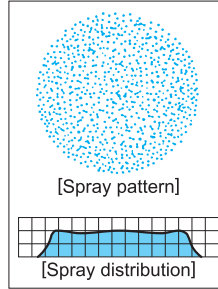


Wide-angle Full Cone Spray Nozzles

BBXP/BBXP-PVDF/BBXP-PVC



[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

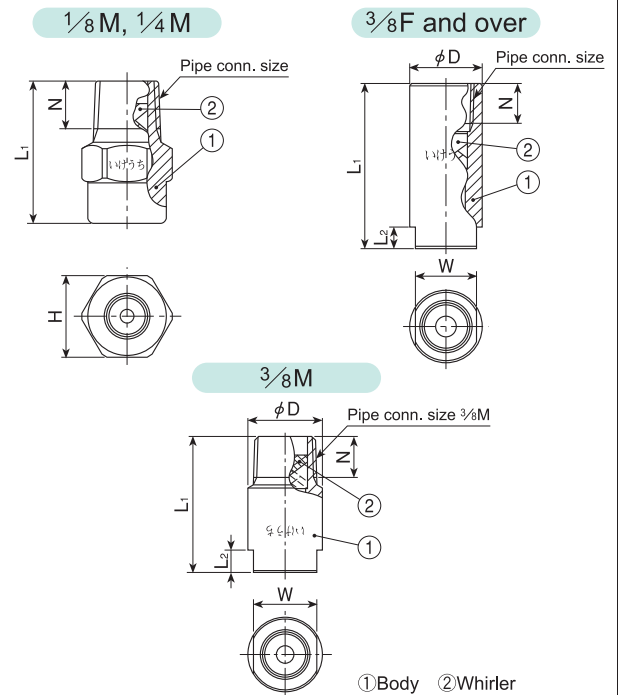
Full Cone

BBXP series

BBXP series	
Structure	● One-piece structure with press-fit X-shaped whirler.
Material	<ul style="list-style-type: none"> ● Sizes 1/8M–3/8M (3/4F): S303 ● Sizes 1/2F–1F: S303 or B (brass) ● Sizes 1 1/2F or larger: S316 ● Optional material: S316L or others

Pipe conn. size*1	Dimensions (mm)						Mass (g)	
	L ₁	L ₂	H	W	φD	N	S303 S316	B
1/8M	21	—	12	—	—	7	11	—
1/4M (015, 020)	21	—	14	—	—	10.5	20	—
1/4M (030)	21.5	—	14	—	—	10.5	20	—
1/4M (040–060)	29	—	14	—	—	10.5	21	—
3/8M	36.5	6	—	17	20	11	55	—
3/8F	45.5	6	—	17	20	11	75	—
1/2F	56	8	—	22	25	14	140	150
3/4F	73	10	—	27	32	15	300	320
1F	94	14	—	34	40	17	585	625
1 1/2F	131	20	—	50	58	19	1,760	—
2F	168	24	—	60	70	23	2,980	—
2 1/2F	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.



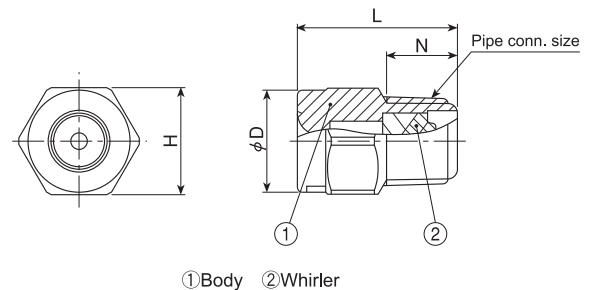
[Note] Appearance and dimensions may differ slightly depending on materials and nozzle codes.

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	
1/8M	18	12	11	8	2
1/4M	22	14	12	11.5	4.1

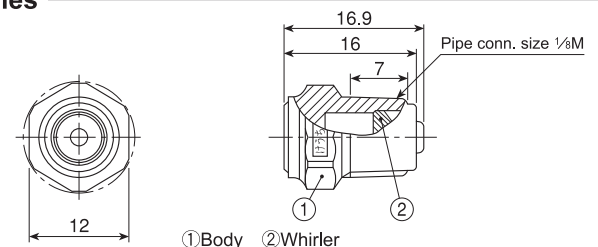
[Note] Appearance and dimensions may differ slightly depending on materials and nozzle codes.



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.



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	340	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	350	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	340	2.0
14	○	○									124	120	112	4.67	5.90	8.10	9.77	11.1	14.0	16.2	18.6	21.5	340	2.4
16	○	○									125	120	113	5.33	6.74	9.25	11.2	12.7	16.0	18.5	21.2	24.6	340	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	420	2.8
23			○								124	120	112	7.67	9.69	13.3	16.0	18.3	23.0	26.6	30.5	35.3	420	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	580	3.8
40				○							124	120	112	13.3	16.9	23.2	27.9	31.8	40.0	46.3	53.1	61.4	580	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	630	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	710	7.2
150						○					124	120	112	50.0	63.2	86.9	105	120	150	175	200	230	900	8.5
200							○				124	120	112	66.7	84.3	115	140	160	200	230	265	310	900	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	1,000	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	1,100	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	1,200	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	340	0.8	—
020	○	○	110	120	113	—	1.06	1.46	1.75	2.00	2.51	2.91	3.34	3.86	340	1.2	—

*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) ...1/8M BBXP015S303

1/8M	BBXP	015	S303
Pipe Conn. Size(*1)		Spray Capacity Code	Material(*2)
1/8M		015	S303
4F		1200	S316

② BBXP-PVDF series

(Example) ...1/8M BBXP020PVDF (BLA)

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

③ BBXP-PVC series

1/8M BBXP030PVC-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

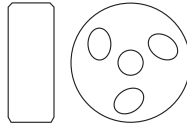
Clogging and Free Passage Diameter

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.

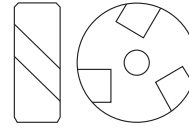
As compared with other whirlers, the **X-shaped whirler** has a larger free passage diameter, which minimizes clogging. Some full cone nozzles without whirlers have been developed to eliminate clogging problems, such as the **AJP series** nozzle which features minimal clogging.



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.

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

[Example]

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

T: Torque (N-m)

C: Constant

Q: Spray capacity (ℓ/min)

D: External dimension of whirler (mm)

P: Spray pressure (MPa)

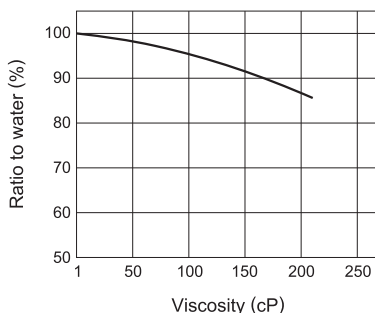
Viscosity

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

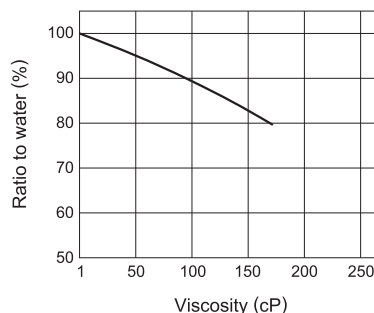
(Spray capacity of hollow cone spray nozzles increases as the viscosity of liquid increases.

See page 55 for details.)

[Relation between viscosity and spray capacity]



[Relation between viscosity and spray angle]



Nozzle tested: JJXP90
Pressure: 0.02–0.03 MPa