PNR

SPRAY NOZZLES FOR INDUSTRIAL APPLICATIONS

SPRAY NOZZLES & ASSEMBLY FITTINGS

GENERAL CATALOGUE

INTRODUCTION

PNR ITALIA

PNR Italy, founded in 1968, has always dedicated itself to the design and manufacturing of industrial spray nozzles and systems. In all these years PNR made major investments both in machinery and human resources to develop top quality products and today is one of the most modern spray nozzles manufacturing facilities in the world. We manifacture thousands of different products to offer our customers one of the most complete product ranges in the world, and keep focused on research plus innovation. Our machine tool park includes all high quality and latest model CNC machines, many of these built to our requirements to accomplish special manifacturing jobs. All products and their performance are strictly controlled and our Quality control system is certified by DNV according to ISO 9001 norms.Our nozzles design requires expertise in hydrodynamics and fluids handling technology as well as a deep manufacturing know-how to give the best performances. It's not just a matter of mechanical processing.

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

DISCLAIMER

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

PRODUCT WARRANTY

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

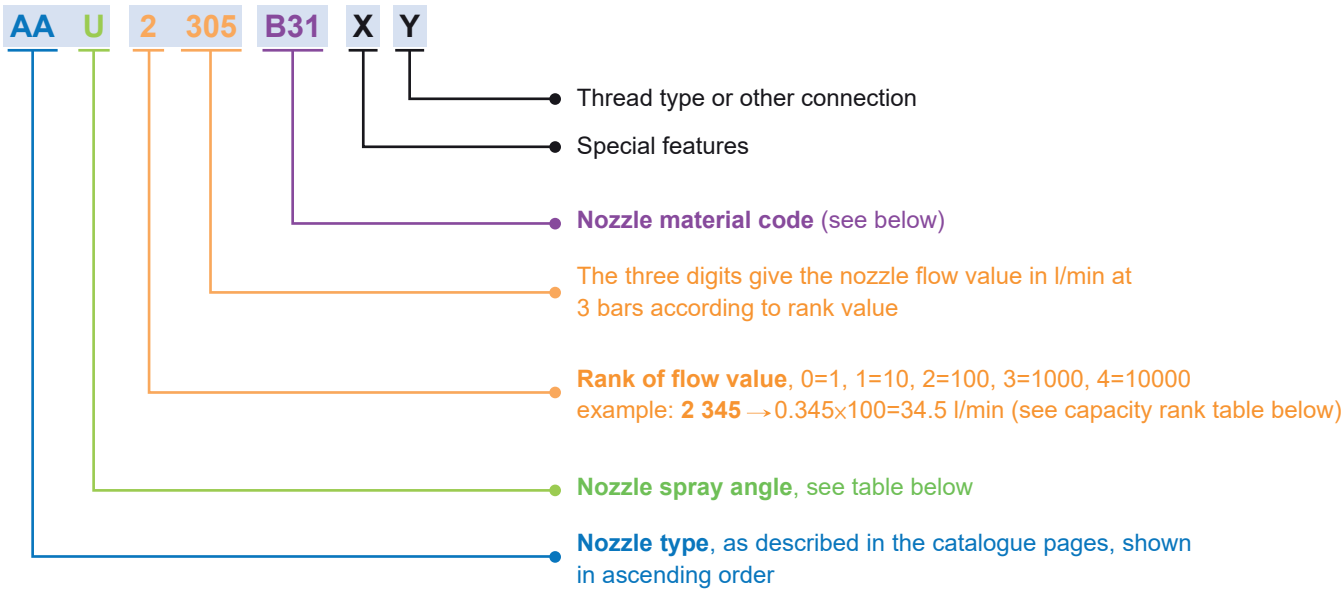
COPYRIGHT

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

NOZZLE IDENTIFICATION CODES

As any other industrial product, spray nozzles need to be precisely identified by means of a code in order to avoid mistakes.
PNR coding system was created bearing in mind the following requirements:
- Codes must be easily processed by a computer, in ascending order.
- Codes must be self-explaining with no need of additional descriptions.
- Codes must give the basic nozzle specifications so to be easily found in the catalogue.

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



Capacity rank

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

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

Some spray angle codes (degrees)

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

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

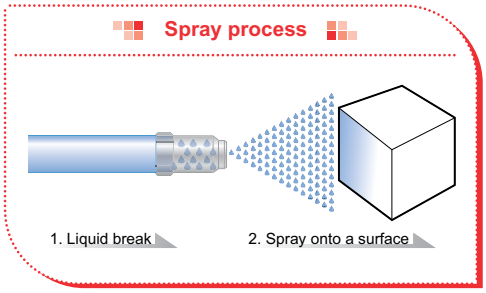
Nozzle material codes

A1	Carbon steel
A2	High speed steel
A8	Zinc coated steel
A9	Nickel coated steel
B1	AISI 303 Stainless steel
B2	AISI 304 Stainless steel
B21	AISI 304L Stainless steel
B3	AISI 316 Stainless steel
B31	AISI 316L Stainless steel
C2	AISI 416 Stainless steel, hardened
D1	Polyvinylchloride (PVC)
D2	Polypropylene (PP)
D3	Polyamide (PA)
D4	Nylon, Glassfibers reinforced
D5	Talcum filled Polypropylene
D6	Glassfibre reinforced PP
D7	High density polyethilene
D8	Polyvinylidenefluoride (PVDF)
D82	PVDF, Injection molded
E0	EPDM
E1	Polytetrafluorethylene (PTFE)
E2	PTFE (15% glassfibers)
E31	Acetalic resin (POM)
E6	LUCITE ® (PMMA)
E7	Viton
E8	Synthetic rubber (NBR)
F5	Ceramic
F30	Ruby insert, 303 body
F31	Ruby insert, 316 body
F32	Diamond insert, 303 body
F33	Diamond insert, 316 body
G1	Cast iron
H1	Titanium
L1	Monel 400
L2	Incolloy 825
L8	Hastelloy C276
P6	Acr. But. Styrene (ABS)
P8	EPDM 40 Shore
T1	Brass
T2	Brass, chrome plated
T3	Copper
T5	Bronze
T8	Brass, nickel plated
T81	Brass, electroless nickel plated
V1	Aluminum
V7	Aluminum, electroless n. plated

THE PROCESS OF ATOMIZATION

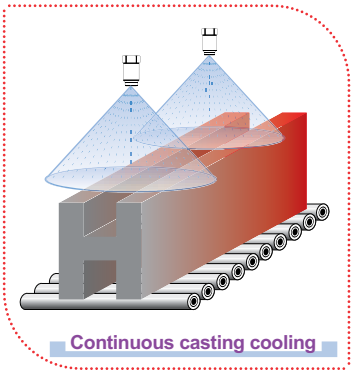
A liquid spraying process can be described as consisting of two phases, namely:
1. breaking of the liquid into separate droplets
2. directing the liquid drops onto a surface or an object, to achieve the desired result.

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

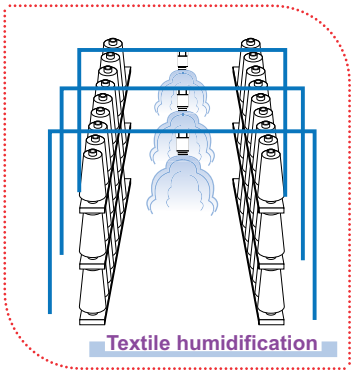


APPLICATIONS

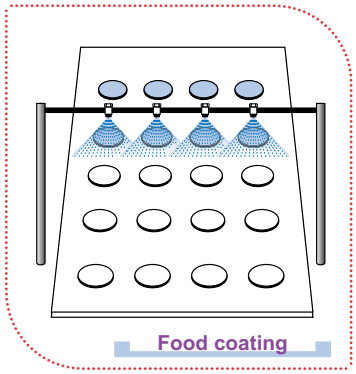
Spraying a liquid through a spray nozzle can serve different purposes, among which the most important are the following:



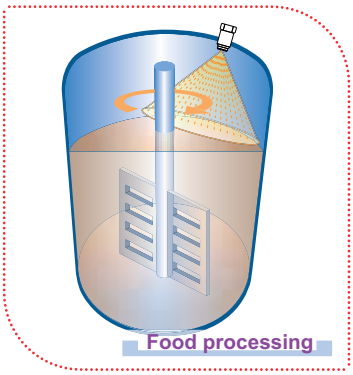
Cooling: heat transfer by spraying liquids onto the products surface for a rapid cooling, such as continuous casting cooling in steelworks.



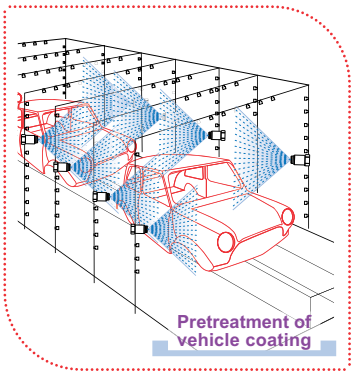
Humidification: spray of very little quantities of liquid onto the products surface into special chambers or rooms to raise relative humidity. A typical application is textiles humidification.



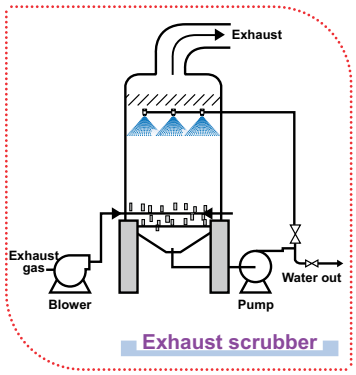
Coating: application of coatings or liquids on the food products surface. For example: oil-spraying on bread.



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



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



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

How to choose the most suitable nozzle among those listed?

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

SPRAY NOZZLES TECHNICAL FEATURES

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

1. NOZZLE EFFICIENCY

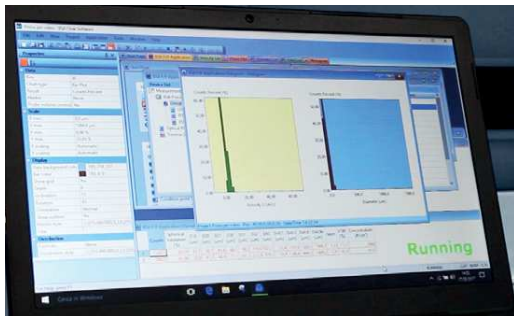
A spray nozzle is a device that turns the pressure energy of a liquid flow into kinetic energy. The nozzle efficiency can be defined as the ratio between the energy available at the nozzle inlet and the energy wich is actually used to increase the liquid speed and create the spray, the difference being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

2. DROPLETS SIZE

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

There are four ways to express the droplets size:

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



ARITHMETIC MEAN DIAMETER

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

SURFACE MEAN DIAMETER

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

1 2 3 4

VOLUME MEAN DIAMETER

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

SAUTER MEAN DIAMETER (D_{32})

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

MEASUREMENT METHODS

SMD is tested using pure water at 30°C

Method by immersion

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

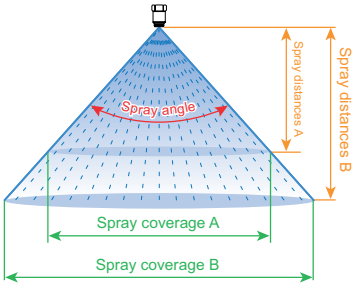
Laser interpherometer test

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

SPRAY NOZZLES TECHNICAL FEATURES

3. SPRAY ANGLE

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



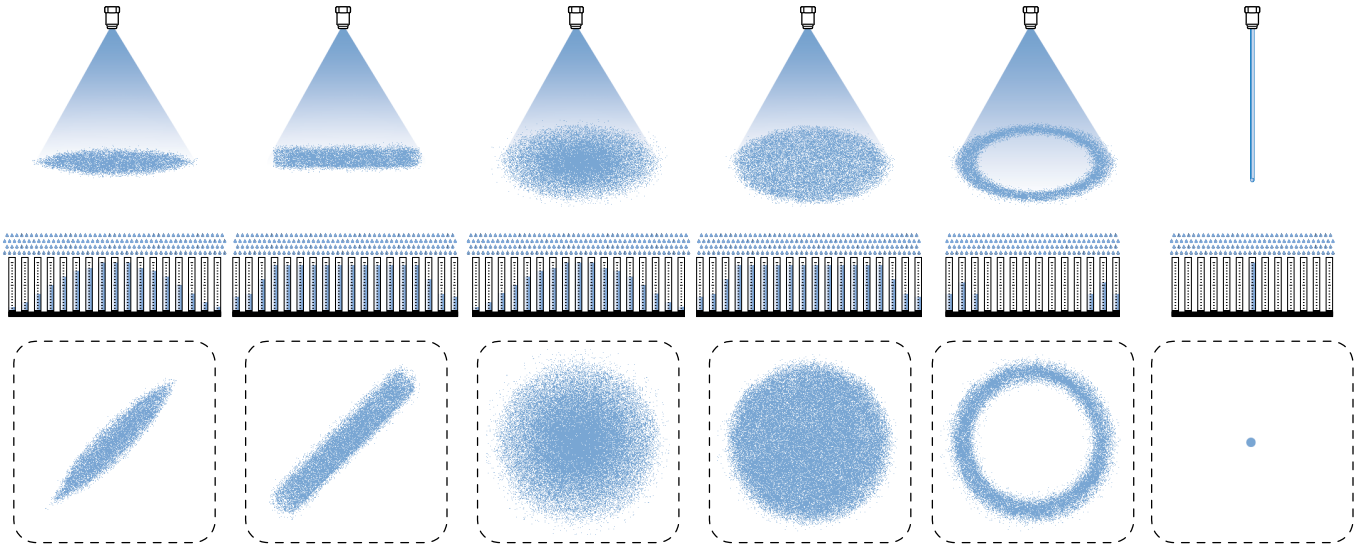
4. IMPACT FORCE

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

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

5. DISTRIBUTION

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



Flat fan
convex distribution

Flat fan
even distribution

Full cone
convex distribution

Full cone
even distribution

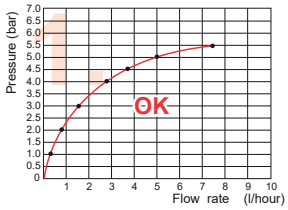
Hollow cone
concave distribution

Straight
single-point distribution

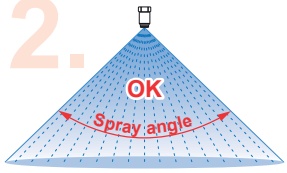
SPRAY NOZZLE

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

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

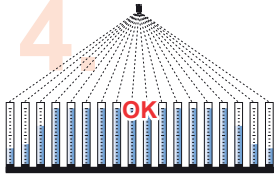


Check if liquid flow and pressure are in direct proportion.

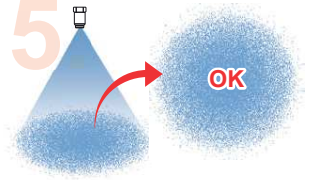


Check if spray angle is as required.

Check if capacity is as required.



Check if distribution is uniform.



Check if droplets diameter is uniform

TECHNIQUES FOR SPRAY PRODUCTION

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

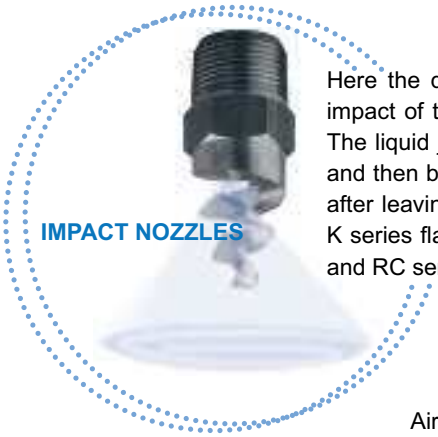
PRESSURE NOZZLES

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

TURBULENCE NOZZLES

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

TECHNIQUES FOR SPRAY PRODUCTION

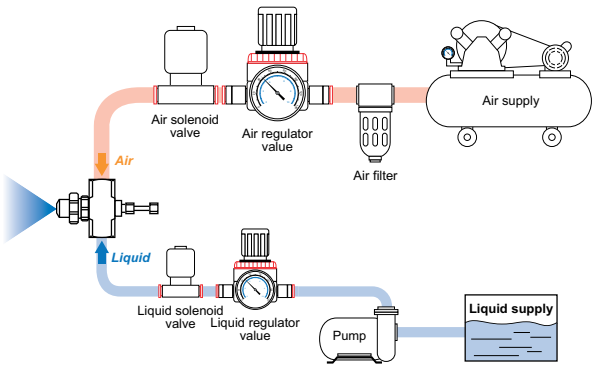


Here the desired spray shape is obtained producing an impact of the liquid jet onto a properly designed surface. The liquid jet is subsequently changed into a fluid lamina and then broken into drops with the desired spray pattern after leaving the nozzle edge. Typical impact nozzles are K series flat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

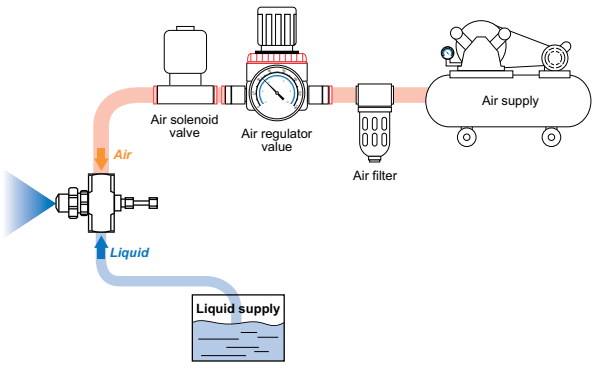
Air-assisted atomizers use their special design and pressurized gas to atomize a liquid and break it into tiny droplets (the smallest average particle size: 10 micron). Please refer to catalogue CTG AZ and contact us.

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

FULL CONE PATTERN

The shape of the tip determines the spray range of full cone nozzles. A typical application of these nozzles is continuous casting cooling when it's necessary to spray the same volume of liquids onto a surface to cool objects.
Our engineers design a series of full cone nozzles to satisfy different needs.
No matter what kind of full cone nozzles they are, they have unique applications.

STANDARD FULL CONE (Turbulence nozzle)

These nozzles use a specially shaped vane placed at the nozzle inlet to give a rotational speed to the fluid flowing through the nozzle.
Because of the rotational speed of the fluid, water exiting the nozzle orifice is subjected to centrifugal force and opens up in the shape of a full cone.
The extent of the angle of the cone is a function of both exit speed (created from the inlet pressure) and the internal design of the nozzle. It can vary in practice from 15° to 120°.

These nozzles can be also produced as square full cone nozzles where the square shape of the pyramidal spray is obtained by a special design of the outlet orifice.
Two important details have to be noted from the system designer when using these type of nozzles:

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

SPIRAL FULL CONE (Impact nozzle)

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

MULTIPLE FULL CONE (Turbulence nozzle)

Several nozzles are grouped in a cluster with different spray directions. These nozzles produce large capacity of watermist.
If you need both large capacity and mist, multi-orifice full cone nozzles are the best option.

FLAT FAN SPRAY PATTERN

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

IN LINE FLAT FAN (Pressure nozzle)

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

IN LINE STRAIGHT JET (Pressure nozzle)

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

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

SPOON FLAT FAN (Impact nozzle)

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

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

High impact types

Large spray angle

HOLLOW CONE SPRAY PATTERN

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

HOLLOW CONE (Turbulence nozzle)

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

HOLLOW CONE (Deflection nozzle)

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

FULL CONE NOZZLES

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

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

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

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

VANE

SLOTTED VANE

Slotted vane, so called for its spray section with 6 flows slots on its edge portion and one in the center.
These vanes produce high-speed rotation of pressurized liquids that flow into turbulence chambers where they are atomized. Slotted vanes provide an excellent atomization in a short time. Effective for cost-saving and in case of limited space.

DISC VANE

Innovative design and precise machining, its smooth surface reduces pressure loss and avoids turbulence. It uses 6 peripheral passages to create a swirling motion of the liquid inside the spray chamber.
A set of superficial millings on the lower side of the disc act as a brake on the liquid rotation at the centre creating a full cone jet with an even distribution and finely atomized droplets. No central hole to avoid clogging.

X - VANE

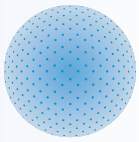
X vanes are widely used, mainly in steelworks. Their simple design is based on two sloping flat surfaces which induce a rotation of the liquid going through the nozzle, and two small slots on each flat part to produce a full-cone spray pattern. All vanes are secured inside the nozzle body to prevent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

S - TYPE VANE

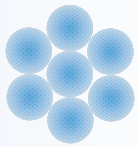
S-type vanes provide a large free passage of liquids through the nozzle, with nearly the same diameter of a spray tip. Therefore they offer the widest possible passage and the highest resistance to clogging among all full-cone spray nozzles with internal vane.

SPIRAL VANE

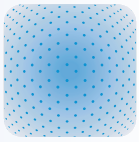
Spiral vane is specific design of spiral full cone nozzles. Liquids hit spiral vane then atomize and extend to the desired spray angle. The specific design greatly increases liquids inlet and outlet diameter. Any foreign matters entering could come out. It avoids clogging and provides larger capacity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



FULL CONE
Round spray



FULL CONE
Cluster spray



FULL CONE
Square pattern

ACCURATE SPRAYS OVERLAPPING

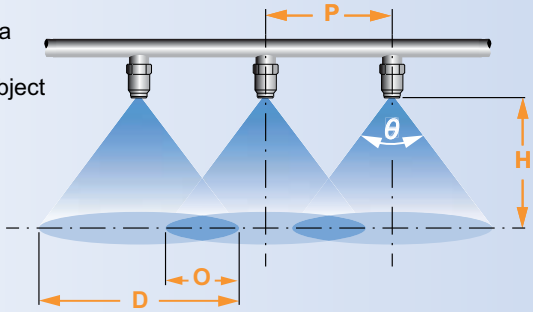
When full and hollow cone nozzles are used simultaneously, it's vital that they cover a uniform spray volume. In general there are two methods to achieve accurate nozzles settings: matrix configuration and offset configuration. See here below.

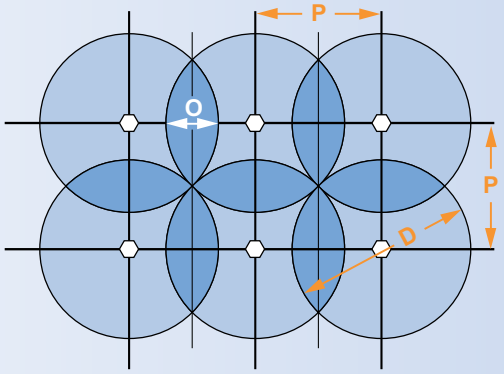
Matrix configuration

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

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

Overlap(O)= D - P



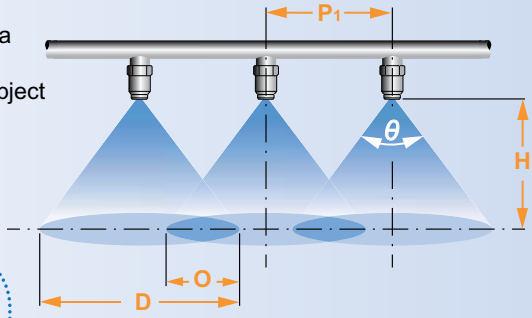


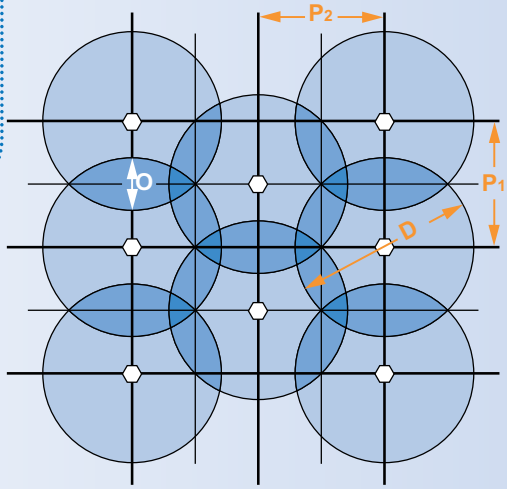
Offset configuration

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

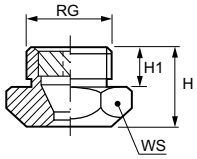
Nozzle spacing(P_1)
= $\frac{D}{2} \times \sqrt{3}$
Nozzle spacing(P_2) = $\frac{3}{4}D$

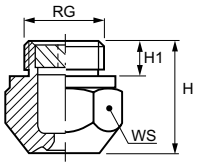
Overlap(O) = D - P_1

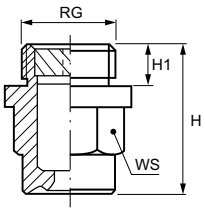




AA (FULL CONE NOZZLES / SHORT BODY)





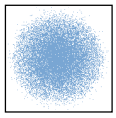


SLOTTED VANE

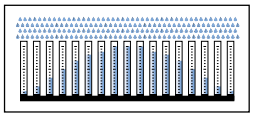
AA series full cone nozzles are made of body and slotted vane, for an even spray distribution. Their design allows them to be 35% shorter than other full cone nozzles. They are used in operating environments with a restricted space available and are cost-effective for the lower material quantity.

- **Typical applications**
  Washing: exhaust scrubbers washing, vehicle parts and gravel washing
  Cooling: high-temperature cooling, vehicle parts cooling, tank cooling
  Other applications: spray of chemicals, sea water desalinization

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



Spray section



Convex distribution

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar) 0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H mm	H1 mm	WS mm
90°	**AAU 2305 xx**	3/4"	6.1	3.0	12.5	14.7	17.6	24.9	30.5	39.4	46.6	55.7	22	10	32
	AAU 2385 xx		6.7	3.0	15.7	18.6	22.2	31.4	38.5	49.7	58.8	70.3			
	AAU 2490 xx		7.8	4.0	20.0	23.7	28.3	40.0	49.0	63.3	74.8	89.5			
	AAU 2610 xx	1"	9.0	4.0	24.9	29.5	35.2	49.8	61.0	78.7	93.2	111	27	12	40
	AAU 2780 xx		10.5	5.0	31.8	37.7	45.0	63.7	78.0	101	119	142			
	AAU 3123 xx	1¼"	12.5	6.0	50.2	59.4	71.0	100	123	159	188	225	30	14	50
	AAU 3194 xx	1½"	16.0	6.0	79.2	93.7	112	158	194	250	296	354	35	16	60
	AAU 3310 xx	2"	20.0	7.0	127	150	179	253	310	400	474	566	45	18	75
	AAU 3386 xx		23.0	9.0	158	186	223	315	386	498	590	705			
	AAU 3490 xx	2½"	25.0	12.0	200	237	283	400	490	633	748	895	52	22	90
	AAU 3610 xx		28.5	13.0	249	295	352	498	610	788	932	1114			
	AAU 3775 xx	3"	32.0	16.0	316	374	447	633	775	1001	1184	1415	60	24	110
120°	**AAW 2490 xx**	3/4"	7.9	3.0	20.0	23.7	28.3	40.0	49.0	63.3	74.8	89.5	38	11	32
	AAW 2780 xx	1"	13.7	6.0	31.8	37.7	45.0	63.7	78.0	101	119	142	47	15	40
	AAW 3123 xx	1¼"	12.7	6.0	50.2	59.4	71.0	100	123	159	188	225	62	19	50
	AAW 3194 xx	1½"	16.0	6.0	79.2	93.7	112	158	194	250	296	354	77	21	50
	AAW 3310 xx	2"	20.0	10.0	127	150	179	253	310	400	474	566	99	24	60
	AAW 3386 xx		22.7	10.0	158	186	223	315	386	498	590	705			
	AAW 3490 xx	2½"	25.5	12.0	200	237	283	400	490	633	748	895	123	27	75
	AAW 3610 xx		30.0	13.0	249	295	352	498	610	788	932	1114			
	AAW 3775 xx	3"	32.0	14.0	316	374	447	633	775	1001	1184	1415	150	30	85

Slotted disc vane

AA nozzles design is ideally suited for plastic materials.

Slotted vane, so called for its spray section with 6 flows slots on its edge portion and one in the centre.
These vanes produce high-speed rotation of pressurized liquids that flow into turbulence chambers where they are atomized. Slotted vanes provide an excellent atomization in a short time. Effective for cost-saving and in case of limited space.

Material	3/4"	1"	1¼"	1½"	2"	2½"	3"
B31 - AISI 316L					•	•	•
T1 - Brass	•						
D1 - PVC	•	•	•	•	•	•	•

HOW TO MAKE UP THE NOZZLE CODE

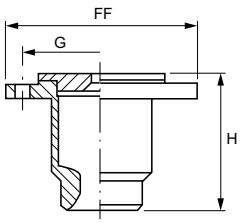
EX.: AAU 2305 B31

AA U 2305 xx

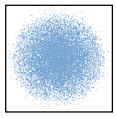
- NOZZLE TYPE
- SPRAY ANGLE • U - 90° • W - 120°
- CAPACITY
- MATERIAL
  - • **B31** - AISI 316L Stainless steel
  - • **D1** - PVC
  - • **T1** - BRASS
  - ○ **B1** - AISI 303 Stainless steel (optional)
  - ○ **D2** - PP (optional)
  - ○ **E1** - PTFE (optional)

SLOTTED VANE

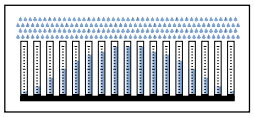
AE type nozzles are designed to deliver large and very large capacity values from 384 l/min to 3842 l/min at 0.5 bar.
The carefully designed slotted vane offers uniform spray distribution and perfect performance even with very low inlet pressure values. Compared to other large nozzles, the upper flange 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°	**AEU 3940 xx**	80	37.0	12.0	271	321	384	454	543	768	940	1214	200	160	140
	AEU 4118 xx		39.0	14.0	341	403	482	570	681	963	1180	1523			
	AEU 4147 xx	100	43.0	13.0	424	502	600	710	849	1200	1470	1898	220	180	156
	AEU 4188 xx	125	53.0	16.0	543	642	768	908	1085	1535	1880	2427	250	210	177
	AEU 4235 xx		56.0	16.0	678	803	959	1135	1357	1919	2350	3034			
	AEU 4294 xx	150	59.0	21.0	849	1004	1200	1420	1697	2400	2940	3796	285	240	188
	AEU 4370 xx		66.0	24.0	1068	1264	1511	1787	2136	3021	3700	4777			
	AEU 4470 xx	200	72.0	28.0	1357	1605	1919	2270	2714	3838	4700	6068	340	295	250
	AEU 4588 xx		81.0	32.0	1697	2008	2400	2840	3395	4801	5880	7591			
	AEU 4741 xx	250	88.0	39.0	2139	2531	3025	3579	4278	6050	7410	9566	395	350	291
	AEU 4941 xx		99.0	37.0	2716	3214	3842	4545	5433	7683	9410	12148			
120°	**AEW 3940 xx**	80	36.0	15.0	271	321	384	454	543	768	940	1214	200	160	140
	AEW 4118 xx		40.5	14.5	341	403	482	570	681	963	1180	1523			
	AEW 4147 xx	100	43.0	18.5	424	502	600	710	849	1200	1470	1898	220	180	156
	AEW 4188 xx	125	53.0	22.0	543	642	768	908	1085	1535	1880	2427	250	210	177
	AEW 4235 xx		55.0	24.0	678	803	959	1135	1357	1919	2350	3034			
	AEW 4294 xx	150	59.0	28.0	849	1004	1200	1420	1697	2400	2940	3796	285	240	188
	AEW 4370 xx		66.0	32.0	1068	1264	1511	1787	2136	3021	3700	4777			
	AEW 4470 xx	200	75.0	35.0	1357	1605	1919	2270	2714	3838	4700	6068	340	295	250
	AEW 4588 xx		81.0	40.0	1697	2008	2400	2840	3395	4801	5880	7591			
	AEW 4741 xx	250	86.0	37.0	2139	2531	3025	3579	4278	6050	7410	9566	395	350	291
	AEW 4941 xx		96.0	42.0	2716	3214	3842	4545	5433	7683	9410	12148			

Typical applications

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

Cleaning
Desulfuration
Exhaust scrubbers

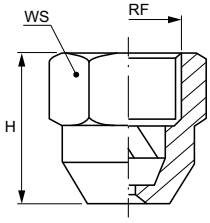
HOW TO MAKE UP THE **NOZZLE CODE**

EX.: AEU 3940 A1

AE U 3940 xx

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

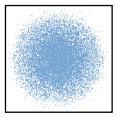
AH (FULL CONE NOZZLES / FINE MIST)



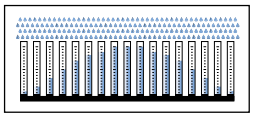
IN-LINE FULL CONE

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

- **Thread specification**: BSP, NPT



Spray section



Convex distribution

Typical applications

Washing
Steel cleaning
Parts washing
Pre-treatment in coating process
Cooling
Continuous casting cooling
Products cooling
Tank cooling
Dust control
Dust removal in mining and coal plants
Other applications
Spray of chemicals
Leak test

DISC VANE

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

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

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

HOW TO MAKE UP THE NOZZLE CODE

EX.: AHR 1390 B1

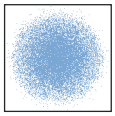
AH R 1309 xx

- NOZZLE TYPE
- SPRAY ANGLE: • R - 65° • T - 80°
- CAPACITY
- MATERIAL: • B1 - AISI 303 Stainless steel • T1 - Brass ○ B31 - AISI 316L Stainless steel (optional)

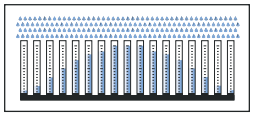
S-TYPE VANE

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

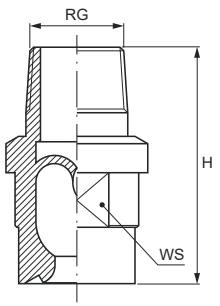
- **Thread specification**: BSPT, NPT



Spray section



Convex distribution



Capacity for nozzles made in PVDF, PP

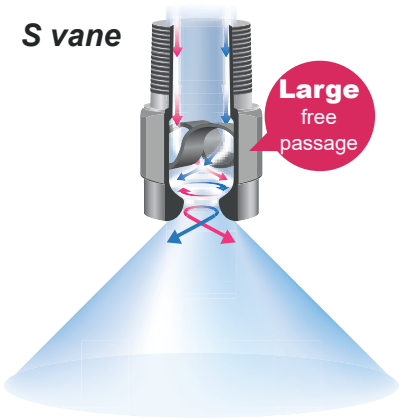
ALS 70°	ALU 90°	Code	RG poll	D mm	Capacity at different pressure values (l/min) (bar) 0.2	0.3	0.5	0.7	1.0	2.0	3.0	5.0
•	•	**2190 xx**	3/8"	3.97	5.32	6.46	8.17	9.50	11.4	15.8	19.0	24.1
•	•	**2250 xx**		4.76	7.00	8.50	10.8	12.5	15.0	20.8	25.0	31.8
	•	**2350 xx**	1/2"	5.56	9.80	11.9	15.1	17.5	21.0	29.1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

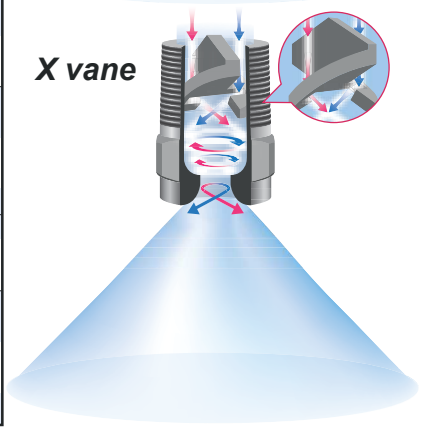
Capacity for nozzles made in AISI 316L

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**	1¼"	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**	1½"	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**	2½"	25.4	168	203	259	303	358	496	600	763
•	•	•	**3737 xx**		28.6	206	249	317	371	439	608	736	935
•	•	•	**3883 xx**		31.5	247	299	381	446	527	730	883	1120
•	•	•	**4106 xx**		34.9	297	359	456	535	632	875	1060	1350
•	•	•	**4123 xx**		38.1	363	440	559	655	774	1070	1230	1650
•	•	•	**4124 xx**	3"	37.1	363	440	559	655	774	1070	1230	1650
•	•	•	**4153 xx**		41.3	428	517	658	770	911	1260	1530	1940
•	•	•	**4174 xx**		44.5	488	591	751	880	1040	1440	1740	2220
•	•	•	**4175 xx**	4"	44.5	488	591	751	880	1040	1440	1740	2220
•	•	•	**4196 xx**		47.6	549	664	845	989	1170	1620	1960	2490
•	•	•	**4230 xx**		49.8	643	778	989	1160	1370	1900	2300	2920
•	•	•	**4256 xx**		54.0	718	869	1100	1290	1530	2120	2560	3260
•	•	•	**4278 xx**		57.2	779	943	1200	1400	1660	2300	2780	3540

S vane v.s. X vane

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





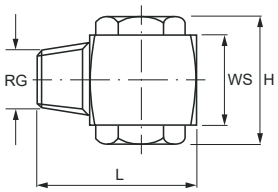
HOW TO MAKE UP THE NOZZLE CODE

Es.: ALU 1927 B31

AL U 1927 xx

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

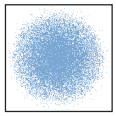
AT (FULL CONE NOZZLES / TANGENTIAL)



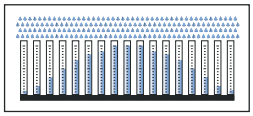
VANELESS – OFF LINE

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

Thread specification
BSPT
NPT (optional)



Spray section



Convex distribution

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

Typical applications

Washing
Exhaust scrubber
Parts cleaning
Pre-treatment for coating process.

Cooling
Gas cooling
Tank cooling

Dust control
Remove dust flying in mining and coal plants.

Other applications
Spray of chemicals
Fire engineering

HOW TO MAKE UP THE NOZZLE CODE

EX.: ATQ 1230 B1

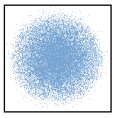
AT Q 1230 xx

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

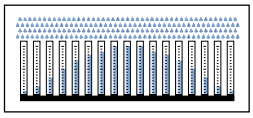
X-VANE / ROUND SPRAY / THREE PIECES DESIGN / EASY CLEAN

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

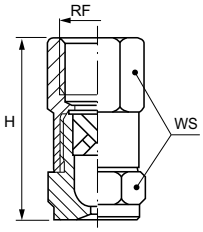
- **Thread specification**
  Male (BSPT, NPT)
  Female (BSP, NPT)



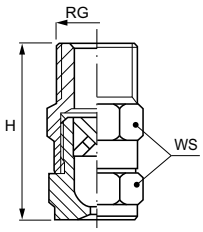
Spray section



Convex distribution



BA



BC

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

Standard spray

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

Wide spray

Typical applications

Washing
Exhaust scrubbers
Parts cleaning
Pre-treatment for coating process

Cooling
Exhaust cooling
Tank cooling

Dust control
Remove dust flying in a mining and coal plants.

Other applications
Spray of chemicals
Fire engineering

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

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

Dimensions & weights

HOW TO MAKE UP THE NOZZLE CODE

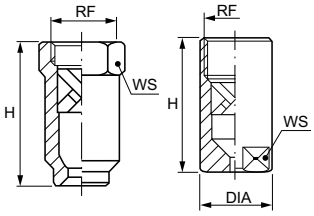
EX.: BAQ 0740 B1

BA Q 0740 xx

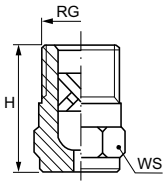
- NOZZLE TYPE
- SPRAY ANGLE
  - Q - 60°
  - W - 120°
- CAPACITY
- MATERIAL
  - **B1** - AISI 303 Stainless steel
  - **B31** - AISI 316L Stainless steel
  - **T1** - Brass
  - **E1** - PTFE
  - **L61** - Hastelloy C22

BE / BG (FULL CONE NOZZLES)

BE

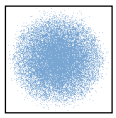


BG

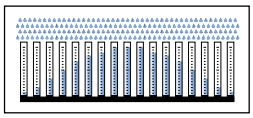


X-VANE / ROUND SPRAY / TWO-PIECE DESIGN

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



Spray section



Convex distribution

Thread specification

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

Typical applications

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

Material

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

STANDARD SPRAY ANGLES

Nozzle type BES (Female)	Nozzle type BGQ (Male)	Code	RF RG (inch)	D (mm)	D1 (mm)	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	5.0	7.0	10	Spray angle at pressure (°) (bar) 0.5	1.5	6.0
	•	**1480 xx**	1/4"	2.3	1.6	1.96	2.77	3.92	4.80	6.20	7.33	8.76	45°	50°	46°
	•	**1740 xx**		2.9	1.6	3.02	4.27	6.04	7.40	9.55	11.3	13.5	58°	67°	61°
	•	**1700 xx**	3/8"	2.6	2.4	2.86	4.04	5.72	7.00	9.04	10.7	12.8	45°	50°	46°
	•	**2111 xx**		3.6	2.4	4.53	6.41	9.06	11.1	14.3	17.0	20.3	64°	67°	61°
	•	**2163 xx**		4.5	2.8	6.65	9.41	13.3	16.3	21.0	24.9	29.8	87°	90°	82°
	•	**2185 xx**	1/2"	4.6	3.2	7.55	10.7	15.1	18.5	23.9	28.3	33.8	64°	67°	61°
	•	**2300 xx**		6.3	3.6	12.3	17.3	24.5	30.0	38.7	45.8	54.8	88°	91°	83°
•	•	**2220 xx**	3/4"	4.9	4.4	8.98	12.7	18.0	22.0	28.4	33.6	40.2	48°	50°	46°
•	•	**2350 xx**		6.4	4.4	14.3	20.2	28.6	35.0	45.2	53.5	63.9	67°	70°	63°
•	•	**2610 xx**		9.5	5.2	24.9	35.2	49.8	61.0	78.8	93.2	111	89°	92°	84°
•	•	**2370 xx**	1"	6.0	5.6	15.1	21.4	30.2	37.0	47.8	56.5	67.6	48°	50°	46°
•	•	**2611 xx**		8.3	5.6	24.9	35.2	49.8	61.0	78.8	93.2	111	67°	68°	62°
•	•	**2870 xx**		11.9	5.6	35.5	50.2	71.0	87.0	112	133	159	78°	90°	94°
•	•	**3104 xx**		11.9	6.4	42.5	60.0	84.9	104	134	159	190	89°	92°	84°
•		**2520 xx**	1¼"	7.4	6.4	21.2	30.0	42.5	52.0	67.1	79.4	95	48°	50°	44°
•		**2871 xx**		9.6	6.4	35.5	50.2	71.0	87.0	112	133	159	64°	67°	58°
•		**3105 xx**		10.7	6.4	42.9	60.6	85.7	105	136	160	192	66°	70°	60°
•		**3122 xx**		12.3	6.4	49.8	70.4	99.6	122	158	186	222	77°	80°	70°
•		**3174 xx**		15.1	7.9	71.0	100	142	174	225	266	318	90°	93°	81°
•		**2872 xx**	1½"	9.5	8.7	35.5	50.2	71.0	87.0	112	133	159	48°	50°	44°
•		**3139 xx**		12.7	8.7	56.8	80.3	113	139	180	212	254	72°	74°	64°
•		**3175 xx**		14.3	8.7	71.4	101	143	175	226	267	320	74°	76°	66°
•		**3260 xx**		18.3	10.3	106	150	212	260	336	397	475	91°	94°	82°
•		**3148 xx**	2"	12.7	11.1	60.4	85.5	121	148	191	226	270	49°	50°	44°
•		**3261 xx**		17.3	11.1	106	150	212	260	336	397	475	72°	74°	64°
•		**3305 xx**		19.2	11.1	125	176	249	305	394	466	557	75°	77°	68°
•		**3350 xx**		21.0	11.1	143	202	286	350	452	535	639	78°	80°	70°
•		**3435 xx**		23.8	14.3	178	251	355	435	562	665	794	83°	85°	75°
•		**3520 xx**		28.6	14.3	212	300	425	520	671	794	949	98°	100°	86°
•		**3215 xx**	2½"	15.1	14.3	87.8	124	176	215	278	328	393	49°	50°	44°
•		**3436 xx**		22.2	14.3	178	251	355	435	562	665	794	72°	74°	64°
•		**3521 xx**		24.6	14.3	212	300	425	520	671	794	949	76°	78°	68°
•		**3610 xx**		28.6	14.3	249	352	498	610	788	932	1114	79°	82°	72°
•		**3700 xx**		28.6	17.5	286	404	572	700	904	1069	1278	86°	88°	77°
•		**3780 xx**		31.8	17.5	318	450	637	780	1007	1192	1424	95°	97°	84°
•		**3365 xx**	3"	19.1	17.5	149	211	298	365	471	558	666	49°	50°	44°
•		**3701 xx**		27.8	17.5	286	404	572	700	904	1069	1278	81°	84°	73°
•		**3781 xx**		30.2	17.5	318	450	637	780	1007	1192	1424	86°	89°	77°
•		**3870 xx**		32.5	17.5	355	502	710	870	1123	1329	1588	92°	95°	83°
•		**4104 xx**		34.9	20.6	425	600	849	1040	1343	1589	1899	102°	105°	89°

DIMENSIONS

	Size inch	1/4"	3/8"	1/2"	3/4"	1"	1¼"	1½"	2"	2½"	3"
BG Male	**H** mm	22.0	25.0	33.0	40.0	51.5					
	WS mm	14.0	17.0	22.0	22.0	27.0					
BE Female	**H** mm				55.5	68.0	90.0	105	140	180	192
	DIA mm				32.0	38.0					
	WS mm				27.0	32.0	48.0	52.0	67.0	85.0	100

WIDE SPRAY ANGLES

Nozzle type BEW Female	Nozzle type BGW Male	Code	RF RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar) 0.5	1.0	2.0	3.0	5.0	7.0	10	Spray angle at pressure (°) (bar) 0.3	0.7	6.0
	•	**2100 xx**	1/4"	3.3	1.6	4.08	5.77	8.16	10.0	12.9	15.3	18.3	114°	120°	103°
	•	**2122 xx**	3/8"	3.6	2.4	4.98	7.04	9.96	12.2	15.8	18.6	22.3	114°	120°	103°
	•	**2144 xx**		4.0	2.4	5.88	8.31	11.8	14.4	18.6	22.0	26.3	114°	120°	104°
	•	**2172 xx**		5.1	2.4	7.02	9.93	14.0	17.2	22.2	26.3	31.4	114°	120°	104°
	•	**2194 xx**		5.2	2.8	7.92	11.2	15.8	19.4	25.0	29.6	35.4	114°	120°	106°
	•	**2220 xx**	1/2"	5.0	3.0	8.98	12.7	18.0	22.0	28.4	33.6	40.2	114°	120°	108°
	•	**2250 xx**		5.4	3.0	10.2	14.4	20.4	25.0	32.3	38.2	45.6	114°	120°	108°
	•	**2290 xx**		6.4	3.0	11.8	16.7	23.7	29.0	37.4	44.3	53.0	114°	120°	108°
	•	**2320 xx**		6.9	3.0	13.1	18.5	26.1	32.0	41.3	48.9	58.4	114°	120°	110°
	•	**2360 xx**		7.6	3.0	14.7	20.8	29.4	36.0	46.5	55.0	65.7	114°	120°	112°
•	•	**2500 xx**	3/4"	8.7	4.5	20.4	28.9	40.8	50.0	64.6	76.4	91.3	115°	120°	112°
•	•	**2920 xx**	1"	11.5	5.6	37.6	53.1	75.1	92.0	119	141	168	117°	120°	117°
•	•	**3134 xx**	1¼"	14.0	6.0	54.7	77.4	109	134	173	205	245	118°	121°	119°
•		**3200 xx**	1½"	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**	2½"	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

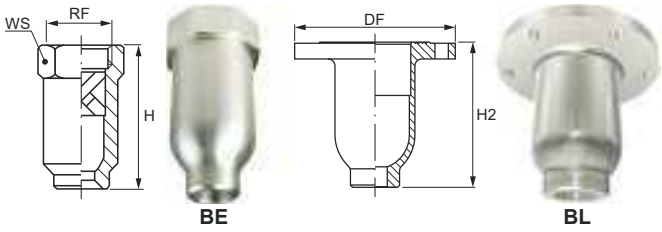
X-VANE / LARGE CAPACITIES

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

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

HOW TO MAKE UP THE NOZZLE CODE

EX.: BEU 4139 B31

BE U 4139 xx

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


BT


BR

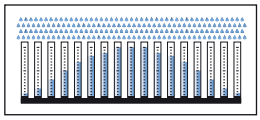

BS

X-VANE / NARROW SPRAY ANGLE

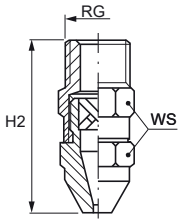
BR/BU nozzles produce a solid cone spray with round spray pattern, where coarse water drops are concentrated within a narrow spray angle to maximize their impact force per square surface unit. Spray angle values of 15° or 30° are available, with a choice of male or female thread connections. BR/BS nozzles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

- **Thread specification**
  Male (BSPT, NPT)
  Female (BSP, NPT)
- **Typical applications**
  bottles washing, parts cleaning, deep cleaning

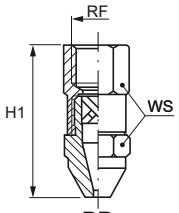

Spray section


Convex distribution

SPRAY ANGLE 15°



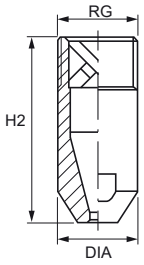
BS



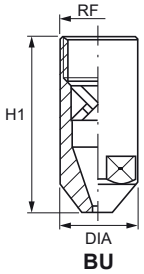
BR

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

SPRAY ANGLE 30°



BT



BU

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

HOW TO MAKE UP THE NOZZLE CODE

EX.: BRB 1270 B1

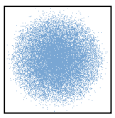
BR B 1270 xx

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

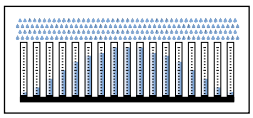
OFF LINE SPRAY

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

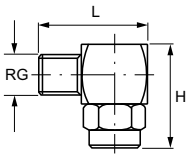
- **Thread specification**
  Male (BSPT, NPT)
  Female (BSP, NPT)



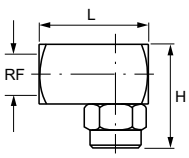
Spray section



Convex distribution



BV



BW

SPRAY ANGLE 60°

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

SPRAY ANGLE 120°

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

Typical applications

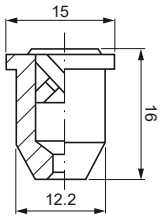
Washing
Parts washing
Gas scrubbing
Food washing
Cooling
Parts cooling
Gas cooling
Tank cooling

HOW TO MAKE UP THE NOZZLE CODE

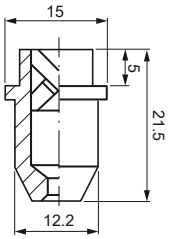
EX.: BVQ 1150 B1

BV Q 1150 xx

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



Above is outer shape of BX 1149 - BX 1372



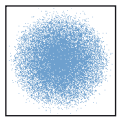
Above is outer shape of BX 1508 - BX 1743

NOZZLE TIPS

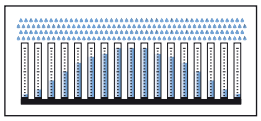
BX full cone tips produce a uniform full cone shaped spray with a round impact area. Thanks to their design they can be easily disassembled and cleaned in case of clogging. These nozzles have an X-vane safely secured inside their body up to 3/8" thread size.

- **Typical applications**

Washing: steel cleaning, parts cleaning, pre-treatment for coating process
Cooling: continuous casting cooling, product cooling, tank cooling
Dust control: dust removal in mining and coal plants
Other applications: spray of chemicals, leak test



Spray section

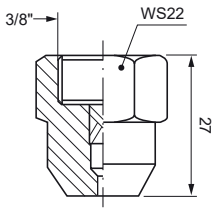


Convex distribution

SAFETY FLANGE

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

BJ



	Code	D mm	Capacity at different pressure values (l/min) (bar)					Spray angle at pressure (°) (bar)		
			1.0	2.0	3.0	5.0	10	1.5	3.0	5.0
60°	**BXQ 1149 xx**	1.3	0.86	1.22	1.49	1.92	2.72	50°	50°	45°
	BXQ 1233 xx	1.7	1.29	1.82	2.23	2.88	4.07	65°	65°	49°
	BXQ 1262 xx	1.7	1.51	2.14	2.62	3.38	4.78	50°	50°	46°
	BXQ 1372 xx	2.1	2.15	3.04	3.72	4.80	6.79	65°	65°	59°
	BXQ 1508 xx	2.4	2.93	4.15	5.08	6.56	9.27	50°	50°	46°
	BXQ 1626 xx	2.9	3.61	5.11	6.26	8.08	11.4	60°	60°	55°
	BXQ 1743 xx	2.9	4.29	6.07	7.43	9.59	13.6	67°	67°	61°

SISTER PRODUCTS / THREAD SIZE

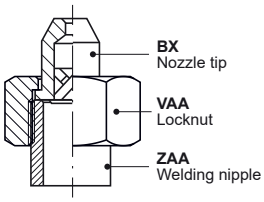
As for the BX series full cone nozzles, sister products with a 3/8" female thread are also available. In the steel industry spraying nozzles fixed on the water pipes can be easily damaged during the manufacturing process. PNR can offer the ideal solution to this problem, the BJ series nozzles designed according to customers' requirements. If welded tips are out of use, you can use BJ nozzles instead of BX. They have the same technical features and jet length.
Simply change the product code as follows, e.g. **BXQ 1372 T1 → BJQ 1372 T1**

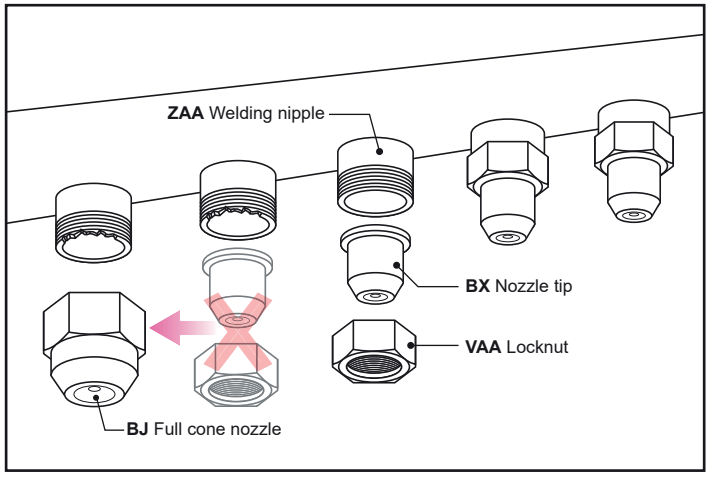
ASSEMBLY ACCESSORIES

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

ZAA C018 xxG

VAA 0380 xx



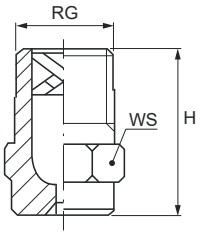


HOW TO MAKE UP THE NOZZLE CODE

EX.: BXQ 1149 B1

BX Q 1149 xx

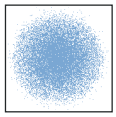
- NOZZLE TYPE
- SPRAY ANGLE • **Q** - 60°
- CAPACITY
- MATERIAL
  - • **B1** - AISI 303 Stainless steel
  - • **T1** - Brass
  - ○ **B31** - AISI 316L Stainless steel (optional)



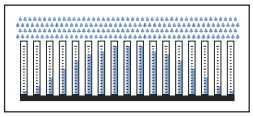
X VANE / TWO-PIECE DESIGN

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

- **Thread specification**: BSPT, NPT



Spray section

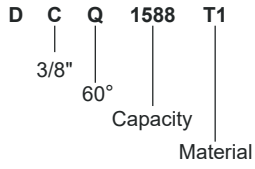


Convex distribution

Thread size coding table

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

How to make up the nozzle code



Typical applications

Washing
Food cleaning
Parts cleaning
Pre-treatment for coating process
Cooling
Continuous casting cooling
Product cooling
Tank cooling
Dust control
Remove flying dust in mining and coal plants.
Other applications
Spray of chemicals
Leak test

SPRAY ANGLE 45°

Nozzle type				Code	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)						
DAM	DBM	DCM	DDM				0.7	1.0	2.0	3.0	5.0	7.0	10
•				**0740 xx**	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•	•			**1118 xx**	1.1	1.0	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			**1147 xx**	1.2	1.1	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•	•			**1188 xx**	1.3	1.2	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•	•			**1212 xx**	1.4	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
•	•	•		**1235 xx**	1.5	1.3	1.14	1.36	1.92	2.35	3.03	3.59	4.29
•	•	•		**1294 xx**	1.7	1.5	1.42	1.70	2.40	2.94	3.80	4.49	5.37
•	•	•		**1370 xx**	2.0	1.8	1.79	2.14	3.02	3.70	4.78	5.65	6.76
•	•	•	•	**1470 xx**	2.1	2.0	2.27	2.71	3.84	4.70	6.07	7.18	8.58
•	•	•	•	**1588 xx**	2.3	2.0	2.84	3.39	4.80	5.88	7.59	8.98	10.7
	•	•	•	**1659 xx**	2.5	2.2	3.18	3.80	5.38	6.59	8.51	10.1	12.0
		•	•	**1740 xx**	2.7	2.3	3.57	4.27	6.04	7.40	9.55	11.3	13.5
		•	•	**1835 xx**	2.8	2.6	4.03	4.82	6.82	8.35	10.8	12.8	15.2
		•	•	**1940 xx**	3.0	3.0	4.54	5.43	7.68	9.40	12.1	14.4	17.2
		•	•	**2105 xx**	3.2	3.2	5.07	6.06	8.57	10.5	13.6	16.0	19.2
		•	•	**2117 xx**	3.4	3.3	5.65	6.75	9.55	11.7	15.1	17.9	21.4
		•	•	**2147 xx**	3.8	3.7	7.10	8.49	12.0	14.7	19.0	22.5	26.8
			•	**2188 xx**	4.3	4.3	9.08	10.9	15.4	18.8	24.3	28.7	34.3
			•	**2235 xx**	5.0	4.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9

SPRAY ANGLE 60°

Nozzle type				Code	D mm	D1 mm	Capacity (l/min) at different pressure values (bar)						
DAQ	DBQ	DCQ	DDQ				0.7	1.0	2.0	3.0	5.0	7.0	10
•				**0740 xx**	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•	•			**1118 xx**	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			**1147 xx**	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•	•	•		**1188 xx**	1.4	1.1	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•	•	•		**1212 xx**	1.5	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
•	•	•		**1235 xx**	1.6	1.2	1.14	1.36	1.92	2.35	3.03	3.59	4.29
•	•	•		**1294 xx**	1.8	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
•	•	•		**1370 xx**	2.0	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
•	•	•		**1470 xx**	2.4	1.9	2.27	2.71	3.84	4.70	6.07	7.18	8.58
	•	•		**1588 xx**	2.6	2.0	2.84	3.39	4.80	5.88	7.59	8.98	10.7
	•	•		**1659 xx**	2.7	2.0	3.18	3.80	5.38	6.59	8.51	10.1	12.0
	•	•	•	**1740 xx**	2.9	2.0	3.57	4.27	6.04	7.40	9.55	11.3	13.5
	•	•	•	**1835 xx**	3.2	2.8	4.03	4.82	6.82	8.35	10.8	12.8	15.2
	•	•	•	**1940 xx**	3.2	2.8	4.54	5.43	7.68	9.40	12.1	14.4	17.2
	•	•	•	**2105 xx**	3.4	3.0	5.07	6.06	8.57	10.5	13.6	16.0	19.2
	•	•	•	**2117 xx**	3.6	3.0	5.65	6.75	9.55	11.7	15.1	17.9	21.4
		•	•	**2147 xx**	4.0	3.3	7.10	8.49	12.0	14.7	19.0	22.5	26.8
		•	•	**2188 xx**	4.5	3.7	9.08	10.9	15.4	18.8	24.3	28.7	34.3
			•	**2235 xx**	5.2	4.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9
			•	**2294 xx**	5.8	4.7	14.2	17.0	24.0	29.4	38.0	44.9	53.7

X VANE / TWO-PIECE DESIGN

SPRAY ANGLE 90°

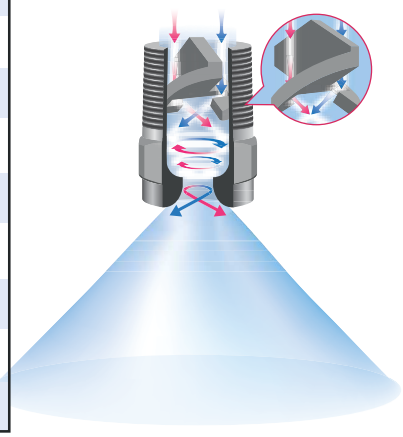
Nozzle type				Code	D mm	D1 mm	Capacity at different pressures values (l/min) (bar)						
DAU	DBU	DCU	DDU				0.7	1.0	2.0	3.0	5.0	7.0	10
•				**0740 xx**	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•				**1118 xx**	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			**1147 xx**	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•	•			**1188 xx**	1.4	1.2	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•	•			**1212 xx**	1.5	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
•	•	•		**1235 xx**	1.6	1.3	1.14	1.36	1.92	2.35	3.03	3.59	4.29
•	•	•		**1294 xx**	1.8	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
•	•	•		**1370 xx**	2.0	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
	•	•		**1470 xx**	2.3	1.8	2.27	2.71	3.84	4.70	6.07	7.18	8.58
	•	•		**1588 xx**	2.6	1.8	2.84	3.39	4.80	5.88	7.59	8.98	10.7
	•	•		**1659 xx**	2.7	2.0	3.18	3.80	5.38	6.59	8.51	10.1	12.0
	•	•		**1740 xx**	2.9	2.0	3.57	4.27	6.04	7.40	9.55	11.3	13.5
	•	•		**1835 xx**	3.3	2.0	4.03	4.82	6.82	8.35	10.8	12.8	15.2
	•	•		**1940 xx**	3.3	2.4	4.54	5.43	7.68	9.40	12.1	14.4	17.2
	•	•		**2105 xx**	3.5	2.6	5.07	6.06	8.57	10.5	13.6	16.0	19.2
		•		**2117 xx**	3.7	2.7	5.65	6.75	9.55	11.7	15.1	17.9	21.4
		•		**2147 xx**	4.0	3.2	7.10	8.49	12.0	14.7	19.0	22.5	26.8
		•		**2164 xx**	4.1	3.2	7.92	9.47	13.4	16.4	21.2	25.1	29.9
			•	**2188 xx**	4.7	3.2	9.08	10.9	15.4	18.8	24.3	28.7	34.3
			•	**2235 xx**	5.2	3.8	11.4	13.6	19.2	23.5	30.3	35.9	42.9
			•	**2294 xx**	5.8	3.8	14.2	17.0	24.0	29.4	38.0	44.9	53.7
			•	**2370 xx**	6.4	3.8	17.9	21.4	30.2	37.0	47.8	56.5	67.6

SPRAY ANGLE 120°

Nozzle type				Code	D mm	D1 mm	Capacity at different pressures values (l/min) (bar)						
DAW	DBW	DCW	DDW				0.7	1.0	2.0	3.0	5.0	7.0	10
•				**0740 xx**	1.0	0.5	0.36	0.43	0.60	0.74	0.96	1.13	1.35
•	•			**1118 xx**	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•	•			**1147 xx**	1.3	0.9	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•	•			**1188 xx**	1.5	1.0	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•	•			**1212 xx**	1.6	1.1	1.02	1.22	1.73	2.12	2.74	3.24	3.87
•	•			**1235 xx**	1.6	1.2	1.14	1.36	1.92	2.35	3.03	3.59	4.29
•	•			**1294 xx**	1.9	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
•	•			**1370 xx**	2.1	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
	•	•		**1470 xx**	2.4	1.6	2.27	2.71	3.84	4.70	6.07	7.18	8.58
	•	•		**1588 xx**	2.7	1.8	2.84	3.39	4.80	5.88	7.59	8.98	10.7
	•	•		**1659 xx**	3.0	1.8	3.18	3.80	5.38	6.59	8.51	10.1	12.0
	•	•		**1740 xx**	3.1	1.9	3.57	4.27	6.04	7.40	9.55	11.3	13.5
	•	•		**1835 xx**	3.3	1.9	4.03	4.82	6.82	8.35	10.8	12.8	15.2
	•	•		**1940 xx**	3.5	1.9	4.54	5.43	7.68	9.40	12.1	14.4	17.2
	•	•		**2105 xx**	3.7	2.3	5.07	6.06	8.57	10.5	13.6	16.0	19.2
		•	•	**2117 xx**	3.8	2.4	5.65	6.75	9.55	11.7	15.1	17.9	21.4
		•	•	**2147 xx**	4.2	2.7	7.10	8.49	12.0	14.7	19.0	22.5	26.8
		•	•	**2164 xx**	4.4	2.7	7.92	9.47	13.4	16.4	21.2	25.1	29.9
		•	•	**2188 xx**	4.6	3.1	9.08	10.9	15.4	18.8	24.3	28.7	34.3
		•	•	**2235 xx**	5.3	3.3	11.4	13.6	19.2	23.5	30.3	35.9	42.9
		•	•	**2294 xx**	5.9	4.1	14.2	17.0	24.0	29.4	38.0	44.9	53.7
			•	**2370 xx**	6.6	4.7	17.9	21.4	30.2	37.0	47.8	56.5	67.6

X vane

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

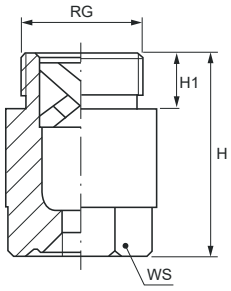


HOW TO MAKE UP THE NOZZLE CODE

EX.: DAU 1118 B1

D A U 1118 xx

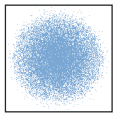
- NOZZLE TYPE
- CONNECTION: • A - 1/8" • B - 1/4" • C - 3/8" • D - 1/2"
- SPRAY ANGLE: • M - 45° • Q - 60° • U - 90° • W - 120°
- CAPACITY
- MATERIAL: • **B1** - AISI 303 Stainless steel • **B31** - AISI 316L Stainless steel • **T1** - Brass ○ On request special materials are quoted



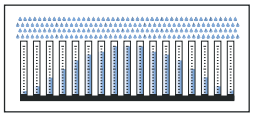
X VANE / TWO-PIECE DESIGN / LARGE CAPACITY

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

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



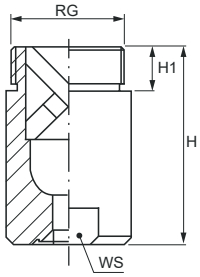
Spray section



Convex distribution

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Dimension mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
60°	**DEQ 2235 xx**	3/4"	4.8	3.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9	43	16	27
	DEQ 2295 xx		5.5	4.5	14.2	17.0	24.1	29.5	38.1	45.1	53.9			
	DEQ 2370 xx		6.0	4.5	17.9	21.4	30.2	37.0	47.8	56.5	67.6			
	DEQ 2470 xx		7.0	4.5	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
	DFQ 2470 xx	1"	7.0	5.6	22.7	27.1	38.4	47.0	60.7	71.8	85.8	58	18	36
	DFQ 2590 xx		7.8	5.6	28.5	34.1	48.2	59.0	76.2	90.1	108			
	DFQ 2740 xx		9.5	5.6	35.7	42.7	60.4	74.0	95.5	113	135			
	DGQ 2740 xx	1¼"	9.5	5.6	35.7	42.7	60.4	74.0	95.5	113	135	74	19	41
	DGQ 3118 xx		12.5	6.0	57.0	68.1	96.3	118	152	180	215			
	DGQ 3147 xx		16.7	6.0	71.0	84.9	120	147	190	225	268			
	DHQ 3147 xx	1½"	13.0	9.0	71.0	84.9	120	147	190	225	268	85	19	50
	DKQ 3188 xx	2"	15.0	9.0	90.8	109	154	188	243	287	343	106	24	60
	DKQ 3235 xx		16.0	11.0	114	136	192	235	303	359	429			
	DKQ 3294 xx		17.0	11.1	142	170	240	294	380	449	537			
	DLQ 3370 xx	2½"	17.5	11.1	179	214	302	370	478	565	676	128	27	75
	DLQ 3470 xx		23.0	11.1	227	271	384	470	607	718	858			
	DMQ 3588 xx	3"	28.0	14.3	284	339	480	588	759	898	1074	153	30	85
	DNQ 3740 xx	3½"	29.0	17.5	357	427	604	740	955	1130	1351	190	32	105
	DNQ 3940 xx		36.0	17.5	454	543	768	940	1214	1436	1716			
	DPQ 4117 xx	4"	39.0	19.0	568	678	959	1175	1517	1795	2145	205	36	110

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Dimension mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
90°	**DEU 2295 xx**	3/4"	5.8	3.0	14.2	17.0	24.1	29.5	38.1	45.1	53.9	43	16	27
	DEU 2370 xx		6.4	4.5	17.9	21.4	30.2	37.0	47.8	56.5	67.6			
	DEU 2470 xx		8.0	4.5	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
	DEU 2590 xx		9.7	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108			
	DFU 2590 xx	1"	8.6	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108	58	18	36
	DFU 2740 xx		9.3	5.0	35.7	42.7	60.4	74.0	95.5	113	135			
	DFU 2830 xx		9.9	6.0	40.3	48.2	68.2	83.5	108	128	152			
	DGU 3118 xx	1¼"	13.0	6.0	57.0	68.1	96.3	118	152	180	215	74	19	41
	DGU 3147 xx		16.0	6.0	71.0	84.9	120	147	190	225	268			
	DHU 3147 xx	1½"	16.0	6.0	71.0	84.9	120	147	190	225	268	85	19	50
	DHU 3188 xx		14.5	9.0	90.8	109	154	188	243	287	343			
	DKU 3235 xx	2"	16.6	11.0	114	136	192	235	303	359	429	106	24	60
	DKU 3294 xx		18.0	11.0	142	170	240	294	380	449	537			
	DKU 3370 xx		25.0	11.0	179	214	302	370	478	565	676			
	DLU 3470 xx	2½"	27.0	11.1	227	271	384	470	607	718	858	128	27	75
	DLU 3588 xx		30.0	14.3	284	339	480	588	759	898	1074			
	DMU 3740 xx	3"	30.0	17.5	357	427	604	740	955	1130	1351	153	30	85
	DMU 3870 xx		32.5	17.5	420	502	710	870	1123	1329	1588			
	DNU 3940 xx	3½"	35.5	17.5	454	543	768	940	1214	1436	1716	190	32	105
	DNU 4117 xx		39.0	19.0	568	678	959	1175	1517	1795	2145			
	DPU 4147 xx	4"	42.8	25.4	710	849	1200	1470	1898	2245	2684	205	36	110



	Code	RG inch	D mm	D1 mm	Capacity at different pressure values (l/min) (bar)							Dimension mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
120°	DEW 2295 xx	3/4"	5.1	3.0	14.2	17.0	24.1	29.5	38.1	45.1	53.9	43	16	27
	DEW 2370 xx		6.5	3.5	17.9	21.4	30.2	37.0	47.8	56.5	67.6			
	DEW 2470 xx		8.5	4.5	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
	DEW 2590 xx		9.2	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108			
	DFW 2590 xx	1"	11.5	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108	58	18	36
	DFW 2740 xx		12.0	4.5	35.7	42.7	60.4	74.0	95.5	113	135			
	DFW 2830 xx		13.0	5.6	40.3	48.2	68.2	83.5	108	128	152			
	DGW 3118 xx	1 1/4"	13.5	6.0	57.0	68.1	96.3	118	152	180	215	74	19	41
	DGW 3147 xx		17.0	6.0	71.0	84.9	120	147	190	225	268			
	DHW 3118 xx	1 1/2"	13.0	6.0	57.0	68.1	96.3	118	152	180	215	85	19	50
	DHW 3188 xx		20.0	9.0	90.8	109	154	188	243	287	343			
	DKW 3235 xx	2"	18.0	11.0	114	136	192	235	303	359	429	106	24	60
	DKW 3294 xx		19.0	11.0	142	170	240	294	380	449	537			
	DKW 3370 xx		21.3	11.0	179	214	302	370	478	565	676			
	DLW 3470 xx	2 1/2"	23.5	11.1	227	271	384	470	607	718	858	128	27	75
	DLW 3588 xx		26.5	14.3	284	339	480	588	759	898	1074			
	DMW 3740 xx	3"	29.5	17.5	357	427	604	740	955	1130	1351	153	30	85
	DMW 3870 xx		32.0	17.5	420	502	710	870	1123	1329	1588			
	DNW 3940 xx	3 1/2"	33.5	17.5	454	543	768	940	1214	1436	1716	190	32	105
	DNW 4117 xx		37.0	19.0	568	678	959	1175	1517	1795	2145			
	DPW 4147 xx	4"	42.0	25.4	710	849	1200	1470	1898	2245	2684	205	36	110

THREAD SIZE CODE (RG)

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

Typical applications

Washing: food cleaning, parts cleaning, pre-treatment for coating process
Cooling: continuous casting cooling, product cooling, tank cooling
Dust control: dust suppression in mining and coal plants.
Other applications: spray of chemicals, leak test.

HOW TO MAKE UP THE NOZZLE CODE

EX.: DEQ 2235 B1

D E Q 2235 xx

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