



# AIR ASSISTED ATOMIZERS

CTG AZ21 EN



## INTRODUCTION

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### TECHNICAL PUBLICATIONS

PNR manufactures a complete range of spray nozzles for industrial applications, as well as products and systems specially designed for specific industries. Information about our Company and our product range is available through the following publications

SPRAY NOZZLES & ASSEMBLY FITTINGS	CTG GN
INDUSTRIAL TANK WASHING SYSTEMS	CTG LS
AIR ASSISTED ATOMIZERS	CTG AZ
SPRAY ENGINEERING HANDBOOK	CTG SH
STEELWORK NOZZLES	CTG SW
SOLUTIONS FOR THE PULP AND PAPER INDUSTRY	CTG PN

As a result of continuous product improvement our documentation is regularly updated: please visit our website to be always updated.

### NOTES

Our products are continuously being reviewed and modified to keep up with the latest state of technology. As a result the technical information provided in this catalogue is for guidance only and is not binding. We regret not being able to provide our customers with notification of such changes all of the time. Should you have an application that requires some special features such as specific flow rates or spray angles for example, then please issue a written request before sending your order and we'll do our best to meet your requirements. All information contained in this catalogue, including product data, product codes, diagrams and photographs are the exclusive property of Flowtech. It is forbidden to reproduce any part of this catalogue without having obtained written permission from Flowtech first.

Dimensions in this catalogue are given in millimetres (mm). All threads are made according to the ISO 228 standards (European norms BS 2779 – DIN 259 – UNI 338). Explanations about the abbreviations used in the catalogue are given on page 25. All mentioned Trademarks are the property of their respective owners.

Our Company has qualified its quality system with DNV, following ISO 9001/2015 standard.

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

## INTRODUCTION

### AIR ASSISTED ATOMIZING

Several industrial processes need the atomizing of liquids into fine and very fine droplets.

This result might be achieved by means of a purely hydraulic nozzle, with the liquid being fed at high pressure through a very small orifice, but the process would originate two main problems:

- A Requiring costly investments and complicated lay-out.
- B Originating plugging problems because of the small orifice dimensions.

In the majority of industrial processes a fine liquid atomization is obtained by means of air assisted atomizers, where compressed air supplies the required energy to break the liquid and to throw the droplets at a given distance from the atomizer. An air atomizing system has however two inherent limitations:

- A The narrow inside passages require adequate filtering of air and liquid.
- B The high speed jet will only produce narrow angle sprays. To overcome this inconvenience multiple orifice atomizers are used to produce a diverging sprays with better droplet distribution.

### AIR ASSISTED ATOMIZERS

The first two sections of the Catalog show two types of atomizers largely used in the industry, the third one deals with complete atomizing systems.

#### ULTRASONIC ATOMIZERS

These devices provide liquid atomization in two steps:

- A The liquid is injected into the nozzle center and is first atomized by shear action and then mixed with the high speed air stream leaving the nozzle through the outlet orifice.
- B The stream carrying the droplets is taken to impact onto a resonator placed in front of the nozzle orifice, and generates a field of sound waves for additional droplet breakup.

Ultrasonic atomizers produce very fine droplets, in a tight dimensional range, and supply low capacities below 100 liters per hour. Their operation produces a typical noise, the level of which needs to be checked according to the local regulations if some personnel is supposed to work in a nearby area.

#### CLASSIC ATOMIZERS

These devices produce liquid atomization by simple shear action, providing a high velocity stream to impact onto a liquid flow. In spite of their inherent low efficiency, and because of the low capacities involved, classic atomizers are the most convenient solution for most of the current applications. A wide range of spray patterns, capacities, atomizer types, body options and accessories has been developed to suit many different requirements from the industry.

### PNR MATERIAL CODES

Many products in this Catalog are available in different materials, and therefore the product codes carry often two letters (XX) which need to be replaced from the required material code. A list with the most used codes is given in the following.

A1	Mild steel
A2	High speed steel
A8	Zinc plated steel
A9	Nickel plated steel
B1	AISI 303 Stainless steel
B2	AISI 304 Stainless steel
B21	AISI 304 L Stainless steel
B3	AISI 316 Stainless steel
B31	AISI 316 L Stainless steel
B8	AISI 309 Stainless steel
C2	AISI 416, Hardened SS
D1	Polyvinylchloride (PVC)
D2	Polypropylene (PP)

D3	Polyamide (PA)
D5	Polypropylene, w/talcum
D6	Polypropylene, 25% glass fiber
D7	High Density Polyethylene
D8	Polyvinyliden fluoride (PVDF)
E0	EPDM
E1	Ethylenepolytetrafluor. (PTFE)
E3	Acetalic resin (POM)
E31	DELTRIN ®
E6	LUCITE ® (PMMA)
E7	Viton
E8	Synthetic rubber (NBR)
H1	Titanium

L1	Monel 400
L2	Incolloy 825
L8	Hastelloy
P6	Acrylic but. styrene (ABS)
P8	EPDM, 40 Shore
T1	Brass
T2	Chrome plated brass
T3	Copper
T8	Nickel plated brass
T81	ENP Brass
T9	Brass body, Stainless steel set-up
V1	Aluminum
V7	ENP Aluminum

## INTRODUCTION

### PROPERTIES OF A LIQUID SPRAY

The atomization of a liquid by means of a compressible fluid, like air, steam or a gas, is defined two-phase or twin-fluid or pneumatic atomization. Many industrial processes require using finely atomized droplets and the techniques to produce finely atomized sprays have been largely improved in recent years with new types of atomizers being developed.

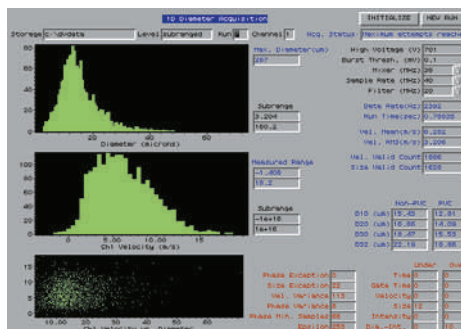
In addition more sophisticated process techniques have increased the demand for a precise definition about the characteristics of a given spray for the purpose of getting precisely repeatable results. The most interesting parameters defining a given spray have been defined as in the following, and are now available to the process design engineer.

Arithmetic Mean Diameter AMD (D10)	This is the arithmetic Mean Value as calculated on the diameters from the total number of the drops in the sample spray.
Volume Mean Diameter VMD (D30)	This is the diameter of that drop whose volume is the arithmetic mean from the total number of the drops in the sample spray.
Sauter Mean Diameter SMD (D32)	This is the diameter of that drop whose Volume/Surface ratio is the arithmetic mean from the total number of the drops in the sample spray.

The following Histograms and Diagrams are often used to resume the data referring to the above parameters and give a visual definition of a spray:

- Volume percentage cumulative diagram
- Droplet diameter distribution Histogram
- Droplet velocity distribution Histogram

The dimensional parameters and the above information make it possible to base process calculations on precise data atomization degree, efficiency of heat exchange and spray behavior in a given operation ambient. The knowledge of a value for the Sauter Mean Diameter SMD ( D32 ) in a given spray is of special importance for the calculation of heating exchange in evaporative cooling processes, since it makes it possible to know the value of the total heat exchange surface obtained atomizing a known quantity of liquid.



PNR can supply upon request complete documentation containing test reports about the aforementioned parameters for all PNR catalog and special atomizers.

The Histograms beside show the distribution of droplet diameters (D32) and velocities for one spray obtained in our laboratory.

The photo beside shows a test performed in our laboratory. A laser Interferometer is used to measure and record the spray parameters, while fluid flow rates and feed pressures are monitored with high precision instruments.

#### NOTE

Please note that all capacity values given in this catalog refer to test performed using water and compressed air. Atomizing liquids other than water, or using motive fluids different from compressed air will modify the performance of any atomizer, which have to be assessed through a laboratory test.





## ULTRASONIC ATOMIZERS

Ultrasonic atomizers operate on a very sophisticated process which is based on two steps: In the first one tiny water jets are injected into an high speed air flow which provides a first break up and atomization of the fluid.

In the second step the two phase flow, air entraining liquid droplets, goes trough a field of sound waves which produce a further break up and a lower droplet dimension. This is realized through an impact between the two phase flow and a resonator located in front of the nozzle orifice.

Ultrasonic atomizers can only be manufactured with high precision machining operations but offer the following remarkable advantages.

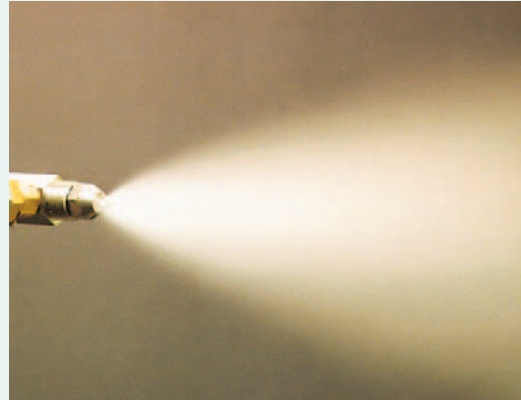
**A**

The droplets in the atomized jet show low values for the Sauter Mean Diameter, and in addition a rather narrow range of individual droplet diameter: in other words the drops are very small and with little difference in diameter between the smallest and the biggest droplet. This means the spray is made by droplets very small and very similar in size, which is very important in all evaporative processes like for example air humidification: it is rather easy then to obtain values for the evaporation time and evaporation length of a given spray.

**B**

The noticeable variations in local air pressure all around the resonator, associated to the sound waves, eliminate the danger of dust and foreign particles build-up in the vicinity of the nozzle orifice, thus avoiding a decay in the atomizer performance.

The system will then be very reliable and require limited or null maintenance.



Ultrasonic atomizers



Page 4

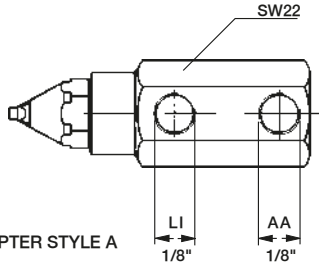
Atomizing carts



Page 5

ULTRASONIC ATOMIZERS

ATOMIZERS AND FITTINGS



ADAPTER STYLE A

Ultrasonic atomizers produce the finest sprays available with air assistance for industrial processes, with a narrow angle full cone jet. Water and air do not mix in a confined volume before leaving the nozzle and therefore their feed pressures can be adjusted independently without influencing each other: this allows for a very wide regulation range on the liquid capacity and makes it easier to reach the desired operating conditions.

Please note that the code given in the table only refers to the atomizing head and must be completed with the identification for one of the four connection adapters available, as shown below in the page.

The drawing beside shows an atomizing head assembled onto one A type adapter.

Materials  
 Atomizing head B1 AISI 303 Stainless steel  
 Adapter B1 AISI 303 Stainless steel  
 T1 Brass

WM = Water capacity ( l/min)  
 AH = Air capacity (Nmc/ora)

**IDENTIFICATION CODES**

**ATOMIZING HEAD**  
 The codes given in the table refer to the atomizing head only, and can be used to order the head as a separate part.

**ADAPTERS**  
 Can be ordered separately using the codes below, please replace  
 XX = B1 for AISI 303  
 XX = T1 for brass

**COMPLETE ATOMIZERS**  
 To identify a complete atomizer, please add to the head code the three suffix letters describing the potential adapter style and its material, according to the information below.

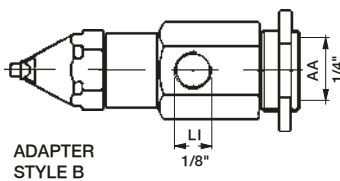
**MAD 0801 B1 X Y Z**

**Adapter material**  
 A = T1 Brass  
 B = B1 AISI 303

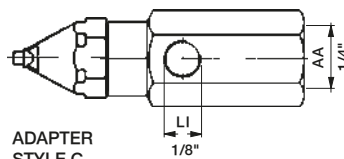
**Adapter style**  
 A = XMA 0103 xx  
 B = XMA 0101 xx  
 C = XMA 0102 xx  
 D = XMA 0100 xx

**Connection**  
 G = BSP F  
 N = NPT F

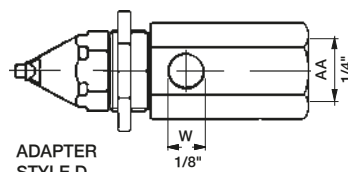
Code		Air pressure (bar)										
		0,5		0,7		1,0		2,0		3,0		
		WM	AH	WM	AH	WM	AH	WM	AH	WM	AH	
25°	MAD 0331 B1	2	0,10	3,1	0,12	3,0	0,15	3,1	0,27	2,7	-	-
		3	0,05	3,7	0,10	3,1	0,12	3,6	0,20	3,7	0,32	2,9
		4	0,02	4,7	0,05	4,8	0,08	4,4	0,18	4,4	0,25	4,2
		5	-	-	0,02	5,3	0,05	5,3	0,13	5,5	0,22	5,2
		6	-	-	-	-	0,02	6,1	0,12	6,0	0,18	5,8
		6	-	-	-	-	-	-	-	-	-	-
	MAD 0801 B1	2	0,23	2,7	0,28	2,9	0,37	2,7	0,72	2,2	-	-
		3	0,22	3,6	0,27	3,6	0,32	3,5	0,52	3,2	0,82	2,7
		4	0,18	4,5	0,22	4,4	0,28	4,6	0,45	4,6	0,62	4,7
		5	0,12	5,4	0,18	5,3	0,25	5,6	0,40	5,4	0,53	5,4
		6	0,07	6,2	0,13	6,3	0,22	6,2	0,35	6,3	0,50	6,2
		6	-	-	-	-	-	-	-	-	-	-
	MAD 1131 B1	2	0,50	7,3	0,60	6,6	0,73	6,9	1,15	5,6	-	-
		3	0,40	9,7	0,50	9,5	0,65	9,4	0,96	9,3	1,35	7,9
		4	0,27	11,6	0,37	11,9	0,55	11,8	0,93	12,1	1,20	11,5
		5	0,13	13,9	0,23	13,8	0,38	14,0	0,87	14,1	1,15	13,8
		6	0,07	18,6	0,13	18,7	0,27	8,7	0,72	18,9	1,10	19,0
		6	-	-	-	-	-	-	-	-	-	-
40°	MAL 0800 B1	2	0,18	2,7	0,23	2,7	0,32	2,9	0,73	2,1	-	-
		3	0,15	3,7	0,18	3,9	0,25	3,5	0,50	3,7	0,85	2,6
		4	0,10	4,5	0,17	4,6	0,22	4,9	0,33	4,8	0,53	4,4
		5	0,03	5,4	0,10	5,6	0,18	5,4	0,30	5,4	0,45	5,3
		6	-	-	0,03	6,2	0,12	6,3	0,27	6,2	0,38	6,3
		6	-	-	-	-	-	-	-	-	-	-
	MAL 1130 B1	2	0,46	7,3	0,52	7,2	0,68	6,8	1,13	5,7	-	-
		3	0,38	9,5	0,47	9,7	0,65	10,2	0,95	9,4	1,27	7,7
		4	0,23	11,8	0,35	11,8	0,50	11,9	0,88	12,1	1,15	11,8
		5	0,13	13,5	0,23	13,9	0,37	14,0	0,82	14,1	1,10	14,2
		6	0,07	16,0	0,13	16,2	0,27	16,2	0,63	16,2	1,03	16,3
		6	-	-	-	-	-	-	-	-	-	-
	MAL 1300 B1	2	0,95	14,6	1,12	16,5	1,40	16,3	2,42	10,4	-	-
		3	0,80	19,3	1,00	20,0	1,26	22,2	1,90	19,2	2,87	14,5
		4	0,60	24,7	0,80	24,7	1,08	25,0	1,80	25,0	2,40	23,2
		5	0,42	29,9	0,60	30,3	0,90	30,4	1,70	30,5	2,27	29,9
		6	0,23	35,6	0,40	36,0	0,67	35,6	1,55	36,2	2,15	35,2
		6	-	-	-	-	-	-	-	-	-	-



ADAPTER STYLE B



ADAPTER STYLE C



ADAPTER STYLE D

LOCKNUT FITS BOTH FRONT AND REAR THREADED BODIES.

B and D adapter style allow for mounting the atomizer through a wall or the side of a duct. In this case do not forget to order the VAM 2002 xxA locknut, which fits both, to hold the adapter in place.

## ATOMIZING CARTS

**ATOMIZING CARTS**

This type of atomizing cart makes it possible to atomize into the air of confined rooms liquids without requiring an operator to be present, the typical example being spraying disinfectants in hospital rooms.

These devices combine the ease of mobility with long operation times and can be efficiently operated by all kind of personnel after a very simple training.

The solution to be atomized is contained into the stainless steel tank, where it is put under pressure by means of the same compressed air used for the atomization process and which must be available on the spot.

Up to three atomizers for a maximum capacity of 7,2 l/min can be assembled onto the cart, each of them mounted on a swivel head for efficient ambient saturation. Ease of mobility is assured from two rubber lined wheels and a convenient handle.

The device can be operated with simple manual controls, or from a PLC unit which allows for setting an operation time and a start delay for allowing the operator to leave the room before atomizing starts.

**Weight with manual control** 13 kg (empty)

**Tank volume** 19 liters

Atomizing carts are designed on customer requirements, therefore no standard range coding is available. A certificate according to EUROPEAN 97/23/CE (PED) norm is released for each tank.



## CLASSIC ATOMIZERS



Classic atomizers are devices producing an atomized spray with the assistance of compressed air, where the liquid is broken into droplets when its outer surface is subjected to shear action from the high speed air flow. By assembling together a range of standard components in different materials, several different capacity values, spray patterns, spray angles and operation modes can be obtained. In addition, specific application problems can be addressed by the use of special accessories available on request.



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### ATOMIZER SET-UP

The set-up is the device where air and liquid flow come in contact and produce the atomized jet.

It consists of a liquid nozzle and an air nozzle, hose orifice dimensions are combined in several different ways in order to obtain the capacity, the spray pattern and the spray angle required.

The above spray parameters are given in the performance tables, besides each set-up code.



Page 8

### ATOMIZER BODIES

The atomizer body serves the purpose of conveniently connecting the set-up to the feed lines for air and water, and it may include some options like liquid shut-off or orifice cleaning needles.

In addition to the MW type, the standard body, a more complete MX type includes an air operated cylinder for remote control of spray operation.



Page 21

### ACCESSORIES AND OPTIONS

In addition to the standard range of components some specific requirements like resistance to internal erosion or solid build-up from water borne foreign matters, body options with a different design or different spray control procedures, can be addressed with special parts.

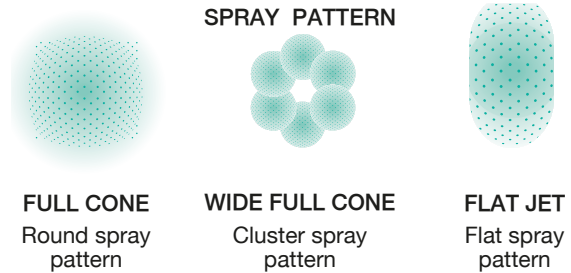


CLASSIC ATOMIZERS

SPRAY SET-UP

A spray set-up is made out of a liquid nozzle and an air nozzle. When assembled the air nozzle fits precisely onto the liquid nozzle and the combination of the two provides the correct inside geometry to produce the spray. Such parameters of the two parts as the number, dimensions and profile of their inside passages determines all the characteristics of the atomized spray produced by that given set-up. A set-up can be selected according to the choices beside.

The capacity tables in the following catalog pages show the specification of each individual set-up, that is air and liquid capacities as a function of air and liquid feed pressures, and spray dimensions. Spray dimensions are understood measured in still air for several pressure values, and cannot be precisely defined, therefore we give indicative values of the maximum throw and of the distance for which the spray maintains a consistent shape.

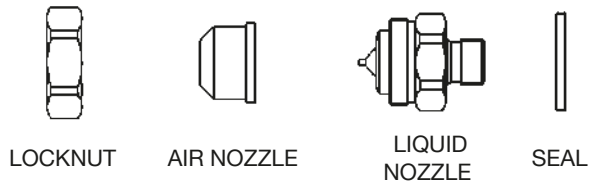


OPERATION PRINCIPLE	Internal mix	Page 8
	External mix	
LIQUID FEED	Pressure feeding	Page 8
	Siphon feeding	

SET-UP PARTS

The set-up code, complete with the material code, can be used to order air and liquid nozzle together. Under the set-up code, air (An) and liquid nozzle (Ln) codes are shown separately for ordering them as spare parts, while Teflon seal and locknut can be ordered with the codes shown beside.

All PNR components are made interchangeable and can be combined even if made in different materials, like for example assembling an erosion resistant set-up in stainless steel with a brass body.



VAM 1901 xx

VDA 0981 E1\*

<b>Set-up code</b>	<b>SUB 1520</b>
<b>Ln XMW 5001xx</b>	Liquid nozzle code
<b>An XMW 4001xx</b>	Air nozzle code

\* Standard seal is in Teflon; on request, we can provide:  
 - copper (VDA 0981 T3);  
 - Viton (VDA 0981 E7);  
 - AISI 316L (VDA 0981 B31).

COMPLETE ATOMIZER CODE

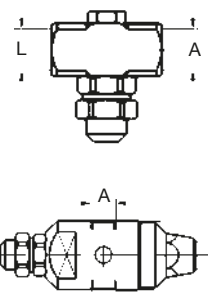
Once the set-up code (and therefore the spray characteristics, has been chosen) it is necessary to choose the body and the options required to come to the complete atomizer code. A set-up can be assembled basically on two different body types:

**BASIC BODY**

This body serves the only purpose of connecting the set-up inlets to the air and liquid feed lines. The plug on the body top can be replaced by several option equipment as shown next page

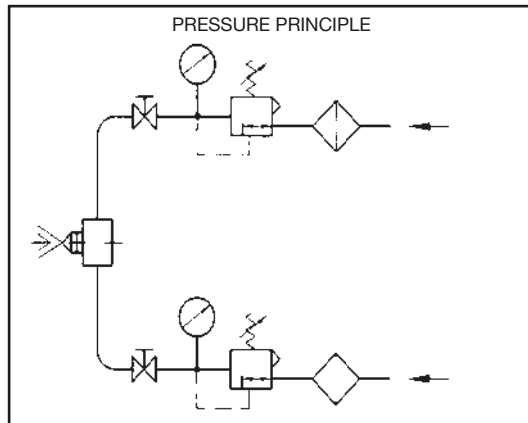
**AIR ACTUATED BODY**

This body has a built in air cylinder allowing to start and stop the spray from a remote location. Additional options are shown at page 10 and 21



## CLASSIC ATOMIZERS

### ATOMIZER FEEDING



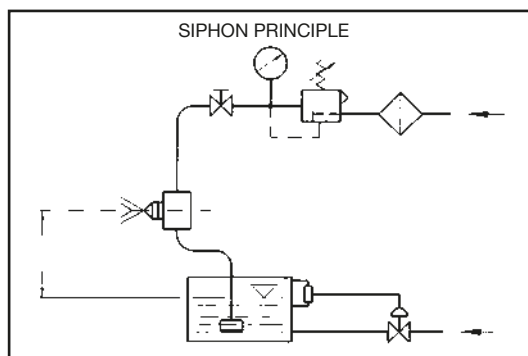
An atomizer can work on two different liquid feed principles, that is

- Liquid is supplied to the atomizer through a line under pressure
- Liquid is aspirated by the atomizer from a container at ambient pressure.

#### PRESSURE PRINCIPLE

It is the most widely used, and therefore a large range of capacities and spray patterns are available. Liquid capacity, air capacity and droplet sizes can be adjusted by regulating air and liquid feed pressures and the two fluids are mixed inside the atomizer prior to be ejected (Internal mix atomizers).

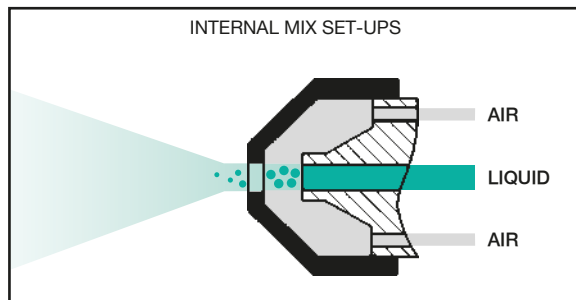
A different type allows for mixing the fluids just after they are ejected from the orifice, avoiding mutual influence of the two fluid pressure values inside a mixing chamber and allowing wider regulation range (External mix atomizers).



#### SIPHON PRINCIPLE

These atomizers offer lower capacity values for liquids and a simpler layout since the liquid is aspirated from the atomizer through a Venturi effect. The liquid is simply supplied from an open container, whose level can be lower or higher than the atomizer one to fine tune the liquid capacity. The atomizing air provides the vacuum necessary into the mixing chamber for the Venturi effect.

### SPRAY GENERATION

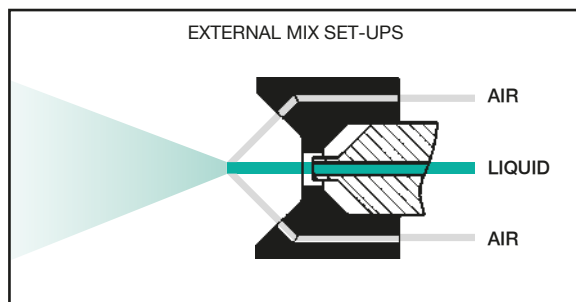


The set-up can be designed in two different ways so as to obtain the following actions

- Air and liquid are mixed up in a mixing chamber inside the atomizer and then they are ejected through the orifice as a spray.
- Air and liquid are ejected from the atomizer through different orifices, and the spray is generated by the impact of the two jets.

#### INTERNAL MIX SET-UPS

The spray is ejected from one or more orifices in the wall of a mixing chamber. In these atomizers a change in the pressure of one of the fluids inside the mixing chamber has an influence on the capacity of the second fluid and this effect reduces the ease of regulation. As an example, increasing the air pressure will decrease the liquid quantity being atomized and the droplet size, and vice-versa.



#### EXTERNAL MIX SET-UPS

The two fluids are ejected through different orifices, their mixing happens outside the orifice. Therefore their pressure values can be adjusted avoiding cross influence with a more precise and stable regulation. External mix set-ups can only work with liquid feed under pressure, and only produce flat jet spray.

**1/4" SIZE** **CLASSIC ATOMIZERS**

**BODY TYPES AND OPTIONS**

**MW**

**COMPLETE CODE**

To obtain the complete code for an atomizer it is necessary to use the set-up code you have chosen from the performance table and complete it with the code for body and options as follows:

- Replace the first two letters in the set-up code (SU) with the code for standard body (MW).
- Add the code for the material you require.
- Add the code for the required options, if any, and the thread type code.

**MWB 1520** X Y Z


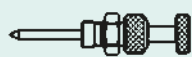


**MATERIALS**

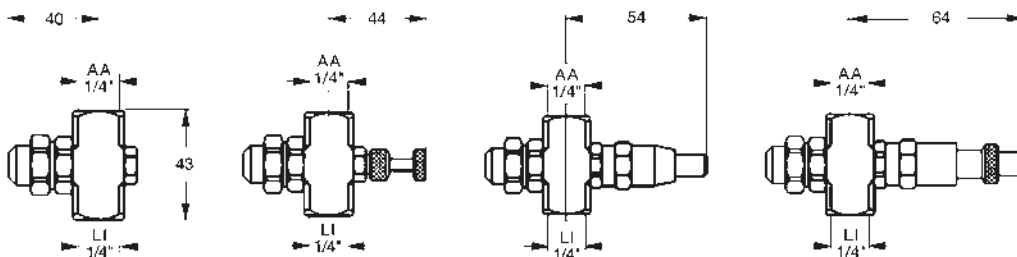
**B1** = AISI 303 Stainless steel  
**B31** = AISI 316L Stainless steel  
**D1** = PVC  
**E6** = LUCITE® (PMMA)  
**T8** = Nickel plated brass

**CONNECTION**

**G** = BSP Female (EU)  
**N** = NPT Female (US)

**OPTIONS**

<b>A</b>		BASIC BODY
<b>B</b>		SHUT-OFF NEEDLE
<b>C</b>		CLEANING NEEDLE
<b>D</b>		CLEAN AND SHUT-OFF NEEDLE

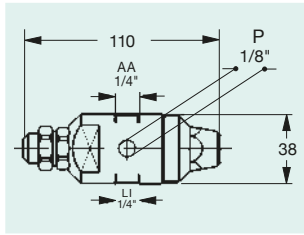


AA = Air Inlet (1/4" F)  
 LI = Liquid inlet (1/4" F)

CLASSIC ATOMIZERS

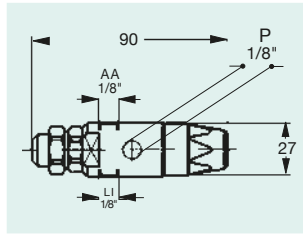
MX

BODY TYPES AND OPTIONS



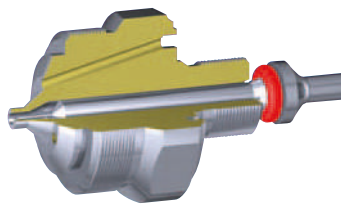
STANDARD SIZE

AA = atomizing air inlet (1/4" F)  
 LI = liquid inlet (1/4" F)  
 AC = cylinder air inlet (1/8" F)



MINI SIZE

AA = atomizing air inlet (1/8" F)  
 LI = liquid inlet (1/8" F)  
 AC = cylinder air inlet (1/8" F)



COMPLETE CODE

To obtain the complete code for an atomizer it is necessary to use the set-up code you have chosen from the performance table and complete it with the code for body and options as follows.

- Replace the first two letters in the set-up code (SU) with the code for air actuated body (MX).
- Add the code for the material you require.
- Add the code for the required options and the code for thread type

AIR ACTUATED ATOMIZER

MX bodies contain an air actuated cylinder which controls the spray operation by means of a needle, opening or closing the water inlet in the liquid nozzle.

Normally the air used for atomizing the liquid flows continuously, while the air to the actuator is used to start and stop the atomizing cycles.

For longer idle times between two atomizing cycles, where too much atomizing air would be wasted, sequenced shut-off should be organized for the two air lines.

The actuator air should be stopped (and the liquid flow interrupted) before atomizing air to be sure all liquid inside is completely atomized and dripping is avoided.

Conversely, when spray begins, atomizing air should be started first so that incoming liquid is atomized without dripping.

Single air option is shown at page 21

NO-DRIP NEEDLE

Our engineers have invented, developed and introduced on the market a no-drip needle (Italian Patent MI96U-00541) to assure positive liquid shut-off and completely drip-free operation.

This solved completely the old problem of dripping atomizers as offered from our competitors. All air actuated PNR atomizers include this better and more consistent design as standard

MXB 1520 X YY Z

**MATERIALS**  
 B1 = AISI 303 Stainless steel  
 B31 = AISI 316L Stainless steel  
 T8 = Nickel plated brass

**CONNECTION**  
 G = BSP Female (EU)  
 N = NPT Female (US)

OPTIONS	Shut-off needle	Cleaning needle
Standard	SA	SB
Mini	MA	MB
Standard single air inlet	UA	UB
Mini single air inlet	NA	NB

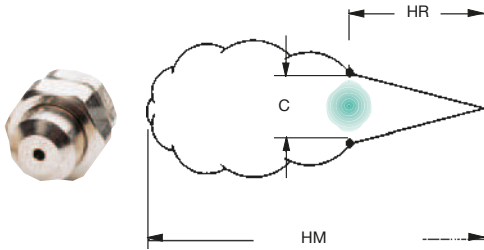




**PRESSURE PRINCIPLE**

**1/4" SIZE**

**INTERNAL MIX SET-UPS**



**FULL CONE SPRAY**

These single orifice set-ups produce narrow angle, full cone shaped, atomized sprays with a spray angle of about 20°.

More precise details on the spray dimensions are given in the table on the right side of the page.

The spray length can reach from 2.500 to 9.000 mm depending upon the set-up type and operating conditions.

See advice on adjustment for flow rates and droplet size given at page 8.

WH = Water capacity (l/ora)

AM = Air capacity (NI/min)

**Materials**

B1 AISI 303 Stainless steel

B31 AISI 316L Stainless steel

D1 PVC

E6 LUCITE® (PMMA)

T8 Nickel plated brass

Set-up code	Air pressure (bar)																
	0,7		1,0		1,5		2,0		3,0		4,0		PA	PL	HR	C	HM
	WH	AM	WH	AM	WH	AM	WH	AM	WH	AM	WH	AM					
<b>SUB 1520</b>	0,7	2,5	15,6	1,4	6,4	13,9	2,7	6,2	23,0	3,5	7,8	28,0	-	-	-	-	-
	0,9	1,8	19,0	1,7	5,5	16,7	2,8	5,7	25,0	3,7	7,3	29,0	0,9	0,7	300	68	2700
	1,0	1,4	22,0	2,0	4,5	19,8	3,0	5,2	27,0	3,9	6,4	33,0	1,7	1,5	330	75	3000
	-	-	-	2,2	3,4	24,0	3,1	4,7	29,0	4,2	5,5	38,0	2,5	2,0	360	82	3400
	Ln XMW 5001	-	-	2,4	3,0	26,0	3,2	4,3	31,0	4,5	4,5	43,0	3,1	3,0	390	96	3800
An XMW 4001	-	-	2,5	2,5	28,0	3,4	3,9	33,0	4,6	4,1	45,0	4,5	4,0	440	116	4400	
-	-	-	2,7	2,3	31,0	3,7	3,0	38,0	4,8	3,7	47,0	-	-	-	-	-	
<b>SUB 1670</b>	0,7	2,5	18,7	1,7	6,7	29,0	2,2	9,2	34,0	2,8	11,9	39,0	-	-	-	-	-
	0,9	2,0	22,0	1,8	6,4	31,0	2,5	8,2	39,0	3,1	11,0	43,0	0,9	0,7	430	90	3700
	1,0	1,6	26,0	2,0	5,9	34,0	2,8	7,2	44,0	3,4	10,1	47,0	1,5	1,5	460	105	4000
	-	-	-	2,1	5,2	37,0	3,0	6,7	47,0	3,7	9,2	52,0	2,4	2,0	480	109	4300
	Ln XMW 5001	-	-	2,2	4,8	40,0	3,1	6,3	49,0	3,9	8,4	58,0	3,0	3,0	510	116	4600
An XMW 4002	-	-	2,4	4,3	43,0	3,2	5,9	52,0	4,2	7,6	62,0	3,9	4,0	560	147	5200	
-	-	-	2,7	3,6	48,0	3,4	5,5	55,0	4,5	6,8	68,0	-	-	-	-	-	
<b>SUB 2142</b>	0,9	4,8	21,0	2,0	10,7	33,0	2,7	16,5	37,0	3,4	20,0	43,0	-	-	-	-	-
	1,1	4,1	27,0	2,1	9,8	37,0	2,8	15,4	38,0	3,7	18,4	47,0	1,5	0,7	480	100	4000
	1,4	3,4	33,0	2,4	8,2	42,0	3,1	13,6	43,0	3,9	16,8	50,0	2,5	1,5	510	116	4300
	1,5	3,1	35,0	2,7	6,8	48,0	3,4	11,8	49,0	4,2	15,2	55,0	3,0	2,0	530	120	4600
	Ln XMW 5002	1,7	3,0	39,0	3,0	5,9	55,0	3,7	10,4	55,0	4,5	13,8	60,0	3,4	3,0	560	137
An XMW 4002	1,8	2,9	41,0	3,2	5,0	59,0	3,9	9,1	61,0	4,8	12,4	65,0	4,2	4,0	600	158	5300
-	2,0	2,8	44,0	3,5	4,1	65,0	4,2	7,9	65,0	4,9	11,8	68,0	-	-	-	-	-
<b>SUC 2376</b>	1,1	13,0	76,0	2,8	20,0	136	3,4	32,0	149	4,6	37,0	193	-	-	-	-	-
	1,4	8,9	91,0	3,1	16,3	149	3,9	25,0	170	5,3	29,0	220	1,7	0,7	660	209	4900
	1,5	7,2	98,0	3,4	11,9	163	4,6	15,9	205	5,6	25,0	235	2,8	1,5	760	268	6100
	1,7	5,8	105	3,9	7,0	187	5,3	9,1	240	6,0	21,0	250	3,9	2,0	810	286	6700
	Ln XMW 5003	1,8	4,7	112	4,2	4,7	205	5,6	6,8	255	6,3	17,4	270	5,3	3,0	910	337
An XMW 4003	2,0	3,6	119	4,6	3,0	220	6,0	5,0	275	6,7	14,0	290	6,0	4,0	970	359	9100
-	2,1	2,7	127	-	-	-	6,3	3,6	290	7,0	11,0	305	-	-	-	-	-
<b>SUC 2690</b>	0,9	31,0	57,0	2,1	53,0	96,0	2,7	80,0	103	3,8	88,0	135	-	-	-	-	-
	1,0	25,0	66,0	2,4	41,0	112	3,0	69,0	117	4,2	73,0	156	1,0	0,7	610	182	4900
	1,1	18,5	75,0	2,7	31,0	127	3,2	59,0	130	4,6	61,0	176	1,8	1,5	690	218	5800
	1,3	12,9	85,0	2,8	26,0	136	3,5	49,0	146	4,9	48,0	196	2,8	2,0	760	268	6700
	Ln XMW 5004	-	-	-	3,0	22,0	144	3,7	44,0	154	5,3	39,0	215	3,5	3,0	790	278
An XMW 4003	-	-	-	-	-	-	3,8	37,0	161	5,6	31,0	240	4,9	4,0	910	337	8500
-	-	-	-	-	-	-	3,9	35,0	170	6,0	23,0	260	-	-	-	-	-
<b>SUC 3129</b>	1,0	44,0	86,0	2,0	123	108	2,2	199	88,0	3,0	250	99,0	-	-	-	-	-
	1,1	32,0	102	2,1	108	119	2,5	174	110	3,2	225	120	1,0	0,7	890	298	6100
	-	-	-	2,2	95,0	130	2,8	146	133	3,5	205	141	1,7	1,5	990	349	7000
	-	-	-	2,4	79,0	143	3,1	121	154	3,8	182	163	2,4	2,0	1040	385	7600
	Ln XMW 5005	-	-	-	2,5	64,0	155	3,2	108	166	4,1	159	184	3,1	3,0	1070	396
An XMW 4004	-	-	-	2,7	52,0	166	3,4	95	176	4,6	121	225	3,8	4,0	1170	455	9100
-	-	-	2,8	42,0	178	3,5	84	187	4,9	93,0	255	-	-	-	-	-	-



**1/4" SIZE** **PRESSURE PRINCIPLE**

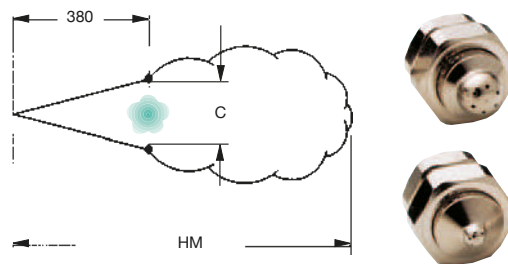
**INTERNAL MIX SET-UPS**

**WIDE ANGLE FULL CONE SPRAY**

These multi-orifice set-ups produce wide angle, full cone shaped, atomized sprays as a result from the combination of several narrow angle sprays.

The resulting encompassed spray angle is about 60° and more precise details on the spray dimensions are given in the table on the right side of the page.

The spray length can reach from 1.500 to 10.400 mm depending upon the set-up type and operating conditions. See advice on adjustment for flow rates and droplet size given at page 8.



WH = Water capacity (l/ora)  
AM = Air capacity (NI/min)

- Materials**
- B1 AISI 303 Stainless steel
  - B31 AISI 316L Stainless steel
  - D1 PVC
  - T8 Nickel plated brass

Set-up code	Air pressure (bar)																
	0,7		1,5		2,0		3,0		4,0		PA	PL	C	HM			
	WH	AM	WH	AM	WH	AM	WH	AM	WH	AM							
<b>SUL 1640</b>	0,6	5,3	10,2	1,5	8,1	16,4	2,4	8,9	22,0	3,1	10,5	24,0	0,7	0,7	230	1500	
	0,7	4,3	12,2	1,8	6,6	21,0	2,7	8,1	26,0	3,4	9,7	28,0	1,4	1,5	240	1800	
	0,9	3,0	14,2	2,1	4,9	25,0	3,0	6,4	30,0	3,9	7,8	36,0	1,8	2,0	250	2100	
	1,0	1,7	17,0	2,4	3,2	29,0	3,2	4,9	34,0	4,2	6,1	42,0	3,0	3,0	260	2700	
	Ln XMW 5001	-	-	-	-	-	-	3,4	4,2	37,0	4,6	4,4	47,0	3,9	4,0	300	4000
An XMW 4010	-	-	-	-	-	-	3,5	3,4	40,0	4,9	2,8	54,0	-	-	-	-	
<b>SUM 2220</b>	0,9	7,0	50,0	2,0	18,5	68,0	2,8	25,0	84,0	3,7	31,0	96,0	-	-	-	-	
	1,0	2,1	62,0	2,1	15,1	76,0	3,0	22,0	92,0	3,8	28,0	105	0,9	0,7	310	1800	
	-	-	-	2,2	11,7	85,0	3,1	18,5	101	3,9	26,0	113	1,7	1,5	330	2400	
	-	-	-	-	-	-	3,2	15,1	109	4,1	23,0	122	2,1	2,0	330	3200	
	Ln XMW 5003	-	-	-	-	-	-	3,4	12,1	119	4,2	20,0	130	3,2	3,0	340	4100
An XMW 4011	-	-	-	-	-	-	3,5	9,1	130	4,6	13,6	153	4,1	4,0	370	5900	
-	-	-	-	-	-	-	3,7	6,1	142	4,9	6,8	183	-	-	-	-	
<b>SUL 2330</b>	1,1	12,3	40,0	2,7	21,0	69,0	4,2	19,3	100	5,6	22,0	130	-	-	-	-	
	1,3	9,9	45,0	3,0	16,3	78,0	4,6	14,6	113	6,0	17,6	142	1,5	0,7	230	2700	
	1,4	7,9	50,0	3,2	12,3	86,0	4,9	10,8	124	6,3	14,0	152	3,0	1,5	240	4600	
	1,5	6,1	54,0	3,4	10,7	91,0	5,3	8,1	135	6,7	11,4	163	3,4	2,0	240	5500	
	1,7	4,9	58,0	3,5	9,3	94,0	5,6	6,2	146	7,0	9,1	174	5,3	3,0	250	7300	
	1,8	3,9	62,0	3,9	6,4	105,0	6,0	4,9	157	-	-	-	6,3	4,0	300	9400	
	An XMW 4013	2,0	3,1	67,0	4,2	4,7	115,0	6,3	4,0	167	-	-	-	-	-	-	-
<b>SUM 2460</b>	0,7	24,0	32,0	2,1	33,0	66,0	2,8	52,0	65,0	3,7	63,0	68,0	-	-	-	-	
	0,9	13,6	44,0	2,2	26,0	78,0	3,0	46,0	76,0	3,8	58,0	79,0	0,9	0,7	360	2100	
	1,0	7,6	57,0	2,4	18,9	89,0	3,1	39,0	87,0	3,9	52,0	101	1,5	1,5	370	3200	
	-	-	-	2,5	11,7	100	3,2	33,0	99,0	4,2	41,0	111	2,4	2,0	370	4100	
	Ln XMW 5004	-	-	-	-	-	-	3,4	26,0	110	4,6	27,0	138	3,2	3,0	380	5000
An XMW 4011	-	-	-	-	-	-	3,5	19,5	122	4,9	15,9	166	3,9	4,0	390	6800	
-	-	-	-	-	-	-	3,7	13,2	133	-	-	-	-	-	-	-	
<b>SUM 2860</b>	1,3	36,0	85,0	3,1	53,0	156	4,2	64,0	197	5,6	74,0	245	-	-	-	-	
	1,5	29,0	102	3,2	50,0	163	4,9	51,0	230	6,0	68,0	260	2,0	0,7	330	5500	
	1,8	23,0	117	3,4	47,0	170	5,6	40,0	265	6,3	62,0	280	3,0	1,5	340	6400	
	2,0	19,7	125	3,5	45,0	177	6,0	34,0	285	6,7	56,0	295	3,9	2,0	370	8200	
	2,1	16,7	133	3,9	38,0	194	6,3	28,0	300	7,0	51,0	315	6,0	3,0	380	9100	
	2,3	14,0	142	4,6	25,0	230	6,7	22,0	320	-	-	-	6,3	4,0	410	10400	
	An XMW 4012	2,4	11,4	149	4,9	18,5	245	7,0	17,8	335	-	-	-	-	-	-	-
<b>SUQ 3140</b>	1,7	25,0	156	3,4	50,0	250	4,6	62,0	320	6,0	93,0	395	2,0	0,7	460	5500	
	1,8	19,7	167	3,5	43,0	260	4,9	47,0	345	6,3	77,0	425	3,2	1,5	470	6400	
	2,0	15,1	178	3,7	41,0	275	5,3	36,0	375	6,7	62,0	460	3,9	2,0	510	7300	
	2,1	11,4	193	3,9	27,0	300	5,6	26,0	405	7,0	52,0	495	5,3	3,0	530	7900	
	2,3	7,6	205	4,1	23,0	310	6,0	18,9	435	-	-	-	6,3	4,0	580	9800	
	Ln XMW 5005	-	-	-	4,2	18,9	320	6,3	13,6	460	-	-	-	-	-	-	-
	An XMW 4014	-	-	-	4,4	15,9	335	-	-	-	-	-	-	-	-	-	-

0,7

2,0

3,0

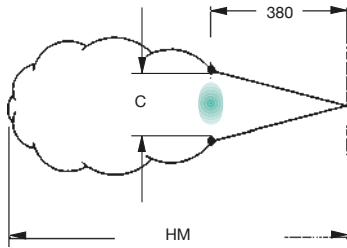
4,0

Liquid pressure (bar)

**PRESSURE PRINCIPLE**

**1/4" SIZE**

**INTERNAL MIX SET-UPS**



**FLAT SPRAY**

These single orifice set-ups produce flat fan shaped atomized sprays. More precise details on the spray dimensions are given in the table on the right side of the page.

The spray length can reach from 1.800 to 5.200 mm depending upon the set-up type and operating conditions.

See advice on adjustment for flow rates and droplet size given at page 8.

WH = Water capacity (l/ora)  
AM = Air capacity (NI/min)

**Materials**  
B1 AISI 303 Stainless steel  
B31 AISI 316L Stainless steel  
D1 PVC  
T8 Nickel plated brass

Set-up code	Air pressure (bar)																			
	0,7		2,0		3,0		4,0		5,0		6,0		7,0		PA	PL	C	HM		
	WH	AM	WH	AM	WH	AM	WH	AM	WH	AM	WH	AM								
<b>SUU 2101</b>	0,7	5,5	24	2,0	8,6	42	2,7	11,2	52	3,9	12	69	1,1	0,7	460	2600				
	0,9	4,7	27	2,2	7,5	47	3,0	10,1	56	4,6	9,7	81	2,1	1,5	660	3000				
	1,0	4,1	31	2,5	6,2	52	3,2	9,1	62	5,3	7,5	93	2,8	2,0	760	3200				
	1,1	3,5	34	2,8	5,2	57	3,5	8,1	66	6,0	5,3	104	3,5	3,0	860	3400				
	1,3	3,0	37	3,1	4,2	63	4,2	5,4	79	6,3	4,3	110	6,0	4,0	940	4000				
	Ln XMW 5001	1,4	2,5	40	3,2	3,7	65	4,6	4,2	85	6,7	3,3	116	-	-	-	-			
	An XMW 4020	1,5	2,0	44	3,4	3,2	68	4,9	3,1	91	7,0	2,4	122	-	-	-	-			
<b>SUU 2160</b>	1,3	3,9	30	3,0	6,1	52	3,9	9,4	60	5,3	10,2	78	1,5	0,7	460	1800				
	1,4	3,0	33	3,1	5,3	54	4,2	7,2	67	5,6	8,3	84	2,7	1,5	690	2000				
	1,5	2,3	35	3,2	4,5	57	4,6	5,3	73	6,0	6,6	89	3,2	2,0	910	2000				
	1,7	1,8	38	3,4	3,8	59	4,9	3,8	80	6,3	5,1	98	4,2	3,0	940	2100				
	Ln XMW 5002	1,8	1,3	41	3,5	3,2	62	-	-	-	-	-	5,6	4,0	970	2300				
	An XMW 4022	2,0	1,0	44	3,9	1,8	68	-	-	-	-	-	-	-	-	-	-			
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
<b>SUM 2167</b>	1,0	9,0	25	2,4	11,6	48	3,1	15,6	56	4,2	17,1	73	1,4	0,7	170	3000				
	1,1	7,8	30	2,5	10,4	51	3,2	14,6	59	4,6	15	80	2,5	1,5	200	3700				
	1,3	6,6	32	2,7	9,40	54	3,4	13,7	62	4,9	12,8	87	3,2	2,0	220	4000				
	1,4	5,2	36	3,0	7,30	61	3,8	10,8	71	5,3	11	94	3,8	3,0	280	4200				
	1,7	3,1	44	3,2	5,50	68	4,2	8,5	82	5,6	9,4	103	5,3	4,0	330	4800				
	Ln XMW 5002	2,0	2,0	50	3,5	4,10	75	4,9	5,2	98	6,3	7,2	119	-	-	-	-			
	An XMW 4021	2,2	1,1	56	3,8	2,90	81	6,0	2,3	120	7,0	6,1	134	-	-	-	-			
<b>SUU 2171</b>	0,9	8,2	20	2,1	13,5	36	2,7	19,1	42	4,6	16,1	69	1,1	0,7	710	2100				
	1,0	6,8	23	2,4	11,4	42	3,0	17,1	46	4,9	13,8	76	2,1	1,5	810	2400				
	1,1	5,5	27	2,7	9,20	47	3,2	15,1	52	5,3	11,5	83	3,0	2,0	890	2600				
	1,3	4,1	30	3,0	7,10	53	3,5	13,1	57	5,6	9,3	90	3,5	3,0	970	2700				
	1,4	2,9	34	3,2	5,00	59	4,2	8,1	72	6,0	7,3	97	5,6	4,0	970	3200				
	Ln XMW 5002	-	-	-	3,4	4,00	63	4,6	5,9	79	6,3	5,6	104	-	-	-	-			
	An XMW 4020	-	-	-	3,5	3,30	66	4,9	4,0	86	6,7	4,3	112	-	-	-	-			
<b>SUM 2320</b>	1,1	11,2	54	2,7	19,6	93	3,5	27	112	4,6	33	137	1,4	0,7	200	3000				
	1,3	8,5	60	2,8	17,3	98	3,7	25	116	4,9	28	149	2,4	1,5	330	3200				
	1,4	6,5	65	3,0	15,2	103	3,8	23	121	5,3	24	161	3,0	2,0	460	3400				
	1,5	5,0	71	3,1	13,2	109	3,9	21	126	5,6	19,7	174	3,7	3,0	460	3500				
	1,7	3,8	77	3,2	11,4	114	4,1	18,9	132	6,0	15,7	187	5,3	4,0	480	4000				
	Ln XMW 5003	-	-	-	-	-	-	4,2	17	137	6,3	12,4	200	-	-	-	-			
	An XMW 4024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
<b>SUM 2600</b>	1,0	17,0	23	2,4	28,0	51	3,4	38	72	3,9	65	75	1,1	0,7	150	2400				
	1,1	11,0	27	2,5	23,0	59	3,5	33	80	4,2	53	89	2,1	1,5	170	3000				
	1,3	7,6	33	2,7	18,9	66	3,7	28	89	4,6	40	108	2,8	2,0	220	3400				
	1,4	3,2	40	2,8	15,1	74	3,8	23	97	4,9	30	127	3,7	3,0	280	3600				
	-	-	-	3,0	11,7	79	3,9	19,7	105	5,3	21	149	4,9	4,0	350	4000				
	Ln XMW 5004	-	-	-	-	-	-	4,2	13,1	120	5,6	13,8	173	-	-	-	-			
	An XMW 4023	-	-	-	-	-	-	4,6	7,2	138	6,3	3,2	225	-	-	-	-			
<b>SUQ 2700</b>	0,9	27,0	33	2,4	39,0	67	3,2	58	76	4,6	59	106	1,1	0,7	300	3400				
	1,0	20,0	38	2,7	30,0	77	3,5	47	87	5,3	40	132	2,4	1,5	410	3500				
	1,1	15,9	45	3,0	24,0	87	3,8	38	97	5,6	32	145	3,2	2,0	430	3700				
	1,3	12,5	48	3,2	17,8	98	3,9	34	103	6,0	26	158	3,9	3,0	480	3800				
	1,4	10,2	56	3,4	15,1	103	4,2	27	113	6,3	20	172	6,0	4,0	510	4400				
	Ln XMW 5004	1,5	7,6	62	3,5	12,9	109	4,6	20	126	6,7	15,9	185	-	-	-	-			
	An XMW 4024	-	-	-	3,7	10,6	114	4,9	14,8	140	7,0	12,7	198	-	-	-	-			
<b>SUQ 3126</b>	1,0	29,0	90	2,1	100	119	3,0	126	140	4,1	140	181	1,0	0,7	250	3400				
	1,1	18,9	108	2,2	79,0	133	3,1	110	151	4,2	125	193	1,8	1,5	430	3800				
	-	-	-	2,4	62,0	147	3,2	95	163	4,6	89	225	2,4	2,0	460	4300				
	-	-	-	2,5	48,0	162	3,4	78	184	4,9	58	265	3,4	3,0	530	4600				
	-	-	-	2,7	36,0	177	3,5	62	193	5,3	34	305	4,9	4,0	580	5200				
	Ln XMW 5005	-	-	-	-	-	-	3,7	48	210	5,6	16,7	340	-	-	-	-			
	An XMW 4025	-	-	-	-	-	-	3,8	37	225	-	-	-	-	-	-	-			

0,7

2,0

3,0

4,0

Liquid pressure (bar)



1/4" SIZE

SIPHON PRINCIPLE

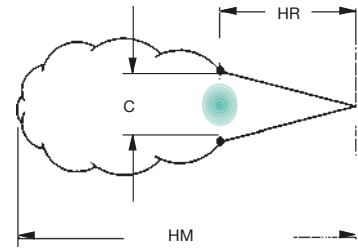
INTERNAL MIX SET-UPS

ROUND AND FLAT SPRAYS

These set-ups are designed to work with a liquid fed out of an ambient pressure container, either by liquid siphoning or by gravity head.

Therefore the performance tables give the water flow rate for both suction head (green background) and gravity head (white background).

The approximate spray depending upon set-up type and operating conditions are given from the table at the right, while advice about adjustment for flow rates and droplet sizes given at page 8.



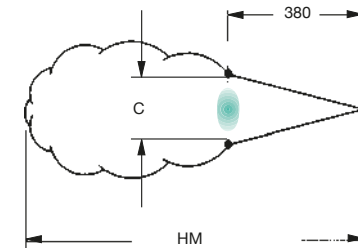
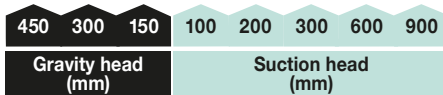
WH = Water capacity (l/ora)  
AM = Air capacity (Nl/min)

- Materials
- B1 AISI 303 Stainless steel
  - B31 AISI 316L Stainless steel
  - D1 PVC
  - T8 Nickel plated brass

Set-up code	Air pressure (bar)										Full Cone Spray			
	Air capacity (Nml/min)										PA	HR	C	HM
	Liquid capacity (l/ora)													
<b>SUC 1120</b>	0,7	11	1,5	1,3	1,1	0,9	0,7	0,5	-	-	0,7	280	89	1800
	1,5	17	1,8	1,7	1,5	1,3	1,2	1,1	0,6	-	1,5	280	89	1900
	3,0	28	2,1	1,9	1,7	1,5	1,4	1,3	1,1	0,8	3,0	300	95	2300
	4,0	36	2,2	2,0	1,8	1,6	1,5	1,4	1,2	0,9	4,0	360	114	2600
<b>SUC 1190</b>	0,7	13	2,4	2,1	1,7	1,5	1,2	0,8	-	-	0,7	300	95	2100
	1,5	20	2,8	2,6	2,4	2,1	1,9	1,6	0,9	-	1,5	330	104	2300
	3,0	32	3,4	3,1	2,9	2,8	2,6	2,4	1,7	1,1	3,0	380	120	2600
	4,0	41	3,7	3,4	3,3	3,1	2,9	2,7	2,1	1,5	4,0	430	144	3000
<b>SUC 1200</b>	0,7	23	2,5	2,3	2,0	1,6	1,4	1,1	-	-	0,7	300	95	2400
	1,5	36	2,9	2,8	2,5	2,2	2,0	1,7	0,9	-	1,5	330	104	2700
	3,0	58	3,4	3,3	3,2	2,9	2,8	2,5	1,9	1,2	3,0	380	127	3400
	4,0	74	3,7	3,6	3,5	3,4	3,3	3,0	2,5	2,0	4,0	430	151	4000
<b>SUC 1290</b>	0,7	19	4,5	4,0	3,4	2,1	1,8	1,4	-	-	0,7	380	140	3000
	1,5	31	5,3	4,9	4,4	3,5	2,9	2,7	1,8	-	1,5	410	152	3400
	3,0	50	6,0	5,6	5,0	4,4	4,0	3,4	2,4	1,2	3,0	460	170	4000
	4,0	65	5,7	5,4	5,0	4,2	3,9	3,5	2,8	1,9	4,0	510	198	4600
<b>SUC 2105</b>	1,5	58	22,0	19,9	16,3	12,3	10,5	8,3	2,8	-	1,5	460	137	3700
	3,0	88	25,0	23,0	19,5	16,7	14,2	11,5	6,4	2,8	3,0	510	161	4300
	4,0	111	26,0	24,0	21,0	18,4	15,7	12,9	7,9	4,5	4,0	530	168	4900
	5,6	147	26,0	24,0	22,0	19,7	17,0	14,6	9,8	6,1	5,6	580	194	5500
<b>SUC 2180</b>	2,0	144	-	-	-	27,0	22,0	16,8	-	-	2,0	510	180	6700
	3,0	190	-	-	-	30,0	26,0	21,0	-	-	3,0	530	187	7000
	4,0	240	-	43,0	40,0	31,0	28,0	23,0	11,0	-	4,0	580	215	7600
	5,6	315	44,0	42,0	39,0	31,0	28,0	24,0	16,7	8,3	5,6	630	245	8200



Set-up code	Air pressure (bar)										Flat Fan Spray		
	Air capacity (Nml/min)										PA	C	HM
	Liquid capacity (l/ora)												
<b>SUQ 0860</b>	0,7	28	1,3	1,2	1,1	1,0	1,0	0,8	0,6	0,5	0,7	380	2100
	1,5	43	1,2	1,1	1,0	0,9	0,9	0,8	0,7	0,5	1,5	380	2100
	2,0	50	0,8	0,8	0,7	0,6	0,5	-	-	-	2,0	380	1800
<b>SUQ 1280</b>	1,5	56	3,7	3,5	3,3	2,9	2,8	2,5	2,3	2,1	1,5	380	2700
	2,0	65	3,4	3,3	3,1	2,8	2,7	2,6	2,4	2,2	2,0	420	2700
	3,0	87	2,8	2,7	2,5	2,4	2,2	2,1	1,9	1,7	3,0	460	3000
	4,0	110	1,9	1,8	1,6	1,5	1,3	1,2	-	-	4,0	480	2700
<b>SUQ 1370</b>	1,5	68	5,1	4,8	4,5	3,8	3,7	3,5	3,0	2,4	1,5	270	3400
	2,0	78	4,9	4,7	4,4	3,6	3,4	3,2	2,9	2,3	2,0	280	3400
	3,0	103	3,4	3,2	3,0	2,2	2,0	1,7	-	-	3,0	300	3000
	3,5	117	2,2	2,0	1,7	-	-	-	-	-	-	-	-
<b>SUQ 1540</b>	1,5	63	7,6	7,2	6,6	5,7	5,4	5,1	4,6	3,7	1,5	270	3400
	2,0	73	7,6	7,3	6,8	5,9	5,7	5,5	5,0	4,2	2,0	290	3400
	3,0	96	6,4	6,1	5,7	5,0	4,5	4,1	3,3	-	3,0	330	3400
	3,5	110	4,2	3,7	3,2	2,6	-	-	-	-	-	-	-



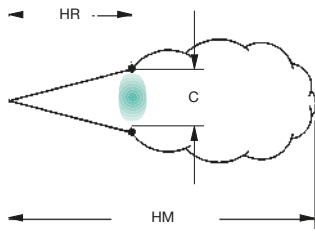
WH = Water capacity (l/ora)  
AM = Air capacity (Nl/min)



**PRESSURE PRINCIPLE**

**1/4" SIZE**

**EXTERNAL MIX**



WH = Water capacity (l/ora)  
AM = Air capacity (NI/min)

**FLAT FAN SPRAY**

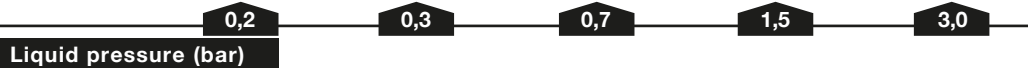
These set-ups are designed in order to have two different paths for air and liquid, and to eject them through different orifices, so that the atomized spray is produced from their impact in the immediate surroundings of the orifices. It is possible therefore to atomize viscous liquids as well as any liquid which might originate a solid build up in the mixing chamber of an ordinary internal mix atomizer.

In addition liquid and air pressure can be adjusted independently from each other, which allows for an easy steady state atomizer regulation. The approximate spray depending upon set-up type and operating conditions are given from the table at the right, while advice about adjustment for flow rates and droplet sizes given at page 8

**Materials**

- B1 AISI 303 Stainless steel
- B31 AISI 316L Stainless steel
- D1 PVC
- T8 Nickel plated brass

Set-up code	Air pressure (bar)																				
	WH		AM		WH		AM		WH		AM		WH		AM		PA	PL	C	HM	HR
<b>SUL 2110</b>	0,2		25	0,4		26	0,7		31	1,4		45	2,8		74	0,2	0,2	230	900	150	
	0,4		26	0,7		31	1,1		40	1,8		54	3,5		85	1,1	0,2	230	1200	150	
	0,7		31	1,1		40	1,4		45	2,1		60	4,2		102	1,4	0,4	230	1200	150	
	1,1	2,8	40	1,4	3,5	45	1,8	5,3	54	2,8	7,8	74	4,9	11	119	1,4	1,4	250	1500	180	
	1,4		45	1,8		54	2,1		59	3,5		85	5,3		128	1,8	0,7	240	1500	150	
	An XMW 4030	1,8		54	2,1		59	2,8		74	4,2		102	5,6		139	2,8	1,4	280	1800	180
<b>SUT 2111</b>	0,4		22	0,4		22	0,4		25	0,6		28	0,7		34	0,6	0,7	400	1800	300	
	0,5		25	0,5	3,5	25	0,6	5,3	28	0,7	7,8	34	1,1	11	45	0,6	1,5	460	1800	350	
	0,5		27	0,6		28	0,7		34	1,1		45	1,8		62	1,4	1,5	410	2700	300	
	0,6		28	0,7		34	0,9		40	1,4		54	2,5		79	1,1	2,0	480	2600	350	
	<b>SUR 2166</b>	0,4		26	0,7		31	1,1		40	1,8		54	3,2		82	0,4	0,2	220	1000	140
		0,7		31	1,1		40	1,4		45	2,1		59	3,5		85	1,4	0,2	220	1700	150
1,1			40	1,4		45	1,8		54	2,8		74	4,2		102	1,8	0,4	230	1800	165	
1,4		4,5	45	1,8	5,5	54	2,1	8,3	59	3,5	12,2	85	4,9	16,6	119	1,8	1,4	290	2100	190	
1,8			54	2,1		59	2,8		74	4,2		102	5,3		127	2,1	0,7	250	1800	180	
An XMW 4030		2,1		59	2,8		74	3,5		85	4,9		119	6,3		159	3,5	1,4	300	2400	220
<b>SUV 2172</b>	0,4		22	0,4		22	0,6		28	0,7		34	1,1		45	0,7	1,5	580	1800	460	
	0,6		28	0,7	5,5	34	0,7	8,3	34	1,4	12,2	54	1,4	17,2	54	1,4	1,5	560	2400	430	
	0,7		34	1,1		45	1,4		54	2,1		71	2,1		71	1,8	2,0	580	2700	460	
	1,1		45	1,4		54	2,1		71	2,5		79	2,5		79	1,8	3,0	660	2900	480	
	<b>SUS 2330</b>	0,7		31	1,1		40	1,4		45	2,5		68	3,5		85	0,7	0,2	250	1200	165
		1,1		40	1,4		45	1,8		54	2,8		74	4,2		102	1,8	0,2	250	1800	165
1,4			45	1,8		54	2,1		59	3,5		85	4,9		119	2,1	0,4	240	1800	180	
1,8		8,5	54	2,1	10,4	59	2,8	15,9	74	4,2	23	102	5,3	33	127	2,5	1,4	320	1800	200	
2,1			59	2,8		74	3,5		85	4,9		119	5,6		139	2,8	0,7	300	2300	190	
An XMW 4030		2,8		74	3,5		85	4,2		102	5,6		139	6,3		159	4,2	1,4	360	3000	200
<b>SUV 2331</b>	0,4		25	0,4		25	0,4		25	0,7		34	1,4		54	0,6	0,7	630	1500	480	
	0,5		27	0,6	10,4	28	0,6	15,9	28	0,9	23	40	1,8	33	62	0,7	1,5	630	1800	480	
	0,6		28	0,7		31	0,7		34	1,1		45	2,1		71	1,4	1,5	660	2400	530	
	0,7		34	0,8		34	0,9		40	1,4		54	2,5		79	1,8	2,0	690	2700	510	
	<b>SUQ 2520</b>	0,7		85	1,0		102	1,4		116	2,5		178	3,2		212	0,7	0,2	250	1700	190
		1,0		102	1,4		116	1,8		139	2,8		195	3,5		232	1,8	0,2	250	2700	190
1,4			116	1,8		139	2,1		156	3,5		227	3,9		255	2,1	0,4	280	3000	190	
1,8		13,4	139	2,1	16,4	156	2,5	25	178	4,2	37	266	4,2	52	275	2,5	0,7	280	3500	220	
2,1			156	2,8		195	2,8		195	4,9		312	4,9		314	2,5	1,4	360	3700	230	
An XMW 4032		2,8		195	3,5		227	3,5		227	5,6		360	5,6		360	4,2	1,4	370	4300	230
<b>SUV 2521</b>	0,6		91	0,7		102	1,4		156	2,1		210	3,2		285	2,1	0,7	560	4300	400	
	0,7		102	1,1	16,4	130	2,1	25	210	2,8	37	260	4,2	52	360	2,1	1,5	580	4000	460	
	1,1		130	1,8		184	2,5		235	3,5		310	5,3		430	4,2	1,5	640	5200	480	
	1,4		156	2,1		210	2,8		260	4,2		360	5,6		455	3,9	2,0	690	4600	510	



1/4" SIZE

PRESSURE PRINCIPLE

EXTERNAL MIX

FLAT FAN SPRAY

Set-up code	Air pressure (bar)																			
	WH		AM	WH		AM	WH		AM	WH		AM	WH		AM	PA	PL	C	HM	HR
<b>SUT 2680</b> Ln XMW 5003 An XMW 4032	0,7		85	1,4		116	1,8		139	2,8		195	3,5		232	0,7	0,4	270	2100	190
	1,0		102	1,8		139	2,1		156	3,2		212	4,2		275	1,8	0,7	270	3000	190
	1,4		116	2,1		156	2,5		178	3,5		227	4,9		314	2,5	1,4	330	3400	220
	1,8	17,6	139	2,5	22	178	2,8	33	195	4,2	48	266	5,3	68	340	2,8	1,4	360	3800	220
	2,1		156	2,8		195	3,5		227	4,9		312	5,6		360	2,8	1,4	370	4000	250
	2,8		195	3,5		227	4,2		266	5,6		360	6,3		411	4,2	2,1	370	4900	250
3,5		227	4,2		266	4,9		312	6,3		411	6,6		428	5,3	2,8	360	5800	230	
<b>SUV 2681</b> Ln XMW 5003 An XMW 4033	0,6		91	0,7		102	1,1		130	2,5		235	3,5		310	1,8	0,7	640	3000	480
	1,1	17,6	130	1,4	22	156	1,8	33	184	3,2	48	285	4,6	68	380	2,5	1,5	640	3800	460
	1,4		156	1,8		184	2,5		235	3,9		330	6,0		475	4,2	1,5	580	4900	430
	1,8		184	2,1		210	2,8		260	4,2		360	6,7		525	4,2	2,0	610	5200	430
<b>SUN 3101</b> Ln XMW 5004 An XMW 4032	1,0		102	1,8		139	2,5		178	3,2		212	3,9		255	1,0	0,2	250	2700	200
	1,4		116	2,1		156	2,8		195	3,5		227	4,2		275	2,1	0,2	290	3000	220
	1,8		139	2,5		178	3,2		212	3,9		246	4,6		297	2,8	0,4	360	3500	240
	2,1	36	156	2,8	45	195	3,5	68	227	4,2	100	266	4,9	141	314	3,2	1,4	390	3700	280
	2,5		178	3,2		212	4,2		266	4,9		312	5,6		360	3,5	0,7	380	4000	270
	2,8		195	3,5		227	4,9		312	5,6		360	6,3		411	4,2	1,4	390	4800	280
3,5		227	4,2		266	5,6		360	6,3		411	7,0		453	5,6	2,8	380	5900	240	
<b>SUN 3102</b> Ln XMW 5008 An XMW 4034	1,8		235	1,8		235	2,5		300	3,9		410				1,8	0,2	290	3000	200
	2,1		260	2,1		260	2,8		330	4,2		445				2,8	0,2	300	3400	200
	2,5		300	2,5		300	3,2		355	4,6		480				2,8	0,3	300	4000	200
	2,8	36	330	2,8	45	330	3,5	68	380	4,9	100	529				3,5	0,7	320	4300	220
	3,2		355	3,2		355	3,9		410	5,3		565				3,9	1,5	340	4600	220
	3,5		380	3,5		380	4,2		445	5,6		600				4,2	1,0	330	4700	230
4,2		445	4,2		445	4,9		520	6,3		685				4,9	1,5	340	5500	230	
<b>SUW 3141</b> Ln XMW 5004 An XMW 4033	0,7		102	1,1		130	1,8		184	3,2		285	5,3		430	2,8	0,7	810	4000	580
	1,1	36	130	1,4	45	156	2,1	68	210	3,5	100	310	6,0	141	475	3,2	1,5	790	4300	580
	1,4		156	2,1		210	2,8		260	4,9		405	6,7		525	5,6	1,5	660	5800	510
	1,8		184	2,5		235	3,2		285	5,9		455	7,0		550	3,9	2,0	840	4300	640
<b>SUN 3175</b> Ln XMW 5009 An XMW 4034	2,1		260	2,8		330	3,9		410	4,9		520				2,1	0,2	340	3500	240
	2,5		300	3,2		355	4,2		445	5,3		565				3,2	0,2	360	4300	240
	2,8		330	3,5		380	4,6		480	5,6		600				3,9	0,3	360	4900	250
	3,2	64	355	3,9	78	410	4,9	119	520	6,0	175	640				4,9	0,7	360	5500	250
	3,5		380	4,2		445	5,3		565	6,3		685				4,9	1,5	380	5500	250
	4,2		445	4,9		520	5,6		600							5,3	1,0	380	5800	250
4,9		520	5,6		600	6,3		685							5,6	1,5	380	6100	250	
<b>SUN 3280</b> Ln XMW 5005 An XMW 4034	2,8		330	3,5		380	4,6		480	5,6		600				2,8	0,2	360	4600	250
	3,2		355	3,9		410	4,9		520	6,0		640				3,9	0,2	370	4900	250
	3,5		380	4,2		445	5,3		565	6,3		685				4,6	0,3	370	5200	250
	3,9	102	410	4,6	125	480	5,6	192	600		280					5,3	0,7	380	5500	270
	4,2		445	4,9		520	6,0		640							5,6	1,0	410	5500	270
	4,6		480	5,3		565	6,3		685							5,6	1,5	410	5800	270
4,9		520	5,6		600										6,0	1,5	410	6100	270	

0,2

0,3

0,7

1,5

3,0

Liquid pressure (bar)

CLASSIC ATOMIZERS

1/2" SIZE

MW

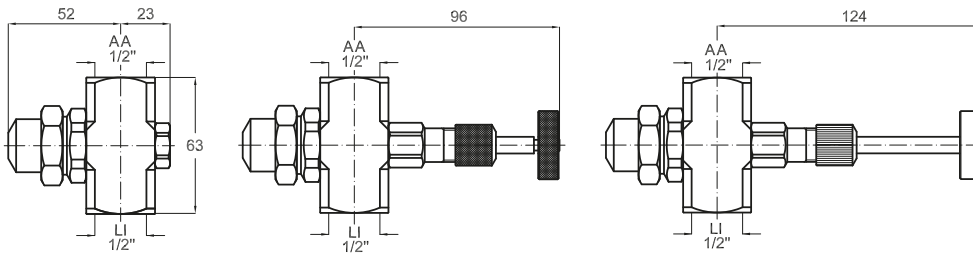
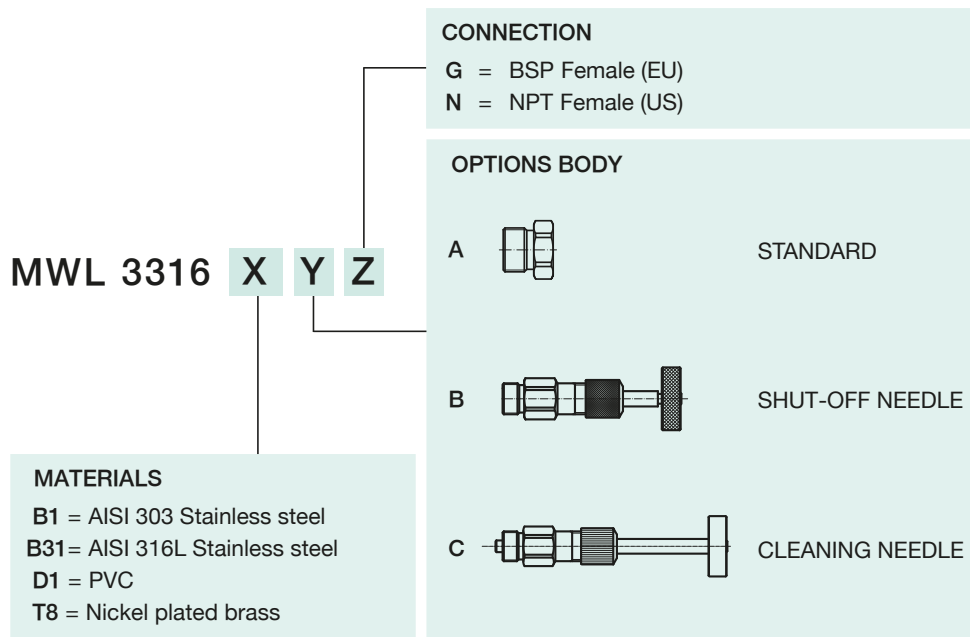
STANDARD BODY



When atomizing higher quantities of liquid is required it is necessary to use larger size atomizer types, as shown in the following pages.

Atomizer design and coding follow the same scheme as smaller size types, with set-up codes and body/option codes. These atomizers offer the same spray patterns as the smaller models, with a capacity range from 32 to 1.158 liter per hour.

The larger size body has two 1/2" inlets, and it is only available in the standard type with no air actuated spray control possible.



AA = Air Inlet (1/2" F)  
LI = Liquid Inlet (1/2" F)



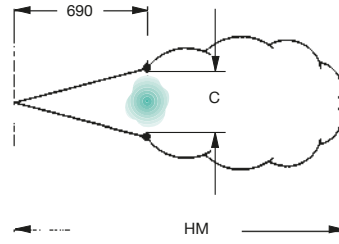
1/2" SIZE

PRESSURE PRINCIPLE

INTERNAL MIX

LARGER CAPACITIES

Larger capacities atomizers shown in these pages work on pressure and siphon liquid feed, and internal and external mix principles. A wide angle hollow cone spray is also available. Approximate jet dimensions are given in the table on the right of the page, while advice about operation adjustment is given at page 8. Please note the larger dimensions for the complete atomizer, as given in the previous page.



WH = Water capacity (l/ora)  
AM = Air capacity (NI/min)

- Materials  
 B1 AISI 303 Stainless steel  
 B31 AISI 316L Stainless steel  
 D1 PVC  
 T8 Nickel plated brass

Set-up code	Air pressure (bar)																				
	WH		AM		WH		AM		WH		AM		WH		AM			PA	PL	C	HM
<b>SUL 3316</b>	-	-	-	-	-	-	2,1	213	176	3,1	316	214	4,2	238	351	2,1	2	690	6700	WIDE ANGLE ROUND SPRAY	
Ln XMW 5201	-	-	-	-	-	-	2,3	127	249	3,2	195	292	4,3	154	439	3,2	3	690	7300		
An XMW 4110	-	-	-	-	-	-	-	-	-	-	107	371	4,5	100	521	4,3	4	690	8500		
<b>SUL 3192</b>	0,6	102	184	1,1	215	153	2,5	185	355	3,7	192	560	5,0	230	830	0,7	0,4	650	6100	WIDE ANGLE ROUND SPRAY	
	0,7	57	230	1,3	124	230	2,7	146	410	3,9	150	620	5,3	158	940	1,3	1,0	670	7900		
	0,9	32	280	1,4	84	280	2,8	112	465	4,0	119	680	5,6	108	1080	2,8	2,0	650	6400		
Ln XMW 5201	-	-	-	3,0	86	520	4,2	86	770	-	-	-	-	-	-	4,0	3,0	670	7300		
An XMW 4111	-	-	-	3,1	65	580	4,6	51	910	-	-	-	-	-	-	5,3	4,0	690	8200		
<b>SUL 3300</b>	0,7	129	325	1,7	182	540	3,1	265	810	4,3	350	1000	-	-	-	0,9	0,4	690	7900		WIDE ANGLE ROUND SPRAY
	0,9	82	370	1,8	143	590	3,2	215	860	4,6	260	1080	-	-	-	1,7	1,0	660	7300		
	1,0	45	415	-	-	-	3,4	173	910	5,0	186	1200	-	-	-	3,4	2,0	660	7000		
Ln XMW 5201	-	-	-	3,5	136	950	-	-	-	-	-	-	-	-	-	4,6	3,0	690	8500		
An XMW 4112	-	-	-	3,6	120	980	-	-	-	-	-	-	-	-	-	-	-	-	-		
<b>SUM 3740</b>	0,7	134	315	1,3	320	440	2,1	575	570	3,0	740	710	3,9	840	860	0,7	0,4	910	3400	WIDE ANGLE ROUND SPRAY	
	0,9	100	380	1,4	255	520	2,2	505	640	3,1	690	770	4,1	790	930	1,4	1,0	910	4900		
	-	-	-	1,5	200	590	2,4	440	720	3,2	630	840	4,2	740	990	2,5	2,0	810	6100		
	-	-	-	1,7	154	670	2,5	380	790	3,4	570	910	4,4	690	1070	3,4	3,0	740	6700		
	-	-	-	-	-	-	2,7	330	860	3,5	520	980	4,5	650	1140	4,5	4,0	730	7600		
	-	-	-	-	-	-	2,8	275	930	3,7	470	1050	4,6	600	1210	-	-	-	-		
	-	-	-	-	-	-	3,0	235	1010	3,8	420	1120	4,8	550	1280	-	-	-	-		
	-	-	-	-	-	-	3,1	195	1080	3,9	345	1190	4,9	510	1350	-	-	-	-		
Ln XMW 5202	-	-	-	-	-	-	-	-	-	4,1	325	1260	5,1	465	1430	-	-	-	-		
An XMW 4113	-	-	-	-	-	-	-	-	-	-	-	-	5,2	425	1490	-	-	-	-		
<b>SUB 3230</b>	1,3	34	350	1,7	146	365	3,0	230	510	-	-	-	-	-	-	1,4	0,4	-	6700	ROUND SPRAY	
	1,4	25	390	1,8	121	395	3,1	200	550	-	-	-	-	-	-	2,0	1,0	250	7300		
	1,5	20	415	2,0	102	430	3,2	176	590	-	-	-	-	-	-	3,2	2,0	-	8200		
	1,7	15,5	445	2,1	86	460	3,4	154	620	-	-	-	-	-	-	-	-	-	-		
Ln XMW 5201	-	-	-	2,3	72	490	3,5	135	660	-	-	-	-	-	-	-	-	-	-		
An XMW 4101	-	-	-	2,4	60	520	3,6	118	700	-	-	-	-	-	-	-	-	-	-		
<b>SUB 3740</b>	0,7	134	315	1,3	320	440	2,1	575	570	3,0	740	710	3,9	840	860	0,7	0,4	230	7000	ROUND SPRAY	
	0,9	100	380	1,4	255	520	2,2	505	640	3,1	690	770	4,1	790	930	1,4	1,0	280	6400		
	-	-	-	1,5	200	590	2,4	440	720	3,2	630	840	4,2	740	990	2,5	2,0	250	11300		
	-	-	-	1,7	154	670	2,5	380	790	3,4	570	910	4,4	690	1070	3,4	3,0	250	12500		
	-	-	-	-	-	-	2,7	330	860	3,5	520	980	4,5	650	1140	4,5	4,0	250	14300		
	-	-	-	-	-	-	2,8	275	930	3,7	470	1050	4,6	600	1210	-	-	-	-		
	-	-	-	-	-	-	3,0	235	1010	3,8	420	1120	4,8	550	1280	-	-	-	-		
	-	-	-	-	-	-	3,1	195	1080	3,9	345	1190	4,9	510	1350	-	-	-	-		
Ln XMW 5202	-	-	-	-	-	-	-	-	-	4,1	325	1260	5,1	465	1430	-	-	-	-		
An XMW 4102	-	-	-	-	-	-	-	-	-	-	-	-	5,2	425	1490	-	-	-	-		
<b>SUM 3184</b>	-	-	-	1,8	154	590	3,4	184	950	-	-	-	-	-	-	2,0	1,0	910	5800	FLAT FAN SPRAY	
Ln XMW 5201	-	-	-	2,0	119	640	3,5	157	1010	-	-	-	-	-	-	3,5	2,0	970	7000		
An XMW 4120	-	-	-	2,1	93	690	3,7	133	1060	-	-	-	-	-	-	-	-	-	-		
<b>SUQ 3740</b>	0,7	134	315	1,3	320	440	2,1	575	570	3,0	740	710	3,9	840	860	0,7	0,4	1190	4000	FLAT FAN SPRAY	
	0,9	100	380	1,4	255	520	2,2	505	640	3,1	690	770	4,1	790	930	1,4	1,0	2110	4600		
	-	-	-	1,5	200	590	2,4	440	720	3,2	630	840	4,2	740	990	2,5	2,0	2080	5200		
	-	-	-	1,7	154	670	2,5	380	790	3,4	570	910	4,4	690	1070	3,4	3,0	2160	5800		
	-	-	-	-	-	-	2,7	330	860	3,5	520	980	4,5	650	1140	4,5	4,0	2260	6400		
	-	-	-	-	-	-	2,8	275	930	3,7	470	1050	4,6	600	1210	-	-	-	-		
	-	-	-	-	-	-	3,0	235	1010	3,8	420	1120	4,8	550	1280	-	-	-	-		
	-	-	-	-	-	-	3,1	195	1080	3,9	345	1190	4,9	510	1350	-	-	-	-		
Ln XMW 5202	-	-	-	-	-	-	-	-	-	4,1	325	1260	5,1	465	1430	-	-	-	-		
An XMW 4121	-	-	-	-	-	-	-	-	-	-	-	-	5,2	425	1490	-	-	-	-		

0,35

1,0

2,0

3,0

4,0

Liquid pressure (bar)

**MORE SET-UP TYPES**

**1/2" SIZE**

**LARGER CAPACITIES**

**EXTERNAL MIX / FLAT JET**

These set-ups can atomize high viscosity liquids and use the wide regulation range possible with independent regulation of the air and liquid pressure. See previous page for materials

Set-up code	Air pressure (bar)																			
	WH		AM		WH		AM		WH		AM		WH		AM		PA	PL	C	HM
<b>SUM 4145</b>	2,1		877	2,8		1075	3,2		1174	3,9		1358	5,6		1839	2,5	0,2	520	5800	
	2,4		962	3,2		1174	3,5		1273	4,2		1457	6,0		1952	3,5	0,4	550	6700	
	2,8	522	1075	3,5	681	1273	3,9	795	1358	4,9	953	1641	6,3	1158	2037	3,9	0,5	580	7020	
	3,2		1174	3,9		1358	4,2		1457	5,3		1754	6,6		2122	4,9	0,7	610	7630	
Ln XMW 5201 An XMW 4135				4,2		1457	4,6		1556	5,6		1839	7,0		2207	6,3	1,0	660	8850	
	<b>0,2</b>		<b>0,35</b>		<b>0,5</b>		<b>0,7</b>		<b>1</b>											
	<b>Liquid pressure (bar)</b>																			

**INTERNAL MIX / HOLLOW CONE JET**

This set-up produces a wide angle hollow cone jet, which can be useful in such cases where a coating must be applied inside a pipe or duct. See previous page for materials.

Set-up code	Air pressure (bar)														
	WH		AM		WH		AM		WH		AM				
<b>SUZ 3460</b>	1,0	213,0	345	1,7	394	453	2,5	439	634	3,4	462	787	5,0	484	1138
	1,1	145,0	418	1,8	324	526	2,7	372	702	3,5	416	843	5,2	439	1197
	1,3	97,6	575	2,0	275	574	2,8	322	750	3,7	372	891	5,3	409	1254
	1,4	59,0	538	2,1	207	642	3,0	277	818	3,8	325	956	5,5	366	1310
	-	-	-	2,3	159	702	3,1	272	874	3,9	282	1019	5,6	325	1367
	-	-	-	2,4	116	758	3,2	188	931	4,1	250	1084	5,8	297	1429
	-	-	-	2,5	93	829	3,4	145	990	4,2	209	1135	5,9	257	1486
	-	-	-	2,7	27	900	3,5	114	1050	4,4	168	1189	6,0	232	1551
	Ln XMW 5202 An XMW 4146	-	-	-	-	-	-	-	-	4,5	141	1259	6,3	182	1670
	-	-	-	-	-	-	-	-	-	4,6	77	1296	-	-	-
		<b>0,7</b>		<b>1,4</b>		<b>2,1</b>		<b>2,8</b>		<b>4,2</b>					
		<b>Liquid pressure (bar)</b>													

**SIPHON PRINCIPLE / INTERNAL MIX / FULL CONE JET**

This set-up offers the same performances as the set-ups shown at page 15, with a larger capacity. See previous page for materials

Set-up code	Air pressure (bar)	Air capacity (Nml/min)								PA	HM
		Liquid capacity (lph)									
		450	300	150	100	200	300	600			
<b>SUC 2230</b>	0,7	360	-	-	-	40	-	-	-	1,5	6100
	1,5	570	-	-	-	97	64,0	-	-	2,0	6700
	2,0	660	-	-	-	117	90,0	-	-	3,0	7300
	3,0	870	-	260,0	225	150	123,0	90	-	3,5	7900
	3,5	990	300	265,0	235	163	133,0	104	-	4,0	8800
	4,0	1100	305	270,0	240	170	143,0	115	-	5,0	9800
	5,0	1300	315	280,0	250	183	157,0	129	53	5,6	10700
	An XMW 4145	5,6	1450	320	290,0	255	188	164,0	136	62	-
		<b>Gravity head (mm)</b>				<b>Suction head (mm)</b>					

**OPTIONS AND ACCESSORIES**

**SINGLE AIR INLET (Body option U)**

Air actuated atomizers can be supplied with a single air inlet for both the atomizing process and the air cylinder, which allows to operate a line of atomizers with only one air line and avoids air waste during the dead cycle times when atomizing is stopped.

With this layout the liquid inside the set-up, at shut-off time, will be atomized with a low air/liquid ratio and large drops may be produced: this option may be used for long dead times in atomizing cycles when some large droplet may be tolerated and it is necessary to limit system investment cost.

Minimum working pressure 2 bar.



**AUTOMATIC WITH LOCKING-NEEDLE SCREW**

MX series atomizers can be automatic with a locking-needle screw. The utility consists in being able to manually close the needle, blocking the operation independently from the pressure of the driving air. This option is used to temporarily block one or more atomizers of a line without disturbing the working of the others.



**SPECIAL MATERIALS AND COATINGS**

Our engineering office is available to design, test and produce bodies, set-ups and complete systems according to the customer requirements.

Special parts, bodies and systems which suit specific customer needs can be arranged under confidentiality agreements, supplied exclusively and not advertised.

**SPECIAL DESIGN**

Our engineering office is available to design, test and produce bodies, set-ups and complete systems according to the customer requirements. Special parts, bodies and systems which suit specific customer needs can be arranged under confidentiality agreements, supplied exclusively and not advertised.



XMW 1021 xx

**ATOMIZER WALL MOUNTING**

It is often convenient to mount atomizers through the wall of a tank or a duct for air treatment, keeping the atomizers and the feed lines on the outside for ease of maintenance. The following parts can serve this purpose for both MW standard atomizers and MX air actuated ones.

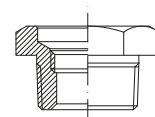


**WALLS THICKER THAN 10 MM**

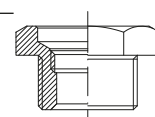
A nipple XMW 0021 xx with an outer tapered thread 3/4" BSPT is recommended, with a corresponding passage in the wall threaded 3/4" straight thread.

**WALLS THINNER THAN 10 MM**

For thin walls it is recommended to use a XMW 0020 xx nipple with a 3/4" straight thread, secured through the locknut VAC 0076 xx and the VDA 26A1 P7 seal. The above three parts can be ordered together with the assembly code XMW 0025 xx. A simple hole with 27 mm diameter is required into the wall.



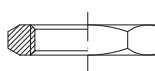
XMW 0021 xx



XMW 0020 xx



VDA 26A1 P7



VAC 0076 xx

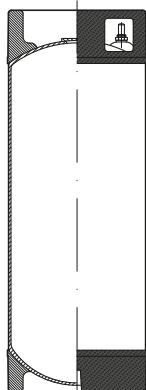
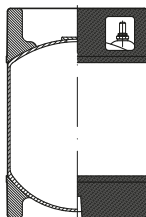


XMW 0025 xx

<b>Materials</b>	<b>Nipple, Locknut</b>	<b>B1 AISI 303 stainless steel T8 Nickel plated brass</b>
	<b>Seal</b>	<b>P7 Oil proof seal material</b>

## OPTIONS AND ACCESSORIES

### UMR



### PRESSURE TANKS

These tanks make it possible to produce atomized sprays in places where a liquid supply under pressure is not available.

These tanks, once filled with the required liquid quantity, are put under pressure with the aid of compressed air and are then ready to serve as a source of liquid under pressure.

Completely built out of high quality stainless steel, UMR tanks have the upper and bottom part protected by a rubber lining and are supplied complete of an air tight cover, pressure safety valve and, if required, quick connection nipples.

The product codes in the following table are given for tanks with cover only, and for tanks with cover and connection nipples.

The maximum operation pressure is given for each type, according to PED norms, from a self-sticking label, see LP value in the table.

#### 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
<b>UMR 0090 B2</b>	<b>UMR C090 B2</b>	9	232	340	3,7	4,9
<b>UMR 0190 B2</b>	<b>UMR C190 B2</b>	18	219	630	4,3	4,9

When a source of liquid under pressure is available, as in the case of a UMR tank, several applications become possible as for example the atomizing cart shown in the picture beside. These carts are designed on specific requirements and are usually fitted with regulation valves to obtain the desired spray characteristics and electronic control. Often used to disinfect single rooms in hospitals, the cart can be programmed to spray for a given time, and to start spraying with a delay which allows the personnel to leave the room before spraying starts.

The components in the following list can be ordered as single spare parts by means of their product code. 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.

<b>XUM R040 B2</b>	Cover complete
<b>XUM R100 E31</b>	Air connection kit
<b>XUM R110 E31</b>	Liquid connection kit



## SPECIAL ATOMIZERS

In many industries, such as in metals industry or chemical industry, bi-phase water-air atomizers are mainly, but not only, used to suppress and cool fumes. In these situations, it is very important to have products that give a homogenous distribution of the nebulized jet that interact with the gaseous phase, and to have the possibility to work with a wide range of pressures, both for water and air.

PNR Italia 50-years' experience allows to find different solutions for the difficult problems the company has faced for its clients, and in this page you can find some special atomizers that have been created, with a special attention to their industrial applications.

In this page, we present, for information only, the products currently available. For more detailed information on the performance and size of individual products, we invite you to visit our website [www.pnr.eu](http://www.pnr.eu) in the "Special Atomizers" section (link: [www.pnr.eu/it/prodotti/atomizzatori-speciali/](http://www.pnr.eu/it/prodotti/atomizzatori-speciali/)), or write an email to [info@pnr.it](mailto:info@pnr.it).

### MF

In many industrial processes requiring gas cooling, fumes suppression or the injection of chemicals, it is necessary to use suitable air atomizing nozzles. PNR bi-phase nozzles MF series are products specifically designed to improve the efficiency of the manufacturing processes with a reduced energy consumption and a low clogging risk. The special geometry of the MF air atomizing nozzles provides a uniform spray pattern and small droplets.



### MN, MO

The MN series atomizers are normally used to cool blooms and billets. They have a full cone spray pattern and a mounting system to the support plates through two pins and O-rings in Viton. They can be supplied with 1/4" or 3/8" female liquid/air connections upon request. All MN atomizers are supplied with a capacity/pressure chart so to be able to adjust the pumps to the capacities required by the plant.

The MO atomizers with oval spray coverage are normally used to cool blooms and billets. They have a fastening system to lock them on the supporting plates through two pins and O-ring in Viton. On request they can be supplied with 1/4" or 3/8" female liquid/air connections upon request. All MO atomizers are supplied with a capacity/pressure chart in order to adjust the pumps to the capacities required for the plant.



### MB, MT

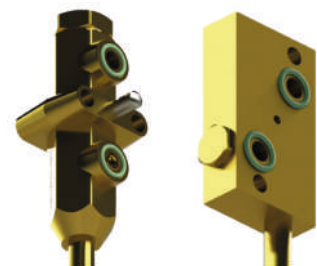
In continuous casting, and in slab casting in particular, lance atomizers replace conventional compact atomizers, currently called block atomizers, where the atomizer body is equipped with an extension and the spray tip is located at the exit end of the extension. The reasons of this replacement are due either to the geometrical need to insert the spraying pipe between rolls, whose clearance is often very small and prevents the use of block atomizers, or to the convenience to position the feeding pipes far from the intensely heated area near the slabs.

Lance atomizers can be classified according to different parameters:

**Atomizer's body:** the body where atomization is generated is matched by a plug-in connection to fluid feeding ducts, may have different shapes according to the model and may be casted or machined.

**Geometry of the pipe:** straight pipe, or bent type.

**Connections of the pipe to the body:** the extension pipe is welded onto the block body, or the extension pipe is screwed to the block body with a locknut.





## HYDRAULIC ATOMIZERS

### RX - RW - RZ



#### HYDRAULIC ATOMIZERS

RX and RZ hollow cone nozzle delivers 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 atomizers works in the same way, but the nozzle is mounted on the pipe by means of a welded nipple ZAA and a locknut VAA.

#### Thread specification:

BSPT, NPT, nipple and locknut

#### Typical applications:

dust control, humidification, deodorant spray, disinfectant liquid spray, exhaust scrubbers

#### Suggested filters:

We suggest to use a threaded filter VEF to protect the nozzle against clogging. You can choose between 50, 75 or 100 mesh.

Code	D mm	Capacity at different pressure values										l/hour bar
		1.5	2.0	3.0	4.0	5.0	6.0	10	15	20	50	
80°	RXT 0060 xx	0.50		2.94	3.60	4.16	4.65	5.09	6.57	8.05	9.30	14.7
	RXT 0100 xx	0.50		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

Code	D mm	Capacity at different pressure values										l/min bar
		1.5	2.0	3.0	4.0	5.0	6.0	10	15	20	50	
60°	RZQ 0080 xx	0.45		0.07	0.08	0.09	0.10	0.11	0.15	0.18	0.21	0.33
	RZQ 0120 xx	0.55		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

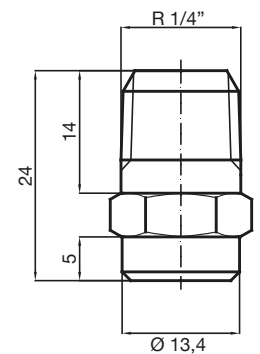
RW capacities are the same as RX nozzle. To have the complete product code, you just have to change "RX" with "RW".

The last two letters ("xx") indicate the material, and must be changed with one of the following:

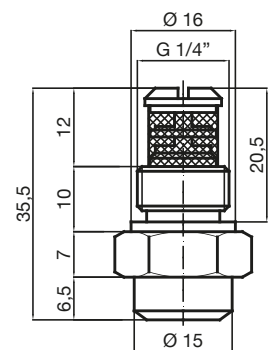
B1 = AISI 303 Stainless steel

B31 = AISI 316L Stainless steel

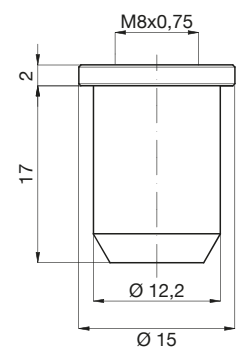
T1 = Brass



RX



RZ (+ VEF)



RW



## GENERAL INFORMATION

## ABBREVIATION LIST

<b>AH</b>	Air capacity	Ncm/hour	<b>CA</b>	Internal volume	liters	<b>LP</b>	Max operation pressure	bar
<b>AM</b>	Air capacity	NI/min	<b>CH</b>	Wrench size	mm	<b>PA</b>	Air pressure	bar
<b>AA</b>	Atomizing air inlet	inch	<b>HM</b>	Maximum spray throw	mm	<b>PL</b>	Liquid pressure	bar
<b>AC</b>	Cylinder air inlet	inch	<b>HR</b>	Length of coherent spray	mm	<b>WH</b>	Water capacity	l/hour
<b>An</b>	Air nozzle code	---	<b>LI</b>	Liquid inlet size	inch	<b>WM</b>	Water capacity	l/min
<b>C</b>	Spray width	mm	<b>Ln</b>	Liquid nozzle code	---			

## 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 customer 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](mailto: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.

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.

**PNR ITALIA SRL**

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www.pnr.eu - E-mail: info@pnr.it

## CTG AZ21 EN - rev18.04



PNR Italia sells its products in Italy directly from its headquarter in Voghera (PV), and through a global network of sales subsidiaries and authorized distributors located in many nations. To find you local distributor, please check our web site:  
[www.pnr.eu/contact/](http://www.pnr.eu/contact/)

Argentina  
Australia  
Austria  
Belgium  
Canada  
China  
Croatia  
Danmark  
Finland  
France  
Germany

Greece  
Hungary  
India  
Indonesia  
Ireland  
Korea  
Mexico  
Norway  
Poland  
Portugal  
Romania

Russia  
Singapore  
Slovenia  
South Africa  
Spain  
Sweden  
Taiwan  
The Netherlands  
Turkey  
UK  
USA





**PART 1**

**SW25**

**COKE SUPPRESSION AND COOLING**



# STEEL WORK NOZZLES



**CONTINUOUS CASTING  
COOLING (WATER)**



**CONTINUOUS CASTING  
COOLING (AIR/WATER)**





**PNR** designs and manufactures high quality spraying nozzles and fluids handling systems. Our range includes a great variety of nozzles that have been successfully used for over 40 years in virtually every manufacturing and processing industry.

We offer a complete range of nozzle types, spray patterns, droplet sizes and capacities made in top quality materials to suit every application, but we also design and produce special nozzles to meet customers' specific needs.

To the steel industry in particular we offer a wide range of products for the whole steelmaking process:

- nozzles for dust suppression on raw materials parks and emission control
- nozzles for coke suppression and cooling
- nozzles for continuous casting cooling and cold lamination (water + air/water)
- high pressure descaling spray nozzles,
- nozzles for roll cooling and pickling
- etc.

a comprehensive range completed by several accessorial products and components, available in many different types, sizes and materials.

**PNR Italia Srl** is an ISO 9001:2015 accredited company.

The full range of **PNR** is shown in our catalogues which can be requested in hard copy or downloaded from our website [www.pnr.eu](http://www.pnr.eu)

**Reference Library**

<b>CTG AC</b>	Accessories
<b>CTG AZ</b>	Air assisted atomizing nozzles
<b>CTG FF</b>	Fire Fighting Systems and Products
<b>CTG LN</b>	Cooling Lances
<b>CTG LS</b>	Tank cleaning systems
<b>CTG PM</b>	Nozzles for pulp & paper mills
<b>CTG SP</b>	Spray-drying nozzles
<b>CTG SW</b>	Steelworks nozzles

Our products are marketed worldwide by PNR companies, with offices in Russia, USA, Benelux, China, Germany, Mexico, France, United Kingdom, Sweden, as well as by a capillary network of distributors in many other Countries.

*Our products are continuously being reviewed and modified to keep up with the latest technology. As a result the technical information provided in this catalogue is for guidance only and is not binding. Should you have an application that requires special features (specific flow rates, spray angles, etc.) please contact our sales office to find the best solution to meet your requirements.*

# PRODUCT IDENTIFICATION

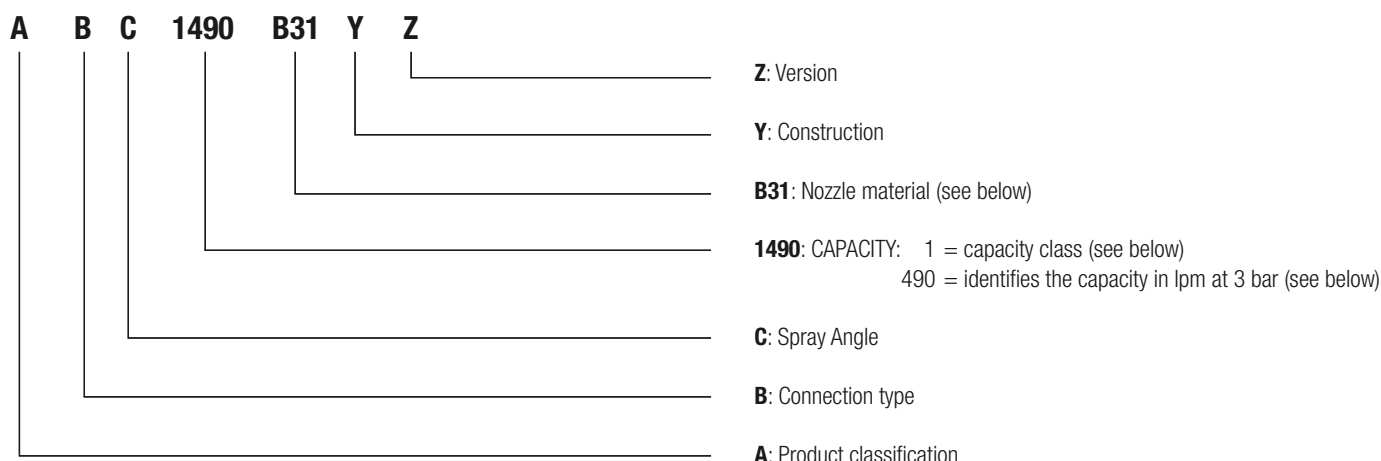
## PNR CODING SYSTEM

Every industrial product needs to be identified with a code to avoid mistakes.

PNR product coding system was conceived to meet the following requirements:

- codes are easily listed by a computer in alphabetical order.
- codes fully describe the product, with no need of further information.
- codes immediately provide the main characteristics of each product so to find it in the catalogue easily.

Code Definition is as follows:



Flow rate capacity at 3 bar.

These codes are purely indicative, their meaning may be occasionally different. Please always refer to the numeric indication of the angles beside each table.

### CAPACITY CLASS

Class	Numbers	Capacity in lpm
0	0 490	0,49
1	1 490	4,90
2	2 490	49,0
3	3 490	490
4	4 490	4900

### COMMON SPRAY ANGLES

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

### PNR PRODUCTS MATERIALS CODE

<b>A1</b>	Carbon Steel
<b>A8</b>	Zinc plated carbon steel
<b>A9</b>	Nickel plated carbon steel
<b>B1</b>	Stainless steel AISI 303
<b>B2</b>	Stainless steel AISI 304
<b>B21</b>	Stainless steel AISI 304 L
<b>B31</b>	Stainless steel AISI 316L
<b>C1</b>	Stainless steel AISI 420 hardened
<b>C2</b>	Stainless steel AISI 416 hardened
<b>D1</b>	Polyvinyl chloride (PVC)
<b>D2</b>	Polypropylene (PP)
<b>D3</b>	Polyamide (PA)
<b>D5</b>	Talc filled Polypropylene

<b>D6</b>	Glass fiber reinforced polypropylene
<b>D7</b>	High-density polyethylene (HDPE)
<b>D8</b>	Polyvinylidene fluoride (PVDF)
<b>E0</b>	Ethylene-propylene diene monomer (EPDM)
<b>E1</b>	Polytetrafluorethylene (PTFE)
<b>E14</b>	25% glass fiber filled PTFE
<b>E3</b>	Polyoxymethylene (POM)
<b>E7</b>	Fluoroelastomer polymer Viton® (FPM)
<b>E8</b>	Nitrile butadiene rubber (NBR)
<b>F1</b>	Tungsten carbide
<b>F3</b>	Ruby
<b>F5</b>	Ceramic

<b>G1</b>	Grey cast iron
<b>H1</b>	Titanium
<b>L1</b>	Nickel alloy Monel® 400
<b>L2</b>	Nickel alloy Incolloy® 825
<b>L8</b>	Nickel alloy Hastelloy® C276
<b>T1</b>	Brass
<b>T2</b>	Chrome plated brass
<b>T3</b>	Copper
<b>T5</b>	Bronze
<b>T8</b>	Galvanic nickel plated brass
<b>T81</b>	Electroless nickel plated brass
<b>V1</b>	Aluminum alloy
<b>V7</b>	Electroless nickel plated aluminum alloy

**LIST OF ABBREVIATIONS - LEGENDA**

<b>AE</b>	Inlet air capacity	Nmc/min
<b>AU</b>	Outlet air capacity	Nmc/min
<b>CL</b>	Spray jet deflection angle	degrees
<b>D</b>	For round exit hole: hole diameter For not round exit holes: equivalent round hole diameter	mm
<b>D1</b>	Smallest passage diameter	mm
<b>DE</b>	Liquid inlet diameter	mm
<b>DF</b>	Flange nominal size for ANSI/ASME flanges	inch
<b>DIA</b>	Outer diameter	mm
<b>DN</b>	Flange nominal size for UNI/DIN flanges	mm
<b>DU</b>	Liquid outlet diameter	mm
<b>DX</b>	Nipple inner diameter	mm
<b>FF</b>	Flange outer diameter	mm
<b>G</b>	Diameter measured between fixing holes centers	mm
<b>H, H1, H2</b>	Height	mm

<b>L, L1</b>	Length	mm
<b>LF</b>	Pipe length	m
<b>LP</b>	Maximum operating pressure	bar
<b>LQ</b>	Maximum capacity	lpm
<b>LT</b>	Maximum operating temperature	°C
<b>NR</b>	Number of orifices	-
<b>QC</b>	Quick coupling connection	-
<b>RA</b>	Radius	mm
<b>RF</b>	Parallel female thread BSPP	inch
<b>RG</b>	Tapered male thread BSPT	inch
<b>S</b>	Thickness	mm
<b>SQ</b>	Square bar size	mm
<b>W</b>	Weight	g, Kg
<b>WS</b>	Wrench size	mm

**PRODUCT WARRANTY**

PNR products will be replaced or repaired at the discretion of PNR and free of charges should the product be found to be defective in manufacturing, labelling or packaging. The product warranty applies for 1 year from the date of shipment. Please note that this will only apply if the problem is reported to PNR within 30 days from the date of shipment. The cost of rectification or repair and procedure to replace products will only apply if these terms are adhered to. Any breach of the warranty conditions will contravene our terms. PNR shall not be held liable for any damage, personal injuries or commercial losses which might be caused by product malfunction.

Should you need to report a defect, our Company Procedure for warranty is as follows:

- 1 Please contact the nearest PNR or PNR Distributor and obtain a return authorization number.
- 2 Please return the products according to PNR instructions, should you be authorized to return the products.
- 3 PNR shall then issue a test report, send you a copy and return the product repaired or replaced.

Our company ethos is to offer full customer satisfaction and we are fully aware of the inconvenience which might be caused from a defective product. Please be assured that we shall do our utmost to offer a solution in the shortest possible time.

**PRODUCT RETURN POLICY**

**WRONG PRODUCTS DELIVERED BY PNR**

- 1 Please Contact nearest PNR or PNR distributor and obtain a return authorization number.
- 2 PNR will sustain the expenses for transport.
- 3 Please agree with your PNR contact if PNR shall have to issue a credit note or make a product replacement.

**MISTAKES IN ORDERS SENT TO PNR**

- 1 Please Contact nearest PNR or PNR distributor and obtain a return authorization number.
- 2 Please return the products according to PNR instructions.
- 3 The products will be returned at your expense.
- 4 Products must be returned in their original condition and inside the original packaging, or equivalent quality packaging
- 5 A re-stocking charge of between 10% and 25% may also apply. Such decision will be communicated by contacted PNR or PNR distributor.

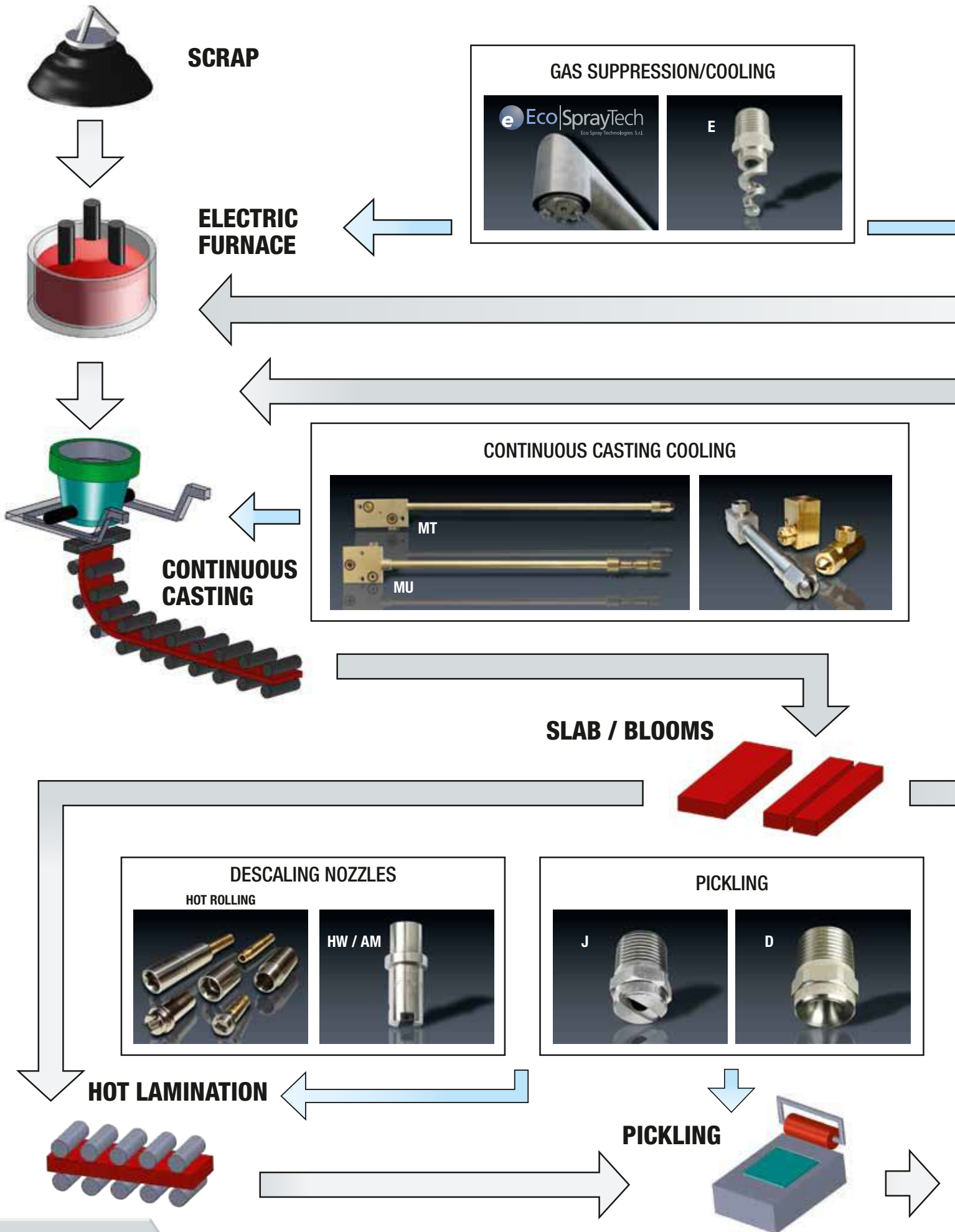
**NON CATALOG PRODUCTS**

These products can only be returned after a written authorization from PNR has been obtained.

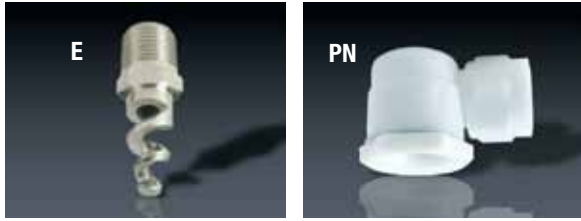
**DISCLAIMER**

Our products are manufactured with the best care and according to the latest developments of the technology, but we cannot assure that every one of our products is perfectly fit for any possible specific process. The information in this Catalogue is provided "as is" and we make 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.





## DUST SUPPRESSION ON RAW MATERIALS PARK



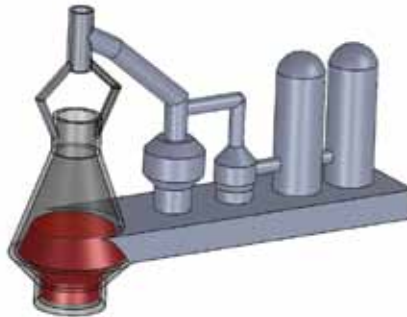
## RAW MATERIALS



## BASIC OXIGEN CONVERTER



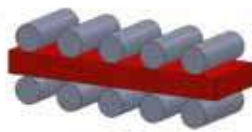
## BLAST FURNACE



## COKE COOLING



## COLD LAMINATION



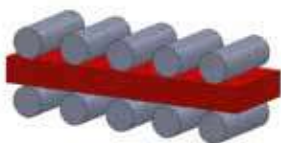
## COILS



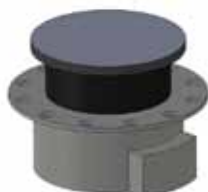
## ROLLS COOLING



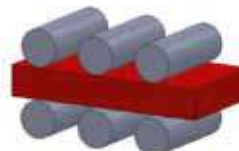
## COLD LAMINATION



## ANNEALING







## TEMPER



## COILS



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<b>ISO 9001:2014 CERTIFICATION</b>	1	
<b>PRODUCT IDENTIFICATION</b>	2	
<b>GENERAL INFORMATION</b>	3	
<b>NOZZLES IN STEELWORKS</b>	4	
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- Model "K" - Fan jet nozzle	10	
- Model "PN/PO" - Hollow cone nozzle	12	
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<b>COKE SUPPRESSION / COOLING</b>		
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- Model "BE" - Full cone nozzle	15	
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<hr/>		
<b>CONTINUOUS CASTING COOLING (WATER)</b>		
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**DESCALING**

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We regret not being able to update our customers on the continuous improvements to our product range, so please consider the information and product specifications supplied in this catalogue as indicative and not binding for our company. For each application that requires one or more characteristics of one of our catalogue products that must be strictly maintained, please kindly ask for a written confirmation. Any information contained in this Catalogue, codes and product specifications, sketches, drawings and photographs, is the exclusive property of Flowtech Srl and it is forbidden to reproduce it in any medium without express written permission of the same.

All dimensions in this catalogue are in millimetres (mm). All threads to be manufactured according to ISO 228 unless otherwise specified. (European Standard BS 2779 - DIN 259 - UNI 338).

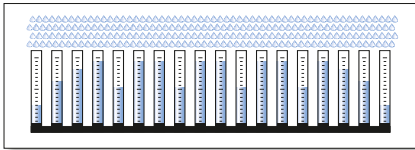
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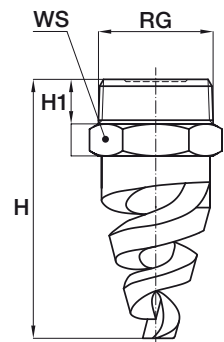
**STANDARD SPIRAL NOZZLES**

E series spiral nozzles work on the impact principle, by the deflection of a water stream that impacts onto a spiral-shaped surface providing 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 minimizes clogging and produces a wider spray coverage than other nozzles with a given flow and pressure. The capacity value 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 in bold letters, we recommend to choose metal nozzles for their longer operating life.

**SPRAY DISTRIBUTION**



Spiral-shaped distribution



**SPRAY ANGLE CODE**

<b>Q</b>	60°
<b>U</b>	90°
<b>W</b>	120°

**THREAD CODE**

<b>B</b>	1/4"
<b>C</b>	3/8"
<b>D</b>	1/2"
<b>E</b>	3/4"
<b>F</b>	1"
<b>H</b>	1 1/2"
<b>K</b>	2"
<b>M</b>	3"
<b>P</b>	4"

**MATERIALS CODE**

<b>B31</b>	Stainless steel AISI 316L
<b>D1</b>	PVC
<b>D2</b>	Polypropylene
<b>D8</b>	PVDF
<b>E1</b>	PTFE
<b>L8</b>	Hastelloy C 276
<b>T1</b>	Brass

**SPRAY PATTERN**



**CONSTRUCTION: Y**

- **S** Standard

**VERSION: Z**

- **B** Tapered thread (BSPT- EN 10226)
- **G** Parallel thread (BSPP- EN 10226)
- **N** Tapered thread (NPT-ANSI B 1.20)

**HOW TO ORDER PNR PRODUCTS**

Model	Thread	Spray Angle	Capacity	Material	Construction	Version
<b>E</b>	<b>B</b>	<b>Q</b>	<b>1550</b>	<b>XX</b>	<b>Y</b>	<b>Z</b>

Order example: **EBQ 1550 B31 SB**

**CAPACITY - DIMENSIONS AND WEIGHTS**

Code	RG	D	D1	Capacity - lpm								Dimensions mm			Weight g		
				Pressure - bar								H	H1	WS	B31	Plastic	Brass
				0,7	1,0	2,0	3,0	5,0	7,0	10							
60°	EBQ 1550 xx	1/4	2,4	2,4	2,66	3,18	4,49	5,50	7,10	<b>8,40</b>	<b>10,0</b>	45	12	14	22	6	26
	EBQ 2156 xx		4,0	3,2	7,54	9,01	12,7	15,6	20,1	<b>23,8</b>	<b>28,5</b>						
	ECQ 2230 xx	3/8	4,8	3,2	11,4	13,6	19,2	23,5	30,3	<b>35,9</b>	<b>42,9</b>	48	14	19	43	11	48
	ECQ 2410 xx		6,4	3,2	20,0	24,0	33,9	41,5	53,6	<b>63,4</b>	<b>75,8</b>						
	ECQ 2640 xx		7,9	3,2	31,2	37,3	52,7	64,6	83,4	<b>99,0</b>	<b>118</b>						
	EDQ 2940 xx	1/2	9,5	4,7	45,6	54,5	77,1	94,4	122	<b>144</b>	<b>172</b>	64	18	22	79	10	81
	EDQ 3128 xx		11,1	4,7	61,8	73,9	105	128	165	<b>196</b>	<b>234</b>						
	EEQ 3165 xx	3/4	12,7	4,7	79,7	95,3	135	165	213	<b>252</b>	<b>301</b>	70	19	27	136	16	141
	EFQ 3260 xx	1	15,9	6,3	126	150	212	260	<b>336</b>	<b>397</b>	<b>475</b>	92	26	34	254	50	289
	EHQ 3507 xx	1 1/2	22,2	7,9	245	293	414	<b>507</b>	<b>655</b>	<b>774</b>	<b>926</b>	111	27	50	619	150	768

**TYPICAL APPLICATIONS**

- Gas Cooling


**DUST SUPPRESSION ON RAW MATERIAL PARKS**

- Exhaust scrubbers
- Desulfurization

**CONVERSION TABLE (UE - USA)**

**PRESSURE: 1 bar = 14,5 psi**  
**CAPACITY: 1 lpm = 0,264 gpm**



	Code	RG	D	D1	Capacity - lpm							Dimensions mm			Weight g		
					Pressure - bar							H	H1	WS	B31	Plastic	Brass
		inch	mm	mm	0,7	1,0	2,0	3,0	5,0	7,0	10						
90°	EBU 1550 xx	1/4	2,4	2,4	2,66	3,18	4,49	5,50	7,10	<b>8,40</b>	<b>10,0</b>	45	12	14	22	6	26
	EBU 2100 xx		3,2	3,2	4,83	5,77	8,16	10,0	12,9	<b>15,3</b>	<b>18,3</b>						
	EBU 2156 xx		4,0	3,2	7,54	9,01	12,7	15,6	20,1	<b>23,8</b>	<b>28,5</b>						
	ECU 2230 xx	3/8	4,8	3,2	11,4	13,6	19,2	23,5	30,3	<b>35,9</b>	<b>42,9</b>	48	14	19	43	11	48
	ECU 2317 xx		5,6	3,9	15,3	18,3	25,9	31,7	40,9	<b>48,4</b>	<b>57,9</b>						
	ECU 2410 xx		6,4	4,8	20,0	24,0	33,9	41,5	53,6	<b>63,4</b>	<b>75,8</b>						
	ECU 2640 xx		7,9	5,5	31,2	37,3	52,7	64,6	83,4	<b>98,7</b>	<b>118</b>						
	EDU 2940 xx	1/2	9,5	3,3	45,6	54,5	77,1	94,4	122	<b>144</b>	<b>172</b>	64	18	22	79	10	81
	EDU 3128 xx		11,1	3,7	61,8	73,9	105	128	165	<b>196</b>	<b>234</b>						
	EEU 3165 xx	3/4	12,7	4,7	79,7	95,3	135	165	213	<b>252</b>	<b>301</b>	70	19	27	136	16	141
	EFU 3260 xx	1	19,0	6,3	126	150	212	260	<b>336</b>	<b>397</b>	<b>475</b>	92	26	34	254	50	288
	EFU 3372 xx		23,0	6,3	180	215	304	372	<b>480</b>	<b>568</b>	<b>679</b>						
	EKU 4100 xx	2	34,9	11,1	527	629	890	<b>1090</b>	<b>1407</b>	<b>1665</b>	<b>1990</b>	149	31	65	1300	380	1400
	EMU 4204 xx	3	44,5	14,3	985	1178	<b>1666</b>	<b>2040</b>	<b>2634</b>	<b>3116</b>	<b>3725</b>	219	42	89	3200	400	4000
	EMU 4267 xx		50,8		1290	1542	<b>2180</b>	<b>2670</b>	<b>3447</b>	<b>4078</b>	<b>4875</b>						
120°	EBW 1550 xx	1/4	2,4	2,4	2,66	3,18	4,49	5,50	7,10	<b>8,40</b>	<b>10,0</b>	45	12	14	22	6	26
	EBW 2100 xx		3,2	3,2	4,83	5,77	8,16	10,0	12,9	<b>15,3</b>	<b>18,3</b>						
	EBW 2156 xx		4,0	3,2	7,54	9,01	12,7	15,6	20,1	<b>23,8</b>	<b>28,5</b>						
	ECW 2156 xx	3/8	4,0	3,2	7,54	7,54	7,5	15,6	20,1	<b>23,8</b>	<b>28,5</b>	48	14	19	43	11	48
	ECW 2230 xx		4,8	3,2	11,4	13,6	19,2	23,5	30,3	<b>35,9</b>	<b>42,9</b>						
	ECW 2317 xx		5,6	4,0	15,3	18,3	25,9	31,7	40,9	<b>48,4</b>	<b>57,9</b>						
	ECW 2410 xx		6,4	4,0	20,0	24,0	33,9	41,5	53,6	<b>63,4</b>	<b>75,8</b>						
	ECW 2640 xx		7,9	4,0	31,2	37,3	52,7	64,6	83,4	<b>98,7</b>	<b>118</b>						
	EDW 2940 xx	1/2	9,5	4,8	45,6	54,5	77,1	94,4	122	<b>144</b>	<b>172</b>	64	18	22	79	10	81
	EDW 3104 xx		9,7	4,8	50,2	60,0	84,9	104	134	<b>159</b>	<b>190</b>						
	EDW 3128 xx		11,1	4,8	61,8	73,9	105	128	165	<b>196</b>	<b>234</b>						
	EEW 3165 xx	3/4	12,7	4,8	79,7	95,3	135	165	213	<b>252</b>	<b>301</b>	70	19	27	136	16	141
	EFW 3260 xx	1	15,9	6,3	126	150	212	260	336	<b>397</b>	<b>475</b>	92	26	34	254	50	289
	EFW 3372 xx		19,0		180	215	304	372	480	<b>568</b>	<b>679</b>						
	EHW 3507 xx	1 1/2	22,2	7,9	245	293	414	507	<b>655</b>	<b>774</b>	<b>926</b>	111	27	50	619	150	768
	EHW 3663 xx		25,4		320	383	541	663	<b>856</b>	<b>1013</b>	<b>1210</b>						
	EHW 3747 xx		28,6		361	431	610	747	<b>964</b>	<b>1141</b>	<b>1364</b>						
	EKW 4100 xx	2	34,9	11,1	527	629	890	<b>1090</b>	<b>1407</b>	<b>1665</b>	<b>1990</b>	149	31	65	1300	380	1400
	EKW 4139 xx		38,1		672	803	1136	<b>1391</b>	<b>1796</b>	<b>2125</b>	<b>2540</b>						
	EMW 4204 xx	3	44,5	14,3	985	1178	<b>1666</b>	<b>2040</b>	<b>2634</b>	<b>3116</b>	<b>3725</b>	203	35	90	3200	400	4000
	EMW 4267 xx		51,0		1280	1530	<b>2164</b>	<b>2650</b>	<b>3421</b>	<b>4048</b>	<b>4838</b>						
	EPW 4412 xx	4	63,5	15,9	1990	2379	<b>3364</b>	<b>4120</b>	<b>5319</b>	<b>6293</b>	<b>7522</b>	230	40	127	6800	900	7800

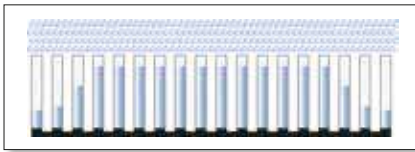


### LARGE SPRAY ANGLE

K flat jet 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 jet 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 0,39 to 350 lpm, and also as tips (KX type) to be assembled onto a nipple by means of a locknut.



#### SPRAY DISTRIBUTION

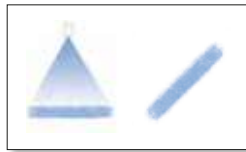


Spiral-shaped distribution

#### SPRAY ANGLE CODE

W	120°
---	------

#### SPRAY PATTERN



#### MATERIALS CODE

B1	Stainless Steel AISI 303
B31	Stainless Steel AISI 316L
T1	Brass

#### HOW TO ORDER PNR PRODUCTS

Model	Connection	Spray Angle	Capacity	Material
K	X	W	0390	XX

Order example: **KGW 0390 B31**

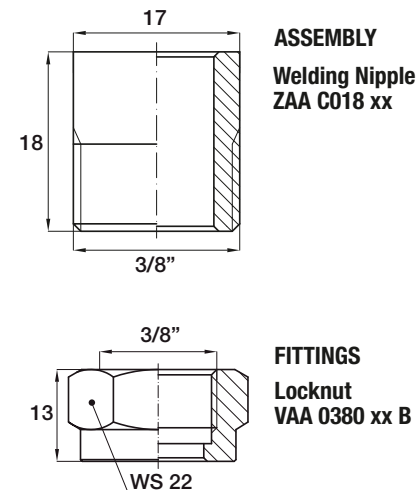
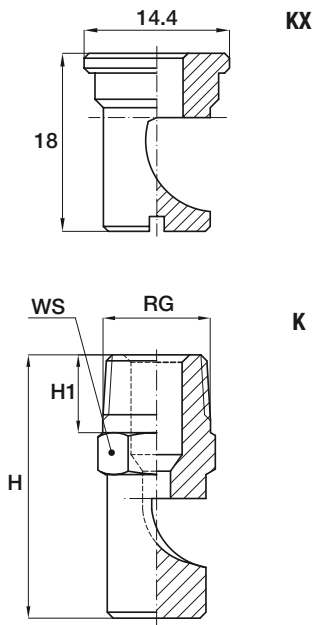
#### THREAD SIZE

#### CAPACITY - DIMENSIONS AND WEIGHTS

Here below find 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 for more information.

Model	From size	To size	Thread RG inch	H mm	H1 mm	WS mm	Weight* g			
							Min flow rate		Max flow rate	
							B1/B31	T1	B1/B31	T1
KGW	0390	1120	1/8 BSPT	24	8,5	14	11	12	22	24
KGW	1160	2157	1/8 BSPT	31	10	14	25	27	24	26
KHW	1160	1940	1/4 BSPT	31	12,5	14	25	27	24	26
KHW	2117	2210	1/4 BSPT	34	12,5	14	29	31	28	30
KIW	All range		3/8 BSPT	44	13	17	61	65	58	62
KJW	All range		1/2 BSPT	49	17	22	109	115	101	108
KKW	2700	2940	3/4 BSPT	56	20	36	190	200	180	190
KKW	3110	3164	3/4 BSPT	65	20	36	320	345	310	335
KLW	All range		1 BSPT	92	26	46	800	850	800	850
KXW	All range		Tip type	18	---	---	14	15	10	11

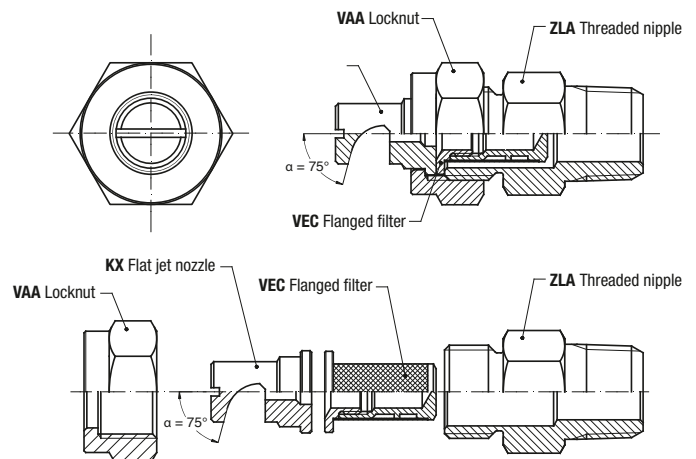
\* = Reported weights refer to nozzles with same thread and represent the lowest and the highest flow rate figure of the range.



**ASSEMBLY**  
Welding Nipple  
ZAA C018 xx

**FITTINGS**  
Locknut  
VAA 0380 xx B

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



## CAPACITY

KGW	KHW	KIW	KJW	KKW	KLW	KXW	Code	D mm	Capacity - lpm							Spray angle	
									Pressure - bar							Pressure - bar	
									0,5	1,0	2,0	3,0	4,0	5,0	7,0	1,5	4,0
•						•	0390	0,6	0,16	0,23	0,32	0,39	0,45	0,50	0,60	90	120
•						•	0590	0,7	0,24	0,34	0,48	0,59	0,68	0,76	0,90	105	120
•						•	0780	0,8	0,32	0,45	0,64	0,78	0,90	1,01	1,19	110	125
•						•	1120	1,0	0,49	0,69	0,98	1,20	1,39	1,55	1,83	105	122
•	•					•	1160	1,1	0,65	0,92	1,31	1,60	1,85	2,07	2,44	110	130
•	•					•	1200	1,3	0,82	1,15	1,63	2,00	2,31	2,58	3,06	120	130
•	•					•	1230	1,4	0,94	1,33	1,88	2,30	2,66	2,97	3,51	110	125
•	•					•	1310	1,6	1,27	1,79	2,53	3,10	3,58	4,00	4,74	120	130
•	•					•	1390	1,8	1,59	2,25	3,18	3,90	4,50	5,03	5,96	130	140
•	•					•	1590	2,3	2,41	3,41	4,82	5,90	6,81	7,62	9,01	120	130
•	•					•	1780	2,6	3,18	4,50	6,37	7,80	9,01	10,1	11,9	130	140
•	•					•	1940	2,9	3,84	5,43	7,68	9,40	10,9	12,1	14,4	140	150
•	•					•	2117	3,3	4,78	6,75	9,55	11,7	13,5	15,1	17,9	110	120
•	•					•	2141	3,6	5,76	8,14	11,5	14,1	16,3	18,2	21,5	120	130
•	•					•	2157	3,8	6,41	9,06	12,8	15,7	18,1	20,3	24,0	120	130
	•					•	2172	4,0	7,02	9,93	14,0	17,2	19,9	22,2	26,3	125	135
	•					•	2188	4,1	7,68	10,9	15,4	18,8	21,7	24,3	28,7	130	140
	•					•	2210	4,4	8,57	12,1	17,1	21,0	24,2	27,1	32,1	135	145
		•				•	2230	4,5	9,39	13,3	18,8	23,0	26,6	29,7	35,1	110	120
		•				•	2270	5,0	11,0	15,6	22,0	27,0	31,2	34,9	41,2	115	125
		•	•			•	2310	5,3	12,7	17,9	25,3	31,0	35,8	40,0	47,4	125	135
		•	•				2350	5,6	14,3	20,2	28,6	35,0	40,4	45,2	53,5	130	140
			•				2390	6,0	15,9	22,5	31,8	39,0	45,0	50,3	59,6	130	140
			•				2470	6,5	19,2	27,1	38,4	47,0	54,3	60,7	71,8	135	140
			•				2550	7,1	22,5	31,8	44,9	55,0	63,5	71,0	84,0	135	145
			•				2630	7,5	25,7	36,4	51,4	63,0	72,7	81,3	96,2	140	150
				•			2700	8,0	28,6	40,4	57,2	70,0	80,8	90,4	107	130	140
				•			2780	8,4	31,8	45,0	63,7	78,0	90,1	101	119	135	145
				•			2860	8,7	35,1	49,7	70,2	86,0	99,3	111	131	135	145
				•			2940	9,3	38,4	54,3	76,8	94,0	109	121	144	140	150
				•			3110	10,3	44,9	63,5	89,8	110	127	142	168	125	135
				•			3125	11,0	51,0	72,2	102	125	144	161	191	130	135
				•			3141	11,4	57,6	81,4	115	141	163	182	215	130	135
				•			3164	12,2	67,0	94,7	134	164	189	212	251	135	145
					•		3235	14,6	95,9	136	192	235	271	303	359	130	135
					•		3350	17,9	143	202	286	350	404	452	535	130	135

### TYPICAL APPLICATIONS

- Rolls cooling
- Dust control

### OTHERS

- Fire prevention and suppression

### CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

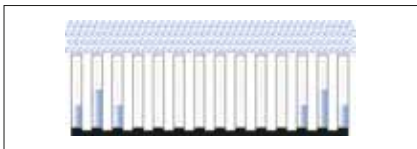
## HOLLOW CONE NOZZLES

PN/PO series moulded plastic nozzles have a high chemical resistance and low prices. They are tangential nozzles and produce an hollow cone spray of atomized droplets. As they have a large free passage and no swirl vane inside their body, they are highly resistant to clogs. PN/PO nozzles are efficient, cost-effective and widely used in many processing.



PN

### SPRAY DISTRIBUTION



Hollow distribution

### SPRAY ANGLE CODE

<b>S</b>	70°	<b>U</b>	90°
<b>T</b>	80°	<b>Y</b>	130°

### MATERIALS CODE

<b>D6</b>	Polypropylene reinforced with fiberglass
-----------	--

### SPRAY PATTERN



### CONSTRUCTION: Y

- **S** Standard

### VERSION: Z

- **G** Parallel thread (BSPP- EN 10226)
- **N** Tapered thread (NPT-ANSI B 1.20)

### HOW TO ORDER PNR PRODUCTS

Model	Spray Angle	Capacity	Material	Construction	Version
<b>PN</b>	<b>U</b>	<b>1170</b>	<b>D6</b>	<b>S</b>	<b>Z</b>

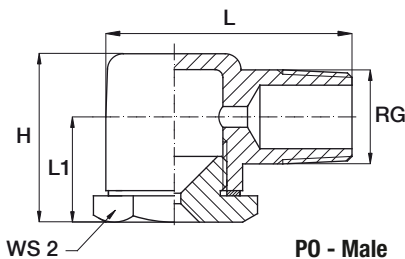
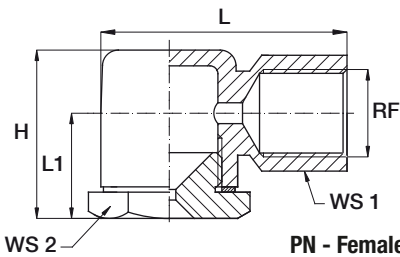
Order example: **PNU 1170 D6 SG**

### WRENCH SIZE

Code	Inch	WS1	WS2
		mm	mm
<b>PN</b>	3/8"	22	27
	1/2"	30	32
<b>PO</b>	3/8"	-	27
	1/2"	-	32



PO



### PN FEMALE THREAD NOZZLE


PN female 3/8" thread nozzles are usually connected to piping by ZPN pipe clamps.


For complete view of PNR clamps range consult PNR website.


PN Nozzle with ZPN pipe clamp in Polypropylene




## CAPACITY - DIMENSIONS AND WEIGHTS

	PNS	POS	Code	RF RG	DE	DU	Capacity - lpm							Dimensions mm			Weight g	
							Pressure - bar							H	L	L1		D6
							0,5	0,7	1,0	2,0	3,0	5,0	7,0					
70°	•	•	1170	3/8	2,0	2,9	0,69	0,82	0,98	1,39	1,70	2,19	2,60	3,10	31	44	20	16

	PNT	POT	Code	RF RG	DE	DU	Capacity - lpm							Dimensions mm			Weight g	
							Pressure - bar							H	L	L1		D6
							0,5	0,7	1,0	2,0	3,0	5,0	7,0					
80°	•	•	1260	3/8	2,7	3,5	1,06	1,26	1,50	2,12	2,60	3,36	3,97	4,75	31	44	20	16

	PNU	POU	Code	RF RG	DE	DU	Capacity - lpm							Dimensions mm			Weight g	
							Pressure - bar							H	L	L1		D6
							0,5	0,7	1,0	2,0	3,0	5,0	7,0					
90°	•		1390	3/8	3,7	3,8	1,59	1,88	2,25	3,18	3,90	5,03	5,96	7,12	31	44	20	17
	•		1670		4,4	5,2	2,74	3,24	3,87	5,47	6,70	8,65	10,2	12,2				
	•		1850		5,2	5,6	3,47	4,11	4,91	6,94	8,50	11,0	13,0	15,5				
	•		2115		6,1	6,3	4,69	5,56	6,64	9,39	11,5	14,8	17,6	21,0				
	•		2220		7,2	9,2	8,98	10,6	12,7	18,0	22,0	28,4	33,6	40,2				
		•	2320	1/2	9,5	10,5	13,1	15,5	18,5	26,1	32,0	41,3	48,9	58,4	42	55	35	17
	•	2398	8,5		14,0	16,2	19,2	23,0	32,5	39,8	51,4	60,8	72,7					

	PNY	POY	Code	RF RG	DE	DU	Capacity - lpm							Dimensions mm			Weight Kg	
							Pressure - bar							H	L	L1		D6
							0,5	0,7	1,0	2,0	3,0	5,0	7,0					
130°	•	•	1170	3/8	1,7	3,5	0,69	0,82	0,98	1,39	1,70	2,19	2,60	3,10	31	44	20	18
	•	•	1260		1,9	5,0	1,06	1,26	1,50	2,12	2,60	3,36	3,97	4,75				
	•	•	1390		2,7	5,0	1,59	1,88	2,25	3,18	3,90	5,03	5,96	7,12				
	•	•	1460		3,1	5,0	1,88	2,22	2,66	3,76	4,60	5,94	7,03	8,40				
	•	•	1570		3,0	7,5	2,33	2,75	3,29	4,65	5,70	7,36	8,71	10,4				
	•	•	1670		3,4	7,5	2,74	3,24	3,87	5,47	6,70	8,65	10,2	12,2				
	•	•	1850		4,1	7,5	3,47	4,11	4,91	6,94	8,50	11,0	13,0	15,5				
	•	•	1980		3,6	12,0	4,00	4,73	5,66	8,00	9,80	12,7	15,0	17,9				
	•	•	2128		4,2	12,0	5,23	6,18	7,39	10,5	12,8	16,5	19,6	23,4				
	•	•	2208		6,0	12,0	8,49	10,0	12,0	17,0	20,8	26,9	31,8	38,0				
	•	•	2220	6,4	12,0	8,98	10,6	12,7	18,0	22,0	28,4	33,6	40,2					
	•		2129	1/2	4,3	14,0	5,23	6,18	7,39	10,5	12,8	16,5	19,6	23,4	42	55	35	18
	•		2209		5,8	14,0	8,49	10,0	12,0	17,0	20,8	26,9	31,8	38,0				
	•		2221		6,3	14,0	8,98	10,6	12,7	18,0	22,0	28,4	33,6	40,2				
	•		2320		7,6	14,0	13,1	15,5	18,5	26,1	32,0	41,3	48,9	58,4				
	•		2420		9,0	14,0	17,1	20,3	24,2	34,3	42,0	54,2	64,2	76,7				

### TYPICAL APPLICATIONS

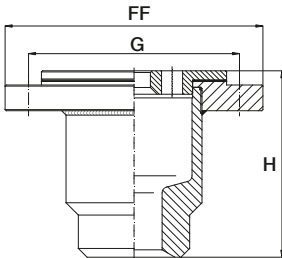
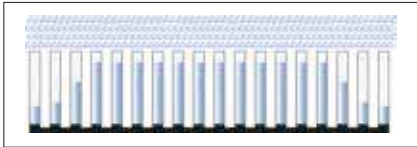
WASHING: exhaust scrubbers, parts cleaning, dust control  
COOLING: wire cooling

### CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi  
CAPACITY: 1 lpm = 0,264 gpm



**SPRAY DISTRIBUTION**



**FULL CONE NOZZLES**

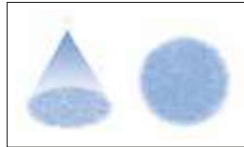
**SLOTTED VANE**

AE type nozzles are designed to deliver large and very large capacity values from 384 L/min to 3.842 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.

**SPRAY ANGLE CODE**

<b>U</b>	90°	<b>W</b>	120°
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**SPRAY PATTERN**



**MATERIALS CODE**

<b>A1</b>	Carbon steel
<b>B31</b>	Stainless steel AISI 316L
<b>D1</b>	PVC
<i>Other materials available upon request</i>	

**CONSTRUCTION: Y**

- **S** Standard (cast) PN 10
- **W** Welded type PN 10
- **R** Standard (cast) PN 16
- **V** Welded type PN 16

**VERSION: Z**

- **E** Flange UNI - EN - DIN
- **G** Flange ANSI B 16.5

**HOW TO ORDER PNR PRODUCTS**

Model	Spray Angle	Capacity	Material	Construction	Version
<b>AE</b>	<b>U</b>	<b>3940</b>	<b>XX</b>	<b>Y</b>	<b>Z</b>

*Order example: AEU 3940 B31 SE*

**CAPACITY - DIMENSIONS AND WEIGHTS**

Code	DN mm	D mm	D1 mm	Capacity - lpm									Dimensions mm			Weight* Kg
				Pressure - bar									FF	G	H	
				0,25	0,35	0,5	0,7	1,0	2,0	3,0	5,0					
90°	80	37,0	12,0	271	321	384	454	543	768	940	1214	200	160	140	8,0	
		39,0	14,0	341	403	482	570	681	963	1180	1523					
	100	43,0	13,0	424	502	600	710	849	1200	1470	1898	220	180	156	10,0	
		4188 xx	53,0	16,0	543	642	768	908	1085	1535	1880					2427
	125	4235 xx	56,0	16,0	678	803	959	1135	1357	1919	2350	3034	250	210	177	16,5
		4294 xx	59,0	21,0	849	1004	1200	1420	1697	2400	2940	3796				
	150	4370 xx	66,0	24,0	1068	1264	1511	1787	2136	3021	3700	4777	285	240	188	21,4
		4470 xx	72,0	28,0	1357	1605	1919	2270	2714	3838	4700	6068				
	200	4588 xx	81,0	32,0	1697	2008	2400	2840	3395	4801	5880	7591	340	295	250	46,0
		4741 xx	88,0	39,0	2139	2531	3025	3579	4278	6050	7410	9566				
250	4941 xx	99,0	37,0	2716	3214	3842	4545	5433	7683	9410	12148	395	350	291	71,0	
	120°	80	36,0	15,0	271	321	384	454	543	768	940					1214
4118 xx			40,5	14,5	341	403	482	570	681	963	1180	1523				
100		4147 xx	43,0	18,5	424	502	600	710	849	1200	1470	1898	220	180	156	10,0
		4188 xx	53,0	22,0	543	642	768	908	1085	1535	1880	2427				
125		4235 xx	55,0	24,0	678	803	959	1135	1357	1919	2350	3034	250	210	177	16,5
		4294 xx	59,0	28,0	849	1004	1200	1420	1697	2400	2940	3796				
150		4370 xx	66,0	32,0	1068	1264	1511	1787	2136	3021	3700	4777	285	240	188	21,4
		4470 xx	75,0	35,0	1357	1605	1919	2270	2714	3838	4700	6068				
200		4588 xx	81,0	40,0	1697	2008	2400	2840	3395	4801	5880	7591	340	295	250	46,0
		4741 xx	86,0	37,0	2139	2531	3025	3579	4278	6050	7410	9566				
250	4941 xx	96,0	42,0	2716	3214	3842	4545	5433	7683	9410	12148	395	350	291	71,0	

The stated flow rate data are measured at a pressure of 3 bar. For other pressures the Bernoulli formula was applied, with exponent 0,5. Effective flow rate may differ from formula. Please contact PNR if you want to know flow rate data at pressures other than 3 bar.

\* = For weight in different materials please contact PNR

**TYPICAL APPLICATIONS**

Exhaust scrubber  
**COOLING:** Coke quench tower scrubber system  
 Exhaust gas cooling

**High temperature cooling**  
**CLEANING:** Desulfuration

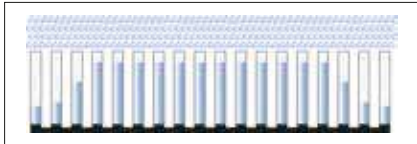


**FULL CONE NOZZLES**

**X-VANE / LARGE CAPACITIES**

The BE nozzles produce a full cone spray evenly distributed over a circular area of impact and are used for applications requiring high flow rates up to 11,300 l/min. Whether produced with standard or large spray angles, they provides a high density of spray per square meter. The bodies are obtained by casting and can be supplied both with female thread (BE series) or with ANSI flange (BL series).

**SPRAY DISTRIBUTION**



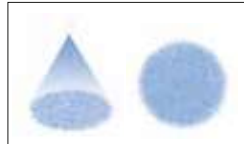
**SPRAY ANGLE CODE**

<b>U</b>	90°
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**MATERIALS CODE**

<b>B31</b>	Stainless steel AISI 316 L
<b>G1</b>	Cast Iron

**SPRAY PATTERN**

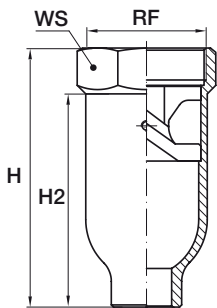


**CONSTRUCTION: Y**

- **S** Standard

**VERSION: Z**

- **G** Parallel thread (BSPP EN 10226)
- **N** Tapered thread (NPT ANSI B 1.20)



**HOW TO ORDER PNR PRODUCTS**

Model	Spray Angle	Capacity	Material	Construction	Version
<b>BE</b>	<b>U</b>	<b>4139</b>	<b>XX</b>	<b>Y</b>	<b>Z</b>

Order example: **BEU 4139 B31 SG**

**CAPACITY - DIMENSIONS AND WEIGHTS**

90°	BEU	Code	RF inch	D mm	D1 mm	Capacity - lpm							Dimensions mm			Weight Kg	
						Pressure- bar							H	H2	WS	B31	G1
						0,7	1,0	2,0	3,0	5,0	7,0	10					
90°	•	4139 xx	4	43	19	671	803	1135	1390	1794	2123	2538	251	207	130	6,0	7,0
		4157 xx		47	22	758	906	1282	1570	2027	2398	2866					
		4174 xx		51	25	840	1005	1421	1740	2246	2658	3177					
		4183 xx		54	25	884	1057	1494	1830	2363	2795	3341					
	•	4218 xx	5	48	29	1053	1259	1780	2180	2814	3330	3980	311	269	170	13,0	14,0
		4244 xx		53	29	1179	1409	1992	2440	3150	3727	4455					
		4279 xx		68	35	1348	1611	2278	2790	3602	4262	5094					
		4287 xx		73	35	1386	1657	2343	2870	3705	4384	5240					
	•	4305 xx	6	61	41	1473	1761	2490	3050	3938	4659	5569	366	321	200	25,0	28,0
		4348 xx		70	41	1681	2009	2841	3480	4493	5316	6354					
		4392 xx		77	44	1894	2263	3201	3920	5061	5988	7157					
		4418 xx		82	44	2019	2413	3413	4180	5396	6385	7632					
	•	4435 xx	8	70	48	2101	2511	3552	4350	5616	6645	7942	470	423	240	36,0	40,0
		4520 xx		80	47	2512	3002	4246	5200	6713	7943	9494					
		4610 xx		91	47	2947	3522	4981	6100	7875	9318	11137					
		4694 xx		102	57	3352	4007	5666	6940	8960	10601	12671					
•	4785 xx		124	57	3792	4532	6409	7850	10134	11991	14332						

**TYPICAL APPLICATIONS**

Cooling: Metals cooling  
Washing: Pre - treatment for coating

**CONVERSION TABLE (UE - USA)**

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

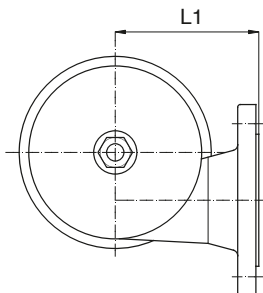
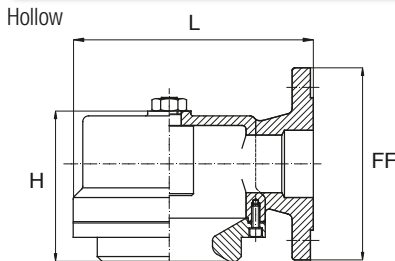
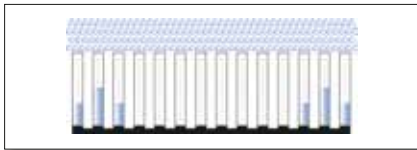




**TANGENTIAL NOZZLES / LARGE FLOW RATES**

PR nozzles produce a hollow cone spray based on the tangential jet principle generating atomized flows with large flow rates. They have a large free inside passage and no swirl vane and offer a considerable resistance to clogging and high performances.

**SPRAY DISTRIBUTION**



**SPRAY ANGLE CODE**

<b>Y</b>	130°
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**SPRAY PATTERN**



**MATERIALS CODE**

<b>A1</b>	Carbon steel
<b>B31</b>	Stainless Steel AISI 316L

**CONSTRUCTION: Y**

- **S** Standard flange assembly (PN 10)
- **X** Special flange assembly (PN 10)
- **R** Standard flange assembly (PN 16)
- **Y** Special flange assembly (PN 16)

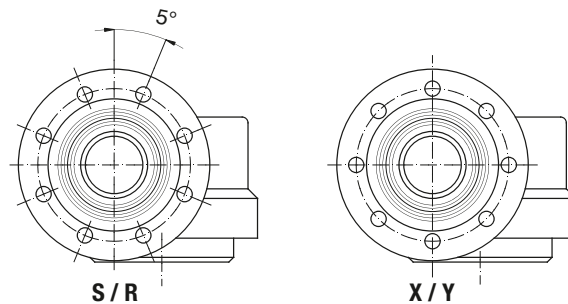
**VERSION: Z**

- **E** EN (UNI) Flange
- **F** ANSI Flange

**HOW TO ORDER PNR PRODUCTS**

Model	Spray Angle	Capacity	Material	Construction	Version
<b>PR</b>	<b>Y</b>	<b>3612</b>	<b>XX</b>	<b>Y</b>	<b>Z</b>

Order example: **PRY 3612 A1 SE**



**CAPACITY - DIMENSIONS AND WEIGHTS**

130°	Code	DN inch	DE mm	DU mm	Capacity - lpm					Dimensions mm				Weight* Kg
					Pressure - bar					FF	H	L	L1	
					0,5	1,0	2,0	3,0	5,0					
3"	PRY 3612 xx	3"	31,0	90	250	353	500	612	790	200	157	250	150	19,5
	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					
4"	PRY 4195 xx	4"	60,0	145	796	1126	1592	1950	2517	220	242	355	200	57,0
	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					

\* = For weight in different materials please contact PNR


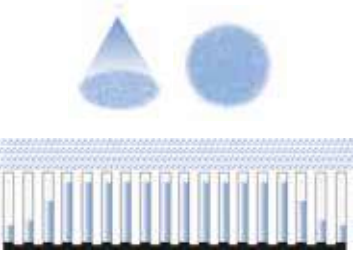


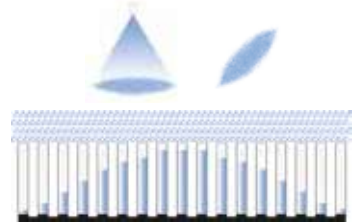






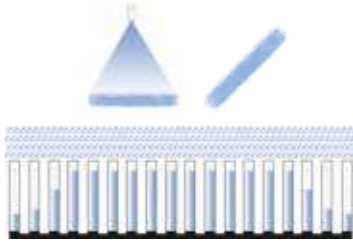



**TYPICAL APPLICATIONS**

- Desulfurization
- Denitrogening
- Exhaust scrubbers
- Coke quenching towers

**CONVERSION TABLE (UE - USA)**

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

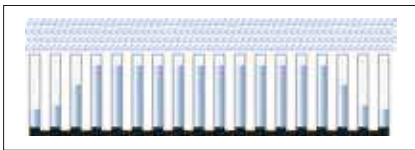
<p><b>ROUND PATTERN</b></p>	 <p>AH BA</p>	<p><b>FEMALE THREAD</b> AH 18 BA 19</p>
	 <p>BC D</p>	<p><b>MALE THREAD</b> BC 19 D 20</p>
<p><b>OVAL PATTERN</b></p>	 <p>BX</p>	<p><b>ROUND TIP TYPE</b> BX 23</p>
	 <p>D.OB D.PB</p>	<p><b>MALE THREAD</b> D.OB 24 D.PB 25</p>
<p><b>SQUARE PATTERN</b></p>	 <p>BH</p>	<p><b>MALE THREAD</b> BH 26</p>
	<p><b>RECTANGULAR PATTERN</b></p>	<p><b>DOUBLE PIN CONNECTION</b> 926 27</p>
	 <p>926</p>	<p><b>DOUBLE PIN CONNECTION</b> 926 27</p>
<p><b>FAN JET PATTERN</b></p>	 <p>GX</p>	<p><b>ROUND TIP TYPE</b> GX 28</p>
	 <p>GY</p>	<p><b>DOVETAIL TIP TYPE</b> GY 30</p>
	 <p>FX FA FB</p>	<p><b>MALE THREAD HIGH PRESSURE TYPE</b> F 32</p>

### FULL CONE NOZZLES / DISC VANE (UNIFORM DISTRIBUTION)

The AH type nozzles produce a full cone spray pattern with a very uniform distribution on the entire spray surface. Thanks to the special design of their disc vane they can produce a full cone jet with no central hole, thus offering the nozzle orifice a very high resistance to clogging even in hard operating conditions.



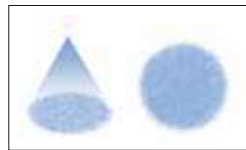
#### SPRAY DISTRIBUTION



#### SPRAY ANGLE CODE

R	65°
T	80°

#### SPRAY PATTERN



#### MATERIALS CODE

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

#### CONSTRUCTION: Y

- S Standard
- A With safety ring

#### VERSION: Z

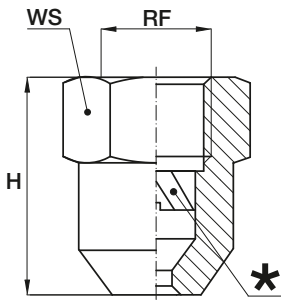
- G Parallel thread (BSPP-EN 10226)
- N Tapered thread (NPT-ANSI B 1.20)

#### HOW TO ORDER PNR PRODUCTS

Model	Spray Angle	Capacity	Material	Construction	Version
AH	R	1309	XX	Y	Z

Order example: **AHR 1309 T1 SG**

#### CAPACITY - DIMENSIONS AND WEIGHTS



#### \* DISC VANE

This special vane uses a series of 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 fluid rotation at the center so to obtain a full cone jet with a very even distribution, avoiding to use a small central hole which may get easily clogged.

#### CONVERSION TABLE (UE - USA)

**PRESSURE:** 1 bar = 14,5 psi

**CAPACITY:** 1 lpm = 0,264 gpm

Code	RF inch	D mm	Capacity - lpm					Dimensions mm		Weight g								
			Pressure - bar					H	WS	B31/B1	T1							
			1,0	2,0	3,0	4,0	5,0											
65°	1/4	1,9	1,79	2,53	3,10	3,58	4,00	27,5	19	45	50							
		2,0	2,08	2,94	3,60	4,16	4,65											
		2,2	2,37	3,35	4,10	4,73	5,29											
	3/8	3/8	1,0	1,21	1,71	2,10	2,42	2,71	25,0	22	45	50						
			1,9	1,79	2,53	3,10	3,58	4,00										
			2,0	1,96	2,78	3,40	3,93	4,39										
			2,1	2,08	2,94	3,60	4,16	4,65										
			2,2	2,35	3,39	4,15	4,79	5,31										
			2,4	2,71	3,84	4,70	5,43	6,07										
			2,6	3,00	4,25	5,18	5,98	6,68										
			2,7	3,58	5,06	6,20	7,16	8,00										
			2,9	4,50	6,37	7,80	9,01	10,12										
			3,1	4,79	6,76	8,28	9,56	10,68										
			4,2	6,35	8,98	11,00	12,70	14,24										
4,2	8,31	11,76	14,40	16,63	18,62													
80°	1/4	2,2	1,79	2,53	3,10	3,58	4,00	27,5	19	45	50							
		2,2	2,08	2,94	3,60	4,16	4,65											
		2,2	2,37	3,35	4,10	4,73	5,29											
	3/8	3/8	2,0	1,79	2,53	3,10	3,58	4,00	25,0	22	45	50						
			2,1	2,08	2,94	3,60	4,16	4,65										
			2,2	2,37	3,35	4,10	4,73	5,29										
			2,6	3,00	4,23	5,18	5,98	6,68										
			2,7	3,58	5,06	6,20	7,16	8,00										
			2,9	4,50	6,37	7,80	9,01	10,07										
			3,1	4,78	6,76	8,28	9,56	10,68										
			4,2	6,35	8,98	11,00	12,70	14,20										
			4,2	8,31	11,76	14,40	16,63	18,62										
			1/2	1/2	4,2	6,35	8,98	11,00					12,70	14,20	36,0	27	105	115
					4,2	8,31	11,76	14,40					16,63	18,62				

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

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



**SPRAY ANGLE CODE**

<b>Q</b>	60°
<b>W</b>	120°

**MATERIALS CODE**

<b>B1</b>	Stainless steel AISI 303
<b>B31</b>	Stainless steel AISI 316 L
<b>T1</b>	Brass

**VERSION: Z**

- **S** Standard

**THREAD CODE**

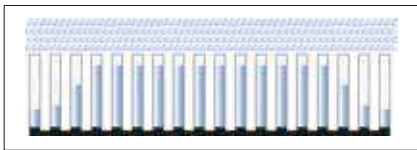
- **G** Parallel thread (BSPP-EN 10226)
- **B** Tapered thread (BSPT EN -10226)
- **N** Conical thread (NPT ANSI B 1.20)

**HOW TO ORDER PNR PRODUCTS**

Model	Spray Angle	Capacity	Material	Version	Thread
<b>BA</b>	<b>Q</b>	<b>0740</b>	<b>B31</b>	<b>S</b>	<b>N</b>

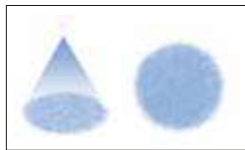
Order example: **BAQ 0740 B31 SN**

**SPRAY DISTRIBUTION**



Standard Spray

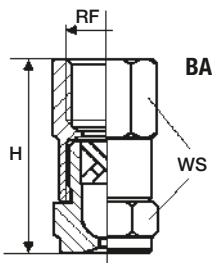
**SPRAY PATTERN**



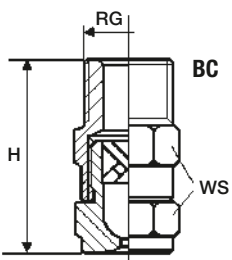
**CAPACITY - DIMENSIONS AND WEIGHTS**

Model	Code	RF RG	D mm	D1 mm	Capacity - lpm						Spray angle			Dimensions mm		Weight g	
					Pressure - bar						Pressure - bar			H	WS	B31/B1	T1
					0,7	1,0	3,0	6,0	7,0	10	0,5	1,5	6,0				
BA	0740	1/8	1,0	0,5	0,36	0,43	0,74	1,05	1,13	1,35	-	58°	53°	30	14	25,0	30,0
	1110		1,2	0,5	0,53	0,64	1,10	1,56	1,68	2,01	52°	65°	59°				
	1150		1,4	1,0	0,72	0,87	1,50	2,12	2,29	2,74	43°	50°	46°				
	1220		1,6	1,0	1,06	1,27	2,20	3,11	3,36	4,02	52°	65°	59°				
	1260		1,6	1,3	1,26	1,50	2,60	3,68	3,97	4,75	43°	50°	46°				
	1370	2,0	1,3	1,79	2,14	3,70	5,23	5,65	6,76	52°	65°	59°					
	1480	2,4	1,7	2,32	2,77	4,80	6,79	7,33	8,76	45°	50°	46°					
	1740	2,9	1,7	3,57	4,27	7,40	10,5	11,3	13,5	58°	67°	61°					
	1930	3,2	1,7	4,49	5,37	9,30	13,2	14,2	17,0	69°	74°	68°					
	1700	3,0	3/8	2,0	3,38	4,04	7,00	9,90	10,69	12,78	45°	50°	46°				
2111	3,4	2,4	5,36	6,41	11,1	15,7	17,0	20,3	64°	67°	61°						
2163	4,5	2,4	7,87	9,41	16,3	23,1	24,9	29,8	87°	90°	82°						
2118	3,4	3,0	5,70	6,81	11,8	16,7	18,0	21,5	48°	50°	46°						
2185	4,4	3,0	8,94	10,7	18,5	26,2	28,3	33,8	64°	67°	61°						
2240	5,0	3,0	11,6	13,9	24,0	33,9	36,7	43,8	72°	75°	68°						
2300	5,6	3,0	14,5	17,3	30,0	42,4	45,8	54,8	88°	91°	83°						

**Standard Spray  
BAQ (Female)  
BCQ (Male)**



**Wide spray  
BAW - BCW**



BC	1200	1/8	1,0	0,5	0,97	1,15	2,00	2,83	3,06	3,65	-	120°	102°	32	14	24,0	30,0
	1310		1,2	0,5	1,50	1,79	3,10	4,38	4,74	5,66	-	120°	102°				
	1400		1,4	1,0	1,93	2,31	4,00	5,66	6,11	7,30	-	120°	102°				
	1570	1,6	1,0	2,75	3,29	5,70	8,06	8,71	10,4	-	120°	103°					
	1720	1,6	1,3	3,48	4,16	7,20	10,2	11,0	13,1	112°	120°	103°					
	1860	2,0	1,3	4,15	4,97	8,60	12,2	13,1	15,7	114°	120°	103°					
	2100	2,4	1,7	4,83	5,77	10,0	14,1	15,3	18,3	114°	120°	103°					
	2122	2,9	1,7	5,89	7,04	12,2	17,3	18,6	22,3	114°	120°	103°					
	2144	3,2	1,7	6,96	8,31	14,4	20,4	22,0	26,3	114°	120°	104°					
	2172	3,0	2,0	8,31	9,93	17,2	24,3	26,3	31,4	114°	120°	104°					
2194	3,4	2,4	9,37	11,2	19,4	27,4	29,6	35,4	114°	120°	106°						
2220	4,5	2,4	10,6	12,7	22,0	31,1	33,6	40,2	114°	120°	108°						
2250	3,4	3,0	12,1	14,4	25,0	35,4	38,2	45,6	114°	120°	108°						
2290	4,4	3,0	14,0	16,7	29,0	41,0	44,3	52,9	114°	120°	108°						
2320	5,0	3,0	15,5	18,5	32,0	45,3	48,9	58,4	114°	120°	110°						
2360	5,6	3,0	17,4	20,8	36,0	50,9	55,0	65,7	114°	120°	112°						

# D

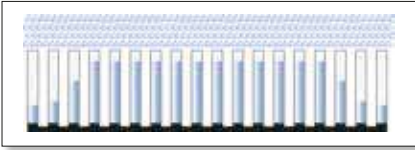
## CONTINUOUS CASTING COOLING (WATER)

### FULL CONE NOZZLES

The D series full cone nozzles offer a simple yet efficient design which consists of a body with male thread and an X - vane with large passage. The insert is locked into place for all sizes up to 3/8" included which allows the nozzle assembly in any desired orientation without danger. Normally available from stock in the below listed materials



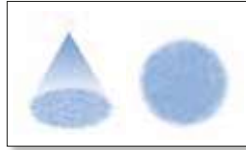
#### SPRAY DISTRIBUTION



#### SPRAY ANGLE CODE

M	45°	U	90°
Q	60°	W	120°

#### SPRAY PATTERN



#### THREADED CONNECTION CODES

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

#### MATERIALS CODE

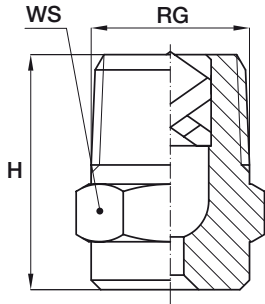
B1	Stainless Steel AISI 303
B31	Stainless Steel AISI 316L
T1	Brass

#### CONSTRUCTION: Y

- S Standard
- A With safety ring

#### VERSION: Z

- B Tapered thread (BSPT-EN 10226)
- N Tapered thread (NPT- ANSI B 1.20)
- G Parallel thread (BSPP-EN 10226)



#### HOW TO ORDER PNR PRODUCTS

Model	Thread	Spray Angle	Capacity	Material	Construction	Version
D	A	U	1118	XX	Y	Z

Order example: **DAU 1118 T1 SB**

#### CAPACITY (WEIGHTS at page 22)

45°	DAM	DBM	DCM	DDM	Code	D mm	D1 mm	Capacity - lpm						
								Pressure - bar						
								0,7	1,0	2,0	3,0	5,0	7,0	10
•	•				1118 xx	1,1	1,0	0,57	0,68	0,96	1,18	1,52	1,80	2,15
•	•				1147 xx	1,2	1,1	0,71	0,85	1,20	1,47	1,90	2,25	2,68
•	•				1188 xx	1,3	1,0	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	3,3	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


#### CONVERSION TABLE (UE - USA)


PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



### CAPACITY (WEIGHTS at page 22)


	DAQ	DBQ	DCQ	DDQ	Code	D	D1	Capacity - lpm						
								Pressure - bar						
								0,7	1,0	2,0	3,0	5,0	7,0	10
60°	•				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	

	DAU	DBU	DCU	DDU	Code	D	D1	Capacity - lpm						
								Pressure - bar						
								0,7	1,0	2,0	3,0	5,0	7,0	10
90°	•				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	9,5	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	

▷ continued on page 22



## CAPACITY

	DAW	DBW	DCW	DDW	Code	D mm	D1 mm	Capacity - lpm						
								Pressure - bar						
								0,7	1,0	2,0	3,0	5,0	7,0	10
120°	•				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	13,5	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	

## WEIGHTS

Model	From Size	To Size	Weight g	
			B1/B31	T1
DA - 1/8"	1118	1235	11	12
	1294	1470	10	11
DB - 1/4"	1118	1588	20	21
	1659	1835	18	19
DC - 3/8"	1235	1740	35	36
	1835	2235	30	31
DD - 1/2"	1470	2105	67	71
	2117	2370	61	66

## CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

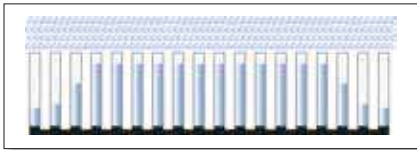
CAPACITY: 1 lpm = 0,264 gpm

**FULL CONE NOZZLE TIPS**

These nozzles produce a full cone spray pattern with a circular impact area. The complete nozzle is made of tip, nipple and ring and this type of construction allows to disassemble the tip quickly and easily for maintenance in case of clogging.



**SPRAY DISTRIBUTION**



**SPRAY ANGLE CODE**

Q	60°
---	-----

**SPRAY PATTERN**



**MATERIALS CODE**

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

**CONSTRUCTION: Y**

- S Standard

**VERSION: Z**

- B Tip type

**HOW TO ORDER PNR PRODUCTS**

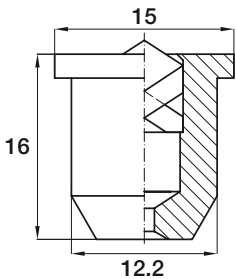
Model	Spray Angle	Capacity	Material	Construction	Version
BX	Q	1149	XX	Y	Z

Order example: **BXQ 1149 B31 SB**

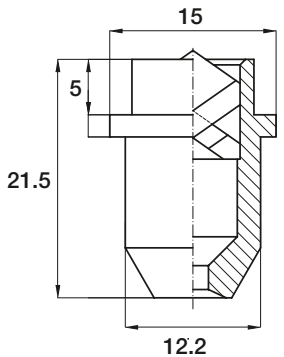
Under Certain conditions, for example nozzles that spray upward at high temperatures, or in case of sudden vacuum conditions in the pipes, the nozzle vane may exit from its housing and impair the functionality of the nozzle itself. Our nozzles with X-vanes, wire size and thread dimension of 3/8" have the vane safely secured in place.

**MOUNTING ACCESSORIES:**

BX nozzles are secured by using a weld nipple (ZAA) and a Lock Nut (VAA).



BX 1149 1372

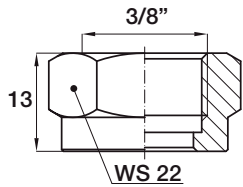


BX 1508 1743

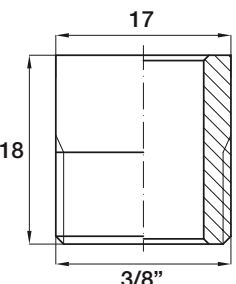


ZAA C018 xx

VAA 0380 xxB



VAA 0380 xxB



ZAA C018 xx

**CAPACITY - DIMENSIONS AND WEIGHTS**

Code	D mm	Capacity - lpm					Spray angle			Weight g		
		Pressure - bar					Pressure - bar			B1/B31	T1	
		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°	12	14
	BXQ 1223 xx	1,7	1,35	1,90	2,33	3,01	4,25	65°	65°	49°	12	14
	BXQ 1262 xx	1,7	1,51	2,14	2,62	3,38	4,78	50°	50°	46°	12	13
	BXQ 1372 xx	2,1	2,15	3,04	3,72	4,80	6,79	65°	65°	59°	12	13
	BXQ 1508 xx	2,4	2,93	4,15	5,08	6,56	9,27	50°	50°	46°	12	13
	BXQ 1570 xx	2,8	3,29	4,65	5,70	7,36	10,4	62°	65°	65°	12	13
	BXQ 1626 xx	2,9	3,61	5,11	6,26	8,08	11,4	60°	60°	55°	12	13
	BXQ 1743 xx	2,9	4,29	6,1	7,43	9,59	13,6	67°	67°	61°	12	13

**CONVERSION TABLE (UE - USA)**

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



**OVAL JET NOZZLES**

These D..OB full cone nozzles with oval spray pattern are used for continuous casting cooling. Their jets, covering an oblong surface, can be easily positioned to ensure a very uniform cooling action. Their construction in two pieces, body and X-vane, offers the same benefits of the normal full cone nozzle in terms of resistance to clogging and a secure vane.

**SPRAY ANGLE CODE**

U..0	$\alpha = 90^\circ$
	$\beta = 60^\circ$

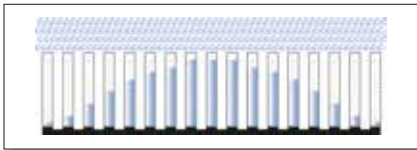
**THREAD CODE**

B	1/4"
C	3/8"

**MATERIALS CODE**

B1	Stainless steel AISI 303
T1	Brass

**SPRAY DISTRIBUTION**



**SPRAY PATTERN**

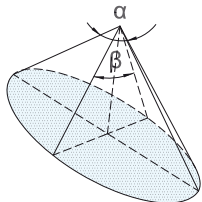
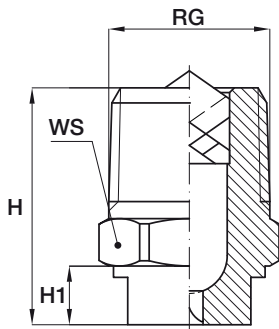


**CONSTRUCTION: Y**

- O Oval
- $\alpha = 90^\circ$
- $\beta = 60^\circ$

**VERSION: Z**

- B Tapered thread (BSPT-EN 10226)



**HOW TO ORDER PNR PRODUCTS**

Model	Thread	Spray Angle	Capacity	Material	Construction	Version
D	B	U..0	1330	XX	Y	Z

Order example: **DBU 1330 T1 OB**

**CAPACITY - DIMENSIONS AND WEIGHTS**

$\alpha$	$\beta$	Code	RG inch	D1 mm	Capacity - lpm							Dimensions mm			Weight g		
					Pressure - bar							H	H1	WS	B1	T1	
							0,7	1,5	2,0	3,0	4,0						6,0
90°	60°	DBU 1330xx OB	1/4	1,2	1,60	2,34	2,69	3,32	3,81	4,65	5,07	6,06	22	5	14	19	18
		DBU 1420xx OB		1,4	2,03	2,97	3,42	4,21	4,85	5,92	6,43	7,68					
		DBU 1540xx OB		1,7	2,62	3,83	4,41	5,44	6,23	7,65	8,31	9,93					
		DBU 1720xx OB		1,9	3,48	5,09	5,87	7,22	8,31	10,2	11,0	13,2					
		DBU 1780xx OB		2,1	3,67	5,37	6,22	7,61	8,78	10,8	11,6	13,9					
		DBU 1840xx OB		2,2	4,05	5,92	6,85	8,39	9,69	11,9	12,8	15,3					
90°	60°	DCU 1320xx OB	3/8	1,1	1,55	2,26	2,61	3,20	3,70	4,53	4,89	5,84	25	5	17	36	35
		DCU 1400xx OB		1,3	1,93	2,83	3,27	4,00	4,62	5,66	6,11	7,30					
		DCU 1520xx OB		1,6	2,52	3,68	4,25	5,20	6,00	7,35	7,94	9,49					
		DCU 1680xx OB		1,6	3,28	4,81	5,55	6,80	7,85	9,62	10,4	12,4					
		DCU 1800xx OB		2	3,86	5,66	6,53	8,00	9,24	11,3	12,2	14,6					

**TYPICAL APPLICATIONS**

Continuous casting

**CONVERSION TABLE (UE - USA)**

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



**OVAL JET NOZZLES**

The full cone nozzles with oval spray pattern D..PB series have the same characteristics and features of the D..OB series nozzles, but with operating angles at 90° and 30°.

**SPRAY ANGLE CODE**

U..P	$\alpha = 90^\circ$
	$\beta = 30^\circ$

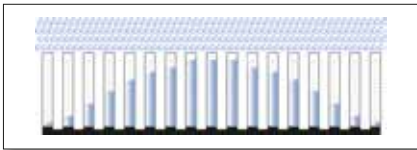
**THREAD CODE**

B	1/4"
C	3/8"

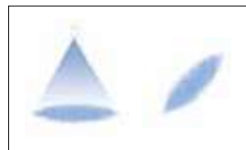
**MATERIALS CODE**

B1	Stainless steel AISI 303
T1	Brass

**SPRAY DISTRIBUTION**



**SPRAY PATTERN**

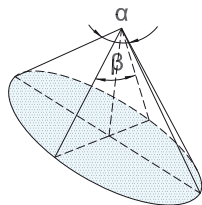
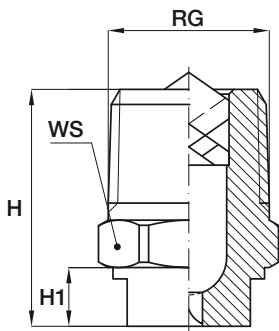


**CONSTRUCTION: Y**

- O Oval
- $\alpha = 90^\circ$
- $\beta = 30^\circ$

**VERSION: Z**

- B Tapered thread (BSPT-EN 10226)



**HOW TO ORDER PNR PRODUCTS**

Model	Thread	Spray Angle	Capacity	Material	Construction	Version
D	B	U..P	1330	XX	Y	Z

Order example: **DBU 1330 T1 PB**

**CAPACITY - DIMENSIONS AND WEIGHTS**

$\alpha$	$\beta$	Code	RG inch	D1 mm	Capacity - lpm							Dimensions mm			Weight g		
					Pressure - bar							H	H1	WS	B1	T1	
0,7   1,5   2,0   3,0   4,0   6,0   7,0   10																	
90°	30°	DBU 1330xx PB	1/4	1,2	1,60	2,34	2,69	3,32	3,81	4,65	5,07	6,06	22	5	14	19	18
		DBU 1420xx PB		1,4	2,03	2,97	3,42	4,21	4,85	5,92	6,43	7,68					
		DBU 1540xx PB		1,7	2,62	3,83	4,41	5,44	6,23	7,65	8,31	9,93					
		DBU 1720xx PB		1,9	3,48	5,09	5,87	7,22	8,31	10,2	11,0	13,2					
		DBU 1780xx PB		2,1	3,67	5,37	6,22	7,61	8,78	10,8	11,6	13,9					
		DBU 1840xx PB		2,2	4,05	5,92	6,85	8,39	9,69	11,9	12,8	15,3					
90°	30°	DCU 1240xx PB	3/8	0,90	1,16	1,70	1,96	2,40	2,77	3,40	3,67	4,38	25	5	17	36	35
		DCU 1320xx PB		1,1	1,55	2,26	2,61	3,20	3,70	4,53	4,89	5,84					
		DCU 1410xx PB		1,3	1,93	2,83	3,27	4,00	4,62	5,66	6,11	7,30					
		DCU 1540xx PB		1,6	2,52	3,68	4,25	5,20	6,00	7,35	7,94	9,49					
		DCU 1680xx PB		1,6	3,28	4,81	5,55	6,80	7,85	9,62	10,4	12,4					
		DCU 1840xx PB		2	3,86	5,66	6,53	8,00	9,24	11,3	12,2	14,6					

**TYPICAL APPLICATIONS**

Continuous casting  
Cooling

**CONVERSION TABLE (UE - USA)**

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

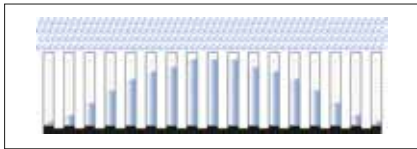
### FULL CONE NOZZLES

#### X-VANE / SQUARE SPRAY PATTERN / 2 PIECES

Depending on their size, these nozzles are produced from bars or castings (see drawings on the page), size and weight as per below table. They are the convenient choice when the coverage of an area should be as uniform as possible. It's worth noting that the sides of the square section of the jet are not in line with the grooves of the nozzle orifice, the deviation angle is between 10° and 15° depending on the working pressure and distance. The proper alignment should be obtained at the time of installation or maintenance.



#### SPRAY DISTRIBUTION



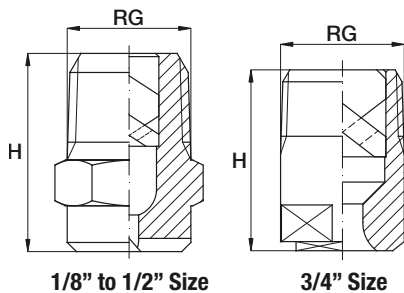
#### SPRAY PATTERN



#### HOW TO ORDER PNR PRODUCTS

Model	Spray Angle	Capacity	Material	Construction	Version
BH	Q	1270	XX	Y	Z

Order example: **BHW 1270 B31 SB**



#### CAPACITY - DIMENSIONS AND WEIGHTS

60°	Code	RG inch	D mm	D1 mm	Capacity - lpm								Spray angle			Dimensions mm		Weight g	
					Pressure - bar								Pressure - bar			H	WS	B31/B1	T1
					0,7	1,0	2,0	3,0	5,0	7,0	10	0,7	3,0	5,0					
60°	BHQ 1270xx	1/8	1,7	1,3	1,30	1,56	2,20	2,70	3,49	4,12	4,93	52	60	58	22	12	10	11	
	BHQ 1350xx		1,9	1,3	1,74	2,08	2,94	3,60	4,65	5,50	6,57	58	60	60					
	BHQ 1440xx		2,2	1,3	2,13	2,54	3,59	4,40	5,68	6,72	8,03	60	65	60					
	60°	BHQ 1740xx	1/4	2,8	1,6	3,57	4,27	6,04	7,40	9,55	11,3	13,5	62	65	60	23	14	18	20
		BHQ 1890xx		3,2	1,6	4,30	5,14	7,27	8,90	11,5	13,6	16,2	62	65	60				
	60°	BHQ 2107xx	3/8	3,8	1,6	5,17	6,18	8,74	10,7	13,8	16,3	19,5	65	65	60	30	17	32	35
		BHQ 2133xx		4,0	2,4	6,42	7,68	10,9	13,3	17,2	20,3	24,3	60	62	60				
		BHQ 2210xx	1/2	5,5	3,2	10,1	12,1	17,2	21,0	27,1	32,1	38,3	62	64	60	39	21	69	71
		BHQ 2270xx		6,4	3,2	13,0	15,6	22,0	27,0	34,8	41,2	49,2	62	65	60				
		BHQ 2370xx	3/4	6,7	4,4	17,8	22,0	31,0	37,0	47,8	56,5	67,5	60	64	62	55	27	109	116
120°		BHW 2100xx	1/4	3,2	1,6	4,83	5,77	8,16	10,0	12,9	15,3	18,3	106	115	100	23	14	16	17
		BHW 2122xx	3/8	3,9	1,6	5,89	7,04	9,96	12,2	15,8	18,6	22,3	105	120	110				
	BHW 2144xx	4,0		2,4	6,96	8,31	11,8	14,4	18,6	22,0	26,3	105	120	110					
	BHW 2172xx	4,6		2,4	8,31	9,93	14,0	17,2	22,2	26,3	31,4	105	120	105					
	BHW 2194xx	5,4		2,4	9,37	11,2	15,8	19,4	25,0	29,6	35,4	105	120	106					
	BHW 2220xx	1/2		4,8	3,0	10,6	12,7	18,0	22,0	28,4	33,6	40,2	105	110	105	39	21	63	68
	BHW 2250xx		5,1	3,0	12,1	14,4	20,4	25,0	32,3	38,2	45,6	105	110	105					
	BHW 2290xx		5,7	3,0	14,0	16,7	23,7	29,0	37,4	44,3	53,0	105	110	105					
	BHW 2320xx	3/4	7,0	3,0	15,4	18,5	26,1	32,0	41,3	48,9	58,4	105	110	105	55	27	95	105	
	BHW 2360xx		8,0	3,0	17,4	20,8	29,4	36,0	46,5	55,0	65,7	105	110	105					
BHW 2500xx	8,5		4,5	24,2	28,9	40,8	50,0	64,5	76,4	91,3	105	115	103						

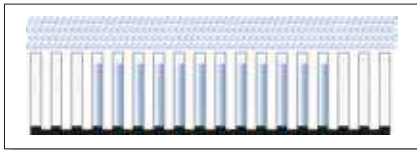


**RECTANGULAR JET NOZZLE TIPS**

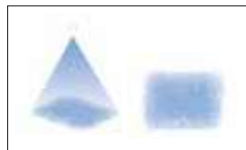
The 926 series nozzles produce a rectangular spray pattern, ideal for continuous castings coverage. They can be supplied as tips with welding nipple and locknut or, on request, with female or male thread.

For any requirements about 926 series please contact our offices.

**SPRAY DISTRIBUTION**



**SPRAY PATTERN**



**MATERIALS CODE**

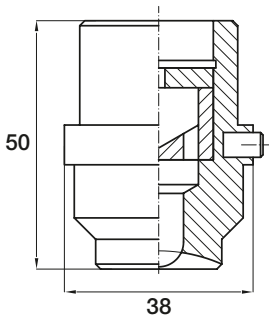
T1 Brass

**CONSTRUCTION: Y**

- S Standard

**VERSION: Z**

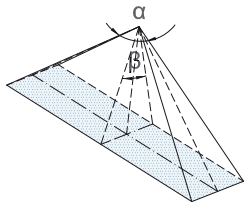
- T Tip connection



**HOW TO ORDER PNR PRODUCTS**

Model	Capacity	Material	Construction	Version
926	L01A	XX	Y	Z

Order example: 926 L01A T1 ST



**CAPACITY - DIMENSIONS AND WEIGHTS**

α	β	Code	Capacity - lpm							Weight g	
			Pressure - bar								
			1,0	2,0	3,0	4,0	5,0	6,0	7,0	10	T1
90°	30°	926 L01A T1ST	3,64	5,14	6,30	7,27	8,13	8,91	9,62	11,50	280
		926 L02A T1ST	9,30	13,15	16,10	18,59	20,79	22,77	24,59	29,39	
		926 L03A T1ST	10,39	14,70	18,00	20,78	23,24	25,46	27,50	32,86	
		926 L04A T1ST	12,41	17,55	21,50	24,83	27,76	30,41	32,84	39,25	

**CONVERSION TABLE (UE - USA)**

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



### FAN JET NOZZLE TIPS

#### SIZE 3/8" AND 3/4"

These fan jet nozzle tips are usually assembled onto a manifold through a welding nipple or a clamp and secured tight with a locknut. Therefore they can be easily replaced and their jet easily oriented in the desired direction. The tips shown on this page have the most common capacity values. The precisely machined orifice can be protected from clogging through a filter housed inside the nipples and the clamp specifically designed for this purpose. The high capacity nozzle tips, see table below, do not require a filter as they have a large orifice and are assembled with a 3/4" welding nipple. Tips with higher capacities and bigger size than those shown in this catalogue, as well as their related nipples and locknuts, can be produced on request.



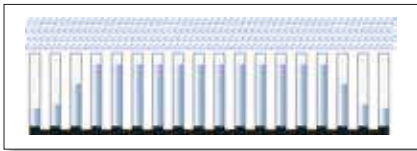
#### SPRAY ANGLE CODE

<b>A</b>	0°	<b>Q</b>	60°
<b>F</b>	30°	<b>U</b>	90°
<b>M</b>	45°	<b>W</b>	120°

#### MATERIALS CODE

<b>B1</b>	Stainless steel AISI 303
<b>B31</b>	Stainless steel AISI 316 L
<b>T1</b>	Brass

#### SPRAY DISTRIBUTION



#### SPRAY PATTERN



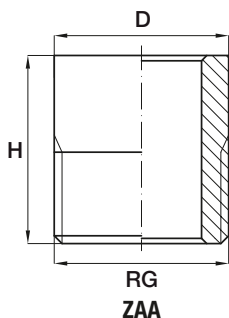
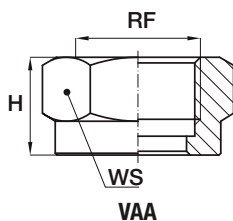
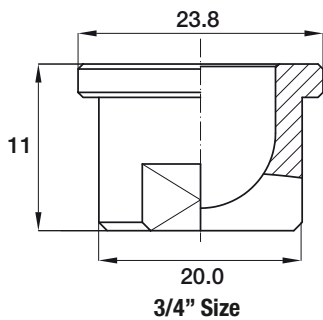
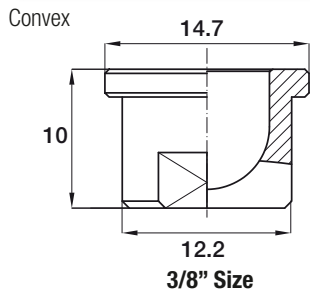
#### HOW TO ORDER PNR PRODUCTS

Model	Spray Angle	Capacity	Material
<b>GX</b>	<b>Q</b>	<b>1190</b>	<b>XX</b>

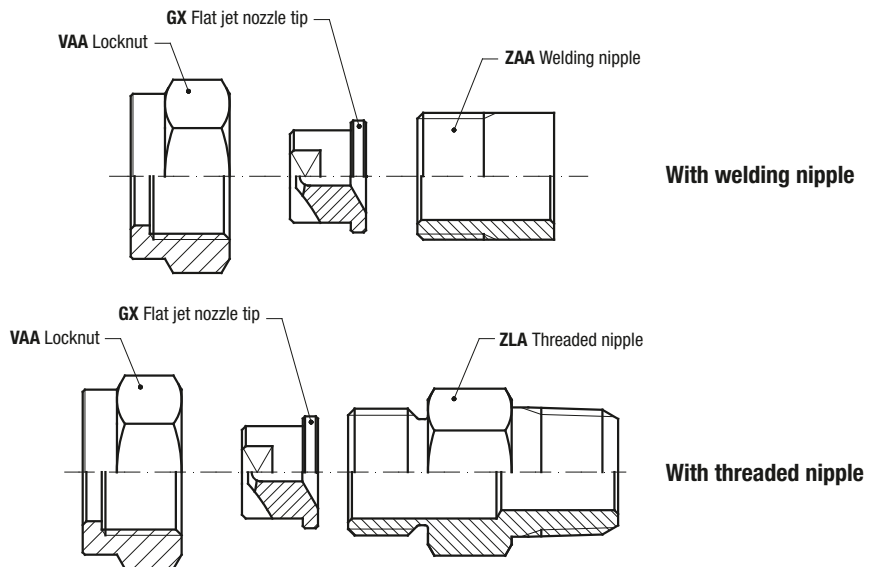
Order example: **GXQ 1190 T1**

#### ASSEMBLY FITTING CODING

Size inch	Locknut	Welding nipple	Threaded nipple
3/8"	VAA 0380 xxB	ZAA 1738 xx	ZLA 3838 xx
3/4"	VAA 0750 xxB	ZAA 2775 xx	ZLA 7575 xx



#### TYPICAL COMBINATION OF A NOZZLE TIP WITH NIPPLE AND LOCKNUT.



#### DIMENSIONS

Code	RG/RF inch	D mm	H mm	WS mm
<b>VAA 0380 xxB</b>	3/8"	-	13	22
<b>VAA 0750 xxB</b>	3/4"	-	16	32
<b>ZAA 1738 xx</b>	3/8"	17	18	-
<b>ZAA 2775 xx</b>	3/4"	27	27	-

### 3/8" size nozzle tips

### CAPACITY - WEIGHTS

GXF	GXM	GXQ	GXU	GXW	Code	Capacity - lpm										Weight g	
						Pressure - bar										B31/B1	T1
						0,5	1,0	1,5	2,0	3,0	4,0	5,0	7,0	10			
•	•	•	•	•	1190	0,78	1,10	1,34	1,55	1,90	2,19	2,45	2,90	3,47	8	9	
•	•	•	•	•	1233	0,95	1,35	1,65	1,90	2,33	2,69	3,01	3,56	4,25	8	9	
•	•	•	•	•	1310	1,27	1,79	2,19	2,53	3,10	3,58	4,00	4,74	5,66	8	9	
•	•	•	•	•	1385	1,57	2,22	2,72	3,14	3,85	4,45	4,97	5,88	7,03	8	9	
•	•	•	•	•	1490	2,00	2,83	3,46	4,00	4,90	5,66	6,33	7,48	8,95	8	9	
•	•	•	•	•	1581	2,37	3,35	4,11	4,74	5,81	6,71	7,50	8,87	10,6	8	9	
•	•	•	•	•	1780	3,18	4,50	5,52	6,37	7,80	9,01	10,1	11,9	14,2	8	9	
•	•	•	•	•	1980	4,00	5,66	6,93	8,00	9,80	11,3	12,7	15,0	17,9	8	9	
•	•	•	•	•	2124	5,06	7,16	8,77	10,1	12,4	14,3	16,0	18,9	22,6	8	9	
•	•	•	•	•	2153	6,25	8,83	10,8	12,5	15,3	17,7	19,8	23,4	27,9	8	9	
•	•	•	•	•	2194	7,96	11,3	13,8	15,9	19,5	22,52	25,2	29,8	35,6	8	9	
•	•	•	•	•	2245	10,0	14,1	17,3	20,0	24,5	28,29	31,6	37,4	44,7	8	9	

### 3/4" size nozzle tips

### CAPACITY - WEIGHTS

GXF	GXM	GXQ	GXU	GXW	Code	Capacity - lpm										Weight g	
						Pressure - bar										B31/B1	T1
						0,5	1,0	1,5	2,0	3,0	4,0	5,0	7,0	10			
•	•	•	•	•	1781	3,18	4,50	5,52	6,37	7,80	9,01	10,1	11,9	14,24	23	25	
•	•	•	•	•	1981	4,00	5,66	6,93	8,00	9,80	11,3	12,7	15,0	17,89	23	25	
•	•	•	•	•	2125	5,06	7,16	8,77	10,1	12,4	14,3	16,0	18,9	22,64	23	25	
•	•	•	•	•	2154	6,25	8,83	10,8	12,5	15,3	17,7	19,8	23,4	27,93	23	25	
•	•	•	•	•	2195	7,92	11,2	13,7	15,8	19,4	22,4	25,0	29,6	35,42	23	25	
•	•	•	•	•	2246	10,0	14,1	17,3	20,0	24,5	28,3	31,6	37,4	44,73	23	25	
•	•	•	•	•	2311	12,7	17,9	21,9	25,3	31,0	35,8	40,0	47,4	56,60	23	25	
•	•	•	•	•	2490	20,0	28,3	34,6	40,0	49,0	56,6	63,3	74,8	89,46	23	25	
•	•	•	•	•	2610	24,9	35,2	43,1	49,8	61,0	70,4	78,8	93,2	111,4	23	25	
•	•	•	•	•	2760	31,0	43,9	53,7	62,1	76,0	87,8	98,1	116,1	138,8	23	25	
•	•	•	•	•	3122	49,8	70,4	86,3	99,6	122	141	158	186	223	23	25	

### CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

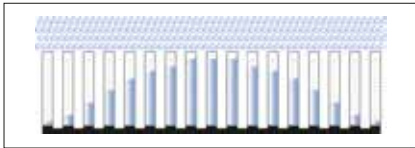
FAN JET NOZZLE TIPS WITH DOVE TAIL

SIZE 3/8" AND 3/4"

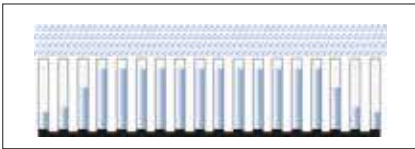
These fan jet nozzle tips are usually assembled onto a manifold through a welding nipple or a clamp and secured tight with a locknut. Therefore they can be easily replaced and their jet easily oriented in the desired direction. The tips shown on this page have the most common capacity values. The precisely machined orifice can be protected from clogging through a filter housed inside the nipples and the clamp specifically designed for this purpose. The high capacity nozzle tips, see table below, do not require a filter as they have a large orifice and are assembled with a 3/4" welding nipple. Tips with higher capacities and bigger size than those shown in this catalogue, as well as their related nipples and locknuts, can be produced on request.



SPRAY DISTRIBUTION

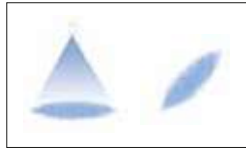


S: Convex (Standard)



E: Equal

SPRAY PATTERN



MATERIALS CODE

<b>B1</b>	Stainless steel AISI 303
<b>B31</b>	Stainless steel AISI 316 L
<b>T1</b>	Brass

OFFSET ANGLE: Y

<b>O</b>	+ 0°	<b>A</b>	+ 5°
<b>B</b>	+ 10°	<b>C</b>	+ 15°
<b>D</b>	+ 20°	<b>E</b>	+ 25°
<b>G</b>	+ 35°	<b>J</b>	+ 45°

VERSION: Z

- **S** Standard (Convex distribution)
- **E** Equal distribution

SPRAY ANGLE CODE

<b>F</b>	30°	<b>U</b>	90°
<b>M</b>	45°	<b>W</b>	120°
<b>Q</b>	60°		

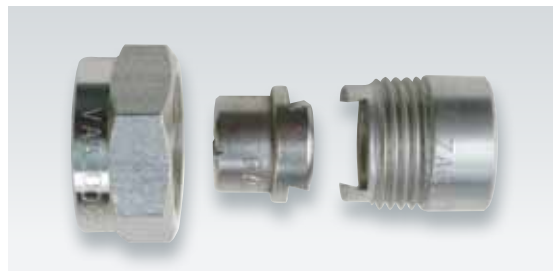
HOW TO ORDER PNR PRODUCTS

Model	Spray Angle	Capacity	Material	Version	Offset angle
<b>GY</b>	<b>Q</b>	<b>1190</b>	<b>XX</b>	<b>Z</b>	<b>Y</b>

Order example: GYQ 1190 T1 SBA

ASSEMBLY FITTINGS

Typical set of dove tail nozzle tip with nipple and locknut.

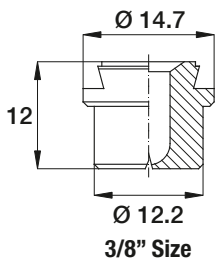


Welding nipples

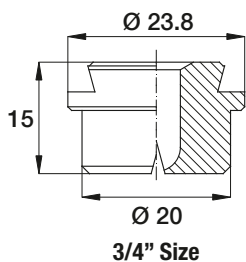


ZAC 1738 xx

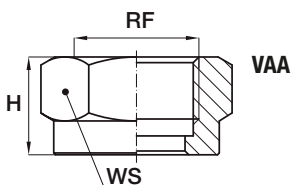
ZAC 2775 xx



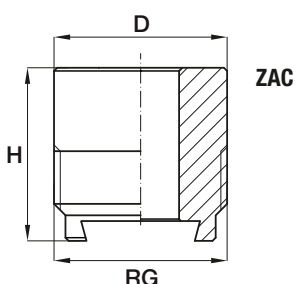
3/8" Size



3/4" Size



VAA



ZAC

ASSEMBLY FITTING CODING

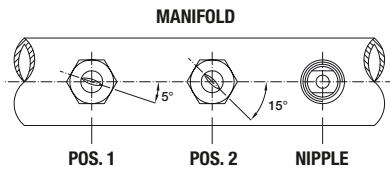
Size inch	Locknut	Welding nipple
3/8"	VAA 0380 xxB	ZAC 1738 xx
3/4"	VAA 0750 xxB	ZAC 2775 xx

Locknuts and threaded nipples are standard available in:

- Thread BSPP - EN 10226
- Other thread standard upon request

DIMENSIONS

Code	RG/RF inch	D mm	H mm	WS mm
<b>VAA 0380 xxB</b>	3/8"	-	13	22
<b>VAA 0750 xxB</b>	3/4"	-	16	32
<b>ZAC 1738 xx</b>	3/8"	17	18	-
<b>ZAC 2775 xx</b>	3/4"	27	27	-



Standard offset angle values  
for 3/8" ( POS. 1 )  
and 3/4" ( POS. 2 ) GY tips

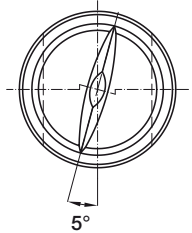
In case a different offset angle is required, please refer to " Offset angle" table - Pag 30.

### 3/8" size nozzle tips

### CAPACITY - WEIGHTS

GYF	GYM	GYQ	GYU	GYW	Code	Capacity - lpm										Weight g	
						Pressure - bar										B31/B1	T1
						0,5	1,0	1,5	2,0	3,0	4,0	5,0	7,0	10			
•	•	•	•	•	1190	0,78	1,10	1,34	1,55	1,90	2,19	2,45	2,90	3,47	10	11	
•	•	•	•	•	1233	0,95	1,35	1,65	1,90	2,33	2,69	3,01	3,56	4,25	10	11	
•	•	•	•	•	1310	1,27	1,79	2,19	2,53	3,10	3,58	4,00	4,74	5,66	10	11	
•	•	•	•	•	1385	1,57	2,22	2,72	3,14	3,85	4,45	4,97	5,88	7,03	10	11	
•	•	•	•	•	1490	2,00	2,83	3,46	4,00	4,90	5,66	6,33	7,48	8,95	10	11	
•	•	•	•	•	1581	2,37	3,35	4,11	4,74	5,81	6,71	7,50	8,87	10,6	10	11	
•	•	•	•	•	1780	3,18	4,50	5,52	6,37	7,80	9,01	10,1	11,9	14,2	10	11	
•	•	•	•	•	1980	4,00	5,66	6,93	8,00	9,80	11,3	12,7	15,0	17,9	10	11	
•	•	•	•	•	2124	5,06	7,16	8,77	10,1	12,4	14,3	16,0	18,9	22,6	10	11	
•	•	•	•	•	2153	6,25	8,83	10,8	12,5	15,3	17,7	19,8	23,4	27,9	10	11	
•	•	•	•	•	2194	7,96	11,3	13,8	15,9	19,5	22,52	25,2	29,8	35,6	10	11	
•	•	•	•	•	2245	10,0	14,1	17,3	20,0	24,5	28,29	31,6	37,4	44,7	10	11	

### OFFSET ANGLE

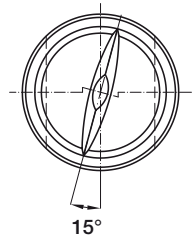


### 3/4" size nozzle tips

### CAPACITY - WEIGHTS

GYF	GYM	GYQ	GYU	GYW	Code	Capacity - lpm										Weight g	
						Pressure - bar										B31/B1	T1
						0,5	1,0	1,5	2,0	3,0	4,0	5,0	7,0	10			
•	•	•	•	•	1781	3,18	4,50	5,52	6,37	7,80	9,01	10,1	11,9	14,2	35	38	
•	•	•	•	•	1981	4,00	5,66	6,93	8,00	9,80	11,3	12,7	15,0	17,9	35	38	
•	•	•	•	•	2125	5,06	7,16	8,77	10,1	12,4	14,3	16,0	18,9	22,6	35	38	
•	•	•	•	•	2154	6,25	8,83	10,8	12,5	15,3	17,7	19,8	23,4	27,9	34	37	
•	•	•	•	•	2195	7,92	11,2	13,7	15,8	19,4	22,4	25,0	29,6	35,4	34	37	
•	•	•	•	•	2246	10,0	14,1	17,3	20,0	24,5	28,3	31,6	37,4	44,7	33	36	
•	•	•	•	•	2311	12,7	17,9	21,9	25,3	31,0	35,8	40,0	47,4	56,6	32	35	
•	•	•	•	•	2490	20,0	28,3	34,6	40,0	49,0	56,6	63,3	74,8	89,5	32	35	
•	•	•	•	•	2610	24,9	35,2	43,1	49,8	61,0	70,4	78,8	93,2	111	27	31	
	•	•			2760	31,0	43,9	53,7	62,1	76,0	87,8	98,1	116	139	25	28	
	•	•			3122	49,8	70,4	86,3	99,6	122	141	158	186	223	23	25	

### OFFSET ANGLE



### CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

H PRESSURE WASHING

HIGH PRESSURE WASHING

Fan jet nozzles F series are designed for high-pressure washing applications. Their special inner profile produce an even spray distribution for an effective and uniform cleaning action over the surface to treat. All nozzles are precisely machined and made of hardened stainless steel AISI 416.



FX

FA

FB

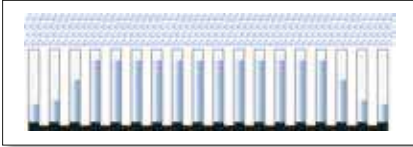
SPRAY ANGLE CODE

A	0°	L	40°
B	15°	R	65°
D	25°		

MATERIALS CODE

C2 Hardened Stainless Steel AISI 416

SPRAY DISTRIBUTION



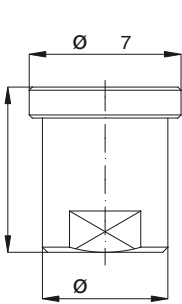
SPRAY PATTERN



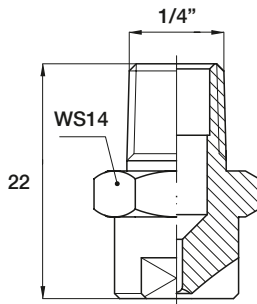
HOW TO ORDER PNR PRODUCTS

Model	Thread	Spray Angle	Capacity	Material
F	A	D	1460	C2

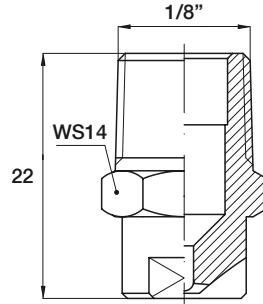
Order example: FAD 1460 C2



FX - Tip Type



FA - 1/8" BSPT Thread



FB - 1/8" BSPT Thread



Flow straightener

We can also supply on request our FX tips which are complete with an inside stainless steel flow straightener to help improve jet efficiency.

THREAD CODE

0°			15°			25°			40°			65°			Code
FX	FA	FB	FX	FA	FB	FX	FA	FB	FX	FA	FB	FX	FA	FB	

CAPACITY AND WEIGHTS

Code	D mm	Capacity - lpm								Weight g		
		Pressure - bar								FX	FA	FB
		20	30	50	70	100	150	200				
1460	0,70	1,97	2,41	3,11	3,70	4,40	5,39	6,22	10	14	19	
1686	1,12	2,95	3,61	4,67	5,50	6,60	8,08	9,33	10	14	19	
1930	1,28	4,11	5,04	6,51	7,70	9,20	11,3	13,0	10	14	19	
2103	1,35	4,61	5,64	7,28	8,60	10,3	12,6	14,6	10	14	19	
2116	1,42	5,10	6,24	8,06	9,50	11,4	14,0	16,1	10	14	19	
2126	1,47	5,63	6,90	8,91	10,50	12,6	15,4	17,8	10	14	19	
2138	1,54	6,08	7,45	9,62	11,40	13,6	16,7	19,2	10	14	19	
2149	1,60	6,66	8,16	10,5	12,50	14,9	18,2	21,1	10	14	19	
2160	1,66	7,16	8,76	11,3	13,40	16,0	19,6	22,6	10	14	19	
2170	1,71	7,60	9,31	12,0	14,20	17,0	20,8	24,0	10	14	19	
2181	1,76	8,09	9,91	12,8	15,10	18,1	22,2	25,6	10	14	19	
2204	1,87	9,08	11,1	14,4	17,10	20,3	24,9	28,7	10	14	19	
2226	1,98	10,1	12,4	16,0	18,90	22,6	27,7	32,0	10	14	19	
2341	2,40	15,2	18,7	24,1	28,40	34,1	41,8	48,2	10	14	19	
2456	2,76	20,3	24,9	32,1	38,20	45,4	55,6	64,2	10	14	19	
2682	3,42	30,4	37,2	48,0	57,10	67,9	83,2	96,0	10	14	19	







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**DESCALING**



**PART 2**

**SW25**

# STEEL WORK NOZZLES



**ROLLS COOLING AND PICKLING**





## **PNR ITALIA**

**PNR ITALIA**, with over 40 years experience, is a world wide leader in spray technology offering general and specialized products for all industrial sectors.

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*Our products are constantly reviewed and adapted to the current most modern technical level. Therefore our documentation is updated accordingly and sent to customers registered on our mailing list. To be included in this list you can send us your request with your exact e-mail or physical address.*

# PRODUCT IDENTIFICATION

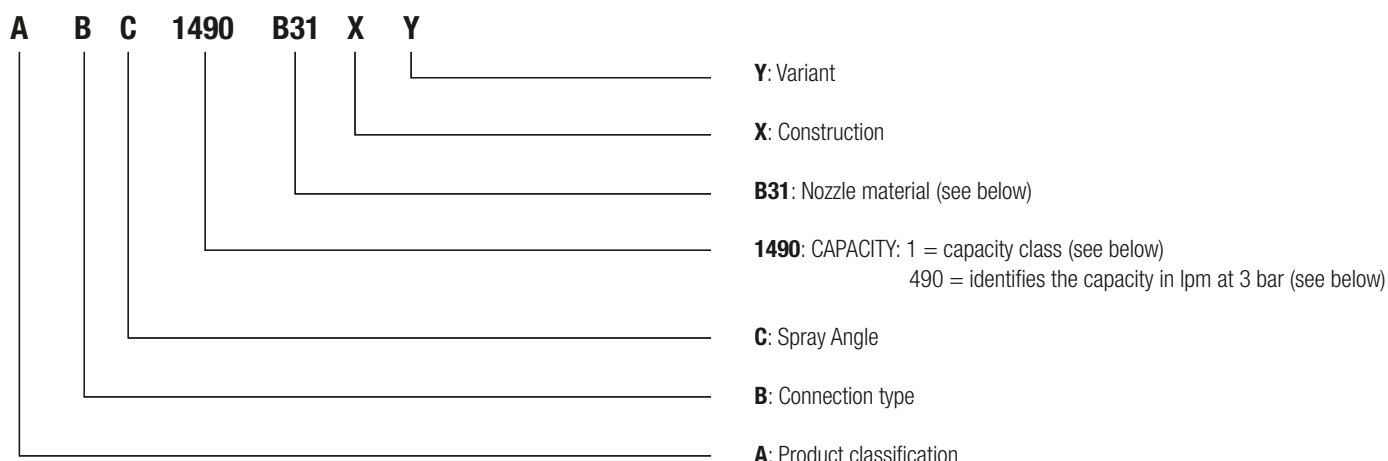
## PNR CODING SYSTEM

Every industrial product needs to be identified with a code to avoid mistakes.

PNR product coding system was conceived to meet the following requirements:

- codes are easily listed by a computer in alphabetical order.
- codes fully describe the product, with no need of further information.
- codes immediately provide the main characteristics of each product so to find it in the catalogue easily.

Code Definition is as follows:



Flow rate capacity at 3 bars.

These codes are purely indicative, their meaning may be occasionally different. Please always refer to the numeric indication of the angles beside each table.

### CAPACITY CLASS

Class	Numbers	Capacity in lpm
0	0 490	0,49
1	1 490	4,90
2	2 490	49,0
3	3 490	490
4	4 490	4900

### COMMON SPRAY ANGLES

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

### PNR PRODUCTS MATERIALS CODES

<b>A1</b>	Carbon steel
<b>A2</b>	High speed steel
<b>A8</b>	Zinc coated steel
<b>A9</b>	Nickel coated steel
<b>B1</b>	Stainless steel AISI 303
<b>B2</b>	Stainless steel AISI 304
<b>B21</b>	Stainless steel AISI 304L
<b>B3</b>	Stainless steel AISI 316
<b>B31</b>	Stainless steel AISI 316L
<b>C1</b>	Stainless steel AISI 420 hardened
<b>C2</b>	Stainless steel AISI 416, hardened
<b>D1</b>	Polyvinylchloride (PVC)
<b>D2</b>	Polypropylene (PP)
<b>D3</b>	Polyamide (PA)

<b>D5</b>	Talcum filled Polypropylene
<b>D6</b>	Glassfibre reinforced PP
<b>D7</b>	High density polyethylene
<b>D8</b>	Polyvinylidene fluoride (PVDF)
<b>E0</b>	EPDM
<b>E1</b>	Polytetrafluorethylene (PTFE)
<b>E2</b>	PTFE (25% glassfibers)
<b>E31</b>	Acetalic resin (POM)
<b>E7</b>	Viton
<b>E8</b>	Synthetic rubber (NBR)
<b>F1</b>	Tungsten carbide
<b>F5</b>	Ceramic
<b>F31</b>	Ruby insert, 303 body
<b>G1</b>	Cast iron

<b>H1</b>	Titanium
<b>L1</b>	Monel 400
<b>L2</b>	Incolloy 825
<b>L8</b>	Hastelloy C276
<b>P6</b>	Acr. But. Styrene (ABS)
<b>P8</b>	EPDM 40 Shore
<b>T1</b>	Brass
<b>T2</b>	Brass, chrome plated
<b>T3</b>	Copper
<b>T5</b>	Bronze
<b>T8</b>	Brass, nickel plated
<b>T81</b>	Brass, electroless nickel plated
<b>V1</b>	Aluminum
<b>V7</b>	Aluminum, electroless n. plated

## LIST OF ABBREVIATIONS - LEGENDA

<b>AI</b>	Inlet air capacity	Nmc/min
<b>AO</b>	Outlet air capacity	Nmc/min
<b>CL</b>	Spray jet deflection angle	degrees
<b>D</b>	Nozzle orifice conventional diameter	mm
<b>D1</b>	Minimum internal passage diameter	mm
<b>DE</b>	Supply passage diameter	mm
<b>DF</b>	Flange size	inch
<b>DIA</b>	Outer diameter	mm
<b>DN</b>	Flange nominal size	mm
<b>DU</b>	Outlet orifice diameter	mm
<b>DX</b>	Nipple inside diameter	mm
<b>FF</b>	Flange outer diameter	mm
<b>G</b>	Flange holes centre to centre diameter	mm
<b>H, H1, H2</b>	Height	mm

<b>L, L1</b>	Length	mm
<b>LF</b>	Pipe length	m
<b>LP</b>	Maximum operating pressure	bar
<b>LQ</b>	Maximum capacity	lpm
<b>LT</b>	Maximum operating temperature	°C
<b>NR</b>	Number of orifices	-
<b>QC</b>	Quick coupling connection	-
<b>RA</b>	Range	mm
<b>RF</b>	Cylindrical female thread BSP	inch
<b>RG</b>	Conic male thread BSPT	inch
<b>S</b>	Thickness	mm
<b>SQ</b>	Square bar size	mm
<b>W</b>	Weight	gr, kg
<b>WS</b>	Hexagon key	mm

## PRODUCT WARRANTY

PNR products will be replaced or repaired at the option of PNR and free of charges if found defective in manufacturing, labelling or packaging. The above warranty conditions will apply if notice of defect 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.

Our Company Procedure for warranty cases requires the following steps to be performed:

- 1 Contact our Quality manager and obtain from PNR a return authorization number
- 2 Return the products together with our Form 3DA A04 duly completed
- 3 PNR shall issue a test report, send you a copy and return the product repaired or replaced

Our Company scope is to offer full Customer satisfaction, and we are fully aware of the inconvenience which can be originated from a defective product. Please be assured we shall do our best to make available a perfect product in the shortest possible time.

## PRODUCT RETURN POLICY

## PRODUCTS DELIVERED IN ERROR FROM PNR

- 1 Obtain from PNR a return authorization number.
- 2 Return the products together with our Form 3DA A04 duly completed.
- 3 PNR shall issue a Credit Note for full Product and shipping costs.

## PRODUCTS ORDERED INCORRECTLY TO PNR

- 1 Obtain from PNR a return authorization number.
- 2 Return the products at your expense together with the form 3DA A04 duly completed.
- 3 Products shall be returned in original condition, inside the original packaging
- 4 A re-stocking change of 15% applies.

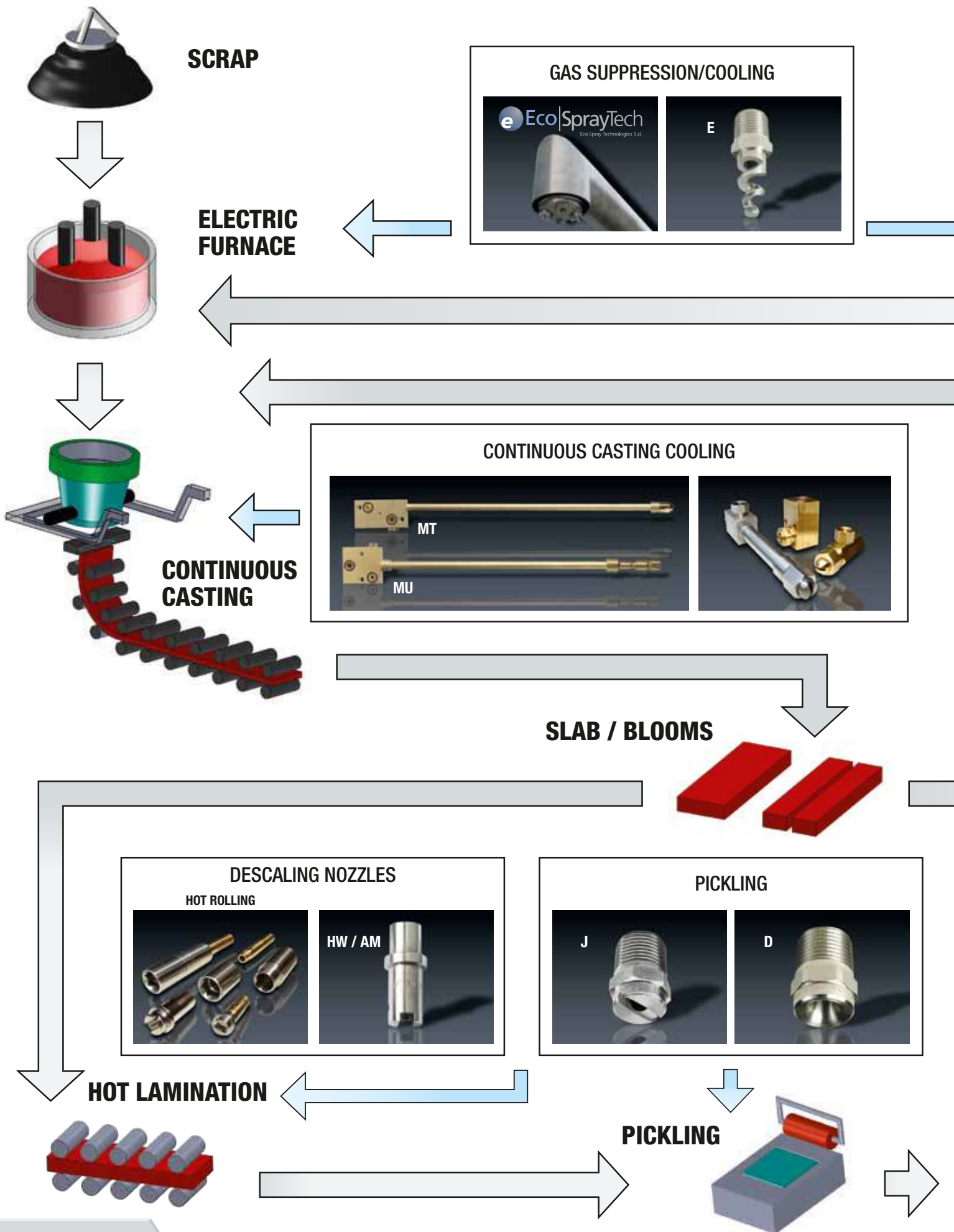
## NON CATALOG PRODUCTS

These products can only be returned after a written authorisation from PNR has been obtained.

## DISCLAIMER

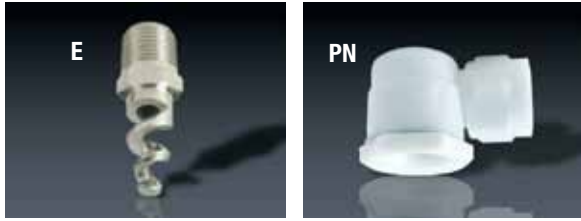
Our products are manufactured with the best care and according to the latest developments of the technology, but we cannot assure that every one of our products is perfectly fit for any possible specific process. The information in this Catalogue is provided "as is" and we make no warranty of any kind 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.







## DUST SUPPRESSION ON RAW MATERIALS PARK



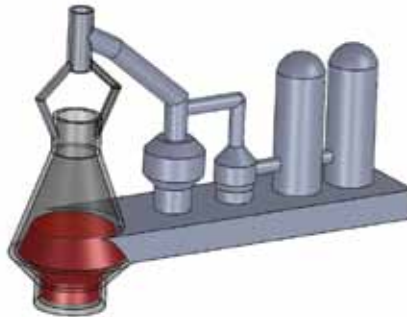
## RAW MATERIALS



## BASIC OXIGEN CONVERTER



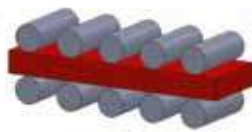
## BLAST FURNACE



## COKE COOLING



## COLD LAMINATION



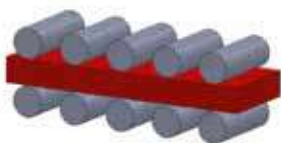
## COILS



## ROLLS COOLING



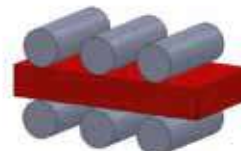
## COLD LAMINATION



## ANNEALING



## TEMPER








## COILS



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We regret not being able to update our customers on the continuous improvements to our product range, so please consider the information and product specifications supplied in this catalogue as indicative and not binding for our company. For each application that requires one or more characteristics of one of our catalogue products that must be strictly maintained, please kindly ask for a written confirmation. Any information contained in this Catalogue, codes and product specifications, sketches, drawings and photographs, is the exclusive property of Flowtech Srl and it is forbidden to reproduce it in any medium without express written permission of the same.

All dimensions in this catalogue are in millimetres (mm). All threads to be manufactured according to ISO 228 unless otherwise specified. (European Standard BS 2779 - DIN 259 - UNI 338).

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# DESCALING

## DESCALING PRINCIPLES

The descaling process is crucial in steel industry to obtain higher quality products. Descaling nozzles are used for an efficient scale removal in hot rolling. The best method is the hydro-mechanical descaling process using high pressure water jets formed by special descaling nozzles. Working pressure range is from 50 to 400 bar (725 to 5.800 psi), for GW type from 30 to 200 bar (435 to 2.900 psi). The impact of the water jet on the steel hot surface produces an impact force that, combined with the thermal action due to the temperature difference between jets and slabs, generates the descaling effect. The jet quality of the nozzle has a great effect upon the steel surface descaling in hot-rolling and is crucial for the quality of the final product.

## DESCALING NOZZLES FEATURE

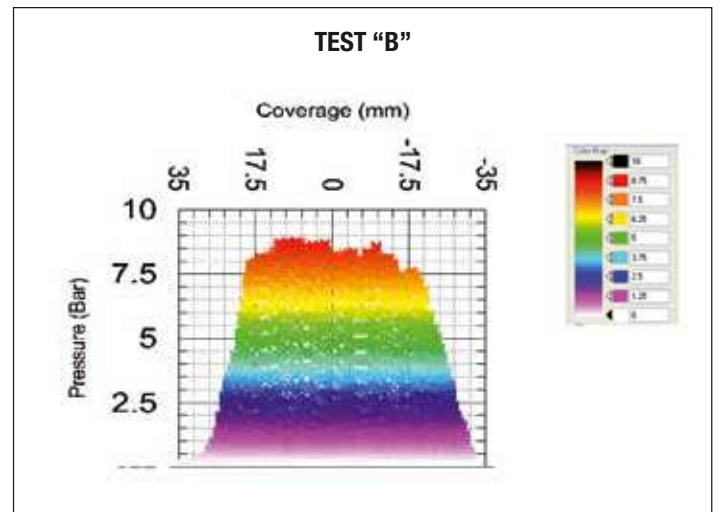
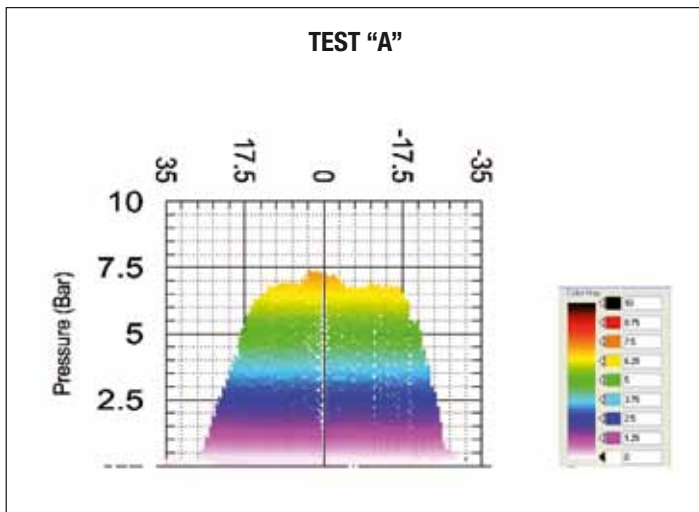
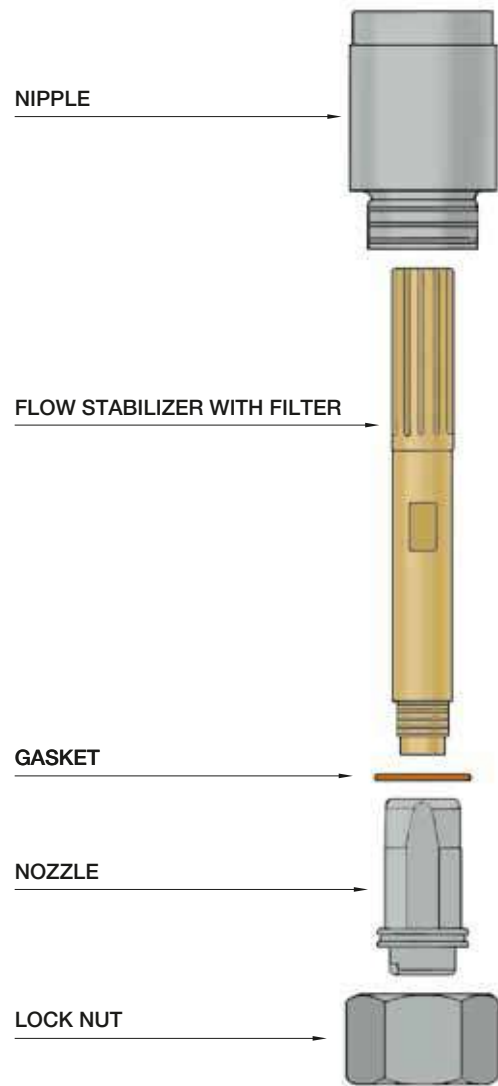
An efficient scale removal requires the use of proper nozzle designed and manufactured with a special internal profile to provide high values of impact and a consistent flow jet spray along the descaling process. The general composition of a descaling nozzle is shown in the picture at the right.

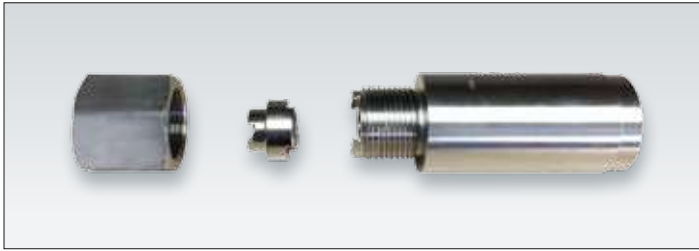
Only GW type is different, as it is integrated only by nipple, nozzle and locknut.

## IMPACT MEASUREMENT

Our descaling nozzles are tested by means of a three-dimensional testing machine that measures the spray jet impact and distribution. A load cell, placed at the bottom of the nozzle, moves along the path of the spray jet measuring its force of impact millimeter by millimeter.

The pressure values with respect to the surface to be descaled, angle of inclination and offset angle, can be varied according to the technical specifications required by customers.

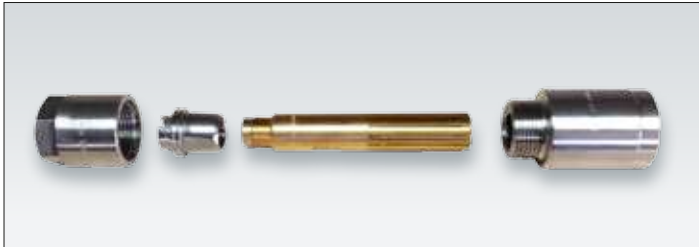




**GW Type**

Dovetail nozzles

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**HW / AH Type**

Short Nozzles - Standard size

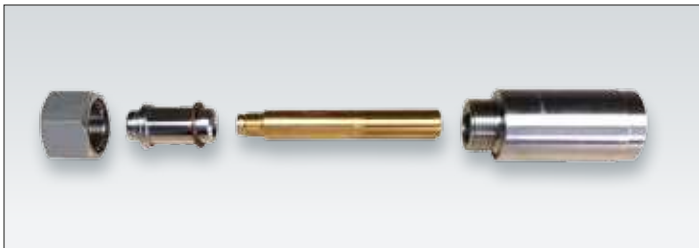
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**HW / AA Type**

Short Nozzles - Mini Size

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**HW / AK Type**

High Impact - Standard Size

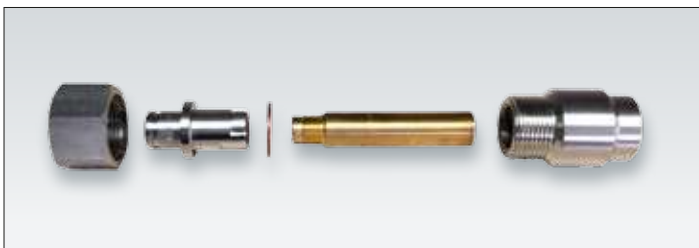
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**HW / AB Type**

High Impact - Mini Size

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**HV / AH Type**

High Impact - Special Size

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**HW / AM Type**

High Impact - Micro Size

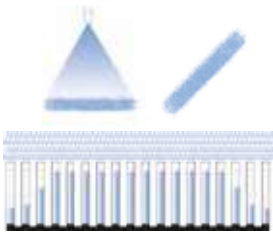
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## DOVE-TAIL NOZZLES

GW series nozzles have been the worldwide standard for many years in hot descaling mills. They have undergone many improvements, specifically to the inner orifice profile, resulting in a very even distribution of the water jet impact onto the steel surface. Their typical design with a dove-tail coupling between nipple and nozzle tip assures for correct alignment of the nozzle onto the spray manifold. Several nipples length value and a specific locknut allow for a wide choice of different assembly dimensions.



### SPRAY PATTERN



### SPRAY ANGLE CODES

GWC	GWE	GWF	GWL
22°	26°	30°	40°

### MATERIALS

### WEIGHT (Kg)

<b>C1</b>	Body	Stainless steel AISI 303	0.07*
	Insert	Stainless steel AISI 420 hardened	
<b>F1</b>	Body	Stainless steel AISI 303	0.08*
	Insert	Tungsten carbide	

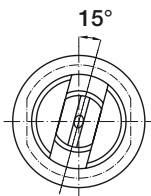
\* Average Value

### HOW TO ORDER PNR PRODUCTS

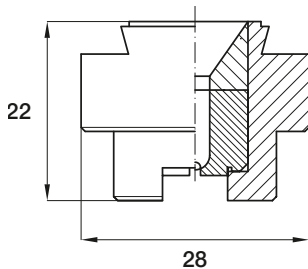
Model	Angle	Capacity	Material
<b>GW</b>	<b>C</b>	<b>2162</b>	<b>XX</b>

Order example: **GWC 2162 C1**

### OFFSET ANGLE



### DIMENSIONS



**D** = Nozzle orifice conventional diameter (mm)

**D<sub>1</sub>** = Minimum internal passage diameter (mm)

Code	D	D <sub>1</sub>	Capacity - lpm								
			Pressure - bar								
			80	90	100	120	140	160	180	200	
2162xx	2.0	1.5	16.2	17.1	18.0	19.5	21.3	22.8	24.0	25.0	
2208xx	2.1	1.8	20.8	21.8	23.0	25.2	27.2	29.1	30.8	35.5	
2250xx	2.5	1.9	25.0	26.5	28.0	31.0	33.0	35.4	37.5	39.0	
2320xx	2.8	2.4	32.0	34.2	36.0	39.4	42.6	45.5	48.3	50.9	
2402xx	3.0	2.5	40.2	42.7	45.0	49.0	53.0	57.0	60.0	63.0	
2520xx	3.5	2.7	52.0	55.0	58.0	63.5	68.6	73.3	77.8	82.0	
2642xx	3.8	3.2	64.2	68.3	72.0	78.0	85.0	91.0	96.0	101	
2798xx	4.3	3.6	79.8	84.4	89.0	98.0	105	112	119	126	
2996xx	4.7	4.0	99.6	106	112	122	132	141	150	158	
3112xx	5.0	4.2	112	119	125	137	148	158	168	177	
3120xx	5.2	4.4	120	127	134	147	158	169	180	189	

### CONVERSION TABLE (UE - USA)

**PRESSURE:** 1 bar = 14,5 psi

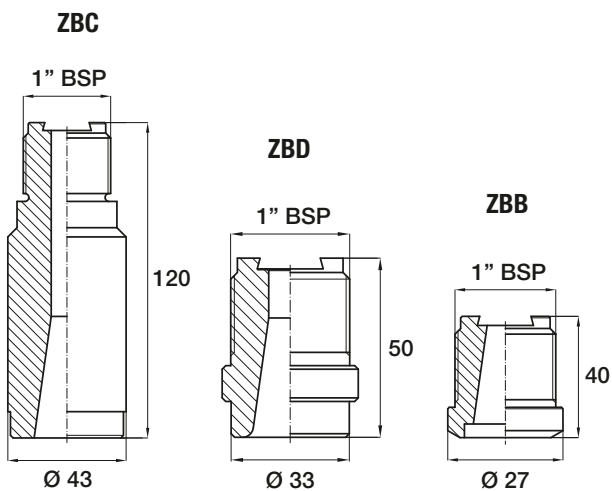
**CAPACITY:** 1 lpm = 0,264 gpm





**ZB NIPPLES**

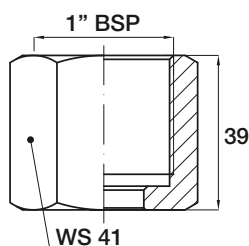
ZB series welding nipples have been designed for the assembling of GW descaling tips onto main manifolds. The accurately machined dove-tail profile assures for precise alignment of the nozzle tip with respect to the axis of the spray manifold. The contact area with the nozzle tip shows a surface machined to an accurate finish to prevent leakage between nipple and nozzle tip. ZB nipples are available in three length values to match different dimensional requirements.



**MATERIALS**

<b>B31</b>	Stainless steel AISI 316L
------------	---------------------------

Code	RG inch	L mm	Weight Kg
ZBB 0100 B3	1	40	0.18
ZBC 0100 B3	1	120	0.90
ZBD 0100 B3	1	50	0.22



**VAA 1001 B1B**

The VAA 1001 B1B cap is designed for the proper assembly between ZB nipples and GW descaling nozzle tips. The strong design assures for a safe operation under the high pressure values typically used in hot descaling mill systems.

**MATERIALS**

<b>B1</b>	Stainless steel AISI 303	<b>WEIGHT (Kg)</b> 0.22*
-----------	--------------------------	-----------------------------

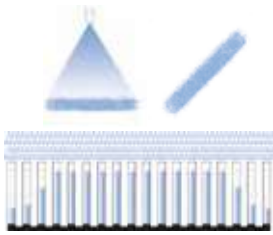
\* Average Value

## SHORT NOZZLES - STANDARD SIZE

The modern design of these nozzle offers the convenience of a more rational alignment system, with a copper seal used between nipple and nozzle tip. The nozzle efficiency is enhanced by means of a carefully designed flow stabilizer, which minimizes turbulence due to sharp direction change at the inlet from the main manifold. Provision is also made for a filter to be mounted at the nozzle inlet, minimizing nozzle clogging and abrasion.



### SPRAY PATTERN



### SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°

### MATERIALS

		WEIGHT (Kg)	
<b>C1</b>	Body	Stainless steel AISI 303	0.08*
	Insert	Stainless steel AISI 420 hardened	
<b>F1</b>	Body	Stainless steel AISI 303	0.09*
	Insert	Tungsten carbide	

\* Average Value

### HOW TO ORDER PNR PRODUCTS

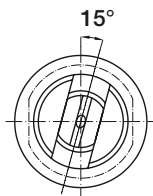
Model	Spray Angle	Capacity	Material
HW/AH	C	2045	XX

Order example: **HWC 2045 F1AH**

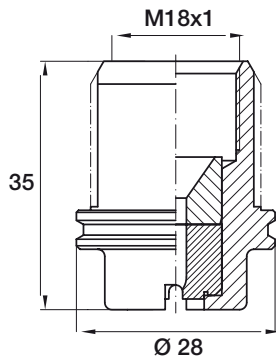
**D** = Nozzle orifice conventional diameter (mm)

**D<sub>1</sub>** = Minimum internal passage diameter (mm)

### OFFSET ANGLE



### DIMENSIONS



Code	D	D1	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAH	0.7	0.6	4.5	5.0	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10.0
2063 xxAH	1.0	0.8	6.3	7.0	8.3	10.0	10.9	11.8	12.2	13.0	13.7	14.1
2106 xxAH	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAH	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAH	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAH	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAH	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAH	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAH	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAH	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAH	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAH	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAH	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAH	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAH	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3



### ALIGNMENT NOZZLE

Alignment blind nozzle HWZ 01Cx B1 allows for fast and safe positioning of the nipple on the manifold prior to welding. The nipple is aligned in place by means of a straight rod and welded to assure the right jet direction.



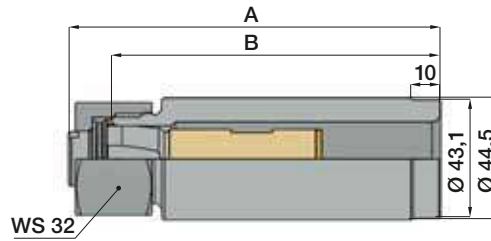
### DISASSEMBLY KIT

Nozzle tip is strongly secured to the nipple and its removal is not always easy and can cause damage to both parts. HWZ 05B0 B1 disassembling kit allows a safe gripping of the nozzle and makes it easier to apply the tensile strength required to extract it from inside the nipple, for replacement and inspection. The kit is sold separately. Ask for the technical data sheet to select the correct tip for the required alignment angle.

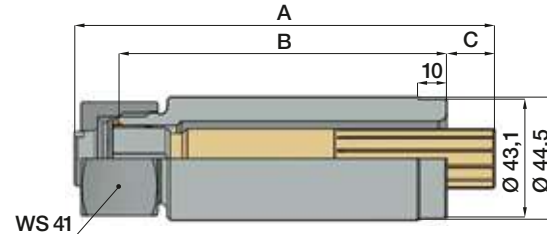
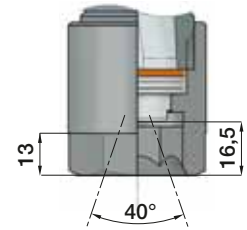
NUT	VAW B100 B1								
NIPPLE	ZWB 0073 B2			ZWB 0100 B2			ZWB 0120 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW CG10 T1				116	100		136	120	
XHW CG20 T1							136	120	

A = Complete Descaling unit Length (mm)  
 B = Welding Nipple Length (mm)  
 C = Flow Straightener Protrusion (mm)

NUT	VAW B100 B1								
NIPPLE	ZWB 0073 B2			ZWB 0100 B2			ZWB 0120 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW CG10 T1	97	73	10						
XHW CG20 T1	133	73	34	133	100	17			
XHW CG21 T1	153	73	54	153	100	37	153	120	17



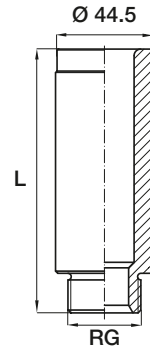
NUT VAW D100 B1



ZWB

**WELDING NIPPLE**

HW nozzles can be assembled on a variety of different nipples, with the same inlet, but with different lengths. The precision machined nipple inlet port assures precise positioning of the nozzle flat fan jet to the specified offset angle value of 15° with regard to manifold center line. This makes it possible to obtain uniform impact distribution yielding better decaling results.



**MATERIALS**

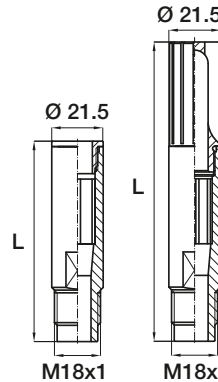
<b>B2</b>	Stainless steel AISI 304		
<b>B3</b>	Stainless steel AISI 316L		
Code	RG	L	Weight
	inch	mm	Kg
ZWB 0073 B2	1	73	0.49
ZWB 0100 B2	1	100	0.71
ZWB 0120 B2	1	120	0.85



XHW

**FLOW STABILIZER**

The flow stabilizer is a critical component for proper descaling, by reducing flow turbulence losses, a larger fraction of the water flow energy can be used for generating impact on the surface to be descaled. The design consists of a cylindrical brass body with a polished inner surface, housing a cast stainless steel flow stabilizer which straightens the liquid path to minimize turbulences. Different length nipples are available, with or without inlet filter. The codes always include a multifin flow straightener.



**MATERIALS**

<b>T1</b>	Body	Brass	
	Filter	Brass	
	Flow stabilizer	Stainless steel AISI 316	
Code	L	Weight	Notes
	mm	Kg	
XHW CG10 T1	74	0.12	without filter
XHW CG20 T1	110.5	0.18	with filter
XHW CG21 T1	130.5	0.20	with filter

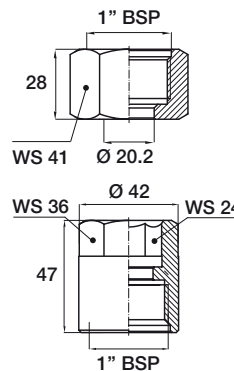


VAW B100 B1

VAW D100 B1

**LOCKNUTS**

The VAW B 100 B1 and VAW D 100 B1 locknuts for ZWB series descaling nipples have been designed profiting from a large experience on the field. The sturdy design and the generous dimensions give the maximum protection to the nozzle and the nipple thread. One locknut size fits all standard size ZWB series nipple of any length.



**MATERIALS**

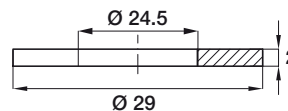
<b>B1</b>	Stainless steel AISI 303	
Code	Notes	Weight
		Kg
VAW B100 B1	Outside exagone	0.16
VAW D100 B1	Built in exagone	0.25



VDA 24C1 T3

**GASKET**

The VDA 24C1 T3 round gasket provides proper assembly between nozzle and nipple. One size fits all standard size ZWB nipple types.



**MATERIALS**

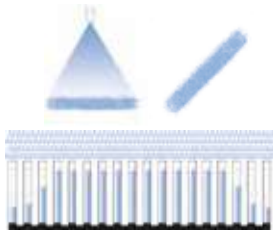
<b>T3</b>	Copper	<b>VDA 24C1 T3</b>
-----------	--------	--------------------

## SHORT NOZZLES - MINI SIZE

The modern design of these nozzle offers the same advantage as the full size HW nozzles. In addition it makes possible to use a smaller pitch between the nozzles allowing for a higher impact value per unit length. The nozzle efficiency is enhanced by means of a carefully designed flow stabilizer, which minimizes turbulence due to sharp direction change at the inlet from the main manifold. Provision is also made for a filter to be mounted at the nozzle inlet, minimizing nozzle clogging and abrasion.



### SPRAY PATTERN



### SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°

### MATERIALS

			WEIGHT (Kg)
<b>C1</b>	Body	Stainless steel AISI 303	0.07*
	Insert	Stainless steel AISI 420 hardened	
<b>F1</b>	Body	Stainless steel AISI 303	0.08*
	Insert	Tungsten carbide	

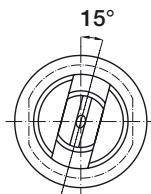
\* Average Value

### HOW TO ORDER PNR PRODUCTS

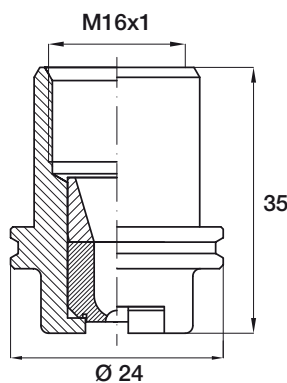
Model	Angle	Capacity	Material
<b>HW/AA</b>	<b>C</b>	<b>2045</b>	<b>XX</b>

Order example: **HWC 2045 F1AA**

### OFFSET ANGLE



### DIMENSIONS



**D** = Nozzle orifice conventional diameter (mm)      **D<sub>1</sub>** = Minimum internal passage diameter (mm)

Code	D mm	D1 mm	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAA	0.7	0.6	4.5	5.0	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10.0
2063 xxAA	1.0	0.8	6.3	7.0	8.3	10.0	10.9	11.8	12.2	13	13.7	14.1
2106 xxAA	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAA	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAA	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAA	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAA	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAA	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAA	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAA	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAA	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAA	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAA	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAA	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAA	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3



### ALIGNMENT NOZZLE

Alignment blind nozzle HWZ 01AxB1 allows for fast and safe positioning of the nipple on the manifold prior to welding. The nipple is aligned in place by means of a straight rod and welded to assure the right jet direction.

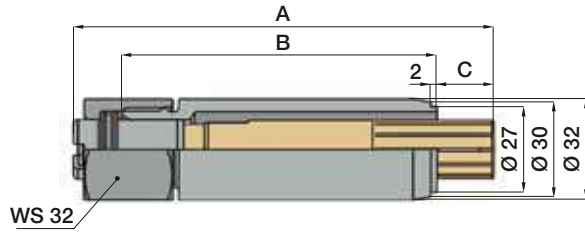


### DISASSEMBLY KIT

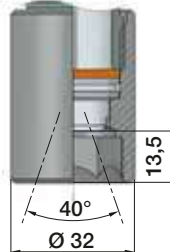
Nozzle tip is strongly secured to the nipple and its removal is not always easy and can cause damage to both parts. HWZ 05A0 B1 disassembling kit allows a safe gripping of the nozzle and makes it easier to apply the tensile strength required to extract it from inside the nipple, for replacement and inspection. The kit is sold separately. Ask for the technical data sheet to select the correct tip for the required alignment angle.

NUT	VAW A075 B1								
NIPPLE	ZWA 0032 B2			ZWA 0039 B2			ZWA 0080 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW AG10 T1	97	32	49	97	39	42	97	80	2
XHW AG20 T1	133	32	86.5	133	39	79.5	133	80	38.5
XHW AG21 T1	153	32	106.5	153	39	99.5	153	80	58.5

A = Complete Descaling unit Length (mm)  
 B = Welding Nipple Length (mm)  
 C = Flow Straightener Protrusion (mm)



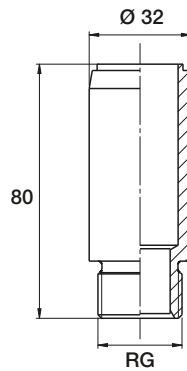
NUT VAW C075 B1



ZWA

WELDING NIPPLES

HW small size nozzles can be assembled on a variety of welding nipples, with same inlet, and different lengths. The precision machined nipple inlet port assures precise positioning of the nozzle flat fan jet to the specified offset angle value of 15° with regard to manifold center line. This makes possible to obtain uniform impact distribution yielding better decaling results.



MATERIALS

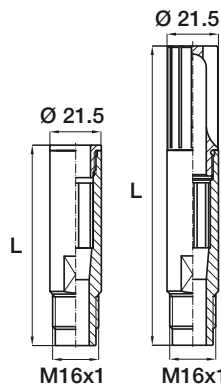
B2	Stainless steel AISI 304		
B3	Stainless steel AISI 316L		
Code	RG inch	L mm	Weight Kg
ZWA 0032 B2	3/4	32	0.06
ZWA 0039 B2	3/4	39	0.08
ZWA 0080 B2	3/4	80	0.19



XHW

FLOW STABILIZER

The flow stabilizer is a critical component for proper descaling, by reducing flow turbulence losses, a larger fraction of the water flow energy can be used for generating impact on the surface to be descaled. The design consists of a cylindrical brass body with a polished inner surface, housing a cast stainless steel flow stabilizer which straightens the liquid path to minimize turbulences. Different length nipples are available, with or without inlet filter. The codes always include a multifin flow straightener.



MATERIALS

T1	Body	Brass	
	Filter	Brass	
	Flow stabilizer	Stainless steel AISI 316 L	
Code	L mm	Weight Kg	Notes
XHW AG10 T1	74.0	0.09	without filter
XHW AG20 T1	110.5	0.14	with filter
XHW AG21 T1	130.5	0.16	with filter

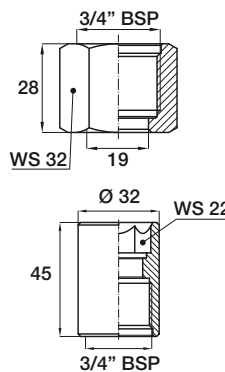


VAW A075 B1

VAW C075 B1

LOCKNUTS

The VAW A075 B1 and VAW C075 B1 locknuts for ZWA series descaling nipples have been designed profiting from a large experience on the field. The sturdy design and the generous dimensions give the maximum protection to the nozzle and the nipple thread. One locknut size fits all standard size ZWA series nipple of any length.



MATERIALS

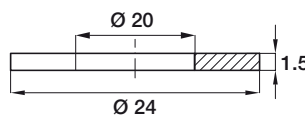
B1	Stainless steel AISI 303	
Code	Notes	Weight Kg
VAW A075 B1	Outside exagone	0.09
VAW C075 B1	Built in exagone	0.12



VDA 20C1 T3

GASKET

The VDA 20C1 T3 round gasket provides proper assembly between nozzle and nipple. One size fits all small size ZWA nipple types.



MATERIALS

T3	Copper	Code VDA 20C1 T3
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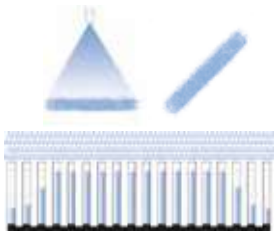


**HIGH IMPACT NOZZLES - STANDARD SIZE**

The water path leading to the nozzle orifice has been completely redesigned to reduce energy losses caused by turbulence, all sharp cross section changes have been eliminated resulting in a significant increase in water velocity at the nozzle orifice.

The afore mentioned advantages are added to those offered by a carefully designed flow stabilizer and a filter when assembled to the nipple inlet, minimizing clogging and abrasion of the nozzle orifice.

**SPRAY PATTERN**



**SPRAY ANGLE CODES**

HWC	HWE	HWF	HWL
22°	26°	30°	40°

**MATERIALS**

			WEIGHT (Kg)
<b>C1</b>	Body	Stainless steel AISI 303	0.14*
	Insert	Stainless steel AISI 420 hardened	
<b>F1</b>	Body	Stainless steel AISI 303	0.15*
	Insert	Tungsten carbide	

\* Average Value

**HOW TO ORDER PNR PRODUCTS**

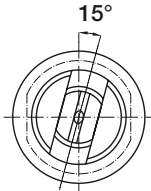
Model	Spray Angle	Capacity	Material
<b>HW/AK</b>	<b>C</b>	<b>2045</b>	<b>XX</b>

Order example: **HWC 2045 F1AK**

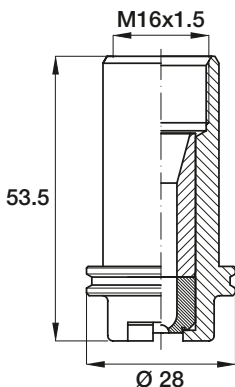
**D** = Nozzle orifice conventional diameter (mm)

**D<sub>1</sub>** = Minimum internal passage diameter (mm)

**OFFSET ANGLE**



**DIMENSIONS**



Code	D	D1	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAK	0.7	0.6	4.5	5.0	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10.0
2063 xxAK	1.0	0.8	6.3	7.0	8.3	10.0	10.9	11.8	12.2	13.0	13.7	14.1
2106 xxAK	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAK	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAK	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAK	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAK	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAK	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAK	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAK	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAK	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAK	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAK	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAK	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAK	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3



**ALIGNMENT NOZZLE**

Alignment blind nozzle HWZ 01Cx B1 allows for fast and safe positioning of the nipple on the manifold prior to welding. The nipple is aligned in place by means of a straight rod and welded to assure the right jet direction.



**DISASSEMBLY KIT**

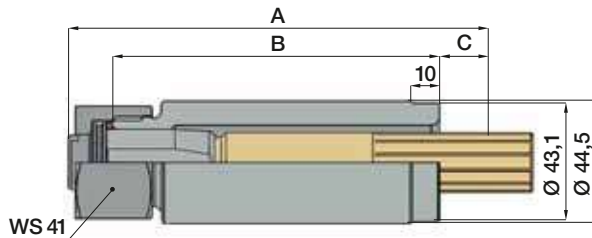
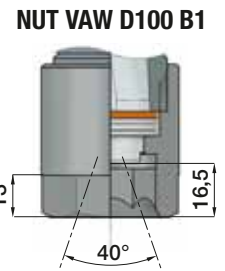
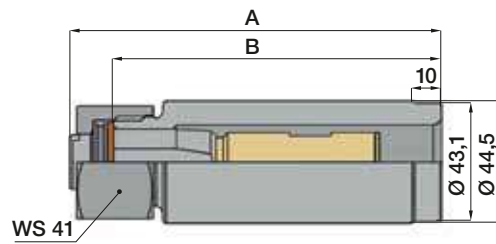
Nozzle tip is strongly secured to the nipple and its removal is not always easy and can cause damage to both parts. HWZ 05B0 B1 disassembling kit allows a safe gripping of the nozzle and makes it easier to apply the tensile strength required to extract it from inside the nipple, for replacement and inspection. The kit is sold separately. Ask for the technical data sheet to select the correct tip for the required alignment angle.



NUT	VAW B100 B1								
NIPPLE	ZWB 0073 B2			ZWB 0100 B2			ZWB 0120 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW DG10 T1				116	100		136	120	
XHW DG20 T1							136	120	

A = Complete Descaling unit Length (mm)  
 B = Welding Nipple Length (mm)  
 C = Flow Straightener Protrusion (mm)

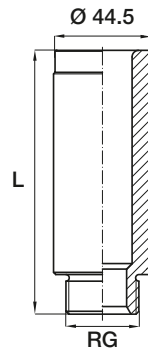
NUT	VAW B100 B1								
NIPPLE	ZWB 0073 B2			ZWB 0100 B2			ZWB 0120 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW DG10 T1	116	73	26						
XHW DG20 T1	136	73	46	136	100	19			
XHW DG21 T1	149	73	60	149	100	33	149	120	13
XHW DG21 T1	169	73	80	169	100	53	169	120	33
XHW DG22 T1	189	73	100	189	100	73	189	120	53



ZWB

WELDING NIPPLES

HW nozzles can be assembled on a variety of different nipples, with the same inlet, but with different lengths. The precision machined nipple inlet port assures precise positioning of the nozzle flat fan jet to the specified offset angle value of 15° with regard to manifold center line. This makes it possible to obtain uniform impact distribution yielding better descaling results.



MATERIALS

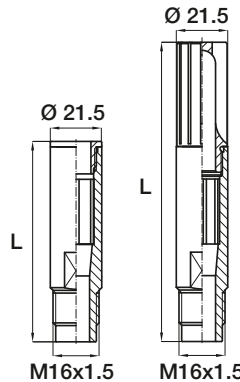
B2	Stainless steel AISI 304		
B3	Stainless steel AISI 316L		
Code	RG	L	Weight
	inch	mm	Kg
ZWB 0073 B2	1	73	0.48
ZWB 0100 B2	1	100	0.70
ZWB 0120 B2	1	120	0.84



XHW

FLOW STABILIZER

The flow stabilizer is a critical component for proper descaling, by reducing flow turbulence losses, a larger fraction of the water flow energy can be used for generating impact on the surface to be descaled. The design consists of a cylindrical brass body with a polished inner surface, housing a cast stainless steel flow stabilizer which straightens the liquid path to minimize turbulences. Different length nipples are available, with or without inlet filter. The codes always include a multifin flow straightener.



MATERIALS

T1	Body	Brass	
	Filter	Brass	
	Flow stabilizer	Stainless steel AISI 316	
Code	L	Weight	Notes
	mm	Kg	
XHW DG 10 T1	76	0.08	without filter
XHW DG 11 T1	96	0.10	without filter
XHW DG 20 T1	110	0.12	with filter
XHW DG 21 T1	130	0.14	with filter
XHW DG 22 T1	150	0.15	with filter

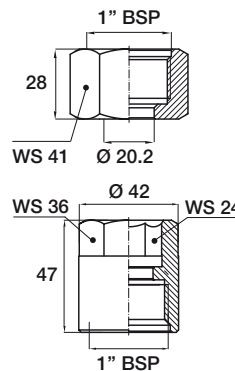


VAW B100 B1

VAW D100 B1

LOCKNUTS

The VAW B 100 B1 and VAW D 100 B1 locknuts for ZWB series descaling nipples have been designed profiting from a large experience on the field. The sturdy design and the generous dimensions give the maximum protection to the nozzle and the nipple thread. One locknut size fits all standard size ZWB series nipple of any length.



MATERIALS

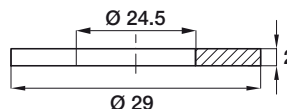
B1	Stainless steel AISI 303	
Code	Notes	Weight
		Kg
VAW B100 B1	Outside exagone	0.16
VAW D100 B1	Built in exagone	0.24



VDA 24C1 T3

GASKET

The VDA 24C1 T3 round gasket provides proper assembly between nozzle and nipple. One size fits all standard size ZWB nipple types.



MATERIALS

T3	Copper
Code	VDA 24C1 T3

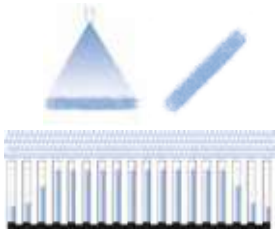


**HIGH IMPACT NOZZLES - MINI SIZE**

The water path leading to the nozzle orifice has been completely redesigned to reduce energy losses caused by turbulence, all sharp cross section changes have been eliminated resulting in a significant increase in water velocity at the nozzle orifice.

The afore mentioned advantages are added to those offered by a carefully designed flow stabilizer and a filter when assembled to the nipple inlet, minimizing clogging and abrasion of the nozzle orifice.

**SPRAY PATTERN**



**SPRAY ANGLE CODES**

HWC	HWE	HWF	HWL
22°	26°	30°	40°

**MATERIALS**

		WEIGHT (Kg)	
<b>C1</b>	Body	Stainless steel AISI 303	0.10*
	Insert	Stainless steel AISI 420 hardened	
<b>F1</b>	Body	Stainless steel AISI 303	0.11*
	Insert	Tungsten carbide	

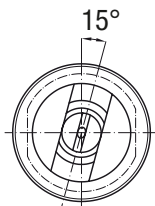
\* Average Value

**HOW TO ORDER PNR PRODUCTS**

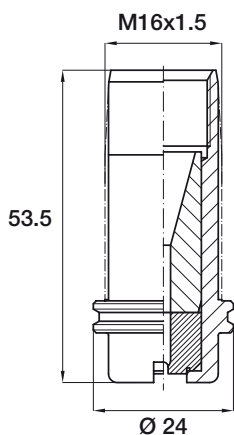
Model	Spray Angle	Capacity	Material
HW/AB	C	2045	XX

Order example: **HWC 2045 F1AB**

**OFFSET ANGLE**



**DIMENSIONS**



**D** = Nozzle orifice conventional diameter (mm)      **D<sub>1</sub>** = Minimum internal passage diameter (mm)

Code	D	D1	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAB	0.7	0.6	4.5	5.0	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10.0
2063 xxAB	1.0	0.8	6.3	7.0	8.3	10	10.9	11.8	12.2	13	13.7	14.1
2106 xxAB	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAB	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAB	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAB	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAB	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAB	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAB	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAB	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAB	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAB	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAB	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAB	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAB	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3



**ALIGNMENT NOZZLE**

Alignment blind nozzle HWZ 01Ax B1 allows for fast and safe positioning of the nipple on the manifold prior to welding. The nipple is aligned in place by means of a straight rod and welded to assure the right jet direction.

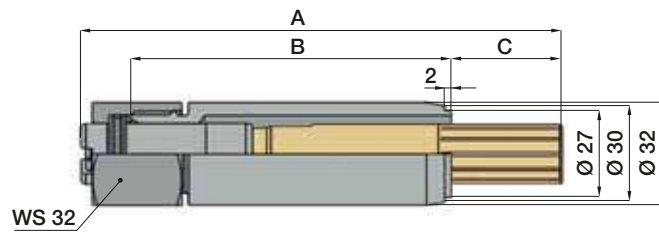


**DISASSEMBLY KIT**

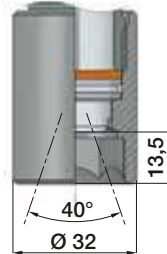
Nozzle tip is strongly secured to the nipple and its removal is not always easy and can cause damage to both parts. HWZ 05A0 B1 disassembling kit allows a safe gripping of the nozzle and makes it easier to apply the tensile strength required to extract it from inside the nipple, for replacement and inspection. The kit is sold separately Ask for the technical data sheet to select the correct tip for the required alignment angle.

NUT	VAW A075 B1								
NIPPLE	ZWA 0032 B2			ZWA 0039 B2			ZWA 0080 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW DG10 T1	115	32	67	115	39	61	115	80	20
XHW DG11 T1	135	32	87	135	39	81	135	80	40
XHW DG20 T1	149	32	101	149	39	95	149	80	54
XHW DG21 T1	169	32	121	169	39	115	169	80	74
XHW DG22 T1	189	32	141	189	39	135	189	39	94

**A** = Complete Descaling unit Length (mm)  
**B** = Welding Nipple Length (mm)  
**C** = Flow Straightener Protrusion (mm)



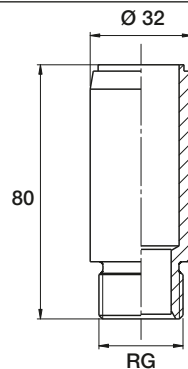
NUT VAW C075 B1



ZWA

WELDING NIPPLES

HW small size nozzles can be assembled on a variety of welding nipples, with same inlet, and different lengths. The precision machined nipple inlet port assures precise positioning of the nozzle flat fan jet to the specified offset angle value of 15° with regard to manifold center line. This makes possible to obtain uniform impact distribution yielding better decaling results.



MATERIALS

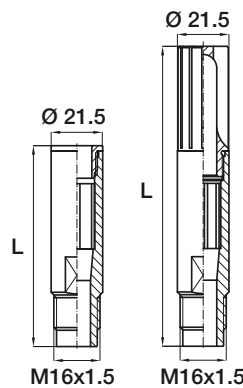
<b>B2</b>	Stainless steel AISI 304		
Code	RG inch	L mm	Weight Kg
ZWA 0032 B2	3/4	32	0.08
ZWA 0039 B2	3/4	39	0.10
ZWA 0080 B2	3/4	80	0.23



XHW

FLOW STABILIZER

The flow stabilizer is a critical component for proper descaling, by reducing flow turbulence losses, a larger fraction of the water flow energy can be used for generating impact on the surface to be descaled. The design consists of a cylindrical brass body with a polished inner surface, housing a cast stainless steel flow stabilizer which straightens the liquid path to minimize turbulences. Different length nipples are available, with or without inlet filter. The codes always include a multifin flow straightener.



MATERIALS

<b>T1</b>	Body	Brass	
	Filter	Brass	
<b>B3</b>	Flow stabilizer	Stainless steel AISI 316	
Code	L mm	Weight Kg	Notes
XHW DG 10 T1	76	0.08	without filter
XHW DG 11 T1	96	0.10	without filter
XHW DG 20 T1	110	0.11	with filter
XHW DG 21 T1	130	0.14	with filter
XHW DG 22 T1	150	0.16	with filter

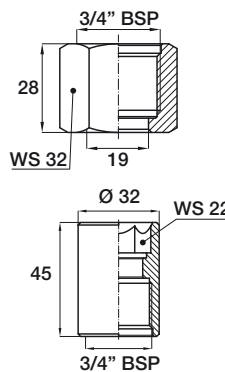


VAW A075 B1

VAW C075 B1

LOCKNUTS

The VAW A075 B1 and VAW C075 B1 locknuts for ZWA series descaling nipples have been designed profiting from a large experience on the field. The sturdy design and the generous dimensions give the maximum protection to the nozzle and the nipple thread. One locknut size fits all standard size ZWA series nipple of any length.



MATERIALS

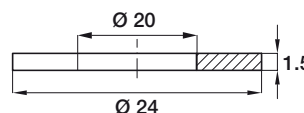
<b>B1</b>	Stainless steel AISI 303	
Code	Notes	Weight Kg
VAW A075 B1	Outside exagone	0.09
VAW C075 B1	Built in exagone	0.12



VDA 20C1 T3

GASKET

The VDA 20C1 T3 round gasket provides proper assembly between nozzle and nipple. One size fits all small size ZWA nipple types.

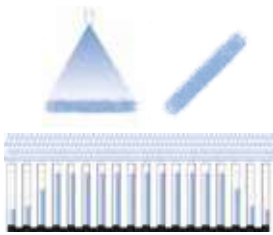


MATERIALS

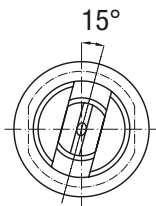
<b>T3</b>	Copper	<b>Code</b> VDA 20C1 T3
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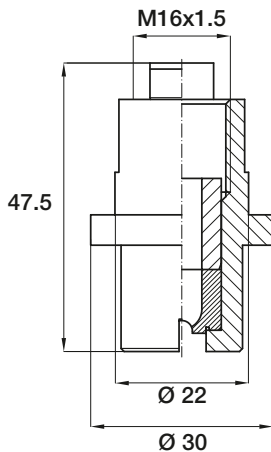
### SPRAY PATTERN



### OFFSET ANGLE



### DIMENSIONS



## HIGH IMPACT NOZZLES - SPECIAL SIZE

High Impact nozzles are widely used in hot rolling processes as they provide an adequate impact for a consistent descaling.

The modern design of these nozzles offers the convenience of a more rational alignment system which allows a copper seal to be used between nipple and nozzle tip. The nozzle efficiency is enhanced by means of a carefully designed flow stabilizer, which minimizes turbulence due to sharp direction change at the inlet from the main manifold. Provision is also made for a filter to be mounted at the nozzle inlet, minimizing nozzle clogging and abrasion.

### SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°

### MATERIALS

			WEIGHT (Kg)
C1	Body	Stainless steel AISI 303	0.12*
	Insert	Stainless steel AISI 420 hardened	
F1	Body	Stainless steel AISI 303	0.13*
	Insert	Tungsten carbide	

\* Average Value

### HOW TO ORDER PNR PRODUCTS

Model	Spray Angle	Capacity	Material
HV/AH	C	2045	XX

Order example: **HVC 2045 F1AH**

D = Nozzle orifice conventional diameter (mm)

D<sub>1</sub> = Minimum internal passage diameter (mm)

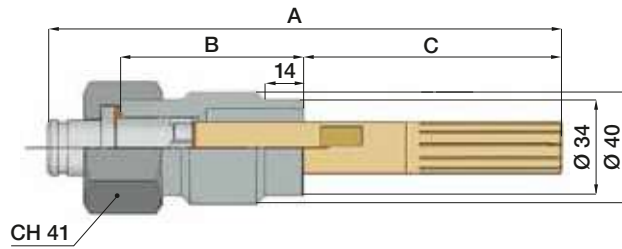
Code	D mm	D1 mm	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAH	0.7	0.6	4.5	5.0	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10.0
2063 xxAH	1.0	0.8	6.3	7.0	8.3	10	10.9	11.8	12.2	13	13.7	14.1
2106 xxAH	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAH	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAH	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAH	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAH	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAH	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAH	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAH	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAH	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAH	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAH	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAH	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAH	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3

### CONVERSION TABLE (UE - USA)

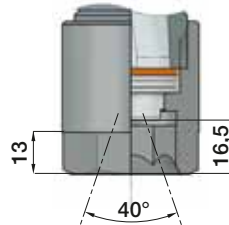
PRESSURE: 1 bar = 14,5 psi	CAPACITY: 1 lpm = 0,264 gpm
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NUT	VAW B100 B1					
NIPPLE	ZWC 0062 B2			ZWC 0066 B2		
STABILIZER	A	B	C	A	B	C
XHW DG10 T1	111	62	23	111	66	23
XHW DG11 T1	131	62	43	131	66	43
XHW DG20 T1	145	62	57	145	66	57
XHW DG21 T1	165	62	77	165	66	77
XHW DG22 T1	185	62	97	185	66	97

**A** = Complete Descaling unit Length (mm)  
**B** = Welding Nipple Length (mm)  
**C** = Flow Straightener Protrusion (mm)



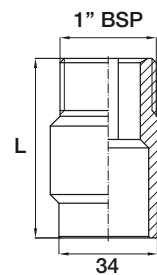
NUT VAW D100 B1



ZWC

WELDING NIPPLES

HV nozzles can be assembled on a series of different nipples, with the same inlet, but with three different lengths. The precision machined nipple inlet port assures precise positioning of the nozzle flat fan jet to the specific offset angle value of 15° with regard to the manifold center line.



MATERIALS

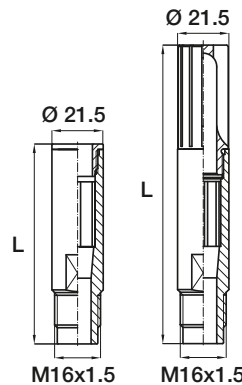
<b>B2</b>	Stainless steel AISI 304		
Code	RG inch	L mm	Weight Kg
ZWC 0062 B2	1	62	0.65
ZWC 0066 B2	1	66	0.70



XHW

FLOW STABILIZER

The flow stabilizer is a critical component for proper descaling, by reducing flow turbulence losses, a larger fraction of the water flow energy can be used for generating impact on the surface to be descaled. The design consists of a cylindrical brass body with a polished inner surface, housing a cast stainless steel flow stabilizer which straightens the liquid path to minimize turbulences. Different length stabilizers are available, with or without inlet filter. The codes always include a multifin flow straightener.



MATERIALS

<b>T1</b>	Body	Brass	
	Filter	Brass	
<b>B3</b>	Flow Stabilizer	Stainless steel AISI 316	
Code	L mm	Weight Kg	Notes
XHW DG 10 T1	76	0.08	without filter
XHW DG 11 T1	96	0.10	without filter
XHW DG 20 T1	110	0.11	with filter
XHW DG 21 T1	130	0.14	with filter
XHW DG 22 T1	150	0.16	with filter

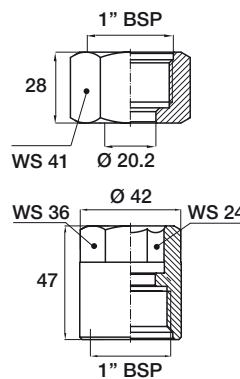


VAW B100 B1

VAW D100 B1

LOCKNUTS

The VAW B100 B1 and VAWD 100 B1 locknuts for ZWC series descaling nipples have been designed profiting from a large experience on the field. The sturdy design and the generous dimensions give the maximum protection to the nozzle and the stabilizer nipple thread. One locknut size fits all standard size ZWB series nipple of any length.



MATERIALS

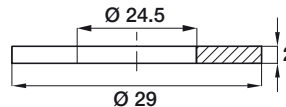
<b>B1</b>	Stainless steel AISI 303	
Code	Notes	Weight Kg
VAW B100 B1	Outside exagone	0.16
VAW D100 B1	Built in exagone	0.25



VDA 24C1 T3

GASKET

The VDA 24C1 T3 round gasket provides proper assembly between nozzle and nipple. One size fits all standard size ZWB nipple types.



MATERIALS

<b>T3</b>	Copper	<b>Code</b> VDA 24C1 T3
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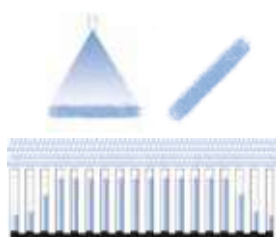




## HIGH IMPACT NOZZLES - MICRO SIZE

In some plants the centre-to-centre distance among descaling nozzles can be very narrow. In these cases the use of micro-descaling tips avoids the installation of nipples and nozzles or rings onto the spray manifold, which would be difficult, if not impossible, with standard nozzles.

### SPRAY PATTERN



### SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°

### MATERIALS

			WEIGHT (Kg)
<b>B1</b>	Body	Stainless steel AISI 303	0.02*
<b>F1</b>	Insert	Tungsten carbide	

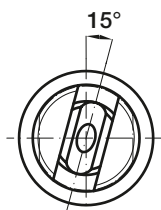
\* Average Value

### HOW TO ORDER PNR PRODUCTS

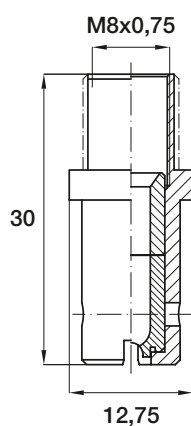
Model	Spray Angle	Capacity	Material
<b>HW/AM</b>	<b>C</b>	<b>2045</b>	<b>XX</b>

Order example: **HWC 2045 F1AM**

### OFFSET ANGLE



### DIMENSIONS



**D** = Nozzle orifice conventional diameter (mm)      **D<sub>1</sub>** = Minimum internal passage diameter (mm)

Code	D	D1	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAM	0.7	0.6	4.5	5.0	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10.0
2063 xxAM	1.0	0.8	6.3	7.0	8.3	10	10.9	11.8	12.2	13.0	13.7	14.1
2106 xxAM	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAM	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAM	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAM	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAM	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9

### CONVERSION TABLE (UE - USA)

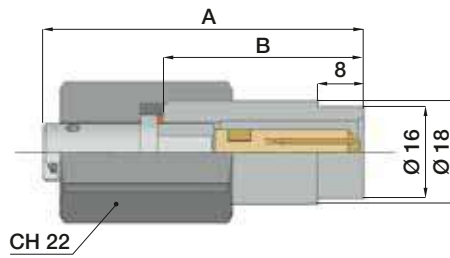
**PRESSURE:** 1 bar = 14,5 psi

**CAPACITY:** 1 lpm = 0,264 gpm



NUT	VAW MM 18 B1		
NIPPLE	ZWM 0035 B2		
STABILIZER	A	B	C
XHW MG20 T1	115	32	67

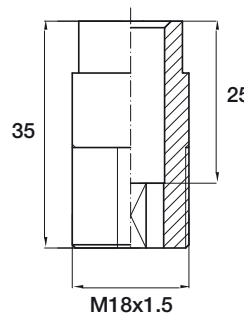
A = Complete Descaling unit Length (mm)  
B = Welding Nipple Length (mm)



ZWM 0035 B2

**WELDING NIPPLE**

Micro descaling nozzles can be assembled on the ZWM 0035 B2 nipple, 35 mm. long. PNR can supply on request a series of different length. The precision machined nipple inlet port assures precise positioning of the nozzle flat fan jet to the specified offset angle value of 15° with regard to the manifold centre line.



**MATERIALS**

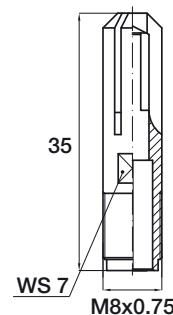
<b>B2</b>	Stainless steel AISI 304		
<b>Code</b>	<b>RG</b> inch	<b>L</b> mm	<b>Weight</b> Kg
ZWM 0035 B2	1.5	35	0.20



XHW MG20 T1

**FLOW STABILIZER**

The flow stabilizer is a critical component for proper descaling, by reducing flow turbulence losses, a larger fraction of the water flow energy can be used for generating impact on the surface to be descaled. The design consists of a cylindrical brass body with a polished inner surface, housing a cast stainless steel flow stabilizer which straightens the liquid path to minimize turbulences.



**MATERIALS**

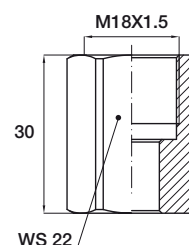
<b>T1</b>	Brass		
<b>Code</b>	<b>L</b> mm	<b>Weight</b> Kg	<b>Notes</b>
XHW MG20 T1	35	0.04	with filter



VAW MM18 B1

**LOCKNUT**

The sturdy design and the generous dimensions of this locknut give the maximum protection to the nozzle and the nipple thread.



**MATERIALS**

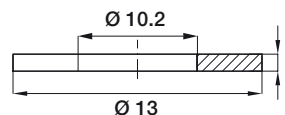
<b>B1</b>	Stainless steel AISI 303		
<b>Code</b>	<b>Weight</b> Kg		
VAW MM18 B1	0.06		



VDA 10A5 T3

**GASKET**

The VDA 10A5 T3 round gasket provides proper assembly and secure seal between nozzle and nipple.



**MATERIALS**

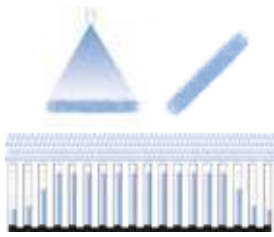
<b>T3</b>	Copper	<b>Code</b> VDA 10A5 T3
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**FLAT FAN JET NOZZLE**

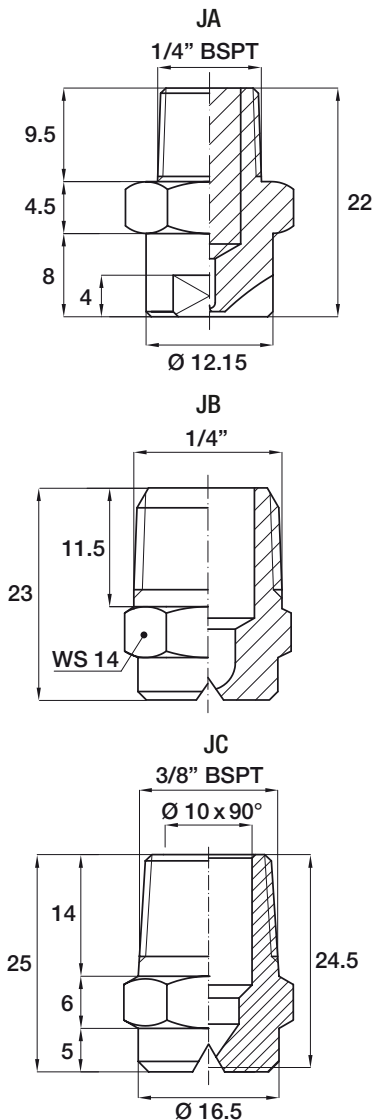
J type flat fan jet nozzles are used in the pickling process, a surface treatment used to remove impurities, such as discoloring oxide layers or scale on the surface, formed during hot working processes. These nozzles are available in a wide range of capacities, spray angles and materials. The tapered thread assures a tight connection and makes it easy to orient the jets in the desired direction. In case of "NPT" connection the model code changes from "J" to "H" but all other parts of the product ( thread, spray angle, material) remain unvaried.



**SPRAY PATTERN**



**DIMENSIONS**



**SPRAY ANGLE CODES**

F	M	Q	U	W
30°	45°	60°	90°	120°

**MATERIALS CODE**

<b>B1</b>	Stainless steel AISI 303
<b>B31</b>	Stainless steel AISI 316L
<b>T1</b>	Brass
<b>D8</b>	PVDF

**HOW TO ORDER PNR PRODUCTS**


Model	Thread	Spray Angle	Capacity	Material
<b>J</b>	<b>A</b>	<b>C</b>	<b>2045</b>	<b>XX</b>


Order example: **JAC 2045 B3**

**DIMENSIONS AND WEIGHTS**

Model	Thread	Weight Kg		
		B1 / B31	T1	D8
<b>JA</b>	1/8"	0.010	0.011	0.002
<b>JB</b>	1/4"	0.020	0.021	0.003
<b>JC</b>	3/8"	0.024	0.028	0.004

30°	JAF	JBF	JCF	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•		1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
		•		1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•		1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•		2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100.0
			•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121.0


	JAM	JBM	JCM	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
45°	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•		1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
		•		1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100.0
		•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121.0	


	JAQ	JBQ	JCQ	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
60°	•	•		1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•	•	1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
		•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100.0
		•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121.0	

### CONVERSION TABLE (UE - USA)

<b>PRESSURE: 1 bar = 14,5 psi</b>	<b>CAPACITY: 1 lpm = 0,264 gpm</b>
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▷ continued on page 56

	JAU	JBU	JCU	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
90°	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100.0
		•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121.0	

	JAW	JBW	JCW	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
120°	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•	•	1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•	•	1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100.0
		•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121.0	

**CONVERSION TABLE (UE - USA)**

**PRESSURE:** 1 bar = 14,5 psi

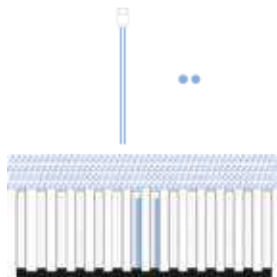
**CAPACITY:** 1 lpm = 0,264 gpm



**ROLL COOLING NOZZLE**

KYA type special flat fan jet nozzles are the best solution to cool forged steel rolls on continuous casting machines with high spray width values. The direction of the two jets is designed to obtain maximum cooling efficiency over a long reach.

**SPRAY PATTERN**



**MATERIALS**

<b>T1</b>	Brass
<b>B31</b>	Stainless steel AISI 316L

**HOW TO ORDER PNR PRODUCTS**

Model	Capacity	Material	Construction	Variation
<b>KYA</b>	<b>A</b>	<b>C</b>	<b>Y</b>	<b>Z</b>

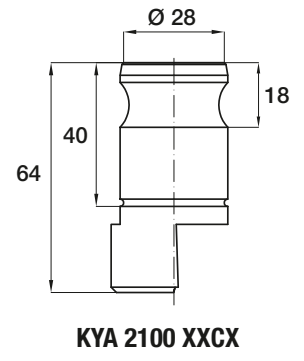
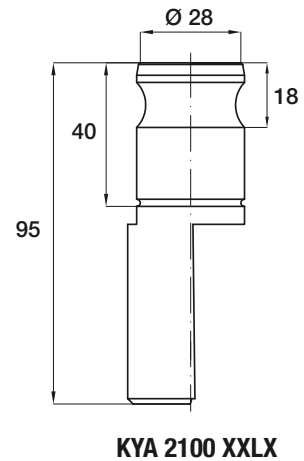
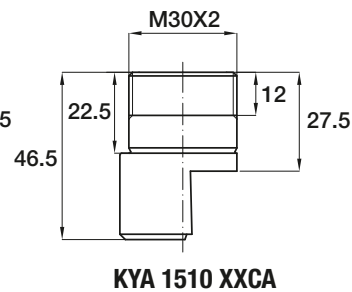
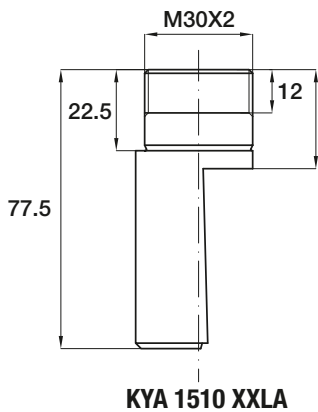
Order example: **UEA D020 V7 SG**

**CONSTRUCTION: Y**

- **C** standard
- **L** long body

**VARIATION: Z**

- **A** metric thread M30x2
- **X** quick coupling



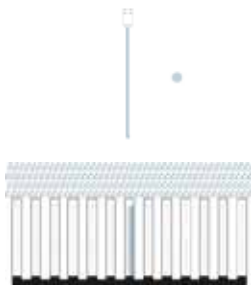
Code	Capacity - lpm								Weight	
	Pressure - bar								Kg	
	1.0	2.0	3.0	4.0	5.0	6.0	7.0	10.0	T1	B31
KYA 1510 xx	2.94	4.16	5.10	5.89	6.58	7.21	7.79	9.31	0,28	0,26
KYA 2107 xx	6.18	8.74	10.70	12.40	13.80	15.10	16.30	19.50	0,35	0,33

**CONVERSION TABLE (UE - USA)**

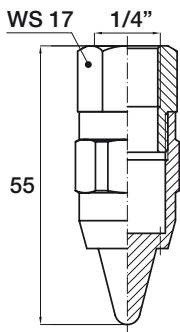
<b>PRESSURE: 1 bar = 14,5 psi</b>	<b>CAPACITY: 1 lpm = 0,264 gpm</b>
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**SPRAY PATTERN**



**DIMENSIONS**



**AIR KNIFE COOLING SYSTEMS ROUND JET**

These efficient blow-off nozzles deliver a highly laminar stream of air with a powerful impact force. The laminar nature of the input air flow minimizes both the turbulence associated with the surrounding air that is entrained in the fast moving stream, and the level of audible noise produced. The body is made either of aluminium protected by a chemical nickel-plating coating, for applications requiring lightweight nozzles, or of stainless steel 316L for heavy duty. The table here below gives the values of air consumption at different operating pressures, whereas the graph shows the noise level as a function of location relative to the nozzle, measured at 2 bar.

**MATERIALS**

<b>V7</b>	Aluminium, chemical nickel-plating LT = 95 °C - LP = 15 bar
<b>B31</b>	Stainless steel AISI 316L LT = 110 °C - LP = 15 bar

LT: Maximum operating temperature

LP : Maximum operating pressure

**HOW TO ORDER PNR PRODUCTS**

Model	Version	Material	Construction	Variation
<b>UEA</b>	<b>D020</b>	<b>XX</b>	<b>Y</b>	<b>Z</b>

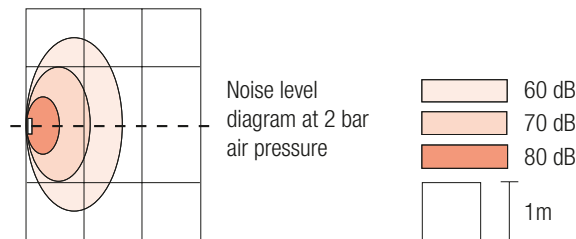
Order example: **UEA D020 V7SG**

**CONSTRUCTION: Y**

**VARIATION: Z**

- **S** standard (Female connection)
- **M** male Connection
- **G** cylindrical gas thread (BSPP)
- **N** conic gas thread

These air blowers meet the requirements of American OSHA regulation



Code	RF inch	Capacity Air - Nm <sup>3</sup> /h					Weight Kg
		Pressure - bar					
		2.0	3.0	4.0	5.0	6.0	
UEA D020 B31xx	1/4	15	20	25	31	35	0.05
UEA D020 V7xx		15	20	25	31	35	0.03

**CONVERSION TABLE (UE - USA)**

<b>PRESSURE: 1 bar = 14,5 psi</b>	<b>CAPACITY: 1 Nm<sup>3</sup>/h = 0,59 cfm</b>
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**AIR KNIFE COOLING SYSTEMS FLAT FAN JET**

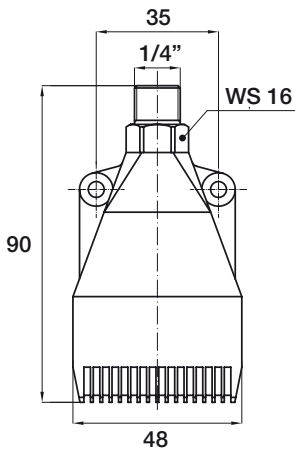
These blow-off nozzles, containing multiple air channels, are used in applications where a flat fan jet of air with high impact velocity is required. Their design produces a uniform layer of air with low noise emission. Typical applications include cooling, drying, cleaning, and the movement of objects on a conveyor belt. The nozzles can be ganged together or on a pipe manifold to achieve wide coverage.

**SPRAY PATTERN**

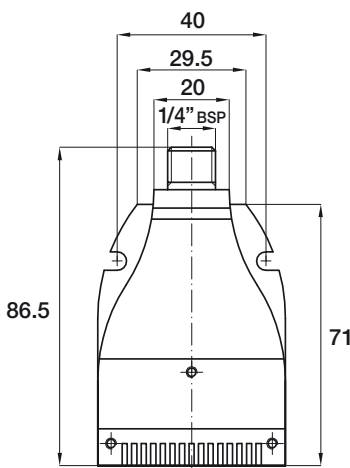


**DIMENSIONS**

VERSION IN E31



VERSION IN V7



**MATERIALS**

<b>E31</b>	Polyacetal Resin (POM) LT = 80 °C - LP = 5 bar
<b>V7</b>	Aluminium, chemical nickel-plated LT = 95 °C - LP = 15 bar

LT: Maximum operating temperature

LP : Maximum operating pressure

**HOW TO ORDER PNR PRODUCTS**

Model	Version	Material	Construction	Variation
<b>UEA</b>	<b>L022</b>	<b>XX</b>	<b>Y</b>	<b>Z</b>

Order example: **UEA L022 V7SG**

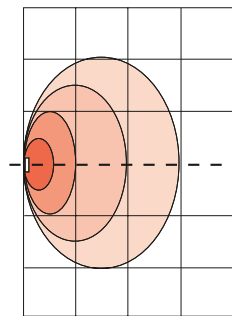
**CONSTRUCTION: Y**

- **S** standard

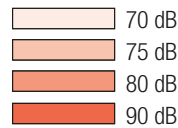
**VARIATION: Z**

- **G** cylindrical gas thread (BSPP)
- **N** conic gas thread

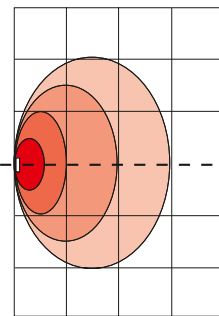
These air blowers meet the requirements of American OSHA regulation



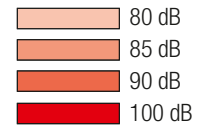
Noise level diagram at 3 bar air pressure



1m



Noise level diagram at 8 bar air pressure



1m

See list of abbreviations - legenda at page 3.

Code	RG inch	Capacity Air - Nm <sup>3</sup> /h					Weight Kg
		Pressure - bar					
		1.0	2.0	3.0	4.0	5.0	
UEA L022 E31xx	1/4	10	17	22	28	33	0.03
UEA L022 V7xx	1/4	10	17	22	28	33	0.07

**CONVERSION TABLE (UE - USA)**

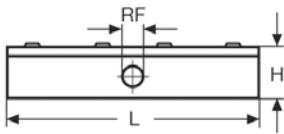
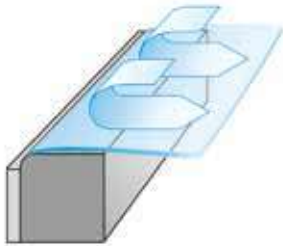
<b>PRESSURE: 1 bar = 14,5 psi</b>	<b>CAPACITY: 1 Nm<sup>3</sup>/h = 0,59 cfm</b>
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**AIR KNIFE COOLING SYSTEMS BAR BLOWERS**

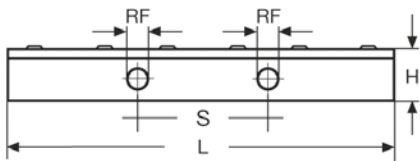
UEB air knives, used for rolls cooling, deliver a laminar flow of compressed air along their entire length with a powerful impact force, low speed and reduced noise level. Their particular design, based on the Coanda effect, allows to place the outlet orifice in a safe position and protect it from any possible damage.

UEB Air knives are manufactured in four different standard lengths and can be ganged together to create air barriers of any desired length.

The jet flow leaving the nozzle orifice curves away following the radiused profile and leaves the body of the air knife with a 90° angle from the initial jet direction, as shown in the drawing. This feature allows to place the nozzle orifice in a totally safe position thus making these air knives the perfect choice to use on conveyor belts, where the products being conveyed may oscillate and damage an ordinary blow-off system.



**UEB 0150 / UEB 0300**



**UEB 0450 / UEB 0600**

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

MATERIALS		
<b>B31</b>	Body and upper plate	Stainless steel AISI 316 LT = 110 °C - LP = 7 bar
	Body	Aluminium, chemical nickel-plated
<b>V7</b>	Upper plate	Nickel plated steel LT = 95 °C - LP = 7 bar

LT: Maximum operating temperature

LP : Maximum operating pressure

**HOW TO ORDER PNR PRODUCTS**

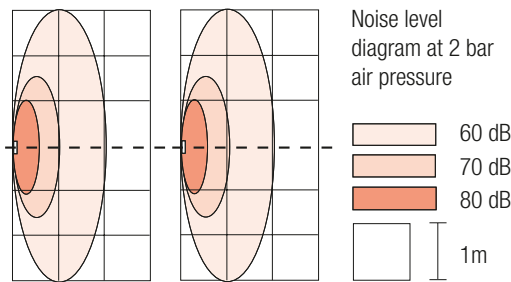
Model	Length	Material	Construction	Variation
<b>UEB</b>	<b>150</b>	<b>XX</b>	<b>Y</b>	<b>Z</b>

Order example: **UEB 0150 V7SG**

CONSTRUCTION: Y

VARIATION: Z

- **S** standard
- **G** cylindrical gas thread (BSPP)
- **N** conic gas thread (NPT)



**UEB 0150**

**UEB 0300**

Code	RF inch	Capacity Air - Nm <sup>3</sup> /h										Dimensions mm			Weight kg
		Pressure - bar										H	L	S	
		2.0		3.0		4.0		5.0		6.0					
UEB 0150 V7xx	1/4	0.26	4.7	0.34	6	0.42	7.1	0.51	8.6	0.6	10.6	30	150	-	0.30
UEB 0300 V7xx		0.52	9.4	0.68	12	0.84	14.2	1.02	17.2	1.2	21.2		300	-	0.70
UEB 0450 V7xx		0.78	14.1	1.03	18	12.6	21.3	1.53	25.8	1.8	31.8		450	270	0.90
UEB 0600 V7xx		1.03	18.7	1.4	24	1.68	28.4	2.04	34.4	2.4	42.4		600	300	1.40

**CONVERSION TABLE (UE - USA)**

PRESSURE: 1 bar = 14,5 psi

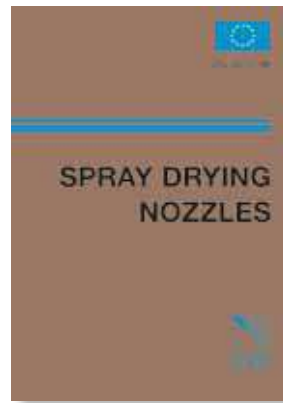
CAPACITY: 1 Nm<sup>3</sup>/h = 0,59 cfm

In addition to the general purpose spray nozzles found in this catalogue, PNR manufactures a wide range of other products and systems for liquid flow and fluid control; suitable for most modern industrial processes. These high quality products can be found in the following catalogues:



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**Accessories Catalogue**

A complete range of nipples, clamps, swivel joints and everything that helps you to easily assemble, align and service your spraying systems. Air blowers, mixing eductors, filters, cleaning guns and lances, hose reels, steam heaters, pressure tanks, quick couplings and more.



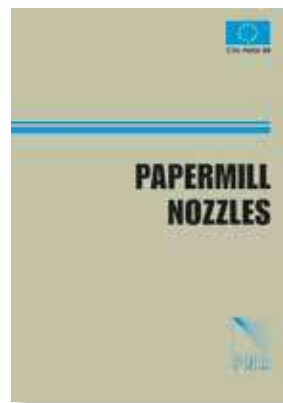
**CTG SP BR**  
**Spray drying nozzles**

High pressure or air assisted precision nozzles manufactured with top quality stainless steel housings and tungsten carbide internals. A complete line of nozzles to retrofit existing plants at competitive prices. Only the highest quality materials and the most precise machining are employed in the manufacture of our nozzles, to assure accurate results and consistent wear.



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**Tank washing systems**

Everything from the simple fixed sprayballs and pintle nozzles to the twin-axis wash heads. Reaction driven, water driven and electric or pneumatic motor driven. Professional inside surface cleaning of industrial tanks with the latest technology, together with state of the art accessories.



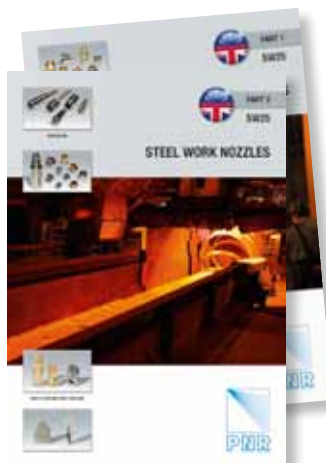
**CTG PM BR**  
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A sixteen page catalogue showing products specifically developed for use on paper making machines, and paper mill processes. These include our patented disc nozzle for self-cleaning pipes, needle nozzles with sapphire and ruby orifices and oscillating pipes.



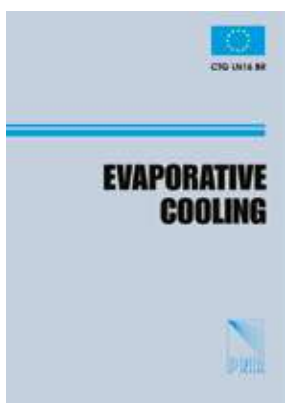
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**Air assisted atomizers**

Ultrasonic, classic and automatic atomisers for the finest atomisation in any process. High quality machining and tight quality control assure a professional result for your system. Control cabinets aid easy construction of complete humidification systems.



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**Steelwork nozzles**

A complete range of nozzles for steelwork applications, including continuous casting air atomisers and conventional nozzles, descaling nozzles for high pressure systems, fixed position dovetail tips and coke quenching high capacity flanged nozzles to name a few.



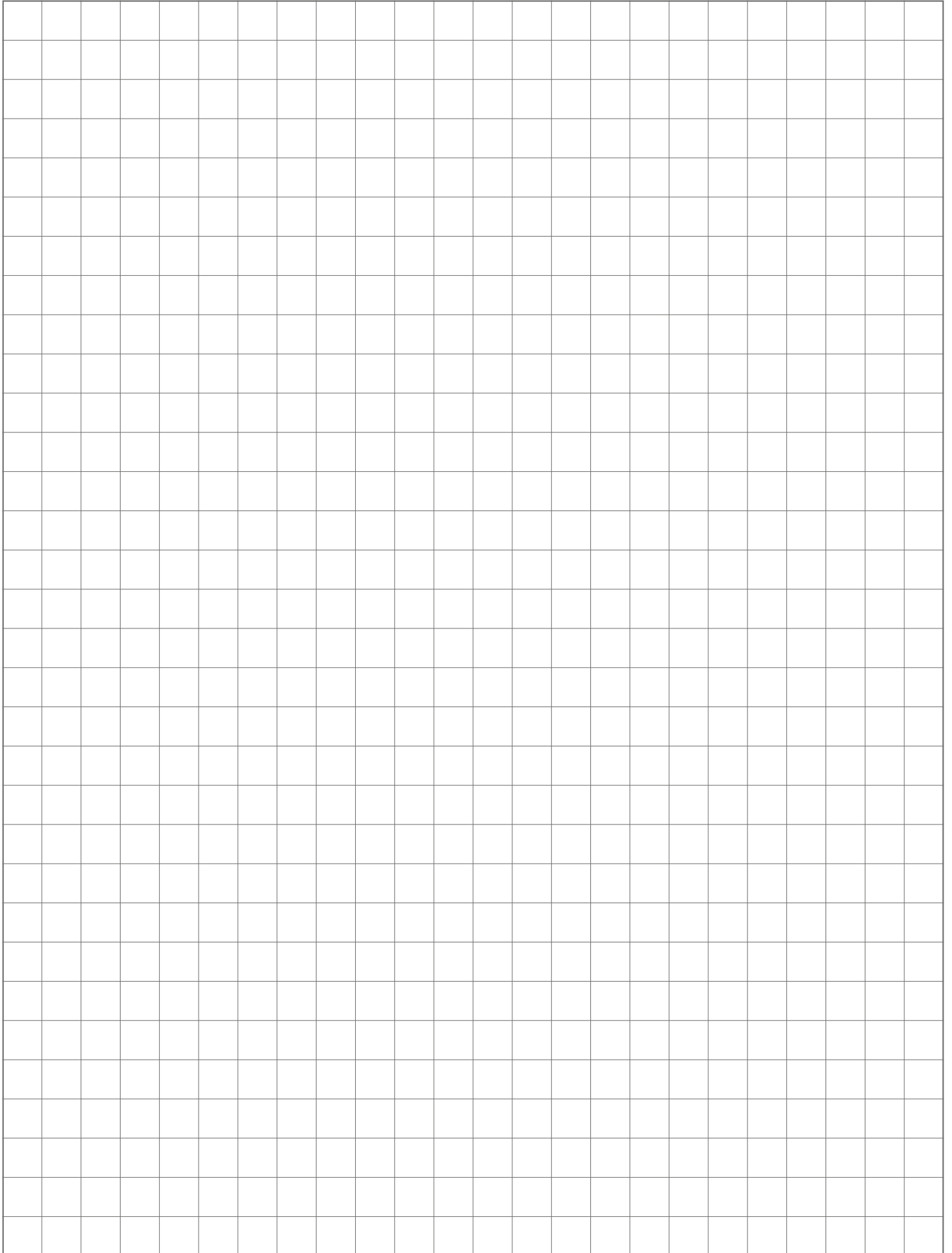
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Spillback or air assisted lances for gas cooling processes in steelworks, cement plants and other industrial applications. We can supply spare parts, retrofit your system or even supply a complete system, PLC driven, to upgrade tower performances to the latest technical standards



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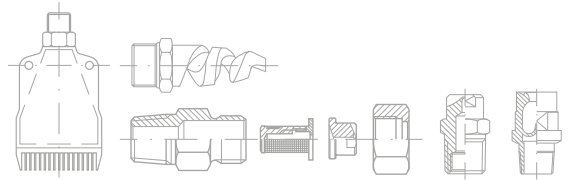
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SPRAY NOZZLES & ASSEMBLY FITTINGS



## 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 manufacture thousands of different products to offer our customers one of the most complete product ranges in the world, and keep focused on research plus innovation. Our machine tool park includes all high quality and latest model CNC machines, many of these built to our requirements to accomplish special manufacturing jobs. All products and their performance are strictly controlled and our Quality control system is certified by DNV according to ISO 9001 norms. Our nozzles design requires expertise in hydrodynamics and fluids handling technology as well as a deep manufacturing know-how to give the best performances. It's not just a matter of mechanical processing.

Nozzles play an important role in industry and only the use of reliable quality products prevent the risk of damage and serious losses in production processes. PNR has extended its sales network to 55 Countries all over the world in 2015. Our sales engineers, fully trained in all industrial applications of our products and with a high technical knowledge, can help customers in finding the best solution for their needs, from process planning to production facilities improvement. We do not supply products only but also provide integrated services and technical assistance.

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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](http://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 customer 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](mailto:quality@pnr.it)
- If PNR ascertains that the manufacturing faults are actually subject to the warranty, the product shall have been 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 been 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.

## COPYRIGHT

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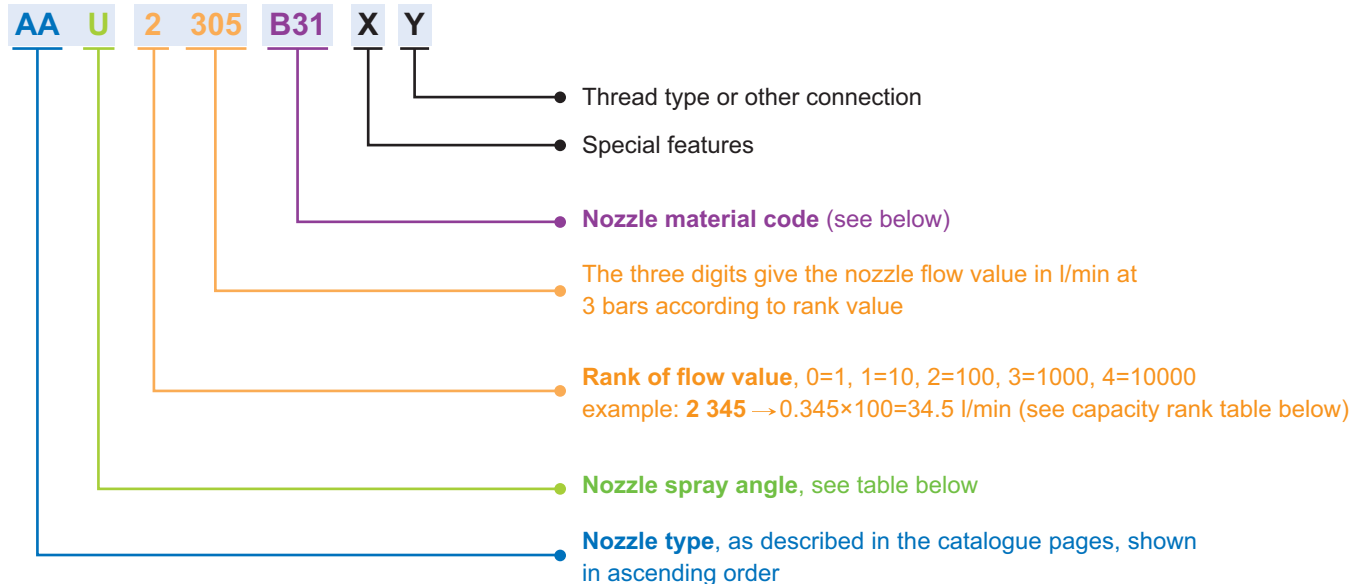
Our Quality System is  
certified ISO 9001:2015  
**COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL**  
= ISO 9001:2015 =

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	<b>0 490</b>	0.49
1	<b>1 490</b>	4.90
2	<b>2 490</b>	49.0
3	<b>3 490</b>	490
4	<b>4 490</b>	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
<b>A</b>	0°	<b>L</b>	40°	<b>T</b>	80°
<b>B</b>	15°	<b>M</b>	45°	<b>U</b>	90°
<b>C</b>	20°	<b>N</b>	50°	<b>J</b>	110°
<b>D</b>	25°	<b>Q</b>	60°	<b>W</b>	120°
<b>F</b>	30°	<b>R</b>	65°	<b>Y</b>	130°
<b>H</b>	35°	<b>S</b>	75°	<b>Z</b>	180°

### Nozzle material codes

<b>A1</b>	Carbon steel	<b>D6</b>	Glassfibre reinforced PP	<b>G1</b>	Cast iron
<b>A2</b>	High speed steel	<b>D7</b>	High density polyethylene	<b>H1</b>	Titanium
<b>A8</b>	Zinc coated steel	<b>D8</b>	Polyvinylidene fluoride (PVDF)	<b>L1</b>	Monel 400
<b>A9</b>	Nickel coated steel	<b>D82</b>	PVDF, Injection molded	<b>L2</b>	Incolloy 825
<b>B1</b>	AISI 303 Stainless steel	<b>E0</b>	EPDM	<b>L61</b>	Hastelloy C 22
<b>B2</b>	AISI 304 Stainless steel	<b>E1</b>	Polytetrafluorethylene (PTFE)	<b>P6</b>	Acr. But. Styrene (ABS)
<b>B21</b>	AISI 304L Stainless steel	<b>E2</b>	PTFE (25% glassfibers)	<b>P8</b>	EPDM 40 Shore
<b>B3</b>	AISI 316 Stainless steel	<b>E31</b>	Acetalic resin (POM)	<b>T1</b>	Brass
<b>B31</b>	AISI 316L Stainless steel	<b>E7</b>	Viton	<b>T2</b>	Brass, chrome plated
<b>C2</b>	AISI 416 Stainless steel, hardened	<b>E8</b>	Synthetic rubber (NBR)	<b>T3</b>	Copper
<b>D1</b>	Polyvinylchloride (PVC)	<b>F5</b>	Ceramic	<b>T5</b>	Bronze
<b>D2</b>	Polypropylene (PP)	<b>F30</b>	Ruby insert, 303 body	<b>T8</b>	Brass, nickel plated
<b>D3</b>	Polyamide (PA)	<b>F31</b>	Ruby insert, 316 body	<b>T81</b>	Brass, electroless nickel plated
<b>D4</b>	Nylon, Glassfibers reinforced	<b>F32</b>	Diamond insert, 303 body	<b>V1</b>	Aluminum
<b>D5</b>	Talcum filled Polypropylene	<b>F33</b>	Diamond insert, 316 body	<b>V7</b>	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 rods**

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

**P.31**



## FULL CONE NOZZLES

**CAS** Cluster nozzle standard spray

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

**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: 0.26 ~ 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**

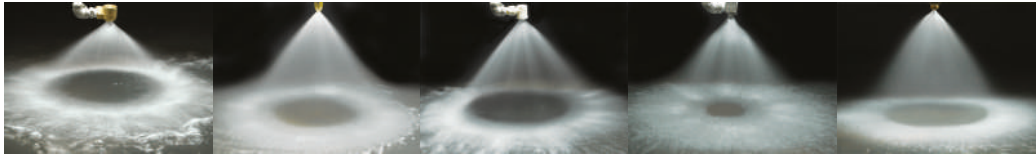
- Spray angle: 90° ~ 140°
- Capacity: 0.39 ~ 31 l/min
- Materials: AISI 303, AISI 316L, Brass

P.59

**Shower Pipe**

P.63





**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"
- S 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 spray 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

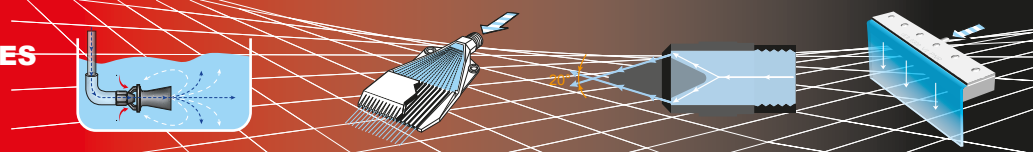
P.76

**RZ** Low capacity

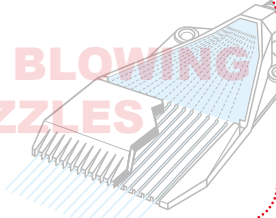
- Thread size: 1/4"
- Spray angle: 30° ~ 90°
- Capacity: 0.08 ~ 2.0 l/min
- Materials: AISI 303, AISI 316L, Brass

P.76

**AIR BLOWING NOZZLES  
MIXING EDUCTORS**



**AIR BLOWING  
NOZZLES**



**GZS Air & steam flat fan tips**

- Thread size: 1/4"
- Spray angle: 70°
- Capacity: 3 ~ 31.5 Nm<sup>3</sup>/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 Nm<sup>3</sup>/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 Nm<sup>3</sup>/hour (3 bar)
- Material: POM

P.83

**UEA 0527**

**Air blow-off nozzles**

- Thread size: 1/4"
- Spray width: 51 mm
- Capacity: 22 Nm<sup>3</sup>/hour (3 bar)
- Materials: Electroless Ni-plated aluminum, AISI 316L

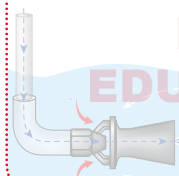
P.83

**UEB High-effect air Knives**

- Thread size: 1/4"
- Length: 150 ~ 600mm
- Air capacity: 0.51-2.04 Nm<sup>3</sup>/min (5 bar)
- Materials: Electroless Ni-plated aluminum, AISI 316L

P.84

**MIXING  
EDUCTORS**



**UPB Mixing eductors**

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

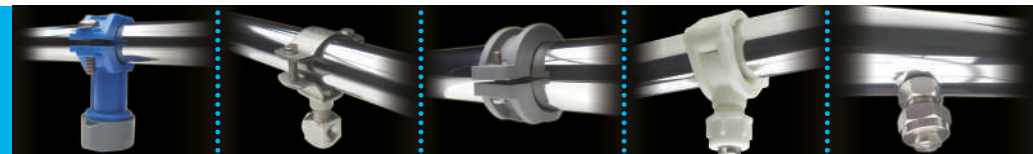
P.85

**UPD Mixing eductors**

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

P.85

**ASSEMBLY  
ACCESSORIES**



**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**

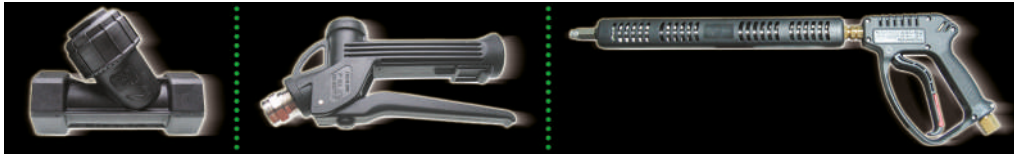
- Pipe external diameter: 2"
- Body: Fiberglass reinforced PP
- O-ring: EPDM
- Pin, bolt: AISI 316

P.88

**ZPM Metal pipe clamps**

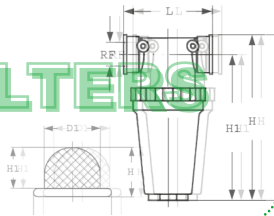
- Pipe size: 1/2" ~ 2-1/2"
- Body: AISI 304, Zinc coated steel
- Gasket: EPDM
- Nipple: AISI 316L, Brass

P.87



**FILTERS  
SPRAY GUNS  
HOSE REELS**

**FILTERS**



**VEA Hat filters**



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

P.91

**VEC Flanged filters**



- Suitable nozzle tip: GX, FX, BX, KX
- Mesh number: 50, 75, 100 Mesh
- Body: AISI 303, AISI 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

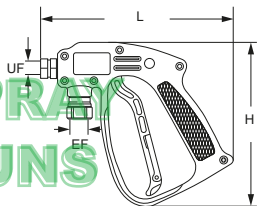
**VEQ "Y" style filters**



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

P.94

**SPRAY GUNS**



**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

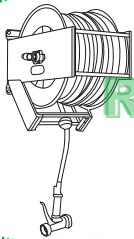
**XUM FLEXIBLE HOSE**



- Hose: EPDM
- Couplings: AISI 316

P.98

**REWIND REELS**



**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



**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

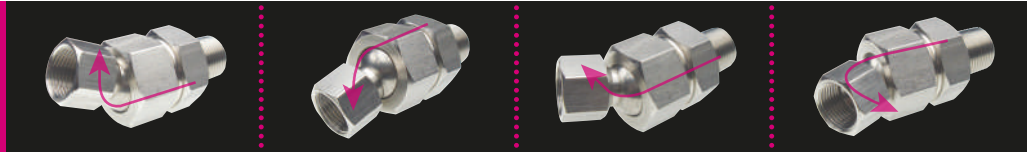
**P.104**

**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**

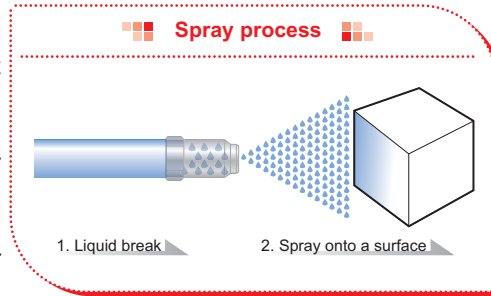
THE PROCESS OF ATOMIZATION

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

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

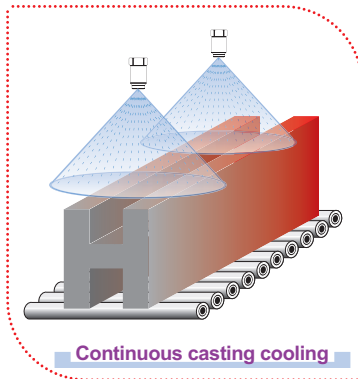
Modern technology allows for a strict control of different parameters of a liquid spray; for example precise information can be obtained about droplet size spectrum, droplets speed and liquid distribution onto the spray target. In recent years we've supported our customers in improving their productivity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

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

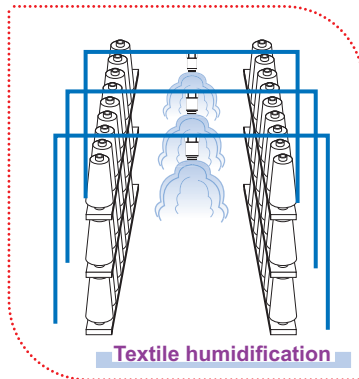


APPLICATIONS

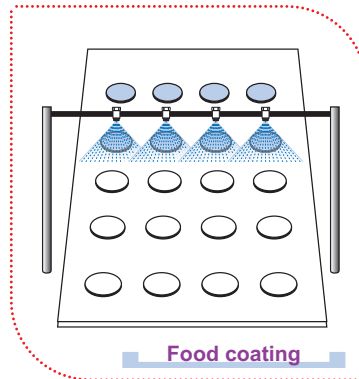
Spraying a liquid through a spray nozzle can serve different purposes, among which the most important are the following:



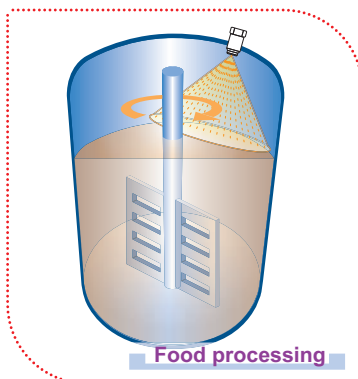
**Cooling:** heat transfer by spraying liquids onto the products surface for a rapid cooling, such as continuous casting cooling in steelworks.



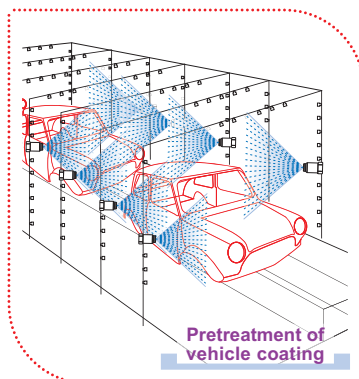
**Humidification:** spray of very little quantities of liquid onto the products surface into special chambers or rooms to raise relative humidity. A typical application is textiles humidification.



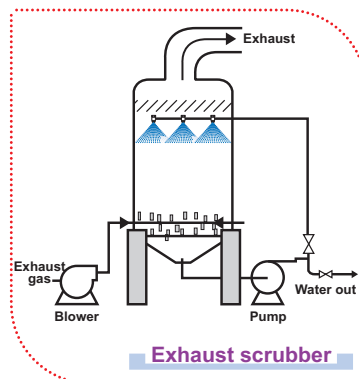
**Coating:** application of coatings or liquids on the food products surface. For example: oil-spraying on bread.



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



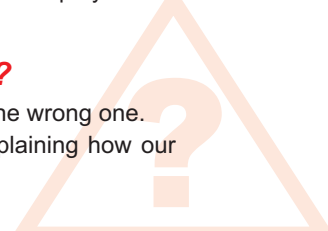
**Washing:** remove dirt from the product surface spraying liquids at high pressure, like in vehicles pre-wash treatment.



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

How to choose the most suitable nozzle among those listed?

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



## SPRAY NOZZLES TECHNICAL FEATURES

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

### 1. NOZZLE EFFICIENCY

A spray nozzle is a device that turns the pressure energy of a liquid flow into kinetic energy. The nozzle efficiency can be defined as the ratio between the energy available at the nozzle inlet and the energy which is actually used to increase the liquid speed and create the spray, the difference being the energy lost during the process because of friction. Depending on the nozzle type and for a good quality machining, the nozzle efficiency varies between 55% and 95% for the types that are commonly used in industrial processes. The above considerations are only valid for purely hydraulic nozzles, where the only energy used is the one from the feed liquid supplied under pressure, and are 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  $D_{32}$ ,  $\mu\text{m}$ (Micron) unit. ( $1\mu\text{m}=10^{-3}\text{mm}$ )

Lorem ipsum

#### ARITHMETIC MEAN DIAMETER

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

#### SURFACE MEAN DIAMETER

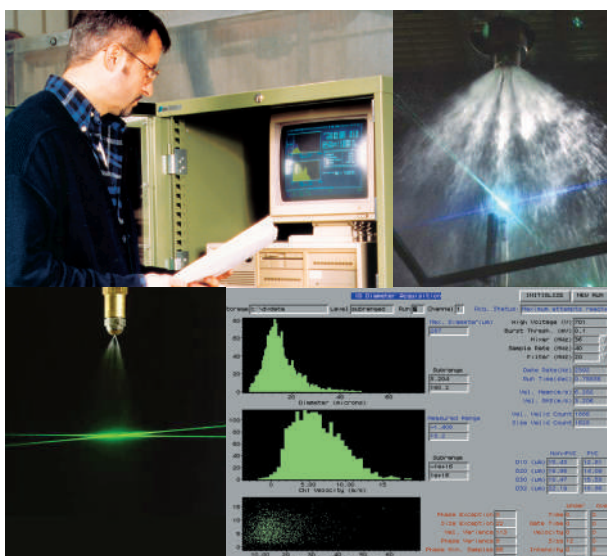
This is a diameter of such a droplet whose surface, multiplied by the total droplets number, equals the sum of all droplets surfaces.

#### VOLUME MEAN DIAMETER

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

#### SAUTER MEAN DIAMETER ( $D_{32}$ )

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



### MEASUREMENT METHODS

SMD is tested using pure water at 25°C

#### Method by immersion

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

#### Laser interferometer test

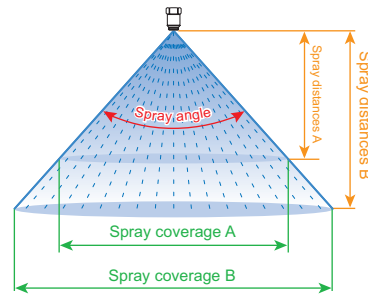
As different droplets have different PI, they produce different refraction angles. Therefore laser light can be used to measure their size. This type of method is fast and precise. PNR can perform this test with technologically advanced equipments and provide complete documentation containing test reports.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



SPRAY NOZZLES TECHNICAL FEATURES

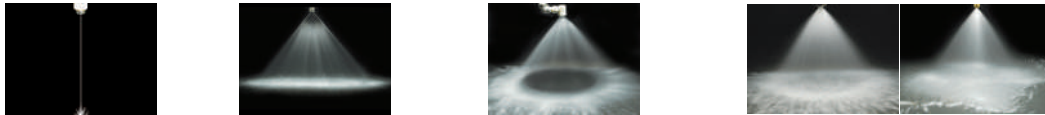
3. SPRAY ANGLE

A spray angle is the angle formed by the cone of liquid leaving a nozzle orifice. The spray angle and the distance between the nozzle orifice and the target surface to be covered determine the spray coverage. (See page 116)



4. IMPACT FORCE

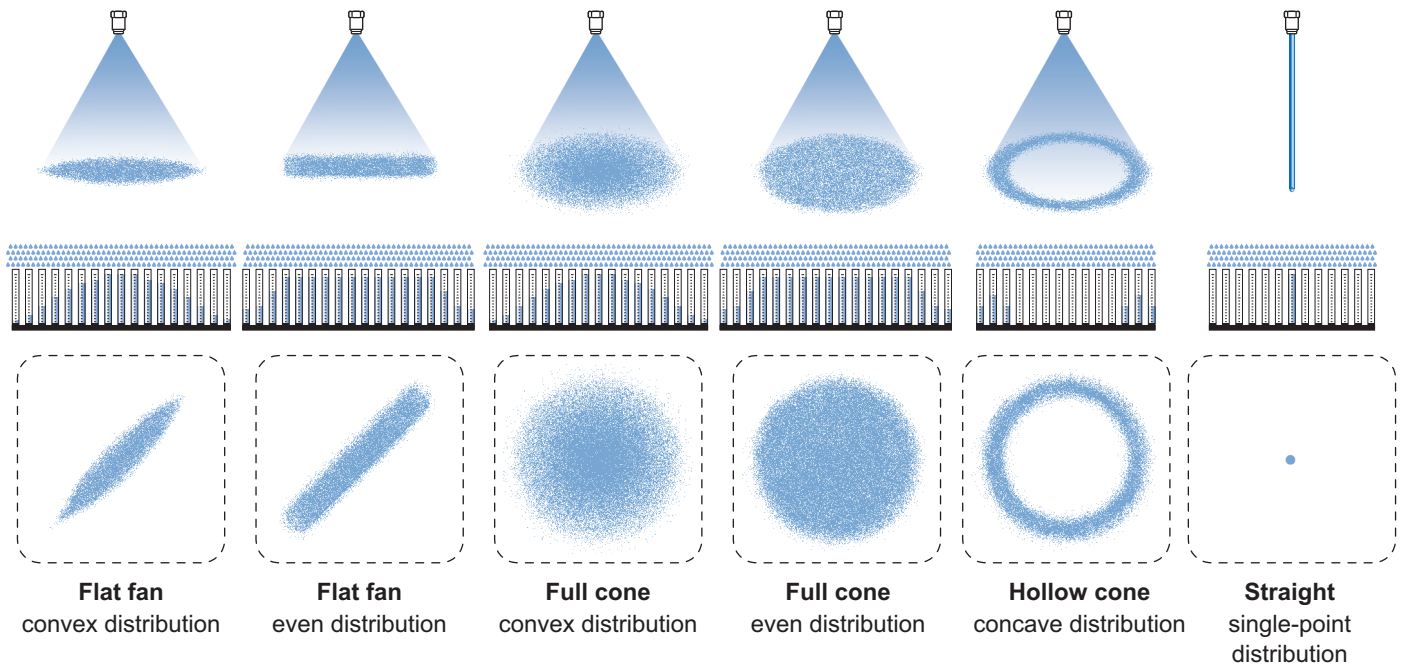
The impact force is the force generated by the jet of water deflected by the impact surface and its strength can be expressed as a force in kg or pounds or as a pressure in a given point in kg/mm<sup>2</sup> or lb/inch<sup>2</sup>. The uniformity of a jet impact force and distribution influence the washing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



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

5. DISTRIBUTION

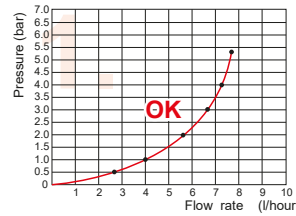
Engineers design nozzles with different spray distribution patterns. Patterns can be solid stream, full cone, hollow cone, flat spray, spoon flat fan. The nozzle design aims at the uniformity and impact force of the jet sprayed whether nozzles are used individually or overlapping. Below figures show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



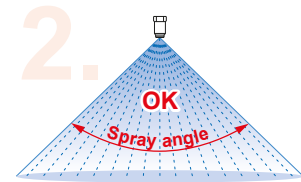
## SPRAY NOZZLE

Although nozzles are used to atomize liquids, the atomization precision and effect are deeply influenced by their quality. With our expertise we fully understand our customers needs and expectations and our engineers set high quality control standards not only for the operating precision of our nozzles but also for product inspection. **PNR ensures the best atomizing effects and provides capacity and spray angle accuracy with a tolerance of  $\pm 10\%$  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.



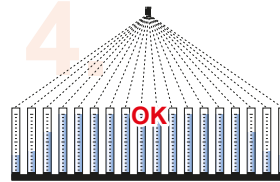
Check if liquid flow and pressure are in direct proportion.



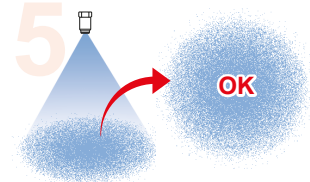
Check if spray angle is as required.



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.

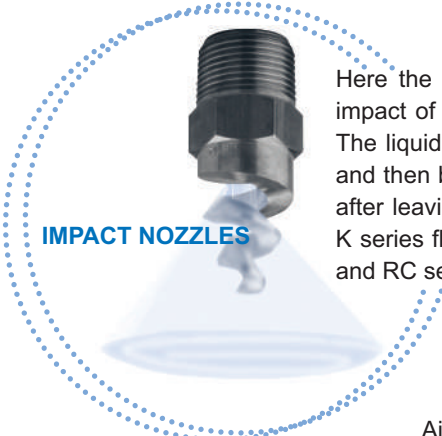
Turbulence nozzles use specially shaped vanes which force the pressurized liquid into a whirl chamber producing its high-speed rotation. This breaks up the liquid which exists the nozzle orifice atomized at high-speed. Different nozzle structures and flow rates produce hollow cone, full cone and full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



TURBULENCE NOZZLES

TECHNIQUES FOR SPRAY PRODUCTION

IMPACT NOZZLES



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



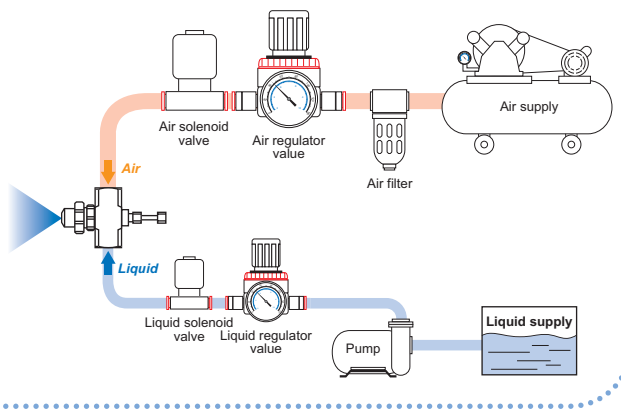
AIR ASSISTED ATOMIZERS



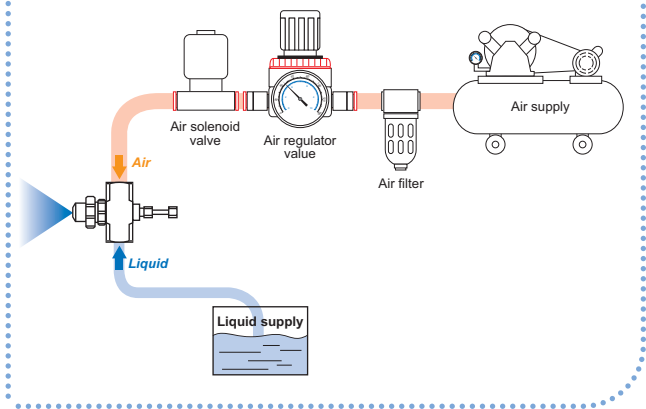
Air-assisted atomizers use their special design and pressurized gas to atomize a liquid and break it into tiny droplets (the smallest average particle size: 10 micron). Please refer to catalogue CTG AZ and contact us.

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

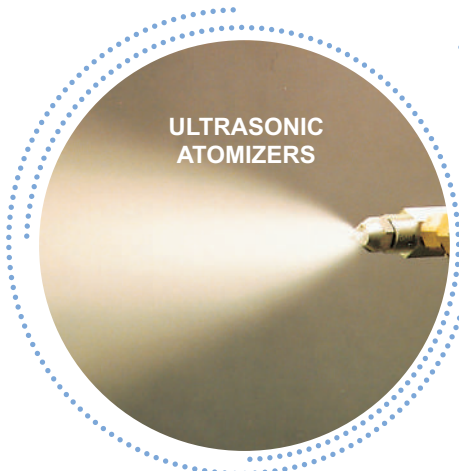
PRESSURE NOZZLES



SIPHON NOZZLES



ULTRASONIC ATOMIZERS



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



## FULL CONE PATTERN

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

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

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



### STANDARD FULL CONE (Turbulence nozzle)

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

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

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

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

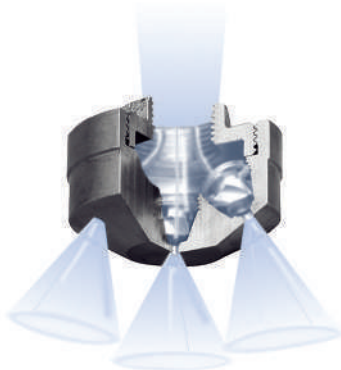
Two important details have to be noted from the system designer when using these type of nozzles:

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



### SPIRAL FULL CONE (Impact nozzle)

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



### MULTIPLE FULL CONE (Turbulence nozzle)

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

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

## FLAT FAN SPRAY PATTERN

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

### IN LINE FLAT FAN (Pressure nozzle)

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

### IN LINE STRAIGHT JET (Pressure nozzle)

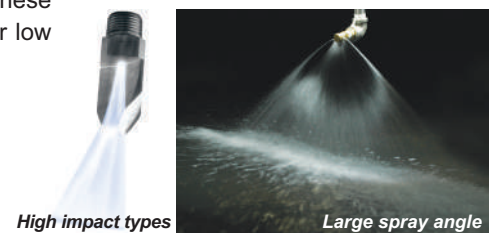
Straight nozzles can be considered as flat fan nozzles as the only difference is the spray angle which is zero degrees in straight nozzles. These nozzles are often used in high-pressure operating environments where the wear resistance of the nozzles is very important. It ensures optimum service life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

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

### SPOON FLAT FAN (Impact nozzle)

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

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



## HOLLOW CONE SPRAY PATTERN

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

### HOLLOW CONE (Turbulence nozzle)

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

### HOLLOW CONE (Deflection nozzle)

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





## FULL CONE NOZZLES

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



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



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



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

## VANE



SLOTTED VANE

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

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



DISC VANE

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

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



X - VANE

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



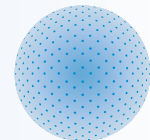
S - TYPE VANE

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

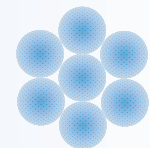


SPIRAL VANE

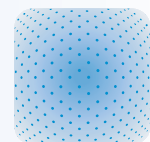
**Spiral vane** is specific design of spiral full cone nozzles. Liquids hit spiral vane then atomize and extend to the desired spray angle. The specific design greatly increases liquids inlet and outlet diameter. Any foreign matters entering could come out. It avoids clogging and provides larger capacity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



**FULL CONE**  
Round spray



**FULL CONE**  
Cluster spray



**FULL CONE**  
Square pattern

## ACCURATE SPRAYS OVERLAPPING

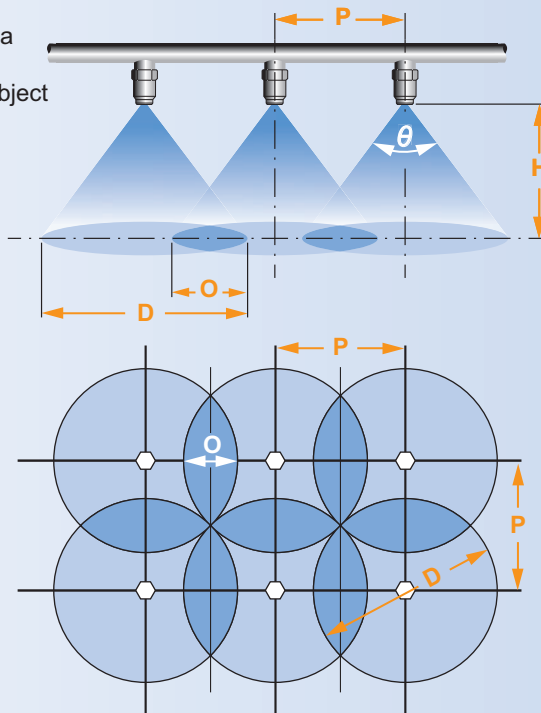
When full and hollow cone nozzles are used simultaneously, it's vital that they cover a uniform spray volume. In general there are two methods to achieve accurate nozzles settings: matrix configuration and offset configuration. See here below.

### Matrix configuration

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

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

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



### Offset configuration

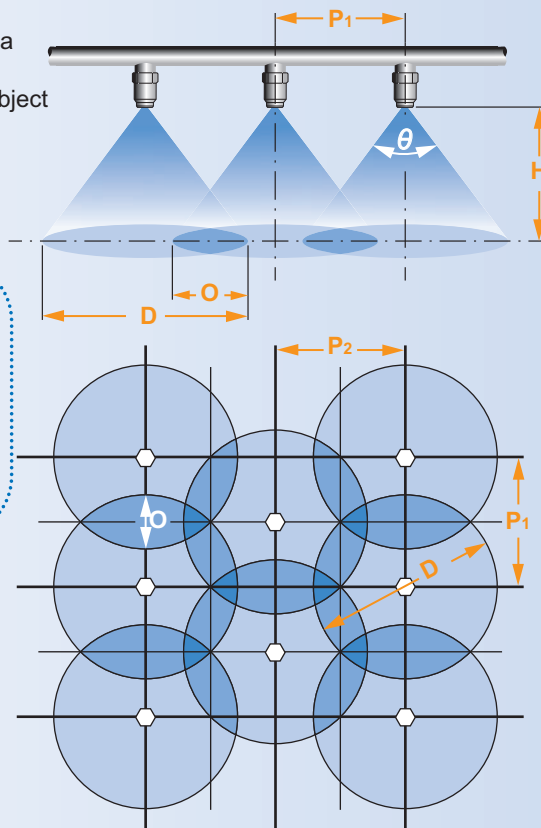
- O** - width of overlapping area
- D** - diameter of spray range
- H** - nozzle distance to the object being sprayed
- P** - nozzle spacing
- θ** - spray angle

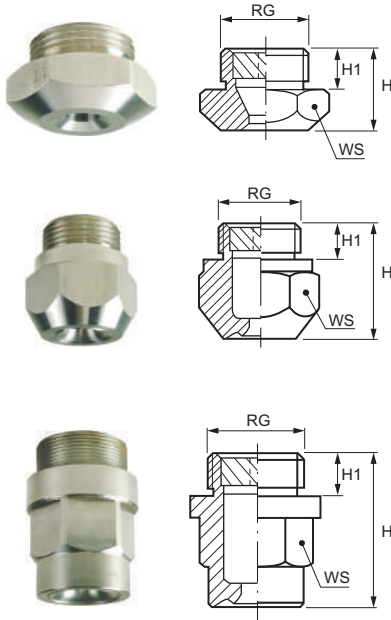
$$\text{Nozzle spacing}(P_1)$$

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

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

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





### SLOTTED VANE

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

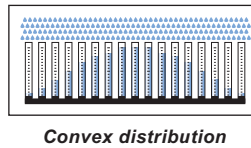
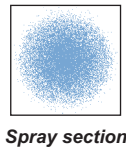
■ **Typical applications**

**Washing:** exhaust scrubbers washing, vehicle parts and gravel washing

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

**Other applications:** spray of chemicals, sea water desalination

■ **Thread size:** BSP, NPT (optional)



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



Slotted disc vane



AA nozzles design is ideally suited for plastic materials.

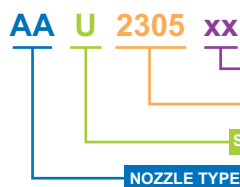
Slotted vane, so called for its spray section with 6 flows slots on its edge portion and one in the centre.

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

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

**HOW TO MAKE UP THE NOZZLE CODE**

EX.: AAU 2305 B31



● **B31 - AISI 316L** Stainless steel

● **D1 - PVC**

● **T1 - BRASS**

○ **B1 - AISI 303** Stainless steel (optional)

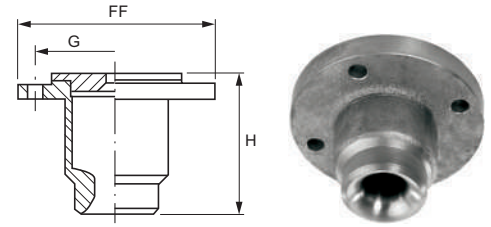
○ **D2 - PP** (optional)

○ **E1 - PTFE** (optional)

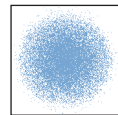
**SLOTTED VANE**

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

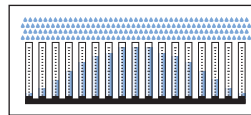
The carefully designed slotted vane offers uniform spray distribution and perfect performance even with very low inlet pressure values. Compared to other large nozzles, the upper flange reduces the length of nozzles and offers fast and safe ways to install.



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



Spray section



Convex distribution

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

**Typical applications**

**Cooling**

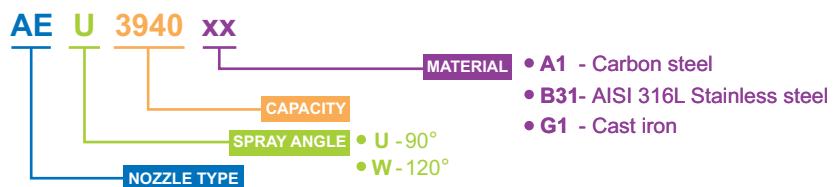
- Coke quench tower scrubber system
- Exhaust gas cooling
- High-temperature cooling

**Cleaning**

- Desulfuration
- Exhaust scrubbers

**HOW TO MAKE UP THE NOZZLE CODE**

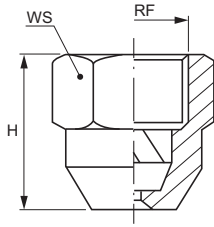
EX.: AEU 3940 A1



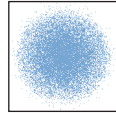


## IN-LINE FULL CONE

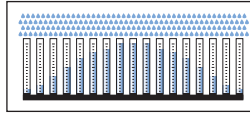
AH series nozzles are made of a body and a disc vane and provide a very uniform spray distribution onto the entire coverage area. AH nozzles have been widely used in continuous casting plants for many years. The special design of their vane produces a fine atomization of the liquid and highly improves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



• Thread specification: BSP, NPT



Spray section



Convex distribution



### Typical applications

#### Washing

- Steel cleaning
- Parts washing
- Pre-treatment in coating process

#### Cooling

- Continuous casting cooling
- Products cooling
- Tank cooling

#### Dust control

- Dust removal in mining and coal plants

#### Other applications

- Spray of chemicals
- Leak test



### DISC VANE

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

Code	RF inch	D mm	Capacity (l/min) at different pressure values (bar)					H mm	WS mm		
			1.0	2.0	3.0	4.0	5.0				
65°	1/4"	AHR 1309 xx	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			
	3/8"	AHR 1517 xx	2.6	2.98	4.22	5.17	5.97	6.67	26.5	22	
		AHR 1207 xx	1.0	1.20	1.69	2.07	2.39	2.67			
		AHR 1258 xx	1.0	1.49	2.11	2.58	2.98	3.33			
	1/2"	AHR 1310 xx	1.9	1.79	2.53	3.10	3.58	4.00	36.0	27	
		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			
	80°	1/4"	AHR 1415 xx	2.2	2.40	3.39	4.15	4.79	5.36	25.0	19
			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		
		3/8"	AHR 1621 xx	2.7	3.59	5.07	6.21	7.17	8.02	26.5	22
			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		
1/2"		AHR 1873 xx	3.3	5.04	7.13	8.73	10.1	11.3	36.0	27	
		AHR 2110 xx	4.2	6.35	8.98	11.0	12.7	14.2			
		AHR 2144 xx	4.2	8.31	11.8	14.4	16.6	18.6			
45°	1/4"	AHT 1309 xx	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			
	3/8"	AHT 1517 xx	2.6	2.98	4.22	5.17	5.97	6.67	26.5	22	
		AHT 1258 xx	2.0	1.49	2.11	2.58	2.98	3.33			
		AHT 1310 xx	2.0	1.79	2.53	3.10	3.58	4.00			
	1/2"	AHT 1340 xx	2.0	1.96	2.78	3.40	3.93	4.39	36.0	27	
		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			
1/2"	AHT 1518 xx	2.6	2.99	4.23	5.18	5.98	6.69	26.5	22		
	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				
1/2"	AHT 1828 xx	3.1	4.78	6.76	8.28	9.56	10.7	36.0	27		
	AHT 1873 xx	3.1	5.04	7.13	8.73	10.1	11.3				
	AHT 2110 xx	4.2	6.35	8.98	11.0	12.7	14.2				
1/2"	AHT 2144 xx	4.2	8.31	11.8	14.4	16.6	18.6	36.0	27		

## AH( FULL CONE NOZZLES / FINE MIST )

Spray angle 45°

### HOW TO MAKE UP THE NOZZLE CODE

EX.: AHR 1390 B1

AH R 1309 xx

NOZZLE TYPE

CAPACITY

SPRAY ANGLE

• R - 65°

• T - 80°

MATERIAL

• B1 - AISI 303 Stainless steel

• T1 - Brass

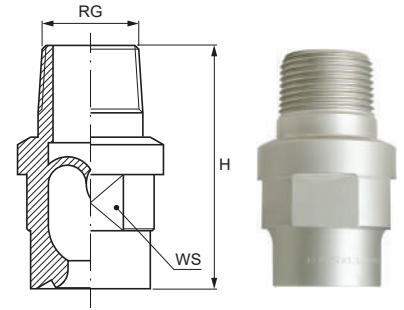
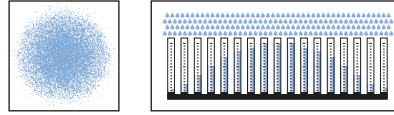
○ B31 - AISI 316L Stainless steel (optional)



**S-TYPE VANE**

AL nozzles offer distinctive advantages due to their special construction, with an integrated S-shaped vane cast in one piece with the nozzle body with an investment casting process. The special design S-shaped vane offers the largest free passage available in a full cone nozzle (actually identical to the nozzle orifice diameter) and can easily handle dirty or recirculated liquids as well as suspended particles to avoid clogging. The best reliability is then assured under the most difficult conditions, which makes these nozzles the right choice in those plants with nozzle clogging problems or where removing and cleaning a clogged nozzle is a difficult job.

- Thread specification: BSPT, NPT



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

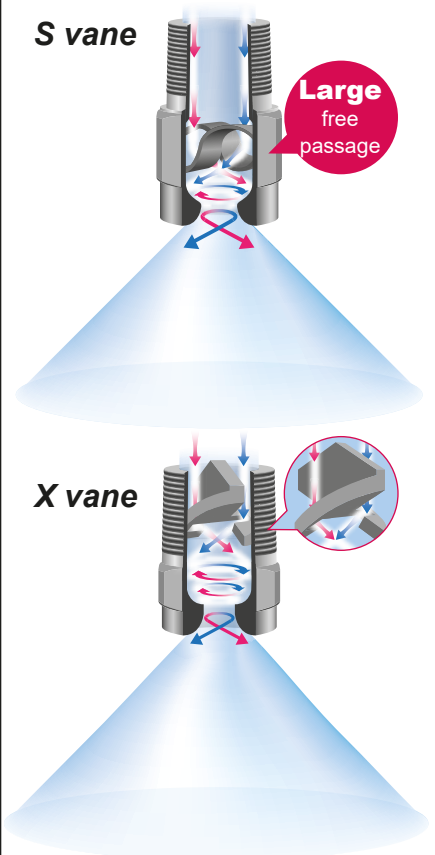
Capacity for nozzles made in AISI 316L

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



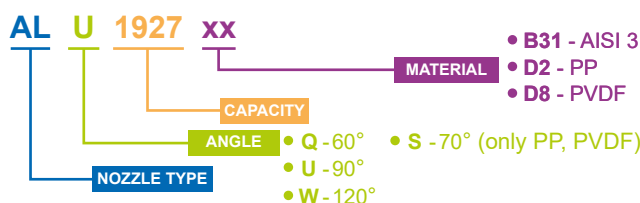
**S vane v.s. X vane**

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

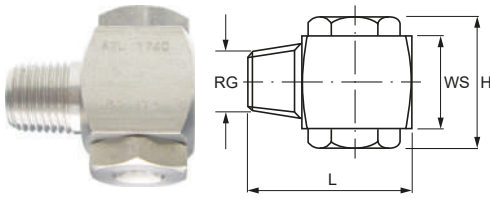


- B31 - AISI 316L Stainless steel
- D2 - PP
- D8 - PVDF

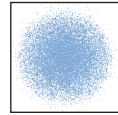
- Q - 60°
- U - 90°
- W - 120°
- S - 70° (only PP, PVDF)

### VANELESS – OFF LINE

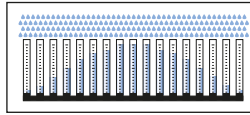
AT series nozzles are full cone nozzles producing a high and strong rotation of the liquid. There's no vane inside the whirl chamber which has free internal passages and for this reason these nozzles are less prone to clogging. Moreover, a specially designed tip placed at the bottom of these nozzles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



- Thread specification
  - BSPT
  - NPT (optional)



Spray section



Convex distribution



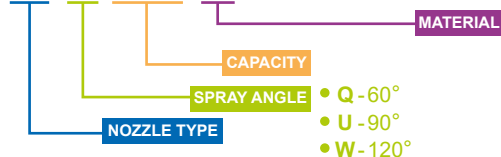
Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							H mm	L mm	WS mm	
				1.0	2.0	3.0	4.0	5.0	6.0	7.0				
60°	ATQ 1230 xx	1/8"	2.0	1.8	1.33	1.88	2.30	2.66	2.97	3.25	3.51	22	24	15
	ATQ 1390 xx	1/4"	2.4	2.2	2.25	3.18	3.90	4.50	5.03	5.52	5.96	25	34	20
	ATQ 1490 xx		2.9	2.8	2.83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

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

**HOW TO MAKE UP THE NOZZLE CODE**

EX.: ATQ 1230 B1

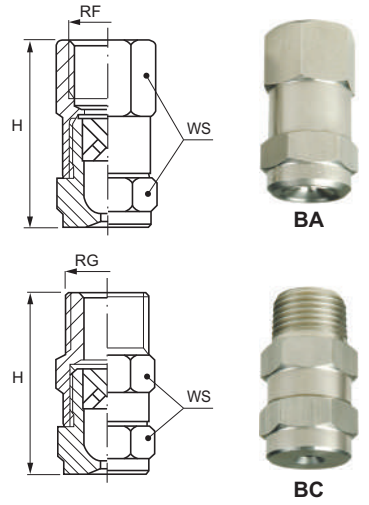
AT Q 1230 xx



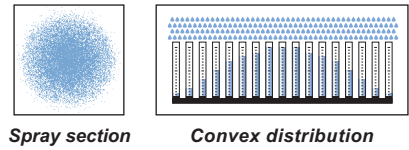
- MATERIAL**
  - B1 - AISI 303 Stainless steel
  - B31 - AISI 316L Stainless steel
  - T1 - Brass
  - Plastic materials on request
- SPRAY ANGLE**
  - Q - 60°
  - U - 90°
  - W - 120°
- CAPACITY**
- NOZZLE TYPE**

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

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



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



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

Standard spray

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

Wide spray

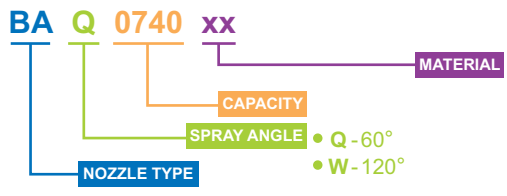
- Typical applications**
- **Washing**  
Exhaust scrubbers  
Parts cleaning  
Pre-treatment for coating process
  - **Cooling**  
Exhaust cooling  
Tank cooling
  - **Dust control**  
Remove dust flying in a mining and coal plants.
  - **Other applications**  
Spray of chemicals  
Fire engineering

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

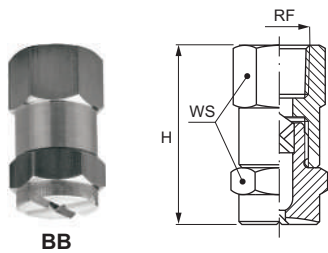
Nozzle type	RG inch	H mm	WS mm	W kg
BC Male	1/8"	32	14	0.02
	1/4"	39	17	0.04
	3/8"	47	19	0.07
	1/2"	57	25	0.20

Dimensions & weights

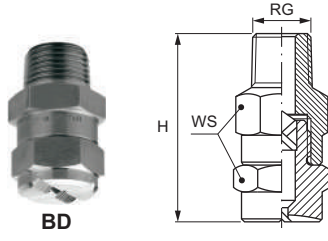
**HOW TO MAKE UP THE NOZZLE CODE**  
EX.: BAQ 0740 B1



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



BB

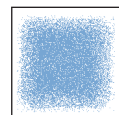


BD

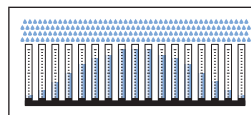
### X VANE / SQUARE SPRAY PATTERN / THREE-PIECE DESIGN / EASY CLEAN

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 mm	D1 mm	Capacity (l/min) at different pressure values (bar)							Spray angle (°) at pressure (bar)		
						0.7	1.0	2.0	3.0	5.0	7.0	10	0.5	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

BB Q 1270 xx

MATERIAL

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

CAPACITY

SPRAY ANGLE • Q - 60°

NOZZLE TYPE



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.

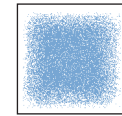


BH

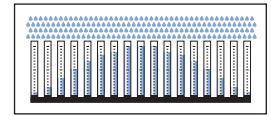


BF

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



Spray section

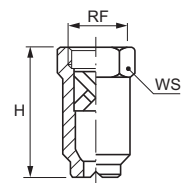
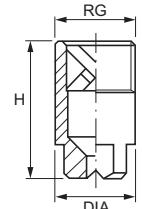
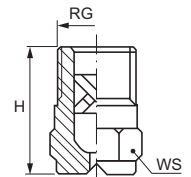


Convex distribution

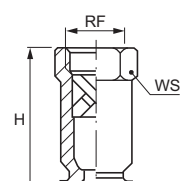
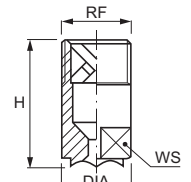
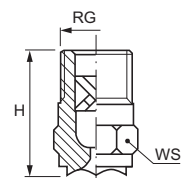
FULL CONE NOZZLES

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

Standard spray angle



Wide spray angle



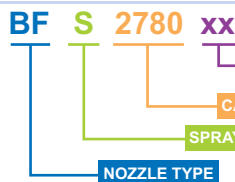
BFW Female	BHW Male	Code	RF RG	D mm	D1 mm	Capacity (l/min) at different pressure values (bar)							Spray angle(°) at pressure(bar)		
						0.7	1.0	2.0	3.0	5.0	7.0	10	0.3	0.7	6.0
	•	2100	1/4"	3.2	1.6	4.83	5.77	8.16	10.0	12.9	15.3	18.3	99°	101°	93°
	•	2122	3/8"	3.9	1.6	5.89	7.04	9.96	12.2	15.8	18.6	22.3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

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

Dimensions and weights

HOW TO MAKE UP THE NOZZLE CODE

EX.: BFS 2780 B1



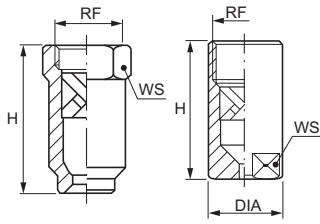
- **MATERIAL**
- **CAPACITY**
- **SPRAY ANGLE**
- **NOZZLE TYPE**

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

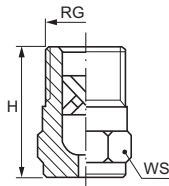




BE

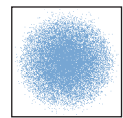


BG

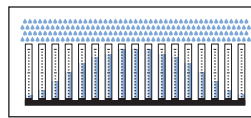


## X-VANE / ROUND SPRAY / TWO-PIECE DESIGN

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



Spray section



Convex distribution



### STANDARD SPRAY ANGLES

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

**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

### DIMENSIONS

BG	Size	inch	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
			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	H	mm				55.5	68.0	90.0	105	140	180	192
	DIA	mm				32.0	38.0					
	WS	mm				27.0	32.0	48.0	52.0	67.0	85.0	100

**WIDE SPRAY ANGLES**

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

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

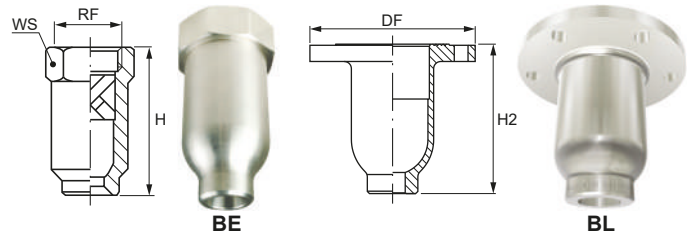
**X-VANE / LARGE CAPACITIES**

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

**Thread specification :** BSP, NPT

**Flange specification :** DIN Standard, JIS Standard (optional)

**Typical applications :** desulfuration, coke quenching

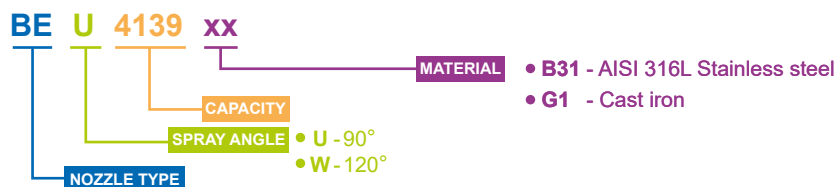


**LARGE CAPACITY**

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

Nozzle type	Code	RF RG	D	D1	Capacity (l/min) at different pressure values (bar)							Dimension mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS	
120°	•	4158 xx	4"	47	22	758	906	1282	1570	2027	2398	2538	251	130

**HOW TO MAKE UP THE NOZZLE CODE**  
EX.: BEU 4139 B31





## X-VANE / NARROW SPRAY ANGLE

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

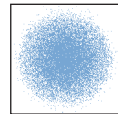
### Thread specification

Male ( BSPT, NPT )

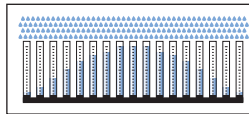
Female ( BSP, NPT )

### Typical applications

bottles washing, parts cleaning, deep cleaning



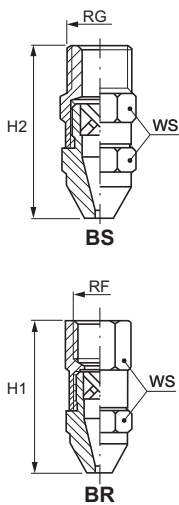
Spray section



Convex distribution

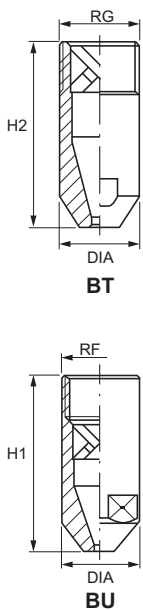


## SPRAY ANGLE 15°



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

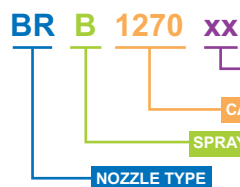
## SPRAY ANGLE 30°



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

### HOW TO MAKE UP THE NOZZLE CODE

EX.: BRB 1270 B1



MATERIAL

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

SPRAY ANGLE

- B - 15°
- F - 30°

CAPACITY

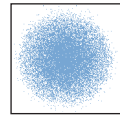
NOZZLE TYPE

**OFF LINE SPRAY**

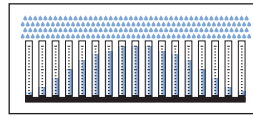
BV/BW series are two-piece nozzles with a 90° elbow coupling that produce a mist spray. Their special design with X-vane breaks the liquid into fine droplets and allows an easy cleaning. They may be supplied with male or female threaded connections. See below table.



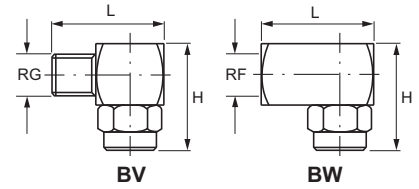
- **Thread specification**  
Male ( BSPT, NPT )  
Female ( BSP, NPT )



Spray section



Convex distribution



**SPRAY ANGLE 60°**

60°	BVQ Male	BWQ Female	Code	RF RG inch	Capacity at different pressure values (l/min) (bar)						Dimension mm	
					0.5	1.0	2.0	3.0	5.0	10	H	L
					•	•	1150 xx	1/8"	0.61	0.87	1.22	1.50
•	•	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°**

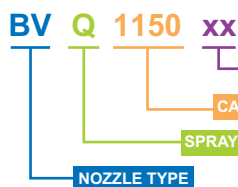
120°	BVW Male	BWW Female	Code	RF RG inch	Capacity at different pressure values (l/min) (bar)						Dimension mm	
					0.5	1.0	2.0	3.0	5.0	10	H	L
					•	•	1310 xx	1/8"	1.27	1.79	2.53	3.10
•	•	1570 xx		2.33	3.29	4.65	5.70	7.36	10.4			
•	•	2100 xx	1/4"	4.08	5.77	8.16	10.0	12.9	18.3	32	32.0	
•	•	2144 xx	3/8"	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**

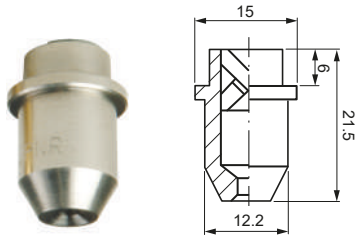
EX.: BVQ 1150 B1



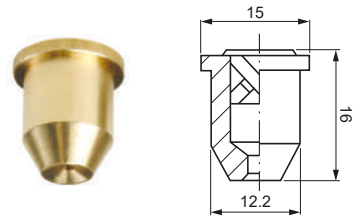
- **B1** - AISI 303 Stainless steel
- **T1** - Brass
- **B31** - AISI 316L Stainless steel (optional)

- **Q** - 60°
- **W** - 120°





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.

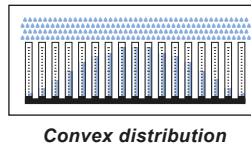
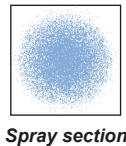
### Typical applications

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

**Cooling:** continuous casting cooling, product cooling, tank cooling

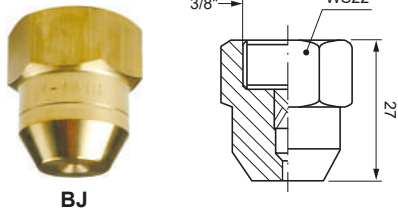
**Dust control:** dust removal in mining and coal plants

**Other applications:** spray of chemicals, leak test



### SAFETY FLANGE

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



BJ

### ASSEMBLY ACCESSORIES

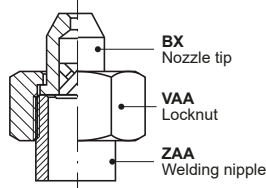
In most steelworks applications, BX series nozzles are provided with a welding nipple and locknut for the assembly of related accessories. Please see on page 44 for detailed information.



ZAA C018 xxG



VAA 0380 xx



BX Nozzle tip

VAA Locknut

ZAA Welding nipple

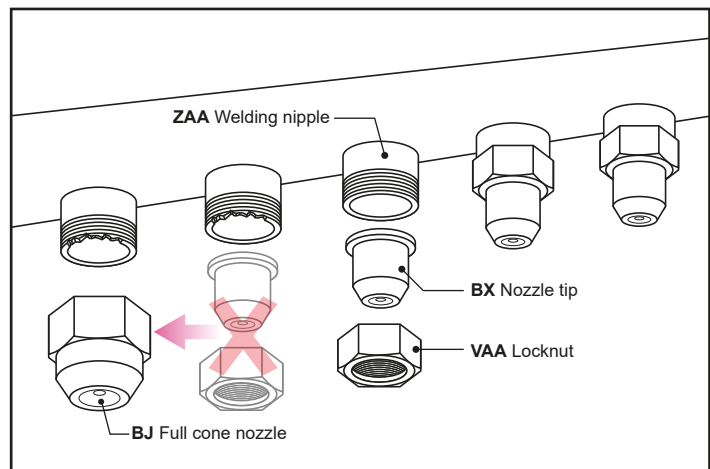
BJ Full cone nozzle

### SISTER PRODUCTS / THREAD SIZE

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

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

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



### HOW TO MAKE UP THE NOZZLE CODE

EX.: BXQ 1149 B1

**BX** **Q** **1149** **xx**

NOZZLE TYPE

CAPACITY

SPRAY ANGLE • Q - 60°

MATERIAL

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

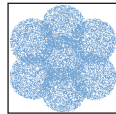


CLUSTER NOZZLES / TYPE 7 AND 13

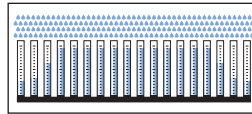
CH series includes large and small capacities hollow cone cluster nozzles. They make a cluster spray pattern and are available in 7 and 13 nozzles versions. Several nozzles are assembled on one nipple with small volume and wide spray coverage. The droplets size is 1/3-1/2 compared to those produced by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



• Thread specification: BSP, NPT

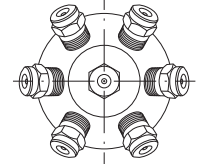
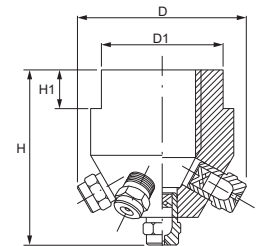


Spray section

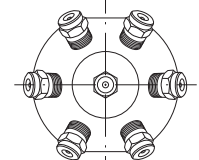
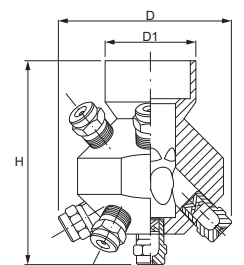


Even distribution

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



Cluster nozzle 7 nozzles type

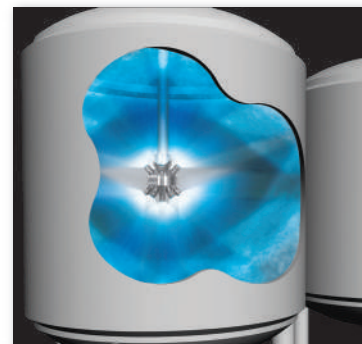


Cluster nozzle 13 nozzles type

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

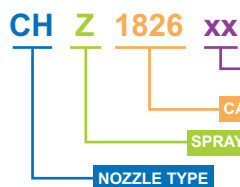
Typical applications

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

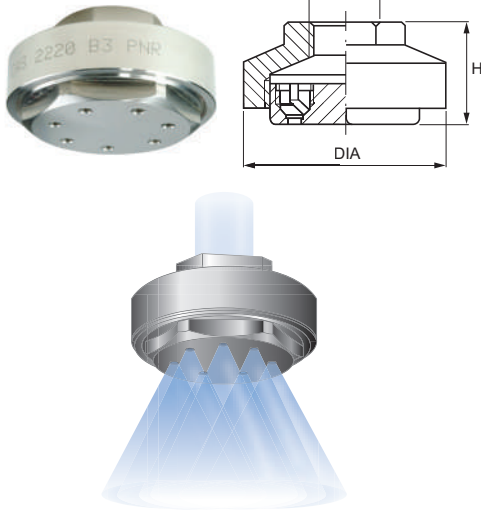


HOW TO MAKE UP THE NOZZLE CODE

EX.: CHZ 1826 B1



- MATERIAL**
  - B1 - AISI 303 Stainless steel
  - B31 - AISI 316L Stainless steel
  - T1 - Brass
- SPRAY ANGLE**
  - Z - 200°
  - E - 360°



## 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

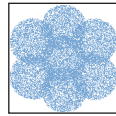
#### Fire control

watermist fire suppression systems

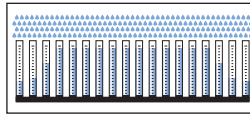
#### Other applications

exhaust gas treatment, dust control, wetting

### Thread specification: BSP, NPT



Spray section



Even distribution

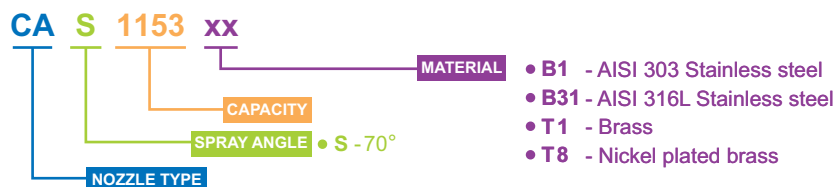


70°	Code	RF inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Dimensions mm		
					0.7	1.0	1.5	2.0	3.0	5.0	10	NR	DIA	H
70°	CAS 1153 xx	1/2"	0.9	0.5	0.74	0.88	1.08	1.25	1.53	1.98	2.79	7	50	33.5
	CAS 1274 xx		1.8	0.5	1.32	1.58	1.94	2.24	2.74	3.54	5.00			
	CAS 1343 xx	3/4"	1.1	1.0	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			
	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

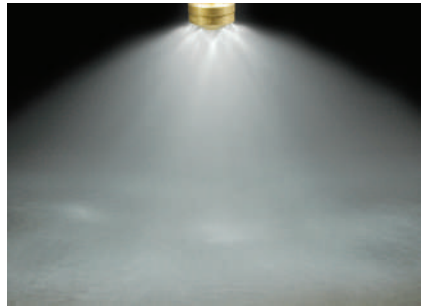
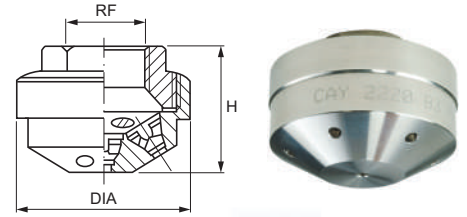
### HOW TO MAKE UP THE NOZZLE CODE

EX.: CAS 1153 B31

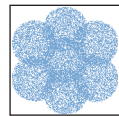


**CLUSTER NOZZLE / WIDE SPRAY ANGLE**

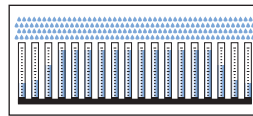
CAY cluster full cone nozzles produce very fine droplets using hydraulic pressure only. They provide large spray capacities, mist effect and a 130° spray angle with wider coverage. CAY nozzles have 7 orifices that, at the same operating pressure and using the same quantity of liquid, produce a finer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



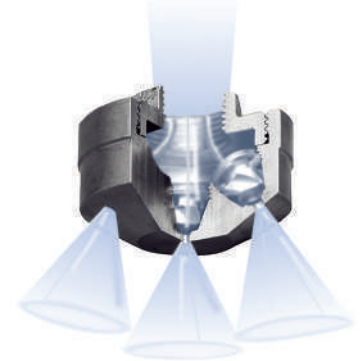
■ Thread specification: BSP, NPT



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°	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	1.32	1.58	1.94	2.24	2.74	3.54				5.00					
	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	2.66	3.18	3.90	4.50	5.51	7.11				10.1					
				CAY 1870 xx	4.20	5.02	6.15	7.10	8.70	11.2				15.9					
				CAY 2116 xx	5.60	6.70	8.20	9.47	11.6	15.0				21.2					
				CAY 2145 xx	7.00	8.37	10.3	11.8	14.5	18.7				26.5					
				CAY 2184 xx	8.89	10.6	13.0	15.0	18.4	23.8				33.6					
				CAY 2220 xx	10.6	12.7	15.6	18.0	22.0	28.4				40.2					
				CAY 2342 xx	16.5	19.8	24.2	27.9	34.2	44.2				62.4					
				CAY 2434 xx	21.0	25.1	30.7	35.4	43.4	56.0				79.2					
				CAY 2551 xx	26.6	31.8	39.0	45.0	55.1	71.1				101					
	CAY 2728 xx	35.2	42.0	51.5	59.4	72.8	94.0	133											
	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	23.6	28.2	34.6	39.9	48.9	63.1				89.3					
				CAY 2685 xx	33.1	39.6	48.4	55.9	68.5	88.4				125					
				CAY 2979 xx	47.3	56.5	69.2	79.9	97.9	126				179					
				CAY 3137 xx	66.2	79.1	96.9	112	137	177				250					
				2"	9.0	3.2	62.8	75.1	91.9	106				130	168	237	7	155	104.5
							CAY 3184 xx	88.9	106	130				150	184	238			
CAY 3245 xx							118	142	173	200				245	316	447			
CAY 3260 xx	126	150	184				212	260	336	475									
CAY 3367 xx	177	212	260				300	367	474	670									
CAY 3490 xx	237	283	346	400	490	633	895												

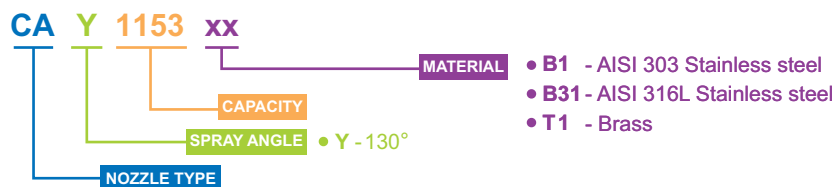
NR - Number of orifices

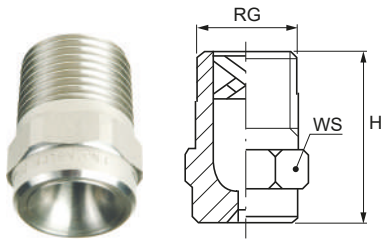
**Typical applications**

- Cooling:** cooling of high-temperature gas
- Washing:** tank cleaning, parts cleaning
- Fire control:** water mist fire suppression systems
- Other applications:** exhaust gas treatment, dust control, wetting

**HOW TO MAKE UP THE NOZZLE CODE**

EX.: CAY 1153 B1

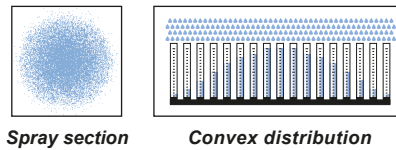




### X VANE / TWO-PIECE DESIGN

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

• Thread specification: BSPT, NPT



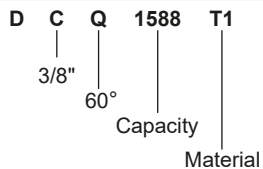
### SPRAY ANGLE 45°

Nozzle type				Code	D mm	D1 mm	Capacity (l/min) at different pressure values (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

### 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



### 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

### 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

X VANE / TWO-PIECE DESIGN

SPRAY ANGLE 90°

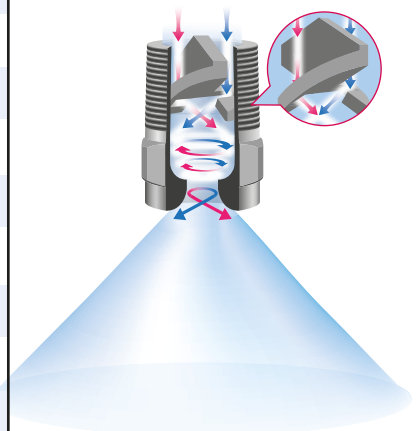
Nozzle type				Code	D mm	D1 mm	Capacity at different pressures values (l/min) (bar)						
DAU	DBU	DCU	DDU				0.7	1.0	2.0	3.0	5.0	7.0	10
•				0740 xx	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•				1118 xx	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			1147 xx	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•	•			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

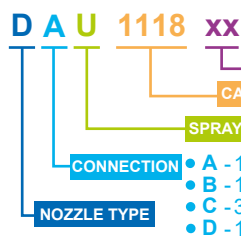
**X vane**

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



MATERIAL

- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass
- On request special materials are quoted

CAPACITY

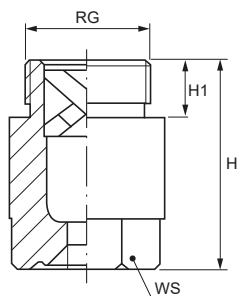
- M - 45°
- Q - 60°
- U - 90°
- W - 120°

CONNECTION

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

NOZZLE TYPE

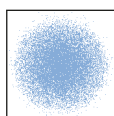




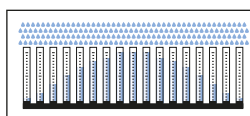
### X VANE / TWO-PIECE DESIGN / LARGE CAPACITY

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

- **Thread specification**  
BSPT, NPT (on request)



Spray section

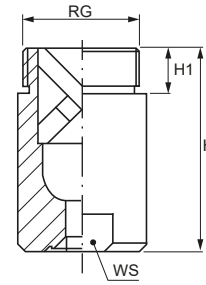


Convex distribution



60°	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)						Dimension mm			
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
60°	DEQ 2235 xx	3/4"	4.8	3.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9	43	16	27
	DEQ 2295 xx		5.5	4.5	14.2	17.0	24.1	29.5	38.1	45.1	53.9			
	DEQ 2370 xx		6.0	4.5	17.9	21.4	30.2	37.0	47.8	56.5	67.6			
	DEQ 2470 xx		7.0	4.5	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
	DFQ 2470 xx	1"	7.0	5.6	22.7	27.1	38.4	47.0	60.7	71.8	85.8	58	18	36
	DFQ 2590 xx		7.8	5.6	28.5	34.1	48.2	59.0	76.2	90.1	108			
	DFQ 2740 xx		9.5	5.6	35.7	42.7	60.4	74.0	95.5	113	135			
	DGQ 2740 xx	1 1/4"	9.5	5.6	35.7	42.7	60.4	74.0	95.5	113	135	74	19	41
	DGQ 3118 xx		12.5	6.0	57.0	68.1	96.3	118	152	180	215			
	DGQ 3147 xx		16.7	6.0	71.0	84.9	120	147	190	225	268			
	DHQ 3147 xx	1 1/2"	13.0	9.0	71.0	84.9	120	147	190	225	268	85	19	50
	DKQ 3188 xx	2"	15.0	9.0	90.8	109	154	188	243	287	343	106	24	60
	DKQ 3235 xx		16.0	11.0	114	136	192	235	303	359	429			
	DKQ 3294 xx		17.0	11.1	142	170	240	294	380	449	537			
	DLQ 3370 xx	2 1/2"	17.5	11.1	179	214	302	370	478	565	676	128	27	75
	DLQ 3470 xx		23.0	11.1	227	271	384	470	607	718	858			
DMQ 3588 xx	3"	28.0	14.3	284	339	480	588	759	898	1074	153	30	85	
DNQ 3740 xx	3 1/2"	29.0	17.5	357	427	604	740	955	1130	1351	190	32	105	
DNQ 3940 xx		36.0	17.5	454	543	768	940	1214	1436	1716				
DPQ 4117 xx	4"	39.0	19.0	568	678	959	1175	1517	1795	2145	205	36	110	

90°	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	1 1/4"	13.0	6.0	57.0	68.1	96.3	118	152	180	215	74	19	41
	DGU 3147 xx		16.0	6.0	71.0	84.9	120	147	190	225	268			
	DHU 3147 xx	1 1/2"	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	2 1/2"	27.0	11.1	227	271	384	470	607	718	858	128	27	75
	DLU 3588 xx		30.0	14.3	284	339	480	588	759	898	1074			
	DMU 3740 xx	3"	30.0	17.5	357	427	604	740	955	1130	1351	153	30	85
	DMU 3870 xx		32.5	17.5	420	502	710	870	1123	1329	1588			
	DNU 3940 xx	3 1/2"	35.5	17.5	454	543	768	940	1214	1436	1716	190	32	105
	DNU 4117 xx		39.0	19.0	568	678	959	1175	1517	1795	2145			
DPU 4147 xx	4"	42.8	25.4	710	849	1200	1470	1898	2245	2684	205	36	110	



120°	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			
	DF W 2590 xx	1"	11.5	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108	58	18	36
	DF W 2740 xx		12.0	4.5	35.7	42.7	60.4	74.0	95.5	113	135			
	DF W 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				
DP W 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

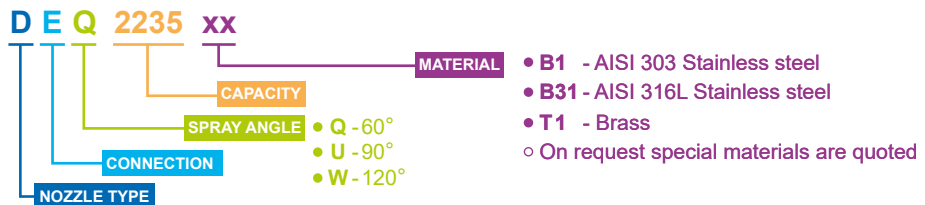
**Cooling:** continuous casting cooling, product cooling, tank cooling

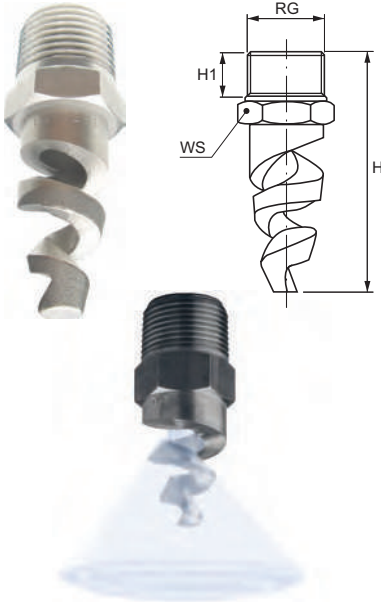
**Dust control:** dust suppression in mining and coal plants.

**Other applications:** spray of chemicals, leak test.

**HOW TO MAKE UP THE NOZZLE CODE**

EX.: DEQ 2235 B1



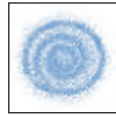


## STANDARD SPIRAL NOZZLES

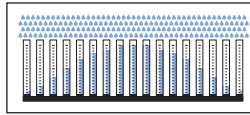
E series spiral nozzles work on the impact principle, by the deflection of a water stream that impacts onto a spiral profiled surface which provides the desired spray angle. These are one-piece nozzles with no internal vane and a wider free passage. The liquid inlet has nearly the same size as the outlet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

Spray Angle	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	1/2"	7.9	3.2	31.2	37.3	52.7	64.6	83.4	99.0	118	64	18	22
	EDQ 2940 xx		9.5	4.7	45.6	54.5	77.1	94.4	122	144	172			
	EDQ 3128 xx	3/4"	11.1	4.7	61.8	73.9	105	128	165	196	234	70	19	27
	EEQ 3165 xx		12.7	4.7	79.7	95.3	135	165	213	252	301			
	EFQ 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34
	EFQ 3372 xx		19.0	6.3	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	3/8"	4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5	48	14	19
	ECU 2230 xx		4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9			
	ECU 2317 xx	1/2"	5.6	3.9	15.3	18.3	25.9	31.7	40.9	48.4	57.9	64	18	22
	ECU 2410 xx		6.4	4.8	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECU 2640 xx	3/4"	7.9	5.5	31.2	37.3	52.7	64.6	83.4	98.7	118	70	19	27
	EDU 2940 xx		9.5	3.3	45.6	54.5	77.1	94.4	122	144	172			
	EDU 3128 xx	1"	11.1	3.7	61.8	73.9	105	128	165	196	234	92	26	34
	EEU 3165 xx		12.7	4.7	79.7	95.3	135	165	213	252	301			
	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	14.3	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"

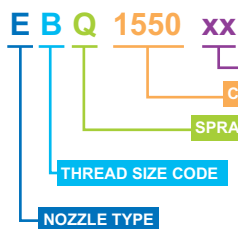


### SPIRAL NOZZLES

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



- Q - 60°
- U - 90°
- W - 120°
- X - 150°
- Z - 180°

● B31 - AISI 316L Stainless steel

● T1 - Brass

○ D1 - PVC

○ D2 - PP

○ D8 - PVDF

○ E1 - PTFE

○ L61 - Hastelloy C 22

○ On request special materials are quoted

STANDARD SPIRAL NOZZLES

Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)								Dimension mm		
				0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS	
120°	EBW 1550 xx	1/4"	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBW 2100 xx		3.2	3.2	4.83	5.77	8.16	10.0	12.9	15.3	18.3			
	EBW 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECW 2156 xx	3/8"	4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5	48	14	19
	ECW 2230 xx		4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9			
	ECW 2317 xx		5.6	4.0	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECW 2410 xx		6.4	4.0	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECW 2640 xx		7.9	4.0	31.2	37.3	52.7	64.6	83.4	98.7	118			
	EDW 2940 xx	1/2"	9.5	4.8	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDW 3104 xx		9.7	4.8	50.2	60.0	84.9	104	134	159	190			
	EDW 3128 xx		11.1	4.8	61.8	73.9	105	128	165	196	234			
	EEW 3165 xx	3/4"	12.7	4.8	79.7	95.3	135	165	213	252	301	70	19	27
	EFW 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34
	EFW 3372 xx		19.0		180	215	304	372	480	568	679			
	EHW 3507 xx	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			
	EEW 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				



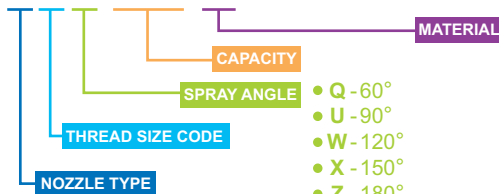
THREAD SIZE CODE (RG)

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

**EBW 1550 xx**



• B31 - AISI 316L Stainless steel

• T1 - Brass

○ D1 - PVC

○ D2 - PP

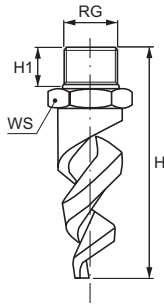
○ D8 - PVDF

○ E1 - PTFE

○ L61 - Hastelloy C 22

○ Special materials are quoted on request



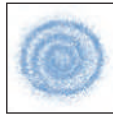


## SPIRAL NOZZLES / WIDE FREE PASSAGE

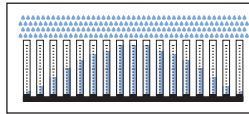
The E-X series nozzles, with their typical elongated spiral design, work on the impact principle, by deflection of a water stream onto their spiral profile that provides the desired spray angle. Their specific shape with no internal parts leaves a larger internal free passage suitable to work with higher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

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

■ Thread specification: BSPT, NPT



Spray section



Convex distribution



### Typical applications

- Gas cooling
- Exhaust scrubbers
- Desulfurization
- Cooling

### Other applications

- Spray of chemicals
- Fire prevention
- Fire suppression

Spray angle	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	185	27	50			
	EHW 3747 xx Xy		28.6	28.6	361	431	610	747	964	1141	1364						
	EKW 4109 xx Xy		2"	35.0	35.0	527	629	890	1090	1407	1665				1990	279	32
	EKW 4139 xx Xy	38.1		38.1	672	803	1136	1391	1796	2125	2540						
	EMW 4204 xx Xy	3"	44.5	44.5	985	1178	1666	2040	2634	3116	3725	267	32	90			
	EMW 4265 xx Xy		51.0	51.0	1280	1530	2164	2650	3421	4048	4838						
EPW 4412 xx Xy	4"	63.5	63.5	1990	2379	3364	4120	5319	6293	7522	293	36	115				

### ES / SILICON CARBIDE NOZZLES

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



ES / SILICON CARBIDE NOZZLES

### HOW TO MAKE UP THE NOZZLE CODE

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

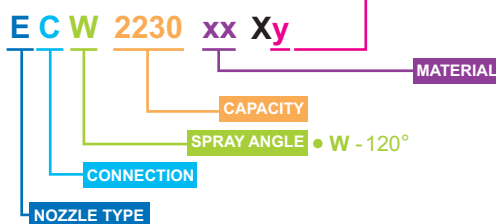
#### EHW 3747 xx Xy

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

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

#### HOW TO MAKE UP THE NOZZLE CODE

EX.: ECW 2230 B31XB



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



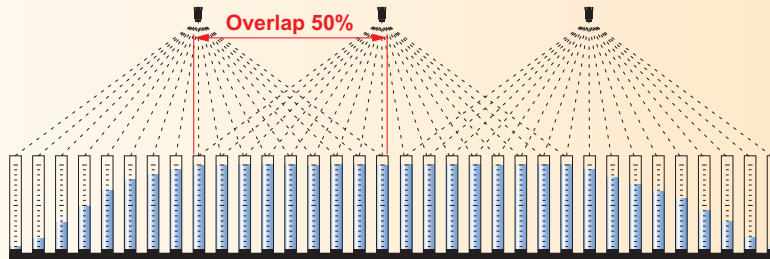
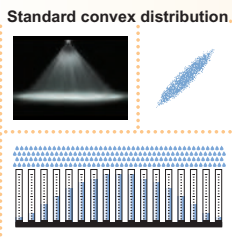


## Correct overlapping

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

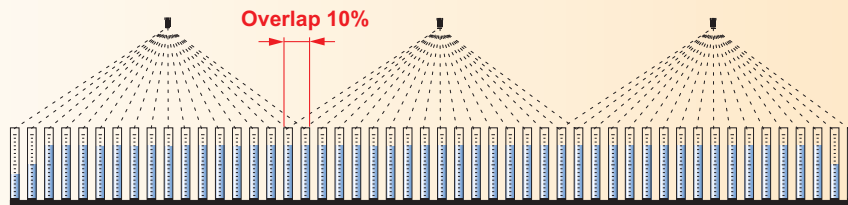
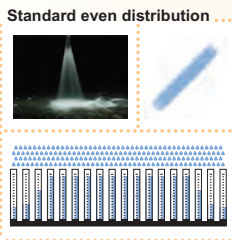
### Standard convex distribution

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



### Standard even distribution

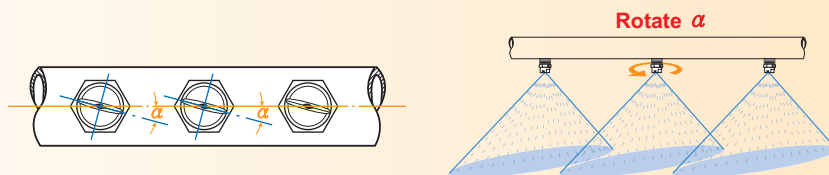
An equal distribution provides a uniform spray and 10% of the spray range overlaps.



## Offset

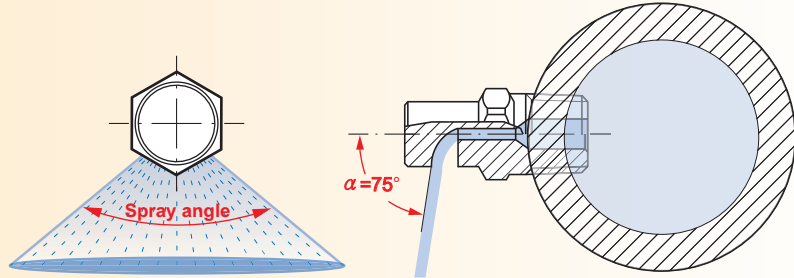
Spray angle	Offset ( $\alpha$ )
15°-60°	5°-10°
60°-120°	10°-15°

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



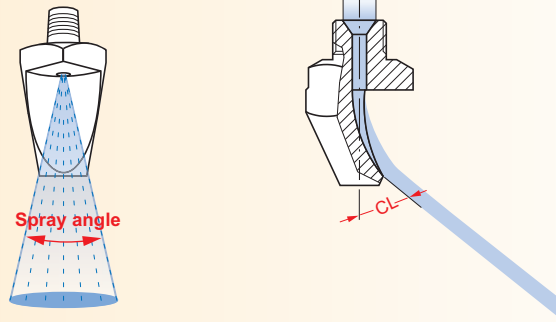
## Flat fan nozzles - low pressure, wide angle

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

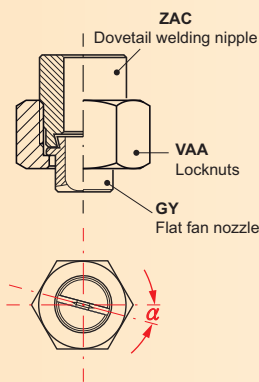


## Flat fan nozzles - high impact

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

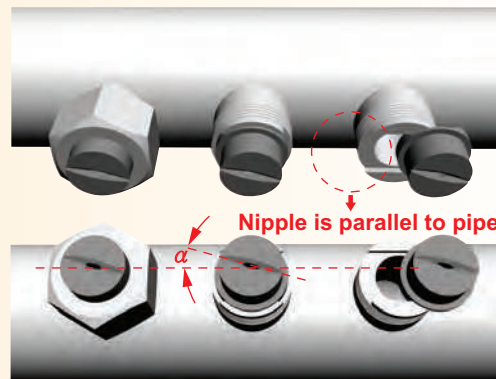


## Dovetail flat fan nozzle



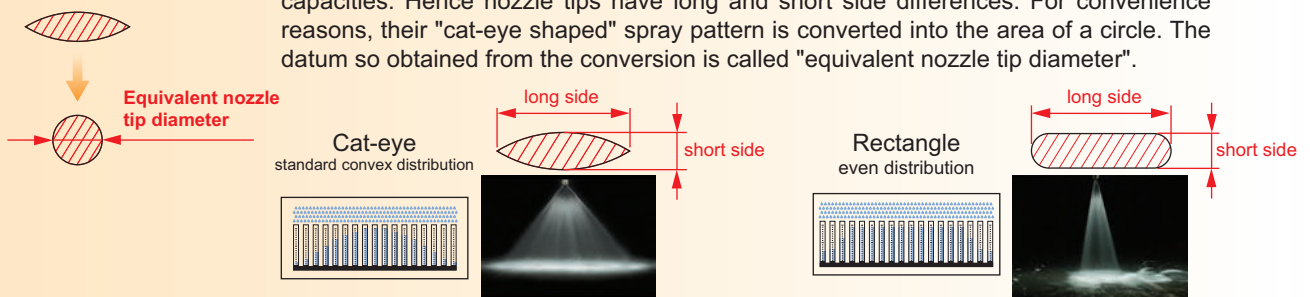
Flat fan nozzle tips provide a high impact spray. Adjacent nozzles must rotate with a specific offset angle to avoid interference and produce a uniform spray coverage when their jets overlap. For the GY series nozzle tips an offset angle  $\sim \alpha$  must be set between the spray plane and their dovetail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

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



## Equivalent nozzle tip diameter

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

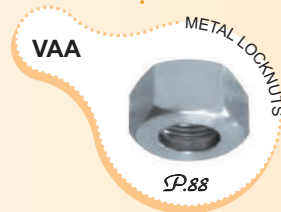
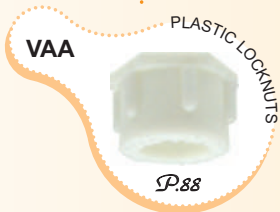
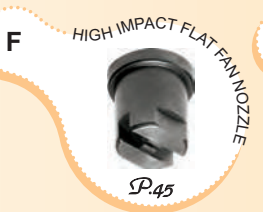
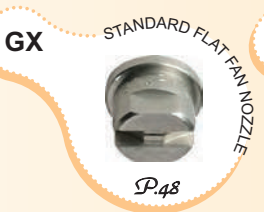
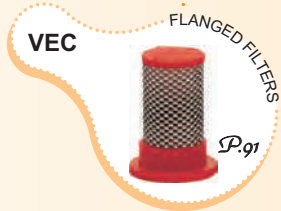
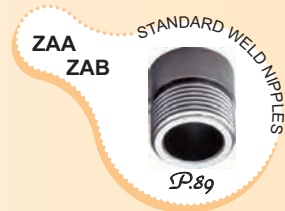
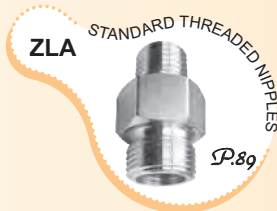
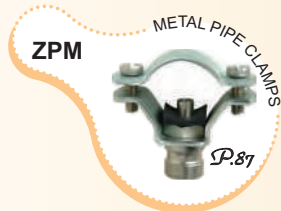
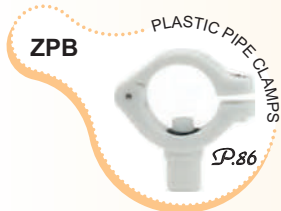
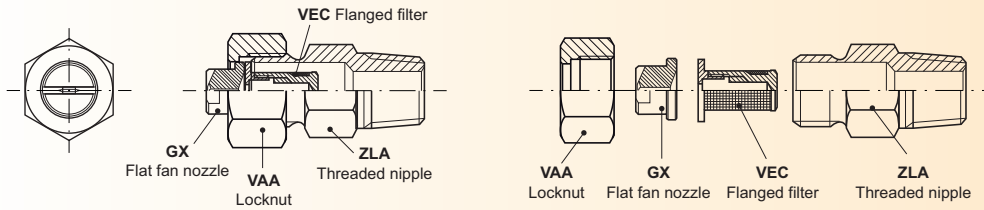


## Flanged nozzle

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

The scope of their design is:

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

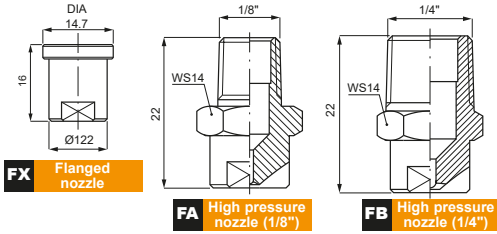


# F ( FLAT FAN NOZZLES / HIGH PRESSURE WASHING )

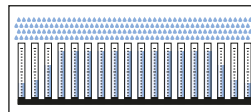
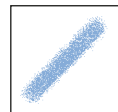


## HIGH PRESSURE WASHING

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

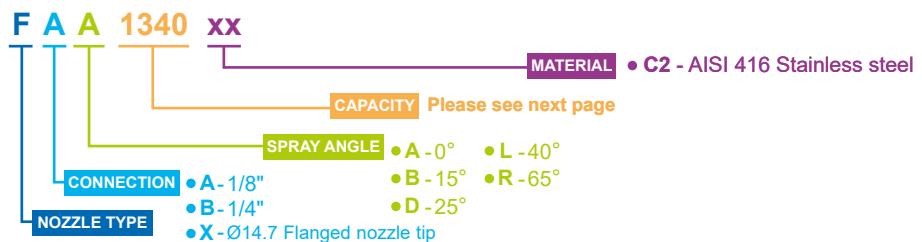


Nozzle type	Thread size
FA	1/8"
FB	1/4"
FX	Ø14.7

0°			15°			25°			40°			65°			US Gals	PNR Code	Capacity at different pressure values (l/min) (bar)						
FAA	FBA	FXA	FAB	FBB	FXB	FAD	FBD	FXD	FAL	FBL	FXL	FAR	FBR	FXR			20	30	50	70	100	150	200
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	015	1340	1.52	1.86	2.40	2.84	3.40	4.16	4.81
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	02	1460	2.06	2.52	3.25	3.85	4.60	5.63	6.51
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	025	1560	2.50	3.07	3.96	4.69	5.60	6.86	7.92
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	03	1686	3.07	3.76	4.85	5.74	6.86	8.40	9.70
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	035	1812	3.63	4.45	5.74	6.79	8.12	9.94	11.5
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	04	1930	4.16	5.09	6.58	7.78	9.30	11.4	13.2
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	045	2103	4.61	5.64	7.28	8.62	10.3	12.6	14.6
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	05	2116	5.19	6.35	8.20	9.71	11.6	14.2	16.4
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	055	2126	5.63	6.90	8.91	10.5	12.6	15.4	17.8
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	06	2138	6.17	7.56	9.76	11.5	13.8	16.9	19.5
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	065	2149	6.66	8.16	10.5	12.5	14.9	18.2	21.1
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	07	2160	7.16	8.76	11.3	13.4	16.0	19.6	22.6
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	075	2170	7.60	9.31	12.0	14.2	17.0	20.8	24.0
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	08	2181	8.09	9.91	12.8	15.1	18.1	22.2	25.6
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	085	2192	8.59	10.5	13.6	16.1	19.2	23.5	27.2
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	09	2204	9.12	11.2	14.4	17.1	20.4	25.0	28.8
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	095	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	2970	43.4	53.1	68.6	81.2	97.0	119	137
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	50	3113	50.5	61.9	79.9	94.5	113	138	160
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	60	3135	60.4	73.9	95.5	113	135	165	191

HOW TO MAKE UP THE NOZZLE CODE

EX.: FAA 1340 C2





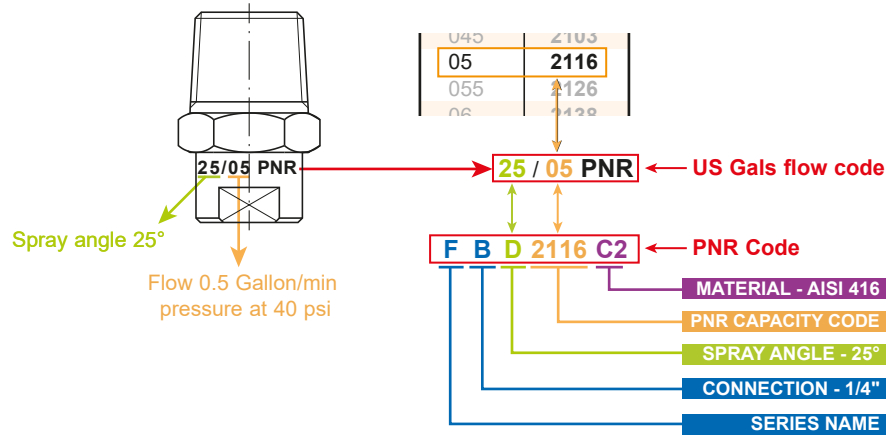
**OUTER DIMENSION OF F TYPE NOZZLES AND FX NOZZLE TIPS (CODE)**

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

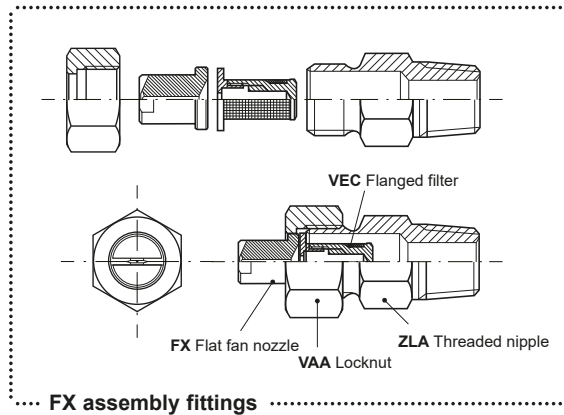
For example:

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

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



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



**HIGH PRESSURE WASHING ACCESSORIES**

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



**UMW 0010 D4**  
High pressure gun  
( P.95 )



**UMW 0020 D4**  
High pressure gun  
( P.95 )



**UMW 0030 B3**  
High pressure lance  
( P.96 )



**UMW 0045 B3**  
High pressure lance  
( P.96 )



**UMU J/I**  
Auto-rewind reels  
( P.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.

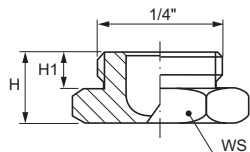
These items can be supplied separately on request.



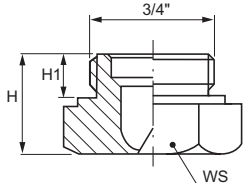




1/4" Standard capacity



3/4" Large capacity

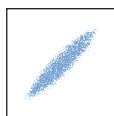


## SHORT BODY

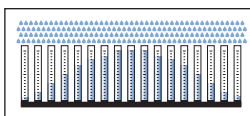
The special short body design of the GA nozzles makes it possible to use nozzle spray pipes in such machines or systems where the available space is very limited. (for ex., tight turns in traps and elbows).

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



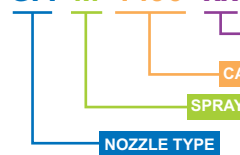
GA series nozzle plastic design

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

### HOW TO MAKE UP THE NOZZLE CODE

EX.: GAM 1490 B1

GA M 1490 XX

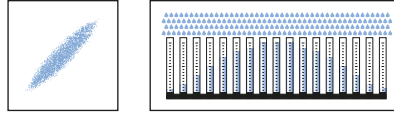
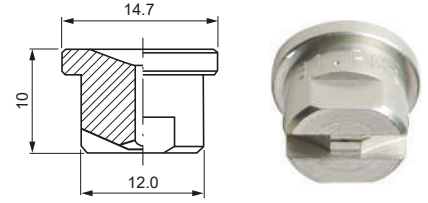


- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass
- D1 - PVC (optional)
- D2 - PP (optional)
- E1 - PTFE (optional)

**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

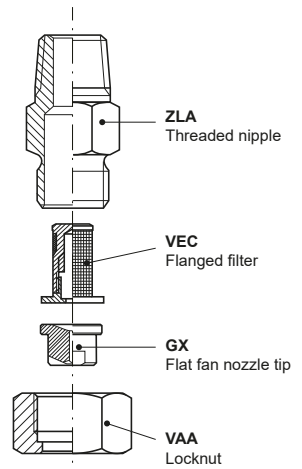
**Cooling:** continuous casting, product cooling

**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		



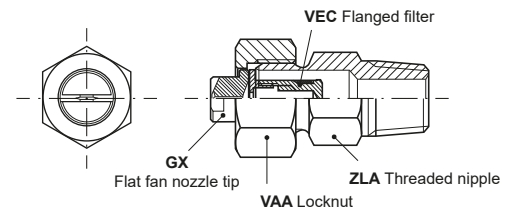
Assembly fittings

**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.

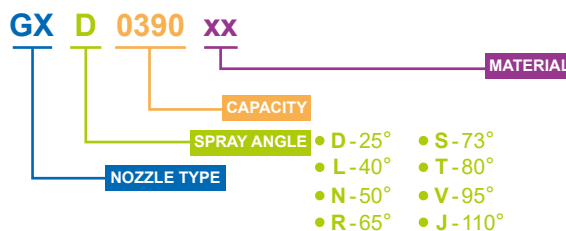
Material	0060	0100	0130	0150	0200	0260	0390	0590	0780
<b>B31</b> - AISI 316L SS					•	•	•	•	• <sup>(1)</sup>
<b>B1</b> - AISI 303 SS	•	•	•	•	•	•	•	•	• <sup>(2)</sup>
<b>T1</b> - Brass	•	•	•	•	•	•	•	•	• <sup>(2)</sup>

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



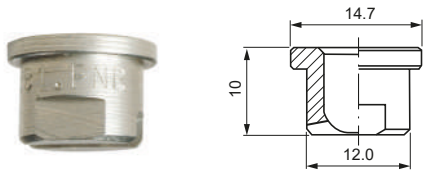
**HOW TO MAKE UP THE NOZZLE CODE**

EX.: GXD 0390 B1

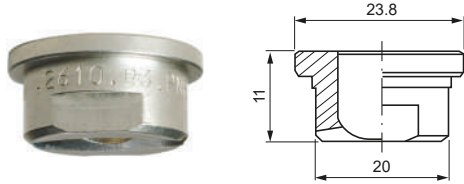


- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass

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



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

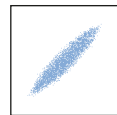
**Washing:** filter cloth cleaning, parts cleaning, vehicles cleaning

**Cooling:** steel cooling, product cooling

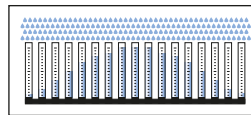
**Lubrication:** spray of lubricating oil and release agents

**Other applications:** spray of antifoulant chemicals, etc.

### Connection: Flange



Spray section



Convex distribution



NEW

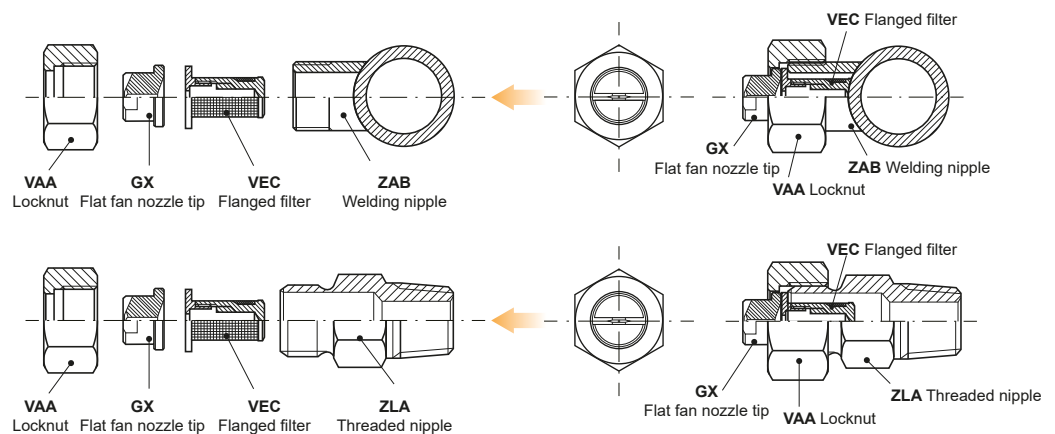
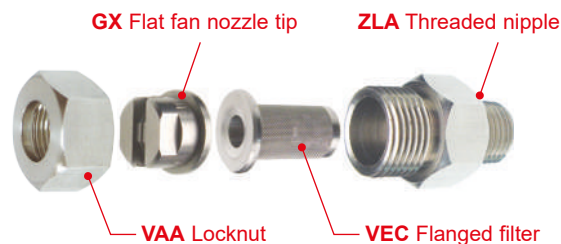
Also available in high quality PVDF

## SPRAY ANGLE CODES

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

## ASSEMBLY FITTINGS

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



### HOW TO MAKE UP THE NOZZLE CODE

EX.: GXA 1310 B1

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

NOZZLE TYPE

CAPACITY

SPRAY ANGLE

MATERIAL

- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass
- D8 - PVDF

- A - 0°
- F - 30°
- M - 45°
- Q - 60°
- U - 90°
- W - 120°

**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

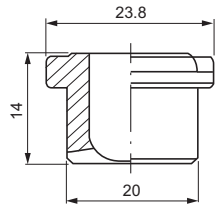
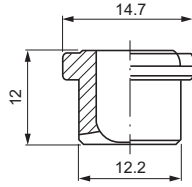
**IMPORTANT:**  
nozzle GXx 0780 B31 is made with "low capacity" body, while when it's fabricated with other materials is made with "standard capacity" body.

**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**

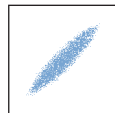
Name	Code and material	Appearance	Standard size 3/8"	Large size 3/4"
<b>Locknut</b> P.88	B1 - AISI 303 SS B31 - AISI 316L SS T1 - Brass D6 - Fiberglass reinforced PP		VAA 0380 xxB	VAA 0750 xxB
<b>Welding nipple</b> P.89	B1 - AISI 303 SS B31 - AISI 316L SS		ZAA C018 xxG	ZAA E027 xxG
<b>Threaded nipple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



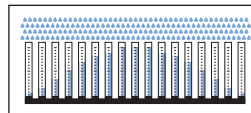
## STANDARD AND LARGE CAPACITIES

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

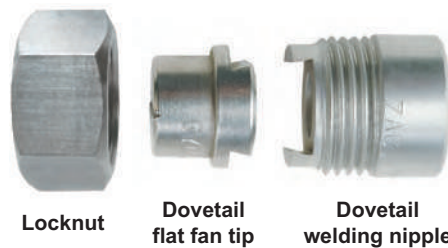


## SPRAY ANGLE CODES

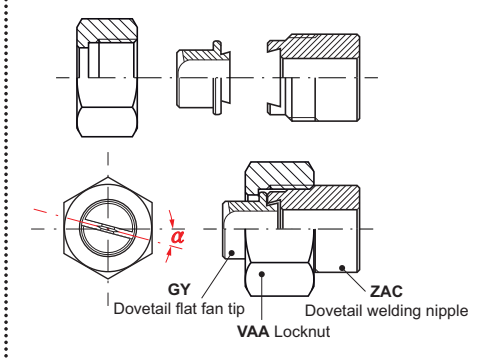
GYA	GYF	GYM	GYQ	GYU	GYW
0°	30°	45°	60°	90°	120°

## ASSEMBLY FITTINGS

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



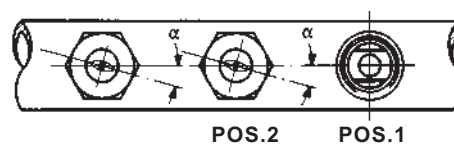
## GY ASSEMBLY FITTINGS



## 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.

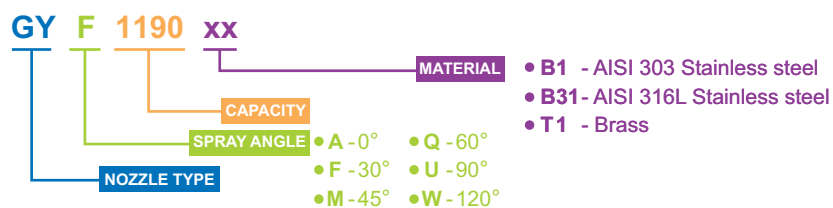
The orientation of the spray jets, properly inclined to avoid their interfering, is automatically obtained welding the nipples in place with their dovetail aligned along the pipe axis. This is easily done by running a straight rule across the dovetail profile machined on the nipple.



See values for jet deviation angle ( $\alpha$ ) beside capacity tables next page.

## HOW TO MAKE UP THE NOZZLE CODE

EX.: GYF 1190 B1





STANDARD AND LARGE CAPACITIES

**3/8" STANDARD CAPACITY TIPS**

Jet deviation angle  $\alpha = 5^\circ$

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  $\alpha = 15^\circ$

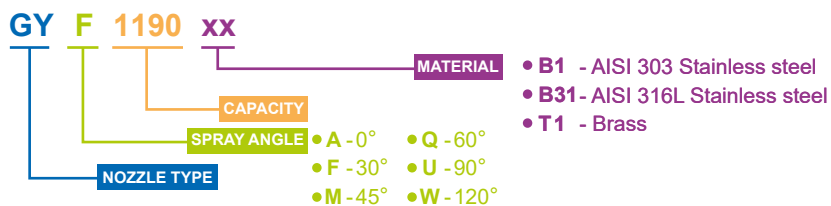
GYA 0°	GYF 30°	GYM 45°	GYQ 60°	GYU 90°	GYW 120°	Capacity code	D mm	Capacity at different pressure values (l/min) (bar)								
								0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
	•	•	•	•	•	1781	2.70	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
	•	•	•	•	•	1981	3.00	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	•	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

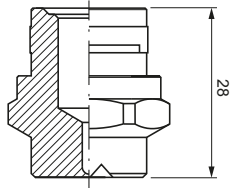
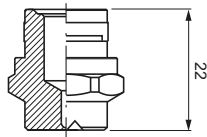
ASSEMBLY FITTINGS CODING

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 xxB	VAA 0750 xxB
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

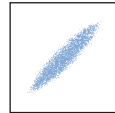
EX.: GYF 1190 B1



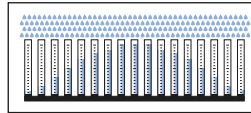


## STANDARD AND LARGE CAPACITY

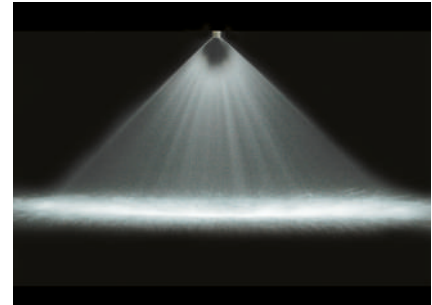
The HT series flat fan nozzles offer the same quality and technical characteristics of the standard types but also the additional convenience of a bayonet coupling which allows a simple assembly with no need of tools and an automatic spray pattern alignment. The optimum performance of your system or 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.



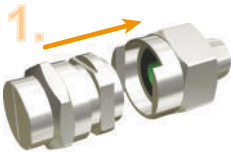
Spray section



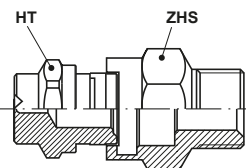
Convex distribution



### 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

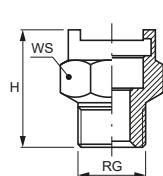
•	•	•	•	•	•	•	•	2310	5.40	12.7	17.9	21.9	25.3	31.0	40.0	47.4	56.6
•	•	•	•	•	•	•	•	2390	6.00	15.9	22.5	27.6	31.8	39.0	50.3	59.6	71.2
•	•	•	•	•	•	•	•	2470	6.60	19.2	27.1	33.2	38.4	47.0	60.7	71.8	85.8
•	•	•	•	•	•	•	•	2590	7.50	24.1	34.1	41.7	48.2	59.0	76.2	90.1	108
•	•	•	•	•	•	•	•	2780	8.70	31.8	45.0	55.2	63.7	78.0	101	119	142

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

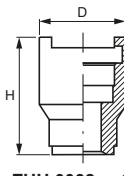
### Typical applications

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

	Thread size (RG) inch	Standard size	Large size	H mm	WS mm	D mm
Male nipple	1/4"	ZHS 0025 xxQ1	-	29	22	-
	3/8"	ZHS 0038 xxQ1	-	29	22	-
	1/2"	-	ZHS 0050 xxQ2	35	30	-
Female nipple	3/8"	ZHT 0038 xxQ1	-	29	22	-
Welding nipple	-	ZHU 0038 xxQ1	ZHU 0050 xxQ2	32	-	28
Seal (Viton) for SS nipples	-	VDH BQ10 E7	VDH BQ20 E7	-	-	-
Seal (BUNA) for brass nipples	-	VDH BQ10 E8	VDH BQ20 E8	-	-	-



ZHU 0038 xxQ1



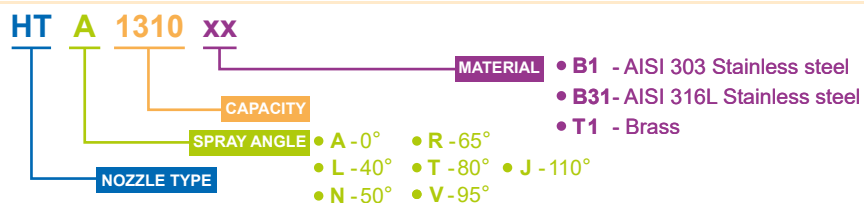
ZHS 0025 xxQ1



ZHS 0050 xxQ2

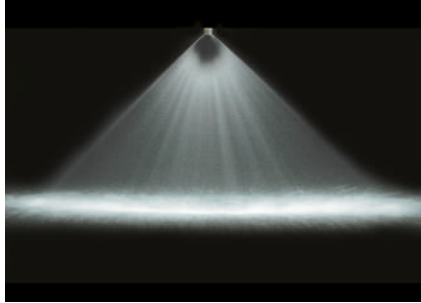
### HOW TO MAKE UP THE NOZZLE CODE

EX.: HTA 1310 B1



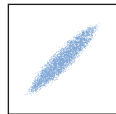
**LOW FLOW FLAT FAN NOZZLES**

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 require 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.

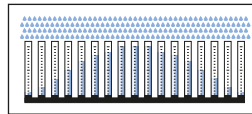


J nozzles series are also available with NPT thread: the code becomes H.

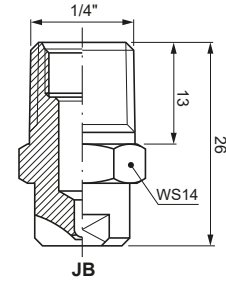
- **Thread specification:** BSPT, NPT
- **Typical applications**
  - Washing:** steel and PCB cleaning, glass substrate cleaning
  - Cooling:** steel cooling, product cooling
  - Other applications:** pre-treatment for coating process, sewage treatment system



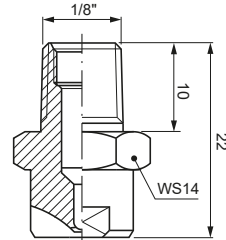
Spray section



Convex distribution



JB



JA

Spray angle	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	0.7	1.0	1.5	2.0	3.0	5.0	7.0
1/4"	JBD	JBL	JBN	JBR	JBS	JBT	JBV	JBV	JBV									
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

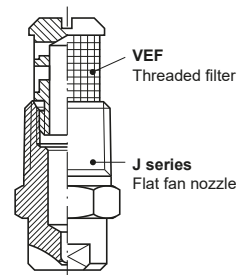
**VEF THREADED FILTERS (OPTIONAL)**

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

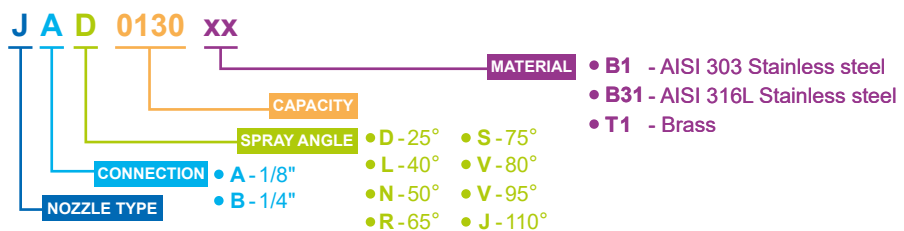


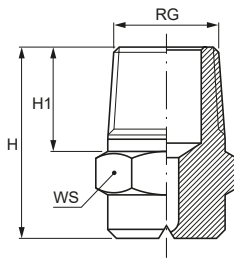
VEF Threaded filter



**HOW TO MAKE UP THE NOZZLE CODE**

EX.: JAD 0130 B1





## 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

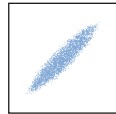
**Spray:** spray of chemicals, disinfectant and lubricating fluids

**Cooling:** metal parts and vehicles cooling

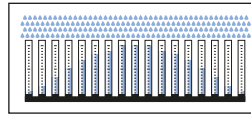
**Other applications:** water curtain for toxic gases separation, cleaning systems

In steelworks they are used in the pickling process to remove surface oxides layers formed during the hot metalwork.

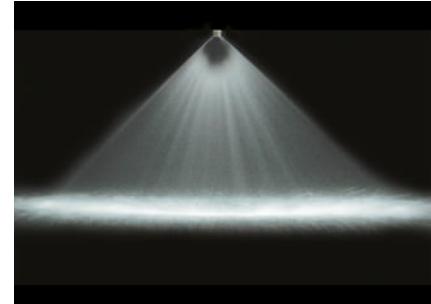
### Thread specification: BSPT, NPT



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"

Spray angle	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

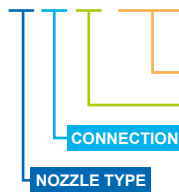
Code	Size (RG)	H	H1	WS	W
	unit	inch	mm	mm	gram
JA	1/8"	19.5	11	12	9
JB	1/4"	22.0	12	14	18
JC	3/8"	25.0	14	17	34

**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



### CONNECTION

- A - 1/8"
- B - 1/4"
- C - 3/8"

### CAPACITY

- A - 0°
- C - 20°
- F - 30°
- M - 45°

### SPRAY ANGLE

- Q - 60°
- U - 90°
- W - 120°

### MATERIAL

- 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"	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	
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		

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"

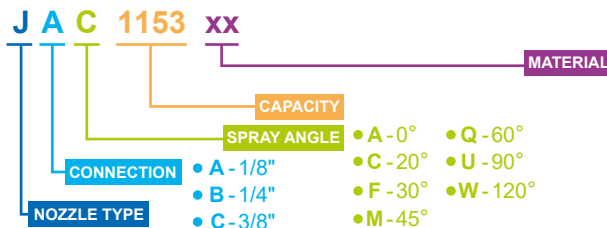
**IMPORTANT:** the nozzle Jxx 0780 B31 is made with "low capacity" body, while when it's fabricated with other materials is made with "standard capacity" body.

◁	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	

HOW TO MAKE UP THE NOZZLE CODE

EX.: JAC 1153 B1



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

- A - 0°
- C - 20°
- F - 30°
- M - 45°
- Q - 60°
- U - 90°
- W - 120°



# J ( STANDARD CAPACITY FLAT FAN NOZZLES )

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.

Diagram	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	

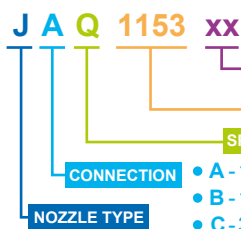
60°	•	•		0780	0.91	0.32	0.45	0.64	0.78	0.90	1.01	1.19	1.42	2.01
	•	•		1120	1.10	0.49	0.69	0.98	1.20	1.39	1.55	1.83	2.19	3.10
	•	•		1160	1.30	0.65	0.92	1.31	1.60	1.85	2.07	2.44	2.92	4.13
	•	•		1190	1.30	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	1.50	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	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	

Diagram	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	

Diagram	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**

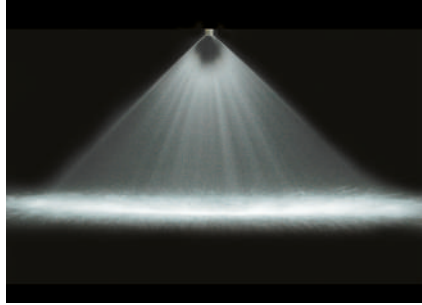
EX.: JAQ 1153 B1



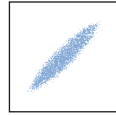
- MATERIAL**
- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass
- D1 - PVC (optional)
- E1 - PTFE (optional)

LARGE CAPACITY FLAT FAN NOZZLES

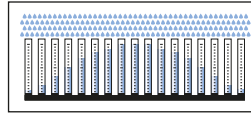
J series standard flat fan nozzles are available in a wide range of different capacities, spray angles, thread sizes and materials. The large capacity models produce a high-impact spray jet with a mist effect and a powerful washing action.



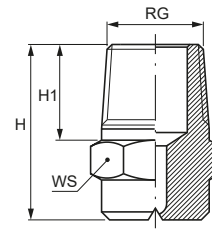
• Thread specification: BSPT, NPT



Spray section



Convex distribution



FLAT FAN - STRAIGHT NOZZLES

Spray angle	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	
15°			•	JFA 3435 xx	178	251	355	435	502	562	664	794	1123	
	•			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	
65°			•	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	
	•			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	
80°	•			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	
	•			JDR 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201	
			•	JFR 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201	
			•	JFR 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201	
95°	•			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	
	•			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	
95°	•			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
JDA	0°
JDB	15°
JDD	25°
JDL	40°
JDN	50°
JDR	65°
JDT	80°
JDV	95°

DIMENSIONS AND WEIGHTS

Below are dimensions and specifications for use.

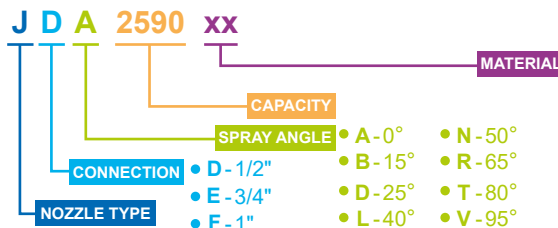
Code	Size	H	H1	WS	W
		inch	mm	mm	mm
JD	1/2"	33	17	22	65
JE	3/4"	41	20	27	130
JF	1"	61	22	27	215

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

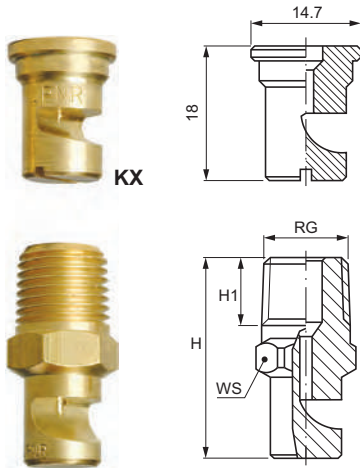


- MATERIAL**
- B1 - AISI 303 Stainless steel
- B31 - AISI 316L Stainless steel
- T1 - Brass

- 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"

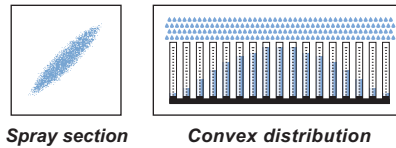
- NOZZLE TYPE**



## 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.

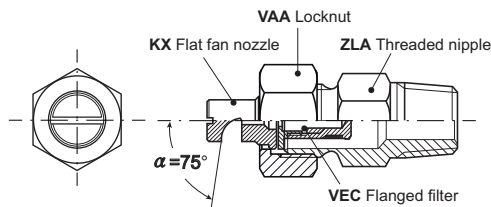
■ Thread specification: BSPT, NPT



## THREAD SIZE AND DIMENSIONS

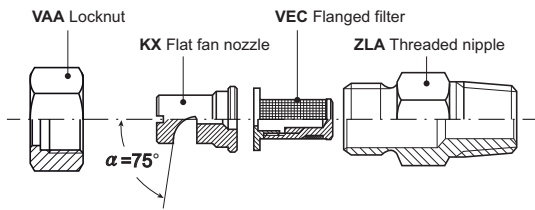
Here below please find available thread sizes and nozzles dimensions. Different capacities correspond to different deflection angles. The external dimensions may differ even if the thread size is the same. The table includes the largest nozzles with a given thread size. Please contact our Sales department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

Code	Thread size (RG) inch	H mm	H1 mm	WS mm
KGW	1/8"	31	10.0	14
KHW	1/4"	34	12.5	14
KIW	3/8"	44	13.0	17
KJW	1/2"	49	17.0	22
KKW	3/4"	65	20.0	36
KLW	1"	92	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

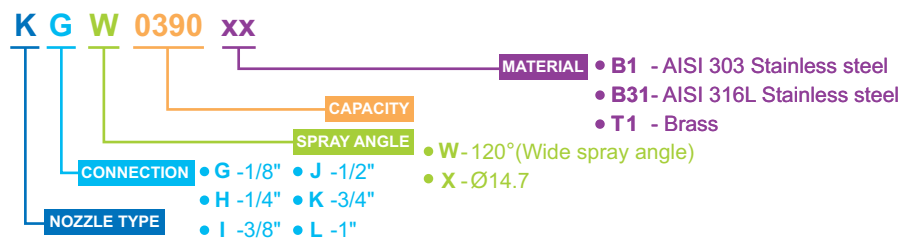
**Spray:** rolling oil, release agents, coolants

**Cooling:** metal parts, bottles

**Other applications:** foam dispersion, fire-fighting systems, water curtains

### HOW TO MAKE UP THE NOZZLE CODE

EX.: KGW 0390 B1



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)							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°

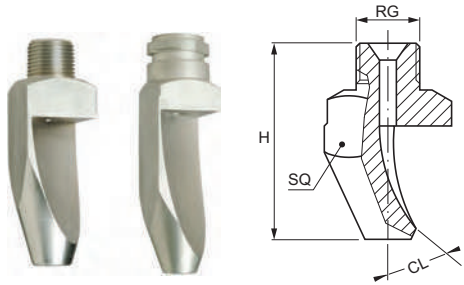
FLAT FAN NOZZLES

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.

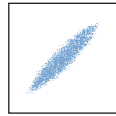
Name	Code and material	Appearance	Model no.	
			3/8" Standard size	3/4" Large size
Locknut P.88	B1 - AISI 303 SS B31- AISI 316L SS T1 - Brass D6 - Fiberglass reinforced PP		VAA 0380 xxB	VAA 0750 xxB
Welding nipple P.89	B1 - AISI 303 SS B31- AISI 316L SS		ZAA C018 xxG	ZAA E027 xxG
Threaded nipple P.89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



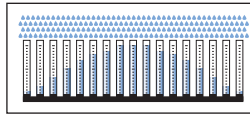
## HIGH IMPACT TYPES

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

KOx	1/8"
KPx	1/4"
KQx	3/8"
KRx	1/2"
KSx	3/4"
KTx	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 xxQ1	-	29	22	-
	3/8"	ZHS 0038 xxQ1	-	29	22	-
	1/2"	-	ZHS 0050 xxQ2	35	30	-
Female nipple	3/8"	ZHT 0038 xxQ1	-	29	22	-
Welding nipple	-	ZHU 0038 xxQ1	ZHU 0050 xxQ2	32	-	28
Seal (Viton) for SS nipple	-	VDH BQ10 E7	VDH BQ20 E7	-	-	-
Seal (BUNA) for brass nipple	-	VDH BQ10 E8	VDH BQ20 E8	-	-	-



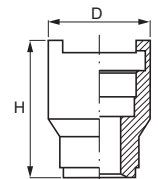
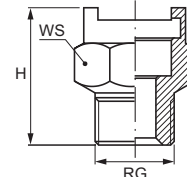
ZHS + KTH



ZHS 0025 xxQ1



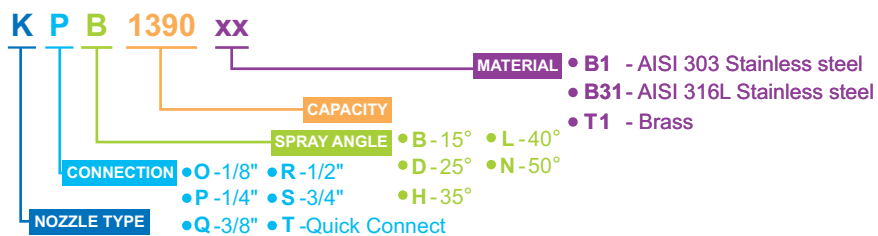
ZHS 0050 xxQ2



ZHU 0038 xxQ1

### HOW TO MAKE UP THE NOZZLE CODE

EX.: KPB 1390 B1



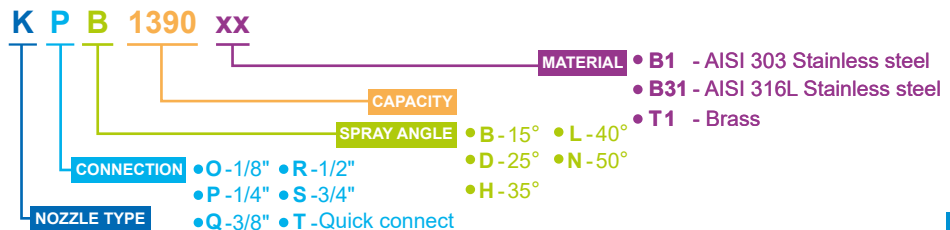


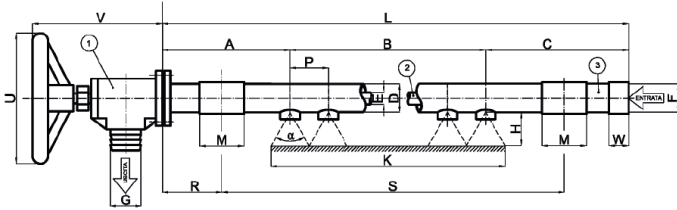
HIGH IMPACT TYPES

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





## LEGEND

- A: first nozzle position
- B: nozzle span
- C: last nozzle position
- D: external diameter x pipe width
- E: shaft outer diameter
- F: inlet connection
- G: outlet connection
- H: height
- L: standard reference length
- M: support length
- N: nozzles number
- P: nozzle pitch
- R: support position
- S: sleeve span
- U: hand wheel diameter
- V: valve length
- W: nipple length
- $\alpha$ : 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).

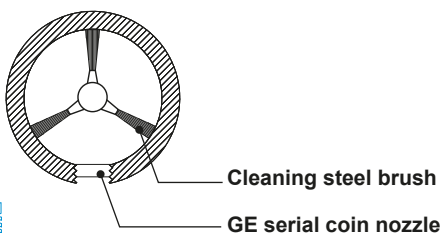
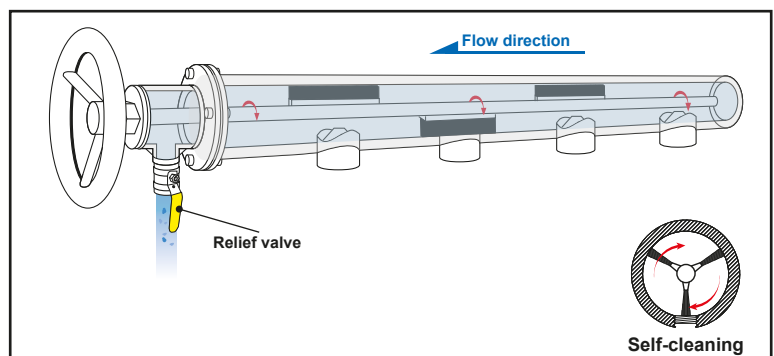
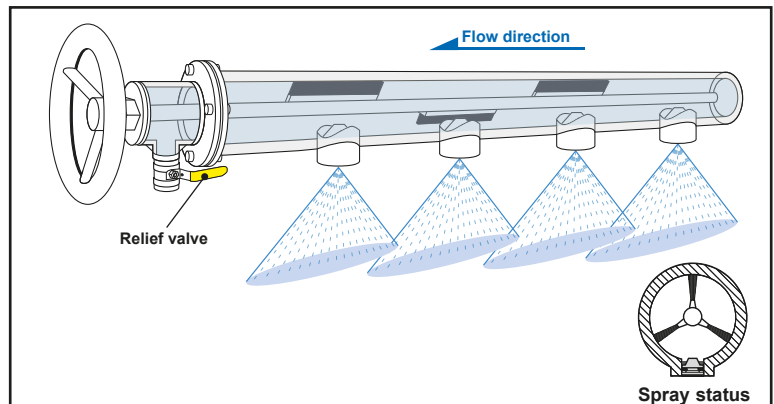
The Assy Shaft is made by a pipe with specific brushes mounted on it; thanks to the connection with the shaft of the Assy Valve, it moves radially and axially. In this way, the brushes can remove the impurities both from the nozzles and from the inner part of the Assy Pipe.

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

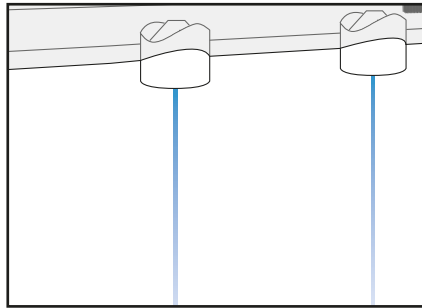
Dim.	MIN	MAX
D (mm)	Ø 50 x 1.5	Ø 73 x 3
L (mm)	600	7100
A (mm)	200	735
B (mm)	200	6000
C (mm)	200	1350
N	2	51
P (mm)	80	2950
F (inch)	1-1/2" F	2-1/2" F
G (mm)	Ø 48	Ø 60

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

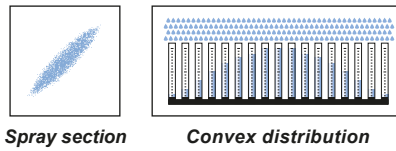


**FLAT FAN NOZZLES / DISC NOZZLES**

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.



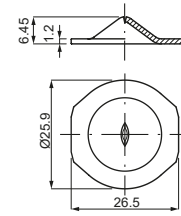
**Typical applications**  
washing or spraying in pulp and paper mills, mesh fabrics cleaning, water treatment systems, screen and filter (felt and wire) washing and many more.



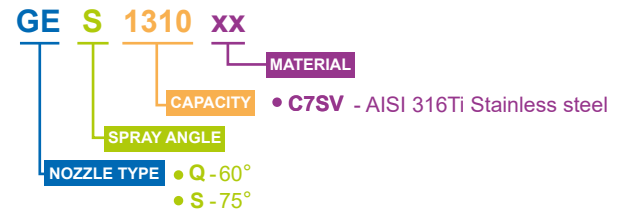
Code	D1 mm	Capacity at different pressure values (l/min) (bar)						
		3.0	4.0	6.0	10	15	20	
60°	GEQ 0900 xx	1.0	0.90	1.04	1.27	1.64	2.01	2.32
	GEQ 1170 xx	1.5	1.70	1.96	2.40	3.10	3.80	4.39
	GEQ 1234 xx	1.7	2.34	2.70	3.31	4.27	5.23	6.04
	GEQ 1310 xx	2.0	3.10	3.58	4.38	5.66	6.93	8.00
	GEQ 1490 xx	2.5	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

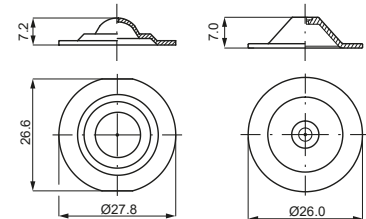


**GEA SERIAL STRAIGHT NOZZLES**

D mm	Nozzle type		Code	Capacity at different pressure values (l/min) (bar)					
	Stainless steel	Ruby insert		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

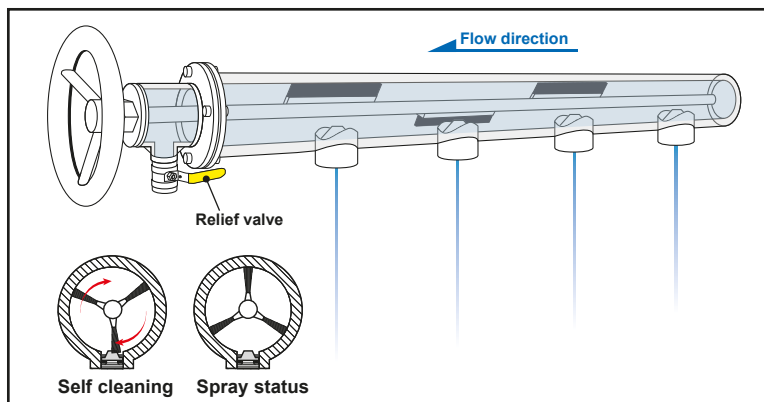
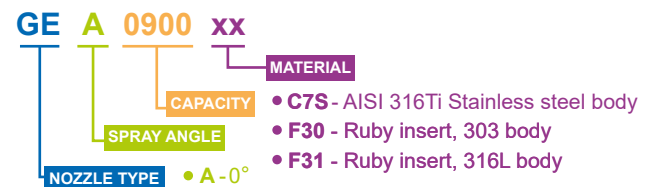
**STRAIGHT NOZZLES**

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



Metal  
GEA 0900 C7S

Ruby nozzle tip  
GEA 0900 F31

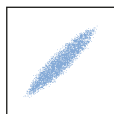




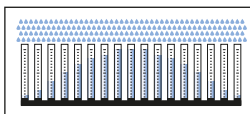
## GF SERIES SELF-CLEANING NOZZLES

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.

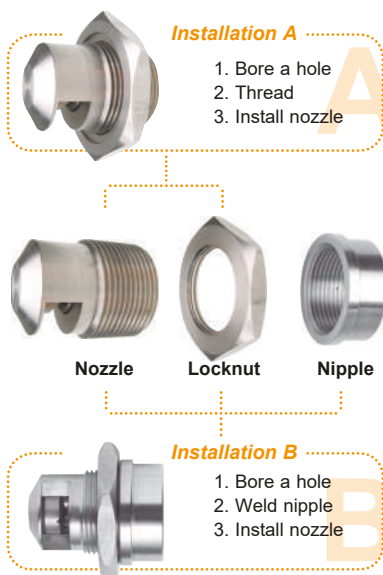
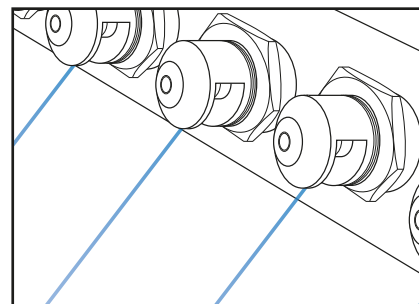
- Typical applications**  
washing or spraying in pulp and paper mills, mesh fabrics cleaning, water treatment systems, and many more.



Spray section

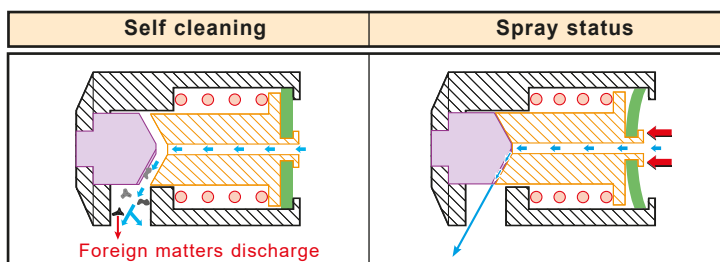
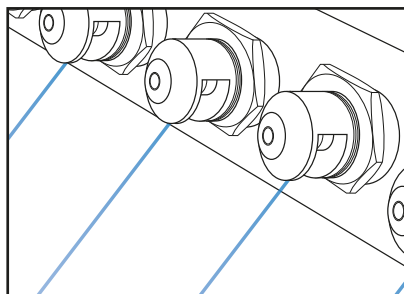


Convex distribution



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



### HOW TO MAKE UP THE NOZZLE CODE

EX.: GFA 1100 B31SM

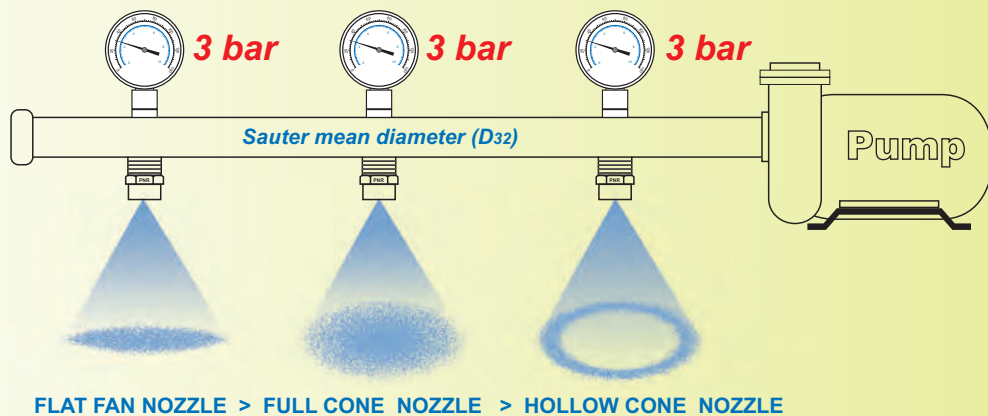




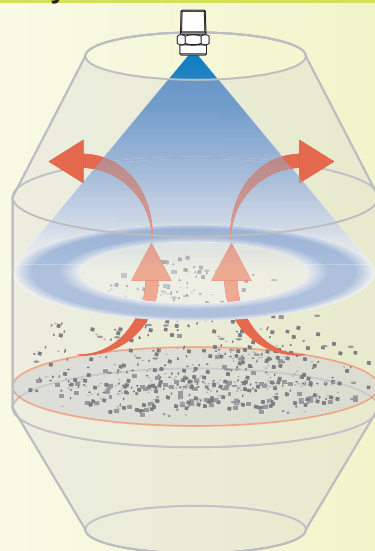


## Mist spray

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.



## Poor gas scrub efficiency?

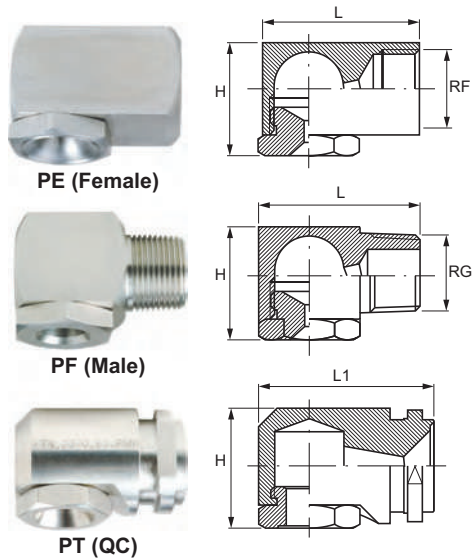


Hollow cone nozzles produce a ring-shaped spray pattern where all the liquid jet is concentrated on the outer edge of the ring. Users may fear that offset nozzles do not catch all suspended particles because air flows through directly from the centre. Hollow cone nozzles are the solution to this problem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





## STANDARD ANGLE SPRAY NOZZLES

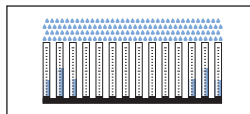
PE/PF hollow cone nozzles generate a ring-shaped spray pattern with finely atomized droplets and work on the tangential flow principle. Inside these nozzles there is an axial groove that injects the liquid tangentially into the vortex chamber where the strong centrifugal force produces a high rotational 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

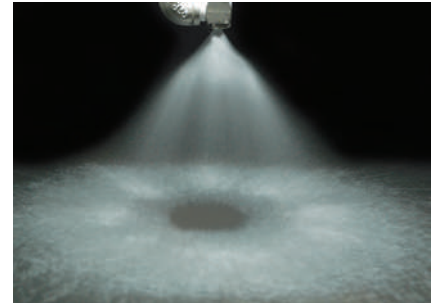
Female thread (PE series): BSPT, NPT  
Male thread (PF series): BSP, NPT



Spray section



Concave distribution



HOLLOW CONE NOZZLES

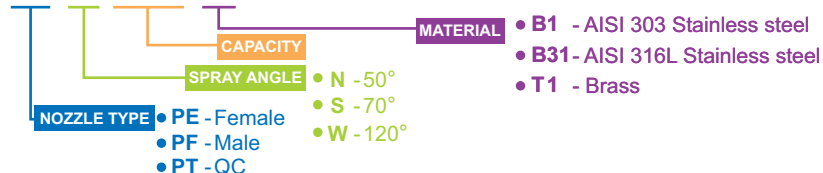
## STANDARD ANGLE SPRAY NOZZLES

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			
70°	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
	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

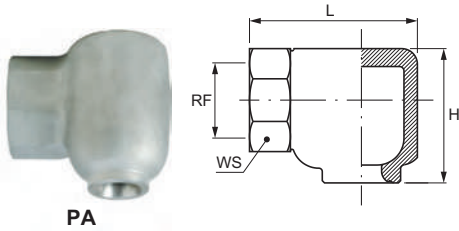
PE S 1160 XX



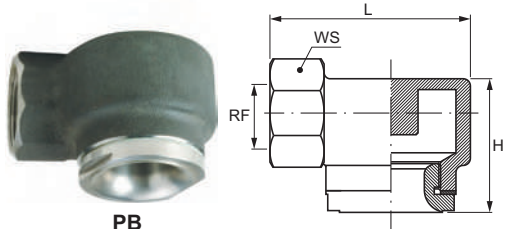
WIDE ANGLE SPRAY NOZZLES

	 RF RG inch	PEW	PFW	PTW	Code	DE mm	DU mm	Capacity at different pressure values (l/min) (bar)								Dimensions mm		
		Female	Male	QC				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
	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
	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

HOLLOW CONE NOZZLES



PA



PB

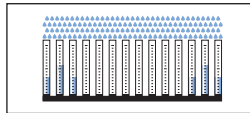
## TANGENTIAL NOZZLES

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



Spray Angle	Code	RF inch	DE mm	DU mm	Capacity at different pressure values									Dimensions mm			
					0.3	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	(l/min) (bar)	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
		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					

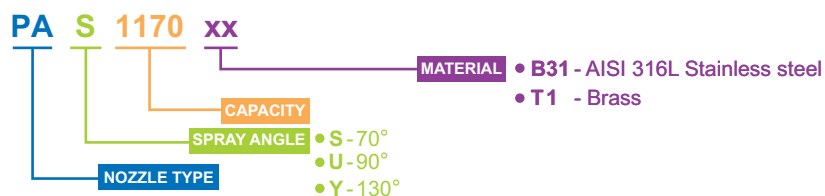
### THREAD SIZE AND MATERIALS

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

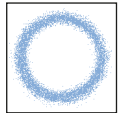


**MOULDED PLASTIC NOZZLES**

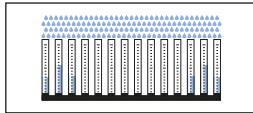
PN/PO series hollow cone nozzles made by plastic moulding, offer a high chemical resistance and low prices. They are tangential nozzles and produce a hollow cone spray of atomized droplets. As they have a large free passage and no swirling vane inside their body, they are highly clog-resistant. PN/PO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



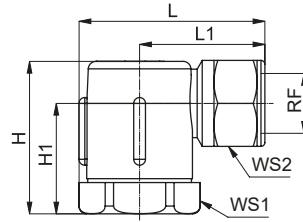
- **Thread specification**  
PO: Male BSPT, NPT  
PN: Female BSP, NPT  
PS: Quick-fit
- **Max operation temperature:**  
100 °C
- **Max operation pressure:**  
10 bar



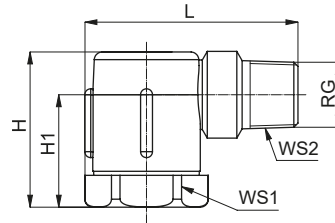
Spray section



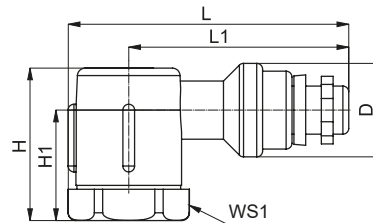
Concave distribution



PN - Female



PO - Male



PS - Quick-fit

Codice	Conn.	L	L1	H	H1	CH1	CH2	D
		mm	mm	mm	mm			
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	3/8" Quick-fit	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		3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5
•	•	•	1980		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	1/2"	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		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**

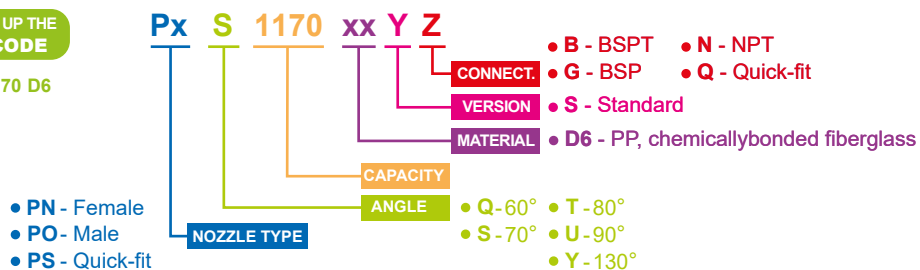
**Washing:** exhaust scrubbers, parts cleaning, pre-treatment in coating process, dust and foam control, filter spraying

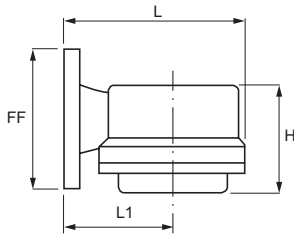
**Cooling:** wire cooling, plastic pipe cooling

**Other applications:** humidification systems, etc.

**HOW TO MAKE UP THE NOZZLE CODE**

EX.: PNS 1170 D6





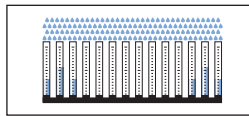
## TANGENTIAL NOZZLES / LARGE FLOW RATES

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.

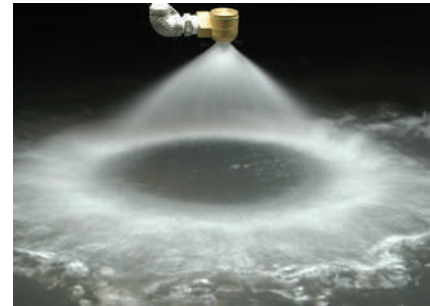
- **Flange**  
DIN2633-ND16, JIS
- **Typical applications**  
Desulfurization  
Denitrification  
Exhaust scrubbers  
Coke quenching towers



Spray section



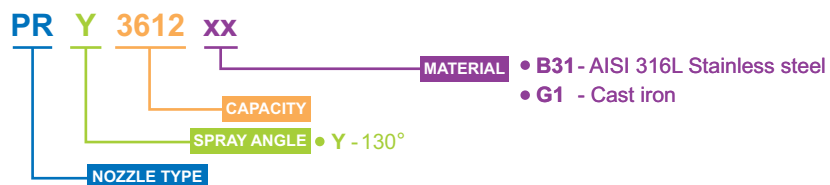
Concave distribution



130°	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

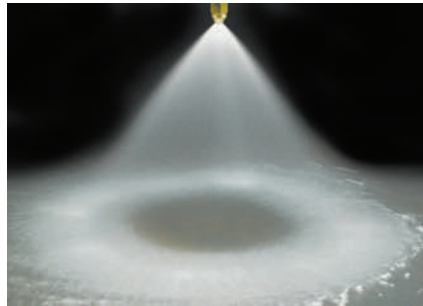
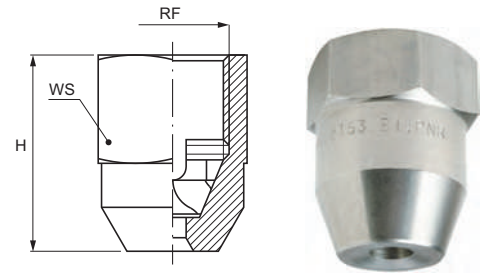
EX.: PRY 3612 B31



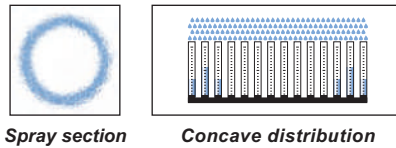


IN LINE SPRAY / INSIDE VANE

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



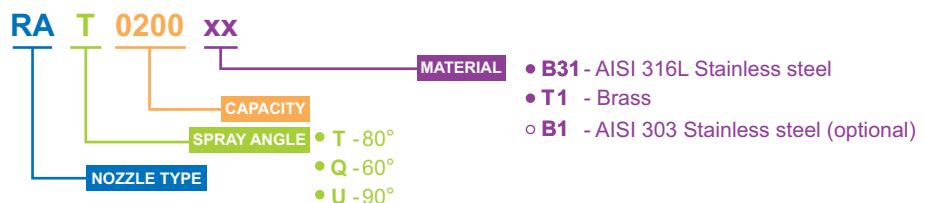
Code	RF inch	D mm	D1 mm	Capacity at different pressure values								Dimensions mm	
				0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS
80°	1/8"	1.0	0.5	0.08	0.10	0.12	0.16	0.20	0.26	0.31	0.37	18	17
		1.7	0.5	0.16	0.19	0.23	0.32	0.39	0.50	0.60	0.71		
60°	3/8"	1.1	0.6	0.20	0.24	0.28	0.40	0.49	0.63	0.75	0.89	29	22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

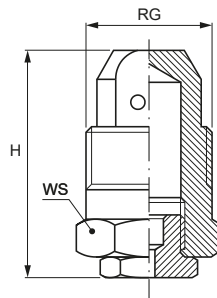
HOW TO MAKE UP THE NOZZLE CODE

EX.: RAT 0200 B31

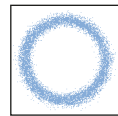


## IN LINE SPRAY / VANELESS

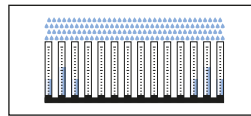
These nozzles, designed with no inside whirling vane and a wide unobstructed passage, produce a hollow cone spray pattern, and are highly resistant to clogging. The liquid flow enters at high speed through the top eccentric orifice into the nozzle swirl chamber where the strong centrifugal force generates 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".



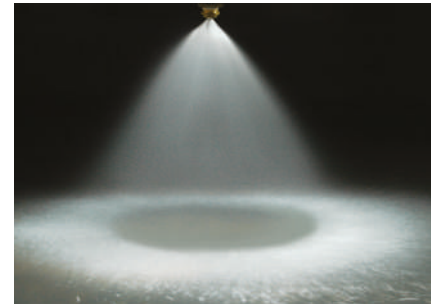
- Thread specification: BSPT, NPT



Spray section



Concave distribution



Code	RG inch	D Orifice mm	D1 Inlet 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	
60°	3/8"	2.0	2.0	0.65	0.77	0.92	1.31	1.60	2.07	2.44	2.92	31	17	
		2.4	2.4	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20			
		3.2	2.3	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
		3.9	3.8	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
		4.4	*4.0	4.49	5.31	6.35	8.98	11.0	14.2	16.8	20.1			
70°	1/2"	3.5	3.0	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	37	22	
		4.0	4.0	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
		4.5	2.9	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		5.1	*3.4	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5			
			7.0	*3.6	6.45	7.63	9.12	12.9	15.8	20.4	24.1	28.8		
			7.3	*4.8	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
		3/4"	4.7	4.5	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2	43	32
			5.9	4.8	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
		7.0	6.5	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6			
		9.3	*6.0	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2			
80°	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	
		12.9	*8.5	22.5	26.6	31.8	44.9	55.0	71.0	84.0	100			
		15.0	*8.5	25.7	30.4	36.4	51.4	63.0	81.3	96.2	115			
		14.6	*9.0	28.6	33.8	40.4	57.2	70.0	90.4	107	128			
		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

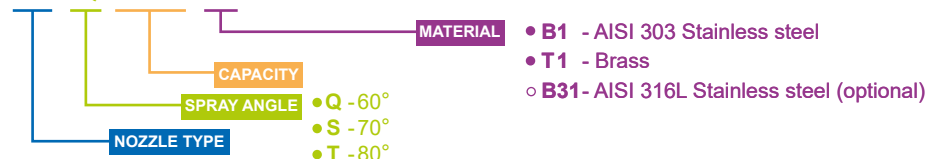
**Washing:** exhaust scrubbers, product cleaning

**Other applications:** dust control, humidification systems, sterilization

### HOW TO MAKE UP THE NOZZLE CODE

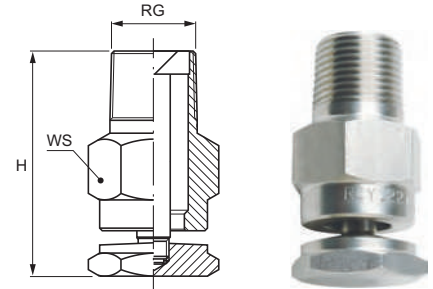
EX.: RBQ 1160 B1

RB Q 1160 XX



**IN LINE SPRAY**

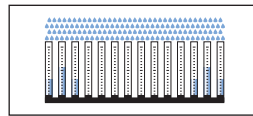
RC type deflected nozzles produce a ring-shaped hollow cone spray pattern, in line with the nozzle inlet supply pipe. The water flow hits the deflection cap fixed onto the nozzle outlet orifice producing small droplets, very wide spray angles and uniform distribution. The deflection cap determines the 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								Dimensions mm	
	1/4"	3/8"		0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS
150°	•		<b>RCY 1780 xx</b>	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2	33	17
	•		<b>RCY 2117 xx</b>	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
	•		<b>RCY 2157 xx</b>	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7		
	•		<b>RCY 2196 xx</b>	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
		•	<b>RCY 2230 xx</b>	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0	44	22
		•	<b>RCY 2270 xx</b>	11.0	13.0	15.6	22.0	27.0	34.9	41.2	49.3		
180°		•	<b>RCY 2310 xx</b>	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6		
		•	<b>RCY 2350 xx</b>	14.3	16.9	20.2	28.6	35.0	45.2	53.5	63.9		
		•	<b>RCY 2390 xx</b>	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2		
	•		<b>RCZ 1780 xx</b>	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2	33	17
	•		<b>RCZ 2117 xx</b>	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
	•		<b>RCZ 2157 xx</b>	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7		
	•		<b>RCZ 2196 xx</b>	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
		•	<b>RCZ 2230 xx</b>	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0	44	22
		•	<b>RCZ 2270 xx</b>	11.0	13.0	15.6	22.0	27.0	34.9	41.2	49.3		
		•	<b>RCZ 2310 xx</b>	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6		
		•	<b>RCZ 2350 xx</b>	14.3	16.9	20.2	28.6	35.0	45.2	53.5	63.9		
		•	<b>RCZ 2390 xx</b>	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2		

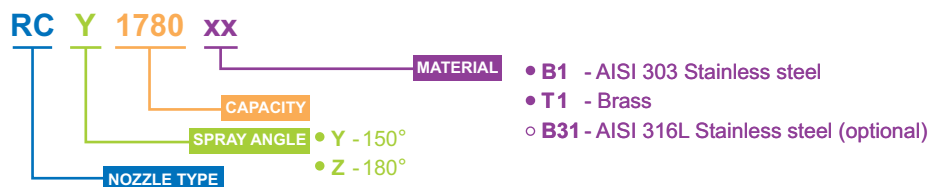
**Typical applications**

**Washing:** exhaust scrubbers, small tanks, pipes interiors

**Other applications:** pipes coating, dust control, fire protection

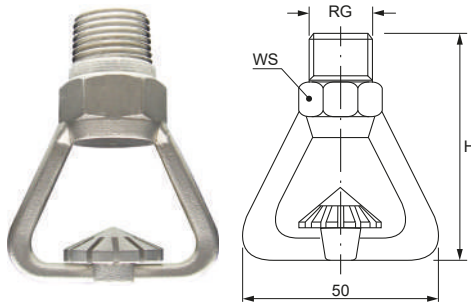
**HOW TO MAKE UP THE NOZZLE CODE**

EX.: RCY 1780 B1

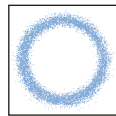


## DEFLECTED SPRAY

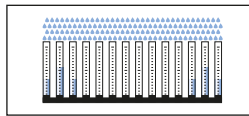
RO hollow cone deflected spray nozzles are specially designed for fire-fighting engineering. They produce an excellent water atomization and their deflected jet assures a wide spray coverage. The spray pattern is formed by the liquid flowing from the nozzle orifice over the surface of the below deflector 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)						WS mm	H mm	
			1.0	3.0	5.0	6.0	7.0	10.0			
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			

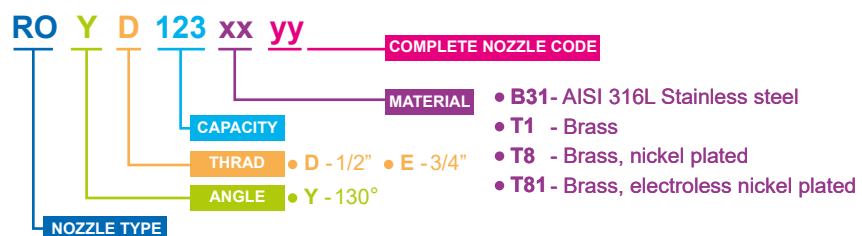
130°											
ROY E005 xx yy	3/4"	3.0	4.80	8.10	10.3	11.3	12.2	14.5	27	65	
ROY E006 xx yy		3.5	6.70	11.5	14.9	16.4	17.6	20.5			
ROY E009 xx yy		4.0	9.00	15.6	20.0	22.0	24.0	29.0			
ROY E011 xx yy		4.5	11.5	19.8	25.0	28.0	30.0	36.0			
ROY E016 xx yy		5.0	15.8	27.0	35.0	39.0	42.0	50.0			
ROY E018 xx 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	None
FB	BSPT	•	
FN	NPT	•	
SB	BSPT		•
SN	NPT		•

### HOW TO MAKE UP THE NOZZLE CODE

EX.: ROY D018 B31FB

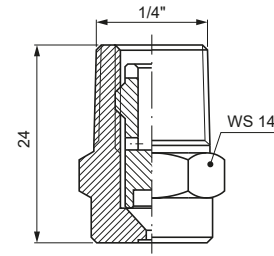
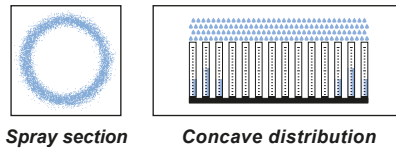


**HYDRAULIC ATOMIZERS**

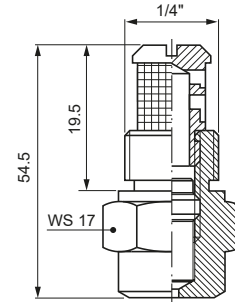
RX/RZ series hydraulic nozzles deliver a very finely atomized hollow cone spray, even at low pressure values. They contain a precisely machined insert with narrow passages that can be easily disassembled for cleaning in case of obstruction. Clogging can be avoided placing a fine mesh strainer on the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

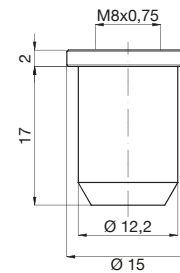
- **Connection:** BSPT (RX), BSP (RZ), NPT (RX, RZ), tip with nipple and locknut (RW)
- **Typical applications** dust control, humidification, deodorant spray, disinfectant liquid spray, exhaust scrubbers



**RX**



**RZ (+VEF)**



**RW**

HOLLOW CONE NOZZLES

Code	D mm	Capacity (l/hour) at different pressure values (bar)										
		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	

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



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

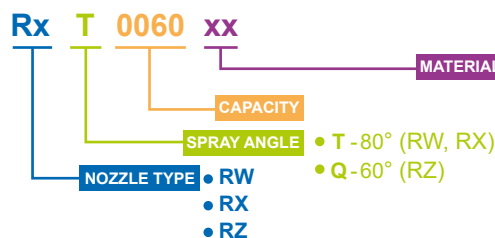
**ADDITIONAL SPRAY ANGLES**

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



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



## 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.

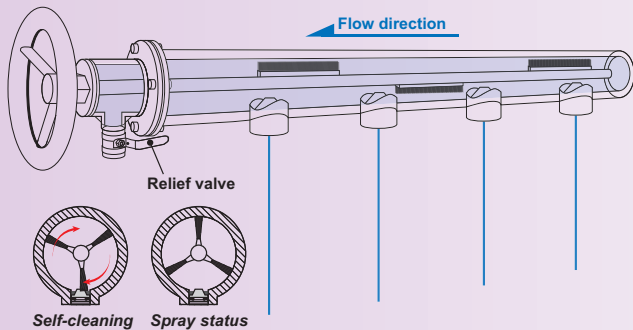
## Highly extended service life

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.



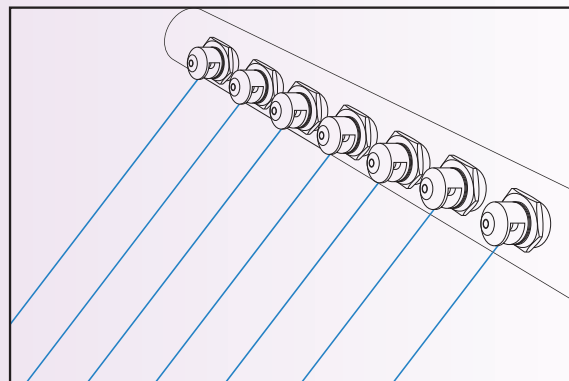
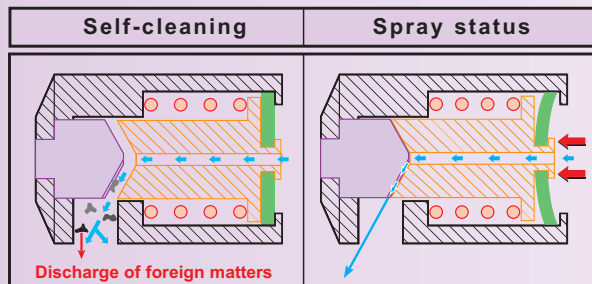
## Self-cleaning shower pipe and nozzles

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.



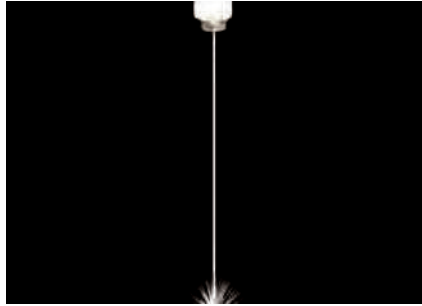
**FAA/FBA HIGH IMPACT SOLID STREAM NOZZLES**

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.

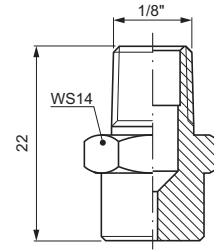
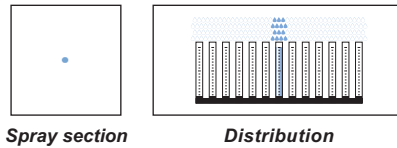
■ **Typical applications**

**Washing:** filter cloth, felts, parts.

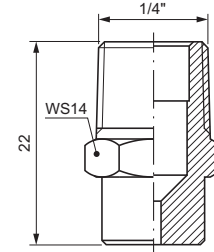
**Other applications:** paint scraping, rust removal, shell removal.



■ **Thread specification:** BSPT, NPT



FAA



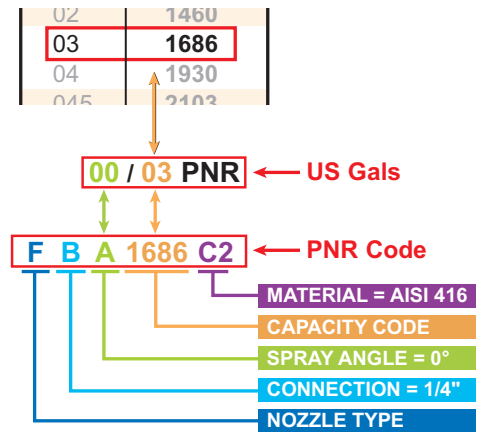
FBA

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	2226	9.70	11.9	15.3	18.1	22.6	27.0	31.0
•	•	•	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	2970	41.0	50.0	64.0	76.0	97.0	112	129
•	•	•	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 TO 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.

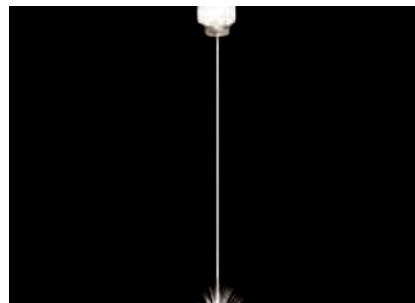
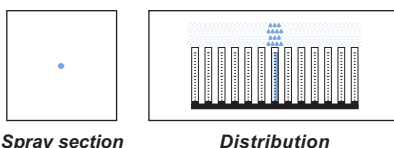


## GDA SERIES NEEDLE JET NOZZLES

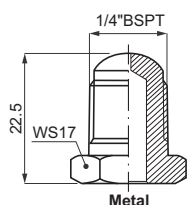
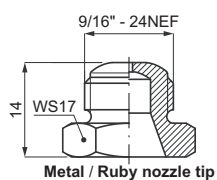
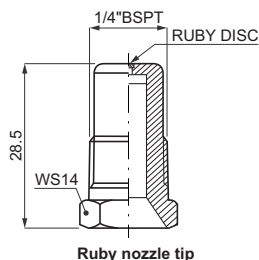
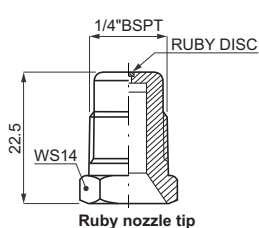
GDA models are classic high impact needle jet nozzles, easy to clean and clog-resistant. Their tips spray a solid stream of high pressure water inside pipes usually containing a steel brush that can be manually or automatically rotated. The rotating brush moving inside the pipe takes all the dirt off 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



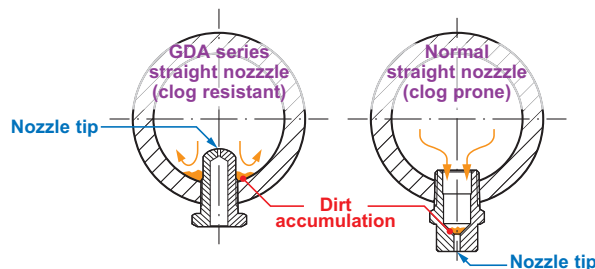
GDA needle jet nozzles are a one-piece construction, suitable to work with operating pressures lower than 20 bar and have a hard ruby spray tip, ideal to work with pressures lower than 200 bar. They are precisely machined and have a hydrodynamic design to produce a solid stream needle jet. Their stainless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



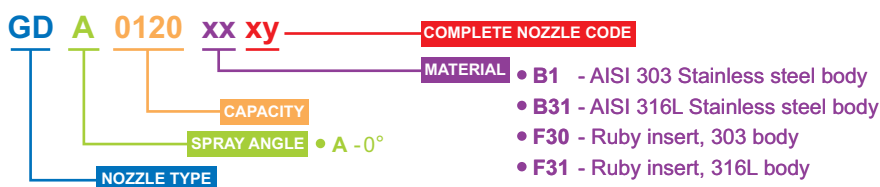
Nozzle type		Code	D mm	Capacity at different pressure values									
Stainless steel	Ruby insert			3.0	5.0	10	20	30	50	70	100	150	
•	•	GDA 0120 xx xy	0.35	0.12	0.15	0.22	0.31						
•	•	GDA 0170 xx xy	0.40	0.17	0.22	0.31	0.44	0.54	0.69	0.82	0.98	1.20	
•	•	GDA 0290 xx xy	0.50	0.29	0.37	0.53	0.75	0.92	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						

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 NEF
C for 22.5 mm	

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

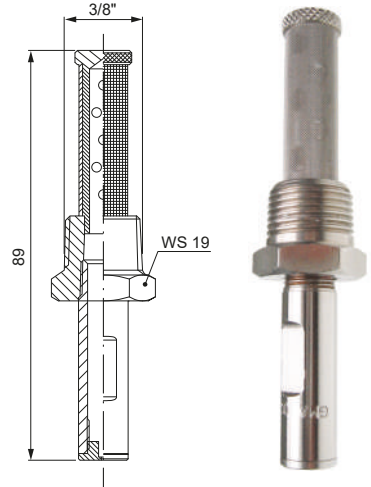
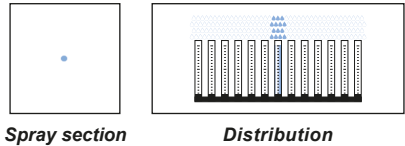



**GMA SERIES PAPER WEB TRIMMERS**

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



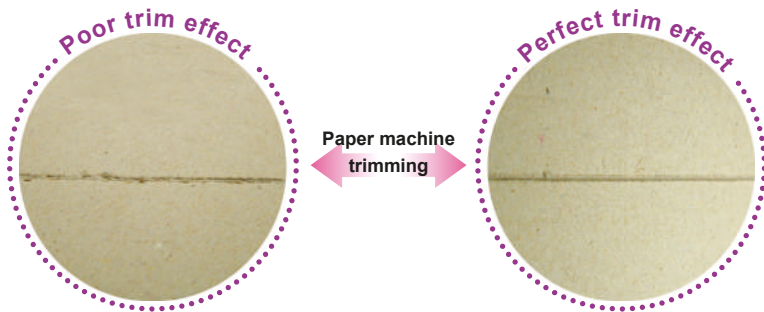
	Code	D mm
0°	<b>GMA 0380</b> <i>xx</i> <i>y</i>	0.381
	<b>GMA 0500</b> <i>xx</i> <i>y</i>	0.508
	<b>GMA 0630</b> <i>xx</i> <i>y</i>	0.635
	<b>GMA 0810</b> <i>xx</i> <i>y</i>	0.810
	<b>GMA 0890</b> <i>xx</i> <i>y</i>	0.889
	<b>GMA 0910</b> <i>xx</i> <i>y</i>	0.914
	<b>GMA 1010</b> <i>xx</i> <i>y</i>	1.016
	<b>GMA 1220</b> <i>xx</i> <i>y</i>	1.219

**NEW** **New code!**

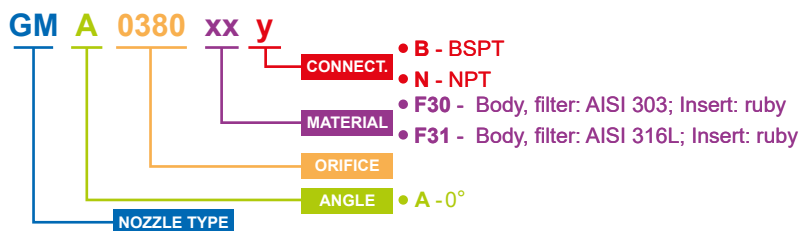
GMA codes have been modified, based on the orifice diameter, measured for every nozzle. Please contact use if you need the capacity at different pressure.

**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





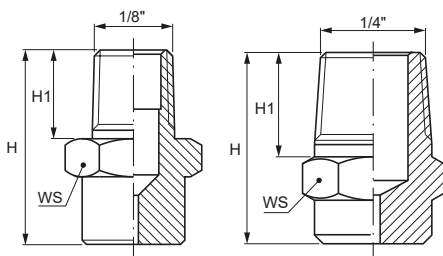
JAA



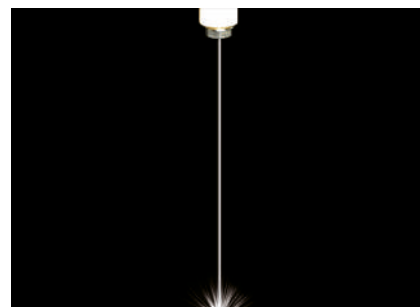
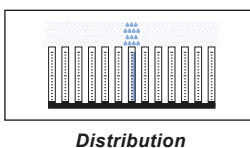
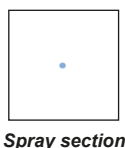
JBA

## 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



### Typical applications

#### Washing

Felts, filter cloths and parts washing

#### Other applications

Paint scraping  
Rust and shell removal

### DIMENSIONS AND WEIGHTS

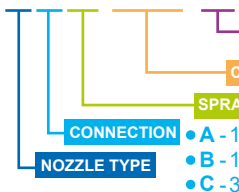
Code	Size	H	H1	WS	W
unit	inch	mm	mm	mm	gram
JA	1/8"	19.5	11	12	9
JB	1/4"	22.0	12	14	18
JC	3/8"	25.0	14	17	34

Nozzle type			Code	D	Capacity (l/min) at different pressure values (bar)			
JAA (1/8")	JBA (1/4")	JCA (3/8")			3.0	5.0	10	20
•	•				0060	0.28	0.06	0.08
•	•		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



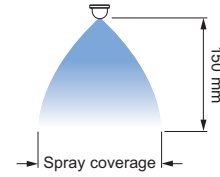
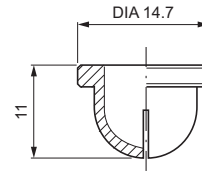
- B1 - AISI 303 Stainless steel body
- B31 - AISI 316L Stainless steel body
- T1 - Brass



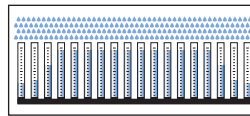
**AIR & STEAM FLAT FAN TIPS**

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



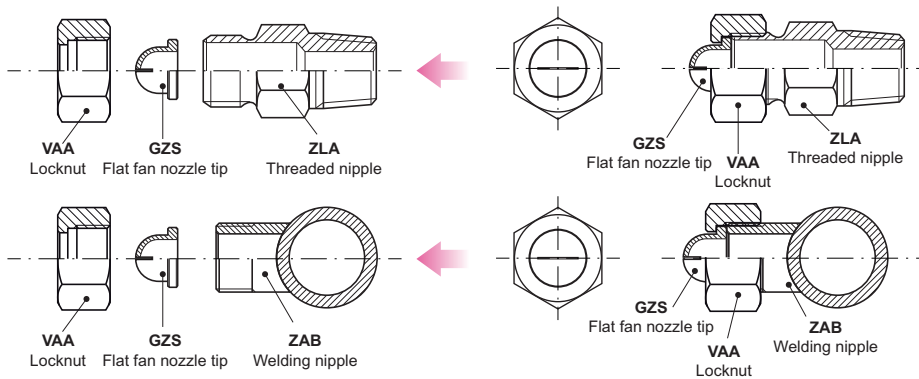
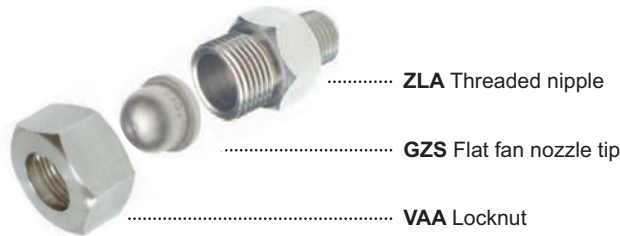
Spray section



Distribution

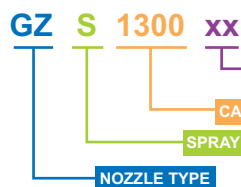
Code	D mm	Air capacity (Nm <sup>3</sup> /hour) at different pressure values (bar)				Steam capacity (kg/hour) at different pressure values (bar)				Spray coverage		
		0.5 bar	2.0 bar	5.0 bar	10 bar	0.5 bar	2.0 bar	5.0 bar	10 bar	2.0 bar	5.0 bar	
70°	<b>GZS 1300 xx</b>	1.3	1.2	3.0	6.0	11.0	0.9	1.9	3.7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

**ASSEMBLY FITTINGS**



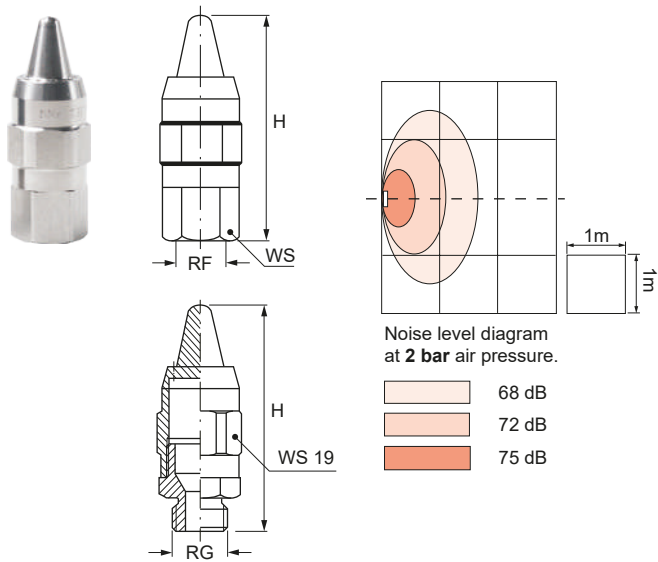
**HOW TO MAKE UP THE NOZZLE CODE**

EX.: GZS 1300 B1

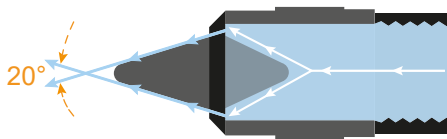
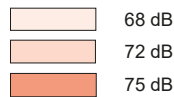


- MATERIAL**
  - B1 - AISI 303 Stainless steel
  - B31 - AISI 316L Stainless steel
  - T1 - Brass

# UEA D020 ( FULL CONE NOZZLES )



Noise level diagram at 2 bar air pressure.



These air blowers meet the requirements of American OSHA regulations

## AIR BLOW-OFF NOZZLES, ROUND JET

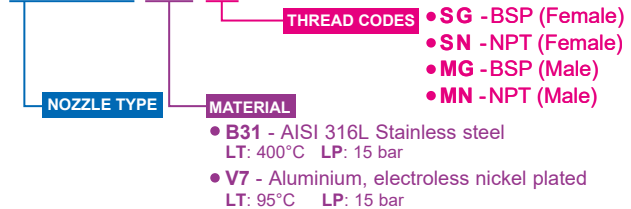
UEA D020 compressed air blowing nozzles produce a powerful air jet concentrated on a well defined impact point. They are specially designed for deep and blind holes drying, produce lower noise and reduce pressure loss.

- **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

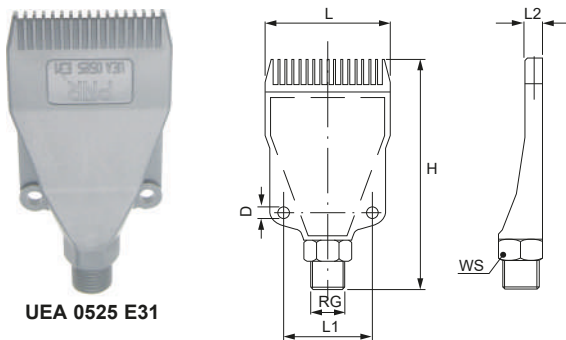
Code	RF inch	Air capacity (Nm <sup>3</sup> /hour) at different pressure values (bar)					H mm	WS mm
		2.0	3.0	4.0	5.0	6.0		
UEA D020 xx yy	1/4"	15	20	25	31	35	55	17

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

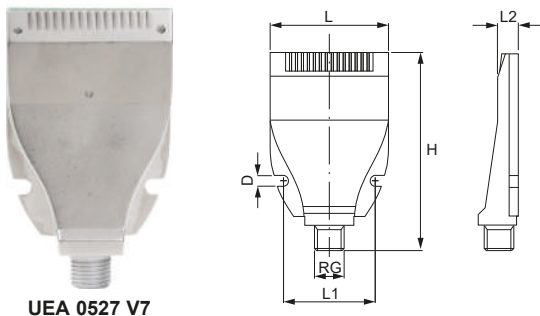
UEA D020 B31 yy



# UEA 0525 / 0527 ( AIR BLOWERS - FLAT FAN )

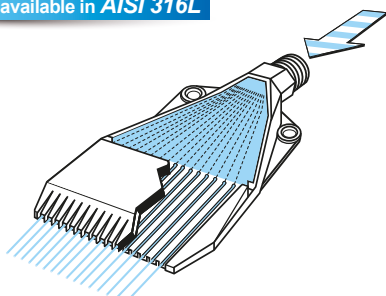


UEA 0525 E31



UEA 0527 V7

NEW Also available in AISI 316L

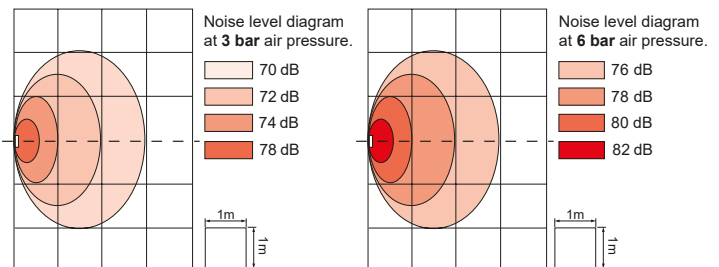


These air blowers meet the requirements of American OSHA regulations

## 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



Code	RG inch	Air capacity (Nm <sup>3</sup> /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	33	90.0	48	35	6.5	4.5	16
UEA 0527 xx yy	1/4"	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

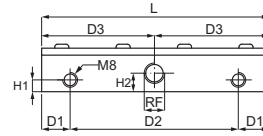
UEA 0525 E31 yy



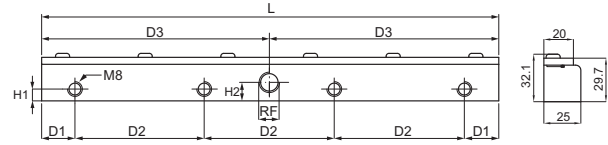
**HIGH EFFICIENCY AIR KNIVES**

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.

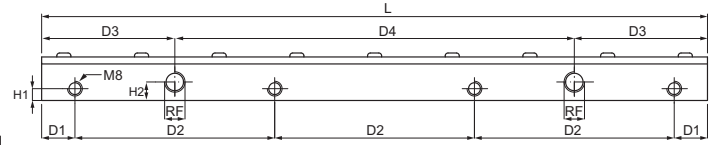
- Length: 150 mm, 300 mm, 450 mm, 600 mm
- Typical applications: Water removal from surfaces  
Flocks and water blow off  
Water removal before stick and print
- Max working temperature **LT** 95°C
- Max working pressure **LP** 7 bar
- Thread specification **BSP**, **NPT**
- Thread size **1/4"**
- Materials 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**

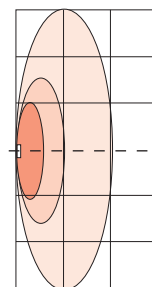
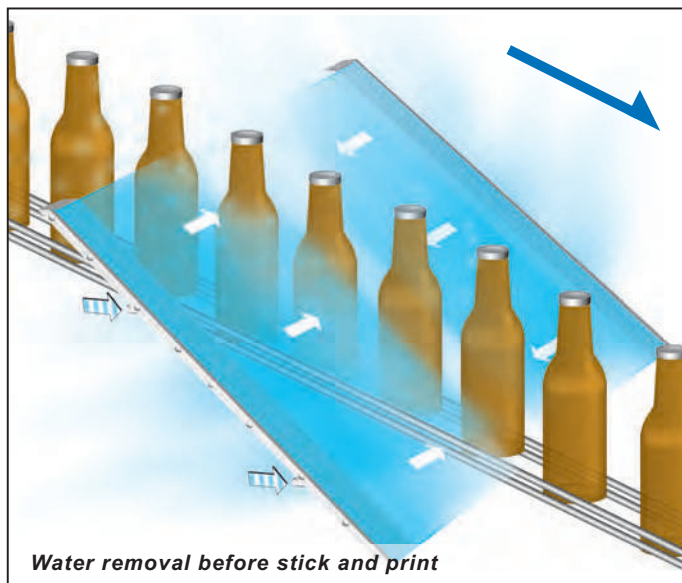
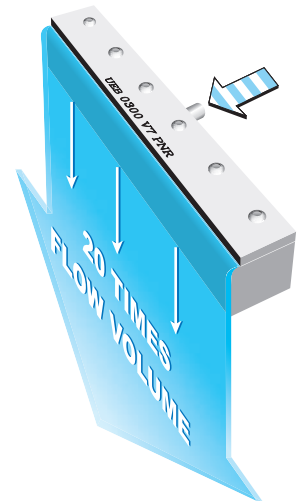
Code	RF inch	Air capacity (Nm <sup>3</sup> /min)										Dimensions						W kg	
		AI	AO	AI	AO	AI	AO	AI	AO	AI	AO	D1 mm	D2 mm	D3 mm	D4 mm	H1 mm	H2 mm		L mm
<b>UEB 0150 xx yy</b>	1/4"	0.26	4.70	0.34	6.00	0.42	7.10	0.51	8.60	0.60	10.6	20.0	110	75	-	8	12.5	150	0.3
<b>UEB 0300 xx yy</b>		0.52	9.40	0.68	12.0	0.84	14.2	1.02	17.2	1.20	21.2	22.5	85	150	-			300	0.7
<b>UEB 0450 xx yy</b>		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
<b>UEB 0600 xx yy</b>		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



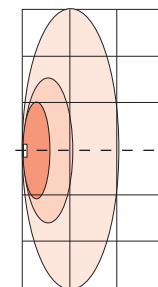
The table shows the air capacity as a function of the air pressure whereas the below graphs show the noise level as a function of the front and side distances from the nozzle outlet at an operating pressure of 2 bar. The air flow leaving the nozzle orifice drags along ambient air, the air blade produced 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.

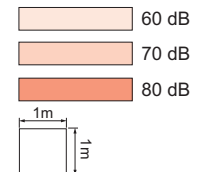


**UEB 0150**



**UEB 0300**

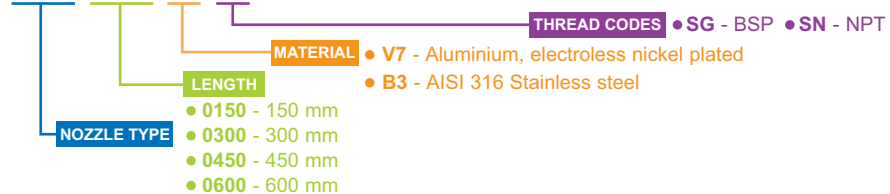
Noise level diagram at 2 bar air pressure.

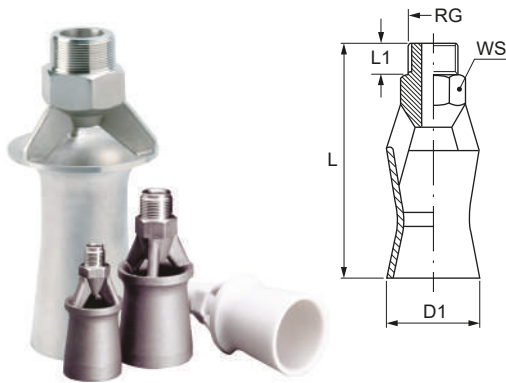


**HOW TO MAKE UP THE NOZZLE CODE**

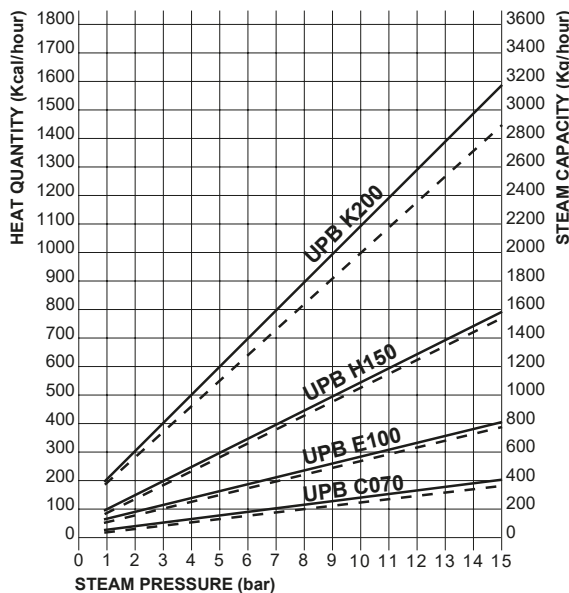
EX.: UEB 0150 V7SG

**UEB 0150 xx yy**





STEAM CONSUMPTION CHART



Heat quantity —————  
Steam pressure - - - - -

The table above shows the working condition of UPB C070 B31 eductor when set at 50 cm depth.

## 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 eductor. 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.

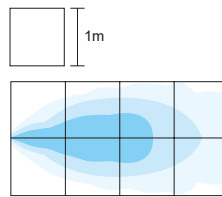
- **Typical applications** Liquid mixing in electroplating and automotive paint factories
- **Thread specification** BSPT, BSPP, NPT
- **Max working temperature** LT 80°C (PP), 90°C (PVDF)
- **Materials**
  - B31** AISI 316L Stainless steel
  - D6** PP, chemically bonded fiberglass
  - D82** PVDF, moulded (3/8" Parallel Male thread)

Code	RG inch	D mm	Flow rate at pressure (l/min) (bar)					D1 mm	L mm	L1 mm	WS mm
			1.0	2.0	3.0	4.0	5.0				
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											
UPB H150 B31Sx	1 1/2"	15.0	155	220	268	310	346	110	225	30	60
UPB K200 B31Sx	2"	20.0	206	287	357	410	460	102	295	30	70

EX.: UPB C070 B31Sx — x = Thread codes

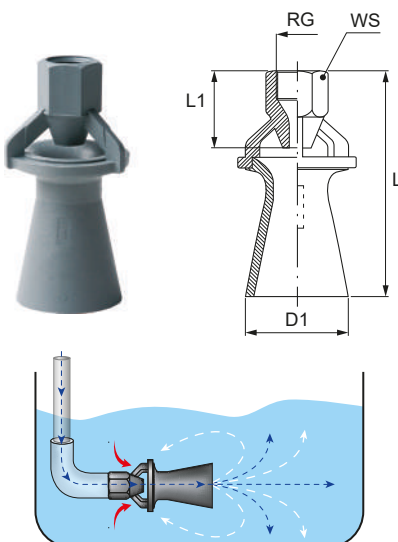
- B** = BSPT, S.Steel only
- G** = BSPP, PP & PVDF
- N** = NPT, all materials

We are at your disposal to realize UPB eductors on demand: PNR will give you the code and the dimensions



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 eductor. 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, NPT
- **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)					D1 mm	L mm	L1 mm	WS mm
			1.0	2.0	3.0	4.0	5.0				
UPD E100 D6xx	3/4"	10	63	89	109	126	141	75	147	30	34
UPD H150 D6Sxx	1 1/2"	15	141	199	243	281	313	80	225	45	60
UPD H150 B31Sxx	1 1/2"	15	141	199	243	281	313	80	239	83	60
UPD K200 B31Sxx	2"	20	206	287	357	412	460	102	295	83	70

EX.: UPD E100 D6xx — xx = Thread codes

- SG** - BSP
- SN** - NPT



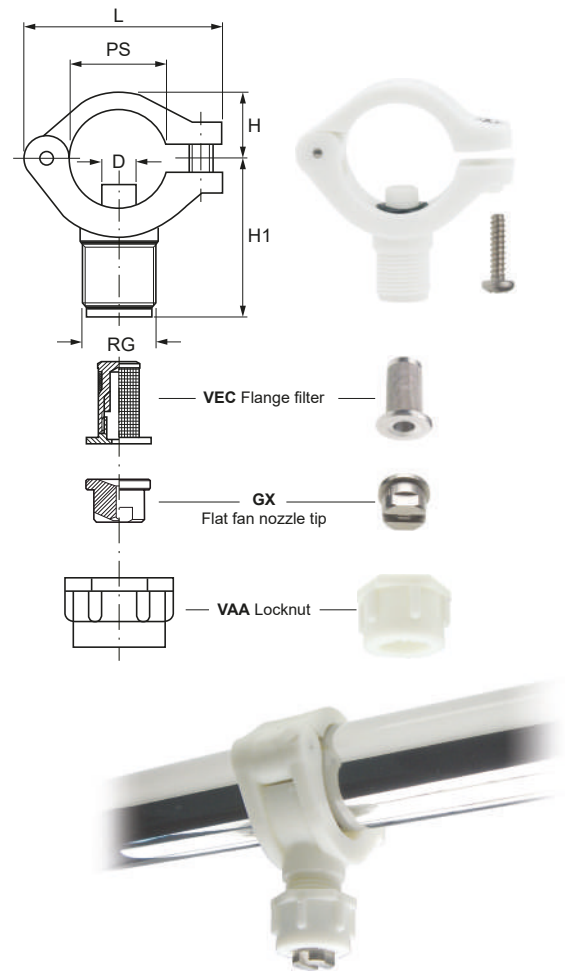
**PLASTIC PIPE CLAMPS**

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

Code	RG poll	PS poll	PD mm	D mm	H mm	H1 mm	L mm	W g
ZPB 0050 D6	3/8"	1/2"	21/22	7.60	16.0	36.0	44.0	20.0
ZPB 0075 D6		3/4"	26/27	7.60	17.5	39.0	51.0	26.0
ZPB 0100 D6		1"	33/34	10.8	21.0	46.0	61.0	30.0
ZPB 0125 D6		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



( PLASTIC BAYONET PIPE CLAMPS ) **ZPC**

**PLASTIC BAYONET PIPE CLAMPS**

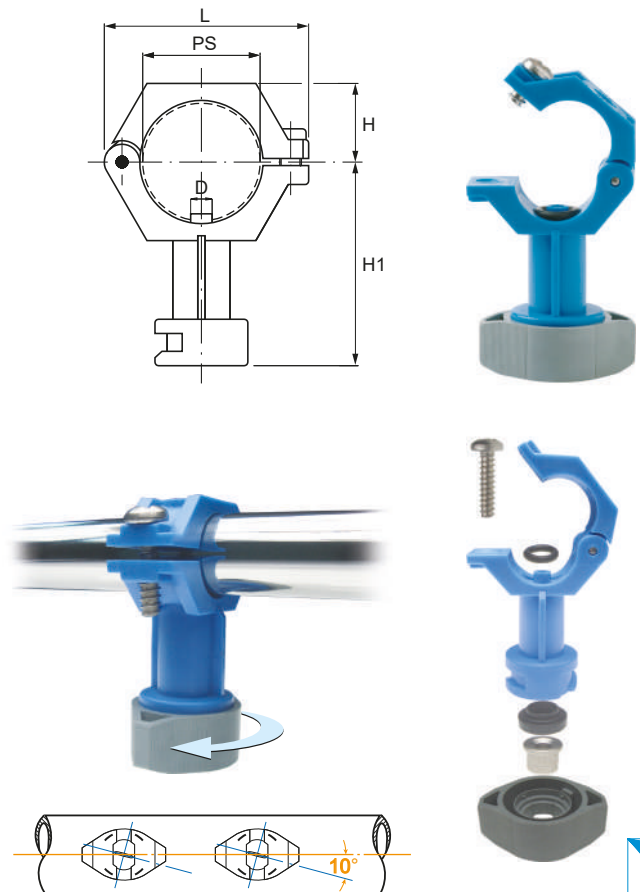
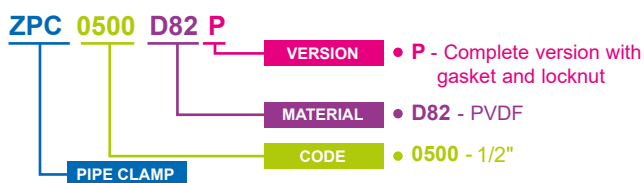
ZPC plastic bayonet pipe clamps serve for a quick and easy instalment of GX type flat fan flanged nozzles.

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.

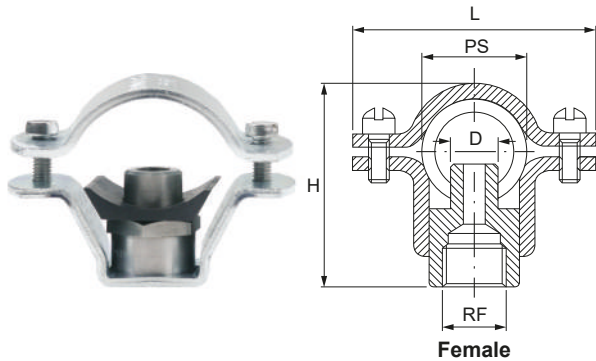
- **Typical applications** PCB wet process  
Pre-treatment for coating process
- **Pipe size** PS 1/2"
- **Max working temperature** LT 90°C
- **Max working pressure** LP 8 bar
- **Materials** Body **D82** PVDF, moulded  
O-ring **E7** Viton  
Metal parts **B3** AISI 316 Stainless steel

Code	PS poll	PD mm	D mm	H mm	H1 mm	L mm	W g
ZPC 0500 D82P	1/2"	20/22	7.6	16.0	36.0	44.0	21.0

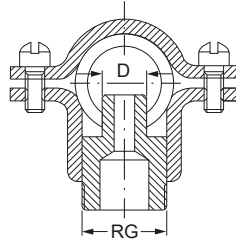
HOW TO MAKE UP THE **PRODUCT CODE** EX.: ZPC 0500 D82P







Female



Male



ZPM Metal clamps + PF Hollow cone nozzle

## METAL PIPE CLAMPS

ZPM metal pipe clamps are suitable for a quick, easy and safe installation 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", 1 1/4", 1 1/2", 2", 2 1/2"
- **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	1 1/4"	1/4"	9	45	18	68	71
ZPM 0125 xxYW		3/8"					
ZPM 0125 xxYW		1/2"					
ZPM 0150 xxYW	1 1/2"	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	2 1/2"	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 greater 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.

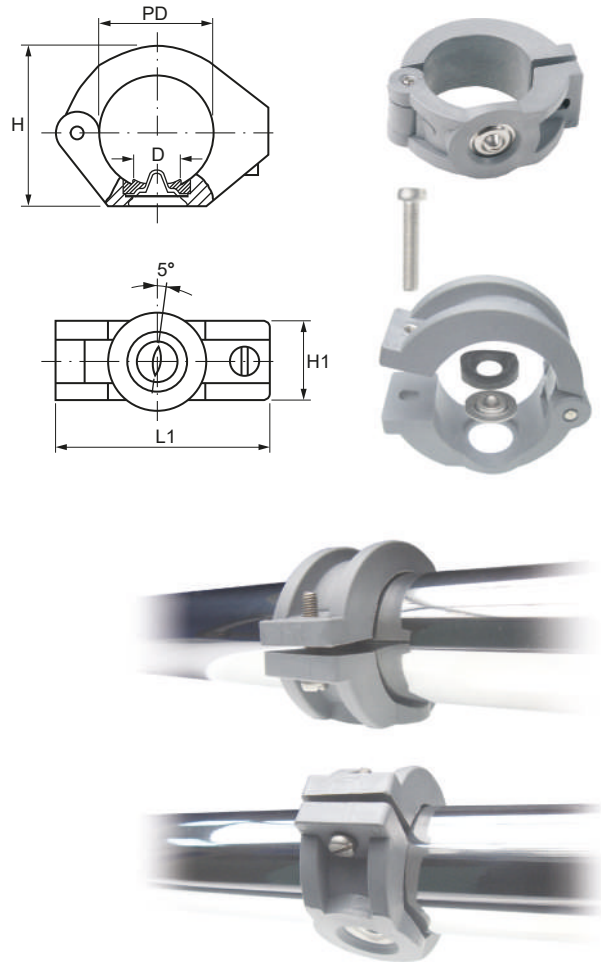
You must drill a 19 mm diameter hole on the pipe, insert the clamp into it and fix it with screws.

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

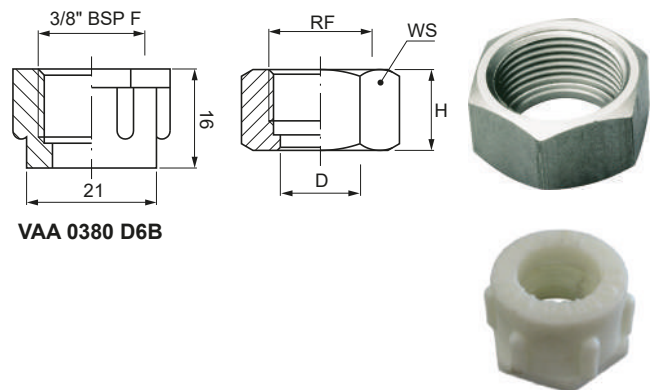
HOW TO MAKE UP THE **PRODUCT CODE** EX.: ZPH 0150 D6



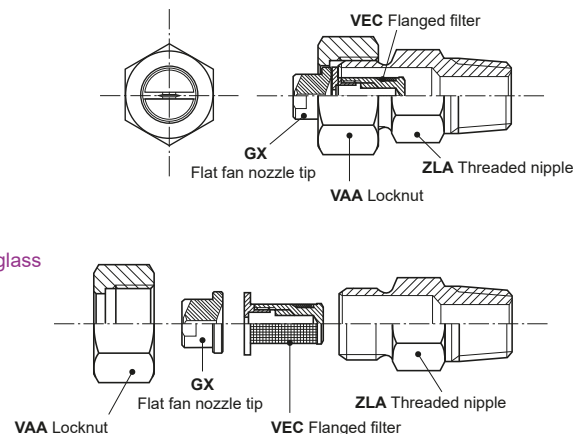
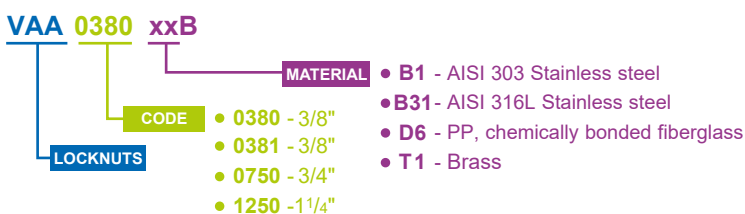
**LOCKNUTS**

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

Code	RF inch	D mm	H mm	WS mm	Material	
					Plastic	Metal
VAA 0380 <b>xxB</b>	3/8"	12.9	12	22	•	•
VAA 0381 <b>xxB</b>	3/8"	12.5	15	22		•
VAA 0750 <b>xxB</b>	3/4"	20.5	16	32		•
VAA 1250 <b>xxB</b>	1 1/4"	32.5	27	50		•

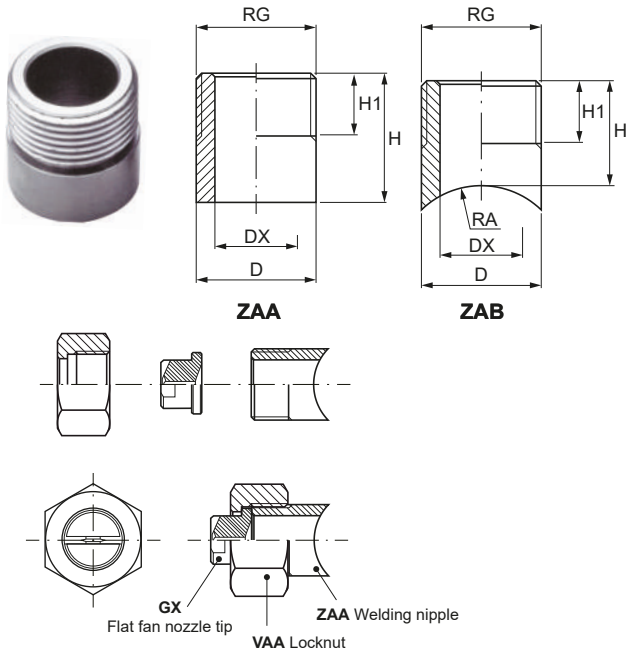


HOW TO MAKE UP THE **PRODUCT CODE** EX.: VAA 0380 B1B



# ZAA / ZAB ( STANDARD WELD NIPPLES )

www.pnr.eu



## STANDARD WELD NIPPLES

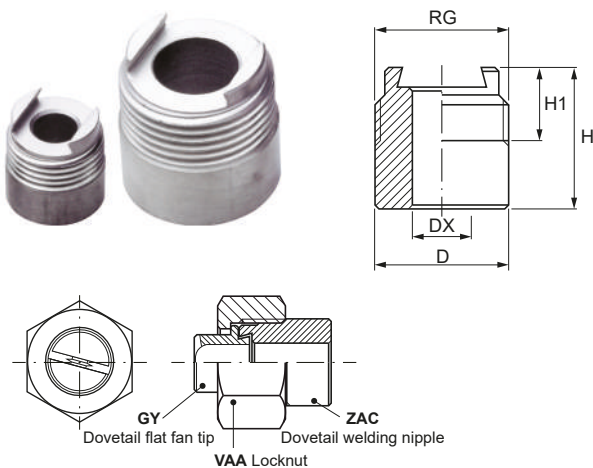
ZAA/ZAB welding nipples allow the assembly of GX, BX or KX series nozzle tips onto pipes and spray manifolds. One end of the nipple is fixed onto the pipe and the other to the nozzle tip. ZAA is a standard model with a flat welding surface. ZAB is radiused type with a curved welding surface that fits 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
<b>Standard</b>							
ZAA C018 xxG	3/8"	18	10	17	11.5	-	20
ZAA E027 xxG	3/4"	27	15	27	18.0	-	61
<b>Radiused</b>							
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

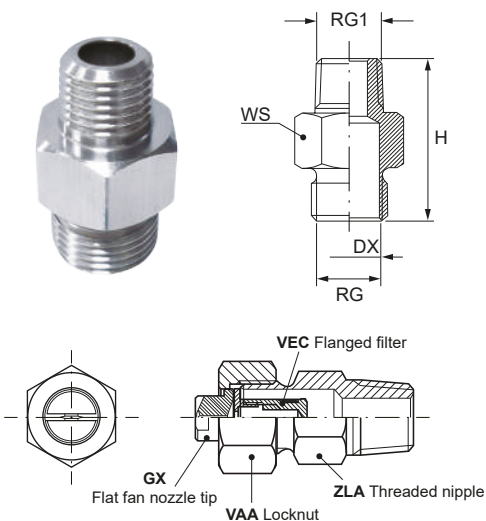
ZAC welding nipples are manufactured with a dovetail end to match GY type dovetail nozzle tips.

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", 1 1/4"
- **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	1 1/4"	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
- **Material** 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	RG1					
							1/8"	1/4"	3/8"	1/2"	3/4"	
ZLx 1212 xxB	1/8"	1/8"	5.00	25.0	14	18	1/8"	•	•	•	•	•
ZLx 2525 xxB	1/4"	1/4"	7.50	29.0	19	20	1/4"		•	•	•	•
ZLx 3838 xxB	3/8"	3/8"	10.0	35.0	19	25	3/8"	•	•	•	•	•
ZLx 5050 xxB	1/2"	1/2"	15.0	38.0	27	50	1/2"			•	•	•
ZLx 7575 xxB	3/4"	3/4"	18.0	40.0	32	90	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.

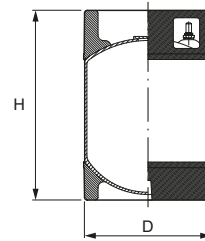
- **Inlet / Outlet diameter** Quick connection or 1/4" PT (Female)
- **Max working pressure** LP 4,9 bar
- **Materials**
  - Body **B2** AISI 304 Stainless steel
  - Base & Handles **E8** Synthetic rubber (NBR)
  - Quick connection **E31** Delrin®
  - O-Ring **E0** EPDM

Code	Cover and nipples	CA	D	H	W	LP
Cover only		liters	mm	mm	kg	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**

<b>XUM R110 E31</b>	<b>Liquid connection kit</b> connection: 7/16-20UNF	
<b>XUM R100 E31</b>	<b>Air connection kit</b> 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



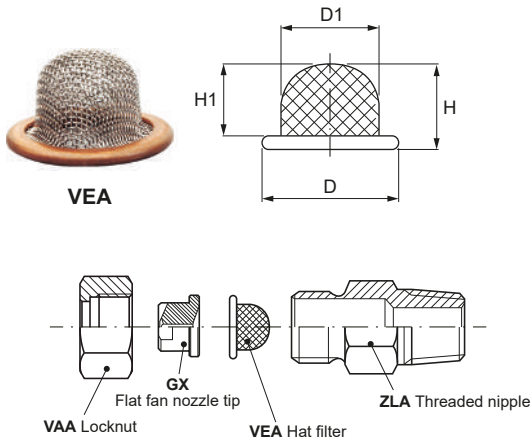
**PRESSURE TANK OPERATION**

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.





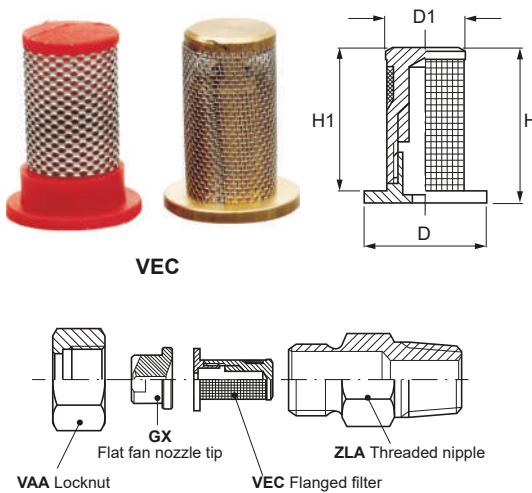
## HAT FILTERS

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
VEA 0238 T9					75	BX FX
VEA 0338 T9					50	KX

# VEC ( FLANGED FILTERS )



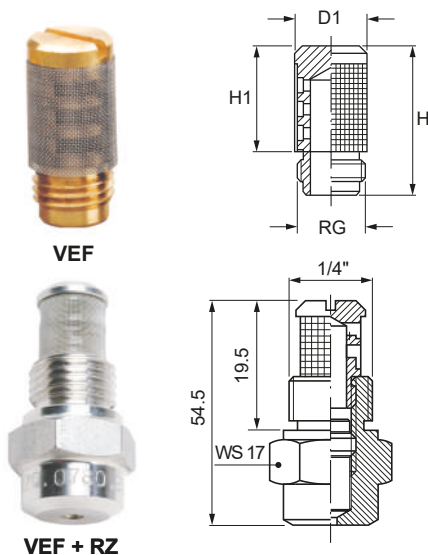
## FLANGED FILTERS

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
VEC 0238 xx					75	BX FX
VEC 0338 xx					50	KX

# VEF ( THREADED FILTERS )



## 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
- **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	<b>RX, RZ</b>
VEF 0138 xx	10.2	3/8"UNF	21.0	15.0	100	<b>JB(1/4")</b>
VEF 0238 xx					75	
VEF 0338 xx					50	
VEF 0411 xx	8.1	M7	15.7	13.2	120	<b>JA(1/8")</b>



**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
    - B2** AISI 304 Stainless steel
- Wire net

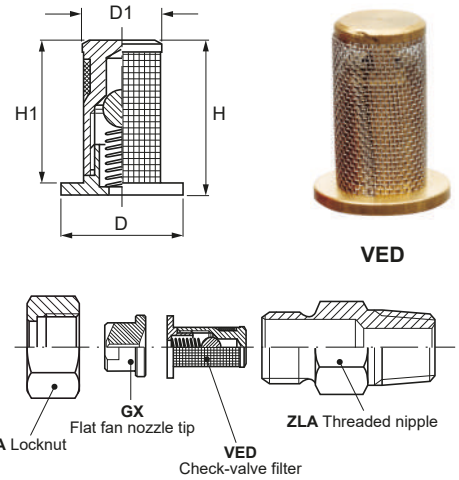






Table for body material: **AISI 303, AISI 316L, brass**

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**

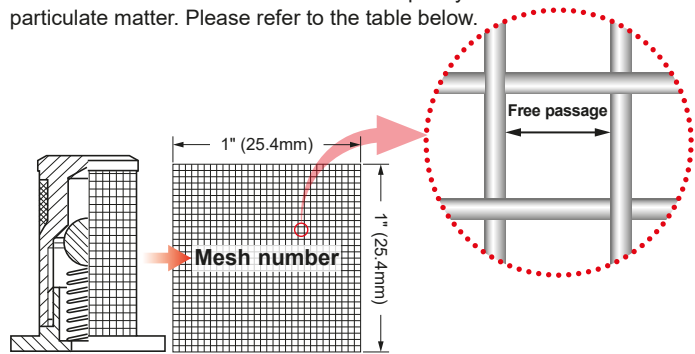
Code	D mm	D1 mm	H mm	H1 mm	M mesh	Opening bar
VED 0138 xxB	15.0	10.0	20.0	18.5	100	0.70
VED 0238 xxB	15.0	10.0	20.0	18.5	80	0.70
VED 0338 xxB	15.0	10.0	20.0	18.5	50	0.70
VED 0138 xxE	15.0	10.0	20.0	18.5	100	2.00
VED 0338 xxE	15.0	10.0	20.0	18.5	50	2.00

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

Code	VEC	VED	VEF	VEA
<b>Appearance</b>				
	Flanged	Check-valve	Threaded	Hat
<b>B1</b> AISI 303	•	•	•	
<b>B31</b> AISI 316L	•	•	•	
<b>D3</b> Nylon	•	•		
<b>T1</b> Brass	•	•	•	
<b>T9</b> 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 ?**

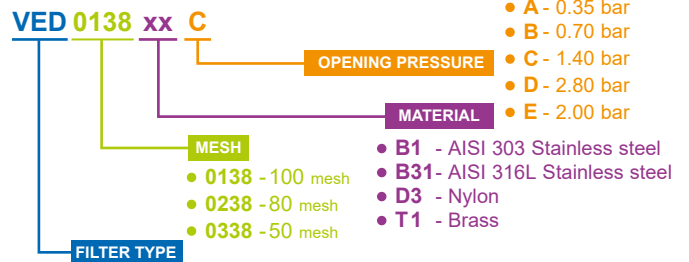
The largest filter free passage < nozzle orifice

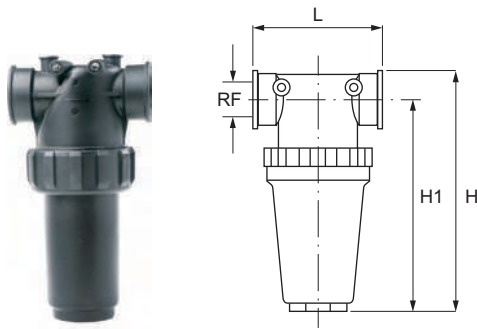
Mesh number	Free passage mm
30 - 32	0.6 - 0.58
50	0.3
60	0.25
75	0.2
80	0.18
100	0.15
150	0.1
200	0.075

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





## 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", 1 1/4", 1 1/2"
- Max steam pressure LP from 10 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	1 1/4"	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	1 1/2"	279	239	146	250	XVE H060 DA2	32
VEH 0151 D21						XVE H061 DA2	50
VEH 0152 D21						XVE H062 DA2	100

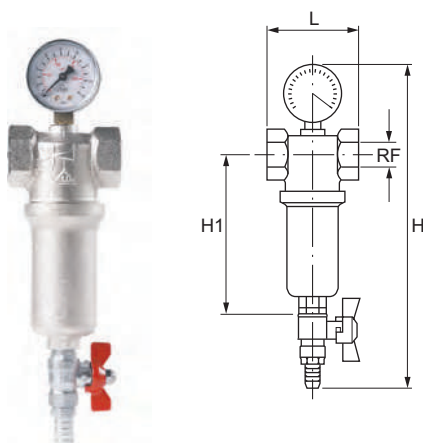
### HOW TO MAKE UP THE FILTER CODE

EX.: VEH 0050 D21

VEH 0050 D21



# VEL ( BRASS BODY FILTERS )



## BRASS BODY FILTERS

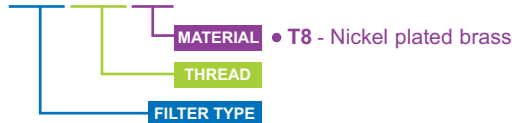
VEL type filters with body in brass are the ideal solution for small plants requiring easy cleaning and maintenance. When necessary, simply open the valve at the bottom of the filter and the dirt contained inside the cartridge is easily expelled. A manometer on the filter head shows the outlet pressure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

- Inlet / Outlet thread size 1/2", 3/4", 1", 1 1/4", 1 1/2", 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

### HOW TO MAKE UP THE FILTER CODE

EX.: VEL 0039 T8

VEL 0039 T8

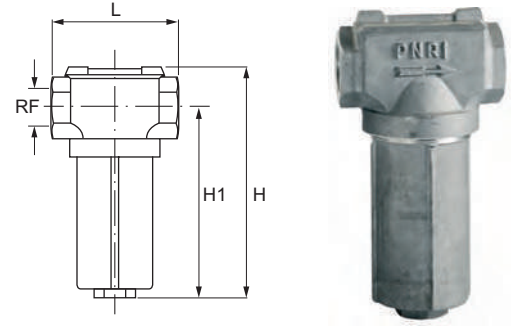


Code	RF inch BSPP	H mm	H1 mm	L mm	Q l/min	Cartridge	M mesh
VEL 0039 T8	3/8"	285	133	50	14	XVE L171 B2	150
VEL 0051 T8	1/2"	288	136	56	25		
VEL 0076 T8	3/4"	287	132	67	38	XVE L172 B2	
VEL 0101 T8	1"	295	137	80	72		
VEL 0126 T8	1 1/4"	343	169	92	118	XVE L200 B2	
VEL 0151 T8	1 1/2"	356	179	110	178	XVE L201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

**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", 1 1/4", 1 1/2", 2", 2 1/2", 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

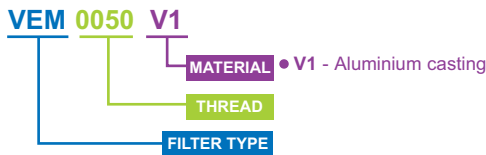


Mesh number	Free passage mm
30 - 32	0.6 - 0.58
50	0.3
60	0.25
75	0.2
80	0.18
100	0.15
150	0.1
200	0.075

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	1 1/4"	270	210	140	30	280	XVE M150 B2	60	1.6
VEM 0126 V1							XVE M151 B2	80	
VEM 0150 V1	1 1/2"	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	2 1/2"	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	

**HOW TO MAKE UP THE FILTER CODE**

EX.: VEM 0050 V1

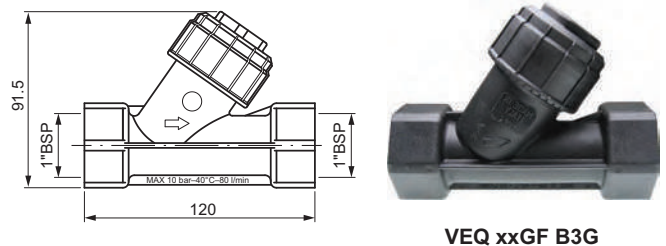


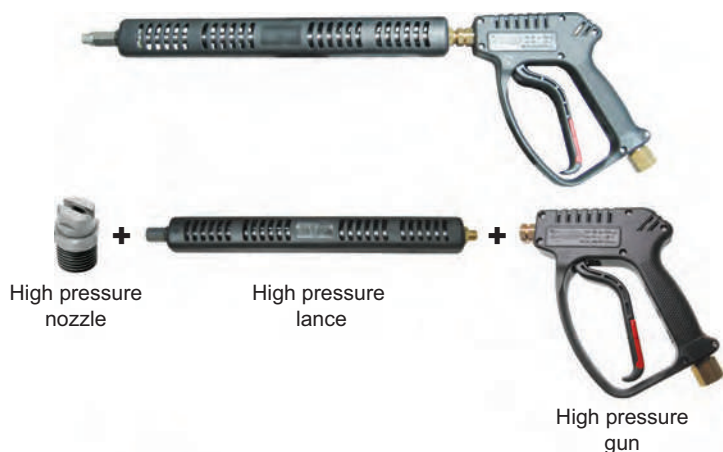
( "Y" STYLE FILTER ) **VEQ**

**"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 1/2" 3/4" 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





## 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** series economical and efficient spray guns are widely applied in industrial high pressure cleaning and car wash.

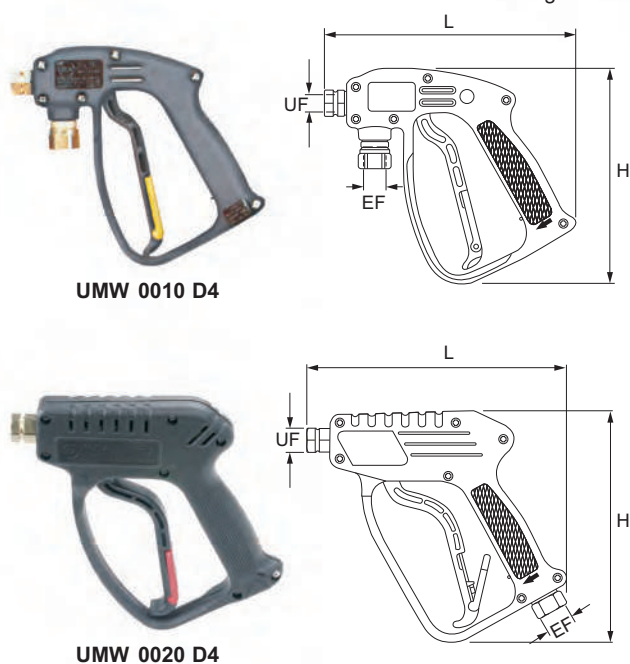
- Nominal pressure **LP** 200 bar
- Max operation pressure **LT** 220 bar
- Max operation temperature **LQ** 160 °C
- Max capacity **LQ** 30 l/min

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

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

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

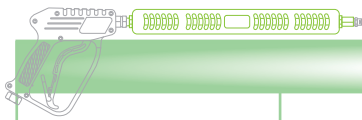


UMW 0010 D4

UMW 0020 D4

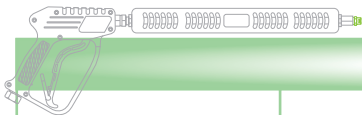
## HIGH PRESSURE GUNS

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	<b>UMW 0020 D4</b>	<b>UMW 0021 D4</b>	<b>UMW 0020 B1</b>
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**

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



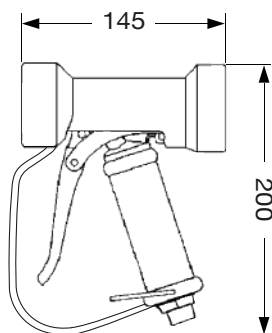
**HIGH PRESSURE NOZZLES**

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





UMV 2210 xx



## 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 chosen for each individual job.

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.

### Materials

<b>Body</b>	T2 Brass casting, chrome plated B31 AISI 316L Stainless steel
<b>Lining</b>	E0 EPDM
<b>Steam</b>	B3 AISI 316 Stainless steel
<b>Trigger</b>	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

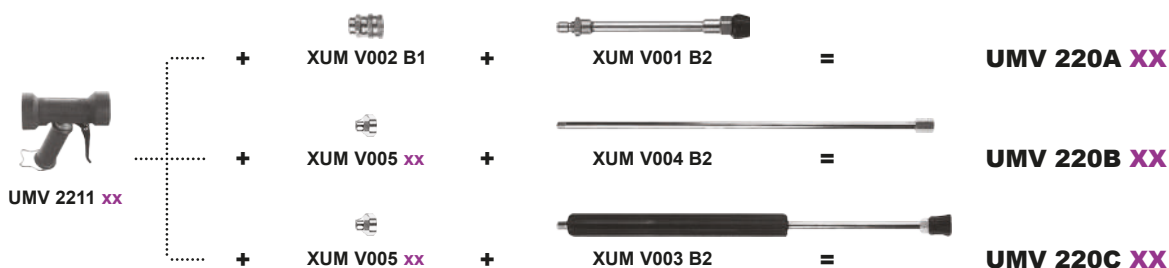
21 lpm @ 3 bar	UMV 2210
61 lpm @ 3 bar	UMV 2211

### UMV 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 ending with (xx) must be completed with the code of the material, substituting the (xx) with the code T2 for chrome plated brass or B31 for AISI 316L stainless steel.



### Single components

Code	Components
XUM V001 B2	Foam lance
XUM V002 B1	Quick connect coupling for foam lance, 1/2" F
XUM V003 B2	Universal lance, 1/4" F out, heat protection
XUM V004 B2	Universal lance, 1/4" F out, zinc-plated steel
XUM V005 xx	Nipple, 1/4" F x 1/2" F

Please note that codes ending with (xx) must be completed with the code of the material, substituting the (xx) with the code T8 for nickel 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

**QUICK COUPLINGS**

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** **B3** AISI 316 Stainless steel

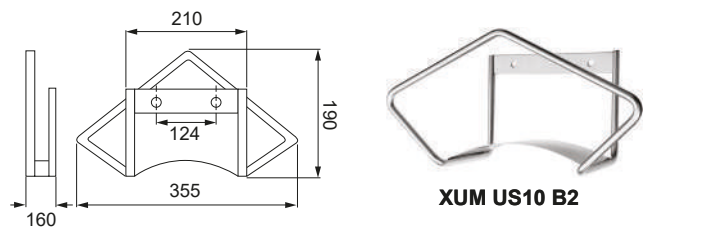
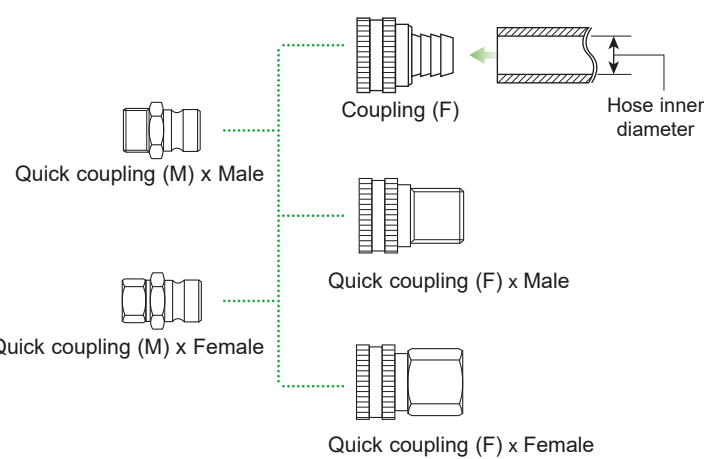
Code	Quick coupling tipo	Thread inch	Diameter mm
XUM VQF1 B3	Female	1/2" M	
XUM VQF2 B3	Female	1/2" F	
XUM VQF3 B3	Female	3/4" M	
XUM VQF4 B3	Female	3/4" F	
XUM VQF5 B3*	Female		13
XUM VQF6 B3*	Female		19
XUM VQM1 B3	Male	1/2" M	
XUM VQM2 B3	Male	1/2" F	
XUM VQM3 B3	Male	3/4" M	
XUM VQM4 B3	Male	3/4" F	

\* These couplings have a hose shank with the shown dia size.

**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



SPRAY GUNS

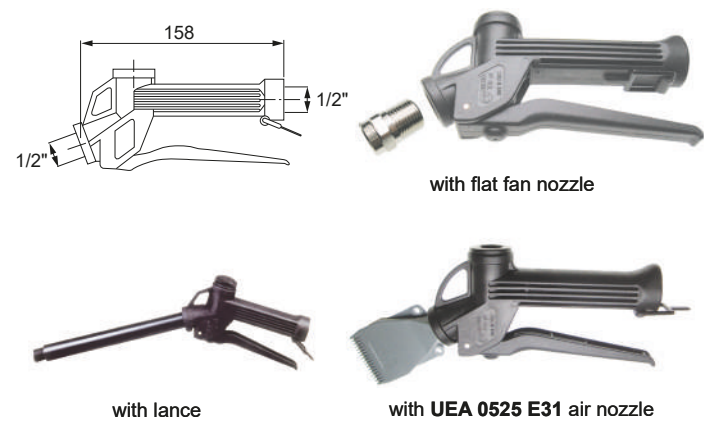
( PORTABLE WATER GUN ) **UMS**

**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





**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 pulled 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	
UMU HC20 B2HSB					3/8"	20	18	530	550	300	XUM US20 B2
UMU HD20 B2HSB					1/2"	20	18	530	550	300	

**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

REWIND REELS

( 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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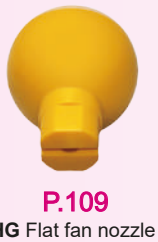
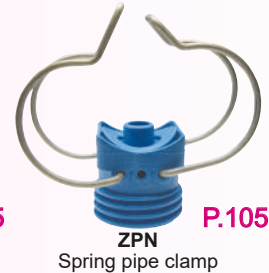
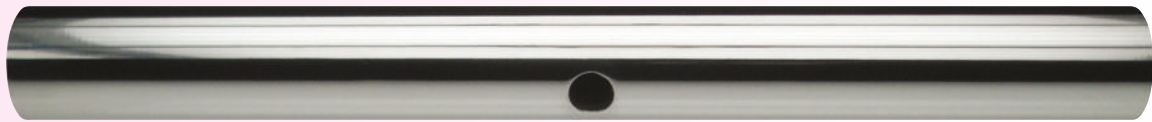
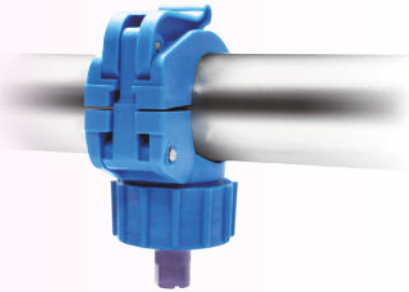
100% RESPONSIVE

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.



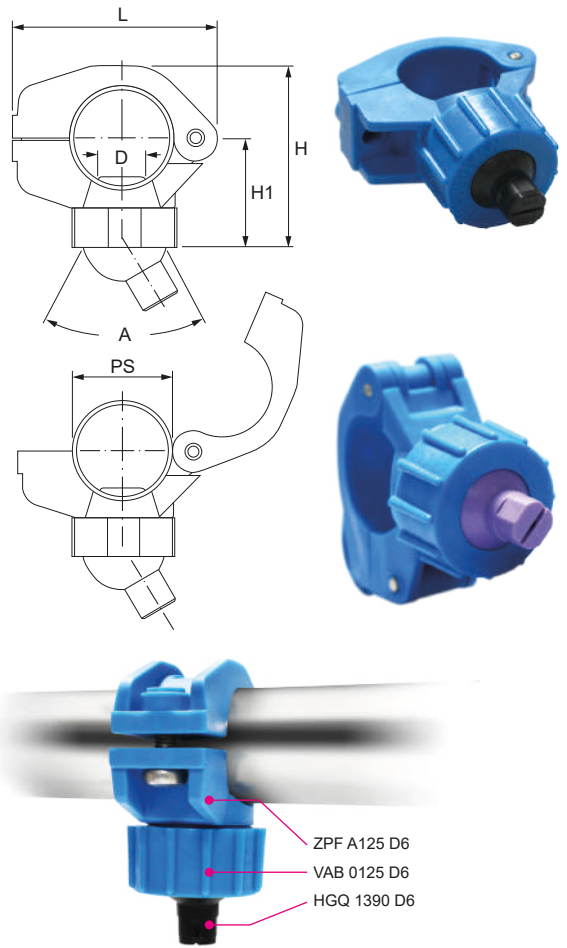
**SWIVEL NOZZLE CLAMPS**

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 fiberglass 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	1 1/4"	41/43	20.0	83	54	84	40°	85
ZPF B125 D6			17.0					
ZPF C125 D6			14.0					
ZPF A150 D6	1 1/2"	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



CLIP-ON NOZZLES

( SWIVEL NOZZLE CAM AND LEVER CLAMPS ) **ZPQ**

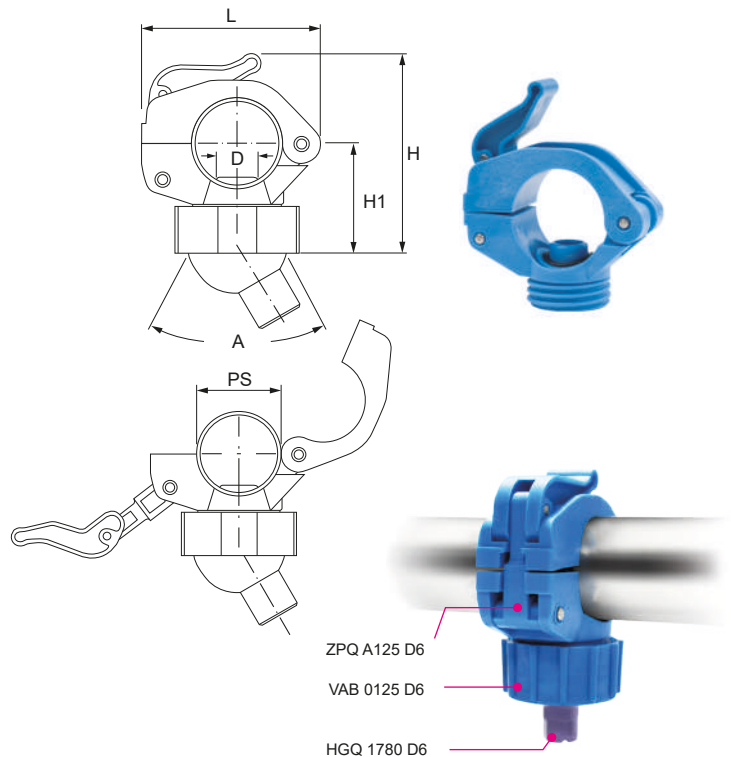
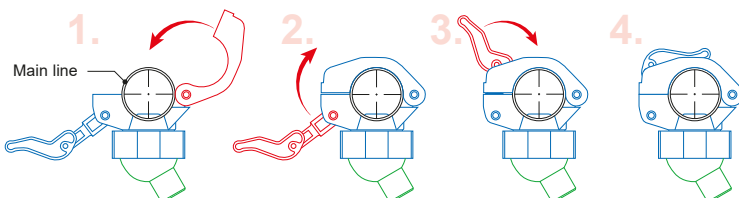
**SWIVEL NOZZLE CAM AND LEVER CLAMPS**

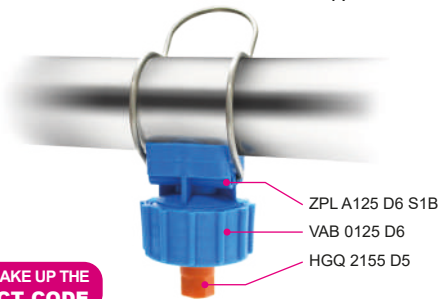
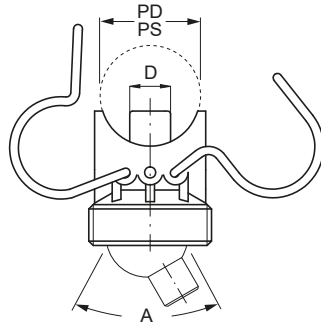
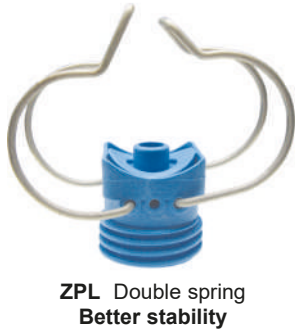
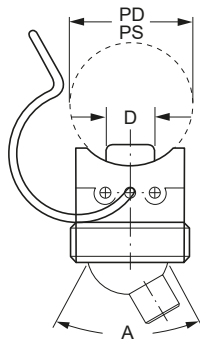
ZPQ cam and lever clamps are specially designed for HGQ, RGN and ZBA ball nozzles. Only three steps to install them on a pipe: drill a hole, wrap the cam around the pipe and pull the lever down to block it. No need of tools. The body is in PP chemically bonded fiberglass whereas accessorial bolts and 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	1 1/4"	42/43	20.0	93	41	84	40°	87
ZPQ B125 D6			17.0					
ZPQ A150 D6	1 1/2"	48/49	20.0	96	44	95	40°	97
ZPQ B150 D6			17.0					

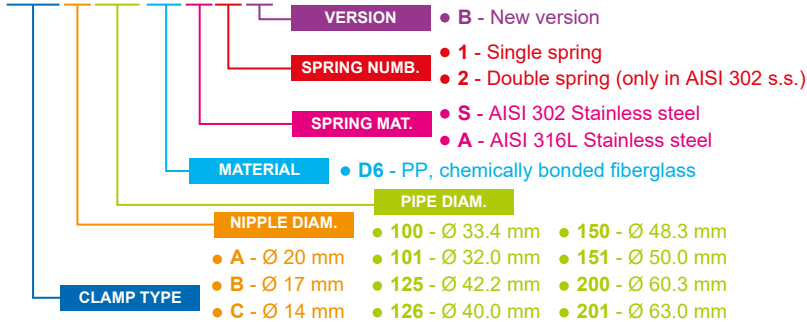
**HOW TO INSTALL THE SWIVEL NOZZLE CAM & LEVER CLAMPS**





**HOW TO MAKE UP THE PRODUCT CODE**

ZPL A 100 D6 X Y Z



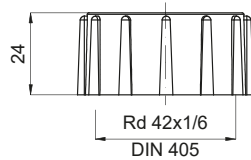
## SWIVEL NOZZLE SPRING PIPE CLAMPS

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

Code	PS		PD mm	D mm	A deg
	poll	DN			
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	1 1/4"	DN32	42.2	20.0	40°
ZPL B125 D6 XYZ	1 1/4"	DN32	42.2	17.0	40°
ZPL C125 D6 XYZ	1 1/4"	DN32	42.2	14.0	40°
ZPL A126 D6 XYZ	1 1/4"	DN32	40.0	20.0	40°
ZPL B126 D6 XYZ	1 1/4"	DN32	40.0	17.0	40°
ZPL C126 D6 XYZ	1 1/4"	DN32	40.0	14.0	40°
ZPL A150 D6 XYZ	1 1/2"	DN40	48.3	20.0	40°
ZPL B150 D6 XYZ	1 1/2"	DN40	48.3	17.0	40°
ZPL C150 D6 XYZ	1 1/2"	DN40	48.3	14.0	40°
ZPL A151 D6 XYZ	1 1/2"	DN40	50.0	20.0	40°
ZPL B151 D6 XYZ	1 1/2"	DN40	50.0	17.0	40°
ZPL C151 D6 XYZ	1 1/2"	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°

# VAB ( PLASTIC LOCKNUTS )



## 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 fiberglass 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



CLIP-ON NOZZLES



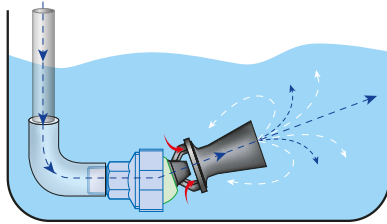
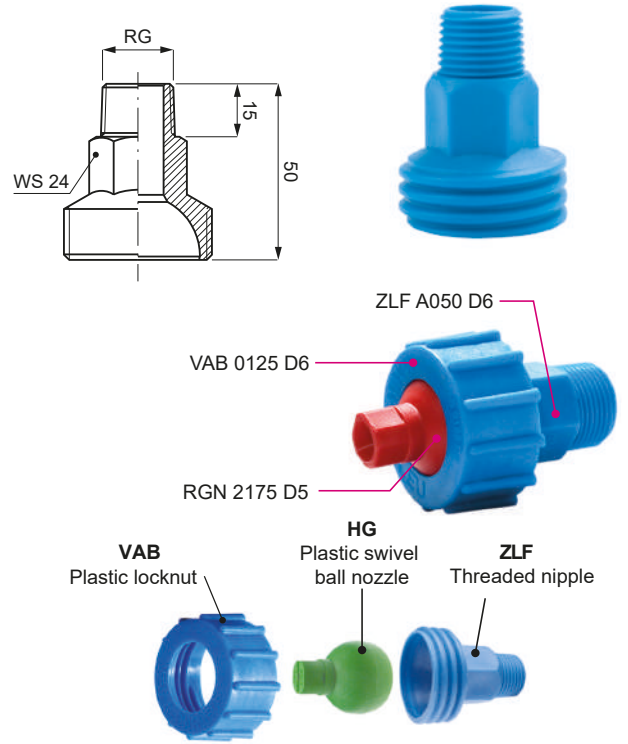
**SWIVEL NOZZLE THREADED NIPPLE**

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 fibreglass

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

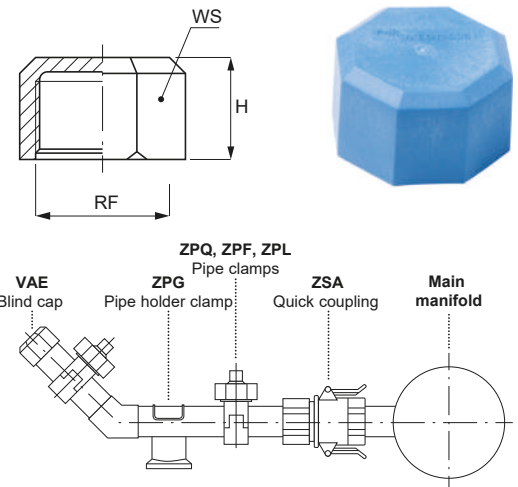
( PLASTIC END CAPS ) **VAE**

**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 fibreglass
- **Max working temperature**  
LT 80°C

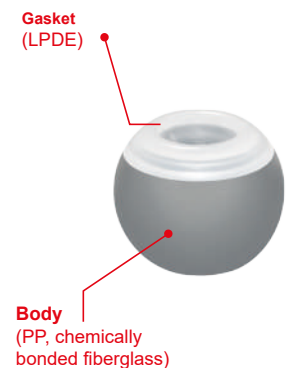


( THREADED AND QUICK-FIT SPHERES ) **ZBA**

**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.

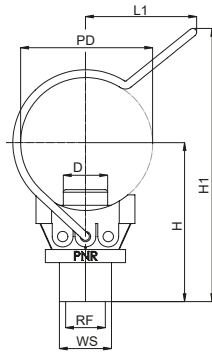
Code	Connection			Type	L mm	D mm	H mm
	RF/RG	M/F	BSP/NPT				
ZBA 0000 D5x	Cieca	---	---	---	35.0	17.5	27.5
ZBA 0039 D5	3/8"	M	BSP	Mobile	35.0	20.0	27.3
ZBA GAT1 D5x	1/8"	F	BSP	Mobile	35.0	20.0	27.3
ZBA GBT1 D5x	1/4"	F	BSP	Mobile	35.0	20.0	27.3
ZBA GCT1 D5x	3/8"	F	BSP	Mobile	35.0	20.0	27.3
ZBA GDT1 D5x	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



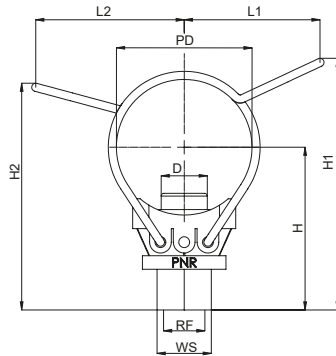




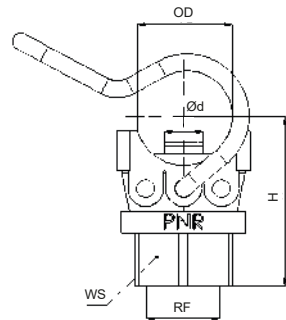
ZPN Single spring



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 widely 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  
O-ring **B31** AISI 316L Stainless steel  
**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 poll	PS		PD mm	D mm	WS mm
		poll	DN			
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 poll	OD poll	Ød mm	WS mm	H mm	Colour
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

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

### HOW TO MAKE UP THE PRODUCT CODE

ZPN MINI

ZPN E 050 D6 X Y Z

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

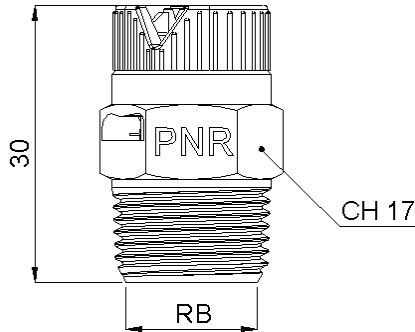
**MINI QUICK-FIT NOZZLES**

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



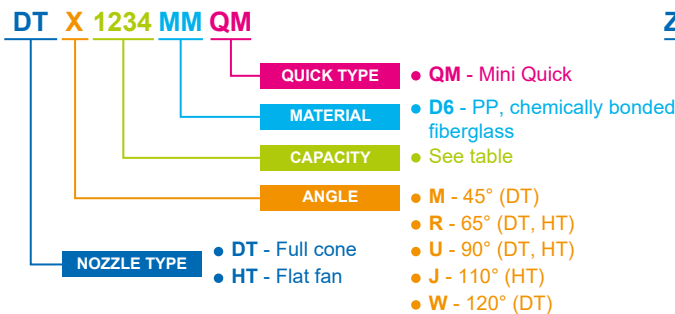
DT/QM + Gasket + Nipple    HT/QM + Gasket + Nipple



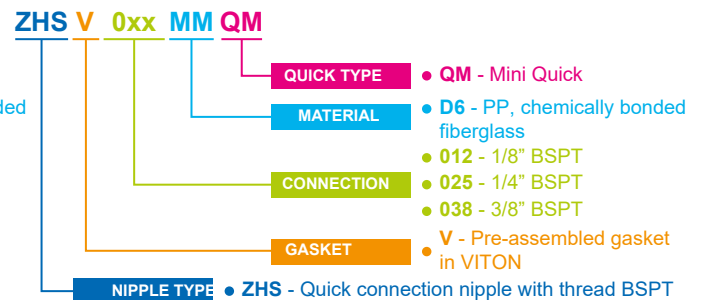
Code	Capacity at different pressure values (l/min) (bar)					Colour
	1.0	2.0	3.0	4.0	5.0	
DTx 0780 D6QM	0.45	0.64	0.78	0.90	1.01	Grey
DTx 1100 D6QM	0.58	0.82	1.00	1.15	1.29	Brown
DTx 1120 D6QM	0.69	0.98	1.20	1.39	1.55	Black
DTx 1150 D6QM	0.87	1.22	1.50	1.73	1.94	L. orange
DTx 1190 D6QM	1.10	1.55	1.90	2.19	2.45	L. green
DTx 1235 D6QM	1.36	1.92	2.35	2.71	3.03	L. yellow
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
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)					Colour
	1.0	2.0	3.0	4.0	5.0	
HTx 0780 D6QM	0.45	0.64	0.78	0.78	1.01	Grey
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
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
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**



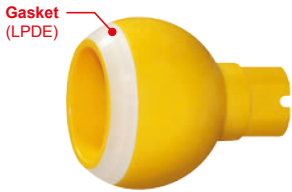
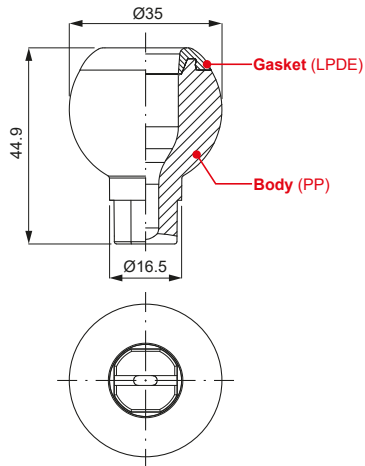
**HOW TO MAKE UP THE PRODUCT CODE**



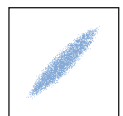
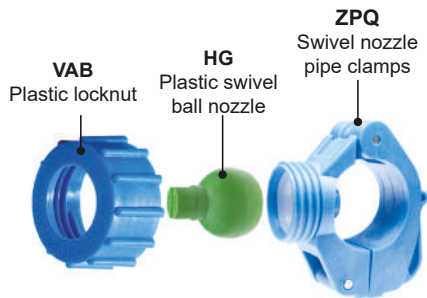
**NOTE:** each nozzle, both DT/QM and HT/QM, of any capacity, can be mounted on all three types of nipples.



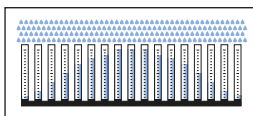
**HGQ 2117 D5**  
Flat fan nozzle



Gasket (LPDE)



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 fiberglass to offer the best stability at high temperatures and resistance to chemicals.

	Code	Capacity at different pressure values (l/min) (bar)					Color	W g
60°	HGQ 1390 xx	1.70	2.00	2.40	2.90	3.30	Black	16
	HGQ 1770 xx	3.20	3.80	4.50	5.50	6.40	Purple	
	HGQ 1980 xx	4.00	4.70	5.60	6.90	8.00	Brown	
	HGQ 2117 xx	4.60	5.50	6.50	8.00	9.30	Yellow	
	HGQ 2135 xx	5.50	6.50	7.80	9.50	11.0	Gray	
	HGQ 2155 xx	6.20	7.40	8.80	10.8	12.5	Red	
	HGQ 2195 xx	7.80	9.20	11.0	13.8	15.6	Green	
	HGQ 2230 xx	9.50	11.3	13.5	16.3	19.1	Blue	
	HGQ 2270 xx	10.9	12.8	15.4	18.8	21.7	Sky blue	
	HGQ 2337 xx	13.8	16.4	19.5	24.0	27.7	White	
	HGQ 2410 xx	16.7	19.8	23.6	29.0	33.5	Pink	

Pressure (bar) 0,5 0,7 1,0 1,5 2,0

### HOLLOW CONE NOZZLES

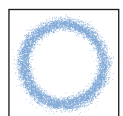
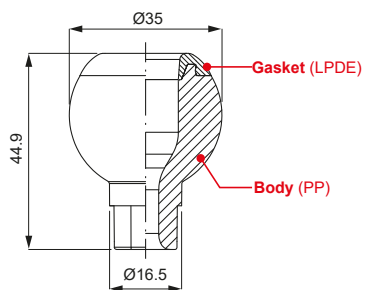
RGN hollow cone nozzles have a 50° spray angle and offer a wide range of flow rates, all identified by a particular nozzle colour to avoid any possible confusion. The material is top quality PP, chemically bonded fiberglass to offer the best stability at high temperatures and resistance to chemicals.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

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

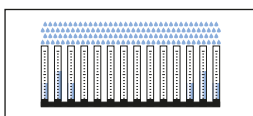
Pressure (bar) 0,5 0,7 1,0 1,5 2,0



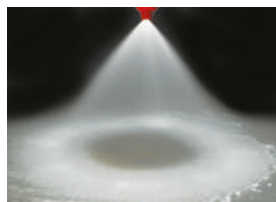
**RGN**  
Hollow cone nozzle



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°)

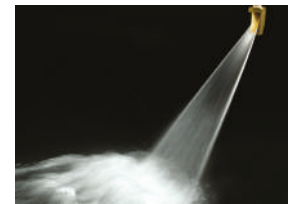
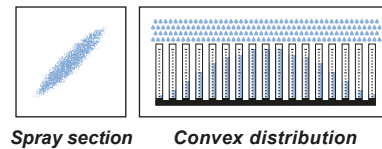
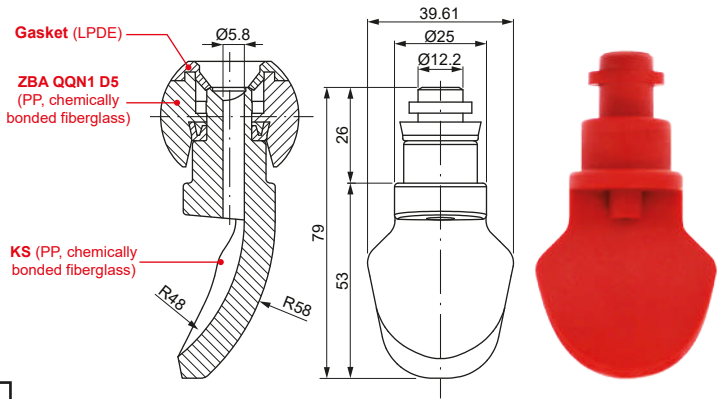
**FLAT FAN QUICK-FIT SPOON NOZZLES**

KS 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 fibreglass
- **Typical application** Cleaning equipment used in pre-treatment for coating process

Code	Capacity (l/min) at different pressure values (bar)						Color	W g
50°	<b>KSN 2155 D6QQ</b>	6.30	7.50	8.90	11.0	12.7	<b>Red</b>	23
	<b>KSN 2195 D6QQ</b>	8.00	9.40	11.3	13.8	15.9	<b>Green</b>	
60°	<b>KSQ 2230 D6QQ</b>	9.40	11.1	13.3	16.3	18.8	<b>Blue</b>	
	<b>KSQ 2270 D6QQ</b>	11.0	13.0	15.6	19.1	22.0	<b>Sky blue</b>	
	<b>KSQ 2337 D6QQ</b>	13.8	16.3	19.5	23.8	27.5	<b>White</b>	
	<b>KSQ 2390 D6QQ</b>	15.9	18.8	22.5	27.6	31.8	<b>Orange</b>	
	<b>KSQ 2410 D6QQ</b>	16.7	19.8	23.7	29.0	33.5	<b>Pink</b>	
	<b>KSQ 2433 D6QQ</b>	17.7	20.9	25.0	30.6	35.4	<b>Brown</b>	

Perssure (bar) 0,5 0,7 1,0 1,5 2,0



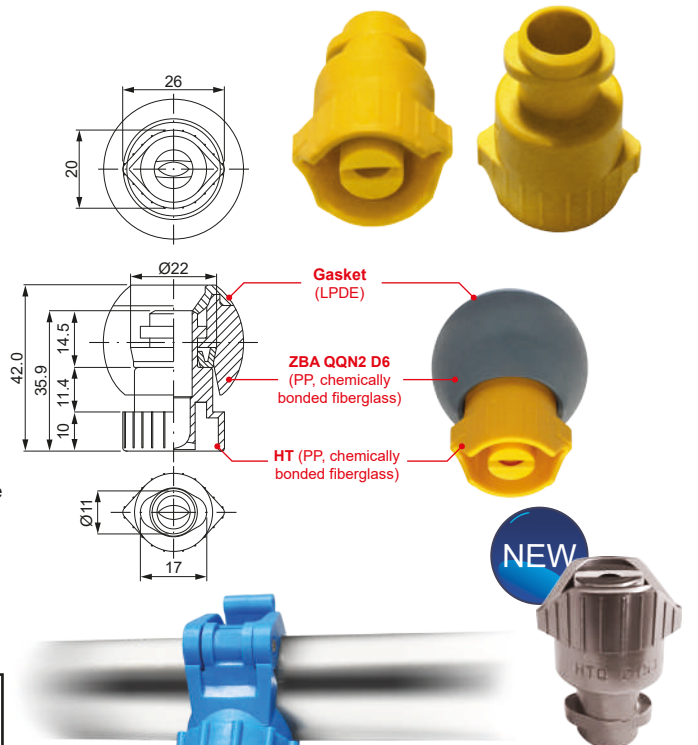
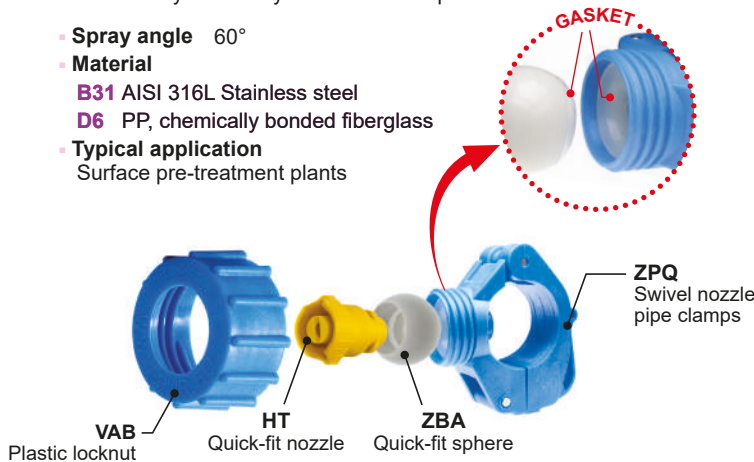
CLIP-ON NOZZLES

( FLAT FAN QUICK-FIT NOZZLES ) **HT/QQ**

**FLAT FAN QUICK-FIT NOZZLES**

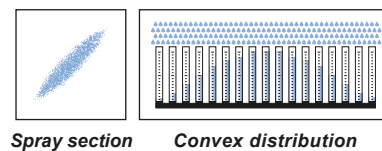
HTQ type flat fan quick-fit nozzles feature 60° spray angle and impact force for a given feed pressure. The new design offers the ideal efficiency for cleaning, quick-fit design for ease of assembly and seal that avoids leakage. Different flow rates are distinguished by color and available for selection. 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 (l/min) at different pressure values (bar)						Color
60°	<b>HTQ 1390 xxQQ</b>	1.60	1.90	2.30	2.80	3.20	<b>Black</b>
	<b>HTQ 1590 xxQQ</b>	2.40	2.80	3.40	4.20	4.80	<b>Purple</b>
	<b>HTQ 1780 xxQQ</b>	3.20	3.80	4.50	5.50	6.40	<b>Lilac</b>
	<b>HTQ 2117 xxQQ</b>	4.80	5.70	6.80	8.30	9.60	<b>Yellow</b>
	<b>HTQ 2153 xxQQ</b>	6.20	7.40	8.80	10.8	12.5	<b>Red</b>
	<b>HTQ 2195 xxQQ</b>	8.00	9.40	11.3	13.8	15.9	<b>Green</b>
	<b>HTQ 2230 xxQQ</b>	9.40	11.1	13.3	16.3	18.8	<b>Blue</b>
	<b>HTQ 2274 xxQQ</b>	11.2	13.2	15.8	19.4	22.4	<b>Sky blue</b>

Perssure (bar) 0,5 0,7 1,0 1,5 2,0



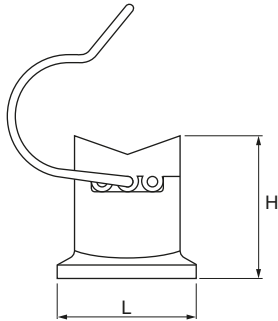
**AISI 316L**

**NEW**

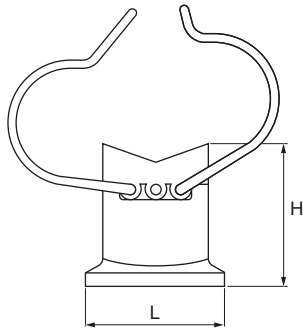




Single spring



Double spring



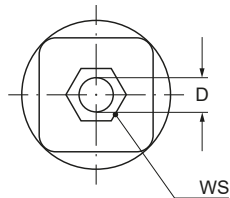
## PIPE HOLDERS

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.

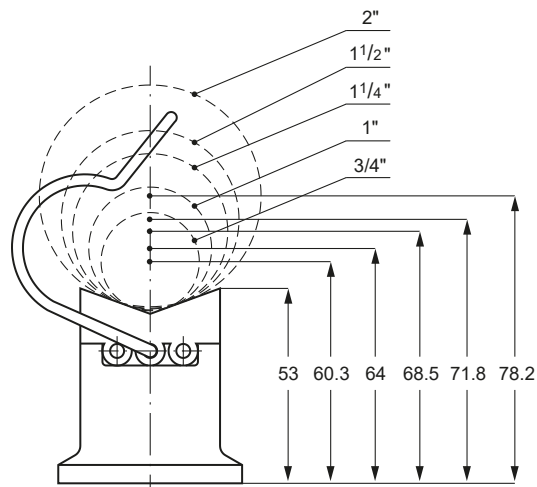
- **Typical application** Cleaning equipment used in pre-treatment for coating process
- **Pipe size** PS 3/4", 1", 1 1/4", 1 1/2", 2"
- **Materials** Body **D6** PP, chemically bonded fiberglass  
Springs **N1** AISI 302 Stainless steel, heat treated

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	1 1/4"					90
-	ZPG 2150 D6	1 1/2"					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

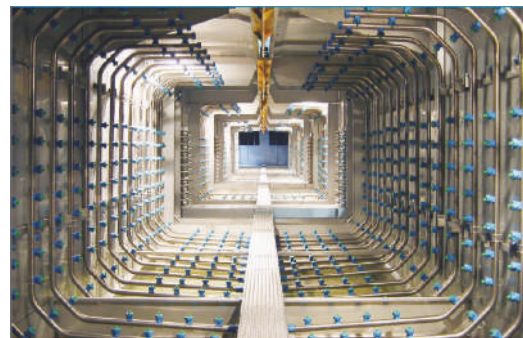
#### ZPG 1075 D6

**MATERIAL** • D6 - PP, chemically bonded fiberglass

- PIPE CODE**
- 075 - 3/4"
  - 100 - 1"
  - 125 - 1 1/4"
  - 150 - 1 1/2"
  - 200 - 2"

- CLAMP CODE**
- 1 - Single spring
  - 2 - Double spring

**PIPE HOLDERS**



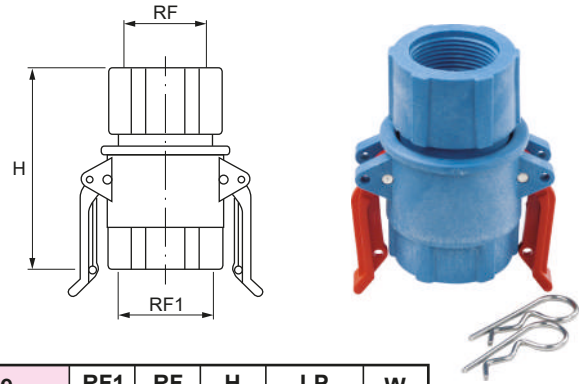
The above photo shows a European top coating plant using our products



**QUICK COUPLING JOINTS**

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

- **Thread size** 3/4", 1", 1 1/4", 1 1/2"
- **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, Polyvinylidene fluoride
  - O-ring **E0** EPDM
  - E7** Viton
  - E8** NBR



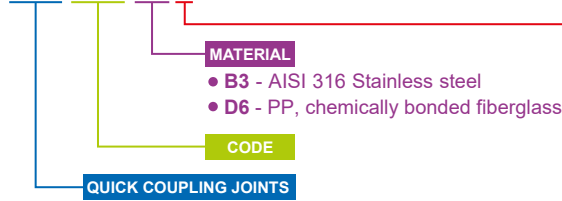
Code	RF1 inch	RF inch	H mm	LP bar	W kg
ZSA 0075 B3x	3/4"	3/4"	85	15	*
ZSA 0100 B3x	1"	1"	73	15	
ZSA 0100 D6x			73	7	
ZSA 0125 B3x	1 1/4"	1 1/4"	110	15	
ZSA 0125 D6x				7	
ZSA 0150 D6x	1 1/2"	1 1/4"	110	6	
ZSA 0151 B3x	1 1/2"	1 1/2"	110	15	
ZSA 0151 D6x				6	

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

**HOW TO MAKE UP THE PRODUCT CODE**

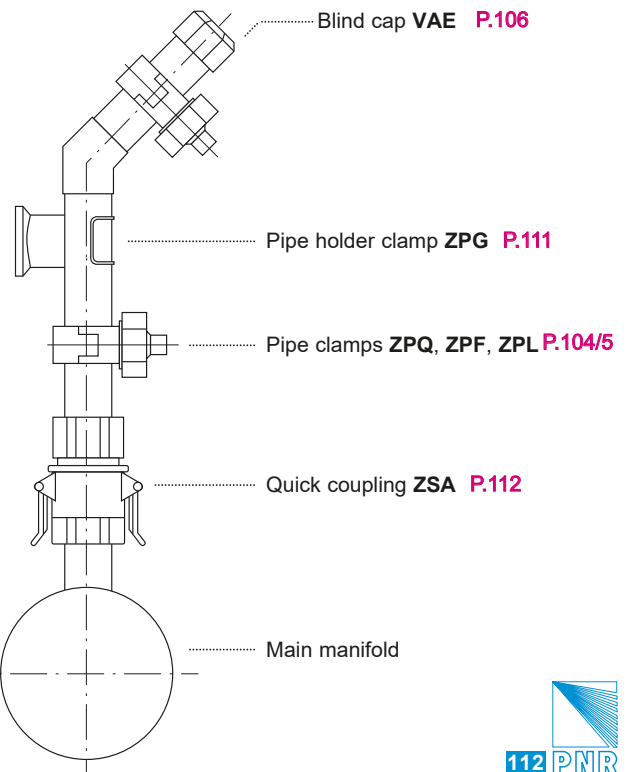
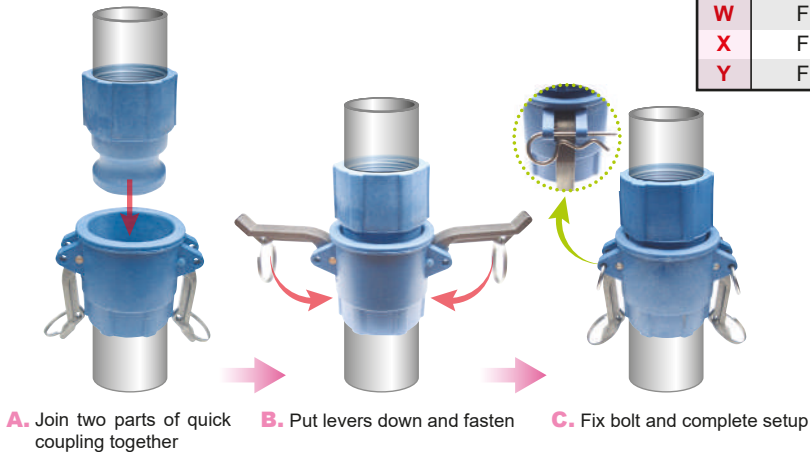
EX.: ZSA 0075 B3B

ZSA 0075 B3 x



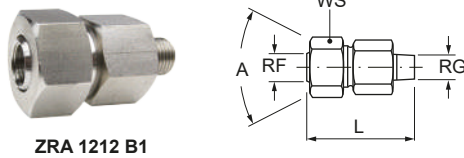
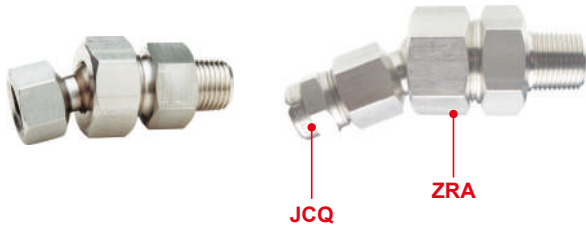
X	Orientation	Lever material	O-ring	Rings
B	Fixed	AISI 316L, sint	EPDM	AISI 316
C	Fixed	PVDF	EPDM	AISI 316
D	Fixed	PVDF	VITON	AISI 316
F	Fixed	PVDF	EPDM	none
G	Fixed	PVDF	VITON	none
H	Fixed	AISI 316L, sint	VITON	AISI 316
S	Free	AISI 316L, sint	EPDM	AISI 316
R	Free	AISI 316L, microf	EPDM	AISI 316
Q	Free	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**

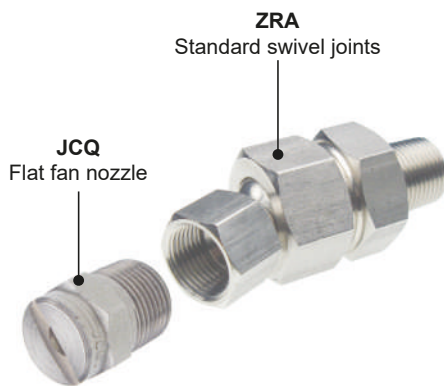


**QUICK FITTING RISERS AND HEADER MANIFOLDS**

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 1212 B1



ZRA  
Standard swivel joints

JCQ  
Flat fan nozzle

## 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

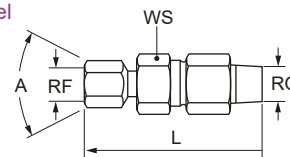
### HOW TO MAKE UP THE PRODUCT CODE

ZRx 12 12 xx Y Z

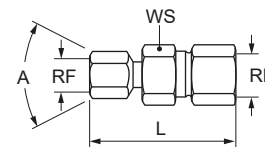
- THREAD**
  - B - BSP (female), BSPT (male)
  - N - NPT
- VARIANT**
  - S - Standard (three parts)
  - R - Reduced (two parts)
- MATERIAL**
  - B1 - AISI 303 Stainless steel
  - B31 - AISI 316L Stainless steel
  - T1 - Brass
- INLET THREAD SIZE**
  - 12 - 1/8"
  - 25 - 1/4"
  - 38 - 3/8"
  - 50 - 1/2"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

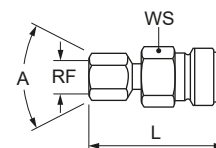
ZRA



ZRB



ZRC

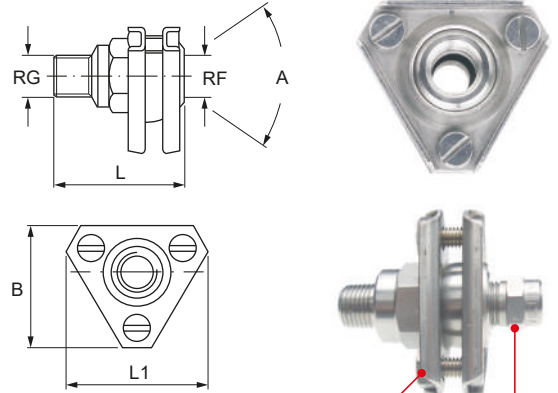


**TRIANGLE FLANGED SWIVEL JOINTS**

ZRP 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

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



ZRP Triangle flanged swivel joints  
JBC Flat fan nozzle  
ZRP Triangle flanged swivel joints

**HOW TO MAKE UP THE PRODUCT CODE**

EX.: ZRP 1212 B1

ZRP 1212 xx

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

JBC Flat fan nozzle



SWIVEL JOINTS

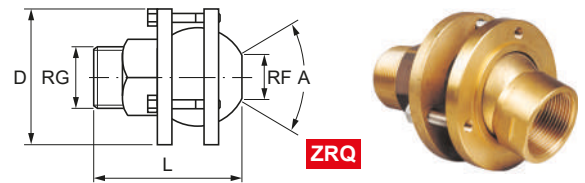
( LARGE CAPACITY SWIVEL JOINTS ) **ZRQ**

**LARGE CAPACITY SWIVEL JOINTS**

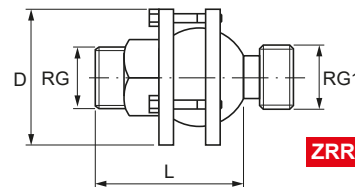
ZRQ series swivel joints are suitable for operating environments requiring large capacities and product diversification. Once set, they can be easily fitted and adjusted .

- **Typical applications** Cleaning equipment used in pre-treatment for coating process.  
Continuous casting cooling.
- **Inlet / Outlet thread size** 1", 1 1/4", 1 1/2", 2", 2 1/2"
- **Max working pressure** LP 9 bar
- **Materials**
  - B1 AISI 303 Stainless steel
  - B31 AISI 316L Stainless steel
  - T1 Brass

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	1 1/4"	-	1 1/4"	130			2.1
ZRQ 8482 xx	1 1/2"	-	1 1/4"	133			2.4
ZRR 8282 xx	1 1/4"	1 1/4"	-	130	92	40°	2.2
ZRR 8284 xx	1 1/2"	1 1/4"	-	130			2.2
ZRR 8484 xx	1 1/2"	1 1/2"	-	130			2.4
ZRR 8686 xx	2"	2 1/2"	-	203	158	40°	8.0
ZRR 8888 xx	2 1/2"	2 1/2"	-	229			8.8



ZRQ



ZRR

ZRQ Large capacity swivel joints



**HOW TO MAKE UP THE PRODUCT CODE**

EX.: ZRQ 8080 B1

ZRQ 8080 xx

- MATERIAL**
  - B1 - AISI 303 Stainless steel
  - B31 - AISI 316L Stainless steel
  - T1 - Brass
- OUTLET THREAD SIZE**
  - 80 - 1"
  - 82 - 1 1/4"
  - 84 - 1 1/2"
  - 86 - 2"
  - 88 - 2 1/2"
- LNLET THREAD SIZE**
  - 80 - 1"
  - 82 - 1 1/4"
  - 84 - 1 1/2"
- JOINT TYPE**
  - ZRQ - Female
  - ZRR - Male

Length conversion table					
µm	mm	cm	m	inch	ft
1	1x10 <sup>-3</sup>	1x10 <sup>-4</sup>	1x10 <sup>-6</sup>	3.94x10 <sup>-5</sup>	3.28x10 <sup>-6</sup>
1x10 <sup>3</sup>	1	0.1	1x10 <sup>-3</sup>	3.94x10 <sup>-2</sup>	3.28x10 <sup>-3</sup>
1x10 <sup>4</sup>	10	1	1x10 <sup>-2</sup>	3.94x10 <sup>-1</sup>	3.28x10 <sup>-2</sup>
1x10 <sup>7</sup>	1x10 <sup>3</sup>	100	1	39.4	3.28
2.54x10 <sup>4</sup>	25.4	2.54	2.54x10 <sup>-2</sup>	1	8.33x10 <sup>-2</sup>
3.05x10 <sup>5</sup>	3.05x10 <sup>2</sup>	30.5	3.05x10 <sup>-1</sup>	12	1

Area conversion table			
cm <sup>2</sup>	m <sup>2</sup>	inch <sup>2</sup>	ft <sup>2</sup>
1	1x10 <sup>-4</sup>	0.155	1.08x10 <sup>-3</sup>
1x10 <sup>4</sup>	1	1.55x10 <sup>3</sup>	10.8
6.45	6.45x10 <sup>-4</sup>	1	6.94x10 <sup>-3</sup>
9.30x10 <sup>2</sup>	9.30x10 <sup>-2</sup>	1.44x10 <sup>2</sup>	1

Volume conversion table				
cm <sup>3</sup>	Liter	m <sup>3</sup>	ft <sup>3</sup>	US gallon
1	1x10 <sup>-3</sup>	1x10 <sup>-6</sup>	3.53x10 <sup>-5</sup>	2.64x10 <sup>-4</sup>
1000	1	1x10 <sup>-3</sup>	3.53x10 <sup>-2</sup>	0.264
1x10 <sup>6</sup>	1000	1	353	264
2.83x10 <sup>4</sup>	28.3	2.83x10 <sup>-2</sup>	1	0.749
3.79x10 <sup>3</sup>	3.79	3.79x10 <sup>-3</sup>	1.34	1

Pressure conversion table						
MPa	KPa	Bar	Kg/cm <sup>2</sup>	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 <sup>-3</sup>	7.5x10 <sup>-1</sup>
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 <sup>2</sup>	1.013	1.033	14.7	1	0.76
0.133	1.33x10 <sup>2</sup>	1.33	1.36	19.3	1.32	1

Flow rate unit conversion table					
l/min	m <sup>3</sup> /min	m <sup>3</sup> /hour	Inch <sup>3</sup> /hour	ft <sup>3</sup> /hour	US gallon/min
1	0.001	0.06	3.66x10 <sup>3</sup>	2.12	0.264
1000	1	60	3.66x10 <sup>6</sup>	2.12x10 <sup>3</sup>	264
16.67	0.017	1	6.1x10 <sup>4</sup>	35.3	4.40
2.73x10 <sup>-4</sup>	2.7x10 <sup>-7</sup>	1.64x10 <sup>-5</sup>	1	5.79x10 <sup>-4</sup>	7.22x10 <sup>-6</sup>
0.472	4.72x10 <sup>-4</sup>	0.028	1.728	1	0.125
3.79	0.004	0.227	1.39x10 <sup>4</sup>	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

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 Capacity value at 0.1~0.3 kg/cm <sup>2</sup> pressure loss
A	B	Inner diameter	Outer diameter	
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

## 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											





[www.pnr.eu](http://www.pnr.eu)

PNR Italia sells its products in Italy directly from its headquarter in Voghera (PV), and through a global network of sales subsidiaries and authorized distributors located in many nations. To find you local distributor, please check our web site: [www.pnr.eu/contact/](http://www.pnr.eu/contact/)

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<b>Australia</b>	<b>Hungary</b>	<b>Singapore</b>
<b>Austria</b>	<b>India</b>	<b>Slovenia</b>
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<b>Germany</b>	<b>Romania</b>	<b>USA</b>

REV 19.02



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