



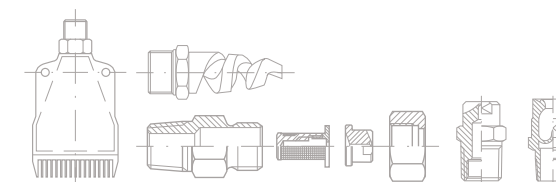
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SPRAY NOZZLES & ASSEMBLY FITTINGS

SPRAY NOZZLES & ASSEMBLY FITTINGS

World leader for industrial spray nozzles and related equipment



Our products are distributed through:

PNR America
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PNR Benelux

PNR Italia
PNR China
PNR Deutschland
PNR France

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We are moreover represented in:

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PNR ITALY



PNR Italy, founded in 1968, has always dedicated itself to the design and manufacturing of industrial spray nozzles and systems. In all these years PNR made major investments both in machinery and human resources to develop top quality products and today is one of the most modern spray nozzles manufacturing facilities in the world. We manufacture thousands of different products to offer our customers one of the most complete product ranges in the world, and keep focused on research plus innovation. Our machine tool park includes all high quality and latest model CNC machines, many of these built to our requirements to accomplish special manufacturing jobs. All products and their performance are strictly controlled and our Quality control system is certified by DNV according to ISO 9001 norms.

Our nozzles design requires expertise in hydrodynamics and fluids handling technology as well as a deep manufacturing know-how to give the best performances. It's not just a matter of mechanical processing. Nozzles play an important role in industry and only the use of reliable quality products prevent the risk of damage and serious losses in production processes.

PNR has extended its sales network to 55 Countries all over the world in 2015. Our sales engineers, fully trained in all industrial applications of our products and with a high technical knowledge, can help customers in finding the best solution for their needs, from process planning to production facilities improvement. We do not supply products only but also provide integrated services and technical assistance.

TECHNICAL PUBLICATIONS

PNR produces a complete range of nozzles for different applications in various industrial sectors. Please check our detailed Catalogues to find the most suitable products for your needs. Our Technical Sales Service is at your disposal for any further information and additional technical specification you may require.



CTG UG
General purpose
spray nozzles



CTG AZ
Air-assisted atomizers



CTG AC
Complementary products
and assembly fittings



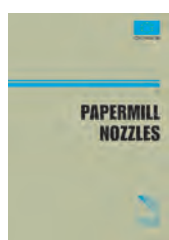
CTG LS
Industrial tank
washing systems



CTG SW
Steelworks nozzles



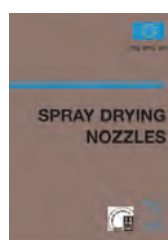
CTG FF
Fire protection
systems components



CTG PM
Paper mill nozzles



CTG LN
Evaporative cooling



CTG SP
Spray drying nozzles



CTG SH
Spray engineering
handbook

Our quality management system
is certified ISO 9001:2008

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
■ ISO 9001:2008 ■

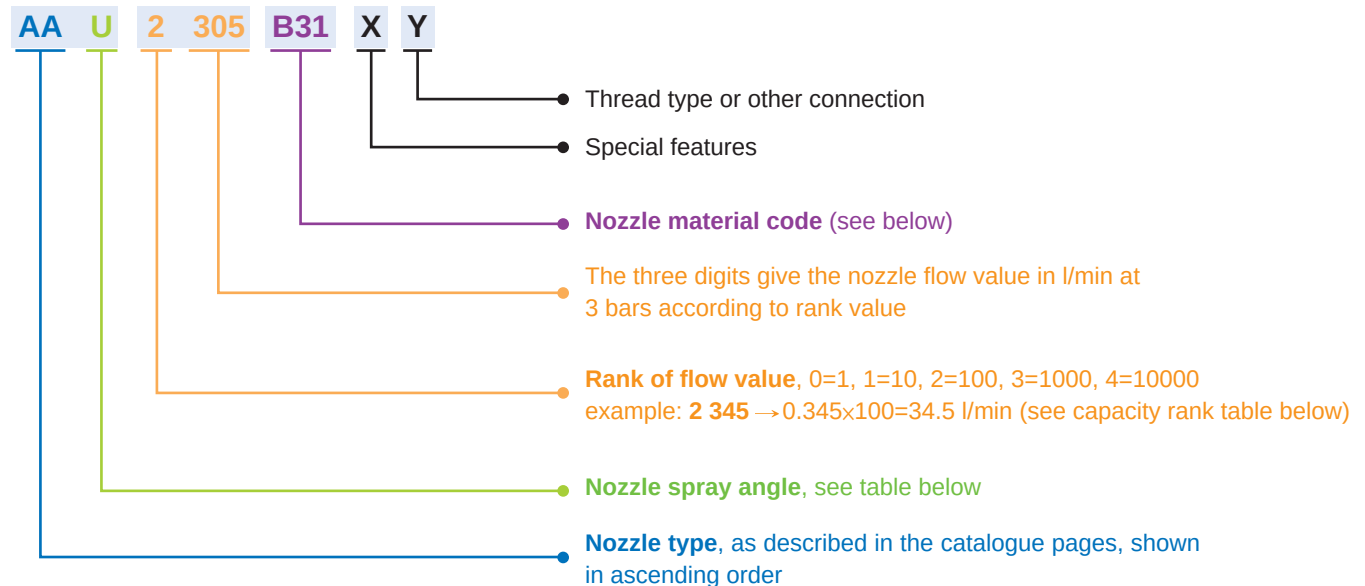


As any other industrial product, spray nozzles need to be precisely identified by means of a code in order to avoid mistakes.

PNR coding system was created bearing in mind the following requirements:

- Codes must be easily processed by a computer, in ascending order.
- Codes must be self-explaining with no need of additional descriptions.
- Codes must give the basic nozzle specifications so to be easily found in the catalogue.

Therefore, we have created our coding system as described here below:



Capacity rank

Nozzles nominal flow rate, measured at 3.0 bar are highlighted on a yellow background in the catalogue tables. Flow values were calculated at different pressures.

Rank	Flow digits	Actual flow (l/min)
0	0 490	0.49
1	1 490	4.90
2	2 490	49.0
3	3 490	490
4	4 490	4900

Some spray angle codes (degrees)

These codes serve as an indication only. Based on different types of nozzles, their significance can be occasionally different.

Code	Spray angle	Code	Spray angle	Code	Spray angle
A	0°	L	40°	T	80°
B	15°	M	45°	U	90°
C	20°	N	50°	J	110°
D	25°	Q	60°	W	120°
F	30°	R	65°	Y	130°
H	35°	S	75°	Z	180°

Nozzle material codes

A1	Carbon steel	D6	Glassfibre reinforced PP	G1	Cast iron
A2	High speed steel	D7	High density polyethylene	H1	Titanium
A8	Zinc coated steel	D8	Polyvinylidene fluoride (PVDF)	L1	Monel 400
A9	Nickel coated steel	D82	PVDF, Injection molded	L2	Incolloy 825
B1	AISI 303 Stainless steel	E0	EPDM	L8	Hastelloy C276
B2	AISI 304 Stainless steel	E1	Polytetrafluorethylene (PTFE)	P6	Acr. But. Styrene (ABS)
B21	AISI 304L Stainless steel	E2	PTFE (25% glassfibers)	P8	EPDM 40 Shore
B3	AISI 316 Stainless steel	E31	Acetalic resin (POM)	T1	Brass
B31	AISI 316L Stainless steel	E7	Viton	T2	Brass, chrome plated
C2	AISI 416 Stainless steel, hardened	E8	Synthetic rubber (NBR)	T3	Copper
D1	Polyvinylchloride (PVC)	F5	Ceramic	T5	Bronze
D2	Polypropylene (PP)	F30	Ruby insert, 303 body	T8	Brass, nickel plated
D3	Polyamide (PA)	F31	Ruby insert, 316 body	T81	Brass, electroless nickel plated
D4	Nylon, Glassfibers reinforced	F32	Diamond insert, 303 body	V1	Aluminum
D5	Talcum filled Polypropylene	F33	Diamond insert, 316 body	V7	Aluminum, electroless n. plated

FULL CONE NOZZLES



AA Short body

- Thread size: 3/4" ~ 3"
- Spray angle: 90°, 120°
- Capacity: 30.5 ~ 775 l/min
- Materials: AISI 303
AISI 316L
Brass

P.19



AE Flange

- Flange size: 80 ~ 250mm
- Spray angle: 90°, 120°
- Capacity: 940 ~ 9410 l/min
- Materials: AISI 316L
Cast iron
Carbon steel

P.20



AH Fine mist

- Thread size: 1/4" ~ 1/2"
- Spray angle: 65°, 80°
- Capacity: 2.07 ~ 15.4 l/min
- Materials: AISI 303
AISI 316L
Brass

P.21



AL Non clogging

- Thread size: 3/8" ~ 2"
- Spray angle: 60°, 90°, 120°
- Capacity: 9.27 ~ 2780 l/min
- Material: AISI 316L

P.22



AT Tangential

- Thread size: 1/8" ~ 1"
- Spray angle: 60°, 90°, 120°
- Capacity: 2.30 ~ 122 l/min
- Materials: AISI 303
AISI 316L
Brass

P.23



BA Cleanable

- Thread size: 1/8" ~ 1/2"
- Spray angle: 60°, 120°
- Capacity: 0.74 ~ 36 l/min
- Materials: AISI 303
AISI 316L
Brass

P.24



BB Cleanable

- Thread size: 1/8" ~ 2"
- Spray angle: 60°
- Capacity: 2.7 ~ 27 l/min
- Materials: AISI 303
AISI 316L
Brass

P.25



BC Cleanable

- Thread size: 1/8" ~ 1/2"
- Spray angle: 60°, 120°
- Capacity: 0.74 ~ 36 l/min
- Materials: AISI 303
AISI 316L
Brass

P.24



BD Cleanable

- Thread size: 1/8" ~ 1/2"
- Spray angle: 60°
- Capacity: 2.7 ~ 27 l/min
- Materials: AISI 303
AISI 316L
Brass

P.25



BE Large capacity

- Thread size: 3/4" ~ 8"
- Spray angle: 50° ~ 120°
- Capacity: 22 ~ 7850 l/min
- Materials: AISI 303
AISI 316L
Brass

P.27



BF Large capacity

- Thread size: 3/4" ~ 6"
- Spray angle: 80° ~ 115°
- Capacity: 50 ~ 4200 l/min
- Materials: AISI 303
AISI 316L
Brass

P.26



BG Small capacity

- Thread size: 1/4" ~ 1 1/2"
- Spray angle: 60°, 120°
- Capacity: 4.8 ~ 200 l/min
- Materials: AISI 303
AISI 316L
Brass

P.27



BH Small capacity

- Thread size: 1/8" ~ 1"
- Spray angle: 60°, 120°
- Capacity: 2.7 ~ 93 l/min
- Materials: AISI 303
AISI 316L
Brass

P.26



BL Large capacity

- Thread size: 4" ~ 10"
- Spray angle: 90°
- Capacity: 1390 ~ 11300 l/min
- Materials: AISI 316L
Cast iron
Carbon steel

P.28



BR Narrow spray

- Thread size: 1/8" ~ 3/4"
- Spray angle: 15°, 30°
- Capacity: 0.98 ~ 35.2 l/min
- Materials: AISI 303
AISI 316L
Brass

P.29



BS Narrow spray

- Thread size: 1/8" ~ 3/4"
- Spray angle: 15°, 30°
- Capacity: 0.98 ~ 35.2 l/min
- Materials: AISI 303
AISI 316L
Brass

P.29



BT Narrow spray

- Thread size: 1" ~ 2 1/2"
- Spray angle: 30°
- Capacity: 27 ~ 470 l/min
- Materials: AISI 303
AISI 316L
Brass

P.29



BV Tangential

- Thread size: 1/8" ~ 1/2"
- Spray angle: 60°, 120°
- Capacity: 1.5 ~ 36 l/min
- Materials: AISI 303
AISI 316L
Brass

P.30



BW Tangential

- Thread size: 1/8" ~ 1/2"
- Spray angle: 60°, 120°
- Capacity: 1.5 ~ 36 l/min
- Materials: AISI 303
AISI 316L
Brass

P.30



BX Three-piece

- Spray angle: 60°
- Capacity: 1.49 ~ 7.43 l/min
- Materials: AISI 303
AISI 316L
Brass

P.31



BJ sister rods

- Thread size: 3/8"
- Spray angle: 60°
- Capacity: 1.49 ~ 7.43 l/min
- Materials: AISI 303
AISI 316L
Brass

P.31



FULL CONE NOZZLES

CAS Cluster nozzle standard spray



- Thread size: 1/2" ~ 2"
- Spray angle: 70°
- Capacity: 1.53 ~ 245 l/min
- Materials: AISI 303, AISI 316L, Brass

P.33

CAY Cluster nozzle wide spray angle



- Thread size: 1/2" ~ 2"
- Spray angle: 130°
- Capacity: 1.53 ~ 490 l/min
- Materials: AISI 303, AISI 316L, Brass

P.34

CH 7 / 13 cluster nozzle



- Thread size: 3/4" ~ 2"
- Spray angle: 200°, 360°
- Capacity: 8.26 ~ 481 l/min
- Materials: AISI 303, AISI 316L, Brass

P.32

D Two-piece



- Thread size: 1/8" ~ 1/2"
- Spray angle: 45°, 60°, 90°, 120°
- Capacity: 0.61 ~ 37 l/min
- Materials: AISI 303, AISI 316L, Brass

P.35

D Large capacity



- Thread size: 3/4" ~ 4"
- Spray angle: 60°, 90°, 120°
- Capacity: 23.5 ~ 1470 l/min
- Materials: AISI 303, AISI 316L, Brass

P.37

E Spiral nozzle



- Thread size: 1/4" ~ 4"
- Spray angle: 60°, 90°, 120°, 150°, 180°
- Capacity: 5.5 ~ 4120 l/min
- Materials: AISI 316L, Brass, PP, PVC, PTFE, PVDF

P.39

E-X Spiral nozzle



- Thread size: 3/8" ~ 4"
- Spray angle: 120°
- Capacity: 23.5 ~ 4120 l/min
- Materials: AISI 316L, Brass, PP, PVC, PTFE, PVDF

P.41

ES Silicon carbide



- Spray angle: 90°, 120°, 150°
- Capacity: 23.5 ~ 4120 l/min
- Material: Silicon carbide

P.41



STRAIGHT JET NOZZLES

F High impact



- Thread size: 1/8", 1/4"
- Spray angle: 0°
- Capacity: 3.4 ~ 68.2 l/min (100 bar)
- Material: AISI 416

P.78

J General purpose



- Thread size: 1/8", 1/4"
- Spray angle: 0°
- Capacity: 0.17~47 l/min (3 bar)
- Materials: AISI 303, AISI 316L, Brass, Ruby insert on 316L body, Diamond insert, 316L body

P.81

GDA Needle jet nozzles



- Thread size: 1/4", 9/16-24NEF
- Spray angle: 0°
- Capacity: 0.12~7.3 l/min (10 bar)
- Materials: AISI 303, AISI 316L, Ruby insert on 316L body

P.79

GMA Paper web trimmers



- Thread size: 3/8"
- Spray angle: 0°
- Capacity: 0.08~2.2 l/min (3 bar)
- Materials: Ruby insert, 303 (316L) body, Diamond insert, 303 (316L) body

P.80

GEA Disc nozzle



- Spray angle: 0°
- Capacity: 0.17~3.1 l/min (3 bar)
- Materials: AISI 316Ti, Ruby insert on 303 (316L) body

P.64

GFA Self-cleaning nozzles



- Spray angle: 0°
- Capacity: 1.0 ~ 3.3 l/min (3 bar)
- Material: AISI 316L

P.65

FLAT FAN NOZZLES



F High impact

- Thread size: 1/8" ~ 1/4"
- Spray angle: 0°, 15°, 25°, 40°, 65°
- Capacity: 3.40 ~ 135 l/min (100 bar)
- Material: AISI 416

P.45



FX High impact

- Spray angle: 0°, 15°, 25°, 40°, 65°
- Capacity: 3.40 ~ 68.2 l/min (100 bar)
- Material: AISI 416

P.45



GA Short body

- Thread size: 1/4", 3/4"
- Spray angle: 45°, 60°, 90°, 120°
- Capacity: 3.10 ~ 76 l/min
- Materials: AISI 303, AISI 316L, Brass

P.47



GX Low capacity

- Spray angle: 25° ~ 110°
- Capacity: 0.06 ~ 1.6 l/min
- Materials: AISI 303, AISI 316L, Brass

P.48



GX Std / large capacity

- Spray angle: 0° ~ 120°
- Capacity: 1.90 ~ 122 l/min
- Materials: AISI 303, AISI 316L, Brass

P.49



GY Fixed orientation

- Spray angle: 0° ~ 120°
- Capacity: 1.90 ~ 122 l/min
- Materials: AISI 303, AISI 316L, Brass

P.51



HT Quick connection

- Thread size: 1/4", 3/8"
- Spray angle: 0° ~ 110°
- Capacity: 3.10 ~ 78 l/min
- Materials: AISI 303, AISI 316L, Brass

P.53



J Low capacity

- Thread size: 1/8", 1/4"
- Spray angle: 25° ~ 110°
- Capacity: 0.06 ~ 1.6 l/min
- Materials: AISI 303, AISI 316L, Brass

P.54



J Standard capacity

- Thread size: 1/8" ~ 3/8"
- Spray angle: 0° ~ 120°
- Capacity: 1.53 ~ 47 l/min
- Materials: AISI 303, AISI 316L, Brass

P.55



J Large capacity

- Thread size: 1/2" ~ 1"
- Spray angle: 0° ~ 95°
- Capacity: 19.5 ~ 435 l/min
- Materials: AISI 303, AISI 316L, Brass

P.58



K Large spray angle

- Thread size: 1/8" ~ 1"
- Spray angle: 90° ~ 140°
- Capacity: 0.39 ~ 350 l/min
- Materials: AISI 303, AISI 316L, Brass

P.59



KX Large spray angle

- Spray angle: 90° ~ 140°
- Capacity: 0.39 ~ 31 l/min
- Materials: AISI 303, AISI 316L, Brass

P.59



K High impact

- Thread size: 1/8" ~ 3/4"
- Spray angle: 15° ~ 50°
- Capacity: 1.60 ~ 78 l/min
- Materials: AISI 303, AISI 316L, Brass

P.61



KHT High impact

- Thread size: 1/4" ~ 1/2"
- Spray angle: 35°
- Capacity: 23 ~ 31 l/min
- Materials: AISI 303, AISI 316L, Brass

P.61



GC Coin nozzles

- Thread size: 5/8 - 18 UNF
- Spray angle: 45° ~ 80°
- Capacity: 5.1 ~ 9.5 l/min (2 bar)
- Materials: AISI 303, AISI 316L

P.63



GE Disc nozzles

- Spray angle: 0°, 60°, 75°
- Capacity: 0.17 ~ 23.0 l/min
- Materials: AISI 316Ti, Ruby insert on 316L body (straight jet nozzles only)

P.64



GF Self cleaning nozzles

- Spray angle: 0° ~ 80°
- Capacity: 1.0 ~ 13.9 l/min
- Material: AISI 316L

P.65



HOLLOW CONE NOZZLES



PA Large capacity

- Thread size: 3/8" ~ 2 1/2"
- Spray angle: 70°, 90°
- Capacity: 1.70 ~ 605 l/min
- Materials: AISI 316L
Brass

P.69



PB Large capacity

- Thread size: 3/8" ~ 2 1/2"
- Spray angle: 130°
- Capacity: 3.90 ~ 665 l/min
- Materials: AISI 316L
Brass

P.69



PE Standard capacity

- Thread size: 1/8" ~ 3/4"
- Spray angle: 70°, 120°
- Capacity: 0.39 ~ 63 l/min
- Materials: AISI 303
AISI 316L
Brass

P.67



PF Standard capacity

- Thread size: 1/8" ~ 3/4"
- Spray angle: 50° ~ 120°
- Capacity: 0.39 ~ 94 l/min
- Materials: AISI 303
AISI 316L
Brass

P.67



PFS 1122 F5
Standard capacity

- Thread size: 1/4"
- Spray angle: 75°
- Capacity: 1.22 l/min
- Material: AISI 316L+Ceramic

P.68



PT Quick connection

- Thread size: 1/4" ~ 1/2"
- Spray angle: 50° ~ 120°
- Capacity: 0.78 ~ 47 l/min
- Materials: AISI 303
AISI 316L
Brass

P.67



PR Large capacity

- Thread size: 3", 4"
- Spray angle: 130°
- Capacity: 612 ~ 3850 l/min
- Materials: AISI 316L
Cast Iron

P.71



PN Moulded plastic

- Thread size: 3/8" ~ 1/2"
- Spray angle: 70° ~ 130°
- Capacity: 1.70 ~ 42 l/min
- Material: Fiberglass reinforced PP

P.70



PO Moulded plastic

- Thread size: 3/8", 1/2"
- Spray angle: 70° ~ 130°
- Capacity: 1.70 ~ 42 l/min
- Material: Fiberglass reinforced PP

P.70



RA Fine spray small passages

- Thread size: 1/8" ~ 1/2"
- Spray angle: 60° ~ 90°
- Capacity: 0.20 ~ 19.6 l/min
- Materials: AISI 303
AISI 316L
Brass

P.72



RB Fine cpray clog resistant

- Thread size: 3/8" ~ 1 1/2"
- Spray angle: 60° ~ 80°
- Capacity: 1.60 ~ 94 l/min
- Materials: AISI 303
AISI 316L
Brass

P.73



RC Extra wide spray angle

- Thread size: 1/4", 3/8"
- Spray angle: 150°, 180°
- Capacity: 7.80 ~ 39 l/min
- Materials: AISI 303
AISI 316L
Brass

P.74



RO Non clogging

- Thread size: 1/2", 3/4"
- Spray angle: 130°
- Capacity: 8.1 ~ 164 l/min
- Materials: AISI 316L, Brass,
Brass, Nickel plate

P.75



RX Low capacity

- Thread size: 1/4"
- Spray angle: 80°
- Capacity: 3.6 ~ 99.6 l/hour
- Materials: AISI 303
AISI 316L
Brass

P.76



RXY Low capacity

- Thread size: 1/8"
- Spray angle: 145°
- Capacity: 0.62 l/min
- Material: AISI 316L+Ceramic

P.76

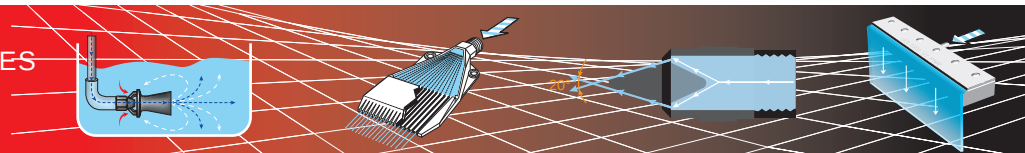


RZ Low capacity

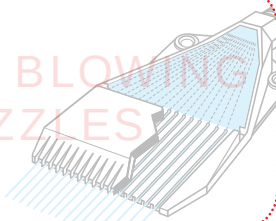
- Thread size: 1/4"
- Spray angle: 30° ~ 90°
- Capacity: 0.08 ~ 2.0 l/min
- Materials: AISI 303
AISI 316L
Brass

P.76

AIR BLOWING NOZZLES MIXING EDUCTORS



AIR BLOWING NOZZLES



- GZS** Air & steam flat fan tips
- Thread size: 1/4"
 - Spray angle: 70°
 - Capacity: 3 ~ 31.5 Nm³/hour (2 bar)
 - Materials: AISI 303, AISI 316L, Brass

P.82



- UEA D020**
Air blow-off nozzles
- Thread size: 1/4"
 - Spray angle: 20°
 - Capacity: 20 Nm³/hour (3 bar)
 - Materials: AISI 316L, Electroless nickel plate aluminum

P.83



- UEA 0525 E31**
Air blow-off nozzles
- Thread size: 1/4"
 - Spray width: 48 mm
 - Capacity: 22 Nm³/hour (3 bar)
 - Material: POM

P.83



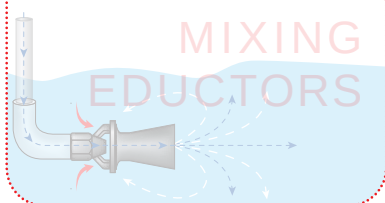
- UEA 0527 V7**
Air blow-off nozzles
- Thread size: 1/4"
 - Spray width: 51 mm
 - Capacity: 22 Nm³/hour (3 bar)
 - Material: Electroless nickel plate aluminum

P.83



- UEB** High-effect air knives
- Thread size: 1/4"
 - Length: 150 ~ 600mm
 - Air capacity: 0.51~2.04 Nm³/min (5 bar)
 - Materials: AISI 316, Electroless nickel plate aluminum

P.84



MIXING EDUCTORS



- UPB** Mixing eductors
- Thread size: 3/8" ~ 2"
 - Capacity: 59 ~ 357 l/min
 - Materials: AISI 316L, PVDF, Fiberglass reinforced PP

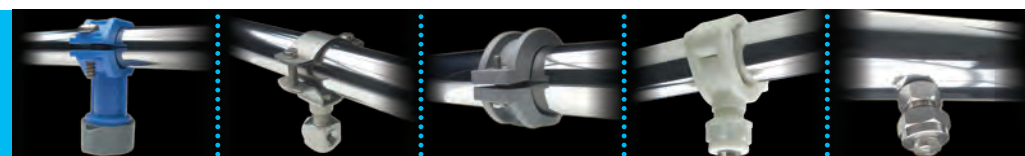
P.85



- UPD** Mixing eductors
- Thread size: 3/4" ~ 2"
 - Capacity: 109~357 l/min
 - Materials: AISI 316L, Fiberglass reinforced PP

P.85

ASSEMBLY ACCESSORIES



- ZPB** Plastic pipe clamps
- Pipe size: 1/2" ~ 1"
 - Material: Fiberglass reinforced PP
 - O-ring: NBR
 - Metal Parts: AISI 304

P.86



- ZPC** Plastic bayonet pipe clamps
- Pipe size: 1/2", 3/4"
 - Material: PVDF
 - O-ring: VITON
 - Material: AISI 316

P.86



- ZPM** Metal pipe clamps
- Pipe size: 1/2" ~ 2 1/2"
 - Body: AISI 304
 - Zinc coated steel
 - Gasket: EPDM
 - Nipple: AISI 303, Brass

P.87



- ZPH** Disk nozzle pipe clamp
- Pipe external diameter: 50mm(2")
 - Material: Fiberglass reinforced PP
 - O-ring: EPDM
 - Pin, bolt: AISI 316

P.88



- VAA** Locknut
- Thread size: 3/8", 3/4", 1 1/4"
 - Materials: AISI 303, AISI 316, Brass, Fiberglass reinforced PP

P.88



- ZAA** Standard welding nipples
- Thread size: 3/8", 3/4"
 - Materials: AISI 303, AISI 316L

P.89



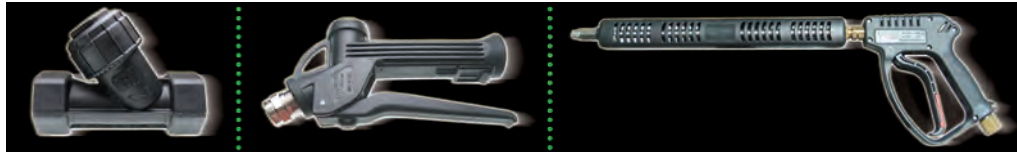
- ZAC** Dovetail welding nipples
- Thread size: 3/8", 3/4", 1 1/4"
 - Material: AISI 316L

P.89



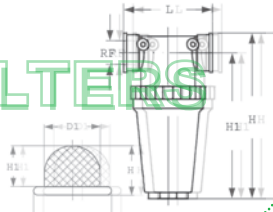
- ZLA** Standard threaded nipples
- Thread size: 1/4", 3/8", 3/4"
 - Materials: AISI 316L, Brass

P.89



FILTERS SPRAY GUNS HOSE REELS

FILTERS



VEA Hat filters



- Suitable nozzle tip: GX, FX, BX, KX
- Mesh number: 50, 75, 100 Mesh
- Collar: Copper
- Wire net: AISI 316

P.91

VEC Flanged filters



- Suitable nozzle tip: GX, FX, BX, KX
- Mesh number: 50, 75, 100 Mesh
- Body: AISI 303, AISI 316, Brass, PP
- Wire net: AISI 304

P.91

VED Check-valve filters



- Suitable nozzle tip: GX, FX, BX, KX
- Mesh number: 50, 75, 100 Mesh
- Body: AISI 303, AISI 316(L), Brass
- Wire net: AISI 304

P.92

VEF Threaded filters



- Suitable nozzle tip: J, RX, RZ
- Mesh number: 50, 75, 100 Mesh
- Body: AISI 303, AISI 316(L), Brass
- Wire net: AISI 304

P.91

VEH Plastic body filters



- Thread size: 1/2" ~ 1 1/2"
- Mesh number: 32, 50, 100 Mesh
- Body: PP
- Wire net: AISI 304
- Seal: EPDM

P.93

VEL Brass body filters



- Thread size: 3/8" ~ 2"
- Mesh number: 150 Mesh
- Body: Nickel plated Brass
- Cartridge: AISI 316
- Seal: EPDM

P.93

VEM Large capacity filters



- Thread size: 1/2" ~ 3"
- Mesh number: 30, 60, 80 Mesh
- Body: Aluminum casting
- Wire net: AISI 304
- Seal: EPDM

P.94

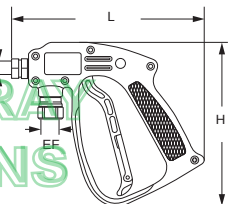
VEQ "Y" style filters



- Thread size: 1"
- Mesh number: 50 Mesh
- Body: Fiberglass reinforced PP
- Wire net: AISI 304
- Seal: EPDM

P.94

SPRAY GUNS



UMS Portable water guns



- Inlet thread: 1/2"
- Outlet thread: 1/2"
- Material: Acetalic resin

P.99

UMV Hot water spray guns



- Thread size: 1/2"
- Body: AISI 316L Brass casting, chrome plated
- Outside shell: Rubber

P.98

UMW High pressure guns



- Inlet thread: 3/8"
- Outlet thread: 1/4"
- Body: AISI 303, Brass
- Outside shell: Nylon, Glassfibers reinforced

P.95

UMX Wash guns



- Thread size: 1/2"
- Body: AISI 316
- Outside shell: Rubber

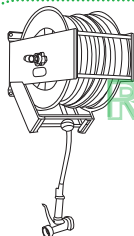
P.97

UPL Steam heaters



- Thread size: 3/4", 1 1/4"
- Materials: AISI 316 Bronze

P.100



REWIND REELS

UMU A / B Manual rewind reels



- Flexible hose size: 3/8" ~ 1"
- Material: AISI 304

P.101

UMU G / H Auto-rewind reels



- Flexible hose size: 3/8" ~ 1"
- Material: AISI 304

P.101

UMR Pressure tanks



- Body: AISI 304
- Base: Synthetic rubber
- Capacity: 9, 19 Liters
- LP: 9 bar

P.90

UMU L / K Auto-rewind & orientable outlet reels



- Flexible hose size: 1/2" ~ 1"
- Material: AISI 304

P.102

UMU J / I Large capacity auto-rewind reels



- Flexible hose size: 1/2" ~ 1"
- Material: AISI 304

P.102

CLIP-ON NOZZLES



ZPF Swivel nozzle clamps

- Thread size: 1 1/4", 1 1/2"
- Body: Fiberglass reinforced PP
- O-ring: NBR
- Pin & bolt: AISI 316

P.104

ZPQ Cam & lever clamps

- Thread size: 1 1/4", 1 1/2"
- Body: Fiberglass reinforced PP
- O-ring: NBR
- Pins: AISI 316

P.104

ZPL Spring pipe clamps

- Thread size: 1", 1 1/4", 1 1/2"
- Body: Fiberglass reinforced PP
- O-ring: NBR
- Spring: AISI 302

P.105

ZPN Spring pipe clamps

- Thread size: 1", 1 1/4", 1 1/2"
- Body: Fiberglass reinforced PP
- O-ring: NBR
- Spring: AISI 302

P.105

ZLF Threaded nipple

- Thread size: 3/8", 1/2"
- Material: Fiberglass reinforced PP

P.105

HG Flat fan nozzles

- Spray angle: 60°
- Capacity: 2.3 ~ 23.7 l/min
- Material: Fiberglass reinforced PP

P.107

RG Hollow cone nozzles

- Spray angle: 50°
- Capacity: 10.1 ~ 22.5 l/min
- Material: Fiberglass reinforced PP

P.107

KS Flat fan nozzles

- Spray angle: 60°
- Capacity: 8.9 ~ 25 l/min
- Body: Fiberglass reinforced PP

P.108

HT Quick-fit nozzles

- Spray angle: 60°
- Capacity: 2.3 ~ 15.8 l/min
- Material: Fiberglass reinforced PP

P.108

ZBA Threaded spheres

- Thread size: 1/4", 3/8", 1/2"
- Angle of rotation: 60°
- Material: Fiberglass reinforced PP

P.106

ZBA Quick-fit spheres

- Suitable nozzle tip: HT, KS
- Angle of rotation: 60°
- Body: Fiberglass reinforced PP

P.106

VAB Locknuts

- Body: Fiberglass reinforced PP

P.106

VAE Locknuts

- Material: Fiberglass reinforced PP

P.106

ZPG Pipe holders

- Thread size: 3/4" ~ 2"
- Body: Fiberglass reinforced PP
- Spring: AISI 302

P.109

ZSA Quick coupling joints

- Thread size: 3/4" ~ 1 1/2"
- Materials: AISI 316
- Fiberglass reinforced PP

P.110

SWIVEL JOINTS



ZRA Standard swivel joints

- Thread size: 1/8" ~ 3/4"
- Materials: AISI 303
- AISI 316L
- Brass

P.111

ZRP Triangle flanged swivel joints

- Thread size: 1/8" ~ 3/8"
- Materials: AISI 304
- Brass

P.112

ZRQ Large capacity swivel joints

- Thread size: 1" ~ 2 1/2"
- Materials: AISI 316L
- Brass

P.112

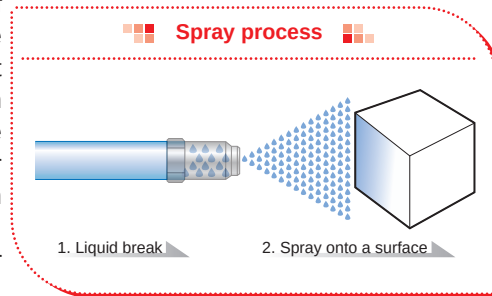
THE PROCESS OF ATOMIZATION

A liquid spraying process can be described as consisting of two phases, namely:

1. breaking of the liquid into separate droplets
2. directing the liquid drops onto a surface or an object, to achieve the desired result.

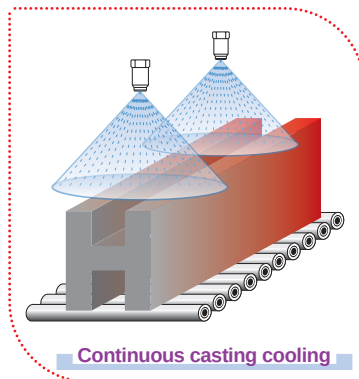
Modern technology allows for a strict control of different parameters of a liquid spray; for example precise information can be obtained about droplet size spectrum, droplets speed and liquid distribution onto the spray target. In recent years we've supported our customers in improving their productivity and market share by providing them cutting edge industrial techniques.

PNR is your best partner to help you enhance your productivity and quality.

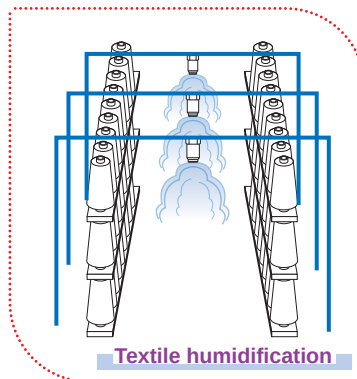


APPLICATIONS

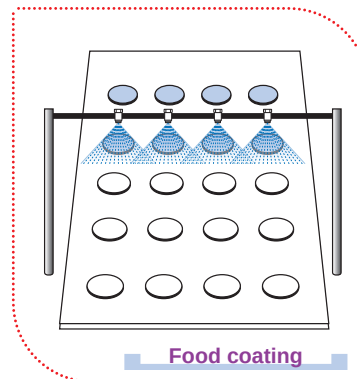
Spraying a liquid through a spray nozzle can serve different purposes, among which the most important are the following:



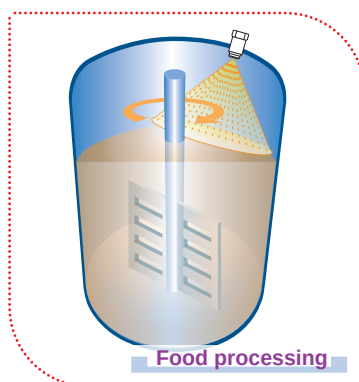
Cooling: heat transfer by spraying liquids onto the products surface for a rapid cooling, such as continuous casting cooling in steelworks.



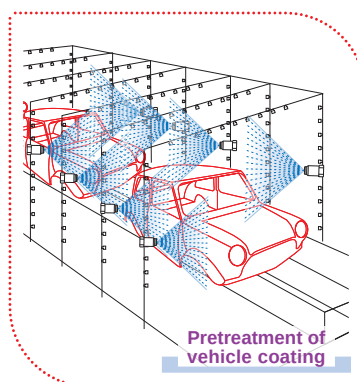
Humidification: spray of very little quantities of liquid onto the products surface into special chambers or rooms to raise relative humidity. A typical application is textiles humidification.



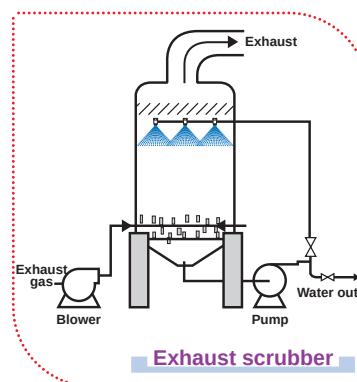
Coating: application of coatings or liquids on the food products surface. For example: oil-spraying on bread.



Food processing: spray to add specific ingredients or substances to speed up chemical reactions. For ex.: addition of fructose in fruit juices, etc.



Washing: remove dirt from the product surface spraying liquids at high pressure, like in vehicles pre-wash treatment.



Pollution control: use of atomized scrubbing liquids to capture particulate matter and/or gaseous pollutants in liquid droplets, like in wet scrubbers and spray towers.

How to choose the most suitable nozzle among those listed?

This is the first question most customers ask themselves. Do not be afraid to choose the wrong one. Contact us, tell us what you need and we will help you to make the right choice explaining how our nozzles work in a simple and user-friendly way.

SPRAY NOZZLES TECHNICAL FEATURES

Several technical features must be taken into account to select the proper nozzle. This will be dealt with on the following page.

1. NOZZLE EFFICIENCY

A spray nozzle is a device that turns the pressure energy of a liquid flow into kinetic energy. The nozzle efficiency can be defined as the ratio between the energy available at the nozzle inlet and the energy which is actually used to increase the liquid speed and create the spray, the difference being the energy lost during the process because of friction. Depending on the nozzle type and for a good quality machining, the nozzle efficiency varies between 55% and 95% for the types that are commonly used in industrial processes. What above stated is not valid for air-assisted atomizers which require a much higher energy because of the losses inherent in the energy transfer from compressed air to liquid surface.

2. DROPLETS SIZE

The droplets size depends on the structure of the atomizer, intensity of the liquids energy, liquid surface tension and density. The size of the atomized droplets is not uniform. Therefore, the average droplets size becomes an important factor. For example, the droplets size in gas quenching towers is extremely important. If their size is too big, they do not fully evaporate leading to dust bag failure. On the contrary, if the droplets size is too small, it's not possible to lower the temperature to the desired level and high temperature may cause the dust bags burn out.

There are four ways to express the droplets size:

The Sauter Mean Diameter (SMD) is the most commonly used. It refers to the drop volume/surface area ratio and it's often shown as D_{32} , μm (Micron) unit. ($*1\mu\text{m}=10^{-3}\text{mm}$)

ARITHMETIC MEAN DIAMETER

This is a diameter value which, multiplied by the local number of droplets in the sample, equals the addition of all droplets diameters.

SURFACE MEAN DIAMETER

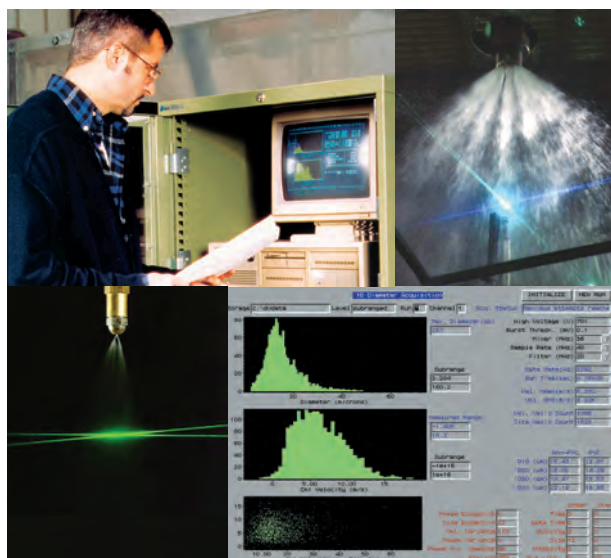
This is a diameter of such a droplet whose surface, multiplied by the total droplets number, equals the sum of all droplets surfaces.

VOLUME MEAN DIAMETER

This is the diameter of such a droplet whose volume, multiplied by the total droplets number, equals the sum of all droplets volumes.

SAUTER MEAN DIAMETER (D_{32})

This is the diameter of such a droplet whose volume/area ratio, equals the ratio between the sum of all droplet volumes divided by the sum of all droplet surfaces.



MEASUREMENT METHODS

※SMD is tested using pure water at 25°C

Method by immersion

A glass dish containing 60% of silicone oil is passed quickly under the spraying nozzle. Silicon oil is heavier so the water droplets float on the oil surface. Every droplet diameter is recorded and the resulting average is the SMD. This is a difficult method to perform and for this reason it's rarely used.

Laser interferometer test

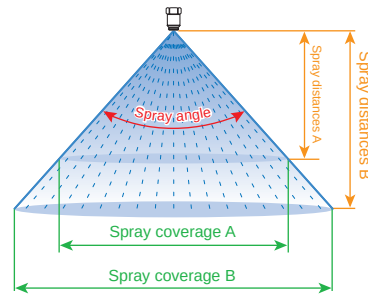
As different droplets have different PI, they produce different refraction angles. Therefore laser light can be used to measure their size. This type of method is fast and precise. PNR can perform this test with technologically advanced equipments and provide complete documentation containing test reports. Please contact us for more information.

SPRAY NOZZLES TECHNICAL FEATURES

3. SPRAY ANGLE

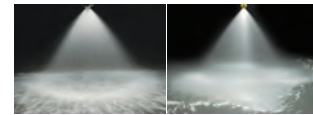
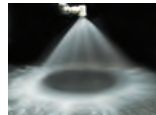
A spray angle is the angle formed by the cone of liquid leaving a nozzle orifice.

The spray angle and the distance between the nozzle orifice and the target surface to be covered determine the spray coverage. (See page 114)



4. IMPACT FORCE

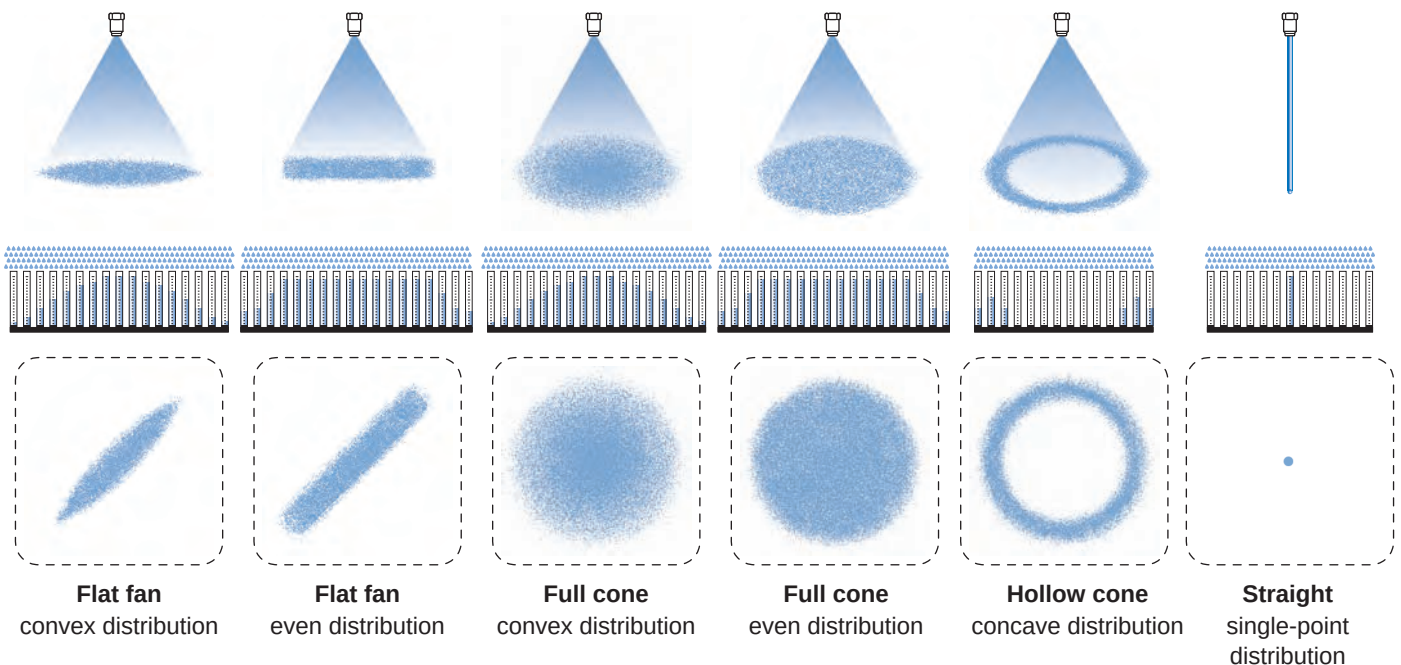
The impact force is the force generated by the jet of water deflected by the impact surface and its strength is often expressed in kg/cm^2 or lb/inch^2 . The uniformity of a jet impact force and distribution influence the washing effect. Under the same operating conditions (same pressure and capacity), different types of nozzles can be used to perform an impact force test and the results are shown here below.



Straight nozzles > Flat fan nozzles > Hollow cone nozzles > Full cone and square nozzles

5. DISTRIBUTION

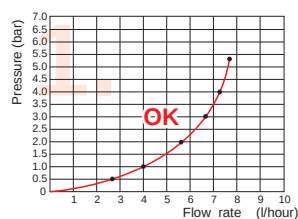
Engineers design nozzles with different spray distribution patterns. Patterns can be solid stream, full cone, hollow cone, flat spray, spoon flat fan. The nozzle design aims at the uniformity and impact force of the jet sprayed whether nozzles are used individually or overlapping. Below figures show detailed information for a variety of capacities and spray sections. We mark distribution on every page for your convenience.



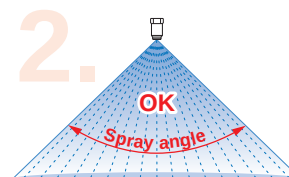
SPRAY NOZZLE

Although nozzles are used to atomize liquids, the atomization precision and effect are deeply influenced by their quality. With our expertise we fully understand our customers needs and expectations and our engineers set high quality control standards not only for the operating precision of our nozzles but also for product inspection. **PNR ensures the best atomizing effects and provides capacity and spray angle accuracy with a tolerance of $\pm 5\%$ guarantee.** Below highlights of quality inspection.

1. Check if liquid flow and pressure are in direct proportion.
2. Check if spray angle is as required.
3. Check if capacity is as required.
4. Check if distribution is uniform.
5. Check if droplets diameter is uniform.



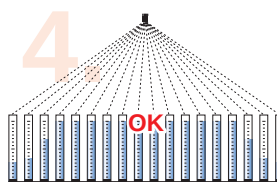
Check if liquid flow and pressure are in direct proportion.



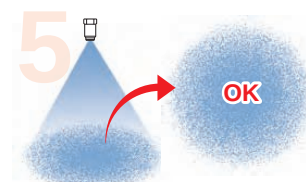
Check if spray angle is as required.



Check if capacity is as required.



Check if distribution is uniform.



Check if droplets diameter is uniform

TECHNIQUES FOR SPRAY PRODUCTION

Many different hydrodynamics techniques can be used to produce a spray and most of them are used today for nozzles to be applied in industrial processes.



PRESSURE NOZZLES

This is the simplest type of nozzle where an orifice is opened into a chamber where the liquid to be sprayed is fed under pressure. A spray is produced through the orifice with spray pattern, flow rate and spray angle depending upon the orifice edge profile and the design of the inside pressure chamber. Typical pressure nozzles are J series straight nozzles and F series high pressure flat fan nozzles.

Turbulence nozzles use specially shaped vanes which force the pressurized liquid into a whirl chamber producing its high-speed rotation. This breaks up the liquid which exists the nozzle orifice atomized at high-speed. Different nozzle structures and flow rates produce hollow cone, full cone and full square cone spray patterns. Typical turbulence nozzles are RA series hollow cone and D series full cone nozzles.



TURBULENCE NOZZLES

TECHNIQUES FOR SPRAY PRODUCTION

IMPACT NOZZLES

Here the desired spray shape is obtained producing an impact of the liquid jet onto a properly designed surface. The liquid jet is subsequently changed into a fluid lamina and then broken into drops with the desired spray pattern after leaving the nozzle edge. Typical impact nozzles are K series flat fan nozzles, E series spiral full cone nozzles and RC series hollow cone nozzles.



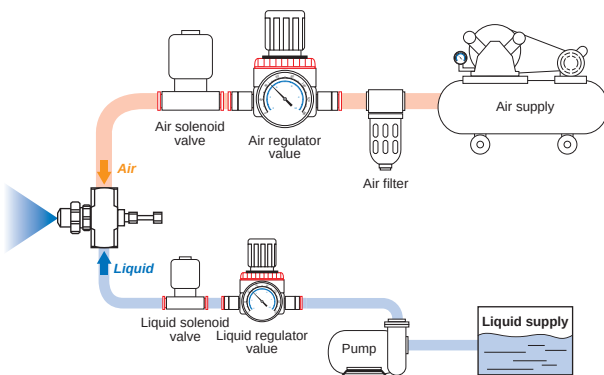
AIR ASSISTED ATOMIZERS

Air-assisted atomizers use their special design and pressurized gas to atomize a liquid and break it into tiny droplets (the smallest average particle size: 10 micron). Please refer to catalogue CTG AZ and contact us.

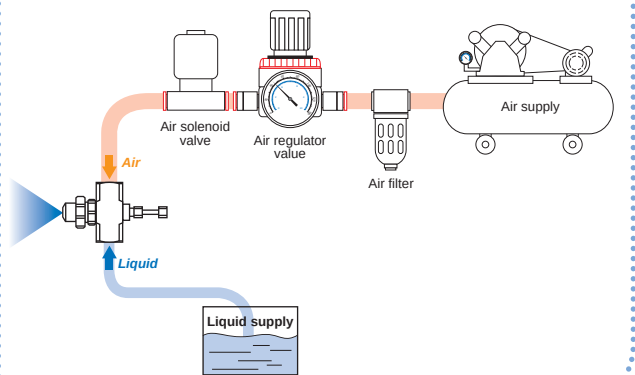


Air-assisted nozzles - Depending on the liquid supply, these nozzles are of two types: Pressure nozzles and Siphon nozzles.

PRESSURE NOZZLES



SIPHON NOZZLES



ULTRASONIC ATOMIZERS

Ultrasonic atomizers are sister products of air-assisted atomizers. The front-end has a titanium ultrasonic generator. It uses the energy of the high-speed impact to produce a high-frequency oscillation that micro-atomizes the liquid droplets. The special design produces tiny and uniform droplets (the average smallest particle size: 7 Micron). The advantages are vital to many applications. Ultrasonic atomizers have two phases of atomization. Phase one: liquids mix with pressured air and produce tiny droplets to spray. Phase two: when the atomized droplets hit the ultrasonic generator they get micro-atomized generating smaller droplets. Please contact us for catalogue CTG AZ and more information.



FULL CONE PATTERN

The shape of the tip determines the spray range of full cone nozzles. A typical application of these nozzles is continuous casting cooling when it's necessary to spray the same volume of liquids onto a surface to cool objects.

Our engineers design a series of full cone nozzles to satisfy different needs.

No matter what kind of full cone nozzles they are, they have unique applications.



STANDARD FULL CONE (Turbulence nozzle)

These nozzles use a specially shaped vane placed at the nozzle inlet to give a rotational speed to the fluid flowing through the nozzle.

Because of the rotational speed of the fluid, water exiting the nozzle orifice is subjected to centrifugal force and opens up in the shape of a full cone.

The extent of the angle of the cone is a function of both exit speed (created from the inlet pressure) and the internal design of the nozzle. It can vary in practice from 15° to 120°.

These nozzles can be also produced as square full cone nozzles where the square shape of the pyramidal spray is obtained by a special design of the outlet orifice.

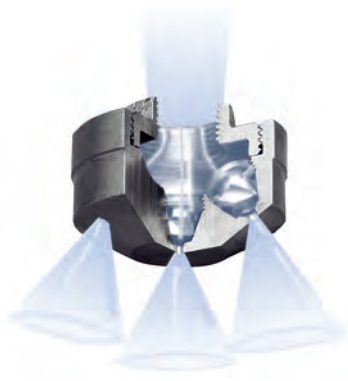
Two important details have to be noted from the system designer when using these type of nozzles:

1. The spray angle is measured on the side of the square section.
2. The square section of the spray rotates within the distance from the nozzle orifice to the target area.



SPIRAL FULL CONE (Impact nozzle)

This is not properly a full cone but rather a continuous liquid curtain evolving with the shape of a spiral inside a conical volume. The disadvantage of a scarcely even distribution is compensated by an exceptionally good resistance to clogging, large orifice and vaneless which make this nozzle the best choice in those applications such as wet scrubber, fire-fighting systems, etc.



MULTIPLE FULL CONE (Turbulence nozzle)

Several nozzles are grouped in a cluster with different spray directions. These nozzles produce large capacity of watermist.

If you need both large capacity and mist, multi-orifice full cone nozzles are the best option.

FLAT FAN SPRAY PATTERN

A flat fan spray nozzle serves the purpose of spraying onto a surface or an object moving in a transverse direction with respect to the one of the jet surface, a typical example being the nozzles in a car washing tunnel. The vast majority of flat spray nozzles used in the industry work according to one of the following principles.

IN LINE FLAT FAN (Pressure nozzle)

This is the general purpose flat fan nozzle where the liquid enters the nozzle in line with the axis length and is fed to a pressure chamber from where it is ejected through the nozzle orifice. Flow value and spray angle are determined respectively from the orifice cross section and the orifice edge profile.

IN LINE STRAIGHT JET (Pressure nozzle)

Straight nozzles can be considered as flat fan nozzles as the only difference is the spray angle which is zero degrees in straight nozzles. These nozzles are often used in high-pressure operating environments where the wear resistance of the nozzles is very important. It ensures optimum service life and spray orientation. PNR offers a wide range of material selection.

- 416 hardened stainless steel
- Ruby nozzle + stainless steel body
- Tungsten carbide nozzle tip + stainless steel body

SPOON FLAT FAN (Impact nozzle)

These nozzles feature a flat fan spray. According to the different arc design, these spoon flat fan nozzles can be of two types: high impact with narrow spray angle or low pressure with wide spray angle.

- Under the same operating conditions, narrow angle high impact nozzles produce a higher impact force than standard flat fan nozzles. They are suitable for cleaning environments that need strong impact force.
- Low pressure nozzles with wider spray angle produce a 130° spray angle and a large area of water curtain effect. Low-impact spray nozzles are widely used in various applications such as foam removal, water curtain for gas separation, fruits and vegetables cleaning.



High impact types



Large spray angle

HOLLOW CONE SPRAY PATTERN

A hollow cone spray pattern is made of droplets concentrated on a ring-shaped impact area, with no droplets falling inside the conic volume. Under the same operating conditions, hollow cone nozzles produce a very fine atomized liquid mist and can capture a higher rate of suspended particles than other nozzles. They are widely used in exhaust scrubbers and gas cooling.

HOLLOW CONE (Turbulence nozzle)

These nozzles use a tangential injection of liquid into a whirling chamber to generate centrifugal forces which break up the liquid vein as soon as it leaves the orifice. Precisely designed orifice profiles, making use of the Coanda effect, provide the ability to obtain very large spray angles.

HOLLOW CONE (Deflection nozzle)

A hollow cone can also be obtained taking a liquid flow to change direction onto a properly designed surface in order to break the liquid into droplets and distributes them as a hollow cone spray pattern with clog resistance. This kind of nozzle is mainly used for applications in fire-fighting systems.



FULL CONE NOZZLES

There are two types of full cone nozzles: turbulence nozzles and impact nozzles, distinguishable by their different spray patterns.



Turbulence nozzles use vanes to produce a high-speed rotation and pressurize the liquid flow inside a turbulence chamber. Liquids are atomized by the centrifugal force that produces a solid stream jet with a full cone spray pattern.

Impact nozzles work on the impact principle. Liquids hit their spiral profile, atomize and produce large spray flows with full-cone patterns and desired spray angle. They have no vanes and are virtually clog-free.



To meet the needs of different operating environments, PNR developed a series of vanes, each one with its own technical features. See here below.

VANE



SLOTTED VANE

Slotted vane, so called for its spray section with 6 flows slots on its edge portion and one in the center.

These vanes produce high-speed rotation of pressurized liquids that flow into turbulence chambers where they are atomized. Slotted vanes provide an excellent atomization in a short time. Effective for cost-saving and in case of limited space.



DISC VANE

Innovative design and precise machining, its smooth surface reduces pressure loss and avoids turbulence. It uses 6 peripheral passages to create a swirling motion of the liquid inside the spray chamber.

A set of superficial millings on the lower side of the disc act as a brake on the liquid rotation at the centre creating a full cone jet with an even distribution and finely atomized droplets. No central hole to avoid clogging.



X - VANE

X vanes are widely used, mainly in steelworks. Their simple design is based on two sloping flat surfaces which induce a rotation of the liquid going through the nozzle, and two small slots on each flat part to produce a full-cone spray pattern. All vanes are secured inside the nozzle body to prevent their moving in case of size changes due to high temperatures or sudden vacuum conditions in the feed pipe.



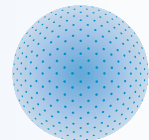
S - TYPE VANE

S-type vanes provide a large free passage of liquids through the nozzle, with nearly the same diameter of a spray tip. Therefore they offer the widest possible passage and the highest resistance to clogging among all full-cone spray nozzles with internal vane.

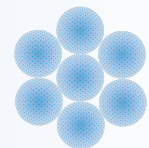


SPIRAL VANE

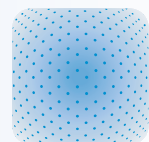
Spiral vane is specific design of spiral full cone nozzles. Liquids hit spiral vane then atomize and extend to the desired spray angle. The specific design greatly increases liquids inlet and outlet diameter. Any foreign matters entering could come out. It avoids clogging and provides larger capacity with the same thread size.



FULL CONE
Round spray



FULL CONE
Cluster spray



FULL CONE
Square pattern

ACCURATE SPRAYS OVERLAPPING

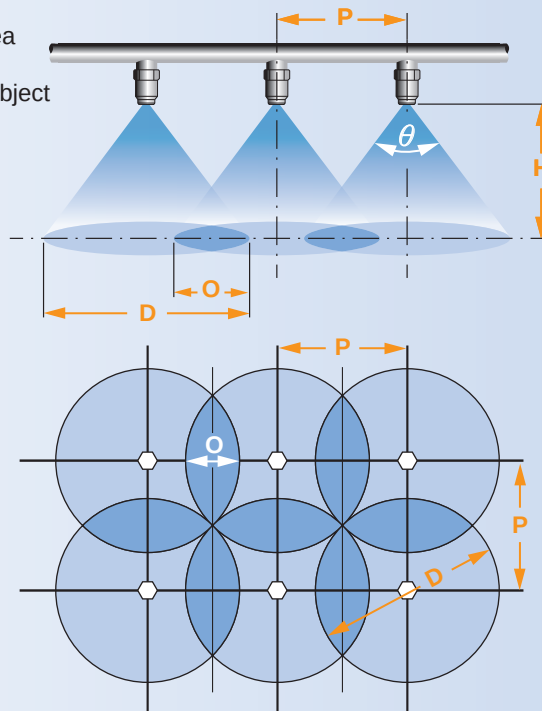
When full and hollow cone nozzles are used simultaneously, it's vital that they cover a uniform spray volume. In general there are two methods to achieve accurate nozzles settings: matrix configuration and offset configuration. See here below.

Matrix configuration

- O** - width of overlapping area
- D** - diameter of spray range
- H** - nozzle distance to the object being sprayed
- P** - nozzle spacing
- θ** - spray angle

$$\text{Nozzle spacing}(P) = \frac{D}{\sqrt{2}}$$

$$\text{Overlap}(O) = D - P$$



Offset configuration

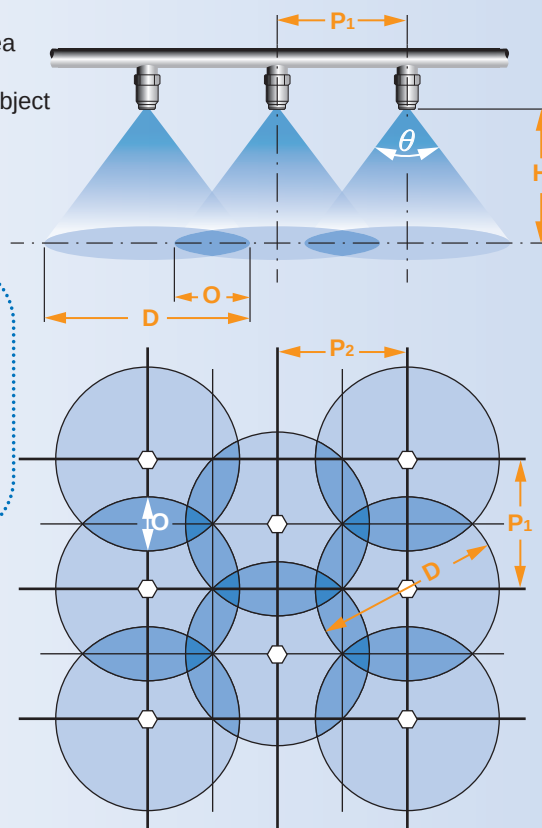
- O** - width of overlapping area
- D** - diameter of spray range
- H** - nozzle distance to the object being sprayed
- P** - nozzle spacing
- θ** - spray angle

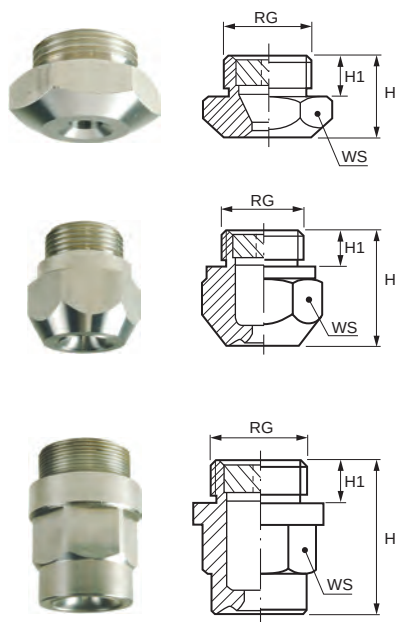
$$\text{Nozzle spacing}(P_1)$$

$$= \frac{D}{2} \times \sqrt{3}$$

$$\text{Nozzle spacing}(P_2) = \frac{3}{4}D$$

$$\text{Overlap}(O) = D - P_1$$





SLOTTED VANE

AA series full cone nozzles are made of body and slotted vane, for an even spray distribution. Their design allows them to be 35% shorter than other full cone nozzles. They are used in operating environments with a restricted space available and are cost-effective for the lower material quantity.

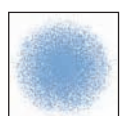
Typical applications

Washing: exhaust scrubbers washing, vehicle parts and gravel washing

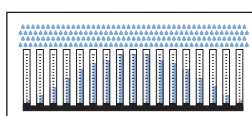
Cooling: high-temperature cooling, vehicle parts cooling, tank cooling

Other applications: spray of chemicals, sea water desalinization

■ Thread size: BSP, NPT (optional)



Spray section



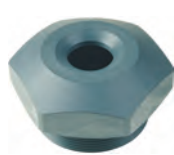
Convex distribution



	Code	RG inch	D mm	D1 mm	Capacity at different pressure values								H mm	H1 mm	WS mm
					0.5	0.7	1.0	2.0	3.0	5.0	7.0	10			
90°	AAU 2305 xx	3/4"	6.1	3.0	12.5	14.7	17.6	24.9	30.5	39.4	46.6	55.7	22	10	32
	AAU 2385 xx		6.7	3.0	15.7	18.6	22.2	31.4	38.5	49.7	58.8	70.3			
	AAU 2490 xx		7.8	4.0	20.0	23.7	28.3	40.0	49.0	63.3	74.8	89.5			
	AAU 2610 xx	1"	9.0	4.0	24.9	29.5	35.2	49.8	61.0	78.7	93.2	111	27	12	40
	AAU 2780 xx		10.5	5.0	31.8	37.7	45.0	63.7	78.0	101	119	142			
	AAU 3123 xx	1 1/4"	12.5	6.0	50.2	59.4	71.0	100	123	159	188	225	30	14	50
	AAU 3194 xx	1 1/2"	16.0	6.0	79.2	93.7	112	158	194	250	296	354	35	16	60
	AAU 3310 xx	2"	20.0	7.0	127	150	179	253	310	400	474	566	45	18	75
	AAU 3386 xx		23.0	9.0	158	186	223	315	386	498	590	705			
	AAU 3490 xx	2 1/2"	25.0	12.0	200	237	283	400	490	633	748	895	52	22	90
120°	AAU 3610 xx		28.5	13.0	249	295	352	498	610	788	932	1114			
	AAU 3775 xx	3"	32.0	16.0	316	374	447	633	775	1001	1184	1415	60	24	110
	AAW 2490 xx	3/4"	7.9	3.0	20.0	23.7	28.3	40.0	49.0	63.3	74.8	89.5	38	11	32
	AAW 2780 xx	1"	13.7	6.0	31.8	37.7	45.0	63.7	78.0	101	119	142	47	15	40
	AAW 3123 xx	1 1/4"	12.7	6.0	50.2	59.4	71.0	100	123	159	188	225	62	19	50
	AAW 3194 xx	1 1/2"	16.0	6.0	79.2	93.7	112	158	194	250	296	354	77	21	50
	AAW 3310 xx	2"	20.0	10.0	127	150	179	253	310	400	474	566	99	24	60
	AAW 3386 xx		22.7	10.0	158	186	223	315	386	498	590	705			
	AAW 3490 xx	2 1/2"	25.5	12.0	200	237	283	400	490	633	748	895	123	27	75
	AAW 3610 xx		30.0	13.0	249	295	352	498	610	788	932	1114			
	AAW 3775 xx	3"	32.0	14.0	316	374	447	633	775	1001	1184	1415	150	30	85



Slotted disc vane



AA nozzles design is ideally suited for plastic materials.

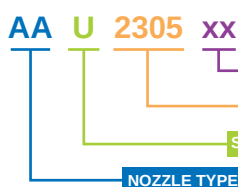
Slotted vane, so called for its spray section with 6 flows slots on its edge portion and one in the centre.

These vanes produce high-speed rotation of pressurized liquids that flow into turbulence chambers where they are atomized. Slotted vanes provide an excellent atomization in a short time. Effective for cost-saving and in case of limited space.

Material	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
B31 - AISI 316L					•	•	•
T1 - Brass	•				•	•	•
D1 - PVC	•	•	•	•	•	•	•

HOW TO MAKE UP THE NOZZLE CODE

EX.: AAU 2305 B3



• B31 - AISI 316L Stainless steel

• D1 - PVC

• T1 - BRASS

○ B1 - AISI 303 Stainless steel (optional)

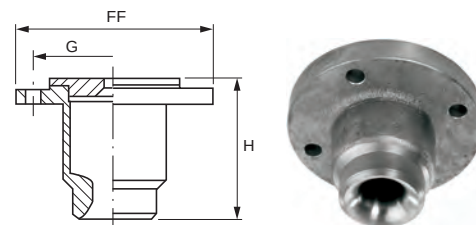
○ D2 - PP (optional)

○ E1 - PTFE (optional)

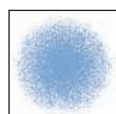
SLOTTED VANE

AE type nozzles are designed to deliver large and very large capacity values from 384 l/min to 3842 l/min at 0.5 bar.

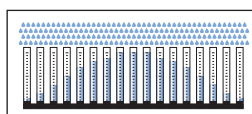
The carefully designed slotted vane offers uniform spray distribution and perfect performance even with very low inlet pressure values. Compared to other large nozzles, the upper flange reduces the length of nozzles and offers fast and safe ways to install.



■ **Flange specification**
DIN Standard
JIS Standard (optional)



Spray section



Convex distribution

	Code	DN mm	D mm	D1 mm	Capacity at different pressure values								FF mm	G mm	H mm
					0.25	0.35	0.5	0.7	1.0	2.0	3.0	5.0			
90°	AEU 3940 xx	80	37.0	12.0	271	321	384	454	543	768	940	1214	200	160	140
	AEU 4118 xx		39.0	14.0	341	403	482	570	681	963	1180	1523			
	AEU 4147 xx	100	43.0	13.0	424	502	600	710	849	1200	1470	1898	220	180	156
	AEU 4188 xx	125	53.0	16.0	543	642	768	908	1085	1535	1880	2427	250	210	177
	AEU 4235 xx		56.0	16.0	678	803	959	1135	1357	1919	2350	3034			
	AEU 4294 xx	150	59.0	21.0	849	1004	1200	1420	1697	2400	2940	3796	285	240	188
	AEU 4370 xx		66.0	24.0	1068	1264	1511	1787	2136	3021	3700	4777			
	AEU 4470 xx	200	72.0	28.0	1357	1605	1919	2270	2714	3838	4700	6068	340	295	250
	AEU 4588 xx		81.0	32.0	1697	2008	2400	2840	3395	4801	5880	7591			
120°	AEU 4741 xx	250	88.0	39.0	2139	2531	3025	3579	4278	6050	7410	9566	395	350	291
	AEU 4941 xx		99.0	37.0	2716	3214	3842	4545	5433	7683	9410	12148			
	AEW 3940 xx	80	36.0	15.0	271	321	384	454	543	768	940	1214	200	160	140
	AEW 4118 xx		40.5	14.5	341	403	482	570	681	963	1180	1523			
	AEW 4147 xx	100	43.0	18.5	424	502	600	710	849	1200	1470	1898	220	180	156
	AEW 4188 xx	125	53.0	22.0	543	642	768	908	1085	1535	1880	2427	250	210	177
	AEW 4235 xx		55.0	24.0	678	803	959	1135	1357	1919	2350	3034			
	AEW 4294 xx	150	59.0	28.0	849	1004	1200	1420	1697	2400	2940	3796	285	240	188
	AEW 4370 xx		66.0	32.0	1068	1264	1511	1787	2136	3021	3700	4777			
	AEW 4470 xx	200	75.0	35.0	1357	1605	1919	2270	2714	3838	4700	6068	340	295	250
	AEW 4588 xx		81.0	40.0	1697	2008	2400	2840	3395	4801	5880	7591			
	AEW 4741 xx	250	86.0	37.0	2139	2531	3025	3579	4278	6050	7410	9566	395	350	291
	AEW 4941 xx		96.0	42.0	2716	3214	3842	4545	5433	7683	9410	12148			

Typical applications

Cooling

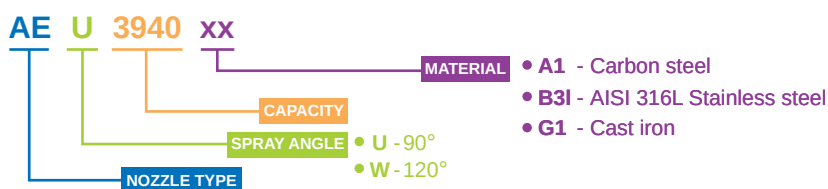
Coke quench tower scrubber system
Exhaust gas cooling
High-temperature cooling

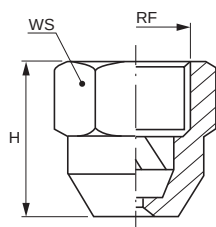
Cleaning

Desulfuration
Exhaust scrubbers

HOW TO MAKE UP THE
NOZZLE CODE

EX.: AEU 3940 A1



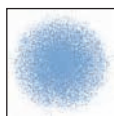


IN-LINE FULL CONE

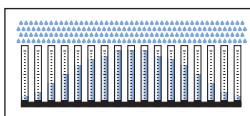
AH series nozzles are made of a body and a disc vane and provide a very uniform spray distribution onto the entire coverage area. AH nozzles have been widely used in continuous casting plants for many years. The special design of their vane produces a fine atomization of the liquid and highly improves its distribution.

These innovative nozzles, highly appreciated for their performance, are widely used in the steelworks industry both in Europe and America.

■ Thread specification: BSP, NPT



Spray section



Convex distribution



Typical applications

Washing

Steel cleaning
Parts washing
Pre-treatment in coating process

Cooling

Continuous casting cooling
Products cooling
Tank cooling

Dust control

Dust removal in mining and coal plants

Other applications

Spray of chemicals
Leak test



DISC VANE

This innovative vane is machined with high precision. Its smooth surface reduces pressure loss and avoids turbulence. Its stabilizer acts as a hydrodynamic brake on the fluid rotating at high-speed inside the whirl chamber. Its shape splits the liquid leaving the nozzle into 6 flows. Disc vanes produce micro-droplets and even atomization.

	Code	RF inch	D mm	Capacity at different pressure values (l/min) (bar)					H mm	WS mm
				1.0	2.0	3.0	4.0	5.0		
65°	AHR 1309 xx	1/4"	1.9	1.78	2.52	3.09	3.57	3.99	25.0	19
	AHR 1362 xx		2.0	2.09	2.96	3.62	4.18	4.67		
	AHR 1409 xx		2.2	2.36	3.34	4.09	4.72	5.28		
	AHR 1517 xx		2.6	2.98	4.22	5.17	5.97	6.67		
	AHR 1207 xx	3/8"	1.0	1.20	1.69	2.07	2.39	2.67	26.5	22
	AHR 1258 xx		1.0	1.49	2.11	2.58	2.98	3.33		
	AHR 1310 xx		1.9	1.79	2.53	3.10	3.58	4.00		
	AHR 1340 xx		2.0	1.96	2.78	3.40	3.93	4.39		
	AHR 1363 xx		2.1	2.10	2.96	3.63	4.19	4.69		
	AHR 1415 xx		2.2	2.40	3.39	4.15	4.79	5.36		
	AHR 1470 xx		2.5	2.71	3.84	4.70	5.43	6.07		
	AHR 1518 xx		2.6	2.99	4.23	5.18	5.98	6.69		
	AHR 1621 xx		2.7	3.59	5.07	6.21	7.17	8.02		
	AHR 1780 xx		2.9	4.50	6.37	7.80	9.01	10.1		
	AHR 1828 xx		3.1	4.78	6.76	8.28	9.56	10.7		
	AHR 1873 xx		3.3	5.04	7.13	8.73	10.1	11.3		
80°	AHR 2110 xx	1/2"	4.2	6.35	8.98	11.0	12.7	14.2	36.0	27
	AHR 2144 xx		4.2	8.31	11.8	14.4	16.6	18.6		
	AHR 2154 xx		5.0	8.89	12.6	15.4	17.8	19.9		
	AHT 1309 xx	1/4"	2.2	1.78	2.52	3.09	3.57	3.99	25.0	19
	AHT 1362 xx		2.2	2.09	2.96	3.62	4.18	4.67		
	AHT 1409 xx		2.2	2.36	3.34	4.09	4.72	5.28		
	AHT 1517 xx		2.6	2.98	4.22	5.17	5.97	6.67		
	AHT 1258 xx	3/8"	2.0	1.49	2.11	2.58	2.98	3.33	26.5	22
	AHT 1310 xx		2.0	1.79	2.53	3.10	3.58	4.00		
	AHT 1340 xx		2.0	1.96	2.78	3.40	3.93	4.39		
	AHT 1363 xx		2.1	2.10	2.96	3.63	4.19	4.69		
	AHT 1415 xx		2.2	2.40	3.39	4.15	4.79	5.36		
	AHT 1518 xx		2.6	2.99	4.23	5.18	5.98	6.69		
	AHT 1621 xx		2.7	3.59	5.07	6.21	7.17	8.02		
	AHT 1780 xx		2.9	4.50	6.37	7.80	9.01	10.1		
	AHT 1828 xx		3.1	4.78	6.76	8.28	9.56	10.7		
	AHT 1873 xx		3.1	5.04	7.13	8.73	10.1	11.3		
45°	AHM 1309 xx	1/4"	2.2	1.78	2.52	3.09	3.57	3.99	25.0	19
	AHM 1409 xx		2.2	2.09	2.96	3.62	4.18	4.67		
	AHM 1517 xx		2.6	2.98	4.22	5.17	5.97	6.67		

AH(FULL CONE NOZZLES / FINE MIST)
Spray angle 45°

HOW TO MAKE UP THE
NOZZLE CODE

EX.: AHR 1390 B1

AH R 1309 xx

NOZZLE TYPE

SPRAY ANGLE

• R-65°
• T-80°

CAPACITY

MATERIAL

- B1 - AISI 303 Stainless steel
- T1 - Brass
- B31- AISI 316L Stainless steel (optional)



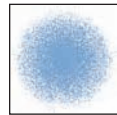
S-TYPE VANE

AL nozzles offer distinctive advantages due to their special construction, with an integrated S-shaped vane cast in one piece with the nozzle body with an investment casting process. The special design S-shaped vane offers the largest free passage available in a full cone nozzle (actually identical to the nozzle orifice diameter) and can easily handle dirty or recirculated liquids as well as suspended particles to avoid clogging.

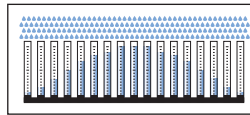
The best reliability is then assured under the most difficult conditions, which makes these nozzles the right choice in those plants with nozzle clogging problems or where removing and cleaning a clogged nozzle is a difficult job.



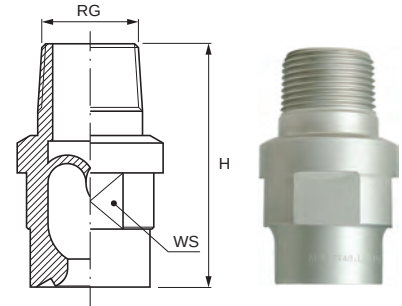
■ Thread specification: BSPT, NPT



Spray section



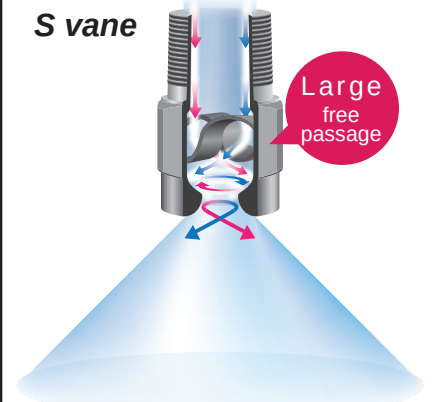
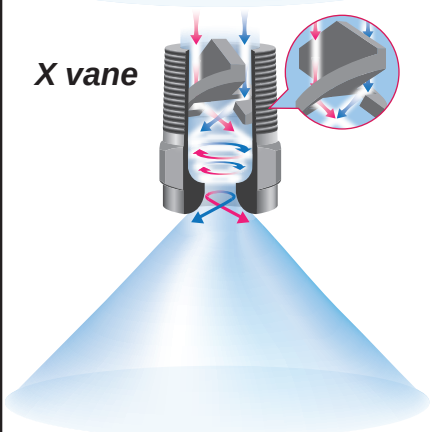
Convex distribution



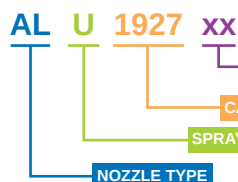
ALQ 60°	ALU 90°	ALW 120°	Code	RF inch	D mm	Capacity at different pressure values								(l/min) (bar)	
						0.2	0.3	0.5	0.7	1.0	2.0	3.0	5.0		
•	•	•	1927 XX	3/8"	3.18	2.60	3.14	3.99	4.68	5.53	7.66	9.27	11.8		
•	•	•	2147 XX		3.97	4.13	4.99	6.35	7.43	8.79	12.2	14.7	18.7		
•	•	•	2213 XX		4.76	5.96	7.21	9.17	10.7	12.7	17.6	21.3	27.1		
•	•	•	2214 XX	1/2"	4.76	5.96	7.21	9.17	10.7	12.7	17.6	21.3	27.1		
•	•	•	2339 XX		5.56	9.48	11.5	14.6	17.1	20.2	28.0	33.9	43.0		
•	•	•	2380 XX		6.35	10.7	12.9	16.4	19.2	22.7	31.4	38.0	48.4		
•	•	•	2468 XX	3/4"	7.14	13.1	15.8	20.1	23.6	27.9	38.6	46.8	59.4		
•	•	•	2566 XX		7.94	15.9	19.2	24.4	28.6	33.8	46.8	56.6	72.0		
•	•	•	2694 XX		8.73	19.4	23.5	29.9	35.0	41.4	57.3	69.4	88.2		
•	•	•	2818 XX		9.53	22.9	27.7	35.2	41.3	48.8	67.6	81.8	104		
•	•	•	2819 XX	1"	9.53	22.9	27.7	35.2	41.3	48.8	67.6	81.8	104		
•	•	•	2980 XX		10.3	27.5	33.2	42.2	49.2	58.5	81.0	98.0	125		
•	•	•	3115 XX		11.1	32.1	38.8	49.4	57.8	68.4	94.7	115	146		
•	•	•	3116 XX	1 1/4"	11.1	32.1	38.8	49.4	57.8	68.4	94.7	115	146		
•	•	•	3148 XX		12.7	41.3	49.9	63.5	74.3	87.9	122	148	187		
•	•	•	3164 XX		13.5	45.8	55.4	70.5	82.5	97.6	135	164	208		
•	•	•	3179 XX		14.3	50.2	60.8	77.3	90.5	107	148	179	228		
•	•	•	3180 XX	1 1/2"	13.97	50.2	60.8	77.3	90.5	107	148	179	228		
•	•	•	3205 XX		15.1	57.3	69.3	88.1	103	122	169	205	260		
•	•	•	3218 XX		15.9	61.0	73.8	93.9	110	130	180	218	277		
•	•	•	3265 XX		16.7	74.2	89.7	114	134	158	219	265	337		
•	•	•	3278 XX		17.5	77.9	94.3	120	140	166	230	278	354		
•	•	•	3339 XX	2"	19.1	94.8	115	146	171	202	280	339	430		
•	•	•	3370 XX		20.6	104	126	160	187	221	306	370	471		
•	•	•	3458 XX		22.2	129	155	197	231	273	378	458	582		
•	•	•	3513 XX		23.8	144	174	221	259	306	424	513	652		
•	•	•	3600 XX		25.4	168	203	259	303	358	496	600	763		
•	•	•	3736 XX		28.6	206	249	317	371	439	608	736	935		
•	•	•	3601 XX	2 1/2"	25.4	168	203	259	303	358	496	600	763		
•	•	•	3737 XX		28.6	206	249	317	371	439	608	736	935		
•	•	•	3883 XX		31.5	247	299	381	446	527	730	883	1120		
•	•	•	4106 XX		34.9	297	359	456	535	632	875	1060	1350		
•	•	•	4123 XX		38.1	363	440	559	655	774	1070	1230	1650		
•	•	•	4124 XX	3"	37.1	363	440	559	655	774	1070	1230	1650		
•	•	•	4153 XX		41.3	428	517	658	770	911	1260	1530	1940		
•	•	•	4174 XX		44.5	488	591	751	880	1040	1440	1740	2220		
•	•	•	4175 XX	4"	44.5	488	591	751	880	1040	1440	1740	2220		
•	•	•	4196 XX		47.6	549	664	845	989	1170	1620	1960	2490		
•	•	•	4230 XX		49.8	643	778	989	1160	1370	1900	2300	2920		
•	•	•	4256 XX		54.0	718	869	1100	1290	1530	2120	2560	3260		
•	•	•	4278 XX		57.2	779	943	1200	1400	1660	2300	2780	3540		

S vane v.s. X vane

S-type vanes provide a large free passage of liquids through the nozzle, with nearly the same diameter of a spray tip. Therefore they offer the widest possible passage and the highest resistance to clogging among all full-cone spray nozzles with internal vane.

S vane**X vane****HOW TO MAKE UP THE NOZZLE CODE**

EX.: ALU 1927 B31



MATERIAL

- B31 - AISI 316L Stainless steel
- Any castable alloy on request

CAPACITY

SPRAY ANGLE

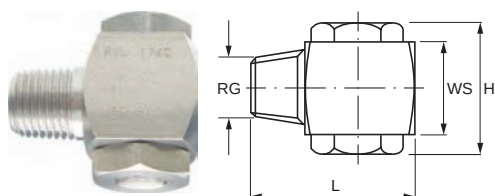
• U - 90°

• W - 120°

NOZZLE TYPE

VANELESS – OFF LINE

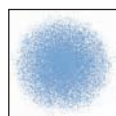
AT series nozzles are full cone nozzles producing a high and strong rotation of the liquid. There's no vane inside the whirl chamber which has free internal passages and for this reason these nozzles are less prone to clogging. Moreover, a specially designed tip placed at the bottom of these nozzles increases their atomizing effect. The design of AT nozzles allows a uniform spray distribution and increases their operating life by 20%.



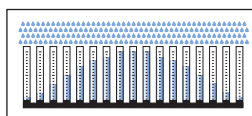
Thread specification

BSPT

NPT (optional)



Spray section



Convex distribution



	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							H mm	L mm	WS mm
					1.0	2.0	3.0	4.0	5.0	6.0	7.0			
60°	ATQ 1230 xx	1/8"	2.0	1.8	1.33	1.88	2.30	2.66	2.97	3.25	3.51	22	24	15
	ATQ 1390 xx	1/4"	2.4	2.2	2.25	3.18	3.90	4.50	5.03	5.52	5.96	25	34	20
	ATQ 1490 xx		2.9	2.8	2.83	4.00	4.90	5.66	6.33	6.93	7.48			
	ATQ 1740 xx		3.3	3.2	4.27	6.04	7.40	8.54	9.55	10.5	11.3			
	ATQ 2110 xx	3/8"	5.1	4.6	6.35	8.98	11.0	12.7	14.2	15.6	16.8	27	34	20
90°	ATU 1230 xx	1/8"	2.1	1.8	1.33	1.88	2.30	2.66	2.97	3.25	3.51	22	24	15
	ATU 1390 xx	1/4"	2.5	2.1	2.25	3.18	3.90	4.50	5.03	5.52	5.96	25	34	20
	ATU 1490 xx		3.0	2.1	2.83	4.00	4.90	5.66	6.33	6.93	7.48			
	ATU 1620 xx		3.2	3.0	3.58	5.06	6.20	7.16	8.00	8.77	9.47			
	ATU 1621 xx	3/8"	3.5	3.2	3.58	5.06	6.20	7.16	8.00	8.77	9.47	27	34	20
	ATU 1780 xx		5.0	3.4	4.50	6.37	7.80	9.01	10.1	11.0	11.9			
	ATU 2110 xx		5.1	4.3	6.35	8.98	11.0	12.7	14.2	15.6	16.8			
	ATU 2153 xx		5.3	5.2	8.83	12.5	15.3	17.7	19.8	21.6	23.4			
	ATU 2245 xx	1/2"	8.7	5.5	14.1	20.0	24.5	28.3	31.6	34.6	37.4	38	48	30
	ATU 2315 xx		8.7	6.5	18.2	25.7	31.5	36.4	40.7	44.5	48.1			
	ATU 2385 xx		8.8	7.2	22.2	31.4	38.5	44.5	49.7	54.4	58.8			
	ATU 2530 xx	3/4"	12.6	8.7	30.6	43.3	53.0	61.2	68.4	75.0	81.0	50	58	40
	ATU 2770 xx		12.6	11.2	44.5	62.9	77.0	88.9	99.4	109	118			
	ATU 2420 xx	1"	9.2	9.8	24.2	34.3	42.0	48.5	54.2	59.4	64.2	48	61	42
	ATU 2645 xx		10.3	10.3	37.2	52.7	64.5	74.5	83.3	91.2	98.5			
	ATU 2870 xx		16.0	11.5	50.2	71.0	87.0	100	112	123	133			
120°	ATW 1310 xx	1/8"	2.5	2.1	1.79	2.53	3.10	3.58	4.00	4.38	4.74	22	24	15
	ATW 1311 xx	1/4"	2.5	2.1	1.79	2.53	3.10	3.58	4.00	4.38	4.74	25	34	20
	ATW 1490 xx		4.1	2.4	2.83	4.00	4.90	5.66	6.33	6.93	7.48			
	ATW 1491 xx	3/8"	4.2	2.7	2.83	4.00	4.90	5.66	6.33	6.93	7.48	27	34	20
	ATW 1621 xx		4.5	3.2	3.58	5.06	6.20	7.16	8.00	8.77	9.47			
	ATW 1780 xx		5.0	3.4	4.50	6.37	7.80	9.01	10.1	11.0	11.9			
	ATW 2110 xx		5.4	4.4	6.35	8.98	11.0	12.7	14.2	15.6	16.8			
	ATW 2245 xx	1/2"	8.5	5.5	14.1	20.0	24.5	28.3	31.6	34.6	37.4	38	48	30
	ATW 2315 xx		8.5	6.3	18.2	25.7	31.5	36.4	40.7	44.5	48.1			
	ATW 2231 xx	3/4"	8.4	5.2	13.3	18.8	23.0	26.6	29.7	32.5	35.1	56	59	40
	ATW 2385 xx		8.8	7.3	22.2	31.4	38.5	44.5	49.7	54.5	58.8			
	ATW 2480 xx		12.6	7.8	27.7	39.2	48.0	55.4	62.0	67.9	73.3			
	ATW 2770 xx		14.0	10.7	44.5	62.9	77.0	88.9	99.4	109	118			
	ATW 2420 xx	1"	9.5	8.0	24.2	34.3	42.0	48.5	54.2	59.4	64.2	48	61	42
	ATW 2645 xx		12.8	9.2	37.2	52.7	64.5	74.5	83.3	91.2	98.5	58	61	40
	ATW 2870 xx		16.0	11.5	50.2	71.0	87.0	100	112	123	133	61	68	45
	ATW 3122 xx		18.0	14.0	70.4	99.6	122	141	158	173	186	66	76	50

Typical applications

Washing

Exhaust scrubber
Parts cleaning
Pre-treatment for coating process.

Cooling

Gas cooling
Tank cooling

Dust control

Remove dust flying in mining and coal plants.

Other applications

Spray of chemicals
Fire engineering

HOW TO MAKE UP THE NOZZLE CODE

EX.: ATQ 1230 B1

AT Q 1230 xx

MATERIAL

- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass

CAPACITY

SPRAY ANGLE

- Q - 60°
- U - 90°
- W - 120°

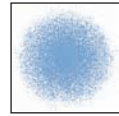
NOZZLE TYPE

X-VANE / ROUND SPRAY / THREE PIECES DESIGN / EASY CLEAN

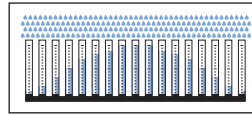
BA/BC series full cone nozzles have a three-piece design made of body, X-vane and nipple. Their X-vane design combines resistance to clogging with the convenience of an easy and fast inside cleaning as they can be easily disassembled for maintenance. When these nozzles are mounted to spray upwards, the design of the nipple avoids losing the vane. BA/BC nozzles are available with a female (BA) or male (BC) inlet thread nipple. See dimensions and weight at the bottom of the page.



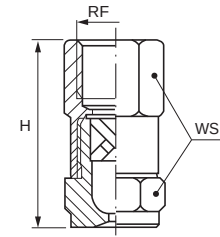
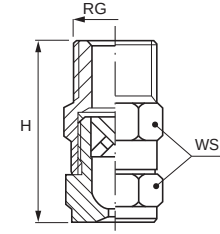
- **Thread specification**
Male (BSPT, NPT)
Female (BSP, NPT)



Spray section



Convex distribution

**BA****BC**

BAQ Female	BCQ Male	Code	RF RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Spray angle at pressure (°) (bar)		
						0.7	1.0	2.0	3.0	5.0	7.0	10	0.5	1.5	6.0
•	•	0740	1/8"	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35	--	58°	53°
•	•	1110		1.2	0.5	0.53	0.64	0.90	1.10	1.42	1.68	2.01	52°	65°	59°
•	•	1150		1.4	1.0	0.73	0.87	1.23	1.50	1.94	2.29	2.74	43°	50°	46°
•	•	1220		1.6	1.0	1.06	1.27	1.80	2.20	2.84	3.36	4.02	52°	65°	59°
•	•	1260		1.6	1.3	1.26	1.50	2.12	2.60	3.36	3.97	4.75	43°	50°	46°
•	•	1370		2.0	1.3	1.79	2.14	3.02	3.70	4.78	5.65	6.76	52°	65°	59°
•	•	1480	1/4"	2.4	1.7	2.32	2.77	3.92	4.80	6.20	7.33	8.76	45°	50°	46°
•	•	1740		2.9	1.7	3.58	4.27	6.04	7.40	9.55	11.3	13.5	58°	67°	61°
•	•	1930		3.2	1.7	4.49	5.37	7.59	9.30	12.0	14.2	17.0	69°	74°	68°
•	•	1700	3/8"	3.0	2.0	3.38	4.04	5.72	7.00	9.04	10.7	12.8	45°	50°	46°
•	•	2111		3.4	2.4	5.36	6.41	9.06	11.1	14.3	17.0	20.3	64°	67°	61°
•	•	2163		4.5	2.4	7.87	9.41	13.3	16.3	21.0	24.9	29.8	87°	90°	82°
•	•	2118	1/2"	3.4	3.0	5.70	6.81	9.63	11.8	15.2	18.0	21.5	48°	50°	46°
•	•	2185		4.4	3.0	8.94	10.7	15.1	18.5	23.9	28.3	33.8	64°	67°	61°
•	•	2240		5.0	3.0	11.6	13.9	19.6	24.0	31.0	36.7	43.8	72°	75°	68°
•	•	2300		5.6	3.0	14.5	17.3	24.5	30.0	38.7	45.8	54.8	88°	91°	83°

Standard spray

BAW	BCW	Code	RF/RG	D	D1	0.7	1.0	2.0	3.0	5.0	7.0	10	0.3	0.7	6.0
•	•	1200	1/8"	1.5	1.0	0.97	1.15	1.63	2.00	2.58	3.06	3.65	--	120°	102°
•	•	1310		1.8	1.0	1.50	1.79	2.53	3.10	4.00	4.74	5.66	--	120°	102°
•	•	1400		2.3	1.0	1.93	2.31	3.27	4.00	5.16	6.11	7.30	--	120°	102°
•	•	1570		2.5	1.1	2.75	3.29	4.65	5.70	7.36	8.71	10.4	--	120°	103°
•	•	1720	1/4"	3.3	1.7	3.48	4.16	5.88	7.20	9.30	11.0	13.2	112°	120°	103°
•	•	1860		3.4	1.3	4.15	4.97	7.02	8.60	11.1	13.1	15.7	114°	120°	103°
•	•	2100		3.6	1.6	4.83	5.77	8.16	10.0	12.9	15.3	18.3	114°	120°	103°
•	•	2122	3/8"	3.9	1.6	5.89	7.04	9.96	12.2	15.8	18.6	22.3	114°	120°	103°
•	•	2144		4.3	2.4	6.96	8.31	11.8	14.4	18.6	22.0	26.3	114°	120°	104°
•	•	2172		4.9	2.4	8.31	9.93	14.0	17.2	22.2	26.3	31.4	114°	120°	104°
•	•	2194		5.3	2.5	9.37	11.2	15.8	19.4	25.1	29.6	35.4	114°	120°	106°
•	•	2220	1/2"	5.0	3.0	10.6	12.7	18.0	22.0	28.4	33.6	40.2	114°	120°	108°
•	•	2250		5.3	3.0	12.1	14.4	20.4	25.0	32.3	38.2	45.6	114°	120°	108°
•	•	2290		5.6	3.0	14.0	16.7	23.7	29.0	37.4	44.3	53.0	114°	120°	108°
•	•	2320		6.7	3.5	15.5	18.5	26.1	32.0	41.3	48.9	58.4	114°	120°	110°
•	•	2360		7.6	4.0	17.4	20.8	29.4	36.0	46.5	55.0	65.7	114°	120°	112°

Wide spray**Typical applications**

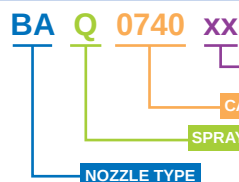
- Washing**
Exhaust scrubbers
Parts cleaning
Pre-treatment for coating process
- Cooling**
Exhaust cooling
Tank cooling
- Dust control**
Remove dust flying in a mining and coal plants.
- Other applications**
Spray of chemicals
Fire engineering

Nozzle type	RF inch	H mm	WS mm	W kg
BA Female	1/8"	30	14	0.03
	1/4"	37	17	0.04
	3/8"	46	19	0.07
	1/2"	57	25	0.20

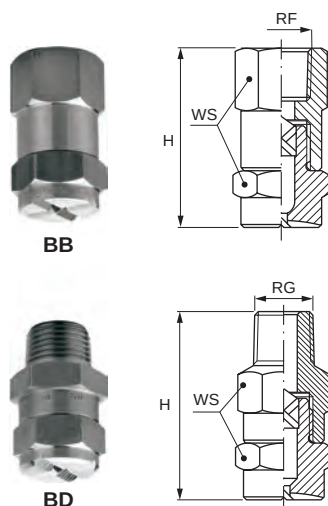
Nozzle type	RG inch	H mm	WS mm	W kg
BC Male	1/8"	32	14	0.02
	1/4"	39	17	0.04
	3/8"	47	19	0.07
	1/2"	57	25	0.20

Dimensions & weights**HOW TO MAKE UP THE NOZZLE CODE**

EX.: BAQ 0740 B1



- **B1** - AISI 303 Stainless steel
- **B31** - AISI 316L Stainless steel
- **T1** - Brass
- **E1** - PTFE
- **L61** - Hastelloy C22



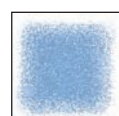
X VANE / SQUARE SPRAY PATTERN / THREE-PIECE DESIGN / EASY CLEAN

BB/BD series full cone nozzles offer a three-piece design made of body, X-vane and connection. BB/BD series nozzles supply a square section spray pattern and are suitable for working environments that strictly require a uniform coverage. The most important feature of BB/BD series nozzle is their X-vane which can be easily disassembled. It is mounted between its body and connection, allowing the narrowest passage to avoid clogging. The best choice to solve clogging problems.

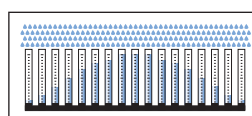
Thread specification

Male (BSPT, NPT)

Female (BSP, NPT)



Spray section



Convex distribution



SQUARE SPRAY

BBQ Female	BDQ Male	Code	RF RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Spray angle at pressure (°) (bar)		
						0.7	1.0	2.0	3.0	5.0	7.0	10	0.5	1.5	6.0
•	•	1270	1/8"	1.8	1.0	1.30	1.56	2.21	2.70	3.49	4.12	4.93	40°	52°	47°
•	•	1360		1.9	1.3	1.74	2.08	2.94	3.60	4.65	5.50	6.57	48°	63°	57°
•	•	1440		2.1	1.3	2.13	2.54	3.59	4.40	5.68	6.72	8.03	60°	66°	60°
•	•	1740	1/4"	2.8	1.6	3.58	4.27	6.04	7.40	9.55	11.3	13.5	62°	67°	61°
•	•	1890		3.2	1.6	4.30	5.14	7.27	8.90	11.5	13.6	16.3	70°	75°	68°
•	•	2110		3.8	1.6	5.31	6.35	8.98	11.0	14.2	16.8	20.1	78°	82°	75°
•	•	2133	3/8"	3.8	2.4	6.42	7.68	10.9	13.3	17.2	20.3	24.3	71°	75°	68°
•	•	2210	1/2"	5.6	3.0	10.1	12.1	17.2	21.0	27.1	32.1	38.3	71°	75°	68°
•	•	2270		6.4	3.2	13.0	15.6	22.1	27.0	34.9	41.2	49.3	78°	82°	75°

BB/BD series nozzles produce a square spray pattern. The flat spray orientation is set with a 10°-15° offset angle from the main manifold axis to avoid jet overlapping. Therefore the correct alignment of these nozzles is very important and must be done properly. Please refer to the table below.

DIMENSIONS AND WEIGHTS

Nozzle type	RF inch	H mm	WS mm	W kg
BB Female	1/8"	30	14	0.03
	1/4"	37	17	0.04
	3/8"	46	19	0.07
	1/2"	57	25	0.20

Nozzle type	RG inch	H mm	WS mm	W kg
BD Male	1/8"	32	14	0.02
	1/4"	39	17	0.04
	3/8"	47	19	0.07
	1/2"	57	25	0.20

Typical applications

Washing: exhaust scrubbers, parts cleaning, pre-treatment for coating processes

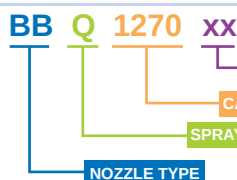
Cooling: exhaust gas cooling, tank cooling

Coating: oil coating, spray of chemicals

Other applications: dust control, leak test

HOW TO MAKE UP THE
NOZZLE CODE

EX.: BBQ 1270 B1



- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass (optional)

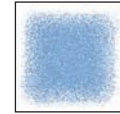
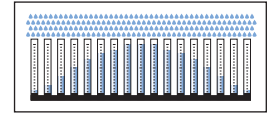
X-VANE / SQUARE SPRAY PATTERN / TWO-PIECE DESIGN

BF/BH type nozzles have a simple two-piece design producing a square section spray pattern. They are the convenient choice where the coverage of a surface is required to be as even as possible. Their X-vane ensures uniform spray distribution and resistance to clogging, also when working with large capacities. The sides of the square spray section are not aligned with the grooves of the nozzle orifice and the offset angle is between 10° and 15° depending on working pressure and distance from the impact surface. Therefore, utmost attention must be paid during the nozzles overlay setting. They must be carefully aligned and adjusted according to the operating situation.

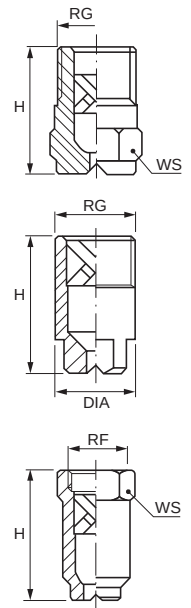
**Thread specification**

Male (BSPT, NPT)

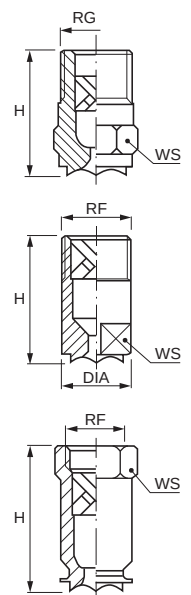
Female (BSP, NPT)

**BH****BF****Spray section****Convex distribution**

BFS Female	BHQ Male	Code	RF RG inch	D mm	D1 mm	Capacity at different pressure values							Spray angle at pressure			
						(l/min) (bar)							(°) (bar)			
						0.7	1.0	2.0	3.0	5.0	7.0	10	0.5	1.5	3.0	6.0
	•	1270	1/8"	1.7	1.3	1.30	1.56	2.21	2.70	3.49	4.12	4.93	40°	52°	60°	47°
	•	1350		1.9	1.3	1.69	2.02	2.86	3.50	4.52	5.35	6.39	48°	63°	60°	57°
	•	1440		2.2	1.3	2.13	2.54	3.59	4.40	5.68	6.72	8.03	60°	66°	65°	60°
	•	1740	1/4"	2.8	1.6	3.58	4.27	6.04	7.40	9.55	11.3	13.5	62°	67°	65°	61°
	•	1890		3.2	1.6	4.30	5.14	7.27	8.90	11.5	13.6	16.3	70°	75°	65°	68°
	•	2107		3.8	1.6	5.17	6.18	8.74	10.7	13.8	16.3	19.5	78°	82°	65°	75°
	•	2133	3/8"	4.0	2.4	6.42	7.68	10.9	13.3	17.2	20.3	24.3	71°	75°	62°	68°
	•	2210	1/2"	5.5	3.2	10.1	12.1	17.1	21.0	27.1	32.1	38.3	71°	75°	64°	68°
	•	2270		6.4	3.2	13.0	15.6	22.1	27.0	34.9	41.2	49.3	78°	82°	65°	75°
	•	2370	3/4"	6.7	4.4	17.9	21.4	30.2	37.0	47.8	56.5	67.6	71°	75°	64°	68°
•		2780	1"	1.9	1.3	37.7	45.0	63.7	78.0	101	119	142	78°	80°	78°	73°
•		3131	1 1/4"	2.4	1.3	63.3	75.6	107	131	169	200	239	78°	80°	78°	73°
•		3170	1 1/2"	2.8	1.6	82.1	98.1	139	170	219	260	310	73°	77°	78°	70°
•		3215	2"	3.2	1.6	104	124	176	215	278	328	393	66°	70°	72°	64°
•		3265		3.8	1.6	128	153	216	265	342	405	484	70°	74°	75°	67°
•		3355		1.6	1.3	171	205	290	355	458	542	648	79°	82°	75°	74°
•		3360	2 1/2"	1.9	1.3	174	208	294	360	465	550	657	62°	67°	70°	61°
•		3435		2.4	1.3	210	251	355	435	562	664	794	75°	78°	80°	71°
•		3700		2.8	1.6	338	404	572	700	904	1069	1278	81°	84°	76°	76°
•		4220	5"	1.9	1.3	1063	1270	1796	2200	2840	3361	4017	89°	91°	75°	83°
•		4420	6"	2.4	1.3	2029	2425	3429	4200	5422	6416	7668	102°	105°	78°	95°

Standard spray angle

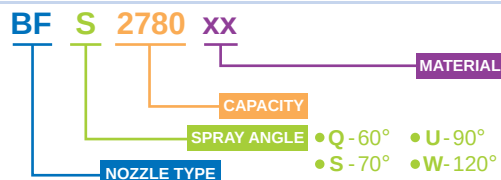
BFW Female	BHW Male	Code	RF RG inch	D mm	D1 mm	Capacity (l/min) at different pressure values (bar)							Spray angle(°) at pressure(bar)		
						0.7	1.0	2.0	3.0	5.0	7.0	10	0.3	0.7	6.0
	•	2100	1/4"	3.2	1.6	4.83	5.77	8.16	10.0	12.9	15.3	18.3	99°	101°	93°
	•	2122	3/8"	3.9	1.6	5.89	7.04	9.96	12.2	15.8	18.6	22.3	99°	101°	93°
	•	2144		4.0	2.4	6.96	8.31	11.8	14.4	18.6	22.0	26.3	104°	110°	94°
	•	2172		4.6	2.4	8.31	9.93	14.0	17.2	22.2	26.3	31.4	104°	110°	94°
	•	2194		5.4	2.4	9.37	11.2	15.8	19.4	25.0	29.6	35.4	104°	110°	98°
	•	2220	1/2"	4.8	3.0	10.6	12.7	18.0	22.0	28.4	33.6	40.2	104°	110°	102°
	•	2250		5.1	3.0	12.1	14.4	20.4	25.0	32.3	38.2	45.6	104°	110°	102°
	•	2290		5.7	3.0	14.0	16.7	23.7	29.0	37.4	44.3	52.9	104°	110°	102°
	•	2320		7.0	3.0	15.5	18.5	26.1	32.0	41.3	48.9	58.4	104°	110°	102°
	•	2360		8.0	3.0	17.4	20.8	29.4	36.0	46.5	55.0	65.7	104°	110°	102°
•	•	2500	3/4"	8.5	4.5	24.2	28.9	40.8	50.0	64.6	76.4	91.3	105°	110°	102°
•	•	2930	1"	11.6	5.6	44.9	53.7	75.9	93.0	120	142	170	107°	110°	107°
•		3134	1 1/4"	14.5	6.0	64.7	77.4	109	134	173	205	245	108°	111°	109°
•		3200	1 1/2"	18.2	9.0	96.6	115	163	200	258	306	365	109°	114°	109°
•		3395	2"	24.0	11.1	191	228	323	395	510	603	721	110°	114°	109°
•		3590	2 1/2"	26.0	14.3	285	341	482	590	762	901	1077	110°	115°	109°
•		3800	3"	31.5	17.5	386	462	653	800	1033	1222	1461	110°	115°	109°

Wide spray angle

Size inch	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	5"	6"
H mm	22	23	30	39	55	70	88	102	138	175	187	311	366
WS mm	12	14	17	21	27	32	40	50	60	85	100	170	200
DIA mm					32	38							
W kg	0.01	0.02	0.03	0.04	0.20	0.35	0.55	0.80	1.6	2.0	7.8	18	25
Manufacture	Machine						Casting						

Dimensions and weights**HOW TO MAKE UP THE NOZZLE CODE**

EX.: BFS 2780 B1



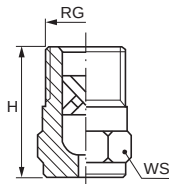
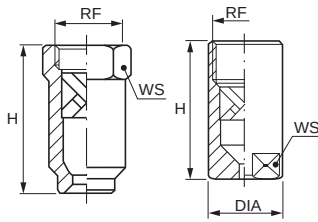
- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass
- D1 - PVC
- E1 - PTFE



BE

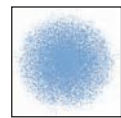


BG

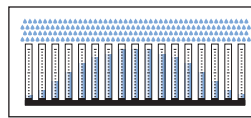


X-VANE / ROUND SPRAY / TWO-PIECE DESIGN

BE/BG series nozzles have a two-piece design producing a full cone round spray pattern with angles ranging between 70° and 120° and capacities from 4.8 and 1.040 l/min. Their X-vane ensures uniform spray distribution and resistance to clogging, also when working with large capacities. For this important feature these nozzles are a widely popular choice. The table on this page shows BE/BG threaded nozzles up to size 3". Nozzles with larger capacities with either threaded or flanged connections are shown on the next page.



Spray section



Convex distribution



STANDARD SPRAY ANGLES

Nozzle type		Code	RF RG	D mm	D1 mm	Capacity at different pressure values							Spray angle at pressure		
BES Female	BGQ Male					0.5	1.0	2.0	3.0	5.0	7.0	10	0.5	1.5	6.0
	•	1480 XX	1/4"	2.3	1.6	1.96	2.77	3.92	4.80	6.20	7.33	8.76	45°	50°	46°
	•	1740 XX		2.9	1.6	3.02	4.27	6.04	7.40	9.55	11.3	13.5	58°	67°	61°
	•	1700 XX	3/8"	2.6	2.4	2.86	4.04	5.72	7.00	9.04	10.7	12.8	45°	50°	46°
	•	2111 XX		3.6	2.4	4.53	6.41	9.06	11.1	14.3	17.0	20.3	64°	67°	61°
	•	2163 XX		4.5	2.8	6.65	9.41	13.3	16.3	21.0	24.9	29.8	87°	90°	82°
	•	2185 XX	1/2"	4.6	3.2	7.55	10.7	15.1	18.5	23.9	28.3	33.8	64°	67°	61°
	•	2300 XX		6.3	3.6	12.3	17.3	24.5	30.0	38.7	45.8	54.8	88°	91°	83°
•	•	2220 XX	3/4"	4.9	4.4	8.98	12.7	18.0	22.0	28.4	33.6	40.2	48°	50°	46°
•	•	2350 XX		6.4	4.4	14.3	20.2	28.6	35.0	45.2	53.5	63.9	67°	70°	63°
•	•	2610 XX		9.5	5.2	24.9	35.2	49.8	61.0	78.8	93.2	111	89°	92°	84°
•	•	2370 XX	1"	6.0	5.6	15.1	21.4	30.2	37.0	47.8	56.5	67.6	48°	50°	46°
•	•	2611 XX		8.3	5.6	24.9	35.2	49.8	61.0	78.8	93.2	111	67°	68°	62°
•	•	2870 XX		11.9	5.6	35.5	50.2	71.0	87.0	112	133	159	78°	90°	94°
•	•	3104 XX		11.9	6.4	42.5	60.0	84.9	104	134	159	190	89°	92°	84°
•		2520 XX	1 1/4"	7.4	6.4	21.2	30.0	42.5	52.0	67.1	79.4	95	48°	50°	44°
•		2871 XX		9.6	6.4	35.5	50.2	71.0	87.0	112	133	159	64°	67°	58°
•		3105 XX		10.7	6.4	42.9	60.6	85.7	105	136	160	192	66°	70°	60°
•		3122 XX		12.3	6.4	49.8	70.4	99.6	122	158	186	222	77°	80°	70°
•		3174 XX		15.1	7.9	71.0	100	142	174	225	266	318	90°	93°	81°
•		2872 XX	1 1/2"	9.5	8.7	35.5	50.2	71.0	87.0	112	133	159	48°	50°	44°
•		3139 XX		12.7	8.7	56.8	80.3	113	139	180	212	254	72°	74°	64°
•		3175 XX		14.3	8.7	71.4	101	143	175	226	267	320	74°	76°	66°
•		3260 XX		18.3	10.3	106	150	212	260	336	397	475	91°	94°	82°
•		3148 XX	2"	12.7	11.1	60.4	85.5	121	148	191	226	270	49°	50°	44°
•		3261 XX		17.3	11.1	106	150	212	260	336	397	475	72°	74°	64°
•		3305 XX		19.2	11.1	125	176	249	305	394	466	557	75°	77°	68°
•		3350 XX		21.0	11.1	143	202	286	350	452	535	639	78°	80°	70°
•		3435 XX		23.8	14.3	178	251	355	435	562	665	794	83°	85°	75°
•		3520 XX		28.6	14.3	212	300	425	520	671	794	949	98°	100°	86°
•		3215 XX	2 1/2"	15.1	14.3	87.8	124	176	215	278	328	393	49°	50°	44°
•		3436 XX		22.2	14.3	178	251	355	435	562	665	794	72°	74°	64°
•		3521 XX		24.6	14.3	212	300	425	520	671	794	949	76°	78°	68°
•		3610 XX		28.6	14.3	249	352	498	610	788	932	1114	79°	82°	72°
•		3700 XX		28.6	17.5	286	404	572	700	904	1069	1278	86°	88°	77°
•		3780 XX		31.8	17.5	318	450	637	780	1007	1192	1424	95°	97°	84°
•		3365 XX	3"	19.1	17.5	149	211	298	365	471	558	666	49°	50°	44°
•		3701 XX		27.8	17.5	286	404	572	700	904	1069	1278	81°	84°	73°
•		3781 XX		30.2	17.5	318	450	637	780	1007	1192	1424	86°	89°	77°
•		3870 XX		32.5	17.5	355	502	710	870	1123	1329	1588	92°	95°	83°
•		4104 XX		34.9	20.6	425	600	849	1040	1343	1589	1899	102°	105°	89°

DIMENSIONS

BG Male	Size	inch	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
	H	mm	22.0	25.0	33.0	40.0	51.5					
BE Female	WS	mm	14.0	17.0	22.0	22.0	27.0					
	H	mm				55.5	68.0	90.0	105	140	180	192
	DIA	mm				32.0	38.0					
	WS	mm				27.0	32.0	48.0	52.0	67.0	85.0	100



WIDE SPRAY ANGLES

Nozzle type		Code	RF RG	D mm	D1 mm	Capacity at different pressure values							Spray angle at pressure		
BEW Female	BGW Male					(l/min) (bar)							(°) (bar)		
			inch	mm	mm	0.5	1.0	2.0	3.0	5.0	7.0	10	0.3	0.7	6.0
	•	2100 xx	1/4"	3.3	1.6	4.08	5.77	8.16	10.0	12.9	15.3	18.3	114°	120°	103°
	•	2122 xx	3/8"	3.6	2.4	4.98	7.04	9.96	12.2	15.8	18.6	22.3	114°	120°	103°
	•	2144 xx		4.0	2.4	5.88	8.31	11.8	14.4	18.6	22.0	26.3	114°	120°	104°
	•	2172 xx		5.1	2.4	7.02	9.93	14.0	17.2	22.2	26.3	31.4	114°	120°	104°
	•	2194 xx		5.2	2.8	7.92	11.2	15.8	19.4	25.0	29.6	35.4	114°	120°	106°
	•	2220 xx	1/2"	5.0	3.0	8.98	12.7	18.0	22.0	28.4	33.6	40.2	114°	120°	108°
	•	2250 xx		5.4	3.0	10.2	14.4	20.4	25.0	32.3	38.2	45.6	114°	120°	108°
	•	2290 xx		6.4	3.0	11.8	16.7	23.7	29.0	37.4	44.3	53.0	114°	120°	108°
	•	2320 xx		6.9	3.0	13.1	18.5	26.1	32.0	41.3	48.9	58.4	114°	120°	110°
	•	2360 xx		7.6	3.0	14.7	20.8	29.4	36.0	46.5	55.0	65.7	114°	120°	112°
•	•	2500 xx	3/4"	8.7	4.5	20.4	28.9	40.8	50.0	64.6	76.4	91.3	115°	120°	112°
•	•	2920 xx	1"	11.5	5.6	37.6	53.1	75.1	92.0	119	141	168	117°	120°	117°
•	•	3134 xx	1 1/4"	14.0	6.0	54.7	77.4	109	134	173	205	245	118°	121°	119°
•	•	3200 xx	1 1/2"	16.5	9.0	81.7	116	163	200	258	306	365	119°	124°	119°
•	•	3395 xx	2"	24.0	11.1	161	228	323	395	510	603	721	120°	124°	119°
•	•	3590 xx	2 1/2"	26.0	14.3	241	341	482	590	762	901	1077	120°	125°	119°
•	•	3800 xx	3"	32.0	17.5	327	462	653	800	1033	1222	1461	120°	125°	119°

(FULL CONE NOZZLES) **BE / BL**

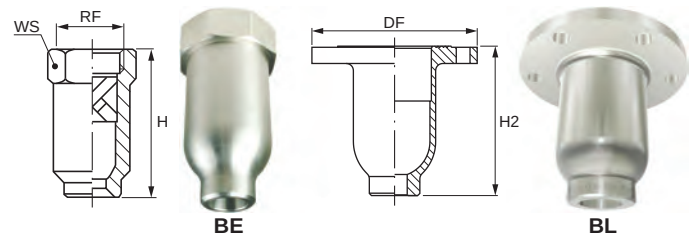
X-VANE / LARGE CAPACITIES

BE/BL series large capacity nozzles feature a full cone spray pattern with uniform distribution over a round impact area, ranging between 90° and 120° and for applications where a very large capacity is required. The bodies are machined from a casting, and can be finished either with a female thread connection (BE type) or with an integral ANSI flange (BL type).

Thread specification: BSP, NPT

Flange specification: DIN Standard, JIS Standard (optional)

Typical applications: desulfuration, coke quenching

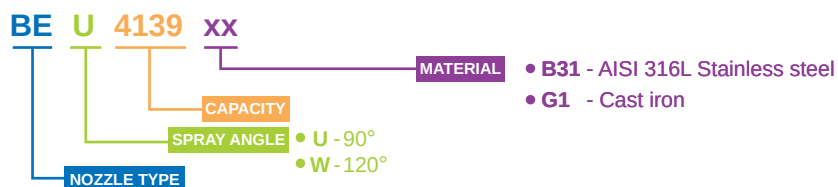


LARGE CAPACITY

	Nozzle type		Code	RF RG	D	D1	Capacity at different pressure values							(l/min) (bar)		Spray angle at pressure (°) (bar)			Dimension mm		
	BEU	BLU					0.7	1.0	2.0	3.0	5.0	7.0	10	0.5	1.5	6.0	H	H2	WS		
	Casting	Flange																			
90°	•	•	4139 xx	4"	43	19	671	803	1135	1390	1794	2123	2538	87°	90°	70°	251	207	130		
	•	•	4157 xx		47	22	758	906	1282	1570	2027	2398	2866	92°	95°	83°					
	•	•	4174 xx		51	25	840	1005	1421	1740	2246	2658	3177	97°	100°	87°					
	•	•	4183 xx		54	25	884	1057	1494	1830	2363	2795	3341	102°	105°	91°					
	•	•	4218 xx	5"	48	29	1053	1259	1780	2180	2814	3330	3980	89°	91°	80°	311	269	170		
	•	•	4244 xx		53	29	1179	1409	1992	2440	3150	3727	4455	93°	96°	84°					
	•	•	4279 xx		68	35	1348	1611	2278	2790	3602	4262	5094	97°	100°	87°					
	•	•	4287 xx		73	35	1386	1657	2343	2870	3705	4384	5240	102°	105°	91°					
	•	•	4305 xx	6"	61	41	1473	1761	2490	3050	3938	4659	5569	87°	90°	78°	366	321	200		
	•	•	4348 xx		70	41	1681	2009	2841	3480	4493	5316	6354	92°	95°	83°					
	•	•	4392 xx		77	44	1894	2263	3201	3920	5061	5988	7157	97°	100°	87°					
	•	•	4418 xx		82	44	2019	2413	3413	4180	5396	6385	7632	102°	105°	91°					
	•	•	4435 xx	8"	70	48	2101	2511	3552	4350	5616	6645	7942	78°	80°	70°	470	423	240		
	•	•	4520 xx		80	47	2512	3002	4246	5200	6713	7943	9494	86°	88°	77°					
	•	•	4610 xx		91	47	2947	3522	4981	6100	7875	9318	11137	92°	95°	83°					
	•	•	4694 xx		102	57	3352	4007	5666	6940	8960	10601	12671	102°	105°	91°					
	•	•	4785 xx		124	57	3792	4532	6409	7850	10134	11991	14332	106°	110°	96°					
		•	4695 xx	10"	102	57	3357	4013	5675	6950	8972	10616	12689	78°	80°	70°		527			
	•	4870 xx		102	64	4202	5023	7104	8700	11232	13289	15884	86°	89°	77°						
	•	5104 xx		122	67	5024	6004	8492	10400	13426	15886	18988	97°	100°	87°						
	•	5113 xx		135	67	5458	6524	9226	11300	14588	17261	20631	103°	106°	92°						
	BEW		Code	RF RG	D	D1	Capacity (l/min) at different pressure values (bar)							Dimension mm							
	0.7	1.0					2.0	3.0	5.0	7.0	10	H	WS								
	120°	•		4158 xx	4"	47	22	758	906	1282	1570	2027	2398	2538	251	130					

HOW TO MAKE UP THE
NOZZLE CODE

EX.: BEU 4139 B31





X-VANE / NARROW SPRAY ANGLE

BR/BU nozzles produce a solid cone spray with round spray pattern, where coarse water drops are concentrated within a narrow spray angle to maximize their impact force per square surface unit. Spray angle values of 15° or 30° are available, with a choice of male or female thread connections. BR/BS nozzles are made of three pieces designed to allow their easy disassembly and cleaning in case of clogging.

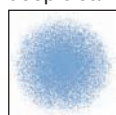
Thread specification

Male (BSPT, NPT)

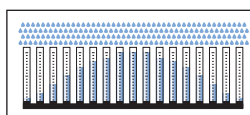
Female (BSP, NPT)

Typical applications

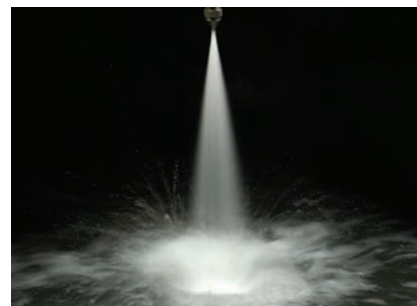
bottles washing, parts cleaning,
deep cleaning



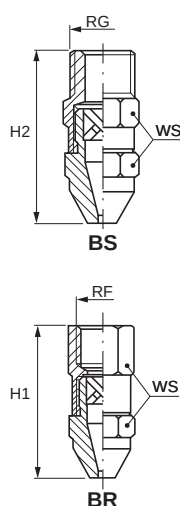
Spray section



Convex distribution

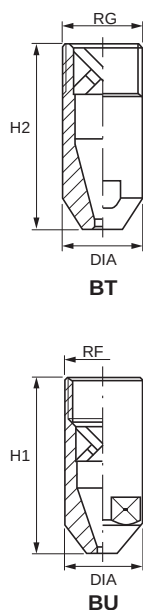


SPRAY ANGLE 15°



BRB Female	BSB Male	BUB Female	Code	RF RG inch	D mm	Capacity at different pressure values (l/min) (bar)					Dimension mm			
						1.0	2.0	3.0	5.0	10	DIA	H1	H2	WS
•	•		1270 xx	1/8"	1.6	1.56	2.20	2.70	3.49	4.93		33	35	12
•	•		1550 xx		2.3	3.18	4.49	5.50	7.10	10.0				
•	•		2117 xx	1/4"	3.2	6.75	9.55	11.7	15.1	21.4		44	44	17
•	•		2196 xx	3/8"	4.2	11.3	16.0	19.6	25.3	35.8		53	53	22
•	•		2352 xx	1/2"	5.6	20.3	28.7	35.2	45.4	64.3		72	72	24
		•	2587 xx	3/4"	7.8	33.9	47.9	58.7	75.8	107	32	72		25
		•	3110 xx	1"	10.2	63.5	89.8	110	142	201	40	92		35
		•	3168 xx	1 1/4"	12.6	97.0	137	168	217	307	48	117		40
		•	3245 xx	1 1/2"	15.1	141	200	245	316	447	60	127		52
		•	3450 xx	2"	22.0	260	367	450	581	822	80	183		70
		•	3680 xx	2 1/2"	26.0	393	555	680	878	1242	90	223		85
		•	3980 xx	3"	31.0	566	800	980	1265	1789	105	268		100

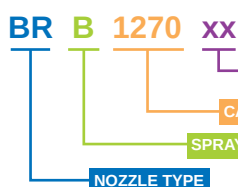
SPRAY ANGLE 30°



BRF Female	BSF Male	BTF Male	Code	RF RG inch	D mm	Capacity at different pressure values (l/min) (bar)					Dimension mm			
						1.0	2.0	3.0	5.0	10	DIA	H1	H2	WS
•	•		0980 xx	1/8"	1.0	0.57	0.80	0.98	1.27	1.79		33	35	12
•	•		1160 xx		1.2	0.92	1.31	1.60	2.07	2.92				
•	•		1270 xx		1.6	1.56	2.20	2.70	3.49	4.93				
•	•		1350 xx	1/4"	1.8	2.02	2.86	3.50	4.52	6.39		44	44	17
•	•		1550 xx	3/8"	2.3	3.18	4.49	5.50	7.10	10.0		53	53	22
•	•		2117 xx	1/2"	3.2	6.75	9.55	11.7	15.1	21.4		72	72	24
•	•		2195 xx	3/4"	4.2	11.3	15.9	19.5	25.2	35.6		84	87	25
		•	2270 xx	1"	5.1	15.6	22.0	27.0	34.9	49.3	34		92	35
		•	2390 xx		6.1	22.5	31.8	39.0	50.3	71.2				
		•	2590 xx	1 1/4"	7.4	34.1	48.2	59.0	76.2	108	42		117	40
		•	2780 xx		8.6	45.0	63.7	78.0	101	142				
		•	2980 xx	1 1/2"	9.6	56.6	80.0	98.0	127	179	48		127	52
		•	3117 xx		10.5	67.5	95.5	117	151	214				
		•	3137 xx	2"	11.1	79.1	112	137	177	250	60		200	55
		•	3156 xx		11.9	90.1	127	156	201	285				
		•	3195 xx		13.5	113	159	195	252	356				
		•	3235 xx	2 1/2"	14.7	136	192	235	303	429	70		254	60
		•	3275 xx		15.9	159	225	275	355	502				
		•	3390 xx		19.1	225	318	390	503	712				
		•	3430 xx		19.8	248	351	430	555	785				
		•	3470 xx		20.6	271	384	470	607	858				

HOW TO MAKE UP THE NOZZLE CODE

EX.: BRB 1270 B1



MATERIAL

- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass
- E1 - PTFE
- D1 - PVC
- D2 - Polypropylene

CAPACITY

SPRAY ANGLE

- B - 15°
- F - 30°

NOZZLE TYPE

OFF LINE SPRAY

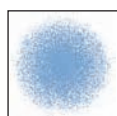
BV/BW series are two-piece nozzles with a 90° elbow coupling that produce a mist spray. Their special design with X-vane breaks the liquid into fine droplets and allows an easy cleaning. They may be supplied with male or female threaded connections. See below table.



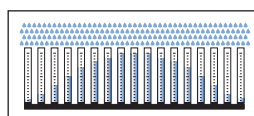
■ Thread specification

Male (BSPT, NPT)

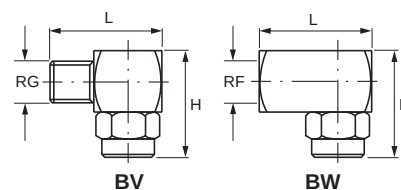
Female (BSP, NPT)



Spray section



Convex distribution



SPRAY ANGLE 60°

	BVQ Male	BWQ Female	Code	RF RG inch	Capacity at different pressure values (l/min) (bar)						Dimension mm	
					0.5	1.0	2.0	3.0	5.0	10	H	L
60°	•	•	1150 XX	1/8"	0.61	0.87	1.22	1.50	1.94	2.74	24	24.5
	•	•	1220 XX		0.90	1.27	1.80	2.20	2.84	4.02		
	•	•	1260 XX		1.06	1.50	2.12	2.60	3.36	4.75		
	•	•	1290 XX		1.18	1.67	2.37	2.90	3.74	5.29		
	•	•	1370 XX		1.51	2.14	3.02	3.70	4.78	6.76		
	•	•	1450 XX	1/4"	1.84	2.60	3.67	4.50	5.81	8.22		
	•	•	1480 XX		1.96	2.77	3.92	4.80	6.20	8.76	32	32.0
	•	•	1740 XX		3.02	4.27	6.04	7.40	9.55	13.5		
	•	•	1930 XX		3.80	5.37	7.59	9.30	12.0	17.0		
	•	•	1700 XX	3/8"	2.86	4.04	5.72	7.00	9.04	12.8	35	32.5
	•	•	2111 XX		4.53	6.41	9.06	11.1	14.3	20.3		
	•	•	2144 XX		5.88	8.31	11.8	14.4	18.6	26.3		
	•	•	2163 XX		6.65	9.41	13.3	16.3	21.0	29.8		
	•	•	2118 XX	1/2"	4.82	6.81	9.63	11.8	15.2	21.5	50	40.0
	•	•	2185 XX		7.55	10.7	15.1	18.5	23.9	33.8		
	•	•	2240 XX		9.80	13.9	19.6	24.0	31.0	43.8		
	•	•	2300 XX		12.3	17.3	24.5	30.0	38.7	54.8		
	•	•	2360 XX		14.7	20.8	29.4	36.0	46.5	65.7		

SPRAY ANGLE 120°

	BVW Male	BWW Female	Code	RF RG inch	Capacity at different pressure values (l/min) (bar)						Dimension mm	
					0.5	1.0	2.0	3.0	5.0	10	H	L
120°	•	•	1310 XX	1/8"	1.27	1.79	2.53	3.10	4.00	5.66	24	24.5
	•	•	1570 XX		2.33	3.29	4.65	5.70	7.36	10.4		
	•	•	2100 XX	1/4"	4.08	5.77	8.16	10.0	12.9	18.3	32	32.0
	•	•	2144 XX	3/8"	5.88	8.31	11.8	14.4	18.6	26.3	35	32.5
	•	•	2250 XX	1/2"	10.2	14.4	20.4	25.0	32.3	45.6	50	40.0
	•	•	2360 XX		14.7	20.8	29.4	36.0	46.5	65.7		

Typical applications

Washing

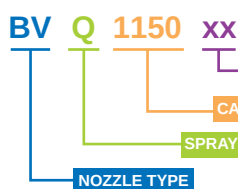
Parts washing
Gas scrubbing
Food washing

Cooling

Parts cooling
Gas cooling
Tank cooling

HOW TO MAKE UP THE
NOZZLE CODE

EX.: BVQ 1150 B1



MATERIAL

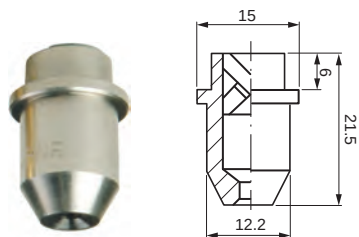
- B1 - AISI 303 Stainless steel
- T1 - Brass
- B31 - AISI 316L Stainless steel (optional)

CAPACITY

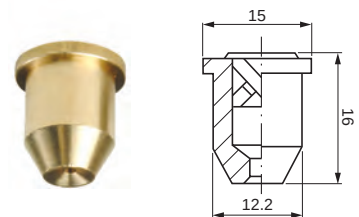
• Q - 60°
• W - 120°

SPRAY ANGLE

NOZZLE TYPE



Above is outer shape of BX 1149 - BX 1372



Above is outer shape of BX 1508 - BX 1743

NOZZLE TIPS

BX full cone tips produce a uniform full cone shaped spray with a round impact area. Thanks to their design they can be easily disassembled and cleaned in case of clogging. These nozzles have an X-vane safely secured inside their body up to 3/8" thread size.

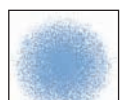
Typical applications

Washing: steel cleaning, parts cleaning, pre-treatment for coating process

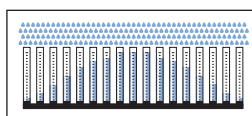
Cooling: continuous casting cooling, product cooling, tank cooling

Dust control: dust removal in mining and coal plants

Other applications: spray of chemicals, leak test



Spray section

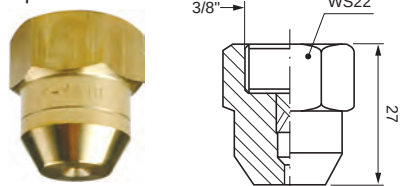


Convex distribution



SAFETY FLANGE

In continuous casting cooling and other specific applications, nozzles are often positioned to spray upwards and must operate at very high temperatures. This may cause both thermal expansion and shrinkage of the nozzle vane due to temperature changes. The X-type vanes are designed to endure such temperature variations and to avoid the risk of escaping from the nozzle body in case of pump shut downs in vacuum conditions. All PNR full cone nozzles with X-vane (and thread size smaller than 3/8") have a protection flange to secure their vanes in place.



BJ

ASSEMBLY ACCESSORIES

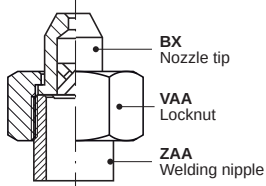
In most steelworks applications, BX series nozzles are provided with a welding nipple and locknut for the assembly of related accessories. Please see on page 44 for detailed information.



ZAA 1738 xx



VAA 0380 xx

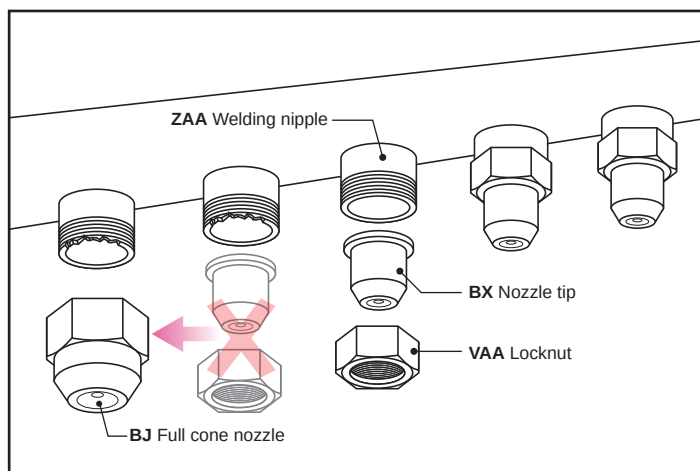


SISTER PRODUCTS / THREAD SIZE

As for the BX series full cone nozzles, sister products with a 3/8" female thread are also available. In the steel industry spraying nozzles fixed on the water pipes can be easily damaged during the manufacturing process. PNR can offer the ideal solution to this problem, the BJ series nozzles designed according to customers' requirements. If welded tips are out of use, you can use BJ nozzles instead of BX. They have the same technical features and jet length.

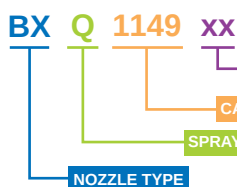
Simply change the product code as follows, e.g. **BXQ 1372 T1** → **BJQ 1372 T1**

	Code	D mm	Capacity at different pressure values (l/min) (bar)					Spray angle at pressure (°) (bar)		
			1.0	2.0	3.0	5.0	10	1.5	3.0	5.0
60°	BXQ 1149 xx	1.3	0.86	1.22	1.49	1.92	2.72	50°	50°	45°
	BXQ 1223 xx	1.7	1.29	1.82	2.23	2.88	4.07	65°	65°	49°
	BXQ 1262 xx	1.7	1.51	2.14	2.62	3.38	4.78	50°	50°	46°
	BXQ 1372 xx	2.1	2.15	3.04	3.72	4.80	6.79	65°	65°	59°
	BXQ 1508 xx	2.4	2.93	4.15	5.08	6.56	9.27	50°	50°	46°
	BXQ 1626 xx	2.9	3.61	5.11	6.26	8.08	11.4	60°	60°	55°
	BXQ 1743 xx	2.9	4.29	6.07	7.43	9.59	13.6	67°	67°	61°



HOW TO MAKE UP THE NOZZLE CODE

EX.: BXQ 1149 B1



MATERIAL

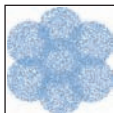
- B1 - AISI 303 Stainless steel
- T1 - Brass
- B31 - AISI 316L Stainless steel (optional)

CLUSTER NOZZLES / TYPE 7 AND 13

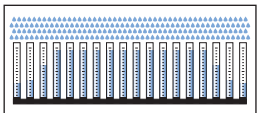
CH series includes large and small capacities hollow cone cluster nozzles. They make a cluster spray pattern and are available in 7 and 13 nozzles versions. Several nozzles are assembled on one nipple with small volume and wide spray coverage. The droplets size is 1/3-1/2 compared to those produced by a single nozzle with same capacity. An added value to CH nozzles is their wide spray range.



■ Thread specification: BSP, NPT



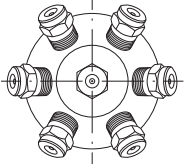
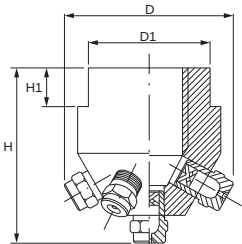
Spray section



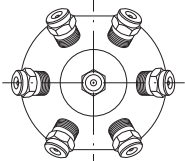
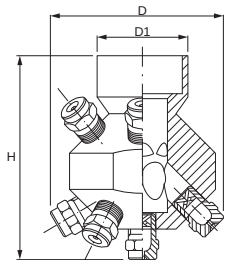
Even distribution



	Code	RF inch	D inch	Capacity at different pressure values (l/min) (bar)					Dimensions mm				NR
				1.0	2.0	3.0	5.0	10	D	D1	H	H1	
200°	CHZ 1826 xx	3/4"	1/8"	4.77	6.47	8.26	10.7	15.1	71	40	55	13	7
	CHZ 2165 xx			9.53	13.5	16.5	21.3	30.1					
	CHZ 2329 xx	1"	1/4"	19.0	26.9	32.9	42.5	60.1	89	46	68	17	
	CHZ 2585 xx			33.8	47.8	58.5	75.5	106.8					
	CHZ 2819 xx			47.3	66.9	81.9	105.7	149.5					
	CHZ 3102 xx	1 1/2"	3/8"	59.4	84.0	102.9	132.8	187.9	128	70	93	20	
	CHZ 3131 xx			76.0	107.5	131.6	169.9	240.3					
	CHZ 3206 xx	2"	1/2"	119.2	168.6	206.5	266.6	377.0	171	85	122	27	
360°	CHZ 3259 xx		3/4"	149.5	211.5	259.0	334.4	472.9					13
	CHZ 3329 xx			189.9	268.6	329.0	424.7	600.7					
	CHE 2153 xx	3/4"	1/8"	8.83	12.5	15.3	19.8	27.9	69	39	85	-	
	CHE 2306 xx			17.7	25.0	30.6	39.5	55.9					
	CHE 2611 xx	1"	1/4"	35.3	49.9	61.1	78.9	111.6	86	48	105	-	
	CHE 3108 xx			62.7	88.7	108.6	140.2	198.3					
	CHE 3152 xx			87.8	124.2	152.1	196.4	277.7					
	CHE 3191 xx	1 1/2"	3/8"	110.3	156.0	191.1	246.7	348.9	98	55	120	-	
	CHE 3245 xx			141.5	200.0	245.0	316.3	447.3					
	CHE 3383 xx	2"	1/2"	221.4	313.1	383.5	495.1	700.2	129	73	158	-	
	CHE 3481 xx		3/4"	277.7	392.7	481.0	621.0	878.2	169	95	206	-	



Cluster nozzle
7 nozzles type



Cluster nozzle
13 nozzles type

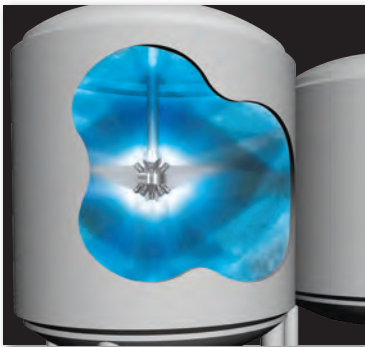
* You can go with other full cone nozzle in addition to standard capacity. Please contact us.

Typical applications

Cooling: gas cooling

Washing: tank cleaning, gas cleaning

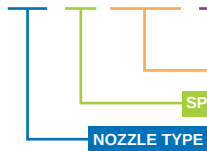
Other applications: fire engineering, dust control, wetting



HOW TO MAKE UP THE
NOZZLE CODE

EX.: CHZ 1826 B1

CH Z 1826 xx



MATERIAL

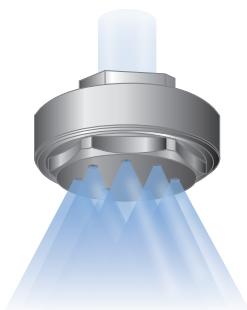
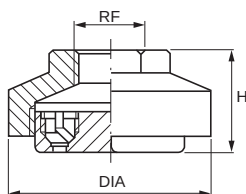
- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass

CAPACITY

SPRAY ANGLE

- Z - 200°
- E - 360°

NOZZLE TYPE



CLUSTER NOZZLE / STANDARD SPRAY ANGLE

CAS cluster nozzles have seven orifices, large spray capacities and produce very fine droplets using hydraulic pressure only. As the droplets size, among other factors, also depends on the nozzle size, these multi-orifice nozzles produce a finer spray than a standard full cone single-orifice nozzle working at the same pressure and delivering the same quantity of liquid. The surely are the best choice when fine mist effect and large spray capacity are required.

Typical applications

Cooling

cooling of high-temperature gas

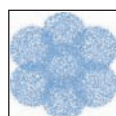
Fire control

watermist fire suppression systems

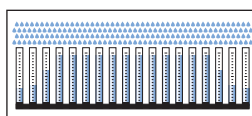
Other applications

exhaust gas treatment, dust control, wetting

Thread specification: BSP, NPT



Spray section



Even distribution

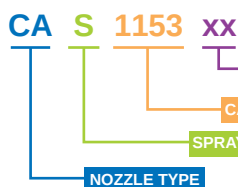


	Code	RF inch	D mm	D1 mm	Capacity at different pressure values							Dimensions mm		
					0.7	1.0	1.5	2.0	3.0	5.0	10	NR	DIA	H
70°	CAS 1153 xx	1/2"	0.9	0.5	0.74	0.88	1.08	1.25	1.53	1.98	2.79	7	50	33.5
	CAS 1274 xx		1.8	0.5	1.32	1.58	1.94	2.24	2.74	3.54	5.00			
	CAS 1343 xx	3/4"	1.1	1.0	1.66	1.98	2.43	2.80	3.43	4.43	6.26	7	72	43
	CAS 1551 xx		1.5	1.4	2.66	3.18	3.90	4.50	5.51	7.11	10.1			
	CAS 1870 xx		2.1	2.0	4.20	5.02	6.15	7.10	8.70	11.2	15.9			
	CAS 2116 xx		2.5	2.0	5.60	6.70	8.20	9.47	11.6	15.0	21.2			
	CAS 2145 xx		3.0	2.0	7.00	8.37	10.3	11.8	14.5	18.7	26.5			
	CAS 2184 xx		3.5	2.0	8.89	10.6	13.0	15.0	18.4	23.8	33.6			
	CAS 2220 xx		4.0	2.0	10.6	12.7	15.6	18.0	22.0	28.4	40.2			
	CAS 2342 xx		3.5	2.0	16.5	19.8	24.2	27.9	34.2	44.2	62.4			
	CAS 2434 xx		4.0	2.0	21.0	25.1	30.7	35.4	43.4	56.0	79.2			
	CAS 2551 xx		5.0	2.0	26.6	31.8	39.0	45.0	55.1	71.1	101			
	CAS 2728 xx		6.0	2.0	35.2	42.0	51.5	59.4	72.8	94.0	133			
	CAS 2385 xx		5.0	2.5	18.6	22.2	27.2	31.4	38.5	49.7	70.3	7	140	74
	CAS 2489 xx		6.5	2.5	23.6	28.2	34.6	39.9	48.9	63.1	89.3			
	CAS 2685 xx		8.0	2.5	33.1	39.6	48.4	55.9	68.5	88.4	125			
	CAS 3130 xx	2"	9.0	5.0	62.8	75.1	91.9	106	130	168	237	7	185	103
	CAS 3184 xx		12.0	5.0	88.9	106	130	150	184	238	336			
	CAS 3245 xx		15.0	5.0	118	142	173	200	245	316	447			

* NR - Number of orifices

HOW TO MAKE UP THE NOZZLE CODE

EX.: CAS 1153 B31

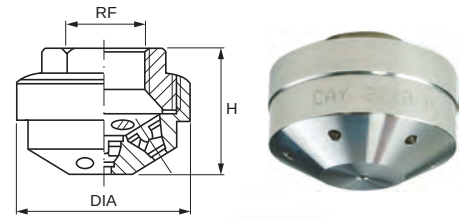


MATERIAL

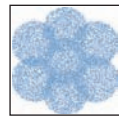
- B31 - AISI 316L Stainless steel
- B1 - AISI 304 Stainless steel
- T8 - Nickel plated brass
- T1 - Brass

CLUSTER NOZZLE / WIDE SPRAY ANGLE

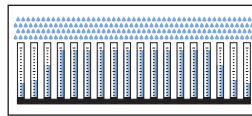
CAY cluster full cone nozzles produce very fine droplets using hydraulic pressure only. They provide large spray capacities, mist effect and a 130° spray angle with wider coverage. CAY nozzles have 7 orifices that, at the same operating pressure and using the same quantity of liquid, produce a finer spray than standard full cone nozzles with one orifice only. They are the best choice when large spray capacities and mist effect are required.



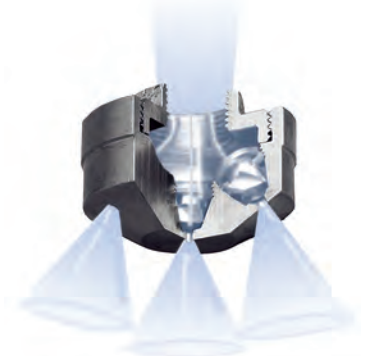
■ Thread specification: BSP, NPT



Spray section



Even distribution



	Code	RF inch	D mm	D1 mm	Capacity at different pressure values							Dimensions mm		
					0.7	1.0	1.5	2.0	3.0	5.0	10	NR	DIA	H
130°	CAY 1153 xx	1/2"	1.0	0.5	0.74	0.88	1.08	1.25	1.53	1.98	2.79	7	40	33.5
	CAY 1274 xx		1.8	0.5	1.32	1.58	1.94	2.24	2.74	3.54	5.00			
	CAY 1343 xx	3/4"	1.0	1.0	1.66	1.98	2.43	2.80	3.43	4.43	6.26	7	63	46.0
	CAY 1551 xx		1.4	1.4	2.66	3.18	3.90	4.50	5.51	7.11	10.1			
	CAY 1870 xx		2.0	2.0	4.20	5.02	6.15	7.10	8.70	11.2	15.9			
	CAY 2116 xx		2.5	2.0	5.60	6.70	8.20	9.47	11.6	15.0	21.2			
	CAY 2145 xx		3.0	2.0	7.00	8.37	10.3	11.8	14.5	18.7	26.5			
	CAY 2184 xx		3.5	2.0	8.89	10.6	13.0	15.0	18.4	23.8	33.6			
	CAY 2220 xx		4.0	2.0	10.6	12.7	15.6	18.0	22.0	28.4	40.2			
	CAY 2342 xx		3.5	1.7	16.5	19.8	24.2	27.9	34.2	44.2	62.4			
	CAY 2434 xx		4.0	1.7	21.0	25.1	30.7	35.4	43.4	56.0	79.2			
	CAY 2551 xx		5.0	1.7	26.6	31.8	39.0	45.0	55.1	71.1	101			
	CAY 2728 xx		6.0	1.7	35.2	42.0	51.5	59.4	72.8	94.0	133			
	CAY 2385 xx	1"	5.0	3.2	18.6	22.2	27.2	31.4	38.5	49.7	70.3	7	120	81.0
	CAY 2489 xx		6.0	3.6	23.6	28.2	34.6	39.9	48.9	63.1	89.3			
	CAY 2685 xx		8.0	3.6	33.1	39.6	48.4	55.9	68.5	88.4	125			
	CAY 2979 xx		6.0	2.5	47.3	56.5	69.2	79.9	97.9	126	179			
	CAY 3137 xx		8.0	2.5	66.2	79.1	96.9	112	137	177	250			
	CAY 3130 xx	2"	9.0	3.2	62.8	75.1	91.9	106	130	168	237	7	155	104.5
	CAY 3184 xx		12.0	3.2	88.9	106	130	150	184	238	336			
	CAY 3245 xx		15.0	3.6	118	142	173	200	245	316	447			
	CAY 3260 xx		9.0	3.0	126	150	184	212	260	336	475			
	CAY 3367 xx		12.0	3.0	177	212	260	300	367	474	670			
	CAY 3490 xx		15.0	3.0	237	283	346	400	490	633	895			

* NR - Number of orifices

Typical applications

Cooling: cooling of high-temperature gas

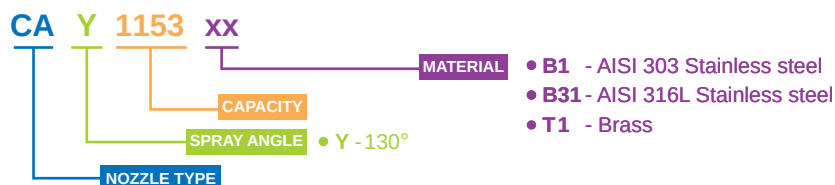
Washing: tank cleaning, parts cleaning

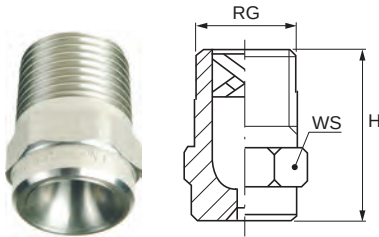
Fire control: water mist fire suppression systems

Other applications: exhaust gas treatment, dust control, wetting

HOW TO MAKE UP THE NOZZLE CODE

EX.: CAY 1153 B1

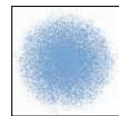




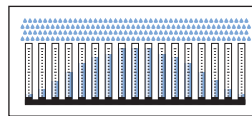
X VANE / TWO-PIECE DESIGN

D series full cone nozzles with wide passage X-vanes offer a full choice of spray angles, capacities ranging from 1.18 and 1.420 l/min and connections from 1/8" to 4". In continuous casting cooling and other specific applications, they are used spraying upwards and operate at very high temperatures. The X-vane is safely locked into place for all dimensions up to 3/8", to avoid it may escape from the nozzle body in case of size changes due to temperature variations, and allows to assemble the nozzle with any desired orientation. Excellent mist effect and a wide variety of applications make D series nozzles an optimal choice.

- Spray specification
- BSPT
- NPT (on request)



Spray section



Convex distribution



SPRAY ANGLE 45°

Thread size coding table

RG inch	Code	H mm	WS mm
1/8"	DA	19.5	12.0
1/4"	DB	22.0	14.0
3/8"	DC	25.0	17.0
1/2"	DD	33.0	22.0

How to make up the nozzle code

D	C	Q	1588	T1
	3/8"	60°	Capacity	Material

Nozzle type				Code	D mm	D1 mm	Capacity at different pressure values							(l/min) (bar)
DAM	DBM	DCM	DDM				0.7	1.0	2.0	3.0	5.0	7.0	10	
•				1118 xx	1.1	1.0	0.57	0.68	0.96	1.18	1.52	1.80	2.15	
•	•			1147 xx	1.2	1.1	0.71	0.85	1.20	1.47	1.90	2.25	2.68	
•	•			1188 xx	1.3	1.2	0.91	1.09	1.54	1.88	2.43	2.87	3.43	
•	•			1212 xx	1.4	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87	
•	•			1235 xx	1.5	1.3	1.14	1.36	1.92	2.35	3.03	3.59	4.29	
•	•			1294 xx	1.7	1.5	1.42	1.70	2.40	2.94	3.80	4.49	5.37	
	•	•		1370 xx	2.0	1.8	1.79	2.14	3.02	3.70	4.78	5.65	6.76	
	•	•		1470 xx	2.1	2.0	2.27	2.71	3.84	4.70	6.07	7.18	8.58	
	•	•		1588 xx	2.3	2.0	2.84	3.39	4.80	5.88	7.59	8.98	10.7	
	•	•	•	1659 xx	2.5	2.2	3.18	3.80	5.38	6.59	8.51	10.1	12.0	
		•	•	1740 xx	2.7	2.3	3.57	4.27	6.04	7.40	9.55	11.3	13.5	
		•	•	1835 xx	2.8	2.6	4.03	4.82	6.82	8.35	10.8	12.8	15.2	
		•	•	1940 xx	3.0	3.0	4.54	5.43	7.68	9.40	12.1	14.4	17.2	
		•	•	2105 xx	3.2	3.2	5.07	6.06	8.57	10.5	13.6	16.0	19.2	
		•	•	2117 xx	3.4	3.3	5.65	6.75	9.55	11.7	15.1	17.9	21.4	
		•	•	2147 xx	3.8	3.7	7.10	8.49	12.0	14.7	19.0	22.5	26.8	
		•	•	2188 xx	4.3	4.3	9.08	10.9	15.4	18.8	24.3	28.7	34.3	
		•	•	2235 xx	5.0	4.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9	

SPRAY ANGLE 60°

Typical applications

Washing

- Food cleaning
- Parts cleaning
- Pre-treatment for coating process

Cooling

- Continuous casting cooling
- Product cooling
- Tank cooling

Dust control

- Remove flying dust in mining and coal plants.

Other applications

- Spray of chemicals
- Leak test

Nozzle type				Code	D mm	D1 mm	Capacity (l/min) at different pressure values (bar)						
DAQ	DBQ	DCQ	DDQ				0.7	1.0	2.0	3.0	5.0	7.0	10
•				0610 xx	0.9	0.5	0.29	0.35	0.50	0.61	0.79	0.93	1.11
•	•			1118 xx	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			1147 xx	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•	•			1188 xx	1.4	1.1	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•	•			1212 xx	1.5	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
•	•			1235 xx	1.6	1.2	1.14	1.36	1.92	2.35	3.03	3.59	4.29
•	•			1294 xx	1.8	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
•	•	•		1370 xx	2.0	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
•	•	•		1470 xx	2.4	1.9	2.27	2.71	3.84	4.70	6.07	7.18	8.58
	•	•		1588 xx	2.6	2.0	2.84	3.39	4.80	5.88	7.59	8.98	10.7
	•	•		1659 xx	2.7	2.0	3.18	3.80	5.38	6.59	8.51	10.1	12.0
	•	•	•	1740 xx	2.9	2.0	3.57	4.27	6.04	7.40	9.55	11.3	13.5
	•	•	•	1835 xx	3.2	2.8	4.03	4.82	6.82	8.35	10.8	12.8	15.2
	•	•	•	1940 xx	3.2	2.8	4.54	5.43	7.68	9.40	12.1	14.4	17.2
	•	•	•	2105 xx	3.4	3.0	5.07	6.06	8.57	10.5	13.6	16.0	19.2
		•	•	2117 xx	3.6	3.0	5.65	6.75	9.55	11.7	15.1	17.9	21.4
		•	•	2147 xx	4.0	3.3	7.10	8.49	12.0	14.7	19.0	22.5	26.8
		•	•	2188 xx	4.5	3.7	9.08	10.9	15.4	18.8	24.3	28.7	34.3
		•	•	2235 xx	5.2	4.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9
		•	•	2294 xx	5.8	4.7	14.2	17.0	24.0	29.4	38.0	44.9	53.7

X VANE / TWO-PIECE DESIGN

SPRAY ANGLE 90°

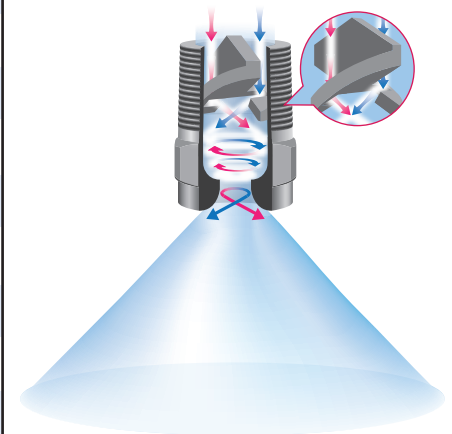
Nozzle type				Code	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)						
DAU	DBU	DCU	DDU				0.7	1.0	2.0	3.0	5.0	7.0	10
•				0610 XX	0.9	0.5	0.29	0.35	0.50	0.61	0.79	0.93	1.11
•				1118 XX	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			1147 XX	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•	•			1188 XX	1.4	1.2	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•	•			1212 XX	1.5	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
•	•			1235 XX	1.6	1.3	1.14	1.36	1.92	2.35	3.03	3.59	4.29
•	•			1294 XX	1.8	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
•	•	•		1370 XX	2.0	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
	•	•		1470 XX	2.3	1.8	2.27	2.71	3.84	4.70	6.07	7.18	8.58
	•	•		1588 XX	2.6	1.8	2.84	3.39	4.80	5.88	7.59	8.98	10.7
	•	•		1659 XX	2.7	2.0	3.18	3.80	5.38	6.59	8.51	10.1	12.0
	•	•		1740 XX	2.9	2.0	3.57	4.27	6.04	7.40	9.55	11.3	13.5
	•	•		1835 XX	3.3	2.0	4.03	4.82	6.82	8.35	10.8	12.8	15.2
	•	•		1940 XX	3.3	2.4	4.54	5.43	7.68	9.40	12.1	14.4	17.2
	•	•		2105 XX	3.5	2.6	5.07	6.06	8.57	10.5	13.6	16.0	19.2
		•		2117 XX	3.7	2.7	5.65	6.75	9.55	11.7	15.1	17.9	21.4
		•		2147 XX	4.0	3.2	7.10	8.49	12.0	14.7	19.0	22.5	26.8
		•		2164 XX	4.1	3.2	7.92	9.47	13.4	16.4	21.2	25.1	29.9
			•	2188 XX	4.7	3.2	9.08	10.9	15.4	18.8	24.3	28.7	34.3
			•	2235 XX	5.2	3.8	11.4	13.6	19.2	23.5	30.3	35.9	42.9
			•	2294 XX	5.8	3.8	14.2	17.0	24.0	29.4	38.0	44.9	53.7
			•	2370 XX	6.4	3.8	17.9	21.4	30.2	37.0	47.8	56.5	67.6

SPRAY ANGLE 120°

Nozzle type				Code	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)						
DAW	DBW	DCW	DDW				0.7	1.0	2.0	3.0	5.0	7.0	10
•				0610 XX	0.9	0.5	0.29	0.35	0.50	0.61	0.79	0.93	1.11
•	•			1118 XX	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			1147 XX	1.3	0.9	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•	•			1188 XX	1.5	1.0	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•	•			1212 XX	1.6	1.1	1.02	1.22	1.73	2.12	2.74	3.24	3.87
•	•			1235 XX	1.6	1.2	1.14	1.36	1.92	2.35	3.03	3.59	4.29
•	•			1294 XX	1.9	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
•	•			1370 XX	2.1	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
	•	•		1470 XX	2.4	1.6	2.27	2.71	3.84	4.70	6.07	7.18	8.58
	•	•		1588 XX	2.7	1.8	2.84	3.39	4.80	5.88	7.59	8.98	10.7
	•	•		1659 XX	3.0	1.8	3.18	3.80	5.38	6.59	8.51	10.1	12.0
	•	•		1740 XX	3.1	1.9	3.57	4.27	6.04	7.40	9.55	11.3	13.5
	•	•		1835 XX	3.3	1.9	4.03	4.82	6.82	8.35	10.8	12.8	15.2
	•	•		1940 XX	3.5	1.9	4.54	5.43	7.68	9.40	12.1	14.4	17.2
	•	•		2105 XX	3.7	2.3	5.07	6.06	8.57	10.5	13.6	16.0	19.2
		•		2117 XX	3.8	2.4	5.65	6.75	9.55	11.7	15.1	17.9	21.4
		•		2147 XX	4.2	2.7	7.10	8.49	12.0	14.7	19.0	22.5	26.8
		•		2164 XX	4.4	2.7	7.92	9.47	13.4	16.4	21.2	25.1	29.9
		•		2188 XX	4.6	3.1	9.08	10.9	15.4	18.8	24.3	28.7	34.3
			•	2235 XX	5.3	3.3	11.4	13.6	19.2	23.5	30.3	35.9	42.9
			•	2294 XX	5.9	4.1	14.2	17.0	24.0	29.4	38.0	44.9	53.7
			•	2370 XX	6.6	4.7	17.9	21.4	30.2	37.0	47.8	56.5	67.6

X-VANE

X vanes are widely used, mainly in steelworks. Their simple design is based on two sloping flat surfaces which induce a rotation of the liquid going through the nozzle, and two small slots on each flat part to produce a full-cone spray pattern. All vanes are secured inside the nozzle body to prevent their moving in case of size changes due to high temperatures or sudden vacuum conditions in the feed pipe.

HOW TO MAKE UP THE
NOZZLE CODE

EX.: DAU 1118 B1

DAU 1118 XX

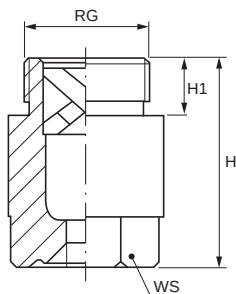
NOZZLE TYPE
CONNECTION
SPRAY ANGLE
CAPACITY
MATERIAL

• A - 1/8"
• B - 1/4"
• C - 3/8"
• D - 1/2"

• M - 45°
• Q - 60°
• U - 90°
• W - 120°

• B1 - AISI 303 Stainless steel
• B31 - AISI 316L Stainless steel
• T1 - Brass

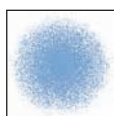
○ On request special materials are quoted



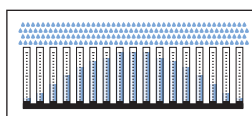
X VANE / TWO-PIECE DESIGN / LARGE CAPACITY

D series full cone nozzles with large capacity are widely used in industry. They provide uniform spray coverage and are available in various thread sizes, spray angles and capacities to comply with environmental requirements. Their X-vane offers the largest free passage available in a nozzle, for an easier handling of the suspended particles and a higher resistance to clogging. D nozzles provide an optimal mist effect and are effective in many industrial applications.

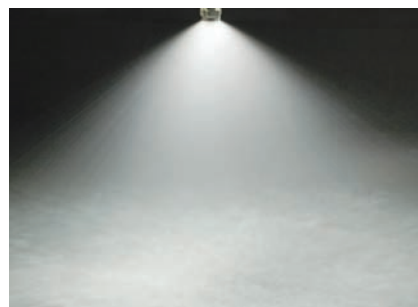
■ Thread specification
BSPT, NPT (on request)



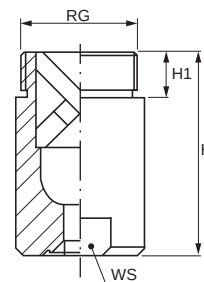
Spray section



Convex distribution



	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Dimension mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
60°	DEQ 2235 xx	3/4"	4.8	3.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9	43	16	27
	DEQ 2295 xx		5.5	4.5	14.2	17.0	24.1	29.5	38.1	45.1	53.9			
	DEQ 2370 xx		6.0	4.5	17.9	21.4	30.2	37.0	47.8	56.5	67.6			
	DEQ 2470 xx		7.0	4.5	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
	DFQ 2470 xx	1"	7.0	5.6	22.7	27.1	38.4	47.0	60.7	71.8	85.8	58	18	36
	DFQ 2590 xx		7.8	5.6	28.5	34.1	48.2	59.0	76.2	90.1	108			
	DFQ 2740 xx		9.5	5.6	35.7	42.7	60.4	74.0	95.5	113	135			
	DGQ 2740 xx	1 1/4"	9.5	5.6	35.7	42.7	60.4	74.0	95.5	113	135	74	19	41
	DGQ 3118 xx		12.5	6.0	57.0	68.1	96.3	118	152	180	215			
	DHQ 3147 xx	1 1/2"	13.0	9.0	71.0	84.9	120	147	190	225	268	85	19	50
	DKQ 3188 xx	2"	15.0	9.0	90.8	109	154	188	243	287	343	106	24	60
	DKQ 3235 xx		16.0	11.0	114	136	192	235	303	359	429			
	DKQ 3294 xx		17.0	11.1	142	170	240	294	380	449	537			
	DLQ 3370 xx	2 1/2"	17.5	11.1	179	214	302	370	478	565	676	128	27	75
	DLQ 3470 xx		23.0	11.1	227	271	384	470	607	718	858			
	DMQ 3588 xx	3"	28.0	14.3	284	339	480	588	759	898	1074	153	30	85
90°	DNQ 3740 xx	3 1/2"	29.0	17.5	357	427	604	740	955	1130	1351	190	32	105
	DNQ 3940 xx		36.0	17.5	454	543	768	940	1214	1436	1716			
	DPQ 4117 xx	4"	39.0	19.0	568	678	959	1175	1517	1795	2145	205	36	110
	DEU 2295 xx	3/4"	5.8	3.0	14.2	17.0	24.1	29.5	38.1	45.1	53.9	43	16	27
	DEU 2370 xx		6.4	4.5	17.9	21.4	30.2	37.0	47.8	56.5	67.6			
	DEU 2470 xx		8.0	4.5	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
	DFU 2590 xx	1"	8.6	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108	58	18	36
	DFU 2740 xx		9.3	5.0	35.7	42.7	60.4	74.0	95.5	113	135			
	DFU 2830 xx		9.9	6.0	40.3	48.2	68.2	83.5	108	128	152			
	DGU 3118 xx	1 1/4"	13.0	6.0	57.0	68.1	96.3	118	152	180	215	74	19	41
	DGU 3147 xx		16.0	6.0	71.0	84.9	120	147	190	225	268			
	DHU 3188 xx	1 1/2"	14.5	9.0	90.8	109	154	188	243	287	343	85	19	50
	DKU 3235 xx	2"	16.6	11.0	114	136	192	235	303	359	429	106	24	60
	DKU 3294 xx		18.0	11.0	142	170	240	294	380	449	537			
	DKU 3370 xx		25.0	11.0	179	214	302	370	478	565	676			
	DLU 3470 xx	2 1/2"	27.0	11.1	227	271	384	470	607	718	858	128	27	75
	DLU 3588 xx		30.0	14.3	284	339	480	588	759	898	1074			
	DMU 3740 xx	3"	30.0	17.5	357	427	604	740	955	1130	1351	153	30	85
	DMU 3870 xx		32.5	17.5	420	502	710	870	1123	1329	1588			
	DNU 3940 xx	3 1/2"	35.5	17.5	454	543	768	940	1214	1436	1716	190	32	105
	DNU 4117 xx		39.0	19.0	568	678	959	1175	1517	1795	2145			
	DPU 4147 xx	4"	42.8	25.4	710	849	1200	1470	1898	2245	2684	205	36	110



	Code	RG inch	D mm	D1 mm	Capacity at different pressure values							Dimension mm		
					(l/min) (bar)							H	H1	WS
					0.7	1.0	2.0	3.0	5.0	7.0	10			
120°	DEW 2295 xx	3/4"	5.1	3.0	14.2	17.0	24.1	29.5	38.1	45.1	53.9	43	16	27
	DEW 2370 xx		6.5	3.5	17.9	21.4	30.2	37.0	47.8	56.5	67.6			
	DEW 2470 xx		8.5	4.5	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
	DFW 2590 xx	1"	11.5	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108	58	18	36
	DFW 2740 xx		12.0	4.5	35.7	42.7	60.4	74.0	95.5	113	135			
	DFW 2830 xx		13.0	5.6	40.3	48.2	68.2	83.5	108	128	152			
	DGW 3118 xx	1 1/4"	13.5	6.0	57.0	68.1	96.3	118	152	180	215	74	19	41
	DGW 3147 xx		17.0	6.0	71.0	84.9	120	147	190	225	268			
	DHW 3188 xx	1 1/2"	20.0	9.0	90.8	109	154	188	243	287	343	85	19	50
	DKW 3235 xx	2"	18.0	11.0	114	136	192	235	303	359	429	106	24	60
	DKW 3294 xx		19.0	11.0	142	170	240	294	380	449	537			
	DKW 3370 xx		21.3	11.0	179	214	302	370	478	565	676			
	DLW 3470 xx	2 1/2"	23.5	11.1	227	271	384	470	607	718	858	128	27	75
	DLW 3588 xx		26.5	14.3	284	339	480	588	759	898	1074			
	DMW 3740 xx	3"	29.5	17.5	357	427	604	740	955	1130	1351	153	30	85
	DMW 3870 xx		32.0	17.5	420	502	710	870	1123	1329	1588			
	DNW 3940 xx	3 1/2"	33.5	17.5	454	543	768	940	1214	1436	1716	190	32	105
	DNW 4117 xx		37.0	19.0	568	678	959	1175	1517	1795	2145			
	DPW 4147 xx	4"	42.0	25.4	710	849	1200	1470	1898	2245	2684	205	36	110

THREAD SIZE CODE (RG)

DE	DF	DG	DH	DK	DL	DM	DN	DP
3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"

Typical applications

Washing: food cleaning, parts cleaning, pre-treatment for coating process

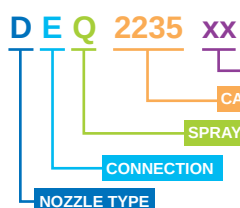
Cooling: continuous casting cooling, product cooling, tank cooling

Dust control: dust suppression in mining and coal plants.

Other applications: spray of chemicals, leak test.

HOW TO MAKE UP THE NOZZLE CODE

EX.: DEQ 2235 B1



CAPACITY

SPRAY ANGLE

CONNECTION

NOZZLE TYPE

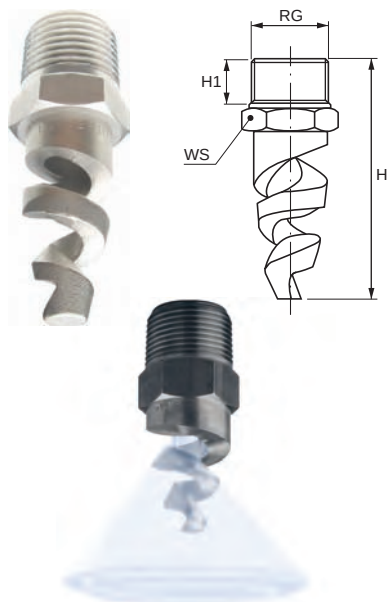
MATERIAL

• B1 - AISI 303 Stainless steel

• B31 - AISI 316L Stainless steel

• T1 - Brass

○ On request special materials are quoted

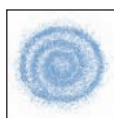


STANDARD SPIRAL NOZZLES

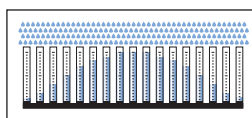
E series spiral nozzles work on the impact principle, by the deflection of a water stream that impacts onto a spiral profiled surface which provides the desired spray angle. These are one-piece nozzles with no internal vane and a wider free passage. The liquid inlet has nearly the same size as the outlet orifice diameter. Their special design makes them virtually clog-free and produces a wider spray coverage than other nozzles for a given flow and pressure.

The capacity values on darker background can be obtained with metal nozzles only, plastic materials being too weak to assure structural nozzle resistance in harsh operating conditions. If the capacity values you are looking for are those on darker background, we recommend to choose metal nozzles for their longer operating life.

■ Thread specification: BSPT, NPT



Spray section



Convex distribution



Typical applications

Gas cooling
Exhaust scrubbers
Desulfurization
Cooling

Other applications

Spray of chemicals
Fire prevention and fire suppression

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values							Dimensions mm		
					(l/min) (bar)							H	H1	WS
60°	EBQ 1550 xx	1/4"	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBQ 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECQ 2230 xx	3/8"	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECQ 2410 xx		6.4	3.2	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECQ 2640 xx		7.9	3.2	31.2	37.3	52.7	64.6	83.4	99.0	118			
	EDQ 2940 xx	1/2"	9.5	4.7	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDQ 3128 xx		11.1	4.7	61.8	73.9	105	128	165	196	234			
	EEQ 3165 xx	3/4"	12.7	4.7	79.7	95.3	135	165	213	252	301	70	19	27
	EFQ 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34
	EFQ 3372 xx		19.0		180	215	304	372	480	568	679			
90°	EHQ 3507 xx	1 1/2"	22.2	7.9	245	293	414	507	655	774	926	111	27	50
	EKQ 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	65
	EBU 1550 xx	1/4"	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBU 2100 xx		3.2	3.2	4.83	5.77	8.16	10.0	12.9	15.3	18.3			
	EBU 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECU 2230 xx	3/8"	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECU 2317 xx		5.6	3.9	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECU 2410 xx		6.4	4.8	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECU 2640 xx		7.9	5.5	31.2	37.3	52.7	64.6	83.4	98.7	118			
	EDU 2940 xx	1/2"	9.5	3.3	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDU 3128 xx		11.1	3.7	61.8	73.9	105	128	165	196	234			
	EEU 3165 xx	3/4"	12.7	4.7	79.7	95.3	135	165	213	252	301	70	19	27
	EFU 3260 xx	1"	19.0	6.3	126	150	212	260	336	397	475	92	26	34
	EFU 3372 xx		23.0	6.3	180	215	304	372	480	568	679			
	EKU 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	65
	EMU 4204 xx	3"	44.5	14.3	985	1178	1666	2040	2634	3116	3725	219	42	89
	EMU 4267 xx		50.8		1290	1542	2180	2670	3447	4078	4875			

THREAD SIZE CODE (RG)

EB	EC	ED	EE	EF	EH	EK	EM	EP
1/4"	3/8"	1/2"	3/4"	1"	1 1/2"	2"	3"	4"

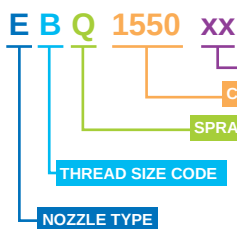
SPIRAL NOZZLES

The picture shows the inside of a spiral nozzle with a complete free passage without any internal vane. It has nearly the same size of liquid inlet and outlet orifice diameter to avoid clogging.



HOW TO MAKE UP THE
NOZZLE CODE

EX.: EBQ 1550 B31



• B31 - AISI 316L Stainless steel

• T1 - Brass

• D1 - PVC

• D2 - PP

• D8 - PVDF

• E1 - PTFE

• L61 - Hastelloy C 22

• On request special materials are quoted

STANDARD SPIRAL NOZZLES

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values							(l/min) (bar)		Dimension mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS		
120°	EBW 1550 xx	1/4"	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14		
	EBW 2100 xx		3.2	3.2	4.83	5.77	8.16	10.0	12.9	15.3	18.3					
	EBW 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5					
	ECW 2156 xx	3/8"	4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5	48	14	19		
	ECW 2230 xx		4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9					
	ECW 2317 xx		5.6	4.0	15.3	18.3	25.9	31.7	40.9	48.4	57.9					
	ECW 2410 xx		6.4	4.0	20.0	24.0	33.9	41.5	53.6	63.4	75.8					
	ECW 2640 xx		7.9	4.0	31.2	37.3	52.7	64.6	83.4	98.7	118					
	EDW 2940 xx	1/2"	9.5	4.8	45.6	54.5	77.1	94.4	122	144	172	64	18	22		
	EDW 3104 xx		9.7	4.8	50.2	60.0	84.9	104	134	159	190					
	EDW 3128 xx		11.1	4.8	61.8	73.9	105	128	165	196	234					
	EEW 3165 xx	3/4"	12.7	4.8	79.7	95.3	135	165	213	252	301	70	19	27		
	EFW 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34		
	EFW 3372 xx		19.0		180	215	304	372	480	568	679					
	EHW 3507 xx	1½"	22.2	7.9	245	293	414	507	655	774	926	111	27	50		
	EHW 3663 xx		25.4		320	383	541	663	856	1013	1210					
	EHW 3747 xx		28.6		361	431	610	747	964	1141	1364					
	EKW 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	65		
	EKW 4139 xx		38.1		672	803	1136	1391	1796	2125	2540					
	EMW 4204 xx	3"	44.5	14.3	985	1178	1666	2040	2634	3116	3725	203	35	90		
	EMW 4265 xx		51.0		1280	1530	2164	2650	3421	4048	4838					
	EPW 4412 xx	4"	63.5	15.9	1990	2379	3364	4120	5319	6293	7522	230	40	127		
150°	ECX 2230 xx	3/8"	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19		
	ECX 2317 xx		5.6	4.0	15.3	18.3	25.9	31.7	40.9	48.4	57.9					
	ECX 2410 xx		6.4		20.0	24.0	33.9	41.5	53.6	63.4	75.8					
	ECX 2640 xx		7.9		31.2	37.3	52.7	64.6	83.4	98.7	118					
	EDX 2940 xx	1/2"	9.5	4.8	45.6	54.5	77.1	94.4	122	144	172	64	18	22		
	EDX 3128 xx		11.1		61.8	73.9	105	128	165	196	234					
	EEX 3165 xx	3/4"	12.7	4.8	79.7	95.3	135	165	213	252	301	70	19	27		
	EFX 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34		
	EFX 3372 xx		19.0		180	215	304	372	480	568	679					
	EHX 3507 xx	1½"	22.2	7.9	245	293	414	507	655	774	926	111	27	50		
	EHX 3663 xx		25.4		320	383	541	663	856	1013	1210					
	EHX 3747 xx		28.6		361	431	610	747	964	1141	1364					
	EKX 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	65		
	EKX 4139 xx		38.1		672	803	1136	1391	1796	2125	2540					
180°	EBZ 2156 xx	1/4"	4.0	2.5	7.54	9.01	12.7	15.6	20.1	23.8	28.5	45	12	14		
	ECZ 2230 xx	3/8"	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19		
	ECZ 2317 xx		5.6	4.0	15.3	18.3	25.9	31.7	40.9	48.4	57.9					
	ECZ 2410 xx		6.4		20.0	24.0	33.9	41.5	53.6	63.4	75.8					
	ECZ 2640 xx		7.9		31.2	37.3	52.7	64.6	83.4	98.7	118					
	EDZ 2940 xx	1/2"	9.5	3.3	45.6	54.5	77.1	94.4	122	144	172	64	18	22		
	EDZ 3128 xx		11.1	4.8	61.8	73.9	105	128	165	196	234					
	EEZ 3165 xx	3/4"	12.7	4.7	79.7	95.3	135	165	213	252	301	70	19	27		
	EFZ 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	25	36		
	EFZ 3372 xx		19.0		180	215	304	372	480	568	679					
	EHZ 3507 xx	1½"	22.2	7.9	245	293	414	507	655	774	926	111	27	50		
	EHZ 3663 xx		25.4		320	383	541	663	856	1013	1210					
	EHZ 3747 xx		28.6		361	431	610	747	964	1141	1364					
	EKZ 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	63		
	EKZ 4139 xx		38.1		671	803	1136	1391	1796	2125	2540					



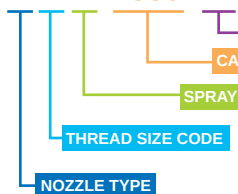
THREAD SIZE CODE (RG)

EB	EC	ED	EE	EF	EH	EK	EM	EP
1/4"	3/8"	1/2"	3/4"	1"	1 1/2"	2"	3"	4"

HOW TO MAKE UP THE
NOZZLE CODE

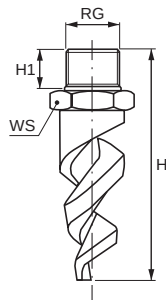
EX.: EBW 1550 B31

EBW 1550 xx



MATERIAL

- B31 - AISI 316L Stainless steel
- T1 - Brass
- D1 - PVC
- D2 - PP
- D8 - PVDF
- E1 - PTFE
- L61 - Hastelloy C 22
- Special materials are quoted on request

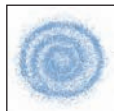


SPIRAL NOZZLES / WIDE FREE PASSAGE

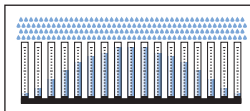
The E-X series nozzles, with their typical elongated spiral design, work on the impact principle, by deflection of a water stream onto their spiral profile that provides the desired spray angle. Their specific shape with no internal parts leaves a larger internal free passage suitable to work with higher capacities and for higher clog resistance than other nozzles of the same size.

The capacity values on darker background can be obtained with metal nozzles only as plastic nozzles cannot ensure resistance in harsh operating conditions. If the capacity values you are looking for are those on darker background, we recommend to chose metal nozzles for their longer operating life.

■ Thread specification: BSPT, NPT



Spray section



Convex distribution



Typical applications

Gas cooling
Exhaust scrubbers
Desulfurization
Cooling

Other applications

Spray of chemicals
Fire prevention
Fire suppression

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Dimension mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
120°	ECW 2230 xx Xy	3/8"	4.8	4.8	11.4	13.6	19.2	23.5	30.3	35.9	42.9	70	15	22
	ECW 2317 xx Xy		5.6	5.6	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECW 2410 xx Xy		6.4	6.4	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECW 2640 xx Xy		7.9	7.9	31.2	37.3	52.7	64.6	83.4	98.7	118			
	EDW 2940 xx Xy	1/2"	9.5	9.5	45.6	54.5	77.1	94.4	122	144	172	86	18	27
	EDW 3128 xx Xy		11.1	11.1	61.8	73.9	105	128	165	196	234			
	EEW 3165 xx Xy	3/4"	12.7	12.7	79.7	95.3	135	165	213	252	301	130	20	27
	EFW 3260 xx Xy	1"	16.0	16.0	126	150	212	260	336	397	475	131	26	34
	EFW 3372 xx Xy		19.0	19.0	180	215	304	372	480	568	679	168	26	34
	EHW 3507 xx Xy	1 1/2"	22.2	22.2	245	293	414	507	655	774	926	171	27	50
	EHW 3663 xx Xy		25.4	25.4	320	383	541	663	856	1013	1210			
	EHW 3747 xx Xy		28.6	28.6	361	431	610	747	964	1141	1364	185	27	50
	EKW 4109 xx Xy	2"	35.0	35.0	527	629	890	1090	1407	1665	1990	279	32	65
	EKW 4139 xx Xy		38.1	38.1	672	803	1136	1391	1796	2125	2540			
	EMW 4204 xx Xy	3"	44.5	44.5	985	1178	1666	2040	2634	3116	3725	267	32	90
	EMW 4265 xx Xy		51.0	51.0	1280	1530	2164	2650	3421	4048	4838			
	EPW 4412 xx Xy	4"	63.5	63.5	1990	2379	3364	4120	5319	6293	7522	293	36	115

ES / SILICON CARBIDE NOZZLES

PNR designs and supplies spiral nozzles made out of several types of silicon carbide for applications where fluids containing abrasive solid particles must be sprayed and long nozzle service life is required. Please contact our Sales department for more detailed information.



ES / SILICON CARBIDE NOZZLES

HOW TO MAKE UP THE NOZZLE CODE

Spiral nozzles with extra wide internal passage are widely used in pollution treatment and can be supplied with customized connections. Please refer to the picture of Silicon carbide nozzles on the left. Locknut fitting makes assembly easier and more convenient. This design, the only one possible for Silicon carbide nozzles, is optional for nozzles cast in alloys or stainless steel. To identify such nozzles, please note the following product coding.

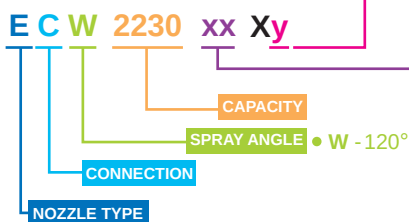
EHW 3747 xx Xy

xx = Material code, see **MATERIAL** table on the below page

y = **CONNECTION CODE** B - BSPT, Male thread
N - NPT, Male thread
F - Locknut fitting

HOW TO MAKE UP THE NOZZLE CODE

EX.: ECW 2230 B31XB



- B31 - AISI 316L Stainless steel
- T1 - Brass
- D1 - PVC
- D2 - PP
- D8 - PVDF
- E1 - PTFE
- L61 - Hastelloy C 22
- Special materials are quoted on request



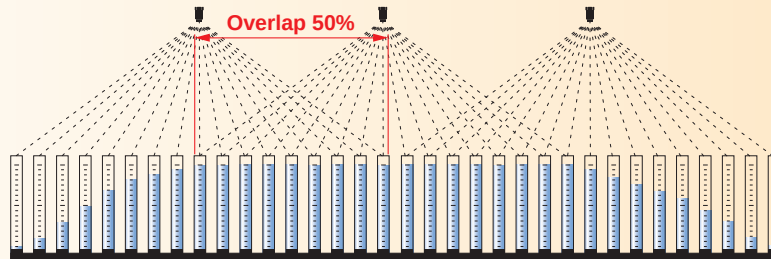
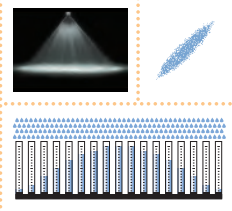
Correct overlapping

When several nozzles are used to spray, it's very important to produce a uniform spray distribution. The correct sprays overlapping methods are shown here below.

Standard convex distribution

In a standard convex spray distribution the medium section has a larger capacity than the two lateral sections. It's necessary to overlap 50% of the spray range.

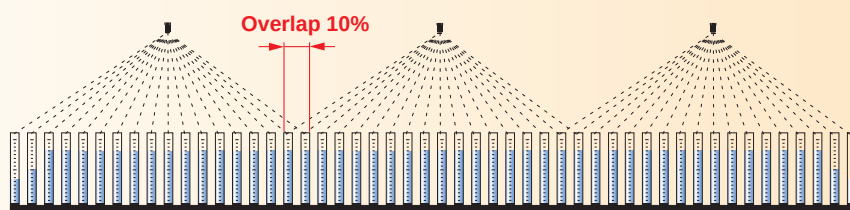
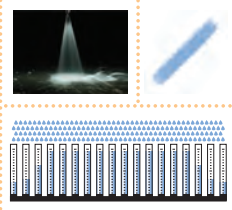
Standard convex distribution



Standard even distribution

An equal distribution provides a uniform spray and 10% of the spray range overlaps.

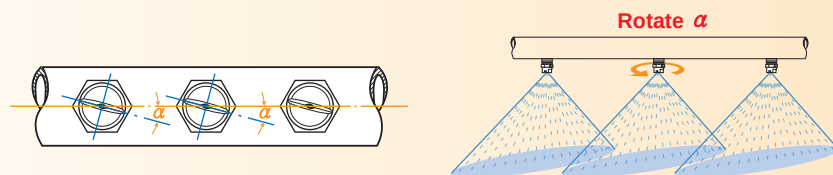
Standard even distribution



Offset

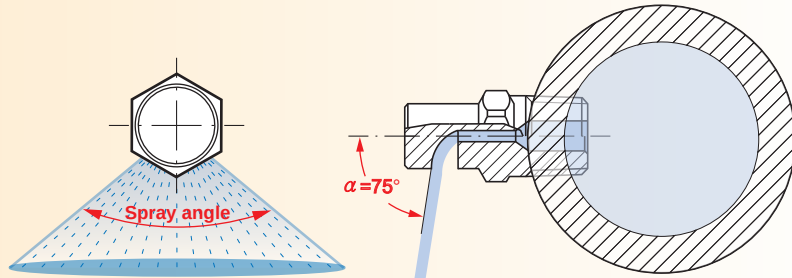
Spray angle	Offset (α)
15°~60°	5°~10°
60°~120°	10°~15°

A flat fan nozzle produces a high impact jet with a 5°-15° offset angle to avoid overlapping and interference. The offset angle depends on the spray range of the flat fan nozzle.



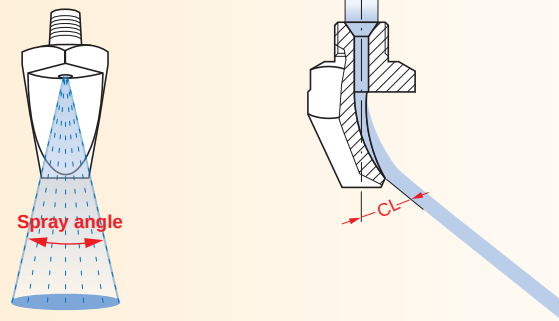
Flat fan nozzles - low pressure, wide angle

K series nozzles work on the principle of jet deflection, conveying the liquid against an accurately machined sloping surface to change the flow direction and produce a fan-shaped mist with a 75° spray angle. Medium-sized droplets and medium/low impact values.

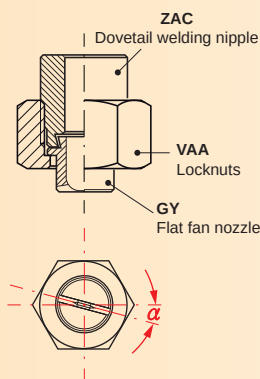


Flat fan nozzles - high impact

K nozzles high-impact type work on the principle of jet deflection. The liquid flow is conveyed onto a deflection sloping surface specially designed to produce a high impact narrow flat fan and medium-sized droplets. They are widely used in operating environments requiring high impact spray jets. Moreover, their rounded orifice and free inside passage minimize the risk of clogging. There is a specific angle that must be kept to ensure spray direction (see below picture ~ CL).

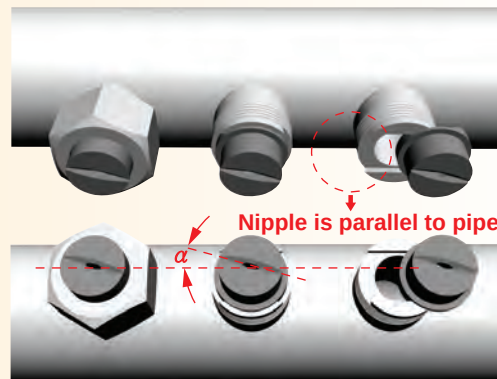


Dovetail flat fan nozzle

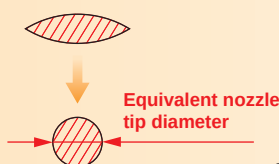


Flat fan nozzle tips provide a high impact spray. Adjacent nozzles must rotate with a specific offset angle to avoid interference and produce a uniform spray coverage when their jets overlap. For the GY series nozzle tips an offset angle $\sim \alpha$ must be set between the spray plane and their dovetail guide.

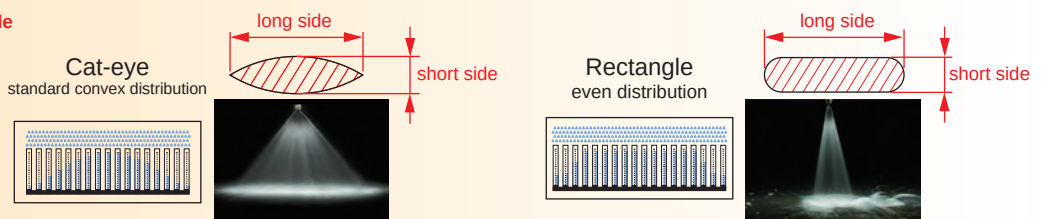
Their specific dove-tail design ensures the correct spray direction and allows time saving as spray angles must not be adjusted each time. For thread size 3/8" offset angle is 5°. For thread size 3/4" offset angle is 15°. The picture to the right shows an offset angle $\sim \alpha$ between the spray plane and the dovetail.



Equivalent nozzle tip diameter



Flat fan nozzles produce cat-eye shaped or parabolic distribution patterns with different capacities. Hence nozzle tips have long and short side differences. For convenience reasons, their "cat-eye shaped" spray pattern is converted into the area of a circle. The datum so obtained from the conversion is called "equivalent nozzle tip diameter".

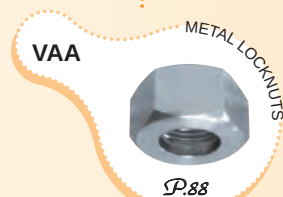
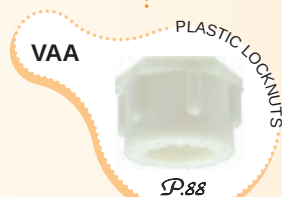
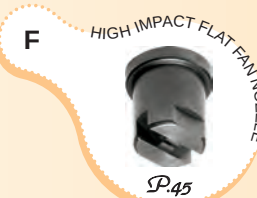
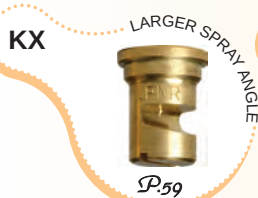
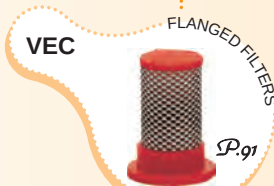
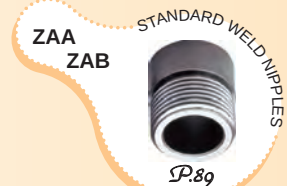
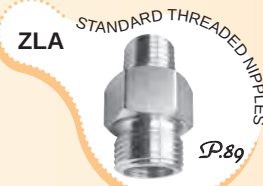
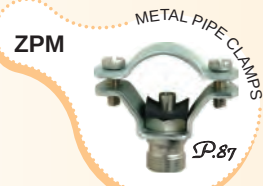
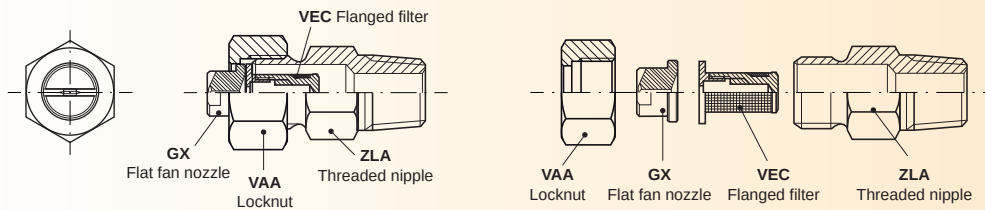


Flanged nozzle

Flanged nozzles have no thread. The nozzle tip is installed on a welding nipple and fastened with a locknut.

The scope of their design is:

1. Easy adjustment of the spray direction
2. Easy maintenance





HIGH PRESSURE WASHING

Flat fan nozzles F series are designed for high-pressure washing applications. Their specially designed inner profile allows for even jet distribution, which results in effective and uniform cleaning action over the surface being processed. All nozzles are precisely machined and made of hardened stainless steel AISI 416.

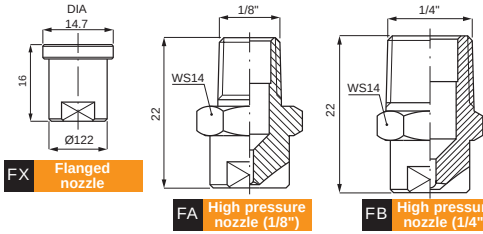
■ Thread specification: BSPT, NPT

■ Typical applications

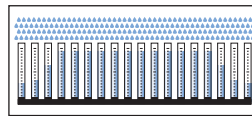
Car washing

High pressure washers

Industrial cleaning



Spray section



Even distribution



Nozzle type	Thread size
FA	1/8"
FB	1/4"
FX	Ø14.7

0°			15°			25°			40°			65°			US Gals	PNR Code	Capacity at different pressure values							(l/min) (bar)
FAA	FBA	FXA	FAB	FBB	FXB	FAD	FBD	FXD	FAL	FBL	FXL	FAR	FBR	FXR			20	30	50	70	100	150	200	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	015	1340	1.52	1.86	2.40	2.84	3.40	4.16	4.81	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	02	1460	2.06	2.52	3.25	3.85	4.60	5.63	6.51	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	025	1560	2.50	3.07	3.96	4.69	5.60	6.86	7.92	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	03	1686	3.07	3.76	4.85	5.74	6.86	8.40	9.70	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	035	1812	3.63	4.45	5.74	6.79	8.12	9.94	11.5	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	04	1930	4.16	5.09	6.58	7.78	9.30	11.4	13.2	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	045	2103	4.61	5.64	7.28	8.62	10.3	12.6	14.6	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	05	2116	5.19	6.35	8.20	9.71	11.6	14.2	16.4	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	055	2126	5.63	6.90	8.91	10.5	12.6	15.4	17.8	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	06	2138	6.17	7.56	9.76	11.5	13.8	16.9	19.5	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	065	2149	6.66	8.16	10.5	12.5	14.9	18.2	21.1	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	07	2160	7.16	8.76	11.3	13.4	16.0	19.6	22.6	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	075	2170	7.60	9.31	12.0	14.2	17.0	20.8	24.0	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	08	2181	8.09	9.91	12.8	15.1	18.1	22.2	25.6	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	085	2192	8.59	10.5	13.6	16.1	19.2	23.5	27.2	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	09	2204	9.12	11.2	14.4	17.1	20.4	25.0	28.8	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	095	2226	10.1	12.4	16.0	18.9	22.6	27.7	32.0	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	10	2230	10.3	12.6	16.3	19.2	23.0	28.2	32.5	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	11	2248	11.1	13.6	17.5	20.7	24.8	30.4	35.1	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	12	2272	12.2	14.9	19.2	22.8	27.2	33.3	38.5	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	12.5	2280	12.5	15.3	19.8	23.4	28.0	34.3	39.6	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	13	2296	13.2	16.2	20.9	24.8	29.6	36.3	41.9	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	14	2320	14.3	17.5	22.6	26.8	32.0	39.2	45.3	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	15	2341	15.2	18.7	24.1	28.5	34.1	41.8	48.2	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	16	2360	16.1	19.7	25.5	30.1	36.0	44.1	50.9	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	18	2410	18.3	22.5	29.0	34.3	41.0	50.2	58.0	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	20	2456	20.4	25.0	32.2	38.2	45.6	55.8	64.5	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	25	2567	25.4	31.1	40.1	47.4	56.7	69.4	80.2	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	30	2682	30.5	37.4	48.2	57.1	68.2	83.5	96.4	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	35	2800	35.8	43.8	56.6	66.9	80.0	98.0	113	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	40	2970	43.4	53.1	68.6	81.2	97.0	119	137	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	50	3113	50.5	61.9	79.9	94.5	113	138	160	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	60	3135	60.4	73.9	95.5	113	135	165	191	

HOW TO MAKE UP THE
NOZZLE CODE

EX.: FAA 1340 C2

F A A 1340 XX

CONNECTION • A - 1/8" • B - 1/4" • X - Ø14.7 Flanged nozzle tip

NOZZLE TYPE

SPRAY ANGLE • A - 0° • L - 40° • B - 15° • R - 65° • D - 25°

CAPACITY Please see next page

MATERIAL • C2 - AISI 416 Stainless steel

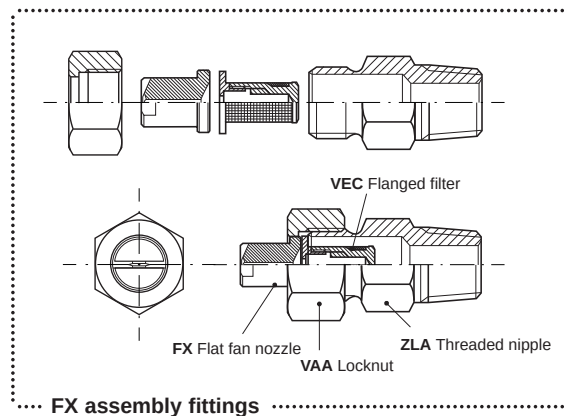
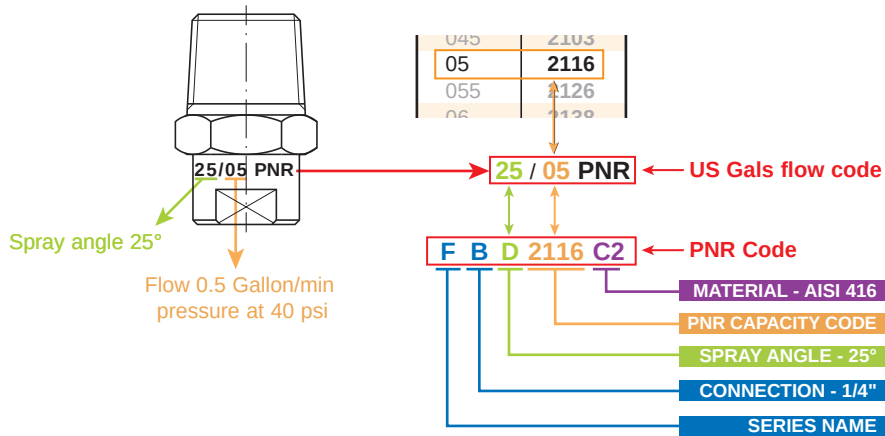
OUTER DIMENSION OF F TYPE NOZZLES AND FX NOZZLE TIPS (CODE)

The table on the right shows the correspondence between the nominal capacity in US Gallons per minute at 40 psi, which is commonly used to identify high pressure washing nozzles and the PNR capacity code at 100 bar. For the convenience of worldwide use, all nozzles are US coding system.

For example:

FBA 1686 C2 (PNR code) nozzle will be codified as **00/03** (US Gallons) with a spray angle 0° and capacity 0.3 Gals/min at a pressure of 40 psi.

FBD 2116 C2 (PNR code) nozzle will be codified as **25/05** (US Gallons) with a spray angle 25° and capacity 0.5 Gals/min at a pressure of 40 psi. (see below)



US Gals	PNR Code
015	1340
02	1460
025	1560
03	1686
035	1812
04	1930
045	2103
05	2116
055	2126
06	2138
065	2149
07	2160
075	2170
08	2181
085	2192
09	2204
095	2226
10	2230
11	2248
12	2272
12.5	2280
13	2296
14	2320
15	2341
16	2360
18	2410
20	2456
25	2567
30	2682
35	2800
40	2970
50	3113
60	3135

HIGH PRESSURE WASHING ACCESSORIES

We have all kinds of washing guns (low/medium/high/superhigh pressure) and accessories for various washing applications and environments. We will help you to chose the best solution for your needs.



UMW 0010 D4
High pressure gun
(P.95)



UMW 0020 D4
High pressure gun
(P.95)



UMW 0030 B3
High pressure lance
(P.96)



UMW 0045 B3
High pressure lance
(P.96)



UMU J/I
Auto-rewind reels
(P.102)

OPTIONAL ELEMENT- FLOW STRAIGHTENER

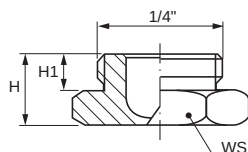
Flow straighteners improve spray jet efficiency by straightening the liquid path to minimize turbulence and produce swirl-free, even, stable and straight-run flows. All PNR nozzles are ready to embed a flow straightener.

These items can be supplied separately on request.

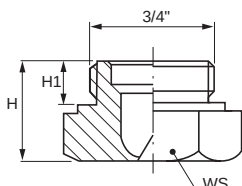




1/4" Standard capacity



3/4" Large capacity

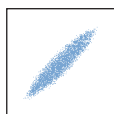


SHORT BODY

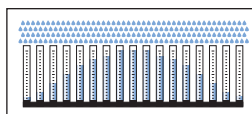
The special short body design of the GA nozzles makes it possible to use nozzle spray pipes in such machines or systems where the available space is very limited. (for ex., tight turns in traps and elbows).

They allow an even jet distribution and a proper force of impact. GA nozzles are available in two types: 1/4" standard capacity and 3/4" large capacity. They are made in brass, stainless steel or in plastic materials to suit different working environments. GA nozzles in plastic materials are made with a longer thread and bigger front for higher efficiency and longer service life.

Thread specification: BSP



Spray section



Convex distribution



Typical applications

Washing

Filter cleaning in paper making machines and dryers.

Cooling

Continuous casting
Product cooling

Other applications

Spray of chemicals
Water curtains for toxic gases suppression
Excellent for pipe, sewer and drain cleaning

1/4" BSP THREAD

GAM 45°	GAQ 60°	GAU 90°	GAW 120°	Capacity code	D mm	Capacity at different pressure values (l/min) (bar)									
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
•	•	•	•	1310	1.70	1.27	1.79	2.19	2.53	3.10	3.58	4.00	4.74	5.66	
•	•	•	•	1385	1.80	1.57	2.22	2.72	3.14	3.85	4.45	4.97	5.88	7.03	
•	•	•	•	1490	2.10	2.00	2.83	3.46	4.00	4.90	5.66	6.33	7.48	8.95	
•	•	•	•	1780	2.70	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2	
•	•	•	•	2124	3.40	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	22.6	
•	•	•	•	2153	3.80	6.25	8.83	10.8	12.5	15.3	17.7	19.8	23.4	27.9	
•	•	•	•	2194	4.30	7.92	11.2	13.7	15.8	19.4	22.4	25.0	29.6	35.4	

3/4" BSP THREAD

GAM 45°	GAQ 60°	GAU 90°	GAW 120°	Capacity code	D mm	Capacity at different pressure values (l/min) (bar)									
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
•	•	•	•	2195	4.30	7.96	11.3	13.8	15.9	19.5	22.5	25.2	29.8	35.6	
•	•	•	•	2246	4.80	10.0	14.2	17.4	20.1	24.6	28.4	31.8	37.6	44.9	
•	•	•	•	2311	5.40	12.7	18.0	22.0	25.4	31.1	35.9	40.1	47.5	56.8	
•	•	•	•	2490	6.40	20.0	28.2	34.6	40.0	49.0	56.6	63.3	74.8	89.5	
•	•	•	•	2610	7.50	24.9	35.2	43.1	49.8	61.0	70.4	78.8	93.2	111	
•	•	•	•	2760	8.30	31.0	43.9	53.7	62.1	76.0	87.8	98.1	116	139	

Longer thread and bigger front design for short-body nozzles in plastic to ensure safer operating performances and longer service life.



GA series nozzle metal design

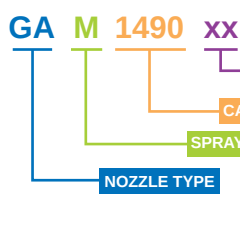


GA series nozzle plastic design

	Dimensions (mm)					
	Small size (1/4")			Large size (3/4")		
Material	H	H1	WS	H	H1	WS
B1 - AISI 303 SS	12	7	17	15	8	32
B31 - AISI 316L SS						
T1 - Brass						
D2 - PP	17	7	17	23	11	32
E1 - PTFE						
D1 - PVC						

HOW TO MAKE UP THE NOZZLE CODE

EX.: GAM 1490 B1



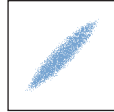
- M - 45°
- Q - 60°
- U - 90°
- W - 120°

- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass
- D1 - PVC (optional)
- D2 - PP (optional)
- E1 - PTFE (optional)

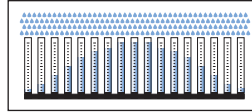
LOW CAPACITY

Flat fan nozzle tips are usually mounted onto a pipe by means of a welded nipple or a clamp, and secured in place with a retaining nut. They can be easily replaced and the jet can be conveniently oriented in the desired direction.

The tips models shown on this page delivery very low flow values. Their precisely machined small orifices can be protected from clogging by means of a filter assembled inside our nipples and clamps that are designed for this purpose. Please find more information on page 44.



Spray section



Convex distribution

■ **Connection:** Flange

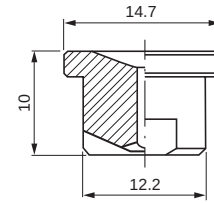
■ **Typical applications**

Washing: semiconductor and precision parts cleaning

Cooling: continuous casting, product cooling

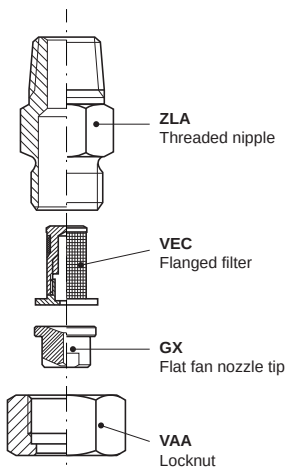
Lubrication: spray of lubricating oils and release agents

Other applications: spray of flavouring agents, cooling oil and antifoulant chemicals



GXD 25°	GXL 40°	GXN 50°	GXR 65°	Capacity code	D mm	Capacity at different pressure values (l/min) (bar)									
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
			•	0060	0.28				0.05	0.06	0.07	0.08	0.09	0.11	
			•	0100	0.34				0.08	0.10	0.12	0.13	0.15	0.18	
			•	0130	0.38				0.11	0.13	0.15	0.17	0.20	0.24	
		•	•	0200	0.46		0.12	0.14	0.16	0.20	0.23	0.26	0.31	0.37	
	•	•	•	0260	0.53		0.15	0.18	0.21	0.26	0.30	0.34	0.40	0.47	
•	•	•	•	0390	0.66		0.23	0.28	0.32	0.39	0.45	0.50	0.60	0.71	
•	•	•	•	0590	0.79	0.24	0.34	0.42	0.48	0.59	0.68	0.76	0.90	1.08	
•	•	•	•	0780	0.91	0.32	0.45	0.55	0.64	0.78	0.90	1.01	1.19	1.42	
•	•	•	•	1120	1.10	0.49	0.69	0.85	0.98	1.20	1.39	1.55	1.83	2.19	
•	•	•	•	1160	1.30	0.65	0.92	1.13	1.31	1.60	1.85	2.07	2.44	2.92	

GXS 73°	GXT 80°	GXV 95°	GXJ 110°	Capacity code	D mm	0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
•				0060	0.28				0.05	0.06	0.07	0.08	0.09	0.11	
•				0100	0.34				0.08	0.10	0.12	0.13	0.15	0.18	
•				0130	0.38				0.11	0.13	0.15	0.17	0.20	0.24	
				0150	0.40				0.12	0.15	0.17	0.19	0.23	0.27	
	•	•		0200	0.46		0.12	0.14	0.16	0.20	0.23	0.26	0.31	0.37	
•	•	•	•	0260	0.53		0.15	0.18	0.21	0.26	0.30	0.34	0.40	0.47	
•	•	•	•	0390	0.66		0.23	0.28	0.32	0.39	0.45	0.50	0.60	0.71	
•	•	•	•	0590	0.79	0.24	0.34	0.42	0.48	0.59	0.68	0.76	0.90	1.08	
•	•	•	•	0780	0.91	0.32	0.45	0.55	0.64	0.78	0.90	1.01	1.19	1.42	
•	•	•	•	1120	1.10	0.49	0.69	0.85	0.98	1.20	1.39	1.55	1.83	2.19	
•	•	•	•	1160	1.30	0.65	0.92	1.13	1.31	1.60	1.85	2.07	2.44	2.92	

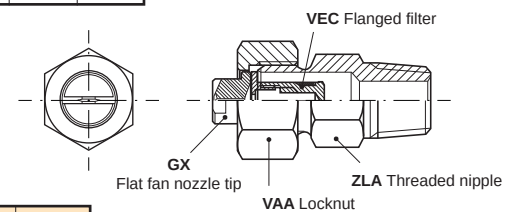


Assembly fittings

MATERIAL PROCESSING

Because of the extreme difficulty of working hard materials such as stainless steels with very small profile drills, not all the capacity sizes shown in the nozzle table are available in all materials. The table below shows the minimum capacity values we can produce for each given material. Please contact our sales for more information.

Material	0060	0100	0130	0150	0200	0260	0390	0590	0780	1120	1160
B31 - AISI 316L SS			•	•	•	•	•	•	•	•	•
B1 - AISI 303 SS			•	•	•	•	•	•	•	•	•
T1 - Brass	•	•	•	•	•	•	•	•	•	•	•



HOW TO MAKE UP THE
NOZZLE CODE

EX.: GXD 0390 B1

GX **D** **0390** **XX**

NOZZLE TYPE

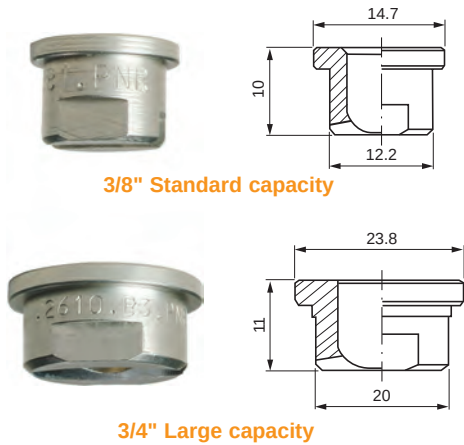
SPRAY ANGLE

CAPACITY

MATERIAL

• D - 25° • S - 73°
• L - 40° • T - 80°
• N - 50° • V - 95°
• R - 65° • J - 110°

• B1 - AISI 303 Stainless steel
• B31 - AISI 316L Stainless steel
• T1 - Brass



STANDARD AND LARGE CAPACITIES

Flat fan nozzle tips are usually mounted onto a pipe by means of a welded 3/8" nipple or a clamp, and secured in place with a retaining nut. They can be easily replaced and their jet can be conveniently oriented in the desired direction. These nozzle are available in two types: 3/8" standard capacity and 3/4" large capacity. The tip is assembled with a pipe clamp, a welding nipple and a locknut. Please find more information on page 44.

Typical applications

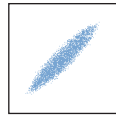
Washing: filter cloth cleaning, parts cleaning, vehicles cleaning

Cooling: steel cooling, product cooling

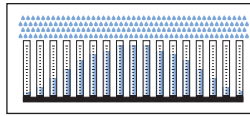
Lubrication: spray of lubricating oil and release agents

Other applications: spray of antifoulant chemicals, etc.

Connection: Flange



Spray section



Convex distribution

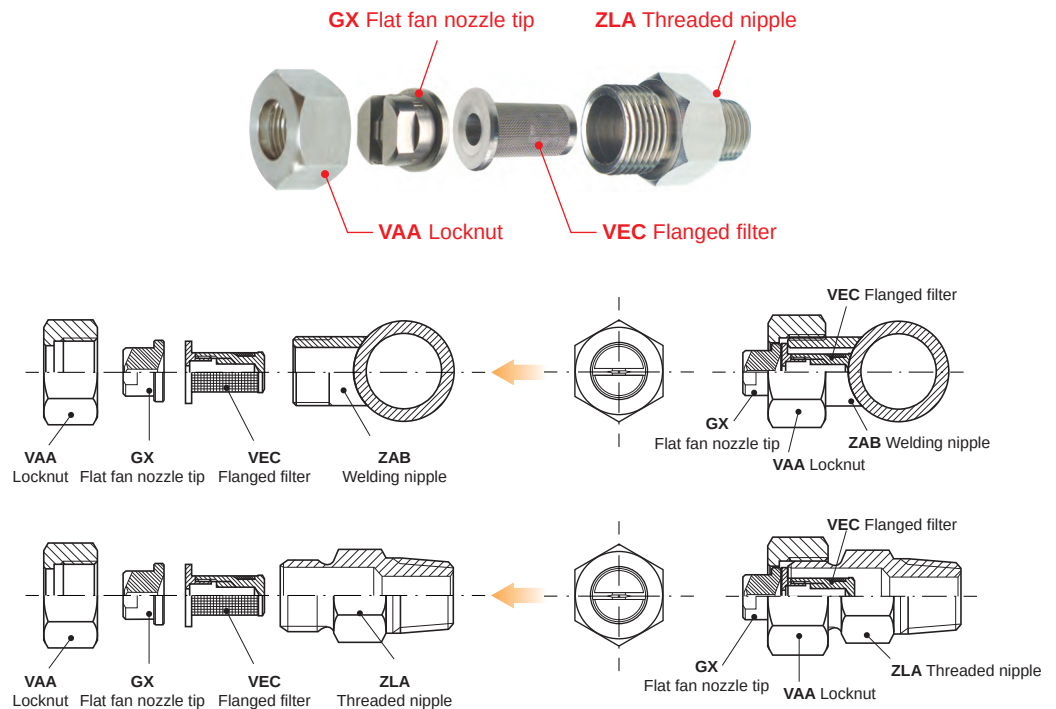


SPRAY ANGLE CODES

GXA	GXF	GXM	GXQ	GXU	GXW
0°	30°	45°	60°	90°	120°

ASSEMBLY FITTINGS

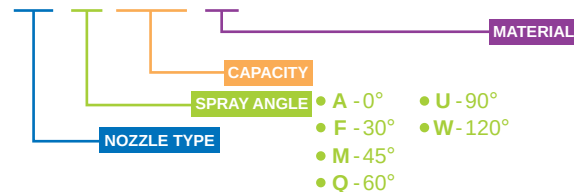
This illustration shows a typical assembly of a nozzle tip with a locknut and a welding nipple.



HOW TO MAKE UP THE NOZZLE CODE

EX.: GXA 1310 B1

GX **A** **1310** **XX**



- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass