PNR

SPRAY NOZZLES FOR INDUSTRIAL APPLICATIONS



SPRAY NOZZLES & ASSEMBLY FITTINGS

GENERAL CATALOGUE

INTRODUCTION

PNR ITALIA

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 manifacture 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 manifacturing 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 it 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.

DISCLAIMER

Our products are manufactured with the best care and according to the latest developments of the technology available. However we cannot assure that every one of our products is perfectly fit for every specific application. The information in this catalogue is provided “as seen” and so we offer no warranty of any kind with respect to the subject matter or accuracy of the information contained herein. This publication may include technical inaccuracies or typographical errors and changes may be periodically made to the information herein without prior notice.As a result of continuous product improvement our documentation is regularly updated: please visit our website www.pnr.eu to be always updated.

PRODUCT WARRANTY

PNR products will be replaced or repaired at the option of PNR and free of charges if found defective in manufacturing, labelling and packaging. The above conditions will apply if notice of defects is received by PNR within 30 days from date of product installations or one year from date of shipment. The cost of above said replacement or repair shall be the exclusive remedy for any breach of any warranty, and PNR shall not be held liable for any damage due to personal injuries or commercial losses coming from product malfunction.
It is self-understood that no warranty may apply in case our products have been operated under nonacceptable conditions, like for example (but not limited to):
– Operation at pressures exceeding those shown in catalogue performance table
– Operation with or exposure to liquids containing abrasive particles
– Operation with or exposure to liquids producing a chemical attack on the nozzle material
– Mechanical damages to nozzle orifices, nozzle spray edge or body due to careless handling or assembling.
In all above cases, the costumer must accept a nozzle life reduction below life expected, or performance parameters below the values in the catalogue.
The guarantee may be exercised as follows:
– By sending a precautionary report to PNR on the detected damages. This report can also be sent by email to this address: quality@pnr.it
– If PNR ascertains that the manufacturing faults are actually subject to the warranty, the product shall have be returned to the manufacturer in its original packaging prior request of authorization to the manufacturer and receipt of manufacturer’s written authorization.
– The rejected goods shall have be returned by the means that PNR will communicate to the customer and the transportation costs of returned merchandise will be entirely borne by the manufacturer.

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Our Quality System is certified ISO 9001:2015

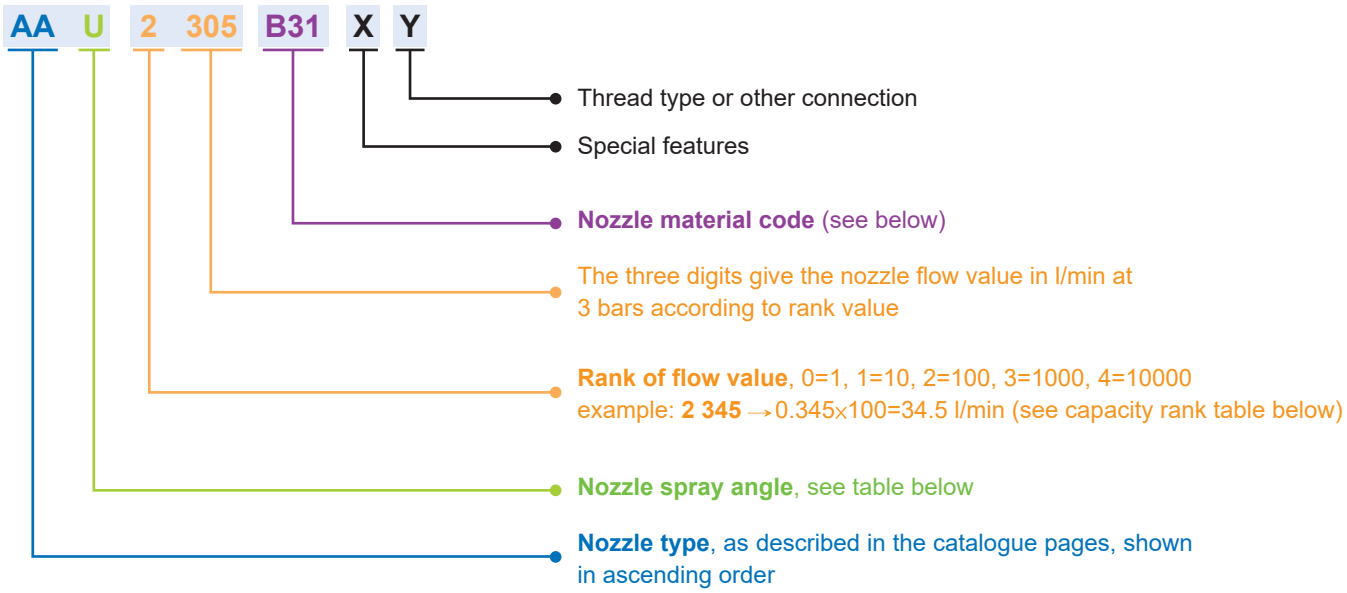
COMPANY WITH QUALITY SYSTEM CERTIFIED BY DNV GL = ISO 9001:2015 =



NOZZLE IDENTIFICATION CODES

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
A2	High speed steel
A8	Zinc coated steel
A9	Nickel coated steel
B1	AISI 303 Stainless steel
B2	AISI 304 Stainless steel
B21	AISI 304L Stainless steel
B3	AISI 316 Stainless steel
B31	AISI 316L Stainless steel
C2	AISI 416 Stainless steel, hardened
D1	Polyvinylchloride (PVC)
D2	Polypropylene (PP)
D3	Polyamide (PA)
D4	Nylon, Glassfibers reinforced
D5	Talcum filled Polypropylene
D6	Glassfibre reinforced PP
D7	High density polyethilene
D8	Polyvinylidenefluoride (PVDF)
D82	PVDF, Injection molded
E0	EPDM
E1	Polytetrafluorethylene (PTFE)
E2	PTFE (15% glassfibers)
E31	Acetalic resin (POM)
E6	LUCITE ® (PMMA)
E7	Viton
E8	Synthetic rubber (NBR)
F5	Ceramic
F30	Ruby insert, 303 body
F31	Ruby insert, 316 body
F32	Diamond insert, 303 body
F33	Diamond insert, 316 body
G1	Cast iron
H1	Titanium
L1	Monel 400
L2	Incolloy 825
L8	Hastelloy C276
P6	Acr. But. Styrene (ABS)
P8	EPDM 40 Shore
T1	Brass
T2	Brass, chrome plated
T3	Copper
T5	Bronze
T8	Brass, nickel plated
T81	Brass, electroless nickel plated
V1	Aluminum
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, PP, PVDF

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, PTFE, Hastelloy C 22

P.24



BB Cleanable

- Thread size: 1/8" ~ 1/2"
- Spray angle: 60°
- Square spray pattern
- 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, PTFE, Hastelloy C22

P.24



BD Cleanable

- Thread size: 1/8" ~ 1/2"
- Spray angle: 60°
- Square spray pattern
- 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, PTFE, Hastelloy C22

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, PVC, PTFE

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, PTFE, Hastelloy C22

P.27



BH Small capacity

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

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, PTFE, PVC, PP

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, PTFE, PVC, PP

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, PTFE, PVC, PP

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 BX sister roducts

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

P.31

Unless otherwise specified, the maximum and minimum capacities of every range refer to the pressure of 3.0 bar.



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, Nickel plated 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: 0.78 ~ 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, Hastelloy C22

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, Hastelloy C22

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



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 (with ruby insert)

P.79



GEA Disc nozzle

- Spray angle: 0°
- Capacity: 0.17 ~ 3.1 l/min
- Materials: AISI 303 with ruby insert, AISI 316L with ruby insert, AISI 316Ti

P.64



GFA Self-cleaning nozzles

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

P.65



GMA Paper web trimmers

- Thread size: 3/8"
- Spray angle: 0°
- Capacity: 0.08 ~ 2.2 l/min
- Materials: ASI 303 with ruby insert, AISI 316L with ruby insert

P.80



J General purpose

- Thread size: 1/8", 1/4"
- Spray angle: 0°
- Capacity: 0.17 ~ 47 l/min
- Materials: AISI 303, AISI 316L, Brass, AISI 316L with ruby insert, AISI 316L with diamond insert

P.81

Unless otherwise specified, the maximum and minimum capacities of every range refer to the pressure of 3.0 bar.

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, PVC, PP, PTFE

P.47



GE Disc nozzles

- Spray angle: 60°, 75°
- Capacity: 0.90 ~ 23.0 l/min
- Materials: AISI 316Ti

P.64



GF Self cleaning nozzles

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

P.65



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, PVDF

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: 0.26 ~ 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, PVC, PTFE

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



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

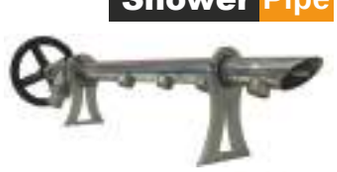


KX Large spray angle

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

P.59

Shower Pipe



P.63

Unless otherwise specified, the maximum and minimum capacities of every range refer to the pressure of 3.0 bar.



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



PN Moulded plastic

- Thread size: 3/8" ~ 1/2"
- Spray angle: 60° ~ 130°
- Capacity: 1.70 ~ 42 l/min
- Material: Fiberglass reinforced PP

P.70



PO Moulded plastic

- Thread size: 3/8"
- Spray angle: 60° ~ 130°
- Capacity: 1.70 ~ 22 l/min
- Material: Fiberglass reinforced PP

P.70



PR Large capacity

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

P.71



PS Moulded plastic

- Thread size: 3/8"
- Spray angle: 60° ~ 130°
- Capacity: 1.70 ~ 22 l/min
- Material: Fiberglass reinforced PP

P.70



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



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, Ni-plated brass (chemical)

P.75



RW Low capacity

- Tip + nipple + locknut
- Spray angle: 80°
- Capacity: 3.6 ~ 99.6 l/hour
- Materials: AISI 303, AISI 316L, Brass

P.76



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



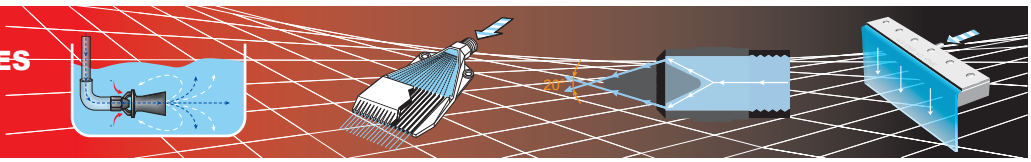
RZ Low capacity

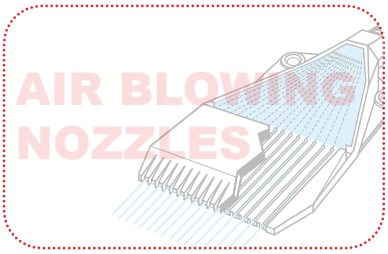
- Thread size: 1/4"
- Spray angle: 30° ~ 90°
- Capacity: 0.08 ~ 2.0 l/min
- Materials: AISI 303, AISI 316L, Brass

P.76

Unless otherwise specified, the maximum and minimum capacities of every range refer to the pressure of 3.0 bar.

AIR BLOWING NOZZLES
MIXING EDUCTORS







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: Electroless Ni-plated aluminum, AISI 316L

P.83



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

P.83



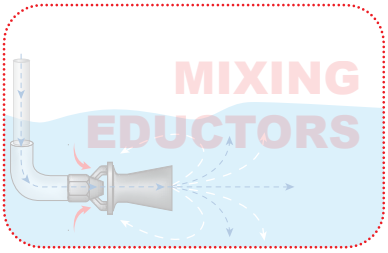
UEA 0527 Air blow-off nozzles
- Thread size: 1/4"
- Spray width: 51 mm
- Capacity: 22 Nm³/hour (3 bar)
- Materials: Electroless Ni-plated aluminum, AISI 316L

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: Electroless Ni-plated aluminum, AISI 316L

P.84





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

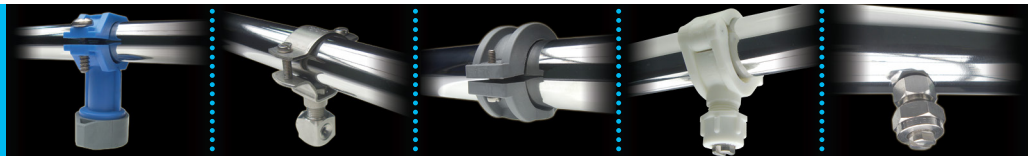
P.85



UPD Mixing eductors
- Thread size: 3/4" ~ 2", 1/4"
- Capacity: 109 ~ 357 l/min
- Materials: AISI 316L, Fiberglass reinforced PP

P.85

ASSEMBLY ACCESSORIES





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, PP, PVDF

P.89



ZAC Dovetail welding nipples
- Thread size: 3/8", 3/4", 1-1/4"
- Material: AISI 303, AISI 316L, PP, PVDF

P.89



ZLA Standard threaded nipples
- Thread size: 1/8" ~ 1/2"
- Materials: AISI 303, AISI 316L, Brass, PVC, PP, PVDF

P.89



ZPB Plastic pipe clamps
- Pipe size: 1/2" ~ 1-1/4"
- Body: Fiberglass reinforced PP
- O-ring: NBR
- Metal Parts: AISI 304

P.86



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

P.86



ZPH Disk nozzle pipe clamp
- Pipe external diameter: 2"
- Body: Fiberglass reinforced PP
- O-ring: EPDM
- Pin, bolt: AISI 316

P.88



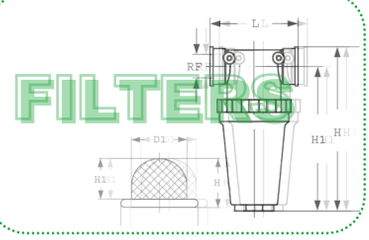
ZPM Metal pipe clamps
- Pipe size: 1/2" ~ 2-1/2"
- Body: AISI 304, Zinc coated steel
- Gasket: EPDM
- Nipple: AISI 316L, Brass

P.87

Unless otherwise specified, the maximum and minimum capacities of every range refer to the pressure of 3.0 bar.



FILTERS
SPRAY GUNS
HOSE REELS





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 316L, Nylon
- Wire net: Brass, AISI 304

P.91



VED Check-valve filters

- Suitable nozzle tip: GX, FX, BX, KX
- Mesh number: 50, 80, 100 Mesh
- Body: AISI 303, AISI 316L, Brass, Nylon
- Wire net: AISI 304

P.92



VEF Threaded filters

- Suitable nozzle tip: J, RW, 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 304
- 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

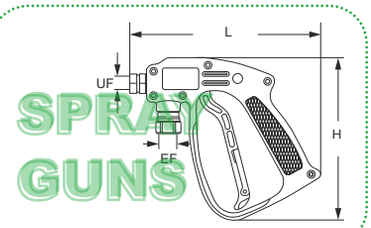
P.94



VEQ "Y" style filters

- Thread size: 1/2", 3/4" , 1"
- Mesh number: 60 Mesh
- Body: Fiberglass reinforced PP
- Wire net: AISI 304
- Seal: EPDM

P.94





UMS Portable water guns

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

P.98



UMV Hot water spray guns

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

P.97



UMW High pressure guns

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

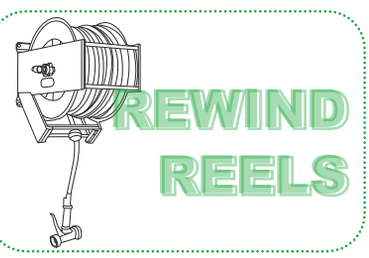
P.95



XUM FLEXIBLE HOSE

- Hose: EPDM
- Couplings: AISI 316

P.98





UMU A / B Manual rewind reels

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

P.99



UMU G / H Auto-rewind reels

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

P.99



UMR Pressure tanks

- Body: AISI 304
- Base: Synthetic rubber
- Capacity: 9, 19 Liters
- LP: 4.9 bar

P.90



UMU L / K Auto-rewind & orientable outlet reels

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

P.100



UMU J / I Large capacity auto-rewind reels

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

P.100

Unless otherwise specified, the maximum and minimum capacities of every range refer to the pressure of 3.0 bar.

CLIP-ON NOZZLES





DT/QM Full cone nozzles
HT/QM Flat fan nozzles

- Quick-fit
- Spray angle: 45° ~ 120°
- Capacity: 0.78 ~ 28.0 l/min
- Material: Fiberglass reinforced PP

P.108



HG Flat fan nozzles

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

P.109



HT/QQ Flat fan nozzles

- Quick-fit
- Spray angle: 60°
- Capacity: 2.3 ~ 15.8 l/min
- Material: Fiberglass reinforced PP AISI 316L

P.110



KS/QQ Flat fan nozzles

- Quick-fit
- Spray angle: 50°, 60°
- Capacity: 8.9 ~ 25 l/min
- Body: Fiberglass reinforced PP

P.110



RG Hollow cone nozzles

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

P.109



VAB Locknuts

- Body: Fiberglass reinforced PP

P.105



VAE Locknuts

- Material: Fiberglass reinforced PP

P.106



ZBA Threaded / quick-fit sphere

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

P.106



ZLF Threaded nipple

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

P.106



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



ZPG Pipe holders

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

P.111



ZPL Spring pipe clamps

- Thread size: 1", $1^1/4$", $1^1/2$", 2"
- Body: Fiberglass reinforced PP
- O-ring: NBR
- Spring: AISI 302, AISI 316L

P.105



ZPN Spring pipe clamps

- Thread size: 1/8" ~ 1/2"
- Body: Fiberglass reinforced PP
- O-ring: NBR
- Spring: AISI 302, AISI 316L

P.107



ZPQ Cam & lever clamps

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

P.104

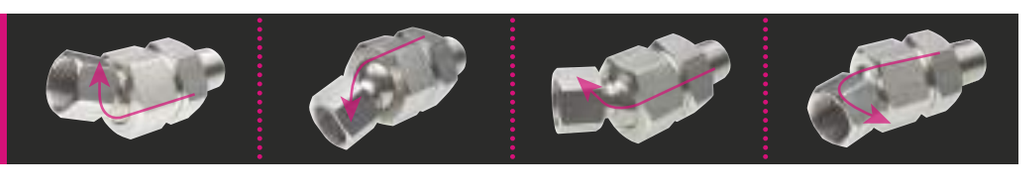


ZSA Quick coupling joints

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

P.112

SWIVEL JOINTS





ZRA Standard swivel joints

- Thread size: 1/8" ~ 3/4"
- Materials: AISI303, AISI 316L, Brass

P.113



ZRP Triangle flanged swivel joints

- Thread size: 1/8" ~ 3/8"
- Materials: AISI303, AISI 316L, Brass

P.114



ZRQ Large capacity swivel joints

- Thread size: 1" ~ $2^1/2$"
- Materials: AISI303, AISI 316L, Brass

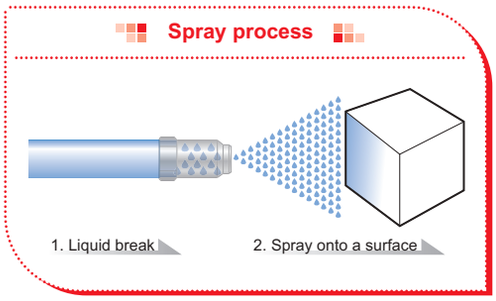
P.114

Unless otherwise specified, the maximum and minimum capacities of every range refer to the pressure of 3.0 bar.

THE PROCESS OF ATOMIZATION

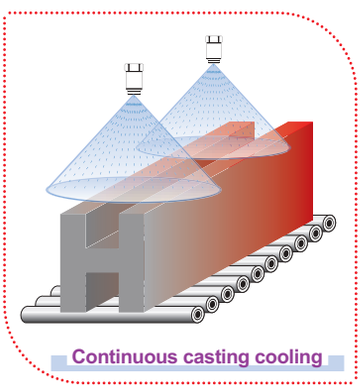
A liquid spraying process can be described as consisting of two phases, namely:
1. breaking of the liquid into separate droplets
2. directing the liquid drops onto a surface or an object, to achieve the desired result.

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

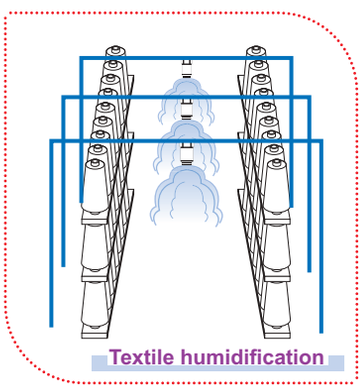


APPLICATIONS

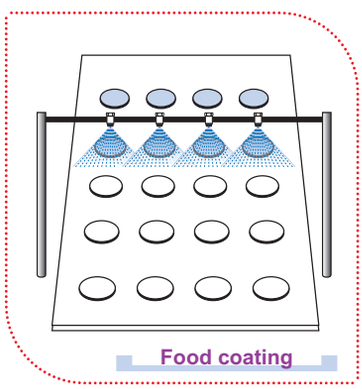
Spraying a liquid through a spray nozzle can serve different purposes, among which the most important are the following:



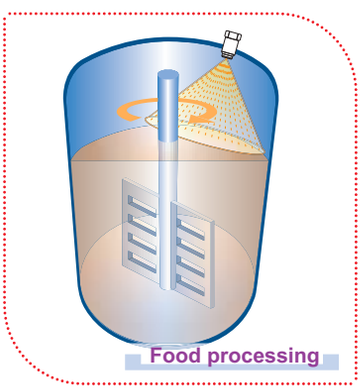
Cooling: heat transfer by spraying liquids onto the products surface for a rapid cooling, such as continuous casting cooling in steelworks.



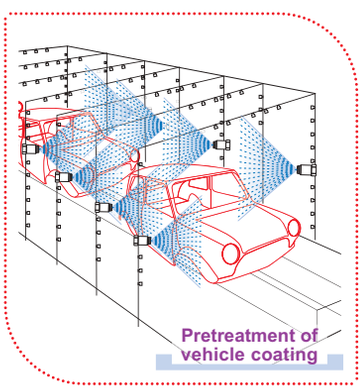
Humidification: spray of very little quantities of liquid onto the products surface into special chambers or rooms to raise relative humidity. A typical application is textiles humidification.



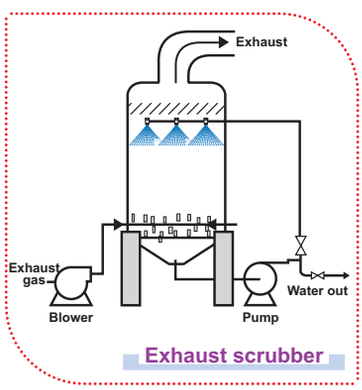
Coating: application of coatings or liquids on the food products surface. For example: oil-spraying on bread.



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 web 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.

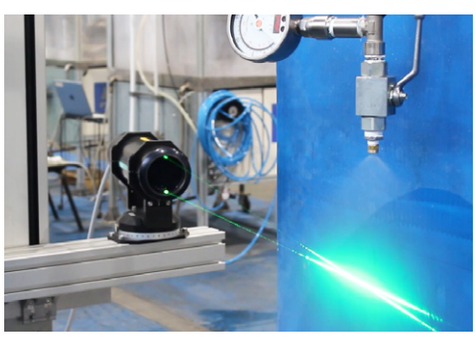
1. NOZZLE EFFICIENCY

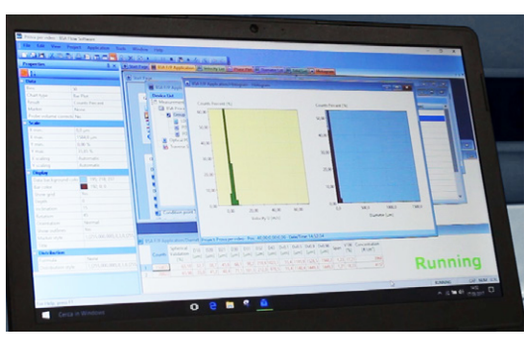
A spray nozzle is a device that turns the pressure energy of a liquid flow into kinetic energy. The nozzle efficiency can be defined as the ratio between the energy available at the nozzle inlet and the energy wich is actually used to increase the liquid speed and create the spray, the difference being 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. ($1\mu m=10^{-3}mm$)





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.

1 2

3 4

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 30°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.

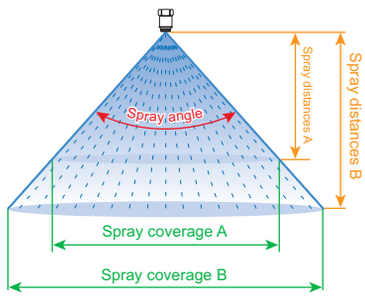
Laser interpherometer test

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

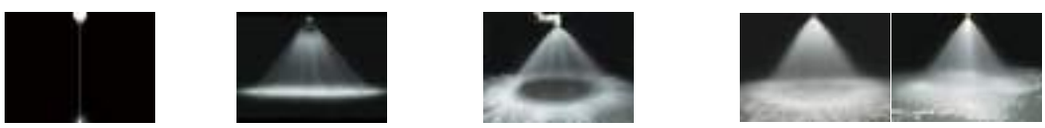
3. SPRAY ANGLE

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 116)



4. IMPACT FORCE

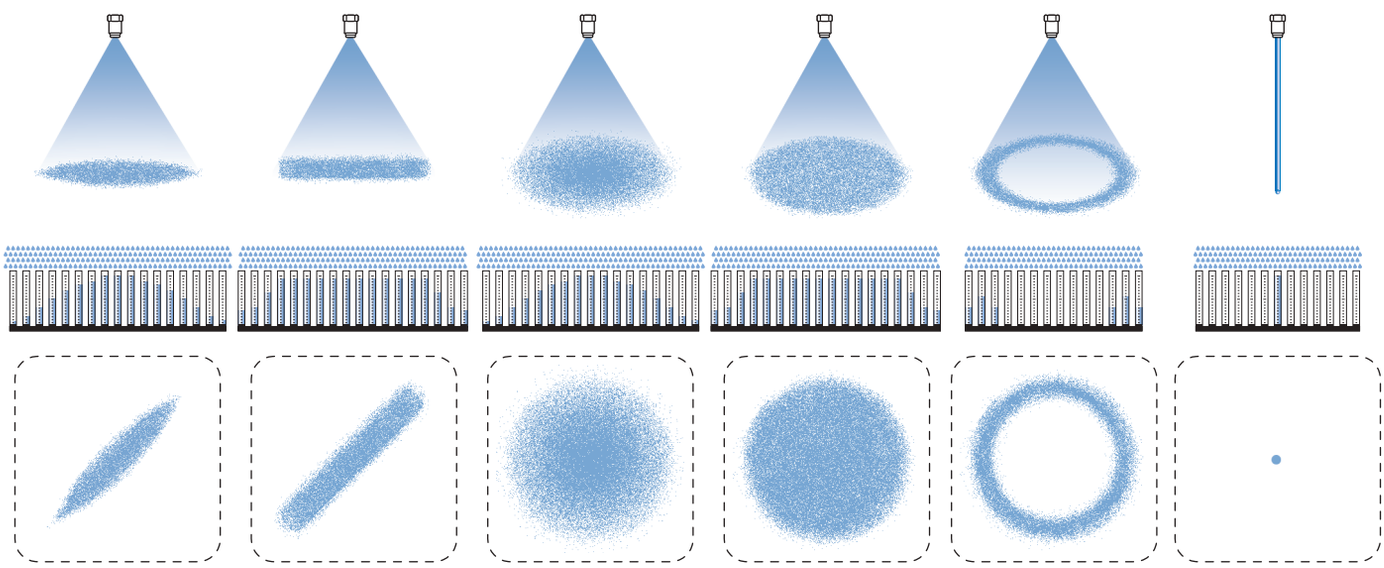
The impact force is the force generated by the jet of water deflected by the impact surface and its strength can be expressed as a force in kg or pounds or as a pressure in a given point in kg/mm^2 or lb/inch^2. The uniformity of a jet impact force and distribution influence the washing effect. Under 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.



Flat fan convex distribution

Flat fan even distribution

Full cone convex distribution

Full cone even distribution

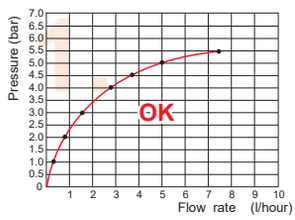
Hollow cone concave distribution

Straight single-point distribution

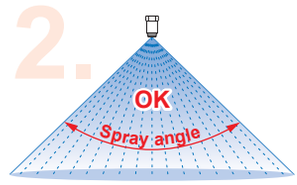
SPRAY NOZZLE

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 ±10% 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



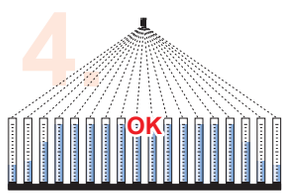
Check if liquid flow and pressure are in direct proportion.



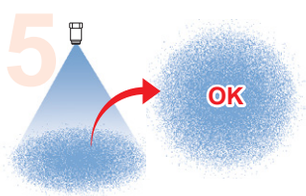
Check if spray angle is as required.



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

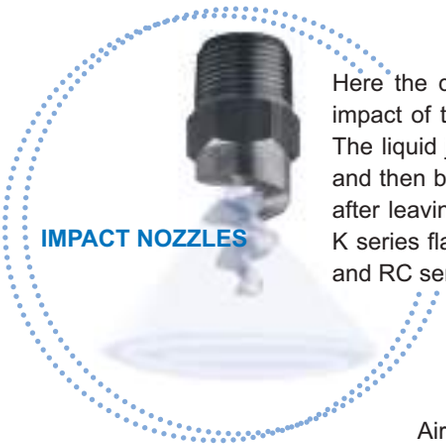
This is the simplest type of nozzle where an orifice is opened into a chamber where the liquid to be sprayed is fed under pressure.
A spray is produced through the orifice with spray pattern, flow rate and spray angle depending upon the orifice edge profile and the design of the inside pressure chamber.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



TURBULENCE NOZZLES

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.

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.



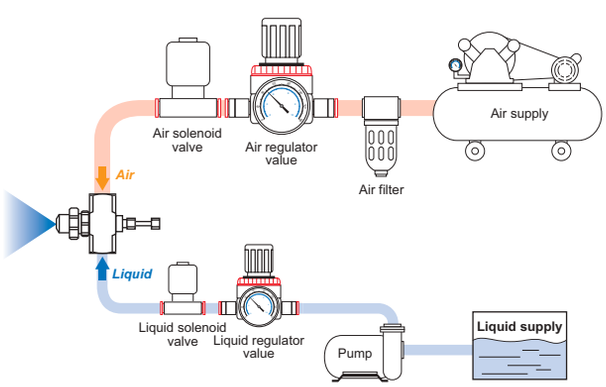
AIR ASSISTED ATOMIZERS

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.

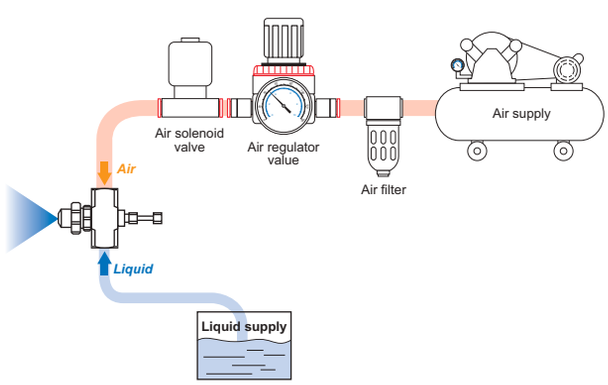


Air-assisted nozzles - Depending on the liquid supply, these nozzles are of two types: Pressure nozzles and Siphon nozzles.

PRESSURE NOZZLES



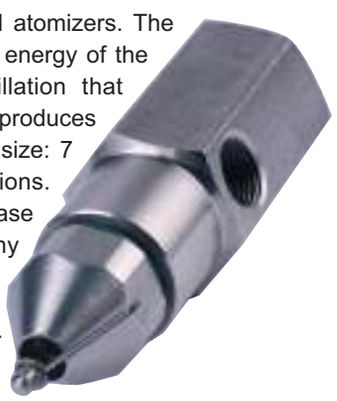
SIPHON NOZZLES





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.



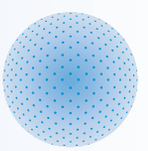
S - TYPE VANE

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.

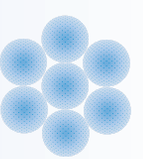


SPIRAL VANE

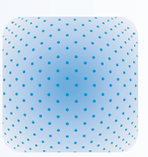
Spiral vane is specific design of spiral full cone nozzles. Liquids hit spiral vane then atomize and extend to the desired spray angle. The specific design greatly increases liquids inlet and outlet diameter. Any foreign matters entering could come out. It avoids clogging and provides larger capacity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



FULL CONE
Round spray



FULL CONE
Cluster spray



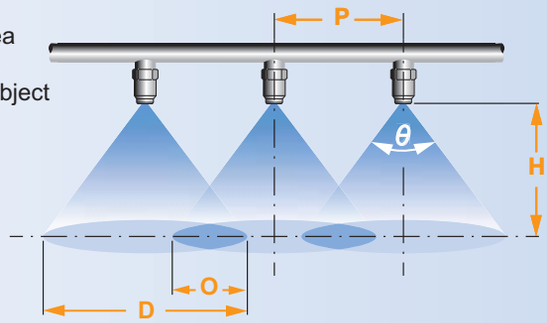
FULL CONE
Square pattern

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.

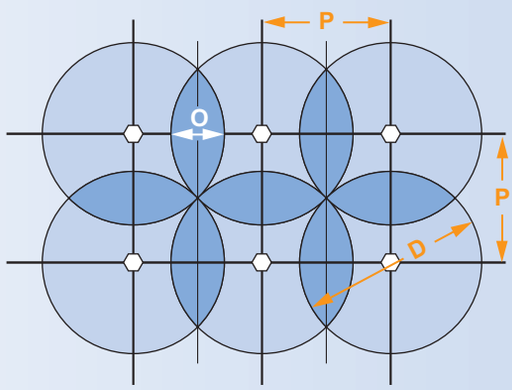
Matrix configuration

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



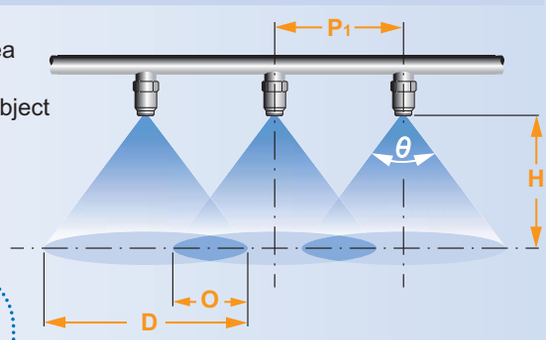
Nozzle spacing(P) = $\frac{D}{\sqrt{2}}$

Overlap(O)= D - P



Offset configuration

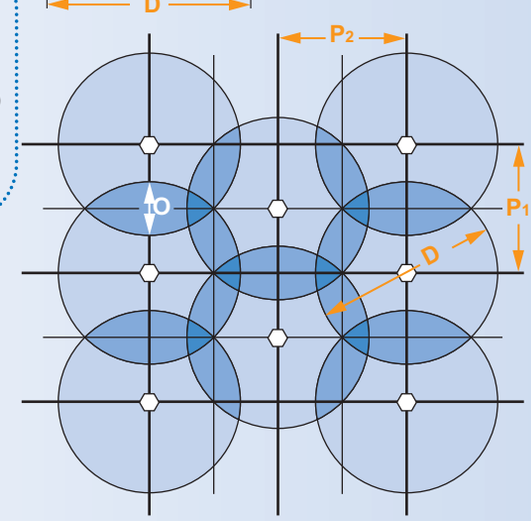
O - width of overlapping area
D - diameter of spray range
H - nozzle distance to the object being sprayed
P - nozzle spacing
θ - spray angle



Nozzle spacing(P_1)
= $\frac{D}{2} \times \sqrt{3}$

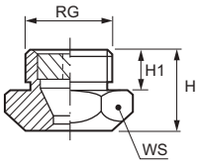
Nozzle spacing(P_2) = $\frac{3}{4}D$

Overlap(O) = D - P_1

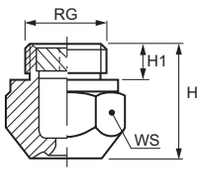


AA (FULL CONE NOZZLES / SHORT BODY)

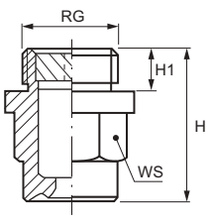










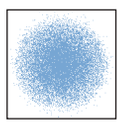


SLOTTED VANE

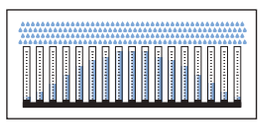
AA series full cone nozzles are made of body and slotted vane, for an even spray distribution. Their design allows them to be 35% shorter than other full cone nozzles. They are used in operating environments with a restricted space available and are cost-effective for the lower material quantity.

- **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 (l/min) (bar) 0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H mm	H1 mm	WS mm
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	1¼"	12.5	6.0	50.2	59.4	71.0	100	123	159	188	225	30	14	50
	AAU 3194 xx	1½"	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	2½"	25.0	12.0	200	237	283	400	490	633	748	895	52	22	90
	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
120°	**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	1¼"	12.7	6.0	50.2	59.4	71.0	100	123	159	188	225	62	19	50
	AAW 3194 xx	1½"	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	2½"	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"	1¼"	1½"	2"	2½"	3"
B31 - AISI 316L					•	•	•
T1 - Brass	•						
D1 - PVC	•	•	•	•	•	•	•

HOW TO MAKE UP THE NOZZLE CODE

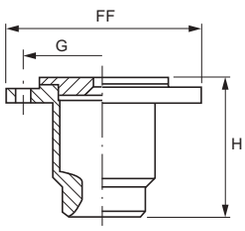
EX.: AAU 2305 B31

AA U 2305 xx

- MATERIAL
  - • **B31** - AISI 316L Stainless steel
  - • **D1** - PVC
  - • **T1** - BRASS
  - ○ **B1** - AISI 303 Stainless steel (optional)
  - ○ **D2** - PP (optional)
  - ○ **E1** - PTFE (optional)
- CAPACITY
- SPRAY ANGLE
  - • **U** - 90°
  - • **W** - 120°
- NOZZLE TYPE

SLOTTED VANE

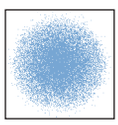
AE type nozzles are designed to deliver large and very large capacity values from 384 l/min to 3842 l/min at 0.5 bar.
The carefully designed slotted vane offers uniform spray distribution and perfect performance even with very low inlet pressure values. Compared to other large nozzles, the upper flange reduces the length of nozzles and offers fast and safe ways to install.



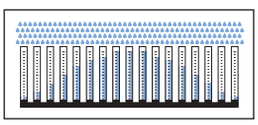




Flange specification
DIN Standard
JIS Standard (optional)



Spray section



Convex distribution

	Code	DN mm	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)								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			
	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			
120°	**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**

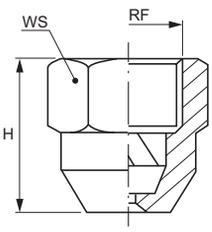
EX.: AEU 3940 A1

AE U 3940 xx

- NOZZLE TYPE
- SPRAY ANGLE • **U** - 90° • **W** - 120°
- CAPACITY
- MATERIAL • **A1** - Carbon steel • **B31**- AISI 316L Stainless steel • **G1** - Cast iron

AH (FULL CONE NOZZLES / FINE MIST)

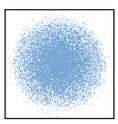




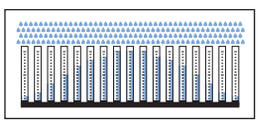
IN-LINE FULL CONE

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

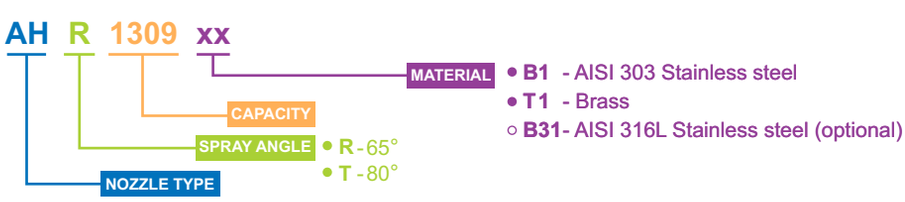
This innovative vane is machined with high precision. Its smooth surface reduces pressure loss and avoids turbulence. Its stabilizer acts as a hydrodynamic brake on the fluid rotating at high-speed inside the whirl chamber. Its shape splits the liquid leaving the nozzle into 6 flows. Disc vanes produce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

	Code	RF inch	D mm	Capacity at different pressure values (bar) (l/min)					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		
	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		
80°	**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		
	AHT 2110 xx	1/2"	4.2	6.35	8.98	11.0	12.7	14.2	36.0	27
	AHT 2144 xx		4.2	8.31	11.8	14.4	16.6	18.6		
45°	**AHM 1309 xx**	1/4"	2.2	1.78	2.52	3.09	3.57	3.99	25.0	19
	AHM 1409 xx									
	AHM 1517 xx							5.97	6.67	

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

HOW TO MAKE UP THE NOZZLE CODE

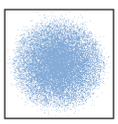
EX.: AHR 1390 B1



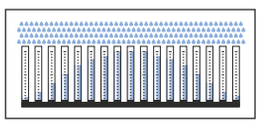
S-TYPE VANE

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.

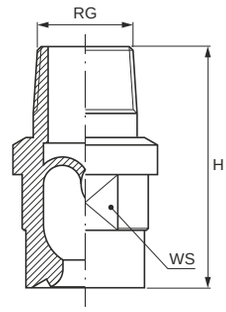
- **Thread specification**: BSPT, NPT



Spray section



Convex distribution





Capacity for nozzles made in PVDF, PP

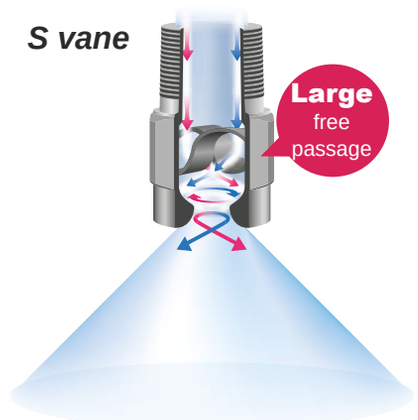
ALS 70°	ALU 90°	Code	RG poll	D mm	Capacity at different pressure values (l/min) (bar) 0.2	0.3	0.5	0.7	1.0	2.0	3.0	5.0
•	•	**2190 xx**	3/8"	3.97	5.32	6.46	8.17	9.50	11.4	15.8	19.0	24.1
•	•	**2250 xx**		4.76	7.00	8.50	10.8	12.5	15.0	20.8	25.0	31.8
	•	**2350 xx**	1/2"	5.56	9.80	11.9	15.1	17.5	21.0	29.1	35.0	44.5

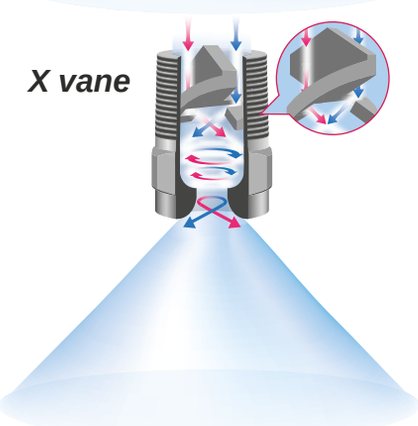
Capacity for nozzles made in AISI 316L

ALQ 60°	ALU 90°	ALW 120°	Code	RG poll	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.





HOW TO MAKE UP THE NOZZLE CODE

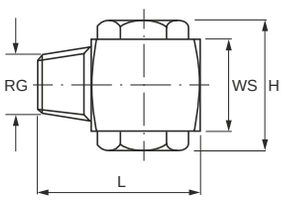
Es.: ALU 1927 B31

AL U 1927 xx

- **NOZZLE TYPE**: AL
- **ANGLE**: U
  - **Q** - 60°
  - **U** - 90°
  - **W** - 120°
  - **S** - 70° (only PP, PVDF)
- **CAPACITY**: 1927
- **MATERIAL**: xx
  - **B31** - AISI 316L Stainless steel
  - **D2** - PP
  - **D8** - PVDF

AT (FULL CONE NOZZLES / TANGENTIAL)

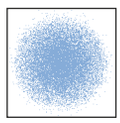




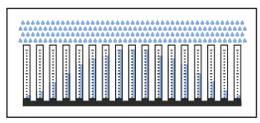
VANELESS – OFF LINE

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) 1.0	2.0	3.0	4.0	5.0	6.0	7.0	H mm	L mm	WS mm
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

- NOZZLE TYPE: AT
- SPRAY ANGLE: Q
  - Q - 60°
  - U - 90°
  - W - 120°
- CAPACITY: 1230
- MATERIAL: xx
  - B1 - AISI 303 Stainless steel
  - B31 - AISI 316L Stainless steel
  - T1 - Brass
  - Plastic materials on request

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

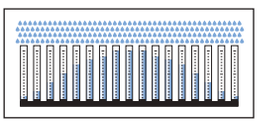
BA/BC series full cone nozzles have a three-piece design made of body, X-vane and nipple. Their X-vane design combines resistance to clogging with the convenience of an easy and fast inside cleaning as they can be easily disassembled for maintenance. When these nozzles are mounted to spray upwards, the design of the nipple avoids loosing 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.



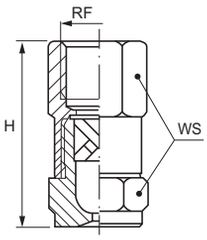
- **Thread specification**
  Male (BSPT, NPT)
  Female (BSP, NPT)



Spray section

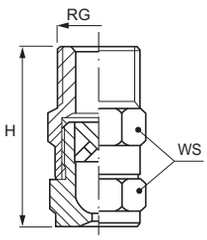


Convex distribution





BA





BC

Standard spray

BAQ Female	BCQ Male	Code	RF RG	D	D1	Capacity at different pressure values (l/min) (bar)							Spray angle at pressure (°) (bar)		
			inch	mm	mm	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°

Wide 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°

Dimensions & weights

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

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

HOW TO MAKE UP THE NOZZLE CODE

EX.: BAQ 0740 B1

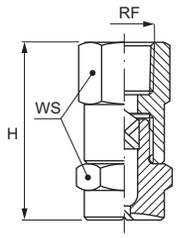
BA Q 0740 xx

- NOZZLE TYPE: BA
- SPRAY ANGLE: Q
  - Q - 60°
  - W - 120°
- CAPACITY: 0740
- MATERIAL: xx
  - **B1** - AISI 303 Stainless steel
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass
  - **E1** - PTFE
  - **L61** - Hastelloy C22

BB / BD (FULL CONE NOZZLES / CLEANABLE)

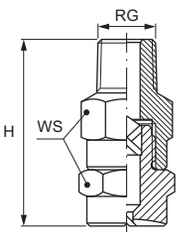


BB





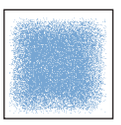
BD



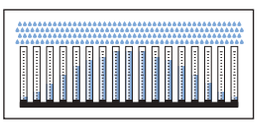
X VANE / SQUARE SPRAY PATTERN / THREE-PIECE DESIGN / EASY CLEAN

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	D	D1	Capacity at different pressure values (l/min) (bar)							Spray angle at pressure (°) (bar)		
			inch	mm	mm	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

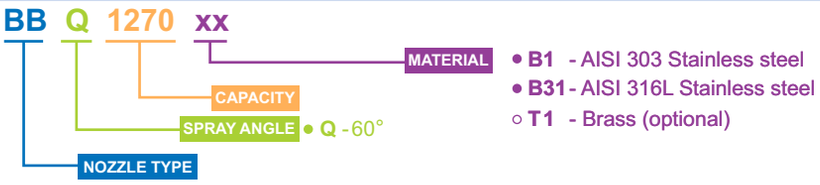
Nozzle type	RG inch	H mm	WS mm	W kg
BD Male	1/8"	32	14	0.02
	1/4"	39	17	0.04
	3/8"	47	19	0.07
	1/2"	57	25	0.20

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



(FULL CONE NOZZLES / SQUARE SPRAY) BF / BH

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.



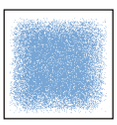
- **Thread specification**
  Male (BSPT, NPT)
  Female (BSP, NPT)



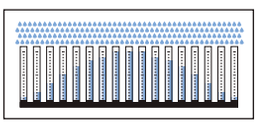
BH



BF



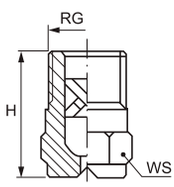
Spray section

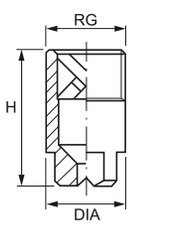


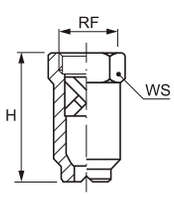
Convex distribution

Standard spray angle

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

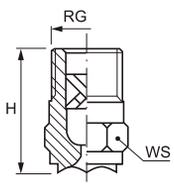


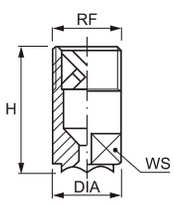


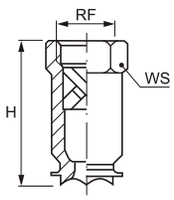


Wide spray angle

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







Dimensions and weights

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						

HOW TO MAKE UP THE NOZZLE CODE

EX.: BFS 2780 B1

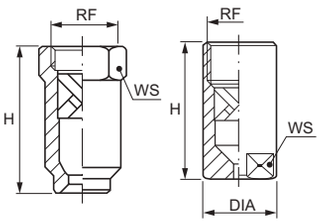
BF S 2780 xx

- BF — NOZZLE TYPE
- S — SPRAY ANGLE: • Q - 60° • U - 90° • S - 70° • W - 120°
- 2780 — CAPACITY
- xx — MATERIAL:
  - • B1 - AISI 303 Stainless steel
  - • B31 - AISI 316L Stainless steel
  - • T1 - Brass
  - • D1 - PVC
  - • E1 - PTFE

BE / BG (FULL CONE NOZZLES)

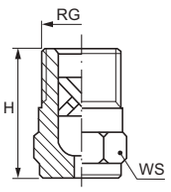


BE



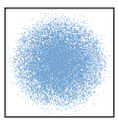


BG

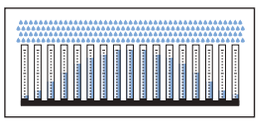


X-VANE / ROUND SPRAY / TWO-PIECE DESIGN

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



Thread specification

Male (BSPT, NPT)
Female (BSP, NPT)

Typical applications

Washing
Food cleaning
Parts cleaning
Pre-treatment for coating process
Cooling
Steel cooling
Product cooling
Tank cooling
Other applications
Desulfuration
Leak test

Material

B1 AISI 303
B31 AISI 316L
T1 Brass, only sizes 1" and smaller
E1 PTFE
L61 Hastelloy C22

STANDARD SPRAY ANGLES

Nozzle type BES Female	Nozzle type BGQ Male	Code	RF RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	5.0	7.0	10	Spray angle at pressure (°) (bar) 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**	1¼"	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**	1½"	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**	2½"	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

	Size inch	1/4"	3/8"	1/2"	3/4"	1"	1¼"	1½"	2"	2½"	3"
BG Male	**H** mm	22.0	25.0	33.0	40.0	51.5					
	WS mm	14.0	17.0	22.0	22.0	27.0					
BE Female	**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 BEW Female	Nozzle type BGW Male	Code	RF RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	5.0	7.0	10	Spray angle at pressure (°) (bar) 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°

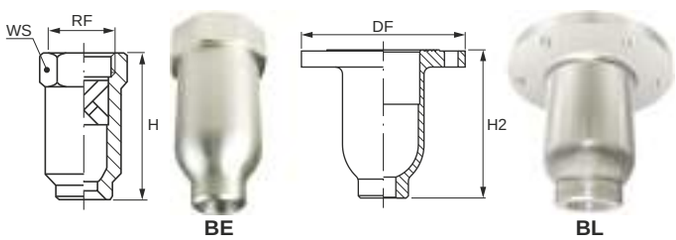
X-VANE / LARGE CAPACITIES

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 BEU Casting	Nozzle type BLU Flange	Code	RF RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar) 0.7	1.0	2.0	3.0	5.0	7.0	10	Spray angle at pressure (°) (bar) 0.5	1.5	6.0	Dimension mm H	H2	WS
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) 0.7	1.0	2.0	3.0	5.0	7.0	10	Dimension mm 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

BE U 4139 xx

- NOZZLE TYPE
- SPRAY ANGLE • **U** - 90° • **W** - 120°
- CAPACITY
- MATERIAL • **B31** - AISI 316L Stainless steel • **G1** - Cast iron

BR / BS / BT / BU (FULL CONE NOZZLES)


BT


BR

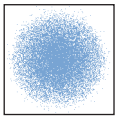

BS

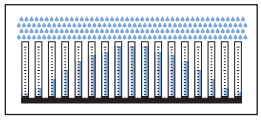
X-VANE / NARROW SPRAY ANGLE

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)

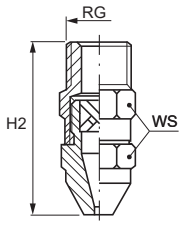
Typical applications
bottles washing, parts cleaning, deep cleaning


Spray section

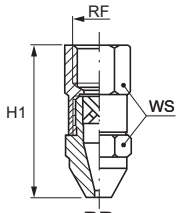

Convex distribution



SPRAY ANGLE 15°



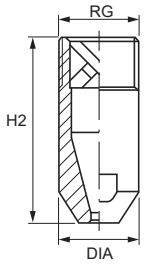
BS



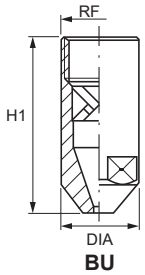
BR

BRB Female	BSB Male	BUB Female	Code	RF RG inch	D mm	Capacity at different pressure values (l/min) (bar) 1.0	2.0	3.0	5.0	10	Dimension mm 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°



BT



BU

BRF Female	BSF Male	BTF Male	Code	RF RG inch	D mm	Capacity at different pressure values (l/min) (bar) 1.0	2.0	3.0	5.0	10	Dimension mm 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	40
		•	**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

BR B 1270 xx

- BR — NOZZLE TYPE
- B — SPRAY ANGLE (• B - 15° • F - 30°)
- 1270 — CAPACITY
- xx — MATERIAL
  - • B1 - AISI 303 Stainless steel
  - • B31 - AISI 316L Stainless steel
  - • T1 - Brass
  - • E1 - PTFE
  - • D1 - PVC
  - • D2 - Polypropylene

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.

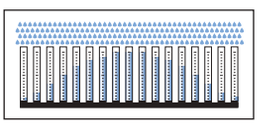




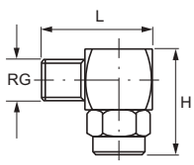
- **Thread specification**
  Male (BSPT, NPT)
  Female (BSP, NPT)



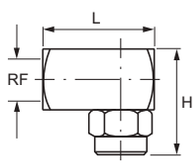
Spray section



Convex distribution



BV



BW

SPRAY ANGLE 60°

	BVQ Male	BWQ Female	Code	RF RG inch	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	5.0	10	Dimension mm 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**		1.84	2.60	3.67	4.50	5.81	8.22		
	•	•	**1480 xx**	1/4"	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) 0.5	1.0	2.0	3.0	5.0	10	Dimension mm 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

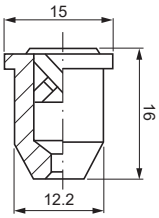
EX.: BVQ 1150 B1

BV Q 1150 xx

- NOZZLE TYPE
- SPRAY ANGLE: • **Q** - 60° • **W** - 120°
- CAPACITY
- MATERIAL: • **B1** - AISI 303 Stainless steel • **T1** - Brass ○ **B31** - AISI 316L Stainless steel (optional)

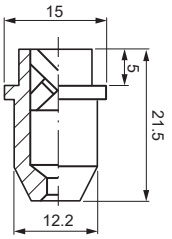
BX / BJ (FULL CONE NOZZLES / FLANGE)





Above is outer shape of BX 1149 - BX 1372





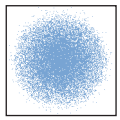
Above is outer shape of BX 1508 - BX 1743

NOZZLE TIPS

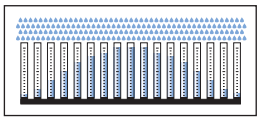
BX full cone tips produce a uniform full cone shaped spray with a round impact area. Thanks to their design they can be easily disassembled and cleaned in case of clogging. These nozzles have an X-vane safely secured inside their body up to 3/8" thread size.

- **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



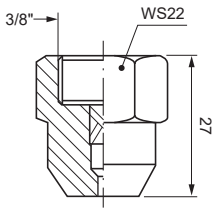


SAFETY FLANGE

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



	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 1233 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°

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**

ASSEMBLY ACCESSORIES

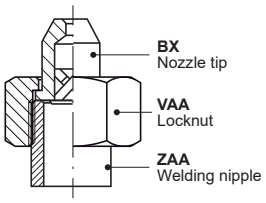
In most steelworks applications, BX series nozzles are provided with a welding nipple and locknut for the assembly of related accessories.
Please see on page 44 for detailed information.

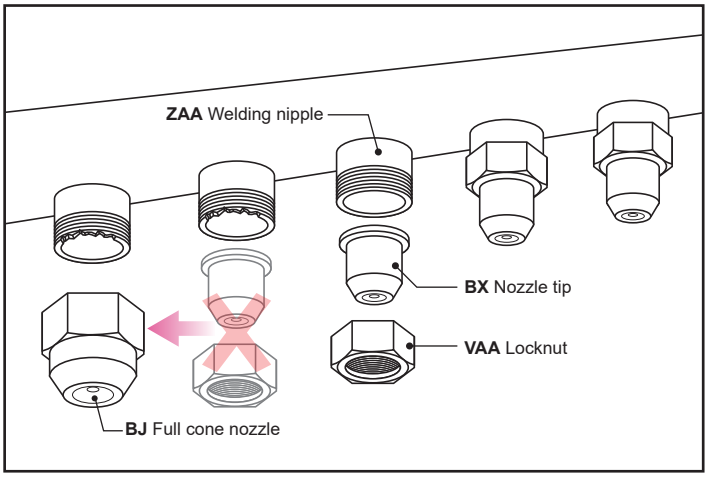


ZAA C018 xxG



VAA 0380 xx





HOW TO MAKE UP THE **NOZZLE CODE**

EX.: BXQ 1149 B1

BX Q 1149 xx

- NOZZLE TYPE
- SPRAY ANGLE • **Q** - 60°
- CAPACITY
- MATERIAL
  - • **B1** - AISI 303 Stainless steel
  - • **T1** - Brass
  - ○ **B31** - AISI 316L Stainless steel (optional)

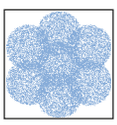
CLUSTER NOZZLES / TYPE 7 AND 13

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.

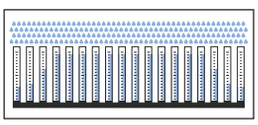




- **Thread specification**: BSP, NPT



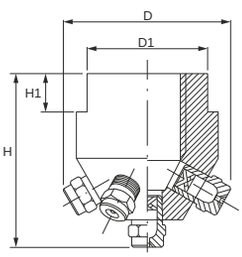
Spray section

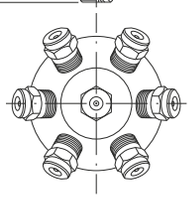


Even distribution

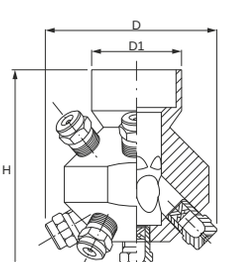
	Code	RF inch	D inch	Capacity at different pressure values (l/min) (bar) 1.0	2.0	3.0	5.0	10	Dimensions mm D	D1	H	H1	NR
200°	**CHZ 1826 xx**	3/4"	1/8"	4.77	6.47	8.26	10.7	15.1	71	40	55	13	7
	CHZ 2156 xx			9.01	12.7	15.6	20.1	28.5					
	CHZ 2329 xx	1"	1/4"	19.0	26.9	32.9	42.5	60.1	89	46	68	17	
	CHZ 2585 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	
	CHZ 3259 xx		3/4"	149.5	211.5	259.0	334.4	472.9					
	CHZ 3329 xx			189.9	268.6	329.0	424.7	600.7					
360°	**CHE 2153 xx**	3/4"	1/8"	8.83	12.5	15.3	19.8	27.9	69	39	85	-	13
	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	-	

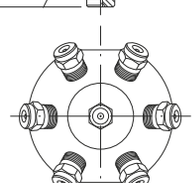
** You can go with other full cone nozzle in addition to standard capacity. Please contact us.*





Cluster nozzle 7 nozzles type





Cluster nozzle 13 nozzles type

Typical applications
Cooling: gas cooling
Washing: tank cleaning, gas cleaning
Other applications: fire engineering, dust control, wetting



HOW TO MAKE UP THE NOZZLE CODE

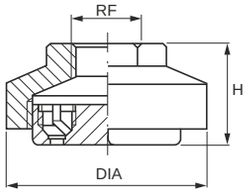
EX.: CHZ 1826 B1

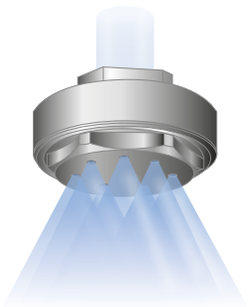
CH Z 1826 xx

- **xx** — MATERIAL
  - **B1** - AISI 303 Stainless steel
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass
- **1826** — CAPACITY
- **Z** — SPRAY ANGLE
  - **Z** - 200°
  - **E** - 360°
- **CH** — NOZZLE TYPE

CAS (FULL CONE NOZZLES / CLUSTER NOZZLE)







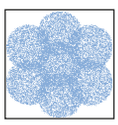
CLUSTER NOZZLE / STANDARD SPRAY ANGLE

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.

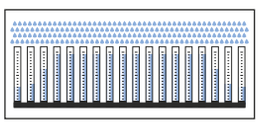
- **Typical applications**

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 (l/min) (bar)							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	1"	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

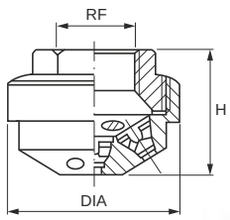
CA (NOZZLE TYPE) **S** (SPRAY ANGLE) **1153** (CAPACITY) **xx** (MATERIAL)

- **S** - 70°

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

CLUSTER NOZZLE / WIDE SPRAY ANGLE

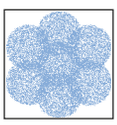
CAY cluster full cone nozzles produce very fine droplets using hydraulic pressure only. They provide large spray capacities, mist effect and a 130° spray angle with wider coverage. CAY nozzles have 7 orifices that, at the same operating pressure and using the same quantity of liquid, produce a finer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



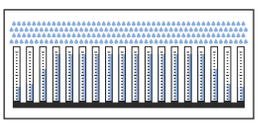




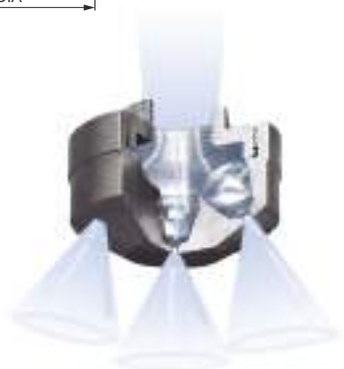
- **Thread specification**: BSP, NPT



Spray section



Even distribution



	Code	RF inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							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

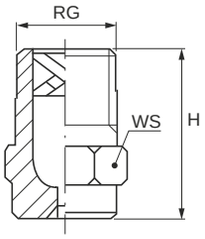
HOW TO MAKE UP THE NOZZLE CODE

EX.: CAY 1153 B1

CA Y 1153 xx

- NOZZLE TYPE
- SPRAY ANGLE • **Y** - 130°
- CAPACITY
- MATERIAL
  - • **B31** - AISI 316L Stainless steel
  - • **T1** - Brass
  - • **T8** - Nickel plated brass

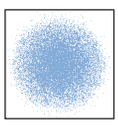




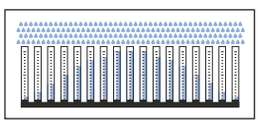
X VANE / TWO-PIECE DESIGN

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.

Thread specification: BSPT, NPT



Spray section



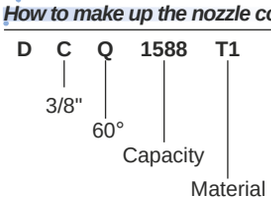
Convex distribution



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



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

SPRAY ANGLE 45°

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
•				0740 xx	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•	•			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°

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
•				0740 xx	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•	•			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°

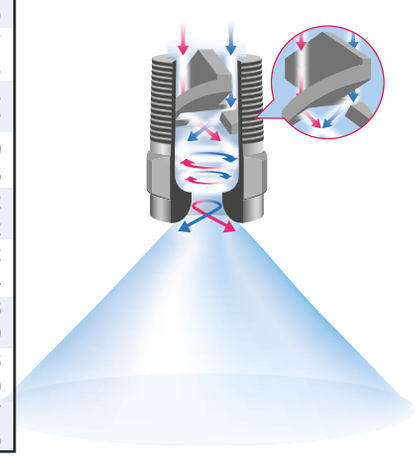
Nozzle type				Code	D mm	D1 mm	Capacity at different pressures values (l/min) (bar)						
DAU	DBU	DCU	DDU				0.7	1.0	2.0	3.0	5.0	7.0	10
•				**0740** xx	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•				**1118** xx	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			**1147** xx	1.3	1.0	0.71	0.85	1.20	1.47	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 pressures values (l/min) (bar)						
DAW	DBW	DCW	DDW				0.7	1.0	2.0	3.0	5.0	7.0	10
•				**0740** xx	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•	•			**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.



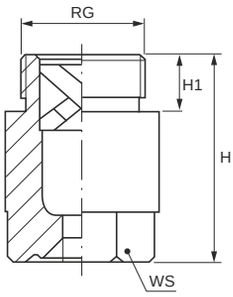
HOW TO MAKE UP THE NOZZLE CODE

EX.: DAU 1118 B1

D A U 1118 xx

- **NOZZLE TYPE**
- **CONNECTION**: • **A** - 1/8" • **B** - 1/4" • **C** - 3/8" • **D** - 1/2"
- **SPRAY ANGLE**: • **M** - 45° • **Q** - 60° • **U** - 90° • **W** - 120°
- **CAPACITY**
- **MATERIAL**: • **B1** - AISI 303 Stainless steel • **B31** - AISI 316L Stainless steel • **T1** - Brass ○ On request special materials are quoted

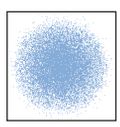




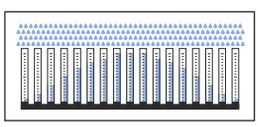
X VANE / TWO-PIECE DESIGN / LARGE CAPACITY

D series full cone nozzles with large capacity are widely used in industry. The 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

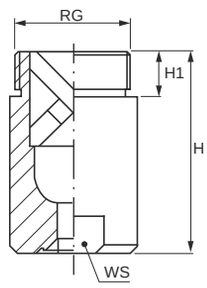


Convex distribution



	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	1¼"	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			
	DGQ 3147 xx		16.7	6.0	71.0	84.9	120	147	190	225	268			
	DHQ 3147 xx	1½"	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	2½"	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
	DNQ 3740 xx	3½"	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

	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
90°	**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			
	DEU 2590 xx		9.7	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108			
	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	1¼"	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 3147 xx	1½"	16.0	6.0	71.0	84.9	120	147	190	225	268	85	19	50
	DHU 3188 xx		14.5	9.0	90.8	109	154	188	243	287	343			
	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	2½"	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	3½"	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 (l/min) (bar)							Dimension mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
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			
	DEW 2590 xx		9.2	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108			
	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 3118 xx	1 1/2"	13.0	6.0	57.0	68.1	96.3	118	152	180	215	85	19	50
	DHW 3188 xx		20.0	9.0	90.8	109	154	188	243	287	343			
	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

D E Q 2235 xx

- **NOZZLE TYPE**
- **CONNECTION**
- **SPRAY ANGLE** ● **Q** - 60° ● **U** - 90° ● **W** - 120°
- **CAPACITY**
- **MATERIAL** ● **B1** - AISI 303 Stainless steel ● **B31** - AISI 316L Stainless steel ● **T1** - Brass ○ On request special materials are quoted



STANDARD SPIRAL NOZZLES

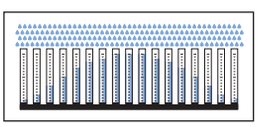
E series spiral nozzles work on the impact principle, by the deflection of a water stream that impacts onto a spiral profiled surface which provides the desired spray angle. These are one-piece nozzles with no internal vane and a wider free passage. The liquid inlet has nearly the same size as the outlet 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 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 and fire suppression

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Dimensions mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	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			
	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
90°	**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

E B Q 1550 xx

- **xx** → MATERIAL
  - ● **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
- **1550** → CAPACITY
- **Q** → SPRAY ANGLE
  - ● **Q** - 60°
  - ● **U** - 90°
  - ● **W** - 120°
  - ● **X** - 150°
  - ● **Z** - 180°
- **B** → THREAD SIZE CODE
- **E** → NOZZLE TYPE

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	1 1/2"	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	1 1/2"	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	1 1/2"	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

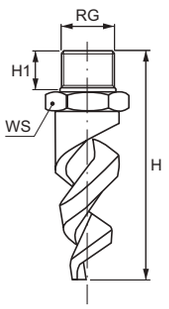
EX.: EBW 1550 B31

E B W 1550 xx

- **E** — NOZZLE TYPE
- **B** — THREAD SIZE CODE
- **W** — SPRAY ANGLE
  - **Q** - 60°
  - **U** - 90°
  - **W** - 120°
  - **X** - 150°
  - **Z** - 180°
- **1550** — CAPACITY
- **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

E-X (FULL CONE NOZZLES / WIDE PASSAGE)





SPIRAL NOZZLES / WIDE FREE PASSAGE

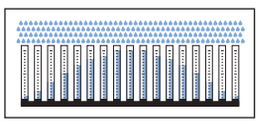
The E-X series nozzles, with their typical elongated spiral design, work on the impact principle, by deflection of a water stream onto their spiral profile that provides the desired spray angle. Their specific shape with no internal parts leaves a larger internal free passage suitable to work with higher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

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.

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

E C W 2230 xx Xy

- MATERIAL
- CAPACITY
- SPRAY ANGLE • W - 120°
- CONNECTION
- NOZZLE TYPE

- **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

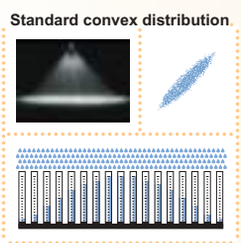


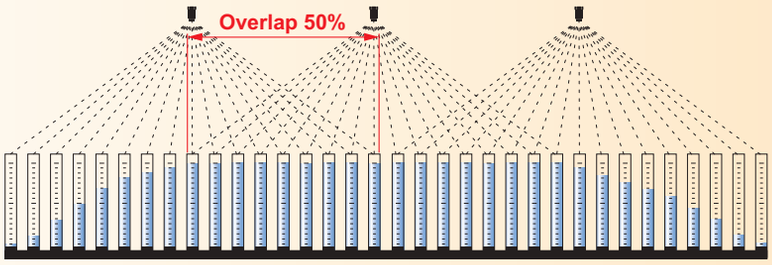
Correct overlapping

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

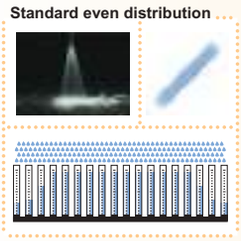
In a standard convex spray distribution the medium section has a larger capacity than the two lateral sections. It's necessary to overlap 50% of the spray range.

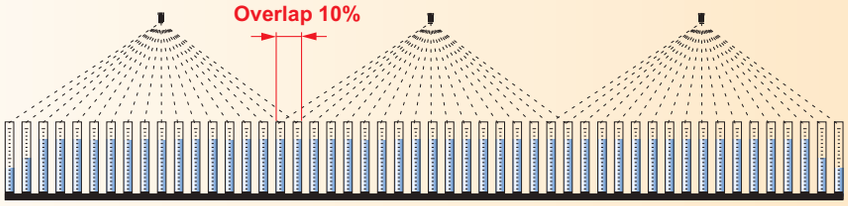




Standard even distribution

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

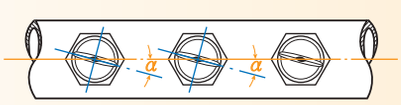


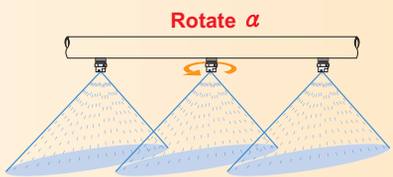


Offset

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

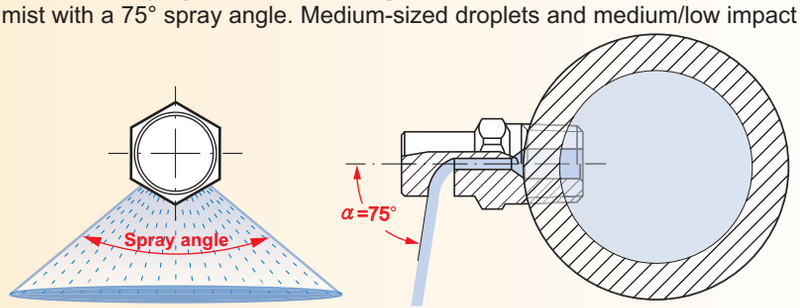
A flat fan nozzle produces a high impact jet with a 5°-15° offset angle to avoid overlapping and interference. The offset angle depends on the spray range of the flat fan nozzle.





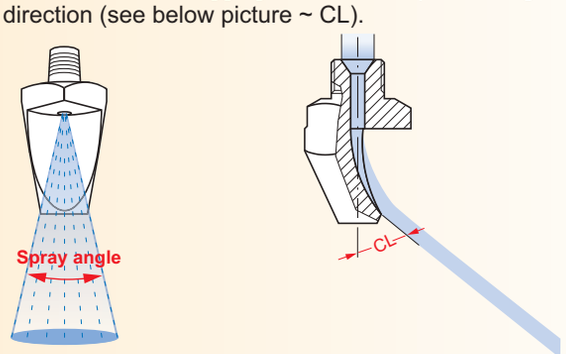
Flat fan nozzles - low pressure, wide angle

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.

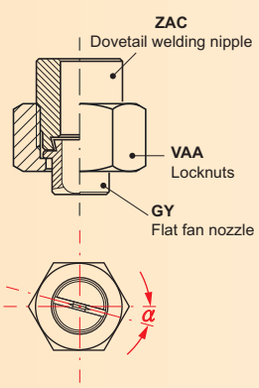


Flat fan nozzles - high impact

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).

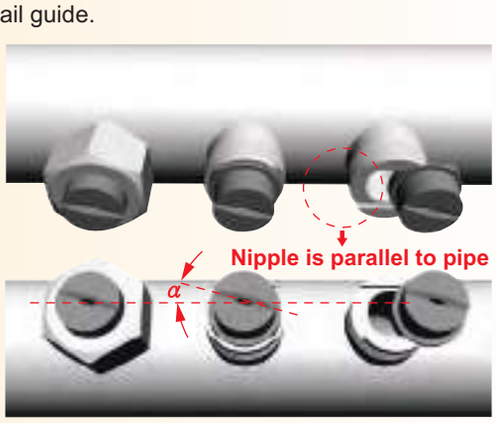


Dovetail flat fan nozzle



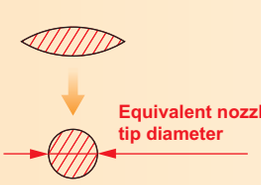
Flat fan nozzle tips provide a high impact spray. Adjacent nozzles must rotate with a specific offset angle to avoid interference and produce a uniform spray coverage when their jets overlap. For the GY series nozzle tips an offset angle ~α must be set between the spray plane and their dovetail guide.

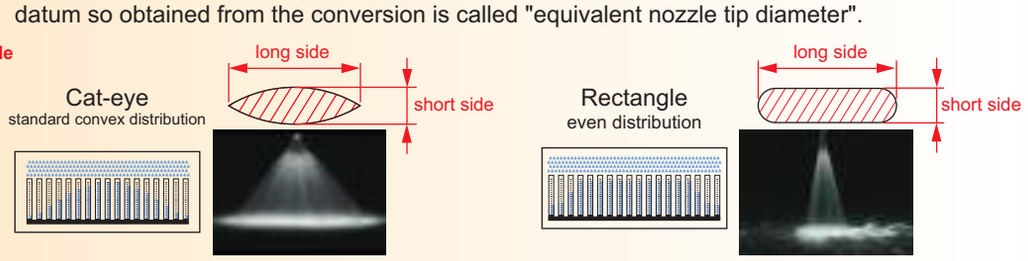
Their specific dove-tail design ensures the correct spray direction and allows time saving as spray angles must not be adjusted each time. For thread size 3/8" offset angle is 5°. For thread size 3/4" offset angle is 15°. The picture to the right shows an offset angle ~α between the spray plane and the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



Equivalent nozzle tip diameter

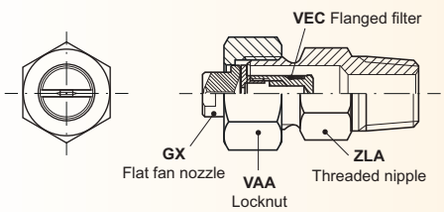
Flat fan nozzles produce cat-eye shaped or parabolic distribution patterns with different capacities. Hence nozzle tips have long and short side differences. For convenience reasons, their "cat-eye shaped" spray pattern is converted into the area of a circle. The datum so obtained from the conversion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

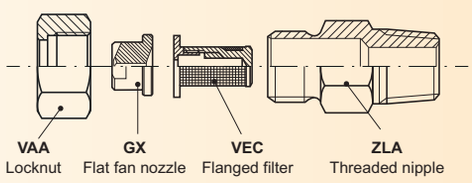




Flanged nozzle

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

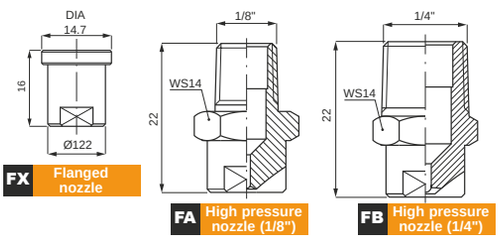












FX Flanged nozzle

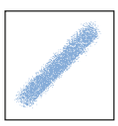
FA High pressure nozzle (1/8")

FB High pressure nozzle (1/4")

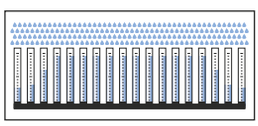
HIGH PRESSURE WASHING

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 - FG	1/8" BSPT - 1/8" NPT
FB - FH	1/4" BSPT - 1/4" NPT
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	**2220**	9.84	12.1	15.6	18.4	22.0	26.9	31.1
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	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	**2910**	40.7	49.8	64.3	76.1	91.0	111	128
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	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**

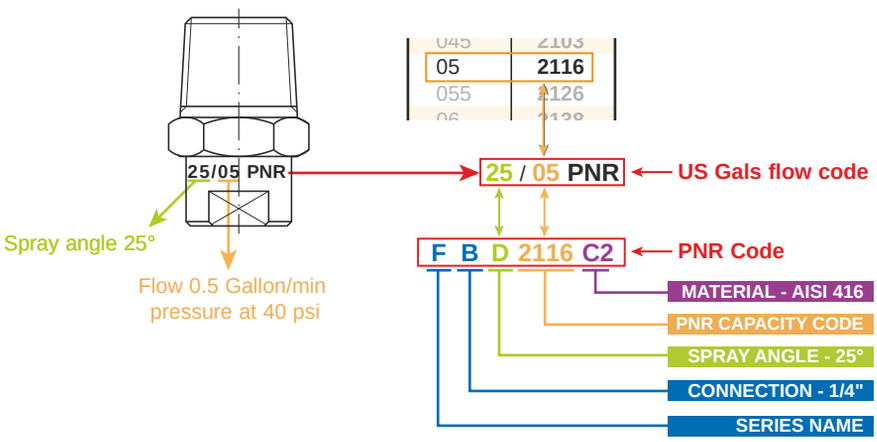
EX.: FAA 1340 C2

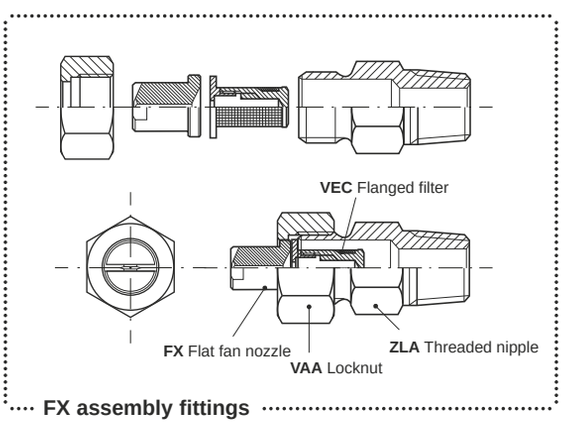
F A A 1340 xx

- **MATERIAL**: ● **C2** - AISI 416 Stainless steel
- **CAPACITY**: Please see next page
- **SPRAY ANGLE**: ● **A** - 0° ● **B** - 15° ● **D** - 25° ● **L** - 40° ● **R** - 65°
- **CONNECTION**: ● **A** - 1/8" ● **B** - 1/4"
- **NOZZLE TYPE**: ● **X** - Ø14.7 Flanged nozzle tip

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)





FX assembly fittings

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	2220
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	2910
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)



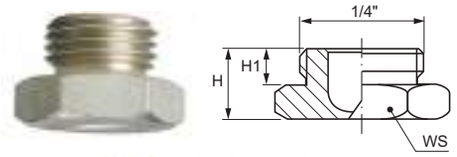
UMU J / I
Auto-rewind reels
(P.100)

OPTIONAL ELEMENT- FLOW STRAIGHTENER

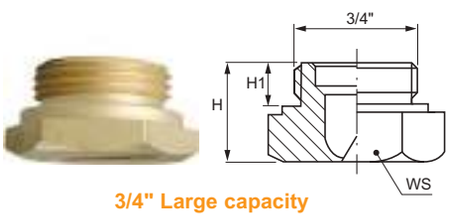
Flow straighteners improve spray jet efficiency by straightening the liquid path to minimize turbulence and produce swirl-free, even, stable and straight-run flows. All PNR nozzles are ready to embed a flow straightener.
These items can be supplied separately on request.



GA (FLAT FAN NOZZLES / SHORT BODY)



1/4" Standard capacity

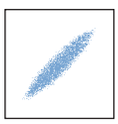


3/4" Large capacity

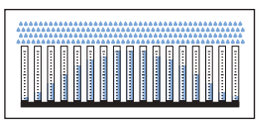
SHORT BODY

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

Material	Dimensions (mm) Small size (1/4") H	H1	WS	Large size (3/4") 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**

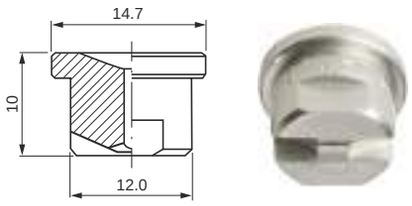
EX.: GAM 1490 B1

GA M 1490 xx

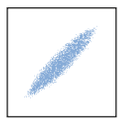
- NOZZLE TYPE: GA
- SPRAY ANGLE: M
  - • M - 45°
  - • Q - 60°
  - • U - 90°
  - • W - 120°
- CAPACITY: 1490
- MATERIAL: xx
  - • B1 - AISI 303 Stainless steel
  - • B31 - AISI 316L Stainless steel
  - • T1 - Brass
  - ○ D1 - PVC (optional)
  - ○ D2 - PP (optional)
  - ○ E1 - PTFE (optional)

LOW CAPACITY

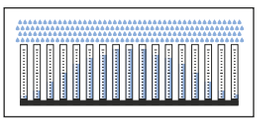
Flat fan nozzle tips are usually mounted onto a pipe by means of a welded nipple or a clamp, and secured in place with a retaining nut. They can be easily replaced and the jet can be conveniently oriented in the desired direction.
The tips models shown on this page delivery very low flow values. Their 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

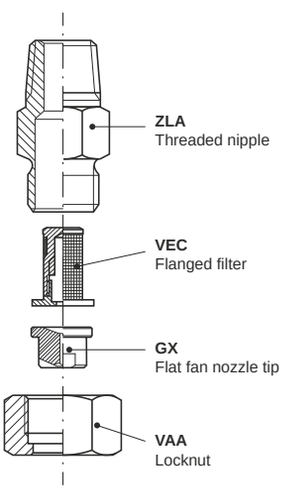


Convex distribution

- **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	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.11
			•	0100	0.34	0.05	0.06	0.07	0.08	0.10	0.12	0.13	0.15	0.18
			•	0130	0.38	0.06	0.08	0.09	0.11	0.13	0.15	0.17	0.20	0.24
•	•	•	•	0150	0.40	0.07	0.09	0.11	0.12	0.15	0.17	0.19	0.23	0.27
•	•	•	•	0200	0.46	0.08	0.12	0.14	0.16	0.20	0.23	0.26	0.31	0.37
•	•	•	•	0260	0.53	0.11	0.15	0.18	0.21	0.26	0.30	0.34	0.40	0.47
•	•	•	•	0390	0.66	0.16	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

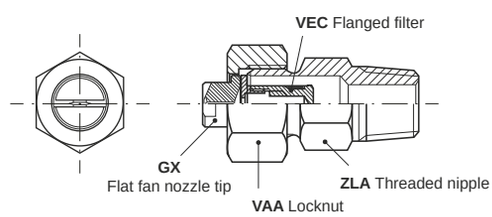
GXS 75°	GXT 80°	GXV 95°	GXJ 110°	Capacity code	D mm	Capacity at different pressure values (l/min) (bar)								
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
•				0100	0.34	0.05	0.06	0.07	0.08	0.10	0.12	0.13	0.15	0.18
•				0130	0.38	0.06	0.08	0.09	0.11	0.13	0.15	0.17	0.20	0.24
•	•	•	•	0150	0.40	0.07	0.09	0.11	0.12	0.15	0.17	0.19	0.23	0.27
•	•	•	•	0200	0.46	0.08	0.12	0.14	0.16	0.20	0.23	0.26	0.31	0.37
•	•	•	•	0260	0.53	0.11	0.15	0.18	0.21	0.26	0.30	0.34	0.40	0.47
•	•	•	•	0390	0.66	0.16	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



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
B31 - AISI 316L SS					•	•	•	•	•(1)
B1 - AISI 303 SS	•	•	•	•	•	•	•	•	•(2)
T1 - Brass	•	•	•	•	•	•	•	•	•(2)

(1) Low capacity body
(2) Standard capacity body

HOW TO MAKE UP THE **NOZZLE CODE**

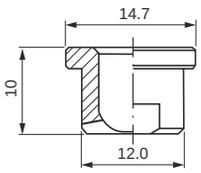
EX.: GXD 0390 B1

GX D 0390 XX

- NOZZLE TYPE
- SPRAY ANGLE: • D - 25° • S - 73° • L - 40° • T - 80° • N - 50° • V - 95° • R - 65° • J - 110°
- CAPACITY
- MATERIAL: • B1 - AISI 303 Stainless steel • B31 - AISI 316L Stainless steel • T1 - Brass

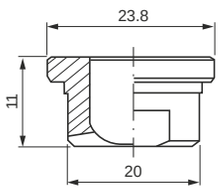
GX (FLAT FAN NOZZLE TIPS)





3/8" Standard capacity



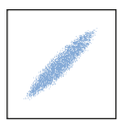


3/4" Large capacity

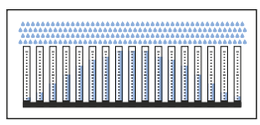
STANDARD AND LARGE CAPACITIES

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





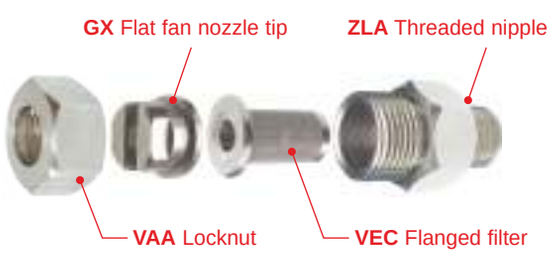
NEW Also available in high quality ***PVDF***

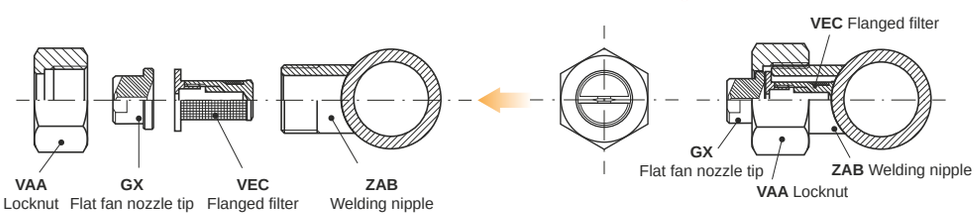
In the table you can check the available 3/8" GX tips, manufactured in plastic material (D82 - molded PVDF).

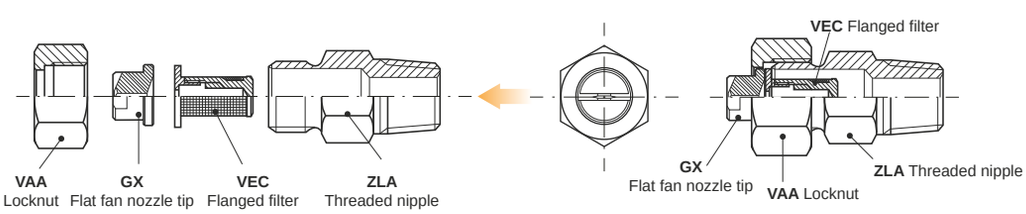
3/8" PLASTIC TIPS

GXQ 60°	GXU 90°	GXJ 110°	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
		•	**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
•	•	•	**1233**	1.50	0.95	1.35	1.65	1.90	2.33	2.69	3.01	3.56	4.25
	•	•	**1310**	1.70	1.27	1.79	2.19	2.53	3.10	3.58	4.00	4.74	5.66
	•		**1490**	2.10	2.00	2.83	3.46	4.00	4.90	5.66	6.33	7.48	8.95

ASSEMBLY FITTINGS







HOW TO MAKE UP THE **NOZZLE CODE**

EX.: GXA 1310 B1

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

- NOZZLE TYPE: GX
- SPRAY ANGLE: A - 0° · F - 30° · M - 45° · Q - 60° · U - 90° · W - 120°
- CAPACITY: 1310
- MATERIAL:
  - **B1** - AISI 303 Stainless steel
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass
  - **D82** - PVDF (molded)

3/8" STANDARD CAPACITY TIPS

GXA 0°	GXF 30°	GXM 45°	GXQ 60°	GXU 90°	GXW 120°	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
•	•	•	•	•	•	**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
•	•	•	•	•	•	**1190**	1.30	0.78	1.10	1.34	1.55	1.90	2.19	2.45	2.90	3.47
•	•	•	•	•	•	**1233**	1.50	0.95	1.35	1.65	1.90	2.33	2.69	3.01	3.56	4.25
•	•	•	•	•	•	**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
•	•	•	•	•	•	**1581**	2.30	2.37	3.35	4.11	4.74	5.81	6.71	7.50	8.87	10.6
•	•	•	•	•	•	**1780**	2.70	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
•	•	•	•	•	•	**1980**	3.00	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	•	**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
•	•	•	•	•	•	**2245**	4.80	10.0	14.1	17.3	20.0	24.5	28.3	31.6	37.4	44.7

IMPORTANT: nozzle GXx 0780 B31 is made with "low capacity" body, while when it's fabricated with other materials is made with "standard capacity" body.

3/4" LARGE CAPACITY TIPS

GXA 0°	GXF 30°	GXM 45°	GXQ 60°	GXU 90°	GXW 120°	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
•	•	•	•	•	•	**1781**	2.70	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
•	•	•	•	•	•	**1981**	3.00	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	•	**2125**	3.40	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	22.6
•	•	•	•	•	•	**2154**	3.80	6.25	8.83	10.8	12.5	15.3	17.7	19.8	23.4	27.9
•	•	•	•	•	•	**2195**	4.30	7.92	11.2	13.7	15.8	19.4	22.4	25.0	29.6	35.4
•	•	•	•	•	•	**2246**	4.80	10.0	14.1	17.3	20.0	24.5	28.3	31.6	37.4	44.7
•	•	•	•	•	•	**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	28.3	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
•	•	•	•	•	•	**3122**	12.5	49.8	70.4	86.3	99.6	122	141	158	186	223

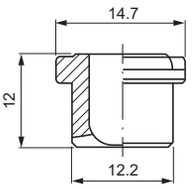
ASSEMBLY FITTINGS CODING

Name	Code and material	Appearance	Standard size 3/8"	Large size 3/4"
Locknut P.88	**B1** - AISI 303 SS **B31**- AISI 316L SS **T1** - Brass **D6** - Fiberglass reinforced PP		VAA 0380 **xx**B	VAA 0750 **xx**B
Welding nipple P.89	**B1** - AISI 303 SS **B31**- AISI 316L SS		ZAA C018 **xx**G	ZAA E027 **xx**G
Threaded nipple P.89	**B1** - AISI 303 SS **B31**- AISI 316L SS **T1** - Brass		ZLA 2538 **xx**B	ZLA 7575 **xx**B
Metal pipe clamp P.87	**B1** - AISI 303 SS **T1** - Brass		ZPM	–
Plastic pipe clamp P.86	**D6** - Fiberglass reinforced PP		ZPB 0050 D6	–
Plastic bayonet pipe clamp P.86	**D82** - PVDF		ZPC 0500 D82P	–
Flanged filter P.92	**B1** - AISI 303 SS **B31**- AISI 316L SS **T1** - Brass **D3** - Polyamide		VEC 0138 **xx**	–

GY (DOVETAIL FLAT FAN TIPS)

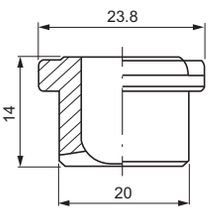


3/8" Standard capacity





3/4" Large capacity



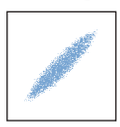
STANDARD AND LARGE CAPACITIES

GY flat fan nozzle tips are usually mounted onto a pipe by means of a welding nipple and secured in place with a retaining nut. Therefore, they can be easily replaced and their dovetail connection assures an always precise assembly as the nozzle can be assembled only when the flat fan is properly oriented. They are available in three types: 3/8" standard capacity, 3/4" large capacity and 1" extra-large capacity. The tip models shown on this page deliver the most popular capacity values, while GY flat fan tips with bigger capacities and sizes can be manufactured on request and supplied with matching dovetail nipples and retaining nuts. Please find information about instalment and accessories on page 89.

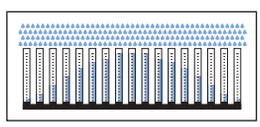
- **Connection**: Dovetail flat fan tips
- **Typical applications**

Washing: steel cleaning
filter cloth cleaning
parts cleaning

Cooling: steel cooling, product cooling



Spray section



Convex distribution



SPRAY ANGLE CODES

GYA	GYF	GYM	GYQ	GYU	GYW
0°	30°	45°	60°	90°	120°

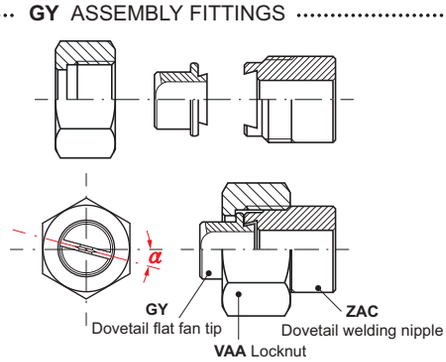
ASSEMBLY FITTINGS

The picture below shows a GY nozzle tip (in the middle) assembled with a dovetail nipple (right) and a locknut (left).



Locknut — **Dovetail flat fan tip** — **Dovetail welding nipple**

GY ASSEMBLY FITTINGS



DOVETAIL NIPPLES

GY nozzle tips are assembled onto their own series of matching dovetail nipples, to assure perfect alignment: the two tip sizes require nipples and caps as shown in the table below.

The orientation of the spray jets, properly inclined to avoid their interfering, is automatically obtained welding the nipples in place with their dovetail aligned along the pipe axis. This is easily done by running a stright rule across the dovetail profile machined on the nipple.



POS.2 **POS.1**

See values for jet deviation angle (**α**) beside capacity tables next page.

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: GYF 1190 B1

GY F 1190 xx

- **MATERIAL**
  - **B1** - AISI 303 Stainless steel
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass
- **CAPACITY**
- **SPRAY ANGLE**
  - **A** - 0°
  - **F** - 30°
  - **M** - 45°
  - **Q** - 60°
  - **U** - 90°
  - **W** - 120°
- **NOZZLE TYPE**

STANDARD AND LARGE CAPACITIES

3/8" STANDARD CAPACITY TIPS

Jet deviation angle α = 5°

GYF 30°	GYM 45°	GYQ 60°	GYU 90°	GYW 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
•	•	•	•	•	**1190**	1.30	0.78	1.10	1.34	1.55	1.90	2.19	2.45	2.90	3.47
•	•	•	•	•	**1233**	1.50	0.95	1.35	1.65	1.90	2.33	2.69	3.01	3.56	4.25
•	•	•	•	•	**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
•	•	•	•	•	**1581**	2.30	2.37	3.35	4.11	4.74	5.81	6.71	7.50	8.87	10.6
•	•	•	•	•	**1780**	2.70	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
•	•	•	•	•	**1980**	3.00	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	**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	7.96	11.3	13.8	15.9	19.5	22.5	25.2	29.8	35.6

3/4" LARGE CAPACITY TIPS

Jet deviation angle α = 15°

GYA 0°	GYF 30°	GYM 45°	GYQ 60°	GYU 90°	GYW 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
	•	•	•	•	•	**1781**	2.70	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
	•	•	•	•	•	**1981**	3.00	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	•	**2125**	3.40	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	22.6
•	•	•	•	•	•	**2154**	3.80	6.25	8.83	10.8	12.5	15.3	17.7	19.8	23.4	27.9
•	•	•	•	•	•	**2195**	4.30	7.92	11.2	13.7	15.8	19.4	22.4	25.0	29.6	35.4
•	•	•	•	•	•	**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	28.3	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
	•	•	•			**3122**	12.5	49.8	70.4	86.3	99.6	122	141	158	186	223

ASSEMBLY FITTINGS CODING

Name	Code and material	Appearance	Model no.	
			Standard size 3/8"	Large size 3/4"
Locknut P.88	**B1** - AISI 303 SS **B31** - AISI 316L SS **T1** - Brass		VAA 0381 **xx**B	VAA 0750 **xx**B
Dovetail welding nipple P.89	**B1** - AISI 303 SS **B31** - AISI 316L SS		ZAC C018 **xx**	ZAC E027 **xx**

HOW TO MAKE UP THE **NOZZLE CODE**

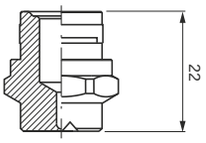
EX.: GYF 1190 B1

GY F 1190 xx

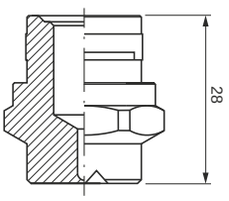
- NOZZLE TYPE: GY
- SPRAY ANGLE: F
  - • A - 0°
  - • F - 30°
  - • M - 45°
  - • Q - 60°
  - • U - 90°
  - • W - 120°
- CAPACITY: 1190
- MATERIAL: xx
  - • **B1** - AISI 303 Stainless steel
  - • **B31** - AISI 316L Stainless steel
  - • **T1** - Brass

HT (QUICK-CONNECT FLAT FAN NOZZLES)



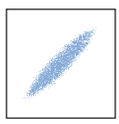




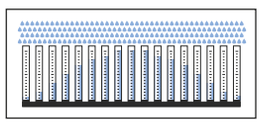


STANDARD AND LARGE CAPACITY

The HT series flat fan nozzles offer the same quality and technical characteristics of the standard types but also the additional convenience of a bayonet coupling which allows a simple assembly with no need of tools and an automatic spray pattern alignment. The optimum performance of your system or machine is then conveniently safeguarded, with a noticeable reduction in service cost and production loss for system downtime. HT series are widely applied to working environments that are easy to clog. HT nozzles are available with low, standard and large capacity.



Spray section



Convex distribution



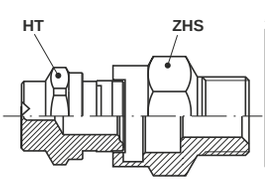
Quick-connect nozzles







HT + ZHS



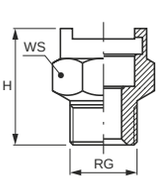
HTA 0°	HTL 40°	HTN 50°	HTR 65°	HTT 80°	HTV 95°	HTJ 110°	Code	D mm	Capacity at different pressure values (l/min) (bar) 0.5	1.0	1.5	2.0	3.0	5.0	7.0	10
Low capacity tips																
	•	•	•	•	•	•	**0260**	0.53	0.11	0.15	0.18	0.21	0.26	0.34	0.40	0.47
	•	•	•	•	•	•	**0390**	0.66	0.16	0.23	0.28	0.32	0.39	0.50	0.60	0.71
	•	•	•	•	•	•	**0590**	0.79	0.24	0.34	0.42	0.48	0.59	0.76	0.90	1.08
	•	•	•	•	•	•	**0780**	0.91	0.32	0.45	0.55	0.64	0.78	1.01	1.19	1.42
	•	•	•	•	•	•	**1120**	1.10	0.49	0.69	0.85	0.98	1.20	1.55	1.83	2.19
	•	•	•	•	•	•	**1160**	1.30	0.65	0.92	1.13	1.31	1.60	2.07	2.44	2.92
	•	•	•	•	•	•	**1190**	1.30	0.78	1.10	1.34	1.55	1.90	2.45	2.90	3.50
	•	•	•	•	•	•	**1200**	1.40	0.82	1.15	1.41	1.63	2.00	2.58	3.06	3.65
	•	•	•	•	•	•	**1230**	1.50	0.94	1.33	1.63	1.88	2.30	2.97	3.51	4.20
Standard capacity tips																
•	•	•	•	•	•	•	**1310**	1.70	1.27	1.79	2.19	2.53	3.10	4.00	4.74	5.66
•	•	•	•	•	•	•	**1385**	1.80	1.57	2.22	2.72	3.14	3.85	4.97	5.88	7.03
•	•	•	•	•	•	•	**1490**	2.10	2.00	2.83	3.46	4.00	4.90	6.33	7.48	8.95
•	•	•	•	•	•	•	**1581**	2.30	2.37	3.35	4.11	4.74	5.81	7.50	8.87	10.6
•	•	•	•	•	•	•	**1780**	2.70	3.18	4.50	5.52	6.37	7.80	10.1	11.9	14.2
•	•	•	•	•	•	•	**1980**	3.00	4.00	5.66	6.93	8.00	9.80	12.7	15.0	17.9
•	•	•	•	•	•	•	**2124**	3.40	5.06	7.16	8.77	10.1	12.4	16.0	18.9	22.6
•	•	•	•	•	•	•	**2153**	3.80	6.25	8.83	10.8	12.5	15.3	19.8	23.4	27.9
•	•	•	•	•	•	•	**2194**	4.30	7.96	11.3	13.8	15.9	19.5	25.2	29.8	35.6
High capacity tips																
•	•	•	•	•	•	•	**2310**	5.40	12.7	17.9	21.9	25.3	31.0	40.0	47.4	56.6
•	•	•	•	•	•	•	**2390**	6.00	15.9	22.5	27.6	31.8	39.0	50.3	59.6	71.2
•	•	•	•	•	•	•	**2470**	6.60	19.2	27.1	33.2	38.4	47.0	60.7	71.8	85.8
•	•	•	•	•	•	•	**2590**	7.50	24.1	34.1	41.7	48.2	59.0	76.2	90.1	108
•	•	•	•	•	•	•	**2780**	8.70	31.8	45.0	55.2	63.7	78.0	101	119	142

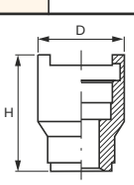
ACCESSORIES We offer various specification and materials of nipples. Please see below ordering code.

	Thread size (RG) inch	Standard size	Large size	H mm	WS mm	D mm
Male nipple	1/4"	ZHS 0025 **xx**Q1	-	29	22	-
	3/8"	ZHS 0038 **xx**Q1	-	29	22	-
	1/2"	-	ZHS 0050 **xx**Q2	35	30	-
Female nipple	3/8"	ZHT 0038 **xx**Q1	-	29	22	-
Welding nipple	-	ZHU 0038 **xx**Q1	ZHU 0050 **xx**Q2	32	-	28
Seal (Viton) for SS nipples	-	VDH BQ10 E7	VDH BQ20 E7	-	-	-
Seal (BUNA) for brass nipples	-	VDH BQ10 E8	VDH BQ20 E8	-	-	-

Typical applications

Washing
Steel and PCB cleaning
Filter cloth cleaning
Cooling
Steel cooling
Product cooling
Other applications
Pre-treatment for coating process
Sewage treatment system





ZHU 0038 xxQ1



ZHS 0025 xxQ1



ZHS 0050 xxQ2

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: HTA 1310 B1

HT A 1310 xx

- NOZZLE TYPE: HT
- SPRAY ANGLE: A
- CAPACITY: 1310
- MATERIAL: xx
  - **B1** - AISI 303 Stainless steel
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass

SPRAY ANGLE options:
- **A** - 0°
- **L** - 40°
- **N** - 50°
- **R** - 65°
- **T** - 80°
- **V** - 95°
- **J** - 110°

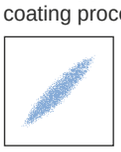
LOW FLOW FLAT FAN NOZZLES

These standard flat fan nozzles are available in a wide range of capacities, spray angles and materials. Nozzles shown on this page cover the low to minimal capacity range from 0.06 to 1.60 litres per minute. The tiny outlet orifices, machined with high precision, may required to be protected from clogging by means of an adequate filter positioned inside the supply line, depending upon the quantity and type of the solid particles suspended in the liquid. These nozzles can be made with a customized inner thread for a VEF filter (*optional). We suggest to buy these nozzles with their related VEF filter.

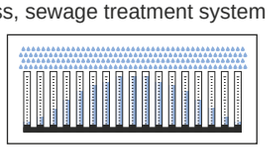


J nozzles series are also available with NPT thread: the code becomes H.

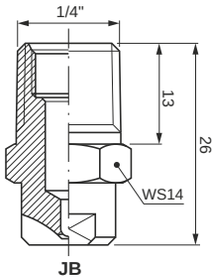
- **Thread specification**: BSPT, NPT
- **Typical applications**
  Washing: steel and PCB cleaning
  glass substrate cleaning
  Cooling: steel cooling, product cooling
  Other applications: pre-treatment for coating process, sewage treatment system



Spray section

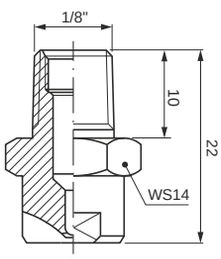


Convex distribution



JB





JA

	25°	40°	50°	65°	75°	80°	95°	110°	Capacity code	D mm	Capacity at different pressure values (l/min) (bar)							
1/8"	JAD	JAL	JAN	JAR	JAS	JAT	JAV	JAJ										
1/4"	JBD	JBL	JBN	JBR	JBS	JBT	JBV	JBJ			0.7	1.0	1.5	2.0	3.0	5.0	7.0	10
0100				•					0100	0.34	0.048	0.06	0.07	0.08	0.10	0.13	0.15	0.18
0130				•					0130	0.38	0.06	0.08	0.09	0.11	0.13	0.17	0.20	0.24
0150	•	•	•	•	•	•	•	•	0150	0.40	0.07	0.09	0.11	0.12	0.15	0.19	0.23	0.27
0200	•	•	•	•	•	•	•	•	0200	0.46	0.096	0.12	0.14	0.16	0.20	0.26	0.31	0.37
0260	•	•	•	•	•	•	•	•	0260	0.53	0.10	0.15	0.18	0.21	0.26	0.34	0.40	0.47
0390	•	•	•	•	•	•	•	•	0390	0.66	0.19	0.23	0.28	0.32	0.39	0.50	0.60	0.71
0590	•	•	•	•	•	•	•	•	0590	0.79	0.28	0.34	0.42	0.48	0.59	0.76	0.90	1.08

LIMIT OF MATERIALS PROCESSING

Hard materials such as stainless steel are extremely difficult to work with small profile drills, therefore not all nozzle sizes are available in all materials. Our sales office will offer you the best choice according to the materials and specifications you require.

Material	0100	0130	0150	0200	0260	0390	0590	0780
B31 - AISI 316L SS				•	•	•	•	•(1)
B1 - AISI 303 SS	•	•	•	•	•	•	•	•(2)
T1 - Brass	•	•	•	•	•	•	•	•(2)

(1) Low capacity body
(2) Standard capacity body

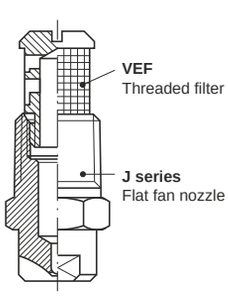
VEF THREADED FILTERS (OPTIONAL)

J series small capacity nozzles have a small diameter and can work with clean liquids. So, if you order small capacity nozzles, we suggest you to order VEF threaded filters too, to avoid clogging. Please see page 91 for more information.

Nozzle type	Thread filter code	Thread size
JA (1/8")	VEF 0411 xx	M7
JB (1/4")	VEF 0138 xx	3/8"UNF



VEF Threaded filter



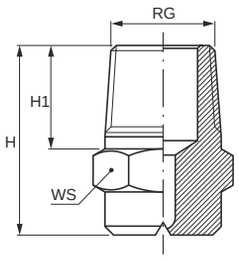
HOW TO MAKE UP THE **NOZZLE CODE**

EX.: JAD 0130 B1

J A D 0130 xx

- NOZZLE TYPE
- CONNECTION: • A - 1/8" • B - 1/4"
- SPRAY ANGLE: • D - 25° • L - 40° • N - 50° • R - 65° • S - 75° • V - 80° • V - 95° • J - 110°
- CAPACITY
- MATERIAL: • B1 - AISI 303 Stainless steel • B31 - AISI 316L Stainless steel • T1 - Brass





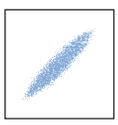
STANDARD CAPACITY FLAT FAN NOZZLES

Standard flat fan nozzles are available in a wide range of different capacities, spray angles, thread sizes and materials. Used in several industrial applications, they produce a mist spray and supply an appropriate force of impact.

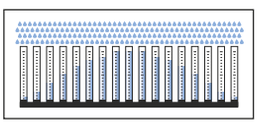
- **Typical applications**

Washing: parts cleaning, food cleaning, filter cloth cleaning
Spray: spray of chemicals, disinfectant and lubricating fluids
Cooling: metal parts and vehicles cooling
Other applications: water curtain for toxic gases separation, cleaning systems
In steelworks they are used in the pickling process to remove surface oxides layers formed during the hot metalwork.

- **Thread specification**: BSPT, NPT



Spray section



Convex distribution



Spray angle codes

JxA	0°
JxC	20°
JxF	30°
JxM	45°
JxQ	60°
JxU	90°
JxW	120°

Thread size codes (RG)

JA	1/8”
JB	1/4”
JC	3/8”

	JAA 1/8"	JBA 1/4"	JCA 3/8"	Capacity code	D mm	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
0°	•	•		**0780**	0.91	0.32	0.45	0.64	0.78	0.90	1.01	1.19	1.42	2.01
	•	•		**1120**	1.10	0.49	0.69	0.98	1.20	1.39	1.55	1.83	2.19	3.10
	•	•		**1160**	1.30	0.65	0.92	1.31	1.60	1.85	2.07	2.44	2.92	4.13
	•	•		**1190**	1.30	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		**1233**	1.50	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		**1310**	1.70	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		**1385**	1.80	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		**1490**	2.10	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.7
	•	•		**1581**	2.30	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	**1780**	2.70	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	**1980**	3.00	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
	•	•	•	**2124**	3.40	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
	•	•	•	**2153**	3.80	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	**2195**	4.30	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	**2245**	4.80	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	**2274**	5.20	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	•	**2310**	5.40	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
		•	•	**2390**	6.00	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
		•	•	**2470**	6.20	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

DIMENSIONS AND WEIGHTS

Code	Size (RG)	H	H1	WS	W
unit	inch	mm	mm	mm	gram
JA	1/8"	19.5	11	12	9
JB	1/4"	22.0	12	14	18
JC	3/8"	25.0	14	17	34

IMPORTANT: the nozzle Jxx 0780 B31 is made with “low capacity” body, while when it’s fabricated with other materials is made with “standard capacity” body.

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: JAA 1153 B1

J A A 1153 xx

- NOZZLE TYPE: J
- CONNECTION: A
  - ● A - 1/8"
  - ● B - 1/4"
  - ● C - 3/8"
- SPRAY ANGLE: A
  - ● A - 0°
  - ● C - 20°
  - ● F - 30°
  - ● M - 45°
  - ● Q - 60°
  - ● U - 90°
  - ● W - 120°
- CAPACITY: 1153
- MATERIAL: xx
  - ● **B1** - AISI 303 Stainless steel
  - ● **B31** - AISI 316L Stainless steel
  - ● **T1** - Brass
  - ○ **D1** - PVC (optional)
  - ○ **E1** - PTFE (optional)

	JAC 1/8"	JBC 1/4"	JCC 3/8"	Capecity code	D mm	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
20°	•	•		0780	0.91	0.32	0.45	0.64	0.78	0.90	1.01	1.19	1.42	2.01
	•	•		1120	1.10	0.49	0.69	0.98	1.20	1.39	1.55	1.83	2.19	3.10
	•	•		1160	1.30	0.65	0.92	1.31	1.60	1.85	2.07	2.44	2.92	4.13
	•	•		1190	1.30	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	1.50	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.70	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.80	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.10	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.7
	•	•		1581	2.30	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	2.70	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	3.00	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
	•	•	•	2124	3.40	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
	•	•	•	2153	3.80	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	4.30	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	4.80	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	5.20	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	•	2310	5.40	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
		•	•	2390	6.00	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
			•	2470	6.20	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

	JAF	JBF	JCF	Code	D	0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
30°	•	•		0780	0.91	0.32	0.45	0.64	0.78	0.90	1.01	1.19	1.42	2.01
	•	•		1120	1.10	0.49	0.69	0.98	1.20	1.39	1.55	1.83	2.19	3.10
	•	•		1160	1.30	0.65	0.92	1.31	1.60	1.85	2.07	2.44	2.92	4.13
	•	•		1190	1.30	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	1.50	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.70	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.80	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.10	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.7
	•	•		1581	2.30	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	2.70	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	3.00	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
	•	•	•	2124	3.40	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
	•	•	•	2153	3.80	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	4.30	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	4.80	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	5.20	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	•	2310	5.40	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
		•	•	2390	6.00	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
			•	2470	6.20	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

	JAM	JBM	JCM	Code	D	0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
45°	•	•		0780	0.91	0.32	0.45	0.64	0.78	0.90	1.01	1.19	1.42	2.01
	•	•		1120	1.10	0.49	0.69	0.98	1.20	1.39	1.55	1.83	2.19	3.10
	•	•		1160	1.30	0.65	0.92	1.31	1.60	1.85	2.07	2.44	2.92	4.13
	•	•		1190	1.30	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	1.50	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.70	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.80	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.10	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.7
	•	•		1581	2.30	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	2.70	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	3.00	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
	•	•	•	2124	3.40	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
	•	•	•	2153	3.80	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	4.30	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	4.80	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	5.20	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	•	2310	5.40	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	6.00	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
			•	2470	6.20	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

Spray angle codes

JxA	0°
JxC	20°
JxF	30°
JxM	45°
JxQ	60°
JxU	90°
JxW	120°

Thread size codes (RG)

JA	1/8"
JB	1/4"
JC	3/8"

IMPORTANT: the nozzle Jxx 0780 B31 is made with "low capacity" body, while when it's fabricated with other materials is made with "standard capacity" body.

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: JAC 1153 B1

J A C 1153 xx

- **NOZZLE TYPE**
- **CONNECTION**: • A - 1/8" • B - 1/4" • C - 3/8"
- **SPRAY ANGLE**: • A - 0° • C - 20° • F - 30° • M - 45° • Q - 60° • U - 90° • W - 120°
- **CAPACITY**
- **MATERIAL**: • B1 - AISI 303 Stainless steel • B31 - AISI 316L Stainless steel • T1 - Brass ○ D1 - PVC (optional) ○ E1 - PTFE (optional)

J (STANDARD CAPACITY FLAT FAN NOZZLES)

Spray angle codes

JxA	0°
JxC	20°
JxF	30°
JxM	45°
JxQ	60°
JxU	90°
JxW	120°

Thread size codes (RG)

JA	1/8"
JB	1/4"
JC	3/8"

IMPORTANT: the nozzle Jxx 0780 B31 is made with "low capacity" body, while when it's fabricated with other materials is made with "standard capacity" body.

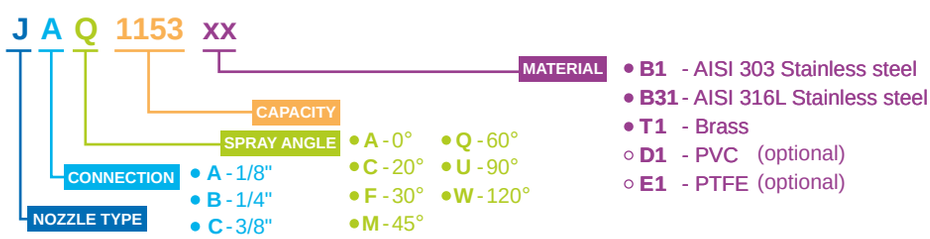
	JAQ 1/8"	JBQ 1/4"	JCQ 3/8"	Capacity code	D mm	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
60°	•	•		0780	0.91	0.32	0.45	0.64	0.78	0.90	1.01	1.19	1.42	2.01
	•	•		1120	1.10	0.49	0.69	0.98	1.20	1.39	1.55	1.83	2.19	3.10
	•	•		1160	1.30	0.65	0.92	1.31	1.60	1.85	2.07	2.44	2.92	4.13
	•	•		1190	1.30	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	1.50	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.70	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.80	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.10	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.7
	•	•		1581	2.30	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	2.70	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	3.00	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
	•	•	•	2124	3.40	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
	•	•	•	2153	3.80	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	4.30	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	4.80	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	5.20	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	•	2310	5.40	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	6.00	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
			•	2470	6.20	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

	JAU	JBU	JCU	Codice	D	0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
90°	•	•		0780	0.91	0.32	0.45	0.64	0.78	0.90	1.01	1.19	1.42	2.01
	•	•		1120	1.10	0.49	0.69	0.98	1.20	1.39	1.55	1.83	2.19	3.10
	•	•		1160	1.30	0.65	0.92	1.31	1.60	1.85	2.07	2.44	2.92	4.13
	•	•		1190	1.30	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	1.50	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.70	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.80	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.10	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.7
	•	•		1581	2.30	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	2.70	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	3.00	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
	•	•	•	2124	3.40	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
	•	•	•	2153	3.80	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	4.30	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	4.80	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	5.20	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	•	2310	5.40	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	6.00	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
			•	2470	6.20	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

	JAW	JBW	JCW	Codice	D	0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
120°	•	•		0780	0.91	0.32	0.45	0.64	0.78	0.90	1.01	1.19	1.42	2.01
	•	•		1120	1.10	0.49	0.69	0.98	1.20	1.39	1.55	1.83	2.19	3.10
	•	•		1160	1.30	0.65	0.92	1.31	1.60	1.85	2.07	2.44	2.92	4.13
	•	•		1190	1.30	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	1.50	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.70	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.80	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.10	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.7
	•	•		1581	2.30	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	2.70	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	3.00	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
	•	•	•	2124	3.40	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
	•	•	•	2153	3.80	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	4.30	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	4.80	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	5.20	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	•	2310	5.40	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	6.00	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
			•	2470	6.20	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: JAQ 1153 B1

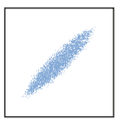


LARGE CAPACITY FLAT FAN NOZZLES

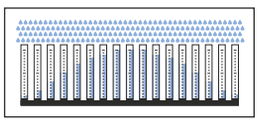
J series standard flat fan nozzles are available in a wide range of different capacities, spray angles, thread sizes and materials. The large capacity models produce a high-impact spray jet with a mist effect and a powerful washing action.



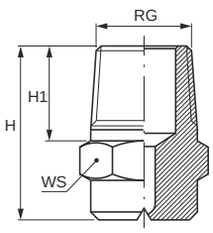
- **Thread specification**: BSPT, NPT



Spray section



Convex distribution





	1/2"	3/4"	1"	Code	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
0°	•			JDA 2590 xx	24.1	34.1	48.2	59.0	68.1	76.2	90.1	108	152
	•			JDA 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201
		•		JEA 3134 xx	54.7	77.4	109	134	155	173	205	245	346
		•		JEA 3275 xx	112	159	225	275	318	355	420	502	710
			•	JFA 3390 xx	159	225	318	390	450	503	596	712	1007
			•	JFA 3435 xx	178	251	355	435	502	562	664	794	1123
15°	•			JDB 2195 xx	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
	•			JDB 2274 xx	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
	•			JDB 2390 xx	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
		•		JEB 2990 xx	40.4	57.2	80.8	99.0	114	128	151	181	256
25°	•			JDD 2390 xx	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
	•			JDD 2590 xx	24.1	34.1	48.2	59.0	68.1	76.2	90.1	108	152
	•			JDD 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201
			•	JFD 3195 xx	79.6	113	159	195	225	252	298	356	503
40°	•			JDL 2195 xx	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
	•			JDL 2240 xx	9.80	13.9	19.6	24.0	27.7	31.0	36.7	43.8	62.0
	•			JDL 2274 xx	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
	•			JDL 2390 xx	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
	•			JDL 2590 xx	24.1	34.1	48.2	59.0	68.1	76.2	90.1	108	152
50°	•			JDN 2274 xx	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
	•			JDN 2390 xx	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
	•			JDN 2590 xx	24.1	34.1	48.2	59.0	68.1	76.2	90.1	108	152
	•			JDN 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201
		•		JEN 3158 xx	64.5	91.2	129	158	182	204	241	288	408
			•	JFN 3195 xx	79.6	113	159	195	225	252	298	356	503
			•	JFN 3230 xx	93.9	133	188	230	266	297	351	420	594
65°	•			JDR 2195 xx	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
	•			JDR 2240 xx	9.80	13.9	19.6	24.0	27.7	31.0	36.7	43.8	62.0
	•			JDR 2274 xx	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
	•			JDR 2390 xx	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
	•			JDR 2590 xx	24.1	34.1	48.2	59.0	68.1	76.2	90.1	108	152
			•	JFR 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201
80°	•			JDT 2195 xx	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
	•			JDT 2240 xx	9.80	13.9	19.6	24.0	27.7	31.0	36.7	43.8	62.0
	•			JDT 2274 xx	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
	•			JDT 2390 xx	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
	•			JDT 2590 xx	24.1	34.1	48.2	59.0	68.1	76.2	90.1	108	152
	•			JDT 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201
		•		JET 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201
		•		JET 3158 xx	64.5	91.2	129	158	182	204	241	288	408
95°	•			JDV 2195 xx	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
	•			JDV 2240 xx	9.80	13.9	19.6	24.0	27.7	31.0	36.7	43.8	62.0
	•			JDV 2274 xx	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
	•			JDV 2390 xx	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	101
	•			JDV 2590 xx	24.1	34.1	48.2	59.0	68.1	76.2	90.1	108	152

SPRAY ANGLE CODES

Nozzle code	Spray angle
JD**A**	**0°**
JD**B**	**15°**
JD**D**	**25°**
JD**L**	**40°**
JD**N**	**50°**
JD**R**	**65°**
JD**T**	**80°**
JD**V**	**95°**

DIMENSIONS AND WEIGHTS

Below are dimensions and specifications for use.

Code	Size	H	H1	WS	W
	inch	mm	mm	mm	gram
JD	1/2"	33	17	22	65
JE	3/4"	41	20	27	130
JF	1"	61	22	27	215

Typical applications

Washing
Tanks, large parts and vehicles cleaning
Spray
Spray of chemicals
Disinfectants and lubricating fluids
Cooling
Parts cooling
Steel cooling
Other applications
Water curtain to separate toxic gases
Fire-fighting systems

HOW TO MAKE UP THE **NOZZLE CODE**

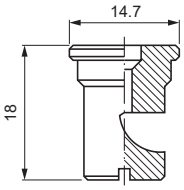
EX.: JDA 2590 B1

J D A 2590 xx

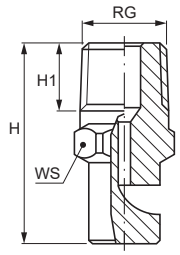
- **MATERIAL**
  - **B1** - AISI 303 Stainless steel
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass
- **CAPACITY**
- **SPRAY ANGLE**
  - **A** - 0°
  - **B** - 15°
  - **D** - 25°
  - **L** - 40°
  - **N** - 50°
  - **R** - 65°
  - **T** - 80°
  - **V** - 95°
- **CONNECTION**
  - **D** - 1/2"
  - **E** - 3/4"
  - **F** - 1"
- **NOZZLE TYPE**



KX



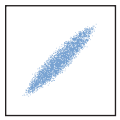




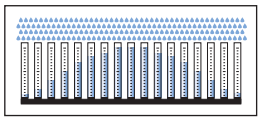
LARGE SPRAY ANGLE

K flat fan nozzles work on the deflection principle conveying a water vein onto a machined deflection surface, and produce a jet with a wide angle flat spray pattern, medium impact value and medium size droplets. Between their inlet orifice and spray orientation there is a 75° angle (see below). Their round outlet orifice and free inside passage minimize the risk of clogging. In addition, compared to standard flat fan nozzles working with a limited operating pressure, the K series models with large spray angles produce an excellent mist effect. These K nozzles are available with threaded connections, for capacities from 0390 and 3350, and also as tips to be assembled onto a nipple by means of a retaining nut. An alternative option are the KX types.

- **Thread specification**: BSPT, NPT



Spray section



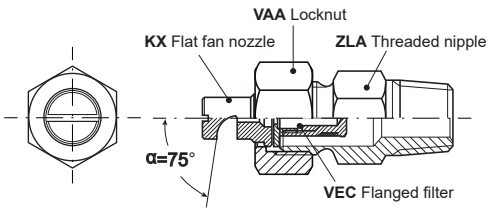
Convex distribution

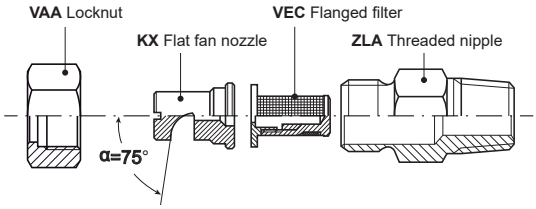


THREAD SIZE AND DIMENSIONS

Here below please find available thread sizes and nozzles dimensions. Different capacities correspond to different deflection angles. The external dimensions may differ even if the thread size is the same. The table includes the largest nozzles with a given thread size. Please contact our Sales department for more information.

Code	RG inch	H mm	H1 mm	CH mm
KGW	1/8"	24,0 (from 0390 to 1120)	8,5	12
		25,0 (from 1160 to 1940)	9,0	
		31,0 (from 2117 to 2157)	10,0	14
KHW	1/4"	31,0 (from 1160 to 1940)	12,5	14
		34,0 (from 2117 to 2210)		
KIW	3/8"	44,0 (all codes)	13,0	17
KJW	1/2"	49,0 (all codes)	17,0	22
KKW	3/4"	56,0 (from 2700 to 2940)	20,0	36
		65,0 (from 3110 to 3164)		
KLW	1"	92,0 (all codes)	26,0	46





ASSEMBLY FITTINGS

The below illustration shows the assembly of a KX nozzle tip (in the middle) with a nipple and a locknut.



Locknut **Flat fan nozzle** **Welding nipple**

Typical applications

Washing: fruits, vegetables, crushed stones, other
Spray: rolling oil, release agents, coolants
Cooling: metal parts, bottles
Other applications: foam dispersion, fire-fighting systems, water curtains

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: KGW 0390 B1

K G W 0390 xx

- **MATERIAL**: • **B1** - AISI 303 Stainless steel • **B31** - AISI 316L Stainless steel • **T1** - Brass
- **CAPACITY**
- **SPRAY ANGLE**: • **W** - 120° (Wide spray angle) • **X** - Ø14.7
- **CONNECTION**: • **G** -1/8" • **J** -1/2" • **H** -1/4" • **K** -3/4" • **I** -3/8" • **L** -1"
- **NOZZLE TYPE**

LARGE SPRAY ANGLE

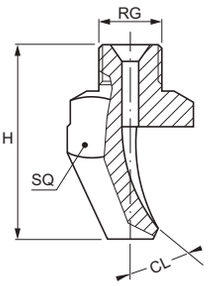
KGW 1/8"	KHW 1/4"	KIW 3/8"	KJW 1/2"	KKW 3/4"	KLW 1"	KXW	D mm	Code	Capacity at different pressure values (l/min) (bar)							Spray angle (°) at pressure (bar)	
									0.5	1.0	2.0	3.0	4.0	5.0	7.0	1.5	4.0
•						•	0.6	**0390**	0.16	0.23	0.32	0.39	0.45	0.50	0.60	90°	120°
•						•	0.7	**0590**	0.24	0.34	0.48	0.59	0.68	0.76	0.90	105°	120°
•						•	0.8	**0780**	0.32	0.45	0.64	0.78	0.90	1.01	1.19	110°	125°
•						•	1.0	**1120**	0.49	0.69	0.98	1.20	1.39	1.55	1.83	105°	122°
•	•					•	1.1	**1160**	0.65	0.92	1.31	1.60	1.85	2.07	2.44	110°	130°
•	•					•	1.3	**1200**	0.82	1.15	1.63	2.00	2.31	2.58	3.06	120°	130°
•	•					•	1.4	**1230**	0.94	1.33	1.88	2.30	2.66	2.97	3.51	110°	125°
•	•					•	1.6	**1310**	1.27	1.79	2.53	3.10	3.58	4.00	4.74	120°	130°
•	•					•	1.8	**1390**	1.59	2.25	3.18	3.90	4.50	5.03	5.96	130°	140°
•	•					•	2.3	**1590**	2.41	3.41	4.82	5.90	6.81	7.62	9.01	120°	130°
•	•					•	2.6	**1780**	3.18	4.50	6.37	7.80	9.01	10.1	11.9	130°	140°
•	•					•	2.9	**1940**	3.84	5.43	7.68	9.40	10.9	12.1	14.4	140°	150°
•	•					•	3.3	**2117**	4.78	6.75	9.55	11.7	13.5	15.1	17.9	110°	120°
•	•					•	3.6	**2141**	5.76	8.14	11.5	14.1	16.3	18.2	21.5	120°	130°
•	•					•	3.8	**2157**	6.41	9.06	12.8	15.7	18.1	20.3	24.0	120°	130°
	•					•	4.0	**2172**	7.02	9.93	14.0	17.2	19.9	22.2	26.3	125°	135°
	•					•	4.1	**2188**	7.68	10.9	15.4	18.8	21.7	24.3	28.7	130°	140°
	•					•	4.4	**2210**	8.57	12.1	17.1	21.0	24.2	27.1	32.1	135°	145°
		•				•	4.5	**2230**	9.39	13.3	18.8	23.0	26.6	29.7	35.1	110°	120°
		•				•	5.0	**2270**	11.0	15.6	22.0	27.0	31.2	34.9	41.2	115°	125°
		•	•			•	5.3	**2310**	12.7	17.9	25.3	31.0	35.8	40.0	47.4	125°	135°
		•	•				5.6	**2350**	14.3	20.2	28.6	35.0	40.4	45.2	53.5	130°	140°
			•				6.0	**2390**	15.9	22.5	31.8	39.0	45.0	50.3	59.6	130°	140°
			•				6.5	**2470**	19.2	27.1	38.4	47.0	54.3	60.7	71.8	135°	140°
			•				7.1	**2550**	22.5	31.8	44.9	55.0	63.5	71.0	84.0	135°	145°
			•				7.5	**2630**	25.7	36.4	51.4	63.0	72.7	81.3	96.2	140°	150°
				•			8.0	**2700**	28.6	40.4	57.2	70.0	80.8	90.4	107	130°	140°
				•			8.4	**2780**	31.8	45.0	63.7	78.0	90.1	101	119	135°	145°
				•			8.7	**2860**	35.1	49.7	70.2	86.0	99.3	111	131	135°	145°
				•			9.3	**2940**	38.4	54.3	76.8	94.0	109	121	144	140°	150°
				•			10.3	**3110**	44.9	63.5	89.8	110	127	142	168	125°	135°
				•			11.0	**3125**	51.0	72.2	102	125	144	161	191	130°	135°
				•			11.4	**3141**	57.6	81.4	115	141	163	182	215	130°	135°
				•			12.2	**3164**	67.0	94.7	134	164	189	212	251	135°	145°
					•		14.6	**3235**	95.9	136	192	235	271	303	359	130°	135°
					•		17.9	**3350**	143	202	286	350	404	452	535	130°	135°

ASSEMBLY ACCESSORIES

KX series nozzles are assembled with pipe clamp, welding nipple and locknut.
Our assembly accessories are available in many different types and materials. Please see on page 44 for more information.

Name	Code and material	Appearance	Model no.	
			3/8" Standard size	3/4" Large size
Locknut P.88	**B1** - AISI 303 SS **B31**- AISI 316L SS **T1** - Brass **D6** - Fiberglass reinforced PP		VAA 0380 **xx**B	VAA 0750 **xx**B
Welding nipple P.89	**B1** - AISI 303 SS **B31**- AISI 316L SS		ZAA C018 **xx**G	ZAA E027 **xx**G
Threaded nipple P.89	**B1** - AISI 303 SS **B31**- AISI 316L SS **T1** - Brass		ZLA 2538 **xx**B	ZLA 7575 **xx**B
Metal pipe clamp P.87	**B1** - AISI 303 SS **T1** - Brass		ZPM	–
Plastic pipe clamp P.86	**D6** - Fiberglass reinforced PP		ZPB 0050 D6	–

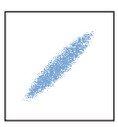




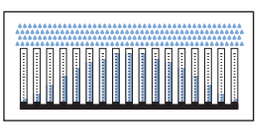
HIGH IMPACT TYPES

The K series nozzles of this type are designed with a spoon-shaped deflected surface to concentrate the liquid flow and produce a narrow-angle flat fan spray with a high impact value. For this feature they are widely used in all working environments requiring powerful jets. Compared to the standard cat-eye-shaped flat fan nozzle tips, K nozzles have a larger and free inner passage and are less subject to clogging, provide high performance cleaning efficiency and have an extended operating life. They are designed with a specific angle (see ~ CL on the left drawing) between inlet orifice and spray orientation surface. These nozzles are available with standard male threads but also with quick coupling nipples to shorten maintenance time. Please contact our Sales department for more information.

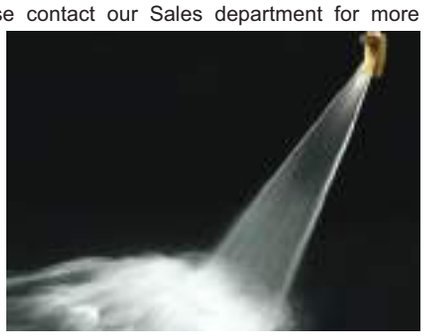
- **Thread specification**: BSPT, NPT
- **Typical applications**
  cleaning of parts, crushed stone, road, aircrafts, vehicles and tanks.



Spray section



Convex distribution



THREAD SIZE CODE

KO**x**	1/8"
KP**x**	1/4"
KQ**x**	3/8"
KR**x**	1/2"
KS**x**	3/4"
KT**x**	QC

QUICK COUPLING NIPPLES

Please refer to below table for dimensions and materials suitable for different uses.

Name	Thread size (RG) inch	Standard size	Large size	H mm	WS mm	D mm
Male nipple	1/4"	ZHS 0025 **xx**Q1	-	29	22	-
	3/8"	ZHS 0038 **xx**Q1	-	29	22	-
	1/2"	-	ZHS 0050 **xx**Q2	35	30	-
Female nipple	3/8"	ZHT 0038 **xx**Q1	-	29	22	-
Welding nipple	-	ZHU 0038 **xx**Q1	ZHU 0050 **xx**Q2	32	-	28
Seal (Viton) for SS nipple	-	VDH BQ10 E7	VDH BQ20 E7	-	-	-
Seal (BUNA) for brass nipple	-	VDH BQ10 E8	VDH BQ20 E8	-	-	-





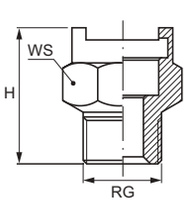
ZHS + KTH

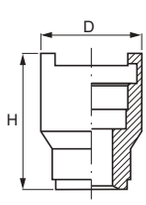


ZHS 0025 xxQ1



ZHS 0050 xxQ2





ZHU 0038 xxQ1

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: KPB 1390 B1

K P B 1390 xx

- **MATERIAL**: • **B1** - AISI 303 Stainless steel • **B31** - AISI 316L Stainless steel • **T1** - Brass
- **CAPACITY**
- **SPRAY ANGLE**: • **B** - 15° • **D** - 25° • **H** - 35° • **L** - 40° • **N** - 50°
- **CONNECTION**: • **O** - 1/8" • **P** - 1/4" • **Q** - 3/8" • **R** - 1/2" • **S** - 3/4" • **T** - Quick Connect
- **NOZZLE TYPE**

HIGH IMPACT TYPES

	1/8"	1/4"	3/8"	1/2"	3/4"	QC	Code	D mm	Capacity at different pressure values (l/min) (bar)							CL deg	H mm	SQ mm
									2.0	3.0	4.0	5.0	6.0	7.0	10			
15°		KPB				KTB	**1390**	1.9	3.18	3.90	4.50	5.03	5.52	5.96	7.12	22°	48	15
		KPB				KTB	**1780**	2.6	6.37	7.80	9.01	10.1	11.0	11.9	14.2	19°	54	
			KQB			KTB	**2117**	3.2	9.55	11.7	13.5	15.1	16.5	17.9	21.4	25°	72	20
			KQB			KTB	**2156**	3.7	12.7	15.6	18.0	20.1	22.1	23.8	28.5	18°	92	
			KQB			KTB	**2195**	4.2	15.9	19.5	22.5	25.2	27.6	29.8	35.6	15°	90	
				KRB			**2230**	4.6	18.8	23.0	26.6	29.7	32.5	35.1	42.0	14°	125	25
				KRB			**2310**	5.3	25.3	31.0	35.8	40.0	43.8	47.4	56.6	14°	130	
				KRB	KSB		**2390**	5.9	31.8	39.0	45.0	50.3	55.2	59.6	71.2	14°	137	
					KSB		**2780**	8.4	63.7	78.0	90.1	101	110	119	142	14°	191	30
25°		KPD				KTD	**2156**	3.7	12.7	15.6	18.0	20.1	22.1	23.8	28.5	25°	65	20
35°	KOH					KTH	**1160**	1.2	1.31	1.60	1.85	2.07	2.26	2.44	2.92	40°	23	12
		KPH				KTH	**1390**	1.9	3.18	3.90	4.50	5.03	5.52	5.96	7.12	36°	37	15
		KPH	KQH			KTH	**1780**	2.6	6.37	7.80	9.01	10.1	11.0	11.9	14.2	30°	43	20
		KPH	KQH			KTH	**1980**	2.9	8.00	9.80	11.3	12.7	13.9	15.0	17.9	28°	49	
		KPH	KQH			KTH	**2117**	3.3	9.55	11.7	13.5	15.1	16.5	17.9	21.4	28°	52	
			KQH			KTH	**2156**	3.7	12.7	15.6	18.0	20.1	22.1	23.8	28.5	26°	58	
			KQH			KTH	**2195**	4.1	15.9	19.5	22.5	25.2	27.6	29.8	35.6	23°	64	
				KRH		KTH	**2230**	4.5	18.8	23.0	26.6	29.7	32.5	35.1	42.0	22°	73	25
				KRH		KTH	**2310**	5.3	25.3	31.0	35.8	40.0	43.8	47.4	56.6	24°	81	
				KRH			**2390**	5.9	31.8	39.0	45.0	50.3	55.2	59.6	71.2	19°	89	
				KRH	KSH		**2630**	7.5	51.4	63.0	72.7	81.3	89.1	96.2	115	23°	114	32
					KSH		**2780**	8.4	63.7	78.0	90.1	101	110	119	142	22°	122	
40°			KQL			KTL	**2156**	3.7	12.7	15.6	18.0	20.1	22.1	23.8	28.5	35°	60	25
			KQL			KTL	**2195**	4.1	15.9	19.5	22.5	25.2	27.6	29.8	35.6	33°	64	
			KQL			KTL	**2230**	4.5	18.8	23.0	26.6	29.7	32.5	35.1	42.0	33°	72	
			KQL			KTL	**2270**	5.0	22.0	27.0	31.2	34.9	38.2	41.2	49.3	29°	75	
			KQL			KTL	**2310**	5.2	25.3	31.0	35.8	40.0	43.8	47.4	56.6	26°	77	
			KQL			KTL	**2350**	5.7	28.6	35.0	40.4	45.2	49.5	53.5	63.9	28°	77	
			KQL			KTL	**2390**	6.0	31.8	39.0	45.0	50.3	55.2	59.6	71.2	28°	87	
50°		KPN	KQN			KTN	**1200**	1.5	1.63	2.00	2.31	2.58	2.83	3.06	3.65	50°	31	15
		KPN	KQN			KTN	**1270**	1.6	2.20	2.70	3.12	3.49	3.82	4.12	4.93	50°	31	
		KPN	KQN			KTN	**1390**	1.9	3.18	3.90	4.50	5.03	5.52	5.96	7.12	60°	31	
		KPN	KQN			KTN	**1980**	2.9	8.00	9.80	11.3	12.7	13.9	15.0	17.9	42°	41	20
		KPN	KQN			KTN	**2156**	3.7	12.7	15.6	18.0	20.1	22.1	23.8	28.5	45°	47	
		KPN	KQN			KTN	**2230**	4.5	18.8	23.0	26.6	29.7	32.5	35.1	42.0	37°	55	25
			KQN			KTN	**2390**	6.0	31.8	39.0	45.0	50.3	55.2	59.6	71.2	40°	72	30
			KQN			KTN	**2490**	6.7	40.0	49.0	56.6	63.3	69.3	74.8	89.5	38°	72	
			KQN			KTN	**2630**	7.5	51.4	63.0	72.7	81.3	89.1	96.2	115	37°	72	
			KQN			KTN	**2780**	8.4	63.7	78.0	90.1	101	110	119	142	32°	72	

HOW TO MAKE UP THE **NOZZLE CODE**

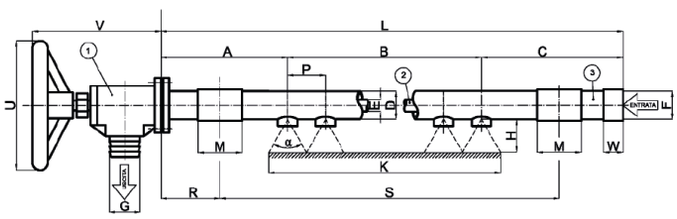
EX.: KPB 1390 B1

K P B 1390 xx

- **MATERIAL**: • **B1** - AISI 303 Stainless steel • **B31** - AISI 316L Stainless steel • **T1** - Brass
- **CAPACITY**
- **SPRAY ANGLE**: • **B** - 15° • **D** - 25° • **H** - 35° • **L** - 40° • **N** - 50°
- **CONNECTION**: • **O** - 1/8" • **P** - 1/4" • **Q** - 3/8" • **R** - 1/2" • **S** - 3/4" • **T** - Quick connect
- **NOZZLE TYPE**

SHOWER PIPE





LEGEND

A: first nozzle position
B: nozzle span
C: last nozzle position
D: external diamenter x pipe widht
E: shaft outer diameter
F: inlet connection
G: outlet connection
H: height
L: standard reference lenght
M: support lenght
N: nozzles number
P: nozzle pitch
R: support position
S: sleeve span
U: hand wheel diameter
V: valve lenght
W: nipple lenght
α: spray angle
(1): assy valve
(2): assy shaft
(3): assy pipe

SELF-CLEANING SHOWER PIPES

Self-cleaning shower pipes are used in the pulp and paper industry for washing and cleaning forming fabrics and felts. There are two kinds of pipes:

- Low pressure (2 ÷ 6 bar) fixed pipes with flat fan nozzles (PNR nozzle: GE)
- High pressure (25 ÷ 70 bar) oscillating pipes with straight jet nozzles (PNR nozzles: GEA)

Both fixed and oscillating pipes must have the following characteristics:

- presence of a cleaning system that cleans the nozzles with simultaneous discharge of impurities;
- easy and fast activation of the cleaning system, without interrupting the spray and without problems for the operators;
- usage of nozzles that allow to save water and that never get blocked, eventually after a long

Shower pipes that satisfy these three characteristics have a structure made of three main parts.

The Assy Valve must allow the passage or the stop of the discharge flux, through the opening or the closing of a lock, moved by a shaft, manually activated by a hand wheel. This movement is used to activate the Assy Shaft. The Assy Valve is connected to the Assy Pipe through a flanged connection, and to the discharge pipes through a specific connection (thread or hose fitting).

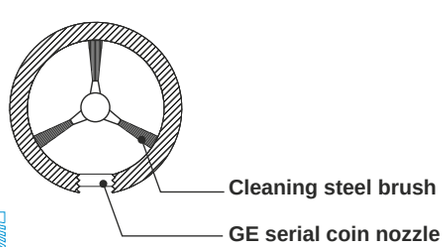
The Assy Shaft is made by a pipe with specific brushes mounted on it; thanks to the connection with the shaft of the Assy Valve, it moves radially and axially. In this way, the brushes can remove the impurities both from the nozzles and from the inner part of the Assy Pipe.

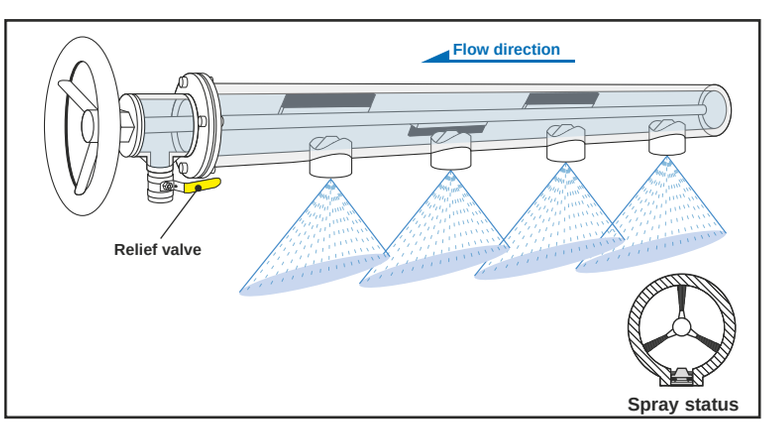
The nozzles are assembled on the Assy Pipe, which is connected to the main pipe. Nozzles can be installed with specific welding nipples or through plastic pipe clamps (PNR code: ZPH, see page 88).

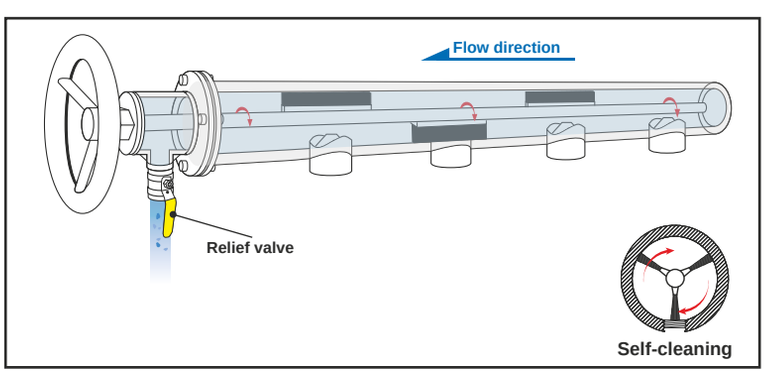
The following table table shows the minimum and the maximum values, for the pipes already produced by PNR Italia. Please contact our Technical Office for any request.

Dim.	MIN	MAX
D (mm)	Ø 50 x 1.5	Ø 73 x 3
L (mm)	600	7100
A (mm)	200	735
B (mm)	200	6000
C (mm)	200	1350
N	2	51
P (mm)	80	2950
F (inch)	1-1/2" F	2-1/2" F
G (mm)	Ø 48	Ø 60

The images shows the functioning of the self-cleaning shower pipe, while rotating the wheel.

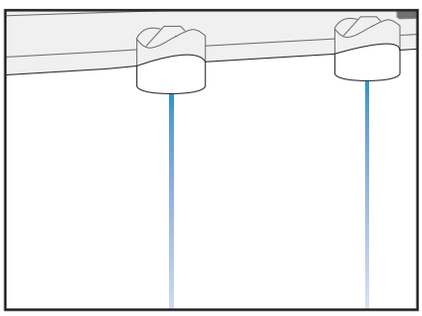




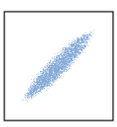


FLAT FAN NOZZLES / DISC NOZZLES

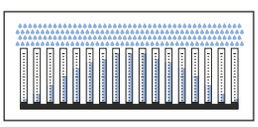
In GE series disc nozzles with thickness 1.2 mm the spray jet is close to the turbulence structure and this special design makes them very easy to clean. Within the delivery pipe these nozzles are assembled to a steel brush, that can be manually or automatically rotated, which takes off all the dirt washed out by water and then flushed out through a release valve positioned at the end of the pipe. Disc nozzles, with their special low profile design, can be easily removed for cleaning so they reduce maintenance times and costs and improve the plant efficiency.



Typical applications
washing or spraying in pulp and paper mills, mesh fabrics cleaning, water treatment systems, screen and filter (felt and wire) washing and many more.



Spray section



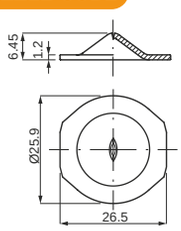
Convex distribution



	Code	D1 mm	Capacity at different pressure values (l/min) (bar) 3.0	4.0	6.0	10	15	20
60°	**GEQ 0900 xx**	1.0	0.90	1.04	1.27	1.64	2.01	2.32
	GEQ 1170 xx	1.5	1.70	1.96	2.40	3.10	3.80	4.39
	GEQ 1234 xx	1.7	2.34	2.70	3.31	4.27	5.23	6.04
	GEQ 1310 xx	2.0	3.10	3.58	4.38	5.66	6.93	8.00
	GEQ 1490 xx	2.5	4.90	5.66	6.93	8.95	11.0	12.7
	GEQ 1780 xx	3.0	7.80	9.01	11.0	14.2	17.4	20.1
	GEQ 2124 xx	4.0	12.4	14.3	17.5	22.6	27.7	32.0
	GEQ 2194 xx	5.0	19.4	22.4	27.4	35.4	43.4	50.1
	GEQ 2310 xx	7.0	23.0	26.6	32.5	42.0	51.4	59.4
75°	**GES 0900 xx**	1.0	0.90	1.04	1.27	1.64	2.01	2.32
	GES 1170 xx	1.5	1.70	1.96	2.40	3.10	3.80	4.39
	GES 1234 xx	1.7	2.34	2.70	3.31	4.27	5.23	6.04
	GES 1310 xx	2.0	3.10	3.58	4.38	5.66	6.93	8.00
	GES 1490 xx	2.5	4.90	5.66	6.93	8.95	11.0	12.7
	GES 1780 xx	3.0	7.80	9.01	11.0	14.2	17.4	20.1
	GES 2124 xx	4.0	12.4	14.3	17.5	22.6	27.7	32.0
	GES 2194 xx	5.0	19.4	22.4	27.4	35.4	43.4	50.1
	GES 2310 xx	7.0	23.0	26.6	32.5	42.0	51.4	59.4

FLAT FAN NOZZLES

HOW TO MAKE UP THE NOZZLE CODE EX.: GES 1310 C7MV



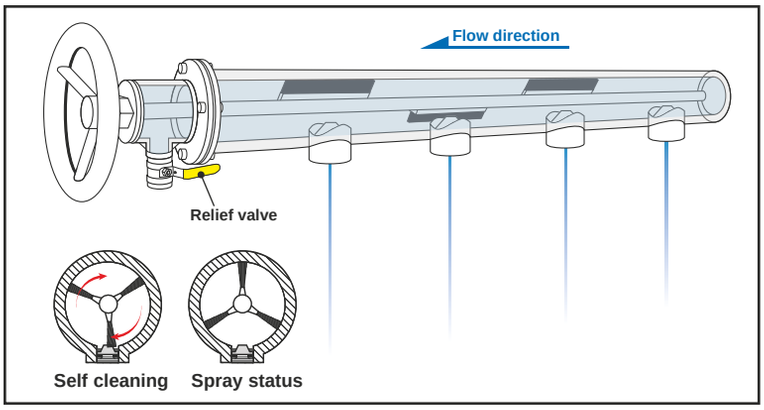
Flat fan nozzle - US
GES 1310 C7SV

GE S 1310 xx

- MATERIAL
  - **C7SV** - AISI 316Ti Stainless steel
- CAPACITY
- SPRAY ANGLE
- NOZZLE TYPE
  - **Q** - 60°
  - **S** - 75°

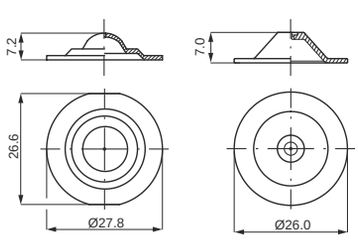
GEA SERIAL STRAIGHT NOZZLES

D mm	Nozzle type: Stainless steel	Nozzle type: Ruby insert	Code	Capacity at different pressure values (l/min) (bar) 3.0	4.0	6.0	10	15	20
0.40		•	**0170**	0.17	0.20	0.24	0.31	0.38	0.44
0.50		•	**0290**	0.29	0.33	0.41	0.53	0.65	0.75
0.60		•	**0320**	0.32	0.37	0.45	0.58	0.72	0.83
0.70		•	**0420**	0.42	0.48	0.59	0.77	0.94	1.08
0.80	•	•	**0500**	0.50	0.58	0.71	0.91	1.12	1.29
0.85		•	**0620**	0.62	0.72	0.88	1.13	1.39	1.60
0.90		•	**0780**	0.78	0.90	1.10	1.42	1.74	2.01
1.00	•	•	**0900**	0.90	1.04	1.27	1.64	2.01	2.32
1.10		•	**1100**	1.10	1.27	1.56	2.01	2.46	2.84
1.20	•	•	**1130**	1.30	1.50	1.84	2.37	2.91	3.36
1.50	•		**1170**	1.70	1.96	2.40	3.10	3.80	4.39
2.00	•		**1310**	3.10	3.58	4.38	5.66	6.93	8.00



STRAIGHT NOZZLES

HOW TO MAKE UP THE NOZZLE CODE EX.: GEA 0900 C7S



Metal
GEA 0900 C7S

Ruby nozzle tip
GEA 0900 F31

GE A 0900 xx

- MATERIAL
  - **C7S** - AISI 316Ti Stainless steel body
  - **F30** - Ruby insert, 303 body
  - **F31** - Ruby insert, 316L body
- CAPACITY
- SPRAY ANGLE
- NOZZLE TYPE
  - **A** - 0°

GF (FLAT FAN NOZZLES / SELF-CLEANING NOZZLES)

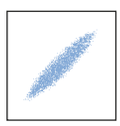




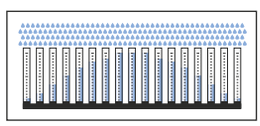
GF SERIES SELF-CLEANING NOZZLES

The self-cleaning design of the GF series nozzles allow an easy maintenance of cleaning spray bars and shower headers. The nozzle body contains a mobile piston whose opening and closure is operated by the water pressure. For example, when nozzles wash mesh fabrics with an operating pressure of 3.0 bar, this pressure is higher than a spring force of 1.0 bar. Piston and nozzle body come close producing a flat fan spray. If the inlet pressure is reduced to 0.5 bar, lower than a spring force of 1.0 bar, piston and nozzle body separate opening to the maximum distance. Water pressure remains at 0.5 bar and removes any build up when back to normal condition. In a word, to clean these nozzles it's sufficient to reduce pressure to avoid the accumulation of dirt inside. GF self-cleaning nozzles are easy to install, align and clean ensuring relevant time and costs savings. The spring force is set depending on customer's plant working pressure.

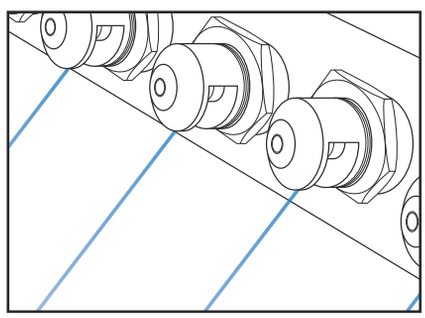
Typical applications
washing or spraying in pulp and paper mills, mesh fabrics cleaning, water treatment systems, and many more.

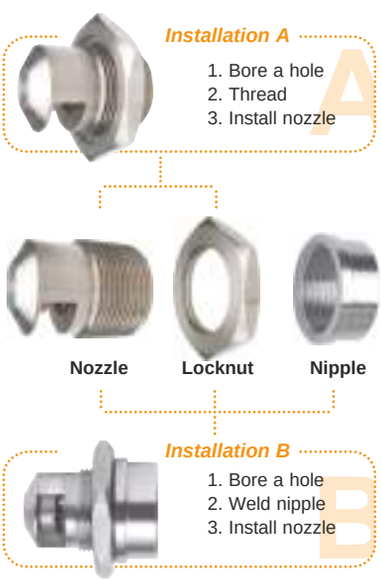


Spray section



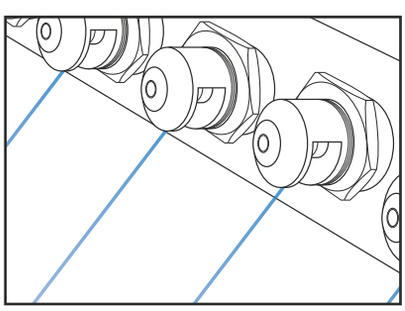
Convex distribution

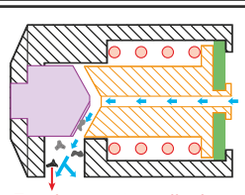
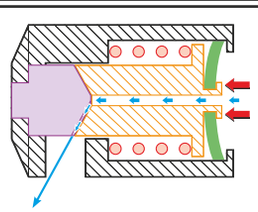




	Code	Capacity at different pressure values (l/min) (bar)								
		3.0	4.0	5.0	6.0	7.0	8.0	10	15	20
0°	GFA 1100 B31 xx	1.00	1.15	1.29	1.41	1.53	1.63	1.83	2.24	2.58
	GFA 1235 B31 xx	2.35	2.71	3.03	3.32	3.59	3.84	4.29	5.25	6.07
	GFA 1330 B31 xx	3.30	3.81	4.26	4.67	5.04	5.39	6.02	7.38	8.52
45°	GFM 1630 B31 xx	6.30	7.27	8.13	8.91	9.62	10.3	11.5	14.1	16.3
	GFM 1750 B31 xx	7.50	8.66	9.68	10.6	11.5	12.2	13.7	16.8	19.4
	GFM 1970 B31 xx	9.70	11.2	12.5	13.7	14.8	15.8	17.7	21.7	25.0
	GFM 2121 B31 xx	12.1	14.0	15.6	17.1	18.5	19.8	22.1	27.1	31.2
	GFM 2139 B31 xx	13.9	16.1	17.9	19.7	21.2	22.7	25.4	31.1	35.9
60°	GFQ 1630 B31 xx	6.30	7.27	8.13	8.91	9.62	10.3	11.5	14.1	16.3
	GFQ 1750 B31 xx	7.50	8.66	9.68	10.6	11.5	12.2	13.7	16.8	19.4
	GFQ 1970 B31 xx	9.70	11.2	12.5	13.7	14.8	15.8	17.7	21.7	25.0
	GFQ 2121 B31 xx	12.1	14.0	15.6	17.1	18.5	19.8	22.1	27.1	31.2
	GFQ 2139 B31 xx	13.9	16.1	17.9	19.7	21.2	22.7	25.4	31.1	35.9
80°	GFT 1630 B31 xx	6.30	7.27	8.13	8.91	9.62	10.3	11.5	14.1	16.3
	GFT 1750 B31 xx	7.50	8.66	9.68	10.6	11.5	12.2	13.7	16.8	19.4
	GFT 1970 B31 xx	9.70	11.2	12.5	13.7	14.8	15.8	17.7	21.7	25.0
	GFT 2121 B31 xx	12.1	14.0	15.6	17.1	18.5	19.8	22.1	27.1	31.2
	GFT 2139 B31 xx	13.9	16.1	17.9	19.7	21.2	22.7	25.4	31.1	35.9

Thread specification	M28 x 1.5	3/4"- 20 UNEF	1 1/8"- 18 UNEF	3/4" BSP
Nozzle	GFx xxxx B31SM	GFx xxxx B31SN	GFx xxxx B31SP	GFx xxxx B31SG
Nipple	XGF 2832 B31SM	XGF 2832 B31SN	XGF 2832 B31SP	XGF 2832 B31SG
Locknut	XGF 7010 B31SM	XGF 7010 B31SN	XGF 7010 B31SP	XGF 7010 B31SG



Self cleaning	Spray status
 Foreign matters discharge	

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: GFA 1100 B31SM

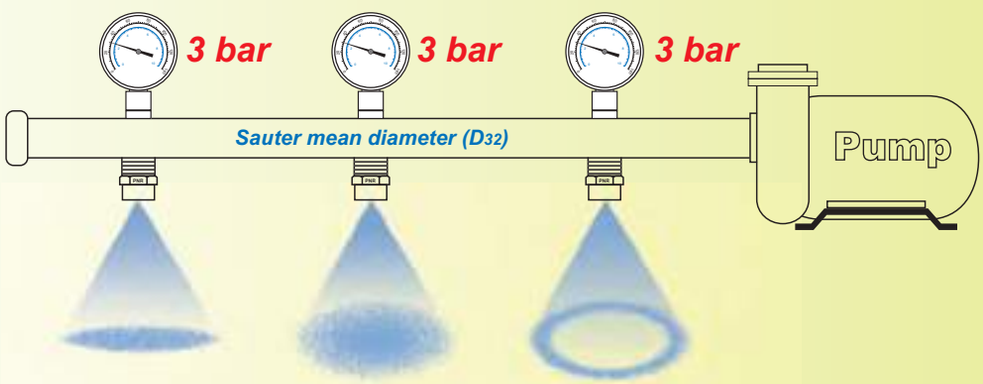
GF A 1100 B31 xx

- NOZZLE TYPE
- SPRAY ANGLE: • A - 0° • Q - 60° • M - 45° • T - 80°
- CAPACITY
- MATERIAL: • **B31** - AISI 316L Stainless steel (Spring: AISI 302 Stainless steel)
- CONNECTION: • **SM** - M28x1.5 • **SN** - 3/4" - 20 UNEF • **SP** - 1 1/8" - 18 UNEF • **SG** - 3/4" BSP



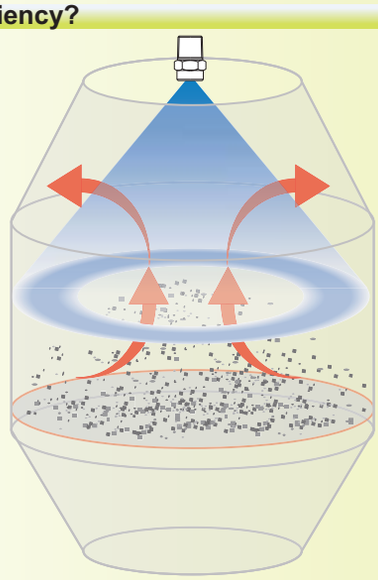
Mist spray

Hollow cone nozzles provide a finely atomized mist and a very uniform hollow cone spray pattern. They are ideal to capture suspended particles and offer higher performances than other nozzles with same operating pressure and capacity. These nozzles are widely used for their efficiency in cooling and cleaning of gases, dust control, absorption processes and air-humidification.



FLAT FAN NOZZLE > FULL CONE NOZZLE > HOLLOW CONE NOZZLE

Poor gas scrub efficiency?



Hollow cone nozzles produce a ring-shaped spray pattern where all the liquid jet is concentrated on the outer edge of the ring. Users may fear that offset nozzles do not catch all suspended particles because air flows through directly from the centre. Hollow cone nozzles are the solution to this problem as their fine mist spray provides a better scrubbing effect.

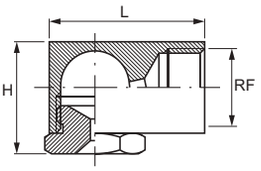
Accurate offset settings

The correct positioning of hollow cone nozzles is of vital importance. There are matrix and offset settings. Please see on page 18 for more information.

PE / PF / PT (HOLLOW CONE NOZZLES)

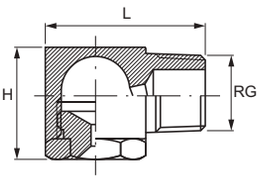


PE (Female)



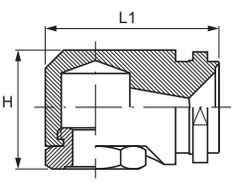


PF (Male)





PT (QC)



STANDARD ANGLE SPRAY NOZZLES

PE/PF hollow cone nozzles generate a ring-shaped spray pattern with finely atomized droplets and work on the tangential flow principle. Inside these nozzles there is an axial groove that injects the liquid tangentially into the vortex chamber where the strong centrifugal force produces a high rotational velocity and generates a finely atomized liquid flow. As these nozzles have a large inside free passage and no swirl insert, they offer the maximum resistance to clogging. PE/PF nozzles are widely used in many production processes and their variety of spray angles and capacities make them suitable for all kinds of working environments.

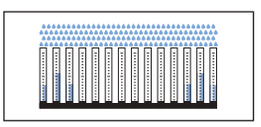
Thread specification

Female thread (PE series): BSPT, NPT

Male thread (PF series): BSP, NPT



Spray section



Concave distribution



STANDARD ANGLE SPRAY NOZZLES

	RF RG inch	PEN Female	PFN Male	PTN QC	Code	DE mm	DU mm	Capacity at different pressure values (l/min) (bar)								Dimensions mm		
								0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1
50°	3/8"		•	•	**2180**	5.9	7.9	7.35	8.69	10.4	14.7	18.0	23.2	27.5	32.9	24	34	35
			•	•	**2220**	7.5	7.9	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2			
			•	•	**2390**	8.7	9.5	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2			
	RF/RG	PES	PFS	PTS	Code	DE	DU	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1
70°	1/8"		•		**0390**	0.79	1.2	0.16	0.19	0.23	0.32	0.39	0.50	0.60	0.71	19	24	26
			•		**0780**	1.6	1.6	0.32	0.38	0.45	0.64	0.78	1.01	1.19	1.42			
		•	•		**1160**	2.0	2.0	0.65	0.77	0.92	1.31	1.60	2.07	2.44	2.92			
		•	•		**1230**	2.4	2.4	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20			
		•	•		**1390**	3.2	3.2	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
		•	•		**1630**	4.0	4.0	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
			•		**1780**	4.4	4.4	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
	1/4"		•	•	**0781**	1.6	1.6	0.32	0.38	0.45	0.64	0.78	1.01	1.19	1.42	23	32	32
		•	•	•	**1161**	2.0	2.0	0.65	0.77	0.92	1.31	1.60	2.07	2.44	2.92			
		•	•		**1231**	2.4	2.4	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20			
		•	•	•	**1391**	3.6	3.6	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
		•	•	•	**1631**	4.0	4.0	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
			•	•	**1781**	4.8	4.4	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		•	•	•	**2117**	5.9	5.2	4.78	5.65	6.75	9.55	11.7	15.1	17.9	21.4			
	3/8"	•	•		**1392**	3.6	3.2	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	24	34	35
		•	•		**1632**	4.4	4.0	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
		•	•		**1782**	5.2	4.4	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		•	•		**2118**	5.9	5.6	4.78	5.65	6.75	9.55	11.7	15.1	17.9	21.4			
		•	•		**2157**	7.1	6.4	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7			
		•	•		**2196**	7.5	7.5	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8			
			•		**2230**	8.3	7.9	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0			
	1/2"	•	•		**2197**	9.5	6.4	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8	31	50	50
		•	•		**2231**	9.5	7.5	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0			
		•	•	•	**2310**	9.5	9.1	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6			
			•	•	**2391**	9.5	11.1	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2			
			•	•	**2470**	9.5	13.1	19.2	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
	3/4"		•		**2311**	12.7	7.9	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6	39	55	58
			•		**2392**	12.7	9.5	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2			
			•		**2471**	12.7	11.1	19.2	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
			•		**2550**	12.7	12.7	22.5	26.6	31.8	44.9	55.0	71.0	84.0	100			
		•	•		**2630**	12.7	14.3	25.7	30.4	36.4	51.4	63.0	81.3	96.2	115			
			•		**2700**	12.7	14.7	28.6	33.8	40.4	57.2	70.0	90.4	107	128			
			•		**2780**	12.7	15.9	31.8	37.7	45.0	63.7	78.0	101	119	142			
			•		**2860**	12.7	17.1	35.1	41.5	49.7	70.2	86.0	111	131	157			
			•		**2940**	12.7	18.3	38.4	45.4	54.3	76.8	94.0	121	144	172			

HOW TO MAKE UP THE NOZZLE CODE

EX.: PES 1160 B1

PE S 1160 xx

- **NOZZLE TYPE**: • **PE** - Female • **PF** - Male • **PT** - QC
- **SPRAY ANGLE**: • **N** - 50° • **S** - 70° • **W** - 120°
- **CAPACITY**: 1160
- **MATERIAL**: • **B1** - AISI 303 Stainless steel • **B31** - AISI 316L Stainless steel • **T1** - Brass

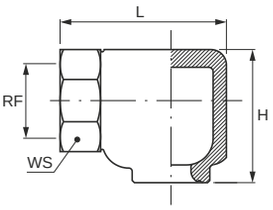
WIDE ANGLE SPRAY NOZZLES

	RF RG inch	PEW Female	PFW Male	PTW QC	Code	DE mm	DU mm	Capacity at different pressure values (l/min) (bar)								Dimensions mm		
								0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1
120°	1/8"	•	•		**0390**	0.79	1.2	0.16	0.19	0.23	0.32	0.39	0.50	0.60	0.71	19	24	26
		•	•		**0780**	1.6	1.6	0.32	0.38	0.45	0.64	0.78	1.01	1.19	1.42			
		•	•		**1200**	2.0	2.8	0.82	0.97	1.15	1.63	2.00	2.58	3.06	3.65			
		•	•		**1230**	2.4	2.8	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20			
		•	•		**1270**	2.4	3.2	1.10	1.30	1.56	2.20	2.70	3.49	4.12	4.93			
		•	•		**1320**	2.0	4.4	1.31	1.55	1.85	2.61	3.20	4.13	4.89	5.84			
		•	•		**1390**	3.2	3.2	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
		•	•		**1510**	3.2	4.4	2.08	2.46	2.94	4.16	5.10	6.58	7.79	9.31			
		•	•		**1700**	4.0	4.4	2.86	3.38	4.04	5.72	7.00	9.04	10.7	12.8			
	1/4"	•	•	•	**0781**	1.6	1.6	0.32	0.38	0.45	0.64	0.78	1.01	1.19	1.42	23	32	32
		•	•	•	**1130**	1.6	3.2	0.53	0.63	0.75	1.06	1.30	1.68	1.99	2.37			
		•	•	•	**1160**	1.6	4.4	0.65	0.77	0.92	1.31	1.60	2.07	2.44	2.92			
		•	•	•	**1190**	1.6	5.6	0.78	0.92	1.10	1.55	1.90	2.45	2.90	3.47			
		•	•	•	**1271**	2.0	3.2	1.10	1.30	1.56	2.20	2.70	3.49	4.12	4.93			
		•	•	•	**1321**	2.0	4.4	1.31	1.55	1.85	2.61	3.20	4.13	4.89	5.84			
		•	•	•	**1391**	3.6	3.2	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
		•	•	•	**1511**	3.6	4.4	2.08	2.46	2.94	4.16	5.10	6.58	7.79	9.31			
		•	•	•	**1600**	3.6	5.6	2.45	2.90	3.46	4.90	6.00	7.75	9.17	11.0			
		•	•	•	**1701**	4.0	4.4	2.86	3.38	4.04	5.72	7.00	9.04	10.7	12.8			
		•	•	•	**1780**	4.8	4.4	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		•	•	•	**1860**	4.0	5.6	3.51	4.15	4.97	7.02	8.60	11.1	13.1	15.7			
		•	•	•	**1940**	4.8	5.6	3.84	4.54	5.43	7.68	9.40	12.1	14.4	17.2			
		•	•	•	**2117**	6.0	5.6	4.78	5.65	6.75	9.55	11.7	15.1	17.9	21.4			
	3/8"	•	•		**1512**	3.6	4.4	2.08	2.46	2.94	4.16	5.10	6.58	7.79	9.31	24	34	35
		•	•		**1601**	3.6	5.6	2.45	2.90	3.46	4.90	6.00	7.75	9.17	11.0			
		•	•		**1702**	4.4	4.4	2.86	3.38	4.04	5.72	7.00	9.04	10.7	12.8			
		•	•		**1781**	5.2	4.4	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		•	•		**1861**	4.4	5.6	3.51	4.15	4.97	7.02	8.60	11.1	13.1	15.7			
		•	•		**1941**	5.2	5.6	3.84	4.54	5.43	7.68	9.40	12.1	14.4	17.2			
		•	•		**2102**	4.4	7.5	4.16	4.93	5.89	8.33	10.2	13.2	15.6	18.6			
		•	•		**2110**	5.2	6.0	4.49	5.31	6.35	8.98	11.0	14.2	16.8	20.1			
		•	•	•	**2118**	6.0	5.6	4.78	5.65	6.75	9.55	11.7	15.1	17.9	21.4			
		•	•	•	**2133**	6.0	6.0	5.43	6.42	7.68	10.9	13.3	17.2	20.3	24.3			
		•	•	•	**2157**	7.1	6.0	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7			
		•	•	•	**2172**	6.0	7.9	7.02	8.31	9.93	14.0	17.2	22.2	26.3	31.4			
		•	•	•	**2196**	7.5	7.5	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8			
		•	•	•	**2220**	7.5	7.9	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2			
	1/2"		•	•	**2391**	9.5	11.1	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2	31	50	50
	3/4"		•		**2630**	12.7	14.3	25.7	30.4	36.4	51.4	63.0	81.3	96.2	115	39	55	58

PA / PB (HOLLOW CONE NOZZLES / LARGE CAPACITY)

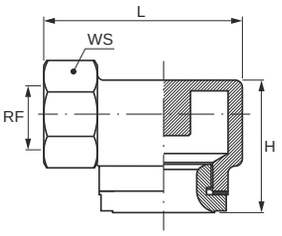


PA





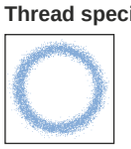
PB



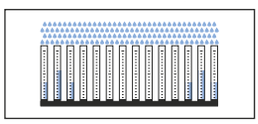
TANGENTIAL NOZZLES

PA/PB tangential nozzles generate a hollow cone spray pattern of finely atomized droplets and work on the tangential flow principle. They are designed with a tangential method of atomization. Inside these nozzles there is an axial groove that injects the liquid tangentially into the vortex chamber where the strong centrifugal force produces a high rotational velocity and generates a finely atomized liquid flow. As these nozzles have a large free passage inside and no swirl insert, they offer the maximum resistance to clogging. PA/PB nozzles are widely used in exhaust scrubbers and are suitable to spray flows with particles.

- **Typical applications**
  Washing: exhaust scrubbers, desulfuration, denitrification
  Cooling: cooling of high temperature gas, product cooling
- **Thread specification**: BSP, NPT (on request)



Spray section



Concave distribution



Code	RF inch	DE mm	DU mm	Capacity at different pressure values (l/min) (bar)									Dimensions mm		
				0.3	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	WS
70° **PAS 1170 xx**	3/8"	3.5	2.0	0.54	0.69	0.82	0.98	1.39	1.70	2.19	2.60	3.10	27	37	22
90° **PAU 1390 xx**	3/8"	4.0	3.8	1.23	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
PAU 1670 xx	1/2"	5.6	5.2	2.12	2.74	3.24	3.87	5.47	6.70	8.65	10.2	12.2	38	46	27
PAU 1850 xx		5.7	6.0	2.69	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5			
PAU 2115 xx		6.6	6.9	3.64	4.69	5.56	6.64	9.39	11.5	14.8	17.6	21.0			
PAU 2220 xx	3/4"	8.5	9.0	6.96	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2	48	60	36
PAU 2320 xx		9.5	11.5	10.1	13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4			
PAU 2420 xx		9.6	14.0	13.3	17.1	20.3	24.2	34.3	42.0	54.2	64.2	76.7			
PAU 2730 xx	1"	20x10	13.7	23.1	29.8	35.3	42.1	59.6	73.0	94.2	112	133	60	75	46
PAU 2970 xx			16.5	30.7	39.6	46.9	56.0	79.2	97.0	125	148	177			
PAU 3147 xx	1 1/2"	32x16	19.5	46.5	60.0	71.0	84.9	120	147	190	225	268	90	93	60
PAU 3194 xx			22.0	61.3	79.2	93.7	112	158	194	250	296	354			
PAU 3244 xx	2"	35x20	26.5	77.2	99.6	118	141	199	244	315	373	445	127	117	80
PAU 3294 xx			28.5	93.0	120	142	170	240	294	380	449	537			
PAU 3364 xx	2 1/2"	25x40	29.5	115	149	176	210	297	364	470	556	665	156	140	100
PAU 3490 xx			36.5	155	200	237	283	400	490	633	748	895			
PAU 3605 xx			45.0	191	247	292	349	494	605	781	924	1105			
130° **PBY 1390 xx**	3/8"	3.0	4.5	1.23	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	27	37	22
PBY 1850 xx		4.4	7.5	2.69	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5			
PBY 1980 xx	1/2"	4.0	12.0	3.10	4.00	4.73	5.66	8.00	9.80	12.7	15.0	17.9	35	46	27
PBY 2128 xx		4.7	12.0	4.05	5.23	6.18	7.39	10.5	12.8	16.5	19.6	23.4			
PBY 2208 xx		6.5	12.0	6.58	8.49	10.0	12.0	17.0	20.8	26.9	31.8	38.0			
PBY 2220 xx	3/4"	6.1	15.0	6.96	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2	50	60	36
PBY 2320 xx		6.5	19.0	10.1	13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4			
PBY 2420 xx		8.0	19.0	13.3	17.1	20.3	24.2	34.3	42.0	54.2	64.2	76.7			
PBY 2730 xx	1"	13.4	26.0	23.1	29.8	35.3	42.1	59.6	73.0	94.2	112	133	60	93	47
PBY 2970 xx		14.0	26.0	30.7	39.6	46.9	56.0	79.2	97.0	125	148	177			
PBY 3147 xx	1 1/2"	15.0	37.0	46.5	60.0	71.0	84.9	120	147	190	225	268	75	111	60
PBY 3194 xx		19.5	37.0	61.3	79.2	93.7	112	158	194	250	296	354			
PBY 3244 xx	2"	22.0	45.0	77.2	99.6	118	141	199	244	315	373	445	91	140	75
PBY 3294 xx		27.1	45.0	93.0	120	142	170	240	294	380	449	537			
PBY 3364 xx	2 1/2"	25.5	64.0	115	149	176	210	297	364	470	556	665	128	193	90
PBY 3490 xx		33.0	64.0	155	200	237	283	400	490	633	748	895			
PBY 3605 xx		38.0	64.0	191	247	292	349	494	605	781	924	1105			
PBY 3665 xx		43.0	64.0	210	271	321	384	543	665	859	1016	1214			

THREAD SIZE AND MATERIALS

The table on the right side shows thread size and materials

Material	3/8"	1/2"	3/4"	1"	1 1/2"	2"	2 1/2"
B31- AISI 316L SS				•	•	•	•
T1 - Brass	•	•	•	•			

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: PAS 1170 B31

PA S 1170 xx

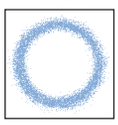
- NOZZLE TYPE
- SPRAY ANGLE: • **S** - 70° • **U** - 90° • **Y** - 130°
- CAPACITY
- MATERIAL: • **B31** - AISI 316L Stainless steel • **T1** - Brass

MOULDED PLASTIC NOZZLES

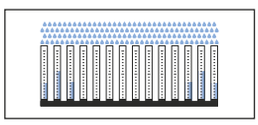
PN/PO series hollow cone nozzles made by plastic moulding, offer a high chemical resistance and low prices. They are tangential nozzles and produce a hollow cone spray of atomized droplets. As they have a large free passage and no swirling vane inside their body, they are highly clog-resistant. PN/PO nozzles are efficient, cost-effective and widely used in many processing lines. Moreover, they can be easily assembled in large quantity onto pipe manifolds.



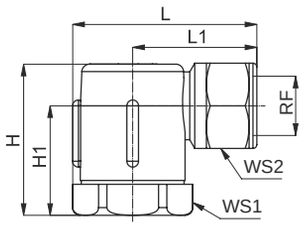
- **Thread specification**
  PO: Male BSPT, NPT
  PN: Female BSP, NPT
  PS: Quick-fit
- **Max operation temperature**:
  100 °C
- **Max operation pressure**:
  10 bar



Spray section

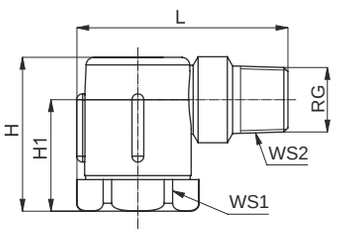


Concave distribution



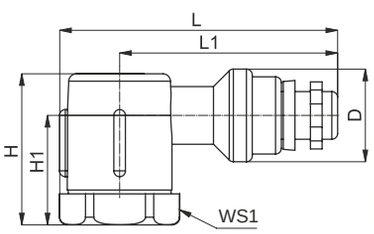


PN - Female





PO - Male





PS - Quick-fit

Codice	Conn.	L	L1	H	H1	CH1	CH2	D
		mm	mm	mm	mm			mm
PN	3/8" F	47.5	32.0	39.0	28.0	28	22	---
	1/2" F	51.5	36.0	39.0	28.0	28	24	---
PO	3/8" M	53.5	38.0	39.0	28.0	28	---	---
PS	Att. rapido	71.5	56.0	39.0	28.0	28	---	24.0

PNx Female	POx Male	PSx Quick-fit	Code	Thread	Capacity at different pressure values (l/min) (bar)							
					0.5	0.7	1.0	2.0	3.0	5.0	7.0	10
•	•	•	**1170**		0.69	0.82	0.98	1.39	1.70	2.19	2.60	3.10
•	•	•	**1390**		1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12
•	•	•	**1460**		1.88	2.22	2.66	3.76	4.60	5.94	7.03	8.40
•	•	•	**1570**		2.33	2.75	3.29	4.65	5.70	7.36	8.71	10.4
•	•	•	**1670**		2.74	3.24	3.87	5.47	6.70	8.65	10.2	12.2
•	•	•	**1850**	3/8"	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5
•	•	•	**1980**	Quick-fit	4.00	4.73	5.66	8.00	9.80	12.7	15.0	17.9
•	•	•	**2115**		4.69	5.56	6.64	9.39	11.5	14.8	17.6	21.0
•	•	•	**2128**		5.23	6.18	7.39	10.5	12.8	16.5	19.6	23.4
•	•	•	**2208**		8.49	10.0	12.0	17.0	20.8	26.9	31.8	38.0
•	•	•	**2220**		8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2
•	•	•	**2319**		13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4
•			**2129**		5.23	6.18	7.39	10.5	12.8	16.5	19.6	23.4
•			**2209**		8.49	10.0	12.0	17.0	20.8	26.9	31.8	38.0
•			**2221**	1/2"	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2
•			**2320**		13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4
•			**2420**		17.1	20.3	24.2	34.3	42.0	54.2	64.2	76.6

PO MALE THREAD NOZZLES

ZPB fastening clamps in plastic usually connect to nozzles with 3/8" female threads. They are flexible, durable and low cost. Please see more on page 86.



PN (Female) **+ ZPB** Plastic pipe clamp

TYPICAL APPLICATIONS

Washing: exhaust scrubbers, parts cleaning, pre-treatment in coating process, dust and foam control, filter spraying
Cooling: wire cooling, plastic pipe cooling
Other applications: humidification systems, etc.

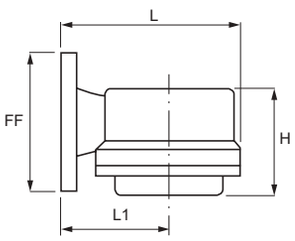
HOW TO MAKE UP THE **NOZZLE CODE**

EX.: PNS 1170 D6

Px S 1170 xx Y Z

- **Px** — NOZZLE TYPE
  - • **PN** - Female
  - • **PO** - Male
  - • **PS** - Quick-fit
- **S** — ANGLE
  - • **Q** - 60° • **T** - 80°
  - • **S** - 70° • **U** - 90°
  - • **Y** - 130°
- **1170** — CAPACITY
- **xx** — MATERIAL
  - • **D6** - PP, chemicallybonded fiberglass
- **Y** — VERSION
  - • **S** - Standard
- **Z** — CONNECT.
  - • **B** - BSPT • **N** - NPT
  - • **G** - BSP • **Q** - Quick-fit





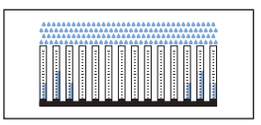
TANGENTIAL NOZZLES / LARGE FLOW RATES

PR nozzles produce a hollow cone spray pattern based on the tangential jet principle generating atomized flows with large flow rates. They have a vaneless and large free inside passage and offer a considerable resistance to clogging and high performances.

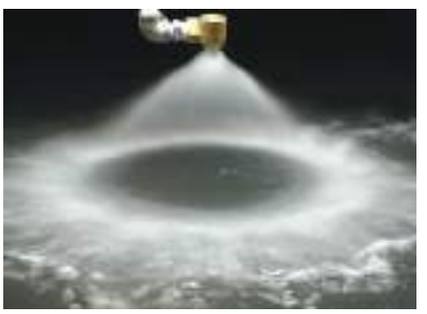
- **Flange**
  DIN2633-ND16, JIS
- **Typical applications**
  Desulfurization
  Denitrification
  Exhaust scrubbers
  Coke quenching towers



Spray section



Concave distribution



	Code	DN inch	DE mm	DU mm	Capacity at different pressure values (l/min) (bar)					Dimensions mm			
					0.5	1.0	2.0	3.0	5.0	FF	H	L	L1
130°	**PRY 3612 xx**	3"	31.0	90	250	353	500	612	790	200	157	250	150
	PRY 3685 xx		34.0	90	280	395	559	685	884				
	PRY 3771 xx		36.5	90	315	445	630	771	995				
	PRY 3869 xx		39.5	90	355	502	710	869	1122				
	PRY 3979 xx		40.0	90	400	565	799	979	1264				
	PRY 4110 xx		43.0	90	449	635	898	1100	1420				
	PRY 4122 xx		50.0	90	498	704	996	1220	1575				
	PRY 4153 xx		57.0	90	625	883	1249	1530	1975				
	PRY 4195 xx	4"	60.0	145	796	1126	1592	1950	2517	220	242	355	200
	PRY 4244 xx		70.0	145	996	1409	1992	2440	3150				
	PRY 4306 xx		79.0	145	1249	1767	2498	3060	3950				
	PRY 4385 xx		87.0	145	1572	2223	3144	3850	4970				

HOW TO MAKE UP THE **NOZZLE CODE**

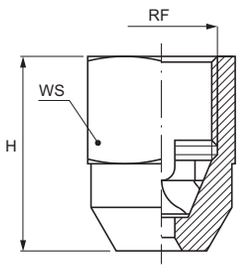
EX.: PRY 3612 B31

PR **Y** **3612** **xx**

- **xx** — MATERIAL
  - **B31** - AISI 316L Stainless steel
  - **G1** - Cast iron
- **3612** — CAPACITY
- **Y** — SPRAY ANGLE
  - **Y** - 130°
- **PR** — NOZZLE TYPE

IN LINE SPRAY / INSIDE VANE

RA nozzles are tangential hollow cone nozzles that produce a finely atomized spray in line with the inlet supply pipe. In their body there is a carefully machined swirl vane with two spiral grooves which produce a wide range of capacities, starting from very low values. The strong centrifugal force inside the vortex chamber creates a high speed rotation of the liquid flow producing an atomized mist. For small capacity RA nozzles we suggest to place a suitable filter before their inlet orifice to avoid clogging.



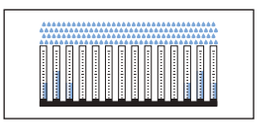




- **Thread specification**: BSP, NPT



Spray section



Concave distribution

	Code	RF inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)								Dimensions mm	
					0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS
80°	**RAT 0200 xx**	1/8"	1.0	0.5	0.08	0.10	0.12	0.16	0.20	0.26	0.31	0.37	18	17
	RAT 0390 xx		1.7	0.5	0.16	0.19	0.23	0.32	0.39	0.50	0.60	0.71		
60°	**RAQ 0490 xx**	3/8"	1.1	0.6	0.20	0.24	0.28	0.40	0.49	0.63	0.75	0.89	29	22
	RAQ 0770 xx		1.6	0.6	0.31	0.37	0.44	0.63	0.77	0.99	1.18	1.41		
	RAQ 1122 xx		2.0	0.6	0.50	0.59	0.70	1.00	1.22	1.58	1.86	2.23		
90°	**RAU 1208 xx**	3/8"	3.0	1.0	0.85	1.00	1.20	1.70	2.08	2.69	3.18	3.80	29	22
	RAU 1306 xx		4.0	1.6	1.25	1.48	1.77	2.50	3.06	3.95	4.67	5.59		
	RAU 1490 xx		4.2	1.6	2.00	2.37	2.83	4.00	4.90	6.33	7.48	8.95		
	RAU 1612 xx		4.7	1.6	2.50	2.96	3.53	5.00	6.12	7.90	9.35	11.2		
	RAU 1772 xx		5.5	1.6	3.15	3.73	4.46	6.30	7.72	9.97	11.8	14.1		
	RAU 2104 xx		6.3	1.6	4.25	5.02	6.00	8.49	10.4	13.4	15.9	19.0		
	RAU 1491 xx	1/2"	5.0	1.8	2.00	2.37	2.83	4.00	4.90	6.33	7.48	8.95	36	27
	RAU 1551 xx		5.5	1.8	2.25	2.66	3.18	4.50	5.51	7.11	8.42	10.1		
	RAU 1686 xx		6.0	1.8	2.80	3.31	3.96	5.60	6.86	8.86	10.5	12.5		
	RAU 1980 xx		6.3	2.0	4.00	4.73	5.66	8.00	9.80	12.7	15.0	17.9		
	RAU 2137 xx		6.7	2.0	5.59	6.62	7.91	11.2	13.7	17.7	20.9	25.0		
	RAU 2153 xx		7.5	2.0	6.25	7.39	8.83	12.5	15.3	19.8	23.4	27.9		
	RAU 2196 xx		9.0	2.0	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8		

Typical applications

Cooling: gas, products, pipes cooling
Washing: exhaust scrubbers, parts washing
Other applications: dust control, humidification and air refreshing systems

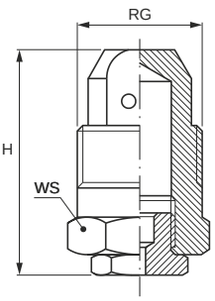
HOW TO MAKE UP THE **NOZZLE CODE**

EX.: RAT 0200 B31

RA T 0200 xx

- NOZZLE TYPE: **RA**
- SPRAY ANGLE: **T** - 80°; **Q** - 60°; **U** - 90°
- CAPACITY: **0200**
- MATERIAL: **xx**
  - ● **B31** - AISI 316L Stainless steel
  - ● **T1** - Brass
  - ○ **B1** - AISI 303 Stainless steel (optional)

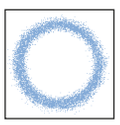




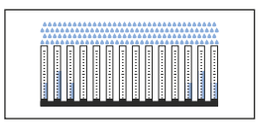
IN LINE SPRAY / VANELESS

These nozzles, designed with no inside whirling vane and a wide unobstructed passage, produce a hollow cone spray pattern, and are highly resistant to clogging. The liquid flow enters at high speed through the top eccentric orifice into the nozzle swirl chamber where the strong centrifugal force generates finely atomized droplets. These nozzles, the ideal choice for dust control applications, are particularly suitable for coal dust suppression and for this reason they are called "miner's nozzles".

- **Thread specification**: BSPT, NPT



Spray section



Concave distribution



	Code	RG	D Orifice	D1 Inlet	Capacity at different pressure values (l/min) (bar)								Dimensions mm	
		inch	mm	mm	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS
60°	**RBQ 1160 xx**	3/8"	2.0	2.0	0.65	0.77	0.92	1.31	1.60	2.07	2.44	2.92	31	17
	RBQ 1230 xx		2.4	2.4	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20		
	RBQ 1390 xx		3.2	2.3	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12		
	RBQ 1630 xx		3.9	3.8	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5		
	RBQ 2110 xx		4.4	*4.0	4.49	5.31	6.35	8.98	11.0	14.2	16.8	20.1		
70°	**RBS 1391 xx**	1/2"	3.5	3.0	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	37	22
	RBS 1631 xx		4.0	4.0	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5		
	RBS 1781 xx		4.5	2.9	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2		
	RBS 2117 xx		5.1	*3.4	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
	RBS 2157 xx		7.0	*3.6	6.45	7.63	9.12	12.9	15.8	20.4	24.1	28.8		
	RBS 2196 xx		7.3	*4.8	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
	RBS 1782 xx	3/4"	4.7	4.5	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2	43	32
	RBS 2118 xx		5.9	4.8	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
	RBS 2197 xx		7.0	6.5	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
	RBS 2390 xx		9.3	*6.0	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2		
80°	**RBT 2310 xx**	1 1/2"	10.0	*7.0	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6	69	50
	RBT 2550 xx		12.9	*8.5	22.5	26.6	31.8	44.9	55.0	71.0	84.0	100		
	RBT 2630 xx		15.0	*8.5	25.7	30.4	36.4	51.4	63.0	81.3	96.2	115		
	RBT 2700 xx		14.6	*9.0	28.6	33.8	40.4	57.2	70.0	90.4	107	128		
	RBT 2940 xx		19.8	*10.0	38.4	45.4	54.3	76.8	94.0	121	144	172		

**** Double inlet orifice***

Typical applications

Cooling: gas cooling, product cooling, pipe cooling
Washing: exhaust scrubbers, product cleaning
Other applications: dust control, humidification systems, sterilization

HOW TO MAKE UP THE **NOZZLE CODE**

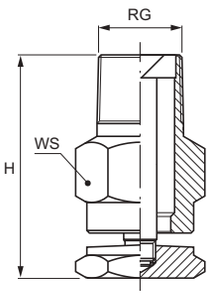
EX.: RBQ 1160 B1

RB **Q** **1160** **xx**

- NOZZLE TYPE: RB
- SPRAY ANGLE: Q
  - ● **Q** - 60°
  - ● **S** - 70°
  - ● **T** - 80°
- CAPACITY: 1160
- MATERIAL: xx
  - ● **B1** - AISI 303 Stainless steel
  - ● **T1** - Brass
  - ○ **B31** - AISI 316L Stainless steel (optional)

IN LINE SPRAY

RC type deflected nozzles produce a ring-shaped hollow cone spray pattern, in line with the nozzle inlet supply pipe. The water flow hits the deflection cap fixed onto the nozzle outlet orifice producing small droplets, very wide spray angles and uniform distribution. The deflection cap determines the various deflection angles. This nozzles are highly efficient and clog resistant.



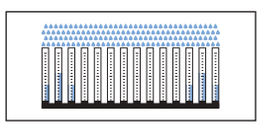




■ **Thread specification**: BSPT, NPT



Spray section



Concave distribution

	RG inch		Code	Capacity at different pressure values (l/min) (bar)								Dimensions mm	
	1/4"	3/8"		0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS
150°	•		**RCY 1780 xx**	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2	33	17
	•		**RCY 2117 xx**	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
	•		**RCY 2157 xx**	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7		
	•		**RCY 2196 xx**	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
		•	**RCY 2230 xx**	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0	44	22
		•	**RCY 2270 xx**	11.0	13.0	15.6	22.0	27.0	34.9	41.2	49.3		
		•	**RCY 2310 xx**	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6		
		•	**RCY 2350 xx**	14.3	16.9	20.2	28.6	35.0	45.2	53.5	63.9		
		•	**RCY 2390 xx**	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2		
180°	•		**RCZ 1780 xx**	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2	33	17
	•		**RCZ 2117 xx**	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
	•		**RCZ 2157 xx**	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7		
	•		**RCZ 2196 xx**	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
		•	**RCZ 2230 xx**	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0	44	22
		•	**RCZ 2270 xx**	11.0	13.0	15.6	22.0	27.0	34.9	41.2	49.3		
		•	**RCZ 2310 xx**	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6		
		•	**RCZ 2350 xx**	14.3	16.9	20.2	28.6	35.0	45.2	53.5	63.9		
		•	**RCZ 2390 xx**	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2		

Typical applications

Washing: exhaust scrubbers, small tanks, pipes interiors
Other applications: pipes coating, dust control, fire protection

HOW TO MAKE UP THE **NOZZLE CODE**

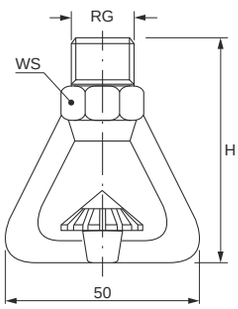
EX.: RCY 1780 B1

RC **Y** **1780** **xx**

- **xx** — MATERIAL
  - • **B1** - AISI 303 Stainless steel
  - • **T1** - Brass
  - ○ **B31** - AISI 316L Stainless steel (optional)
- **1780** — CAPACITY
- **Y** — SPRAY ANGLE
  - • **Y** - 150°
  - • **Z** - 180°
- **RC** — NOZZLE TYPE

RO (HOLLOW CONE NOZZLES / DEFLECTED SPRAY)

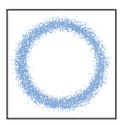




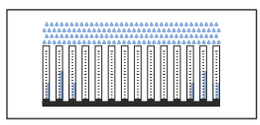
DEFLECTED SPRAY

RO hollow cone deflected spray nozzles are specially designed for fire-fighting engineering. They produce an excellent water atomization and their deflected jet assures a wide spray coverage. The spray pattern is formed by the liquid flowing from the nozzle orifice over the surface of the below deflector with a special slotted design. All RO nozzles are certified by the EU fire regulations.

- **Thread specification**: BSPT, NPT
- **Typical applications**
  Fire-fighting: fire extinguishing, cooling
  Other applications: tank cleaning, exhaust scrubbers



Spray section



Concave distribution





	Code	RG inch	D mm	Capacity at different pressure values (l/min) (bar) 1.0	3.0	5.0	6.0	7.0	10.0	WS mm	H mm
130°	**ROY D005** xx yy	1/2"	3.0	4.80	8.10	10.3	11.3	12.2	14.5	25	65
	ROY D006 xx yy		3.5	6.70	11.5	14.9	16.4	17.6	20.5		
	ROY D009 xx yy		4.0	9.00	15.6	20.0	22.0	24.0	29.0		
	ROY D011 xx yy		4.5	11.5	19.8	25.0	28.0	30.0	36.0		
	ROY D016 xx yy		5.0	15.8	27.0	35.0	39.0	42.0	50.0		
	ROY D018 xx yy		5.5	18.0	30.0	40.0	44.0	48.0	57.0		
	ROY D023 xx yy		6.0	23.0	39.0	50.0	55.0	60.0	71.0		
	ROY D027 xx yy		6.5	27.0	47.0	61.0	66.0	72.0	86.0		
	ROY D032 xx yy		7.0	31.0	55.0	72.0	77.0	84.0	91.0		
	ROY D041 xx yy		8.0	41.0	70.0	92.0	103	112	130		
	ROY D052 xx yy		9.0	52.0	91.0	117	129	140	165		
	ROY D064 xx yy		10.0	64.0	110	139	152	165	200		
	ROY D095 xx yy		12.0	95.0	164	214	236	255	290		
	ROY D103 xx yy		13.0	103	178	230	252	272	325		
130°	**ROY E005** xx yy	3/4"	3.0	4.80	8.10	10.3	11.3	12.2	14.5	27	65
	ROY E006 xx yy		3.5	6.70	11.5	14.9	16.4	17.6	20.5		
	ROY E009 xx yy		4.0	9.00	15.6	20.0	22.0	24.0	29.0		
	ROY E011 xx yy		4.5	11.5	19.8	25.0	28.0	30.0	36.0		
	ROY E016 xx yy		5.0	15.8	27.0	35.0	39.0	42.0	50.0		
	ROY E018 xx yy		5.5	18.0	30.0	40.0	44.0	48.0	57.0		
	ROY E023 xx yy		6.0	23.0	39.0	50.0	55.0	60.0	71.0		
	ROY E027 xx yy		6.5	27.0	47.0	61.0	66.0	72.0	86.0		
	ROY E032 xx yy		7.0	31.0	55.0	72.0	77.0	84.0	91.0		
	ROY E041 xx yy		8.0	41.0	70.0	92.0	103	112	130		
	ROY E052 xx yy		9.0	52.0	91.0	117	129	140	165		
	ROY E064 xx yy		10.0	64.0	110	139	152	165	200		
	ROY E095 xx yy		12.0	95.0	164	214	236	255	290		
	ROY E103 xx yy		13.0	103	178	230	252	272	325		

COMPLETE NOZZLE CODE

Code	Thread	Filter: Copper	Filter: None
FB	BSPT	•	
FN	NPT	•	
SB	BSPT		•
SN	NPT		•

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: ROY D018 B31FB

RO (NOZZLE TYPE) **Y** (ANGLE) **D** (THRAD) **123** (CAPACITY) **xx** (MATERIAL) **yy** (COMPLETE NOZZLE CODE)

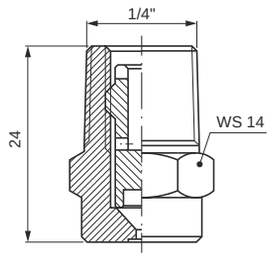
- THRAD: • **D** - 1/2" • **E** - 3/4"
- ANGLE: • **Y** - 130°
- MATERIAL:
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass
  - **T8** - Brass, nickel plated
  - **T81** - Brass, electroless nickel plated

HYDRAULIC ATOMIZERS

RX/RZ series hydraulic nozzles deliver a very finely atomized hollow cone spray, even at low pressure values. They contain a precisely machined insert with narrow passages that can be easily disassembled for cleaning in case of obstruction. Clogging can be avoided placing a fine mesh strainer on the main manifold or using an individual filter.

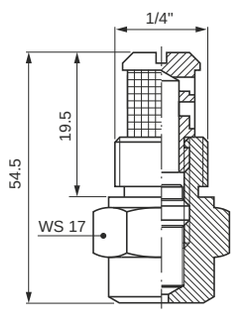
RW hydraulic atomizers works in the same way, but the tip is locked with a welded nipple ZAA and a locknut VAA. The capacities of RW tip are the same of RX nozzle. To have the complete product code, just change “RX” with “RW”.

- **Connection**:
  BSPT (RX), BSP (RZ), NPT (RX, RZ), tip with nipple and locknut (RW)
- **Typical applications**
  dust control, humidification, deodorant spray, disinfectant liquid spray, exhaust scrubbers



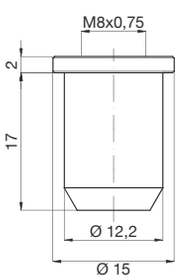


RX





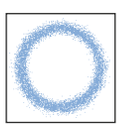
RZ (+VEF)



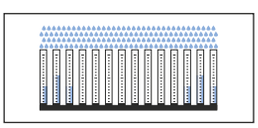


RW





Spray section



Concave distribution

	Code	D	Capacity (l/hour) at different pressure values (bar)									
		mm	1.5	2.0	3.0	4.0	5.0	6.0	10	15	20	50
80°	**RXT 0060 xx**	0.50	2.55	2.94	3.60	4.16	4.65	5.09	6.57	8.05	9.30	14.7
	RXT 0100 xx	0.50	4.24	4.90	6.00	6.93	7.75	8.49	11.0	13.4	15.5	24.5
	RXT 0130 xx	0.70	5.52	6.37	7.80	9.01	10.1	11.0	14.2	17.4	20.1	31.8
	RXT 0190 xx	0.70	8.06	9.31	11.4	13.2	14.7	16.1	20.8	25.5	29.4	46.5
	RXT 0250 xx	1.00	10.6	12.2	15.0	17.3	19.4	21.2	27.4	33.5	38.7	61.2
	RXT 0380 xx	1.00	16.1	18.6	22.8	26.3	29.4	32.2	41.6	51.0	58.9	93.1
	RXT 0510 xx	1.50	21.6	25.0	30.6	35.3	39.5	43.3	55.9	68.4	79.0	125
	RXT 0650 xx	1.60	27.6	31.8	39.0	45.0	50.3	55.2	71.2	87.2	101	159
	RXT 0780 xx	1.90	33.1	38.2	46.8	54.0	60.4	66.2	85.4	105	121	191
	RXT 0910 xx	1.90	38.6	44.6	54.6	63.0	70.5	77.2	99.7	122	141	223
	RXT 1116 xx	1.90	49.2	56.8	69.6	80.4	89.9	98.4	127	156	180	284
	RXT 1143 xx	1.90	60.7	70.1	85.8	99.1	111	121	157	192	222	350
	RXT 1166 xx	2.20	70.4	81.3	99.6	115	129	141	182	223	257	407



VEF THREADED FILTERS

We suggest to use a VEF threaded filter to protect the nozzle against clogging.

	Code	D	Capacity (l/min) at different pressure values (bar)									
		mm	1.5	2.0	3.0	4.0	5.0	6.0	10	15	20	50
60°	**RZQ 0080 xx**	0.45	0.06	0.07	0.08	0.09	0.10	0.11	0.15	0.18	0.21	0.33
	RZQ 0120 xx	0.55	0.08	0.10	0.12	0.14	0.15	0.17	0.22	0.27	0.31	0.49
	RZQ 0250 xx	0.80	0.18	0.20	0.25	0.29	0.32	0.35	0.46	0.56	0.65	1.02
	RZQ 0390 xx	1.00	0.28	0.32	0.39	0.45	0.50	0.55	0.71	0.87	1.01	1.59
	RZQ 0560 xx	1.20	0.40	0.46	0.56	0.65	0.72	0.79	1.02	1.25	1.45	2.29
	RZQ 0780 xx	1.40	0.55	0.64	0.78	0.90	1.01	1.10	1.42	1.74	2.01	3.18
	RZQ 1100 xx	1.60	0.71	0.82	1.00	1.15	1.29	1.41	1.83	2.24	2.58	4.08
	RZQ 1140 xx	1.90	0.99	1.14	1.40	1.62	1.81	1.98	2.56	3.13	3.61	5.72
	RZQ 1170 xx	2.10	1.20	1.39	1.70	1.96	2.19	2.40	3.10	3.80	4.39	6.94
	RZQ 1200 xx	2.30	1.41	1.63	2.00	2.31	2.58	2.83	3.65	4.47	5.16	8.16

ADDITIONAL SPRAY ANGLES

The spray angle of the RZQ nozzles is 60° with orifice dimensions larger than 1.0 mm. Please see additional angles in the table below.

RZF	RZM	RZQ	RZU
30°	45°	60°	90°

HOW TO MAKE UP THE **NOZZLE CODE**

EX.: RXT 0060 B1

Rx T 0060 xx

- **MATERIAL**
  - **B1** - AISI 303 Stainless steel
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass
- **CAPACITY**
- **SPRAY ANGLE**
  - **T** - 80° (RW, RX)
  - **Q** - 60° (RZ)
- **NOZZLE TYPE**
  - **RW**
  - **RX**
  - **RZ**

Concentrated high impact force

Solid stream nozzles provide a sharp and concentrated high pressure spray jet. These nozzles offer a stronger impact force than other types at the same operating pressures and flow rates.

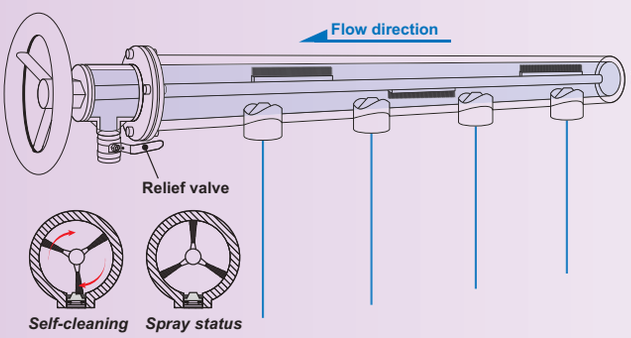
Highly extended service life

Solid stream nozzles are designed for applications requiring medium or high liquid pressures.
High pressures may shorten nozzles service life. After a long research and many application tests, our engineers found out that ruby with a second hardness level is the ideal material to overcome this problem and extend nozzles durability as it resists abrasion or scratching. The nozzle tips are precisely machined and polished to ensure a perfect solid stream and enhance performance.



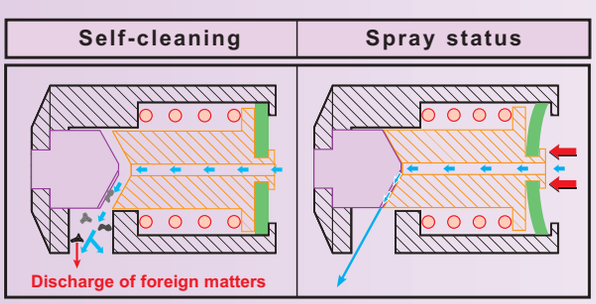
Self-cleaning shower pipe and nozzles

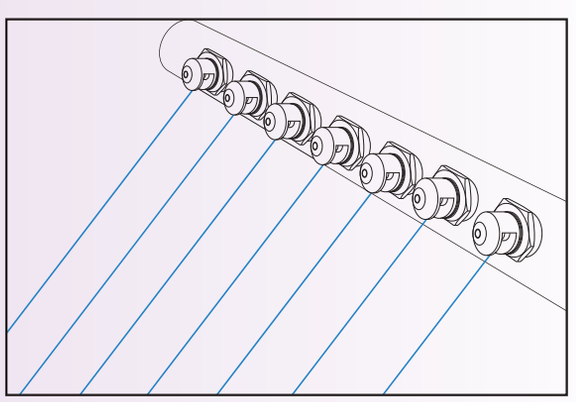
Paper making requires a great deal of water. Waste water is often reused to clean filters and felts to save costs and reduce water consumption. Reclaimed water contains solids and impurities that cause nozzles clogging and shutdowns for maintenance. Self-cleaning spray pipes and nozzles are the best solution to this. Their revolutionary design helps improving a great deal both production efficiency and industrial competitiveness.



Self-cleaning spray pipes contain a rotating steel brush which can be automatically or manually operated and an escape valve at their outlet. The rotating brush removes all the dirt from the pipe walls using water.

The nozzle body contains a mobile piston and its opening and closing are controlled by the operating water pressure. For example, when nozzles wash mesh fabrics with an operating pressure of 3 bar, this pressure is higher than a spring force of 1 bar. Piston and nozzle body come close producing a flat fan. If the inlet pressure is reduced to 0.5 bar, lower than a spring force of 1 bar, piston and nozzle body separate opening to the maximum distance. Water pressure remains at 0.5 bar and removes any build up when back to normal condition. Self-cleaning nozzles are easy to install, align and clean and ensuring relevant time and costs savings. The spring force is set depending on customer's plant working pressure.





FAA/FBA HIGH IMPACT SOLID STREAM NOZZLES

FAA/FBA types nozzles are specially designed for high pressure cleaning and washing operations. They are made in Stainless Steel 416, accurately machined and perfectly polished. They are particularly hard, resistant to wear, have a long service life and offer high precision performances.

- **Typical applications**

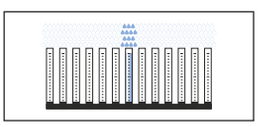
Washing: filter cloth, felts, parts.
Other applications: paint scraping, rust removal, shell removal.



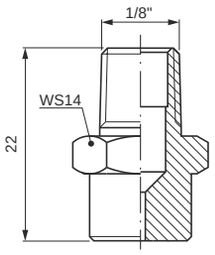
- **Thread specification**: BSPT, NPT



Spray section

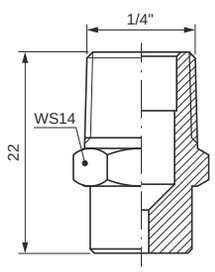


Distribution





FAA



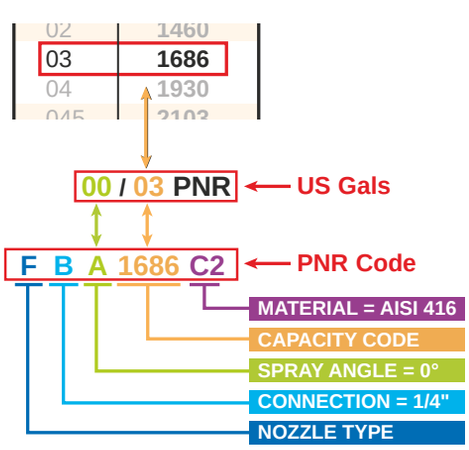


FBA

Nozzle type			US Gals	PNR Code	Capacity at different pressure values (l/min) (bar)						
FAA 1/8"	FBA 1/4"	FXA			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**	2.00	2.50	3.20	3.80	4.60	5.60	6.40
•	•	•	025	**1560**	2.50	3.07	3.96	4.69	5.60	6.86	7.92
•	•	•	03	**1686**	3.10	3.70	4.80	5.70	6.80	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**	4.60	5.60	7.20	8.60	10.3	12.6	14.5
•	•	•	05	**2116**	5.10	6.20	8.10	9.50	11.4	14.0	16.1
•	•	•	055	**2126**	5.60	6.90	8.91	10.5	12.5	15.4	17.7
•	•	•	06	**2138**	6.10	7.50	9.70	11.4	13.8	16.7	19.3
•	•	•	065	**2149**	6.60	8.10	10.5	12.4	14.9	18.1	21.0
•	•	•	07	**2160**	7.16	8.76	11.3	13.4	16.0	19.6	22.6
•	•	•	075	**2170**	7.60	9.40	12.0	14.2	17.0	21.0	24.0
•	•	•	08	**2181**	8.20	10.0	12.9	15.3	18.1	22.0	26.0
•	•	•	085	**2192**	8.70	10.6	13.7	16.2	19.2	24.5	27.0
•	•	•	09	**2204**	9.20	11.2	14.5	17.2	20.4	25.0	29.0
•	•	•	095	**2220**	9.84	12.1	15.6	18.4	22.0	26.9	31.1
•	•	•	10	**2230**	10.2	12.5	16.1	19.1	23.0	28.0	32.0
•	•	•	11	**2248**	11.2	13.7	17.7	21.0	24.8	31.0	35.0
•	•	•	12	**2272**	12.2	15.0	19.3	23.0	27.2	33.0	39.0
•	•	•	12.5	**2280**	12.7	15.6	20.0	24.0	28.0	35.0	40.0
•	•	•	13	**2296**	13.3	16.2	21.0	25.0	29.6	36.0	42.0
•	•	•	14	**2320**	14.3	17.5	23.0	27.0	32.0	39.0	45.0
•	•	•	15	**2341**	15.3	18.7	24.0	29.0	34.1	42.0	48.0
•	•	•	16	**2360**	16.3	20.0	26.0	31.0	36.0	45.0	52.0
•	•	•	18	**2410**	18.3	22.0	29.0	34.0	41.0	50.0	58.0
•	•	•	20	**2456**	20.0	25.0	32.0	38.0	45.6	56.0	64.0
•	•	•	25	**2567**	25.0	31.0	40.0	48.0	56.7	70.0	81.0
•	•	•	30	**2682**	31.0	37.0	48.0	57.0	68.2	84.0	97.0
•	•	•	35	**2800**	36.0	44.0	56.0	67.0	80.0	98.0	113
•	•	•	40	**2910**	40.7	49.8	64.3	76.1	91.0	111	128
•	•	•	50	**3113**	51.0	62.0	81.0	95.0	113	140	161
•	•	•	60	**3135**	61.0	75.0	97.0	114	135	167	193

HOW TP MAKE UP THE NOZZLE CODE PRODUCT IDENTIFICATION CODE

The above table shows the "American Capacity Code", that is, the capacity in Gallons per minute at an operating pressure of 40 psi, and the "PNR Capacity Code" (in Litres/min) at a capacity of 100 bar. For the convenience of worldwide use, all nozzles are expressed with the US coding system.
For Example: nozzle **FBA 1686 C2** (PNR code) 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.



FLOW STABILIZER

Flow stabilizers are used to improve the stability of the liquid flow as they reduce losses caused by internal turbulence and allow to use a higher percentage of the liquid vein energy to generate a high impact solid flat fan. Flow stabilizers can be installed on all nozzles.



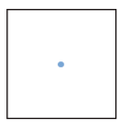


GDA SERIES NEEDLE JET NOZZLES

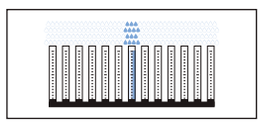
GDA models are classic high impact needle jet nozzles, easy to clean and clog-resistant. Their tips spray a solid stream of high pressure water inside pipes usually containing a steel brush that can be manually or automatically rotated. The rotating brush moving inside the pipe takes all the dirt off the inner walls and then flushes out the debris through an escape valve. For their revolutionary design, GDA nozzles are ideal for high pressure cleaning in paper mills and in all industrial processes requiring a high impact needle spray jet. Their resistance to clogging ensures greater productivity and low servicing costs.

- **Thread specification**: BSPT, 9/16-24NEF
- **Typical applications**

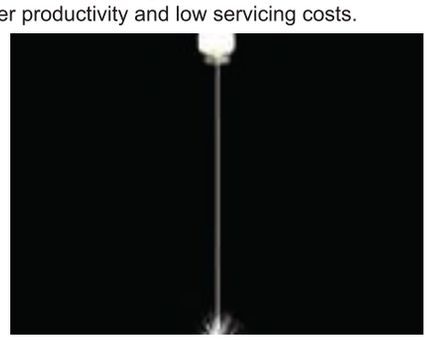
Washing: filter cloth washing, woolen blanket washing, parts washing
Other applications: scrape paint, rust removal



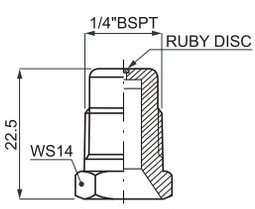
Spray section



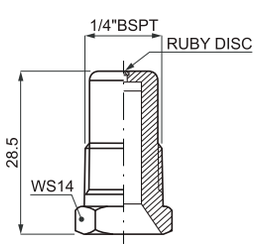
Distribution



GDA needle jet nozzles are a one-piece construction, suitable to work with operating pressures lower than 20 bar and have a hard ruby spray tip, ideal to work with pressures lower than 200 bar. They are precisely machined and have a hydrodynamic design to produce a solid stream needle jet. Their stainless steel body and ruby tip ensure a long service life and a high resistance to wear.

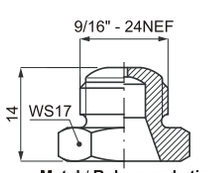


Ruby nozzle tip

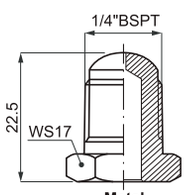


Ruby nozzle tip

Nozzle type		Code	D mm	Capacity at different pressure values (l/min) (bar)								
Stainless steel	Ruby insert			3.0	5.0	10	20	30	50	70	100	150
•		GDA 0120 xx xy	0.35	0.12	0.15	0.22	0.31					
•	•	GDA 0170 xx xy	0.40	0.17	0.22	0.31	0.44	0.54	0.69	0.82	0.98	1.20
•	•	GDA 0290 xx xy	0.50	0.29	0.37	0.53	0.75	0.92	1.18	1.40	1.67	2.05
•	•	GDA 0320 xx xy	0.60	0.32	0.41	0.58	0.83	1.01	1.31	1.55	1.85	2.26
•	•	GDA 0420 xx xy	0.70	0.42	0.54	0.77	1.08	1.33	1.71	2.03	2.42	2.97
•	•	GDA 0500 xx xy	0.80	0.50	0.65	0.91	1.29	1.58	2.04	2.42	2.89	3.54
•	•	GDA 0620 xx xy	0.85	0.62	0.80	1.13	1.60	1.96	2.53	2.99	3.58	4.38
•	•	GDA 0780 xx xy	0.90	0.78	1.01	1.42	2.01	2.47	3.18	3.77	4.50	5.52
•	•	GDA 0890 xx xy	1.00	0.89	1.15	1.62	2.30	2.81	3.63	4.30	5.14	6.29
•	•	GDA 1120 xx xy	1.10	1.20	1.55	2.19	3.10	3.79	4.90	5.80	6.93	8.49
•	•	GDA 1153 xx xy	1.20	1.53	1.98	2.79	3.95	4.84	6.25	7.39	8.83	10.8
•		GDA 1160 xx xy	1.40	1.60	2.07	2.92	4.13					
•		GDA 1270 xx xy	1.80	2.70	3.49	4.93	6.97					
•		GDA 1450 xx xy	2.40	4.50	5.81	8.22	11.6					
•		GDA 1730 xx xy	3.20	7.30	9.42	13.3	18.8					



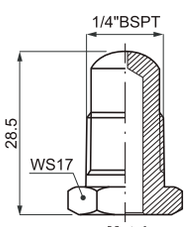
Metal / Ruby nozzle tip



Metal

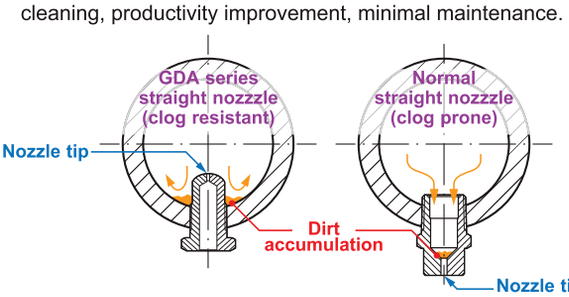
COMPLETE NOZZLE CODE

x = Body length	y = Thread
A for 14.0 mm	A for 1/4" BSPT
B for 28.5 mm	B for 9/16-24 UNEF
C for 22.5 mm	



Metal

GD nozzles are installed with their spray tips inside the pipe that spray in high pressure fluids producing turbulence to remove all dirt off the inner pipe walls. Used in combination with self-cleaning pipes, these nozzles assure complete cleaning, productivity improvement, minimal maintenance.



HOW TO MAKE UP THE NOZZLE CODE

EX.: GDA 0120 B1AA

GD A 0120 xx xy

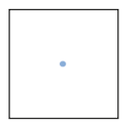
- GD — NOZZLE TYPE
- A — SPRAY ANGLE • A -0°
- 0120 — CAPACITY
- xx — MATERIAL
  - • **B1** - AISI 303 Stainless steel body
  - • **B31** - AISI 316L Stainless steel body
  - • **F30** - Ruby insert, 303 body
  - • **F31** - Ruby insert, 316L body
- xy — COMPLETE NOZZLE CODE

GMA SERIES PAPER WEB TRIMMERS

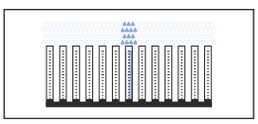
GMA nozzles produce a glass-rod like needle jet, ideal in paper mills to cut and trim the side of your paper web with a sharp edge, precise, clean and with no dust. They are precisely machined. Their smooth high quality ruby tip and special design produce a solid straight jet for precision trimming. A 150 mesh stainless steel filter avoids clogging. Their stainless steel body and ruby spray tip assures a long service life.



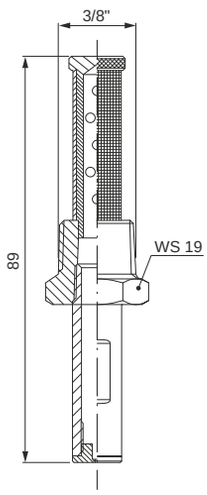
- **Thread specification**: 3/8" BSPT, 3/8" NPT
- **Filtering fineness**: 150 Mesh
- **Typical applications**
  Felt and wire cleaning
  Parts washing
  Paper trimming



Spray section



Distribution





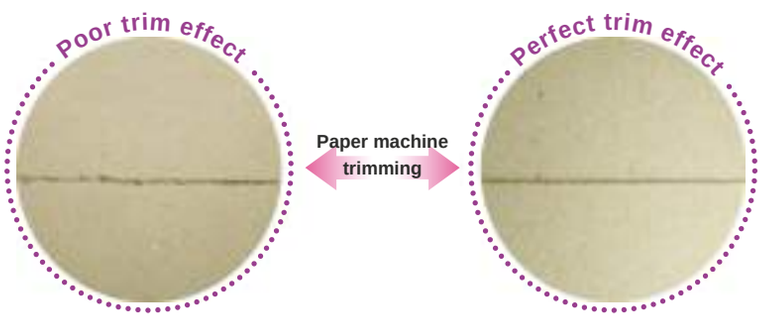
	Code	D mm
0°	**GMA 0380 xxy**	0.381
	GMA 0500 xxy	0.508
	GMA 0630 xxy	0.635
	GMA 0810 xxy	0.810
	GMA 0890 xxy	0.889
	GMA 0910 xxy	0.914
	GMA 1010 xxy	1.016
	GMA 1220 xxy	1.219

NEW **New code!**

GMA codes have been modified, based on the orifice diameter, measured for every nozzle. Please contact use if you need the capacity at different pressure.

PERFECT CLEANING

GMA top quality ruby tips produce a solid needle spray jet to trim paper web with a precise and sharp edge cut.



HOW TO MAKE UP THE **NOZZLE CODE**

EX.: GMA 0380 F30B

GM **A** **0380** **xx** **y**

- NOZZLE TYPE: **GM**
- ANGLE: **A** - 0°
- ORIFICE: **0380**
- MATERIAL: **xx**
  - **F30** - Body, filter: AISI 303; Insert: ruby
  - **F31** - Body, filter: AISI 316L; Insert: ruby
- CONNECT.: **y**
  - **B** - BSPT
  - **N** - NPT

JAA / JBA (STRAIGHT NOZZLES)



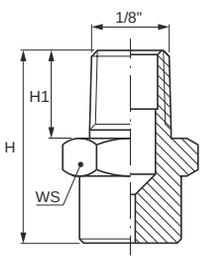
JAA

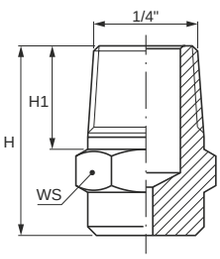


JBA

JAA/JBA HIGH IMPACT STRAIGHT JET NOZZLES

J type high impact straight jet nozzles are a one-piece construction in stainless steel, suitable to work with pressures lower than 20 bar, and have a ruby spray tip suitable for operating pressures lower than 200 bar. The two types, JAA and JBA, have a special hydrodynamic design and are machined with high precision to produce a solid needle jet. Their stainless steel body is highly resistant to chemicals and wear and assure a long service life.

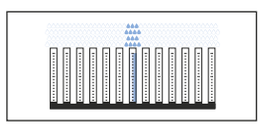




- **Thread specification**: BSPT



Spray section



Distribution



Typical applications

Washing
Felts, filter cloths and parts washing
Other applications
Paint scraping
Rust and shell removal

DIMENSIONS AND WEIGHTS

Code	Size	H	H1	WS	W
unit	inch	mm	mm	mm	gram
JA	1/8"	19.5	11	12	9
JB	1/4"	22.0	12	14	18
JC	3/8"	25.0	14	17	34

Nozzle type			Code	D	Capacity at different pressure values (l/min) (bar)			
JAA (1/8")	JBA (1/4")	JCA (3/8")			3.0	5.0	10	20
•	•		**0060**	0.28	0.06	0.08	0.11	0.15
•	•		**0100**	0.34	0.10	0.13	0.18	0.26
•	•		**0130**	0.38	0.13	0.17	0.24	0.34
•	•		**0150**	0.40	0.15	0.19	0.27	0.39
•	•		**0200**	0.46	0.20	0.26	0.37	0.52
•	•		**0260**	0.53	0.26	0.34	0.47	0.67
•	•		**0390**	0.66	0.39	0.50	0.71	1.01
•	•		**0590**	0.79	0.59	0.76	1.08	1.52
•	•		**0780**	0.91	0.78	1.01	1.42	2.01
•	•		**1120**	1.10	1.20	1.55	2.19	3.10
•	•		**1160**	1.30	1.60	2.07	2.92	4.13
•	•		**1190**	1.30	1.90	2.45	3.47	4.91
•	•		**1233**	1.50	2.33	3.01	4.25	6.02
•	•		**1310**	1.70	3.10	4.00	5.66	8.00
•	•		**1385**	1.80	3.85	4.97	7.03	9.94
•	•		**1490**	2.10	4.90	6.33	8.95	12.7
•	•		**1581**	2.30	5.81	7.50	10.6	15.0
•	•	•	**1780**	2.70	7.80	10.1	14.2	20.1
•	•	•	**1980**	3.00	9.80	12.7	17.9	25.3
•	•	•	**2124**	3.40	12.4	16.0	22.6	32.0
•	•	•	**2153**	3.80	15.3	19.8	27.9	39.5
	•	•	**2195**	4.30	19.5	25.2	35.6	50.3
	•	•	**2245**	4.80	24.5	31.6	44.7	63.3
	•	•	**2274**	5.20	27.4	35.4	50.0	70.7
	•	•	**2310**	5.40	31.0	40.0	56.6	80.0
	•	•	**2390**	6.00	39.0	50.3	71.2	101
	•	•	**2470**	6.20	47.0	60.7	85.8	121

HOW TO MAKE UP THE NOZZLE CODE

EX.: JAA 0170 B1

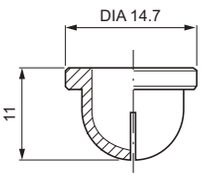
J A A 0170 xx

- NOZZLE TYPE: J
- CONNECTION: A
  - **A** - 1/8"
  - **B** - 1/4"
  - **C** - 3/8"
- SPRAY ANGLE: A
  - **A** - 0°
- CAPACITY: 0170
- MATERIAL: xx
  - **B1** - AISI 303 Stainless steel body
  - **B31** - AISI 316L Stainless steel body
  - **T1** - Brass

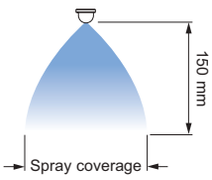
AIR & STEAM FLAT FAN TIPS

GZ air & steam flat fan tips are ideal for gas application.
They are widely used in drying processes.

- **Typical applications**: water removal from surfaces, flocks and water blow off
- **Connection**: flanged nozzle tip



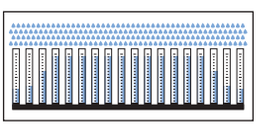








Spray section



Distribution

	Code	D mm	Air capacity (Nm^3/hour) at different pressure values (bar)				Steam capacity (kg/hour) at different pressure values (bar)				Spray coverage	
			0.5 bar	2.0 bar	5.0 bar	10 bar	0.5 bar	2.0 bar	5.0 bar	10 bar	2.0 bar	5.0 bar
70°	**GZS 1300 xx**	1.3	1.2	3.0	6.0	11.0	0.9	1.9	3.7	6.7	70	85
	GZS 1350 xx	1.5	2.0	3.5	7.1	12.6	1.0	2.1	4.1	7.7	72	87
	GZS 1500 xx	1.8	2.3	5.3	10.7	19.5	1.7	3.3	6.6	11.8	110	125
	GZS 1800 xx	2.1	3.2	8.0	16.0	29.0	2.5	5.0	9.9	18.0	115	140
	GZS 2150 xx	2.8	5.4	13.0	26.0	48.0	4.2	8.2	16.0	29.0	130	170
	GZS 2200 xx	3.6	8.9	21.7	43.3	79.4	6.8	13.6	27.0	48.0	140	180
	GZS 2315 xx	4.3	13.0	31.8	65.6	120.2	10.3	20.6	40.4	73.0	170	215

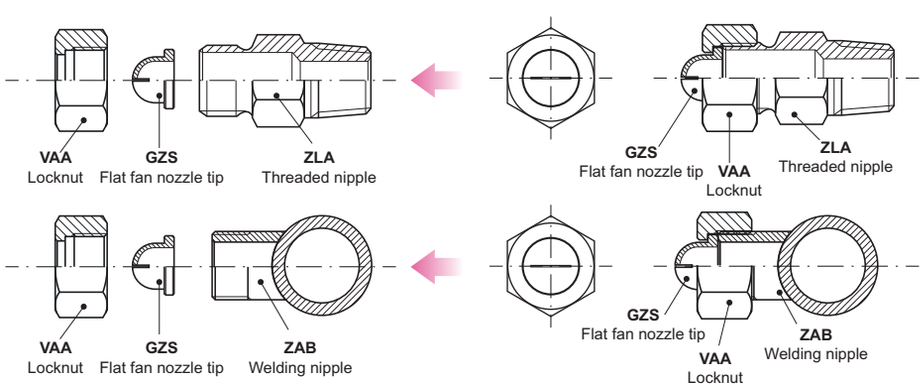
ASSEMBLY FITTINGS



ZLA Threaded nipple

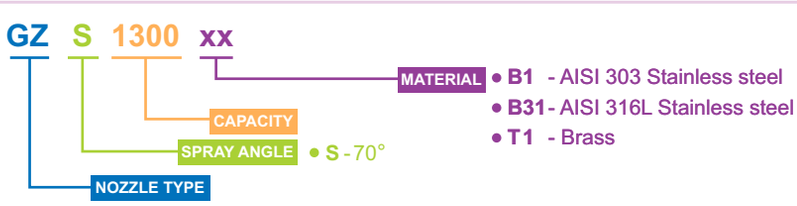
GZS Flat fan nozzle tip

VAA Locknut



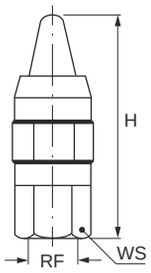
HOW TO MAKE UP THE NOZZLE CODE

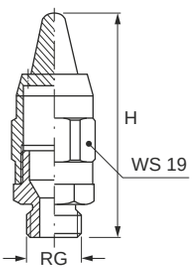
EX.: GZS 1300 B1

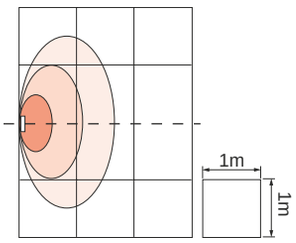


UEA D020 (FULL CONE NOZZLES)



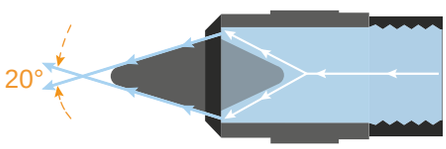






Noise level diagram at **2 bar** air pressure.

68 dB
72 dB
75 dB



These air blowers meet the requirements of American OSHA regulations

AIR BLOW-OFF NOZZLES, ROUND JET

UEA D020 compressed air blowing nozzles produce a powerful air jet concentrated on a well defined impact point. They are specially designed for deep and blind holes drying, produce lower noise and reduce pressure loss.

- **Thread size** 1/4"
- **Thread specification** BSP, NPT
- **Material**
  V7 Aluminium, electroless nickel plated
  B31 AISI 316L Stainless steel
- **Typical applications** Water removal from surfaces
  Flocks and water blow off

Code	RF inch	Air capacity (Nm³/hour) at different pressure values (bar)					H mm	WS mm
		2.0	3.0	4.0	5.0	6.0		
UEA D020 xx yy	1/4"	15	20	25	31	35	55	17

HOW TO MAKE UP THE NOZZLE CODE EX.: UEA D020 B31SG

UEA D020 B31 yy

NOZZLE TYPE

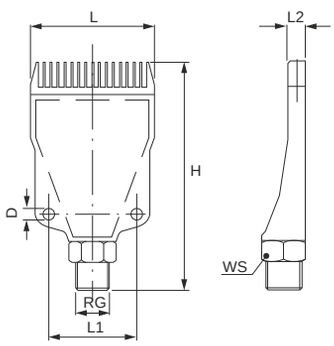
MATERIAL
- **B31** - AISI 316L Stainless steel
  LT: 400°C **LP**: 15 bar
- **V7** - Aluminium, electroless nickel plated
  LT: 95°C **LP**: 15 bar

THREAD CODES
- **SG** - BSP (Female)
- **SN** - NPT (Female)
- **MG** - BSP (Male)
- **MN** - NPT (Male)

UEA 0525 / 0527 (AIR BLOWERS - FLAT FAN)

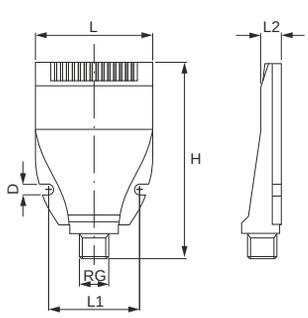


UEA 0525 E31

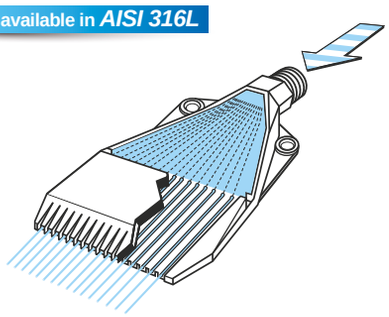




UEA 0527 V7



NEW Also available in *AISI 316L*

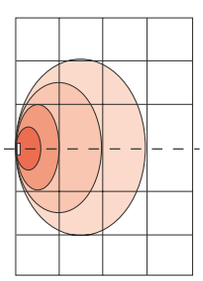


These air blowers meet the requirements of American OSHA regulations

AIR BLOWERS, FLAT FAN

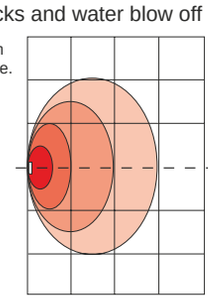
UEA series compressed air blowers are the best choice for operating environments requiring strong impact laminar sprays. The compressed air flow is blown through 16 orifices producing a strong impact jet, limited noise level and uniform spray. They are suitable to be installed on moving conveyors.

- **Thread size** 1/4"
- **Thread specification** BSPT, NPT
- **Material**
  E31 Polyacetalic resin (POM)
  V7 Aluminium, electroless nickel plated
  B31 AISI 316L
- **Typical applications** Water removal from surfaces
  Flocks and water blow off



Noise level diagram at **3 bar** air pressure.

70 dB
72 dB
74 dB
78 dB



Noise level diagram at **6 bar** air pressure.

76 dB
78 dB
80 dB
82 dB

Code	RG inch	Air capacity (Nm³/hour) at different pressure values (bar)					H mm	L mm	L1 mm	L2 mm	D mm	WS mm
		1.0	2.0	3.0	4.0	5.0						
UEA 0525 E31 yy	1/4"	10	17	22	28	---	90.0	48	35	6.5	4.5	16
UEA 0527 xx yy		10	17	22	28	33	86.5	51	40	9.0	5.1	17

HOW TO MAKE UP THE NOZZLE CODE EX.: UEA 0525 E31SG

UEA 0525 E31 yy

NOZZLE TYPE

MATERIAL
- **E31** - Polyacetalic resin (POM)
  Only for UEA 0525
  LT: 80 °C **LP**: 4 bar
- **B31** - AISI 316L Stainless steel
  LT: 400°C **LP**: 15 bar
- **V7** - Aluminium, electroless Ni-plated
  LT: 150°C **LP**: 15 bar

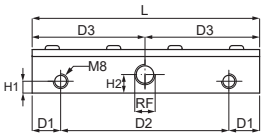
THREAD CODES
- **SG** - BSP
- **SN** - NPT

HIGH EFFICIENCY AIR KNIVES

UEB air knives produce a high impact laminar jet of compressed air. They are fully adjustable and precisely engineered with a special design based on the Coanda effect, the natural tendency of a fluid jet to be attracted to a nearby surface. The air blade coming out through their side slot follows the radiused profile and leaves the blower body with a 90° angle from the original direction. The negative pressure brings in a 20 times bigger wind volume allowing a high energy saving. They offer an excellent drying performance and eliminate static electricity.

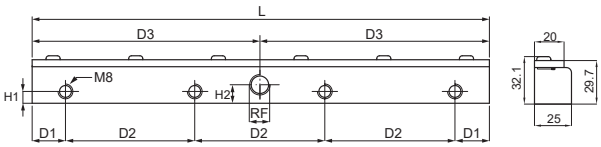
Length: 150 mm, 300 mm, 450 mm, 600 mm
Typical applications: Water removal from surfaces
Flocks and water blow off
Water removal before stick and print

Max working temperature		**LT**	95°C
Max working pressure		**LP**	7 bar
Thread specification			BSP, NPT
Thread size			1/4"
Materials	Body	**V7**	Aluminium,electroless nickel plated
		B3	AISI 316 Stainless steel
	Upper plate	**A9**	Nickel plated steel
		B3	AISI 316 Stainless steel

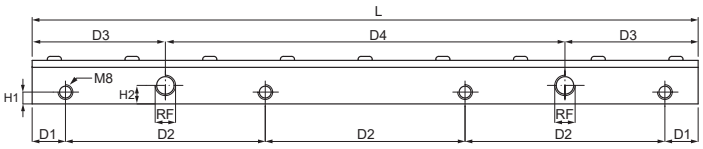




UEB 0150



UEB 0300



UEB 0450 / UEB 0600

Code	RF	Air capacity (Nm³/min)										Dimensions							W
	inch	AI	AO	AI	AO	AI	AO	AI	AO	AI	AO	D1 mm	D2 mm	D3 mm	D4 mm	H1 mm	H2 mm	L mm	kg
UEB 0150 xx yy	1/4"	0.26	4.70	0.34	6.00	0.42	7.10	0.51	8.60	0.60	10.6	20.0	110	75	-	8	12.5	150	0.3
UEB 0300 xx yy		0.52	9.40	0.68	12.0	0.84	14.2	1.02	17.2	1.20	21.2	22.5	85	150	-			300	0.7
UEB 0450 xx yy		0.78	14.1	1.03	18.0	1.26	21.3	1.53	25.8	1.80	31.8	22.5	135	90	270			450	0.9
UEB 0600 xx yy		1.03	18.7	1.40	24.0	1.68	28.4	2.04	34.4	2.40	42.4	22.5	185	150	300			600	1.4

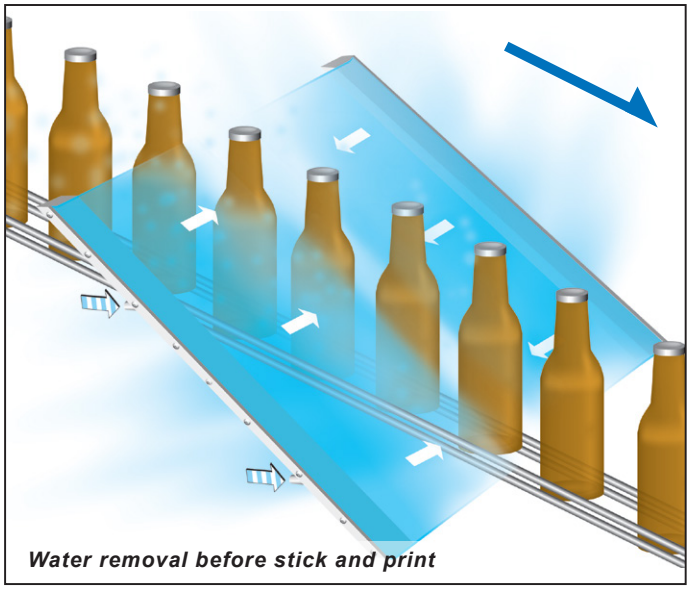
Pressure (bar)	2,0	3,0	4,0	5,0	6,0

The table shows the air capacity as a function of the air pressure whereas the below graphs show the noise level as a function of the front and side distances from the nozzle outlet at an operating pressure of 2 bar. The air flow leaving the nozzle orifice drags along ambient air, the air blade produced by the nozzle (AIR OUT) has a larger flow rate which is a multiple of the feed air flow (AIR IN).

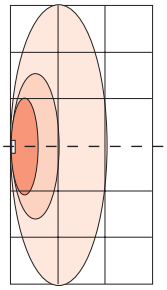


SAVE ENERGY AND INCREASE THE AMOUNT OF WIND

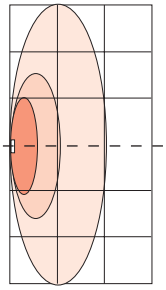
The compressed air exits through the side slot following the radiused profile and leaves the body with an angle of 90° from the original direction. The negative pressure brings in 20 times wind volume and saves energy consumption greatly.



Water removal before stick and print

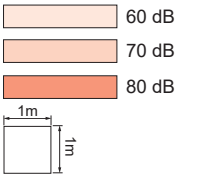


UEB 0150



UEB 0300

Noise level diagram at **2 bar** air pressure.



HOW TO MAKE UP THE **NOZZLE CODE**

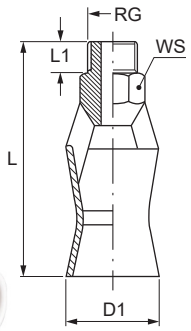
EX.: UEB 0150 V7SG

UEB 0150 xx yy

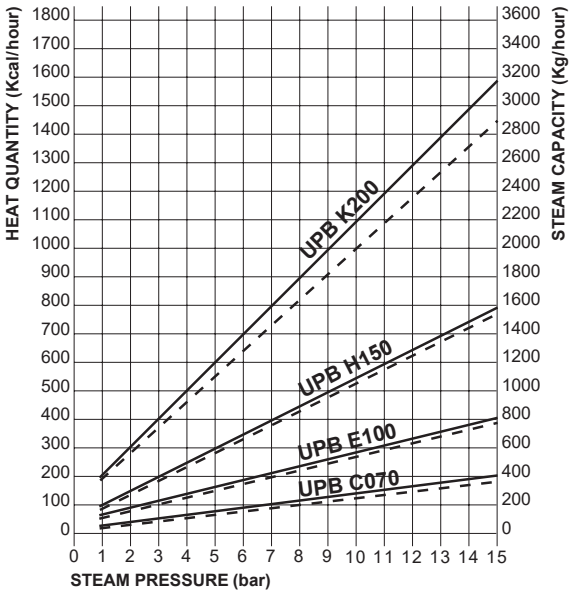
- **THREAD CODES** • **SG** - BSP • **SN** - NPT
- **MATERIAL** • **V7** - Aluminium, electroless nickel plated • **B3** - AISI 316 Stainless steel
- **LENGTH** • **0150** - 150 mm • **0300** - 300 mm • **0450** - 450 mm • **0600** - 600 mm
- **NOZZLE TYPE**

UPB (MIXING EDUCTORS)





STEAM CONSUMPTION CHART



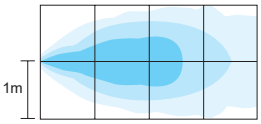
The table above shows the working condition of UPB C070 B31 eductor when set at 50 cm depth.
We are at your disposal to realize UPB eductors on demand: PNR will give you the code and the dimensions

MIXING EDUCTORS

UPB mixing eductors are energy saving products. Their robust bell-shaped body minimizes the risk of damage during maintenance operations and the Venturi design assures a high mixing efficiency. These eductors enable the circulation of large volumes of liquid and are ideal for continuous blending and stirring of liquids or solutions in tanks. The UPB eductors are installed at the bottom of a tank and pressurized to spray the solution. This flow creates a powerful negative pressure that allows to take in four times the liquid volume, mix it with a solution inside the nozzle and spray it back into the tank at a high speed. 1 HP pump and UPB mixing eductor can replace a 5 HP mixing educator. UPB eductors are an efficient way to get the best performance from re-circulating process tanks and are cost-effective because they reduce the electrical costs.

- **Typical applications** Liquid mixing in electroplating and automotive paint factories
- **Thread spec.** BSPT (**B**, only AISI), BSPP (**G**, PP & PVDF), NPT (**N**, all)
- **Max working temperature** **LT** 80°C (PP), 90°C (PVDF)
- **Materials** **B31** AISI 316L Stainless steel
  D6 PP, chemically bonded fiberglass
  D82 PVDF, moulded

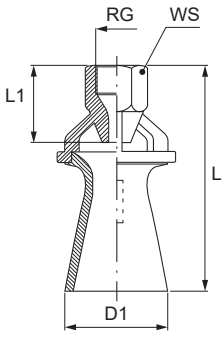
Code	RG poll	D mm	Flow rate at pressure (l/min) (bar) 1.0	2.0	3.0	4.0	5.0	D1 mm	L mm	L1 mm	WS mm
UPB B030 D82Sx	1/4"	3.0	5.9	8.2	9.9	11	13	38	78	---	---
UPB B030 D6Sx		3.0	5.9	8.2	9.9	11	13				
UPB B040 D6Sx		4.0	10	15	18	20	23				
UPB B050 D6Sx		5.0	16	22	27	31	35				
UPB C070 B31Sx	3/8"	7.0	34	48	59	68	76	45	98	15	22
UPB C070 D6Sx		7.0	34	48	59	68	76				
UPB C070 D82Sx		7.0	34	48	59	68	76				
UPB E100 B31Rx	1/2"	10.0	63	89	109	126	141	60	132	20	30
UPB E100 B31Sx	3/4"	10.0	63	89	109	126	141	60	132	20	30
UPB E100 D6Sx			63	89	109	126	141				
UPB H150 B31Sx	1 1/2"	15.0	155	215	265	305	340	110	225	30	60
UPB K200 B31Sx	2"	20.0	268	377	460	531	592	102	295	30	70

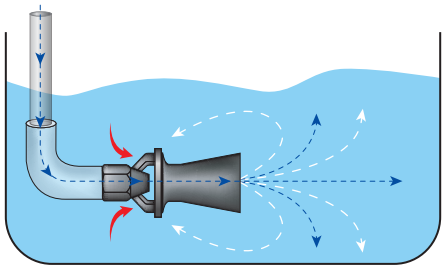


Under normal operating conditions, with feed pressure values ranging from 2 to 4 bars, eductors with a total capacity equal to 20% of the liquid volume to be stirred proved to be adequate for most industrial applications. Please contact us for additional information about eductors layouts.

UPD (MIXING EDUCTORS)







MIXING EDUCTORS

UPD mixing eductors, whose design applies the "Coanda Effect", enable the circulation of large volumes of liquid. They are installed at the bottom of a tank and pressurized to spray the solution.
This flow creates a powerful negative pressure that allows to take in four times the liquid volume, mix it with a solution inside the nozzle and spray it back into the tank at a high speed. 1 HP pump and UPB mixing eductor can replace a 5 HP mixing educator. UPD eductors offer a high mixing efficiency and are cost effective because they save energy and are resistant to wear and corrosion.
UPD eductors have the same technical features of the UPB models, but they come with a female thread connection.

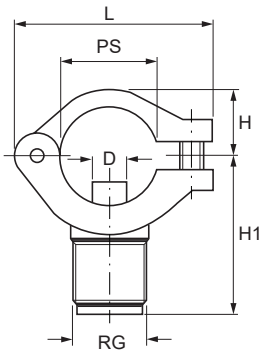
- **Thread specification** BSP (**G**), NPT (**N**)
- **Materials** **B31** AISI 316L Stainless steel
  D6 PP, chemically bonded fiberglass
- **Max working temperature** **LT** 80°C (PP)
- **Typical applications** Liquids mixing in electroplating, automotive painting, chemical plants.

Code	RG inch	D mm	Flow rate at pressure (l/min) (bar) 1.0	2.0	3.0	4.0	5.0	D1 mm	L mm	L1 mm	WS mm
UPD E100 D6Sx	3/4"	10	63	89	109	126	141	75	147	30	34
UPD H150 D6Sx	1 1/2"	15	141	199	243	281	313	80	225	45	60
UPD H150 B31Sx	1 1/2"	15	155	215	265	305	340	80	239	83	60
UPD K200 B31Sx	2"	20	268	377	460	531	592	102	295	83	70

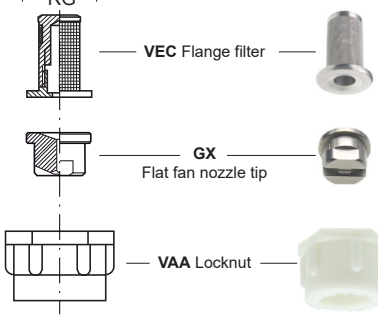
PLASTIC PIPE CLAMPS

ZPB plastic pipe clamps allow a quick, professional and convenient instalment of GX, BX or KX flanged nozzles onto manifolds. Using these clamps it's not necessary to weld nipples or use thick pipes, all you need is one hole in the pipe. ZPB body is made in PP reinforced glass fiber while screws and bolts are in stainless steel AISI 316 to assure a good corrosion resistance. VEA, VEC and VED flanged filters are available on request to prevent clogging.

- **Typical applications** Pre-treatment for coating process
Parts cleaning
- **Max working temperature** **LT** 80°C
- **Max working pressure** **LP** 8 bar
- **Materials** Body **D6** PP, chemically bonded fiberglass
O-ring **E8** NBR
Metal parts **B2** AISI 304 Stainless steel







Codice	RG inch	PS inch	PD mm	D mm	H mm	H1 mm	L mm	W g
ZPB 0050 D6SG	3/8"	1/2"	21 / 22	7,60	15,0	36,0	44,5	20,0
ZPB 0074 D6SG		-	25	7,60	19,0	39,0	51,5	24,0
ZPB 0075 D6SG		3/4"	26 / 27	7,60	19,0	39,0	51,5	26,0
ZPB 0100 D6SG		1"	33 / 34	10,0	23,0	46,0	62,0	30,0
ZPB 0125 D6SG		1-1/4"	42 / 43	12,0	35,0	55,0	85,0	75,0



HOW TO MAKE UP THE **PRODUCT CODE** EX.: ZPB 0050 D6

ZPB 0050 D6

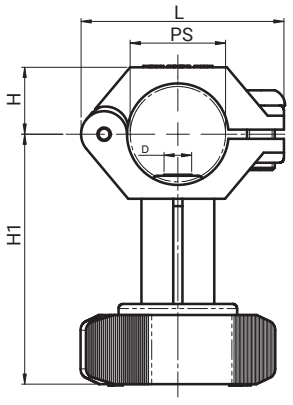
- PIPE CLAMPS
- CODE • **0050** - 1/2" • **0100** - 1" • **0075** - 3/4" • **0125** - 1-1/4"
- MATERIAL • **D6** - PP, chemically bonded fiberglass

(PLASTIC BAYONET PIPE CLAMPS) ZPC

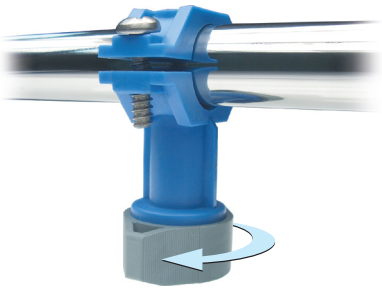
PLASTIC BAYONET PIPE CLAMPS

ZPC plastic bayonet pipe clamps serve for a quick and easy instalment of GX type flat fan flanged nozzles.
No need to weld nozzles or use thick pipes to thread. It's sufficient to make a hole in the pipe and fix the clamp in. The clamp body is in PVDF while screws and bolts are in stainless steel AISI 316, suitable for high temperatures. Their quick-fit cap is easy to disassemble for cleaning. The flat fan orientation has an offset angle of 10° from the main manifold axis to avoid jets overlapping.

- **Typical applications** PCB wet process
Pre-treatment for coating process
- **Pipe size** **PS** 1/2"
- **Max working temperature** **LT** 90°C
- **Max working pressure** **LP** 8 bar
- **Materials** Body **D82** PVDF, moulded
O-ring **E7** Viton
Metal parts **B3** AISI 316 Stainless steel

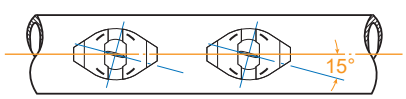








Code	PS poll	PD mm	D mm	H mm	H1 mm	L mm	W g
ZPC 0500 D82P	1/2"	20/22	6.0	14.5	54.0	44.0	45.0



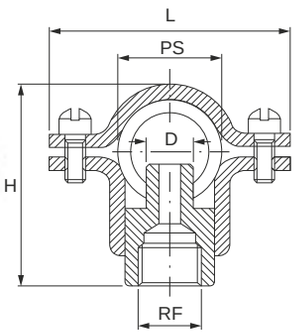
HOW TO MAKE UP THE **PRODUCT CODE** EX.: ZPC 0500 D82P

ZPC 0500 D82 P

- PIPE CLAMP
- CODE • **0500** - 1/2"
- MATERIAL • **D82** - PVDF
- VERSION • **P** - Complete version with gasket and locknut

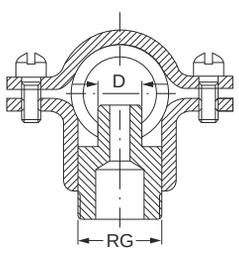
ZPM (METAL PIPE CLAMPS)





Female





Male



ZPM Metal clamps **+ PF** Hollow cone nozzle

METAL PIPE CLAMPS

ZPM metal pipe clamps are suitable for a quick, easy and safe instalment of various types of nozzles on pipes.
They can be fit into a pipe simply by making a hole on it. As it's not necessary to thread thick pipes or weld the nozzles, these clamps assure a relevant time and costs saving.

- **Thread size** 1/8", 1/4", 3/8", 1/2"
- **Connection** BSP, NPT
- **Typical applications** Pre-treatment for coating process
  Exhaust Scrubber
- **Pipe size** **PS** 1/2", 3/4", 1", 1¼", 1½", 2", 2½"
- **Max working temperature** **LT** 80°C
- **Max working pressure** **LP** 20 bar
- **Materials**
  - Body: **B2** AISI 304 Stainless steel; **A8** Zinc coated steel
  - Screws: **B2** AISI 304 Stainless steel
  - Nipples: **B31** AISI 316L Stainless steel; **T1** Brass
  - Gasket: **E0** EPDM

Code	PS inch	RF/RG inch	LP bar	LQ l/min	D mm	H mm	L mm
ZPM 0050 xxAW	1/2"	1/8"	17	11	7	40	49
ZPM 0050 xxBW		1/4"					
ZPM 0050 xxUW		3/8"				48	
ZPM 0075 xxAW	3/4"	1/8"	17	11	7	45	58
ZPM 0075 xxBW		1/4"					
ZPM 0075 xxUW		3/8"				53	
ZPM 0100 xxAW	1"	1/8"	17	11	7	45	65
ZPM 0100 xxBW		1/4"					
ZPM 0100 xxUW		3/8"				53	
ZPM 0125 xxYW	1¼"	1/4"	9	45	18	68	71
ZPM 0125 xxYW		3/8"					
ZPM 0125 xxYW		1/2"					
ZPM 0150 xxYW	1½"	1/4"	9	45	18	72	90
ZPM 0150 xxYW		3/8"					
ZPM 0150 xxYW		1/2"					
ZPM 0200 xxYW	2"	1/4"	9	45	18	85	100
ZPM 0200 xxYW		3/8"					
ZPM 0200 xxYW		1/2"					
ZPM 0250 xxYW	2½"	1/4"	9	45	18	110	118
ZPM 0250 xxYW		3/8"					
ZPM 0250 xxYW		1/2"					

CODE COMPLEMENTS

EX.: ZPM 0050 A8 AA

Replace xx and YW in the above codes as shown below

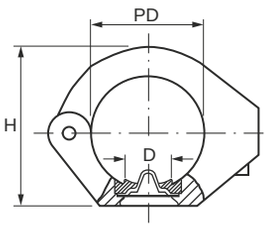
NOTE: Nipple thread (letter Y) can be 3/8" BSP F (letter C) or 1/2" BSP F (letter D) only for pipe sizes (PS in the above table) equal or grater than 1-1/2".

ZPM 0050 xx Y W

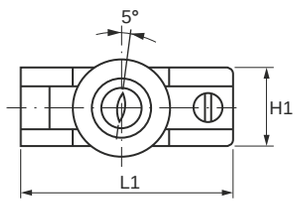
XX	For clamp material	Y	For nipple thread	W	For nipple material
A8	Zinc coated steel	A	1/8" BSP Female	A	Brass
B2	AISI 304	B	1/4" BSP Female	B	AISI 303
		C	3/8" BSP Female	C	AISI 316L
		D	1/2" BSP Female		
		U	3/8" BSP Male		

DISK NOZZLE PIPE CLAMP

ZPH pipe clamps are specially designed for the quick and easy instalment of disc nozzles onto pipes.
These clamps are very convenient as there's no need to buy expensive metal tips or welded nozzle tips.
You must drill a 19 mm diameter hole on the pipe, insert the clamp into it and fix it with screws.
Their design, which allows to position the disc nozzles with a 5° offset angle, assures a proper jet orientation. These clamps avoid spray jets interference and are ideal for nozzles cleaning steel brushes.









- **Max working temperature** **LT** 80°C
- **Max working pressure** **LP** 7 bar
- **Fitting dimensions** Outer pipe diameter **50 mm**
  Inner pipe diameter **47 mm**
  Feed hole **19 mm**
- **Materials** Clamp **D6** PP, chemically bonded fiberglass
  Pin, bolt **B3** AISI 316 Stainless steel
- **Typical application** Paper machines self-cleaning pipes

Code	OD mm	D mm	H mm	H1 mm	L1 mm
ZPH 0150 D6	52	19	70	34	91





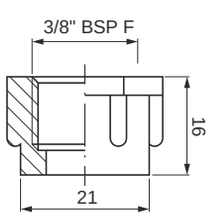
HOW TO MAKE UP THE **PRODUCT CODE** EX.: ZPH 0150 D6

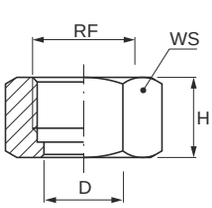
ZPH 0150 D6

- MATERIAL: ● **D6** - PP, chemically bonded fiberglass
- PIPE CLAMP

LOCKNUTS

VAA locknuts go with ZAA, ZAC, ZLA and ZPB to fix different nozzles.





VAA 0380 D6B



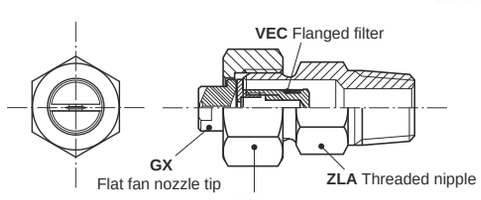


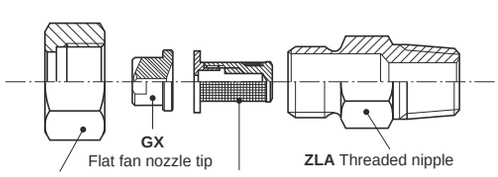
Code	RF inch	D mm	H mm	WS mm	Material Plastic	Material Metal
VAA 0380 xxB	3/8"	12.9	12	22	●	●
VAA 0381 xxB	3/8"	12.5	15	22		●
VAA 0750 xxB	3/4"	20.5	16	32		●
VAA 1250 xxB	1¼"	32.5	27	50		●

HOW TO MAKE UP THE **PRODUCT CODE** EX.: VAA 0380 B1B

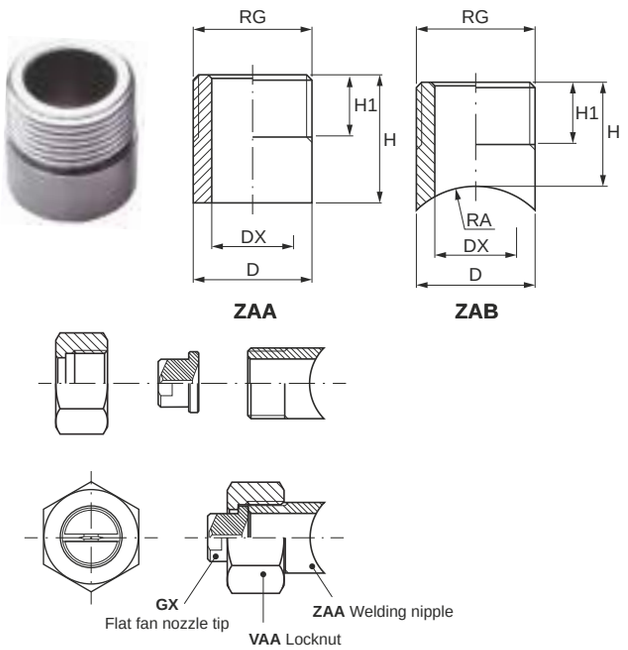
VAA 0380 xxB

- LOCKNUTS
- CODE:
  - ● **0380** - 3/8"
  - ● **0381** - 3/8"
  - ● **0750** - 3/4"
  - ● **1250** -1¼"
- MATERIAL:
  - ● **B1** - AISI 303 Stainless steel
  - ● **B31**- AISI 316L Stainless steel
  - ● **D6** - PP, chemically bonded fiberglass
  - ● **T1** - Brass





ZAA / ZAB (STANDARD WELD NIPPLES)



STANDARD WELD NIPPLES

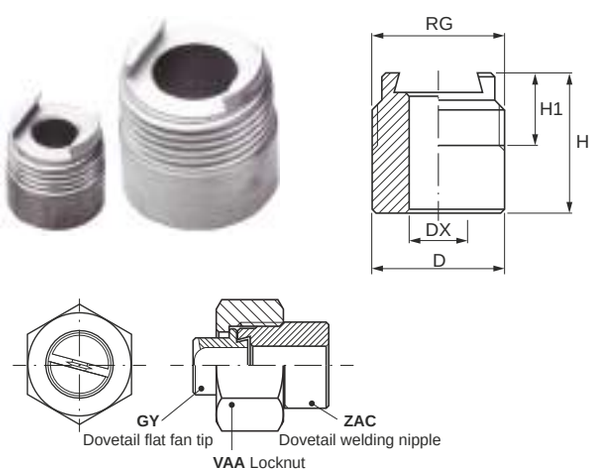
ZAA/ZAB welding nipples allow the assembly of GX, BX or KX series nozzle tips onto pipes and spray manifolds. One end of the nipple is fixed onto the pipe and the other to the nozzle tip. ZAA is a standard model with a flat welding surface. ZAB is radiused type with a curved welding surface that fits the pipe diameter. VAA locknut goes with ZAA/ZAB weld nozzle tip. Additionally, we suggest you to add VEA, VEC or VED flanged filters to avoid clogging when you use small orifice nozzles. Please refer to page 91 for more information.

- **Thread size** 3/8", 3/4"
- **Materials** **B1** AISI 303 Stainless steel **D1** PP
  B31 AISI 316L Stainless steel **D8** PVDF

Code	RG poll	H mm	H1 mm	D mm	DX mm	RA mm	W g
Standard							
ZAA C018 xxG	3/8"	18	10	17	11.5	-	20
ZAA E027 xxG	3/4"	27	15	27	18.0	-	61
Radiused							
ZAB C018 xxD	3/8"	18	10	17	11.5	10.0	20
ZAB C018 xxE						12.5	
ZAB C018 xxF						16.0	
ZAB C018 xxG						20.0	
ZAB C018 xxH						25.0	

PNR Italia is available to supply additional models with measures on request.

ZAC (DOVETAIL WELDING NIPPLES)



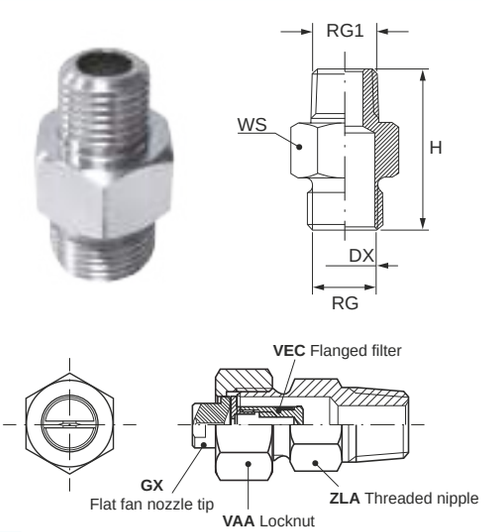
DOVETAIL WELDING NIPPLES

ZAC welding nipples are manufactured with a dovetail end to match GY type dovetail nozzle tips.
One end of the nipple is fastened onto the pipe and the other end to the nozzle tip by means of a VAA locknut. The dovetail design of these nipples keeps them properly orientated in the desired position, thus shortening time for nozzle tips cleaning and orientation adjustments.

- **Thread size** 3/8", 3/4", 1¼"
- **Material** **B1** AISI 303 Stainless steel **D2** PP
  B31 AISI 316L Stainless steel **D8** PVDF

Code	RG poll	H mm	H1 mm	D mm	DX mm	W g
ZAC C018 xx	3/8"	18.0	10.0	17	7.5	20
ZAC E027 xx	3/4"	27.5	14.0	27	14.0	61
ZAC G040 xx	1¼"	40.0	21.0	42	20.0	280

ZLA / ZLC (STANDARD THREADED NIPPLES)



STANDARD THREADED NIPPLES

ZLA threaded nipples have a flanged end to match nozzle tips type GX, BX or KX. One end of the nipple gets assembled onto the pipe and the other end to the nozzle tip to which it is fixed by means of a VAA locknut. In addition, flanged filters VEA, VEC and VED can be assembled to avoid clogging. Please find more information on page 91.

- **Inlet thread size** 1/8", 1/4", 3/8", 1/2", 3/4"
- **Outlet thread size** 1/8", 1/4", 3/8", 1/2", 3/4"
- **Connection** **RG1**: BSPT (A), BSP (C) **RG**: BSP
- **Materiali** **B1** AISI 303 Stainless steel **T1** Ottone **D2** PP
  B31 AISI 316L Stainless steel **D1** PVC **D8** PVDF

Code	RG poll	RG1 poll	DX mm	H mm	WS mm	W g
ZLx 1212 xxB	1/8"	1/8"	5.00	25.0	14	18
ZLx 2525 xxB	1/4"	1/4"	7.50	29.0	19	20
ZLx 3838 xxB	3/8"	3/8"	10.0	35.0	19	25
ZLx 5050 xxB	1/2"	1/2"	15.0	38.0	27	50
ZLx 7575 xxB	3/4"	3/4"	18.0	40.0	32	90

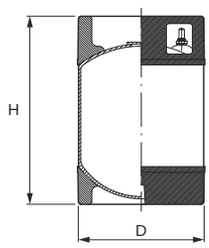
RG \ RG1	1/8"	1/4"	3/8"	1/2"	3/4"
1/8"	•	•	•	•	•
1/4"		•	•	•	•
3/8"	•	•	•	•	•
1/2"			•	•	•
3/4"				•	•

The table on the right shows the different combinations PNR Italia can produce, based on the inlet thread size RG1 and the outlet thread size RG. Our Technical Office is at your disposal to give you codes and dimensions.

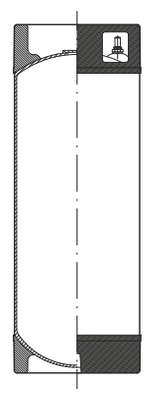
PRESSURE TANKS

UMR pressure tanks are widely used to spray liquids under pressure containing disinfectants and so on. They are an excellent choice as they make it possible to deliver liquids to air atomizers without requiring expensive pumps and can also be operated as mobile units.

- **Inlet / Outlet diameter** — Quick connection or 1/4" PT (Female)
- **Max working pressure** — **LP** 4,9 bar
- **Materials**
  - Body — **B2** AISI 304 Stainless steel
  - Base & Handles — **E8** Synthetic rubber (NBR)
  - Quick connection — **E31** Delrin®
  - O-Ring — **E0** EPDM









Code Cover only	Cover and nipples	CA liters	D mm	H mm	W kg	LP bar
UMR 0090 B2	**UMR C090 B2**	9	232	340	3.65	4.9
UMR 0190 B2	**UMR C190 B2**	19	219	630	4.00	4.9

PRESSURE TANKS - ACCESSORIES

XUM R110 E31	**Liquid connection kit** connection: 7/16-20UNF	
XUM R100 E31	**Air connection kit** connection: 7/16-20UNF	

Please note that both connection kit, air and liquid, can only be supplied as a complete assembly, it is not possible to supply single components.



PRESSURE TANK OPERATION

Remove the pressure tank cover, fill in the liquid and put the cover back on. Fill the tank with compressed air. The liquid is pushed out (see picture above) by the pressure inside the tank which is higher than the outside pressure. Generally, we recommend to add a gas pressure regulator and a pressure gauge on the pressure tank inlet and outlet to adjust inside and outside pressures.

AUTO-DISINFECTION SYSTEM

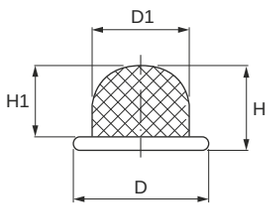
The cart shown on the right is specially designed for disinfection in hospital areas where bacteria and germs must be safely eliminated. It's a portable small-sized complete system for automatic disinfection. Spray time and capacity can be automatically set. Its spray system is activated by an infrared rays sensor that safely detects people passing in its proximity.

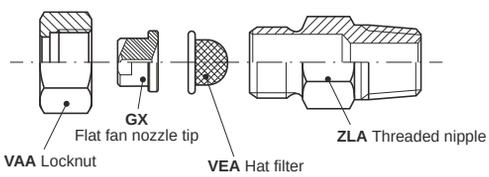


VEA (HAT FILTERS)



VEA





HAT FILTERS

VEA series hat-shaped check-valve filters are specially designed for 3/8" flanged nozzles. They are drip-free and protect the nozzle tips. We recommend to assemble filters with check-valve on small capacity nozzles to avoid clogging and enhance their performance.

- **Mesh number** 50, 75, 100 mesh
- **Materials** Collar **T9** Copper
  Wire net **B3** AISI 316 Stainless steel
- **Typical application** Filtering before spraying liquids

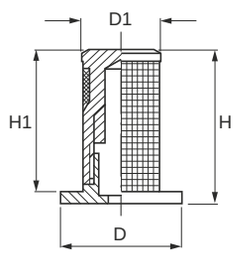
Code	D mm	D1 mm	H mm	H1 mm	M mesh	Nozzle code
VEA 0138 T9	14.5	9.5	8.5	7.3	100	GX BX FX KX
VEA 0238 T9					75	
VEA 0338 T9					50	

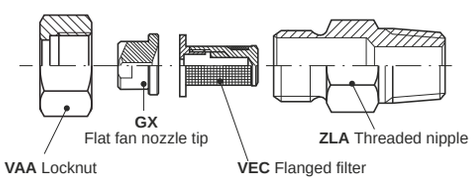
FILTERS

VEC (FLANGED FILTERS)



VEC





FLANGED FILTERS

VEC check-valve filters are specially designed for 3/8" flanged nozzles. They are drip-free and protect the nozzle tips. We recommend to assemble these filters on small capacity nozzles to avoid clogging and enhance their performance.

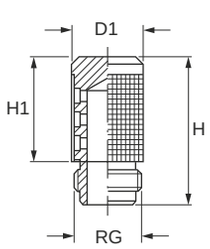
- **Materials** Body **B1** AISI 303 Stainless steel
  B31 AISI 316L Stainless steel
  D3 Nylon
  T1 Brass
  Wire net **B2** AISI 304 Stainless steel
- **Typical application** Filtering before spraying liquids

Code	D mm	D1 mm	H mm	H1 mm	M mesh	Nozzle code
VEC 0138 xx	15.0	10.0	20.0	18.5	100	GX BX FX KX
VEC 0238 xx					75	
VEC 0338 xx					50	

VEF (THREADED FILTERS)

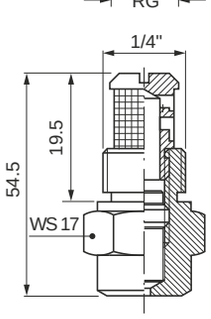


VEF





VEF + RZ



THREADED FILTERS

VEF threaded filters are specially designed for 1/4" J series flat fan nozzles and RX/RZ hollow cone nozzles. They provide a top filtering action and protect nozzle tips. We recommend to assemble threaded filters on small capacity nozzles to avoid clogging and enhance their performance.

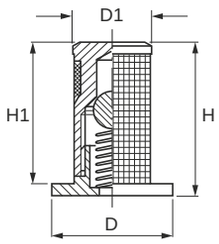
- **Thread size** 3/8" UNF , M7, M8
- **Mesh number** 50, 75, 100 mesh
- **Materials** Body **B1** AISI 303 Stainless steel
  B31 AISI 316L Stainless steel
  T1 Brass
  Wire net **B2** AISI 304 Stainless steel
- **Typical application** Filtering before spraying liquids

Code	D1 mm	RG poll	H mm	H1 mm	M mesh	Nozzle code
VEF 0112 xx	10.0	M8	16.0	12.0	100	**RX, RZ**
VEF 0138 xx	10.2	3/8"UNF	21.0	15.0	100	**JB**(1/4")
VEF 0238 xx					75	
VEF 0338 xx					50	
VEF 0411 xx	8.1	M7	15.7	13.2	120	**JA**(1/8")

CHECK-VALVE FILTERS

VED series check-valve filters are specially designed for 3/8" flanged nozzles. VED filters contain a one-way ball valve to avoid dripping when spray is turned off. They also serve to protect the nozzle tips. We recommend to assemble check-valve filters on small capacity nozzles to avoid clogging and enhance their performance.

- **Opening pressure** 0.35, 0.70, 1.40, 2.00, 2.80 bar
- **Wire net mesh size** 50, 80, 100 mesh
- **Materials** Body **B1** AISI 303 Stainless steel
  B31 AISI 316L Stainless steel
  D3 Nylon
  T1 Brass
  Wire net **B2** AISI 304 Stainless steel





VED

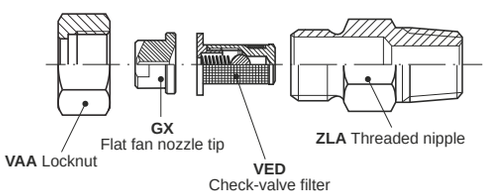


*Table for body material: **AISI 303, AISI 316L, brass***

Code	D mm	D1 mm	H mm	H1 mm	M mesh	Opening bar
VED 0138 xxA	15.0	10.0	20.0	18.5	100	0.35
VED 0238 xxA	15.0	10.0	20.0	18.5	80	0.35
VED 0338 xxA	15.0	10.0	20.0	18.5	50	0.35
VED 0138 xxB	15.0	10.0	20.0	18.5	100	0.70
VED 0238 xxB	15.0	10.0	20.0	18.5	80	0.70
VED 0338 xxB	15.0	10.0	20.0	18.5	50	0.70
VED 0138 xxC	15.0	10.0	20.0	18.5	100	1.40
VED 0238 xxC	15.0	10.0	20.0	18.5	80	1.40
VED 0338 xxC	15.0	10.0	20.0	18.5	50	1.40
VED 0138 xxD	15.0	10.0	20.0	18.5	100	2.80
VED 0238 xxD	15.0	10.0	20.0	18.5	80	2.80
VED 0338 xxD	15.0	10.0	20.0	18.5	50	2.80

*Table for body material: **nylon***

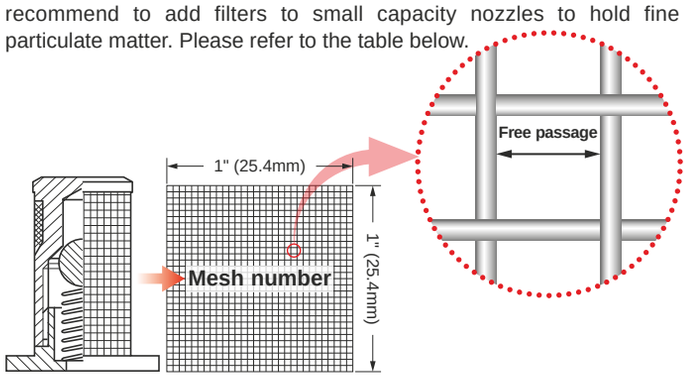
Code	D mm	D1 mm	H mm	H1 mm	M mesh	Opening bar
VED 0138 xxB	15.0	10.0	20.0	18.5	100	0.70
VED 0238 xxB	15.0	10.0	20.0	18.5	80	0.70
VED 0338 xxB	15.0	10.0	20.0	18.5	50	0.70
VED 0138 xxE	15.0	10.0	20.0	18.5	100	2.00
VED 0338 xxE	15.0	10.0	20.0	18.5	50	2.00

We offer a large assortment of VE series filters for your convenience. Please refer to below table.

Code	VEC	VED	VEF	VEA
Appearance				
	Flanged	Check-valve	Threaded	Hat
B1 AISI 303	•	•	•	
B31 AISI 316L	•	•	•	
D3 Nylon	•	•		
T1 Brass	•	•	•	
T9 Copper				•

CARTRIDGE SIZE TABLE

To figure out mesh sizes one has to count the number of openings from the centre of any one wire to the centre of a parallel wire one inch away. The number of openings in a filter cartridge is the mesh size. We highly recommend to add filters to small capacity nozzles to hold fine particulate matter. Please refer to the table below.



HOW TO CHOSE THE PROPER FILTER ?

The largest filter free passage < nozzle orifice

Mesh number	Free passage mm
30 - 32	0.6 - 0.58
50	0.3
60	0.25
75	0.2
80	0.18
100	0.15
150	0.1
200	0.075

If the nozzle tip diameter is 0.3 mm, we suggest you to choose a 60 mesh filter or more (free passage 0.25 mm). Please consider that the higher is the number of mesh, the greater is the filtering power.

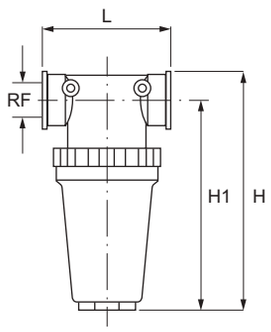
HOW TO MAKE UP THE **FILTER CODE** EX.: VED 0138 B1C

VED 0138 xx C

- OPENING PRESSURE: **A** - 0.35 bar; **B** - 0.70 bar; **C** - 1.40 bar; **D** - 2.80 bar; **E** - 2.00 bar
- MATERIAL: **B1** - AISI 303 Stainless steel; **B31** - AISI 316L Stainless steel; **D3** - Nylon; **T1** - Brass
- MESH: **0138** - 100 mesh; **0238** - 80 mesh; **0338** - 50 mesh
- FILTER TYPE

VEH (PLASTIC BODY FILTERS)





PLASTIC BODY FILTERS

VEH filters with plastic body are a rational and economic solution for most operating environments. The threaded coupling between bowl and head allows a quick filter cleaning and easy replacement of the cartridge and no need of tools. They have a high particles retention and are durable.

- Inlet / Outlet thread size: 1/2", 3/4", 1", 1¼", 1½"
- Max steam pressure: **LP** from10 bar to 15 bar
- Capacity: **LQ** 250 l/min
- Materials: Body **D6** Polypropylene + 30% Glass fiber; Seal **E0** EPDM; Cartridge **B2** AISI 304 Stainless steel
- Typical application: Filtering before spraying liquids

Code	RF inch BSPP	H mm	H1 mm	L mm	Q l/min	Cartridge	M mesh
VEH 0050 D21	1/2"	136	118	99	140	XVE H050 DA2	32
VEH 0051 D21						XVE H051 DA2	50
VEH 0052 D21						XVE H052 DA2	100
VEH 0075 D21	3/4"	136	118	99	140	XVE H050 DA2	32
VEH 0076 D21						XVE H051 DA2	50
VEH 0077 D21						XVE H052 DA2	100
VEH 0100 D21	1"	165	143	107	140	XVE H053 DA2	32
VEH 0101 D21						XVE H054 DA2	50
VEH 0102 D21						XVE H055 DA2	100
VEH 0125 D21	1¼"	279	239	146	250	XVE H060 DA2	32
VEH 0126 D21						XVE H061 DA2	50
VEH 0127 D21						XVE H062 DA2	100
VEH 0150 D21	1½"	279	239	146	250	XVE H060 DA2	32
VEH 0151 D21						XVE H061 DA2	50
VEH 0152 D21						XVE H062 DA2	100

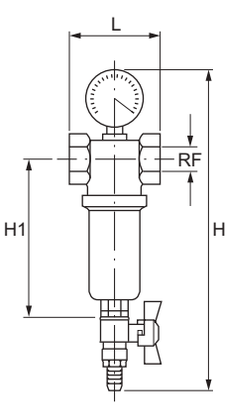
HOW TO MAKE UP THE FILTER CODE EX.: VEH 0050 D21

VEH 0050 D21

- D21 - Polypropylene (MATERIAL)
- 0050 (THREAD)
- VEH (FILTER TYPE)

VEL (BRASS BODY FILTERS)





BRASS BODY FILTERS

VEL type filters with body in brass are the ideal solution for small plants requiring easy cleaning and maintenance. When necessary, simply open the valve at the bottom of the filter and the dirt contained inside the cartridge is easily expelled. A manometer on the filter head shows the outlet pressure hence pressure drop when clogged.

- Inlet / Outlet thread size: 1/2", 3/4", 1", 1¼", 1½", 2"
- Max operation temperature: **LT** 100°C
- Max steam pressure: **LP** 16 bar
- Materials: Body **T8** Nickel plated brass; Cartridge **B2** AISI 304 Stainless steel
- Typical application: Filtering before spraying liquids

Code	RF inch BSPP	H mm	H1 mm	L mm	Q l/min	Cartridge	M mesh
VEL 0039 T8	3/8"	285	133	50	14	XVE L171 B2	150
VEL 0051 T8	1/2"	288	136	56	25		
VEL 0076 T8	3/4"	287	132	67	38	XVE L172 B2	
VEL 0101 T8	1"	295	137	80	72		
VEL 0126 T8	1¼"	343	169	92	118	XVE L200 B2	
VEL 0151 T8	1½"	356	179	110	178	XVE L201 B2	
VEL 0201 T8	2"	362	179	110	213		

HOW TO MAKE UP THE FILTER CODE EX.: VEL 0039 T8

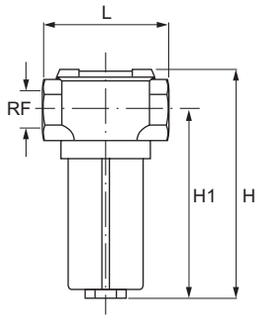
VEL 0039 T8

- T8 - Nickel plated brass (MATERIAL)
- 0039 (THREAD)
- VEL (FILTER TYPE)

LARGE CAPACITY FILTERS

VEM filters are specially designed for high particle retention, easy maintenance and great efficiency in harsh operating conditions. Their bowl houses a large size cartridge for a longer operating life and reduced servicing times. The threaded connection to the filter body allows a quick removal with no need of tools. A plug placed at the bottom of the bowl allows to fit in a ball valve to purge the filter.

- Thread size: 1/2", 3/4", 1", 1¼", 1½", 2", 2½", 3"
- Wire net mesh size: 60, 80 mesh; other sizes available on request
- Max working pressure: **LP** 40 bar
- Materials: Body & bowl **V1** Aluminium casting; Cartridge **B2** AISI 304 Stainless steel
- Typical application: Filtering before spraying liquids

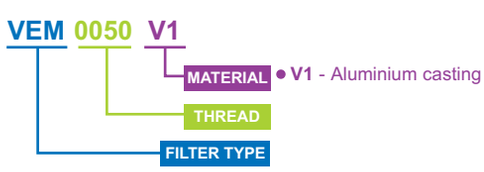




Mesh number	Free passage mm
30 - 32	0.6 - 0.58
50	0.3
60	0.25
75	0.2
80	0.18
100	0.15
150	0.1
200	0.075

HOW TO MAKE UP THE **FILTER CODE**

EX.: VEM 0050 V1

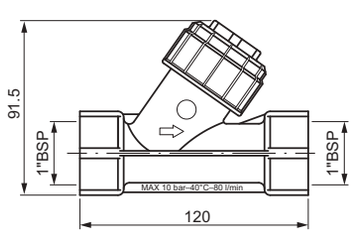


Code	RF inch BSPP	H mm	H1 mm	L mm	LP bar	Q l/min	Cartridge	M mesh	W kg
VEM 0050 V1	1/2"	210	152	105	40	70	XVE M075 B2	60	0.9
VEM 0051 V1							XVE M076 B2	80	
VEM 0075 V1	3/4"	210	152	105	40	95	XVE M075 B2	60	
VEM 0076 V1							XVE M076 B2	80	
VEM 0100 V1	1"	210	152	105	40	140	XVE M075 B2	60	
VEM 0101 V1							XVE M076 B2	80	
VEM 0125 V1	1¼"	270	210	140	30	280	XVE M150 B2	60	1.6
VEM 0126 V1							XVE M151 B2	80	
VEM 0150 V1	1½"	270	210	140	30	315	XVE M150 B2	60	
VEM 0151 V1							XVE M151 B2	80	
VEM 0200 V1	2"	400	318	200	10	750	XVE M300 B2	30	5.6
VEM 0201 V1							XVE M301 B2	60	
VEM 0202 V1							XVE M302 B2	80	
VEM 0250 V1	2½"	400	318	200	10	810	XVE M300 B2	30	
VEM 0251 V1							XVE M301 B2	60	
VEM 0252 V1							XVE M302 B2	80	
VEM 0300 V1	3"	400	318	200	10	1050	XVE M300 B2	30	
VEM 0301 V1							XVE M301 B2	60	
VEM 0302 V1							XVE M302 B2	80	

"Y" STYLE FILTER

VEQ xxGF B3G filter is widely used in all types of nozzles filtering systems. It allows for quick cleaning and replacement with no need of tools.

- Inlet / Outlet thread size: ½" ¾" 1"
- Mesh: 60 Mesh
- Max operation temperature: **LT** 40°C
- Max operation pressure: **LP** 10 bar
- Max capacity: **LQ** 80 l/min
- Materials: Body **D6** PP, chemically bonded fiberglass; Cartridge **B3** AISI 316l Stainless steel
- Typical application: Filtering before spraying liquids





VEQ xxGF B3G



High pressure nozzle + High pressure lance + High pressure gun

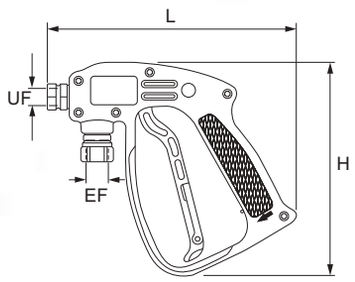
UMW SERIES HIGH PRESSURE GUNS

UMW series spray guns are specially designed for high pressure cleaning. The main features are: light weight and easy to handle, heavy duty durability, high temperatures and high pressures resistant, low failure rate, low price. They can be supplied with a variety of pressure hoses and nozzles for all types of cleaning requirements. UMW spray guns are widely and successfully used in car washing and many other industrial applications.

- Typical applications: Products cleaning; Equipment cleaning; Vehicles cleaning
- Materials — Body: **D4** Nylon, Glassfibers reinforced
  Inside parts: **B1** AISI 303 Stainless steel; **C3** AISI 440 Stainless steel, hardened; **T1** Brass



UMW 0010 D4



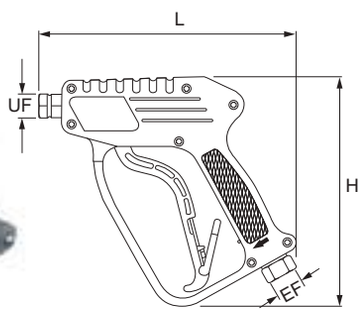
UMW 0010 D4 series economical and efficient spray guns are widely applied in industrial high pressure cleaning and car wash.

- Nominal pressure 200 bar
- Max operation pressure **LP** 220 bar
- Max operation temperature **LT** 160 °C
- Max capacity **LQ** 30 l/min

Code	Inlet thread size EF	Outlet thread size UF	H mm	L mm	W kg
UMW 0010 D4	3/8"	1/4"	162	185	0.27



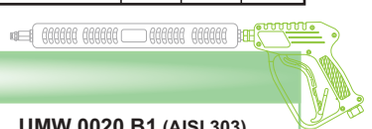
UMW 0020 D4



UMW 0020 D4 guns are suitable for heavy duty applications. They are light and have an ergonomical easy-grip handle. These spray guns are highly appreciated for operations requiring high pressure and large capacity.

- Nominal pressure 310 bar
- Max operation pressure **LP** 350 bar
- Max operation temperature **LT** 160 °C
- Max capacity **LQ** 40 l/min

Code	Inlet thread size EF	Outlet thread size UF	H mm	L mm	W kg
UMW 0020 D4	3/8"	1/4"	183	202	0.78



HIGH PRESSURE GUNS

Code	UMW 0020 D4 (Brass) Standard high pressure gun	UMW 0021 D4 (Brass) Swivel high pressure gun	UMW 0020 B1 (AISI 303) Sanitary high pressure gun
Appearance			
Code	UMW 0020 D4	UMW 0021 D4	UMW 0020 B1
Inlet thread size	3/8" BSP Female	3/8" BSP Female	3/8" BSP Female
Outlet thread size	1/4" BSP Female	1/4" BSP Female	1/4" BSP Female
Max operating pressure	350 bar	280 bar	280 bar
Max operating temperature	160°C	160°C	160°C
Max capacity	40 l/min	40 l/min	40 l/min
Inner parts	Brass	Brass	AISI 303
Outside shell	PP, chemically bonded fiberglass	PP, chemically bonded fiberglass	PP, chemically bonded fiberglass
Weight	0.78 kg	0.78 kg	0.83 kg
Swivel	✕	✓	✕
Security lock	✓	✓	✓

HIGH PRESSURE LANCE

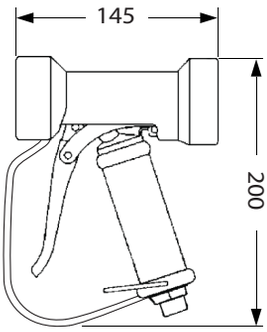
Appearance			
Code	**UMW 0038 A8**	**UMW 0045 B2**	**UMW 0047 B2**
Liquid inlet diameter	1/4" BSPT Male	1/4" BSPT Male	1/4" BSPT Male
Liquid outlet diameter	1/4" BSP Female	1/4" BSP Female	1/4" BSP Female
Max operating pressure	280 bar	280 bar	200 bar
Max operating temper.	160°C	160°C	160°C
Spray lance	Zinc coated steel	AISI 304	AISI 304
Shank	Brass	AISI 303	AISI 303
Plastic material	PP, chemically bonded fiberglass	PP, chemically bonded fiberglass	PP, chemically bonded fiberglass
Length	380 mm	1200 mm, 1500 mm 1700 mm, 2000 mm	700 mm
Weight	0.4 kg	0.9 kg, 1.1 kg, 1.3 kg, 1.4 kg	0.56 kg

HIGH PRESSURE NOZZLES

Appearance			
Code	**F series high pressure nozzles**	**UMW 0050 B2**	**UMW 0060 D2**
Spray pattern	Straight / Flat fan (Fixed)	Straight / Flat fan (Free)	High pressure water (360°)
Spray angle	0°, 15°, 25°, 40°, 65°	0° ~ 40°	40°
Capacity	3.4 ~ 68.2 l/min at 100 bar	10.3 l/min at 100 bar	6.86 ~ 18.1 l/min at 100 bar
Thread size	1/4" BSP Male	1/4" BSP Female	1/4" BSP Female
Min operating pressure	--	--	80 bar
Max operating pressure	500 bar	280 bar	250 bar
Max operating temper.	600°C	90°C	100°C
Nozzle material	AISI 416	AISI 420	AISI 420
Shank	--	Brass	Brass
Plastic material	--	PP, chemically bonded fiberglass	PP, chemically bonded fiberglass

UMV (HOT WATER SPRAY GUN)





UMV 2210 xx

The versatility of this washgun is enhanced from the additional model UMV 2211 xx, which can be fitted with nozzles or different lances through its 1/2" male thread. The three different lance models shown are easily fitted to the gun body with a 1/2" male nipple and offer the following choices of operation:

1 Foaming machines and equipment prior to washing operations. The foam lance comes with a quick connect female coupling, and a matching coupling must be fitted at the gun outlet.

2 General purpose 1/4" female thread outlet, 1/4" male thread inlet. Available both with heat protection sleeve, or zincplated steel. The general purpose lance needs a connection nipple 1/4" fem to 1/2" female to be fitted on the gun.

HOT WATER WASHING GUN

The UMV series washgun has been designed primarily to avoid hot water waste, while assuring very comfortable operation conditions. Its thick rubber casing not only effectively protects the operator's hand from the discomfort of hot water but also assures an excellent protection in case the washgun is dropped or falls to the ground since it avoids any damage to the tiles or the equipment. The careful design, mainly used for the food industry, also includes a grease and detergent resistant quality rubber, plus a blue colour has been chosen as a visual aid to be seen clearly against a white or clear foreground. The trigger is lined too, and can be held in the open position by means of a lock-ring. The spray pattern can be adjusted continuously between a closed straight jet to a wide angle spray, so that the proper spray pattern can be choosen for each individual job.

Materials

Body	T2 Brass casting, chrome plated
	B31 AISI 316L Stainless steel
Lining	E0 EPDM
Steam	B3 AISI 316 Stainless steel
Trigger	B3 AISI 316 Stainless steel, rubber lined

Technical data

Hose shank	13 mm
Weight	0.9 kg
Max temperature	95° C
Max pressure	24 bar

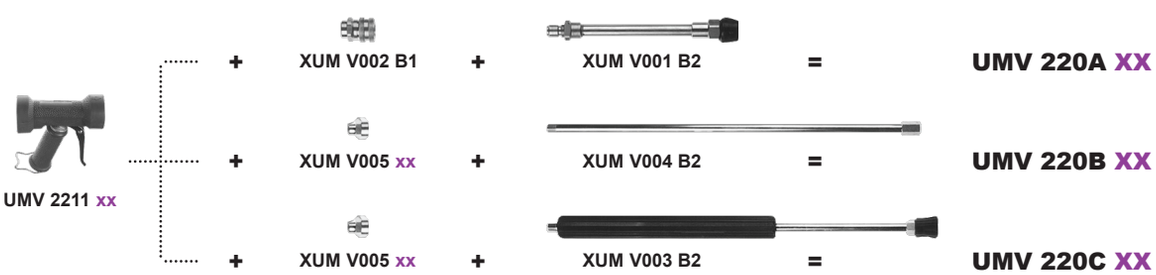
Performance

21 lpm @ 3 bar UMV 2210
61 lpm @ 3 bar UMV 2211

UMW series hot water spray guns
Functional spray guns match front shut-off extensions for foam, hot water and general use.

Code	Features
UMV 2210 xx	Standard, adjustable jet
UMV 2211 xx	With 1/2" male quick thread, without lance
UMV 220A xx	With foam lance
UMV 220B xx	With 1/4" female outlet, bare lance
UMV 220C xx	With 1/4" female outlet, heat protected lance

Please note that codes endind with (xx) must be completed with the code of the material, substituting the (xx) with the code T2 for crome plated brass or B31 for AISI 316L stainless steel.



Single components

Code	Components
XUM V001 B2	Foam lance, AISI 304
XUM V002 B1	Quick connect coupling for foam lance, 1/2" F, AISI 303
XUM V003 B2	Universal lance, 1/4" F out, heat protenction, AISI 304
XUM V004 B2	Universal lanca, 1/4" F out, AISI 304
XUM V005 xx	Nipple, 1/4" F x 1/2" F

Please note that codes endind with (xx) must be completed with the code of the material, substituting the (xx) with the code T8 for nichel plated brass or B31 for AISI 316L stainless steel.

HOT WATER SPRAY GUN ACCESSORIES



FLEXIBLE HOSE

This hose has been selected to be used with all models of UMV hot water spray-gun as it's made in top quality EPDM to outwear oil, high temperatures, high pressures and assure a long service life. Inlet and outlet ends are provided with female quick couplings for easy assembly and safety.

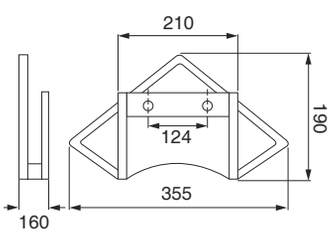
- **Max working temperature** **LT** 160°C
- **Max working pressure** **LP** 8 bar
- **Materials** Hose **E0** EPDM
  Couplings **B3** AISI 316 Stainless steel

Code	**Size** (inch)	**Hose length** (m)
XUM VT25 E0	1/2"	25
XUM VT20 E0	3/4"	20

HOSE STAND

XUM quick couplings are hot water spray gun accessories. It is convenient to assemble nozzle and spray gun. Please refer to below table for model no.

- **Material** **B2** AISI 304 Stainless steel



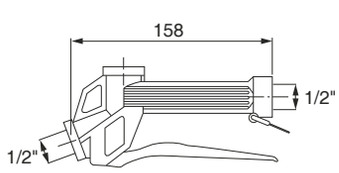


XUM US10 B2

PORTABLE WATER SPRAY GUN

UMS portable water spray-guns are widely used in industry. They have a lock ring to fix the handle while operating for a comfortable long use. The gun has a 1/2" female thread for nozzles assembly. The most common applications of this spray-gun are:
(1) Blowing off of water and surface dust with a UEA 0525 E31 air nozzles
(2) Parts and environment cleaning with suitable flat fan nozzles
(3) Liquid filling or packing with proper complementary accessories

- **Typical applications** Product cleaning
  Liquid addition
  Air spray gun
- **Inlet / Outlet thread size** 1/2" BSP
- **Max working temperature** **LT** 100°C
- **Max working pressure** **LP** 50 bar
- **Max capacity** **LQ** 70 l/min
- **Weight** **W** 0.17 / 0.25 kg
- **Materials** Inner parts **B1** AISI 303 Stainless steel
  Inside seal **E7** Viton
  Outside shell **E3** Acetalic resin





with flat fan nozzle



with lance



with **UEA 0525 E31** air nozzle

UMU A / B (MANUAL REWIND HOSE REELS)



UMU AD20 B2HSB
Spray gun is not included

UMU A/B - MANUAL REWIND HOSE REELS

UMU A/B models are basic manual rewind hose reels. The hose can be pull out to the desired length, oriented for release and safely returned into initial position after use. It can be assembled on a mobile cart or fixed to floor, wall or ceiling. Its construction is industrial grade, it's safe for operators, wear-resistant, and leak-free. They are specially designed for swivel nozzles and can be customized in length, materials, operating pressure and temperature to satisfy your requirements.

- **Typical applications** food factories, washing lines, car wash
- **Inlet thread size** 1/2", 1"
- **Outlet thread size** 1/2", 1"
- **Flexible hose size** 3/8", 1/2", 1"
- **Max hose length** 70 M
- **Max working pressure** **LP** 200 bar
- **Material** Body **B2** AISI 304 Stainless steel

Code	LP bar	E inch	U inch	DI mm	MF inch	LF m	W kg	DE mm	H mm	S mm	Swivel code
UMU BF10 B2LSB	20	1"	1"	20	1"	10	12	500	460	270	on request
UMU BF20 B2LSB					1"	20	13	500	460	340	
UMU AC20 B2HSB	200	1/2"	1/2"	10	3/8"	20	9	390	330	300	
UMU AD20 B2HSB					1/2"	20					
UMU BC50 B2HSB					3/8"	50	12	500	460	270	
UMU BD35 B2HSB					1/2"	35					
UMU BC70 B2HSB					3/8"	70	13	500	460	340	
UMU BD50 B2HSB					1/2"	50					

UMU G / H (AUTO - REWIND HOSE REELS)



UMU HD20 B2HSB

UMU G/H - AUTO-REWIND HOSE REELS

UMU G/H models are auto-rewind hose reels with multi-position release, very useful and practical for frequent cleaning operations. The hose can be easily pulled out from the reel for the desired length and locked in place during use. When washing is completed, a short further pull activates a spring powered automatic rewind mechanism that returns the hose onto the reel. It's suitable for a variety of industrial environments, wear-resistant, robust in construction and designed to mount floor, wall, ceiling or cart.

- **Typical applications** food factories, washing lines, car wash
- **Inlet thread size** 1/2", 1"
- **Outlet thread size** 1/2", 1"
- **Flexible hose size** 3/8", 1/2", 3/4", 1"
- **Max hose length** 20 M
- **Max working pressure** **LP** 200 bar
- **Material** Body **B2** AISI 304 Stainless steel

Code	LP bar	E inch	U inch	DI mm	MF inch	LF m	W kg	DE mm	H mm	S mm	Swivel code
UMU HE13 B2LSB	20	1"	1"	20	3/4"	13	18	530	550	300	XUM US20 B2
UMU HF08 B2LSB					1"	8	18				
UMU HE18 B2LSB	20	1"	1"	20	3/4"	18	24	530	550	480	XUM US22 B2
UMU HF15 B2LSB					1"	15	24				
UMU GD15 B2HSB	200	1/2"	1/2"	10	1/2"	15	13	550	430	230	XUM US15 B2
UMU GD20 B2HSB					1/2"	20	18	550	430	260	XUM US20 B2
UMU HC20 B2HSB					3/8"	20	18	530	550	300	
UMU HD20 B2HSB					1/2"	20	18	530	550	300	

(AUTO - REWIND ADJUSTABLE HOSE REELS) UMU L / K

UMU L/K - AUTO-REWIND ADJUSTABLE HOSE REELS

UMU L/K models are hose reels with spring powered automatic rewind and adjustable release, suitable for industrial environments requiring efficient cleaning power. They provide quick hose direction and retraction, are wear-resistant, leak-free and handy to use. The hose can be pulled to the desired length and locked in place during use. When operation is completed, a short further pull activates a spring powered automatic rewind mechanism that returns the hose onto the reel.
UMU L/K hose reels are specially designed for swivel nozzles and can be customized in length, materials, operating pressure and temperature to satisfy your requirements.

- **Typical applications** food factories, washing lines, car wash
- **Inlet thread size** 1/2", 1"
- **Outlet thread size** 1/2", 1"
- **Flexible hose size** 1/2", 3/4", 1"
- **Max hose length** 20 M
- **Max working pressure** **LP** 200 bar
- **Material** Body **B2** AISI 304 Stainless steel



UMU KD20 B2HSB

Code	LP bar	E inch	U inch	DI mm	MF inch	LF m	W kg	DE mm	H mm	S mm	Swivel code
UMU LE13 B2LSB	20	1"	1"	20	3/4"	13	18	530	550	300	XUM US20 B2
UMU LF08 B2LSB					1"	8	18				
UMU LE18 B2LSB	20	1"	1"	20	3/4"	18	24	530	550	480	XUM US22 B2
UMU LF15 B2LSB					1"	15	24				
UMU KD15 B2HSB	200	1/2"	1/2"	10	1/2"	15	13	500	480	250	XUM US15 B2
UMU KD20 B2HSB						20	18	500	480	280	XUM US20 B2

(LARGE CAPACITY AUTO - REWIND HOSE REELS) UMU J / I

UMU J/I - LARGE CAPACITY AUTO-REWIND HOSE REELS

UMU J/I large capacity auto-rewind hose reels are recommended for working environments requiring a large capacity. UMU J/I reels have been designed to hold flexible and long hoses up to 40 meters (depending on hose diameter), and have a double retraction spring that ensure a quick and reliable hose auto-rewinding.
They are robust, wear-resistant, leak-free, powerful and adjustable. Ideal to clean long tunnels or machines from a single water feed point. They can be customized in length, materials, operating pressure and temperature to satisfy your requirements.

- **Typical applications** food factories, washing lines, car wash
- **Inlet thread size** 1/2", 1"
- **Outlet thread size** 1/2", 1"
- **Flexible hose size** 3/8", 1/2", 3/4", 1"
- **Max hose length** 40 M
- **Max working pressure** **LP** 200 bar
- **Material** Body **B2** AISI 304 Stainless steel



UMU ID40 B2HSB
Spray gun is not included.

Code	LP bar	E inch	U inch	DI mm	MF inch	LF m	W kg	DE mm	H mm	S mm	Swivel code
UMU JE30 B2LSB	20	1"	1"	20	3/4"	30	40	530	550	520	Please contact our sales
UMU JF25 B2LSB				20	1"	25					
UMU ID25 B2HSB	200	1/2"	1/2"	10	1/2"	25	26	530	550	370	
UMU IC40 B2HSB				10	3/8"	40	36				
UMU ID40 B2HSB				10	1/2"	40	36	530	550	420	

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DISCOVER OUR CERTIFICATIONS

CLIP-ON NOZZLES



Diversified manufacturing is a competitiveness key-factor today. PNR Italy manufactures several diversified products to meet all costumers' needs and help them achieve their production targets. Its complete product range includes clip-on nozzles which now widely used by European and American automobile manufacturers. In the automobile industry the coating lines and 3C lines are representative of diversified production requiring timely adjustments of nozzles spray direction and coverage. Moreover, in such operating environments, nozzles must be regularly cleaned and serviced to ensure high quality coating. To satisfy such requirements PNR has developed cutting-edge quality products to enhance the productivity and competitiveness of the production plant. PNR clip-on adjustable nozzles, made with innovative design and in top quality materials, shorten installation, adjustment and servicing times to the benefit of production efficiency. These nozzles are installed on pipes and can be rapidly released and changed at any time or easily adjusted to different production conditions. PNR clip-on nozzles fully comply with below specifications.





P.104
ZPF
Swivel nozzle clamp



P.104
ZPQ
Cam & lever clamp



P.105
ZPL
Single spring pipe clamp



P.105
ZPL
Double spring pipe clamp



P.106
ZLF
Threaded nipple



P.106
ZBA Threaded sphere



P.106
ZBA Quick-fit sphere



P.109
HG Flat fan nozzle



P.109
RG Hollow cone nozzle



P.54
Threaded nozzle



P.110
KS
Quick-fit spoon nozzle



P.110
HT
Quick-fit nozzle



P.105
VAB Plastic locknuts & Tool

(SWIVEL NOZZLE CLAMPS) ZPF

SWIVEL NOZZLE CLAMPS

ZPF swivel clamps are specially designed for HGQ, RGN and ZBA series. To install them on pipes all you need is drill a hole, insert the nozzle clamp inside and fasten it with a simple screwdriver. The nozzle clamp body is in PP chemically bonded fibreglass whereas accessorial bolts and screws are made in stainless steel AISI 316. They are robust, easy to install, adjust and service and their design revolutioned modern surface pre-treatment plants. They provide excellent performance at high temperatures and easy spray jet orientation.

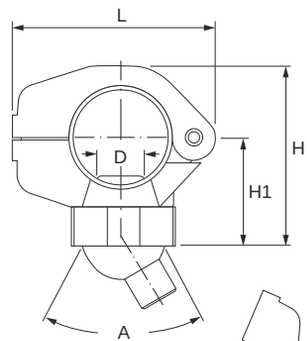
- **Typical application** Cleaning equipment used in pre-treatment for coating process
- **Max working temperature** **LT** 80°C
- **Max working pressure** **LP** 5 bar
- **Materials** Body **D6** PP, chemically bonded fiberglass
  Pin & bolt **B3** AISI 316 Stainless steel
  O-ring **E8** NBR

Code	PS inch	PD mm	D mm	H mm	H1 mm	L mm	A deg	W g
ZPF A125 D6	1¼"	41/43	20.0	83	54	84	40°	85
ZPF B125 D6			17.0					
ZPF C125 D6			14.0					
ZPF A150 D6	1½"	46/49	20.0	90	57	90	40°	88
ZPF B150 D6			17.0					
ZPF C150 D6			14.0					

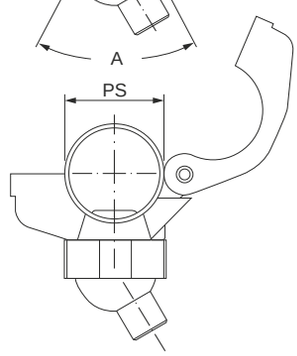
HOW TO MAKE UP THE PRODUCT CODE **EX.: ZPF A125 D6**

ZPF A125 D6
- ZPF — SWIVEL NOZZLE PIPE CLAMPS
- A125 — CODE
- D6 — MATERIAL

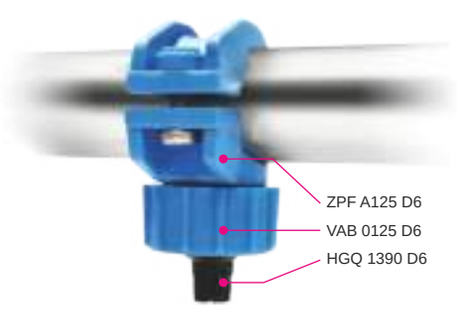
● **D6** - PP, chemically bonded fiberglass











CLIP-ON NOZZLES

(SWIVEL NOZZLE CAM AND LEVER CLAMPS) ZPQ

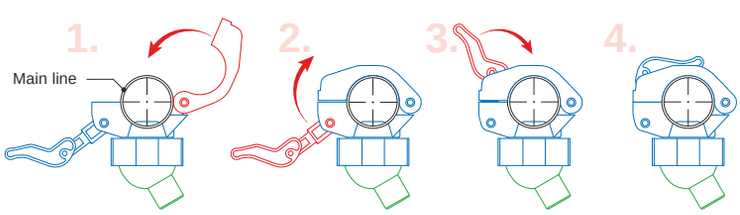
SWIVEL NOZZLE CAM AND LEVER CLAMPS

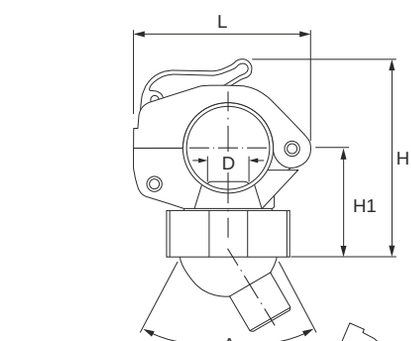
ZPQ cam and lever clamps are specially designed for HGQ, RGN and ZBA ball nozzles. Only three steps to install them on a pipe: drill a hole, wrap the cam around the pipe and pull the lever down to block it. No need of tools. The body is in PP chemically bonded fibreglass whereas accessorial bolts and screws are made in stainless steel AISI 316. ZPQ swivel nozzles with cam and lever clamps provide excellent performance at high temperatures and easy spray jet orientation.

- **Common application** Surface pre-treatment plants
- **Max working temperature** **LT** 80°C
- **Max working pressure** **LP** 5 bar
- **Materials** Body **D6** PP, chemically bonded fiberglass
  Pin & bolt **B3** AISI 316 Stainless steel
  O-ring **E8** NBR
  Seal **D22** Soft polypropylene

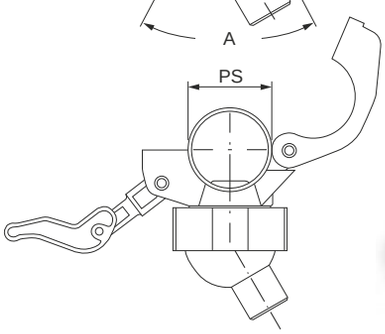
Code	PS inch	PD mm	D mm	H mm	H1 mm	L mm	A deg	W g
ZPQ A125 D6	1¼"	42/43	20.0	93	41	84	40°	87
ZPQ B125 D6			17.0					
ZPQ A150 D6	1½"	48/49	20.0	96	44	95	40°	97
ZPQ B150 D6			17.0					

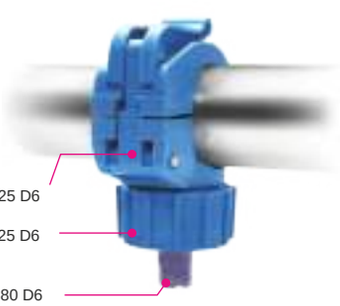
HOW TO INSTALL THE SWIVEL NOZZLE CAM & LEVER CLAMPS







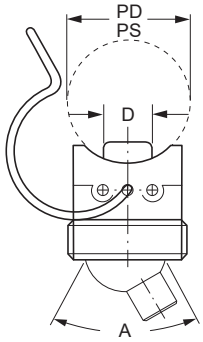




ZPL (SWIVEL NOZZLE SPRING PIPE CLAMPS)

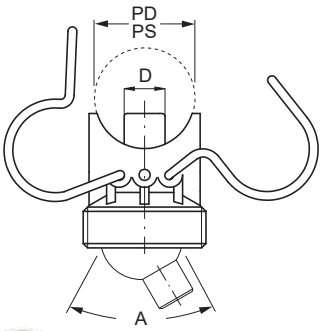


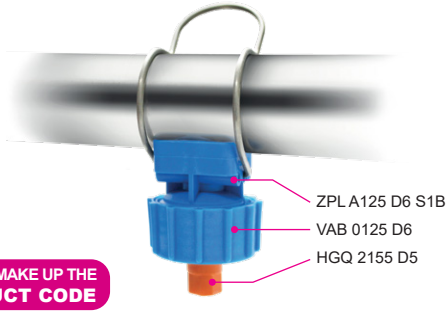
ZPL Single spring





ZPL Double spring
Better stability





SWIVEL NOZZLE SPRING PIPE CLAMPS

ZPL pipe clamps are specially designed for swivel ball nozzles. Drill a hole and fix the clamp with one screw. Body is made of fibreglass reinforced PP, screw and spring in AISI 316L (or AISI 302). ZPL swivel nozzles work under high temperature and high degree of intensity. ZPL swivel nozzle pipe clamps are widely used in surface pre-treatment.

- **Typical application** — Cleaning equipment used in pre-treatment for coating process
- **Max working temperature** **LT** 80°C
- **Max working pressure** — Single spring 3 bar; Double spring 7 bar
- **Materials**
  - Body: **D6** PP, chemically bonded fiberglass
  - Spring: **N1** AISI 302 Stainless steel; **B31** AISI 316L Stainless steel
  - O-ring: **E8** NBR

Codice	PS		PD	D	A
	poll	DN	mm	mm	deg
ZPL A100 D6 XYZ	1"	DN25	33.4	20.0	40°
ZPL B100 D6 XYZ	1"	DN25	33.4	17.0	40°
ZPL C100 D6 XYZ	1"	DN25	33.4	14.0	40°
ZPL A101 D6 XYZ	1"	DN25	32.0	20.0	40°
ZPL B101 D6 XYZ	1"	DN25	32.0	17.0	40°
ZPL C101 D6 XYZ	1"	DN25	32.0	14.0	40°
ZPL A125 D6 XYZ	1¼"	DN32	42.2	20.0	40°
ZPL B125 D6 XYZ	1¼"	DN32	42.2	17.0	40°
ZPL C125 D6 XYZ	1¼"	DN32	42.2	14.0	40°
ZPL A126 D6 XYZ	1¼"	DN32	40.0	20.0	40°
ZPL B126 D6 XYZ	1¼"	DN32	40.0	17.0	40°
ZPL C126 D6 XYZ	1¼"	DN32	40.0	14.0	40°
ZPL A150 D6 XYZ	1½"	DN40	48.3	20.0	40°
ZPL B150 D6 XYZ	1½"	DN40	48.3	17.0	40°
ZPL C150 D6 XYZ	1½"	DN40	48.3	14.0	40°
ZPL A151 D6 XYZ	1½"	DN40	50.0	20.0	40°
ZPL C151 D6 XYZ	1½"	DN40	50.0	14.0	40°
ZPL A200 D6 XYZ	2"	DN50	60.3	20.0	40°
ZPL B200 D6 XYZ	2"	DN50	60.3	17.0	40°
ZPL C200 D6 XYZ	2"	DN50	60.3	14.0	40°
ZPL A201 D6 XYZ	2"	DN50	63.0	20.0	40°
ZPL B201 D6 XYZ	2"	DN50	63.0	17.0	40°
ZPL C201 D6 XYZ	2"	DN50	63.0	14.0	40°

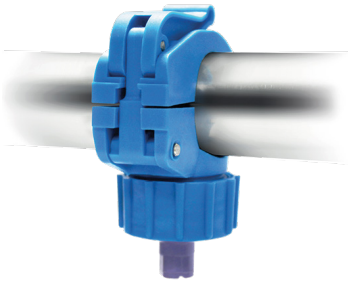
HOW TO MAKE UP THE PRODUCT CODE

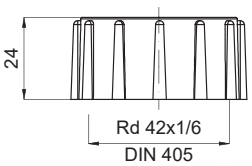
ZPL A 100 D6 X Y Z

- **VERSION**: **B** - New version
- **SPRING NUMB.**: **1** - Single spring; **2** - Double spring
- **SPRING MAT.**: **S** - AISI 302 Stainless steel; **A** - AISI 316L Stainless steel
- **MATERIAL**: **D6** - PP, chemically bonded fiberglass
- **PIPE DIAM.**: **100** - Ø 33.4 mm; **101** - Ø 32.0 mm; **125** - Ø 42.2 mm; **126** - Ø 40.0 mm; **150** - Ø 48.3 mm; **151** - Ø 50.0 mm; **200** - Ø 60.3 mm; **201** - Ø 63.0 mm
- **NIPPLE DIAM.**: **A** - Ø 20 mm; **B** - Ø 17 mm; **C** - Ø 14 mm
- **CLAMP TYPE**

VAB (PLASTIC LOCKNUTS)







ZPQ
Swivel nozzle pipe clamps



HG
Plastic swivel ball nozzle



VAB
Plastic locknut

PLASTIC LOCKNUTS

VAB plastic locknuts are exclusively designed for ball nozzles. Their special thread and shape allow to assemble the cap and by hand, with no need of tools, thus making all servicing operations easier and quicker. They are made of high quality PP or chemically bonded fibreglass to keep stability at high temperatures and offer the best resistance to chemicals.

- **Material** **D6** PP, chemically bonded fiberglass
- **Max working temperature** **LT** 80°C

HOW TO MAKE UP THE PRODUCT CODE Es.: VAB 0125 D6

VAB 0125 D6

- **MATERIAL**: **D6**- PP, chemically bonded fiberglass
- **CODE**
- **LOCKNUT**

(SWIVEL NOZZLE THREADED NIPPLE) ZLF

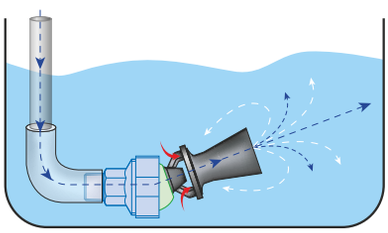
SWIVEL NOZZLE THREADED NIPPLE

ZLF series threaded nipples offer another convenient type of installation for swivel ball nozzles. They are made of fibreglass reinforced PP. ZLF series work under high temperature and high degree of intensity. ZLF threaded nipples are widely used in surface pre-treatment.

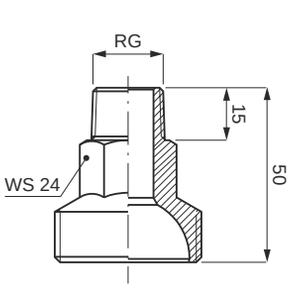
- **Typical application** Cleaning equipment used in pre-treatment for coating process
- **Material** **D6** PP, chemically bonded fiberglass

Code	RG poll BSPT	RG poll NPT	W g
ZLF A038 D6	3/8"	-	15
ZLF B038 D6	-	3/8"	
ZLF A050 D6	1/2"	-	
ZLF B050 D6	-	1/2"	

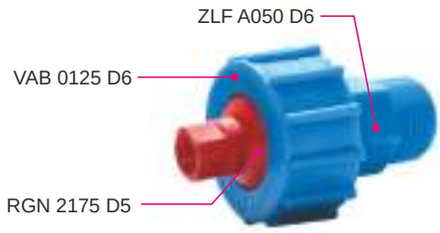
- **Max working temperature** **LP** 4 bar
- **Max working temperature** **LT** 80°C

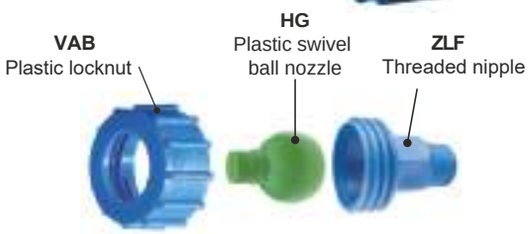


ZLF threaded nipples offer the best mixing effect and are often used in combination with UPB mixing eductors.









CLIP-ON NOZZLES

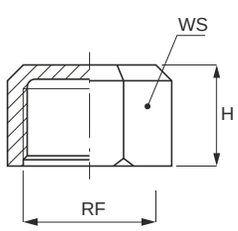
(PLASTIC END CAPS) VAE

PLASTIC END CAPS

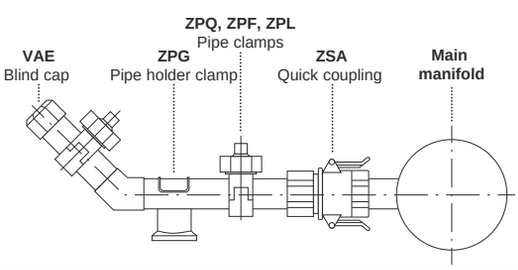
VAE plastic caps are specially used to close pipes ends. Besides, 1 1/4" VAE 1250 D6 plastic caps can be used to seal pipes ends when, to manufacture different size products, it's necessary to reduce the quantity of swivel nozzles. They are made of high quality PP or chemically bonded fibreglass to keep stability at high temperatures and offer the best resistance to chemicals. They are widely used in surface pre-treatment.

Code	RF poll	H mm	CH mm
VAE 1000 D6	1"	25	42
VAE 1250 D6	1 1/4"	32	52
VAE 1500 D6	1 1/2"	32	60

- **Material** **D6** PP, chemically bonded fiberglass
- **Max working temperature** **LT** 80°C







(THREADED AND QUICK-FIT SPHERES) ZBA

THREADED AND QUICK-FIT SPHERES

ZBA swivel nozzles are produced with three different types of connections: threaded, quick-fit and blind hole.
The threaded nozzles are assembled to threaded swivel joints. The quick-fit types are designed for HTQ/KSQ quick-fit flat fan nozzles whereas the blind hole models are specially used in spraying processes requiring changes and pauses.

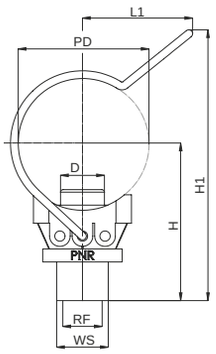
Code	Connection			Type	L	D	H
	RF/RG	M/F	BSP/NPT		mm	mm	mm
ZBA 0000 D5x	Cieca	---	---	---	35.0	17.5	27.5
ZBA 0039 D5	3/8"	M	BSP	Mobile	35.0	20.0	27.3
ZBA GAT1 D5x	1/8"	F	BSP	Mobile	35.0	20.0	27.3
ZBA GBT1 D5x	1/4"	F	BSP	Mobile	35.0	20.0	27.3
ZBA GCT1 D5x	3/8"	F	BSP	Mobile	35.0	20.0	27.3
ZBA GDT1 D5x	1/2"	F	BSP	Mobile	35.0	20.0	27.3
ZBA NAT1 D5x	1/8"	F	NPT	Mobile	35.0	20.0	27.3
ZBA NBT1 D5x	1/4"	F	NPT	Mobile	35.0	20.0	27.3
ZBA NCT1 D5x	3/8"	F	NPT	Mobile	35.0	20.0	27.3
ZBA NDT1 D5x	1/2"	F	NPT	Mobile	35.0	20.0	27.3
ZBA GAT2 D5x	1/8"	F	BSP	Fixed	27.4	26.0	35.1
ZBA GBT2 D5x	1/4"	F	BSP	Fixed	27.4	26.0	35.1
ZBA GCT2 D5x	3/8"	F	BSP	Fixed	27.4	26.0	35.1
ZBA GDT2 D5x	1/2"	F	BSP	Fixed	27.4	26.0	35.1
ZBA QQN2 D6	Quick	---	---	Mobile	35.0	23.4	27.0



ZPN (SPRING PIPE CLAMPS)

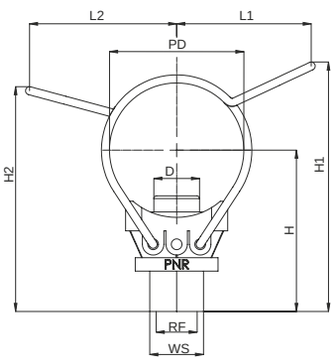


ZPN Single spring





ZPN Double spring
Better stability





ZPN MINI Single spring



SPRING PIPE CLAMPS

ZPN spring clamps provide quick connection of 3/8" and 1/2" male threaded nozzles to 1 1/2" pipes. Geometrical characteristics of ZPN are same as ZPL in connection pipe side. Single or double spring versions are available. ZPN pipe clamps are widly used in pre-treatment for coating process.

- **Typical application** — Cleaning equipment used in pre-treatment for coating process
- **Max working temperature** — **LT** 80°C
- **Max working pressure** — Single spring 3 bar; Double spring 7 bar
- **Material** — Body: **D6** PP, chemically bonded fiberglass; Spring: **N1** AISI 302 Stainless steel, **B31** AISI 316L Stainless steel; O-ring: **E8** NBR

MINI SPRING PIPE CLAMPS

ZPN MINI spring clamps provide quick connection of 1/8", 1/4", 3/8" and 1/2" female threaded to 1/2", 3/4" and 1" pipes. It's enough make one hole on pipe, insert the clamp with the seal and fix to pipe with the spring. Up to now, only single spring model is available. Models are made of different colours, depending on pipe size (yellow clamp for pipe size 1/2", green clamp for pipe size 3/4", blue clamp for pipe size 1").

- **Typical application** — Cleaning equipment used in pre-treatment for coating process
- **Max working temperature** — **LT** 80°C
- **Max working pressure** — **LP** 5 bar
- **Material** — Body: **D6** PP, chemically bonded fiberglass; Spring: **B3** AISI 316 Stainless steel; O-ring: **E8** NBR

Code and dimension for ZPN

Code	RF	PS		PD	D	WS
	poll	poll	DN	mm	mm	mm
ZPN B151 D6C1	3/8" F	1 1/2"	DN40	48.2 - 50.0	17.0	20
ZPN B151 D6D1	1/2" F	1 1/2"	DN40	48.2 - 50.0	17.0	26
ZPN B151 D6C2	3/8" F	1 1/2"	DN40	48.2 - 50.0	17.0	20
ZPN B151 D6D2	1/2" F	1 1/2"	DN40	48.2 - 50.0	17.0	26

Code and dimension for ZPN mini

Code	RF	OD	Ød	WS	H	Colour
	poll	poll	mm	mm	mm	
ZPN E050 D6AMA	1/8" F	1/2"	9.00	16	38.0	Yellow
ZPN E050 D6BMA	1/4" F	1/2"	9.00	18	38.0	
ZPN E050 D6CMA	3/8" F	1/2"	9.00	22	38.0	
ZPN E050 D6DMA	1/2" F	1/2"	9.00	24	38.0	
ZPN D075 D6AMA	1/8" F	3/4"	11.0	16	41.0	Green
ZPN D075 D6BMA	1/4" F	3/4"	11.0	18	41.0	
ZPN D075 D6CMA	3/8" F	3/4"	11.0	22	41.0	
ZPN D075 D6DMA	1/2" F	3/4"	11.0	24	41.0	
ZPN F100 D6AMA	1/8" F	1"	13.0	16	45.0	Blue
ZPN F100 D6BMA	1/4" F	1"	13.0	18	45.0	
ZPN F100 D6CMA	3/8" F	1"	13.0	22	45.0	
ZPN F100 D6DMA	1/2" F	1"	13.0	24	45.0	

HOW TO MAKE UP THE PRODUCT CODE ZPN

ZPN B 151 D6 X Y Z

- **SPRING MAT.**: **S** - AISI 302 Stainless steel; **A** - AISI 316L Stainless steel
- **SPRING NUMB.**: **1** - Single spring; **2** - Double spring
- **CONNECTION**: **C** - 3/8" F (BSPP); **D** - 1/2" F (BSPP)
- **MATERIAL**: **D6** - PP, chem. bonded fiberglass
- **PIPE SIZE**: **151** - 1-1/2"
- **NIPPLE DIAM.**: **B** - Ø 17 mm
- **CLAMP TYPE**

HOW TO MAKE UP THE PRODUCT CODE ZPN MINI

ZPN E 050 D6 X Y Z

- **SPRING MAT.**: **A** - AISI 316 Stainless steel
- **VERSION**: **M** - Mini, single spring
- **CONNECTION**: **A** - 1/8" F (BSPP); **B** - 1/4" F (BSPP); **C** - 3/8" F (BSPP); **D** - 1/2" F (BSPP)
- **MATERIAL**: **D6** - PP, chem. bonded fiberglass
- **PIPE SIZE**: **050** - 1/2"; **075** - 3/4"; **100** - 1"
- **NIPPLE DIAM.**: **E** - Ø 9 mm; **D** - Ø 11 mm; **F** - Ø 13 mm
- **CLAMP TYPE**

MINI QUICK-FIT NOZZLES

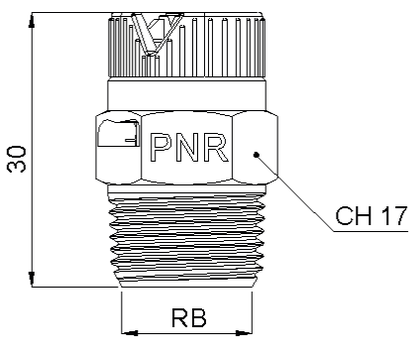
DT/QM full cone spray nozzles and HT/QM flat fan spray nozzles, assembled onto a nipple with 3/8”, 1/4" e 1/8” BSPT connections, offer the convenience of a quick coupling which allows a simple assembly. Moreover, the special seal between nipple and nozzle avoids any risk of leakage. To allow a perfect spray pattern alignment, the spray jet has an offset angle of 10° from the hexagon of the nipple onto which the nozzle is assembled. This type of nozzles are extremely convenient for maintenance and can be quickly replaced in case of clogging. The various flow rates of these nozzles are marked by different colours. They are made in glass fibre-reinforced PP to ensure maximum stability at high temperatures and chemical resistance.

- **Materials** **D6** PP, chemically bonded fiberglass
- **Nipple dim.** 1/8”, 1/4”, 3/8” BSPT
- **Max working temp.** **LT** 95 °C
- **Typical application**

Washing: food cleaning, parts cleaning, filter cloth cleaning, vehicles cleaning
Lubrication: spray of lubricants and release agents
Agriculture: spray of antifouling chemicals
Cooling: product cooling
Other applications: spray of chemicals



DT/QM + Gasket + Nipple HT/QM + Gasket + Nipple



	Code	Capacity at different pressure values (l/min) (bar) 1.0	2.0	3.0	4.0	5.0	Colour
45°	DTx 0780 D6QM	0.45	0.64	0.78	0.90	1.01	Grey
	DTx 1100 D6QM	0.58	0.82	1.00	1.15	1.29	Brown
	DTx 1120 D6QM	0.69	0.98	1.20	1.39	1.55	Black
	DTx 1150 D6QM	0.87	1.22	1.50	1.73	1.94	L. orange
	DTx 1190 D6QM	1.10	1.55	1.90	2.19	2.45	L. green
65°	DTx 1235 D6QM	1.36	1.92	2.35	2.71	3.03	L. yellow
90°	DTx 1294 D6QM	1.70	2.40	2.94	3.39	3.80	Sky blue
	DTx 1370 D6QM	2.14	3.02	3.70	4.27	4.78	White
120°	DTx 1470 D6QM	2.71	3.84	4.70	5.43	6.07	Red
	DTx 1590 D6QM	3.41	4.82	5.90	6.81	7.62	Dark grey
	DTx 1740 D6QM	4.27	6.04	7.40	8.54	9.55	Brown/black
	DTx 2112 D6QM	6.47	9.14	11.2	12.9	14.5	Dark orange

	Code	Capacity at different pressure values (l/min) (bar) 1.0	2.0	3.0	4.0	5.0	Colour
65°	HTx 0780 D6QM	0.45	0.64	0.78	0.78	1.01	Gray
	HTx 1100 D6QM	0.58	0.82	1.00	1.15	1.29	Brown
	HTx 1120 D6QM	0.69	0.98	1.20	1.39	1.55	Black
	HTx 1160 D6QM	0.92	1.31	1.60	1.85	2.07	Orange
	HTx 1190 D6QM	1.10	1.55	1.90	2.19	2.45	L. green
	HTx 1233 D6QM	1.35	1.90	2.33	2.69	3.01	L. yellow
	HTx 1310 D6QM	1.79	2.53	3.10	3.58	4.00	Sky blue
90°	HTx 1390 D6QM	2.25	3.18	3.90	4.50	5.03	White
	HTx 1590 D6QM	3.41	4.82	5.90	6.81	7.62	Dark grey
110°	HTx 1780 D6QM	4.50	6.37	7.80	9.01	10.1	Black/Brown
	HTx 1980 D6QM	5.66	8.00	9.80	11.3	12.7	Purple
	HTx 2117 D6QM	6.75	9.55	11.7	13.5	15.1	Red orange
	HTx 2135 D6QM	7.79	11.0	13.5	15.6	17.4	Lilac
	HTx 2153 D6QM	8.83	12.5	15.3	17.7	19.8	Green
	HTx 2195 D6QM	11.3	15.9	19.5	22.5	25.2	Yellow
	HTx 2230 D6QM	13.3	18.8	23.0	26.6	29.7	Blue
	HTx 2280 D6QM	16.2	22.9	28.0	32.3	36.1	Red

HOW TO MAKE UP THE PRODUCT CODE

DT X 1234 MM QM

- QUICK TYPE: ● **QM** - Mini Quick
- MATERIAL: ● **D6** - PP, chemically bonded fiberglass
- CAPACITY: ● See table
- ANGLE: ● **M** - 45° (DT) ● **R** - 65° (DT, HT) ● **U** - 90° (DT, HT) ● **J** - 110° (HT) ● **W** - 120° (DT)
- NOZZLE TYPE: ● **DT** - Full cone ● **HT** - Flat fan

HOW TO MAKE UP THE PRODUCT CODE

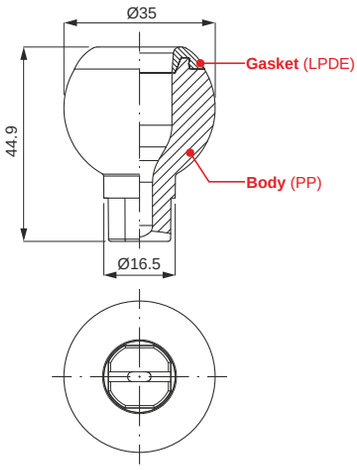
ZHS V 0xx MM QM

- QUICK TYPE: ● **QM** - Mini Quick
- MATERIAL: ● **D6** - PP, chemically bonded fiberglass
- CONNECTION: ● **012** - 1/8” BSPT ● **025** - 1/4” BSPT ● **038** - 3/8” BSPT
- GASKET: ● **V** - Pre-assembled gasket in VITON
- NIPPLE TYPE: ● **ZHS** - Quick connection nipple with thread BSPT

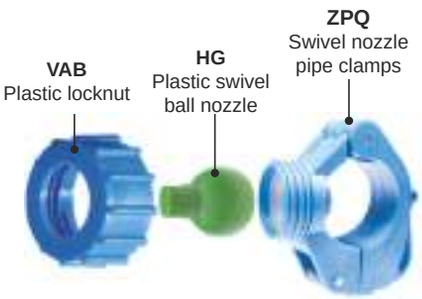
NOTE: each nozzle, both DT/QM and HT/QM, of any capacity, can be mounted on all three types of nipples.

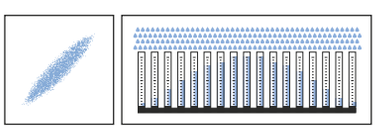


HGQ 2117 D5
Flat fan nozzle









Spray section *Convex distribution*



PLASTIC SWIVEL BALL NOZZLES

HGQ and RGN plastic swivel ball nozzles are designed for diversified applications. They allow an easy adjustment of their spray jet direction and offer a quick-fit connection.

- **Nozzle type** — Flat fan nozzles (HG)
  Hollow cone nozzles (RG)
- **Typical application** — Cleaning equipment used in pre-treatment for coating process
- **Material** — Body **D5** PP, talcum filled
  D6 PP, chemically bonded fiberglass

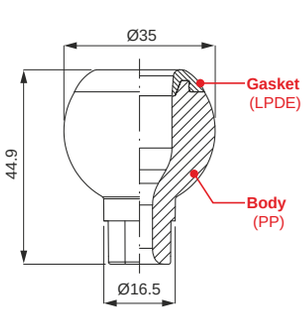
FLAT FAN NOZZLES

HGQ flat fan nozzles feature a 60° spray angle and their wide range of flow rates makes them the best choice in pre-treatment plants. For an easier identification and use, they are made in different colours depending on the flow rate. The material is top quality PP, chemically bonded fibreglass to offer the best stability at high temperatures and resistance to chemicals.

	Code	Capacity at different pressure values (l/min) (bar)						Color	W g
		0.5	0.7	1.0	1.5	2.0	3.0		
60°	HGQ 1390 xx	1.70	2.00	2.40	2.90	3.30	3.90	Black	16
	HGQ 1780 xx	3.18	3.77	4.50	5.52	6.37	7.80	Purple	
	HGQ 1980 xx	4.00	4.70	5.60	6.90	8.00	9.80	Brown	
	HGQ 2117 xx	4.60	5.50	6.50	8.00	9.30	11.7	Yellow	
	HGQ 2135 xx	5.50	6.50	7.80	9.50	11.0	13.5	Grey	
	HGQ 2155 xx	6.20	7.40	8.80	10.8	12.5	15.5	Red	
	HGQ 2195 xx	7.80	9.20	11.0	13.8	15.6	19.5	Green	
	HGQ 2230 xx	9.50	11.3	13.5	16.3	19.1	23.0	Blue	
	HGQ 2270 xx	10.9	12.8	15.4	18.8	21.7	27.0	Sky blue	
	HGQ 2337 xx	13.8	16.4	19.5	24.0	27.7	33.7	White	
	HGQ 2410 xx	16.7	19.8	23.6	29.0	33.5	41.0	Pink	



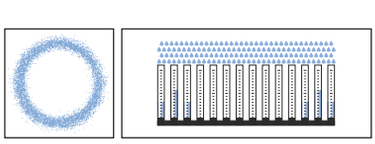
RGN
Hollow cone nozzle



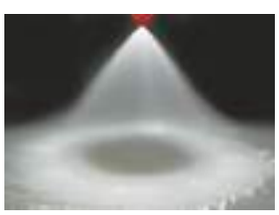
HOLLOW CONE NOZZLES

RGN hollow cone nozzles have a 50° spray angle and offer a wide range of flow rates, all identified by a particular nozzle colour to avoid any possible confusion. The material is top quality PP, chemically bonded fibreglass to offer the best stability at high temperatures and resistance to chemicals. For these features they are widely used in pre-treatment plants.

	Code	Capacity at different pressure values (l/min) (bar)						Color	W g
		0.5	0.7	1.0	1.5	2.0	3.0		
50°	RGN 2175 xx	7.10	8.50	10.1	12.4	14.3	17.5	Red	25
	RGN 2215 xx	8.80	10.4	12.4	15.2	17.6	21.5	Blue	
	RGN 2390 xx	15.9	18.8	22.5	27.6	31.8	39.0	Black	



Spray section *Concave distribution*



HOW TO MAKE UP THE NOZZLE CODE EX.: HGQ 1390 D5

HGQ 1390 D5

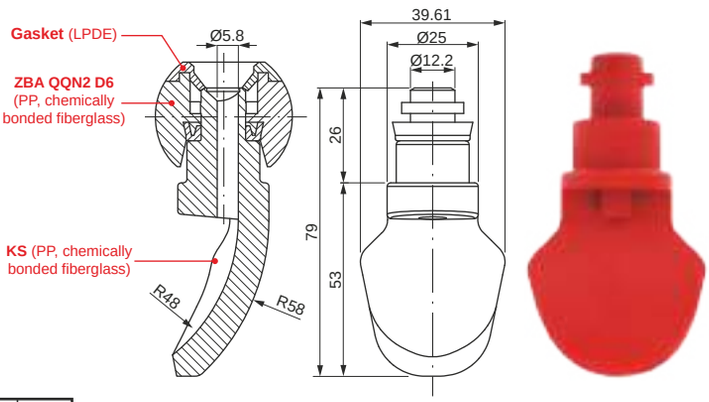
- MATERIAL
  - **D5** - PP, talcum filled
  - **D6** - PP, chemically bonded fiberglass
- CAPACITY
- NOZZLE TYPE
  - **HGQ** - Flat fan nozzles (60°)
  - **RGN** - Hollow cone nozzles (50°)

(FLAT FAN QUICK-FIT SPOON NOZZLES) KS/QQ

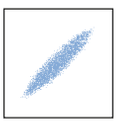
FLAT FAN QUICK-FIT SPOON NOZZLES

KS flat fan quick-fit spoon nozzles produce a flat spray pattern with a 50° or 60° deflection spray angle and offer the highest possible impact for a given feed pressure, up to 60° compared to standard turbulence flat fan nozzles. The innovative design ensures the ideal efficiency for deep cleaning and their quick connection makes them easy to assemble and avoids leakage. The different flow rates are identified by their colours available for proper selection. Materials are high quality PP and chemically bonded fibreglass to keep stability at high temperatures and be chemicals-resistant. These nozzles are widely used in surface pre-treatments.

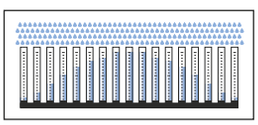
- **Material** PP, chemically bonded fiberglass
- **Typical application** Cleaning equipment used in pre-treatment for coating process



	Code	Capacity at different pressure values (l/min) (bar) 0.5	0.7	1.0	1.5	2.0	3.0	Color	W g
50°	KSN 2155 D6QQS	6.20	7.40	8.80	10.8	12.5	15.5	Red	23
	KSN 2195 D6QQS	7.80	9.20	11.0	13.5	15.6	19.5	Green	
60°	KSQ 2230 D6QQS	9.50	11.3	13.5	16.5	19.1	23.0	Blue	
	KSQ 2270 D6QQS	10.9	12.8	15.4	18.8	21.7	27.0	Sky blue	
	KSQ 2337 D6QQS	13.9	16.4	19.6	24.0	27.7	33.7	White	
	KSQ 2390 D6QQS	15.9	18.8	22.5	27.6	31.8	39.0	Orange	
	KSQ 2410 D6QQS	16.7	19.8	23.6	29.0	33.5	41.0	Pink	
	KSQ 2433 D6QQS	17.7	21.0	25.0	30.6	35.3	43.3	Brown	



Spray section



Convex distribution



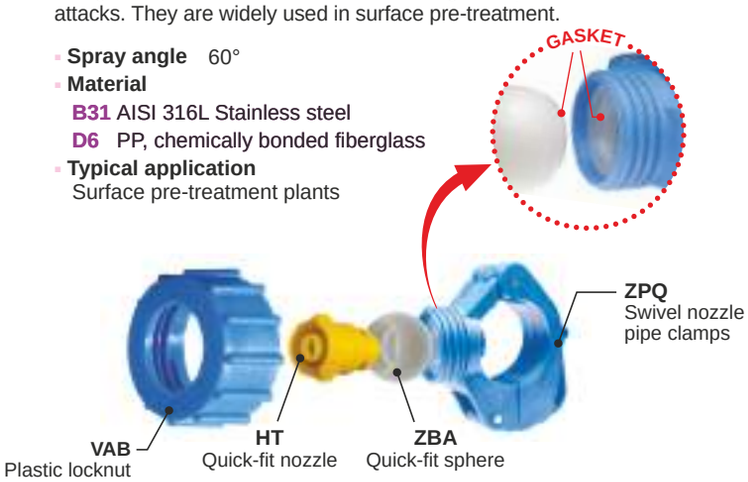
CLIP-ON NOZZLES

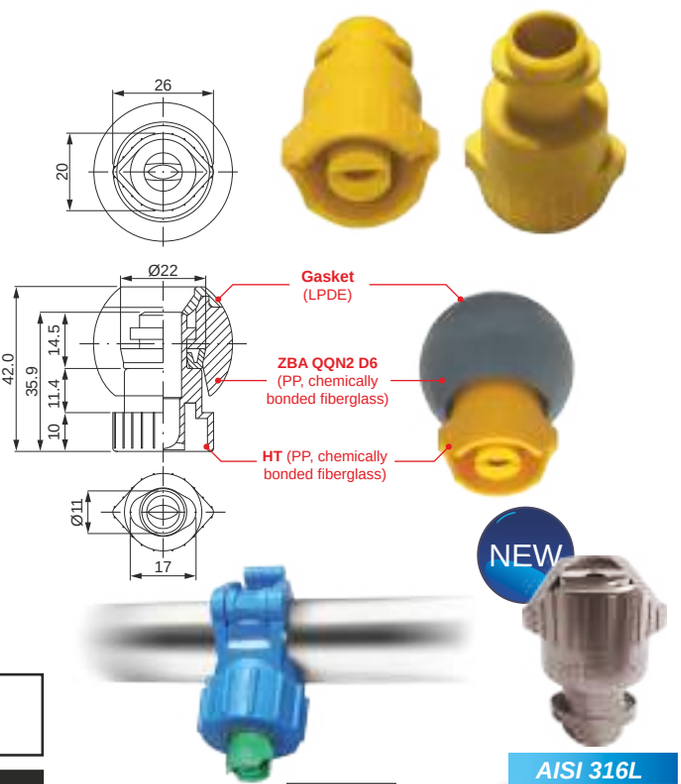
(FLAT FAN QUICK-FIT NOZZLES) HT/QQ

FLAT FAN QUICK-FIT NOZZLES

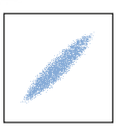
HTQ type flat fan quick-fit nozzles feature 60° spray angle and impact force for a given feed pressure. The new design offers the ideal efficiency for cleaning, quick-fit design for ease of assembly and seal that avoids leakage. Different flow rates are distinguished by color and available for selection. The materials are high quality PP, chemically bonded fiberglass in order to remain stable in high temperature and chemical attacks. They are widely used in surface pre-treatment.

- **Spray angle** 60°
- **Material**
  - **B31** AISI 316L Stainless steel
  - **D6** PP, chemically bonded fiberglass
- **Typical application**
  Surface pre-treatment plants

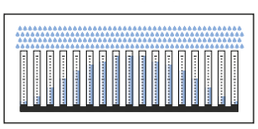




	Code	Capacity at different pressure values (l/min) (bar) 0.5	0.7	1.0	1.5	2.0	3.0	Color
60°	HTQ 1390 xxQQS	1.60	1.90	2.30	2.80	3.20	3.90	Black
	HTQ 1590 xxQQS	2.40	2.80	3.40	4.20	4.80	5.90	Purple
	HTQ 1780 xxQQS	3.20	3.80	4.50	5.50	6.40	7.80	Lilac
	HTQ 2117 xxQQS	4.80	5.70	6.80	8.30	9.60	11.7	Yellow
	HTQ 2153 xxQQS	6.20	7.40	8.90	11.0	12.8	15.3	Red
	HTQ 2195 xxQQS	8.00	9.40	11.3	13.8	15.9	19.5	Green
	HTQ 2230 xxQQS	9.40	11.1	13.3	16.3	18.8	23.0	Blue
	HTQ 2274 xxQQS	11.2	13.2	15.6	19.1	22.4	27.4	Sky blue



Spray section

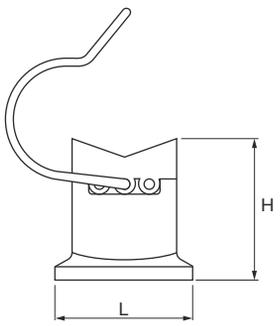


Convex distribution



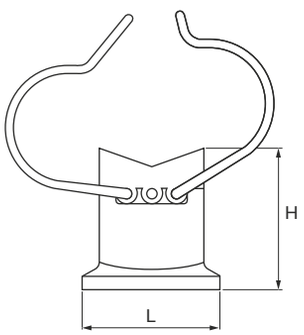


Single spring





Double spring



PIPE HOLDERS

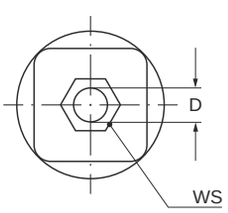
ZPG pipe holders are a user-friendly and convenient solution for fixing spray manifolds onto tunnels walls in surface treatment plants. They are easy to assemble, excellent fastening and low cost. The single spring type is suitable for plastic holder whereas the double spring version is meant for metallic pipe holders.

- **Typical application** Cleaning equipment used in pre-treatment for coating process
- **Pipe size** **PS** 3/4", 1", 1¼", 1½", 2"
- **Materials** Body **D6** PP, chemically bonded fiberglass
  Springs **N1** AISI 302 Stainless steel, heat treated

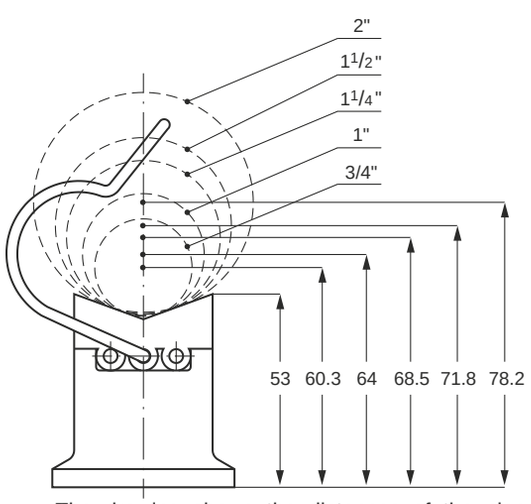
Code		PS	D	H	L	WS	W
Single spring	Double spring	inch	mm	mm	mm	mm	g
ZPG 1075 D6	ZPG 2075 D6	3/4"	11	53	50	17	72
ZPG 1100 D6	ZPG 2100 D6	1"					72
ZPG 1125 D6	ZPG 2125 D6	1¼"					90
-	ZPG 2150 D6	1½"					90
-	ZPG 2200 D6	2"					110

Weight values are based on the double spring version





ZPG body is designed to be fastened to the tunnel wall by means of one M10 bolt with 17 mm hexagonal head.



The drawing shows the distances of the pipe central axis from the wall for different pipe sizes assembled onto the pipe holder.

HOW TO MAKE UP THE PRODUCT CODE EX.: ZPG 1075 D6

ZPG 1 075 D6

- MATERIAL: • **D6** - PP, chemically bonded fiberglass
- PIPE CODE: • **075** - 3/4" • **100** - 1" • **125** - 1¼" • **150** - 1½" • **200** - 2"
- CLAMP CODE: • **1** - Single spring • **2** - Double spring
- PIPE HOLDERS

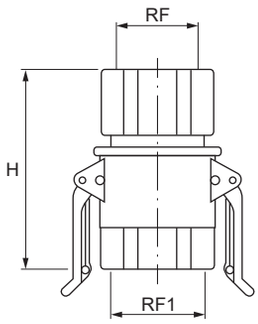


The above photo shows a European top coating plant using our products

QUICK COUPLING JOINTS

ZSA quick coupling joints are a very popular solution for industrial facilities requiring ease of operation.

- **Thread size** 3/4", 1", 1¼", 1½"
- **Thread specification** BSP, NPT
- **Typical applications** Cleaning equipment used in pre-treatment for coating process
  Addition and release of liquids in chemical tankers
- **Materials**
  - Body: **D6** PP, chemically bonded fiberglass; **B3** AISI 316 Stainless steel
  - Lever: **B31** AISI 316L Stainless steel, cast; **B35** AISI 316 Stainless steel, sintered; **D8** PVDF, Polyvinylidenefluoride
  - O-ring: **E0** EPDM; **E7** Viton; **E8** NBR





Codice	RF1 poll	RF poll	H mm	LP bar	W kg
ZSA 0075 B3xG	3/4"	3/4"	68	15	*
ZSA 0075 D6xG			85	9	*
ZSA 0100 B3xG	1"	1"	78	15	*
ZSA 0100 D6xG			93	7	*
ZSA 0125 B3xG	1¼"	1¼"	89	15	*
ZSA 0125 D6xG			113	7	*
ZSA 0150 D6xG	1½"	1¼"	113	6	*
ZSA 0151 B3xG	1½"	1½"	83	15	*
ZSA 0151 D6xG			113	6	*

** Weight values for different materials are given on request.*

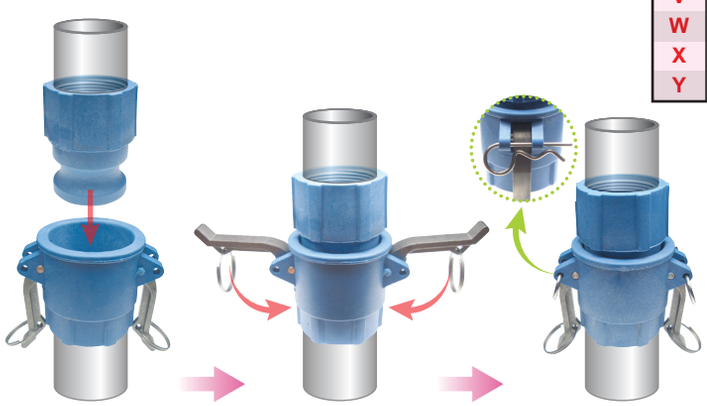
HOW TO MAKE UP THE PRODUCT CODE EX.: ZSA 0075 B3BG

ZSA 0075 B3 x

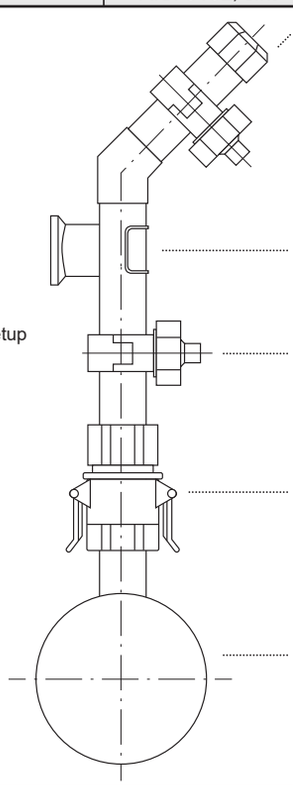
- QUICK COUPLING JOINTS
- CODE
- MATERIAL
  - **B3** - AISI 316 Stainless steel
  - **D6** - PP, chemically bonded fiberglass

X	Orientation	Lever material	O-ring	Rings
B	Fixed	AISI 316L, sint	EPDM	AISI 316
C	Fixed	PVDF	EPDM	AISI 316
D	Fixed	PVDF	VITON	AISI 316
F	Fixed	PVDF	EPDM	none
G	Fixed	PVDF	VITON	none
H	Fixed	AISI 316L, sint	VITON	AISI 316
S	Free	AISI 316L, sint	EPDM	AISI 316
R	Free	AISI 316L, microf	EPDM	AISI 316
Q	Free	AISI 316, mech. lav.	NBR	AISI 316
T	Free	PVDF	EPDM	AISI 316
U	Free	PVDF	VITON	AISI 316
V	Free	PVDF	EPDM	none
W	Free	PVDF	VITON	none
X	Free	AISI 316, mech. lav.	VITON	none
Y	Free	AISI 316L, sint	VITON	AISI 316

QUICK COUPLING JOINTS - INSTALLMENT



A. Join two parts of quick coupling together **B.** Put levers down and fasten **C.** Fix bolt and complete setup



QUICK FITTING RISERS AND HEADER MANIFOLDS

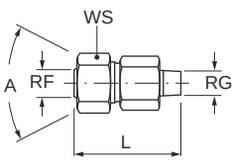
Our range of products for surface pre-treatment plants is the most complete on the market and has been developed in collaboration with the most important system manufacturers on a worldwide basis. PNR has designed most of the assembly accessories commonly adopted today in pre-treatment plants.
Right figure shows the installment steps. Quick couplings and pipe holder clamps can be quickly assembled and disassembled in seconds to minimize maintenance and shut-off time.

ZRA (STANDARD SWIVEL JOINTS)





ZRA 1212 B1





STANDARD SWIVEL JOINTS

ZRA / ZRB / ZRC are standard swivel joints for manufacturing plants requiring product diversification. The fitting and adjustment of the joints can be done easily by tightening the hexagonal screw cap.

- **Typical applications** — Cleaning equipment used in pre-treatment for coating process. Continuous casting cooling.
- **Inlet thread size** — 1/8", 1/4", 3/8", 1/2", 3/4"
- **Outlet thread size** — 1/8", 1/4", 3/8", 1/2", 3/4"
- **Max working pressure** — **LP** 21 bar
- **Materials** — **B1** AISI 303 Stainless steel; **B31** AISI 316L Stainless steel; **T1** Brass

Code	RG poll	RF poll	L mm	A deg	CH mm	W g
ZRA 1212 xx YZ	1/8"	1/8"	38	50°	22	57
ZRA 2525 xx YZ	1/4"	1/4"	59	50°	22	75
ZRA 3838 xx YZ	3/8"	3/8"	72	50°	27	155
ZRA 5050 xx YZ	1/2"	1/2"	82	50°	27	186
ZRA 7575 xx YZ	3/4"	3/4"	92	50°	41	468

Code	RF poll	RF poll	L mm	A deg	CH mm	W g
ZRB 1212 xx YZ	1/8"	1/8"	29	50°	22	57
ZRB 2525 xx YZ	1/4"	1/4"	49	50°	22	75
ZRB 3838 xx YZ	3/8"	3/8"	52	50°	27	155
ZRB 5050 xx YZ	1/2"	1/2"	72	50°	27	186
ZRB 7575 xx YZ	3/4"	3/4"	85	50°	32	468

Code	RF poll	L mm	A deg	CH mm	W g
ZRC 1212 xx YZ	1/8"	32	50°	22	57
ZRC 2626 xx YZ	1/4"	67	50°	27	147
ZRC 7575 xx YZ	3/4"	92	50°	32	468

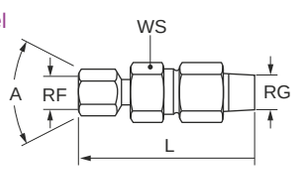
HOW TO MAKE UP THE PRODUCT CODE

ZRx 12 12 xx Y Z

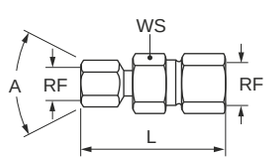
- THREAD: **B** - BSP (female), BSPT (male); **N** - NPT
- VARIANT: **S** - Standard (three parts); **R** - Reduced (two parts)
- MATERIAL: **B1** - AISI 303 Stainless steel; **B31** - AISI 316L Stainless steel; **T1** - Brass
- INLET THREAD SIZE: **12** - 1/8"; **25** - 1/4"; **38** - 3/8"; **50** - 1/2"; **75** - 3/4"
- OUTLET THREAD SIZE: **12** - 1/8"; **25** - 1/4"; **38** - 3/8"; **50** - 1/2"; **75** - 3/4"

Type	Inlet	Outlet
ZRA	Male	Female
ZRB	Female	Female
ZRC	Welded	Female

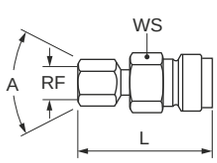
ZRA



ZRB



ZRC

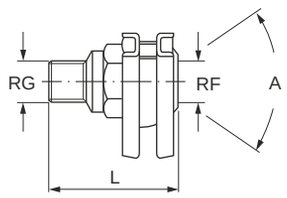


(TRIANGLE FLANGED SWIVEL JOINTS) ZRP

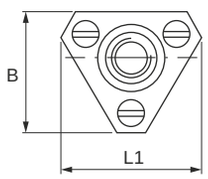
TRIANGLE FLANGED SWIVEL JOINTS

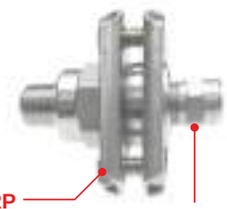
ZRP triangular flanged swivel joints have a robust metallic structure, are easy to fit and adjust and are widely used in manufacturing plants requiring product diversification.

- **Typical applications** Cleaning equipment used in pre-treatment for coating process. Continuous casting cooling.
- **Inlet thread size** 1/8", 1/4", 3/8"
- **Outlet thread size** 1/8", 1/4", 3/8"
- **Max working pressure** **LP** 15 bar









ZRP Triangle flanged swivel joints

JBC Flat fan nozzle

Code	RG inch	RF inch	L mm	B mm	L1 mm	A deg	W g
ZRP 1212 xx	1/8"	1/8"	30	40	35	50°	65
ZRP 2512 xx	1/4"	1/8"	32				92
ZRP 2525 xx	1/4"	1/4"	40	50	45	60°	140
ZRP 2538 xx	1/4"	3/8"	40				150
ZRP 3825 xx	3/8"	1/4"	40				150
ZRP 3838 xx	3/8"	3/8"	40				150

HOW TO MAKE UP THE PRODUCT CODE EX.: ZRP 1212 B1

ZRP 1212 xx

- JOINT TYPE
- OUTLET THREAD SIZE: **12** - 1/8"
- LNLET THREAD SIZE: **25** - 1/4", **38** - 3/8"
- MATERIAL: **B1** - AISI 303 Stainless steel, **T1** - Brass



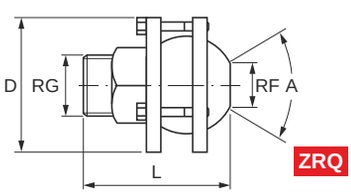
SWIVEL JOINTS

(LARGE CAPACITY SWIVEL JOINTS) ZRQ

LARGE CAPACITY SWIVEL JOINTS

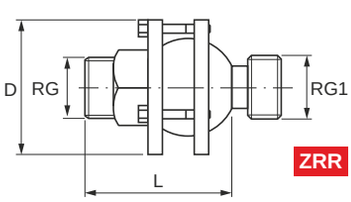
ZRQ series swivel joints are suitable for operating environments requiring large capacities and product diversification. Once set, they can be easily fitted and adjusted .

- **Typical applications** Cleaning equipment used in pre-treatment for coating process. Continuous casting cooling.
- **Inlet / Outlet thread size** 1", 1¼", 1½", 2", 2½"
- **Max working pressure** **LP** 9 bar
- **Materials** **B1** AISI 303 Stainless steel, **B31** AISI 316L Stainless steel, **T1** Brass



ZRQ





ZRR

Code	RG inch	RG1 inch	RF inch	L mm	D mm	A deg	W kg
ZRQ 8080 xx	1"	-	1"	89	92	40°	1.8
ZRQ 8282 xx	1¼"	-	1¼"	130			2.1
ZRQ 8482 xx	1½"	-	1¼"	133			2.4
ZRR 8282 xx	1¼"	1¼"	-	130	92	40°	2.2
ZRR 8284 xx	1½"	1¼"	-	130			2.2
ZRR 8484 xx	1½"	1½"	-	130			2.4
ZRR 8686 xx	2"	2½"	-	203	158	40°	8.0
ZRR 8888 xx	2½"	2½"	-	229			8.8

HOW TO MAKE UP THE PRODUCT CODE EX.: ZRQ 8080 B1

ZRQ 8080 xx

- JOINT TYPE: **ZRQ** - Female, **ZRR** - Male
- OUTLET THREAD SIZE: **80** - 1", **82** - 1¼", **84** - 1½", **86** - 2", **88** - 2½"
- LNLET THREAD SIZE: **80** - 1", **82** - 1¼", **84** - 1½", **86** - 2", **88** - 2½"
- MATERIAL: **B1** - AISI 303 Stainless steel, **B31** - AISI 316L Stainless steel, **T1** - Brass



Length conversion table

μm	mm	cm	m	inch	ft
1	$1x10^{-3}$	$1x10^{-4}$	$1x10^{-6}$	$3.94x10^{-5}$	$3.28x10^{-6}$
$1x10^{3}$	1	0.1	$1x10^{-3}$	$3.94x10^{-2}$	$3.28x10^{-3}$
$1x10^{4}$	10	1	$1x10^{-2}$	$3.94x10^{-1}$	$3.28x10^{-2}$
$1x10^{7}$	$1x10^{3}$	100	1	39.4	3.28
$2.54x10^{4}$	25.4	2.54	$2.54x10^{-2}$	1	$8.33x10^{-2}$
$3.05x10^{5}$	$3.05x10^{2}$	30.5	$3.05x10^{-1}$	12	1

Area conversion table

cm^2	m^2	$inch^2$	ft^2
1	$1x10^{-4}$	0.155	$1.08x10^{-3}$
$1x10^{4}$	1	$1.55x10^{3}$	10.8
6.45	$6.45x10^{-4}$	1	$6.94x10^{-3}$
$9.30x10^{2}$	$9.30x10^{-2}$	$1.44x10^{2}$	1

Volume conversion table

cm^3	Liter	m^3	ft^3	US gallon
1	$1x10^{-3}$	$1x10^{-6}$	$3.53x10^{-5}$	$2.64x10^{-4}$
1000	1	$1x10^{-3}$	$3.53x10^{-2}$	0.264
$1x10^{6}$	1000	1	353	264
$2.83x10^{4}$	28.3	$2.83x10^{-2}$	1	0.749
$3.79x10^{3}$	3.79	$3.79x10^{-3}$	1.34	1

Pressure conversion table

MPa	KPa	Bar	Kg/cm^2	P.S.I	atm	mHg
1	1000	10	10.2	145	9.87	7.5
0.001	1	0.01	0.011	0.145	$9.87x10^{-3}$	$7.5x10^{-1}$
0.1	100	1	1.02	14.5	0.987	0.75
0.09807	98.07	0.981	1	14.22	0.968	0.736
0.00689	6.89	0.069	0.07	1	0.068	0.052
0.101	$1.01x10^{2}$	1.013	1.033	14.7	1	0.76
0.133	$1.33x10^{2}$	1.33	1.36	19.3	1.32	1

Liquid pipe table

Inlet pressure : 3 bar

Diameter Inch	Max capacity values l/min
1/8"	11.20
1/4"	44.70
3/8"	100.80
1/2"	179.30
3/4"	402.00
1"	716.30
1 1/4"	1121.84
1 1/2"	1610.75
2"	2865.24

Flow rate and pipe diameter

Diameter		Steel pipe		Length 10 m
A	B	Inner diameter	Outer diameter	Capacity value at 0.1~0.3kg/cm² pressure loss
6A	1/8B	6.5	10.5	1.3 ~ 2.2
8A	1/4B	9.2	13.8	3 ~ 5.2
10A	3/8B	12.7	17.3	7 ~ 12
15A	1/2B	16.1	21.7	12 ~ 21
20A	3/4B	21.6	27.2	22 ~ 38
25A	1B	27.6	34.0	38 ~ 65
32A	1 1/4B	35.7	42.7	70 ~ 120
40A	1 1/2B	41.6	48.6	120 ~ 210
50A	2B	52.9	60.5	215 ~ 370
65A	2 1/2B	67.9	76.3	410 ~ 700
80A	3B	80.7	89.1	680 ~ 1200
100A	4B	105.3	114.3	1200 ~ 2100
125A	5B	130.8	139.8	2100 ~ 3600
150A	6B	155.2	165.2	3300 ~ 5700

Flow rate unit conversion table

l/min	m^3/min	m^3/hour	$Inch^3$/hour	ft^3/hour	US gallon/min
1	0.001	0.06	$3.66x10^{3}$	2.12	0.264
1000	1	60	$3.66x10^{6}$	$2.12x10^{3}$	264
16.67	0.017	1	$6.1x10^{4}$	35.3	4.40
$2.73x10^{-4}$	$2.7x10^{-7}$	$1.64x10^{-5}$	1	$5.79x10^{-4}$	$7.22x10^{-6}$
0.472	$4.72x10^{-4}$	0.028	1.728	1	0.125
3.79	0.004	0.227	$1.39x10^{4}$	8.02	1

Air pipe table

Pipe size	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"
Pressure loss per 10m (bar)	1.25	0.733	0.56	0.44	0.287	0.214	0.138	0.108
Inlet pressure (bar)	Max capacity values (NL/min)							
1.5	163	314	668	1076	1885	3150	4960	6630
2.0	179	344	730	1180	2060	3450	5430	7280
3.0	206	395	840	1360	2375	3900	6300	8400
4.0	230	422	940	1520	2660	4450	7000	9360
5.0	252	485	1030	1660	2920	4875	7700	10250
6.0	272	523	1110	1800	3140	5250	8300	11050
7.0	292	558	1185	1920	3350	5620	8870	11800

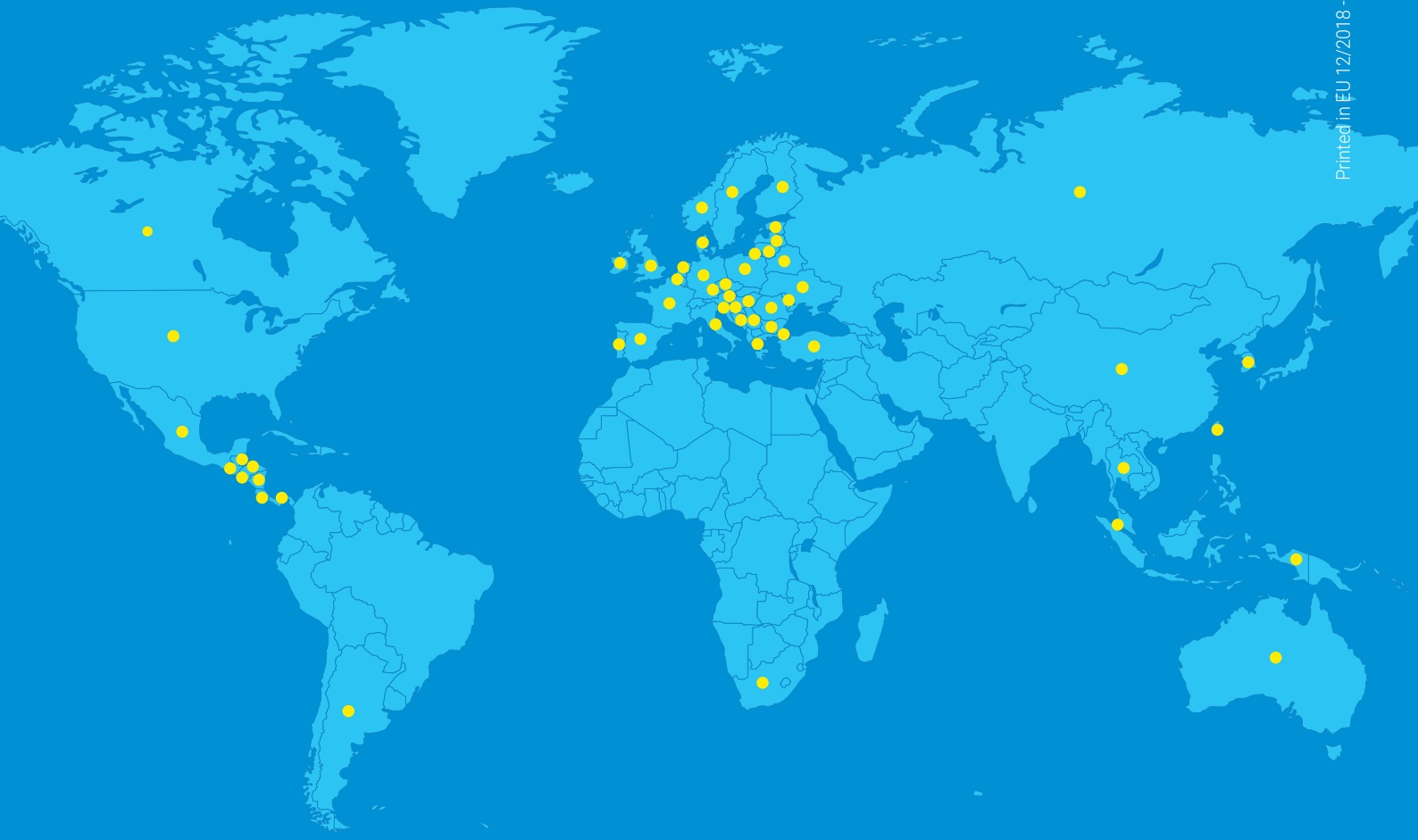
ABBREVIATIONS

Code	Name	Unit	Code	Name	Unit	Code	Name	Unit
CL	Jet deflection angle	deg	**DIA**	Outside diameter	mm	**NR**	Number of orifices	--
D	Conventional orifice diameter	mm	**DU**	Liquid outer diameter	mm	**QC**	Quick-fit connection	--
D1	Smallest free inside diameter	mm	**E**	Inlet diameter	mm	**RF**	Female thread	poll
D2	Liquid inlet diameter	mm	**EF**	Flange diameter	mm	**RG**	Male thread	poll
D3	Liquid outlet diameter	mm	**FF**	Flange outer diameter	mm	**SQ**	Square bar size	mm
DE	Liquid inlet diameter	mm	**G**	Flange center-hole diameter	mm	**UF**	Outlet diameter	poll
DF	Flange size	poll	**H,H1,H2**	Height	mm	**WS**	Wrench size (female)	mm
DN	Flange nominal size	mm	**L,L1**	Lenght	mm	**WS1**	Wrench size (female)	mm

SPRAY ANGLE AND DISTANCES

Spray angle	SPRAY DISTANCE (mm)													
	50	100	150	200	250	300	400	500	600	700	800	900	1000	1500
	Theoretical coverage at various distances from the nozzle (mm)													
5°	4.4	8.7	13.1	17.5	21.8	26.2	34.9	43.7	52.4	61.1	69.9	78.6	87.3	131.0
10°	8.7	17.5	26.2	35.0	43.7	52.5	70.0	87.5	105.0	122.0	140.0	158.0	175.0	262.0
15°	13.2	26.3	39.5	52.7	65.8	79.0	105.0	132.0	158.0	184.0	211.0	237.0	263.0	395.0
20°	17.6	35.3	52.9	70.5	88.2	106.0	141.0	176.0	212.0	247.0	282.0	317.0	353.0	529.0
25°	22.2	44.3	66.5	88.7	111.0	133.0	177.0	222.0	266.0	310.0	355.0	399.0	443.0	665.0
30°	26.8	53.6	80.4	107.0	134.0	161.0	214.0	268.0	322.0	375.0	429.0	482.0	536.0	804.0
35°	31.5	63.1	94.6	126.0	158.0	189.0	252.0	315.0	378.0	441.0	504.0	568.0	631.0	946.0
40°	36.4	72.8	109.0	146.0	182.0	218.0	291.0	364.0	437.0	510.0	582.0	655.0	728.0	1092.0
45°	41.4	82.8	124.0	166.0	207.0	249.0	331.0	414.0	497.0	580.0	663.0	746.0	828.0	1243.0
50°	46.6	93.3	140.0	187.0	233.0	280.0	373.0	466.0	560.0	653.0	746.0	839.0	933.0	1399.0
55°	52.1	104.0	156.0	208.0	260.0	312.0	416.0	521.0	625.0	729.0	833.0	937.0	1041.0	1562.0
60°	57.7	115.0	173.0	231.0	289.0	346.0	462.0	577.0	693.0	808.0	924.0	1039.0	1155.0	1732.0
65°	63.7	127.0	191.0	255.0	319.0	382.0	510.0	637.0	764.0	892.0	1019.0	1147.0	1274.0	1911.0
70°	70.0	140.0	210.0	280.0	350.0	420.0	560.0	700.0	840.0	980.0	1120.0	1260.0	1400.0	2101.0
75°	76.7	153.0	230.0	307.0	384.0	460.0	614.0	767.0	921.0	1074.0	1228.0	1381.0	1535.0	2302.0
80°	83.9	168.0	252.0	336.0	420.0	503.0	671.0	839.0	1007.0	1175.0	1343.0	1510.0	1678.0	2517.0
85°	91.6	183.0	275.0	367.0	458.0	550.0	733.0	916.0	1100.0	1283.0	1466.0	1649.0	1833.0	2749.0
90°	100.0	200.0	300.0	400.0	500.0	600.0	800.0	1000.0	1200.0	1400.0	1600.0	1800.0	2000.0	3000.0
95°	109.0	218.0	327.0	437.0	546.0	655.0	873.0	1091.0	1310.0	1528.0	1746.0	1964.0	2183.0	3274.0
100°	119.0	238.0	358.0	477.0	596.0	715.0	953.0	1192.0	1430.0	1668.0	1907.0	2145.0	2384.0	3575.0
110°	143.0	286.0	428.0	571.0	714.0	867.0	1143.0	1430.0	1714.0	1999.0	2285.0	2571.0	2856.0	
115°	157.0	314.0	471.0	628.0	785.0	942.0	1256.0	1570.0	1884.0	2197.0	2511.0	2825.0	3139.0	
120°	173.0	346.0	520.0	693.0	866.0	1039.0	1386.0	1732.0	2078.0	2425.0	2771.0	3117.0	3464.0	
130°	214.0	429.0	643.0	858.0	1072.0	1287.0	1716.0	2145.0	2573.0	3002.0	3431.0	3860.0		
140°	275.0	549.0	824.0	1099.0	1374.0	1648.0	2198.0	2747.0	3297.0	3846.0				
150°	373.0	747.0	1120.0	1493.0	1866.0	2240.0	2986.0	3733.0						
160°	567.0	1134.0	1702.0	2269.0	2837.0	3403.0								
170°	1143.0	2285.0	3429.0											

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PNR

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