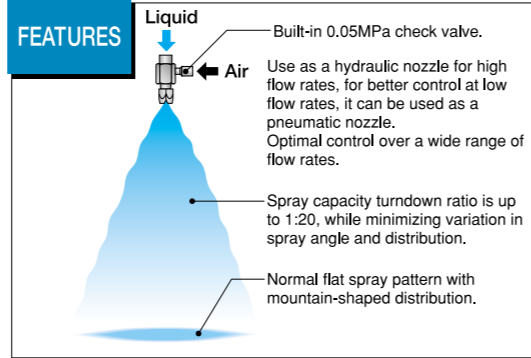
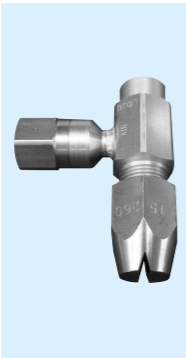


VVP+AS series Hydraulic/Pneumatic (dual-use) Flat Spray Nozzles

- Steel making process**
- Cooling continuous casted steel (Bloom)
 - Cooling continuous casted steel (Slab short side)
 - Cooling continuous casted steel (Billet)
 - Cooling roll on continuous casting machine

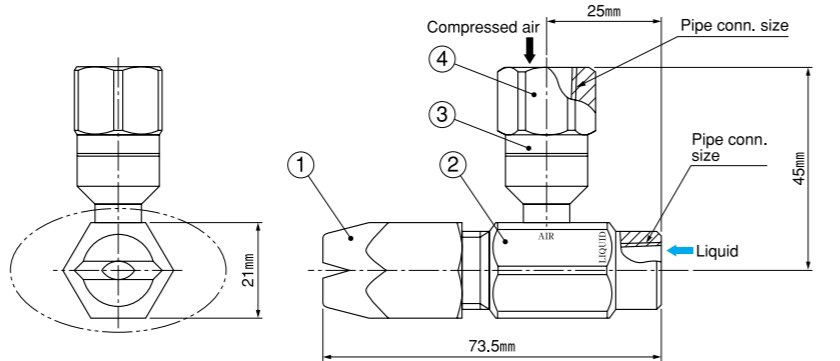
- Rolling mill process**
- Cooling sheets on continuous annealing line
 - Cooling roll in heat treatment
 - Cooling electromagnetic steel



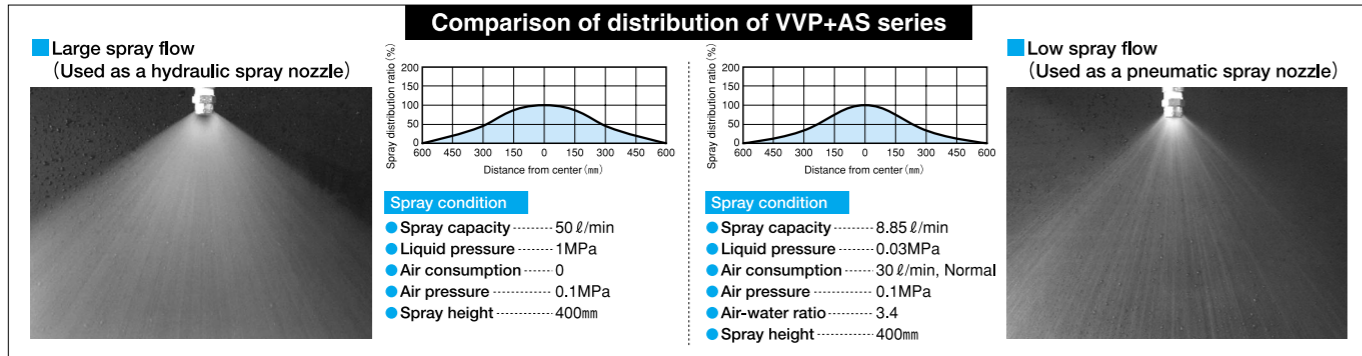
VVP+AS series

MATERIALS

- ① Nozzle: S303
- ② Mixing adaptor: S304
- ③ Check valve: S304
- ④ Air socket: S303



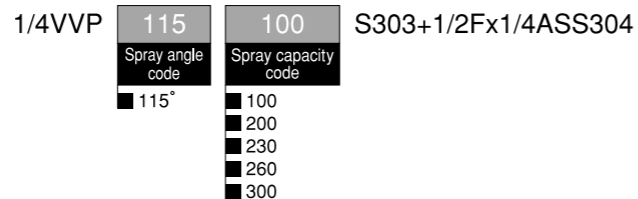
Spray angle code	Spray capacity code	Spray angle (°)				Spray capacity Qw (ℓ/min) & Air consumption Qa (ℓ/min, Normal) at Liquid pressure Pw (MPa) & Air pressure of 0.1MPa												Mean droplet diameter (μm)	Free pass. dia. (mm)		Mass (g)					
		0.01 MPa	0.1 MPa	0.3 MPa	0.7 MPa	0.01 MPa	0.02 MPa	0.03 MPa	0.05 MPa	0.07 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa		1.5 MPa	2 MPa		Nozzle	Adaptor			
115°	100	—	107	115	119	Qw	—	—	0.94	2.96	4.77	5.69	6.97	8.05	9.87	12.75	15.09	18.05	22.12	25.56	1.4					
						Qa	—	—	35	10	—	—	—	—	—	—	—	—	—	—					—	—
	200	100	107	115	119	Qw	3.46	4.9	6	7.75	9.17	10.9	13.4	15.5	19	24.52	29.03	34.71	42.54	49.14	400					
						Qa	46	40	30	4	—	—	—	—	—	—	—	—	—	—						—
	230	100	107	115	119	Qw	3.98	5.63	6.9	8.91	10.5	12.6	15.4	17.8	21.8	28.2	33.38	39.92	48.92	56.52	550	7.0	2.0	190		
						Qa	46	40	30	4	—	—	—	—	—	—	—	—	—	—						
	260	100	107	115	119	Qw	4.5	6.37	7.8	10.1	11.9	14.2	17.4	20.1	24.7	31.87	37.73	45.13	55.3	63.89	550					
						Qa	46	40	30	3	—	—	—	—	—	—	—	—	—	—						
	300	100	107	115	119	Qw	5.11	7.23	8.85	11.4	13.5	16.1	19.8	22.8	28	36.16	42.81	51.2	62.75	72.49	550					
						Qa	46	40	30	4	—	—	—	—	—	—	—	—	—	—						



How to order

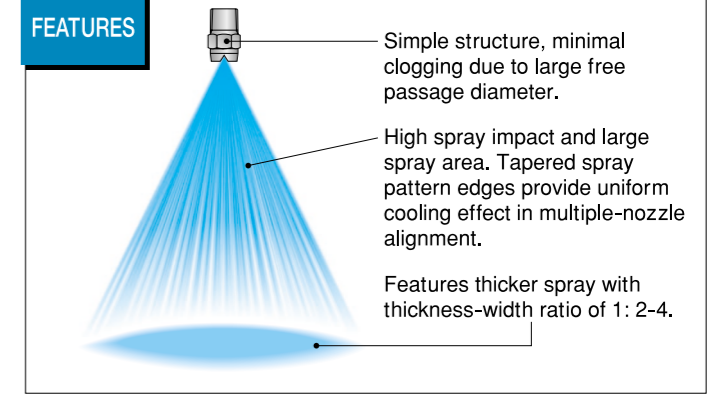
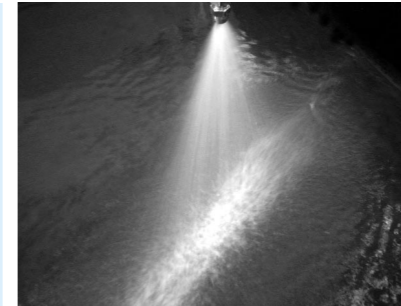
Please inquire or order for a specific nozzle using this coding system.

〈Example〉 1/4VVP115100S303+1/2Fx1/4ASS304



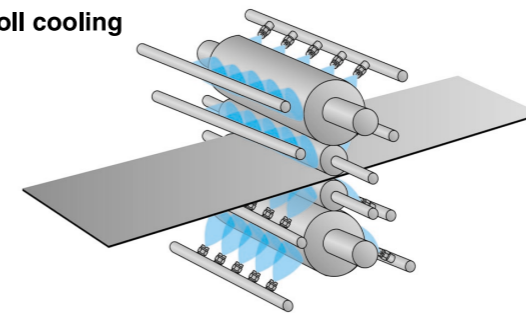
WVVP series Thick Flat Spray Nozzles

- Rolling mill process**
- Roll cooling
 - Cooling steel plates



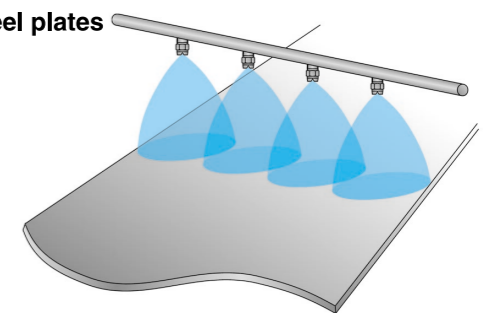
WVVP nozzles used in cooling application

- Roll cooling



WVVP achieves uniform and effective cooling.

- Cooling steel plates



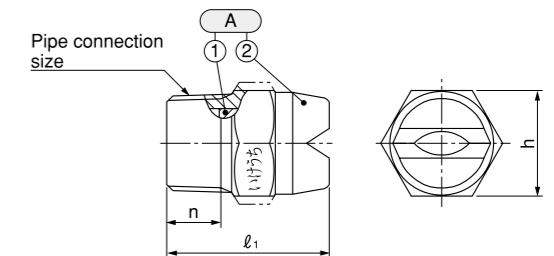
WVVP provides a wide and uniform cooling zone.

WVVP series

MATERIAL S303 (Stainless steel 303)

Series	Pipe connection size	Dimensions (mm)		
		ℓ ₁	n	h
WVVP	1/2M	38	14	23
	3/4M	45	15	29
	1M	55	18	35

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



Ⓐ Nozzle (① Nozzle body ② Deflector)

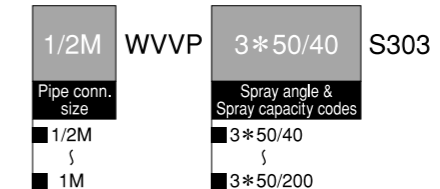
Spray angle and spray capacity codes	Pipe connection size			Spray angle		Spray capacity (ℓ/min)				
	1/2M	3/4M	1M	0.3 MPa		0.05 MPa	0.1 MPa	0.2 MPa	0.3 MPa	0.5 MPa
3*50/40	○			20	50	16.3	23.1	32.7	40.0	51.6
5*80/100		○		20	75	31.6	44.7	63.2	77.5	100
3*80/200			○	20	80	81.6	115	163	200	258
3*50/200			○	20	50	81.6	115	163	200	258

Conversion of unit [Pressure] 0.1MPa ≒ 14.50psi 10psi ≒ 0.069MPa [Flow rate] 1ℓ (liter) ≒ 0.264 US gal. 1US gal. ≒ 3.79ℓ (liter)

How to order

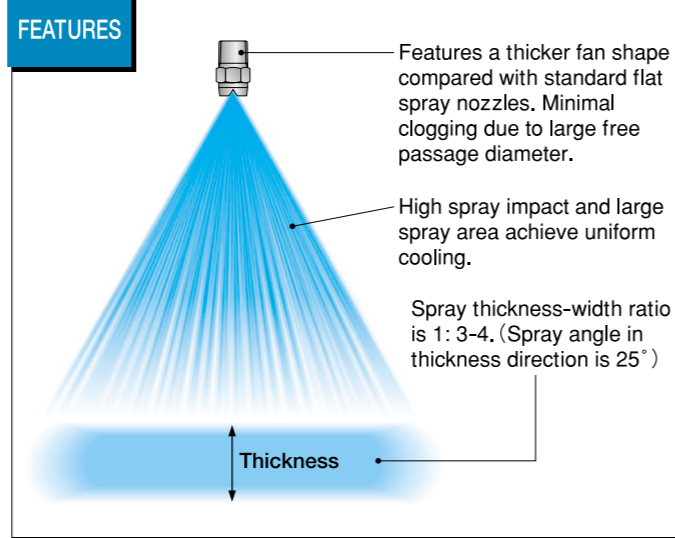
Please inquire or order for a specific nozzle using this coding system.

〈Example〉 1/2M WVVP 3*50/40 S303



WVVEP series Thick Flat Spray Nozzles with Even Distribution

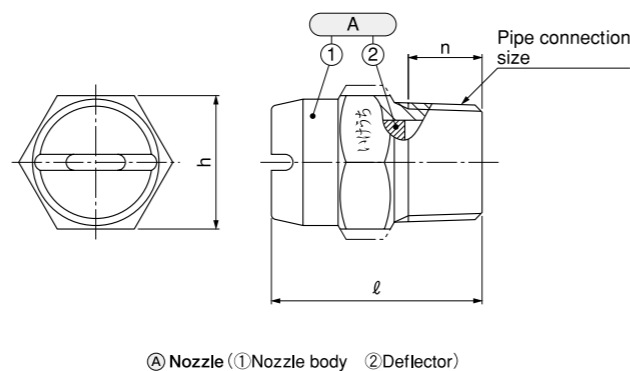
- Plate/Hot strip mill**
- Roll cooling
 - Cooling plates and steel sheets
 - Cooling casted steel



WVVEP series

MATERIALS Brass (C3604) or S303

Series	Pipe connection size	Dimensions (mm)			Mass (g)	
		ℓ	n	h	B	S303
WVVEP	1/4M	25	9.5	14	23	21
	3/8M	30	10.5	19	40	37
	1/2M	38	14	23	70	65



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

Performance Data

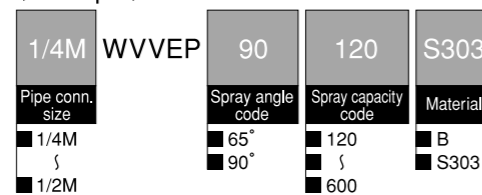
Spray angle code	Spray capacity code	Pipe connection size	Spray capacity (ℓ/min)								
			0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa
90°, 65°	120	1/4M	4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0
	140		5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1
	200		8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6
	260	3/8M	10.6	15.0	18.4	21.2	26.0	33.6	39.7	47.5	67.1
	300		12.2	17.3	21.2	24.5	30.0	38.7	45.8	54.8	77.5
	400		16.3	23.1	28.3	32.7	40.0	51.6	61.1	73.0	103
	500	1/2M	20.4	28.9	35.4	40.8	50.0	64.6	76.4	91.3	129
	600		24.5	34.6	42.4	49.0	60.0	77.5	91.7	110	155

Conversion of unit [Pressure] 0.1MPa ≅ 14.50psi [Flow rate] 1ℓ (liter) ≅ 0.264 US gal. 10psi ≅ 0.069MPa 1US gal. ≅ 3.79ℓ (liter)

How to order

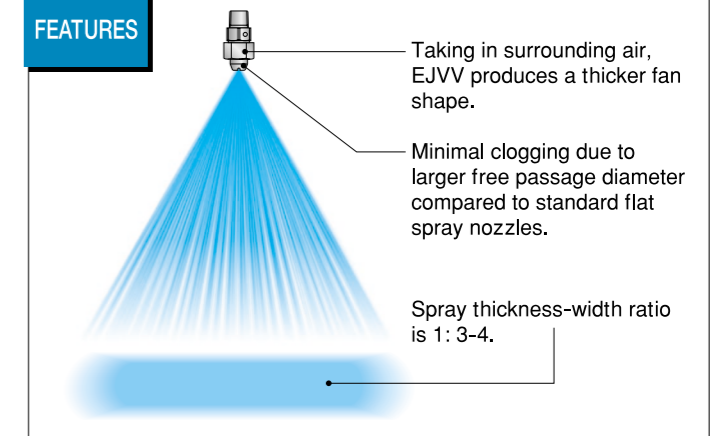
Please inquire or order for a specific nozzle using this coding system.

〈Example〉 1/4M WVVEP 90 120 S303



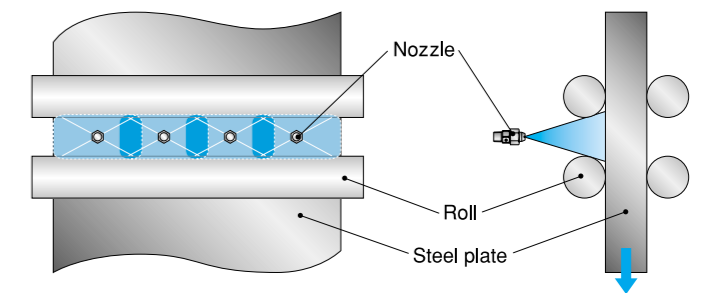
EJVV series Air Mixing Type Flat Spray Nozzles

- Iron making process**
- Washing electric precipitator pole plates
- Rolling mill process**
- Cooling steel plates



EJVV used in cooling steel plates

EJVV achieves uniform and effective cooling in the entire spray area with large thick spray.



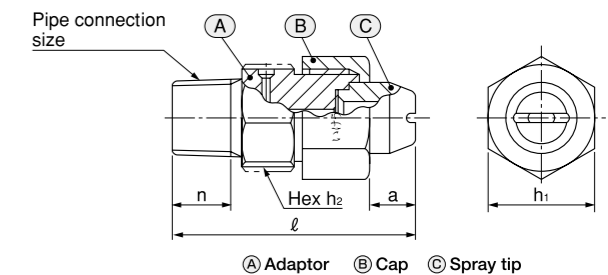
EJVV series

MATERIALS Brass (C3604) or S303

OPTIONAL MATERIAL: S316 or others

Series	Pipe conn. size	Dimensions (mm)					Mass (g)	
		ℓ	h ₁	h ₂	a	n	B	S303
EJVV	1/4M	44.5	19	17	8	10.5	60	57

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



Performance Data

Spray angle code	Spray capacity code	Pipe connection size	Spray angle		Spray capacity (ℓ/min)						Mean droplet diameter (μm)	Free passage diameter (mm)		
			0.3 MPa	0.7 MPa	0.25 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa				
90°	20	1/4M	90°	90°	1.83	2.00	2.58	3.06	3.65	5.16	320	0.9		
	30		90°	90°	2.74	3.00	3.87	4.58	5.48	7.75	320	1.1		
	40		90°	90°	3.65	4.00	5.16	6.11	7.30	10.3	320	1.2		
	50		90°	90°	4.56	5.00	6.45	7.64	9.13	12.9	320	1.3		
	60		90°	90°	5.78	6.00	7.75	9.17	11.0	15.5	420	1.5		
	80		90°	90°	7.30	8.00	10.3	12.2	14.6	20.7	420	1.7		
	100		90°	90°	9.13	10.0	12.9	15.3	18.3	25.8	590	2.0		
	120		90°	90°	11.0	12.0	15.5	18.3	21.9	31.0	590	2.2		
	80°		20	1/4M	80°	80°	1.83	2.00	2.58	3.06	3.65	5.16	320	0.9
			30		80°	80°	2.74	3.00	3.87	4.58	5.48	7.75	320	1.1
40		80°	80°		3.65	4.00	5.16	6.11	7.30	10.3	320	1.3		
50		80°	80°		4.56	5.00	6.45	7.64	9.13	12.9	320	1.5		
60		80°	80°		5.78	6.00	7.75	9.17	11.0	15.5	430	1.7		
80		80°	80°		7.30	8.00	10.3	12.2	14.6	20.7	430	1.9		
100		80°	80°		9.13	10.0	12.9	15.3	18.3	25.8	590	2.2		
120		80°	80°		11.0	12.0	15.5	18.3	21.9	31.0	590	2.6		

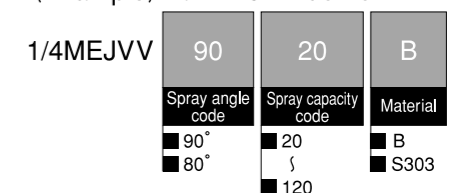
*Please use EJVV at pressure over 0.25MPa.

Conversion of unit [Pressure] 0.1MPa ≅ 14.50psi [Flow rate] 1ℓ (liter) ≅ 0.264 US gal. 10psi ≅ 0.069MPa 1US gal. ≅ 3.79ℓ (liter)

How to order

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

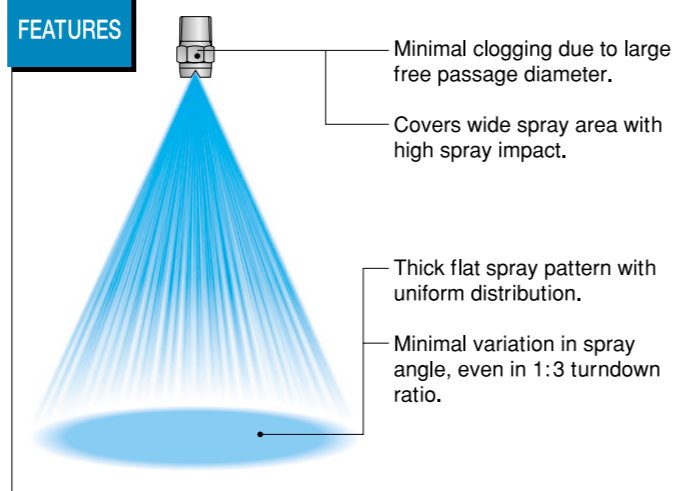
〈Example〉 1/4MEJVV 90 20 B



DDRP series Thick Flat Spray Nozzles with Even Distribution

Rolling mill process

- Cooling
- Cleaning after pickling

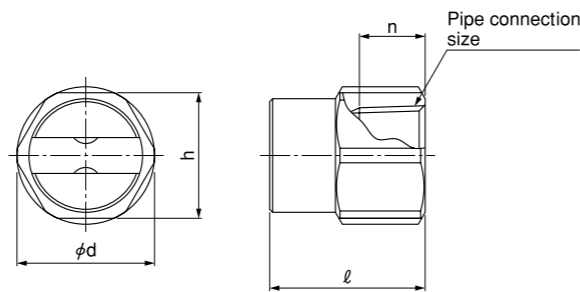


DDRP series

MATERIAL S303

STRUCTURE Simple one-piece structure to be screwed into pipe, no whirler inside.

Series	Pipe conn. size	Dimensions (mm)				Mass (g)
		ℓ	n	h	φd	
DDRP	1/4F	21	10.5	19	21	30
	3/8F	26	11	21	23	40
	1/2F	32	14	26	29	80
	3/4F	40	15	32	35	140
	1F	48	17	41	46	300



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

Performance Data

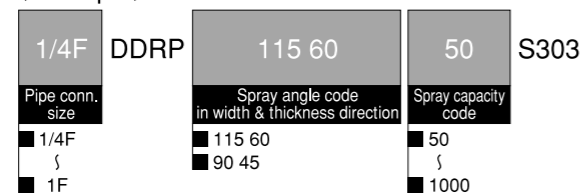
Spray angle code (width & thickness)	Spray capacity code	Pipe connection size	Spray capacity (ℓ/min)								
			0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	0.7 MPa	1 MPa	2 MPa
115° (width) & 60° (thickness) or 90° (width) & 45° (thickness)	50	1/4F	2.04	2.89	3.54	4.08	5.0	6.46	7.64	9.13	12.9
	100		4.08	5.77	7.07	8.17	10.0	12.9	15.3	18.3	25.8
	120		4.90	6.93	8.49	9.80	12.0	15.5	18.3	21.9	31.0
	140		5.72	8.08	9.90	11.4	14.0	18.1	21.4	25.6	36.1
	200	3/8F	8.16	11.5	14.1	16.3	20.0	25.8	30.6	36.5	51.6
	260		10.6	15.0	18.4	21.2	26.0	33.6	39.7	47.5	67.1
	300	1/2F	12.2	17.3	21.2	24.5	30.0	38.7	45.8	54.8	77.5
	500	3/4F	20.4	28.9	35.4	40.8	50.0	64.6	76.4	91.3	129
	800	1F	32.7	46.2	56.5	65.3	80.0	103	122	146	206
	1000		40.8	57.7	70.7	81.7	100	129	153	183	258

Conversion of unit [Pressure] 0.1MPa ≒ 14.50psi [Flow rate] 1ℓ (liter) ≒ 0.264 US gal. 10psi ≒ 0.069MPa 1US gal. ≒ 3.79ℓ (liter)

How to order

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

Example: 1/4F DDRP 115 60 50 S303

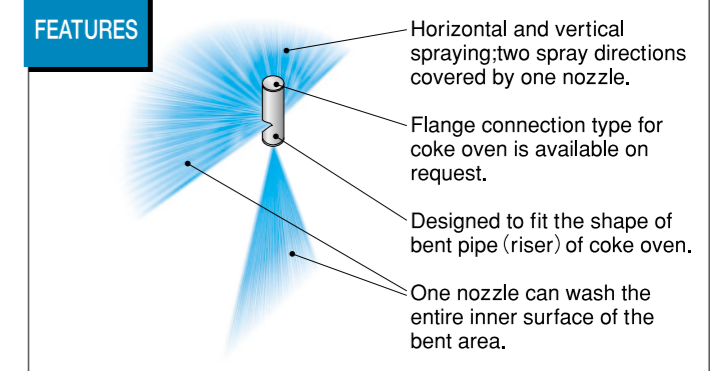
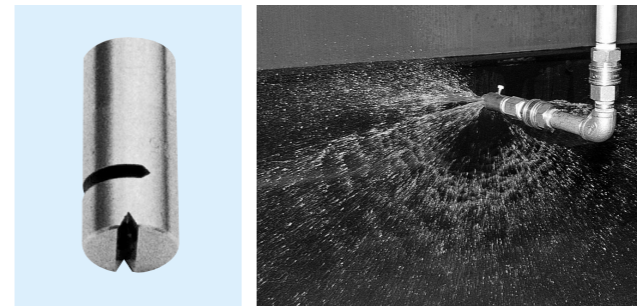


VV+YY series Dual Flat Spray Nozzles

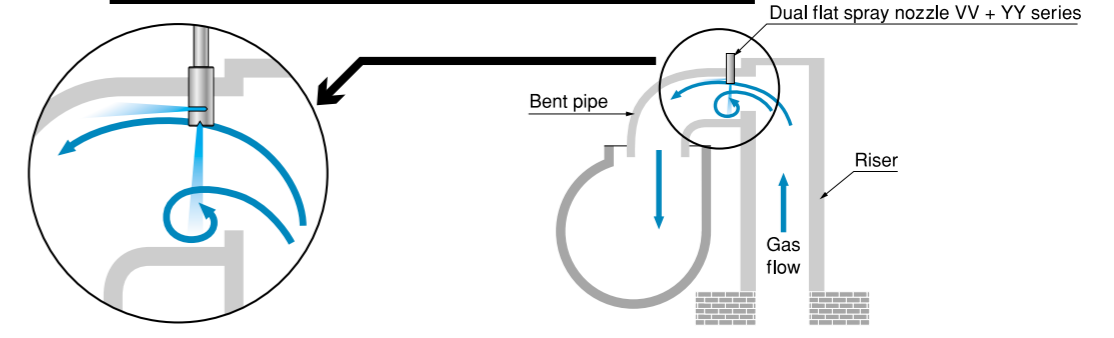
Patented

Raw material process

- Cleaning inner surface of bent pipe of coke oven



VV+YY nozzle used in bent pipe cleaning

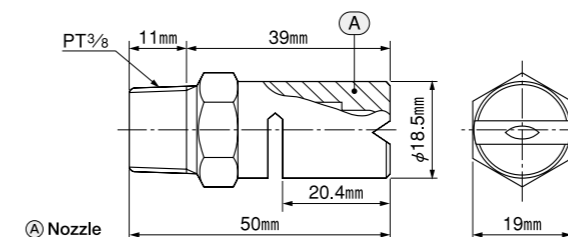


VV + YY series

<Reference of nozzle shape>

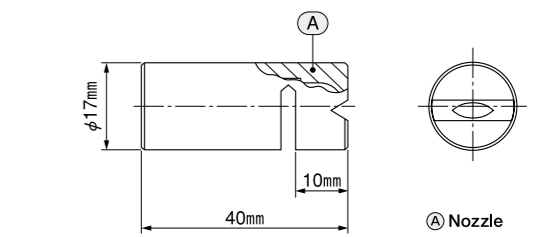
Thread type Nozzle code: E 3/8M (PT) VV2*60/15 + YY2*180/35S303

MATERIAL: S303



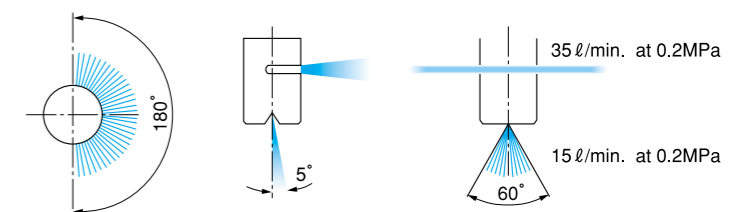
Weld type Nozzle code: E VV2*60/15 + YY2*180/35S303

MATERIAL: S303



<Reference of spray pattern>

Nozzle code: E 3/8M (PT) VV2*60/15 + YY2*180/35S303



Nozzle code	Spray capacity (ℓ/min)						Spray capacity (ℓ/min) at 0.05MPa (Reference only)		
	0.05 MPa	0.1 MPa	0.15 MPa	0.2 MPa	0.3 MPa	0.5 MPa	1 MPa	Down spray	Side spray
VV1.5 30/10 + YY1.5 180/20	17.3	24.5	30.0	34.6	42.4	54.8	77.5	5.8	11.6
VV 2 60/15 + YY1.5 180/35	25.0	35.4	43.3	50.0	61.2	79.1	112	7.5	17.5
VV0.5 60/10 + YY1.5 200/20	30.0	42.4	52.0	60.0	73.5	94.9	134	10	20
VV0.5 30/10 + YY1.5 180/20	30.0	42.4	52.0	60.0	73.5	94.9	134	10	20

Conversion of unit [Pressure] 0.1MPa ≒ 14.50psi [Flow rate] 1ℓ (liter) ≒ 0.264 US gal. 10psi ≒ 0.069MPa 1US gal. ≒ 3.79ℓ (liter)

How to order

Please contact our local sales for details.