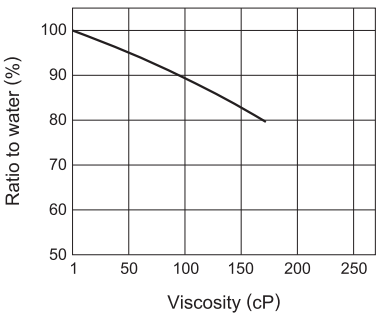
Viscosity

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]



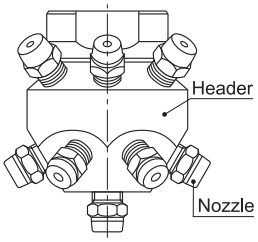
[Relation between viscosity and spray angle]



Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

Related Products

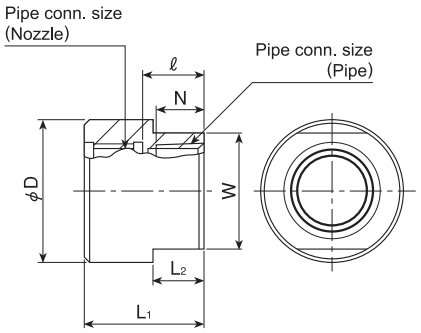
13JJXP series (13-head Full Cone Spray Nozzles)

Series	Appearance	Structure	Features	Applications
13JJXP			● 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.	● 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

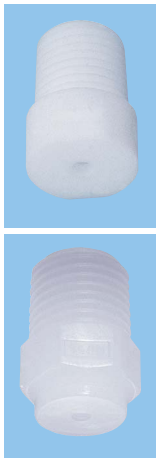


Nominal diameter	Pipe conn. size		Dimensions (mm)						Mass (g)
	Nozzle	Pipe	L_1	L_2	ℓ	W	ϕD	N	
1/2	1/2	1/2	34	10	18	27	30	14	120
3/4	3/4	3/4	39	14	21	35	40	15	230
3/4x1	1	3/4	41	18	21	41	50	15	200
1	1	1	43	18	23	41	50	17	400
1x1 1/2	1 1/2	1	47	24	24	60	70	17	560
1 1/2	1 1/2	1 1/2	50	24	27	60	70	19	840
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

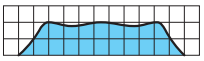
* Thread for connecting pipe is female taper thread.

Small Capacity
Full Cone Spray Nozzles

JJRP



[Spray pattern]



[Spray distribution]

[Features]
- Small capacity full cone spray nozzles made of excellent wear-resistant PTFE (polytetrafluoroethylene) and injection molded PVDF (polyvinylidene fluoride).
- Disc whirler is designed to provide uniform spray distribution at small spray capacity.

[Standard Pressure]
0.2 MPa

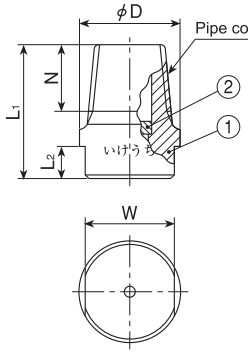
[Applications]
Spraying: Etchants, acid liquids
Cleaning: When spraying pure water

Full Cone

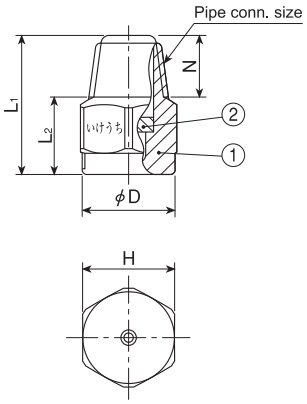
JJRP series

	JJRP series
Structure	● One-piece structure with press-fit disc whirler. ● JJRP-PVDF nozzle body is injection molded.
Material	● PTFE (polytetrafluoroethylene), PVDF (polyvinylidene fluoride)

JJRP-PTFE



JJRP-PVDF



①Body ②Whirler

Series	Pipe conn. size	Dimensions (mm)						Mass (g)
		L_1	L_2	H	W	ϕD	N	
JJRP-PTFE	1/8M	16	4	—	10	12	7	2
	1/4M	21	5	—	14	16	10.5	5
JJRP-PVDF	1/8M	18	10	12	—	11	8	2
	1/4M	22	10.5	14	—	12	11.5	4.1

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

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

*Only the nozzles with white circle "○" in the above table are available.

How to order

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

① JJRP-PTFE series

〈Example〉···1/8MJJRP005PTFE

1/8M	JJRP	005	PTFE
Pipe Conn. Size		Spray Capacity Code	
1/8M		005	
1/4M(*1)		≀	
		060	

② JJRP-PVDF series

〈Example〉···1/8MJJRP007PVDF

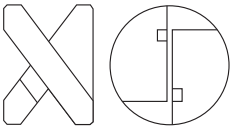
1/8 M	JJRP	007	PVDF
Pipe Conn. Size		Spray Capacity Code	
1/8M		005	
1/4M(*1)		007	

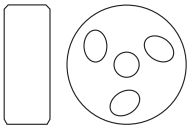
*1) When Spray Capacity Code is 005–030, Pipe Connection Size for 1/4M is indicated as "1/4x1/8M".

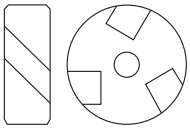
Effective Use of Full Cone Spray Nozzles

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.

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

T: Torque (N-m)
C: Constant
Q: Spray capacity (ℓ/min)
D: External dimension of whirler (mm)
P: Spray pressure (MPa)

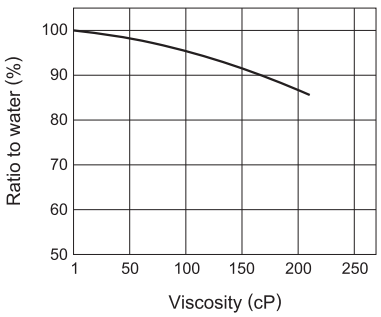
[Example]

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

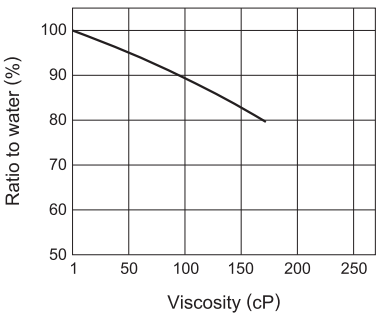
Viscosity

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]



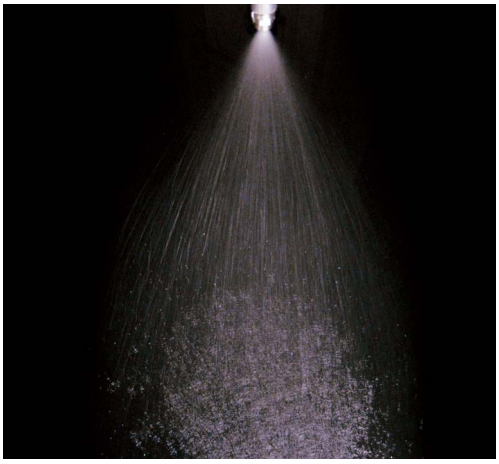
[Relation between viscosity and spray angle]

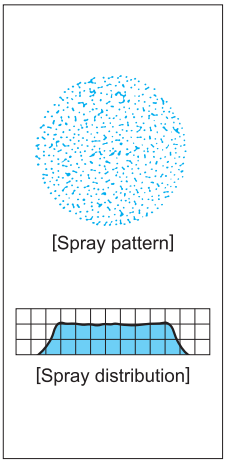


Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

Small Capacity
Full Cone Spray Nozzles

J





[Features]
- Full cone spray pattern with a round impact area and uniform distribution.
- Features smallest spray capacity among full cone spray nozzles.
- Unique design developed from new engineering concept to produce fine atomization by impinging two inflows inside vortex chamber.
- Ceramic orifice and closer provide excellent wear-resistance.

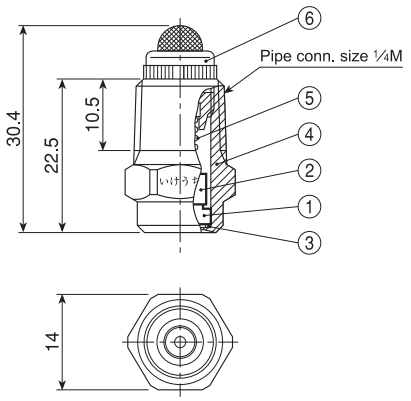
[Standard Pressure]
0.5 MPa for spray capacity codes of 006 and 008.
0.2 MPa for spray capacity codes of 010 and over.

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

J series

	J series (with ceramic orifice inserted)
Structure	● Spray orifice and closer are made of ceramics. ● It can be disassembled into components. ● All J series nozzles are equipped with built-in strainers.
Material	● Metal parts: S303 or B (brass) ● Optional material: S316
Mass	● S303: 17.5 g ● B (brass): 18.5 g

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



Spray Capacity Code	Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	Strainer Mesh Size
	0.1 MPa	0.2 MPa	0.5 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	1.5 MPa	2 MPa			
006	—	—	70	—	—	—	0.07	0.09	0.10	0.12	0.14	0.16	130	0.2	200
008	—	—	70	—	—	—	0.09	0.12	0.14	0.16	0.19	0.22	140	0.2	200
010	—	70	65	—	0.09	0.10	0.12	0.15	0.17	0.20	0.24	0.28	160	0.3	200
012	—	70	65	—	0.10	0.12	0.14	0.18	0.21	0.25	0.29	0.33	190	0.3	200
015	—	70	65	—	0.13	0.15	0.18	0.23	0.26	0.31	0.37	0.42	170	0.3	200
020	60	70	65	0.14	0.17	0.20	0.24	0.30	0.35	0.41	0.49	0.56	〃	0.3	200
025	65	70	67	0.18	0.22	0.25	0.30	0.38	0.44	0.51	0.61	0.70	230	0.3	200
030	67	70	68	0.22	0.26	0.30	0.36	0.45	0.52	0.61	0.73	0.83	220	0.4	150
040	67	70	68	0.29	0.35	0.40	0.48	0.60	0.70	0.82	0.98	1.11	〃	0.4	150
050	68	70	68	0.36	0.44	0.50	0.60	0.75	0.87	1.02	1.22	1.39	290	0.5	150
060	68	70	68	0.43	0.52	0.60	0.72	0.90	1.05	1.23	1.47	1.67	280	0.5	150
070	68	70	68	0.51	0.61	0.70	0.84	1.05	1.22	1.43	1.71	1.95	〃	0.6	150
080	68	70	68	0.58	0.70	0.80	0.95	1.19	1.38	1.61	1.92	2.18	350	0.7	150
100	68	70	68	0.72	0.87	1.00	1.19	1.49	1.72	2.01	2.40	2.72		0.7	100
120	68	70	68	0.87	1.05	1.20	1.43	1.79	2.07	2.42	2.88	3.27	〃	0.8	50
140	68	70	68	1.01	1.22	1.40	1.67	2.09	2.41	2.82	3.36	3.81	440	0.9	50

How to order

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

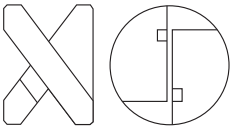
〈Example〉··· ¼MJ006NS303W

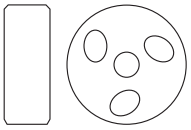
¼MJ	006	N	S303	W
	Spray Capacity Code 006 〃 140		Material S303 B	

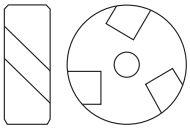
Effective Use of Full Cone Spray Nozzles

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.

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

T: Torque (N-m)
C: Constant
Q: Spray capacity (ℓ/min)
D: External dimension of whirler (mm)
P: Spray pressure (MPa)

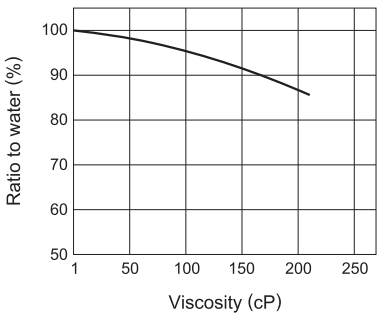
[Example]

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

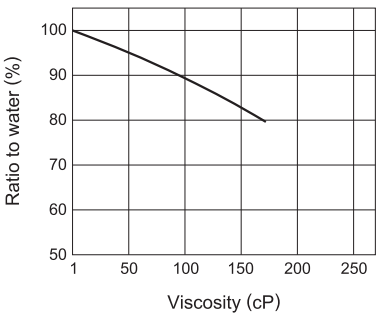
Viscosity

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]



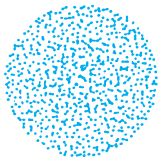
[Relation between viscosity and spray angle]



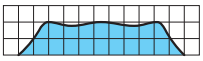
Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

Flange-type, Large Capacity
Full Cone Spray Nozzles

TJJX



[Spray pattern]



[Spray distribution]

[Features]
- Full cone spray pattern with a round impact area and uniform distribution.
- Flanged connection.
- X-shaped whirler provides large free passage diameter for minimal clogging.
- Adopting newly developed X-shaped whirler has shortened total length by 20% compared to conventional nozzles.

[Standard Pressure]
0.2 MPa

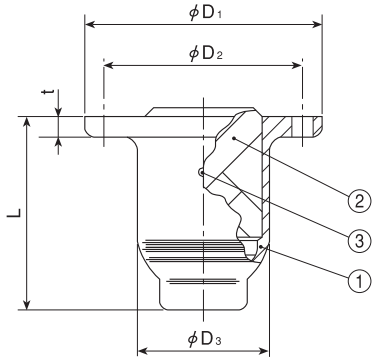
[Applications]
Cooling: Gas, liquids
Reacting: Chemical plants
Spraying: Aeration, sea water desalination

TJJX series

	TJJX series
Structure	● One-piece structure with removable X-shaped whirler fixed to nozzle body by lock bolt. ● Flanged connection.
Material	● SCS13 or SCS14 (Lock bolt: S316) ● Optional material: SCS16

Flange size	Dimensions (mm)					Flange (JIS 10K)		Mass (kg)
	L	φD1	φD2	φD3	t	Qty. of bolt holes	φ(mm)	
4T	171	210	175	117	18	8	19	9.3
5T	211	250	210	143	20	8	23	11.4
6T	253	280	240	169	22	8	23	22.7

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



①Body ②Whirler ③Lock bolt

Spray Capacity Code	Flange size			Spray Angle (°)			Spray Capacity (ℓ/min)							Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	4T	5T	6T	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa		
1500	○			90	90	75	628	794	1,091	1,315	1,500	1,770	2,180	1,850	29
2000	○			100	100	85	838	1,059	1,455	1,753	2,000	2,360	2,907		29
2500		○		90	90	75	1,047	1,324	1,819	2,191	2,500	2,950	3,634	≀	36
3000		○		100	100	85	1,257	1,588	2,183	2,629	3,000	3,540	4,361	2,500	36
3500			○	90	90	75	1,466	1,853	2,547	3,067	3,500	4,130	5,087	≀	44
4000			○	95	95	80	1,675	2,118	2,911	3,505	4,000	4,720	5,814	2,650	44

[Note]
TJJX with larger spray flow and larger flange is available upon request.

How to order

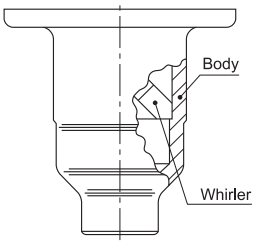
Please inquire or order for a specific nozzle using this coding system.

〈Example〉···4TJJX1500S304

4	TJJX	1500	S304
Pipe Conn. Size		Spray Capacity Code	Material
4 ≀ 6		1500 ≀ 4000	S304 S316

Related Products

For spraying slurry, wear resistance of nozzles must be considered. For such applications, TJJX-SiC series nozzles are available.
TJJX-SiC series nozzles are made of highly wear-resistant SiC (silicon nitride bonded silicon carbide).
Please inquire with us for details.

Series	Appearance	Structure	Features	Applications
TJJX-SiC			● Full cone spray pattern with a round impact area and uniform distribution. ● X-shaped whirler provides large free passage diameter for minimal clogging. ● Whole nozzle fired as one piece. ● Highly wear-resistant and lightweight structure made of SiC. [Note] Since TJJX-SiC series nozzles are die-cast molded, the spray capacity is guaranteed within ±10% and the spray angle within ±7° under standard pressure.	● Spraying recirculated water for water granulation ● Other applications for spraying slurry

Effective Use of Full Cone Spray Nozzles

Clogging and Free Passage Diameter

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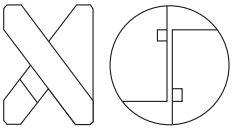
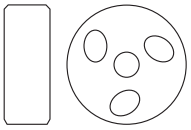
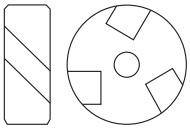
As compared with other whirlers, the **X-shaped whirler** has a larger free passage diameter, which minimizes clogging. Some full cone nozzles without whirlers have been developed to eliminate clogging problems, such as the **AJP series** nozzle which features minimal clogging.


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.

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

T: Torque (N-m)
C: Constant
Q: Spray capacity (ℓ/min)
D: External dimension of whirler (mm)
P: Spray pressure (MPa)

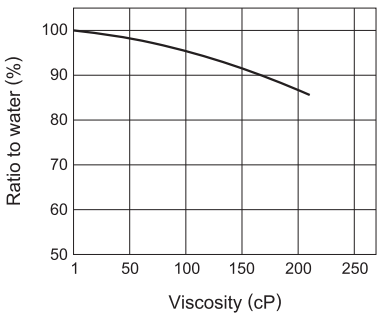
[Example]

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

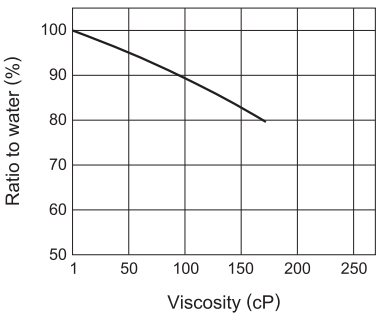
Viscosity

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]



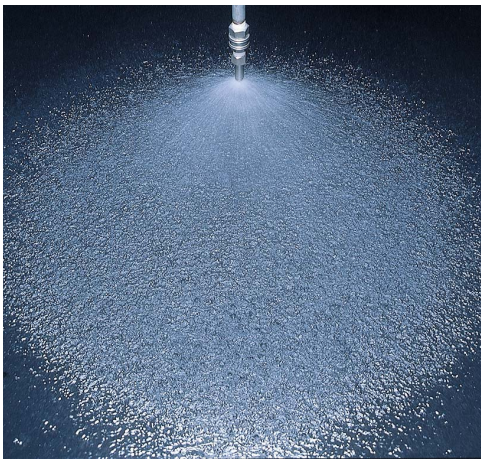
[Relation between viscosity and spray angle]

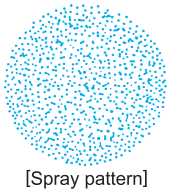


Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

Wide-angle
Full Cone Spray Nozzles

BBXP/BBXP-PVDF/BBXP-PVC




[Spray pattern]


[Spray distribution]

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

[Standard Pressure]
0.2 MPa for spray capacity codes of 015–060.
0.35 MPa for spray capacity codes of 10 and over.

[Applications]
Cleaning: Gas, incinerator fumes, machinery, eliminators, screen, tanks, parts, crushed stones, earth and sand
Cooling: Gas, machineries, tanks, steel plates
Spraying: Water treatment, aeration, foam breaking, fire extinguishing, dust suppression, sea water desalination

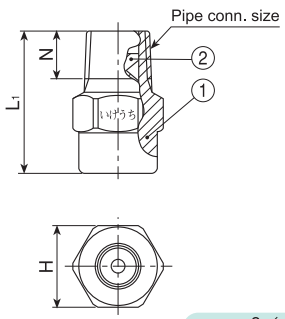
BBXP series

	BBXP series
Structure	● One-piece structure with press-fit X-shaped whirler.
Material	● Sizes ⅛M–⅜M (⅜F): S303 ● Sizes ½F–1F: S303 or B (brass) ● Sizes 1½F or larger: S316 ● Optional material: S316L or others

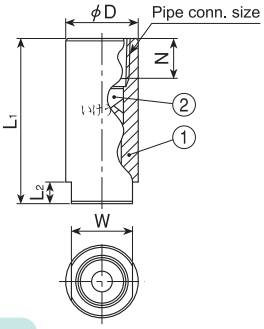
Pipe conn. size*1	Dimensions (mm)						Mass (g)	
	L1	L2	H	W	φD	N	S303 S316	B
⅛M	21	—	12	—	—	7	11	—
¼M (015, 020)	21	—	14	—	—	10.5	20	—
¼M (030)	21.5	—	14	—	—	10.5	20	—
¼M (040–060)	29	—	14	—	—	10.5	21	—
⅜M	36.5	6	—	17	20	11	55	—
⅜F	45.5	6	—	17	20	11	75	—
½F	56	8	—	22	25	14	140	150
¾F	73	10	—	27	32	15	300	320
1F	94	14	—	34	40	17	585	625
1½F	131	20	—	50	58	19	1,760	—
2F	168	24	—	60	70	23	2,980	—
2½F	199	27	—	80	90	27	5,890	—
3F	220	30	—	90	105	30	9,400	—
4F	278	40	—	115	130	36	16,100	—

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

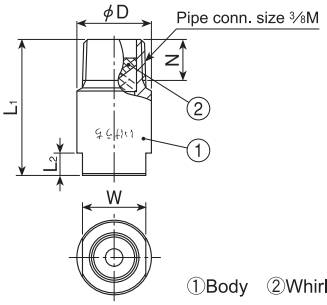
⅛M, ¼M



⅜F and over



⅜M



①Body ②Whirler

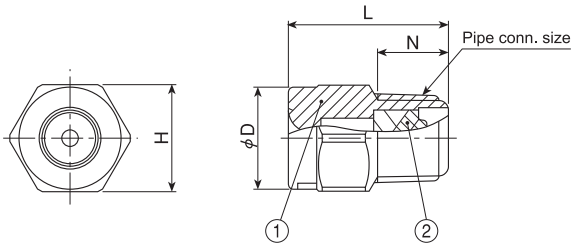
[Note] Appearance and dimensions may differ slightly depending on materials and nozzle codes.

BBXP-PVDF series

	BBXP-PVDF series
Structure	● One-piece structure with press-fit X-shaped whirler.
Material	● PVDF (polyvinylidene fluoride)

Pipe conn. size	Dimensions (mm)				Mass (g)
	L	H	φD	N	
⅛M	18	12	11	8	2
¼M	22	14	12	11.5	4.1

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

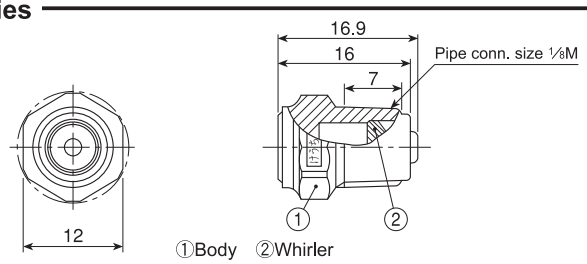


①Body ②Whirler

BBXP-PVC series

	BBXP-PVC series
Structure	● One-piece structure with removable X-shaped whirler.
Material	● PVC (polyvinyl chloride)
Mass	● 1.4 g

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



①Body ②Whirler

Wide-angle Full Cone Spray Nozzles
BBXP/BBXP-PVDF/BBXP-PVC series

BBXP series

Spray Capacity Code	Pipe Conn. Size		Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1/8M	1/4M	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.35 MPa	0.5 MPa	0.7 MPa	1 MPa		
015	○	○	—	120	112	—	—	1.09	1.32	1.50	1.88	2.18	2.50	2.89	300	0.7
020	○	○	110	120	112	—	1.06	1.46	1.75	2.00	2.51	2.91	3.34	3.86	≀	0.9
030	○	○	112	120	113	—	1.59	2.18	2.63	3.00	3.77	4.36	5.00	5.79	340	0.9
040		○	110	120	112	—	2.12	2.91	3.51	4.00	5.03	5.81	6.67	7.72	350	1.4
050		○	112	120	113	—	2.65	3.64	4.38	5.00	6.28	7.27	8.34	9.64	≀	1.7
060		○	114	120	114	2.51	3.18	4.37	5.26	6.00	7.54	8.72	10.0	11.6	430	1.7

Spray Capacity Code	Pipe Conn. Size										Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	3/8M	3/8F	1/2F	3/4F	1F	1 1/2F	2F	2 1/2F	3F	4F	0.15 MPa	0.35 MPa	0.7 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.35 MPa	0.5 MPa	0.7 MPa	1 MPa		
10	○	○									123	120	111	3.34	4.21	5.79	6.98	7.96	10.0	11.6	13.3	15.3	340	2.0
12	○	○									124	120	112	4.00	5.06	6.95	8.37	9.55	12.0	13.9	15.9	18.4		2.0
14	○	○									124	120	112	4.67	5.90	8.10	9.77	11.1	14.0	16.2	18.6	21.5	≀	2.4
16	○	○									125	120	113	5.33	6.74	9.25	11.2	12.7	16.0	18.5	21.2	24.6		2.6
18			○								123	120	111	6.00	7.58	10.4	12.6	14.3	18.0	20.8	23.9	27.6	420	2.8
20			○								123	120	111	6.67	8.43	11.6	14.0	15.9	20.0	23.1	26.5	30.7	≀	2.8
23			○								124	120	112	7.67	9.69	13.3	16.0	18.3	23.0	26.6	30.5	35.3		2.8
26			○								124	120	112	8.67	11.0	15.1	18.1	20.7	26.0	30.1	34.5	39.9	480	2.8
30				○							123	120	111	10.0	12.6	17.4	20.9	23.9	30.0	34.7	39.8	46.0	≀	3.8
40				○							124	120	112	13.3	16.9	23.2	27.9	31.8	40.0	46.3	53.1	61.4		4.8
50				○							125	120	113	16.7	21.0	29.0	34.9	39.8	50.0	57.8	66.3	76.7	580	4.8
60					○						124	120	112	20.0	25.3	34.7	41.9	47.7	60.0	69.4	79.6	92.1	≀	5.4
80					○						125	120	113	26.7	33.7	46.3	55.8	63.7	80.0	92.5	106	123	630	6.0
100						○					123	120	111	33.3	42.1	57.9	69.8	79.6	100	115	135	155		7.2
150						○					124	120	112	50.0	63.2	86.9	105	120	150	175	200	230	≀	8.5
200							○				124	120	112	66.7	84.3	115	140	160	200	230	265	310	710	8.9
300							○				125	120	113	100	125	175	210	240	300	350	400	460	900	10.2
400								○			124	120	112	135	170	235	280	320	400	465	530	615	≀	14.3
500								○			125	120	113	170	210	290	350	400	500	580	665	770	1,000	14.3
600									○		124	120	112	200	255	350	420	480	600	695	795	920	≀	19.0
700									○		125	120	113	235	295	405	490	550	700	810	930	1,070	1,100	19.0
900										○	124	120	112	300	380	520	630	720	900	1,041	1,195	1,380	≀	19.8
1200										○	125	120	113	400	505	695	840	955	1,200	1,390	1,590	1,840	1,200	21.7

BBXP-PVDF series

Spray Capacity Code	Pipe Conn. Size		Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)	Nozzle Body Color
	1/8M	1/4M	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.35 MPa	0.5 MPa	0.7 MPa	1 MPa			
008	○		—	120	112	—	—	0.58	0.70	0.80	1.00	1.16	1.33	1.54	280	0.5	
015	○	○	—	120	112	—	—	1.09	1.32	1.50	1.88	2.18	2.50	2.89	≀	0.8	
020	○		110	120	113	—	1.06	1.46	1.75	2.00	2.51	2.91	3.34	3.86	340	1.2	

*Nozzle body colors differ depending on Spray Capacity Codes; BBXP008 and BBXP020 are black (BLA), BBXP015 is gray (GRA).

BBXP-PVC series

Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
115	120	110	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	350	1.5

How to order

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

① BBXP series (metal)

〈Example〉···1/8MBBXP015S303

1/8M BBXP 015 S303

- Pipe Conn. Size (*1): 1/8M ≀ 4F
- Spray Capacity Code: 015 ≀ 1200
- Material (*2): S303, B, S316

② BBXP-PVDF series

〈Example〉···1/8MBBXP020PVDF (BLA)

1/8M BBXP 020 PVDF (BLA)

- Pipe Conn. Size: 1/8M, 1/4x1/8M (*3)
- Spray Capacity Code: 008, 015, 020
- Nozzle Color: BLA (BBXP008, 020), GRA (BBXP015)

③ BBXP-PVC series

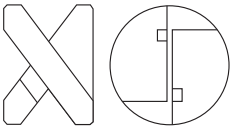
1/8MBBXP030PVC-IN

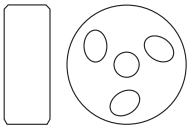
*1) When Spray Capacity Code is 015–030, Pipe Connection Size for 1/4M is indicated as "1/4x1/8M".
*2) See "Material" information on page 72 for standard materials by each size.
*3) Pipe Connection Size code for 1/4M is "1/4x1/8M" in BBXP-PVDF series.

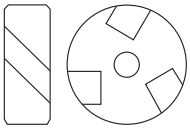
Effective Use of Full Cone Spray Nozzles

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.

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

T: Torque (N-m)
C: Constant
Q: Spray capacity (ℓ/min)
D: External dimension of whirler (mm)
P: Spray pressure (MPa)

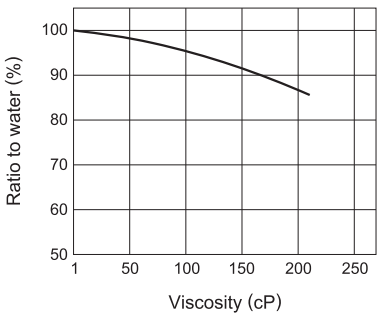
[Example]

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

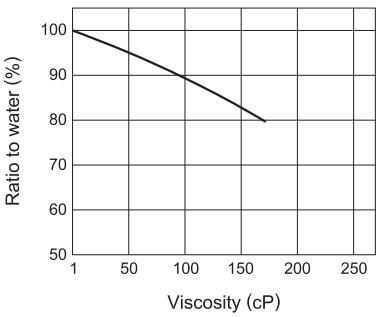
Viscosity

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]

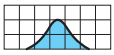


Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

Narrow-angle
Full Cone Spray Nozzles

NJJP

[Spray pattern]



[Spray distribution]

[Features]
- Narrow-angle full cone spray pattern with a round impact area and uniform distribution.
- Unique design producing fine atomization without a whirler.
- No-whirler design with large free passage diameter minimizes clogging.

[Standard Pressure]
0.3 MPa

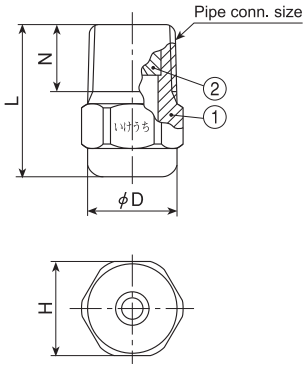
[Applications]
Cleaning: Pipes, bottles, containers, filters
Cooling: Steel plates

NJJP series

	NJJP series
Structure	● One piece structure with press-fit orifice tip. ● No obstructions in nozzle interior.
Material	● S303 ● Optional material: S316

Pipe conn. size	Dimensions (mm)				Mass (g)
	L	H	ϕD	N	
1/4M	24	14	13.5	10.5	19.5
3/8M	32	19	18	11	48

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



①Body ②Orifice tip

Spray Angle Code	Spray Capacity Code	Pipe Conn. Size		Spray Angle (°)			Spray Capacity (ℓ/min)						Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
		1/4M	3/8M	0.15 MPa	0.3 MPa	0.7 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
30	06	○		26	30	32	4.80	5.26	6.00	7.42	8.54	9.91	750	2.5
	08	○		26	30	32	6.40	7.02	8.00	9.90	11.4	13.2	∫	3.0
	14		○	26	30	32	11.2	12.3	14.0	17.3	19.9	23.1		3.9
	20		○	26	30	32	16.0	17.5	20.0	24.7	28.5	33.0	970	4.6
15	06	○		12	15	16	4.80	5.26	6.00	7.42	8.54	9.91	925	2.4
	08	○		12	15	16	6.40	7.02	8.00	9.90	11.4	13.2	∫	3.0
	14		○	12	15	16	11.2	12.3	14.0	17.3	19.9	23.1		3.9
	20		○	12	15	16	16.0	17.5	20.0	24.7	28.5	33.0	1,200	4.6

Precautions for use
Please use NJJP series nozzles at water pressure of 0.15 MPa or greater to obtain a stable spray pattern.

How to order

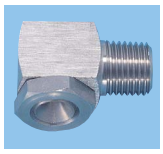
Please inquire or order for a specific nozzle using this coding system.

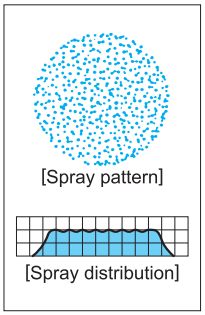
〈Example〉···1/4MNJJP3006S303

1/4M	NJJP	30	06	S303
Pipe Conn. Size		Spray Angle Code	Spray Capacity Code	
1/4M		30	06	
3/8M		15	∫	
			20	

Clog-resistant
Vaneless Full Cone Spray Nozzles

AJP/AJP-PPS





[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.

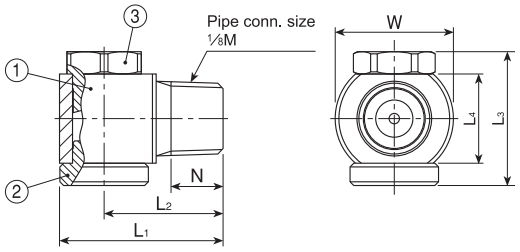
[Standard Pressure]
0.2 MPa

[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

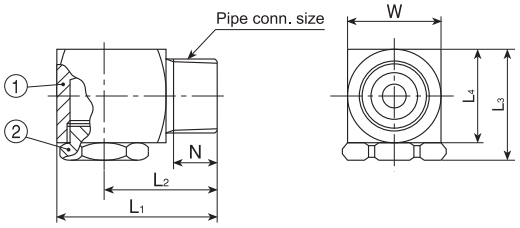
	AJP series
Structure	● Comprises nozzle body and orifice cap ● Only 1/8M size comprises nozzle body, orifice cap, and plug. ● Orifice cap of sizes 3/8M and 1/2M are pressed into bodies. ● No obstructions in nozzle interior.
Material	● Body: S304 or S303 or SCS13 (vary by nozzle code) ● Orifice cap: S303 ● Optional material: S316

1/8M

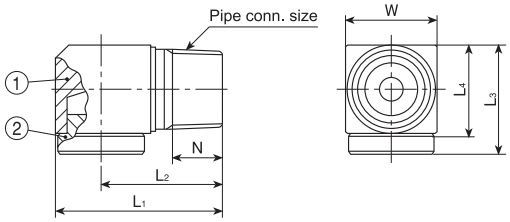


①Body ②Orifice cap ③Plug

1/4M, 3/4M, 1M, 1 1/2M



3/8M, 1/2M



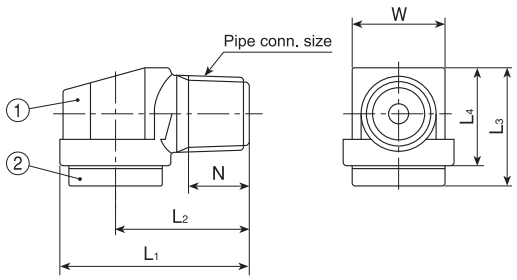
①Body ②Orifice cap

Pipe conn. size	Dimensions (mm)						Mass (g)
	L1	L2	L3	L4	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	● One-piece structure with orifice cap electrodeposited to the body. ● No obstructions in nozzle interior.
Material	● PPS (polyphenylene sulfide)



①Body ②Orifice cap

Pipe conn. size	Dimensions (mm)						Mass (g)
	L1	L2	L3	L4	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.

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	3.2
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	7.1
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	22.3

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	

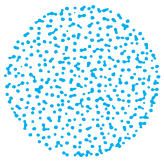
Clog-resistant
Vaneless Full Cone Spray Nozzles

AJP-AL92

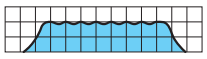
Related Products

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

(AJP-AL92 nozzle with S316 socket)



[Spray pattern]



[Spray distribution]

[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

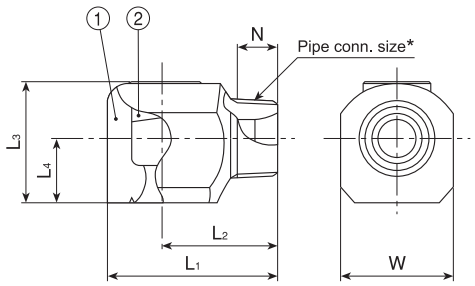
[Applications]

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

AJP-AL92 series

	AJP-AL92 series
Structure	● Whole nozzle fired as one piece. ● No obstructions in nozzle interior.
Material	● 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	
½M	49.5	33.5	36	18	32	14	120
¾M	59	39	44	22	41	15	220
1M	76	50	54	28	50	18	450
1½M	106	70	80.5	43.5	75	20	1,600

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

* 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)

Spray Capacity Code	Pipe Conn. Size				Spray Angle (°)			Spray Capacity (ℓ/min)							Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	½M	¾M	1M	1½M	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	1,250	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

How to order

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

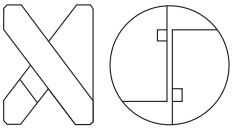
〈Example〉···½MAJP18 AL92

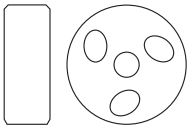
½M	AJP	18	AL92
Pipe Conn. Size		Spray Capacity Code	
½M		18	
≀		≀	
1½M		250	

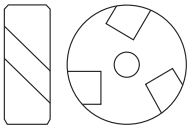
Effective Use of Full Cone Spray Nozzles

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.

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

T: Torque (N-m)
C: Constant
Q: Spray capacity (ℓ/min)
D: External dimension of whirler (mm)
P: Spray pressure (MPa)

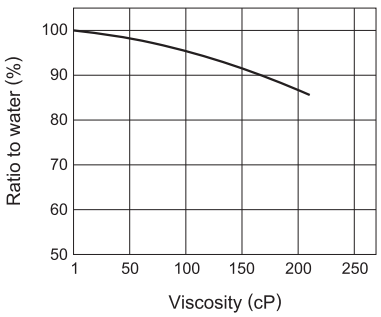
[Example]

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

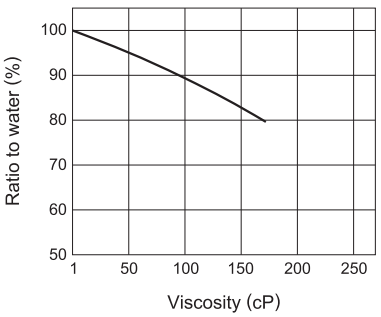
Viscosity

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]



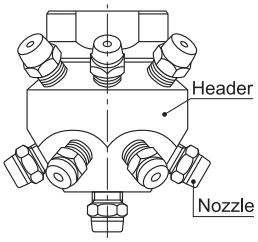
[Relation between viscosity and spray angle]



Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa

Related Products

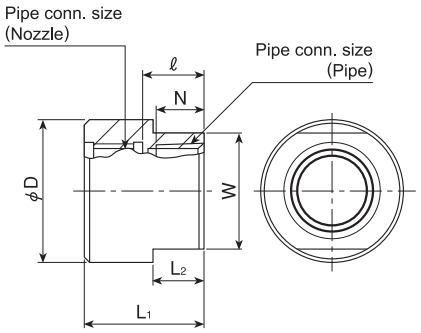
13JJXP series (13-head Full Cone Spray Nozzles)

Series	Appearance	Structure	Features	Applications
13JJXP			● 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.	● 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

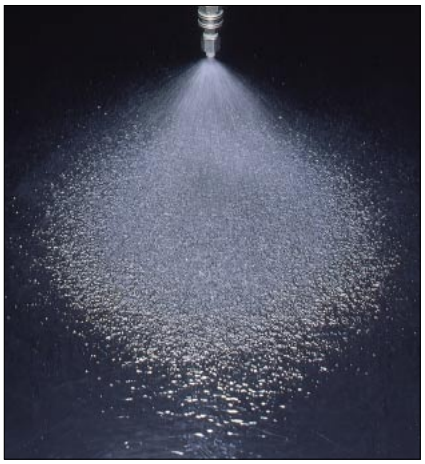


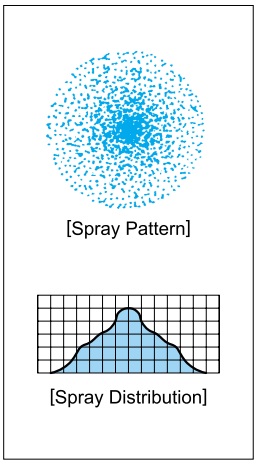
Nominal diameter	Pipe conn. size		Dimensions (mm)						Mass (g)
	Nozzle	Pipe	L_1	L_2	ℓ	W	ϕD	N	
1/2	1/2	1/2	34	10	18	27	30	14	120
3/4	3/4	3/4	39	14	21	35	40	15	230
3/4x1	1	3/4	41	18	21	41	50	15	200
1	1	1	43	18	23	41	50	17	400
1x1 1/2	1 1/2	1	47	24	24	60	70	17	560
1 1/2	1 1/2	1 1/2	50	24	27	60	70	19	840
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.

Quick-Detachable High-efficiency Etching Nozzles

SNAPJet





[Features]

- Mountain-shaped distribution and high spray impact achieve high-precision etching.
- Uniform etching effect in any production lines because the distortion of spray distribution is minimized even if spray pressure is modulated.
- Quick-detachable design makes periodic maintenance easy.
  Whirler inside the nozzles is also removable.
- Also available in titanium for high-temperature and high-pressure condition.

[Standard Pressure]

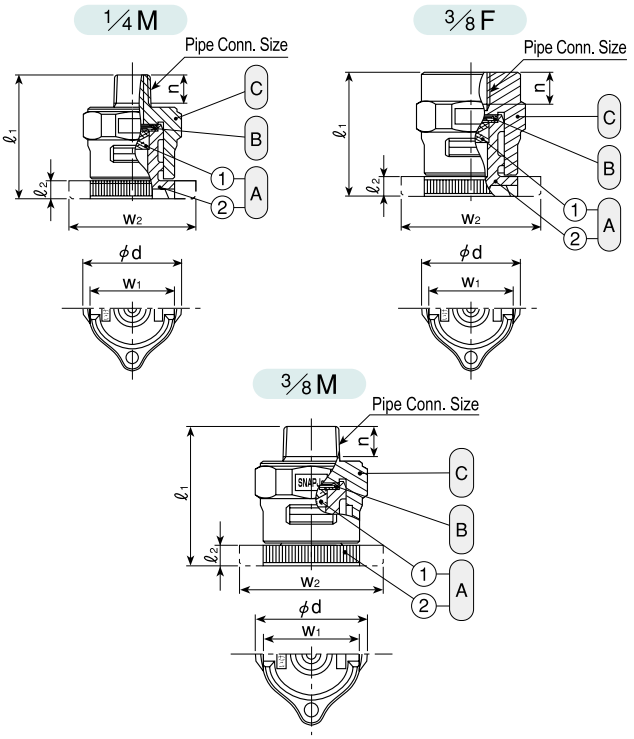
0.2MPa

[Applications]

Shadow mask etching, lead frame etching
High-precision etching for PCB and TAB, etc.

SNAPJet-series

	SNAPJet-series
Structure	• 2-piece structure comprised of adaptor and nozzle with whirler. Nozzle is removable only by turning 90°.
Material	• Nozzle body, adaptor and whirler : PPS(polyphenylene sulfide) • Packing : EPDM • Optional material : Nozzle body made of TN (titanium)



Series	Pipe Conn. Size	Dimensions(mm) ℓ1	ℓ2	ϕd	W1	W2	n	Mass (g)
SNAPJet	¼ M	44	6.5	35	30	45	10	30
	⅜ F	44	6.5	35	30	45	11	40
	⅜ M	44	6.5	35	30	45	10	35

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

Ⓐ Nozzle (①Whirler ②Body) Ⓑ Packing-EPDM Ⓒ Adaptor-PPS

Spray Capacity Code	Pipe Conn. Size (Adaptor) ¼M	⅜F	Spray Angle 0.05 MPa	0.2 MPa	0.5 MPa	Spray Capacity (ℓ/min) 0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
040	○	○	54°	65°	64°	2.10	2.90	3.50	4.00	4.79	6.01	6.98	380	1.6
050	○	○	54°	65°	64°	2.62	3.62	4.37	5.00	5.99	7.51	8.73	≀	2.0
060	○	○	59°	70°	69°	3.15	4.35	5.25	6.00	7.18	9.02	10.5		2.4
070	○	○	64°	75°	74°	3.67	5.07	6.12	7.00	8.38	10.5	12.2	520	2.4

How to order

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

① Complete unit

〈Example〉···¼MSNAPJJX040PPS+PPS

¼M (Pipe Conn. Size: ¼M, ⅜F, ⅜M) SNAPJJX 040 (Spray Capacity Code: 040 ≀ 070) PPS+PPS

② Nozzle only

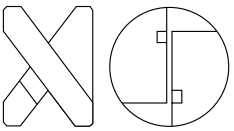
〈Example〉···SNAPJJX040PPS

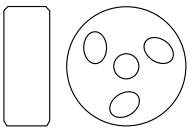
SNAPJJX 040 (Spray Capacity Code: 040 ≀ 070) PPS

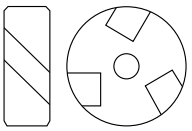
For Effective Use of Full Cone Spray Nozzles

Clogging & 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** 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** is ideal, as the orifice and whirler are made of ceramics. **JUXP, AJP-AL92 and TJJX-SiC series** 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.

Weight Savings

For arrangements of many large size nozzles, weight savings of the nozzles affects the total production cost for the systems. The **TJJX-series** with a newly developed X-shaped whirler has a 20% shorter overall length and 20% less weight than conventional nozzles. In addition, the weight of TJJX-SiC 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.

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

T : Torque (N-cm)
C : Constant
Q : Spray capacity (ℓ/min)
D : External dimension of whirler (mm)
P : Spray pressure (MPa)

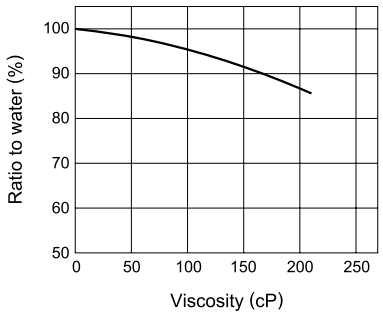
[Example]

Nozzle No.	Torque at pressure of 0.2MPa
¾FJJXP23	2.5N-cm
8TJJX8000	8,000N-cm

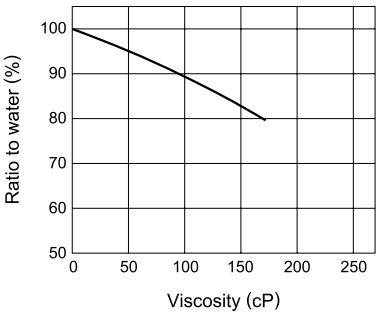
Viscosity

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 p.55 for details.)

[Relation between viscosity and spray capacity]



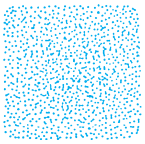
[Relation between viscosity and spray angle]



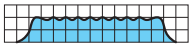
Nozzle tested : JJXP90
Pressure : 0.02-0.03MPa

Square Spray Nozzles

SSXP / SSXP-HTPVC



[Spray pattern]



[Spray distribution]

[Features]

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

[Standard Pressure]

SSXP series: 0.2 MPa
SSXP-HTPVC series: 0.15 MPa

[Applications]

Cleaning: Gas, incinerator fumes, machinery, eliminators, screen, tanks, crushed stones, earth and sand
Cooling: Gas, machinery, tanks, steels
Spraying: Waste water treatment, foam breaking, fire extinguishing, dust suppression

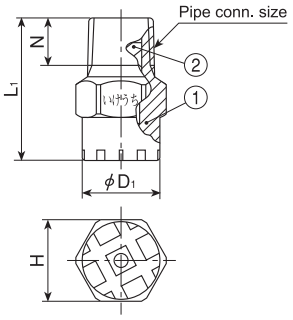
SSXP series

	SSXP series
Structure	● One-piece structure with press-fit X-shaped whirler.
Material	● Sizes 1F or smaller: S303 or B (brass) ● Sizes 1½F or larger: S316 (SCS14) ● Optional material: S316L (SCS16)

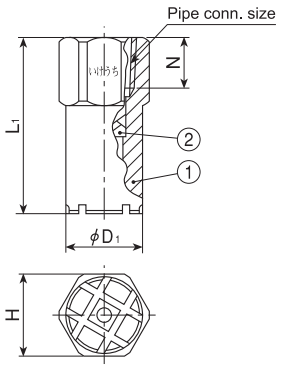
Pipe conn. size	Dimensions (mm)							Mass (g)	
	L_1	L_2	H	W	ϕD_1	ϕD_2	N	S303 S316	B
1/8M	21	—	12	—	11.5	—	7	11.5	12
1/4M	29	—	14	—	13.5	—	10.5	20	21.5
1/8F	27	—	12	—	11.5	—	7	18	19
1/4F	36.5	—	17	—	16	—	10.5	45	46
3/8F	45.5	6	—	17	—	20	11	70	74
1/2F	56	8	—	22	—	25	14	150	160
3/4F	73	10	—	27	—	32	15	300	320
1F	94	14	—	34	—	40	17	575	620
1 1/2F	131	20	—	50	—	58	19	1,690	—
2F	168	24	—	60	—	70	23	2,910	—
2 1/2F	199	27	—	80	—	90	27	5,860	—
3F	220	30	—	90	—	105	30	9,420	—

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

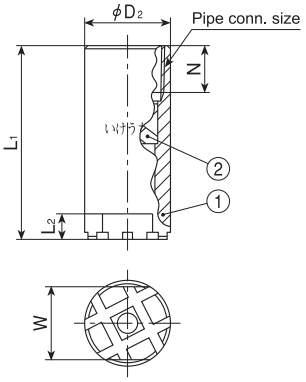
1/8M, 1/4M



1/8F, 1/4F



3/8F and over

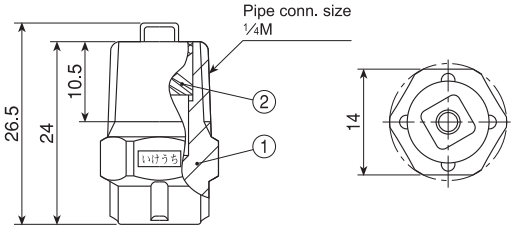


①Body ②Whirler

SSXP-HTPVC series

	SSXP-HTPVC series
Structure	● One-piece structure with removable X-shaped whirler.
Material	● HTPVC (heat-treated polyvinyl chloride)
Mass	● 3.1 g

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



①Body ②Whirler

Square Spray Nozzles
SSXP / SSXP-HTPVC series

SSXP series

Spray Capacity Code	Pipe Conn. Size				Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	1/8M	1/4M	1/8F	1/4F	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
020	○		○		86	90	81	—	1.06	1.46	1.75	2.00	2.36	2.91	3.34	3.86	330	0.9
030	○		○		86	90	81	—	1.59	2.18	2.63	3.00	3.54	4.36	5.00	5.79	380	1.2
040		○		○	90	95	85	—	2.12	2.91	3.51	4.00	4.72	5.81	6.67	7.72	360	1.3
050		○		○	91	95	86	—	2.65	3.64	4.38	5.00	5.90	7.27	8.34	9.64	〃	1.7
060		○		○	91	95	86	2.51	3.18	4.37	5.26	6.00	7.08	8.72	10.0	11.6	490	1.7

Spray Capacity Code	Pipe Conn. Size								Spray Angle (°)			Spray Capacity (ℓ/min)									Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
	3/8F	1/2F	3/4F	1F	1 1/2F	2F	2 1/2F	3F	0.05 MPa	0.2 MPa	0.5 MPa	0.03 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
070	○								94	100	89	2.93	3.71	5.09	6.14	7.00	8.26	10.2	11.7	13.5	440	2.0
080	○								95	100	90	3.35	4.24	5.82	7.01	8.00	9.44	11.6	13.3	15.4	〃	2.0
10	○								96	100	91	4.19	5.29	7.28	8.77	10.0	11.8	14.5	16.7	19.3		2.6
12	○								97	100	92	5.03	6.35	8.73	10.5	12.0	14.2	17.4	20.0	23.1	630	2.6
16		○							95	100	90	6.70	8.47	11.6	14.0	16.0	18.9	23.3	26.7	30.9	〃	2.8
20		○							96	100	91	8.36	10.6	14.6	17.5	20.0	23.6	29.1	33.4	38.6	710	3.5
30			○						96	100	91	12.6	15.9	21.8	26.3	30.0	35.4	43.6	50.0	57.9	〃	3.8
40			○						97	100	92	16.8	21.2	29.1	35.1	40.0	47.2	58.1	66.7	77.2		4.8
50				○					95	100	90	20.9	26.5	36.4	43.8	50.0	59.0	72.7	83.4	96.4	750	5.4
60				○					96	100	91	25.1	31.8	43.7	52.6	60.0	70.8	87.2	100	115	〃	5.4
80				○					97	100	92	33.5	42.4	58.2	70.1	80.0	94.4	115	135	155	1,000	6.0
100					○				96	100	91	41.9	52.9	72.8	87.7	100	120	145	170	195	〃	7.1
150					○				97	100	92	62.8	79.4	110	130	150	180	220	250	290		10.2
300						○			97	100	92	125	160	220	265	300	355	435	500	580	1,350	12.7
500							○		97	100	92	210	265	365	440	500	590	730	835	965	1,500	16.8
700								○	97	100	92	290	370	510	615	700	826	1,020	1,170	1,350	1,700	17.1

SSXP-HTPVC series

Spray Angle (°)			Spray Capacity (ℓ/min)								Mean Drop. Dia. (μm)	Free Pass. Dia. (mm)
0.05 MPa	0.15 MPa	0.5 MPa	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		
56	65	65	2.72	3.74	4.50	5.14	6.06	7.46	8.56	9.90	450	2.2

How to order

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

① SSXP series (metal)

〈Example〉…1/8MSSXP020S303

1/8M (Pipe Conn. Size) SSXP 020 (Spray Capacity Code) S303 (Material)

- Pipe Conn. Size: 1/8M 〃 3F
- Spray Capacity Code: 020 〃 700
- Material: S303, B, S316

② SSXP-HTPVC series (plastic)

1/4MSSXP $1.5\frac{65}{4.5}$ HTPVC