



GENERAL PURPOSE SPRAY NOZZLES

CTG UG18 BR



INTRODUCTION

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TECHNICAL PUBLICATIONS

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

PRODUCT RANGE	CTG TV10 BR
GENERAL PURPOSE SPRAY NOZZLES	CTG UG18 BR
AIR ASSISTED ATOMIZERS	CTG AZ15 BR
COMPLEMENTARY PRODUCTS AND ASSEMBLY FITTINGS	CTG AC16 BR
INDUSTRIAL TANK WASHING SYSTEMS	CTG LS15 BR
EVAPORATIVE COOLING SYSTEMS	CTG LN16 BR
FIRE FIGHTING PRODUCTS	CTG FF10 BR
PAPERMILL PRODUCTS	CTG PM09 BR
STEELWORK NOZZLES	CTG SW11 BR
SPRAYDRY NOZZLES	CTG SP10 BR

As a result of continuous product improvement our documentation is regularly updated and mailed to Customers whose name and address are registered into our Catalog Mailing List. We shall gladly register your name if you mail to the nearest PNR office or Distributor the form on page 57, duly filled with the required information.

NOTES

Our products and their performances are continuously reconsidered and modified to keep up with the latest state of technology. We regret not to be able to give our Customers previous advice about these modifications: for this reason the data and product specifications given in our Catalogs are always to be understood as being indicative, and do not firmly engage our Company.

In case your application should imperatively require that one or more characteristics of one of our products as given by the Catalogue is strictly adhered to, we ask you to obtain a written confirmation about your requirements before sending your order.

All information contained into this Catalogue, including product data, product codes, diagrams and photographs are the exclusive property of Flowtech. It is forbidden to reproduce any part of this Catalogue without having obtained a written permission from Flowtech.

Dimensions in this Catalogue are given in millimeters (mm).

All threads are made according to the ISO 228 standards.

(European norms BS 2779 – DIN 259 – UNI 338).

Explanations about the abbreviations used in the Catalogue are given at page 57.

All mentioned Trademarks are the property of their respective owners.

Please read our Warranty conditions at page 57.

Our factory has qualified
our Quality System
through DNV to the
Norms ISO 9001/2000

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
=ISO 9001/2000=

LIQUID SPRAY AS A PROCESS

The process of spraying a liquid can be described as composed of two phases, namely:

- 1 Breaking up the liquid into separated drops.
- 2 Directing the liquid drops onto a surface or an object, to achieve the desired result.

The above two phases are normally performed, by the types of nozzles being used in industrial processes, at the same time by means of different techniques which shall be illustrated in the following.

The continuous progress in the manufacturing techniques in the recent years has requested the nozzle manufacturer to make available to the industry an always more complete range of spray nozzle types, to perform the different processes in a more efficient way.

It is the interest of the engineer using spray nozzles in manufacturing processes to become familiar with the different types of nozzles which are available today, and with their individual characteristics, in order to be able to choose the nozzle which performs with the highest possible efficiency on a given application.

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

- 1 Cooling, by means of heat transfer between the product itself and the liquid running on its surface.
- 2 Washing, where the water directed onto the product takes away dirt or undesired substances from the product surface.
- 3 Humidifying, with sprays carrying very little liquid quantities to the product surface or the room volume.
- 4 Metering the desired liquid quantity per time unit into the product being handled.
- 5 Applying a product on a surface, as in the case of spray painting or surface pre-treatment before painting.
- 6 Increasing the liquid surface to speed up heat transfer processes or chemical reactions and many others in numberless applications throughout modern industry.

It is self evident that the best results for every application are only obtained when the right choices in terms of nozzle type, flow value, spray angle, drop dimensions and nozzle material are made.

The purpose of the following pages is to give the reader the basic knowledge which is needed to properly select a spray nozzle for a given application.

SPRAY NOZZLES

A spray nozzle is a device which makes use of the pressure energy of a liquid to increase its speed through an orifice and break it into drops.

Its performances can be identified and described precisely, so that the design engineer can specify exactly the spray nozzle required for a given process.

The relevant characteristics which identify the performances of a nozzle are the following:

- 1 The liquid flow delivered as a function of the nozzle feed pressure.
- 2 The opening angle of the produced spray.
- 3 The nozzle efficiency, as the ratio between the energy of the spray and the energy used by the nozzle.
- 4 The evenness of the flow distribution over the target.
- 5 The droplet size distribution of the spray.

The above characteristics will be discussed in the following pages, in connection with the different nozzle types.

SPRAY TECHNOLOGY

TECHNIQUES FOR SPRAY PRODUCTION

Many different techniques can be used to produce a spray, and most of them are used today for nozzles to be applied in industrial processes. Based on the different techniques, the following nozzle types can be used in industrial applications to generate a liquid spray.

1 PRESSURE NOZZLES

This is the simplest type of nozzles, 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 the flat jet nozzles series GA, J, GX and GY.

2 TURBULENCE NOZZLES

In these nozzles the liquid moving towards the chamber preceding the orifice is given a rotational speed component, so as to open up in a conical shape as soon as it leaves the orifice edge because of centrifugal force. Based on the nozzle design and the technique used to generate the rotational speed, the drops produced can be confined to the cone outer surface (hollow cone spray) or be evenly distributed to fill the entire volume of the cone (full cone spray).

3 IMPACT NOZZLES

Here the desired spray shape is obtained producing an impact of the liquid jet onto a properly designed surface. The liquid jet is subsequently changed into a fluid lamina and then broken into drops with the desired spray pattern after leaving the nozzle edge.

4 AIR ASSISTED ATOMIZERS

Fine and very fine sprays can be obtained by means of air assisted atomizers, working upon various different principles. More detailed informations about air assisted atomizing can be found in our catalogue "Air assisted atomizers" (ordering code CTG AZ 15 BR).

The interested reader can find further informations into our Spray Handbook CTG SH02 BR, to be obtained at no cost by any PNR Company or Distributor.

SPRAYING NOZZLE TECHNICAL PARAMETERS

Several technical properties have to be taken into account for properly selecting a nozzle, and will be mentioned into the following page. Among them the following two are of prime interest to the design engineer.

1 NOZZLE EFFICIENCY

A spray nozzle is a device that transforms the pressure energy of a liquid flow into kinetic energy. The nozzle efficiency can be defined as the ratio between the energy available at the nozzle inlet, and the energy which is used to increase the liquid velocity and create the spray, the difference being the energy lost within the process because of friction both inside the liquid and between the liquid and the nozzle inner surface. Depending upon the nozzle type, and for a good quality machining, the nozzle efficiency varies between 55% and 95% for the types commonly used in industrial processes. The above is not valid for air assisted atomizers, which have much higher energy requirements, because of the losses inherent in the energy transfer from compressed air to liquid surface.

2 DROPLET SIZE

For several applications the size of the droplets in the spray is of prime importance to the final result. Considerations about how to define and measure the droplet size of a spray are contained both in our Spray Handbook (CTG SH02 BR), and in our Catalogue "Air assisted Atomizers" (CTG AZ 15 BR).

SPRAY PATTERNS

FULL CONE PATTERN

In a full cone spray the droplets are distributed into a volume which is limited by a cone, having its origin point at the nozzle orifice. Such spray pattern is commonly used in a large variety of industrial processes, since it is the one which allows to distribute in an even way the water flow onto a surface: the full cone spray pattern is therefore useful, as a typical example, to evenly spray cooling liquid on a still surface. Another typical use is to distribute liquid droplets within a certain volume, like for example evenly distributing water droplets in the inside volume of a cooling tower.

Because of the wide number of processes performed by means of full cone nozzles the original shape has evolved into a range of specialized types, where the full cone spray pattern, or a pattern similar to a full cone one, is obtained by different techniques.

STANDARD FULL CONE (TURBULENCE NOZZLE)

These nozzles use a specially shaped vane placed at the nozzle inlet, to give a rotational speed component to the fluid flowing through the nozzle. Because of this rotational speed component, water exiting the nozzle orifice is subjected to centrifugal force and opens up in the shape of a full cone. The amplitude angle of the cone is a function of both exit speed (therefore of the inlet pressure) and the internal design of nozzle. It can vary in the 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 this type of nozzles:

- 1 - the spray angle is measured on the side of the square section
- 2 - the square section of the spray rotates with the distance from the nozzle.

SPIRAL FULL CONE (DEFLECTION 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 plugging, which makes this nozzle the best choice in those applications where safety or system reliability are the prime concern, e.g. fire fighting systems.

MULTIPLE FULL CONE (TURBULENCE NOZZLE, AIR ATOMIZER)

This spray pattern is used in two cases, that is:

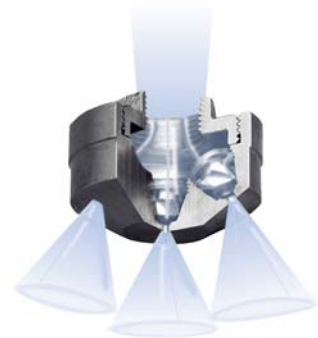
- A When a wide spray angle is to be reached with nozzles which inherently can only produce a narrow one, or in such cases where small size droplets and rather high capacities are required. Therefore several nozzles are grouped in a cluster with different spray directions, so that the resulting spray pattern comes from the addition of the single nozzle sprays and the droplet size of the spray remains the same as the one of the single tiny nozzle. It must be noted that a smaller nozzle will normally make smaller drops as compared to a larger size nozzle of the same type operating under the same conditions.
- B When it is necessary to obtain a wide angle jet using nozzles which inherently deliver a limited angle spray. In the case of a wide angle air atomizer, for example, the droplet distribution is obviously not homogeneous and the result is rather a number of small angle sprays with different directions, but still the liquid is atomized towards all the parts of the volume to be treated.



STANDARD FULL CONE



SPIRAL FULL CONE



MULTIPLE FULL CONE

SPRAY PATTERNS

FLAT JET SPRAY PATTERN



In a flat jet spray the liquid droplets are sprayed with the shape of a flat liquid layer, with different thickness according to the principle used to generate the spray. A flat jet 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 JET (PRESSURE NOZZLE)

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



IN LINE STRAIGHT JET (PRESSURE NOZZLE)

These nozzles can be considered a special kind of flat jet nozzles, with naught degree spray angle. They are designed to produce a sharp stable stream, with powerful impact on a given point, and serve normally to perform cleaning processes or cut soft materials.

SPOON FLAT JET (DEFLECTION NOZZLE)

In this type of nozzle the liquid is fed under pressure to a round outlet orifice, and then deflected onto a smooth profiled surface so as to assume a flat jet shape. This sophisticated design is of advantage since it offers a stronger jet impact using the same feed pressure. Higher efficiency comes from the very little energy required to just change the direction of the liquid flow, this being the only energy required to generate the flat jet.

HOLLOW CONE SPRAY PATTERN



A hollow cone spray pattern consists of droplets concentrated onto the outer surface of a conical shape volume, with no droplets contained in the inside of the conical jet shape. These nozzles are normally used for smoke washing or gas cooling applications in several industrial processes.

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, permit to obtain very large spray angles.



HOLLOW CONE (DEFLECTION NOZZLE)

A hollow cone can also be obtained taking a liquid vein to change direction onto a properly designed surface, in order to break the liquid into droplets and distributing them on an hollow cone pattern spray. This kind of nozzles finds applications mainly in dust control and fire fighting systems.

NOZZLE IDENTIFICATION CODES

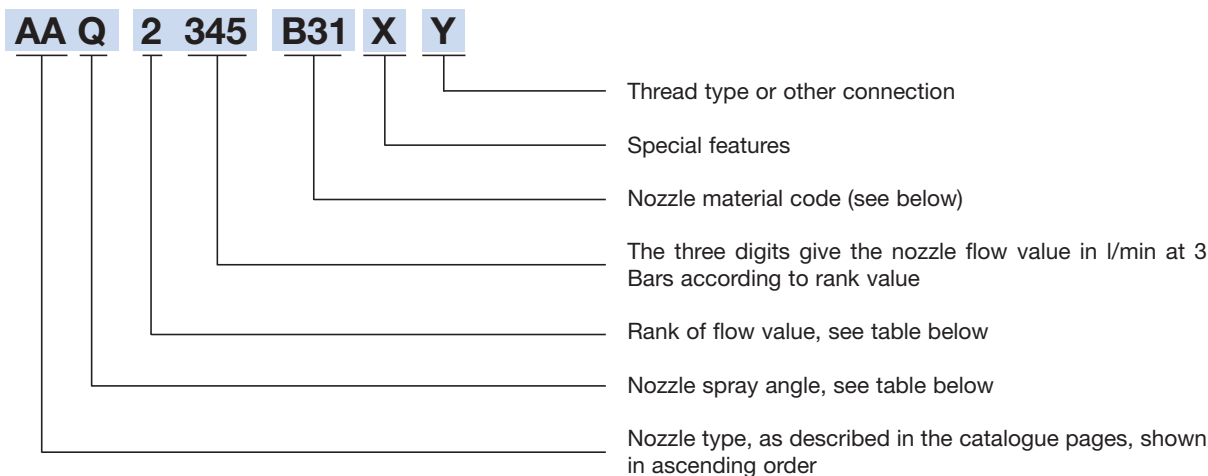
PNR CODING SYSTEM

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 has been designed with the following requirements in mind:

- Codes must be easily processed by a computer, in ascending order.
- Codes must describe completely the product without any need for additional description.
- Codes must show to the user the basic specifications of the nozzle in order to ease the search in the catalogue.

We have then determined our coding system as described in the following:



Nozzle tables report on a blue background the nominal flow value, measured at 3,0 bar. Flow values at different pressures have been calculated.

These codes serve as an indication only.

Based on different types of nozzles, their significance can be occasionally different.

Capacity rank

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)

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 304 L Stainless steel
B3	AISI 316 Stainless steel
B31	AISI 316 L Stainless steel
C2	AISI 416 Stainless steel, hardened
D1	Polyvinylchloride (PVC)
D2	Polypropylene (PP)
D3	Polyamide (PA)
D5	Talcum filled Polypropylene

D6	Glassfibre reinforced PP
D7	High density polyethylene
D8	Polyvinylidene fluoride (PVDF)
E0	EPDM
E1	Polytetrafluorethylene (PTFE)
E2	PTFE (25% glassfibers)
E31	Acetalic resin (POM)
E7	Viton
E8	Synthetic rubber (NBR)
F5	Ceramic
F31	Ruby insert, 303 body
G1	Cast iron
H1	Titanium
L1	Monel 400

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

FULL CONE NOZZLES RANGE OVERVIEW

A wide choice of full cone nozzles is shown on the following pages, covering any possible requirement for standard industrial processes.

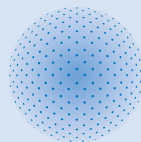
The table below list full nozzles type codes, and beside each type some general indication about nozzle style, special features, spray pattern and specific application, in order to assist your choice.

Full cone nozzles are normally delivered in brass or AISI 316 Stainless steel, while a wide choice of other materials like PVC, Polypropylene, Teflon, Hastelloy, Titanium can be supplied on request.

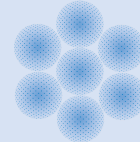
Please note that nozzles shown in this catalog are listed for general purpose applications, additional nozzle types designed specifically for specific applications are shown in other Catalogs as listed in the back cover page and shown at page 55.



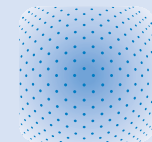
FULL CONE
Round spray



FULL CONE
Cluster spray



FULL CONE
Square pattern



Type	Connection	Design	Feature	Pattern	Recommended	Page
AA	Male thread	In line	Short body	Round	Plastic materials	07
AE	Flange	In line	Large capacity	Round	Coke quench	08
AL	Male/Female	In line	Non clogging	Round	General	09
AT	Male thread	Tangential	Non clogging	Round	Demister wash	10
BA	Female thread	In line	Three pieces	Round	Cleanable	11
BB	Female thread	In line	Three pieces	Square	Cleanable	12
BC	Male thread	In line	Three pieces	Round	Cleanable	11
BD	Male thread	In line	Three pieces	Square	Cleanable	12
BE	Female thread	In line	Cast body	Round	General	13
BF	Female thread	In line	Cast body	Square	General	15
BG	Male thread	In line	Small capacity	Round	General	13
BH	Male thread	In line	Two pieces	Square	Surface cooling	15
BL	Flange	In line	Large capacity	Round	General	14
BR	Female thread	In line	Narrow spray	Round	Cleanable	16
BS	Male thread	In line	Narrow spray	Round	Cleanable	16
BX	Nipple & nut	In line	Manifold mount	Round	Continuous casting	17
CA	Female thread	In line	Cluster jet	Round	Cooling	18
D	Male thread	In line	Two pieces	Round	General	20
E	Male thread	In line	Non clogging	Spiral	Scrubbers	24

FULL CONE NOZZLES

AA

SLOTTED VANE

Type AA full cone nozzles are made out of a body and a slotted vane, for even spray distribution.

This type of construction offers a nozzle length generally shorter than other types, and it is used in applications where strict space requirements are to be met.

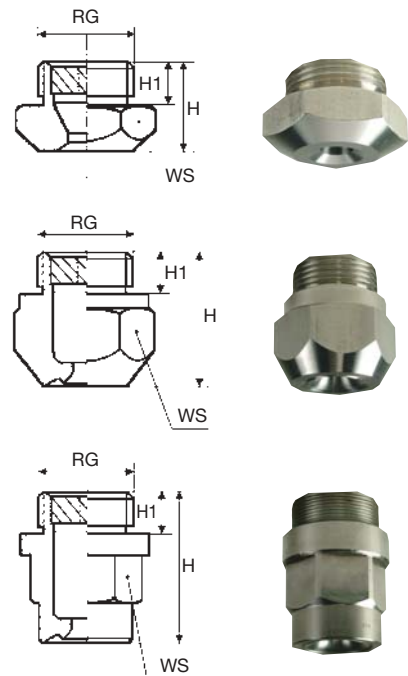
Connection thread is parallel, according to BSP standards.

Typical applications in gas cooling, washing processes and fire fighting systems.

Their compact design makes them the best choice where a plastic material like PVC, PP or PTFE is required, because of the resistance of their thick vane to collapsing under high temperature and the convenient price resulting from less material being required through shorter length.

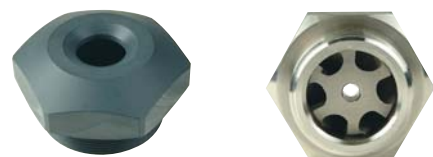
In addition these nozzles can be readily manufactured from almost any machineable material, making them the best choice when urgent delivery is requested.

Materials B3 AISI 316 Stainless steel
T1 Brass
D All plastic materials on request



Code	RG	D	D1	Capacity at different pressure values (l/min)								H (mm)	H1 (mm)	WS (mm)	
				0.5	0.7	1.0	2.0	3.0	5.0	7.0	10				
90°	AAU 2305 xx	3/4"	6.1	3.0	12.5	14.7	17.6	24.9	30.5	39.4	46.6	55.7	22	10	32
	AAU 2385 xx		6.7	3.0	15.7	18.6	22.2	31.4	38.5	49.7	58.8	70.3			
	AAU 2490 xx		7.8	4.0	20.0	23.7	28.3	40.0	49.0	63.3	74.8	89.4			
	AAU 2610 xx	1"	9.0	4.0	24.9	29.5	35.2	49.8	61.0	78.7	93.1	111	27	12	40
	AAU 2780 xx		10.5	5.0	31.9	37.7	45.1	63.7	78.0	101	119	142			
	AAU 3123 xx	1+1/4"	12.5	6.0	50.2	59.4	71.0	100	123	158	187	224	30	14	50
	AAU 3194 xx	1+1/2"	16.0	6.0	79.2	93.8	112	158	194	250	296	354	35	16	60
	AAU 3310 xx	2"	20.0	7.0	127	150	179	253	310	400	473	564	45	18	75
	AAU 3386 xx		23.0	9.0	158	186	223	315	386	498	589	703			
	AAU 3490 xx	2+1/2"	25.0	12.0	200	237	283	400	490	632	748	894	52	22	90
AAU 3610 xx	28.5		13.0	249	295	352	498	610	787	931	1112				
AAU 3775 xx	3"	32.0	16.0	317	375	448	633	775	1000	1183	1412	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	89.4	38	11	32
	AAW 2780 xx	1"	13.7	6.0	31.9	37.7	45.1	63.7	78.0	101	119	142	47	15	40
	AAW 3123 xx	1+1/4"	12.7	6.0	50.2	59.4	71.0	100	123	158	187	224	62	19	50
	AAW 3194 xx	1+1/2"	16.0	6.0	79.2	93.8	112	158	194	250	296	354	77	21	50
	AAW 3310 xx	2"	20.0	10.0	127	150	179	253	310	400	473	564	99	24	60
	AAW 3386 xx		22.7	10.0	158	186	223	315	386	498	589	703			
	AAW 3490 xx	2+1/2"	25.5	12.0	200	237	283	400	490	632	748	894	123	27	75
	AAW 3610 xx		30	13.0	249	295	352	498	610	787	931	1112			
	AAW 3775 xx	3"	32.0	14.0	317	375	448	633	775	1000	1183	1412	150	30	85

While AA type nozzles are available on request in several materials, the different sizes are normally stocked or produced in brass, PVC and 316 stainless steel according to the Material Table beside. Also, please note that the wrench sizes given in the above table refer to brass nozzles, while stainless steel and plastic bars may have different sizes.



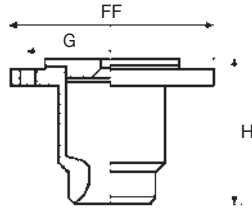
AA nozzles design is ideally suited for plastic materials.

Slotted disc vane

MATERIAL	3/4"	1"	1+1/4"	1+1/2"	2"	2+1/2"	3"
AISI 316					•	•	•
Brass	•						
PVC	•	•	•	•	•	•	•

FULL CONE NOZZLES

AE



SLOTTED VANE

AE type nozzles are designed to deliver large and very large capacity values, with a carefully designed and machined inside profile, which allows for perfect performance even with very low feed pressure values.

The nozzle is made from castings or welded from steel sheet according to its size, and has an upper flange, normally a ND 16 DIN standard, for connection to the feed line.

Typical application for these nozzle is coke quenching and any other application requesting efficient cooling over large surfaces.

Materials A1 Carbon steel
B3 AISI 316 Stainless steel
G1 Cast iron

Code	DN	D	D1	Capacity at different pressure values (l/min)								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	12	340	405	442	520	599	788	940	1195	200	160	140
	AEU 4118 xx		39	14	425	505	568	670	740	987	1180	1480			
	AEU 4147 xx	100	43	13	535	630	700	830	940	1230	1470	1825	220	180	156
	AEU 4188 xx	125	53	16	680	810	900	1060	1180	1595	1880	2340	250	210	177
	AEU 4235 xx		56	16	845	1010	1128	1335	1495	1975	2350	2590			
	AEU 4294 xx	150	59	21	1065	1265	1398	1650	1880	2490	2940	3630	285	240	188
	AEU 4370 xx		66	24	1345	1593	1795	2120	2320	3140	3700	4610			
	AEU 4470 xx	200	72	28	1710	2020	2180	2565	2995	3930	4700	5860	340	295	250
	AEU 4588 xx		81	32	2135	2530	2760	3300	3635	4940	5880	7310			
	AEU 4741 xx	250	88	39	2650	3185	3590	4245	4690	6150	7410	9120	395	350	291
AEU 4941 xx		99	37	3410	4050	4520	5350	5980	7880	9410	11650				
120°	AEW 3940 xx	80	36	15	340	405	442	520	599	788	940	1195	200	160	140
	AEW 4118 xx		40.5	14.5	425	505	568	670	740	987	1180	1480			
	AEW 4147 xx	100	43	18.5	535	630	700	830	940	1230	1470	1825	220	180	156
	AEW 4188 xx	125	53	22	680	810	900	1060	1180	1595	1880	2340	250	210	177
	AEW 4235 xx		55	24	845	1010	1128	1335	1495	1975	2350	2590			
	AEW 4294 xx	150	59	28	1065	1265	1398	1650	1880	2490	2940	3630	285	240	188
	AEW 4370 xx		66	32	1345	1593	1795	2120	2320	3140	3700	4610			
	AEW 4470 xx	200	75	35	1710	2020	2180	2565	2995	3930	4700	5860	340	295	250
	AEW 4588 xx		81	40	2135	2530	2760	3300	3635	4940	5880	7310			
	AEW 4741 xx	250	86	37	2650	3185	3590	4245	4690	6150	7410	9120	395	350	291
AEW 4941 xx		96	42	3410	4050	4520	5350	5980	7880	9410	11650				

Common Applications

Coke quenching

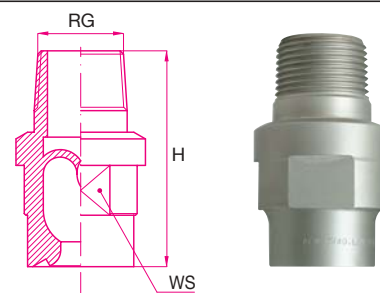
Cooling

FULL CONE NOZZLES

AL

S-TYPE VANE

AL style nozzles offer distinct advantages thanks to their special construction, with an integrated S-shape vane cast in one piece with the nozzle body. Because of their special design they offer 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 foreign matters. The highest reliability is then assured under the most difficult conditions, which makes these nozzles the best choice in those plants with high nozzle clogging danger or where disassembling and cleaning a clogged nozzle is a difficult job.



Materials B31 AISI 316 L Stainless steel
Or any castable metal on request.

Code	RG	D	Capacity at different pressure values (l/min) (bar)								H (mm)	WS (mm)	DIA (mm)	W (Kg)				
			0.25	0.5	1.0	2.0	3.0	4.0	5.0									
90°	ALU 2671 xx	3/4"	8.7	19.4	27.4	38.7	54.8	67.1	77.5	86.6	60	32		0.20				
	ALU 2792 xx		9.5	22.9	32.3	45.7	64.7	79.2	91.5	102								
	ALU 2793 xx	1"	9.5	22.9	32.3	45.7	64.7	79.2	91.5	102	75	38		0.35				
	ALU 2952 xx		10.3	27.5	38.9	55.0	77.7	95.2	110	123								
	ALU 3111 xx		11.1	32.0	45.3	64.1	90.6	111	128	143								
	ALU 3112 xx	1+1/4"	11.1	32.0	45.3	64.1	90.6	111	128	143	86	50		0.60				
	ALU 3143 xx		12.7	41.3	58.4	82.6	117	143	165	185								
	ALU 3159 xx		13.5	45.9	64.9	91.8	130	159	184	205								
	ALU 3175 xx		14.3	50.5	71.4	101	143	175	202	226								
	ALU 3176 xx	1+1/2"	14.3	50.5	71.4	101	143	175	202	226	86	50		0.60				
	ALU 3198 xx		15.1	57.2	80.8	114	162	198	229	256					112	60		0.90
	ALU 3212 xx		15.9	61.2	86.5	122	173	212	245	274								
	ALU 3227 xx		16.7	74.2	105	148	210	257	297	332								
	ALU 3270 xx		17.5	77.9	110	156	220	270	312	349								
	ALU 3328 xx	2"	19.0	94.7	134	189	268	328	379	423	160		70	1.6				
	ALU 3360 xx		20.6	104	147	208	294	360	416	465								
	ALU 3445 xx		22.3	128	182	257	363	445	514	574								
	ALU 3499 xx		23.8	144	204	288	407	499	576	644								
ALU 3581 xx	25.4		167	237	335	474	581	671	750									
ALU 3714 xx	28.5		206	291	412	583	714	824	922									

AL style nozzles feature a special S-vane design, allowing the narrowest free passage inside the nozzle to be approximately equal to the nozzle orifice diameter.

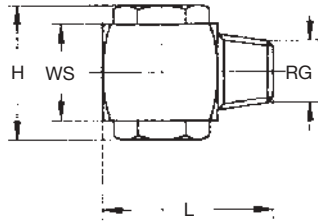
They offer therefore the widest possible passage among all full cone nozzles working with an inside vane.

**Common Applications**

Fire protection
Gas scrubbers
Cooling
Washing gravel
Dust control

FULL CONE NOZZLES

AT



VANELESS - OFF LINE

These nozzles can produce a full cone spray pattern without any vane inside the swirl-chamber, which has free internal passages. The spray axis has an angle of 90° with the axis of the nozzle feed inlet and consists of coarse drops insensitive to wind drift well distributed over the spray area and with a stable spray angle.

Connection thread is BSPT male.

Materials B3 AISI 316 Stainless steel
T1 Brass

Code	RG	D	D1	Capacity (l/min) at different pressure values (bar)							H (mm)	L (mm)	WS (mm)	
				1.0	2.0	3.0	4.0	5.0	6.0	7.0				
60°	ATQ 1230 xx	1/8"	2.0	1.8	1.33	1.88	2.30	2.66	2.97	3.25	3.51	22	24	15
	ATQ 1390 xx	1/4"	2.4	2.2	2.25	3.18	3.90	4.50	5.03	5.52	5.96	25	34	20
	ATQ 1490 xx		2.9	2.8	2.83	4.00	4.90	5.66	6.33	6.93	7.48			
	ATQ 1740 xx		3.3	3.2	4.27	6.04	7.40	8.54	9.55	10.5	11.3			
ATQ 2110 xx	3/8"	5.1	4.6	6.35	8.98	11.0	12.7	14.2	15.8	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	8.80	9.50			
	ATU 1621 xx	3/8"	3.5	3.2	3.58	5.06	6.20	7.16	8.00	8.80	9.50	27	34	20
	ATU 1780 xx		5.0	3.4	4.50	6.37	7.80	9.00	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	8.80	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	1.82	2.48	3.10	3.58	4.02	4.40	4.65	22	24	15
	ATW 1311 xx	1/4"	2.5	2.1	1.82	2.48	3.10	3.58	4.02	4.40	4.65	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	8.80	9.50			
	ATW 1780 xx		5.0	3.4	4.50	6.37	7.80	9.00	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 2395 xx		8.8	7.3	22.2	31.4	38.5	44.5	49.7	54.4	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	157	175	186	66	76	50	

Common Applications

Profile washing in drop eliminators
Rotary filter washing

Accessories

Swivel joints
Line filters

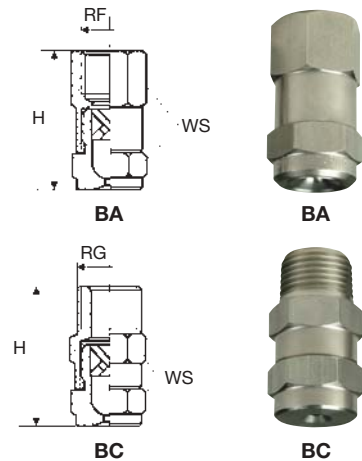
FULL CONE NOZZLES

BA/BC

X-VANE / ROUND SPRAY / THREE PIECE

These full cone nozzles offer a three-piece design based on the clog resistant X-vane design plus the convenience of an easy and fast internal cleaning since they can be easily disassembled for maintenance. The nipple design avoids losing the vane when the nozzle is mounted spraying upwards. Available with female (BA) or male (BC) inlet thread nipple, see dimensions and weights next page.

Materials
 B1 AISI 303 Stainless steel
 B3 AISI 316 Stainless steel on request
 T1 Brass



Standard spray

BAQ	BCQ	Code	RF RG	D	D1	Capacity at different pressure values							Spray angle (degrees) at pressure		
						0.7	1.0	2.0	3.0	5.0	7.0	10	0.7	1.5	5.0
•	•	0740	1/8"	1.0	0.5	0.36	0.43	0.60	0.74	0.93	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	51	65	60
•	•	1150		1.4	1.0	0.72	0.87	1.22	1.50	1.94	2.29	2.74	43	59	46
•	•	1220		1.6	1.0	1.06	1.27	1.80	2.20	2.84	3.36	4.02	50	65	60
•	•	1260		1.6	1.3	1.26	1.50	2.12	2.60	3.36	3.97	4.75	43	48	45
•	•	1370		2.0	1.3	1.79	2.14	3.02	3.70	4.78	5.70	6.76	50	65	58
•	•	1480	1/4"	2.4	1.7	2.32	2.77	3.92	4.80	6.20	7.30	8.76	45	50	45
•	•	1740		2.9	1.7	3.57	4.27	6.04	7.40	9.60	11.3	13.5	55	65	60
•	•	1700	3/8"	3.0	2.0	3.38	4.04	5.71	7.00	9.03	10.7	12.7	45	50	45
•	•	2111		3.4	2.4	5.36	6.40	9.10	11.1	14.3	17.0	20.3	65	68	60
•	•	2163		4.5	2.4	7.87	9.40	13.3	16.3	21.0	24.9	29.8	85	90	80
•	•	2118	1/2"	3.4	3.0	5.70	6.80	9.60	11.8	15.2	18.0	21.5	50	50	45
•	•	2185		4.4	3.0	8.94	10.7	15.1	18.5	23.9	28.3	33.8	65	68	60
•	•	2240		5.0	3.0	11.6	13.9	19.6	24.0	31.0	36.7	43.8	70	75	65
•	•	2300		5.6	3.0	14.5	17.3	24.5	30.0	38.7	45.8	54.8	90	92	85

Wide spray

BAW	BCW	Code	RF/RG	D	D1	0.7	1.0	2.0	3.0	5.0	7.0	10	0.7	1.5	5.0
•	•	1200	1/8"	1.5	1.0	0.97	1.15	1.63	2.00	2.58	3.06	3.65	120	115	104
•	•	1310		1.8	1.0	1.50	1.79	2.53	3.10	4.00	4.74	5.66	120	110	104
•	•	1400		2.3	1.0	1.93	2.31	3.27	4.00	5.16	6.11	7.30	120	110	104
•	•	1570		2.5	1.1	2.75	3.29	4.65	5.70	7.36	8.71	10.4	120	110	104
•	•	1720	1/4"	3.3	1.7	3.48	4.16	5.88	7.20	9.30	11.0	13.1	120	110	105
•	•	1860		3.4	1.3	4.15	4.97	7.02	8.60	11.1	13.1	15.7	120	110	105
•	•	2100		3.6	1.6	4.83	5.77	8.16	10.0	12.9	15.3	18.3	120	110	105
•	•	2122	3/8"	3.9	1.6	5.89	7.04	9.96	12.2	15.8	18.6	22.3	120	110	105
•	•	2144		4.3	2.4	6.96	8.30	11.8	14.4	18.6	22.0	26.3	120	110	105
•	•	2172		4.9	2.4	8.31	9.90	14.0	17.2	22.2	26.3	31.4	120	110	105
•	•	2194		5.3	2.5	9.37	11.2	15.8	19.4	25.0	29.6	35.4	120	110	105
•	•	2220	1/2"	5.0	3.0	10.6	12.7	18.0	22.0	28.4	33.6	40.2	120	115	110
•	•	2250		5.3	3.0	12.1	14.4	20.4	25.0	32.3	38.2	45.6	120	115	110
•	•	2290		5.6	3.0	14.0	16.7	23.7	29.0	37.4	44.3	52.9	120	115	110
•	•	2320		6.7	3.5	15.5	18.5	26.1	32.0	41.3	48.9	58.4	120	115	110
•	•	2360		7.6	4.0	17.4	20.8	29.4	36.0	46.5	55.0	65.7	120	115	110

Dimensions and weights

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

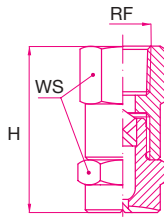
Nozzle Type	RF/RG (inch)	H (mm)	WS (mm)	W (kg)
BC/BD	1/8"	32	14	0.02
	1/4"	39	17	0.04
	3/8"	47	19	0.07
	1/2"	57	25	0.20

FULL CONE NOZZLES

BB/BD



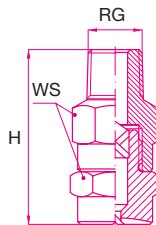
BB



BB



BD



BD

X-VANE / SQUARE SPRAY / THREE PIECE

Same three-piece nozzles can be also manufactured to supply a square section spray pattern, to optimize their performance where the coverage of a surface is required to be as even as possible. Please note that the sides of the square spray section are not in line with the grooves on the nozzle orifice, the offset angle being between 10° and 15° depending upon working pressure and distance. The proper alignment of the nozzles should be obtained at the time when the system is installed or serviced.

Materials

- T1 Brass
- B1 AISI 303 Stainless steel
- B3 AISI 316 Stainless steel on request

Square spray

BBQ	BDQ	Code	RF RG	D	D1	Capacity at different pressure values						Spray angle (degrees) at pressure			
						(l/min) (bar)	0.7	1.0	2.0	3.0	5.0	7.0	10	0.7	1.5
•	•	1270	1/8"	1.8	1.0	1.30	1.56	2.20	2.70	3.49	4.12	4.93	42	55	48
•	•	1360		1.9	1.3	1.74	2.08	2.94	3.60	4.65	5.50	6.57	48	60	60
•	•	1440		2.1	1.3	2.13	2.54	3.59	4.40	5.68	6.72	8.03	60	65	60
•	•	1740	1/4"	2.8	1.6	3.57	4.27	6.04	7.40	9.55	11.3	13.5	60	65	60
•	•	1890		3.2	1.6	4.30	5.14	7.27	8.90	11.5	13.6	16.2	65	67	60
•	•	2110		3.8	1.6	5.31	6.35	8.98	11.0	14.2	16.8	20.1	75	80	75
•	•	2133	3/8"	3.8	2.4	6.42	7.68	10.9	13.3	17.2	20.3	24.3	70	72	65
•	•	2210	1/2"	5.6	3.0	10.1	12.1	17.2	21.0	27.1	32.1	38.3	70	74	65
•	•	2270		6.4	3.2	13.0	15.6	22.0	27.0	34.9	41.2	49.3	75	80	75

Common Applications

Drop production in chemical reactors
Scrubbing and washing with recirculated liquids
Washing and rinsing processes

Accessories

Assembly clamps for feed pipes
Swivel joints
Strainers
One way valves

Dimensions and weights

Nozzle Type	RF/RG (inch)	H (mm)	WS (mm)	W (kg)
BA/BB	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	RF/RG (inch)	H (mm)	WS (mm)	W (kg)
BC/BD	1/8"	32	14	0.02
	1/4"	39	17	0.04
	3/8"	47	19	0.07
	1/2"	57	25	0.20

FULL CONE NOZZLES

BE/BG

X-VANE/ROUND SPRAY/TWO PIECES

These full cone nozzles have a two-piece design and produce a full cone round spray, with angles ranging between 70° and 120° and capacities between 4.8 and 1040 liters per minute. Higher capacities, up to 11,300 lpm can be obtained with the larger sizes shown in the following. The X-vane design assures a satisfactory compromise as far as even coverage of the spray and nozzle resistance to clogging are considered, and is therefore a widely popular choice. The table in this page shows female thread nozzles up to 3" size, larger capacity nozzles both with female thread and flange connection are shown in the next page. Please note BE nozzles have a female BSP thread, BG have a male BSPT thread. Dimensions for standard and wide spray angle nozzles shown at next page.



BG

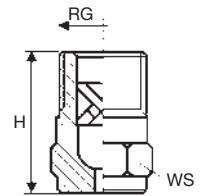


BE

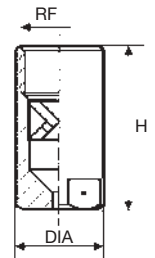
- Materials B1 AISI 303 Stainless steel
 B31 AISI 316 L Stainless steel
 T1 Brass, only sizes 1" and smaller

Standard spray angles

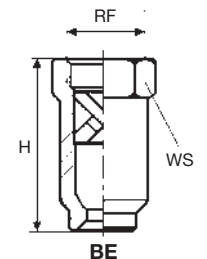
BES	BGQ	Code	RF RG	D (mm)	D1 (mm)	Capacity at different pressure values								Spray angle at pressure		
						0.5	1.0	2.0	3.0	5.0	7.0	10	0.7	3.0	5.0	
	•	1480 xx	1/4"	2.3	1.6	1.96	2.77	3.92	4.80	6.20	7.33	8.76	55	60	55	
	•	1740 xx		2.9	1.6	3.02	4.27	6.04	7.40	9.55	11.3	13.5	65	62		
	•	1700 xx	3/8"	2.6	2.4	2.86	4.04	5.72	7.00	9.04	10.7	12.8	66	60	55	
	•	2111 xx		3.6	2.4	4.53	6.41	9.06	11.0	14.3	17.0	20.3	65	67	60	
	•	2163 xx		4.5	2.8	6.65	9.41	13.3	16.3	21.0	24.9	29.8	59	62	60	
	•	2185 xx	1/2"	4.6	3.2	7.55	10.7	15.1	18.5	23.9	28.3	33.8	64	65	60	
	•	2300 xx		6.3	3.6	12.2	17.3	24.5	30.0	38.7	45.8	54.8	58	60	58	
	•	2220 xx	3/4"	4.9	4.4	9.00	12.7	18.0	22.0	28.4	33.6	40.2	54	60	56	
	•	2350 xx		6.4	4.4	14.3	20.2	28.6	35.0	45.2	53.5	63.9	56	63	60	
	•	2610 xx		9.5	5.2	24.9	35.2	49.8	61.0	78.8	93.2	111	58	65	60	
	•	2370 xx	1"	6.0	5.6	15.1	21.4	30.2	37.0	47.8	56.5	67.6	58	60	56	
	•	2611 xx		8.3	5.6	24.9	35.2	49.8	61.0	78.8	93.2	111	60	61	58	
	•	2870 xx		11.9	5.6	35.5	50.2	71.0	87.0	112	133		60	63	60	
	•	3104 xx		11.9	6.4	42.5	60.0	84.9	104	134	159		62	65	61	
	•	2520 xx	1+1/4"	7.4	6.4	21.2	30.0	42.5	52.0	67.1	79.4		72	75	65	
	•	2871 xx		9.6	6.4	35.5	50.2	71.0	87.0	112	133		72	75	68	
	•	3105 xx		10.7	6.4	42.9	60.6	85.7	105	136	160		72	75	70	
	•	3122 xx		12.3	6.4	49.8	70.4	99.6	122	158	186		72	75	71	
	•	3174 xx		15.1	7.9	71.0	100	142	174	225	266		74	75	71	
	•	2872 xx	1+1/2"	9.5	8.7	35.5	50.2	71.0	87.0	112	133		68	72	65	
	•	3139 xx		12.7	8.7	56.7	80.3	113	139	179	212		68	72	70	
	•	3175 xx		14.3	8.7	71.4	101	143	175	226	267		72	75	70	
	•	3260 xx		18.3	10.3	106	150	212	260	336	397		74	78	73	
	•	3148 xx	2"	12.7	11.1	60.4	85.4	121	148	191	226		68	70	68	
	•	3261 xx		17.3	11.1	106	150	212	260	336	397		70	73	68	
	•	3305 xx		19.2	11.1	125	176	249	305	394	466		72	75	70	
	•	3350 xx		21.0	11.1	143	202	286	350	452	535		72	75	70	
	•	3435 xx		23.8	14.3	178	251	355	435	562	664		71	75	72	
	•	3520 xx		28.6	14.3	212	300	425	520	671	794		74	77	72	
	•	3215 xx	2+1/2"	15.1	14.3	87.8	124	176	215	278	328		70	73	70	
	•	3436 xx		22.2	14.3	178	251	355	435	562	664		72	75	70	
	•	3521 xx		24.6	14.3	212	300	425	520	671	794		72	75	70	
	•	3610 xx		28.6	14.3	249	352	498	610	788	932		73	75	70	
	•	3700 xx		28.6	17.5	286	404	572	700	904	1069		73	77	72	
	•	3780 xx		31.8	17.5	318	450	637	780	1007	1191		75	78	75	
	•	3365 xx	3"	19.1	17.5	149	211	298	365	471	558		70	73	68	
	•	3701 xx		27.8	17.5	286	404	572	700	904	1069		70	73	70	
	•	3781 xx		30.2	17.5	318	450	637	780	1007	1191		72	75	70	
	•	3870 xx		32.5	17.5	355	502	710	870	1123	1329		72	75	70	
	•	4104 xx		34.9	20.6	425	600	849	1040	1343	1589		75	78	73	



BG



BE



BE

FULL CONE NOZZLES

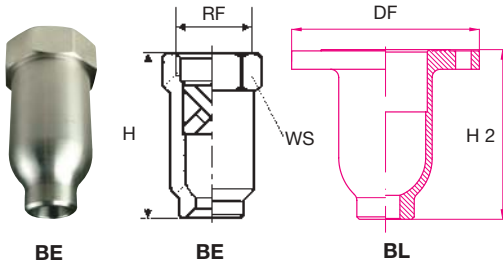
BE/BG

X-VANE/ROUND SPRAY/TWO PIECES

Wide spray angles

BEW	BGW	Code	RF RG	D	D1	Capacity at different pressure values							Spray angle at pressure			Dimension (mm)		
						(l/min) (bar)	0.5	1.0	2.0	3.0	5.0	7.0	10	(degrees) (bar)	0.7	3.0	5.0	H
	•	2100 xx	1/4"	3.3	1.6	4.08	5.77	8.16	10.0	12.9	15.3	18.3	115	120	106	23	14	
	•	2122 xx	3/8"	3.6	2.4	4.98	7.04	9.96	12.2	15.7	18.6	22.3	115	120	105	30	17	
	•	2144 xx		4.0	2.4	5.88	8.31	11.8	14.4	18.6	22.0	26.3	115	120	105			
	•	2172 xx		5.1	2.4	7.02	9.93	14.0	17.2	22.2	26.3	31.4	115	120	105			
	•	2194 xx		5.2	2.8	7.92	11.2	15.8	19.4	25.0	29.6	35.4	115	120	105			
	•	2220 xx	1/2"	5.0	3.0	8.98	12.7	18.0	22.0	28.4	33.6	40.2	115	120	105	39	22	
	•	2250 xx		5.4	3.0	10.2	14.4	20.4	25.0	32.3	38.2	45.6	115	120	105			
	•	2290 xx		6.4	3.0	11.8	16.7	23.7	29.0	37.4	44.3	52.9	115	120	105			
	•	2320 xx		6.9	3.0	13.1	18.5	26.1	32.0	41.3	48.9	58.4	115	120	105			
	•	2360 xx		7.6	3.0	14.7	20.8	29.4	36.0	46.5	55.0	65.7	115	120	110			
•	•	2500 xx	3/4"	8.7	4.5	20.4	28.9	40.8	50.0	64.5	76.4	91.3	105	110	105	40	27	
•	•	2920 xx	1"	11.5	5.6	37.6	53.1	75.1	92.0	119.	141		105	110	105	54	34	
•	•	3134 xx	1+1/4"	14.0	6.0	54.7	77.4	109	134	173	205		110	115	110	88	48	
•	•	3200 xx	1+1/2"	16.5	9.0	81.6	115	163	200	258	306		110	115	110	102	52	
•	•	3395 xx	2"	24.0	11.1	161	228	323	395	510	603		110	115	110	138	67	
•	•	3590 xx	2+1/2"	26.0	14.3	241	341	482	590	762	901		110	115	110	162	85	
•	•	3800 xx	3"	32.0	17.5	327	462	653	800	1033	1222		110	115	110	187	100	

BE/BL



X-VANE/LARGE CAPACITIES

The large capacity nozzles feature a full cone spray pattern with uniform distribution over a round impact area, for applications where a very large capacity is required (values up to 11.300 liters per minute). They are manufactured with large spray angles, while still assuring high water density per square meter. Their 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).

Materials B31 AISI 316 L Stainless steel
G1 Cast iron

Large capacity

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

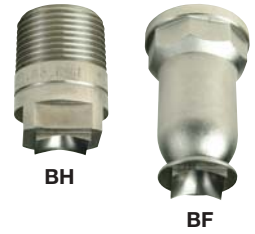
120°	BEW	Code	RF DF	D	D1	Capacity (l/min) at pressure (bar)							Dimension (mm)		
						0.7	1.0	2.0	3.0	5.0	7.0	10	H	H2	WS
120°	•	4158 xx	4"	47	22	758	906	1282	1570	2027	2398	2538	251	207	130

FULL CONE NOZZLES

BF/BH

X-VANE/SQUARE SPRAY/TWO PIECE

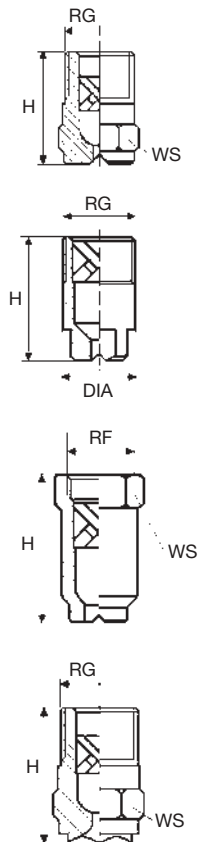
A simpler two piece design is used for BF and BH type nozzles producing a square section spray pattern. Depending upon their size these nozzles are manufactured out of bar stock or casting, see drawings in the page, dimensions and weights as shown. They are the convenient choice where the coverage of a surface is required to be as even as possible. Please note that the sides of the square spray section are not in line with the grooves on the nozzle orifice, the offset angle being between 10° and 15° depending upon working pressure and distance. The proper alignment of the nozzles should be obtained at the time when the system is installed or serviced.



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

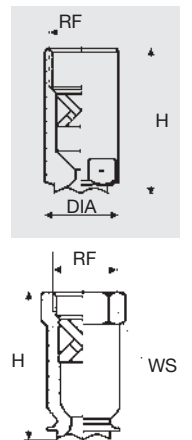
Standard spray angle

BFS	BHQ	Code	RF RG	D	D1	Capacity (l/min) at different pressure values (bar)							Spray angle (degrees) at pressure (bar)		
						0.7	1.0	2.0	3.0	5.0	7.0	10	0.7	3.0	5.0
	•	1270	1/8"	1.7	1.3	1.30	1.56	2.20	2.70	3.49	4.12	4.93	52	60	58
	•	1350		1.9	1.3	1.74	2.08	2.94	3.60	4.65	5.50	6.57	58	60	60
	•	1440		2.2	1.3	2.13	2.54	3.59	4.40	5.68	6.72	8.03	60	65	60
	•	1740	1/4"	2.8	1.6	3.57	4.27	6.04	7.40	9.55	11.3	13.5	62	65	60
	•	1890		3.2	1.6	4.30	5.14	7.27	8.90	11.5	13.6	16.2	62	65	60
	•	2107		3.8	1.6	5.17	6.18	8.74	10.7	13.8	16.3	19.5	65	65	60
	•	2133	3/8"	4.0	2.4	6.42	7.68	10.9	13.3	17.2	20.3	24.3	60	62	60
	•	2210	1/2"	5.5	3.2	10.1	12.1	17.2	21.0	27.1	32.1	38.3	62	64	60
	•	2270		6.4	3.2	13.0	15.6	22.0	27.0	34.8	41.2	49.2	62	65	60
	•	2370	3/4"	6.7	4.4	17.8	22.0	31.0	37.0	47.8	56.5	67.5	60	64	62
•		2780	1"	1.9	1.3	37.7	45.2	64.3	78.0	101	120	142	77	78	75
•		3131	1+1/4"	2.4	1.3	63.3	75.6	107	131	169	200	239	77	78	73
•		3170	1+1/2"	2.8	1.6	82.1	98.1	139	170	219	260	310	75	78	70
•		3215	2"	3.2	1.6	104	124	176	215	278	328	392	65	72	68
•		3265		3.8	1.6	128	153	216	265	342	405	484	73	75	68
•		3355		1.6	1.3	171	205	290	355	458	542	648	73	75	70
•		3360	2+1/2"	1.9	1.3	174	208	294	360	465	550	657	64	70	63
•		3435		2.4	1.3	210	251	355	435	562	664	794	75	80	73
•		3700		2.8	1.6	338	404	571	700	904	1069	1278	73	76	74
•		4220	5"	1.9	1.3	1063	1270	1796	2200	2840	3361	4017	73	75	72
•		4420	6"	2.4	1.3	2029	2425	3429	4200	5422	6416	7668	75	78	74



Wide spray angle

BFW	BHW	Code	RF RG	D	D1	0.7	1.0	2.0	3.0	5.0	7.0	10	0.7	3.0	5.0
	•	2100	1/4"	3.2	1.6	4.83	5.77	8.16	10.0	12.9	15.3	18.3	106	115	100
	•	2122	3/8"	3.9	1.6	5.89	7.04	9.96	12.2	15.8	18.6	22.3	105	120	110
	•	2144		4.0	2.4	6.96	8.31	11.8	14.4	18.6	22.0	26.3	105	120	110
	•	2172		4.6	2.4	8.31	9.93	14.0	17.2	22.2	26.3	31.4	105	120	105
	•	2194		5.4	2.4	9.37	11.2	15.8	19.4	25.0	29.6	35.4	105	120	106
	•	2220	1/2"	4.8	3.0	10.6	12.7	18.0	22.0	28.4	33.6	40.2	105	110	105
	•	2250		5.1	3.0	12.1	14.4	20.4	25.0	32.3	38.2	45.6	105	110	105
	•	2290		5.7	3.0	14.0	16.7	23.7	29.0	37.4	44.3	53.0	105	110	105
	•	2320		7.0	3.0	15.4	18.5	26.1	32.0	41.3	48.9	58.4	105	110	105
	•	2360		8.0	3.0	17.4	20.8	29.4	36.0	46.5	55.0	65.7	105	110	105
•	•	2500	3/4"	8.5	4.5	24.2	28.9	40.8	50.0	64.5	76.4	91.3	105	115	103
•	•	2930	1"	11.6	5.6	44.9	53.7	75.9	93.0	120	142	170	107	110	106
•		3134	1+1/4"	14.5	6.0	64.7	77.4	109	134	173	205	245	108	110	107
•		3200	1+1/2"	18.2	9.0	96.6	115	163	200	258	305	365	108	115	108
•		3395	2"	24.0	11.1	191	228	322	395	510	603	721	110	112	108
•		3590	2+1/2"	26.0	14.3	285	341	482	590	761	901	1077	110	115	110
•		3800	3"	31.5	17.5	386	462	653	800	1032	1220	1460	110	120	110



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

Dimensions and weights
 Values are based on the largest/heaviest nozzle for each single size.

FULL CONE NOZZLES

BR/BU



BT



BR



BS

X-VANE/NARROW SPRAY ANGLES

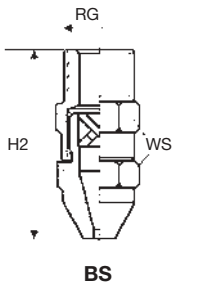
These nozzles produce a solid cone spray with round spray pattern, where coarse water drops are concentrated within a narrow spray angle to maximize their impact force per square surface unit.

Spray angle values of 15° or 30° are available, with a choice of male or female thread connection.

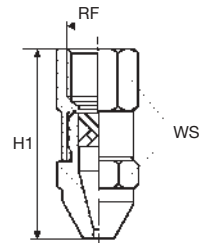
The BR and BS nozzle types are manufactured in three pieces, to allow for easy disassembly and cleaning of the nozzles in case of clogging.

Materials

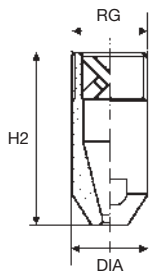
- B1 AISI 303 Stainless steel
- B3 AISI 316 Stainless steel on request
- T1 Brass



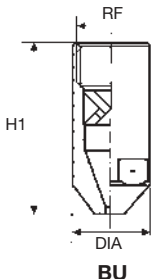
BS



BR



BT



BU

Spray angle 15°

BRB	BSB	BUB	Code	RF RG	D	Capacity at pressure (l/min)					Nozzle dimensions (mm)			
						1.0	2.0	3.0	5.0	10	DIA	H1	H2	WS
•	•		1270 xx	1/8"	1.6	1.56	2.20	2.70	3.50	4.90		33	39	12
•	•		1550 xx		2.3	3.18	4.49	5.50	7.10	10.0				
•	•		2117 xx	1/4"	3.2	6.75	9.60	11.7	15.1	21.4		44	45	17
•	•		2196 xx	3/8"	4.2	11.3	16.0	19.6	25.3	35.8		53	56	22
•	•		2352 xx	1/2"	5.6	20.3	28.7	35.2	45.4	64.3		72	70	24
		•	2587 xx	3/4"	7.8	33.9	47.9	58.7	75.8	107	32	72		25
		•	3110 xx	1"	10.2	63.5	89.8	110	142	201	40	92		35
		•	3168 xx	1+1/4"	12.6	97.0	137	168	217	307	48	117		40
		•	3245 xx	1+1/2"	15.1	141	200	245	316	447	60	127		52
		•	3450 xx	2"	22.0	260	367	450	581	822	80	183		70
		•	3680 xx	2+1/2"	26.0	393	555	680	878	1242	90	223		85
		•	3980 xx	3"	31.0	566	800	980	1265	1789	105	268		100

Spray angle 30°

BRF	BSF	BTF	Code	RF RG	D	Capacity at pressure (l/min)					Nozzle dimensions (mm)			
						1.0	2.0	3.0	5.0	10	DIA	H1	H2	WS
•	•		0980 xx	1/8"	1.0	0.57	0.80	0.98	1.27	1.79		35	33	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	45	17
•	•		1550 xx	3/8"	2.3	3.18	4.49	5.50	7.10	10.0		53	56	22
•	•		2117 xx	1/2"	3.2	6.75	9.55	11.7	15.1	21.4		72	70	24
•	•		2195 xx	3/4"	4.2	11.3	15.9	19.5	25.0	36.0		72	87	25
		•	2270 xx	1"	5.1	15.6	22.0	27.0	35.0	49.0	34		92	35
		•	2390 xx		6.1	23.0	32.0	39.0	50.0	71.0				
		•	2590 xx	1+1/4"	7.4	34.0	48.0	59.0	76.0	108	42		117	40
		•	2780 xx		8.6	45.0	64.0	78.0	101	142				
		•	2980 xx	1+1/2"	9.6	57.0	80.0	98.0	127	179	48		127	52
		•	3117 xx		10.5	68.0	96.0	117	151	214				
		•	3137 xx	2"	11.1	79.0	112	137	177	250	60		200	55
		•	3156 xx		11.9	90.0	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	224	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	606	857				

Common Applications

- Washing and cooling inside pipes
- washing of products
- Agitating liquids inside tanks and vats.

FULL CONE NOZZLES

BX

NOZZLE TIPS

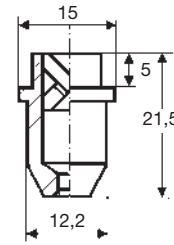
Full cone tips produce a uniform full cone shaped spray with a round impact area.

Complete nozzles made out of nozzle tip, seal, nipple and locknut.

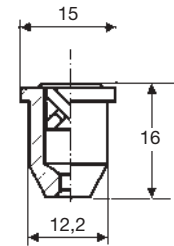
This design allows the nozzle to be disassembled and readily cleaned in case of clogging, for a fast and easy maintenance.

In addition to metal nipples a range of pipe clamps is available, please see our Accessories Catalogue CTG AC 16 BR.

Materials B1 AISI 303 Stainless steel
 T1 Brass



**BX
1508
1743**



**BX
1149
1372**

Code	D	Capacity at pressure (l/min)					Spray angle at different pressure			
		1.0	2.0	3.0	5.0	10	1.5	3.0	5.0	
60°	BXQ 1149 xx	1.3	0.86	1.22	1.49	1.92	2.72	50	50	45
	BXQ 1223 xx	1.7	1.35	1.90	2.33	3.01	4.25	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	9.30	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	10.0	14.0	67	67	61

Under certain conditions, for example nozzle working bottom-up at high temperature or sudden vacuum in the pipes, the nozzle vane can escape from the body and impair the nozzle operation. As an added safety feature our full cone nozzles with X-vane, up to the 3/8" thread size, have the vane safely secured in places.



BJ

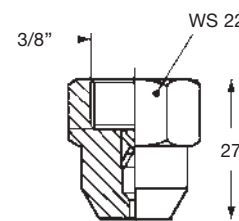
THREADED NOZZLES

Most sizes in the BX range can be obtained as a two-piece nozzle, with a 3/8" female thread.

Capacity and spray angle maintain exactly the same values, nozzle identification code is BJQ.

This is convenient where a damaged nipple does not allow for a tight assembly, and avoids the need for disassembling the pipe and replace the defective nipple, while keeping approximately the same distance between the nozzle orifice and the spray target.

As an example, the nozzle with the same specifications of the BXQ 1372 T1 tip has the code BJQ 1372 T1.



ZAA 1738 xx



VAA 0038 xx

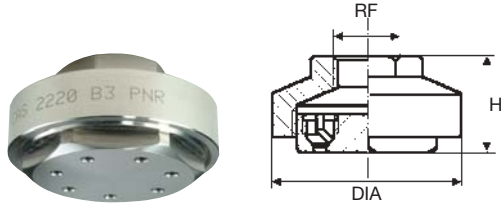
Assembly accessories

BX tips are normally secured through a locknut onto a welded nipple.

All details on accessories are shown in our Catalog CTG AC16 BR.

FULL CONE NOZZLES

CAS



CLUSTER NOZZLE/STANDARD SPRAY

CAS multiple full cone nozzles can produce very fine droplets using only hydraulic pressure.

Their full cone spray pattern results from the interaction of several hollow cone sprays, whose number (NR) is stated in the capacity table below.

Since the droplet size depends among other factors upon the nozzle size, these multi-orifice nozzles produce a finer spray than a standard full cone one-orifice nozzle working at the same pressure and delivering the same quantity of liquid.

Materials B3 AISI 316 Stainless steel on request
 T1 Brass

60°	Code	RF	D	D1	Capacity at different pressure values (l/min)						Dimension (mm)			
					(bar)						NR	DIA	H	
					0.7	1.0	1.5	2.0	3.0	5.0				10
CAS 1153 xx CAS 1274 xx	1/2"	0.9	0.5	0.5	1.08	1.25	1.53	1.98	2.79	7	50	25		
					1.8	1.94	2.24	2.74	3.54				5.00	
CAS 1343 xx CAS 1551 xx CAS 1870 xx CAS 2116 xx CAS 2145 xx CAS 2184 xx CAS 2220 xx CAS 2342 xx CAS 2434 xx CAS 2551 xx CAS 2728 xx	3/4"	1.1	1.0	1.0	1.66	1.98	2.43	2.80	3.43	4.43	7	72	39	
					2.66	3.18	3.90	4.50	5.51	7.11				10.1
					4.20	5.02	6.15	7.10	8.70	11.2				15.9
					5.60	6.70	8.20	9.47	11.6	15.0				21.2
					7.00	8.37	10.2	11.8	14.5	18.7				26.5
					8.89	10.6	13.0	15.0	18.4	23.8				33.6
					10.6	12.7	15.6	18.0	22.0	28.4				40.2
					16.5	19.8	24.3	28.0	34.3	44.3				62.6
					21.0	25.1	30.7	35.4	43.4	56.0				79.2
					26.6	31.8	39.0	45.0	55.1	71.1				101
					35.2	42.0	51.5	59.4	72.8	94.0				133
					CAS 2385 xx CAS 2489 xx CAS 2685 xx	1"	5.0	2.5	2.5	18.5				22.2
23.6	28.2	34.5	39.9	48.9						63.1	89.2			
33.1	39.6	48.4	56.0	68.5						88.5	125			
CAS 3130 xx CAS 3184 xx CAS 3245 xx	2"	9.0	5.0	5.0	62.8	75.1	91.8	106	130	168	7	185	103	
					88.9	106	130	150	184	237				336
					118	141	173	200	245	316				447

* Double capacity insert

FULL CONE NOZZLES

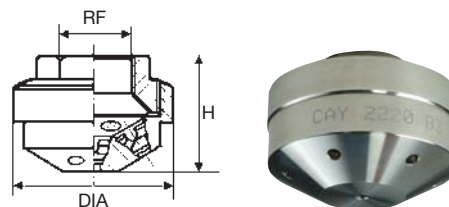
CAY

CLUSTER NOZZLE/WIDE ANGLE SPRAY

CAY multiple full cone nozzles can produce very fine droplets using only hydraulic pressure.

Their full cone spray pattern results from the interaction of several hollow cone sprays, whose number (NR) is stated in the capacity table below.

Since the droplet size depends among other factors upon the nozzle size, these multi-orifice nozzles produce a finer spray than a standard full cone one-orifice nozzle working at the same pressure and delivering the same quantity of liquid. The design of CAY nozzle bodies allows to obtain a wide angle spray while maintaining the fine droplet dimensions.



Materials	B1	AISI 303 Stainless steel
	B3	AISI 316 Stainless steel on request
	T1	Brass

130°	Code	RF	D	D1	Capacity (l/min) at different pressure values (bar)							Dimension (mm)		
					0.7	1.0	1.5	2.0	3.0	5.0	10	NR	DIA	H
130°	CAY 1153 xx	1/2"	1.0	0.5			1.08	1.25	1.53	1.98	2.79	7	40	29
	CAY 1274 xx		1.8	0.5			1.94	2.24	2.74	3.54	5.00			
	CAY 1343 xx	3/4"	1.0	1.0	1.66	1.98	2.43	2.80	3.43	4.43	6.26	7	63	45
	CAY 1551 xx		1.4	1.4	2.66	3.18	3.90	4.50	5.51	7.11	10.1			
	CAY 1870 xx		2.0	2.0	4.20	5.02	6.15	7.10	8.70	11.2	15.9			
	CAY 2116 xx		2.5	2.0	5.60	6.70	8.20	9.47	11.6	15.0	21.2			
	CAY 2145 xx		3.0	2.0	7.00	8.37	10.2	11.8	14.5	18.7	26.5			
	CAY 2184 xx		3.5	2.0	8.89	10.6	13.0	15.0	18.4	23.8	33.6			
	CAY 2220 xx		4.0	2.0	10.6	12.7	15.6	18.0	22.0	28.4	40.2			
	CAY 2342 xx		3.5	*1.7	16.6	19.8	24.3	28.0	34.2	44.3	62.6			
	CAY 2434 xx		4.0	*1.7	21.0	25.1	30.7	35.4	43.4	56.0	79.2			
	CAY 2551 xx		5.0	*1.7	26.6	31.8	39.0	45.0	55.1	71.1	101			
	CAY 2728 xx	6.0	*1.7	35.2	42.0	51.5	59.4	72.8	94.0	133				
	CAY 2385 xx	1"	5.0	3.2	18.6	22.2	27.2	31.4	38.5	49.7	70.3	7	120	81
	CAY 2489 xx		6.0	3.6	23.7	28.3	34.6	40.0	49.0	63.3	89.5			
	CAY 2685 xx		8.0	3.6	33.1	39.5	48.4	55.9	68.5	88.4	125			
	CAY 2979 xx		6.0	*2.5	47.3	56.5	69.2	79.9	97.9	126	179			
	CAY 3137 xx		8.0	*2.5	66.2	79.1	96.9	112	137	177	250			
	CAY 3130 xx	2"	9.0	3.2	62.8	75.1	91.9	106	130	168	237	7	155	94
	CAY 3184 xx		12.0	3.2	88.9	106	130	150	184	238	336			
CAY 3245 xx	15.0		3.6	118	141	173	200	245	316	447				
CAY 3260 xx	9.0		*3.0	126	150	184	212	260	336	475				
CAY 3367 xx	12.0		*3.0	177	212	260	300	367	474	670				
CAY 3490 xx	15.0		*3.0	237	283	346	400	490	633	895				

* Double capacity insert

FULL CONE NOZZLES

D

TWO-PIECE NOZZLE

Spray angle 90°

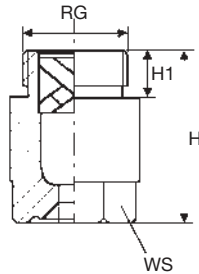
DAU	DBU	DCU	DDU	Code	D	D1	Capacity (l/min) at different pressure values (bar)						
							0.7	1.0	2.0	3.0	5.0	7.0	10
							•				1118 xx	1.2	0.8
•				1147 xx	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•				1188 xx	1.4	1.2	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•				1212 xx	1.5	1.2	1.02	1.22	1.73	2.12	2.74	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	13.5	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°

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

FULL CONE NOZZLES

D



TWO-PIECE NOZZLES/LARGE CAPACITY

The larger nozzles in the D series are widely used in the industry, for a wide variety of applications. They maintain the simple design of the smaller nozzles, with the inherent resistance to clogging due to design of the X-vane, and are often manufactured out of high quality alloys and special plastic materials.

Materials

B1 AISI 303 Stainless steel

B31 AISI 316 L Stainless steel

T1 Brass

On request special materials are quoted

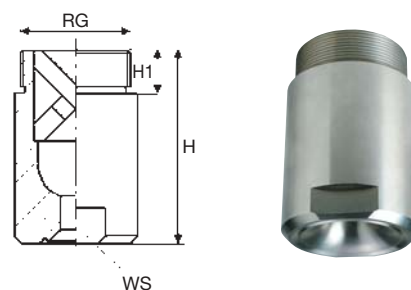
60°	Code	RG	D	D1	Capacity at different pressure values						Dimension (mm)			
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
60°	DEQ 2235 xx	3/4"	4.8	3.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9	43	16	27
	DEQ 2295 xx		5.5	4.5	14.2	17.0	24.1	29.5	38.1	45.1	53.9			
	DEQ 2370 xx		6.0	4.5	17.9	21.4	30.2	37.0	47.8	56.5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

90°	Code	RG	D	D1	Capacity at different pressure values						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			
	DFU 2590 xx	1"	8.6	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108	58	18	36
	DFU 2740 xx		9.3	5.0	35.7	42.7	60.4	74.0	95.5	113	135			
	DFU 2830 xx		9.9	6.0	40.3	48.2	68.2	83.5	108	128	152			
	DGU 3118 xx	1 1/4"	13.0	6.0	57.0	68.1	96.3	118	152	180	215	74	19	41
	DGU 3147 xx		16.0	6.0	71.0	84.9	120	147	190	225	268			
	DHU 3188 xx	1 1/2"	14.5	9.0	90.8	109	154	188	243	287	343	85	19	50
	DKU 3235 xx	2"	16.6	11.0	114	136	192	235	303	359	429	106	24	60
	DKU 3294 xx		18.0	11.0	142	170	240	294	380	449	537			
	DKU 3370 xx		25.0	11.0	179	214	302	370	478	565	676			
DLU 3470 xx	2 1/2"	27.0	11.1	227	271	384	470	607	718	858	128	27	75	
DLU 3588 xx		30.0	14.3	284	339	480	588	759	898	1074				
DMU 3740 xx	3"	30.0	17.5	357	427	604	740	955	1130	1351	153	30	85	
DMU 3870 xx		32.5	17.5	420	502	710	870	1123	1329	1588				
DNU 3940 xx	3 1/2"	35.5	17.5	454	543	768	940	1214	1436	1716	190	32	105	
DNU 4117 xx		39.0	19.0	568	678	959	1175	1517	1795	2145				
DPU 4147 xx	4"	42.8	25.4	710	849	1200	1470	1898	2245	2684	205	36	110	

FULL CONE NOZZLES

D

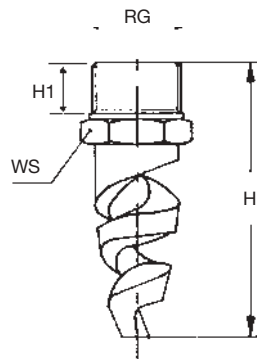
TWO-PIECE NOZZLES/LARGE CAPACITY



120°	Code	RG	D	D1	Capacity at different pressure values						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			
	DFW 2590 xx	1"	11.5	4.5	28.5	34.1	48.2	59.0	76.2	90.1	108	58	18	36
	DFW 2740 xx		12.0	4.5	35.7	42.7	60.4	74.0	95.5	113	135			
	DFW 2830 xx		13.0	5.6	40.3	48.2	68.2	83.5	108	128	152			
	DGW 3118 xx	1 1/4"	13.5	6.0	57.0	68.1	96.3	118	152	180	215	74	19	41
	DGW 3147 xx		17.0	6.0	71.0	84.9	120	147	190	225	268			
	DHW 3188 xx	1 1/2"	20.0	9.0	90.8	109	154	188	243	287	343	85	19	50
	DKW 3235 xx	2"	18.0	11.0	114	136	192	235	303	359	429	106	24	60
	DKW 3294 xx		19.0	11.0	142	170	240	294	380	449	537			
	DKW 3370 xx		21.3	11.0	179	214	302	370	478	565	676			
	DLW 3470 xx	2 1/2"	23.5	11.1	227	271	384	470	607	718	858	128	27	75
	DLW 3588 xx		26.5	14.3	284	339	480	588	759	898	1074			
	DMW 3740 xx	3"	29.5	17.5	357	427	604	740	955	1130	1351	153	30	85
	DMW 3870 xx		32.0	17.5	420	502	710	870	1123	1329	1588			
	DNW 3940 xx	3 1/2"	33.5	17.5	454	543	768	940	1214	1436	1716	190	32	105
	DNW 4117 xx		37.0	19.0	568	678	959	1175	1517	1795	2145			
DPW 4147 xx	4"		42.0	25.4	710	849	1200	1470	1898	2245	2684			

FULL CONE NOZZLES

E



SPIRAL NOZZLES

Spiral nozzles work on the impact principle, by deflection of a water stream onto a spiral profiled surface which provides the desired spray angle.

The spray angle value is maintained even at low pressure and when spraying high viscosity liquids.

While the droplet spray distribution is not comparable to the one provided by a standard full cone nozzle, the fact that a whirling vane is not required makes them virtually clog-free in most cases. Since spiral nozzles work on the impact principle and have no inherent turbulence losses, they produce faster and smaller droplets as compared to a standard full cone nozzle.

Capacity values on a grey background should be obtained with metal nozzles only, plastic materials being too weak to assure structural nozzle resistance.

See next page for materials, applications and assembly fittings.

△	Code	RG	D	D1	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°	EBQ 1550 xx	1/4"	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBQ 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECQ 2230 xx	3/8"	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECQ 2410 xx		6.4	3.2	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECQ 2640 xx		7.9	3.2	31.2	37.3	52.7	64.6	83.4	99.0	118			
	EDQ 2940 xx	1/2"	9.5	4.7	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDQ 3128 xx		11.1	4.7	61.8	73.9	105	128	165	196	234			
	EEQ 3165 xx	3/4"	12.7	4.7	79.7	95.3	135	165	213	252	301	70	19	27
EFQ 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34	
EHQ 3507 xx	1 1/2"	22.2	7.9	245	293	414	507	655	774	926	111	27	50	
90°	EBU 1550 xx	1/4"	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBU 2100 xx		3.2	3.2	4.83	5.77	8.16	10.0	12.9	15.3	18.3			
	EBU 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECU 2230 xx	3/8"	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECU 2317 xx		5.6	3.9	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECU 2410 xx		6.4	4.8	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECU 2640 xx		7.9	5.5	31.2	37.3	52.7	64.6	83.4	99.0	118			
	EDU 2940 xx	1/2"	9.5	3.3	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDU 3128 xx		11.1	3.7	61.8	73.9	105	128	165	196	234			
	EEU 3165 xx	3/4"	12.7	4.7	79.7	95.3	135	165	213	252	301	70	19	27
	EFU 3260 xx	1"	19.0	6.3	126	150	212	260	336	397	475	92	26	34
	EFU 3372 xx		23.0	6.3	180	215	304	372	480	568	679			
	EKU 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	65
	EMU 4204 xx	3"	44.5	14.3	985	1178	1666	2040	2633	3116	3724	219	42	89
EMU 4267 xx	50.8			1290	1541	2180	2670	3447	4078	4874				

Operation with pressure values and capacities shown on the grey background recommended for cast or machined metal nozzles only.



The picture shows the inside of a spiral nozzle with a completely free passage, without any internal vane.

FULL CONE NOZZLES

E

SPIRAL NOZZLES

Code	RG	D	D1	Capacity at different pressure values (l/min) (bar)								Dimension (mm)		
				0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS	
120°	EBW 1550 xx	1/4"	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBW 2100 xx		3.2	3.2	4.83	5.77	8.16	10.0	12.9	15.3	18.3			
	EBW 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECW 2156 xx	3/8"	4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5	48	14	19
	ECW 2230 xx		4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9			
	ECW 2317 xx		5.6	4.0	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECW 2410 xx		6.4	4.0	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECW 2640 xx	7.9	4.0	31.2	37.3	52.7	64.6	83.4	98.7	118				
	EDW 2940 xx	1/2"	9.5	4.8	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDW 3104 xx		9.7	4.8	50.2	60.0	84.9	104	134	159	190			
	EDW 3128 xx		11.1	4.8	61.8	73.9	105	128	165	196	234			
	EEW 3165 xx	3/4"	12.7	4.8	79.7	95.3	135	165	213	252	301	70	19	27
	EFW 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34
	EFW 3372 xx		19.0	6.3	180	215	304	372	480	568	679			
	EHW 3507 xx	1 1/2"	22.2	7.9	245	293	414	507	655	774	926	111	27	50
	EHW 3663 xx		25.4	7.9	320	383	541	663	856	1013	1210			
	EHW 3747 xx		28.6	7.9	361	431	610	747	964	1141	1364			
	EKW 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	65
EKW 4139 xx	38.1		11.1	671	803	1136	1391	1796	2125	2540				
EMW 4204 xx	3"	44.5	14.3	985	1178	1666	2040	2634	3116	3725	203	35	90	
EMW 4265 xx		51.0	14.3	1280	1530	2164	2650	3421	4048	4838				
EPW 4412 xx	4"	63.5	15.9	1990	2379	3364	4120	5318	6293	7522	230	40	127	
150°	ECX 2230 xx	3/8"	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECX 2317 xx		5.6	4.0	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECX 2410 xx		6.4	4.0	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECX 2640 xx		7.9	4.0	31.2	37.3	52.7	64.6	83.4	98.7	118			
	EDX 2940 xx	1/2"	9.5	4.8	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDX 3128 xx		11.1	4.8	61.8	73.9	105	128	165	196	234			
	EEX 3165 xx	3/4"	12.7	4.8	79.7	95.3	135	165	213	252	301	70	19	27
	EFX 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34
	EFX 3372 xx		19.0	6.3	180	215	304	372	480	568	679			
	EHX 3507 xx	1 1/2"	22.2	7.9	245	293	414	507	655	774	926	111	27	50
	EHX 3663 xx		25.4	7.9	320	383	541	663	856	1013	1210			
	EHX 3747 xx		28.6	7.9	361	431	610	747	964	1141	1364			
EKX 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	65	
EKX 4139 xx		38.1	11.1	671	803	1136	1391	1796	2125	2540				
180°	ECZ 2230 xx	3/8"	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECZ 2317 xx		5.6	4.0	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECZ 2410 xx		6.4	4.0	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECZ 2640 xx		7.9	4.0	31.2	37.3	52.7	64.6	83.4	99.0	118			
	EDZ 2940 xx	1/2"	9.5	3.3	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDZ 3128 xx		11.1	4.8	61.8	73.9	105	128	165	196	234			
	EEZ 3165 xx	3/4"	12.7	4.7	79.7	95.3	135	165	213	252	301	70	19	27
	EFZ 3260 xx	1"	15.9	6.3	126	150	212	260	336	397	475	92	26	34
	EFZ 3372 xx		19.0	6.3	180	215	304	372	480	568	679			
	EHZ 3507 xx	1 1/2"	22.2	7.9	245	293	414	507	655	774	926	111	27	50
	EHZ 3663 xx		25.4	7.9	320	383	541	663	856	1013	1210			
	EHZ 3747 xx		28.6	7.9	361	431	610	747	964	1141	1364			
EKZ 4109 xx	2"	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	63	
EKZ 4139 xx		38.1	11.1	671	803	1136	1391	1796	2125	2540				



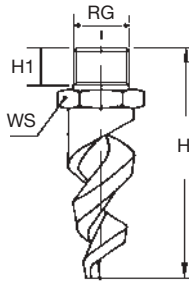
Operation with pressure values and capacities shown on the grey background recommended for cast or machined metal nozzles only.

Materials

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

FULL CONE NOZZLES

E-X



SPIRAL NOZZLES/WIDE PASSAGE

E-X type nozzles feature the same design and advantages as the E-type nozzles, while the resistance to clogging is enhanced by a longer spiral pitch. The spiral pitch length is typically equal to the inlet orifice diameter, therefore any foreign particle entering the nozzle can also find a way out through the spiral opening.

Material list at the bottom of this page.

120°	Code	RG	D	D1	Capacity at different pressure values (l/min) (bar)							Dimension (mm)		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
120°	ECW 2230 xx	3/8"	4.8	4.8	11.4	13.6	19.2	23.5	30.3	35.9	42.9	70	15	22
	ECW 2317 xx		5.6	5.6	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECW 2410 xx		6.4	6.4	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECW 2640 xx		7.9	7.9	31.2	37.3	52.7	64.6	83.4	98.7	118			
	EDW 2940 xx	1/2 "	9.5	9.5	45.6	54.5	77.1	94.4	122	144	172	86	18	27
	EDW 3128 xx		11.1	11.1	61.8	73.9	105	128	165	196	234			
	EEW 3165 xx	3/4"	12.7	12.7	79.7	95.3	135	165	213	252	301	130	20	27
	EFW 3260 xx	1"	16.0	16.0	126	150	212	260	336	397	475	131	26	34
	EFW 3372 xx		19.0	19.0	180	215	304	372	480	568	679			
	EHW 3507 xx	1 1/2"	22.2	22.2	245	293	414	507	655	774	926	171	27	50
	EHW 3663 xx		25.4	25.4	320	383	541	663	856	1013	1210			
	EHW 3747 xx		28.6	28.6	361	431	610	747	964	1141	1364			
EKW 4109 xx	2"	35.0	35.0	527	629	890	1090	1407	1665	1990	279	32	65	
EKW 4139 xx		38.1	38.1	671	803	1136	1391	1796	2125	2540				
EMW 4204 xx	3"	44.5	44.5	985	1178	1666	2040	2634	3116	3725	267	32	90	
EMW 4265 xx		51.0	51.0	1280	1530	2164	2650	3421	4048	4838				
EPW 4412 xx	4"	63.5	63.5	1990	2379	3364	4120	5318	6293	7522	293	36	115	

Operation with pressure values and capacities shown on the grey background recommended for cast or machined metal nozzles only.



SILICON CARBIDE NOZZLES

We design and supply spiral nozzles made out several types of silicon carbide, for applications where fluids containing abrasive solid particles must be sprayed and long nozzle service life is required.

Please contact our offices for more detailed information.

Common Applications

Chemical processes
Fire fighting
Gas cooling
Gas & smoke scrubbers

Spiral nozzles can be delivered in brass and all the plastic materials listed in the following. Most types are also available from stock or with short delivery in cast 316 stainless steel.

Please contact our sales offices for delivery time in a given material.

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

FLAT JET NOZZLES RANGE OVERVIEW

A complete range of flat jet spray nozzles is shown on the following pages.

Flat jet nozzles produce typically strong impact values, since the jet energy is concentrated over a limited surface.

Different techniques are available to produce a flat spray, each one offering specific design and spray properties so that it is possible to choose the one nozzle meeting all or most of the requirements for a given case.

For each nozzle type we show the most required construction materials but, as for all other nozzles, special materials for given applications are often available or can be quoted.

Because of the flat jet shape and its relatively high impact value these nozzles are usually employed to wash objects moving on a conveyor in a transverse direction with regard to the pipe on which the nozzles are assembled.

Since a flat jet spraying system involves large or relatively large number of nozzles assembled onto one or more manifolds, a wide range of assembly accessories has been developed to make the job faster. Using a properly designed fitting not only makes for a professional look for a machine or a system, it also assures flat sprays to be properly aligned and with the right flat jet orientation, or all of them being located at the right distance from the conveyor.

Recommended accessories are shown at the bottom of each Catalog page.



Type	Connection	Properties	Application	Page
F	Thread, Male/Female	High impact	High pressure washing	28
GA	Thread, male	Parabolic distribution	General purpose	30
GX	Nut and nipple	Orientable flat jet	General purpose	31
GY	Nut and nipple	Fixed orientation	General purpose	34
HT	Quick connection	Fast replacement	General purpose	36
J	Thread, male	General purpose	General purpose	37
K	Thread, male	High impact	Low pressure washing	42
K	Thread male	Very wide angle	Washing, cooling	44

STRAIGHT JET NOZZLES

Some applications require nozzles producing a sharp straight jet for maximum impact. It is customary in the nozzle industry to consider straight jet nozzles as flat jet nozzles with a 0° spray angle. Straight jet nozzles are then shown in this Catalog together with flat jet nozzles. All flat jet nozzle types are available as straight jet nozzles, except GY and K types, with the same materials used for flat jet nozzles.

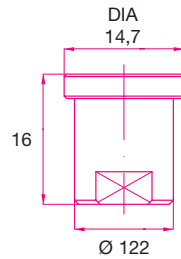
FLAT JET NOZZLES

F

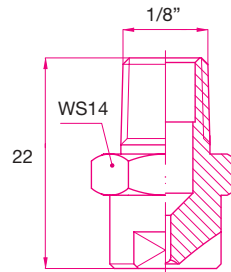
HIGH PRESSURE WASHING

Outer dimensions of F type nozzles and FX nozzle tips.

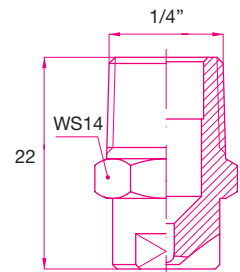
Flow Value US Gals	PNR Flow Code
02	1460
03	1686
04	1930
045	2103
05	2116
055	2126
06	2138
065	2149
07	2160
075	2170
08	2181
09	2204
10	2226
12	2272
15	2341
20	2456
30	2682



FX



FA



FB

High pressure washing accessories

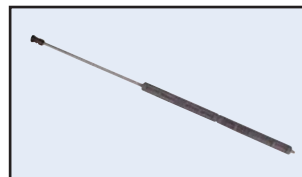
We supply a range our range of quality guns and lances designed for high pressure washing applications in our Accessories Catalogue CTG AC16 BR.



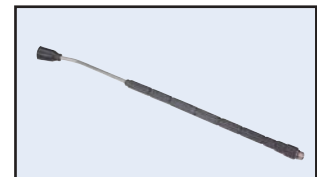
UMW 0010 D4



UMW 0020 D4



UMW 0030 B3



UMW 0040 B3

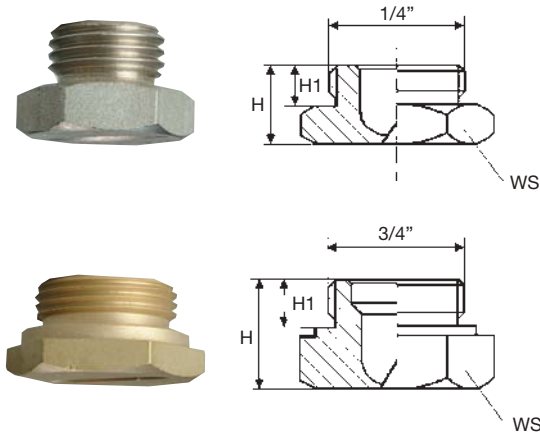
Flow straightener

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



FLAT JET NOZZLES

GA



SHORT BODY

GA type nozzles deliver a flat jet spray with parabolic distribution pattern, which allows for obtaining an even distribution when several nozzles are assembled in a row onto a manifold. Their short body design makes it possible to use nozzle spray pipes in such machines or systems where the available space is very limited. GA nozzles are manufactured in two different capacity ranges out of brass or 303 stainless steel, and on request from a choice of additional metallic and plastic materials. Because of their limited length these nozzles can only be produced with a straight BSP thread, and require some extra care when being assembled to get the proper flat jet alignment.

Also note the different dimensions given in the table below for nozzles manufactured out of plastic materials.

Materials	B1	AISI 303 Stainless steel
	B31	AISI 316 L Stainless steel
	D1	PVC
	E1	PTFE, Teflon
	T1	Brass

1/4" BSP Thread

GAM 45°	GAQ 60°	GAU 90°	GAW 120°	Code	D	Capacity at different pressure values									
						(l/min) (bar)									
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
	•	•	•	1310	2.0	1.27	1.79	2.19	2.53	3.10	3.58	4.00	4.74	5.66	
	•	•	•	1385	2.2	1.57	2.22	2.72	3.14	3.85	4.45	4.97	5.88	7.03	
•	•	•	•	1490	2.5	2.00	2.83	3.46	4.00	4.90	5.66	6.33	7.48	8.95	
	•	•	•	1780	3.0	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2	
•	•	•	•	2124	4.0	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	22.6	
•	•	•	•	2153	4.2	6.25	8.83	10.8	12.5	15.3	17.7	19.8	23.4	27.9	
•	•	•	•	2194	5.0	7.92	11.2	13.7	15.8	19.4	22.4	25.0	29.6	35.4	

3/4" BSP Thread

GAM 45°	GAQ 60°	GAU 90°	GAW 120°	Code	D	Capacity at different pressure values									
						(l/min) (bar)									
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
	•	•	•	2195	5.0	7.96	11.3	13.8	15.9	19.5	22.5	25.2	29.8	35.6	
	•	•	•	2246	5.5	10.0	14.1	17.3	20.0	24.5	28.3	31.6	37.4	44.7	
	•	•	•	2311	6.0	12.7	17.9	21.9	25.3	31.0	35.8	40.0	47.4	56.6	
•	•	•	•	2490	8.0	20.0	28.2	34.6	40.0	49.0	56.6	63.3	74.8	89.5	
	•	•	•	2610	9.0	24.9	35.2	43.1	49.8	61.0	70.4	78.8	93.2	111	
•	•	•	•	2760	10.0	31.0	43.8	53.7	62.1	76.0	87.8	98.1	116	139	

Dimensions of plastic nozzles

Ga nozzles made out of plastic materials, because of lower material strength, have different dimensions with a longer thread and a stronger front hexagon.



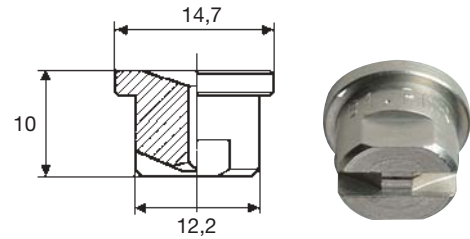
Dimensions	Small size			Large size		
	H	H1	WS	H	H1	WS
AISI 303	12	7	17	15	8	32
AISI 316 L						
BRASS						
POLYPROPYLENE	17	7	17	23	11	32
PTFE						
PVC						

FLAT JET NOZZLE TIPS

GX

LOW CAPACITY

Flat jet nozzle tips are usually mounted onto a pipe by means of a welded nipple or a clamp, and secured in place with a locknut. Seals are available for higher pressure operation, see page bottom. They can be therefore easily replaced and their jet can be conveniently oriented in the desired direction. The tip models shown in this page deliver very low flow values, their precision machined tiny orifices can be protected against the risk of plugging by means of a filter fitting inside our nipples and clamps which are designed for this purpose.



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

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

Accessories

All our range of accessories for GX tips, including welding nipples, pipe clamps, cartridge filters and locknuts are shown in our Accessories catalog CTG AC16 BR.

How to compose the nozzle code

The nozzles tips shown in this page can be supplied with eight different spray angles, whose value are indicated by the third digit in the nozzle code. Therefore the nozzle tip code has to be indicated as in the following example.

GXS 0260 B1

73°

The table on the left shows the codes for the different spray angles.

Spray angle codes

GXD	GXL	GXN	GXR	GXS	GXT	GXV	GXJ
25°	40°	50°	65°	73°	80°	95°	110°

Please note that following spray angle coding applies.

Material Table

Material	0060	0100	0130	0150	0200	0260	0390	0590	0780	1120	1160
AISI 316 L							•	•	•	•	•
AISI 303							•	•	•	•	•
Brass	•	•	•	•	•	•	•	•	•	•	•

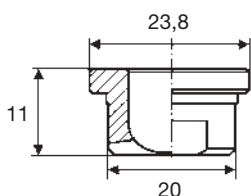
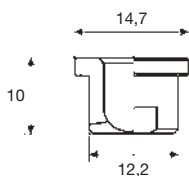
Because of the high difficulty of working hard materials such as stainless steels with very small profile drills not all the capacity sizes shown in the nozzle table are available in all materials. The table below shows the minimum capacity values we can produce for each given material. Please contact our offices for information on the maximum spray angle available for each capacity and material.

Seal available on request

See seal code for standard tip dimension at page 33.

FLAT JET NOZZLE TIPS

GX



STANDARD AND LARGE CAPACITIES

Flat jet nozzle tips are usually mounted onto a pipe by means of a welded nipple or a clamp, and secured in place with a locknut.

Seals are available for higher pressure operation, see page bottom.

They can be therefore easily replaced and their jet can be conveniently oriented in the desired direction.

The tip models shown in this page deliver the most required capacity values, their precision machined orifices can be protected against the risk of plugging by means of a filter fitting inside our nipples and clamps, which are designed for this purpose.

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

How to compose the nozzle code

The nozzle tips shown on this page can be supplied with six different spray angles, whose value is indicated by the third digit in the nozzle code.

Therefore, the nozzle tip code has to be identified as in the following example.

GXQ 1780 B31

60°

The codes for the different spray angle values are listed in the above table.

Assembly fittings

The photo beside shows the typical assembly of a nozzle tip, by means of a locknut and a welding nipple.

Threaded nipples, as well as a range of plastic or steel pipe clamps, make it possible to choose the best suited solution and are shown in our accessories catalogue CTG AC16 BR.

Spray angle codes

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



Typical assembly with nipple and nut.

Assembly fittings



ZPM



ZPB



VEC

FLAT JET NOZZLE TIPS

GX

STANDARD AND LARGE CAPACITIES

Standard capacity tips

GXA	GXF	GXM	GXQ	GXU	GXW	Code	Capacity at different pressure values								(l/min)
															(bar)
							0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
	•	•	•	•	•	1190	0.78	1.10	1.34	1.55	1.90	2.19	2.45	2.90	3.47
	•	•	•	•	•	1233	0.95	1.35	1.65	1.90	2.33	2.69	3.01	3.56	4.25
•	•	•	•	•	•	1310	1.27	1.79	2.19	2.53	3.10	3.58	4.00	4.74	5.66
•	•	•	•	•	•	1385	1.57	2.22	2.72	3.14	3.85	4.45	4.97	5.88	7.03
•	•	•	•	•	•	1490	2.00	2.83	3.46	4.00	4.90	5.66	6.33	7.48	8.95
•	•	•	•	•	•	1581	2.37	3.35	4.11	4.74	5.81	6.71	7.50	8.87	10.6
•	•	•	•	•	•	1780	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
•	•	•	•	•	•	1980	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	•	2124	5.06	5.85	8.77	10.1	12.4	14.3	16.0	18.9	22.6
	•	•	•	•	•	2153	6.25	7.20	10.8	12.5	15.3	17.7	19.8	23.4	27.9
	•	•	•	•	•	2194	7.96	9.20	13.8	15.9	19.5	22.5	25.2	29.8	35.6
	•	•	•	•	•	2245	10.0	11.5	17.3	20.0	24.5	28.3	31.6	37.4	44.7

Large capacity tips

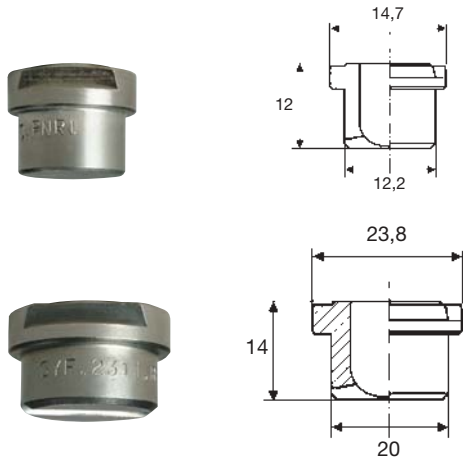
GXA	GXF	GXM	GXQ	GXU	GXW	Code	Capacity at different pressure values								(l/min)
															(bar)
							0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
	•	•	•	•	•	1781	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
	•	•	•	•	•	1981	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	•	2125	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	22.6
•	•	•	•	•	•	2154	6.25	8.83	10.8	12.5	15.3	17.7	19.8	23.4	27.9
•	•	•	•	•	•	2195	7.92	11.2	13.7	15.8	19.4	22.4	25.0	29.6	35.4
•	•	•	•	•	•	2246	10.0	14.1	17.3	20.0	24.5	28.3	31.6	37.4	44.7
•	•	•	•	•	•	2311	12.7	17.9	21.9	25.3	31.0	35.8	40.0	47.4	56.6
•	•	•	•	•	•	2490	20.0	28.3	34.6	40.0	49.0	56.6	63.3	74.8	89.5
•	•	•	•	•	•	2610	24.9	35.2	43.1	49.8	61.0	70.4	78.8	93.2	111
	•	•	•	•	•	2760	31.0	43.9	53.7	62.1	76.0	87.8	98.1	116	139
	•	•	•	•	•	3122	49.8	70.4	86.3	99.6	122	141	158	186	223

Assembly fittings coding

Size	Locknut	Welding nipple	Male nipple	Seal
Standard size 3/8"	VAA 0038 xx	ZAA 1738 xx	ZHA 3838 xx	VDA 0038 P7
Large size 3/4"	VAA 0075 xx	ZAA 2775 xx	ZHA 7575 xx	VDA 0075 P7

DOVETAIL FLAT JET TIPS

GY



STANDARD AND LARGE CAPACITIES

GY flat jet nozzle tips are usually mounted onto a pipe by means of a welded nipple, and secured in place with a locknut. They can be therefore easily replaced and their dovetail connection assures for precise assembly at all times, since the nozzle can be assembled only when the flat jet is properly oriented. The tip models shown in this page deliver the most required capacity values, while larger capacities and sizes can be manufactured on request, and delivered complete with matching nipple and locknuts. The two sizes shown are to be assembled onto 3/8" and 3/4" nipples, see nipple and locknut codes at the bottom of next page.

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

How to compose the nozzle code

The nozzle tips shown on this page can be supplied with six different spray angles, whose value is indicated by the third digit in the nozzle code. Therefore, the nozzle tip code has to be identified as in the following example.

GYQ 1780 B31



Codes for the different spray angles are listed in the above table.

Dovetail nipples

GY type tips are assembled onto their own series of matching dovetail nipples, to assure perfect alignment. The two tip sizes require nipples and caps as shown in the table below. Please note that the right flat jet orientation with jets inclined so as not to disturb each other is automatically obtained welding the nipples in place with their dovetail aligned along the pipe axis. This is easily done by running a straight rule through the nipple female dovetail profiles.

Spray angle codes

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



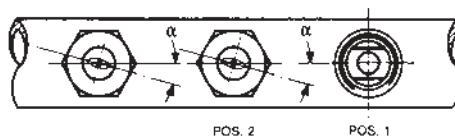
Typical assembly with dovetail nipple and nut.

Welding nipples



ZAC 1738 xx

ZAC 2775 xx



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

DOVETAIL FLAT JET TIPS

GY

STANDARD AND LARGE CAPACITIES

Standard capacity tips

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

GYF	GYM	GYQ	GYU	GYW	Code	Capacity at different pressure values									(l/min) (bar)
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
•	•	•	•	•	1190	0.78	1.10	1.34	1.55	1.90	2.19	2.45	2.90	3.47	
•	•	•	•	•	1233	0.95	1.35	1.65	1.90	2.33	2.69	3.01	3.56	4.25	
•	•	•	•	•	1310	1.27	1.79	2.19	2.53	3.10	3.58	4.00	4.74	5.66	
•	•	•	•	•	1385	1.57	2.22	2.72	3.14	3.85	4.45	4.97	5.88	7.03	
•	•	•	•	•	1490	2.00	2.83	3.46	4.00	4.90	5.66	6.33	7.48	8.95	
•	•	•	•	•	1581	2.37	3.35	4.11	4.74	5.81	6.71	7.50	8.87	10.6	
•	•	•	•	•	1780	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2	
•	•	•	•	•	1980	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9	
•	•	•	•	•	2124	5.06	5.85	8.77	10.1	12.4	14.3	16.0	18.9	22.6	
•	•	•	•	•	2153	6.25	7.20	10.8	12.5	15.3	17.7	19.8	23.4	27.9	
•	•	•	•	•	2194	7.96	9.20	13.8	15.9	19.5	22.5	25.2	29.8	35.6	

Large capacity tips

Jet deviation angle $\alpha = 15^\circ$

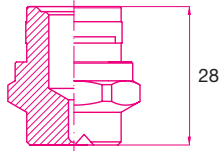
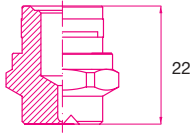
GYA	GYF	GYM	GYQ	GYU	GYW	Code	Capacity at different pressure values									(l/min) (bar)
							0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
	•	•	•	•	•	1781	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2	
	•	•	•	•	•	1981	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9	
•	•	•	•	•	•	2125	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	22.6	
•	•	•	•	•	•	2154	6.25	8.83	10.8	12.5	15.3	17.7	19.8	23.4	27.9	
•	•	•	•	•	•	2195	7.92	11.2	13.7	15.8	19.4	22.4	25.0	29.6	35.4	
•	•	•	•	•	•	2246	10.0	14.1	17.3	20.0	24.5	28.3	31.6	37.4	44.7	
•	•	•	•	•	•	2311	12.7	17.9	21.9	25.3	31.0	35.8	40.0	47.4	56.6	
•	•	•	•	•	•	2490	20.0	28.3	34.6	40.0	49.0	56.6	63.3	74.8	89.5	
•	•	•	•	•	•	2610	24.9	35.2	43.1	49.8	61.0	70.4	78.8	93.2	111	
		•	•	•	•	2760	31.0	43.9	53.7	62.1	76.0	87.8	98.1	116	139	
		•	•			3122	49.8	70.4	86.3	99.6	122	141	158	186	223	

Assembly fittings coding

Size	Locknut	Welding nipple
Standard size 3/8"	VAA 0040 xx	ZAC 1738 xx
Large size 3/4"	VAA 0075 xx	ZAC 2775 xx

QUICK-CONNECT NOZZLES

HT



STANDARD AND LARGE CAPACITY

Flat jet of the HT series offer the same quality and specifications as our standard nozzle types, with the additional convenience of a bayonet coupling which allows not only for a simple assembly without any tool being required but also assure automatic spray pattern alignment.

The optimum performance of your system or machine is then conveniently safeguarded, with a noticeable reduction in service cost and production loss for system downtime.

We offer capacities from 3.1 to 78 l/min over the standard range of spray angles, and a matching range of male, female or welding nipples.

Materials	B1	AISI 303 Stainless steel
	B3	AISI 316 Stainless steel
	T1	Brass

Standard capacity tips

HTA 0°	HTL 40°	HTN 50°	HTR 65°	HTV 95°	HTJ 110°	Code	Capacity at different pressure values									(l/min) (bar)
							0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
•	•	•	•	•	•	1310	1.27	1.79	2.19	2.53	3.10	3.58	4.00	4.74	5.66	
•	•	•	•	•	•	1385	1.57	2.22	2.72	3.14	3.85	4.45	4.97	5.88	7.03	
•	•	•	•	•	•	1490	2.00	2.83	3.46	4.00	4.90	5.66	6.33	7.48	8.95	
•	•	•	•	•	•	1581	2.37	3.35	4.11	4.74	5.81	6.71	7.50	8.87	10.6	
•	•	•	•	•	•	1780	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2	
•	•	•	•	•	•	1980	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9	
•	•	•	•	•	•	2124	5.06	5.85	8.77	10.1	12.4	14.3	16.0	18.9	22.6	
•	•	•	•	•	•	2153	6.25	7.20	10.8	12.5	15.3	17.7	19.8	23.4	27.9	
•	•	•	•	•	•	2194	7.96	9.20	13.8	15.9	19.5	22.5	25.2	29.8	35.6	

Large capacity tips

HTA 0°	HTL 40°	HTN 50°	HTR 65°	HTV 95°	HTJ 110°	Code	Capacity at different pressure values									(l/min) (bar)
							0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
•	•	•	•	•	•	2310	12.7	17.9	21.9	25.3	31.0	35.8	40.0	47.4	56.6	
•	•	•	•	•	•	2390	15.9	22.5	27.6	31.8	39.0	45.0	50.3	59.6	71.2	
•	•	•	•	•	•	2470	19.2	27.1	33.2	38.4	47.0	54.3	60.7	71.8	85.8	
•	•	•	•	•	•	2590	24.1	34.1	41.7	48.2	59.0	68.1	76.2	90.1	108	
•	•	•	•	•	•	2780	22.5	45.0	55.2	63.7	78.0	90.1	101	119	142	

Ordering Codes

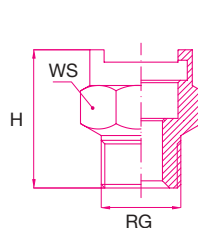
	Thread size	Standard size	Large size	H	WS	D
Male nipple	1/4"	ZHS 0025 xx		29	22	
	3/8"	ZHS 0038 xx		29	22	
	1/2"		ZHS 0050 xx	35	30	
Female nipple	3/8"	ZHT 0038 xx		29	22	
Welding nipple		ZHU 0038 xx	ZHU 0050 xx	32		28
Seal (Viton) for SS nipples	All	VDH 0026 E7	VDH 0050 E7			
Seal (BUNA) for brass nipples	All	VDH 0026 E8	VDH 0050 E8			



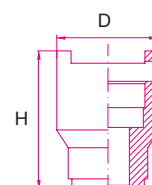
ZHS 0025 xx



ZHS 0050 xx



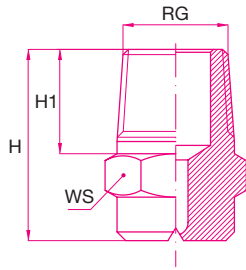
RG



ZHU 0038 xx

FLAT JET NOZZLES

J



STANDARD CAPACITY TYPES

The standard model flat jet nozzles are available in a very wide range of capacities, spray angles and materials. The connection thread is tapered in order to easily allow for both a tight connection and a correct spray pattern orientation. Nozzles shown on this page cover the standard capacity range from 1.5 to 47 liters per minute, delivering high impact jets with small/medium size droplets for the flat spray patterns. Capacity tables also include straight jet types, with spray angle value shown as 0°. They can be made on request out of any machineable material, in addition to the standard materials shown below.

Materials	B1	AISI 303 Stainless steel
	B3	AISI 316 Stainless steel
	T1	Brass

Spray angle codes

JBA	JBC	JBF	JBM	JBQ	JBU	JBW
0°	20°	30°	45°	60°	90°	120°

Thread size code (RG)

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

How to compose the nozzle code

The nozzles shown on this page can be supplied with seven different spray angles, whose value is indicated by the third digit in the nozzle code. Therefore, the nozzle tip code has to be identified as in the following example.

JBQ 1780 B3

60°

Codes for the different spray angles are listed in the above table.

Spray Angle	JAA	JBA	JCA	Code	Capacity at different pressure values								Capacity (l/min) (bar)	
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20	
0°	•	•		1153	0.62	0.88	1.25	1.53	1.77	1.98	2.34	2.79	3.95	
	•	•		1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91	
	•	•		1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02	
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00	
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94	
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6	
	•	•		1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0	
	•	•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1	
	•	•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3	
	•	•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0	
	•	•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5	
	•	•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3	
	•	•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3	
	•	•	•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7	
	•	•	•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0	
•	•	•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100		
•	•	•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121		


Dimensions and weights

Code	Size	H	H1	WS	W
	(inch)	(mm)	(mm)	(mm)	(gram)
JA	1/8"	19.5	11	12	9
JB	1/4"	22	12	14	18
JC	3/8"	25	14	17	34

FLAT JET NOZZLES

J

STANDARD CAPACITY TYPES

	JAC	JBC	JCC	Code	Capacity at different pressure values								(l/min) (bar)	
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20	
					20°	•			1153	0.62	0.88	1.25	1.53	1.77
	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91	
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02	
	•			1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00	
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94	
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6	
	•	•		1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0	
		•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1	
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3	
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0	
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5	
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3	
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3	
		•	•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7	
		•	•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0	
		•	•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100	
		•	•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121	

	JAF	JBF	JCF	Code	0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
					30°	•			1153	0.62	0.88	1.25	1.53
	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•		1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
		•		1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•		1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•		2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100
			•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

	JAM	JBM	JCM	Code	0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
					45°	•			1153	0.62	0.88	1.25	1.53
	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•		1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
		•		1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•		1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100
			•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

Spray angle codes

JBA	JBC	JBF	JBM	JBQ	JBU	JBW
0°	20°	30°	45°	60°	90°	120°

Thread size code (RG)

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

FLAT JET NOZZLES

J

How to compose the nozzle code

The nozzle shown on this page can be supplied with seven different spray angles, whose value is indicated by the third digit in the nozzle code.

Therefore, the nozzle tip code has to be identified as in the following example.

JBQ 1780 B3

60°

Codes for the different spray angles are listed in the above table.

STANDARD CAPACITY TYPES

◁	JAQ	JBQ	JCQ	Code	Capacity at different pressure values								(l/min) (bar)	
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20	
60°	•	•		1153	0.62	0.88	1.25	1.53	1.77	1.98	2.34	2.79	3.95	
	•	•		1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91	
	•	•		1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02	
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00	
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94	
	•	•	•	1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6	
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0	
		•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1	
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3	
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0	
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5	
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3	
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3	
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7	
		•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0		
		•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100		
		•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121		

	JAU	JBU	JCU	Code	0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
90°	•			1153	0.62	0.88	1.25	1.53	1.77	1.98	2.34	2.79	3.95
	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0	
		•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100	
		•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121	

	JAW	JBW	JCW	Code	0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
120°	•			1153	0.62	0.88	1.25	1.53	1.77	1.98	2.34	2.79	3.95
	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•	•	1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•	•	1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
			•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
		•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0	
		•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100	
		•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121	

Spray angle codes

JBA	JBC	JBF	JBM	JBQ	JBU	JBW
0°	20°	30°	45°	60°	90°	120°

Thread size code (RG)

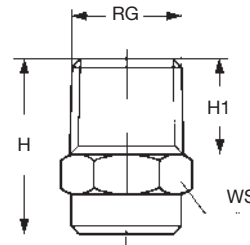
JA	JB	JC
1/8"	1/4"	3/8"

FLAT JET NOZZLES

J

LARGE CAPACITY TYPES

The standard model flat jet nozzles are available in a very wide range of capacities, spray angles and materials. The connection thread is tapered in order to easily allow for both a tight connection and a correct spray pattern orientation. Nozzles shown on this page cover the standard capacity range from 59 to 435 liters per minute, delivering high impact jets with medium size droplets, with flat spray patterns. Capacity tables also include straight jet types, with spray angle value shown as 0°. They can be made on request out of any machineable material, in addition to the standard materials shown below.



- Materials B1 AISI 303 Stainless steel
 B3 AISI 316 Stainless steel
 T1 Brass

Spray angle codes

JDA	0°
JDB	15°
JDD	25°
JDL	40°
JDN	50°
JDR	65°
JDT	80°
JDV	95°

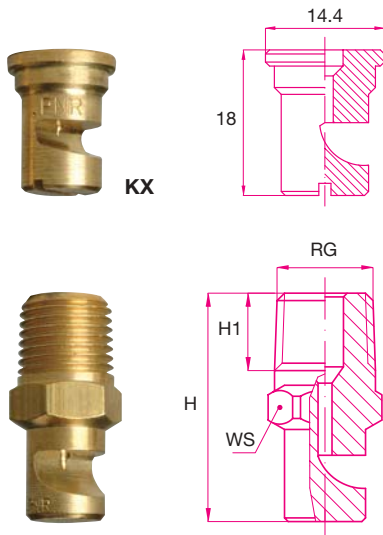
Spray Angle	1/2"	3/4"	1"	Code	Capacity at different pressure values (l/min)								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
0°	•	•	•	JDA 2590 xx	24.1	34.1	48.2	59.0	68.1	76.2	90.1	108	152
				JDA 2780 xx	31.8	45.0	63.7	78.0	90.1	101	119	142	201
				JEA 3134 xx	54.7	77.4	109	134	155	173	205	245	346
		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

Dimensions and weights

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

FLAT JET NOZZLES

K



LARGE SPRAY ANGLE

K flat jet nozzles work on the deflection principle conveying a water vein onto a machined deflection surface, and produce a jet with wide angle flat spray pattern, medium impact value and medium size droplets.

Their round outlet orifice and unobstructed inside passage minimize plugging risks.

K style nozzles shown in the next page are available with a threaded connection and, for capacity sizes from 0390 to 2310 also as a nozzle tip for assembly onto a nipple by means of a locknut.

Materials	B1	AISI 303 Stainless steel
	B3	AISI 316 Stainless steel
	T1	Brass

Thread size and dimensions

Code	RG	H	H1	WS
KGW	1/8"	31	10	14
KHW	1/4"	34	12.5	14
KIW	3/8"	44	13	17
KJW	1/2"	49	17	22
KKW	3/4"	65	20	36
KLW	1"	92	26	46

How to compose the nozzle code

The nozzle shown on this page can be supplied with seven different spray angles, whose value is indicated by the third digit in the nozzle code. Therefore, the nozzle tip code has to be identified as in the following example.

KJW 2470 B3

1/2"

Codes for the different spray angles are listed in the above table.

Nozzle dimensions

Some nozzles may have different dimensions even when made with the same thread.

Dimensions given above refer always to the largest nozzle with a given thread size.

Please refer to our offices for detailed information.

Typical Applications

- Washing of fruits, legumes, crushed stones and any other product moving on a conveyor.
- Cooling and washing of vertical surfaces also for fire fighting purposes

FLAT JET NOZZLES

K

LARGE SPRAY ANGLE

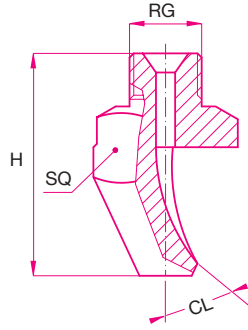
KGW	KHW	KIW	KJW	KKW	KLW	KXW	D	Code	Capacity at different pressure values (l/min) (bar)						Spray angle at press (bar)		
									0.5	1.0	2.0	3.0	4.0	5.0	7.0	1.5	4.0
•						•	0.6	0390	0.16	0.23	0.32	0.39	0.45	0.50	0.60	90	120
•						•	0.7	0590	0.24	0.34	0.48	0.59	0.68	0.76	0.90	105	120
•						•	0.8	0780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

Thread size and dimensions

Code	RG	H	H1	WS
KGW	1/8"	31	10	14
KHW	1/4"	34	12.5	14
KIW	3/8"	44	13	17
KJW	1/2"	49	17	22
KKW	3/4"	65	20	36
KLW	1"	92	26	46

FLAT JET NOZZLES

K



HIGH IMPACT TYPES

K flat jet nozzles work on the deflection principle conveying a water vein onto a deflection surface designed to produce a narrow jet with flat spray pattern, high impact value and medium size droplets.

Their round outlet orifice and unobstructed inside passages minimize plugging risks.

K style nozzles shown in this page are available with a threaded connection and, for the capacity sizes shown in the table, with a quick coupling connection for assembly onto the matching quick connection nipple.

Materials	B1	AISI 303 Stainless steel
	B3	AISI 316 Stainless steel
	T1	Brass

How to compose the nozzle code

The nozzle shown on this page can be supplied with seven different spray angles, whose value is indicated by the third digit in the nozzle code.

Therefore, the nozzle tip code has to be identified as in the following example.

KQB 2195 B3
|
3/8"

Codes for the different spray angles are listed in the above table.

Thread size code

KOx	1/8"
KPx	1/4"
KQx	3/8"
KRx	1/2"
KSx	3/4"
KTx	QC

Nozzle dimensions

Some nozzles may have different dimensions even when made with the same thread.

Dimensions given above refer always to the largest nozzle with a given thread size.

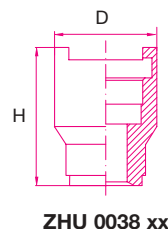
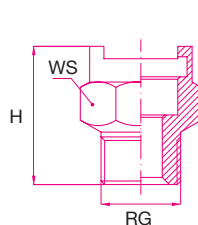
Please refer to our offices for detailed information.

Typical Applications

- Washing of fruits, legumes, crushed stones and any other product moving on a conveyor.
- High pressure cleaning processes
- Felt washing in paper making machines.

Quick coupling nipples


	Thread size	Standard size	Large size	H	WS	D
Male nipple	1/4"	ZHS 0025 xx		29	22	
	3/8"	ZHS 0038 xx		29	22	
	1/2"		ZHS 0050 xx	35	30	
Female nipple	3/8"	ZHT 0038 xx		29	22	
Welding nipple		ZHU 0038 xx	ZHU 0050 xx	32		28
Seal (Viton) for SS nipples	All	VDH 0026 E7	VDH 0050 E7			
Seal (BUNA) for brass nipples	All	VDH 0026 E8	VDH 0050 E8			



FLAT JET NOZZLES

K

HIGH IMPACT TYPES

	1/8"	1/4"	3/8"	1/2"	3/4"	QC	Code	DIA	Capacity at different pressure values								deg CL	mm H	mm SQ	
									(l/min) (bar)											
									2.0	3.0	4.0	5.0	6.0	7.0	10					
15°		KPB KPB					1390 1780 2117 2156 2195 2230 2310 2390 2780	1.9 2.6 3.2 3.7 4.2 4.6 5.3 5.9 8.4	3.18 6.37 9.55 12.7 15.9 18.8 25.3 31.8 63.7	3.90 7.80 11.7 15.6 19.5 23.0 31.0 39.0 78.0	4.50 9.01 13.5 18.0 22.5 26.6 35.8 45.0 90.1	5.03 10.1 15.1 20.1 25.2 29.7 40.0 50.3 101	5.52 11.0 16.5 22.1 27.6 32.5 43.8 55.2 110	5.96 11.9 17.9 23.8 29.8 35.1 47.4 59.6 119	7.12 14.2 21.4 28.5 35.6 42.0 56.6 71.2 142	22 19 25 18 15 14 14 14	48 54 72 92 90 125 130 137 191	16 16 19 22 25 25 32		
	25°		KPD				2156	3.7	12.7	15.6	18.0	20.1	22.1	23.8	28.5	25	65	19		
	35°	KOH						1160 1390 1780 1980 2117 2156 2195 2230 2310 2390 2630 2780	1.2 1.9 2.6 2.9 3.3 3.7 4.1 4.5 5.3 5.9 7.5 8.4	1.31 3.18 6.37 8.00 9.55 12.7 15.9 18.8 25.3 31.8 51.4 63.7	1.60 3.90 7.80 9.80 11.7 15.6 19.5 23.0 31.0 39.0 63.0 78.0	1.85 4.50 9.01 11.3 13.5 18.0 22.5 26.6 35.8 45.0 72.7 90.1	2.07 5.03 10.1 12.7 15.1 20.1 25.2 29.7 40.0 50.3 81.3 101	2.26 5.52 11.0 13.9 16.5 22.1 27.6 32.5 43.8 55.2 89.1 110	2.44 5.96 11.9 15.0 17.9 23.8 29.8 35.1 47.4 59.6 96.2 142	2.92 7.12 14.2 17.9 21.4 28.5 35.6 42.0 56.6 71.2 115 142	40 36 30 28 28 26 27 24 19 23 22	23 37 43 49 52 58 64 73 81 89 114 122	11 16 19 22 25 26 25 32	
				KPH KPH																
					KQH KQH KQH KQH KQH															
						KRH KRH KRH			KTH KTH											
								KSH KSH												
40°				KQL KQL KQL KQL KQL KQL				2156 2195 2230 2270 2310 2350 2390	3.7 4.1 4.5 5.0 5.2 5.7 6.0	12.7 15.9 18.8 22.0 25.3 28.6 31.8	15.6 19.5 23.0 27.0 31.0 35.0 39.0	18.0 22.5 26.6 31.2 35.8 40.4 45.0	20.1 25.2 29.7 34.9 40.0 45.2 50.3	22.1 27.6 32.5 38.2 43.8 49.5 55.2	23.8 29.8 35.1 41.2 47.4 53.5 59.6	28.5 35.6 42.0 49.3 56.6 63.9 71.2	35 33 33 29 26 28 28	60 64 72 75 77 77 87	22 25	
		50°		KPN KPN KPN					1390 1980 2156 2230 2390 2490 2630 2780	1.9 2.9 3.7 4.5 6.0 6.7 7.5 8.4	3.18 8.00 12.7 18.8 31.8 40.0 51.4 63.7	3.90 9.80 15.6 23.0 39.0 49.0 63.0 78.0	4.50 11.3 18.0 26.6 45.0 56.6 72.7 90.1	5.03 12.7 20.1 29.7 50.3 63.3 81.3 101	5.52 13.9 22.1 32.5 55.2 69.3 89.1 110	5.96 15.0 23.8 35.1 59.6 74.8 96.2 142	7.12 17.9 28.5 42.0 71.2 89.5 115 142	60 42 45 37 40 38 37 32	31 41 47 55 72 72 72 72	16 19 19 25 32 32 32

HOLLOW CONE NOZZLES RANGE OVERVIEW

Hollow cone nozzles produce a conical spray pattern jet, where drops are distributed onto the outer surface of the conical shape. They are used in many different applications, the typical ones being to create a droplet curtain inside a cylindrical tower for applications like smoke scrubbing, dedusting and cooling or to cool wide surfaces like the outside of LPG storage tanks. Our range of hollow cone nozzles is shown in the following pages, and additional information about the different types and designs of hollow cone nozzles can be found at page 4 in this catalog. The table below lists the different types available, and gives a basic information about their specific features, so as to make the choice easier for a given application. Accessories available for each nozzle type are usually shown on the single catalogue pages.

Three basic types of hollow cone nozzles are available, that is:

- Turbulence nozzles, tangential spray.
Conical spray pattern axis at 90° with respect to feed pipe axis.
Offer small size droplets, standard and wide angles (very wide angles on request).
- Turbulence nozzles, in line spray.
Conical spray pattern in line with the feed pipe axis.
General specifications similar to off-line types.
- Deflection nozzles, in line spray.
Conical spray pattern in line with feed pipe axis.
Highest resistance to clogging.



All nozzle types, with the exception of turbulence types, do not need any inside part or vane to produce the spray pattern, and are therefore relatively resistant to clogging dangers.

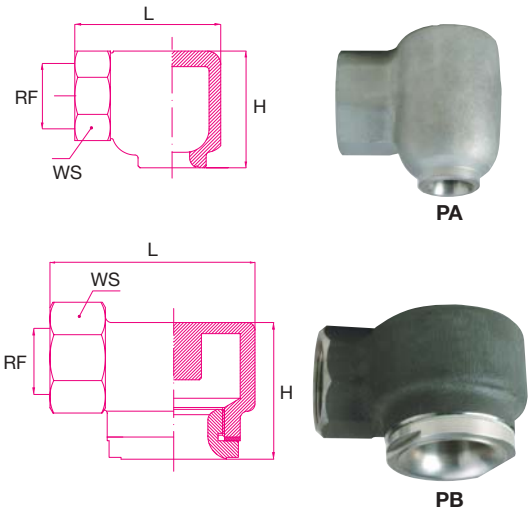
Type	Connection	Specifications	Applications	Page
Turbulence nozzles, tangential				
PA / PB	Female thread	Forged / Cast	General purpose	47
PE / PF	Female / Male thread	Machined from bar stock	General purpose	48
PN / PO	Female / Male thread	Moulded plastic	General purpose	50
Turbulence nozzles, axial				
RA	Female thread	Fine spray, small passages	Humidification	51
RB	Male thread	Fine spray, clog resistant	Dust control	52
RX / RZ	Male thread	Low and very low capacity	Humidification	54
Deflection nozzles, axial				
RC	Male thread	Extra wide spray angle	Dust control	53

HOLLOW CONE NOZZLES

PA/PB

TANGENTIAL NOZZLES

PA/PB type nozzles produce a hollow cone jet working on the tangential flow principle, with a nominal spray angle of 90° or 130°, and a ring shaped impact area. The nozzle contain no internal vane and the centrifugal force inside the whirl chamber provides the energy for liquid breakup. The narrowest section through the nozzle is normally the water inlet diameter for standard angle nozzles (shown as DE in the table below), and the outlet orifice for the wide angle nozzles (shown as DU) these nozzles offer a remarkable resistance to clogging and avoid costly downtime for disassembling and cleaning work. Sizes up to 3/4" are made out of a drop-forged body, with an upper cover for nozzle cleaning. Sizes from 1" and bigger are machined from one piece casting.



Materials B31 AISI 316 L Stainless steel
T1 Brass

Code	RF	DE	DU	Capacity at different pressure values (l/min) (bar)										Dimension (mm)		
				0.3	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	WS	
70° PAS 1170 xx	3/8"	3.5	2.0	0.69	0.72	0.98	1.39	1.70	2.19	2.60	3.10	27	37	22		
90°	PAU 1390 xx	3/8"	4.0	3.8	1.23	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	27	37	22
	PAU 1670 xx	1/2"	5.6	5.2	2.12	2.74	3.24	3.87	5.47	6.70	8.65	10.2	12.2	38	46	27
	PAU 1850 xx		5.7	6.0	2.69	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5			
	PAU 2115 xx		6.6	6.9	3.64	4.69	5.56	6.64	9.39	11.5	14.8	17.6	21.0			
	PAU 2220 xx	3/4"	8.5	9.0	6.96	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2	48	60	36
	PAU 2320 xx		9.5	11.5	10.1	13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4			
	PAU 2420 xx		9.6	14.0	13.3	17.1	20.3	24.2	34.3	42.0	54.2	64.2	76.7			
	PAU 2730 xx	1"	20/10	13.7	23.1	29.8	35.3	42.1	59.6	73.0	94.2	112	133	60	75	46
	PAU 2970 xx			16.5	30.7	39.6	46.9	56.0	79.2	97.0	125	148	177			
	PAU 3147 xx	1+1/2"	32/16	19.5	46.5	60.0	71.0	84.9	120	147	190	225	268	90	93	60
	PAU 3194 xx			22.0	61.3	79.2	93.7	112	158	194	250	296	354			
	PAU 3244 xx	2"	35/20	26.5	77.2	99.6	118	141	199	244	315	373	445	127	117	80
	PAU 3294 xx			28.5	93.0	120	142	170	240	294	380	449	537			
	PAU 3364 xx	2+1/2"	40/40	29.5	115	149	176	210	297	364	470	556	665	156	140	100
PAU 3490 xx			36.5	155	200	237	283	400	490	633	748	895				
PAU 3605 xx			45.0	191	247	292	349	494	605	781	924	1105				
130°	PBY 1390 xx	3/8"	3.5	4.5	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	27	37	22	
	PBY 1850 xx		4.4	7.5	2.69	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5			
	PBY 1980 xx	1/2"	4.0	12	3.10	4.00	4.73	5.66	8.00	9.80	12.7	15.0	17.9	35	46	27
	PBY 2128 xx		4.7	12	4.05	5.23	6.18	7.39	10.5	12.8	16.5	19.6	23.4			
	PBY 2208 xx		6.5	12	6.58	8.49	10.0	12.0	17.0	20.8	26.9	31.6	38.0			
	PBY 2220 xx	3/4"	6.1	15	6.96	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2	50	60	36
	PBY 2320 xx		6.5	19	10.1	13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4			
	PBY 2420 xx		8.0	19	13.3	17.1	20.3	24.2	34.3	42.0	54.2	64.2	76.7			
	PBY 2730 xx	1"	13.4	26	23.1	29.8	35.3	42.1	59.6	73.0	94.2	112	133	60	93	47
	PBY 2970 xx		14.0	26	30.7	39.6	46.9	56.0	79.2	97.0	125	148	177			
	PBY 3147 xx	1+1/2"	15.0	37	46.5	60.0	71.0	84.9	120	147	190	225	268	75	111	60
	PBY 3194 xx		19.5	37	61.3	79.2	93.7	112	158	194	250	296	354			
	PBY 3244 xx	2"	22.0	45	77.2	99.6	118	141	199	244	315	373	445	91	140	75
	PBY 3294 xx		27.1	45	93.0	120	142	170	240	294	380	449	537			
PBY 3364 xx	2+1/2"	25.5	64	115	149	176	210	297	364	470	556	665	128	193	90	
PBY 3490 xx		33.0	64	155	200	237	283	400	490	633	748	895				
PBY 3605 xx		38.0	64	191	247	292	349	494	605	781	924	1105				
PBY 3665 xx		43.0	64	210	271	321	384	543	665	858	1016	1214				

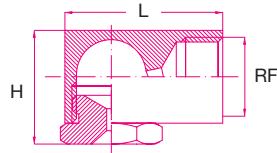
Material table	3/8"	1/2"	3/4"	1"	1+1/2"	2"	2+1/2"
AISI 316 L				•	•	•	•
Brass	•	•	•	•			

HOLLOW CONE NOZZLES

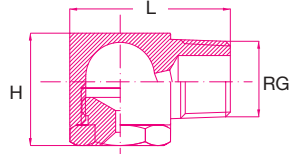
PE/PF



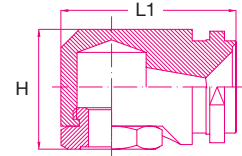
PE



PF



PT



STANDARD ANGLE SPRAY NOZZLES

These hollow cone nozzles work on the tangential flow principle, but are manufactured by machine tool operation from metal bar stock, which allows the construction of small and very small size nozzles.

In addition nozzles can be made on request from any special material and alloy when available as a bar stock.

Materials

- B1** AISI 303 Stainless steel
B3 AISI 316 Stainless steel
T1 Brass

Standard spray angle

50°	RF	PEN	PFN	PTN	Code	DE	DU	Capacity at different pressure values (l/min)							Dimension (mm)			
	RG							0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1
	3/8"		•	•	2180	8.0	6.1	7.35	8.69	10.4	14.7	18.0	23.2	27.5	32.9	24	34	35
			•	•	2220	7.7	7.0	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2			
			•	•	2390	9.5	9.0	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2			

70°	RF	PES	PFS	PTS	Code	D2	D3	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1
1/8"		•	•		0390	0.9	1.0	0.16	0.19	0.23	0.32	0.39	0.50	0.60	0.71	19	24	26
			•	•	0780	1.4	1.7	0.32	0.38	0.45	0.64	0.78	1.01	1.19	1.42			
			•	•	1160	2.2	2.1	0.65	0.77	0.92	1.31	1.60	2.07	2.44	2.92			
			•	•	1230	2.5	2.7	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20			
			•	•	1390	3.4	3.1	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
			•	•	1630	4.0	3.9	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
1/4"		•	•	•	0781	1.1	1.6	0.32	0.38	0.45	0.64	0.78	1.01	1.19	1.42	23	32	32
			•	•	1161	2.1	2.5	0.65	0.77	0.92	1.31	1.60	2.07	2.44	2.92			
			•	•	1231	2.6	2.8	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20			
			•	•	1391	3.5	3.4	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
			•	•	1631	4.6	4.3	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
			•	•	1781	4.4	4.8	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
3/8"		•	•	•	1392	3.7	3.5	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	24	34	35
			•	•	1632	4.5	4.2	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
			•	•	1782	5.0	4.5	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
			•	•	2118	5.8	5.6	4.78	5.65	6.75	9.55	11.7	15.1	17.9	21.4			
			•	•	2157	6.7	6.2	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7			
			•	•	2196	7.5	6.7	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8			
1/2"		•	•	•	2230	8.3	7.9	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0	31	50	50
			•	•	2197	9.5	6.4	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8			
			•	•	2231	9.5	7.5	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0			
			•	•	2310	9.5	9.0	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6			
			•	•	2391	9.5	10.5	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2			
			•	•	2470	10.0	12.0	19.2	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
3/4"		•	•	•	2311	9.5	9.0	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6	39	55	58
			•	•	2392	10.7	9.7	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2			
			•	•	2471	11.7	10.8	19.2	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
			•	•	2550	11.7	12.0	22.5	26.6	31.8	44.9	55.0	71.0	84.0	100			
			•	•	2630	12.2	12.0	25.7	30.4	36.4	51.4	63.0	81.3	96.2	115			
			•	•	2700	12.7	12.0	28.6	33.8	40.4	57.2	70.0	90.4	107	128			
			•	•	2780	12.7	14.0	31.8	37.7	45.0	63.7	78.0	101	119	142			
			•	•	2860	12.7	16.1	35.1	41.5	49.7	70.2	86.0	111	131	157			
			•	•	2940	13.5	16.5	38.4	45.4	54.3	76.8	94.0	121	144	172			

HOLLOW CONE NOZZLES

PE/PF

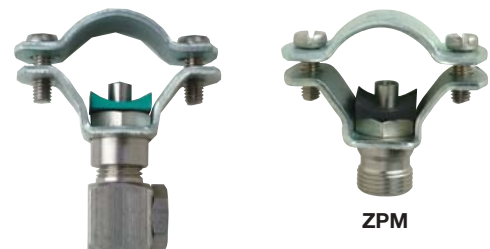
WIDE ANGLE SPRAY NOZZLES

Wide spray angle

120°	RF RG	PEW	PFW	PTW	Code	DE	DU	Capacity at different pressure values								Dimension (mm)										
								(l/min) (bar)								H	L	L1								
								0.5	0.7	1.0	2.0	3.0	5.0	7.0	10											
1/8"	●	●	●	●	0390	09	1.1	0.16	0.19	0.23	0.32	0.39	0.50	0.60	0.71	19	24	26								
					0780	1.4	1.5	0.32	0.38	0.45	0.64	0.78	1.01	1.19	1.42											
					1200	1.5	3.9	0.82	0.97	1.15	1.63	2.00	2.58	3.06	3.65											
					1230	2.0	3.4	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20											
					1270	2.2	3.8	1.10	1.30	1.56	2.20	2.70	3.49	4.12	4.93											
					1320	2.1	4.5	1.31	1.55	1.85	2.61	3.20	4.13	4.89	5.84											
					1390	3.6	3.1	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12											
					1510	3.4	5.0	2.08	2.46	2.94	4.16	5.10	6.58	7.79	9.31											
					1700	4.5	5.2	2.86	3.38	4.04	5.72	7.00	9.04	10.7	12.8											
					1/4"	●	●	●	●	0781	1.4	1.5	0.32	0.38	0.45				0.64	0.78	1.01	1.19	1.42	23	32	32
										1130	1.4	3.6	0.53	0.63	0.75				1.06	1.30	1.68	1.99	2.37			
										1160	1.4	4.0	0.65	0.77	0.92				1.31	1.60	2.07	2.44	2.92			
										1190	2.0	2.3	0.78	0.92	1.10				1.55	1.90	2.48	2.90	3.50			
										1271	2.2	3.8	1.10	1.30	1.56				2.20	2.70	3.49	4.12	4.93			
										1321	2.2	4.5	1.31	1.55	1.85				2.61	3.20	4.13	4.89	5.84			
										1391	3.6	3.1	1.59	1.88	2.25				3.18	3.90	5.03	5.96	7.12			
										1511	3.4	5.0	2.08	2.46	2.94				4.16	5.10	6.58	7.79	9.31			
1600	3.4	5.2	2.45	2.90						3.46	4.90	6.00	7.75	9.17	11.0											
1701	4.2	5.2	2.86	3.38						4.04	5.72	7.00	9.04	10.7	12.8											
3/8"	●	●	●	●	1512	3.5	5.0	2.08	2.46	2.94	4.16	5.10	6.58	7.79	9.31	24	34	35								
					1601	3.5	5.2	2.45	2.90	3.46	4.90	6.00	7.75	9.17	11.0											
					1702	4.2	5.2	2.86	3.38	4.04	5.72	7.00	9.04	10.7	12.8											
					1781	3.7	6.0	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2											
					1861	4.0	5.6	3.51	4.15	4.97	7.02	8.60	11.1	13.1	15.7											
					1941	5.0	5.7	3.84	4.54	5.43	7.68	9.40	12.1	14.4	17.2											
					2102	4.5	6.9	4.16	4.93	5.89	8.33	10.2	13.2	15.6	19.0											
					2110	5.0	6.2	4.49	5.31	6.35	8.98	11.0	14.2	16.8	20.0											
					2118	5.0	6.7	4.78	5.65	6.75	9.55	11.7	15.1	17.9	21.4											
					2133	6.1	8.0	5.43	6.42	7.68	10.9	13.3	17.2	20.3	24.3											
1/2"	●	●	●	●	2157	5.0	9.0	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7	31	50	50								
					2172	6.2	7.5	7.02	8.31	9.93	14.0	17.2	22.2	26.3	31.4											
					2196	6.2	8.4	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8											
					2220	6.2	9.7	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2											
					2391	9.0	10.5	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2											
					3/4"	●	●	●	●	2630	10.3	15.0	25.7	30.4	36.4				51.4	63.0	81.3	96.2	115	39	55	58

Pipe clamp

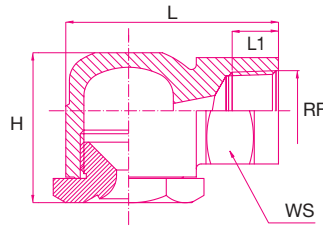
Our accessories catalog shows several types of clamps allowing for an easy assembly of hollow cone nozzles on to main manifold.



ZPM

HOLLOW CONE NOZZLES

PN



MOULDED PLASTIC NOZZLES

This range of hollow cone nozzles are made by plastic moulding, out of high quality glassfiber reinforced polypropylene, for high mechanical strength and dimensional stability. They make available small droplet sizes, uniform distribution and corrosion resistance at moderate prices for all those applications like air humidification, intensive product cooling and gas washing. Together with our pipe clamps, they offer the best solution in all cases where large quantity of nozzles have to be easily assembled onto pipe manifolds.

Maximum operating temperature 75° C.

Materials D6 Fiberglass reinforced PP

∠	RF	PNS	POS	Code	DE	DU	Capacity at different pressure values (l/min) (bar)								Dimension (mm)									
							0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1	WS						
70°	3/8"	•	•	1170	2.0	2.9	0.69	0.82	0.98	1.39	1.70	2.19	2.60	3.10	31	44	20	22						
80°	3/8"	•	•	1260	2.7	3.5	1.06	1.26	1.50	2.12	2.60	3.36	3.97	4.75	31	44	20	22						
90°	3/8"	•	•	1390	3.7	3.8	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	31	44	20	22						
		•	•	1670	4.4	5.2	2.74	3.24	3.87	5.47	6.70	8.65	10.2	12.2										
		•	•	1850	5.2	5.6	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5										
		•	•	2115	6.1	6.3	4.69	5.56	6.64	9.39	11.5	14.8	17.6	21.0										
		•	•	2220	7.2	9.2	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2										
1/2"	•	•	•	2320	9.5	10.5	13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4	42	55	35	30						
				2398	8.5	14.0	16.2	19.2	23.0	32.5	39.8	51.4	60.8	72.7										
130°	3/8"	•	•	1170	1.7	3.5	0.69	0.82	0.98	1.39	1.70	2.19	2.60	3.10	31	44	20	22						
		•	•	1260	1.9	5.0	1.06	1.26	1.50	2.12	2.60	3.36	3.97	4.75										
		•	•	1390	2.7	5.0	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12										
		•	•	1460	3.1	5.0	1.88	2.22	2.66	3.76	4.60	5.94	7.03	8.40										
		•	•	1570	3.0	7.5	2.33	2.75	3.29	4.65	5.70	7.36	8.71	10.4										
		•	•	1670	3.4	7.5	2.74	3.24	3.87	5.47	6.70	8.65	10.2	12.2										
		•	•	1850	4.1	7.5	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5										
		•	•	1980	3.6	12	4.00	4.73	5.66	8.00	9.80	12.7	15.0	17.9										
		•	•	2128	4.2	12	5.23	6.18	7.39	10.5	12.8	16.5	19.6	23.4										
		•	•	2208	6.0	12	8.49	10.0	12.0	17.0	20.8	26.9	31.8	38.0										
		•	•	2220	6.4	12	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2										
		1/2"	•	•	•	2129	4.3	14	5.23	6.18	7.39	10.5	12.8	16.5					19.6	23.4	42	55	35	30
						2209	5.8	14	8.49	10.0	12.0	17.0	20.8	26.9					31.8	38.0				
						2221	6.3	14	8.98	10.6	12.7	18.0	22.0	28.4					33.6	40.2				
						2320	7.6	14	13.1	15.5	18.5	26.1	32.0	41.3					48.9	58.4				
2420	9.0					14	17.1	20.3	24.2	34.3	42.0	54.2	64.2	76.7										



Male thread nozzles

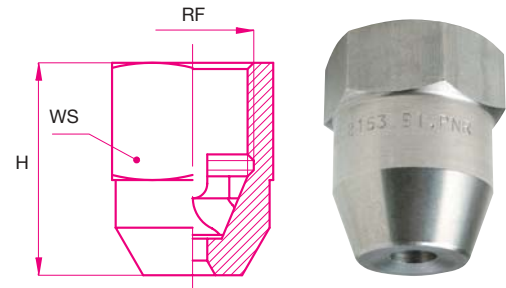
For all 3/8" size nozzles we can supply moulded polypropylene nozzles with 3/8" male thread.

HOLLOW CONE NOZZLES

RA

IN LINE SPRAY/INSIDE VANE

RA nozzles work on the tangential jet principle and produce a very fine spray with a hollow cone spray pattern, in line with the inlet pipe. The carefully machined inside vane has two precision machined spiral grooves, which allow to obtain a wide range of capacities starting from very low values. When low capacity nozzles are used, because of the limited inner passages, it is recommended that the spray manifold should be fitted with a filter of the proper mesh size.

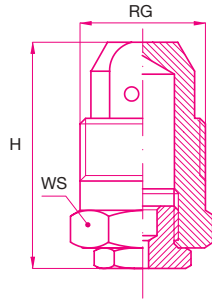


Materials B31 AISI 316 L Stainless steel
 T1 Brass

Code	RF	D	D1	Capacity at different pressure values									Dimension (mm)	
				0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS	
80°	RAT 0200 xx RAT 0390 xx	1/8"	1.0	0.5	0.08	0.10	0.12	0.16	0.20	0.26	0.31	0.37	18	17
			1.7	0.5	0.16	0.19	0.23	0.32	0.39	0.50	0.60	0.71		
60°	RAQ 0490 xx RAQ 0770 xx RAQ 1122 xx	3/8"	1.1	0.6	0.20	0.24	0.28	0.40	0.49	0.63	0.75	0.89	29	22
			1.6	0.6	0.31	0.37	0.44	0.63	0.77	0.99	1.18	1.41		
			2.0	0.6	0.50	0.59	0.70	1.00	1.22	1.58	1.86	2.23		
90°	RAU 1208 xx RAU 1306 xx RAU 1490 xx RAU 1612 xx RAU 1772 xx RAU 2104 xx	3/8"	3.0	1.0	0.85	1.00	1.20	1.70	2.08	2.69	3.18	3.80	29	22
			4.0	1.2	1.25	1.48	1.77	2.50	3.06	3.95	4.67	5.59		
			4.2	1.2	2.00	2.37	2.83	4.00	4.90	6.33	7.48	8.95		
			4.7	1.2	2.50	2.96	3.53	5.00	6.12	7.90	9.35	11.2		
			5.5	1.2	3.15	3.73	4.46	6.30	7.72	10.0	11.8	14.1		
			6.3	1.2	4.25	5.02	6.00	8.49	10.4	13.4	15.9	19.0		
	RAU 1491 xx RAU 1551 xx RAU 1686 xx RAU 1980 xx RAU 2137 xx RAU 2153 xx RAU 2196 xx	1/2"	5.0	0.6	2.00	2.37	2.83	4.00	4.90	6.33	7.48	8.95	36	27
			5.5	0.6	2.25	2.66	3.18	4.49	5.50	7.10	8.40	10.0		
			6.0	0.6	2.80	3.31	3.96	5.60	6.86	8.86	10.5	12.5		
			6.3	0.6	4.00	4.73	5.66	8.00	9.80	12.7	15.0	17.9		
			6.7	0.6	5.59	6.62	7.91	11.2	13.7	17.7	20.9	25.0		
			7.5	0.6	6.45	7.63	9.12	12.9	15.8	20.4	24.1	28.8		
			9.0	0.6	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8		

HOLLOW CONE NOZZLES

RB



IN LINE SPRAY / VANELESS

These nozzles produce a hollow cone spray pattern, in line with the nozzle inlet pipe.

Their design, without any inside whirling vane, offers wide unobstructed passages and minimizes clogging danger while producing fine droplets.

The above characteristics make these nozzles the ideal solution for dust suppression applications, specially suited for coal dust control.

Materials **B1** AISI 303 Stainless steel
 T1 Brass

Code	RG	D	D1	Capacity at different pressure values (l/min)									Dimension (mm)	
				0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS	
60°	3/8"	2.0	2.0	0.65	0.77	0.93	1.31	1.60	2.07	2.44	2.92	31	17	
		2.4	2.4	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20			
		3.3	2.9	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
		3.9	3.8	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
		4.4	4.0	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		4.4	*4.0	4.49	5.31	6.35	8.98	11.0	14.2	16.8	20.1			
70°	1/2"	3.3	3.2	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	37	22	
		4.0	4.0	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
		4.5	4.5	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		5.1	*4.4	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5			
		6.1	*4.7	6.45	7.63	9.12	12.9	15.8	20.4	24.1	28.8			
		7.1	*5.2	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6			
	3/4"	3.3	3.3	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	43	32	
		4.2	4.2	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5			
		4.7	4.5	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		5.4	5.4	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5			
80°	1+1/2"	10.0	*7.9	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6	69	50	
		9.5	*9.5	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2			
		11.1	*9.5	19.2	22.7	27.1	38.4	47.0	60.7	71.8	85.8			
		12.7	*9.5	22.5	26.6	31.8	44.9	55.0	71.0	84.0	100			
		14.3	*9.5	25.7	30.4	36.4	51.4	63.0	81.3	96.2	115			
		15.0	*9.5	28.6	33.8	40.4	57.2	70.0	90.4	107	128			
		15.9	*9.5	31.8	37.7	45.0	63.7	78.0	101	119	142			
		17.1	*9.5	35.1	41.5	49.7	70.2	86.0	111	131	157			
18.3	*9.5	38.4	45.4	54.3	76.8	94.0	121	144	172					

* This nozzle is made with a double inlet orifice.

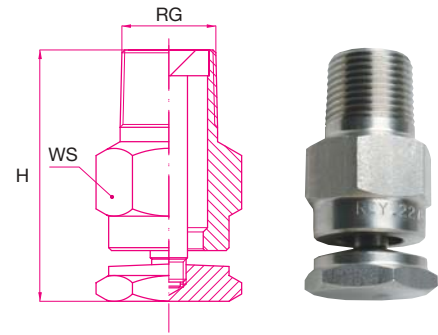
HOLLOW CONE NOZZLES

RC

IN LINE SPRAY

RC type nozzles produce a hollow cone spray pattern, in line with the nozzle inlet pipe.

The spray is produced by deflection of the water flow against a fixed plate in front of the nozzle orifice, which allows at the same time to obtain an high efficiency, small drop size and very wide spray angles.



Materials B1 AISI 303 Stainless steel
 T1 Brass

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

Common applications

RC series hollow cone nozzles are used mainly for air washing, dust suppression and cooling processes.

The accessories shown below can be used for their protection against clogging, or for an appropriate assembly.

Please see our accessories catalogue CTG AC16 BR.

Assembly fittings



VEM



ZRP



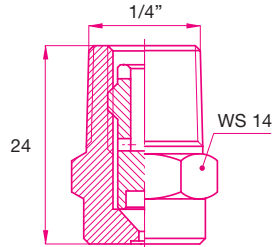
ZPM

HOLLOW CONE NOZZLES

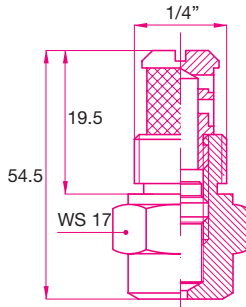
RX/RZ



RX



RZ



HYDRAULIC ATOMIZERS

Hydraulic atomizers are designed to deliver a very finely atomized hollow cone spray, even at low pressure values.

The nozzle contains a precisely machined insert with tiny passages, which can be disassembled for cleaning should the nozzle be clogged. Protection against clogging can be achieved either through a strainer on the main manifold, or by means of an optional individual filter VEF (see accessories catalogue CTG AC16 BR).

We offer two types of bodies, RX with tapered thread and spray angle 80°, and RZ with straight thread and different spray angle values.

Materials	B1	AISI 303 Stainless steel	(RX)
	B3	AISI 316 Stainless steel	(RZ)
	T1	Brass	(RX)

Capacities shown in the above table are given in liters per hour.

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

Capacities shown in the above table are given in liters per minute.

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

Additional spray angles

RZ nozzles with orifice equal or larger than 1,0 mm can be produced with angles of 30°, 45°, 60° or 90°. The table beside shows the nozzle identifying codes for these spray angles.

Spray angle codes

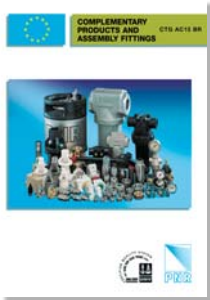
RZF	RZM	RZQ	RZU
30°	45°	60°	90°



VEF

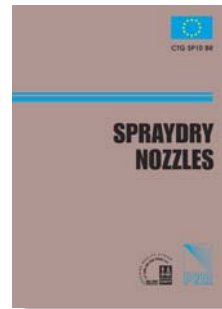
PNR PRODUCT RANGE

PNR manufactures, in addition to the range of general purpose nozzles shown in this Catalogue, a wide range of other products and systems allowing you to optimize the use of liquid spray and fluid control in most modern industrial processes. You find our high quality, proven products shown in the following catalogs:

CTG AC16 BR**Accessories Catalogue**

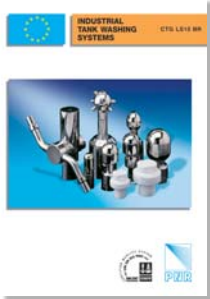
A complete line of nipples, clamps, swivel joints and everything that helps you to easily assemble, align and service your spraying systems.

Air blowers, mixing eductors, filters, cleaning guns and lances, hose reels, steam heaters, pressure tanks, quick couplings to help you build up a professional system to the modern state of the art.

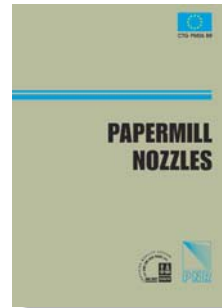
CTG SP10 BR**Spraydry nozzles**

High pressure or air assisted, high quality metal or inside tungsten carbide lined, a complete line of nozzles to retrofit existing plants at competitive prices.

Only the highest quality materials and the most precise machining are employed in the manufacture of our nozzles, to assure precisely defined results and consistent wear life.

CTG LS15 BR**Tank washing systems**

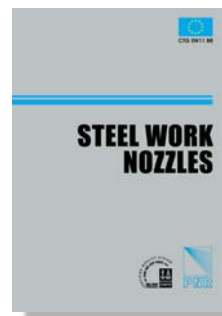
Everything from the simple fixed sprayballs and pintle nozzles to the two-axis washer, heads reaction driven, water driven, with electric or pneumatic motor. Professional inside surface cleaning of industrial tanks with the latest technology, together with state of the art accessories.

CTG PM09 BR**Papermill products**

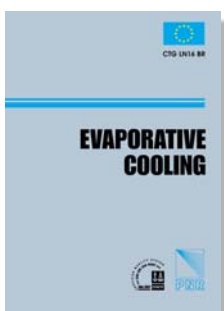
A sixteen page Catalog showing products specially developed for perfect results on paper making machines, including our patented disc nozzle for self-cleaning pipes, needle nozzles with sapphire and ruby orifice, oscillating pipes with high quality computer driven motor.

CTG AZ15 BR**Air assisted atomizers**

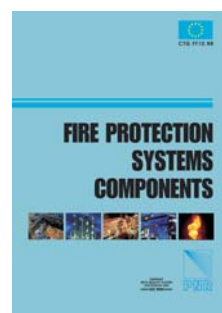
Ultrasonic, classic and automatic atomizers for the finest atomization in any process. High quality machining and tight quality control assure a professional result to your system, control cabinet and spray programmer allow for complete humidification systems to be easily assembled.

CTG SW11 BR**Steelwork nozzles**

A complete line of nozzles for steelwork applications, including continuous casting air atomizers and conventional nozzles, descaling nozzles for high pressure systems, fixed position dovetail tips and coke quenching high capacity flanged nozzles.

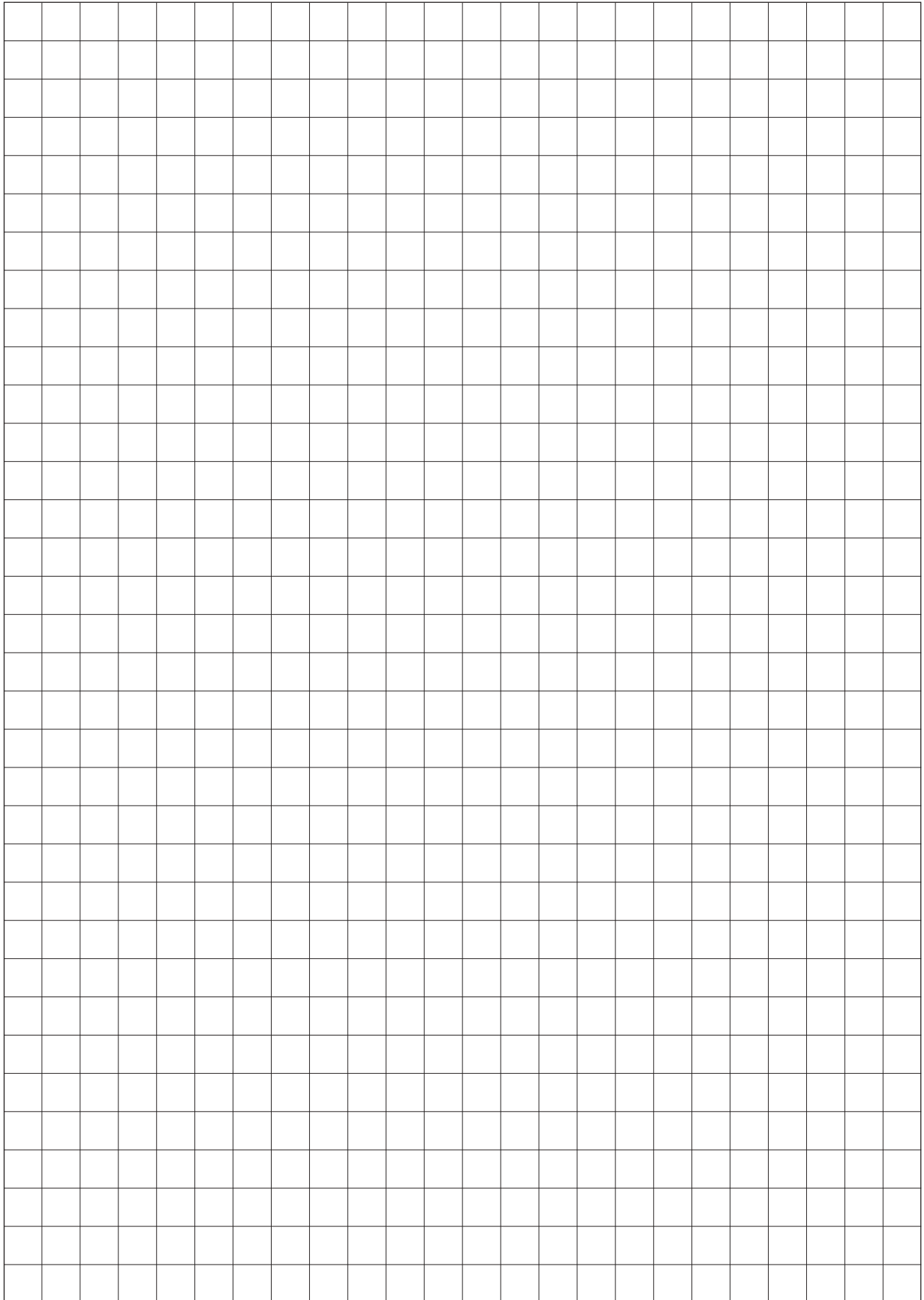
CTG LN16 BR**Gas cooling lances**

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

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Everything for fixed and mobile foam systems, bladder tanks, any kind of foam mixer, monitors, foam lances and foam nozzles, mobile trailers for foam systems, pressure water nozzles and watermist nozzles, hydrants.

NOTE



GENERAL INFORMATION

ABBREVIATIONS

CL	Jet deflection angle	deg	DU	Liquid outlet dia	mm	RF	Female BSP straight thread	inch
D	Conventional orifice dia	mm	FF	Flange outer dia	mm	RG	BSPT male taper thread	inch
D1	Smallest free inside dia	mm	G	Flange center-hole dia	mm	SQ	Square bar size	mm
DE	Liquid inlet dia	mm	H, H1	Height	mm	W	Weight	gram, kg
DF	Flange size	inch	L, L1	Length	mm	WS	Wrench size	mm
DIA	Outside diameter	mm	NR	Number of orifices	-			
DN	Flange nominal size	mm	QC	Quickfit connection	-			

PRODUCT WARRANTY

PNR products will be replaced or repaired at the option of Pnr and free of charges if found defective in manufacturing, labeling or packaging. The above warranty conditions will apply if notice of defect is received by Pnr within 30 days from date of product installations or one year from date of shipment.

The cost of above said replacement or repair shall be the exclusive remedy for any breach of any warranty, and Pnr shall not be held liable for any damage due to personal injuries or commercial losses coming from product malfunction.

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

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

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

PRODUCT RETURN POLICY

PRODUCTS DELIVERED IN ERROR FROM PNR

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

PRODUCTS ORDERED INCORRECTLY TO PNR

- 1 Obtain from Pnr a return authorization number together with a Form 3DA A04
- 2 Return the products at your expense together with the form 3DA A04 duly filled
- 3 Products shall be in original conditions, inside the original packing
- 4 A re-stocking change of 10% applies.

NON CATALOG PRODUCTS

These products can only be returned after a quotation from Pnr has been obtained.

DISCLAIMER

Our products are manufactured with the best care and according to the latest developments of the technology, but we cannot assure that every one of our products is perfectly fit for any possible specific process. The information provided in this Catalog is provided "as is" and we make no warranty of any kind with respect to the subject matter or accuracy of the information contained herein. This publication may include technical inaccuracies or typographical errors and changes may be periodically made to the information herein without previous notice.

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