

CHAPTER 2

◆◆ Hollow Cone Nozzles



◆ ABOUT US

We Are Here to Help

• Welcome to SPADFLOW

facing the **Challenges** of new industries and emerging markets.

• Spray Technologies

with over **Thousands of Spray Nozzle Types** SPADFLOW has become Iran's leading producer.

• From Design to Installation

with **Skilled** engineers and project managers, SPADFLOW is providing consultancy and support services.

• Knowledge and Experience

as an **Expert** on spray technology, SPADFLOW is at the forefront of production and innovation.





Design



Simulation



Production

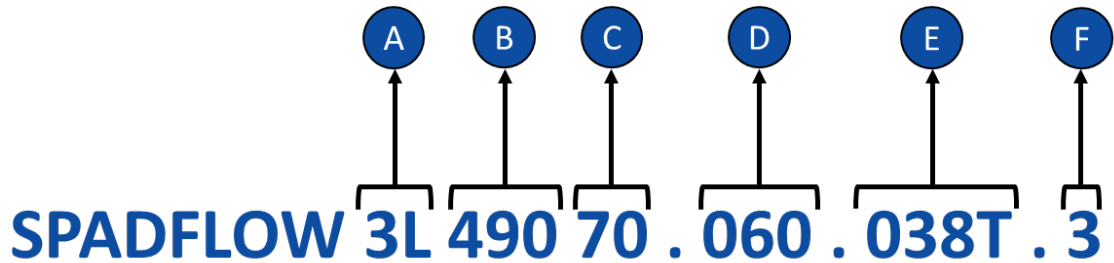


Installation



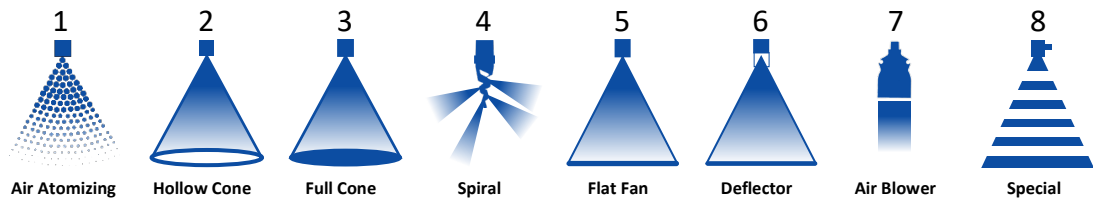
PRODUCT NUMBERS

Everything You Need to Know



A

Nozzle Type (Spray Pattern)



B

Nozzle Series

C

Flow Rate Rank

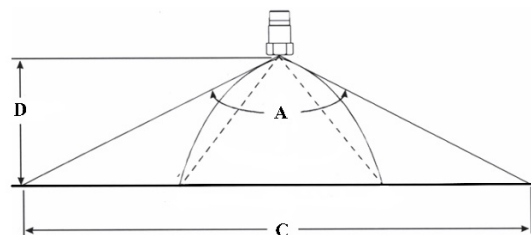
The flow rate rank is relative and depends on the respective nozzle type. The exact value is mentioned in tables on the product pages.

D

Spray Angle

Theoretical spray angle is mentioned in tables on the product pages. Actual spray angle depends on installation and alignment.

- A = Theoretical Spray Angle
- D = Spray Distance
- C = theoretical Spray Coverage



PRODUCT NUMBERS

Everything You Need to Know

E

Connection

1/8" to 4" connections. The exact specification is mentioned in tables on the product pages.

T = BSBT Thread Type Connection

P = BSPP Thread Type Connection

N = NPT Thread Type Connection

R = Retaining Nut

F

Material

Material	Code	Material	Code
Brass	1	Polyvinylchloride	PVC
AISI 304/304L Stainless Steel	2	Polypropylene	PP
AISI 316/316L Stainless Steel	3	Polyamide	PA
AISI 310 Stainless Steel	4	Polyvinylidene fluoride	PVDF
AISI 321 Stainless Steel	5	Polytetrafluorethylene	PTFE
AISI 420 Stainless Steel	6	Polyoxymethylene	POM
Tungsten Carbide	TN	Nitrile Butadiene Rubber	NBR
Phosphor Bronze	CuSn	Polylactic Acid	PLA
Copper	Cu	Acrylonitrile Butadiene Styrene	ABS
Titanium	TI	Nylon Polyamide	PA6
Aluminum	AL	Polycarbonate	PC

Ø B (Equivalent Bore Diameter)

Applies to elliptical discharge holes of flat fan nozzles. A cylindrical hole with a diameter A has the same surface area as the ellipse.

Ø E (Narrowest Free Cross Section)

Important Characteristics for determining the pre-filtration of a nozzle. Can be less than a due to several swirl ducts.

Conversion Formula: $K \text{ factor} \times \sqrt{P(\text{bar})} = Q \text{ (l/min)}$

All flow rate data in this catalogue is based on measurements with water,






Spray angle (α)	Code	Connection Size [inch]	Ø B [mm]	Ø E [mm]	Flow rate (Q) [l/min]						
					Pressure (P) [bar]						
					0.5	1.0	2.0	3.0	5.0	7.0	10.0
45°	3L 490 40 . 045	1/8"	1.25	1.25	0.57	0.76	1.00	1.18	1.44	1.65	1.90
	3L 490 60 . 045	1/4"	2.00	2.00	1.81	2.39	3.15	3.70	4.54	5.20	6.00
	3L 490 70 . 045	3/8"	2.65	2.65	3.22	4.24	5.60	6.59	8.08	9.24	10.66
	3L 490 78 . 045	1/2"	3.45	3.45	5.17	6.82	9.00	10.58	12.98	14.85	17.12
60°	3L 490 40 . 060	1/8"	1.15	1.15	0.57	0.76	1.00	1.18	1.44	1.65	1.90
	3L 490 80 . 060	3/8"	3.70	3.70	5.74	7.58	10.00	11.76	14.43	16.51	19.04
	3L 490 88 . 060	1/2"	4.65	4.65	9.19	12.13	16.00	18.82	23.08	26.41	30.46
	3L 490 96 . 060	3/4"	5.80	5.80	14.36	18.95	25.00	29.40	36.07	41.26	47.59
	3L 491 08 . 060	1"	8.15	8.15	28.72	37.89	50.00	58.80	72.14	82.53	95.18

SPADFLOW spray nozzles are manufactured with the highest precision and undergo permanent quality checks. However, production-related tolerances can affect the spray angle, flow rate, droplet size and droplet distribution.

Hollow Cone Nozzles

Selection Guide





Nozzle Series	Flow Capacity	Operating Pressures	Spray Angle	Application	Page
 2B PJ	Low Flow Up to 6 liters per Minute	High Pressure Up to 70 bar	Standard Spray Angle 90°	Cooling air at gas turbine inlets Coating Scrubbing Quenching Odor Control Misting Humidification Concrete Curing Chemical Process	23
 2L 226	Low Flow Up to 2 liters per Minute	High Pressure Up to 100 bar	Standard Spray Angle 60°-80°	Disinfection Humidification Cooling Chemical Process Adiabatic Cooling	24
 2L 214	Low Flow Up to 1 liter per Minute	Standard Pressure Up to 20 bar	Standard Spray Angle 60°-80°	Cooling and cleaning Dust Control Spray onto Filters Spray Drying Desuperheating Sprinkling	25
 2L 216	Standard Flow Up to 30 liters per Minute	Standard Pressure Up to 20 bar	Standard Spray Angle 90°	Cooling Gas Cleaning Air Dust Control Spray onto Filters Spray Drying Desuperheating Sprinkling	25
 2B NCJ	High Flow Up to 5000 liters per Minute	Low Pressure Up to 7 bar	Narrow Spray Angle 15° - 20° - 30°	Venturi Scrubbing	26 - 27

Hollow Cone Nozzles

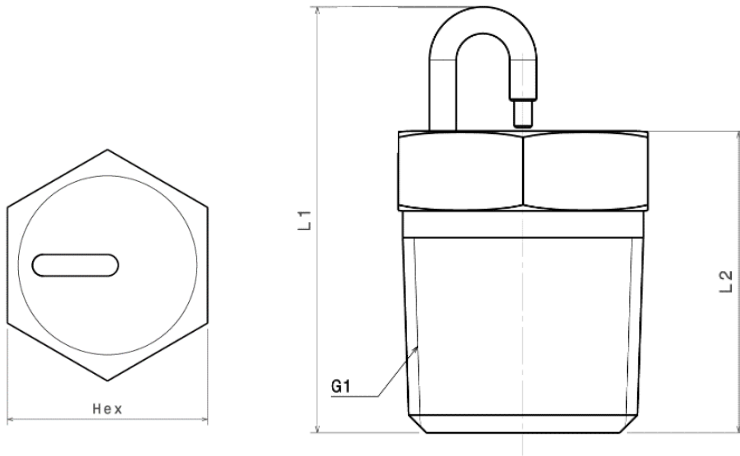
Selection Guide



Nozzle Series	Flow Capacity	Operating Pressures	Spray Angle	Application	Page
 <p>2SF 422</p>	<p>Standard Flow Up to 50 liters per Minute</p>	<p>Standard Pressure Up to 10 bar</p>	<p>Wide Spray Angle 60° - 90° - 120°</p>	<p>Cleaning & Washing Process Cooling Gaseous Fluids and Solids Surface Spraying Spraying onto Mats in Air Washers Improving on Chemical Reactions Continuous Casting Foam Control</p>	<p>28 - 29</p>
 <p>2SF 423</p>	<p>High Flow Up to 250 liters per Minute</p>	<p>Standard Pressure Up to 10 bar</p>	<p>Wide Spray Angle 120°</p>	<p>Cleaning & Washing Process Cooling Gaseous Fluids and Solids Surface Spraying Spraying onto Mats in Air Washers Improving on Chemical Reactions Continuous Casting Foam Control</p>	<p>28 - 29</p>

SPADFLOW 2B PJ

Misting Hollow-Cone Nozzle

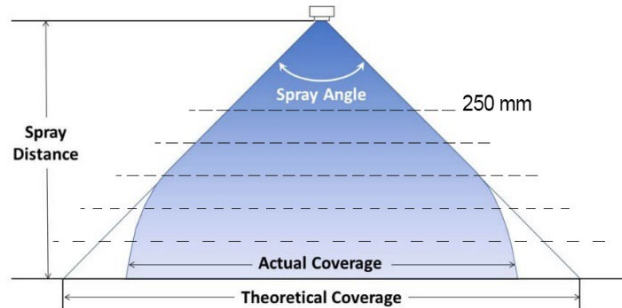


G1	Thread Type			Dimensions [mm]			Weight
	BSPT	BSPP	NPT	L1	L2	Hex	
1/8"	018T	018P	018N	19.1	12.1	12	7 gr
1/4"	014T	014P	014N	24.6	17.6	16	7 gr

Material*	Code
S.S.316	3

* Different materials are available upon request

α	Spray coverage
	@ 250 mm
90°	500 mm



Properties:

- Two-Piece, Compact Construction
- No Whirl Vanes or Internal Parts
- Cone-Shaped Fog
- Uniform Pattern

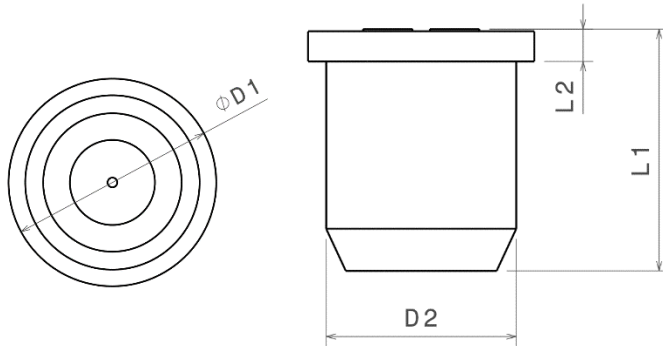
Spray angle (α)	Code	$\varnothing B$ [mm]	$\varnothing E$ [mm]	Flow rate [l/min]							
				P [bar]							
				2.0	3.0	5.0	10.0	20.0	30.0	50.0	70.0
90°	2B PJ 06 .090	0.152	0.152	-	-	0.031	0.043	0.061	0.075	0.097	0.114
	2B PJ 08 .090	0.203	0.203	-	-	0.058	0.082	0.116	0.142	0.183	0.217
	2B PJ 10 .090	0.254	0.254	-	0.067	0.087	0.123	0.173	0.212	0.274	0.324
	2B PJ 12 .090	0.305	0.305	-	0.091	0.117	0.166	0.234	0.287	0.371	0.439
	2B PJ 15 .090	0.381	0.381	0.12	0.146	0.189	0.267	0.377	0.462	0.596	0.705
	2B PJ 20 .090	0.508	0.508	0.22	0.264	0.341	0.483	0.683	0.836	1.08	1.28
	2B PJ 24 .090	0.610	0.610	0.32	0.395	0.51	0.721	1.02	1.25	1.61	1.91
	2B PJ 28 .090	0.711	0.711	0.42	0.513	0.662	0.937	1.32	1.62	2.09	2.48
	2B PJ 32 .090	0.813	0.813	0.58	0.71	0.917	1.297	1.83	2.25	2.9	3.43
2B PJ 40 .090	1.02	1.02	0.90	1.11	1.43	2.02	2.85	3.49	4.51	5.34	



SPADFLOW 2L 226

Low Flow Hollow-Cone Nozzle

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+ STP



Properties:

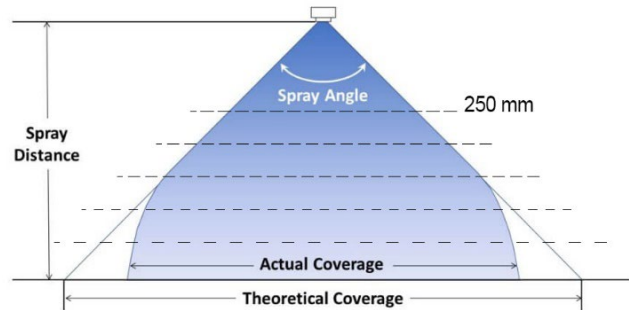
- Two-Piece Construction
- Internal Vane
- Nozzle for Retaining Nut
- Extremely Fine

G1	Dimensions [mm]				Weight
	L1	L2	D1	D2	
Retaining Nut	18.0	2.0	14.8	12.65	13 gr

Material*	Code
S.S.304	2
S.S.316	3

* Different materials are available upon request

α	Spray coverage
	@ 250 mm
60°	120-160 mm
80°	190-300 mm



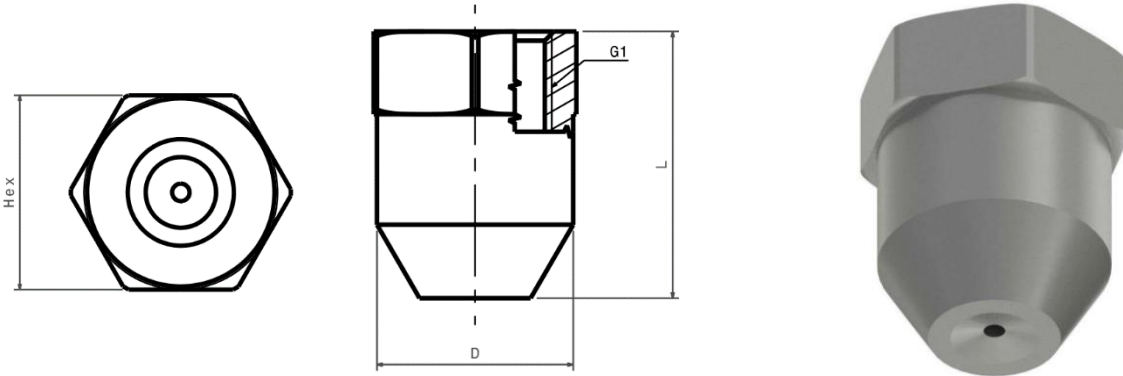
Spray angle (α)	Code	B \emptyset [mm]	E \emptyset [mm]	Mesh size [mm] Strainer	Flow rate [l/min]							
					P [bar]							
					2.0	3.0	5.0	7.0	10.0	20.0	50.0	100.0
60°	2L 226 00 . 060	0.10	0.10	0.04	-	-	0.013	0.015	0.018	0.026	0.041	0.058
	2L 226 01 . 060	0.15	0.15	0.04	-	0.015	0.019	0.022	0.027	0.038	0.060	0.085
	2L 226 05 . 060	0.20	0.15	0.04	0.017	0.021	0.027	0.032	0.038	0.054	0.085	0.121
80°	2L 226 08 . 080	0.25	0.25	0.10	0.025	0.031	0.040	0.047	0.057	0.080	0.126	0.179
	2L 226 12 . 080	0.35	0.35	0.10	0.039	0.048	0.062	0.073	0.088	0.124	0.196	0.277
	2L 226 14 . 080	0.40	0.40	0.10	0.052	0.064	0.082	0.097	0.116	0.164	0.259	0.367
	2L 226 16 . 080	0.45	0.45	0.10	0.065	0.080	0.103	0.122	0.146	0.206	0.326	0.461
	2L 226 18 . 080	0.55	0.35	0.20	0.082	0.101	0.130	0.154	0.184	0.260	0.411	0.581
	2L 226 20 . 080	0.60	0.35	0.20	0.106	0.130	0.168	0.199	0.238	0.336	0.531	0.751
	2L 226 24 . 080	0.70	0.50	0.20	0.165	0.202	0.261	0.309	0.369	0.522	0.825	1.167
	2L 226 28 . 080	0.90	0.55	0.20	0.247	0.302	0.390	0.461	0.552	0.780	1.233	1.744



SPADFLOW 2L 214/216

Axial Hollow-Cone Nozzle

Webpage
+ STP



G1	Thread Type			Dimensions [mm]			Weight
	BSPT	BSPP	NPT	L	D	Hex	
1/8"	018T	018P	018N	18.0	16.0	17	27 gr
3/8"	038T	038P	038N	29.0	21.3	22	60 gr

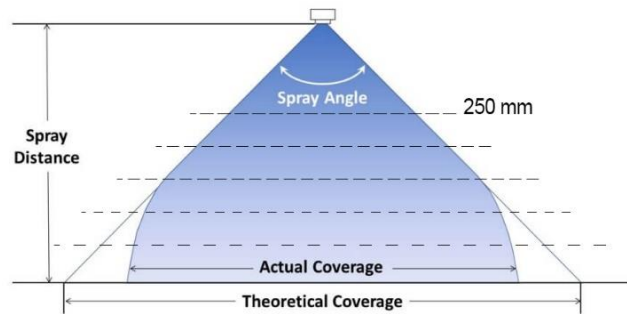
Properties:

- Two-Piece Construction
- Internal Vane
- Uniform Spray
- Extremely Fine Atomization

Material*	Code
Brass	1
S.S.304	2
S.S.316	3

* Different materials are available upon request

α	Spray coverage
	@ 250 mm
60°	200 mm
80°	450 mm
90°	500 mm

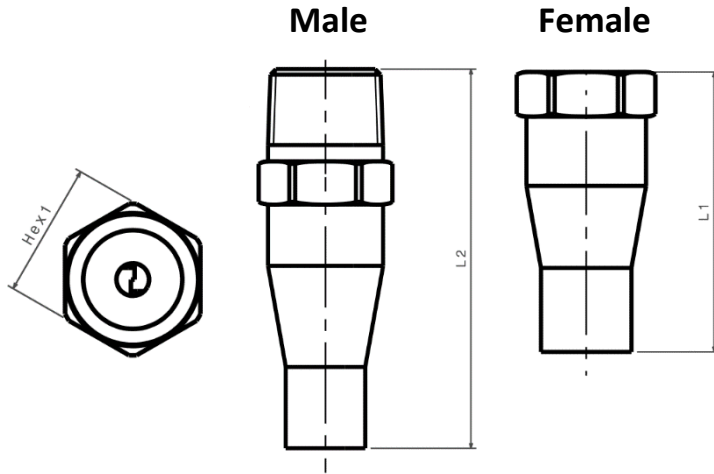


Spray angle α	Code	Connection [inch]	\varnothing B [mm]	\varnothing E [mm]	Flow rate [l/min]						
					P [bar]						
					0.5	1.0 K factor	2.0	3.0	5.0	10.0	20.0
60°	2L 214 18 . 060	1/8"	0.50	0.50	-	-	0.08	0.10	0.13	0.18	0.25
	2L 216 32 . 060	3/8"	1.00	1.00	-	0.28	0.40	0.49	0.63	0.89	1.26
	2L 216 36 . 060	3/8"	1.40	1.40	-	0.45	0.63	0.77	1.00	1.41	1.99
80°	2L 216 40 . 060	3/8"	2.00	2.00	-	0.71	1.00	1.22	1.58	2.24	3.16
	2L 214 24 . 080	1/8"	1.00	0.50	-	-	0.16	0.20	0.25	0.36	0.51
	2L 214 30 . 080	1/8"	1.80	0.50	-	0.23	0.32	0.39	0.51	0.72	1.01
90°	2L 216 49 . 090	3/8"	6.00	2.00	-	1.20	1.70	2.08	2.69	3.80	5.38
	2L 216 56 . 090	3/8"	4.00	2.00	-	1.77	2.50	3.06	3.95	5.59	7.91
	2L 216 64 . 090	3/8"	3.50	2.00	2.00	2.83	4.00	4.90	6.32	8.94	12.65
	2L 216 68 . 090	3/8"	4.00	2.00	2.50	3.54	5.00	6.12	7.91	11.18	15.81
	2L 216 72 . 090	3/8"	5.00	2.00	3.15	4.45	6.30	7.72	9.96	14.09	19.92
	2L 216 77 . 090	3/8"	6.00	2.00	4.30	6.00	8.50	10.40	13.40	19.00	26.90

SPADFLOW 2B NCJ

High Flow Hollow-Cone Nozzle

Webpage
+ STP



G1	Thread Type			Dimensions [mm]			Weight
	BSPT	BSPP	NPT	L ₁	Hex1	L ₂	
3/4"	034T	034P	034N	82.6	28.4	82.6	340 gr
1"	100T	100P	100N	88.9	35.1	88.9	450 gr
1 1/4"	114T	114P	114N	102	44.5	102	570 gr
1 1/2"	112T	112P	112N	127	50.8	127	1020 gr
2"	200T	200P	200N	152	63.5	152	1130 gr
2 1/2"	212T	212P	212N	194	76.2	178	2610 gr
3"	300T	300P	300N	203	88.9	203	2840 gr
4"	400T	400P	400N	278	114	251	6800 gr
6"	600T	600P	600N	381	168	343	15900 gr

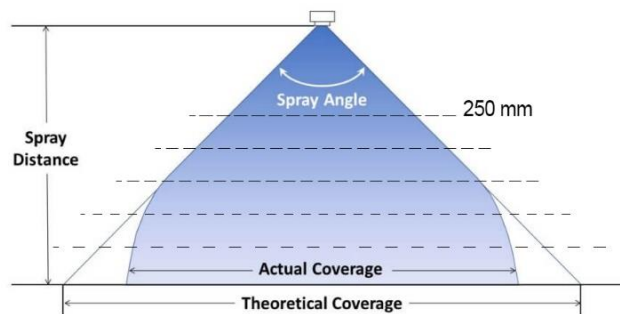
Properties:

- Two-Piece Construction
- Internal Vane
- Coarse Spray
- Flanged Connection is Available
- High Velocity

Material*	Code
Brass	1
S.S.304	2
S.S.316	3

* Different materials are available upon request

α	Spray coverage
	@ 250 mm
15°	60 mm
20°	90 mm
30°	130 mm





SPADFLOW 2B NCJ

High Flow Hollow-Cone Nozzle

Webpage
+ STP



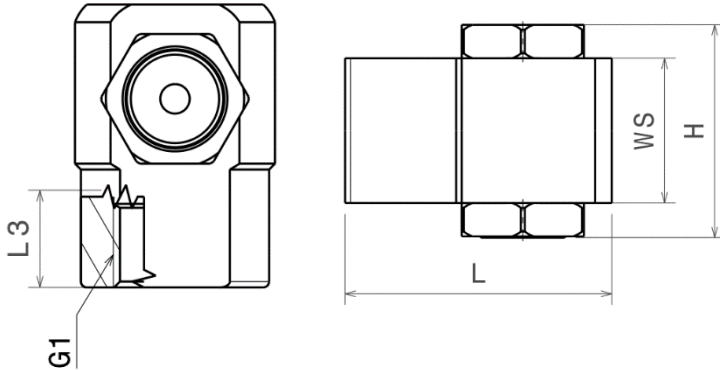
Spray angle α	Code	Connection [inch]	B \varnothing [mm]	Flow rate [l/min]							
				P [bar]							
				0.5	0.7	1.0 <i>K</i> factor	1.5	2.0	3.0	5.0	7.0
15°	2B NCJ 06 . 015	3/4"	7.52	23.1	27.0	32.0	38.7	44.3	53.6	68.1	79.8
	2B NCJ 12 . 015	1"	10.3	46.2	54.1	64.0	77.4	88.6	107	136	160
	2B NCJ 18 . 015	1 1/4"	12.3	69.3	81.1	95.9	116	133	161	204	239
	2B NCJ 26 . 015	1 1/2"	15.1	100	117	139	168	192	232	295	346
	2B NCJ 48 . 015	2"	20.2	185	216	256	310	354	429	545	638
	2B NCJ 72 . 015	2 1/2"	24.6	277	325	384	464	532	643	818	958
	2B NCJ 05 . 015	3"	29.5	404	473	560	677	775	938	1190	1400
	2B NCJ 90 . 015	4"	40.5	731	856	1010	1230	1400	1700	2160	2530
2B NCJ 50 . 015	6"	54.0	1380	1580	1860	2260	2580	3130	3980	4660	
20°	2B NCJ 06 . 020	3/4"	7.52	23.1	27.0	32.0	38.7	44.3	53.6	68.1	79.8
	2B NCJ 12 . 020	1"	10.3	46.2	54.1	64.0	77.4	88.6	107	136	160
	2B NCJ 18 . 020	1 1/4"	12.3	69.3	81.1	95.9	116	133	161	204	239
	2B NCJ 26 . 020	1 1/2"	15.1	100	117	139	168	192	232	295	346
	2B NCJ 48 . 020	2"	20.2	185	216	256	310	354	429	545	638
	2B NCJ 72 . 020	2 1/2"	24.6	277	325	384	464	532	643	818	958
	2B NCJ 05 . 020	3"	29.5	404	473	560	677	775	938	1190	1400
	2B NCJ 90 . 020	4"	40.5	731	856	1010	1230	1400	1700	2160	2530
2B NCJ 50 . 020	6"	54.0	1380	1580	1860	2260	2580	3130	3980	4660	
30°	2B NCJ 06 . 030	3/4"	7.52	23.1	27.0	32.0	38.7	44.3	53.6	68.1	79.8
	2B NCJ 12 . 030	1"	10.3	46.2	54.1	64.0	77.4	88.6	107	136	160
	2B NCJ 18 . 030	1 1/4"	12.3	69.3	81.1	95.9	116	133	161	204	239
	2B NCJ 26 . 030	1 1/2"	15.1	100	117	139	168	192	232	295	346
	2B NCJ 48 . 030	2"	20.2	185	216	256	310	354	429	545	638
	2B NCJ 72 . 030	2 1/2"	24.6	277	325	384	464	532	643	818	958
	2B NCJ 05 . 030	3"	29.5	404	473	560	677	775	938	1190	1400
	2B NCJ 90 . 030	4"	40.5	731	856	1010	1230	1400	1700	2160	2530
2B NCJ 50 . 030	6"	54.0	1380	1580	1860	2260	2580	3130	3980	4660	



SPADFLOW 2SF 422/423

Tangential Hollow-Cone Nozzle

Webpage
+ STP



G1	Thread Type			Dimensions [mm]				Weight
	BSPT	BSPP	NPT	L	L3	H	WS	
1/4"	014T	014P	014N	24.0	9.7	22.0	15.0	44 gr
3/8"	038T	038P	038N	34.0	10.1	25.0	20.0	101 gr
1/2"	012T	012P	012N	48.0	13.2	38.0	30.0	370 gr
3/4"	034T	034P	034N	58.0	14.5	50.0	40.0	830 gr
1"	100T	100P	100N	61.0	16.8	52.0	42.0	1581 gr

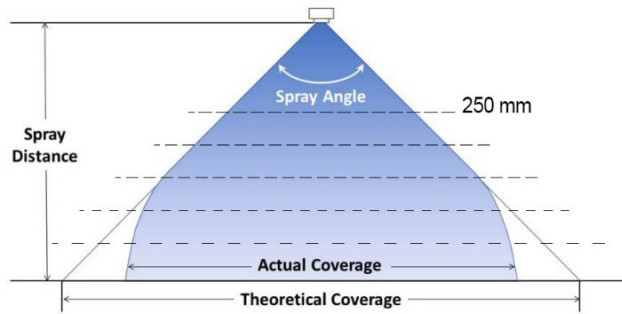
Properties:

- No Whirl Vanes
- Non-Clogging Nozzle
- Uniform Spray
- Full Cone Pattern is Available

Material*	Code
Brass	1
S.S.304	2
S.S.316	3

* Different materials are available upon request

α	Spray coverage
	@ 250 mm
60°	225
90°	380-390
120°	680



Spray angle (α)	Code	Connection [inch]	\varnothing B [mm]	\varnothing E [mm]	Flow rate [l/min]					
					P [bar]					
					0.5	1.0	2.0	3.0	5.0	10.0
90	2SF 422 64 . 060	3/8"	3.00	3.00	2.00	2.83	4.00	4.90	6.32	8.94
	2SF 422 40 . 090	1/4"	1.40	1.40	0.50	0.71	1.00	1.22	1.58	2.24
	2SF 422 48 . 090	1/4"	1.85	1.85	0.80	1.13	1.60	1.96	2.53	3.58
	2SF 422 56 . 090	1/4"	2.25	2.25	1.25	1.77	2.50	3.06	3.95	5.59
	2SF 422 60 . 090	3/8"	2.55	2.55	1.57	2.23	3.15	3.86	4.98	7.04
	2SF 422 64 . 090	3/8"	2.90	2.90	2.00	2.83	4.00	4.90	6.32	8.94
	2SF 422 72 . 090	3/8"	3.70	3.70	3.15	4.45	6.30	7.72	9.96	14.09
	2SF 422 76 . 090	3/8"	4.15	4.15	4.00	5.66	8.00	9.80	12.65	17.89
	2SF 422 80 . 090	3/8"	4.65	4.65	5.00	7.07	10.00	12.25	15.81	22.36
	2SF 422 84 . 090	3/8"	5.30	5.30	6.25	8.84	12.50	15.31	19.76	27.95
	2SF 422 88 . 090	3/8"	5.85	6.00	8.00	11.31	16.00	19.60	25.30	35.78
	2SF 422 96 . 090	1/2"	8.00	8.00	12.50	17.68	25.00	30.62	39.53	55.90



SPADFLOW 2SF 422/423

Tangential Hollow-Cone Nozzle

Webpage
+ STP



Spray angle (α)	Code	Connection [inch]	Ø B [mm]	Ø E [mm]	Flow rate [l/min]					
					P [bar]					
					0.5	1.0 <i>K factor</i>	2.0	3.0	5.0	10.0
120°	2SF 422 48 . 120	1/4"	1.90	1.90	0.80	1.13	1.60	1.96	2.53	3.58
	2SF 422 56 . 120	1/4"	2.45	2.40	1.25	1.77	2.50	3.06	3.95	5.59
	2SF 422 60 . 120	3/8"	2.70	2.70	1.57	2.23	3.15	3.86	4.98	7.04
	2SF 422 72 . 120	3/8"	4.00	3.90	3.15	4.45	6.30	7.72	9.96	14.09
	2SF 422 80 . 120	3/8"	4.90	4.90	5.00	7.07	10.00	12.25	15.81	22.36
	2SF 422 84 . 120	3/8"	5.30	5.30	6.25	8.84	12.50	15.31	19.76	27.95
	2SF 422 88 . 120	3/8"	6.60	6.00	8.00	11.31	16.00	19.60	25.30	35.78
	2SF 422 92 . 120	1/2"	7.30	7.30	10.00	14.14	20.00	24.49	31.62	44.72
	2SF 422 96 . 120	1/2"	8.00	8.00	12.50	17.68	25.00	30.62	39.53	55.90
	2SF 423 00 . 120	1/2"	8.70	8.70	15.75	22.27	31.50	38.88	49.81	70.44
	2SF 423 12 . 120	3/4"	12.70	12.30	31.50	44.55	63.00	77.16	99.61	140.87
	2SF 423 20 . 120	1"	17.00	16.00	50.00	70.71	100.00	122.47	158.11	223.61