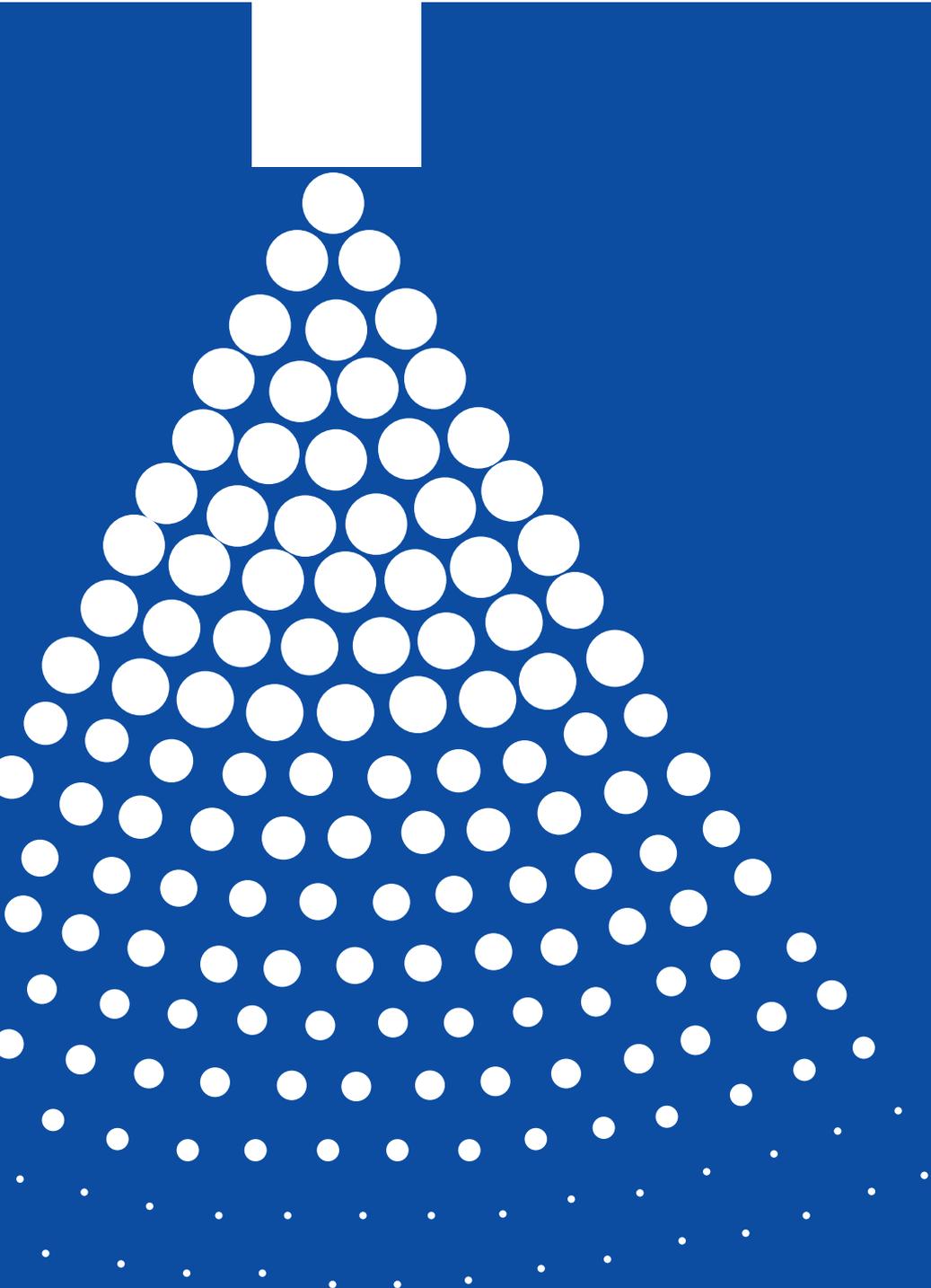


CHAPTER 1

◆◆ Air-Assisted 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.

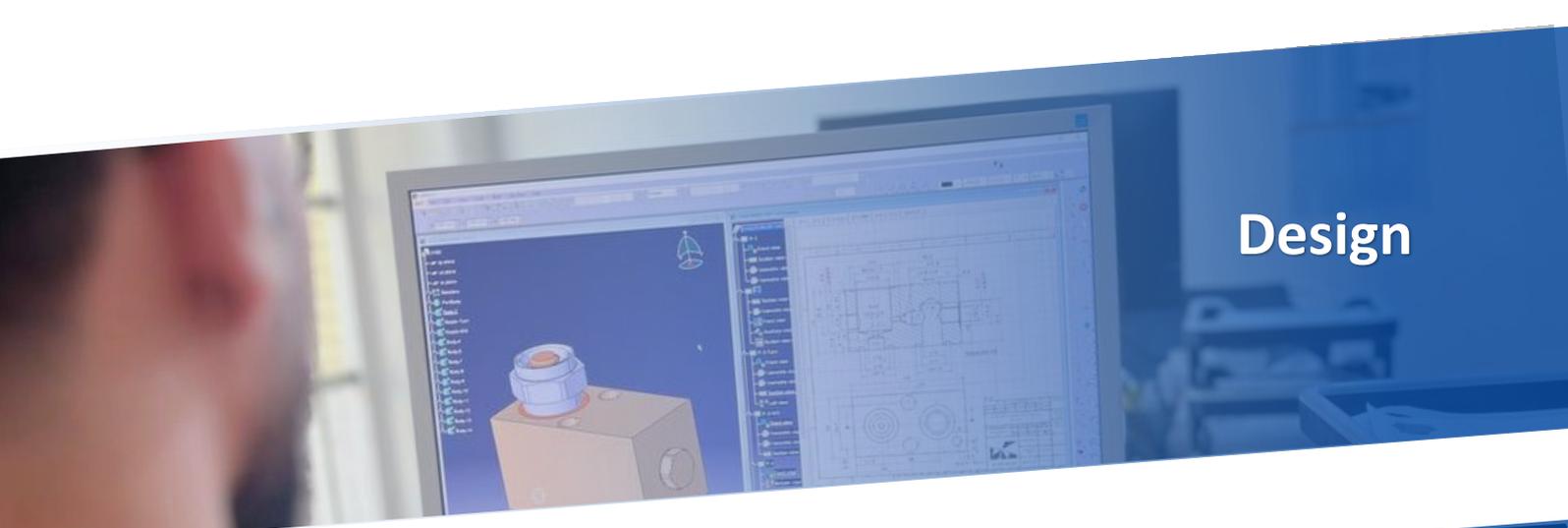
• From Design to Installation

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

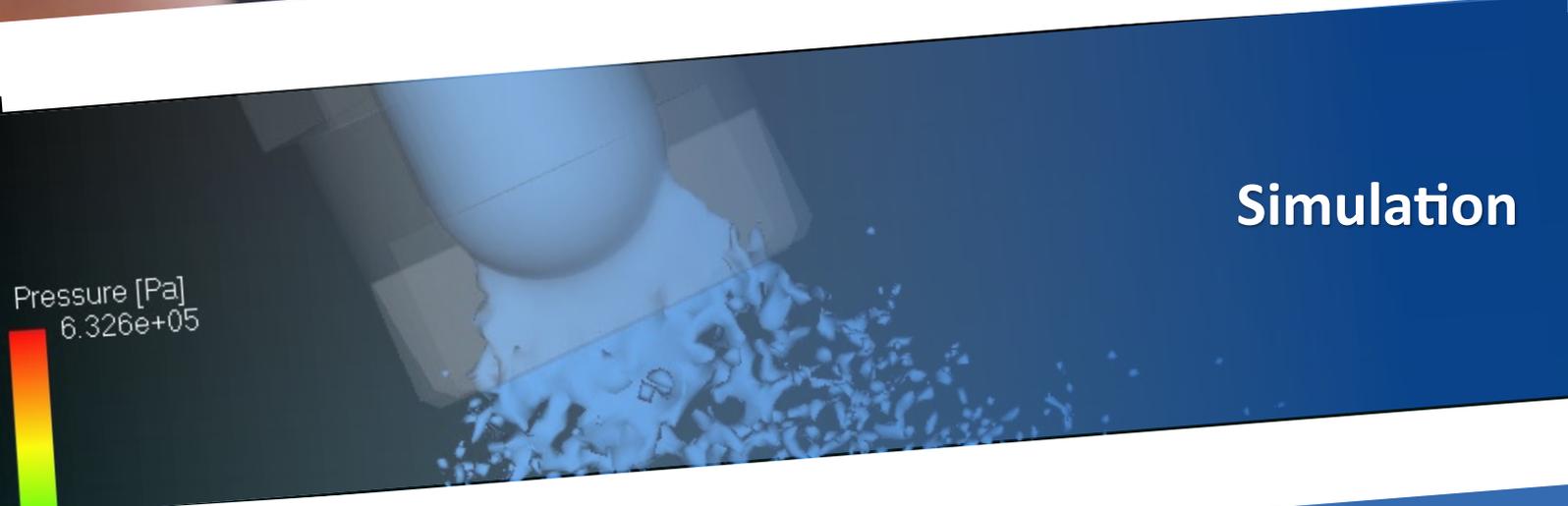
• Knowledge and Experience

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

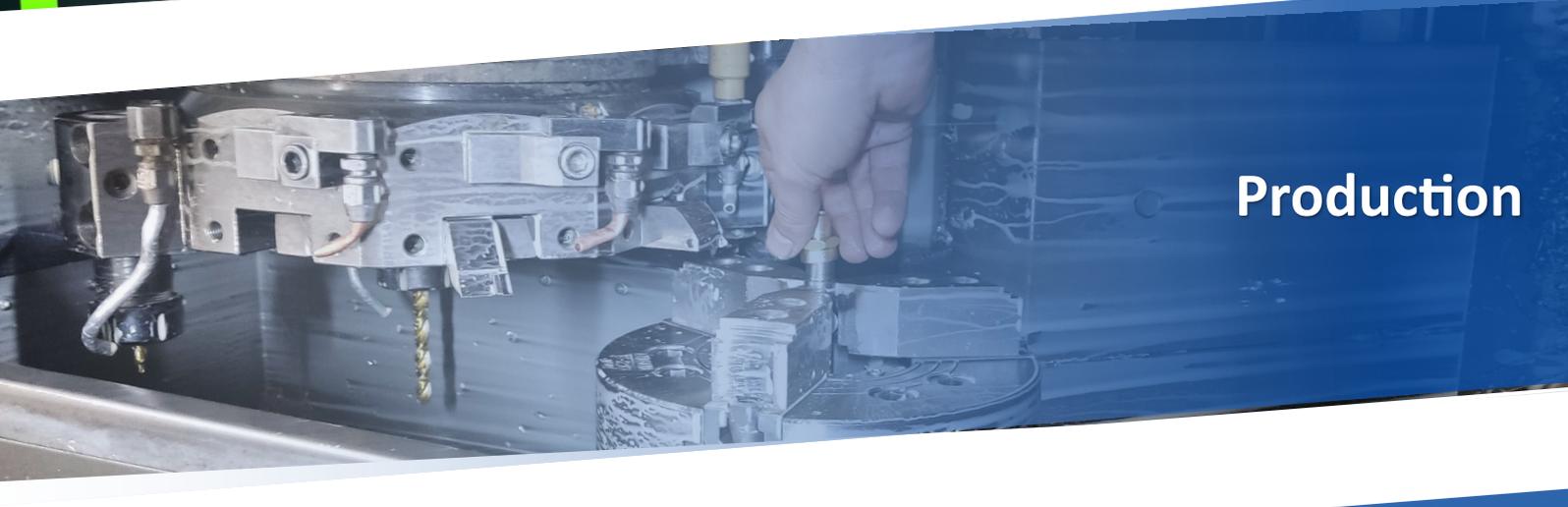




Design



Simulation



Production

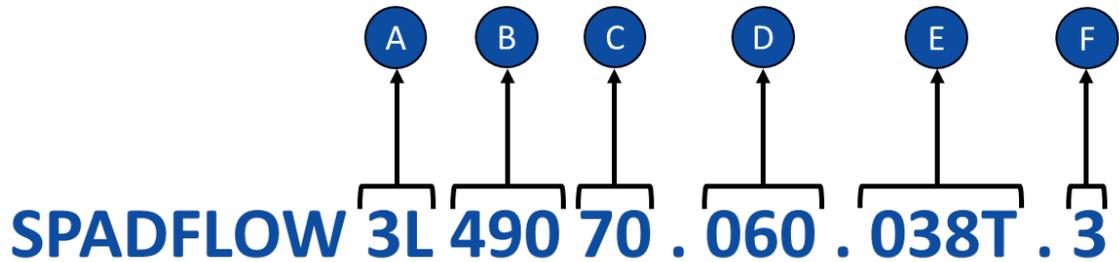


Installation



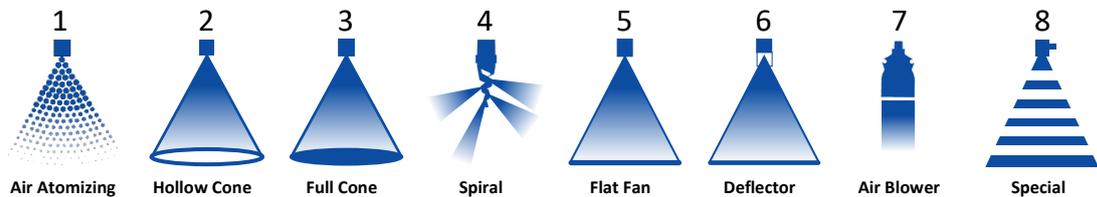
PRODUCT NUMBERS

Everything You Need to Know



A

Nozzle Type (Spray Pattern)



B

Nozzle Series

C

Flow Rate Rank

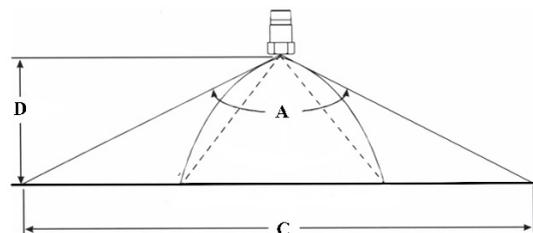
The flow rate rank is relative and depends on the respective nozzle type. The exact value is mentioned in tables on the product pages.

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,

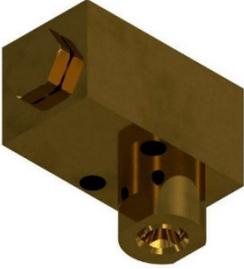
Spray angle (α)	Code	Connection Size [inch]	Ø B [mm]	Ø E [mm]	Flow rate (Q) [l/min]						
					Pressure (P) [bar]						
					0.5	1.0	2.0	3.0	5.0	7.0	10.0
45°	3L 490 40 . 045	1/8"	1.25	1.25	0.57	0.76	1.00	1.18	1.44	1.65	1.90
	3L 490 60 . 045	1/4"	2.00	2.00	1.81	2.39	3.15	3.70	4.54	5.20	6.00
	3L 490 70 . 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.

Air Assist Nozzles

Selection Guide



Nozzle Series	Flow Capacity	Spray Pattern	Spray Angle	Application	Page
 1PM 074	Standard Flow	Oval Cone	Standard Spray Angle 90° x 45°	Cooling Coating Chemical Injection Continuous Casting Machine (Billet, Bloom, Slab)	11
 1PM 137	Standard Flow	Cone-Shape	Standard Spray Angle 80°	Cooling Coating Chemical Injection Continuous Casting Machine	12
 1PM 138	Low Flow Up to 1 liter per Minute	Hollow Cone	Standard Spray Angle 90° - 100°	Cooling Coating Chemical Injection Continuous Casting Machine (Billet, Bloom)	13
 1PM 148	Standard Flow Up to 30 liters per Minute	Flat Fan	Standard Spray Angle 140°	Cooling Coating Chemical Injection Continuous Casting Machine (Billet, Bloom, Slab)	14

Air Assist Nozzles

Selection Guide



Nozzle Series	Flow Capacity	Spray Pattern	Spray Angle	Application	Page
 <p>1PM 150</p>	Standard Flow	Cone-Shape	Narrow Spray Angle 60	Cooling Coating Chemical Injection Continuous Casting	15
 <p>1MA 150</p>	low Flow	Cone-Shape	Spray Angle 40	Cooling Coating Chemical Injection Pharmaceutical industry Food Industry	16
 <p>1HA 150</p>	Low Flow	Cone-Shape	Standard Spray Angle 55	Cooling Coating Chemical Injection Pharmaceutical industry Food Industry	17

Air Assist Nozzles

Selection Guide



Nozzle Series	Flow Capacity	Spray Pattern	Spray Angle	Application	Page
 <p>1HB 200</p>	Standard Flow	Cone-Shape	Narrow Spray Angle 15°	Cooling Coating Chemical Injection Pharmaceutical industry	18
 <p>1HC 150</p>	Low Flow	Cone-Shape	Standard Spray Angle 50°	Cooling Coating Chemical Injection Pharmaceutical industry	19

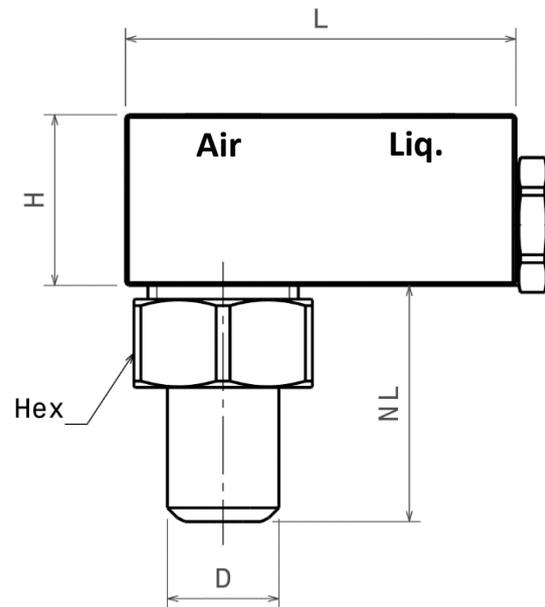
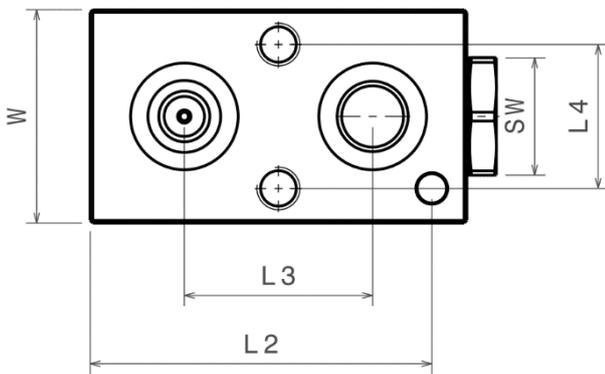
SPADFLOW 1PM 074

Air Assist Oval Spray Nozzle



Properties:

- Fine Atomization at Low Liquid Pressures
- Multiple Parts
- Internal Mixing
- Low Air Consumption
- High Heat Transfer Coefficient (HTC)
- Reduced Maintenance Cost
- Stable Spray Angle



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

* Different Materials are Available Upon Request.

G1	Dimensions [mm]									
	H	W	L	L2	L3	L4	Hex	NL	D	SW
Pneumatic Air Fitting	31	40	70	63.5	35	27	32	31	18	22

Nozzle Code	Flow rate		Spray Angle*
	Air = 2 bar Liq. = 0.5 bar	Air = 2 bar Liq. = 2 bar	
1PM . 074 . 30 . 06. 00 . 1	0.25 l/min	1.20 l/min	90° x 45°

* Spray Angle May Vary Depending on Air and Liquid Pressures.



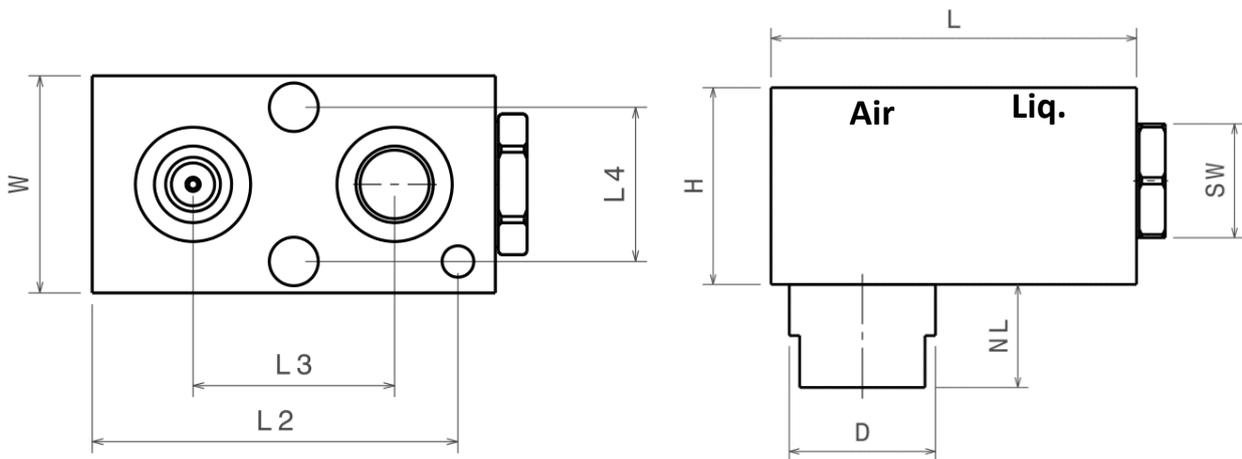
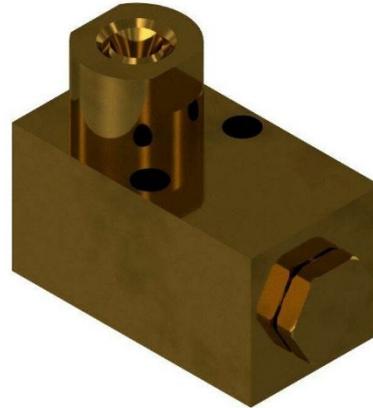
SPADFLOW 1PM 137

Billetcooler Cone Spray Nozzle



Properties:

- Fine Atomization at Low Liquid Pressures
- Internal Mixing
- Multiple Parts
- Reduced Air Consumption
- High Heat Transfer Coefficient (HTC)
- Large Free Passage – Anti Clogging



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

* Different Materials are Available Upon Request.

G1	Dimensions [mm]								
	H	W	L	L2	L3	L4	SW	NL	D
Pneumatic Air Fitting	40	40	70	63.5	35	27	22	20	28

Nozzle Code	Operating Liquid Pressure	Operating Air Pressure	Flow rate	Spray Angle*
			Air = 2 bar Liq. = 2 bar	
1PM . 137 . 30 . 82 . 00 . 3	0.5 -7.0 bar	1.0 – 4.0 bar	1.8 l/min	80°

* Spray Angle May Vary Depending on Air and Liquid Pressures.



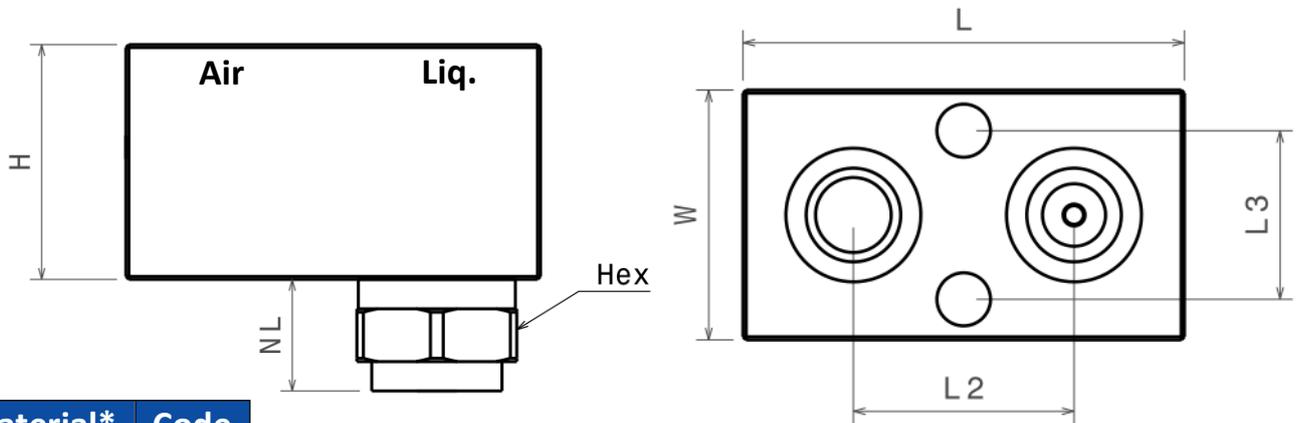
SPADFLOW 1PM 138

Billetcooler Hollow-Cone Spray Nozzle



Properties:

- Atomization at Low Liquid Pressures
- Internal Mixing
- Multiple Parts
- Reduced Air Consumption
- High Heat Transfer Coefficient (HTC)
- Large Free Passage – Anti Clogging
- Reduced Maintenance Cost



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

* Different Materials are Available Upon Request.

G1	Dimensions [mm]							
	H	W	L	L2	L3	Hex	NL	D
Pneumatic Air Fitting	38	38	70	35	27	28	20	28

Nozzle Code	Operating Liquid Pressure	Operating Air Pressure	Flow rate	Spray Angle*
			Air = 2 bar Liq. = 2 bar	
1PM . 138 . 562 . 30 . 39	0.5 -7.0 bar	1.0 – 4.0 bar	2 l/min	90°
1PM .138 . 370 . 100 . 1	0.5 -7.0 bar	1.0 – 4.0 bar	3.7 l/min	100

* Spray Angle May Vary Depending on Air and Liquid Pressures.



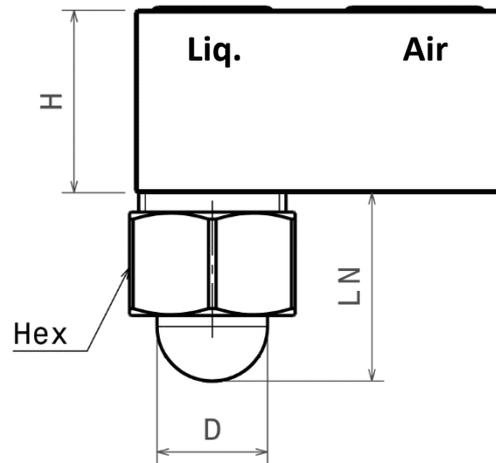
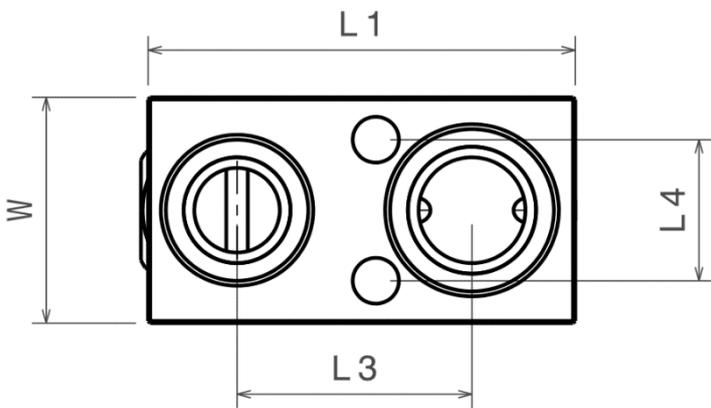
SPADFLOW 1PM 148

Billetcooler Flat-Fan Spray Nozzle



Properties:

- Atomization at Low Liquid Pressures
- Internal Mixing
- Multiple Parts
- Reduced Air Consumption
- High Heat Transfer Coefficient (HTC)
- Reduced Maintenance Cost



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

* Different Materials are Available Upon Request.

G1	Dimensions [mm]							
	H	W	L	L3	L4	Hex	NL	D
Pneumatic Air Fitting	30	32	60	33	20	27	31	18

Nozzle Code	Operating Liquid Pressure	Operating Air Pressure	Flow rate	Spray Angle*
			Air = 2 bar Liq. = 2 bar	
1PM . 148 . 528 . 30 .44	0.5 -7.0 bar	1.0 – 4.0 bar	2 l/min	140°

* Spray Angle May Vary Depending on Air and Liquid Pressures.



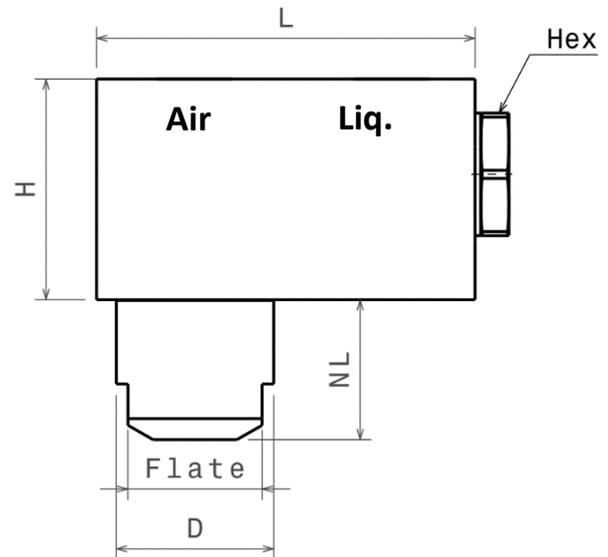
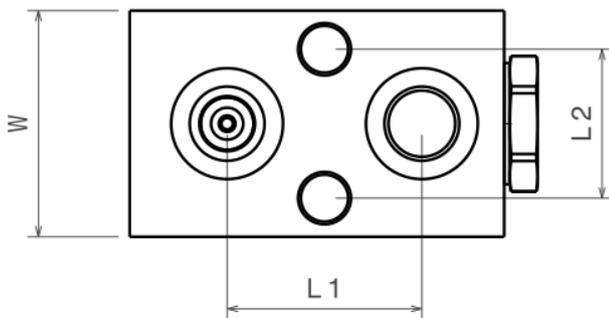
SPADFLOW 1PM 150

Billetcooler Cone Spray Nozzle



Properties:

- Atomization at Low Liquid Pressures
- Internal Mixing
- Multiple Parts
- Reduced Air Consumption
- High Heat Transfer Coefficient (HTC)
- Large Free Passage – Anti Clogging
- Reduced Maintenance Cost



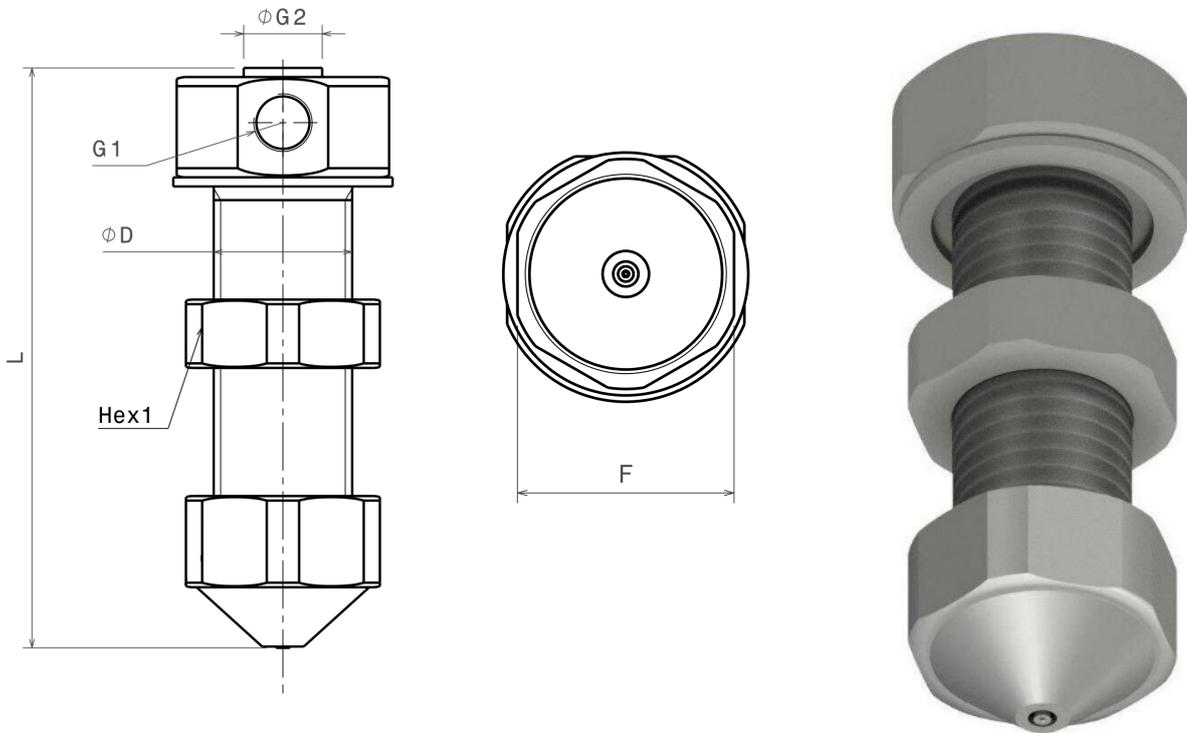
Material*	Code
Brass	1
S.S.304	2
S.S.316	3

* Different Materials are Available Upon Request.

G1	Dimensions [mm]								
	H	W	L	L1	L2	Hex	Flats	NL	D
Pneumatic Air Fitting	40	40	67	35	27	22	24	25	28

Nozzle Code	Operating Liquid Pressure	Operating Air Pressure	Flow rate	Spray Angle*
			Air = 2 bar Liq. = 2 bar	
1PM . 150 . 30 . 05	0.5 -7.0 bar	1.0 – 4.0 bar	2.1 l/min	60°
1PM . 150 . 30 . 08	0.5 -7.0 bar	1.0 – 4.0 bar	3.2 l/min	60°

* Spray Angle May Vary Depending on Air and Liquid Pressures.



Properties:

- Homogeneous Spray Distribution
- Very Fine Atomization at Low Liquid Pressures
- External Mixing
- Multiple parts
- Reduced air consumption

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

* Different Materials are Available Upon Request.

G1	G2	Dimensions [mm]			
		L	D	F	Hex1
1/4"	1/4"	127	M30	42	42

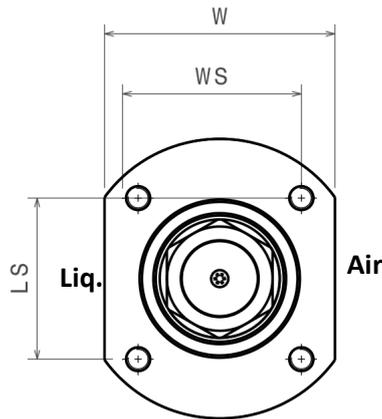
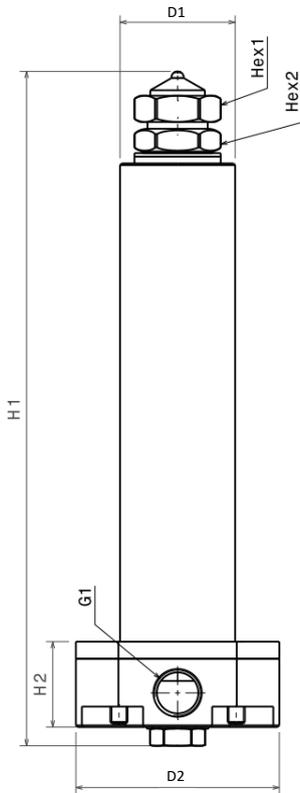
Nozzle Code	Flow rate		Spray Angle*
	Air = 1.5 bar Liq. = 1.5 bar	Air = 3 bar Liq. = 3 bar	
1MA . 060 . 040 . 3	0.15 l/min	0.18 l/min	40°

* Spray Angle May Vary Depending on Air and Liquid Pressures.



SPADFLOW 1HA 150

Low Flow Twin-Fluid Spray Nozzle



Properties:

- Homogeneous Spray Distribution
- Very Fine Atomization at Low Liquid Pressures
- Multiple parts
- Reduced air consumption
- Internal Mixing

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

* Different Materials are Available Upon Request.

G1	Dimensions [mm]										
	H1	H2	D1	D2	Hex1	Hex2	NL	W	WS	LS	D
1/4"	198	25	60	27	20	20	27	48	34	34	28

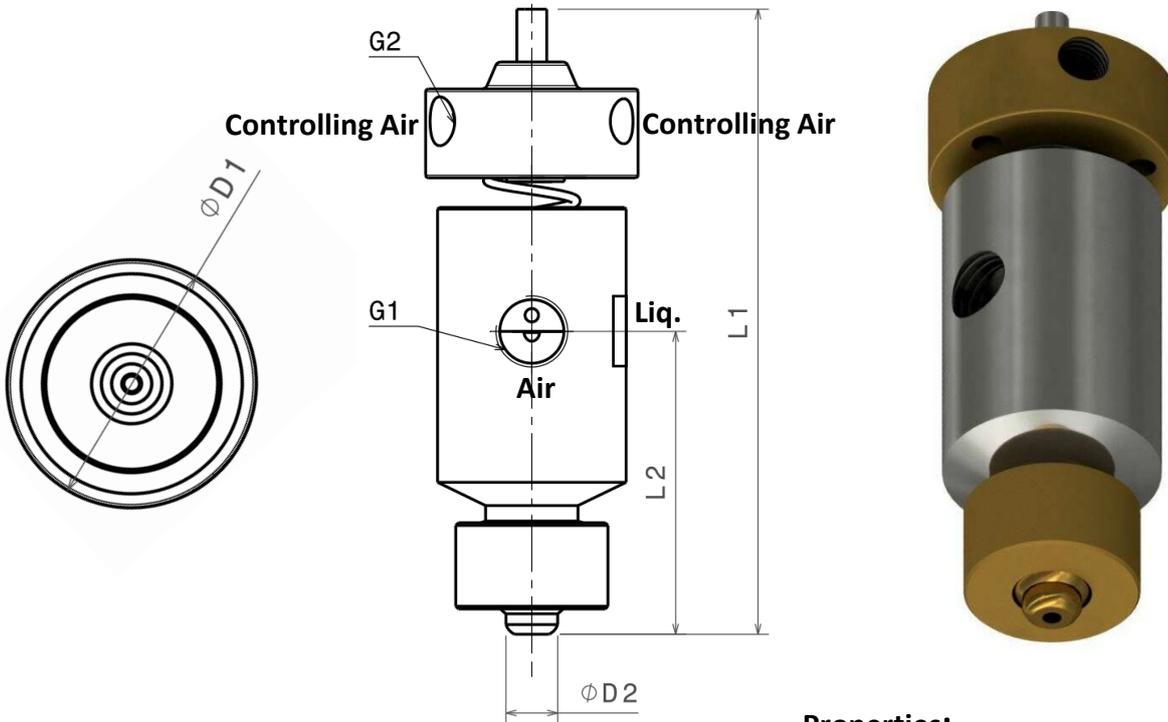
Nozzle Code	Flow rate		Spray Angle*
	Air = 1.5 bar Liq. = 1.5 bar	Air = 3 bar Liq. = 3 bar	
1HA . 150 . 050 . 3	0.15 l/min	0.18 l/min	55°

* Spray Angle May Vary Depending on Air and Liquid Pressures.



SPADFLOW 1HB 200

Controlling Twin-Fluid Spray Nozzle



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

* Different Materials are Available Upon Request.

G1	G2	Dimensions [mm]			
		L1	L2	D1	D2
3/8"	1/4"	116	56.2	39.1	9.5

Properties:

- Very Fine Atomization at Low Liquid Pressures
- Internal Mixing
- Multiple Parts
- Reduced Air Consumption
- Auto Shut-Off Feature
- Flow Adjustment
- All-round Swiveling by 25 degrees
- Easy Adjustment

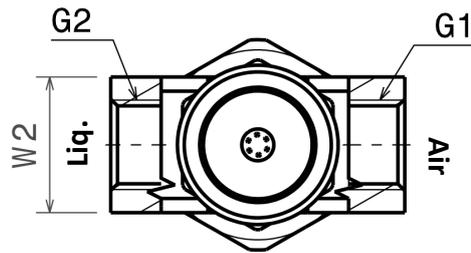
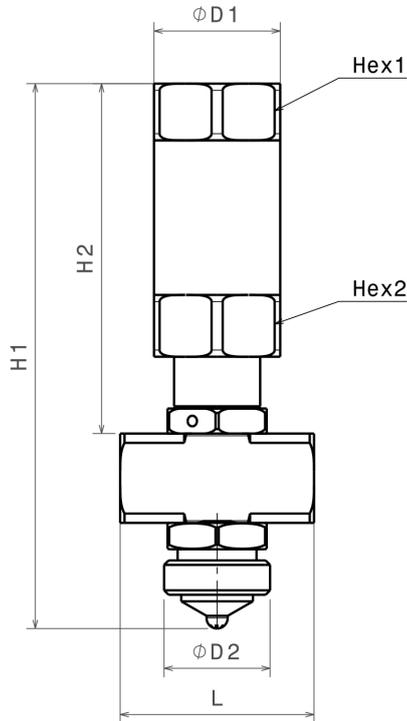
Nozzle Code	Flow rate		Spray Angle*
	Air = 3.2 bar Liq. = 3 bar	Air = 4 bar Liq. = 3 bar	
1HB . 200 . 015 . 3	1.3 l/min	1.23 l/min	15°

* Spray Angle May Vary Depending on Air and Liquid Pressures.



SPADFLOW 1HC 150

Set-Ups Spray Atomizer Nozzle



Properties:

- Very Fine Atomization at Low Liquid Pressures
- Internal Mixing
- Multiple Parts
- Reduced Air Consumption

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

* Different Materials are Available Upon Request.

G1	G2	Dimensions [mm]							
		H1	H2	D1	D2	Hex1	Hex2	L	W2
1/4"	1/4"	122	78.34	28	23.5	28	28	43	20

Nozzle Code	Flow rate		Spray Angle*
	Air = 1.8 bar Liq. = 1.5 bar	Air = 3.5 bar Liq. = 3 bar	
1HA . 150 . 050 . 3	0.15 l/min	0.18 l/min	50°

* Spray Angle May Vary Depending on Air and Liquid Pressures.