GENERAL PURPOSE SPRAY NOZZLES

CTG UG20 BR

INTRODUCTION

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TECHNICAL PUBLICATIONS

TECHNICAL PUBLICATIONS

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

PRODUCT RANGE	CTG TV BR
GENERAL PURPOSE SPRAY NOZZLES	CTG UG BR
AIR ASSISTED ATOMIZERS	CTG AZ BR
COMPLEMENTARY PRODUCTS AND ASSEMBLY FITTINGS	CTG AC BR
INDUSTRIAL TANK WASHING SYSTEMS	CTG LS BR
EVAPORATIVE COOLING SYSTEMS	CTG LN BR
FIRE FIGHTING PRODUCTS	CTG FF BR
PAPERMILL PRODUCTS	CTG PM BR
STEELWORK NOZZLES	CTG SW BR
SPRAYDRY NOZZLES	CTG SP BR

As a result of continuous product improvement our documentation is regularly updated and published on our website. If you wish to receive up-to-date catalogues in hardcopy then please contact us and we'll gladly add you to our catalogue mailing list. There is also a form on page 57 which you can complete and send to your nearest PNR office or agent.

NOTES

NOTES

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

Dimensions in this catalogue are given in millimetres (mm).
All threads are made according to the ISO 228 standards.
(European norms BS 2779 – DIN 259 – UNI 338).
Explanations about the abbreviations used in the catalogue are given on page 57.

Please read our warranty conditions on page 57.

= ISO 9001/2001=
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LIQUID SPRAY AS A PROCESS

The process of spraying a liquid can be split into two phases, namely:
1 Breaking up the liquid into separate droplets.
2 Directing liquid droplets onto a surface or an object to achieve the desired result.

The above two phases are normally determined by the types of nozzles being used in a given industrial process.

The progresses made in manufacturing techniques over recent years means that PNR is continuously expanding the range of nozzles available to industry. This ensures nozzles perform efficiently and also evolve to cope with the different industrial processes where they are used.

In order to choose the most appropriate nozzle for an application, which performs to the highest efficiency possible, it is in the interest of the engineer using spray nozzles to be familiar with the different types available. It is also important that the engineer understands the different characteristics of these nozzles. Spraying a liquid through a spray nozzle can serve a number of different purposes. Here are some of the most important:

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 cleans dirt or any other undesirable substances from the product surface.
3 Humidifying: where fine spray carrying small liquid quantities is directed on to the product surface, into a chamber or into a room.
4 Metering the desired liquid quantity in a unit of time to suit the application.
5 Applying a product to a surface, for example when spray painting or in surface pre-treatment processes before painting a product.
6 Increasing the liquid surface to speed up heat transfer processes or chemical reactions and many other applications throughout modern industry.

It is self evident that the best results for every application are only achieved when the right choice of nozzle is made. This relates to the nozzle type, flow value, spray angle, droplet dimensions and nozzle materials. The purpose of the following pages is to give the reader the basic knowledge required to select the most appropriate spray nozzle or nozzles for a given application.

Note: we make available to our customers at no cost our “Spray Engineering Handbook” which contains much more extensive information about spray technologies.

SPRAY NOZZLES

A spray nozzle is a device which is used to produce liquid droplets by forcing a liquid through an orifice. By utilising the pressure energy of a liquid its speed is increased and it breaks up into droplets as it exists the orifice. Each nozzle performance can be categorised precisely, so that the design engineer can specify the appropriate spray nozzle required.

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 generate a liquid spray using a spray nozzle. There are a number of designs used to achieve different spray pattern results appropriate for a variety of industrial applications. These are as follows:

1 PRESSURE NOZZLES
These are the simplest type of nozzles. Liquid fed under pressure enters into a chamber and a spray is then produced as the liquid exits through the orifice. The spray pattern, flow rate and spray angle is determined by the design of the pressure chamber and also the profile of the orifice edge. Typical pressure nozzles in the PNR range are the flat jet nozzles series GA, J, GX and GY.

2 TURBULENCE NOZZLES
With these nozzles the liquid rotates through a chamber while proceeding to the nozzle orifice. The liquid travels at a given rotational speed and a conical shape spray pattern is then produced due to the centrifugal force created.
The nozzle design and the technique used to generate the rotational speed determines whether the liquid cone is on the outer surface (as in a hollow cone spray) or whether it is evenly distributed to fill the entire volume of the cone (as in a full cone spray).

3 IMPACT NOZZLES
Here the desired spray pattern shape is created by directing the liquid onto a specifically designed and engineered surface. The liquid jet is then subsequently changed into a fluid lamina and then broken into droplets with the desired spray pattern produced as the liquid leaves the nozzle edge.

4 AIR ASSISTED ATOMISERS
Fine droplet spray patterns can be achieved using air assisted atomisers. There are various principles and atomiser setups which can be applied and more detailed information about air assisted atomising can be found in our catalogue " Air Assisted Atomisers" (ordering code CTG AZ BR).

The interested reader can find further information in our free Spray Engineering Handbook, catalogue code CTG SH BR, available from any PNR Company or Distributor.

SPRAYING NOZZLE TECHNICAL PARAMETERS

Several technical properties have to be taken into consideration when selecting the correct nozzle for an application. 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 is defined by 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. Energy can be lost within the process because of the type of internal machined finish (i.e. a highly polished or rough finish), this can affect efficiency between 55% and 95% for the types commonly used in most industrial processes. The above is not valid for air assisted atomisers which have much higher energy requirements because of the losses inherent in the energy transfer from compressed air to the liquid surface.

2 DROPLET SIZE
For several applications the size of the droplets in the spray pattern is extremely significant to the process in hand. Considerations about how to define and measure the droplet size of a spray are found both in our Spray Engineering Handbook (CTG SH BR), and in our “Air Assisted Atomisers” catalogue (code CTG AZ BR).

SPRAY PATTERNS

FULL CONE PATTERN

In a full cone spray the droplets are confined to the shape of a cone, with the cone shape originating at the nozzle orifice. Such a spray pattern is commonly used in a large variety of industrial processes, since it is the specific shape which allows for an even distribution of liquid flow onto a surface. The full cone spray pattern is therefore useful for evenly spray cooling a stationary surface or droplet distribution within a specific space (for example a cooling tower).
Because of the wide number of industrial applications where full cone nozzles can be used the original shape has evolved into a range of specialised types. The full cone spray pattern and similar spray patterns to the full cone are achieved through the following techniques:

STANDARD FULL CONE

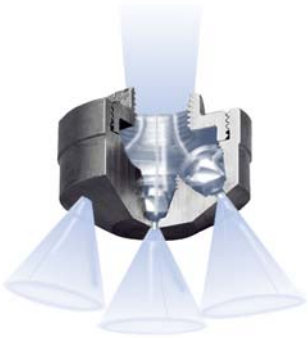
STANDARD FULL CONE (TURBULENCE NOZZLE)
These nozzles use a specifically shaped vane placed at the nozzle inlet to give a rotational speed to the fluid flowing through the nozzle.
Due to the rotational speed of the fluid, water exiting the nozzle orifice is subjected to centrifugal force and opens up in to the shape of a full cone.

The extent of the angle of the cone is a function of both exit speed (created from the inlet pressure) and the internal design of the nozzle. It can vary in practice from 15° to 120°.
These nozzles can also be produced as square full cone nozzles, where the square shape of the pyramidal spray is achieved through a special design feature in the outlet orifice.
Two important details should be noted by the system designer when using this type of nozzle:

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

SPIRAL FULL CONE

SPIRAL FULL CONE (DEFLECTION NOZZLE)
This is not a true full cone, but rather a continuous liquid curtain evolving with the shape of a spiral inside a conical volume. The disadvantage of the scarcely even distribution is compensated by an exceptionally good resistance to clogging , which makes this nozzle the best choice in those applications where safety or system reliability is the prime concern, e.g. fire fighting systems.



MULTIPLE FULL CONE

MULTIPLE FULL CONE (TURBULENCE NOZZLE, MULTIPLE ORIFICE ATOMIZER)
This spray pattern and nozzle type is used when:

A Low flow and fine droplets and good coverage is required. In this case the design usually comprises of a group of hollow cone low flow nozzles which when spraying combine into one spray pattern. It should be noted that it is not completely homogenous as with a single cone spray nozzle.

B Large flow and moderate droplet size with good coverage is required. In this case the design comprises a group of full cone nozzles which when spraying combine into one spray pattern (virtually homogenous).

SPRAY PATTERNS

FLAT JET SPRAY PATTERN

A flat jet spray nozzle produces a flat liquid layer, with different spray thickness achieved according to the principle used to generate the spray. A variety of spray angles are available to suit a wide spectrum of industrial applications, commonly for spraying onto a surface or an object that is moving in a transverse direction to that of the spray pattern; a typical example being the nozzles in a car washing tunnel. The vast majority of flat spray nozzles used in industry work according to one of the following principles.

IN LINE FLAT JET (PRESSURE NOZZLE)
Here the liquid enters the nozzle in line with its axis. The liquid is then fed to a pressure chamber from where it is then forced through the nozzle orifice. The flow value and spray angle is determined respectively by the orifice cross section and the orifice profile.

IN LINE STRAIGHT JET (PRESSURE NOZZLE)
These are not strictly speaking flat jet spray nozzles. There is no spray angle on these, but a straight jet of liquid. A pencil jet, as they are also referred to, produces a sharp stable, stream with a powerful impact. Often these are used for cleaning processes or to cut soft materials.

SPOON FLAT JET (DEFLECTION NOZZLE)
In this nozzle design the liquid is fed though the orifice and onto a smooth curved surface (which is also referred to as a spoon) to produce a flat jet spray pattern. This efficient design uses the same feed pressure as conventional flat jets but achieves a high impact jet of water; especially useful where cleaning is involved.

HOLLOW CONE SPRAY PATTERN

A hollow cone spray pattern consists of droplets concentrated onto the outer surface of a conical shape volume of water, with no droplets on the inside of the spray pattern.
These nozzles are normally used for pollution abatement and gas cooling applications in addition to many other industrial processes.

HOLLOW CONE (TURBULENCE NOZZLE)
These nozzles use a tangential flow principle, the nozzle has no internal vanes and the liquid passes into a whirling chamber which generates a centrifugal force. This breaks up the liquid as it leaves the nozzle orifice. Precisely designed orifice profiles, making use of the Coanda effect, make it possible to produce very wide spray angles.

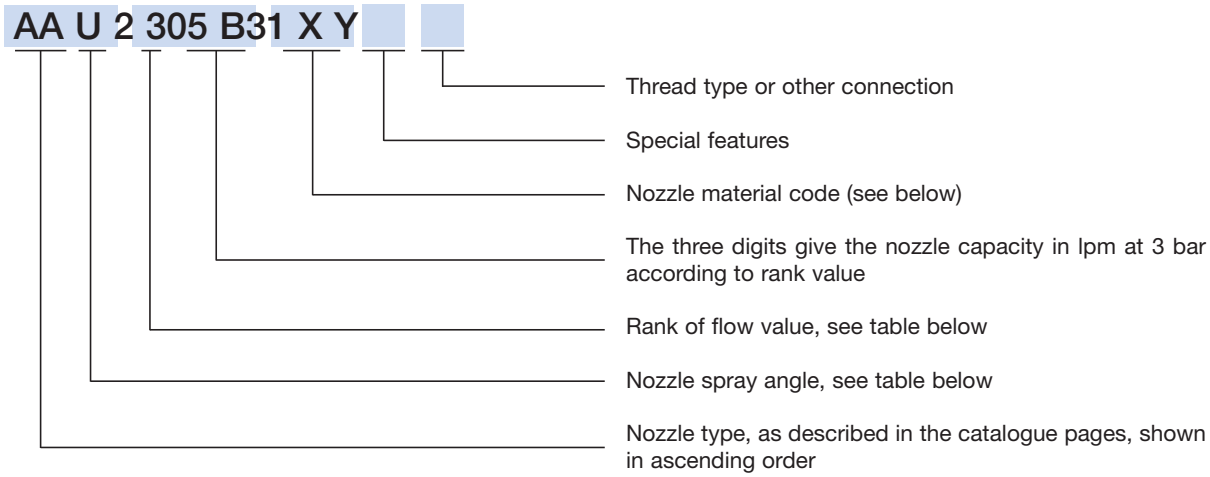
HOLLOW CONE (DEFLECTION NOZZLE)
A hollow cone can also be produced by directing a liquid jet onto a purposely-designed surface. This then breaks the liquid into droplets and forms a hollow cone spray pattern. This type of nozzle is suitable, for example, in fire fighting systems.

NOZZLE IDENTIFICATION CODES

PNR CODING SYSTEM

As with any other industrial product, our spray nozzles are clearly identified using a coding system to avoid any mistakes:
The 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 identify the product without any need for additional description.
- Codes must illustrate the basic specifications of the nozzle to the user to simplify the search in the catalogue.

We have therefore determined our coding system as follows:



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

These codes serve as an indication only.
As there are so many nozzle types, the material codes can occasionally be 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

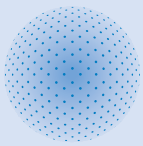
NOZZLE MATERIAL CODES

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
B31	AISI 316L 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 polyethilene
D8	Polyvinylidenefluoride (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

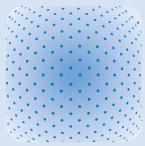
A wide choice of full cone nozzles is shown on the following pages, which are sufficient for the majority of standard industrial processes.
In order to assist your choice of nozzle, the table below lists the full cone nozzle type codes and beside each type we provide some general indications about the nozzle style, special features, spray pattern and specific applications where it might be used.
Full cone nozzles are normally delivered in brass or AISI 316L 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 catalogue are listed for general purpose applications, additional nozzle types designed for specific applications are shown in other catalogues listed on the back cover page of this catalogue, on page 55.

FULL CONE
Round spray



FULL CONE
Cluster spray

FULL CONE
Square pattern



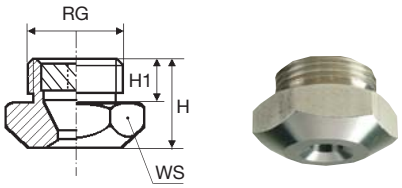
Type	Connection	Design	Feature	Pattern	Recommended	Page
AA	Male thread	In line	Short body	Round	Plastic materials	07
AE	Flange	In line	Large capacity	Round	Coke quench	08
AL	Male/Female	In line	Non clogging	Round	General	09
AT	Male thread	Tangential	Non clogging	Round	Demister wash	10
BA	Female thread	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

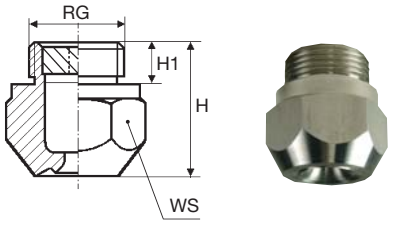
SLOTTED VANE

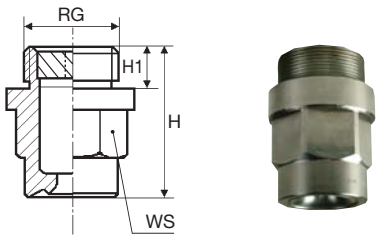
Type AA full cone nozzles are made out of a body and a slotted vane. The slotted vane design provides an even spray distribution. This type of construction offers a nozzle length generally shorter than other types, and it is used in applications where space is restricted.
Connection thread is parallel, according to BSP standards. Typical applications would be: 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. The robust construction of the vane prevents it collapsing when subjected to high temperature. There is also a price advantage resulting from less material being required to manufacture a nozzle of shorter length.

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

Materials **B31** **AISI 316L Stainless steel**
T1 **Brass**
D **All plastic materials on request**

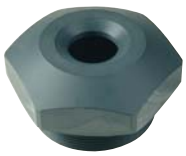






	Code	RG inch	D mm	D1 mm	Capacity at different pressure values lpm bar								H mm	H1 mm	WS mm
					0.5	0.7	1.0	2.0	3.0	5.0	7.0	10			
90°	**AAU 2305 xx**	3/4	6.1	3.0	12.5	14.7	17.6	24.9	30.5	39.4	46.6	55.7	22	10	32
	AAU 2385 xx		6.7	3.0	15.7	18.6	22.2	31.4	38.5	49.7	58.8	70.3			
	AAU 2490 xx		7.8	4.0	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 available in stock, usually produced in brass, PVC and stainless steel 316L. Also, please note that the wrench sizes given in the above diagrammatical drawings refer to brass nozzles, while stainless steel and plastic bars may have different sizes.

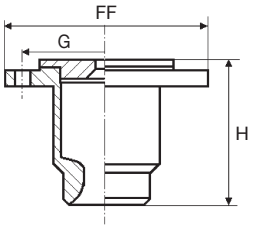


AA nozzles design is ideally suited for plastic materials.

Slotted disc vane

FULL CONE NOZZLES

AE



SLOTTED VANE

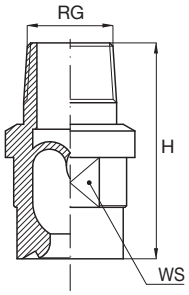
AE type nozzles are designed to deliver large to very large flow values. With a carefully designed and machined internal profile they produce a uniform spray distribution, performing perfectly even with very low inlet pressures.
Depending on the size, the nozzle is made from castings or it is welded from sheet steel and has an upper flange for connection to the feed line (maximum safe working pressure is equal to 16 bar).
Typical applications for these nozzles are coke quenching, inside conditioning of towers and any other application requesting efficient cooling over large surfaces.

Materials
A1 Carbon steel
B31 AISI 316L Stainless steel
G1 Cast iron

	Code	DN mm	D mm	D1 mm	Capacity at different pressure values lpm bar								FF mm	G mm	H mm
					0.25	0.35	0.5	0.7	1.0	2.0	3.0	5.0			
90°	**AEU 3940 xx**	80	37	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

S-TYPE VANE



AL style nozzles are a one piece design construction with an integrated S-shape vane cast into the nozzle body.
This special design offers the largest free passage available in a full cone nozzle (identical to the nozzle orifice diameter) and can easily handle foreign bodies which can be found in dirty or re-circulated liquids.
The best reliability is then assured under the most difficult conditions, which makes these nozzles the right choice in those plants with nozzle clogging problems or where removing and cleaning a clogged nozzle is a difficult job.

Materials **B31 AISI 316L Stainless steel**
Or any alloy on request.

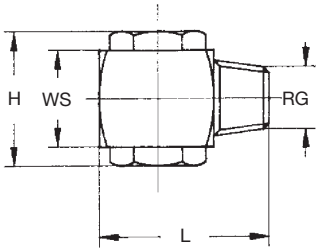
ALU 90°	ALW 120°	Code	RG inch	D mm	Capacity at different pressure values lpm bar							H mm	WS mm	DIA mm	W Kg
					0.25	0.5	1.0	2.0	3.0	4.0	5.0				
•	•	2208 xx	3/8		5.82	8.53	11.9	17.1	20.8	23.9	26.8	38	22		0.10
•	•	2209 xx	1/2		5.82	8.53	11.9	17.1	20.8	23.9	26.8	48	27		0.15
•	•	2373 xx			10.4	15.3	21.3	30.6	37.3	42.9	48.1				
•	•	2671 xx	3/4	8.7	19.4	27.4	38.7	54.8	67.1	77.5	86.6	60	32		0.20
•	•	2792 xx		9.5	22.9	32.3	45.7	64.7	79.2	91.5	102				
•	•	2793 xx	1	9.5	22.9	32.3	45.7	64.7	79.2	91.5	102	75	38		0.35
•	•	2959 xx		10.3	27.5	38.9	55.0	77.7	95.9	110	123				
•	•	3111 xx		11.1	32.0	45.3	64.1	90.6	112	128	143				
•	•	3112 xx	1+1/4	11.1	32.0	45.3	64.1	90.6	112	128	143	86	50		0.60
•	•	3144 xx		12.7	41.3	58.4	82.6	117	144	165	185				
•	•	3160 xx		13.5	45.9	64.9	91.8	130	160	184	205				
•	•	3175 xx		14.3	50.5	71.4	101	143	176	202	226				
•	•	3176 xx	1+1/2	14.3	50.5	71.4	101	143	176	202	226	86	50		0.60
•	•	3198 xx		15.1	57.2	80.8	114	162	198	229	256	112	60		0.90
•	•	3212 xx		15.9	61.2	86.5	122	173	212	245	274				
•	•	3227 xx		16.7	74.2	105	148	210	257	297	332				
•	•	3270 xx		17.5	77.9	110	156	220	270	312	349				
•	•	3328 xx	2	19.0	94.7	134	189	268	328	379	423	160		70	1.6
•	•	3360 xx		20.6	104	147	208	294	360	416	465				
•	•	3445 xx		22.3	128	182	257	363	445	514	574				
•	•	3499 xx		23.8	144	204	288	407	499	576	644				
•	•	3586 xx		25.4	167	237	335	474	586	671	750				
•	•	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 internal vane.

Common Applications
Fire protection
Gas scrubbers
Cooling
Washing gravel
Dust control

FULL CONE NOZZLES

AT



VANELESS - OFF LINE

These nozzles produce a full cone spray pattern without any vane present inside the whirl-chamber and with the spray pattern being tangential to the axis of the nozzle feed inlet. Free internal passages mean there they are less prone to clogging. The nozzles also produce coarse droplets that are well distributed over the spray area offering a stable spray angle through a wide range of inlet pressure values. The course droplets are also quite resistant to wind drift.

Materials **B31 AISI 316L Stainless steel**
T1 Brass
Plastic materials on request

This type of nozzle is often manufactured in small quantities, special materials and non-standard specifications, and is usually not available from stock. Please check with our offices for delivery time about the nozzles you require.

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values lpm bar							H mm	L mm	WS mm
					1.0	2.0	3.0	4.0	5.0	6.0	7.0			
60°	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 1740 xx		3.3	3.2	4.27	6.04	7.40	8.54	9.55	10.5	11.3			
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 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 1740 xx		3.3	3.2	4.27	6.04	7.40	8.54	9.55	10.5	11.3			
	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 2196 xx		6.6	5.6	11.3	16.0	19.6	22.6	25.3	27.7	29.9			
	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 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			
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 1780 xx	3/8	5.0	3.4	4.50	6.37	7.80	9.00	10.1	11.0	11.9	27	34	20
	ATW 2110 xx		5.4	4.4	6.35	8.98	11.0	12.7	14.2	15.6	16.8			
	ATW 2153 xx		5.3	5.2	8.80	12.5	15.3	17.7	19.8	21.6	23.4			
	ATW 2196 xx		6.6	6.0	11.3	16.0	19.6	22.6	25.3	27.7	29.9			
	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 2480 xx	3/4	12.6	7.8	27.7	39.2	48.0	55.4	62.0	67.9	73.3	56	59	40
	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

BA/BC

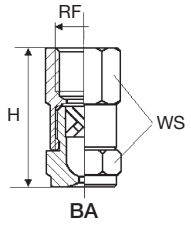
X-VANE / ROUND SPRAY / THREE PIECES

These full cone nozzles are manufactured in a three-piece construction. They are based on the clog resistant X-vane design which is easily dismantled for internal cleaning. The nipple is engineered to avoid losing the internal X-vane when the nozzle is mounted in the upwards spraying position. Available with female (BA) or male (BC) inlet thread.

(See dimensions and weights at the bottom of the page).

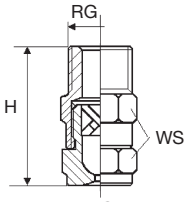
Materials

B1	**AISI 303 Stainless steel**
B31	**AISI 316L Stainless steel on request**
T1	**Brass**



BA


BA



BC


BC

Standard spray

BAQ	BCQ	Code	RF RG	D	D1	Capacity at different pressure values lpm bar							Spray angle (degrees) at pressure bar		
			inch	mm	mm	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
•	•	1930		3.2	1.7	4.46	5.34	7.61	9.30	12.0	14.2	16.9	68	70	67
•	•	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

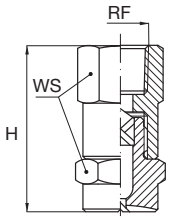
Nozzle Type	RF/RG inch	H mm	WS mm	W kg
BA/BB	1/8	30	14	0.03
	1/4	37	17	0.04
	3/8	46	19	0.07
	1/2	57	25	0.20

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

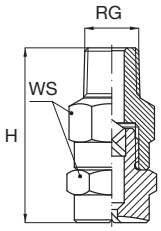
BB/BD

BB



BB

BD



BD

X-VANE / SQUARE SPRAY / THREE PIECES

This is the same three-piece nozzle as the BA/BC design, but manufactured to produce a square section spray pattern. With this shape spray pattern it is possible to optimize the coverage or zone of a surface. Please note that the sides of the square spray section are not in line with the grooves on the nozzle orifice, the offset angle is 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 316L Stainless steel on request**
T1	**Brass**

Square spray

BBQ	BDQ	Code	RF RG	D	D1	Capacity at different pressure values lpm bar							Spray angle (degrees) at pressure bar		
			inch	mm	mm	0.7	1.0	2.0	3.0	5.0	7.0	10	0.7	1.5	5.0
•	•	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

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 litres per minute. Higher capacities, up to 11,300 lpm can be obtained with the larger sizes shown in the following table.
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 on this page shows female threaded nozzles up to 3" size, larger capacity nozzles both with female threads and flange connections are shown on 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 are shown on the table at the bottom of this page.

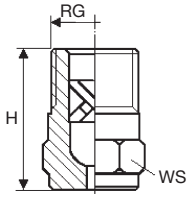
BE

BG

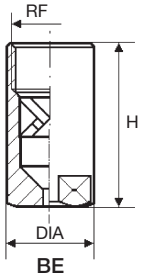
Materials
B1 AISI 303 Stainless steel
B31 AISI 316L Stainless steel
T1 Brass, only sizes 1" and smaller

Standard spray angles

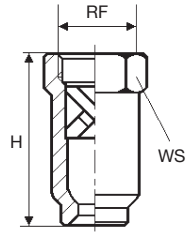
BES	BGQ	Code	RF RG	D	D1	Capacity at different pressure values lpm bar							Spray angle (degrees) at pressure bar		
			inch	mm	mm	0.5	1.0	2.0	3.0	5.0	7.0	10	0.7	3.0	5.0
	•	1480 xx	1/4	2.3	1.6	1.96	2.77	3.92	4.80	6.20	7.33	8.76	55	60	55
	•	1740 xx		2.9	1.6	3.02	4.27	6.04	7.40	9.55	11.3	13.5	65	62	62
	•	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		26.0	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

Dimensions

	Size inch	1/8	1/4	3/8	1/2	3/4	1	1+1/4	1+1/2	2	2+1/2	3
BG	H mm	19.5	22.0	25.0	33.0	40.0	51.5					
	WS mm	12.0	14.0	17.0	22.0	22.0	27.0					
BE	H mm					55.5	68.0	90.0	105	140	180	192
	DIA mm					32.0	38.0					
	WS mm					27.0	32.0	48.0	52.0	67.0	85.0	100

FULL CONE NOZZLES

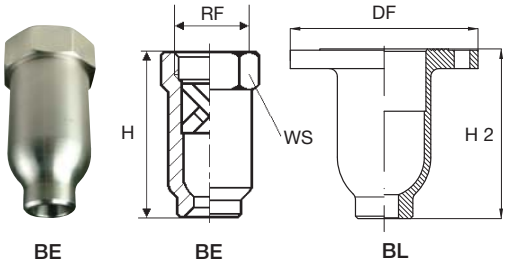
BE/BG

X-VANE/ROUND SPRAY/TWO PIECES

Wide spray angles

BEW	BGW	Code	RF RG	D	D1	Capacity at different pressure values lpm bar							Spray angle (degrees) at pressure bar			Dimension mm		
			inch	mm	mm	0.5	1.0	2.0	3.0	5.0	7.0	10	0.7	3.0	5.0	H	DIA	WS
	•	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

These 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 litres per minute). They are manufactured with large spray angles while still assuring high water density per square meter. The bodies are machined from a casting and can be finished either with a female thread connection (BE type) or with an integral ANSI flange (BL type).

Materials **B31** **AISI 316L Stainless steel**
G1 **Cast iron**

Large capacity

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

	BEW	Code	RF	D	D1	Capacity lpm at pressure bar							Dimension mm		
		DF			0.7	1.0	2.0	3.0	5.0	7.0	10		HH2	WS	
120°	•	4158 xx	4	47	22	758	906	1282	1570	2027	2398	2538	251	207	130

BF/BH

X-VANE/SQUARE SPRAY/TWO PIECES

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. They are the ideal 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 is 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.


BH

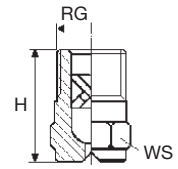

BF

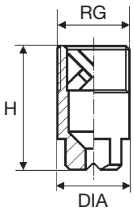
Materials

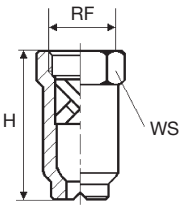
	B1	AISI 303 Stainless steel
	B31	AISI 316L Stainless stel
	T1	Brass

Standard spray angle

BFS	BHQ	Code	RF RG	D	D1	Capacity at different pressure values lpm bar							Spray angle (degrees) at pressure bar		
			inch	mm	mm	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

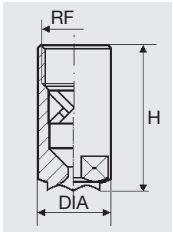


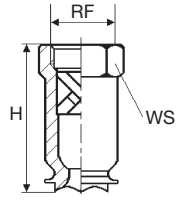




Wide spray angle

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

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

FULL CONE NOZZLES

BR/BU


BT


BR

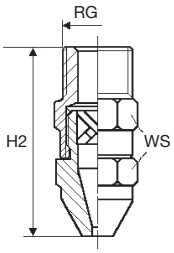

BS

X-VANE/NARROW SPRAY ANGLES

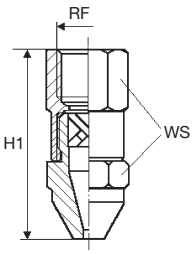
These nozzles produce a solid cone spray with round spray pattern. Coarse water droplets are concentrated within a narrow spray angle to maximise their impact force over the surface area.
Spray angle values of 15° or 30° are available, with a choice of male or female thread connections.
The BR and BS nozzle types are manufactured in three pieces to allow for ease of disassembly and cleaning in case of clogging.

Materials

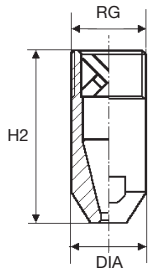
B1	**AISI 303 Stainless steel**
B31	**AISI 316L Stainless steel on request**
T1	**Brass**



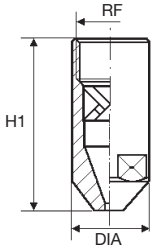
BS



BR



BT



BU

Spray angle 15°

BRB	BSB	BUB	Code	RF RG	D	Capacity at pressure lpm bar					Dimensions mm			
				inch	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	35	12
•	•		1550 xx		2.3	3.18	4.49	5.50	7.10	10.0				
•	•		2117 xx	1/4	3.2	6.75	9.60	11.7	15.1	21.4		44	44	17
•	•		2196 xx	3/8	4.2	11.3	16.0	19.6	25.3	35.8		53	53	22
•	•		2352 xx	1/2	5.6	20.3	28.7	35.2	45.4	64.3		72	72	24
		•	2587 xx	3/4	7.8	33.9	47.9	58.7	75.8	107	32	72		25
		•	3110 xx	1	10.2	63.5	89.8	110	142	201	40	92		35
		•	3168 xx	1+1/4	12.6	97.0	137	168	217	307	48	117		40
		•	3245 xx	1+1/2	15.1	141	200	245	316	447	60	127		52
		•	3450 xx	2	22.0	260	367	450	581	822	80	183		70
		•	3680 xx	2+1/2	26.0	393	555	680	878	1242	90	223		85
		•	3980 xx	3	31.0	566	800	980	1265	1789	105	268		100

Spray angle 30°

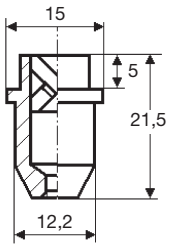
BRF	BSF	BTF	Code	RF RG	D	Capacity at pressure lpm bar					Dimensions mm			
				inch	mm	1.0	2.0	3.0	5.0	10	DIA	H1	H2	WS
•	•		0980 xx	1/8	1.0	0.57	0.80	0.98	1.27	1.79		33	35	12
•	•		1160 xx		1.2	0.92	1.31	1.60	2.07	2.92				
•	•		1270 xx		1.6	1.56	2.20	2.70	3.49	4.93				
•	•		1350 xx	1/4	1.8	2.02	2.86	3.50	4.52	6.39		44	44	17
•	•		1550 xx	3/8	2.3	3.18	4.49	5.50	7.10	10.0		53	53	22
•	•		2117 xx	1/2	3.2	6.75	9.55	11.7	15.1	21.4		72	72	24
•	•		2195 xx	3/4	4.2	11.3	15.9	19.5	25.0	36.0		84	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.
Venturi scrubbers

BX

NOZZLE TIPS

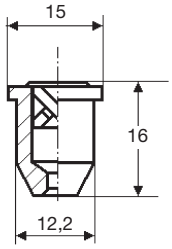
Full cone tips produce a uniform cone pattern with a round impact area.
Complete nozzle assemblies comprise nozzle tip, seal, nipple and retaining nut.
This design allows the nozzle to be disassembled and readily cleaned in case of clogging; for fast and easy maintenance.
In addition to metal nipples a range of pipe clamps are available; please see our Accessories Catalogue code CTG AC.



BX
1508
1743

Materials

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



BX
1149
1372

	Code	D mm	Capacity at pressure lpm) bar					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

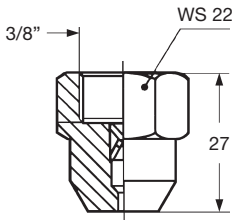
As an added safety feature on our full cone nozzle tips the X-vane is safely secured in place.
Under certain conditions the nozzle vane can escape from the body and impair the nozzle operation, for example, when the nozzle is working upside down, at high temperatures or when subjected to sudden vacuum conditions - with this safety feature this will not happen.

BJ

THREADED NOZZLES

Most sizes in the BX range can be offered as a two-piece nozzle with a 3/8” female thread.
Flow capacity and spray angle remains the same, it is identified by code BJQ. As an example, the nozzle with the same specifications of the BXQ 1372 T1 tip has the code BJQ 1372 T1.

Where pipes or manifolds are difficult to get to or cannot be removed this style might be a preference.

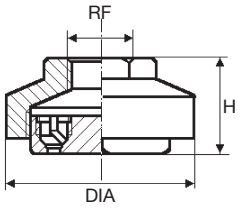


ZAA C018 xx

VAA 0380 xxB

Assembly accessories
BX tips are normally secured with a retaining nut onto a welded nipple.
All details on accessories are shown in our Accessories Catalogue code CTG AC.

CAS



CLUSTER NOZZLE/STANDARD SPRAY

CAS multiple full cone nozzles can produce very fine droplets using only hydraulic pressure. The full cone spray pattern results from the interaction of several hollow cone sprays, the number of these per cluster is designated by (NR) as stated in the flow capacity table below.

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

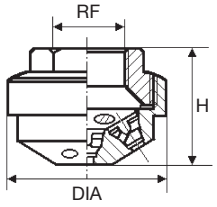
Materials **B31** **AISI 316L Stainless steel on request**
T1 **Brass**

	Code	RF inch	D mm	D1 mm	Capacity at different pressure values lpm bar							Dimensions mm		
					0.7	1.0	1.5	2.0	3.0	5.0	10	NR	DIA	H
70°	**CAS 1153 xx**	1/2	0.9	0.4			1.08	1.25	1.53	1.98	2.79	7	50	25
	CAS 1274 xx		1.8	0.3			1.94	2.24	2.74	3.54	5.00			
	CAS 1343 xx	3/4	1.1	0.5	1.66	1.98	2.43	2.80	3.43	4.43	6.26	7	72	39
	CAS 1551 xx		1.5	0.5	2.66	3.18	3.90	4.50	5.51	7.11	10.1			
	CAS 1870 xx		2.1	0.5	4.20	5.02	6.15	7.10	8.70	11.2	15.9			
	CAS 2116 xx		2.5	0.9	5.60	6.70	8.20	9.47	11.6	15.0	21.2			
	CAS 2145 xx		3.0	0.9	7.00	8.37	10.2	11.8	14.5	18.7	26.5			
	CAS 2184 xx		3.3	1.1	8.89	10.6	13.0	15.0	18.4	23.8	33.6			
	CAS 2220 xx		4.0	1.1	10.6	12.7	15.6	18.0	22.0	28.4	40.2			
	CAS 2342 xx		3.5	*1.1	16.5	19.8	24.3	28.0	34.3	44.3	62.6			
	CAS 2434 xx		4.0	*1.1	21.0	25.1	30.7	35.4	43.4	56.0	79.2			
	CAS 2551 xx		5.0	*1.1	26.6	31.8	39.0	45.0	55.1	71.1	101			
	CAS 2728 xx		6.2	*1.1	35.2	42.0	51.5	59.4	72.8	94.0	133			
	CAS 2385 xx	1	5.0	1.9	18.5	22.2	27.2	31.4	38.5	49.7	70.3	7	140	75
	CAS 2489 xx		6.0	1.9	23.6	28.2	34.5	39.9	48.9	63.1	89.2			
	CAS 2685 xx		5.7	1.9	33.1	39.6	48.4	56.0	68.5	88.5	125			
	CAS 3130 xx	2	8.0	2.4	62.8	75.1	91.8	106	130	168	237	7	185	103
	CAS 3184 xx		11.0	2.4	88.9	106	130	150	184	237	336			
	CAS 3245 xx		10.0	5.5	118	141	173	200	245	316	447			

** Double capacity insert*

CAY

CLUSTER NOZZLE / WIDE ANGLE SPRAY



CAY multiple full cone nozzles can produce very fine droplets using only hydraulic pressure.
The full cone spray pattern results from the interaction of several hollow cone sprays, the number of these per cluster is designated by (NR) as stated in the capacity table below.

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

Materials

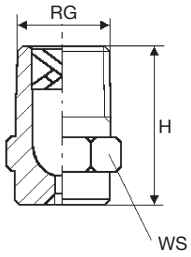
B1	**AISI 303 Stainless steel on request**
B31	**AISI 316L Stainless steel**
T1	**Brass**

	Code	RF inch	D mm	D1 mm	Capacity at different pressure values lpm bar							Dimensions mm		
					0.7	1.0	1.5	2.0	3.0	5.0	10	NR	DIA	H
130°	CAY 1153 xx	1/2	1.0	0.4			1.08	1.25	1.53	1.98	2.79	7	40	29
	CAY 1274 xx		1.7	0.4			1.94	2.24	2.74	3.54	5.00			
	CAY 1343 xx	3/4	1.0	0.5	1.66	1.98	2.43	2.80	3.43	4.43	6.26	7	63	45
	CAY 1551 xx		1.5	0.5	2.66	3.18	3.90	4.50	5.51	7.11	10.1			
	CAY 1870 xx		2.0	0.5	4.20	5.02	6.15	7.10	8.70	11.2	15.9			
	CAY 2116 xx		2.5	0.9	5.60	6.70	8.20	9.47	11.6	15.0	21.2			
	CAY 2145 xx		3.0	0.9	7.00	8.37	10.2	11.8	14.5	18.7	26.5			
	CAY 2184 xx		3.5	1.1	8.89	10.6	13.0	15.0	18.4	23.8	33.6			
	CAY 2220 xx		4.0	1.1	10.6	12.7	15.6	18.0	22.0	28.4	40.2			
	CAY 2342 xx		3.5	*1.1	16.6	19.8	24.3	28.0	34.2	44.3	62.6			
	CAY 2434 xx		4.0	*1.1	21.0	25.1	30.7	35.4	43.4	56.0	79.2			
	CAY 2551 xx		5.0	*1.1	26.6	31.8	39.0	45.0	55.1	71.1	101			
	CAY 2728 xx		6.2	*1.1	35.2	42.0	51.5	59.4	72.8	94.0	133			
	CAY 2385 xx	1	5.0	1.9	18.6	22.2	27.2	31.4	38.5	49.7	70.3	7	120	81
	CAY 2489 xx		6.0	1.9	23.7	28.3	34.6	40.0	49.0	63.3	89.5			
	CAY 2685 xx		5.7	1.9	33.1	39.5	48.4	55.9	68.5	88.4	125			
	CAY 2979 xx		6.5	*1.9	47.3	56.5	69.2	79.9	97.9	126	179			
	CAY 3137 xx		9.0	*1.9	66.2	79.1	96.9	112	137	177	250			
	CAY 3130 xx	2	9.0	2.4	62.8	75.1	91.9	106	130	168	237	7	155	94
	CAY 3184 xx		12.0	2.4	88.9	106	130	150	184	238	336			
	CAY 3245 xx		10.0	5.5	118	141	173	200	245	316	447			
	CAY 3260 xx		9.0	*5.5	126	150	184	212	260	336	475			
	CAY 3367 xx		12.0	*5.5	177	212	260	300	367	474	670			
	CAY 3490 xx		15.0	*5.5	237	283	346	400	490	633	895			

** Double capacity insert*

FULL CONE NOZZLES

D



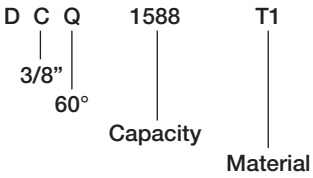
TWO-PIECE NOZZLES

D type nozzles offer a simple and efficient design for a full cone nozzle, that is a wide passage X- style vane assembled into a male threaded body. For sizes up to 3/8" the vane is locked in place, which allows the nozzle to be fitted under any possible orientation without the risk of the vane falling out.
D type nozzles are offered with capacities ranging from 1.18 to 1470 lpm, a full choice of spray angles, and connections from 1/8" to 4".
Normally stocked in the materials listed below, they are often manufactured on request in several super-alloys.

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

How to make up the nozzle code

The coding for D type nozzles uses the second digit to indicate the connection thread size.
Therefore, according to the desired thread size and material, the code for a D type nozzle is worked out as follows:.



The table below gives coding and dimensions for different thread sizes, for nozzles shown both on this page and the next page.

Thread size coding table

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

Spray angle 45°

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

Spray angle 60°

DAQ	DBQ	DCQ	DDQ	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	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•				1188 xx	1.4	1.1	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•				1212 xx	1.5	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
•				1235 xx	1.6	1.2	1.14	1.36	1.92	2.35	3.03	3.59	4.29
•	•			1294 xx	1.8	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
•	•			1370 xx	2.0	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
	•	•		1470 xx	2.4	1.9	2.27	2.71	3.84	4.70	6.07	7.18	8.58
	•	•		1588 xx	2.6	2.0	2.84	3.39	4.80	5.88	7.59	8.98	10.7
	•	•		1659 xx	2.7	2.0	3.18	3.80	5.38	6.59	8.51	10.1	12.0
	•	•		1740 xx	2.9	2.0	3.57	4.27	6.04	7.40	9.55	11.3	13.5
	•	•		1835 xx	3.2	2.8	4.03	4.82	6.82	8.35	10.8	12.8	15.2
	•	•		1940 xx	3.2	2.8	4.54	5.43	7.68	9.40	12.1	14.4	17.2
	•	•		2100 xx	3.4	3.0	5.07	6.06	8.57	10.5	13.5	16.0	19.2
		•		2117 xx	3.6	3.0	5.65	6.75	9.55	11.7	15.1	17.9	21.4
			•	2147 xx	4.0	3.3	7.10	8.49	12.0	14.7	19.0	22.5	26.8
			•	2188 xx	4.5	3.7	9.08	10.9	15.4	18.8	24.3	28.7	34.3
			•	2235 xx	5.2	4.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9
			•	2294 xx	5.8	4.7	14.2	17.0	24.0	29.4	38.0	44.9	53.7

TWO-PIECE NOZZLES

Spray angle 90°

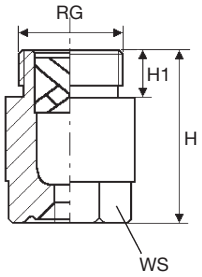
DAU	DBU	DCU	DDU	Code	D mm	D1 mm	Capacity at different pressure values lpm bar						
							0.7	1.0	2.0	3.0	5.0	7.0	10
•				1118 xx	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
•				1147 xx	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
•				1188 xx	1.4	1.2	0.91	1.09	1.54	1.88	2.43	2.87	3.43
•				1212 xx	1.5	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 maintain the simple design of the smaller D series nozzles, but they are resistant to clogging due to the X-vane design they inherit. These nozzles are often manufactured out of high quality alloys and special plastic materials and are widely used in many industrial processes.

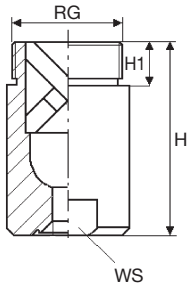
Materials

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

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values lpm bar							Dimensions 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

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values lpm bar							Dimensions 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

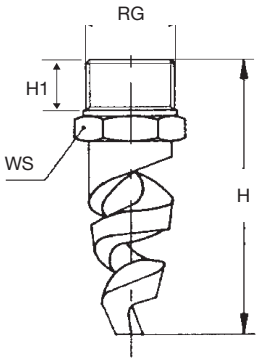
TWO-PIECE NOZZLES/LARGE CAPACITY



	Code	RG inch	D mm	D1 mm	Capacity at different pressure values lpm bar							Dimensions 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	205	36	110

FULL CONE NOZZLES

E



SPIRAL NOZZLES

Spiral nozzles work on the impact principle. The stream of liquid is deflected onto a surface which is engineered into a spiral profile creating the desired spray angle. The spray angle value is maintained even at low pressure and also when spraying high viscosity liquids.
While the droplet spray distribution is not comparable to that of a standard full cone nozzle, the fact that an internal vane is not present makes them virtually clog-free in most cases.
Please note that spray coverage is not as uniform as that from a standard full cone nozzle with the internal vane. The capacity values provided on the grey background in the table below should be attributed to metal nozzles only, as plastic materials can be too weak to assure structural resistance in the nozzle. See next page for materials, applications and assembly fittings.

Materials **B31** **AISI 316L Stainless steel**
T1 **Brass**

The two above materials are usually available in stock, while several other materials, as listed on page 25, can be offered on request.

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values lpm bar							Dimensions mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
60°	EBQ 1550 xx	1/4	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBQ 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECQ 2230 xx	3/8	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECQ 2410 xx		6.4	3.2	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECQ 2640 xx		7.9	3.2	31.2	37.3	52.7	64.6	83.4	99.0	118			
	EDQ 2940 xx	1/2	9.5	4.7	45.6	54.5	77.1	94.4	122	144	172	64	18	22
	EDQ 3128 xx		11.1	4.7	61.8	73.9	105	128	165	196	234			
	EEQ 3165 xx	3/4	12.7	4.7	79.7	95.3	135	165	213	252	301	70	19	27
	EFQ 3260 xx	1	15.9	6.3	126	150	212	260	336	397	475	92	26	34
	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			

Pressure values and capacities shown here on the grey background are 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.

SPIRAL NOZZLES

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

Pressure values and capacities shown here on the grey background are recommended for cast or machined metal nozzles only.

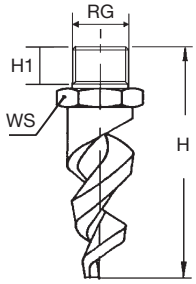
Spiral nozzles can be delivered in brass and in all the plastic materials from the opposite list. Most types are also available from stock or with a short delivery if in cast 316 stainless steel. Please contact our sales offices for delivery time in a given material.

Materials

B31	AISI **316L 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. The resistance to clogging is enhanced by a longer spiral pitch and 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 previous page.

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values lpm bar							Dimensions mm		
					0.7	1.0	2.0	3.0	5.0	7.0	10	H	H1	WS
120°	ECW 2230 xx Xy	3/8	4.8	4.8	11.4	13.6	19.2	23.5	30.3	35.9	42.9	70	15	22
	ECW 2317 xx Xy		5.6	5.6	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECW 2410 xx Xy		6.4	6.4	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECW 2640 xx Xy		7.9	7.9	31.2	37.3	52.7	64.6	83.4	98.7	118			
	EDW 2940 xx Xy	1/2	9.5	9.5	45.6	54.5	77.1	94.4	122	144	172	86	18	27
	EDW 3128 xx Xy		11.1	11.1	61.8	73.9	105	128	165	196	234			
	EEW 3165 xx Xy	3/4	12.7	12.7	79.7	95.3	135	165	213	252	301	130	20	27
	EFW 3260 xx Xy	1	16.0	16.0	126	150	212	260	336	397	475	131	26	34
	EFW 3372 xx Xy		19.0	19.0	180	215	304	372	480	568	679	168	26	34
	EHW 3507 xx Xy	1 1 /2	22.2	22.2	245	293	414	507	655	774	926	171	27	50
	EHW 3663 xx Xy		25.4	25.4	320	383	541	663	856	1013	1210			
	EHW 3747 xx Xy		28.6	28.6	361	431	610	747	964	1141	1364	185	27	50
	EKW 4109 xx Xy	2	35.0	35.0	527	629	890	1090	1407	1665	1990	279	32	65
	EKW 4139 xx Xy		38.1	38.1	671	803	1136	1391	1796	2125	2540			
	EMW 4204 xx Xy	3	44.5	44.5	985	1178	1666	2040	2634	3116	3725	267	32	90
	EMW 4265 xx Xy		51.0	51.0	1280	1530	2164	2650	3421	4048	4838			
	EPW 4412 xx Xy	4	63.5	63.5	1990	2379	3364	4120	5318	6293	7522	293	36	127

Pressure values and capacities shown here on the grey background are recommended for cast or machined metal nozzles only.

Coding

Extra wide passage spiral nozzles are often supplied in a special design, where the nozzle has no thread and it is assembled onto a nipple using a retaining nut. This design is the only one possible with Silicon Carbide nozzles, while it can be obtained as an option for nozzles cast in special alloys or stainless steel. To identify such nozzles please note the following coding:

EHW 3747 *xx* **X***y*
xx = Material code, see material table on the previous page
y = Connection code / B=Bspt male thread / N=NPT male thread / F= Locknut fitting

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 where 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

FLAT JET NOZZLES RANGE OVERVIEW

A complete range of flat jet spray nozzles are shown on the following pages.
Flat jet spray nozzles have strong fluid impact values, since the energy of the jet is concentrated over a small surface area.
Different techniques are used to achieve a flat spray pattern, each one offering a specific design with spray properties to suit most industrial applications.
For each of these nozzle types we show the most popular materials that they are manufactured from, but as for all of our other nozzles, special materials are often available or can be quoted to suit specific requirements.
Because of the flat jet shape and its relatively high impact value these nozzles are commonly used to wash objects moving on conveyors in a transverse direction to the pipe the nozzles are assembled to.
Since a flat jet spraying system involves large or relatively large number of nozzles assembled onto one or more manifolds, PNR also offer a wide range of assembly accessories to accompany the application.
Using the correct accessory fittings not only gives the application, machine or system a professional look, it also assures that flat spray patterns are aligned in the right flat jet orientation and/or the right distance from the conveyor/product.
Recommended accessories are shown at the bottom of each catalogue 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 to produce a sharp straight jet for maximum impact. It is customary in the nozzle industry to consider straight jet nozzles as flat jet nozzles, even with a 0° spray angle. Straight jet nozzles are therefore shown in this catalogue together with flat jet nozzles. All flat jet nozzle types are available as straight jet nozzles, except GY and K types, are also available in the same materials used for flat jet nozzles.

FLAT JET NOZZLES RANGE OVERVIEW

F

HIGH PRESSURE WASHING

Type F flat jet nozzles are designed for high pressure washing applications.
The inner profile design allows for even jet distribution which results in an effective and uniform cleaning action over the surface being processed.
All nozzles are finished on high precision machinery assuring close manufacturing tolerances for capacity within +/- 3% of the nominal value, and they are made out of AISI 416 grade stainless steel, bright-hardened through the body (not cheaply surface hardened). Nozzles shown in this catalogue have a tapered thread according to BSPT standards, while NPT threaded nozzles are available for other markets outside Europe.
Typical applications are machines and plants for car washing processes, industrial cleaning processes, and pressure washers.

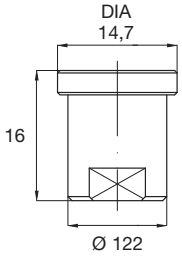
Material **C2** **AISI 416 Stainless steel, hardened**

0°			15°			25°			40°			65°			Code	Eqv. DIA	Nozzle capacity at different pressure values lpm / bar						
FAA	FBA	FXA	FAB	FBB	FXB	FAD	FBD	FXD	FAL	FBL	FXL	FAR	FBR	FXR		mm	20	30	50	70	100	150	200
							•			•					1460	0.70	2.0	2.4	3.1	3.7	4.4	5.4	6.2
							•			•					1686	1.12	3.0	3.6	4.7	5.5	6.6	8.1	9.3
	•			•			•			•					1930	1.28	4.1	5.0	6.5	7.7	9.2	11.3	13.0
	•			•		•	•	•	•	•					2103	1.35	4.6	5.6	7.3	8.6	10.3	12.6	14.6
•	•	•	•	•	•	•	•	•	•	•	•				2116	1.42	5.1	6.2	8.1	9.5	11.4	14.0	16.1
•	•	•	•	•	•	•	•	•	•	•	•		•		2126	1.47	5.6	6.9	8.9	10.5	12.6	15.4	17.8
•	•	•	•	•	•	•	•	•	•	•	•		•		2138	1.54	6.1	7.4	9.6	11.4	13.6	16.7	19.2
•	•	•	•	•	•	•	•	•	•	•	•	•	•		2149	1.60	6.7	8.2	10.5	12.5	14.9	18.2	21.1
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	2160	1.66	7.2	8.8	11.3	13.4	16.0	19.6	22.6
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	2170	1.71	7.6	9.3	12.0	14.2	17.0	20.8	24.0
•	•	•	•	•	•	•	•	•	•	•	•	•	•		2181	1.76	8.1	9.9	12.8	15.1	18.1	22.2	25.6
•	•	•	•	•	•	•	•	•	•	•	•		•		2204	1.87	9.1	11.2	14.4	17.1	20.3	25.0	28.8
•	•	•	•	•	•	•	•	•	•	•	•				2226	1.98	10.1	12.4	16.0	18.9	22.6	27.7	32.0
•	•	•	•	•	•	•	•	•	•	•	•				2341	2.40	15.2	18.6	24.0	28.4	34.1	41.5	47.9
	•			•			•			•					2456	2.76	20.4	25.0	32.2	38.2	45.4	55.8	64.5
				•			•			•					2682	3.42	30.5	37.4	48.2	57.1	67.9	83.5	96.4

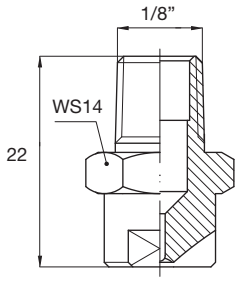
The table on the next page shows the correspondence between the nominal capacities in U.S. gallons per minute at 40 psi, this is commonly used to identify high pressure washing nozzles and the PNR capacity code at 100 bar. See the following page for dimensions and assembly accessories that accompany high pressure washing nozzles.

OUTER DIMENSIONS OF F TYPE NOZZLES AND FX NOZZLE TIPS

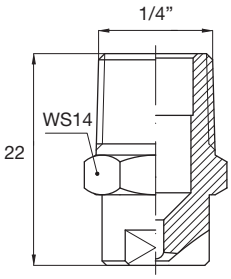
US Gals	PNR Code
02	1460
03	1686
04	1930
045	2103
05	2116
055	2126
06	2138
065	2149
07	2160
075	2170
08	2181
09	2204
10	2226
12	2272
12.5	2280
13	2296
15	2341
20	2456
30	2682



FX



FA



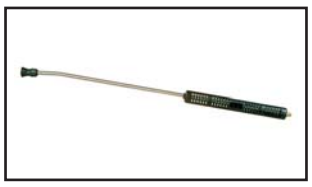
FB

High pressure washing accessories

We supply a range of quality guns and lances designed for high pressure washing applications in our Accessories catalogue (code CTG AC).

UMW 0010 D4

UMW 0020 D4



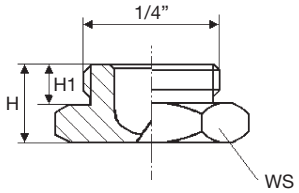
UMW 0030 B31

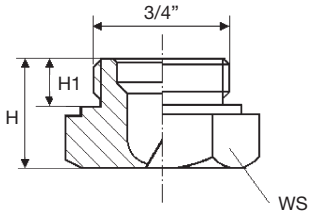
UMW 0045 B31

Flow straightener

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

GA





SHORT BODY

GA type nozzles deliver a parabolic flat jet spray distribution pattern. This allows for obtaining an even distribution when several nozzles are assembled in a row onto a manifold. Their short body dimensions make it possible to use them 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 so require some extra care when being assembled to ensure the flat jet alignment is correct and accurate.
Also note the different dimensions that are given in the table below for nozzles manufactured out of plastic materials.

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

1/4" BSP Thread

GAM 45°	GAQ 60°	GAU 90°	GAW 120°	Code	D mm	Capacity at different pressure values lpm 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 mm	Capacity at different pressure values lpm 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

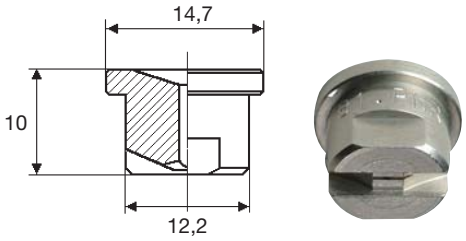
Dimensions of plastic nozzles

GA nozzles made out of plastic materials have lower material strength and therefore different dimensions; as a result they have a longer thread and also a stronger front hexagon.

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

LOW CAPACITY

Flat jet nozzle tips are usually mounted onto a pipe using a welded 3/8" nipple or a clamp and secured in place with a retaining nut.
Seals are available for higher pressure operations (see bottom of the page.) This means they can be easily replaced and that the jet can be conveniently oriented in the desired direction.
The tip models shown on this page deliver very low flow values. The tiny precision machined orifices can be protected against the risk of clogging by using a filter which fits neatly into the PNR nipples and clamps; specifically designed for this purpose.



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

GXD	GXL	GXN	GXR	Code	Capacity at different pressure values lpm bar								
					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

GXS	GXT	GXV	GXJ	Code	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
•				0150				0.13	0.15	0.17	0.20	0.25	0.28
	•	•		0200		012	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

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 316L								•	•	•	•
AISI 303							•	•	•	•	•
Brass	•	•	•	•	•	•	•	•	•	•	•

Due to the extreme difficulty of working with small drill profiles on hard materials such as stainless steels, not all the capacity sizes shown in the this nozzle table are available in all of the 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.

Accessories

All our range of accessories for GX tips, including welding nipples, pipe clamps, cartridge filters and retaining nuts are shown in our Accessories Catalogue CTG AC20.

How to compose the nozzle code

The nozzles tips shown on this page can be supplied with eight different spray angles, with flow values indicated by the third digit in the nozzle code. Therefore the nozzle tip code is indicated as in the following example.

GXS 0260 T1

73°

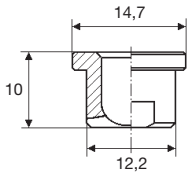
The table on the left shows the codes for the different spray angles.

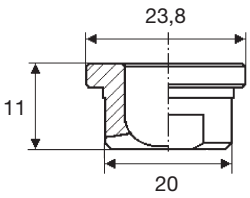
Seal available on request

See seal code for standard tip dimension on page 33.

FLAT JET NOZZLE TIPS

GX





Accessories

All our range of accessories for GX tips, including welding nipples, pipe clamps, cartridge filters and retaining nuts are shown in our Accessories Catalogue CTG AC.

How to compose the nozzle code

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

GXQ 1780 B31

60°

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

STANDARD AND LARGE CAPACITIES

Flat jet nozzle tips are usually mounted onto a pipe using a welded 3/8" nipple or a clamp and secured in place with a retaining nut. Seals are available for higher pressure operations (see table on the bottom of next page). This means they can be easily replaced and that the jet can be conveniently oriented in the desired direction. The tip models shown on this page deliver the most popular flow capacity values. The precision machined orifices can be protected against the risk of clogging by using a filter which fits neatly into the PNR nipples and clamps; specifically designed for this purpose. Higher capacity tips, shown in the bottom table, do not need filter protection because of the large dimension of the orifices. These higher capacity tips are assembled onto 3/4" nipples. See nipple and retaining nut codes at the bottom of the page. Tips with higher capacities and larger dimensions than those shown in the catalogue can be delivered on request, together with specification of the nozzle body (nipples) and retaining nuts.

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

Assembly fittings

The table in the following page shows the coding for a typical assembly of a nozzle tip using a retaining nut and a welding nipple.
Threaded nipples, as well as a range of plastic or steel pipe clamp fittings, offers a choice of assembly solutions for your application. These are also shown in our Complimentary and Assembly Fittings catalogue (code CTG AC).

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

STANDARD AND LARGE CAPACITIES

Standard capacity tips

GXA	GXF	GXM	GXQ	GXU	GXW	Code	Capacity at different pressure values lpm 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

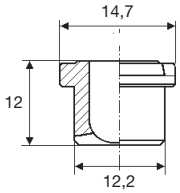
GXA	GXF	GXM	GXQ	GXU	GXW	Code	Capacity at different pressure values lpm bar								
							0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
	•	•	•	•	•	1781	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
	•	•	•	•	•	1981	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	•	2125	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	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

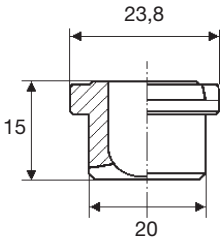
Assembly fittings coding

Size inch	Locknut	Welding nipple	Male nipple	Seal
3/8”	VAA 0380 xxB	ZAA C018 xx	ZLA 3838 xxB	VDA 13A1 P7
3/4”	VAA 0750 xxB	ZAA E027 xx	ZHA 7575 xxB	VDA 26A1 P7

DOVETAIL FLAT JET TIPS

GY





How to compose the nozzle code

The nozzle tips shown on this page can be supplied with six different spray angles with flow values indicated by the third digit in the nozzle code. Therefore the nozzle tip code is indicated as in the following example.

GYQ 1780 B31

60°

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

Welding nipples

ZAC 1738 xx

ZAC 2775 xx

STANDARD AND LARGE CAPACITIES

GY flat jet nozzle tips are mounted onto a pipe using a welded 3/8” nipple with a dovetail profile and secured in place with a retaining nut. This means they can easily be replaced and that the jet can be fixed into the appropriate orientation using the dovetail system.
The tip models shown on this page deliver the most popular flow capacity values; these larger capacities and sizes can be manufactured on request and delivered complete with matching nipples and retaining nuts. Higher capacity tips are assembled onto 3/4” nipples.
See nipple and retaining nut codes at the bottom of the next page.

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

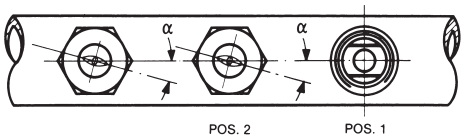
Dovetail nipples

GY type tips are assembled with their own series of matching dovetail nipples to ensure perfect alignment. The two tip sizes require nipples and caps as illustrated in the last table on the adjacent page.
Please note that the right flat jet orientation is automatically achieved by welding the dovetail nipples on to the pipe with the dovetail aligned along the pipe axis.
This is easily done by running a straight rule across the dovetail profile machined on top of the nipple.

Spray angle codes

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

Typical assembly with dovetail nipple and nut.



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

STANDARD AND LARGE CAPACITIES

Standard capacity tips — *Jet deviation angle α = 5°*

GYF	GYM	GYQ	GYU	GYW	Code	Capacity at different pressure values lpm 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

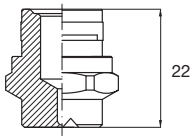
Large capacity tips — *Jet deviation angle α = 15°*

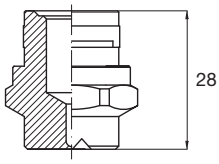
GYA	GYF	GYM	GYQ	GYU	GYW	Code	Capacity at different pressure values lpm bar								
							0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
	•	•	•	•	•	1781	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
	•	•	•	•	•	1981	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	•	2125	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	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 inch	Locknut	Welding nipple
3/8”	VAA 0381 xxB	ZAC C018 xx
3/4”	VAA 0750 xxB	ZAC E027 xx

HT





STANDARD AND LARGE CAPACITY

Flat jets of the HT series offer the same specifications as our standard nozzle types but are manufactured with a quick coupling system. This allows for quick and easy assembly without the use of tools and automatically aligns the spray pattern correctly.
The optimum performance of your system or machine is then conveniently safeguarded with a noticeable reduction in service cost and production downtime.
We offer capacities from 3.1 to 78 lpm over the standard range of spray angles and a matching range of threaded male or female connections or welding nipples.

Materials

B1	**AISI 303 Stainless steel**
B31	**AISI 316L 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 lpm 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

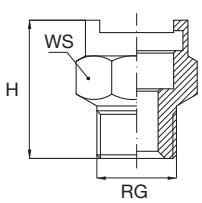
HTA 0°	HTL 40°	HTN 50°	HTR 65°	HTV 95°	HTJ 110°	Code	Capacity at different pressure values lpm bar								
							0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
•			•	•	•	2310	12.7	17.9	21.9	25.3	31.0	35.8	40.0	47.4	56.6
•	•	•	•	•		2390	15.9	22.5	27.6	31.8	39.0	45.0	50.3	59.6	71.2
•		•				2470	19.2	27.1	33.2	38.4	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

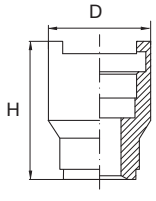
Ordering Codes

	Thread size inch	Standard size	Large size	H mm	WS mm	D mm
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 V025 xxQ1

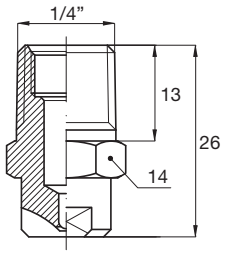
ZHS V050 xxQ2





ZHU 0038 xx

LOW CAPACITY TYPES



These standard model flat jet nozzles are available in a very wide range of flow rates, spray angles and materials. A tapered thread allows for a tight connection and a correct spray pattern orientation. The nozzles shown on this page cover the lowest flow rates from 0.06 to 1.60 litres per minute. These tiny outlet orifices, which are manufactured using our high precision machine tooling, may require adequate filtering in the supply line to prevent clogging. This does depend on how dirty the liquid being used is and the type of solids suspended in the liquid.

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

The low capacity nozzle bodies shown on this page can also be supplied with an internal thread, allowing for individual filters to be fitted to each nozzle. Please refer to our VEF filter cartridges found in the Accessories Catalogue (code CTG AC) or ask for assistance.

Materials and minimum capacities

Due to the extreme difficulty of working with small drill profiles on hard materials such as stainless steels, not all the flow capacity sizes shown in the this nozzle table are available in every material.
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.

How to compose the nozzle code

The nozzles tips shown on this page can be supplied with eight different spray angles, with values indicated by the third digit in the nozzle code.
Therefore the nozzle tip code is indicated as in the following example.

JBR 0780 B31

65°

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

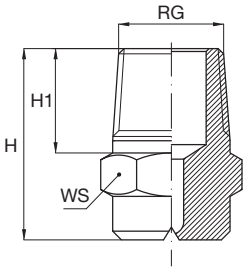
JBD 25°	JBL 40°	JBN 50°	JBR 65°	JBS 75°	JBT 80°	JBV 95°	JBJ 110°	Code	Capacity at different pressure values lpm bar								
									0.7	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
			•					0060			0.04	0.05	0.06	0.07	0.08	0.09	0.11
			•					0100			0.07	0.08	0.10	0.12	0.13	0.15	0.18
			•					0130			0.09	0.11	0.13	0.15	0.17	0.20	0.24
			•					0150		0.09	0.11	0.12	0.15	0.17	0.19	0.23	0.27
			•		•		•	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	0.28	0.34	0.42	0.48	0.59	0.68	0.76	0.90	1.08
•	•	•	•	•	•	•	•	0780	0.38	0.45	0.55	0.64	0.78	0.90	1.01	1.19	1.42
•	•	•	•	•	•	•	•	1120	0.58	0.69	0.85	0.98	1.20	1.39	1.55	1.83	2.19
•	•	•	•		•	•	•	1160	0.77	0.92	1.13	1.31	1.60	1.85	2.07	2.44	2.92

Materials and minimum capacities

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

FLAT JET NOZZLES

J



STANDARD CAPACITY TYPES

These standard model flat jet nozzles are available in a very wide range of flow rates, spray angles and materials. A tapered thread allows for a tight connection and a correct spray pattern orientation. The nozzles shown on this page cover the standard flow rates from 1.5 to 47 litres per minute, delivering high impact flat jet spray patterns with small to medium size droplets. Our flow capacity tables also include straight jet type nozzles with a 0° spray angle. These straight jets can be made on request out of any material that can be machined, in addition to the standard materials shown below.

Materials	**B1**	**AISI 303 Stainless steel**
	B31	**AISI 316L 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 tips shown on this page can be supplied with seven different spray angles, with values indicated by the third digit in the nozzle code. Therefore the nozzle tip code is indicated as in the following example.

JBQ 1780 B31

60°

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

	JAA	JBA	JCA	Code	Capacity at different pressure values lpm 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

STANDARD CAPACITY TYPES

	JAC	JBC	JCC	Code	Capacity at different pressure values lpm 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	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

	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	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

	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	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

How to compose the nozzle code

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

JBQ 1780 B31

60°

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

STANDARD CAPACITY TYPES

	JAQ	JBQ	JCQ	Code	Capacity at different pressure values lpm 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

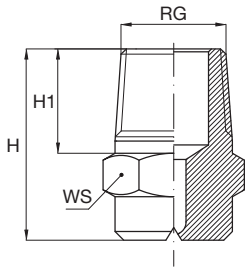
JBA	JBC	JBF	JBM	JBQ	JBU	JBW
0°	20°	30°	45°	60°	90°	120°

Thread size code (RG)

JA	JB	JC
1/8”	1/4”	3/8”

LARGE CAPACITY TYPES

These standard model flat jet nozzles are available in a very wide range of flow rates, spray angles and materials. A tapered thread allows for a tight connection and a correct spray pattern orientation. The nozzles shown on this page cover the standard flow rate range from 59 – 435 litres per minute, delivering high impact flat jet spray patterns with medium size droplets. Our flow capacity tables also include straight jet type nozzles with a 0° spray angle.These straight jets can be made on request out of any material that can be machined, in addition to the standard materials shown below.



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

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

Spray angle codes

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

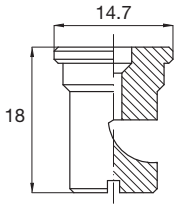
Dimensions and weights

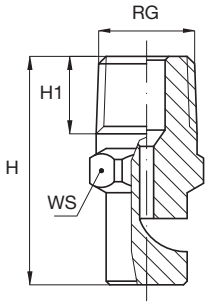
Code	JD	JE	JF
Size inch	1/2	3/4	1
H mm	33	41	61
H1 mm	17	20	22
WS mm	22	27	27
W grams	65	130	215

FLAT JET NOZZLES

K

KX





LARGE SPRAY ANGLE

Our K style flat jet nozzles work on a deflection principle; liquid flow is directed through the nozzle orifice onto a specifically engineered surface to produce a wide angle flat jet spray pattern, with medium impact value and medium size droplets.
The round outlet orifice on these nozzles and the unobstructed inside passages minimize the risk of clogging.
K style nozzles shown on the next page are available with a threaded connection and for flow capacity sizes 0390 to 2310; they are also available as a nozzle tip secured in place by a retaining nut.

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

Thread size and dimensions

Code	RG inch	H mm	H1 mm	WS mm
KGW	1/8	25	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 the next page can be supplied with same capacity and with different connection threads, the size is indicated by the second digit in the nozzle code. Therefore, the nozzle code is as shown in the following example.

KJW 2470 B31
|
1/2”

Nozzle dimensions

Some nozzles may have different dimensions even when made with the same thread.
Dimensions given above always refer to the largest nozzle with a given thread size.
Please contact our offices for more detailed information on this.

Typical applications

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

LARGE SPRAY ANGLE

KGW	KHW	KIW	KJW	KKW	KLW	KXW	D mm	Code	Capacity at different pressure values lpm 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

ZAA 1738 xx

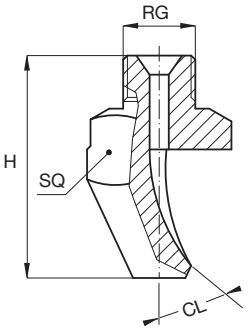
VAA 0038 xx

Assembly accessories

KXW tips are normally secured with a retaining nut onto a welded nipple.
All details on accessories are shown in our catalogue CTG AC.

FLAT JET NOZZLES

K



HIGH IMPACT TYPES

Our K style flat jet nozzles work on a deflection principle; liquid flow is directed through the nozzle orifice onto a specifically engineered surface. This produces a narrow liquid jet with a flat jet spray pattern, high impact value and with medium size droplets.
The round outlet orifice on these nozzles and the unobstructed inside passages minimize the risk of clogging.
K style nozzles shown on this page are available with a threaded connection and for the flow capacities shown in the page; they are also available with a quick coupling connection for assembly onto the matching quick connection nipple. See ZHS fittings at the bottom of the page.

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

Thread size code

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

How to compose the nozzle code

The nozzle shown on this page can be supplied with the same flow capacity but with a different connection thread. The size indicated by the second digit in the nozzle code. Therefore, the nozzle code is shown in the following example.

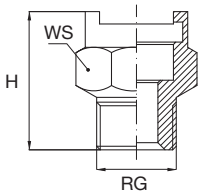
KQB 2195 B31
|
3/8”

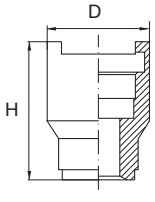
Quick coupling nipples

	Thread size inch	Standard size	Large size	H mm	WS mm	D mm
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 V025 xxQ1

ZHS V050 xxQ2





ZHU 0038 xx

HIGH IMPACT TYPES

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

Nozzle dimensions

Some nozzles may have different dimensions even when made with the same thread.
Dimensions given above always refer to the largest nozzle with a given thread size.
Please contact our offices for more detailed information.

Typical Applications

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

HOLLOW CONE NOZZLES RANGE OVERVIEW

Hollow cone nozzles produce a conical spray pattern where droplets are distributed onto the outer surface of the conical shape. They are used in many different applications, typically gas scrubbing, dust suppression, cooling and cooling of large surfaces, for example on the outside of LPG storage tanks.
Our range of hollow cone nozzles is shown on the following pages, and additional information about the different types and designs of hollow cone nozzles can be found on page 4 in this catalogue. The table below lists the different types available, and gives 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.

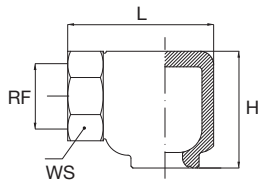
All nozzle types, with the exception of turbulence types, do not need any inside part or vane to produce the spray pattern, and are therefore relatively resistant to clogging dangers.

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

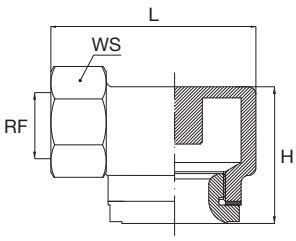
PA/PB

TANGENTIAL NOZZLES

PA type nozzles produce a hollow cone jet working on the tangential flow principle and with a nominal spray angle forms a ring shaped impact area. The nozzle has no internal vanes and the liquid to be sprayed enters the nozzle through the inlet which is set perpendicular to the outlet. Centrifugal force is created within the whirl chamber and this produces the energy to break up the liquid being sprayed. 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 dismantling and cleaning operations. Sizes up to 3/4" are made out of a drop-forged body, with an upper cover for nozzle cleaning. Sizes from 1" and larger are machined from a one piece casting.



PA



PB

Materials **B31** **AISI 316L Stainless steel**
T1 **Brass**

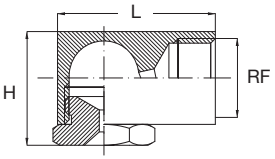
	Code	RF inch	DE mm	DU mm	Capacity at different pressure values lpm bar									Dimensions mm		
					0.3	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	WS
70°	PAS 1170 xx	3/8	3.5	2.0		0.69	0.72	0.98	1.39	1.70	2.19	2.60	3.10	27	37	22
90°	PAU 1390 xx	3/8	4.0	3.8	1.23	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12			
	PAU 1670 xx	1/2	5.6	5.2	2.12	2.74	3.24	3.87	5.47	6.70	8.65	10.2	12.2	38	46	27
	PAU 1850 xx		5.7	6.0	2.69	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5			
	PAU 2115 xx		6.6	6.9	3.64	4.69	5.56	6.64	9.39	11.5	14.8	17.6	21.0			
	PAU 2220 xx	3/4	8.5	9.0	6.96	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2	48	60	36
	PAU 2320 xx		9.5	11.5	10.1	13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4			
	PAU 2420 xx		9.6	14.0	13.3	17.1	20.3	24.2	34.3	42.0	54.2	64.2	76.7			
	PAU 2730 xx	1	20x10	13.7	23.1	29.8	35.3	42.1	59.6	73.0	94.2	112	133	60	75	46
	PAU 2970 xx			16.5	30.7	39.6	46.9	56.0	79.2	97.0	125	148	177			
	PAU 3147 xx	1+1/2	32x16	19.5	46.5	60.0	71.0	84.9	120	147	190	225	268	90	93	60
	PAU 3194 xx			22.0	61.3	79.2	93.7	112	158	194	250	296	354			
	PAU 3244 xx	2	35x20	26.5	77.2	99.6	118	141	199	244	315	373	445	127	117	80
	PAU 3294 xx			28.5	93.0	120	142	170	240	294	380	449	537			
	PAU 3364 xx	2+1/2	40x40	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 316L				•	•	•	•
Brass	•	•	•	•			

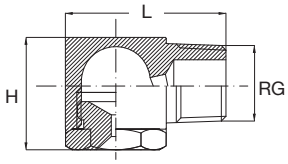
HOLLOW CONE NOZZLES

PE/PF

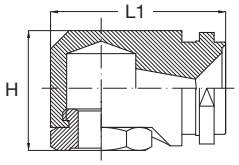
PE



PF



PT



STANDARD ANGLE SPRAY NOZZLES

The principle design is similar to the PA models but can be offered in much smaller flow rates.
This range is produced from bar stock materials and apart from the standard materials shown, they can be manufactured in any special material or alloy that are available in bar stock form.

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

Standard spray angle

	RF RG	PEN	PFN	PTN	Code	DE	DU	Capacity at different pressure values lpm bar								Dimensions mm		
	inch					mm	mm	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1
50°	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			

	RF	PES	PFS	PTS	Code	DE	DU	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1
70°	1/8		•		0390	0.9	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			
			•		1780	4.4	4.4	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
	1/4		•	•	0781	1.1	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			
		•		•	2117	5.5	5.3	4.78	5.65	6.75	9.55	11.7	15.1	17.9	21.4			
	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			
			•		2230	8.3	7.9	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0			
	1/2	•	•		2197	9.5	6.4	8.00	9.47	11.3	16.0	19.6	25.3	29.9	35.8	31	50	50
		•	•		2231	9.5	7.5	9.39	11.1	13.3	18.8	23.0	29.7	35.1	42.0			
		•	•	•	2310	9.5	9.0	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			

WIDE ANGLE SPRAY NOZZLES

Wide spray angle

	RF RG	PEW	PFW	PTW	Code	DE	DU	Capacity at different pressure values lpm bar								Dimensions mm		
	inch					mm	mm	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1
120°	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			
		•	•	•	1781	3.7	6.0	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2			
		•	•	•	1860	4.0	5.6	3.51	4.15	4.97	7.02	8.60	11.1	13.1	15.7			
		•	•	•	1940	5.0	5.7	3.84	4.54	5.43	7.68	9.40	12.1	14.4	17.2			
		•	•	•	2117	5.8	2.4	4.78	5.65	6.75	9.55	11.7	15.1	17.9	21.4			
	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			
		•	•		1782	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			
		•	•	•	2157	5.0	9.0	6.41	7.58	9.06	12.8	15.7	20.3	24.0	28.7			
		•	•	•	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			
	1/2		•	•	2391	9.0	10.5	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2	31	50	50
	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

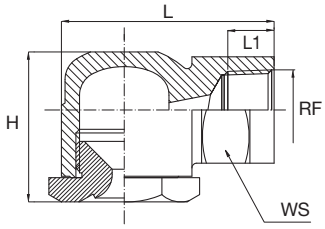
Pipe clamp

Our Accessories Catalogue (CTG AC) shows several types of pipe clamps allowing for an easy assembly of hollow cone nozzles onto a pipe manifold.

ZPM

HOLLOW CONE NOZZLES

PN/PO



MOULDED PLASTIC NOZZLES

This range of hollow cone nozzles are made by plastic moulding using top quality glass fibber reinforced polypropylene offering good mechanical strength and dimensional stability.
They produce small droplets, uniform distribution and are corrosion resistant. Prices are moderate and are ideal for applications like air humidification, intensive product cooling and gas washing. Together with our pipe clamps, they offer the a good solution in cases where large quantity of nozzles have are required.

Materials D6 **Fibreglass reinforced PP**
Maximum operating temperature 75° C.

	RF RG	PNS	POS	Code	DE	DU	Capacity at different pressure values lpm bar								Dimensions mm			
	inch				mm	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

		PNT	POT	Code	DE	DU	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1	WS
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

		PNU	POU	Code	DE	DU	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1	WS
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				

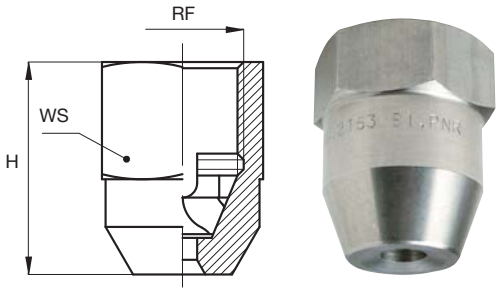
		PNY	POY	Code	DE	DU	0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	L	L1	WS
130°	3/8	•	•	1170	1.7	3.5	0.69	0.82	0.98	1.39	1.70	2.19	2.60	3.10	31	44	20	22
		•	•	1260	1.9	5.0	1.06	1.26	1.50	2.12	2.60	3.36	3.97	4.75				
		•	•	1390	2.7	5.0	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12				
		•	•	1460	3.1	5.0	1.88	2.22	2.66	3.76	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				

PO Male thread nozzles

For all 3/8” size nozzles we can supply PO type nozzles with 3/8” male thread.

IN LINE SPRAY/INSIDE VANE

RA nozzles produce a hollow cone spray pattern with the outlet orifice in line with the inlet. The carefully machined inside vane has two precision machined spiral grooves, which assists with the tangential flow principle. When low capacity nozzles are used it is recommended that the spray manifold is fitted with the correct filter and with the appropriate filter mesh size.

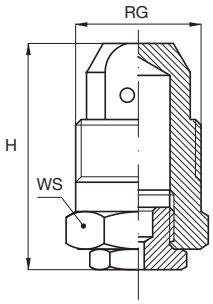


Materials **B31** **AISI 316L Stainless steel**
T1 **Brass**

	Code	RF inch	D mm	D1 mm	Capacity at different pressure values lpm bar								Dimensions mm	
					0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS
80°	RAT 0200 xx	1/8	1.0	0.5	0.08	0.10	0.12	0.16	0.20	0.26	0.31	0.37	18	17
	RAT 0390 xx		1.7	0.5	0.16	0.19	0.23	0.32	0.39	0.50	0.60	0.71		
60°	RAQ 0490 xx	3/8	1.1	0.6	0.20	0.24	0.28	0.40	0.49	0.63	0.75	0.89	29	22
	RAQ 0770 xx		1.6	0.6	0.31	0.37	0.44	0.63	0.77	0.99	1.18	1.41		
	RAQ 1122 xx		2.0	0.6	0.50	0.59	0.70	1.00	1.22	1.58	1.86	2.23		
90°	RAU 1208 xx	3/8	3.0	1.0	0.85	1.00	1.20	1.70	2.08	2.69	3.18	3.80	29	22
	RAU 1306 xx		4.0	1.6	1.25	1.48	1.77	2.50	3.06	3.95	4.67	5.59		
	RAU 1490 xx		4.2	1.6	2.00	2.37	2.83	4.00	4.90	6.33	7.48	8.95		
	RAU 1612 xx		4.7	1.6	2.50	2.96	3.53	5.00	6.12	7.90	9.35	11.2		
	RAU 1772 xx		5.5	1.6	3.15	3.73	4.46	6.30	7.72	10.0	11.8	14.1		
	RAU 2104 xx		6.3	1.6	4.25	5.02	6.00	8.49	10.4	13.4	15.9	19.0		
	RAU 1491 xx	1/2	5.0	1.8	2.00	2.37	2.83	4.00	4.90	6.33	7.48	8.95	36	27
	RAU 1551 xx		5.5	1.8	2.25	2.66	3.18	4.49	5.50	7.10	8.40	10.0		
	RAU 1686 xx		6.0	1.8	2.80	3.31	3.96	5.60	6.86	8.86	10.5	12.5		
	RAU 1980 xx		6.3	2.0	4.00	4.73	5.66	8.00	9.80	12.7	15.0	17.9		
	RAU 2137 xx		6.7	2.0	5.59	6.62	7.91	11.2	13.7	17.7	20.9	25.0		
	RAU 2153 xx		7.5	2.0	6.45	7.63	9.12	12.9	15.8	20.4	24.1	28.8		
	RAU 2196 xx		9.0	2.0	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 with fine droplets in line with the nozzle inlet connection.
The design, which is absent of an internal vane, offers wide unobstructed passages and minimizes the risk of clogging.
The above characteristics make these nozzles the ideal solution for dust suppression applications; such as are the requirements in the coal & mining industries.

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

	Code	RG inch	D mm	D1 mm	Capacity at different pressure values lpm bar								Dimensions mm	
					0.5	0.7	1.0	2.0	3.0	5.0	7.0	10	H	WS
60°	**RBQ 1160 xx**	3/8	2.0	2.0	0.65	0.77	0.93	1.31	1.60	2.07	2.44	2.92	31	17
	RBQ 1230 xx		2.4	2.4	0.94	1.11	1.33	1.88	2.30	2.97	3.51	4.20		
	RBQ 1390 xx		3.3	2.9	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12		
	RBQ 1630 xx		3.9	3.8	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5		
	RBQ 1780 xx		4.4	4.0	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2		
	RBQ 2110 xx		4.4	*4.0	4.49	5.31	6.35	8.98	11.0	14.2	16.8	20.1		
70°	**RBS 1391 xx**	1/2	3.3	3.2	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	37	22
	RBS 1631 xx		4.0	4.0	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5		
	RBS 1781 xx		4.5	4.5	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2		
	RBS 2117 xx		5.1	*4.4	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
	RBS 2157 xx		6.1	*4.7	6.45	7.63	9.12	12.9	15.8	20.4	24.1	28.8		
	RBS 2196 xx		7.1	*5.2	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
	RBS 1392 xx	3/4	3.3	3.3	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	43	32
	RBS 1632 xx		4.2	4.2	2.57	3.04	3.64	5.14	6.30	8.13	9.62	11.5		
	RBS 1782 xx		4.7	4.5	3.18	3.77	4.50	6.37	7.80	10.1	11.9	14.2		
	RBS 2118 xx		5.4	5.4	4.82	5.70	6.81	9.63	11.8	15.2	18.0	21.5		
	RBS 2158 xx		6.4	6.4	6.45	7.63	9.12	12.9	15.8	20.4	24.1	28.8		
	RBS 2197 xx		7.7	7.1	7.96	9.42	11.3	15.9	19.5	25.2	29.8	35.6		
	RBS 2390 xx		9.5	*7.1	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2		
80°	**RBT 2310 xx**	1+1/2	10.0	*7.9	12.7	15.0	17.9	25.3	31.0	40.0	47.4	56.6	69	50
	RBT 2391 xx		9.5	*9.5	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2		
	RBT 2470 xx		11.1	*9.5	19.2	22.7	27.1	38.4	47.0	60.7	71.8	85.8		
	RBT 2550 xx		12.7	*9.5	22.5	26.6	31.8	44.9	55.0	71.0	84.0	100		
	RBT 2630 xx		14.3	*9.5	25.7	30.4	36.4	51.4	63.0	81.3	96.2	115		
	RBT 2700 xx		15.0	*9.5	28.6	33.8	40.4	57.2	70.0	90.4	107	128		
	RBT 2780 xx		15.9	*9.5	31.8	37.7	45.0	63.7	78.0	101	119	142		
	RBT 2860 xx		17.1	*9.5	35.1	41.5	49.7	70.2	86.0	111	131	157		
	RBT 2940 xx		18.3	*9.5	38.4	45.4	54.3	76.8	94.0	121	144	172		

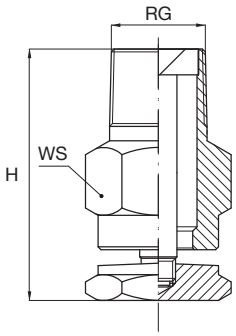
* *Double inlet orifice*

RC

IN LINE SPRAY

RC type nozzles produce a hollow cone spray pattern in line with the nozzle inlet connection.
The spray pattern is produced by the water flow deflecting on a fixed plate in front of the nozzle orifice. This produces small droplets and very wide spray angles.

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



	1/4"	3/8"	Code	Capacity at different pressure values lpm bar								Dimensions 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		
		•	RCY 2350 xx	14.3	16.9	20.2	28.6	35.0	45.2	53.5	63.9		
		•	RCY 2390 xx	15.9	18.8	22.5	31.8	39.0	50.3	59.6	71.2		
180°	•		RCZ 1780 xx			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 AC.

Assembly fittings

VEM

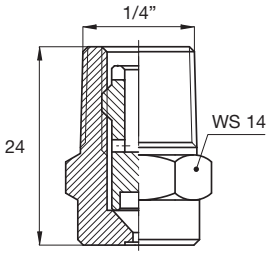
ZRP

ZPM

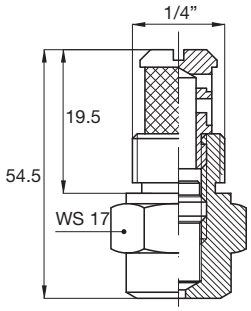
HOLLOW CONE NOZZLES

RX/RZ

RX



RZ



HYDRAULIC ATOMIZERS

Hydraulic atomizers are designed to deliver a very finely atomised hollow cone spray without using air; even at low pressure values.
The nozzle contains a precision machined insert with tiny passages inside which can be disassembled for easy cleaning should the nozzle be clogged. Further protection against clogging can be achieved either by using an in-line filter, or with an optional VEF filter which fits into the back of the nozzle (see accessories catalogue CTG AC).
We offer two types of bodies, RX have a tapered thread and 80 spray angle and RZ have a straight thread and various spray angle values.

Materials	**B1**	**AISI 303 Stainless steel**	**(RX)**
	B31	**AISI 316L Stainless steel**	**(RZ)**
	T1	**Brass**	**(RX)**

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

	Code	D mm	Capacity at different pressure values lph 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 mm	Capacity at different pressure values lpm 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

VEF

Additional spray angles

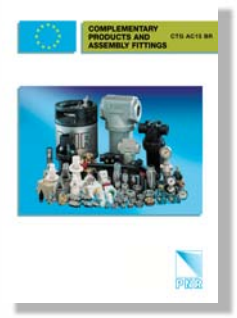
RZ nozzles with orifice equal or larger than 1,0 mm can be produced with angles of 30°, 45°, 60° or 90°. The table beside shows the nozzle identifying codes for these spray angles.

Spray angle codes

RZF	RZM	RZQ	RZU
30°	45°	60°	90°

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

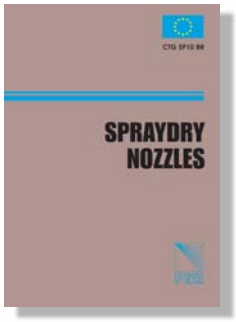
CTG AC BR



Accessories Catalogue

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

CTG SP BR



Spraydry nozzles

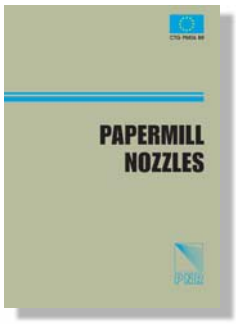
High pressure or air assisted precision nozzles manufactured with top quality stainless steel housings and tungsten carbide internals. A complete line of nozzles to retrofit existing plants at competitive prices. Only the highest quality materials and the most precise machining are employed in the manufacture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

CTG LS BR

Tank washing systems

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

CTG PM BR



Papermill products

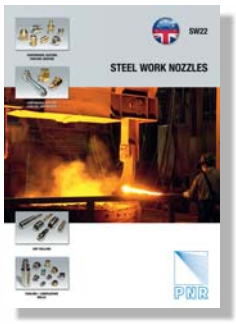
A sixteen page catalogue showing products specifically developed for use on paper making machines, and paper mill processes. These include our patented disc nozzle for self-cleaning pipes, needle nozzles with sapphire and ruby orifices and oscillating pipes.

CTG AZ BR

Air assisted atomizers

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

CTG SW BR



Steelwork nozzles

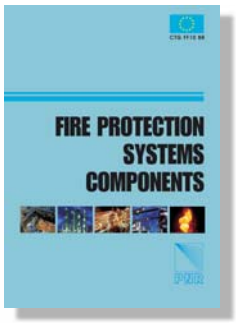
A complete range of nozzles for steelwork applications, including continuous casting air atomisers and conventional nozzles, descaling nozzles for high pressure systems, fixed position dovetail tips and coke quenching high capacity flanged nozzles to name a few.

CTG LN BR

Gas cooling lances

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

CTG FF BR



Fire fighting products

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, water mist nozzles and hydrants.

NOTE

ABBREVIATIONS

CL	Jet deflection angle	deg
D	Conventional orifice dia	mm
D1	Smallest free inside dia	mm
DE	Liquid inlet dia	mm
DF	Flange size	inch
DIA	Outside diameter	mm
DN	Flange nominal size	mm

DU	Liquid outlet dia	mm
FF	Flange outer dia	mm
G	Flange center-hole dia	mm
H, H1	Height	mm
L, L1	Length	mm
NR	Number of orifices	-
QC	Quickfit connection	-

RF	Female BSP straight thread	inch
RG	BSPT male taper thread	inch
SQ	Square bar size	mm
W	Weight	gram, kg
WS	Wrench size	mm

PRODUCT WARRANTY

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

Should you need to report a defect, our Company Procedure for warranty is as follows:
1 Please contact the nearest PNR or PNR Distributor and obtain a return authorization number.
2 Please return the products according to PNR instructions, should you be authorized to return the products.
3 PNR shall then issue a test report, send you a copy and return the product repaired or replaced.

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

PRODUCT RETURN POLICY

WRONG PRODUCTS DELIVERED BY PNR
1 Please contact the nearest PNR or PNR distributor and obtain a return authorization number.
2 Please return the products according to PNR instructions. PNR will sustain the expense for transport.
3 Please agree with your PNR contact if PNR shall have to issue a credit note or make a product replacement.

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

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

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Printed in EU 03/11