Precision Spray Nozzles and Accessories Edition 112

Nozzles

OUR CORE PRODUCT LINES: BEST VALUE, PRECISION, RELIABILITY, QUICK DELIVERY.

INCREASE YOUR PRODUCTIVITY WITH LECHLER SPRAY TECHNOLOGY.

Competition is getting fiercer by the day. Your customers' requests for the highest quality and lowest price force

you to use your full potential for rationalization. Lechler spray technology helps you improve your processes and technologies.

For further information on nozzle technology please visit www.lechler.com

What really matters is that you have the competent partner for the job right from the planning stage. We supply the vital measuring data right from the beginning to ensure your process runs smoothly. Even unusual nozzles are part of our core nozzle range, therefore we can offer you a really individual solution.

Opting for an experienced partner like Lechler means that you run no risks: perfect products, unmatched quality, international know-how, straight off our stock shelves. Isn't that an offer? You should profit from this for your own sake.

Our new catalogue is a unique reference book for you that facilitates your daily work. Its clear layout and the wealth of professional information make it a valuable tool for finding a better solution.

There's a lot more information on spray nozzles, spray technologies and applications available for you which is not contained in this catalogue.

The experienced Lechler personnel is always willing to supply you additional information. Please do not hesitate to ask any time.

Table of contents

For nozzle assembly and special brochures, please refer to the final pages of the catalogue.

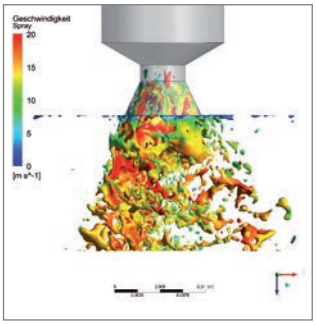
TRADITION AND PROGRESS IN SPRAY TECHNOLOGY.

The Lechler brand has an excellent reputation among experts worldwide. Unrivalled expertise, an interdisciplinary approach and the use of state-of-the-art production methods have led to superb product results in all areas. Today, the Lechler brand is synonymous with innovative spraying technology and applications that enjoy exemplary success.

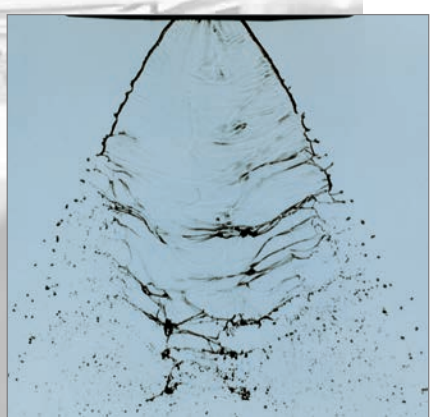
Research and development for a better future

For more than 130 years Lechler has been searching for new solutions and developed and manufactured spray nozzles for trendsetting applications. Internal and external information systems and international data bases give us the leading edge in R&D.

A comprehensive information system, connection to international databases and collaboration with external institutes supplement our own work in this area and create the broad interdisciplinary basis that is required today for excellent developments.



Ultra-modern techniques for construction and simulation are converted into products of high practical value by our staff of engineers and technicians. Full scale tests simulate real life conditions.
Only when all details comply with our requirements, production is released.



Your advantage lies in our productivity

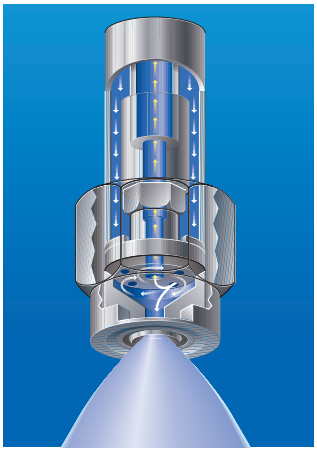
New custom-made manufacturing techniques guarantee productivity and flexibility.

Process automation ensures repeatability and steady properties. For us, this means that not only one nozzle looks like the other, but that spray patterns are identical, too. This applies to 25.000 different variants, materials and sizes.

Lechler is one of the most important spray nozzle manufacturers world-wide. High production quantities allow us more easily to amortize costly research and development and machinery. That's why even a complicated nozzle can be offered at a reasonable price. At the known Lechler quality!

A few words on quality

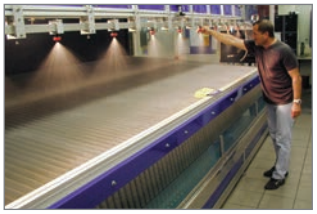
Lechler products are used in many different industries and applications.
Therefore, the requirements of the products have to meet certain specifications. Lechler define »quality« as the ability of our products to surpass the customers individual requirements for performance.



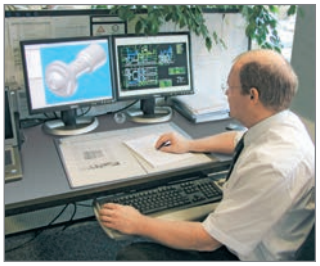
Lechler is certified by ISO 9001:2008. Lechler staff have always worked carefully and carried out permanent quality control from material reception through manufacturing to shipment.
Our products will keep in daily service what we are promising here and now.

What can be measured, can be documented

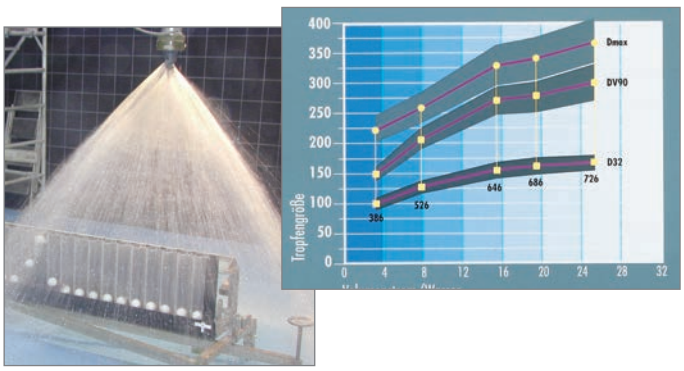
Already a long time before its daily use, we know the exact flow rate, spray angle and uniformity of distribution of each Lechler nozzle.



Right from the beginning, functions and spray characteristics are accurately defined and recorded by our sophisticated measuring techniques and reliable documentation.



Our computer-controlled measuring facilities such as the Laser-Doppler Particle Analyzer, the spray jet measuring device with 3D presentation, liquid distribution systems, and many more are the essential prerequisite for precise measuring data.



Thanks to this data we can help solve your spraying problem.

We offer reliability

Our computer-controlled inventory ensures rapid delivery of your nozzles. Stock items ordered before 2 p.m. will leave our factory the same day. Yet, our real service starts much earlier: technical advice on spray applications and assistance by our experienced Lechler sales representatives. Actually, there is always a Lechler sales office or representation close by, wherever you are in this world. And it goes without saying that there is always a competent technical advisor in our head-quarters who is pleased to help you even a long time after the sale. You can rely on our word.

PERFECT NOZZLE TECHNOLOGY TO SOLVE MANY INDUSTRIAL

In many industries there is a number of tasks that can be economically accomplished with the aid of spraying techniques. However, optimum effects only can be achieved when a spray nozzle manufacturer's wide knowledge of specific requirements and particular service conditions is taken into account, too – right from the project stage. Where this is not the case, a job may quickly end up in a costly experiment for the user.

Lechler, aware of this risk, has put up special teams for the various fields of applications. These teams are joined by external consultants for various industries. In addition, there is the know-how Lechler has accumulated over many years of direct activity in all industries. These synergies are also useful for other, new spray applications. That's why our spray nozzle specialists are often asked to participate as competent consultants in the first planning phases.

As a result, solutions are found that are technically perfect as well as economically sound.

This catalogue contains a wide selection of nozzles that can be used in many different areas of industry. Where special information is useful for special applications, we would be happy to send you our trade brochures.

Surface treatment

- Degreasing
- Phosphating
- Spray painting
- Galvanizing
- Cleaning

etc.

Paper industry

- Foam suppression
- Jet cutting
- Humidification
- Cleaning

etc.

Chemical and Pharmaceutical industry

- Cleaning
- Humidification
- Coating
- Mixing
- Disinfection
- Atomization of viscous liquids

etc.

Food and beverage industry

- Cleaning
- Pasteurisation
- Conveyor belt lubrication
- Disinfection
- Humidification
- Cooling

etc.

TASKS.

Electronic industry

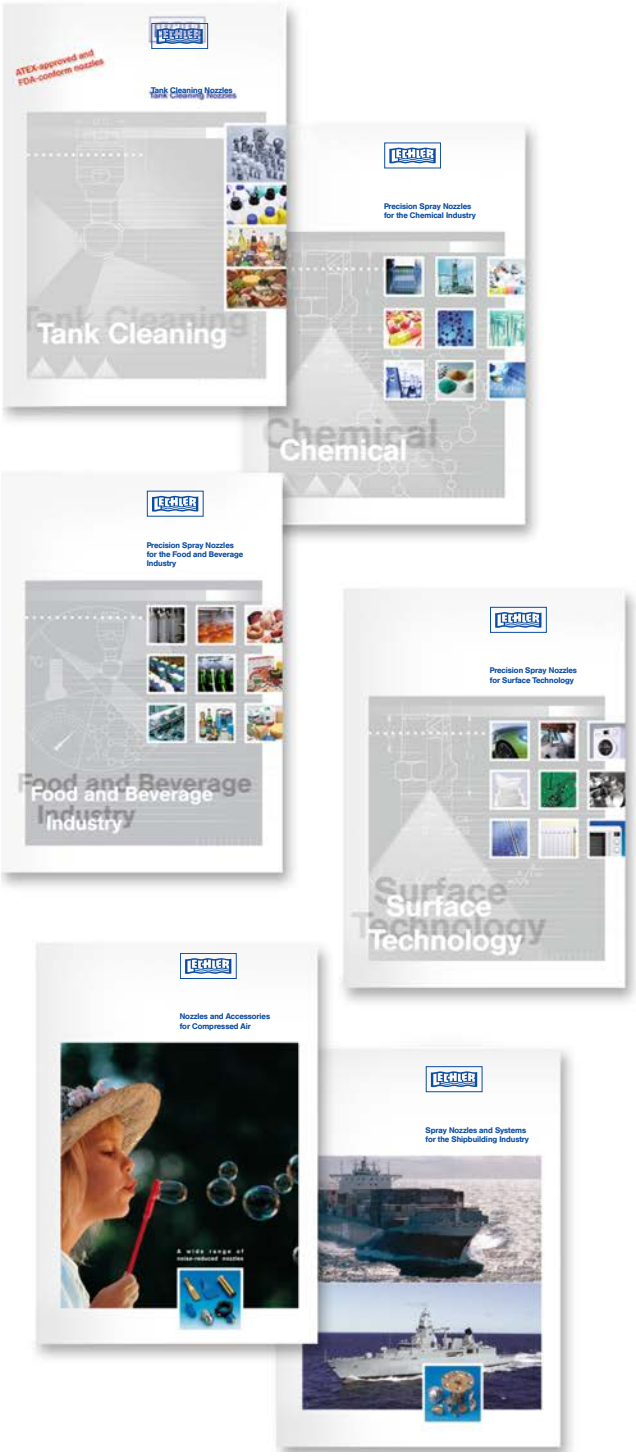
- Circuit board cleaning
- Spray etching
- Coating

etc.

Fire protection

- Tank cooling
- Spraying aboard ships
- Water curtains
- Shavings hopper

etc.



Automotive industry

- Degreasing
- Cleaning
- Preservation
- Coating
- Cooling
- Lubricating
- Drying

etc.

Machine tools

- Cooling
- Lubricating
- Cleaning
- Blowing off

etc.

You can use the order form in Chapter 10 to request specific, special information on nozzles and their areas of use that are not covered in this catalogue.

SPECIAL TASKS REQUIRE SPECIAL SOLUTIONS.

Very individual demands are placed on nozzle technology in the metallurgical industry, environmental engineering and agriculture. That's why Lechler maintains specialist teams who have the specific expertise in these areas. We have compiled product information in separate brochures for these specialist areas, which can be requested by using the form at the end of this catalogue.

Metallurgical industry

A whole range of specially developed and proven nozzles in different versions and materials is available to meet the special requirements of this specialist area.
Descaling, secondary cooling in continuous casting systems and roll cooling are just a few of the many different applications. Nozzles and nozzle systems play a crucial role in all production stages in terms of process optimisation aimed at increasing quality and perfecting production.

A wide range of standard nozzles is supplemented by the possibilities that are available for individual special solutions. At the same time, customers have at their disposal a competent team of experienced specialists employing state-of-the-art design and production methods.

Environmental technology

Flue gas desulphurisation, gas treatment and droplet separation are important areas of work in energy and environmental technology in which Lechler nozzles, systems and droplet separators are used. Internationally, our wide-ranging expert knowledge and experience has made Lechler a competent partner in this sector.

Leading system manufacturers and operators all over the world have opted to become Lechler partners because they have been impressed by our innovative strength, our high level of competence in solving problems and our global organisation.

Find out about the possibilities for collaboration, and how you can profit from our expert knowledge.

Agriculture

All over the world, Lechler agricultural nozzles and accessories are synonymous with efficiency and economy, while also taking account of environmental aspects.
Lechler has taken a leading role in drift reducing technology in particular.
Lechler nozzles ensure that the pesticide lands on the plant exactly where it's needed.

This makes a decisive contribution towards optimising the use of pesticides and protecting the environment.

A comprehensive range of nozzle accessories and some useful tools help the farmer to optimise the application technology and thereby increase his earnings.

Lechler teams with specialist knowledge will support you in your work. We would also be happy to provide you with specialist product information.

WHICH (SPRAY) CHARACTER GOES WITH YOU?

Spray technology has its own rules

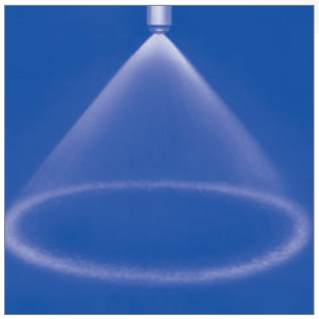
When a liquid flow is made to disintegrate into more or less fine droplets, this is called atomization. The necessary prerequisites are mainly reached by the following principles of atomization:

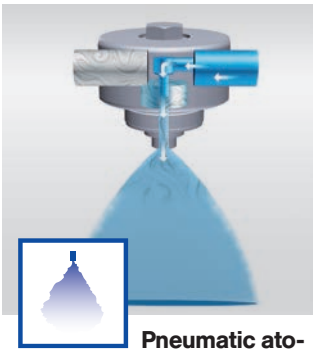
Single-fluid atomization

By narrowing the cross-sections of passage within a nozzle, flow speed increases. Static energy is transformed into kinetic energy (speed). When tension is released at the nozzle orifice, a laminar liquid flow with aerodynamic waves is produced, causing the liquid flow to disintegrate into droplets of different sizes.

Pneumatic atomization

The different flow speeds of gas and liquid generate pressure waves, breaking up the liquid into extremely fine drop particles. The different relative speeds allow atomizing e.g. of viscous liquids at low pressure. Pneumatic atomizers operate both according to internal and external mixing principles, whereby gas and liquid mix inside or outside the nozzle. Depending on the nozzle design, liquid is either supplied by siphon action or by gravity. According to the configuration of the nozzle tip, different spray patterns may be obtained.





Pneumatic atomizing nozzles

Hollow cone spray

Full cone spray

Pneumatic flat fan atomizing nozzles
produce a flat spray pattern with extremely fine droplets and spray angles up to 80°. These nozzles are particularly suited for applications requiring fine droplets and a wide linear impact.

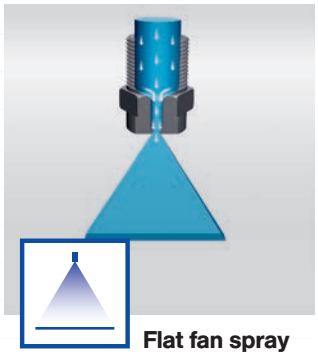
Pneumatic full cone atomizing nozzles,
however, are preferably used for applications demanding uniform circular impact patterns or larger spray distances. Generally, a narrow full cone with approx. 20°-30° is formed. Wider spray angles can be achieved by using special multi-orifice designs.

Axial-flow hollow cone nozzles
The liquid supply is axial, rotary motion of the liquid is generated by so-called swirl inserts or vanes. Axial-flow hollow cone nozzles allow to produce the finest droplets achievable with pressure-operated nozzle designs. This is also called hydraulic atomization.

Eccentric-flow hollow cone nozzles
The liquid supply, which is tangentially positioned to the mixing chamber, causes the liquid to rotate. A liquid layer forms around the inside walls of the nozzle which influences heavily the drop size.
A rotary motion of the liquid flow is transformed at the nozzle orifice into axial and tangential speeds.
A circular liquid screen is formed which disintegrates into fine droplets soon after leaving the nozzle orifice. This nozzle design has wide free cross-sections making it highly clog-proof.

Axial-flow full cone nozzles
achieve a uniform liquid distribution over a circular area. A rotary motion of the liquid is achieved with the aid of swirl inserts inside the free cross-section of the nozzle. Spray formation, liquid distribution, and shaping of droplets are influenced by the dimensioning and functional coordination of the rotary motions and the swirl chamber. Turbulent flows with different axial and tangential speed components lead to overall coarser droplets than with a comparable hollow-cone nozzle.

Tangential-flow full cone nozzles
are free from swirl inserts. Therefore, they are not at all prone to clogging. The full cone spray pattern is produced by grooves milled into the bottom of the nozzle which provide a defined deviation of the liquid flow to the mixing chamber's center, whereby an extremely uniform area distribution of the atomized liquid is obtained.



Flat fan spray

The spray pattern of **flat fan nozzles** features a sharply delimited line due to internal flow characteristics.
The coverage width can be varied by modifying the geometric configuration of the nozzle orifices, where the liquid is shaped into flat, fan-like spray patterns. The flat liquid body takes on a laminar form and disintegrates into droplets as its distance from the nozzle orifice increases. Parabolic, trapezoidal or rectangular impact areas are achieved by adequately determining the functional and geometric dimensions.

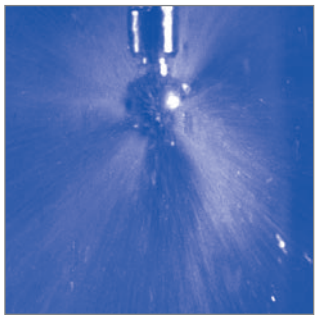
Tongue-type nozzles are of a special kind.
The flat fan pattern is generated by a solid stream, impinging upon an external deflector plate (»the tongue«). Tongue-type nozzles are particularly clog-proof and produce a sharply delimited flat fan pattern.

Solid stream

The smooth solid stream is also known as the so-called »primary jet«. Actually, the solid stream nozzle is not supposed to produce an atomized spray pattern, because it has been designed for maximum jet power. Here, the skill of Lechler design engineers was challenged to prevent concentrated, straight jets from disintegrating into drops at large distances.

Air nozzles

Air nozzles are used for dispersing air or steam in a concentrated and straight fan. Generally, air nozzles have a flat fan or solid stream spray pattern. When using conventional air nozzles, air is blown through a single hole. Often a loud, ear-splitting and hissing noise is produced. To avoid this unpleasant noise, Lechler has designed special **multi-channel air nozzles**. Sound level and air consumption of these nozzles are very low.



Tank cleaning nozzles

Tank cleaning nozzles can be used for both small and large tanks and are available as both rotating and static sprays. The **rotating nozzles** (rotational cleaners) are driven by the cleaning liquid by means of specially positioned nozzles or by turbine or internal gears. Rotational cleaners achieve very good cleaning of the entire tank surface as rapid-repetition impact loosens the dirt and washes it off of the inside tank surfaces.

Static spray balls do not rotate. They are used primarily for washing down relatively small tanks and vessels. All tank cleaning nozzles are operating at low pressures.

NOZZLE PERFORMANCE AND SERVICE DATA.

The essential operating data of spray nozzles is

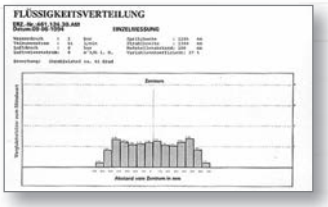
- Flow rate
- Spray angle
- Liquid distribution
- Spray impact
- Droplet size and droplet spectrum

Flow rate, pressure and spray angle

Flow rates and spray angles are dependent on feed pressure and viscosity of the liquid to be sprayed. We have measured the flow rates stated in the catalogue with painstaking accuracy, using inductive flow meters.
The spray angle is determined right at the nozzle's orifice. The indications given on spray widths and coverage diameters are more useful at larger distances from the orifice. Air friction losses and ballistic phenomenons influence the spray behavior and the size of the impact area in dependence on the chosen service pressure. The pressure (p) is the feed pressure above atmospheric, which is available at the liquid inlet into the nozzle. The spraying operation is performed under counterpressure, the flow rate is dependent on the differential pressure. Minimum and maximum pressures are adjusted to the required flow rates and the spray quality.

Distribution of liquid

A uniform distribution of liquid is of paramount importance, e.g. for coating. We have developed special measuring methods which instantaneously deliver test results that are repeatable any time. Thanks to our electronic image processing measurement accuracy is approx. +/- 1 %. The test results are documented and made available to customers for design and construction tasks.



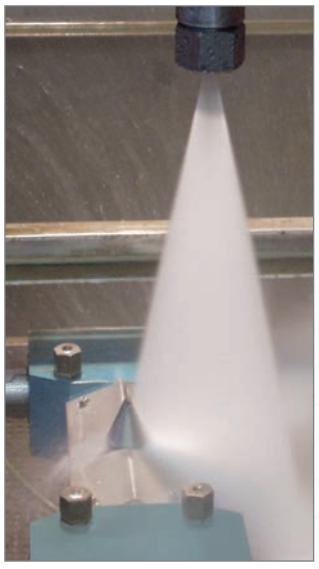
Thus they'll be sure in advance that Lechler spray nozzles exactly comply with their requirements.

Spray impact

For **measuring the jet distribution of the spray impact and the impact itself** a highly sensitive device is guided through the jet pattern. The measuring values detected by the sensor are transformed into electric signals and stored in a computer. Jet impact measurements show how uniformly the jet impact is acting on the impacted area. This data is very useful, in particular for high pressure applications where a maximum of pump energy has to be transformed into cleaning power.

Jet pressure (impact)

In the case of nozzles, the jet pressure (i.e. the effect of a spray jet on a surface) is normally referred to as the impact and is expressed in N/mm^2. This is the conversion of the jet force on the impacted surface.
In the jet pressure measurement, a highly sensitive sensor with a defined surface area is guided through the spray jet. The spray jet exerts a constantly changing force on the sensor, which is saved in the computer. The jet pressure can be determined from the force measured at the respective location and the surface of the sensor.



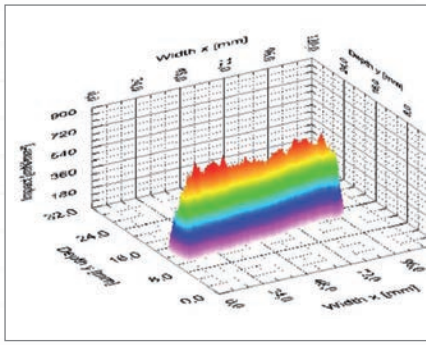
Jet pressure distribution measurements show the regularity of the jet force curve on the impacted surface. In high-pressure applications in particular, this data is of great practical use because it relates to the maximum conversion of pump energy into cleaning effect.

Low jet pressures are obtained by using full-taper or wide-angle flat jet nozzles (120°). **High jet pressures** are produced by flat jet nozzles with narrower jet angles (15° to 60°). Full-jet nozzles produce **maximum jet pressures**.

Droplet sizes and droplet spectrum

For many areas of use, it is necessary to know the size of the droplet spectrum produced by the nozzle.

One of the most precise measuring devices for this is the laser doppler particle analyser. Since this measuring method simultaneously measures both droplet size and droplet velocities, we obtain a complete description of the atomization characteristic. Since the atomized liquid does not dissipate into droplets of a uniform size, we document the droplet size



YOUR REQUIREMENTS DEFINE THE NOZZLE MATERIAL.

distribution by stating the **Sauter mean diameter d_{32}**. This shows the relationship between the total surface area of all droplets and the volume enclosed by it. This enables conclusions to be readily drawn about the expected reaction behaviour of a spray.

This makes this key indicator very important in process technology in particular. Other droplet size definitions can also be derived from the measured values, e.g. the arithmetical mean d_{10}, the mean volume diameter MVD, the logarithmic standard deviation LS and other variables. These must be known for a complete description of a measured droplet spectrum.

All operating data of nozzles have been measured with water.

There are more than 100 materials for you to choose from.

Brass nozzles, now as before, are commonly used for many applications, such as low pressure and humidification processes.
It is necessary to use chemically resistant stainless steel grades, hastelloy, titanium, tantalum, as well as plastic materials, such as PVC, PP, PVDF and TEFLON for spraying corrosive liquids or for the use in aggressive environments.
If materials that are highly resistant to wear are required, quality nozzles in hardened stainless steel, oxide ceramics or silicon carbide are available.

Many nozzles of our range are available in high-grade thermoplastics. These nozzles are produced by injection moulding on process-controlled machines.

Service life

Material	Factor
Brass	1
Stainless steel	4-6
Hardened SS	10-15
Carbide	30-40
Ceramics	90-200

The service life of nozzles is dependent on various circumstances such as spray applications, service conditions, the quality of the liquid to be sprayed – to quote just a few. According to the material used, service life of nozzles can considerably differ.

This short survey is just to give you an idea on service life of some metallic and ceramic nozzle materials commonly used. Depending on service conditions, plastic materials have very different service lives. Hence, a classification is hardly possible.

Stainless steel

Silicon carbide

Brass

Plastic material

ACCESSORIES MAKE YOU BENEFIT FROM OUR KNOW-HOW, TOO.

Our comprehensive range of accessories significantly contributes to optimizing the adaptability of Lechler nozzles to special requirements and prerequisites.

No matter whether you want to change nozzles easily, to provide sealing or just to have an alternative fixing facility, you'll profit in every respect from Lechler's technical know-how and practical experience with accessories. As a result, your work is made easier, your capacity is better utilized and you'll be saving cost to an extent you wouldn't have thought possible.
As you see, it's worthwhile spending a few thoughts on the subject.

Now a short survey on the various Lechler fixing system:

Standard fixing accessories
The great variety of mounting clamps, bases, ball joints etc., available in a multitude of designs, models, sizes and materials, allow accurate matching of nozzles and fixing accessories to meet your spray applications, your liquid and its properties.

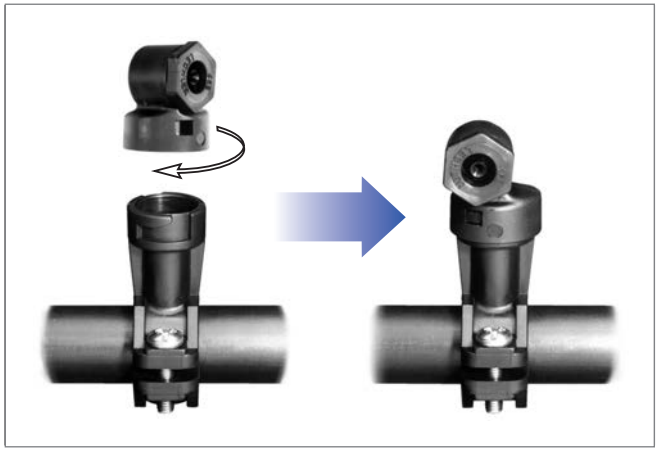
Special accessories for flat fan nozzles with dove-tail guide
(positive guide) provide a perfect presetting of the spray alignment and a quick nozzle change.

TWISTLOC and Bayonet - Assembly systems for changing nozzles in less than no time
The Lechler invention for quick nozzle change without any tool. Additionally, a correct spray alignment is always guaranteed.

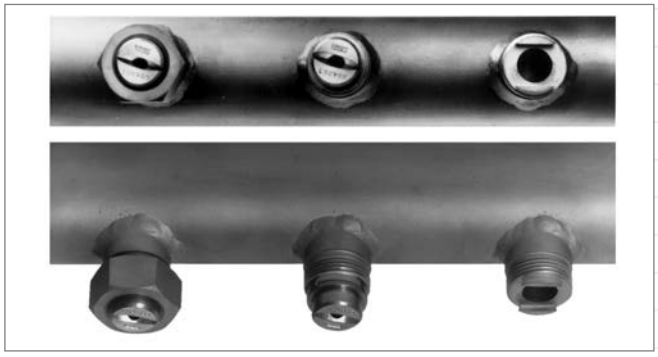
Nozzle filters and strainers to prevent clogging
The advantages:
Steady spray quality, cost reduction because of less maintenance, and, above all, a better quality of your finished products.

Professional sealing material
Lechler offers special proven sealing materials to stop unnecessary sprinkling or dripping: gaskets, Teflon sealing tapes, Teflon glue and a lot more.

For your daily work with the Lechler catalogue, all fixing possibilities are clearly listed in the folded page at the end of the catalogue. You'll find the complete accessory range, detailed descriptions and full technical data under the heading »Accessories«.



Bayonet quick-release system

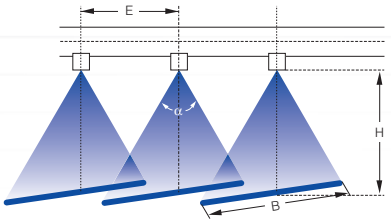


Dove-tail guide

EXAMPLES FOR NOZZLE ARRANGEMENT.

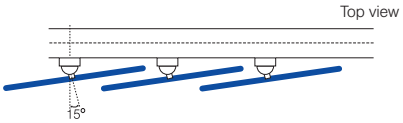
Arrangement of flat fan nozzles with parabolic liquid distribution

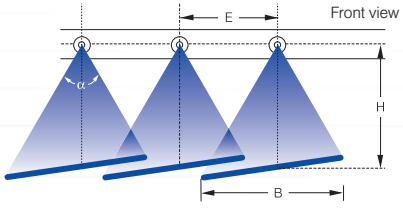
Lechler flat fan nozzles provide a consistent, uniform coverage over the impact area. For this purpose, the spray widths B ought to overlap each other by 1/3 to 1/4. To avoid interferences of the sprays, the nozzle orifices must be offset 5°-15° to the pipe axis.



Alignment of tongue-type nozzles

In order to achieve an even surface coverage the nozzles need to be aligned in such a way that spray widths B overlap by 1/3 to 1/4. Therefore the nozzles should be inclined in an angle of 15° to the vertical of the horizontal axis of the tube (either with a weld base at an angle or a Lechler ball joint nozzle mount) in order to prevent a disturbance of the spray.

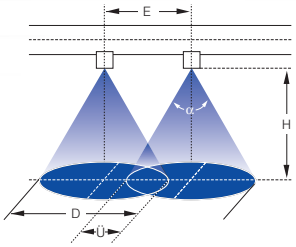




Arrangement of full cone and hollow cone nozzles

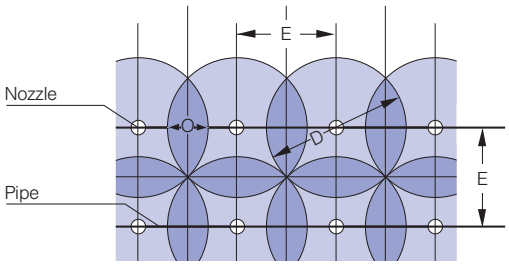
For full cone and hollow cone nozzles, the distance E should be sized so that the spray cones overlap by about 1/3 to 1/4.

O = Overlap of spray angles
D = Spray diameter
E = Nozzle distance
H = Installation distance of nozzles
α = Spray angle



Square or offset arrangement of full cone or hollow cone nozzles

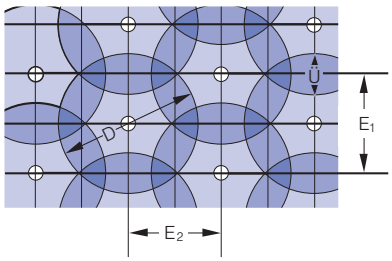
Square arrangement



Nozzle distance: $E = \frac{D}{\sqrt{2}}$

Overlap: $Ü = D - E$

Offset arrangement



Nozzle distance: $E_1 = \frac{D}{2} \times \sqrt{3}$

Nozzle distance: $E_2 = \frac{3}{4} D$

Overlap: $Ü = D - E_1$

The spray angles stated in this catalogue are based on a specific design pressure.
Different pressures and production tolerances lead to differing spray angles. Please consider our adjustment proposals on this page and ask us for a detailed spray width diagram if needed.

TECHNICAL INFORMATION

Here you will find explanations of the special terms and abbreviations used in the tables on the following pages.

Droplet sizes
The droplet size information refers to the Sauter mean diameter d_{32}.
This is defined as the droplet diameter measured on the basis of surface area.
The volume/surface area ratio of a droplet of this diameter is the same as for the sum of all droplets in the spray jet.

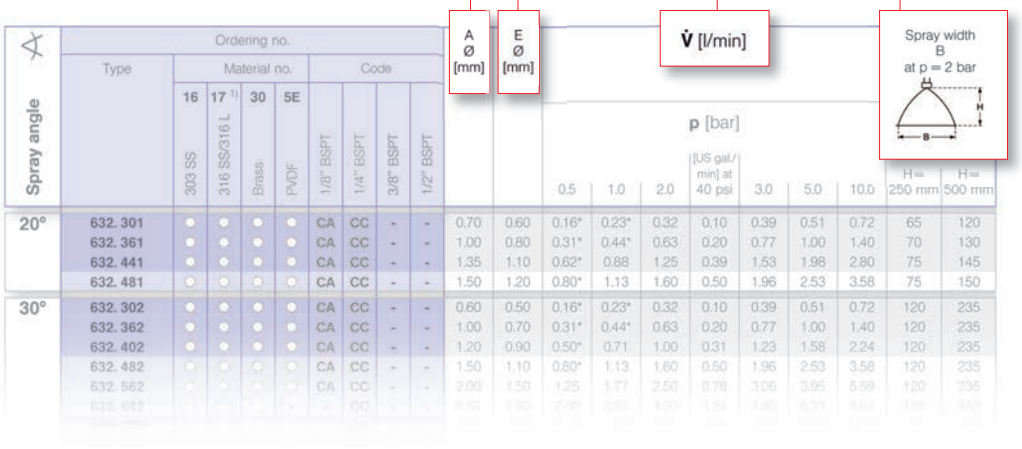
Lechler nozzles are manufactured with the highest precision and undergo permanent quality checks. Nevertheless, production-related tolerances can affect the jet angle, volume flow, droplet size and droplet distribution.

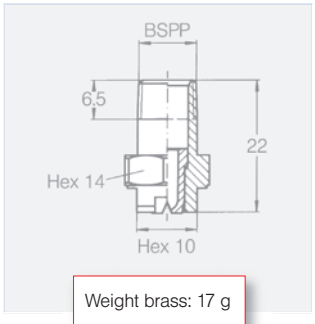
A (equivalent bore diameter)
Applies to elliptical discharge holes of flat fan nozzles.
A cylindrical hole with a diameter A has the same surface area as the ellipse.

E (narrowest free cross section of the nozzle)
Important characteristic for determining the pre-filtration.
Can be less than B due to several swirl ducts.
(Nozzle filter see page 9.8.)

V̇ (flow rate)
All flow rate data in this catalogue is based on measurements with water, and takes into account the individual flow parameters of the various nozzle designs.

B (spray width)
The spray sizes can deviate at reference pressures different to those listed in the tables.





Weight brass: 17 g

Weight
All weight information refers to brass, unless otherwise stated.
See Page 18 for conversion factors for other materials.

B (bore diameter)
This is definitive for the flow rate.

p (liquid pressure)
Pressure p is the differential pressure to the nozzle surrounding.
If you require a liquid pressure stage not given in the tables, you can calculate the flow rate with the formula at the bottom of the respective table page.

CONVERSION TABLES

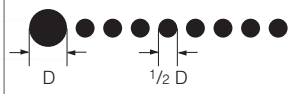
Droplet sizes

· 0,5 mm

• 1 mm

● 5 mm

1 mm = 1000 µm



The volume of a large droplet corresponds to the volume of 8 droplets of half the diameter.

The surface of the large droplet is four times as big as the one of a small droplet. The total surface of the 8 small droplets, however, is twice as big as the surface of a large droplet.

Droplet size range according to nozzle type (Sauter diameter d_{32})

Single fluid nozzles	Liquid pressure [bar] 1		2		5	
	Flow rate V̇ [l/min]	Droplet size [µm]	Flow rate V̇ [l/min]	Droplet size [µm]	Flow rate V̇ [l/min]	Droplet size [µm]
Axial-flow hollow cone nozzle	- -	- -	0,1 1	140 240	0,17 1,6	100 180
Tangential-flow hollow cone nozzle	- 1,8	- 700	1 25	320 640	1,44 36	240 490
Full cone nozzle	0,8 19	540 1300	1 25	400 1100	1,4 36	300 750
Cluster head nozzle	0,9 20	200 400	1,25 28	175 265	2 44	150 190
Flat fan nozzle	0,7 18	400 1200	1 25	360 1000	1,6 40	300 690

Pneumatic atomizing nozzles	Air-/water ratio [m³/h : l/min] 5		10		20	
	Flow rate V̇ [l/min]	Droplet size [µm]	Flow rate V̇ [l/min]	Droplet size [µm]	Flow rate V̇ [l/min]	Droplet size [µm]
others	others	90	others	55	others	40

p Pressure

Conversion / Unit	bar	Pascal [Pa] = N/m²	kp/cm² = 1 at	psi	lb/sq ft
1 bar	1	100000	1,02	14,5	2089
1 Pascal [Pa]	$1 \cdot 10^{-5}$	1	$1,02 \cdot 10^{-5}$	$14,5 \cdot 10^{-5}$	0,0209
1 at = kp/cm²	0,9807	98070	1	14,22	2048
1 psi	0,06895	6895	0,07031	1	144
1 lb/sq ft	$0,479 \cdot 10^{-3}$	47,9	$0,4882 \cdot 10^{-3}$	$6,94 \cdot 10^{-3}$	1

V Volume

Conversion / Unit	l	m³	Imp. gal	US gal
1 l (1 dm³)	1	$1 \cdot 10^{-3}$	0,22	0,264
1 m³	1000	1	220	264,2
1 Imp. gallon	4,546	$4,546 \cdot 10^{-3}$	1	1,201
1 US gallon	3,785	$3,785 \cdot 10^{-3}$	0,8327	1

V̇ Flow rate

Conversion / Unit	l/min	l/s	m³/h	US gal/min	Imp. gal/min
1 l/s	60	1	3,6	15,85	13,20
1 l/min	1	0,01667	0,06	0,2642	0,22
1 m³/h	16,67	0,28	1	4,40	3,66
1 US gal./min	3,785	0,0631	0,227	1	0,8327
1 Imp. gal./min	4,546	0,076	0,273	1,201	1

ρ Change in specific weight

$\dot{V}_w = \frac{\dot{V}_{Fl}}{X}$	$\dot{V}_W$ = Flow rate (water) [l/min, l/h]
$\dot{V}_{Fl} = \dot{V}w\sqrt{\frac{\rho_w}{\rho_{Fl}}} = \dot{V}_w \cdot X$	$\dot{V}_{FL}$ = Flow rate of liquid, with a specific weight that differs from 1
$X = \sqrt{\frac{\rho_w}{\rho_{Fl}}}$	X = Multiplier ρ = Specific weight [kg/m³]

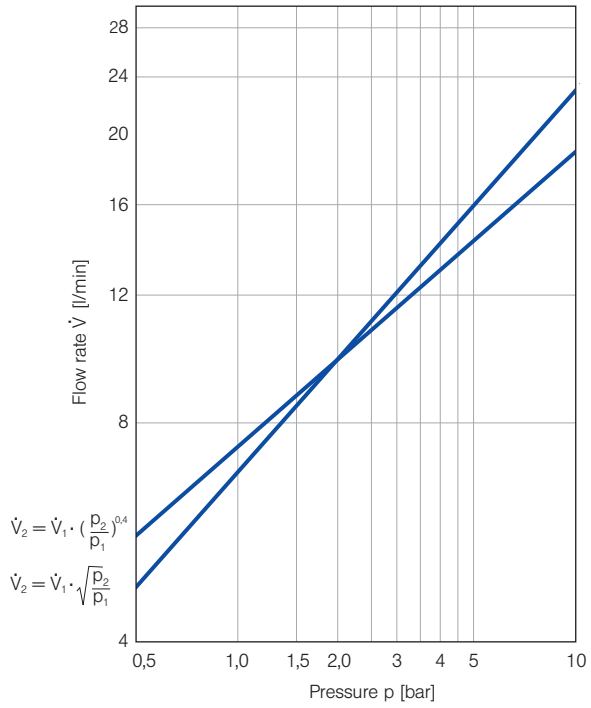
ρ_{Fl}	500	600	700	800	900	1000	1100	1200
X	1,41	1,29	1,20	1,12	1,06	1,0	0,95	0,91
ρ_{Fl}	1300	1400	1500	1600	1700	1800	1900	2000
X	0,88	0,85	0,82	0,79	0,77	0,75	0,73	0,71

p/V̇ Pressure/Flow rate

Valid for **single-fluid nozzles,** except axial-flow full cone nozzles	$\dot{V}_2 = \sqrt{\frac{p_2}{p_1}} \cdot \dot{V}_1$ [l/min]	Ratio of both, given and required pressure – flow rate values
	$p_2 = \left(\frac{\dot{V}_2}{\dot{V}_1}\right)^2 \cdot p_1$ [bar]	
Valid for **axial-flow full cone nozzles**	$\dot{V}_2 = \left(\frac{p_2}{p_1}\right)^{0,4} \cdot \dot{V}_1$ [l/min]	
	$p_2 = \left(\frac{\dot{V}_2}{\dot{V}_1}\right)^{2,5} \cdot p_1$ [bar]	

All flow rate data of the catalogue have been measured with water and consider the individual flow parameters of the nozzle designs.

p/V̇ Pressure-flow rate diagram



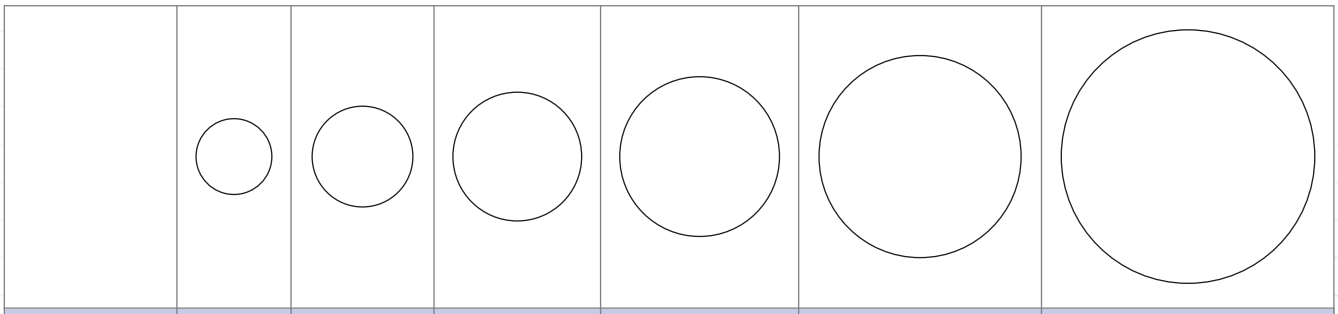
Conversion factors for determining the weight of various materials

Material	Factor
Brass	1,00
Stainless steel	0,95
Plastics (PVDF)	0,21
Aluminium	0,33
Silicon carbide	0,39
Titanium	0,54
Cast iron	0,89

As a rule, the weight indications in this catalogue refer to brass. By applying the conversion factors stated, the approximate weight of nozzles in other materials can easily be calculated.

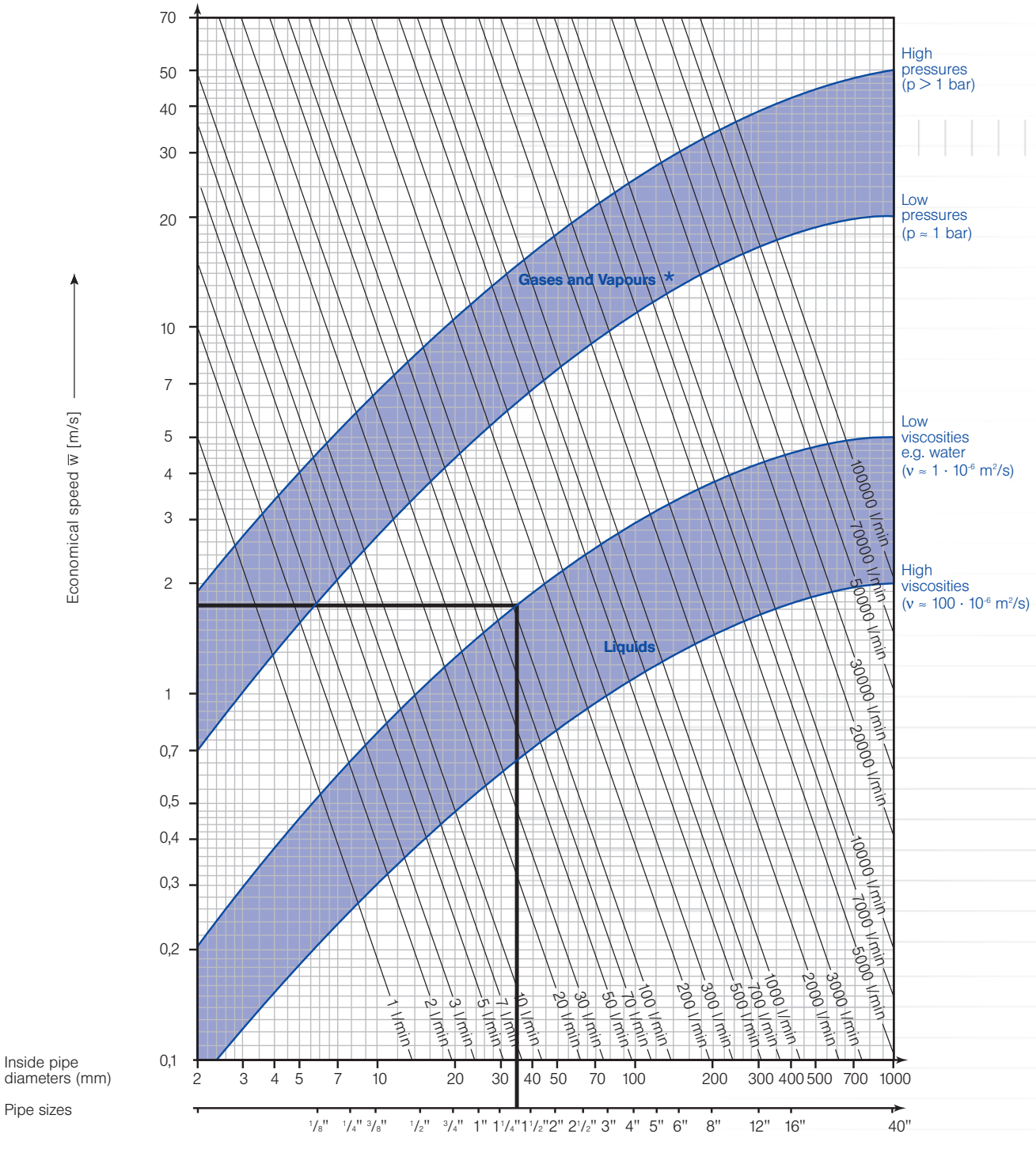
For further information on nozzle technology please visit www.lechler.com

Determination of male thread sizes / diameters



R"	1/8	1/4	3/8	1/2	3/4	1
A Ø mm	10.2	13.5	17.2	21.3	26.9	33.7
DN	6	8	10	14	20	25

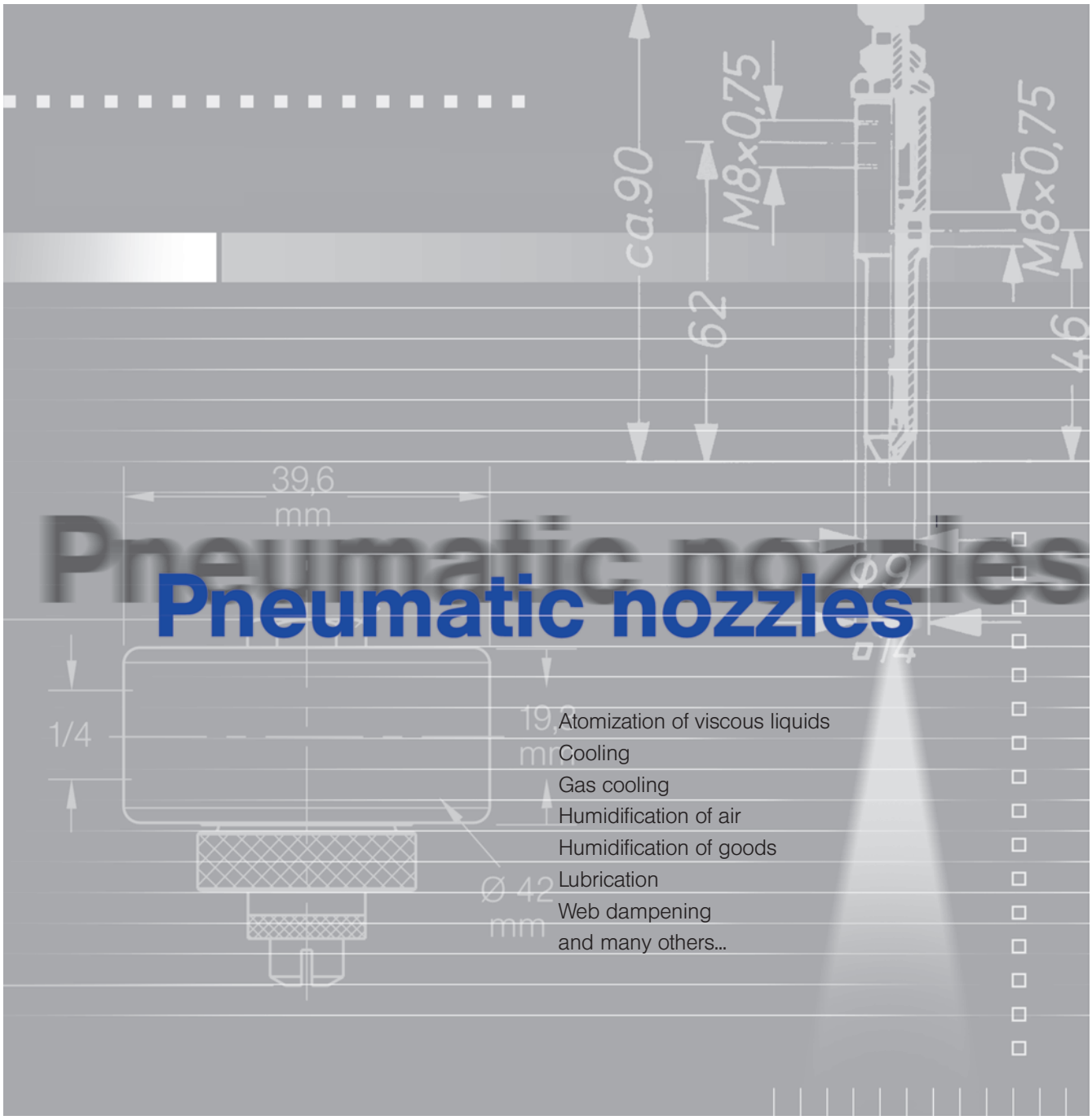
DETERMINATION OF PIPE DIAMETERS.



* Flow rates of gas and vapours in operating condition.

Example: You want to spray a total of 100 l water per minute. Water has a viscosity of $\nu \approx 1 \cdot 10^{-6}$ m²/s. So in your diagram please look for the intersection of the corresponding viscosity curve and the flow rate line. From the coordinates of this point, you gather the correct pipe inside diameter or pipe size, and the economical flow speed.

Pneumatic atomizing nozzles



Pneumatic nozzles

- Atomization of viscous liquids
- Cooling
- Gas cooling
- Humidification of air
- Humidification of goods
- Lubrication
- Web dampening

and many others...

Pneumatic atomizing nozzles

Pneumatic atomizing nozzles are available in various designs to comply with specific spray and flow requirements:

- self-aspiration (siphon principle)
- supply of liquid from a vessel located at a higher level (gravity principle)
- supply of liquid under pressure (pressure principle)
- mixing of fluids inside or outside the nozzle
- full cone or flat fan spray pattern

For many applications, adjustability of liquid flow and, thereby, of the droplet size, is possible with the aid of manually operated accessory components.
A pneumatically controlled piston (series 136) or magnetic valve (series 166) allows to perform automatic or intermittent operations.
A number of special customized designs complete the nozzle range.

We can also supply complete modular nozzle lances on request.
We would be happy to send you detailed product information.

Criteria for selecting pneumatic atomizing nozzles

1. Spray pattern

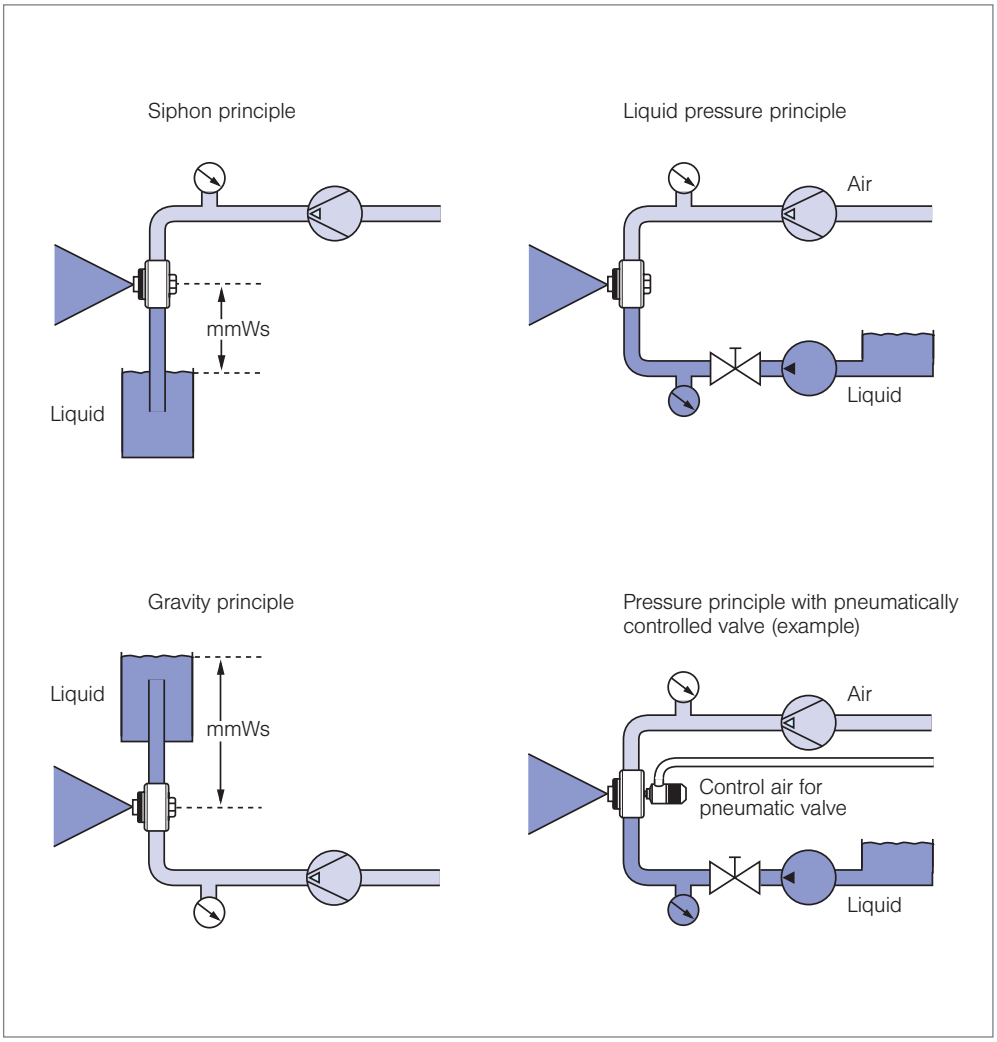
Pneumatic flat fan atomizing nozzles should be chosen for humidifying and cooling of goods, for web dampening and for a number of painting tasks; in short, wherever a broad linear impact is required. **Pneumatic full cone atomizing nozzles,** however, should be used, when a compact, circular impact or a major reach is required, e.g. for direct air humidifying, for gas cooling or for chemical process applications.

2. Mode of liquid supply

Whenever liquid can be supplied under pressure, it is recommended to use nozzles functioning by the **liquid pressure principle.** Use of pneumatic atomizing nozzles operating to the **siphon or the gravity principle** is recommended when liquid is to be sprayed in small quantities, e.g. for spraying of disinfectants.

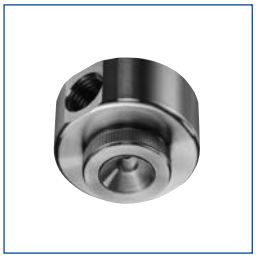
3. Mixing of fluids

The supply of air or gas provides an additional breaking up of the liquid flow into finest drop particles. This supply and mixing can either take place inside or outside the nozzle. **Inside mixing** should be preferred, when water, low viscosity liquids or liquids without solid matter are to be atomized. **Outside mixing** is particularly suited for atomizing viscous liquids which are prone to impurities and therefore tend to cause clogging of the nozzle. Low liquid pressures are used with this type of nozzle due to its design.



Pneumatic atomizing nozzles

Series 136

Spray pattern	Mode of liquid supply	Mixing of fluids		Series	∢	V̇ Water [l/h]	Application	Page
Full cone	Pressure principle	Inside		**136.1**	20°	0.40 – 93.20	Humidification of air, cooling.	**1.7**
Full cone	Pressure principle	Inside		**136.2**	60°	0.40 – 132.90	Humidification of air, cooling.	**1.9**
Full cone	Siphon or gravity principle	Outside		**136.3**	20°	0.30 – 66.70	Chemical industry, cooling, spraying of viscous liquids.	**1.10**
Flat fan	Pressure principle	Inside		**136.4**	45° 60° 80°	0.10 – 76.10	Web dampening, humidification of goods, cooling.	**1.13**
Flat fan	Siphon or gravity principle	Inside		**136.5**	60°	0.80 – 3.20	Web dampening, humidification of goods, cooling.	**1.15**

Pneumatic atomizing nozzles

Series 136

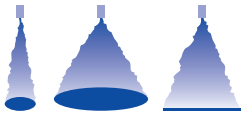
Spray pattern	Mode of liquid supply	Mixing of fluids		Series	∢	$\dot{V}$ Water [l/h]	Application	Page
Flat fan	Pressure principle	Outside		**136.6**	45° 60°	1.70 – 102.10	Web dampening, humidification of goods, atomization of viscous fluids.	**1.17**

Pneumatic atomizing nozzles

Series 166

Spray pattern	Mode of liquid supply	Mixing of fluids		Series	∢	V̇ Water [l/h]	Application	Page
Full cone 	Pressure principle	Inside		**166.1**	20°	0.40 – 93.20	Humidification of air, cooling. **Version with magnetic valve.**	**1.21**
Full cone 	Pressure principle	Inside		**166.2**	60°	0.40 – 132.90	Humidification of air, cooling. **Version with magnetic valve.**	**1.23**
Flat fan 	Pressure principle	Inside		**166.4**	45° 60° 80°	0.10 – 76.10	Web dampening, humidification of goods, cooling. **Version with magnetic valve.**	**1.24**
Flat fan 	Pressure principle	Outside		**166.6**	45° 60°	1.70 – 102.10	Web dampening, humidification of goods, atomization of viscous fluids. **Version with magnetic valve.**	**1.26**

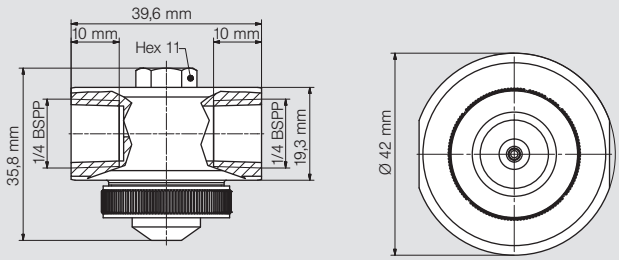
Pneumatic atomizing nozzles

Spray pattern	Mode of liquid supply	Mixing of fluids		Series	∢	$\dot{V}$ Water [l/h]	Application	Page
Full cone 	Siphon or gravity principle	Inside		**140**	20°– 30°	4.50 – 12.00	Lubrication, cooling, humidification of air.	**1.30**
Solid stream Full cone Flat fan 	Pressure principle	Outside		**176 ViscoMist™**	variable	7.80 – 307.00 [l/h]	Coating processes, moistening, lubrication, glazing, disinfection,	**1.31**
Full cone 	Pressure principle	Inside		**170**	15°	8.50 – 290.00 [l/min]	Gas cooling, flue gas desulphurisation, exhaust gas conditioning, dust control.	**On request.**
Full cone 	Pressure principle	Outside		**150**	20°– 30°	0.15 – 63.00 [l/min]	Chemical process engineering, cooling, atomizing of viscous liquids.	**On request.**

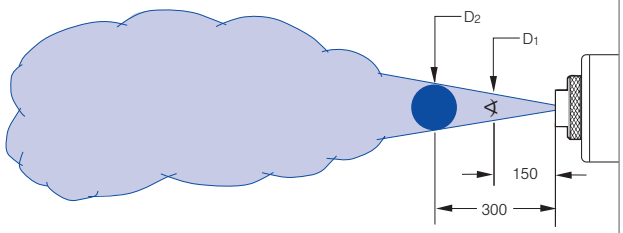
Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 136.1

Fine full cone atomization and fogging with air or gas. Liquid pressure principle. Internal mixing of fluids.
Applications:
Humidification of air, cooling.

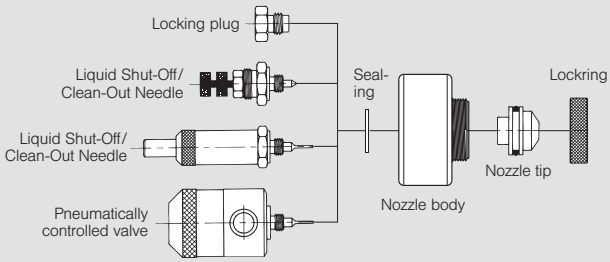
Series 136.1



Weight brass: 200 g



Series 136.1



Accessories for series 136 please refer to page 1.28

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure **p** [bar] 0.7 **p** Air [bar]	0.7 $\dot{V}$ Water [l/h]	0.7 $\dot{V}_n$ Air [m³/h]	1.5 **p** Air [bar]	1.5 $\dot{V}$ Water [l/h]	1.5 $\dot{V}_n$ Air [m³/h]	3.0 **p** Air [bar]	3.0 $\dot{V}$ Water [l/h]	3.0 $\dot{V}_n$ Air [m³/h]	4.0 **p** Air [bar]	4.0 $\dot{V}$ Water [l/h]	4.0 $\dot{V}_n$ Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	D_1 [mm]	D_2 [mm]
20°	**136. 115. xx. A2**	○	○	0.50	0.40	5.90	0.30	1.40	5.80	0.80	2.40	9.10	1.10	3.00	11.00	1.20	0.80	0.70	60	100
					0.80	3.80	0.60	1.80	4.10	1.00	2.80	7.50	1.20	3.40	9.60	1.40	1.80	1.50	60	95
					1.20	1.70	0.90	2.20	2.20	1.40	3.20	5.90	1.50	3.80	8.20	1.60	2.60	2.00	60	100
					-	-	-	2.60	1.20	1.70	3.60	4.40	1.80	4.20	6.80	1.90	3.20	3.00	55	95
					-	-	-	-	-	-	4.00	2.90	2.10	4.60	5.50	2.20	4.40	4.00	55	100
					-	-	-	-	-	-	4.40	2.00	2.50	5.00	4.10	2.50				
					-	-	-	-	-	-	4.80	1.10	2.80	5.40	2.90	2.80				
					-	-	-	-	-	-	5.20	0.40	3.00	5.80	2.10	3.10				
	136. 125. xx. A2	○	○	0.50	0.80	4.70	1.50	1.20	7.00	1.80	2.80	9.10	3.30	3.40	10.60	3.90	1.40	0.70	55	90
					1.20	4.40	1.90	1.60	6.60	2.20	3.20	8.70	3.70	3.80	10.30	4.30	2.20	1.50	55	95
					1.60	4.00	2.30	2.00	6.20	2.60	3.60	8.40	4.10	4.20	9.90	4.60	2.80	2.00	55	100
					2.00	3.50	2.60	2.40	5.80	3.00	4.00	8.00	4.50	4.60	9.60	5.00	3.40	3.00	60	100
					2.40	3.00	3.00	2.80	5.40	3.40	4.40	7.70	4.80	5.00	9.30	5.40	4.20	4.00	60	100
					2.80	2.70	3.20	3.20	4.90	3.70	4.80	7.30	5.20	5.40	8.90	5.80				
					3.20	2.00	3.70	3.60	4.40	4.10	5.20	7.00	5.60	5.80	8.60	6.10				
					3.60	1.60	4.10	4.00	3.90	4.50	5.60	6.60	5.90	-	-	-				
					4.00	1.30	4.50	4.40	3.50	4.80	6.00	6.20	6.30	-	-	-				
					4.40	1.00	4.90	4.80	3.10	5.20	-	-	-	-	-	-				
					4.80	0.60	5.20	5.20	2.70	5.60	-	-	-	-	-	-				
					-	-	-	5.60	2.30	5.90	-	-	-	-	-	-				
					-	-	-	6.00	1.90	6.30	-	-	-	-	-	-				

E = narrowest free cross section (water)

Continued on next page.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 115. xx. A2	+	1Y	=	136. 115. 1Y. A2

Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 136.1

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure **p** [bar] 0.7 **p** Air [bar]	0.7 $\dot{V}$ Water [l/h]	0.7 $\dot{V}_n$ Air [m³/h]	1.5 **p** Air [bar]	1.5 $\dot{V}$ Water [l/h]	1.5 $\dot{V}_n$ Air [m³/h]	3.0 **p** Air [bar]	3.0 $\dot{V}$ Water [l/h]	3.0 $\dot{V}_n$ Air [m³/h]	4.0 **p** Air [bar]	4.0 $\dot{V}$ Water [l/h]	4.0 $\dot{V}_n$ Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	D_1 [mm]	D_2 [mm]
20°	**136. 134. xx. A2**	○	○	0.7	1.20	13.20	2.70	2.00	19.40	3.90	3.00	28.30	5.20	3.80	32.60	6.20	1.80	0.70	55	95
					1.60	12.40	3.30	2.40	18.10	4.40	3.40	27.50	5.70	4.20	32.00	6.80	2.80	1.50	60	105
					2.00	11.80	3.90	2.80	17.30	4.90	3.80	26.70	6.30	4.60	31.30	7.30	3.80	2.00	60	105
					2.40	11.40	4.40	3.20	16.70	5.50	4.20	25.90	6.80	5.00	30.60	7.80	5.20	3.00	65	110
					2.80	11.10	4.90	3.60	16.10	6.00	4.60	25.00	7.30	5.40	29.90	8.40	6.00	4.00	65	110
					3.20	10.80	5.50	4.00	15.60	6.50	5.00	24.20	7.80	5.80	29.30	8.90				
					3.60	10.60	6.00	4.40	15.20	7.00	5.40	23.60	8.40	-	-	-				
					4.00	10.40	6.50	4.80	15.00	7.60	5.80	23.10	8.90	-	-	-				
					4.40	10.10	7.00	5.20	14.60	8.10	-	-	-	-	-	-				
					4.80	9.90	7.60	5.60	14.10	8.60	-	-	-	-	-	-				
					5.20	9.50	8.10	6.00	13.80	9.10	-	-	-	-	-	-				
					5.60	9.00	8.60	-	-	-	-	-	-	-	-	-				
					6.00	8.50	9.20	-	-	-	-	-	-	-	-	-				
	136. 142. xx. A2	○	○	2.5	1.40	24.20	5.10	1.60	53.40	4.70	3.20	70.80	8.00	3.80	93.20	9.20	0.80	0.70	60	100
					1.80	20.40	6.30	2.00	42.60	5.90	3.60	62.50	9.20	4.20	83.10	10.10	1.60	1.50	65	105
					2.20	20.00	7.20	2.40	35.30	7.20	4.00	55.70	10.60	4.60	75.30	11.30	3.00	2.00	60	105
					2.60	19.30	8.20	2.80	30.40	8.40	4.40	49.30	11.70	5.00	69.00	12.50	4.00	3.00	65	110
					3.00	17.60	9.30	3.20	28.60	9.50	4.80	44.60	12.90	5.40	63.40	13.70	6.00	4.00	65	110
					3.40	16.50	10.40	3.60	28.20	10.50	5.20	41.90	14.10	5.80	57.50	14.90				
					3.80	17.00	11.40	4.00	27.30	11.50	5.60	40.40	15.10	-	-	-				
					4.20	16.30	12.40	4.40	25.90	12.50	6.00	39.70	16.10	-	-	-				
					4.60	15.10	13.30	4.80	24.30	13.50	-	-	-	-	-	-				
					5.00	14.00	14.30	5.20	22.30	14.60	-	-	-	-	-	-				
					5.40	13.10	15.30	5.60	21.80	15.70	-	-	-	-	-	-				
					5.80	12.40	16.20	6.00	21.40	16.70	-	-	-	-	-	-				

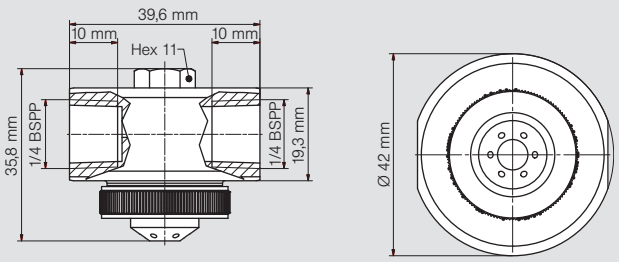
E = narrowest free cross section (water)

Example for ordering:	**Type** **136. 134. xx. A2**	**+**	**Material no. (xx)** **1Y**	**=**	**Ordering no.** **136. 134. 1Y. A2**

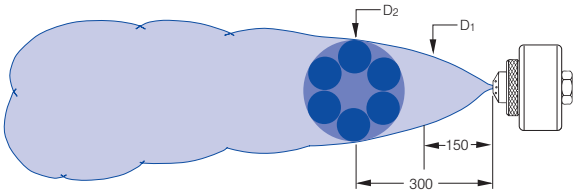
Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 136.2

Fine full cone atomization and fogging with air or gas.
Especially wide spray angle of 60°.
Pressure principle.
Internal mixing of fluids.
Applications:
Humidification of air, cooling.

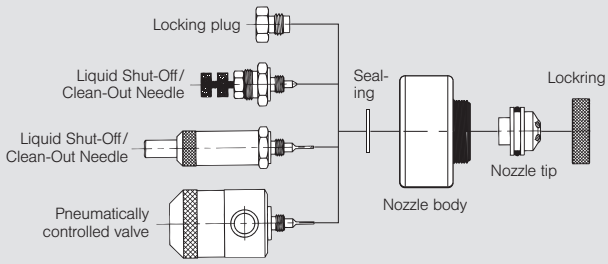
Series 136.2



Weight brass: 200 g



Series 136.2



Accessories for series 136 please refer to page 1.28

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure p [bar] 0.7 p Air [bar]	0.7 V̇ Water [l/h]	0.7 V̇n Air [m³/h]	1.5 p Air [bar]	1.5 V̇ Water [l/h]	1.5 V̇n Air [m³/h]	3.0 p Air [bar]	3.0 V̇ Water [l/h]	3.0 V̇n Air [m³/h]	4.0 p Air [bar]	4.0 V̇ Water [l/h]	4.0 V̇n Air [m³/h]	Spray dimensions p Air [bar]	p Water [bar]	D1 [mm]	D2 [mm]
60°	136. 215. xx. A2	○	○	0.5	1.00	3.00	1.30	1.60	5.80	1.70	2.80	8.50	2.40	3.80	9.40	3.10	1.00	0.70	200	330
					1.20	1.80	1.50	1.80	4.90	1.90	3.20	7.20	2.80	4.20	8.20	3.50	1.60	1.50	230	380
					1.40	0.70	1.80	2.00	3.80	2.10	3.60	5.70	3.20	4.60	6.90	3.90	2.40	2.00	230	385
					-	-	-	2.20	2.80	2.30	4.00	4.00	3.60	5.00	5.40	4.20	3.20	3.00	245	390
					-	-	-	2.40	1.70	2.50	4.40	2.20	4.10	5.40	3.80	4.70	4.20	4.00	250	410
					-	-	-	2.60	0.80	2.80	4.80	0.80	4.50	5.80	2.30	5.20				
					-	-	-	-	-	-	5.00	0.40	4.60	6.00	1.40	5.60				
	136. 222. xx. A2	○	○	1.0	0.80	17.50	2.80	1.60	25.90	4.00	3.00	40.40	5.80	3.80	54.90	6.40	0.80	0.70	250	450
					1.00	6.00	4.30	1.80	14.70	5.30	3.20	31.50	6.90	4.00	45.60	7.30	1.60	1.50	245	465
					-	-	-	2.00	6.70	6.70	3.40	22.20	8.20	4.20	37.60	8.50	2.30	2.00	245	465
					-	-	-	2.20	1.90	8.10	3.60	14.60	9.50	4.40	29.60	9.70	3.20	3.00	250	465
					-	-	-	-	-	-	3.80	8.50	11.00	4.60	21.60	11.20	4.20	4.00	245	465
					-	-	-	-	-	-	4.00	4.50	12.30	4.80	15.30	12.40				
					-	-	-	-	-	-	-	-	-	5.00	9.70	13.80				
					-	-	-	-	-	-	-	-	-	5.20	6.00	15.20				
					-	-	-	-	-	-	-	-	-	5.40	2.90	16.50				
	136. 231. xx. A2	○	○	1.4	1.60	25.60	5.10	2.60	44.20	7.00	3.60	93.70	7.90	4.20	132.90	7.30	2.00	0.70	235	380
					2.00	17.80	6.20	3.00	33.00	8.20	4.00	78.30	9.30	4.60	117.20	9.00	2.60	1.50	245	415
					2.40	11.30	7.20	3.40	24.70	9.20	4.40	65.80	10.60	5.00	101.10	10.40	2.40	2.00	255	420
					2.80	6.90	8.10	3.80	18.10	10.20	4.80	54.90	11.90	5.40	87.90	11.80	3.60	3.00	255	425
					-	-	-	4.20	13.20	11.20	5.20	45.60	13.00	5.80	76.60	13.20	4.20	4.00	265	430
					-	-	-	4.60	9.30	12.00	5.60	38.00	14.10	6.00	71.20	13.80				
					-	-	-	-	-	-	6.00	36.10	14.40	-	-	-				

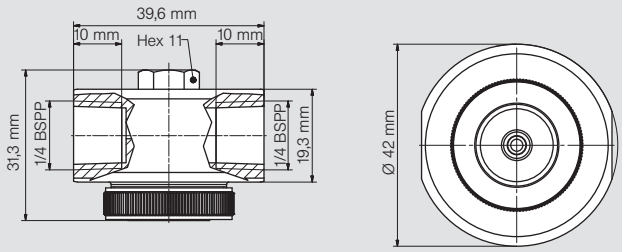
E = narrowest free cross section (water)

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 215. xx. A2	+	1Y	=	136. 215. 1Y. A2

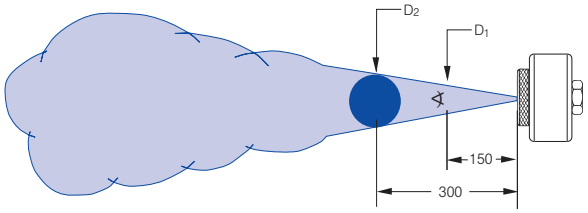
Pneumatic atomizing nozzles, Full cone, siphon principle, external mixing Series 136.3

Particularly fine full cone atomization with air or gas.
Siphon principle.
External mixing of fluids.
Applications:
Chemical industry, cooling, atomization of viscous liquids.

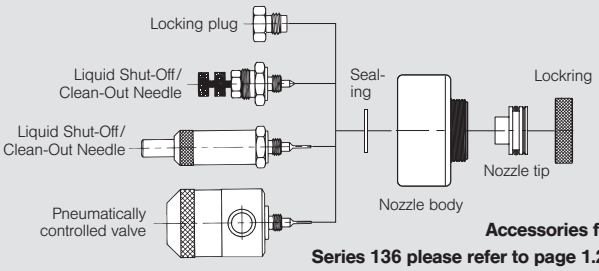
Series 136.3



Weight brass: 200 g



Series 136.3



Accessories for Series 136 please refer to page 1.28

Spray angle A	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Air p [bar]	Air $\dot{V}_n$ [m³/h]	$\dot{V}$ Water [l/h] Water column [mm WS] 150	300	450	Aspiration height [mm WS] 100	200	300	600	900	Spray dimensions p_{Air} [bar]	Aspiration-height [mm WS]	D_1 [mm]	D_2 [mm]
20°	136. 316. xx. A2	○	○	0.4	0.6	0.70	-	1.38	1.32	-	-	-	-	-	1.40	300	60	110
					0.8	0.90	1.29	1.44	1.38	-	-	-	-	-	3.20	300	60	120
					1.20	1.10	1.47	1.62	1.53	1.02	0.84	-	-	-	4.80	300	80	135
					1.40	1.20	1.50	1.68	1.62	1.14	0.96	0.66	-	-	6.00	300	70	120
					1.80	1.40	1.62	1.80	1.71	1.26	1.11	0.90	-	-				
					2.00	1.60	1.68	1.86	1.77	1.32	1.17	0.96	-	-				
					2.40	1.80	1.74	1.92	1.86	1.44	1.32	1.14	0.51	-				
					2.60	1.90	1.80	1.98	1.89	1.50	1.32	1.20	0.63	-				
					3.00	2.10	1.92	2.07	1.95	1.59	1.44	1.29	0.84	0.39				
					3.20	2.20	1.95	2.10	1.98	1.65	1.50	1.35	0.96	0.48				
					3.60	2.40	2.07	2.19	2.10	1.80	1.65	1.50	1.14	0.72				
					3.80	2.60	2.13	2.25	2.16	1.83	1.71	1.59	1.23	0.81				
					4.20	2.80	2.22	2.37	2.28	1.95	1.80	1.68	1.38	1.08				
					4.40	2.90	2.25	2.40	2.34	1.98	1.89	1.77	1.44	1.14				
					4.80	3.10	2.25	2.34	2.28	1.92	1.86	1.77	1.50	1.14				
					5.00	3.20	2.25	2.31	2.22	1.89	1.83	1.71	1.41	0.84				
					5.40	3.40	2.13	2.25	2.16	1.80	1.68	1.56	1.05	0.30				
					5.60	3.60	2.07	2.19	2.10	1.74	1.65	1.44	0.72	-				
					6.00	3.80	1.98	2.10	1.95	1.56	1.50	1.26	-	-				

E = narrowest free cross section (water)

Continued on next page.

Operational information:
Liquid flow of pneumatic atomizing nozzles with external mixing can be turned down to 0 with air pressure remaining constant.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 316. xx. A2	+	1Y	=	136. 316. 1Y. A2

Pneumatic atomizing nozzles, Full cone, siphon principle, external mixing Series 136.3

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Air p [bar]	Air $\dot{V}_n$ [m³/h]	$\dot{V}$ Water [l/h] Water column [mm WS] 150	300	450	Aspiration height [mm WS] 100	200	300	600	900	Spray dimensions p_{Air} [bar]	Aspiration-height [mm WS]	D_1 [mm]	D_2 [mm]
20°	136. 324. xx. A2	○	○	0.7	0.80	0.90	-	-	-	2.49	1.71	-	-	-	1.20	300	60	115
					1.20	1.10	-	-	-	3.12	2.53	1.86	-	-	3.20	300	65	125
					1.40	1.20	-	-	-	3.36	2.78	2.22	-	-	4.80	300	70	135
					1.80	1.50	-	-	-	3.75	3.22	2.67	-	-	6.00	300	80	135
					2.00	1.60	-	-	-	3.96	3.39	2.85	0.66	-				
					2.40	1.80	-	-	-	4.29	3.73	3.21	1.41	-				
					2.60	1.90	-	-	-	4.41	3.91	3.39	1.68	-				
					3.00	2.10	5.43	-	-	4.71	4.18	3.75	2.07	-				
					3.20	2.20	5.55	-	-	4.80	4.31	3.90	2.25	-				
					3.60	2.40	5.82	-	-	5.07	4.56	4.20	2.61	-				
					3.80	2.60	6.03	-	-	5.22	4.72	4.38	2.88	2.10				
					4.20	2.80	6.30	6.66	-	5.64	5.15	4.71	3.21	2.85				
					4.40	2.90	6.36	6.72	7.05	5.88	5.38	4.92	3.60	2.97				
					4.80	3.10	6.27	6.57	6.84	5.97	5.47	5.22	3.93	1.93				
					5.00	3.20	6.12	6.42	6.75	5.88	5.36	5.10	4.05	-				
					5.40	3.40	5.82	6.12	6.48	5.49	5.03	4.71	3.81	-				
					5.60	3.50	5.67	5.97	6.30	5.22	4.84	4.53	3.63	-				
					6.00	3.80	5.31	5.58	6.00	4.80	4.48	4.08	1.92	-				
	136. 334. xx. A2	○	○	0.7	0.60	1.20	-	-	-	2.19	-	-	-	-	0.80	300	65	120
					0.80	1.40	-	-	-	2.64	2.28	1.44	-	-	3.20	300	65	115
					1.20	1.80	-	-	-	3.39	3.00	2.73	0.78	-	4.80	300	70	115
					1.40	2.00	-	-	-	3.69	3.33	3.06	1.11	-	6.00	300	75	120
					1.80	2.30	5.19	-	-	4.20	3.87	3.51	2.16	-				
					2.00	2.50	5.43	5.97	6.42	4.47	4.08	3.78	2.58	0.84				
					2.40	2.80	5.79	6.27	6.72	4.86	4.53	4.20	3.30	1.44				
					2.60	3.00	6.00	6.48	6.90	4.98	4.68	4.41	3.57	1.77				
					3.00	3.40	6.30	6.75	7.14	5.37	5.07	4.71	3.87	2.31				
					3.20	3.50	6.42	6.90	7.29	5.52	5.19	4.89	4.02	2.52				
					3.60	3.90	6.75	7.17	7.59	5.82	5.55	5.19	4.29	3.42				
					3.80	4.00	6.87	7.32	7.80	6.03	5.73	5.37	4.47	3.81				
					4.20	4.40	7.29	7.80	8.34	6.39	6.09	5.79	4.83	4.17				
					4.40	4.60	7.62	8.16	8.73	6.69	6.39	6.09	5.13	4.38				
					4.80	4.90	8.37	8.85	9.21	7.32	6.99	6.69	5.76	4.86				
					5.00	5.10	8.52	8.85	9.15	7.71	7.32	7.05	6.06	5.19				
					5.40	5.40	8.34	8.64	8.88	7.71	7.53	7.29	6.48	5.67				
					5.60	5.60	8.19	8.49	8.76	7.59	7.41	7.20	6.45	5.73				
					6.00	5.90	7.86	8.16	8.43	7.26	7.05	6.84	6.15	5.64				

E = narrowest free cross section (water)

Continued on next page.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 324. xx. A2	+	1Y	=	136. 324. 1Y. A2

Pneumatic atomizing nozzles, Full cone, siphon principle, external mixing Series 136.3

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Air p [bar]	Air $\dot{V}_n$ [m³/h]	$\dot{V}$ Water [l/h] Water column [mm WS] 150	300	450	Aspiration height [mm WS] 100	200	300	600	900	Spray dimensions p_{Air} [bar]	Aspiration-height [mm WS]	D_1 [mm]	D_2 [mm]
20°	136. 342. xx. A2	○	○	1.5	1.40	3.60	-	-	-	8.82	-	-	3.93	-	1.80	300	70	120
					1.80	4.20	-	-	-	9.45	8.49	7.5	5.22	3.39	3.00	300	70	120
					2.00	4.50	11.97	-	-	9.75	8.91	7.95	5.76	4.05	4.20	300	70	120
					2.40	5.20	12.18	-	-	10.26	9.51	8.73	6.75	5.19	6.00	300	70	120
					2.60	5.50	12.27	13.32	-	10.47	9.75	9.03	7.14	5.58				
					3.00	6.10	12.27	13.23	14.16	10.65	10.05	9.42	7.74	6.39				
					3.20	6.40	12.30	13.17	14.07	10.74	10.23	9.63	8.13	6.81				
					3.60	7.00	12.42	13.20	14.07	11.01	10.53	10.05	8.85	7.86				
					3.80	7.30	12.54	13.26	14.10	11.28	10.86	10.44	9.30	8.46				
					4.20	8.00	13.17	13.83	14.49	12.12	11.76	11.40	10.41	9.69				
					4.40	8.30	13.53	14.13	14.73	12.48	12.15	11.76	10.80	10.08				
					4.80	8.90	13.98	14.52	15.15	12.99	12.63	12.18	11.19	10.29				
					5.00	9.20	14.04	14.52	15.15	13.05	12.66	12.30	11.16	10.11				
					5.40	9.80	13.74	14.31	14.94	12.66	12.24	11.79	10.62	9.21				
					5.60	10.10	13.35	14.04	14.64	12.27	11.82	11.37	10.08	8.52				
					6.00	10.80	12.21	12.90	-	10.98	10.50	10.17	8.70	7.05				
	136. 351. xx. A2	○	○	2.5	3.20	11.50	-	-	-	-	38.92	-	-	-	3.80	300	95	135
					3.60	12.50	-	-	-	45.73	41.94	-	33.17	-	4.60	300	95	145
					3.80	13.10	-	-	-	47.81	45.14	42.29	35.36	-	5.40	300	100	150
					4.20	14.20	-	-	-	51.61	49.07	46.46	39.58	29.94	6.00	300	95	150
					4.40	14.80	-	-	-	53.10	50.87	48.30	41.59	31.59				
					4.80	15.90	-	63.39	-	55.30	53.40	51.26	45.06	34.68				
					5.00	16.50	-	63.75	66.69	56.05	54.15	52.18	46.29	35.88				
					5.40	17.60	61.12	64.17	66.72	56.71	55.04	53.17	47.62	37.83				
					5.60	18.10	60.93	63.87	66.48	56.66	55.04	53.22	47.68	38.43				
					6.00	19.20	59.89	62.88	65.43	55.69	53.98	52.11	45.78	37.05				

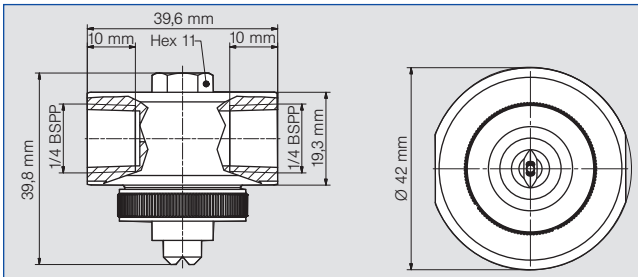
E = narrowest free cross section (water)

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 342. xx. A2	+	1Y	=	136. 342. 1Y. A2

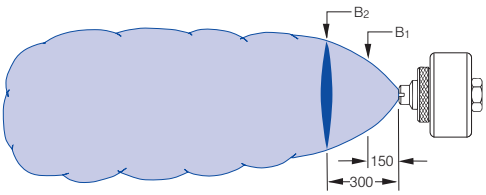
Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing Series 136.4

Particularly fine flat fan atomization with air or gas. Siphon principle. Internal mixing of fluids.
Applications:
Web dampening, cooling, humidification of goods.

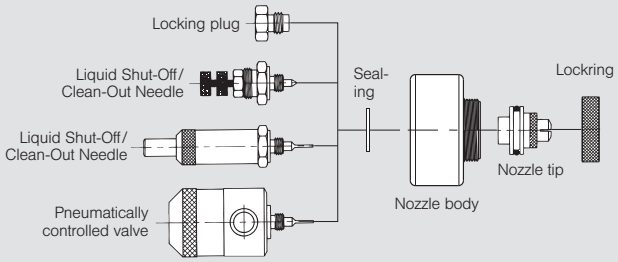
Series 136.4



Weight brass: 200 g



Series 136.4



Accessories for series 136 please refer to page 1.28

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure p [bar] 0.7 p Air [bar]	0.7 V̇ Water [l/h]	0.7 V̇n Air [m³/h]	1.5 p Air [bar]	1.5 V̇ Water [l/h]	1.5 V̇n Air [m³/h]	3.0 p Air [bar]	3.0 V̇ Water [l/h]	3.0 V̇n Air [m³/h]	4.0 p Air [bar]	4.0 V̇ Water [l/h]	4.0 V̇n Air [m³/h]	Spray dimensions p Air [bar]	p Water [bar]	B1 [mm]	B2 [mm]
45°	136. 414. xx. A2	○	○	0.7	1.00	7.70	1.30	1.40	14.30	1.50	2.20	22.40	2.00	3.00	25.10	2.50	1.40	0.70	85	125
					1.20	6.00	1.50	1.60	13.00	1.60	2.60	20.00	2.30	3.40	23.00	2.80	2.40	1.50	100	145
					1.40	4.20	1.70	1.80	11.60	1.80	3.00	17.70	2.60	3.80	20.90	3.10	3.20	2.00	105	155
					1.60	2.70	1.90	2.00	10.20	2.00	3.40	15.50	3.00	4.20	18.90	3.50	3.80	3.00	120	170
					1.80	1.30	2.10	2.20	8.90	2.20	3.80	13.30	3.40	4.60	16.90	3.80	4.60	4.00	130	210
					-	-	-	2.40	7.40	2.40	4.20	11.00	3.70	5.00	14.90	4.20				
					-	-	-	2.60	5.90	2.60	4.60	8.80	4.10	5.40	12.80	4.60				
					-	-	-	2.80	4.60	2.80	5.00	6.60	4.50	5.80	10.80	5.00				
					-	-	-	3.00	3.20	3.00	5.40	4.30	4.90	6.00	9.80	5.20				
					-	-	-	3.20	2.10	3.20	5.80	2.50	5.30	-	-	-				
					-	-	-	3.40	1.10	3.40	6.00	1.60	5.50	-	-	-				
	136. 443. xx. A2	○	○	1.0	1.20	13.90	1.50	1.60	26.60	1.60	3.00	37.10	2.60	3.60	45.60	2.90	1.20	0.70	110	165
					1.40	11.90	1.70	1.80	24.30	1.80	3.40	33.10	3.00	4.00	41.90	3.30	2.00	1.50	115	190
					1.60	9.50	1.90	2.00	22.00	2.00	3.80	29.50	3.40	4.40	38.30	3.70	2.80	2.00	145	190
					1.80	7.80	2.10	2.20	19.90	2.20	4.20	26.20	3.80	4.80	35.00	4.00	3.80	3.00	150	210
					-	-	-	2.40	18.00	2.40	4.60	23.00	4.20	5.20	31.80	4.50	4.80	4.00	160	230
					-	-	-	2.60	16.20	2.60	5.00	20.20	4.60	5.60	29.00	4.90				
					-	-	-	2.80	14.40	2.80	5.40	17.60	4.90	6.00	26.20	5.20				
					-	-	-	3.00	12.80	3.00	5.80	14.90	5.30	-	-	-				
					-	-	-	3.20	11.30	3.20	6.00	14.10	5.50	-	-	-				
					-	-	-	3.40	9.90	3.40	-	-	-	-	-	-				
					-	-	-	3.60	8.80	3.60	-	-	-	-	-	-				

E = narrowest free cross section (water)

Continued on next page.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 414. xx. A2	+	1Y	=	136. 414. 1Y. A2

Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing Series 136.4

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure **p** [bar] 0.7 p Air [bar]	0.7 V̇ Water [l/h]	0.7 V̇n Air [m³/h]	1.5 p Air [bar]	1.5 V̇ Water [l/h]	1.5 V̇n Air [m³/h]	3.0 p Air [bar]	3.0 V̇ Water [l/h]	3.0 V̇n Air [m³/h]	4.0 p Air [bar]	4.0 V̇ Water [l/h]	4.0 V̇n Air [m³/h]	Spray dimensions p Air [bar]	p Water [bar]	B1 [mm]	B2 [mm]
45°	136. 462. xx. A2	○	○	1.5	1.20	19.00	2.60	2.00	22.00	2.00	3.00	61.80	4.00	3.80	76.10	4.60	1.20	0.70	120	140
					1.60	12.20	3.40	2.40	18.00	2.40	3.40	51.90	4.80	4.00	70.40	5.10	2.40	1.50	120	170
					2.00	9.40	4.10	2.80	14.40	2.80	3.80	44.60	5.80	4.20	65.60	5.50	3.20	2.00	120	175
					2.40	7.10	4.80	3.20	11.30	3.20	4.20	39.00	6.60	4.40	61.30	5.90	3.80	3.00	140	205
					2.80	5.70	5.40	3.60	8.80	3.60	4.60	33.40	7.40	4.60	57.30	6.40	6.00	4.00	145	205
					3.20	5.00	6.00	4.00	8.10	3.90	5.00	29.40	8.10	4.80	54.10	6.70				
					3.60	3.60	6.60	4.40	6.20	4.30	5.40	25.50	8.90	5.00	51.30	7.20				
					4.00	3.20	7.20	4.80	4.60	4.60	5.80	22.00	9.60	5.20	49.30	7.70				
					4.40	2.20	7.80	5.20	3.20	4.90	6.00	20.60	9.90	5.40	46.50	8.20				
					-	-	-	5.60	1.60	5.30	-	-	-	5.60	43.70	8.60				
					-	-	-	5.80	0.80	5.40	-	-	-	5.80	41.30	8.90				
					-	-	-	-	-	-	-	-	-	6.00	39.00	9.30				
60°	136. 425. xx. A2	○	○	0.5	080	6.50	1.20	1.40	9.40	1.70	2.40	13.20	2.50	2.40	16.10	2.50	1.20	0.70	155	195
					1.20	5.50	1.60	1.80	8.70	2.10	2.60	12.90	2.70	2.80	15.50	2.90	2.20	1.50	165	255
					1.60	4.70	1.90	2.20	7.90	2.40	3.00	12.30	3.00	3.20	15.00	3.20	3.00	2.00	170	265
					2.00	4.00	2.30	2.60	7.20	2.70	3.40	11.80	3.40	3.60	14.50	3.50	3.40	3.00	200	330
					2.40	3.20	2.60	3.00	6.40	3.10	3.80	11.10	3.70	4.00	13.90	3.80	5.60	4.00	200	330
					2.80	2.60	2.90	3.40	5.70	3.40	4.20	10.40	4.00	4.40	13.40	4.10				
					3.00	2.20	3.10	3.80	5.10	3.70	4.60	9.80	4.30	4.80	12.80	4.50				
					-	-	-	4.00	4.80	3.90	5.00	9.20	4.60	5.20	12.20	4.80				
					-	-	-	4.40	4.20	4.20	5.40	8.60	5.00	5.60	11.70	5.10				
					-	-	-	4.80	3.60	4.50	5.80	8.10	5.30	6.00	11.20	5.40				
					-	-	-	5.20	2.80	4.80	6.00	7.80	5.40	-	-	-				
					-	-	-	5.60	2.20	5.10	-	-	-	-	-	-				
					-	-	-	6.00	1.60	5.50	-	-	-	-	-	-				
	136. 452. xx. A2	○	○	1.5	1.00	18.80	3.90	1.80	31.00	5.30	3.20	50.10	7.70	3.80	70.70	8.20	1.00	0.70	130	185
					1.40	8.60	5.70	2.00	25.40	6.30	3.60	39.50	9.40	4.20	58.60	9.60	1.80	1.50	150	240
					1.80	7.40	7.00	2.20	20.10	7.20	4.00	31.30	11.20	4.60	48.60	11.20	2.60	2.00	155	245
					2.20	4.10	8.40	2.40	15.50	8.00	4.40	24.00	12.90	5.00	41.20	13.10	3.60	3.00	175	280
					2.60	1.00	9.80	2.60	12.40	8.90	4.80	17.70	14.50	5.40	33.60	14.80	5.00	4.00	180	285
					2.80	0.10	10.30	2.80	10.40	9.60	5.20	13.40	16.00	5.80	27.50	16.40				
					-	-	-	-	-	-	5.60	10.60	17.50	6.00	24.40	17.20				
					-	-	-	-	-	-	6.00	8.60	18.80	-	-	-				
80°	136. 433. xx. A2	○	○	0.4	1.00	11.60	2.00	1.80	18.30	2.80	3.00	31.00	3.70	3.80	37.50	4.40	1.40	0.70	150	210
					1.20	8.10	2.40	2.00	15.30	3.20	3.40	25.40	4.40	4.20	32.40	5.00	2.20	1.50	185	255
					1.40	5.30	2.80	2.20	12.20	3.60	3.80	20.60	5.10	4.60	27.70	5.70	3.00	2.00	205	300
					1.60	3.70	3.20	2.40	9.80	4.00	4.20	16.30	5.90	5.00	23.40	6.50	3.80	4.00	300	485
					-	-	-	2.60	7.60	4.30	4.60	12.50	6.60	5.40	19.40	7.20	5.20	4.00	260	395
					-	-	-	2.80	5.90	4.70	5.00	9.30	7.30	5.80	15.90	7.90				
					-	-	-	3.00	4.40	5.00	5.40	6.50	8.00	6.00	14.20	8.30				

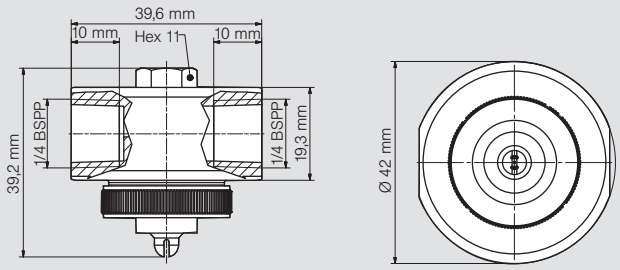
E = narrowest free cross section (water)

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 462. xx. A2	+	**1Y**	=	**136. 462. 1Y. A2**

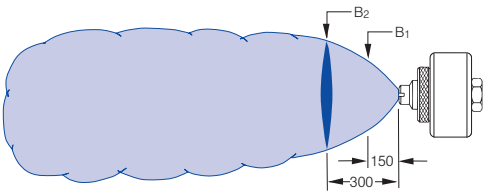
Pneumatic atomizing nozzles, Flat fan, siphon principle, internal mixing Series 136.5

Particularly fine flat fan atomization with air or gas.
Siphon principle.
Internal mixing of fluids.
Applications:
Web dampening, cooling, humidification of goods.

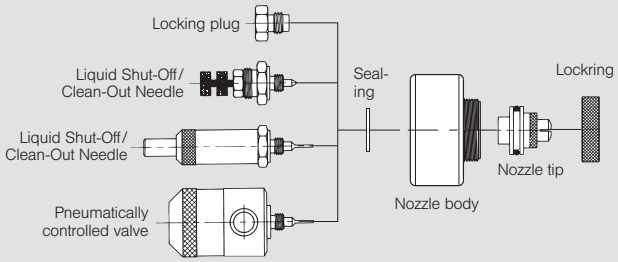
Series 136.5



Weight brass: 200 g



Series 136.5



Accessories for series 136 please refer to page 1.28

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Air p [bar]	Air $\dot{V}_n$ [m³/h]	Liquid pressure p [bar] Water column [mm WS] 150	300	450	Aspiration height [mm WS] 100	200	300	600	900	Spray dimensions p_{Air} [bar]	Aspiration-height [mm WS]	Spray width B_1 [mm]	Spray width B_2 [mm]
60°	136. 516. xx. A2	○	○	0.4	0.80	1.80	-	-	-	1.62	1.53	-	1.17	0.88	1.00	300	130	165
					1.20	2.20	1.89	2.13	2.19	1.80	1.77	1.68	1.41	1.16	3.00	300	150	200
					1.40	2.50	1.95	2.16	2.25	1.86	1.80	1.68	1.47	1.21	4.60	300	170	225
					1.80	2.90	1.98	2.22	2.34	1.89	1.86	1.77	1.53	1.26	6.00	300	180	240
					2.00	3.10	1.95	2.19	2.31	1.89	1.80	1.68	1.50	1.26				
					2.40	3.50	1.89	2.25	2.25	1.83	1.71	1.68	1.47	1.22				
					2.60	3.70	1.83	2.25	2.25	1.74	1.71	1.59	1.44	1.18				
					3.00	4.20	1.74	2.01	2.22	1.71	1.62	1.56	1.44	1.28				
					3.20	4.40	1.71	1.92	2.16	1.65	1.62	1.59	1.59	1.38				
					3.60	4.80	1.74	1.83	2.10	1.80	1.77	1.74	1.68	1.47				
					3.80	5.00	1.92	1.80	2.10	1.86	1.86	1.80	1.71	1.49				
					4.20	5.50	1.98	2.04	2.19	1.92	1.83	1.83	1.68	1.70				
					4.40	5.70	1.95	2.04	2.19	1.89	1.86	1.80	1.74	1.77				
					4.80	6.10	2.01	2.04	2.16	2.01	2.01	2.04	2.04	1.98				
					5.00	6.30	2.10	2.13	2.22	2.19	2.19	2.16	2.10	1.93				
					5.40	6.80	2.31	2.34	2.28	2.25	2.22	2.16	2.04	1.86				
					5.60	7.00	2.31	2.28	2.25	2.19	2.16	2.10	2.01	1.80				
					6.00	7.40	2.22	2.22	2.22	2.10	2.10	2.04	1.92	1.79				

E = narrowest free cross section (water)

Continued on next page.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 516. xx. A2	+	1Y	=	136. 516. 1Y. A2

Operational information:
Liquid flow of pneumatic atomizing nozzles with external mixing can be turned down to 0 with air pressure remaining constant.

Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing Series 136.5

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Air p [bar]	Air $\dot{V}_n$ [m³/h]	$\dot{V}$ Water [l/h] Water column [mm WS] 150	300	450	Aspiration height [mm WS] 100	200	300	600	900	Spray dimensions p_{Air} [bar]	Aspiration-height [mm WS]	B_1 [mm]	B_2 [mm]
60°	136. 525. xx. A2	○	○	0.5	0.60	1.60	-	-	-	2.00	-	-	-	-	1.00	300	155	240
					0.80	1.90	-	-	-	2.21	2.10	1.98	-	-	3.00	300	200	295
					1.20	2.30	2.75	2.84	-	2.53	2.39	2.33	2.04	1.69	4.60	300	215	325
					1.40	2.60	2.84	2.90	3.05	2.63	2.51	2.42	2.14	1.82	6.00	300	250	400
					1.80	3.00	2.96	3.01	3.16	2.78	2.64	2.56	2.20	1.88				
					2.00	3.30	2.94	3.02	3.16	2.73	2.69	2.58	2.18	1.82				
					2.40	3.70	2.87	2.97	3.10	2.59	2.50	2.38	2.01	1.68				
					2.60	3.90	2.82	2.86	3.04	2.49	2.46	2.29	1.91	1.62				
					3.00	4.40	2.59	2.71	2.85	2.23	2.11	2.04	1.73	1.72				
					3.20	4.60	2.48	2.51	2.71	2.09	1.96	1.91	1.74	1.87				
					3.60	5.10	2.37	2.31	2.51	2.25	2.18	2.19	1.98	1.90				
					3.80	5.30	2.34	2.37	2.52	2.22	2.23	2.15	1.99	1.85				
					4.20	5.70	2.35	2.35	2.43	2.20	2.13	2.11	1.94	1.82				
					4.40	6.00	2.30	2.32	2.44	2.20	2.07	2.05	1.96	1.83				
					4.80	6.40	2.25	2.24	2.41	2.12	2.03	2.08	1.90	2.12				
					5.00	6.60	2.20	2.21	2.37	2.09	2.03	1.98	2.25	2.27				
					5.40	7.10	2.52	2.23	2.36	2.60	2.55	2.49	2.26	2.08				
					5.60	7.30	2.50	2.45	2.58	2.57	2.54	2.39	2.16	2.02				
					6.00	7.80	2.57	2.61	2.76	2.37	2.40	2.18	1.94	1.80				

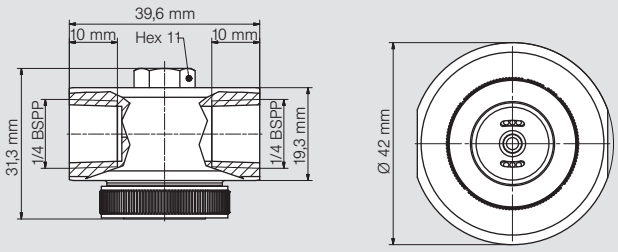
E = narrowest free cross section (water)

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 525. xx. A2	+	1Y	=	136. 525. 1Y. A2

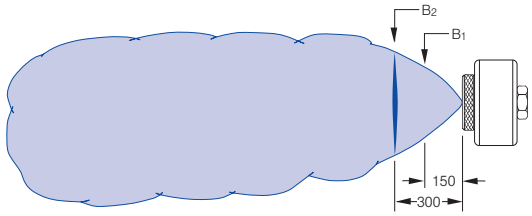
Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing Series 136.6

Fine flat fan atomization with the aid of air or gas. Liquid pressure principle. External mixing of fluids.
Applications:
Web dampening, cooling, humidification of goods, atomization of viscous liquids.

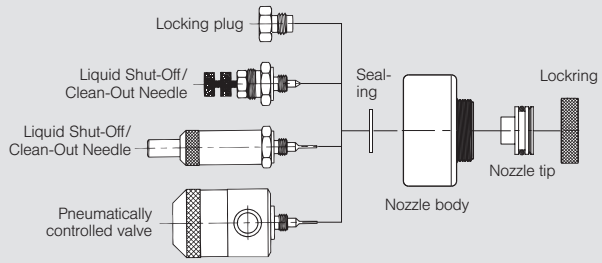
Series 136.6



Weight brass: 200 g



Series 136.6



Accessories for series 136 please refer to page 1.28

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure **p** [bar] 0.07 **p** Air [bar]	0.07 $\dot{V}$ Water [l/h]	0.07 $\dot{V}_n$ Air [m³/h]	0.15 **p** Air [bar]	0.15 $\dot{V}$ Water [l/h]	0.15 $\dot{V}_n$ Air [m³/h]	0.30 **p** Air [bar]	0.30 $\dot{V}$ Water [l/h]	0.30 $\dot{V}_n$ Air [m³/h]	0.35 **p** Air [bar]	0.35 $\dot{V}$ Water [l/h]	0.35 $\dot{V}_n$ Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	B_1 [mm]	B_2 [mm]
45°	136. 616. xx. A2	○	○	0.4	0.80	1.68	2.50	0.80	2.43	2.40	0.80	3.42	2.50	1.00	3.69	2.80	1.40	0.07	80	115
					1.20	1.80	3.10	1.00	2.46	2.90	1.20	3.48	3.10	1.40	3.81	3.40	2.20	0.15	90	130
					1.60	1.92	3.70	1.40	2.58	3.60	1.60	3.51	3.70	1.80	3.87	4.00	3.20	0.20	90	135
					2.00	2.10	4.30	1.80	2.61	4.20	2.00	3.63	4.30	2.20	3.84	4.60	4.00	0.30	95	145
					2.40	2.07	4.90	2.20	2.76	4.80	2.40	3.63	4.90	2.60	3.90	5.20	5.00	0.35	100	145
					2.80	2.19	5.50	2.60	2.73	5.40	2.80	3.63	5.50	3.00	3.93	5.80				
					3.20	2.19	6.10	3.00	2.73	6.00	3.20	3.63	6.10	3.40	3.90	6.40				
					3.60	2.22	6.70	3.60	2.76	6.70	3.60	3.66	6.70	3.80	3.93	7.00				
					4.00	2.22	7.30	4.00	2.76	7.30	4.00	3.69	7.30	4.20	3.96	7.60				
					4.40	2.22	7.90	4.40	2.76	7.90	4.40	3.69	7.90	4.60	3.93	8.20				
					4.80	2.22	8.50	4.80	2.76	8.50	4.80	3.69	8.40	5.00	3.93	8.80				
					5.20	2.22	9.10	5.20	2.76	9.10	5.20	3.66	9.10	5.40	3.93	9.40				
					5.60	2.22	9.60	5.60	2.76	9.70	5.60	3.66	9.60	5.80	3.87	10.00				
					6.00	2.22	10.20	6.00	2.73	10.20	6.00	3.66	10.20	6.00	3.87	10.20				
	136. 635. xx. A2	○	○	0.5	0.80	2.37	2.50	0.80	3.45	2.40	0.80	4.80	2.40	1.00	5.34	2.80	1.40	0.07	85	120
					1.20	2.61	3.10	1.20	3.54	3.10	1.20	5.10	3.10	1.40	5.37	3.40	2.20	0.15	95	130
					1.60	2.85	3.70	1.60	3.66	3.70	1.60	5.01	3.70	1.80	5.46	4.00	3.20	0.20	95	135
					2.00	3.03	4.30	2.00	3.72	4.30	2.10	5.10	4.30	2.20	5.46	4.60	4.00	0.30	100	140
					2.40	3.12	4.90	2.40	3.90	4.90	2.40	5.13	4.90	2.60	5.58	5.20	5.00	0.35	100	145
					2.80	3.15	5.50	2.80	3.87	5.50	2.80	5.16	5.50	3.00	5.58	5.80				
					3.20	3.21	6.10	3.20	3.96	6.10	3.20	5.22	6.10	3.40	5.58	6.40				
					3.60	3.18	6.70	3.60	3.96	6.70	3.60	5.25	6.70	3.80	5.58	7.00				
					4.00	3.21	7.30	4.00	3.96	7.20	4.00	5.22	7.30	4.20	5.58	7.60				
					4.40	3.21	7.90	4.40	3.96	7.90	4.40	5.22	7.90	4.60	5.58	8.10				
					4.80	3.21	8.40	4.80	3.96	8.40	4.80	5.22	8.40	5.00	5.58	8.70				
					5.20	3.21	9.00	5.20	3.96	9.00	5.20	5.22	9.00	5.40	5.58	9.30				
					5.60	3.12	9.60	5.60	3.90	9.60	5.60	5.22	9.60	5.80	5.58	9.90				
					6.00	3.18	10.20	6.00	3.84	10.20	6.00	5.16	10.20	6.00	5.58	10.20				

Continued on next page.

Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing Series 136.6

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure **p** [bar] 0.07 p Air [bar]	0.07 V Water [l/h]	0.07 $\dot{V}_n$ Air [m³/h]	0.15 p Air [bar]	0.15 V Water [l/h]	0.15 $\dot{V}_n$ Air [m³/h]	0.30 p Air [bar]	0.30 V Water [l/h]	0.30 $\dot{V}_n$ Air [m³/h]	0.35 p Air [bar]	0.35 V Water [l/h]	0.35 $\dot{V}_n$ Air [m³/h]	Spray dimensions p Air [bar]	p Water [bar]	B_1 [mm]	B_2 [mm]
45°	136. 654. xx. A2	○	○	0.7	0.80	5.25	2.40	0.80	7.29	2.40	1.20	10.11	3.10	1.60	11.07	3.70	1.40	0.07	95	135
					1.20	5.64	3.10	1.20	7.44	3.10	1.60	10.23	3.70	2.00	11.22	4.30	2.20	0.15	100	150
					1.60	5.79	3.70	1.60	7.62	3.70	2.00	10.38	4.30	2.40	11.28	4.90	3.20	0.20	105	160
					2.00	6.18	4.30	2.00	7.86	4.30	2.40	10.47	4.90	2.80	11.31	5.50	4.00	0.30	105	160
					2.40	6.24	4.90	2.40	7.92	4.90	2.80	10.59	5.50	3.20	11.43	6.10	5.00	0.35	105	160
					2.80	6.27	5.50	2.80	8.04	5.50	3.20	10.59	6.10	3.60	11.46	6.60				
					3.20	6.39	6.10	3.20	8.13	6.10	3.60	10.62	6.70	4.00	11.43	7.20				
					3.60	6.42	6.60	3.60	8.13	6.70	4.00	10.62	7.20	4.40	11.37	7.80				
					4.00	6.45	7.20	4.00	8.13	7.20	4.40	10.62	7.80	4.80	11.37	8.40				
					4.40	6.42	7.80	4.40	8.07	7.80	4.80	10.59	8.40	5.20	11.34	9.00				
					4.80	6.30	8.40	4.80	8.04	8.40	5.20	10.56	9.00	5.60	11.22	9.60				
					5.20	6.24	9.00	5.20	7.86	9.00	5.60	10.50	9.60	6.00	11.16	10.10				
					5.60	6.09	9.60	5.60	7.83	9.60	6.00	10.35	10.20	-	-	-				
					6.00	5.85	10.20	6.00	7.59	10.20	-	-	-	-	-	-				
60°	136. 626. xx. A2	○	○	0.4	0.80	1.83	2.80	0.80	2.49	2.80	0.80	3.48	2.80	0.80	3.78	2.80	1.60	0.07	85	135
					1.20	1.98	3.60	1.20	2.58	3.50	1.20	3.60	3.50	1.20	3.87	3.60	2.40	0.15	90	140
					1.60	2.10	4.30	1.60	2.70	4.20	1.60	3.66	4.30	1.60	3.90	4.20	3.20	0.20	90	140
					2.00	2.16	4.90	2.00	2.82	4.90	2.00	3.69	4.90	2.00	3.96	4.90	4.00	0.30	100	145
					2.40	2.25	5.60	2.40	2.85	5.60	2.40	3.69	5.60	2.40	3.96	5.60	5.20	0.35	105	150
					2.80	2.34	6.30	2.80	2.88	6.30	2.80	3.72	6.30	2.80	4.02	6.30				
					3.20	2.31	7.00	3.20	2.88	7.00	3.20	3.78	7.00	3.20	3.99	7.00				
					3.60	2.34	7.60	3.60	2.88	7.70	3.60	3.78	7.60	3.60	4.02	7.70				
					4.00	2.40	8.40	4.00	2.94	8.40	4.00	3.81	8.30	4.00	4.05	8.30				
					4.40	2.40	9.00	4.40	2.91	9.00	4.40	3.81	9.00	4.40	4.02	9.00				
					4.80	2.40	9.70	4.80	2.97	9.70	4.80	3.81	9.70	4.80	4.08	9.70				
					5.20	2.43	10.40	5.20	2.97	10.40	5.20	3.81	10.40	5.20	4.05	10.40				
					5.60	2.43	11.20	5.60	2.97	11.10	5.60	3.81	11.10	5.60	4.05	11.00				
					6.00	2.43	11.80	6.00	2.97	11.80	6.00	3.81	11.80	6.00	4.05	11.80				
	136. 645. xx. A2	○	○	0.5	0.80	2.73	2.80	0.80	3.69	2.80	1.00	5.16	3.20	1.00	5.55	3.10	1.60	0.07	100	140
					1.20	2.82	3.50	1.20	3.87	3.50	1.40	5.31	3.90	1.40	5.64	3.90	2.40	0.15	110	150
					1.60	3.09	4.20	1.60	3.99	4.20	1.80	5.37	4.60	1.80	5.67	4.60	3.20	0.20	115	155
					2.00	3.27	4.90	2.00	4.11	4.90	2.20	5.37	5.20	2.20	5.76	5.20	4.00	0.30	125	160
					2.40	3.36	5.60	2.40	4.17	5.60	2.60	5.43	5.90	2.60	5.82	5.90	5.20	0.35	130	165
					2.80	3.39	6.20	2.80	4.20	6.30	3.00	5.49	6.60	3.00	5.82	6.60				
					3.20	3.45	7.00	3.20	4.26	7.00	3.40	5.49	7.20	3.40	5.88	7.30				
					3.60	3.48	7.60	3.60	4.29	7.60	3.80	5.55	8.00	3.80	5.88	8.00				
					4.00	3.51	8.30	4.00	4.32	8.30	4.20	5.55	8.60	4.20	5.88	8.70				
					4.40	3.54	9.00	4.40	4.35	9.00	4.60	5.58	9.30	4.60	5.94	9.30				
					4.80	3.57	9.70	4.80	4.38	9.70	5.00	5.55	10.00	5.00	5.94	10.10				
					5.20	3.57	10.40	5.20	4.35	10.40	5.40	5.61	10.70	5.40	5.94	10.70				
					5.60	3.60	11.00	5.60	4.35	11.10	5.80	5.61	11.40	5.80	5.94	11.40				
					6.00	3.60	11.70	6.00	4.38	11.70	6.00	5.61	11.80	6.00	5.97	11.80				

E = narrowest free cross section (water)

Continued on next page.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 654 xx. A2	+	1Y	=	136. 654. 1Y. A2

Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing Series 136.6

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure **p** [bar] 0.07 p Air [bar]	0.07 V Water [l/h]	0.07 V_n Air [m³/h]	0.15 p Air [bar]	0.15 V Water [l/h]	0.15 V_n Air [m³/h]	0.30 p Air [bar]	0.30 V Water [l/h]	0.30 V_n Air [m³/h]	0.35 p Air [bar]	0.35 V Water [l/h]	0.35 V_n Air [m³/h]	Spray dimensions p Air [bar]	p Water [bar]	B_1 [mm]	B_2 [mm]
60°	136. 664. xx. A2	○	○	0.7	0.80	5.46	2.80	1.00	7.68	3.20	1.00	10.50	3.20	1.00	11.28	3.20	1.60	0.07	110	140
					1.20	5.91	3.50	1.40	7.95	3.90	1.40	10.71	3.90	1.40	11.52	3.90	2.40	0.15	130	160
					1.60	6.15	4.20	1.80	8.13	4.60	1.80	10.83	4.60	1.80	11.58	4.50	3.20	0.20	140	170
					2.00	6.42	4.90	2.20	8.34	5.30	2.20	11.01	5.30	2.20	11.70	5.20	4.00	0.30	150	180
					2.40	6.63	5.60	2.60	8.46	5.90	2.60	11.07	5.90	2.60	11.79	5.90	5.20	0.35	155	200
					2.80	6.75	6.30	3.00	8.58	6.60	3.00	11.16	6.60	3.00	11.88	6.60				
					3.20	6.93	6.90	3.40	8.67	7.30	3.40	11.19	7.30	3.40	11.94	7.30				
					3.60	6.99	7.60	3.80	8.73	8.00	3.80	11.25	8.00	3.80	12.00	8.00				
					4.00	7.05	8.30	4.20	8.76	8.70	4.20	11.28	8.60	4.20	12.03	8.70				
					4.40	7.11	9.00	4.60	8.82	9.30	4.60	11.34	9.40	4.60	12.06	9.40				
					4.80	7.11	9.70	5.00	8.82	10.10	5.00	11.37	10.00	5.00	12.06	10.10				
					5.20	7.17	10.40	5.40	8.82	10.70	5.40	11.37	10.70	5.40	12.09	10.70				
					5.60	7.11	11.10	5.80	8.85	11.40	5.80	11.40	11.40	5.80	12.12	11.40				
					6.00	7.20	11.80	6.00	8.85	11.80	6.00	11.40	11.70	6.00	12.15	11.80				
	136. 673. xx. A2	○	○	1.0	0.60	13.89	5.60	1.00	18.51	7.60	1.60	24.81	10.20	2.00	26.61	11.80	1.60	0.07	115	160
					1.00	14.28	7.60	1.40	18.51	9.30	2.00	24.66	11.70	2.40	26.31	13.50	2.40	0.15	120	160
					1.40	14.28	9.40	1.80	18.33	11.00	2.40	24.42	13.30	2.80	25.65	15.10	3.20	0.20	120	160
					1.80	14.10	11.00	2.20	17.91	12.70	2.80	23.52	15.10	3.20	24.57	16.60	4.00	0.30	120	165
					2.20	13.68	12.60	2.60	17.37	14.20	3.20	22.47	16.60	3.60	23.28	18.30	5.20	0.35	120	170
					2.60	13.62	14.20	3.00	16.65	15.90	3.60	21.30	18.40	4.00	21.93	19.90				
					3.00	13.29	18.90	3.40	15.93	17.30	4.00	20.10	19.80	4.40	20.34	21.50				
					3.40	12.87	17.40	3.80	15.06	19.00	4.40	18.78	21.50	4.80	19.20	23.10				
					3.80	12.57	19.10	4.20	14.58	20.80	4.80	17.52	23.20	5.20	18.06	24.70				
					4.20	12.18	20.80	4.60	13.83	22.30	5.20	16.71	24.80	5.60	17.01	26.30				
					4.60	11.79	22.40	5.00	13.08	24.00	5.60	15.63	26.40	6.00	15.87	28.00				
					5.00	10.95	24.00	5.40	12.30	25.60	5.80	15.12	27.30	-	-	-				
					5.40	10.44	25.60	5.80	11.52	27.20	6.00	14.76	28.00	-	-	-				
					5.80	9.57	27.20	6.00	11.04	28.10	-	-	-	-	-	-				
					6.00	8.97	28.10	-	-	-	-	-	-	-	-	-				
	136. 682. xx. A2	○	○	1.5	1.00	22.41	7.50	1.40	28.95	9.30	1.80	41.22	11.10	2.00	44.04	11.80	1.60	0.07	110	155
					1.40	20.19	9.30	1.80	26.07	10.90	2.20	34.92	12.60	2.40	39.09	13.40	2.40	0.15	120	155
					1.80	18.75	11.00	2.20	23.94	12.50	2.60	33.18	14.20	2.80	35.16	15.10	3.20	0.20	120	160
					2.20	17.88	12.50	2.60	22.23	14.30	3.00	30.45	15.90	3.20	32.22	16.70	4.00	0.30	120	165
					2.60	17.10	14.20	3.00	21.12	15.90	3.40	28.29	17.50	3.60	30.18	18.30	5.20	0.35	120	175
					3.00	16.47	15.90	3.40	20.10	17.50	3.80	26.64	19.10	4.00	28.32	19.90				
					3.40	16.08	17.50	3.80	19.44	19.10	4.20	25.35	20.70	4.40	26.94	21.50				
					3.80	15.90	19.10	4.20	18.99	20.70	4.60	24.24	22.30	4.80	25.59	23.10				
					4.20	15.90	20.70	4.60	18.45	22.30	5.00	23.13	24.00	5.20	24.36	24.80				
					4.60	15.81	22.30	5.00	18.18	24.00	5.40	22.14	25.50	5.60	23.28	26.40				
					5.00	15.21	23.90	5.40	17.25	25.40	5.80	21.12	27.20	6.00	22.17	28.00				
					5.40	13.92	25.50	5.80	15.72	27.20	6.00	20.67	28.00	-	-	-				
					5.80	12.09	27.20	6.00	14.91	28.00	-	-	-	-	-	-				
					6.00	11.07	28.00	-	-		-	-	-	-	-	-				

E = narrowest free cross section (water)

Continued on next page.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 664 xx. A2	+	1Y	=	136. 664. 1Y. A2

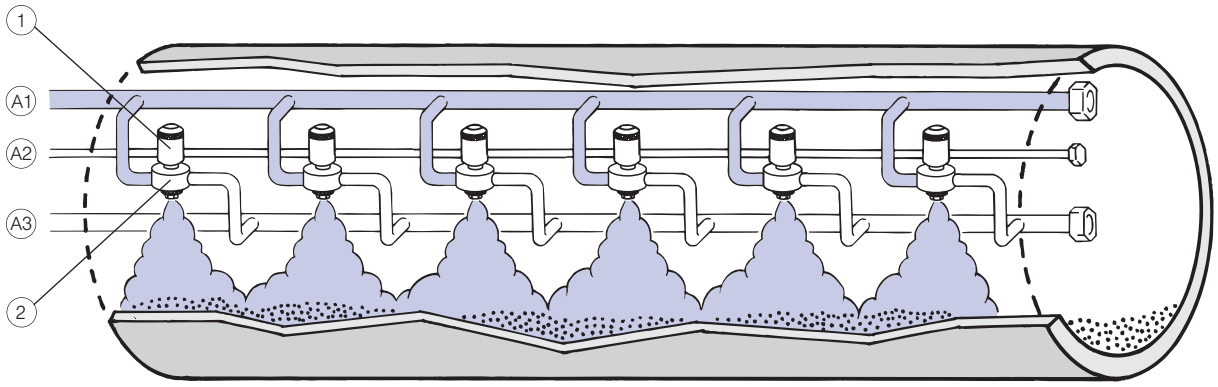
Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing Series 136.6

Spray angle	Ordering no. Type	Mat. no. 1Y AISI 316L	Mat. no. 35 Brass plated	E Ø [mm]	Liquid pressure **p** [bar] 0.07 **p** Air [bar]	0.07 **V** Water [l/h]	0.07 V_n Air [m³/h]	0.15 **p** Air [bar]	0.15 **V** Water [l/h]	0.15 V_n Air [m³/h]	0.30 **p** Air [bar]	0.30 **V** Water [l/h]	0.30 V_n Air [m³/h]	0.35 **p** Air [bar]	0.35 **V** Water [l/h]	0.35 V_n Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	B_1 [mm]	B_2 [mm]
60°	136. 691. xx. A2	○	○	2.5	1.40	52.00	13.80	2.00	67.30	17.50	2.60	92.30	21.20	2.60	102.10	21.20	1.60	0.07	150	200
					1.80	50.00	16.30	2.40	64.60	20.10	3.00	87.70	23.60	3.00	97.20	23.70	2.40	0.15	160	205
					2.20	48.60	18.80	2.80	62.00	22.50	3.40	84.30	26.00	3.40	92.50	26.10	3.20	0.20	160	205
					2.60	47.50	21.30	3.20	60.40	24.90	3.80	80.70	28.50	3.80	88.40	28.50	4.00	0.30	160	210
					3.00	46.50	23.70	3.60	58.00	27.30	4.20	77.00	30.90	4.20	85.20	31.00	5.20	0.35	150	210
					3.40	45.40	26.10	4.00	56.20	29.80	4.60	74.40	33.40	4.60	81.30	33.40				
					3.80	44.40	28.60	4.40	54.20	32.10	5.00	71.10	35.90	5.00	78.20	35.80				
					4.20	42.90	31.00	4.80	52.40	34.70	5.40	68.10	38.30	5.40	74.30	38.20				
					4.60	41.50	33.40	5.20	49.90	37.10	5.80	64.30	40.80	5.80	71.10	40.70				
					5.00	39.90	35.80	5.60	48.10	39.50	6.00	63.20	42.00	6.00	68.90	41.90				
					5.40	38.90	38.30	6.00	46.40	42.00	-	-	-	-	-	-				
					5.60	38.50	39.40	-	-	-	-	-	-	-	-	-				

E = narrowest free cross section (water)

Operational information:
Liquid flow of pneumatic atomizing nozzles with external mixing can be turned down to 0 with air pressure remaining constant.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	136. 691 xx. A2	+	**1Y**	=	**136. 691. 1Y. A2**

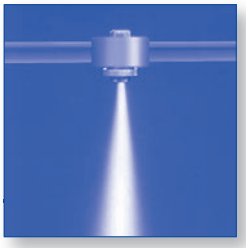


A1 Liquid supply line
A2 Control air for pneumatic valve
A3 Atomizing air supply line

1 Pneumatically controlled valve
Ordering no. 015. 601. xx. xx (see Page 1.28)
2 Pneumatic atomizing nozzle
Ordering no. 136. 6xx. xx. xx

Cereal dampening in a mixing drum

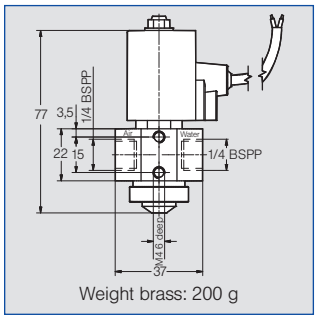
Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 166.1



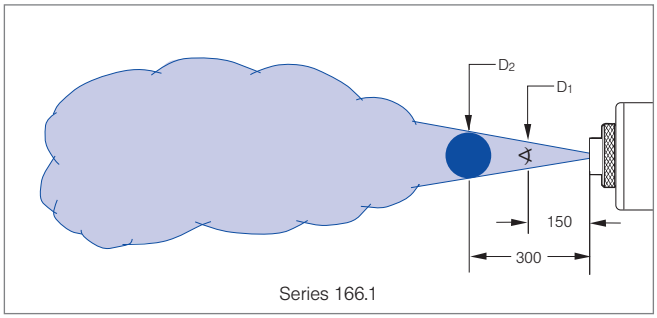
Version with magnetic valve.
Fine full cone atomization and fogging with air or gas.
Liquid pressure principle.
Internal mixing of fluids.
Applications:
Humidification of air, cooling.

Technical Data:
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective system: IP 67
- Ambient temperature: 10°C / +50°C
- Cable length: 1.000 mm
- Material of gasket: EPDM

Series 166.1



Weight brass: 200 g



Series 166.1

Accessories for series 166
please refer to page 1.29

Spray angle	Ordering no. Type	Mat. no. 16 AISI 303	E Ø [mm]	Liquid pressure **p** [bar] 0.7 **p** Air [bar]	0.7 $\dot{V}$ Water [l/h]	0.7 $\dot{V}_n$ Air [m³/h]	1.5 **p** Air [bar]	1.5 $\dot{V}$ Water [l/h]	1.5 $\dot{V}_n$ Air [m³/h]	3.0 **p** Air [bar]	3.0 $\dot{V}$ Water [l/h]	3.0 $\dot{V}_n$ Air [m³/h]	4.0 **p** Air [bar]	4.0 $\dot{V}$ Water [l/h]	4.0 $\dot{V}_n$ Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	D_1 [mm]	D_2 [mm]
20°	**166. 115. xx. A2**	○	0.50	0.40	5.90	0.30	1.40	5.80	0.80	2.40	9.10	1.10	3.00	11.00	1.20	0.80	0.70	60	100
				0.80	3.80	0.60	1.80	4.10	1.00	2.80	7.50	1.20	3.40	9.60	1.40	1.80	1.50	60	95
				1.20	1.70	0.90	2.20	2.20	1.40	3.20	5.90	1.50	3.80	8.20	1.60	2.60	2.00	60	100
				-	-	-	2.60	1.20	1.70	3.60	4.40	1.80	4.20	6.80	1.90	3.20	3.00	55	95
				-	-	-	-	-	-	4.00	2.90	2.10	4.60	5.50	2.20	4.40	4.00	55	100
				-	-	-	-	-	-	4.40	2.00	2.50	5.00	4.10	2.50				
				-	-	-	-	-	-	4.80	1.10	2.80	5.40	2.90	2.80				
				-	-	-	-	-	-	5.20	0.40	3.00	5.80	2.10	3.10				
	166. 125. xx. A2	○	0.50	0.80	4.70	1.50	1.20	7.00	1.80	2.80	9.10	3.30	3.40	10.60	3.90	1.40	0.70	55	90
				1.20	4.40	1.90	1.60	6.60	2.20	3.20	8.70	3.70	3.80	10.30	4.30	2.20	1.50	55	95
				1.60	4.00	2.30	2.00	6.20	2.60	3.60	8.40	4.10	4.20	9.90	4.60	2.80	2.00	55	100
				2.00	3.50	2.60	2.40	5.80	3.00	4.00	8.00	4.50	4.60	9.60	5.00	3.40	3.00	60	100
				2.40	3.00	3.00	2.80	5.40	3.40	4.40	7.70	4.80	5.00	9.30	5.40	4.20	4.00	60	100
				2.80	2.70	3.20	3.20	4.90	3.70	4.80	7.30	5.20	5.40	8.90	5.80				
				3.20	2.00	3.70	3.60	4.40	4.10	5.20	7.00	5.60	5.80	8.60	6.10				
				3.60	1.60	4.10	4.00	3.90	4.50	5.60	6.60	5.90	-	-	-				
				4.00	1.30	4.50	4.40	3.50	4.80	6.00	6.20	6.30	-	-	-				
				4.40	1.00	4.90	4.80	3.10	5.20	-	-	-	-	-	-				
				4.80	0.60	5.20	5.20	2.70	5.60	-	-	-	-	-	-				
				-	-	-	5.60	2.30	5.90	-	-	-	-	-	-				
				-	-	-	6.00	1.90	6.30	-	-	-	-	-	-				

E = narrowest free cross section (water)

Continued on next page.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	166. 115. xx. A2	+	16	=	166. 115. 16. A2

Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 166.1

Spray angle	Ordering no. Type	Mat. no. 16 AISI 303	E Ø [mm]	Liquid pressure **p** [bar] 0.7 **p** Air [bar]	0.7 $\dot{V}$ Water [l/h]	0.7 $\dot{V}_n$ Air [m³/h]	1.5 **p** Air [bar]	1.5 $\dot{V}$ Water [l/h]	1.5 $\dot{V}_n$ Air [m³/h]	3.0 **p** Air [bar]	3.0 $\dot{V}$ Water [l/h]	3.0 $\dot{V}_n$ Air [m³/h]	4.0 **p** Air [bar]	4.0 $\dot{V}$ Water [l/h]	4.0 $\dot{V}_n$ Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	D_1 [mm]	D_2 [mm]
20°	**166. 134. xx. A2**	○	0.7	1.20	13.20	2.70	2.00	19.40	3.90	3.00	28.30	5.20	3.80	32.60	6.20	1.80	0.70	55	95
				1.60	12.40	3.30	2.40	18.10	4.40	3.40	27.50	5.70	4.20	32.00	6.80	2.80	1.50	60	105
				2.00	11.80	3.90	2.80	17.30	4.90	3.80	26.70	6.30	4.60	31.30	7.30	3.80	2.00	60	105
				2.40	11.40	4.40	3.20	16.70	5.50	4.20	25.90	6.80	5.00	30.60	7.80	5.20	3.00	65	110
				2.80	11.10	4.90	3.60	16.10	6.00	4.60	25.00	7.30	5.40	29.90	8.40	6.00	4.00	65	110
				3.20	10.80	5.50	4.00	15.60	6.50	5.00	24.20	7.80	5.80	29.30	8.90				
				3.60	10.60	6.00	4.40	15.20	7.00	5.40	23.60	8.40	-	-	-				
				4.00	10.40	6.50	4.80	15.00	7.60	5.80	23.10	8.90	-	-	-				
				4.40	10.10	7.00	5.20	14.60	8.10	-	-	-	-	-	-				
				4.80	9.90	7.60	5.60	14.10	8.60	-	-	-	-	-	-				
				5.20	9.50	8.10	6.00	13.80	9.10	-	-	-	-	-	-				
				5.60	9.00	8.60	-	-	-	-	-	-	-	-	-				
				6.00	8.50	9.20	-	-	-	-	-	-	-	-	-				
	166. 142. xx. A2	○	2.5	1.40	24.20	5.10	1.60	53.40	4.70	3.20	70.80	8.00	3.80	93.20	9.20	0.80	0.70	60	100
				1.80	20.40	6.30	2.00	42.60	5.90	3.60	62.50	9.20	4.20	83.10	10.10	1.60	1.50	65	105
				2.20	20.00	7.20	2.40	35.30	7.20	4.00	55.70	10.60	4.60	75.30	11.30	3.00	2.00	60	105
				2.60	19.30	8.20	2.80	30.40	8.40	4.40	49.30	11.70	5.00	69.00	12.50	4.00	3.00	65	110
				3.00	17.60	9.30	3.20	28.60	9.50	4.80	44.60	12.90	5.40	63.40	13.70	6.00	4.00	65	110
				3.40	16.50	10.40	3.60	28.20	10.50	5.20	41.90	14.10	5.80	57.50	14.90				
				3.80	17.00	11.40	4.00	27.30	11.50	5.60	40.40	15.10	-	-	-				
				4.20	16.30	12.40	4.40	25.90	12.50	6.00	39.70	16.10	-	-	-				
				4.60	15.10	13.30	4.80	24.30	13.50	-	-	-	-	-	-				
				5.00	14.00	14.30	5.20	22.30	14.60	-	-	-	-	-	-				
				5.40	13.10	15.30	5.60	21.80	15.70	-	-	-	-	-	-				
				5.80	12.40	16.20	6.00	21.40	16.70	-	-	-	-	-	-				

E = narrowest free cross section (water)

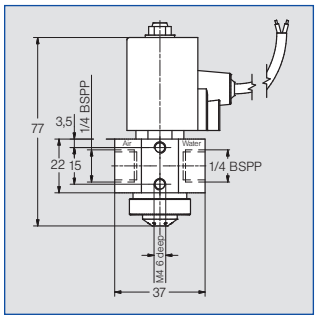
Example for ordering:	**Type** **166. 134. xx. A2**	**+**	**Material no. (xx)** **16**	**=**	**Ordering no.** **166. 134. 16. A2**

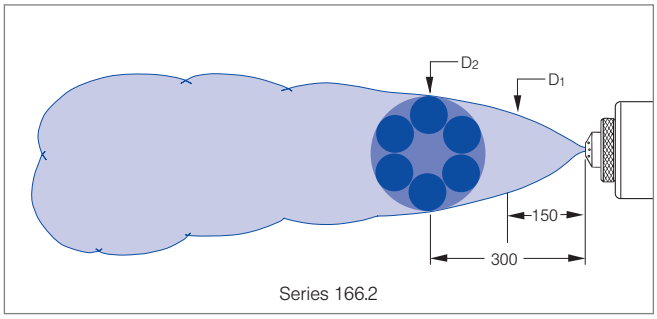
Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 166.2

Version with magnetic valve.
Fine full cone atomization and fogging with air or gas.
Especially wide spray angle of 60°.
Pressure principle.
Internal mixing of fluids.
Applications:
Humidification of air. cooling.

Technical Datas:
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective System: IP 67
- Ambient temperature: 10°C / +50°C
- Material of gasket: EPDM

Series 166.2





Series 166.2

Accessories for series 166 please refer to page 1.29

Spray angle	Ordering no. Type	Mat. no. 16 AISI 303	E Ø [mm]	Liquid pressure **p** [bar] 0.7 p Air [bar]	V̇ Water [l/h]	V̇n Air [m³/h]	1.5 p Air [bar]	V̇ Water [l/h]	V̇n Air [m³/h]	3.0 p Air [bar]	V̇ Water [l/h]	V̇n Air [m³/h]	4.0 p Air [bar]	V̇ Water [l/h]	V̇n Air [m³/h]	Spray dimensions p Air [bar]	p Water [bar]	D1 [mm]	D2 [mm]
60°	**166. 215. xx. A2**	○	0.5	1.00	3.00	1.30	1.60	5.80	1.70	2.80	8.50	2.40	3.80	9.40	3.10	1.00	0.70	200	330
				1.20	1.80	1.50	1.80	4.90	1.90	3.20	7.20	2.80	4.20	8.20	3.50	1.60	1.50	230	380
				1.40	0.70	1.80	2.00	3.80	2.10	3.60	5.70	3.20	4.60	6.90	3.90	2.40	2.00	230	385
				-	-	-	2.20	2.80	2.30	4.00	4.00	3.60	5.00	5.40	4.20	3.20	3.00	245	390
				-	-	-	2.40	1.70	2.50	4.40	2.20	4.10	5.40	3.80	4.70	4.20	4.00	250	410
				-	-	-	2.60	0.80	2.80	4.80	0.80	4.50	5.80	2.30	5.20				
				-	-	-	-	-	-	5.00	0.40	4.60	6.00	1.40	5.60				
	166. 222. xx. A2	○	1.0	0.80	17.50	2.80	1.60	25.90	4.00	3.00	40.40	5.80	3.80	54.90	6.40	0.80	0.70	250	450
				1.00	6.00	4.30	1.80	14.70	5.30	3.20	31.50	6.90	4.00	45.60	7.30	1.60	1.50	245	465
				-	-	-	2.00	6.70	6.70	3.40	22.20	8.20	4.20	37.60	8.50	2.30	2.00	245	465
				-	-	-	2.20	1.90	8.10	3.60	14.60	9.50	4.40	29.60	9.70	3.20	3.00	250	465
				-	-	-	-	-	-	3.80	8.50	11.00	4.60	21.60	11.20	4.20	4.00	245	465
				-	-	-	-	-	-	4.00	4.50	12.30	4.80	15.30	12.40				
				-	-	-	-	-	-	-	-	-	5.00	9.70	13.80				
				-	-	-	-	-	-	-	-	-	5.20	6.00	15.20				
				-	-	-	-	-	-	-	-	-	5.40	2.90	16.50				
	166. 231. xx. A2	○	1.4	1.60	25.60	5.10	2.60	44.20	7.00	3.60	93.70	7.90	4.20	132.90	7.30	2.00	0.70	235	380
				2.00	17.80	6.20	3.00	33.00	8.20	4.00	78.30	9.30	4.60	117.20	9.00	2.60	1.50	245	415
				2.40	11.30	7.20	3.40	24.70	9.20	4.40	65.80	10.60	5.00	101.10	10.40	2.40	2.00	255	420
				2.80	6.90	8.10	3.80	18.10	10.20	4.80	54.90	11.90	5.40	87.90	11.80	3.60	3.00	255	425
				-	-	-	4.20	13.20	11.20	5.20	45.60	13.00	5.80	76.60	13.20	4.20	4.00	265	430
				-	-	-	4.60	9.30	12.00	5.60	38.00	14.10	6.00	71.20	13.80				
				-	-	-	-	-	-	6.00	36.10	14.40	-	-	-				

E = narrowest free cross section (water)

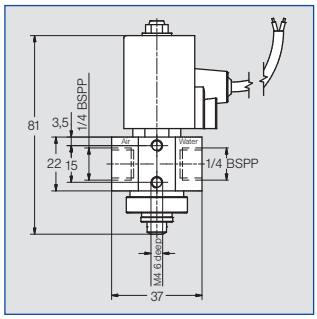
Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	166. 215. xx. A2	+	**16**	=	**166. 215. 16. A2**

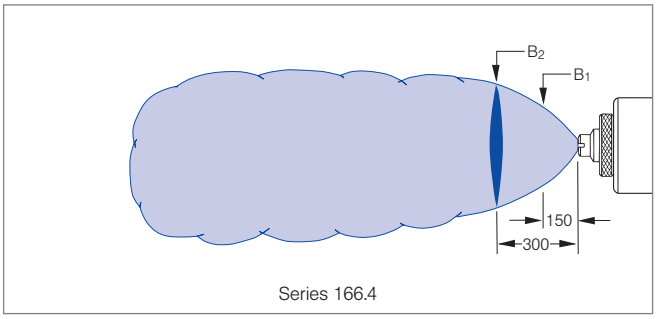
Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing Series 166.4

Version with magnetic valve. Particularly fine flat fan atomization with air or gas. Siphon principle. Internal mixing of fluids.
Applications:
Web dampening, cooling, humidification of goods.

Technical Data:
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective system: IP 67
- Ambient temperature: 10°C / +50°C
- Cable length: 1.000 mm
- Material of gasket: EPDM


Series 166.4





Series 166.4

Accessories for series 166 please refer to page 1.29

Spray angle	Ordering no. Type	Mat. no. 16 AISI 303	E Ø [mm]	Liquid pressure **p** [bar] 0.7 **p** Air [bar]	0.7 $\dot{V}$ Water [l/h]	0.7 $\dot{V}_n$ Air [m³/h]	1.5 **p** Air [bar]	1.5 $\dot{V}$ Water [l/h]	1.5 $\dot{V}_n$ Air [m³/h]	3.0 **p** Air [bar]	3.0 $\dot{V}$ Water [l/h]	3.0 $\dot{V}_n$ Air [m³/h]	4.0 **p** Air [bar]	4.0 $\dot{V}$ Water [l/h]	4.0 $\dot{V}_n$ Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	B_1 [mm]	B_2 [mm]
45°	**166. 414. xx. A2**	○	0.7	1.00	7.70	1.30	1.40	14.30	1.50	2.20	22.40	2.00	3.00	25.10	2.50	1.40	0.70	85	125
				1.20	6.00	1.50	1.60	13.00	1.60	2.60	20.00	2.30	3.40	23.00	2.80	2.40	1.50	100	145
				1.40	4.20	1.70	1.80	11.60	1.80	3.00	17.70	2.60	3.80	20.90	3.10	3.20	2.00	105	155
				1.60	2.70	1.90	2.00	10.20	2.00	3.40	15.50	3.00	4.20	18.90	3.50	3.80	3.00	120	170
				1.80	1.30	2.10	2.20	8.90	2.20	3.80	13.30	3.40	4.60	16.90	3.80	4.60	4.00	130	210
				-	-	-	2.40	7.40	2.40	4.20	11.00	3.70	5.00	14.90	4.20				
				-	-	-	2.60	5.90	2.60	4.60	8.80	4.10	5.40	12.80	4.60				
				-	-	-	2.80	4.60	2.80	5.00	6.60	4.50	5.80	10.80	5.00				
				-	-	-	3.00	3.20	3.00	5.40	4.30	4.90	6.00	9.80	5.20				
				-	-	-	3.20	2.10	3.20	5.80	2.50	5.30	-	-	-				
				-	-	-	3.40	1.10	3.40	6.00	1.60	5.50	-	-	-				
	166. 462. xx. A2	○	1.5	1.20	19.00	2.60	2.00	22.00	2.00	3.00	61.80	4.00	3.80	76.10	4.60	1.20	0.70	120	140
				1.60	12.20	3.40	2.40	18.00	2.40	3.40	51.90	4.80	4.00	70.40	5.10	2.40	1.50	120	170
				2.00	9.40	4.10	2.80	14.40	2.80	3.80	44.60	5.80	4.20	65.60	5.50	3.20	2.00	120	175
				2.40	7.10	4.80	3.20	11.30	3.20	4.20	39.00	6.60	4.40	61.30	5.90	3.80	3.00	140	205
				2.80	5.70	5.40	3.60	8.80	3.60	4.60	33.40	7.40	4.60	57.30	6.40	6.00	4.00	145	205
				3.20	5.00	6.00	4.00	8.10	3.90	5.00	29.40	8.10	4.80	54.10	6.70				
				3.60	3.60	6.60	4.40	6.20	4.30	5.40	25.50	8.90	5.00	51.30	7.20				
				4.00	3.20	7.20	4.80	4.60	4.60	5.80	22.00	9.60	5.20	49.30	7.70				
				4.40	2.20	7.80	5.20	3.20	4.90	6.00	20.60	9.90	5.40	46.50	8.20				
				-	-	-	5.60	1.60	5.30	-	-	-	5.60	43.70	8.60				
				-	-	-	5.80	0.80	5.40	-	-	-	5.80	41.30	8.90				
				-	-	-	-	-	-	-	-	-	6.00	39.00	9.30				

E = narrowest free cross section (water)

Continued on next page.

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	166. 414. xx. A2	+	**16**	=	**166. 414. 16. A2**

Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing Series 166.4

Spray angle	Ordering no. Type	Mat. no. 16 AISI 303	E Ø [mm]	Liquid pressure **p** [bar] 0.7 p Air [bar]	0.7 V̇ Water [l/h]	0.7 V̇n Air [m³/h]	1.5 p Air [bar]	1.5 V̇ Water [l/h]	1.5 V̇n Air [m³/h]	3.0 p Air [bar]	3.0 V̇ Water [l/h]	3.0 V̇n Air [m³/h]	4.0 p Air [bar]	4.0 V̇ Water [l/h]	4.0 V̇n Air [m³/h]	Spray dimensions p Air [bar]	p Water [bar]	B1 [mm]	B2 [mm]
60°	**166. 425. xx. A2**	○	0.5	080	6.50	1.20	1.40	9.40	1.70	2.40	13.20	2.50	2.40	16.10	2.50	1.20	0.70	155	195
				1.20	5.50	1.60	1.80	8.70	2.10	2.60	12.90	2.70	2.80	15.50	2.90	2.20	1.50	165	255
				1.60	4.70	1.90	2.20	7.90	2.40	3.00	12.30	3.00	3.20	15.00	3.20	3.00	2.00	170	265
				2.00	4.00	2.30	2.60	7.20	2.70	3.40	11.80	3.40	3.60	14.50	3.50	3.40	3.00	200	330
				2.40	3.20	2.60	3.00	6.40	3.10	3.80	11.10	3.70	4.00	13.90	3.80	5.60	4.00	200	330
				2.80	2.60	2.90	3.40	5.70	3.40	4.20	10.40	4.00	4.40	13.40	4.10				
				3.00	2.20	3.10	3.80	5.10	3.70	4.60	9.80	4.30	4.80	12.80	4.50				
				-	-	-	4.00	4.80	3.90	5.00	9.20	4.60	5.20	12.20	4.80				
				-	-	-	4.40	4.20	4.20	5.40	8.60	5.00	5.60	11.70	5.10				
				-	-	-	4.80	3.60	4.50	5.80	8.10	5.30	6.00	11.20	5.40				
				-	-	-	5.20	2.80	4.80	6.00	7.80	5.40	-	-	-				
				-	-	-	5.60	2.20	5.10	-	-	-	-	-	-				
				-	-	-	6.00	1.60	5.50	-	-	-	-	-	-				
	166. 452. xx. A2	○	1.5	1.00	18.80	3.90	1.80	31.00	5.30	3.20	50.10	7.70	3.80	70.70	8.20	1.00	0.70	130	185
				1.40	8.60	5.70	2.00	25.40	6.30	3.60	39.50	9.40	4.20	58.60	9.60	1.80	1.50	150	240
				1.80	7.40	7.00	2.20	20.10	7.20	4.00	31.30	11.20	4.60	48.60	11.20	2.60	2.00	155	245
				2.20	4.10	8.40	2.40	15.50	8.00	4.40	24.00	12.90	5.00	41.20	13.10	3.60	3.00	175	280
				2.60	1.00	9.80	2.60	12.40	8.90	4.80	17.70	14.50	5.40	33.60	14.80	5.00	4.00	180	285
				2.80	0.10	10.30	2.80	10.40	9.60	5.20	13.40	16.00	5.80	27.50	16.40				
				-	-	-	-	-	-	5.60	10.60	17.50	6.00	24.40	17.20				
				-	-	-	-	-	-	6.00	8.60	18.80	-	-	-				
80°	**166. 433. xx. A2**	○	0.4	1.00	11.60	2.00	1.80	18.30	2.80	3.00	31.00	3.70	3.80	37.50	4.40	1.40	0.70	150	210
				1.20	8.10	2.40	2.00	15.30	3.20	3.40	25.40	4.40	4.20	32.40	5.00	2.20	1.50	185	255
				1.40	5.30	2.80	2.20	12.20	3.60	3.80	20.60	5.10	4.60	27.70	5.70	3.00	2.00	205	300
				1.60	3.70	3.20	2.40	9.80	4.00	4.20	16.30	5.90	5.00	23.40	6.50	3.80	4.00	300	485
				-	-	-	2.60	7.60	4.30	4.60	12.50	6.60	5.40	19.40	7.20	5.20	4.00	260	395
				-	-	-	2.80	5.90	4.70	5.00	9.30	7.30	5.80	15.90	7.90				
				-	-	-	3.00	4.40	5.00	5.40	6.50	8.00	6.00	14.20	8.30				

E = narrowest free cross section (water)

Example for ordering:	Type	+	Material no. (xx)	=	Ordering no.
	166. 425. xx. A2	+	**16**	=	**166. 425. 16. A2**

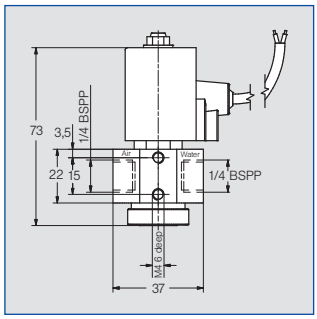
Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing Series 166.6

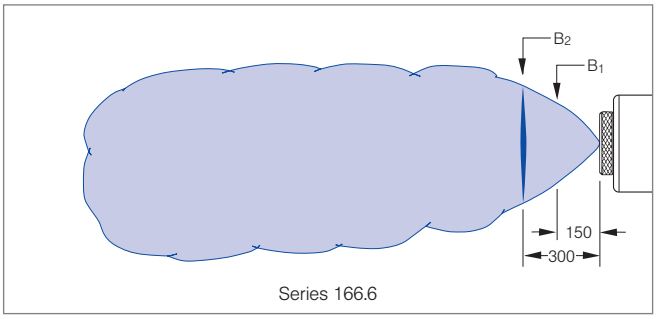
Version with magnetic valve.
Fine flat fan atomization with the aid of air or gas.
Liquid pressure principle.
External mixing of fluids.
Applications:
Web dampening, cooling, humidification of goods, atomization of viscous liquids.

Technical Data:
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective system: IP 67
- Ambient temperature: 10°C / +50°C
- Cable length: 1.000 mm
- Material of gasket: EPDM

Accessories for series 166 please refer to page 1.29


Series 166.6





Series 166.6

Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	E Ø [mm]	Liquid pressure **p** [bar] 0.07 **p** Air [bar]	0.07 $\dot{V}$ Water [l/h]	0.07 $\dot{V}_n$ Air [m³/h]	0.15 **p** Air [bar]	0.15 $\dot{V}$ Water [l/h]	0.15 $\dot{V}_n$ Air [m³/h]	0.30 **p** Air [bar]	0.30 $\dot{V}$ Water [l/h]	0.30 $\dot{V}_n$ Air [m³/h]	0.35 **p** Air [bar]	0.35 $\dot{V}$ Water [l/h]	0.35 $\dot{V}_n$ Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	B_1 [mm]	B_2 [mm]
45°	**166. 616. xx. A2**	○	0.4	0.80	1.68	2.50	0.80	2.43	2.40	0.80	3.42	2.50	1.00	3.69	2.80	1.40	0.07	80	115
				1.20	1.80	3.10	1.00	2.46	2.90	1.20	3.48	3.10	1.40	3.81	3.40	2.20	0.15	90	130
				1.60	1.92	3.70	1.40	2.58	3.60	1.60	3.51	3.70	1.80	3.87	4.00	3.20	0.20	90	135
				2.00	2.10	4.30	1.80	2.61	4.20	2.00	3.63	4.30	2.20	3.84	4.60	4.00	0.30	95	145
				2.40	2.07	4.90	2.20	2.76	4.80	2.40	3.63	4.90	2.60	3.90	5.20	5.00	0.35	100	145
				2.80	2.19	5.50	2.60	2.73	5.40	2.80	3.63	5.50	3.00	3.93	5.80				
				3.20	2.19	6.10	3.00	2.73	6.00	3.20	3.63	6.10	3.40	3.90	6.40				
				3.60	2.22	6.70	3.60	2.76	6.70	3.60	3.66	6.70	3.80	3.93	7.00				
				4.00	2.22	7.30	4.00	2.76	7.30	4.00	3.69	7.30	4.20	3.96	7.60				
				4.40	2.22	7.90	4.40	2.76	7.90	4.40	3.69	7.90	4.60	3.93	8.20				
				4.80	2.22	8.50	4.80	2.76	8.50	4.80	3.69	8.40	5.00	3.93	8.80				
				5.20	2.22	9.10	5.20	2.76	9.10	5.20	3.66	9.10	5.40	3.93	9.40				
				5.60	2.22	9.60	5.60	2.76	9.70	5.60	3.66	9.60	5.80	3.87	10.00				
				6.00	2.22	10.20	6.00	2.73	10.20	6.00	3.66	10.20	6.00	3.87	10.20				
	166. 654. xx. A2	○	0.7	0.80	5.25	2.40	0.80	7.29	2.40	1.20	10.11	3.10	1.60	11.07	3.70	1.40	0.07	95	135
				1.20	5.64	3.10	1.20	7.44	3.10	1.60	10.23	3.70	2.00	11.22	4.30	2.20	0.15	100	150
				1.60	5.79	3.70	1.60	7.62	3.70	2.00	10.38	4.30	2.40	11.28	4.90	3.20	0.20	105	160
				2.00	6.18	4.30	2.00	7.86	4.30	2.40	10.47	4.90	2.80	11.31	5.50	4.00	0.30	105	160
				2.40	6.24	4.90	2.40	7.92	4.90	2.80	10.59	5.50	3.20	11.43	6.10	5.00	0.35	105	160
				2.80	6.27	5.50	2.80	8.04	5.50	3.20	10.59	6.10	3.60	11.46	6.60				
				3.20	6.39	6.10	3.20	8.13	6.10	3.60	10.62	6.70	4.00	11.43	7.20				
				3.60	6.42	6.60	3.60	8.13	6.70	4.00	10.62	7.20	4.40	11.37	7.80				
				4.00	6.45	7.20	4.00	8.13	7.20	4.40	10.62	7.80	4.80	11.37	8.40				
				4.40	6.42	7.80	4.40	8.07	7.80	4.80	10.59	8.40	5.20	11.34	9.00				
				4.80	6.30	8.40	4.80	8.04	8.40	5.20	10.56	9.00	5.60	11.22	9.60				
				5.20	6.24	9.00	5.20	7.86	9.00	5.60	10.50	9.60	6.00	11.16	10.10				
				5.60	6.09	9.60	5.60	7.83	9.60	6.00	10.35	10.20	-	-	-				
				6.00	5.85	10.20	6.00	7.59	10.20	-	-	-	-	-	-				

Continued on next page.

Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing Series 166.6

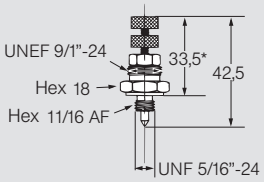
Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	E Ø [mm]	Liquid pressure **p** [bar] 0.07 **p** Air [bar]	0.07 **V̇** Water [l/h]	0.07 $\dot{V}_n$ Air [m³/h]	0.15 **p** Air [bar]	0.15 **V̇** Water [l/h]	0.15 $\dot{V}_n$ Air [m³/h]	0.30 **p** Air [bar]	0.30 **V̇** Water [l/h]	0.30 $\dot{V}_n$ Air [m³/h]	0.35 **p** Air [bar]	0.35 **V̇** Water [l/h]	0.35 $\dot{V}_n$ Air [m³/h]	Spray dimensions **p** Air [bar]	**p** Water [bar]	B_1 [mm]	B_2 [mm]
60°	**166. 626. xx. A2**	○	0.4	0.80	1.83	2.80	0.80	2.49	2.80	0.80	3.48	2.80	0.80	3.78	2.80	1.60	0.07	85	135
				1.20	1.98	3.60	1.20	2.58	3.50	1.20	3.60	3.50	1.20	3.87	3.60	2.40	0.15	90	140
				1.60	2.10	4.30	1.60	2.70	4.20	1.60	3.66	4.30	1.60	3.90	4.20	3.20	0.20	90	140
				2.00	2.16	4.90	2.00	2.82	4.90	2.00	3.69	4.90	2.00	3.96	4.90	4.00	0.30	100	145
				2.40	2.25	5.60	2.40	2.85	5.60	2.40	3.69	5.60	2.40	3.96	5.60	5.20	0.35	105	150
				2.80	2.34	6.30	2.80	2.88	6.30	2.80	3.72	6.30	2.80	4.02	6.30				
				3.20	2.31	7.00	3.20	2.88	7.00	3.20	3.78	7.00	3.20	3.99	7.00				
				3.60	2.34	7.60	3.60	2.88	7.70	3.60	3.78	7.60	3.60	4.02	7.70				
				4.00	2.40	8.40	4.00	2.94	8.40	4.00	3.81	8.30	4.00	4.05	8.30				
				4.40	2.40	9.00	4.40	2.91	9.00	4.40	3.81	9.00	4.40	4.02	9.00				
				4.80	2.40	9.70	4.80	2.97	9.70	4.80	3.81	9.70	4.80	4.08	9.70				
				5.20	2.43	10.40	5.20	2.97	10.40	5.20	3.81	10.40	5.20	4.05	10.40				
				5.60	2.43	11.20	5.60	2.97	11.10	5.60	3.81	11.10	5.60	4.05	11.00				
				6.00	2.43	11.80	6.00	2.97	11.80	6.00	3.81	11.80	6.00	4.05	11.80				
	166. 682. xx. A2	○	1.5	1.00	22.41	7.50	1.40	28.95	9.30	1.80	41.22	11.10	2.00	44.04	11.80	1.60	0.07	110	155
				1.40	20.19	9.30	1.80	26.07	10.90	2.20	34.92	12.60	2.40	39.09	13.40	2.40	0.15	120	155
				1.80	18.75	11.00	2.20	23.94	12.50	2.60	33.18	14.20	2.80	35.16	15.10	3.20	0.20	120	160
				2.20	17.88	12.50	2.60	22.23	14.30	3.00	30.45	15.90	3.20	32.22	16.70	4.00	0.30	120	165
				2.60	17.10	14.20	3.00	21.12	15.90	3.40	28.29	17.50	3.60	30.18	18.30	5.20	0.35	120	175
				3.00	16.47	15.90	3.40	20.10	17.50	3.80	26.64	19.10	4.00	28.32	19.90				
				3.40	16.08	17.50	3.80	19.44	19.10	4.20	25.35	20.70	4.40	26.94	21.50				
				3.80	15.90	19.10	4.20	18.99	20.70	4.60	24.24	22.30	4.80	25.59	23.10				
				4.20	15.90	20.70	4.60	18.45	22.30	5.00	23.13	24.00	5.20	24.36	24.80				
				4.60	15.81	22.30	5.00	18.18	24.00	5.40	22.14	25.50	5.60	23.28	26.40				
				5.00	15.21	23.90	5.40	17.25	25.40	5.80	21.12	27.20	6.00	22.17	28.00				
				5.40	13.92	25.50	5.80	15.72	27.20	6.00	20.67	28.00	-	-	-				
				5.80	12.09	27.20	6.00	14.91	28.00	-	-	-	-	-	-				
				6.00	11.07	28.00	-	-		-	-	-	-	-	-				
	166. 691. xx. A2	○	2.5	1.40	52.00	13.80	2.00	67.30	17.50	2.60	92.30	21.20	2.60	102.10	21.20	1.60	0.07	150	200
				1.80	50.00	16.30	2.40	64.60	20.10	3.00	87.70	23.60	3.00	97.20	23.70	2.40	0.15	160	205
				2.20	48.60	18.80	2.80	62.00	22.50	3.40	84.30	26.00	3.40	92.50	26.10	3.20	0.20	160	205
				2.60	47.50	21.30	3.20	60.40	24.90	3.80	80.70	28.50	3.80	88.40	28.50	4.00	0.30	160	210
				3.00	46.50	23.70	3.60	58.00	27.30	4.20	77.00	30.90	4.20	85.20	31.00	5.20	0.35	150	210
				3.40	45.40	26.10	4.00	56.20	29.80	4.60	74.40	33.40	4.60	81.30	33.40				
				3.80	44.40	28.60	4.40	54.20	32.10	5.00	71.10	35.90	5.00	78.20	35.80				
				4.20	42.90	31.00	4.80	52.40	34.70	5.40	68.10	38.30	5.40	74.30	38.20				
				4.60	41.50	33.40	5.20	49.90	37.10	5.80	64.30	40.80	5.80	71.10	40.70				
				5.00	39.90	35.80	5.60	48.10	39.50	6.00	63.20	42.00	6.00	68.90	41.90				
				5.40	38.90	38.30	6.00	46.40	42.00	-	-	-	-	-	-				
				5.60	38.50	39.40	-	-	-	-	-	-	-	-	-				

E = narrowest free cross section (water)

Example for ordering:	**Type** **166. 654. xx. A2**	**+**	**Material no. (xx)** **16**	**=**	**Ordering no.** **166. 654. 16. A2**

Accessories for pneumatic atomizing nozzles
Series 136.1 - 136.6

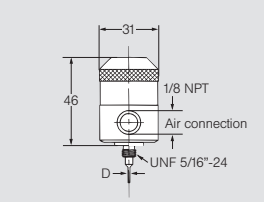
Regulating device and shutting-off needle:



Weight 303 SS/303 SS: 33 g

Ordering no. Type	Mat. no. 16 303 SS	For all nozzles of the series 136
015. 600	○	

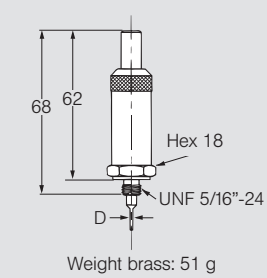
Pneumatically controlled valve.
Opening pressure 2.1 bar, max. 180 cycles/min.



Weight brass: 120 g

Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 35 Brass plated	For nozzles	Needle diameter D [mm]
013. 601. xx. 10	○	○	**136. xx1**	2.1
013. 602. xx. 10	○	○	**136. xx2**	1.2
013. 603. xx. 10	○	○	**136. xx3**	0.8
013. 604. xx. 10	○	○	**136. xx4**	0.6
013. 605. xx. 10	○	○	**136. xx5**	0.4
013. 606. xx. 10	○	○	**136. xx6**	0.3

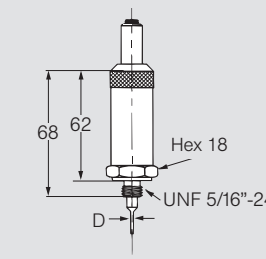
Quick-cleaning device



Weight brass: 51 g

Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 35 Brass plated	For nozzles	Needle diameter D [mm]
013. 601. xx. 20	○	○	**136. xx1**	2.1
013. 602. xx. 20	○	○	**136. xx2**	1.2
013. 603. xx. 20	○	○	**136. xx3**	0.8
013. 604. xx. 20	○	○	**136. xx4**	0.6
013. 605. xx. 20	○	○	**136. xx5**	0.4
013. 606. xx. 20	○	○	**136. xx6**	0.3

Regulating device with quick-cleaning needle



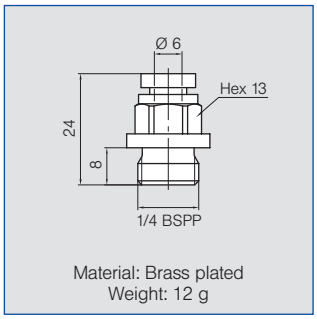
Weight brass: 75 g

Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 35 Brass plated	For nozzles	Needle diameter D [mm]
013. 601. xx. 30	○	○	**136. xx1**	2.1
013. 602. xx. 30	○	○	**136. xx2**	1.2
013. 603. xx. 30	○	○	**136. xx3**	0.8
013. 604. xx. 30	○	○	**136. xx4**	0.6
013. 605. xx. 30	○	○	**136. xx5**	0.4
013. 606. xx. 30	○	○	**136. xx6**	0.3

Example for ordering:	**Type**		**+**	**Material no. (xx)**	**=**	**Ordering no.**
	013. 601. xx. 10		**+**	**16**	**=**	**013. 601. 16. 10**

Accessories for pneumatic atomizing nozzles
Series 136 und 166

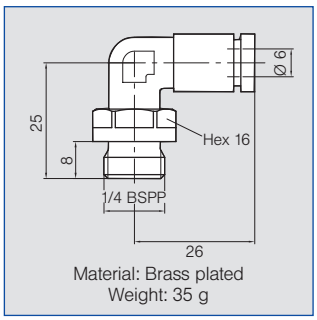
Screwed connection for hose diameter 6 mm



Material: Brass plated
Weight: 12 g

Ordering no.	For all nozzles of the series 136 and 166
095. 016. 35. 11. 79. 0	

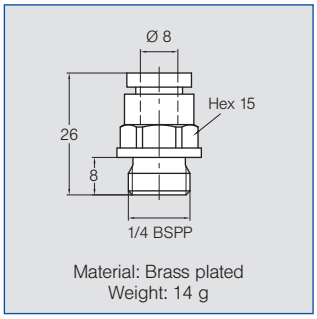
Angled screwed connection for hose diameter 6 mm



Material: Brass plated
Weight: 35 g

Ordering no.	For all nozzles of the series 136 and 166
095. 016. 35. 13. 13. 0	

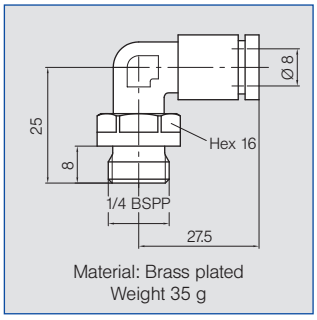
Screwed connection for hose diameter 8 mm



Material: Brass plated
Weight: 14 g

Ordering no.	For all nozzles of the series 136 and 166
095. 016. 35. 11. 80. 0	

Angled screwed connection for hose diameter 8 mm

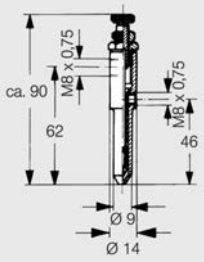


Material: Brass plated
Weight 35 g

Ordering no.	For all nozzles of the series 136 and 166
095. 016. 35. 13. 14. 0	

Pneumatic atomizing nozzles, Full cone, siphon principle, internal mixing Series 140

Particularly fine full cone atomization. Siphon principle. Internal mixing of fluids. Integrated regulating device.
Applications:
Lubrication, cooling, humidification of air.

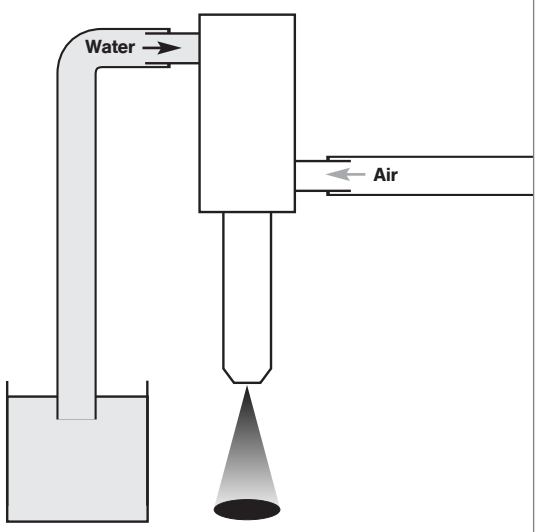


Weight brass: 70 g

Spray angle	Ordering no.	E Ø [mm] Water	E Ø [mm] Air	Hs Aspiration-height [mm WS]	V̇ W = Liquid V̇n L = Air p [bar] Air pressure 0.5 W [l/h]	0.5 L [m³/h]	1.0 W [l/h]	1.0 L [m³/h]	2.0 W [l/h]	2.0 L [m³/h]	3.0 W [l/h]	3.0 L [m³/h]
20°-30°	**140. 252. 30. 01**	0.50	0.75	500	-	-	4.50	4.00	8.00	6.00	10.50	8.00
				200	4.50	2.50	7.00	4.00	10.00	6.00	12.00	8.00

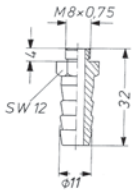
E = narrowest free cross section (water)

Assembly scheme



Accessories:

Gasket
014. 040. 72
7.8 x 12 x 1 (EWP 210)



Nipple
014. 010. 30. 04
(Material brass)
Weight: 17 g

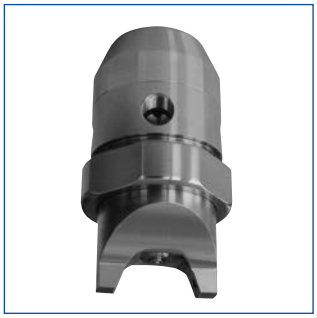
Pneumatic atomizing nozzles, for atomizing viscous media Series 176 ViscoMist™

The ViscoMist™ series offers independent regulation of both atomizing air and fan air, which provides the user with infinite control over the viscous fluid's spray pattern and droplet size.

The ViscoMist™ nozzle features a standard 'Liquid Shut-Off/ Clean-Out Needle' function. This design element activates and deactivates the liquid supply, while simultaneously removing excess fluid from the fluid nozzle preventing clogging. This feature is especially vital when the viscous liquids are being applied in continuous process environments.

The modular design of the ViscoMist™ allows maximum flexibility to meet the exact spray requirements.

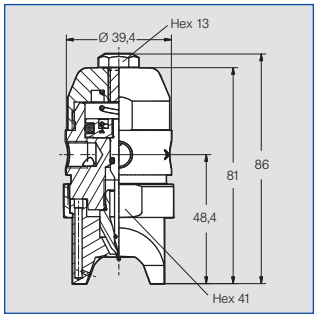
Interchangeable air caps and various flow capacities are available to suit any spraying application needs.



One nozzle – three spray characters
- - Solid stream
  - Full cone
  - Flat fan
- Independent regulation of liquid, atomizing air and fan air
- Fluid circulation possible (Nozzle body with 5 connections)

Atomizing air / Fan air / Signal air
The atomizing air causes the liquid to atomize at the nozzle orifice. The spray character can be adjusted with the fan air to suit the application. The signal air activates the nozzle.

Outside mixing to spray viscous liquids, for example:
- Coating
- Moisturising
- Lubrication
- Glazing
- Sanitising



Fluid cap options
Ø 0.38 mm to 2.54 mm

Valve position
Normally closed, fail-safe with loss of air

Signal air pressure
Min. 1.5 bar
Max. 3 bar

Cycles per minute (short term):
180 cycles / min

Material
1Y (1.4404 (316L))
35 (Nickel plated brass))

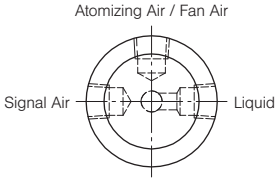
Ports
01 (1/8" NPT (F))
11 (1/8" BSPP (F))

Flow rate range
- Water: 7.8 to 307 l/h, at 2 bar
- Air: 7.5 to 28.4 m³/h i.N., at 2 bar

Further information and ordering data on request.

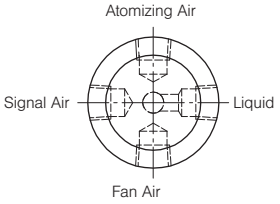
Nozzle body configurations

Nozzle body configuration 2



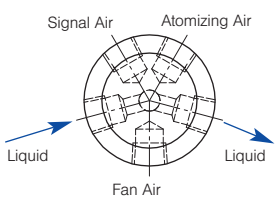
3 connections

Nozzle body configuration 4



4 connections

Nozzle body configuration 5



5 connections

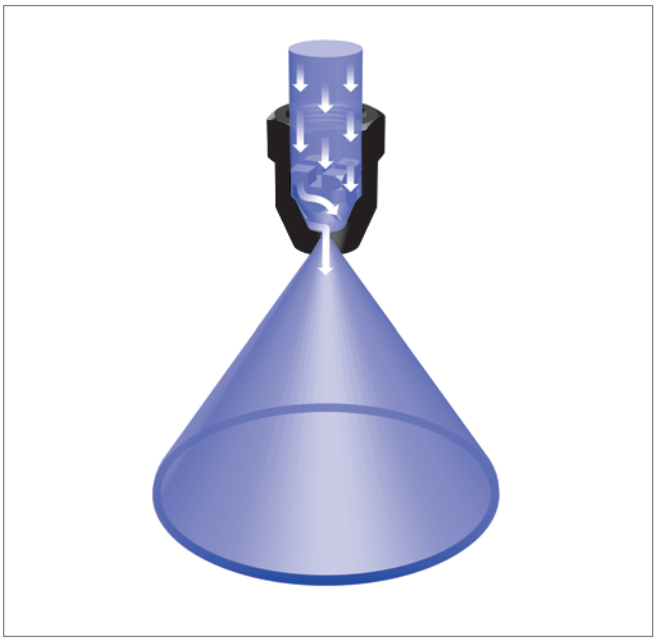
Hollow cone nozzles

- Absorption
- Chemical process engineering
- Cooling
- Disinfection
- Desuperheating
- Dust control
- Fire protection
- Foam destruction
- Gas treatment
- Humidification of air
- Humidification of goods
- Humidification of textiles
- Oil spraying
- Protection of storage tanks
- Spraying onto filters
- Spraying over germinating boxes
- Water recooling
- and many others...

Hollow cone nozzles

Axial-flow hollow cone nozzles

Wherever a fine, uniform hollow cone spray is needed, e.g. for cooling and cleaning of gas, absorption processes, dust control, product dampening, oil spraying and air humidifying, axial-flow hollow cone nozzles have proved very efficient. The spiral grooves in the swirl inserts ensure an efficient whirling of the liquid. As a result, the contact surface of the atomized liquid is significantly increased within a remarkably narrow droplet spectrum. This creates extraordinarily favourable conditions for mass transfer.

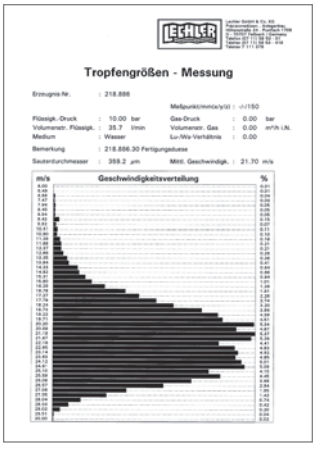


- Finest drop particles
- Narrowest free cross-sections
- Maximum spray angle: 90°

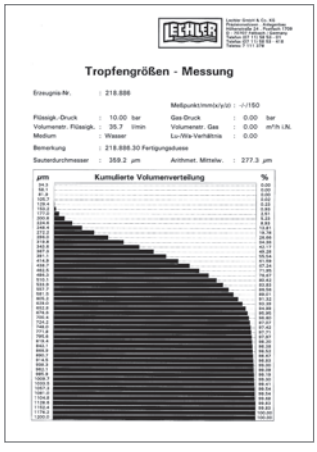
Tangential-flow hollow cone nozzles

Tangential-flow hollow cone nozzles provide a very uniform hollow cone spray thanks to a particular flow geometry. Liquid is put into rotation by an eccentricity arranged liquid inlet. Thereby a very uniform liquid distribution is achieved with spray angles up to 130°. Tangential-flow hollow cone nozzles are of a self-cleaning design, offering a high operational safety, even at rather poor water conditions. Typical applications for tangential-flow hollow cone nozzles are: air-humidification in air conditioning systems or gas cleaning in chemical and environmental engineering installations.

- Coarser droplets than axial-flow hollow cone nozzles
- Large narrowest free cross-sections
- Wide spray angles up to 130°
- Self-cleaning, non-clogging

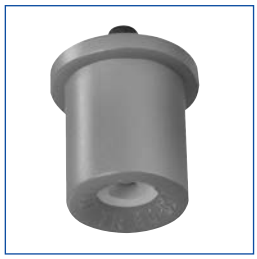


Number/frequency distribution chart



Cumulated volume distribution chart

Hollow cone nozzles

Axial-flow hollow cone nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**212**	60° 80°	0.015 – 0.46 (at p = 7 bar)	1/4 BSPT 1/4 BSPP	Disinfection, humidification of air, spraying over germinating boxes, product dampening, humidification of textiles, oil spraying, absorption. **Extremely fine, fog-like hollow cone spray.**	**2.5**
	**214**	60° 80°	0.08 – 0.32	1/8 BSPP	Cooling and cleaning of air and gas, dust control, spraying onto filters, spray drying, desuperheating	**2.6**
	216	60° 90°	0.40 – 8.50	3/8 BSPP		
	**2TR**	80°	0.16 – 1.57	Assembly with 3/8" retaining nut	Humidification of air, cooling and cleaning of gases, dust control, spraying onto filters. **Fine, uniform hollow cone spray.**	**2.7**

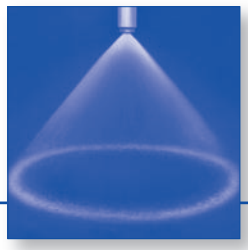
Tangential-flow hollow cone nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**302**	60° 80° 90° 130°	0.40 – 25.00	3/8 BSPP	Humidification of air in air washers, dust control, spraying onto filters, foam control, cooling. **Non-clogging nozzle design, without swirl insert.**	**2.8** **2.9**

Hollow cone nozzles

Tangential-flow hollow cone nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**308**	90°	0.63 – 3.15	3/8 BSPP	Foam destruction, dust control. **Flow rate adjustable.**	**2.8**
	**302 with bayonet-quick-release system**	45° 60° 80° 90° 130°	0.40 – 3.15	Assembly with bayonet quick-release system.	Humidification of air in air washers, dust control, spraying onto filters, foam control, cooling. **Quick and safe assembly with the aid of a bayonet quick-lock system. Automatic setting of spray plane. A time-saving alternative to threaded nozzle designs.**	**2.10**
	**350**	130°	0.63 – 3.15	3/8 BSPP or quick-lock	Humidification of air in air washers, dust control, spraying onto filters, foam control. **Extremely fine atomization with a narrow droplet distribution.**	**2.11**
	**304** **306** **307**	90° 130°	5.60 – 33.50	1/2 BSPP 3/4 BSPP	Fire fighting, protection of storage tanks, foam control. **Non-clogging nozzle design, without swirl insert.**	**2.12**
	**373 „Ramp Bottom“**	70° 80° 90°	63.00 – 227.00	1 BSPP 1 1/4 BSPP 1 1/2 BSPP	Cooling and cleaning of gas, dust control, water recooling, chemical process engineering. **Longer service life thanks to the patented »ramp bottom« design of the mixing chamber.**	**2.13**
	309	90°	118.00 – 160.00	1 1/4 BSPP	**Less expensive design in plastic material.**	

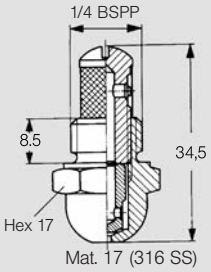
Axial-flow hollow cone nozzles

Series 212

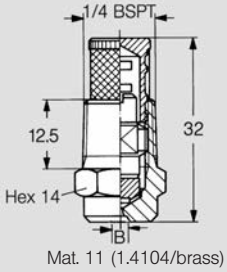


Extremely fine, fog-like hollow cone spray.
Applications:
Disinfection, humidification of air, spraying over germinating boxes, product humidification, humidification of textiles, spraying of oil, absorption.

1/4 BSPP 1/4 BSPT



Mat. 17 (316 SS)
Weight: 26 g



Mat. 11 (1.4104/brass)
Weight: 21 g

Spray angle	Ordering no. Type	Mat. no. 11 AISI 430F/Brass	Mat. no. 17 AISI 316Ti	Code 1/4 BSPP	Code 1/4 BSPT	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 2.0	3.0	5.0	7.0	10.0	20.0	Spray diameter D at p=7 bar H = 100 mm
60°	212. 004	-	○	AC	-	0.10	0.10	-	-	0.013	0.015	0.018	0.025	80
	212. 014	-	○	AC	-	0.15	0.15	-	-	0.019	0.023	0.027	0.039	80
	212. 054	-	○	AC	-	0.20	0.15	-	-	0.027	0.033	0.039	0.057	80
80°	212. 085	○*	○**	-	CC	0.25	0.25	-	-	0.040	0.047	0.057	0.080	140
	212. 125	○*	○**	AC	CC	0.35	0.25	-	0.048	0.062	0.073	0.088	0.124	140
	212. 145	○	-	-	CC	0.40	0.30	-	0.063	0.082	0.097	0.116	0.164	140
	212. 165	○	-	-	CC	0.45	0.30	-	0.080	0.103	0.122	0.146	0.206	140
	212. 185	○	-	-	CC	0.50	0.35	-	0.101	0.130	0.154	0.184	0.260	140
	212. 205	○	-	-	CC	0.60	0.35	0.107	0.131	0.168	0.199	0.238	0.336	140
	212. 245	○	-	-	CC	0.70	0.45	0.166	0.202	0.261	0.310	0.370	0.522	140
	212. 285	○*	○**	AC	CC	0.90	0.60	0.262	0.320	0.390	0.460	0.550	0.770	140

B = bore diameter · E = narrowest free cross section
*Only available with code CC
**Only available with code AC

Example for ordering:	Type	+	Material-No.	+	Code	=	Ordering no.
	212. 004	+	17	+	AC	=	212. 004. 17. AC

The integrated strainer avoids clogging of the nozzle and increases its service life.

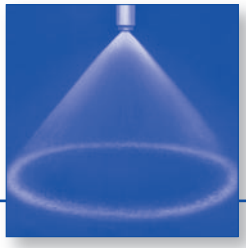
Materials			
Material no.	Nozzle	Strainer holder	Strainer
11	AISI 430F	Messing	Monel
17	AISI 316Ti	AISI 316Ti	AISI 316Ti

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

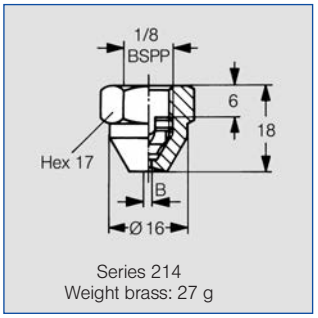
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Axial-flow hollow cone nozzles

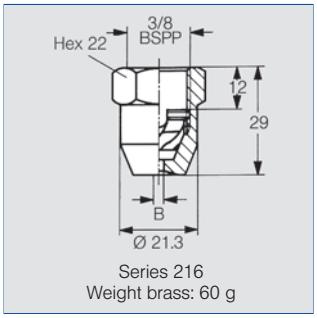
Series 214 / 216



Fine, uniform hollow cone spray.
Applications:
Cooling and cleaning of air and gas, dust control, spraying onto filters, spray drying, desuperheating.



Series 214
Weight brass: 27 g



Series 216
Weight brass: 60 g

Spray angle	Ordering no. Type	Mat. no. 17 AISI 316Ti	Mat. no. 30 Brass	G BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	10.0	20.0	Spray diameter D at p=3 bar H = 250 mm
60°	214. 184	○	○	1/8"	0.50	0.50	-	-	0.08	0.10	0.13	0.18	0.25	200
80°	214. 245	○	○	1/8"	1.00	0.50	-	-	0.16	0.20	0.25	0.36	0.51	450
	214. 305	○	○	1/8"	1.80	0.50	-	0.23	0.32	0.39	0.51	0.72	1.01	450
60°	216. 324	○	○	3/8"	1.00	1.00	-	0.28	0.40	0.49	0.63	0.89	1.26	200
	216. 364	○	○	3/8"	1.40	1.40	-	0.45	0.63	0.77	1.00	1.41	1.99	200
	216. 404	○	○	3/8"	2.00	2.00	-	0.71	1.00	1.22	1.58	2.24	3.16	200
90°	216. 496	○	○	3/8"	3.00	2.00	-	1.20	1.70	2.08	2.69	3.80	5.38	500
	216. 566	○	○	3/8"	4.00	2.00	-	1.77	2.50	3.06	3.95	5.59	7.91	500
	216. 646	○	○	3/8"	3.50	2.00	2.00	2.83	4.00	4.90	6.32	8.94	12.65	500
	216. 686	○	○	3/8"	4.00	2.00	2.50	3.54	5.00	6.12	7.91	11.18	15.81	500
	216. 726	○	○	3/8"	5.00	2.00	3.15	4.45	6.30	7.72	9.96	14.09	19.92	500
	216. 776	○	○	3/8"	6.00	2.00	4.30	6.00	8.50	10.40	13.40	19.00	26.90	500

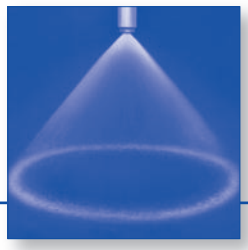
B = bore diameter · E = narrowest free cross section

Example for ordering	Type	+	Material no.	=	Ordering no.
	214. 184	+	17	=	214. 184. 17

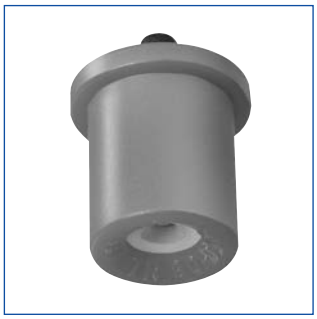
The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

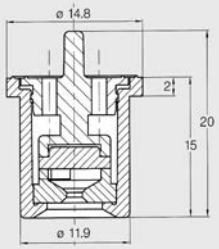
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Axial-flow hollow cone nozzles for retaining nut Series 2TR



Hollow cone nozzle with ceramic insert. Assembly with retaining nut. Fine, uniform hollow cone spray.
Applications:
Humidification of air, cooling and cleaning of gases, dust control, spraying onto filters.

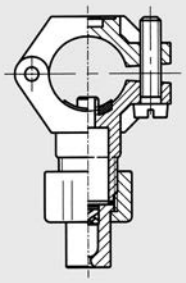




Material: Housing POM
Insert: Ceramic, weight: 3 g

Spray angle	Ordering no. / Type	Colour	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] [pmax = 20 bar] 1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p=3 bar H = 250 mm
80°	**2TR. 245. C8**	lilac	0.65	0.55	-	0.16	0.20	0.25	0.30	0.36	450
	2TR. 275. C8	black	0.80	0.70	0.16	0.22	0.27	0.35	0.41	0.49	450
	2TR. 305. C6	orange	0.90	0.80	0.23	0.32	0.39	0.51	0.60	0.72	450
	2TR. 345. C6	green	1.10	0.90	0.34	0.48	0.59	0.76	0.90	1.07	450
	2TR. 365. C6	yellow	1.40	0.95	0.45	0.63	0.78	1.01	1.19	1.42	450
	2TR. 405. C6	blue	1.70	1.10	0.68	0.96	1.17	1.52	1.79	2.14	450
	2TR. 445. C6	red	2.00	1.20	0.89	1.26	1.55	2.02	2.37	2.83	450
	2TR. 485. C6	brown	2.20	1.30	1.11	1.57	1.94	2.50	2.96	3.54	450

B = bore diameter · E = narrowest free cross section

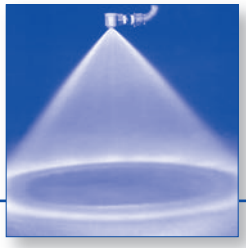


For assembly possibilities please refer to folded page.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

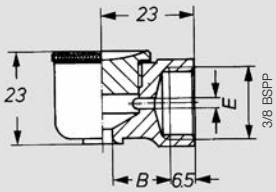
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

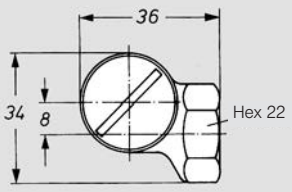
Tangential-flow hollow cone nozzles
Brass versions
Series 302 / 308



Uniform hollow cone spray. Non-clogging nozzle, without swirl insert.
Applications:
Humidification of air in air washers, dust control, spraying onto filters, foam control, cooling.

Series 302





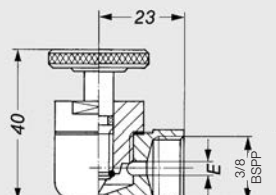
Weight brass: 90 g

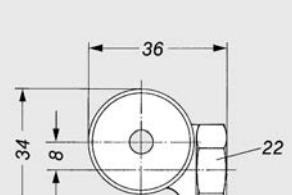
Spray angle	Ordering no. Type	Mat. no. 30 Brass	1Y AISI 316L	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p=2 bar H = 250 mm	H = 500 mm
60°	302. 364	○	–	1.50	1.50	0.31	0.45	0.63	0.77	1.00	1.18	1.41	200	350
	302. 464	○	○	2.00	2.00	0.70	0.99	1.40	1.71	2.21	2.62	3.13	300	560
80°	302. 545	○	○	4.90	2.30	1.12	1.58	2.24	2.74	3.54	4.19	5.01	400	700
90°	302. 606	○	○	4.60	4.00	1.57	2.23	3.15	3.86	4.98	5.89	7.04	450	750
130°	302. 368	○	○	3.00	1.00	0.31	0.45	0.63	0.77	1.00	1.18	1.41	800	1500
	302. 468	○	○	5.00	1.70	0.70	0.99	1.40	1.71	2.21	2.62	3.13	800	1500
	302. 548	○	–	5.00	2.50	1.12	1.58	2.24	2.74	3.54	4.19	5.01	800	1500
	302. 608	○	○	5.00	3.50	1.57	2.23	3.15	3.86	4.98	5.89	7.04	1000	1800
	302. 668	○	–	7.50	3.60	2.25	3.18	4.50	5.51	7.12	8.42	10.06	1200	2000
	302. 748	○	–	7.50	4.80	3.55	5.02	7.10	8.70	11.23	13.28	15.88	1200	2000

B = bore diameter · E = narrowest free cross section

Flow rate adjustable. Decrease in flow rate causes narrower spray angle.
Applications:
Dust control, foam control.

Series 308





Spray angle	Ordering no. Type	Mat.-Nr. 30 Brass	B Ø [mm]	E Ø [mm]	V̇max [l/min] p [bar] 0.3	0.5	1.0	2.0	5.0	10.0	Spray diameter D at p=2 bar H = 250 mm	H = 500 mm
90°	308. 466	○	2.0	2.0	0.54	0.70	1.00	1.40	2.21	3.13	400	880
	308. 606	○	4.0	4.0	1.22	1.58	2.23	3.15	4.98	7.04	450	950

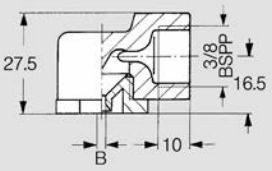
B = bore diameter · E = narrowest free cross section

Example for ordering	Type	+	Material no.	=	Ordering no.
	308. 466	+	30	=	308. 466. 30

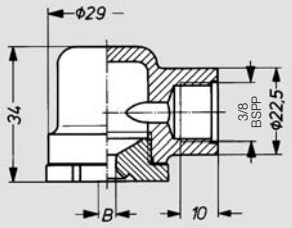
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Tangential-flow hollow cone nozzles
Plastic version
Series 302

Uniform hollow cone spray. Non-clogging nozzle, without swirl insert.
Applications:
Humidification of air in air washers, dust control, spraying onto filters, foam control, cooling.



Type 302.32X – 302.48X
Weight: 13 g



Type 302.52X – 302.99X
Weight: 18 g

Spray angle	Ordering no. Type	Mat. no. 5E PVDF	51 PA	53 PP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray diameter D at p=2 bar H = 250 mm	H = 500 mm
60°	302. 364	-	○	○	1.50	1.50	0.31	0.45	0.63	0,20	0.77	1.00	1.41	200	350
	302. 464	-	○	○	3.80	1.95	0.70	0.99	1.40	0,43	1.71	2.21	3.13	300	560
90°	302. 326	○	○	-	1.20	0.90	0.20	0.28	0.40	0.12	0.49	0.63	0.89	400	700
	302. 366	○	○	-	2.10	1.30	0.31	0.45	0.63	0.20	0.77	1.00	1.41	400	880
	302. 406	○	○	○	2.60	1.40	0.50	0.71	1.00	0.31	1.22	1.58	2.24	400	880
	302. 486	-	○	○	2.60	2.60	0.80	1.13	1.60	0.50	1.96	2.53	3.58	400	880
	302. 526	-	○	○	5.00	2.00	1.00	1.41	2.00	0.62	2.45	3.16	4.47	400	880
	302. 566	-	○	○	5.00	2.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	400	880
	302. 606	-	○	○	5.00	3.20	1.57	2.23	3.15	0.98	3.86	4.98	7.04	450	950
	302. 686	-	○	-	7.50	3.40	2.50	3.45	5.00	1.55	6.12	7.91	11.18	500	1050
	302. 766	-	○	-	9.00	4.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	500	1050
	302. 846	-	○	○	11.00	5.20	6.25	8.84	12.50	3.88	15.31	19.67	27.95	550	1130
	302. 886	○	○	○	11.00	6.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	550	1130
	302. 966	-	○	-	11.00	8.60	12.50	17.68	25.00	7.75	30.62	39.53	55.90	550	1130
130°	302. 328	○	-	-	1.35	0.80	0.20	0.28	0.40	0.12	0.49	0.63	0.89	700	1380
	302. 368	○	○	-	1.85	1.10	0.31	0.45	0.63	0.20	0.77	1.00	1.41	700	1380
	302. 408	○	○	-	3.65	1.30	0.50	0.71	1.00	0.31	1.22	1.58	2.24	700	1380
	302. 488	-	○	○	5.20	1.60	0.80	1.13	1.60	0.50	1.96	2.53	3.58	700	1380
	302. 528	-	○	-	5.00	2.00	1.00	1.41	2.00	0.62	2.45	3.16	4.47	700	1380
	302. 568	-	○	-	5.00	2.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	780	1520
	302. 608	○	○	○	5.00	3.20	1.57	2.23	3.15	0.98	3.86	4.98	7.04	780	1520
	302. 648	-	○	-	7.50	3.00	2.00	2.83	4.00	1.20	4.90	6.32	8.94	950	1850
	302. 688	-	○	-	7.50	3.40	2.50	3.54	5.00	1.55	6.12	7.91	11.18	950	1850
	302. 728	-	○	-	7.50	4.10	3.15	4.45	6.30	1.89	7.72	9.96	14.09	950	1850
	302. 768	-	○	-	9.00	4.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	950	1850
	302. 848	-	○	-	11.00	5.20	6.25	8.84	12.50	3.88	15.31	19.76	27.95	950	1850
	302. 888	-	○	○	11.00	6.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	950	1850
	302. 968	○	○	-	11.00	8.60	12.50	17.68	25.00	7.75	30.62	39.53	55.90	950	1850

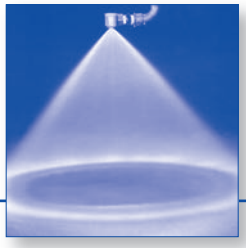
B = bore diameter · E = narrowest free cross section

Example for ordering	Type	+	Material no.	=	Ordering no.
	302. 364	+	51	=	302. 364. 51

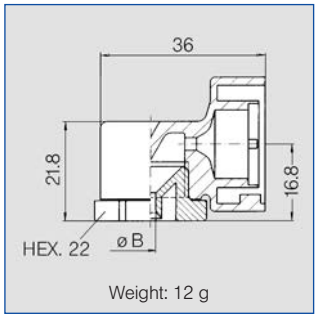
The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

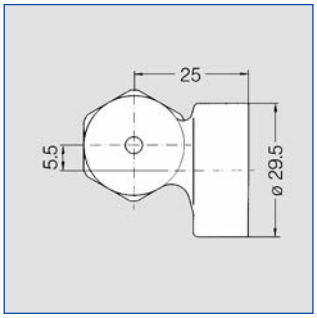
Tangential-flow hollow cone nozzles
Bayonet quick-release system
Series 302



A time-saving alternative to threaded design. Quick and secure assembling. Automatic setting of spray direction.
Applications:
Humidification of air in air washers, dust control, spraying onto filters, foam control.



Weight: 12 g



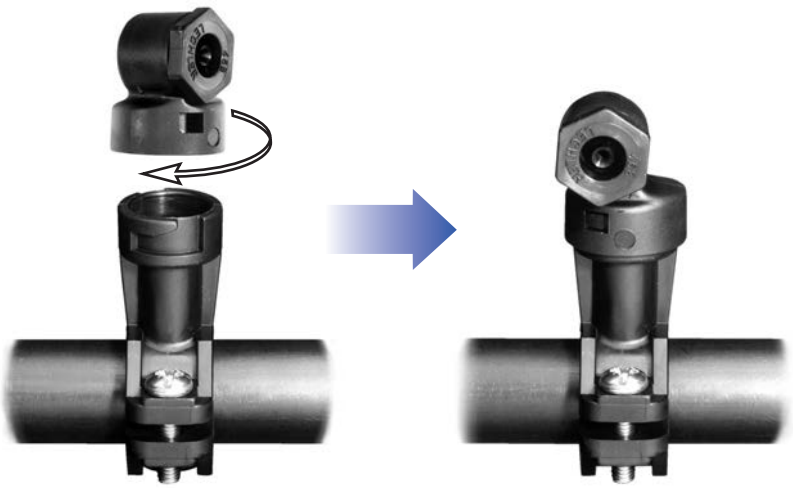
Spray angle	Ordering no. Type	Mat. no. 51 PA	Mat. no. 56 POM	Code Bayonet-quick release	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	US [gal/min] at 40 psi	3.0	4.0	10.0	Spray diameter D at p=2 bar H = 250 mm	H = 500 mm
45°	302. 503	○	-	KB	2.05	2.05	0.90	1.27	1.80	0.56	2.20	2.85	4.02	220	560
60°	302. 464	-	○	KB	1.95	1.95	0.70	0.99	1.40	0.43	1.71	2.21	3.13	300	560
80°	302. 545	-	○	KB	2.30	2.30	1.12	1.58	2.24	0.69	2.74	3.54	5.01	400	700
90°	302. 326	○	○	KB	1.05	1.05	0.20	0.28	0.40	0.12	0.49	0.63	0.89	400	700
	302. 406	○	○	KB	1.55	1.55	0.50	0.71	1.00	0.31	1.22	1.58	2.24	400	880
	302. 486	○	-	KB	2.10	2.10	0.80	1.13	1.60	0.50	1.96	2.53	3.58	400	880
	302. 606	○	-	KB	5.00	3.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	450	880
130°	302. 368	-	○	KB	1.30	1.30	0.31	0.45	0.63	0.20	0.77	1.00	1.41	700	1380
	302. 408	○	○	KB	2.00	2.00	0.50	0.71	1.00	0.31	1.22	1.58	2.24	700	1380
	302. 468	○	-	KB	2.40	2.40	0.70	0.99	1.40	0.43	1.71	2.21	3.13	700	1380
	302. 488	○	-	KB	2.75	2.75	0.80	1.13	1.60	0.50	1.96	2.53	3.58	700	1380

B = bore diameter · E = narrowest free cross section

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	302. 503	+	51	+	KB	=	302. 503. 51. KB

Simple assembling – just with a twist

Nozzle set assembled on pipe

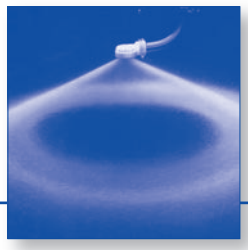


The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

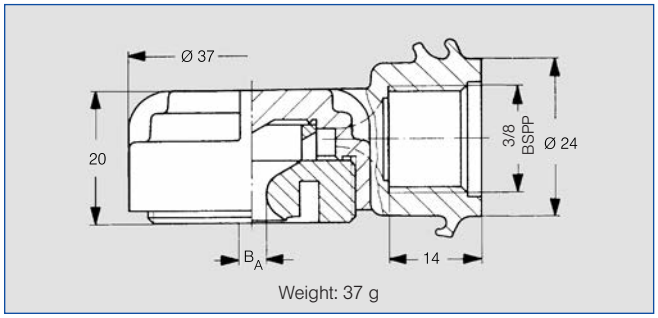
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Tangential-flow hollow cone nozzles

Series 350



High-performance eccentric spray nozzles for air-conditioning. Narrow drop spectrum and extremely uniform distribution of liquid over the entire spray pattern.
Applications:
Humidification of air in air washers, dust control, spraying onto filters, foam control.



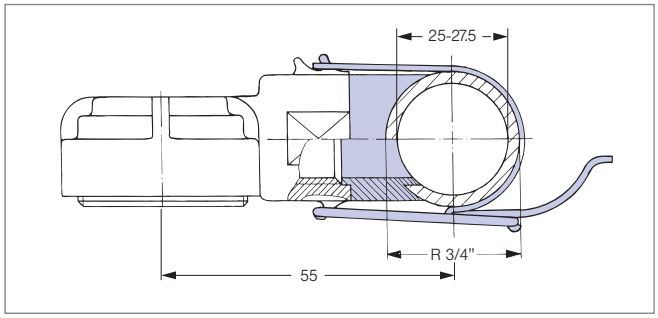
Weight: 37 g

Spray angle	Ordering no. Type	Mat.-Nr. 56 POM	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] pmax: 20 bar 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p=2 bar H = 250 mm	H = 500 mm
130°	**350. 368**	○	1.55	0.70	0.32	0.45	0.63	0.77	1.00	1.18	1.41	1120	2000
	350. 608	○	5.00	1.40	1.58	2.23	3.15	3.86	4.98	5.89	7.04	1140	2100

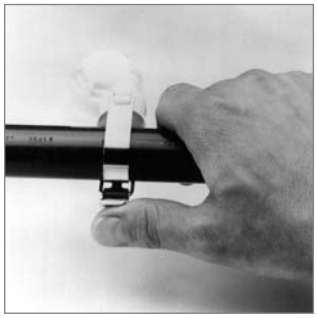
B = bore diameter · E = narrowest free cross section

Example for ordering:	Type	+	Material no.	=	Ordering no.
	350. 368	+	**56**	=	**350. 368. 56**

Accessories



Quick snap clamp unit · **Ord.-no.: 035. 030. 15. 05. 00. 0**
consisting of: Stainless steel clamp and polyurethan gasket

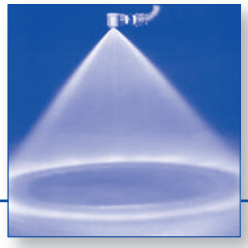


Bore-ø: 18 mm

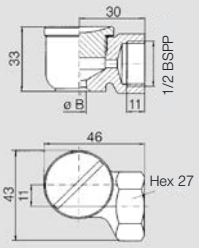
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Tangential-flow hollow cone nozzles

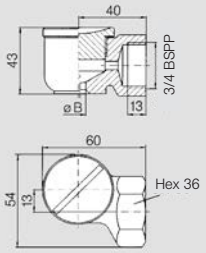
Series 304 / 306 / 307



Uniform hollow cone spray.
Non-clogging nozzle,
without swirl insert.
Applications:
Fire fighting, protection of storage tanks, foam control.



Series 304
Weight brass: 205 g



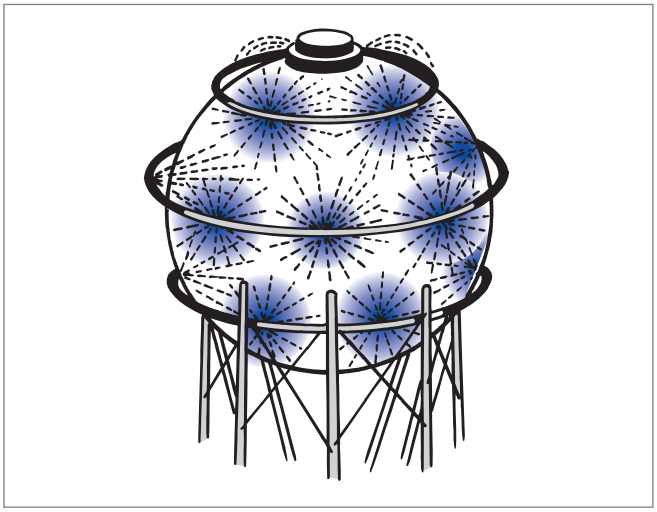
Series 306/307
Weight brass: 410 g

Spray angle	Ordering no. Type	Mat. no. 30 Brass	Mat. no. 1Y AISI 316L	G BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p=2 bar H = 250 mm	H = 500 mm
90°	304. 706	○	○	1/2"	5.10	5.10	2.80	3.96	5.60	6.86	8.85	10.47	12.52	450	750
	304. 796	○	○	1/2"	8.90	6.00	4.75	6.72	9.50	11.64	15.02	17.77	21.24	450	750
	306. 906	○	○	3/4"	9.00	9.00	9.00	12.73	18.00	22.05	28.46	33.68	40.25	470	850
	306. 976	○	○	3/4"	13.50	10.00	13.25	18.74	26.50	32.46	41.90	49.58	59.26	470	850
130°	304. 818	○	–	1/2"	12.00	5.00	5.30	7.50	10.60	12.98	16.76	19.83	23.70	1400	1800
	304. 898	○	○	1/2"	12.00	7.00	8.50	12.02	17.00	20.82	26.88	31.80	38.01	1400	1800
	306. 978	○	–	3/4"	19.00	7.30	13.25	18.74	26.50	32.46	41.90	49.58	59.25	1450	2400
	307. 018	○	○	3/4"	19.00	8.60	16.75	23.69	33.50	41.03	52.97	62.67	74.91	1450	2400

B = bore diameter · E = narrowest free cross section

Example for ordering:	Type	+	Material no.	=	Ordering no.
	304. 706	+	30	=	304. 706. 30

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.



Fire protection on spherical storage tank.

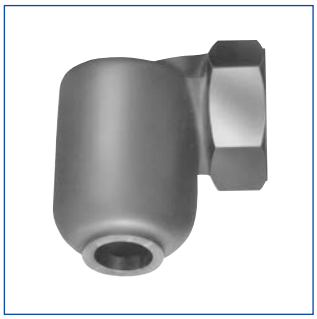
For further informations please ask for our brochure about fire protection.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Tangential-flow hollow cone nozzles

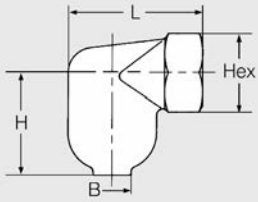
Series 373 »Ramp Bottom« / 309

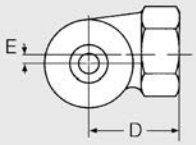
Fine, uniform hollow cone spray, also at low pressures.
Applications:
cooling and cleaning of gas, water re-cooling, dust control, chemical process engineering.



Sectional view of a series 373 »Ramp Bottom« nozzle

»Ramp Bottom« design offering a longer service life, due to the patented »sloping« shape of the swirl chamber.



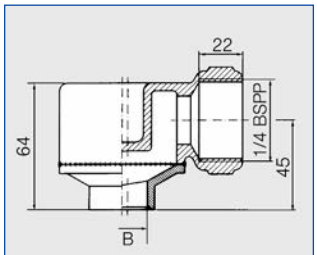


Dimensions

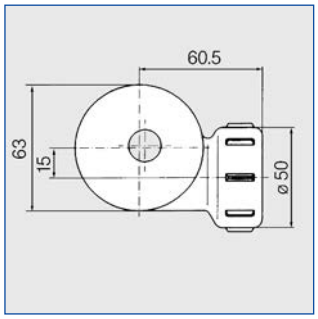
BSPP	L [mm]	D [mm]	H [mm]	E [mm]	SW	Weight 316 SS [g]
1	67	45	52	6.3	41	285
11/4	77	51	65	7.9	48	570
11/2	97	65	81	7.9	58	900

Series 373 „Ramp Bottom“

Less expensive plastic version, with low requirements on temperature and abrasion resistance.



Series 309
Weight: 142 g

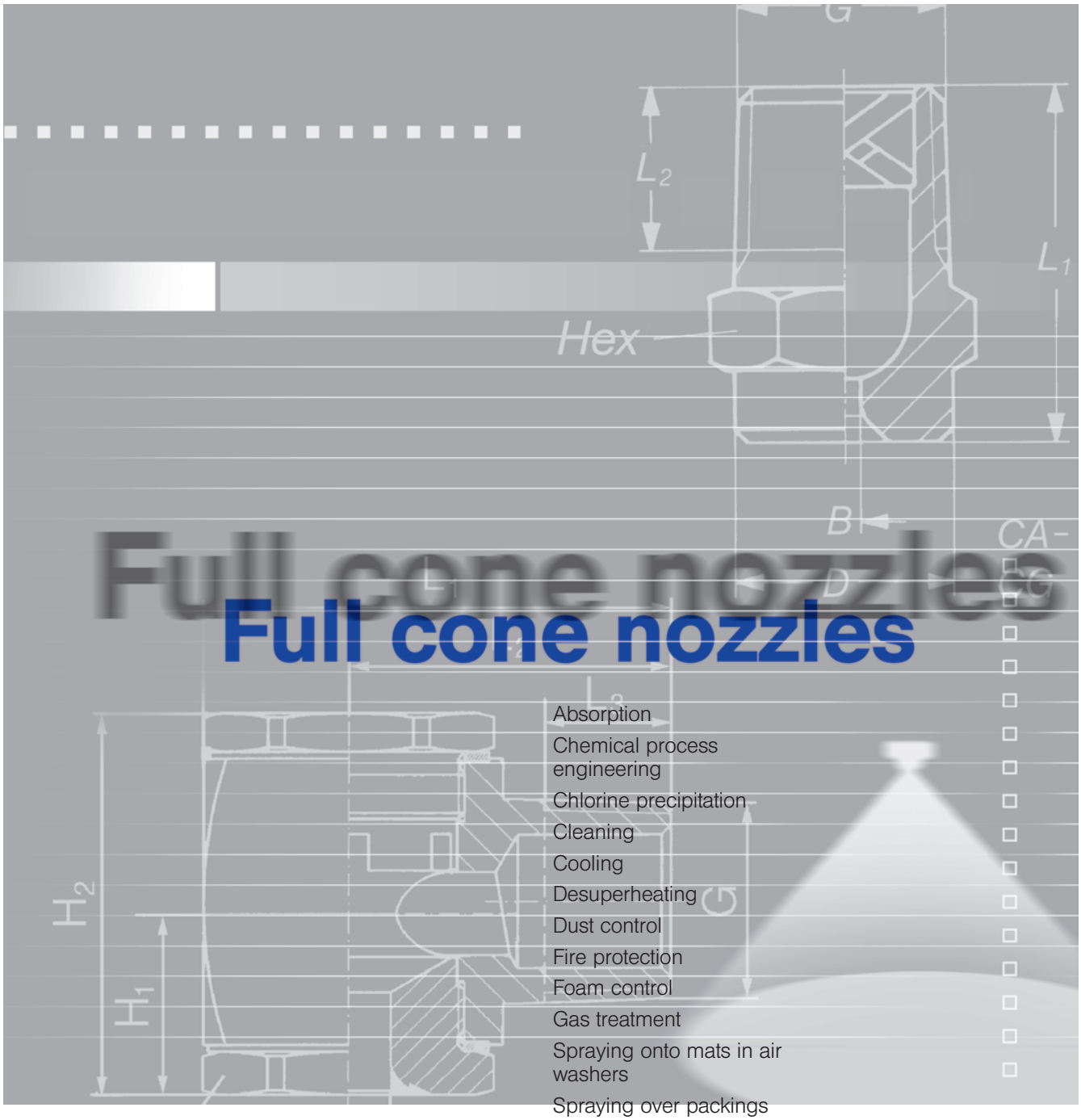


Spray angle	Ordering no. Type	Mat. no. 17 AISI 316Ti	Code 1 BSPP	1 1/4 BSPP	1 1/2 BSPP	B Ø [mm]	V̇ [l/min] p [bar] 0.3	0.5	1.0	2.0	5.0	10.0	Spray diameter D at p=2 bar H = 500 mm	H = 1000 mm
70°	373. 115	○	AN	-	-	11.40	24.40	31.50	44.50	63.00	99.60	141.00	650	1300
80°	373. 175	○	AN	-	-	12.90	31.00	40.00	56.60	80.00	126.00	179.00	800	1550
	373. 235	○	-	AQ	-	16.20	45.70	59.00	83.40	118.00	187.00	264.00	700	1350
	373. 285	○	-	AQ	-	20.50	62.00	80.00	113.00	160.00	253.00	358.00	800	1550
	373. 325	○	-	-	AS	22.20	77.50	100.00	141.00	200.00	316.00	447.00	800	1550
	373. 365	○	-	-	AS	23.60	67.90	114.00	161.00	227.00	359.00	508.00	700	1400
Plastic version:														
90°	309. 236. 5E	(Material PVDF)				20.00	45.70	59.00	83.40	118.00	187.00	264.00	850	1500
	309. 286. 5E	(Material PVDF)				24.00	62.00	80.00	113.00	160.00	253.00	358.00	750	1400

B = bore diameter

Example for ordering	Type	+	Material no.	+	Code	=	Ordering no.
	373. 115	+	17	+	AN	=	373. 115. 17. AN

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$



Full cone nozzles

- Absorption
- Chemical process engineering
- Chlorine precipitation
- Cleaning
- Cooling
- Desuperheating
- Dust control
- Fire protection
- Foam control
- Gas treatment
- Spraying onto mats in air washers
- Spraying over packings
- Surface spraying
- Water treatment
- and many others...

Full cone nozzles

Axial-flow full cone nozzles

Lechler full cone nozzles have an extraordinarily uniform liquid distribution over the whole circular impact area. The high precision of distribution is achieved by orienting the liquid inlet to the centre of the swirl chamber of the nozzle.
The optimized x-style swirl insert ensures a high operating safety due to its large free cross-sections.

Axial-flow full cone nozzles are available with different spray angles and in may flow rates. Therefore, matching to specific service conditions is possible without any difficulties.

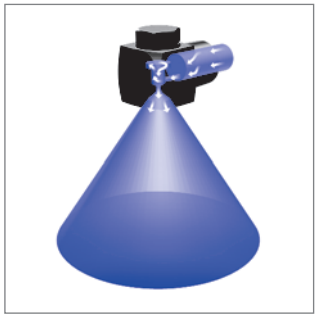
- Extremely uniform liquid distribution
- Wide flow rate range
- Large number of available spray angles

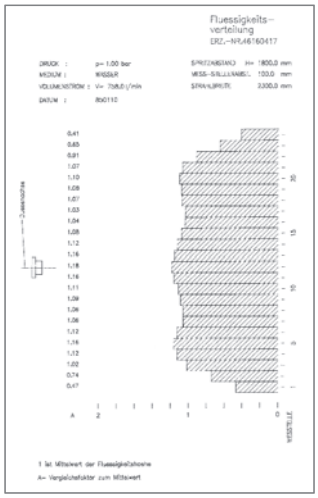
Special design for fire fighting: Deflector-plate nozzle

Tangential flow full cone nozzles

Tangential-flow full cone nozzles are, for instance, particularly suited for closed-circuit spraying of liquids with a high quota of solid matter, or for fire fighting applications. The atomizing fluid is tangentially supplied to a swirl chamber, where it is put into rotation. Tangential-flow full cone nozzles are free of swirl inserts. Hence, they are not at all prone to clogging. The full cone spray is obtained with the aid of specially arranged grooves, milled into the nozzle bottom, which cause an adequate part of the rotating liquid flow to diverge to the center of the swirl chamber. Thereby, an extremely uniform area distribution of the sprayed liquid is achieved.

- Reliable in service
- Non-clogging
- Stable spray angles, unaffected by transient pressures



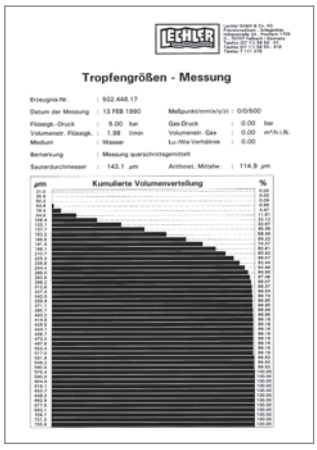


Typical liquid distribution chart

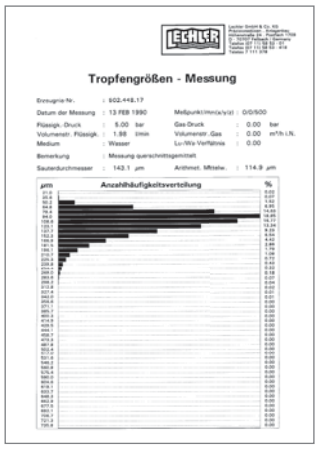
Cluster Head Nozzles

Lechler cluster head nozzles achieve a very large surface of the sprayed liquid by adding various finely atomizing single nozzles.
Whenever a fine fog-like full cone atomization with relatively large flow rates is necessary, e.g. gas exchange processes, steam cooling or dust suppression, Lechler cluster head nozzles have decisive advantages: overlapping hollow cones form a fine full cone atomization with an increased droplet surface area. These very fine droplets cannot be achieved by a single-orifice spray nozzle of the same flow rate size.

The increased droplet surface area of the atomized liquid provides great efficiency in gas treatment and cooling applications.

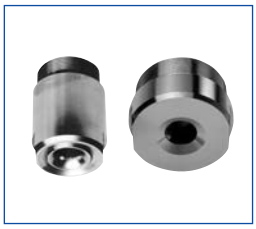


Cumulated volume distribution

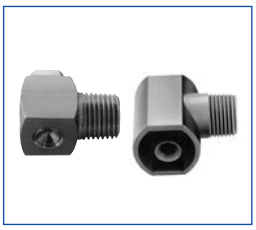
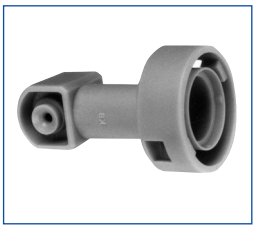


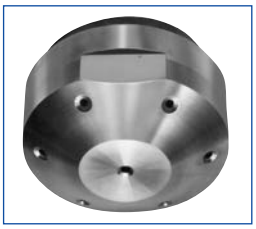
Number distribution

Full cone nozzles

Axial-flow full cone nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**490** **491**	45° 60° 90° 120°	0.63 – 71.00	1/8 BSPT 1/4 BSPT 3/8 BSPT 1/2 BSPT 3/4 BSPP 1 BSPP	Cleaning and washing processes, surface spraying, Container cleaning, foam precipitation, degassing of liquids. **Non-clogging nozzle design.**	**3.5**
	**460** **461**	60° 90° 120°	0.40 – 71.00	1/8 BSPT 1/4 BSPT 3/8 BSPT 1/2 BSPT 3/4 BSPP 1 BSPP	Cleaning and washing process, cooling of gaseous fluids and solids, surface spraying, spraying onto mats in air washers, improving on chemical reactions. **Large free cross-sections, due to optimized x-style swirl insert.**	**3.7**
	**405**	60° 90° 120°	100.00 – 315.00	1 1/4 BSPP 1 1/2 BSPP 2 BSPP	Surface spraying, spraying over packings, cleaning and washing process, chemical process engineering, cooling of gaseous fluids and solids, water treatment. **Uniform full cone spray.**	**3.9**
	**403**	90° 120°	400.00 – 1250.00	2 1/2 BSPP 3 BSPP 3 1/2 BSPP 4 BSPP	Surface spraying, spraying over packings, cleaning and washing process, chemical process engineering, cooling of gaseous fluids and solids, water treatment. **Uniform full cone spray.**	**3.10**
	**468**	60° 90° 120°	0.63 – 12.50	Assembly with 3/8" retaining nut	Surface spraying, spraying over packings, chemical process engineering, cleaning and washing processes, cooling of gaseous fluids and solids. **Uniform full cone spray.**	**3.11**

Full cone nozzles

Tangential-flow full cone nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**422** **423**	60° 90° 120°	1.00 – 100.00	1/4 BSPT 3/8 BSPT 1/2 BSPT 3/4 BSPT 1 BSPT	Cleaning and washing process, cooling of gaseous fluids and solids, surface spraying, spraying onto mats in air washers, improving on chemical reactions, continuous casting. **Without swirl inserts, non-clogging.**	**3.12** **3.13**
	**422** **Bayonet quick-release system**	60° 90° 120°	1.00 – 4.00	Assembly with bayonet quick-release system	Cleaning problems, cooling process, foam control. **Quick and safe assembly, without tools.** **Space-saving installation.**	**3.14**

Cluster head nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**502** **503**	70° 130°	1.25 – 60.00	1/2 BSPP 3/4 BSPP	Cooling of gaseous and solid material, desuperheating, chlorine precipitation, absorption as well as for improvement of chemical reaction by enlarging the contact area. **Fine full cone atomization with the aid of several hollow cones spraying into one another.**	**3.15**
	**520** **523**	130°	8.50 – 90.00	1 BSPP	Fire fighting, cooling of gaseous and solid material, chlorine precipitation. **Extremely fine full cone atomization with the aid of several hollow cones spraying into one another.**	**On request.** For further informations please refer to our brochure »Lechler nozzles for fire fighting«

Deflector-plate nozzle	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**524** **525**	180°	10.0 – 140.00	1/2 BSPP	Fire fighting and broadcast spraying. **Non-clogging nozzle without swirl inserts.**	**3.16**

Axial-flow full cone nozzles

Series 490 / 491

NEW Patent pending

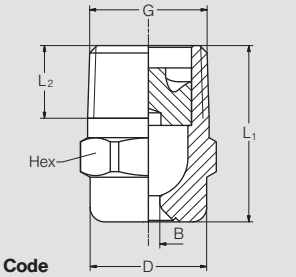
Non-clogging nozzle design. Stable spray angle. Particularly even liquid distribution.
Applications:
Cleaning and washing processes, surface spraying, Container cleaning, foam precipitation, degassing of liquids.

Series 490

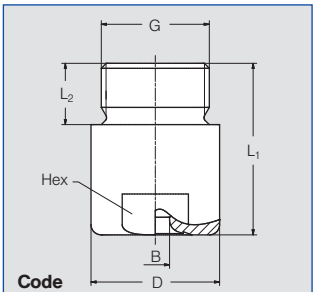
Series 491

Series 490/491 represents a new generation within the axial-flow full cone nozzles product group. These nozzles were developed using state-of-the-art design and simulation methods (CFD).

Nozzles of series 490/491 replace series 460/461 which are still available on request.



Code CA-CG



Code AK-AM

Code	Dimensions [mm] G	L_1	L_2	D	Hex	Weight Brass
CA	1/8 BSPT	18.0	6.5	10.0	11	13 g
CC	1/4 BSPT	22.0	10.0	13.0	14	16 g
CE	3/8 BSPT	24.5	10.0	16.0	17	30 g
CE	3/8 BSPT	30.0	10.0	16.0	17	50 g
CG	1/2 BSPT	32.5	13.0	21.0	22	60 g
CG	1/2 BSPT	43.5	13.0	21.0	22	85 g
AK	3/4 BSPP	42.0	15,0	32.0	27	190 g
AM	1 BSPP	56.0	17.0	40.0	36	350 g

Subject to technical modification.
In a critical installation situation, please ask for the exact dimensions.

Spray angle	Type	Ordering no. Mat. no. 1Y AISI 316L	30 Brass	Code 1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	1 BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p=2 bar H = 200 mm	H = 500 mm
45°	**490. 403**	○	○	**CA**	-	-	-	-	-	1.25	1.25	0.57	0.76	1.00	1.18	1.44	1.65	1.90	160	400
	490. 523	○	○	**CA**	-	-	-	-	-	1.70	1.70	1.15	1.52	2.00	2.35	2.89	3.30	3.81	160	400
	490. 603	○	○	-	**CC**	**CE***	-	-	-	2.00	2.00	1.81	2.39	3.15	3.70	4.54	5.20	6.00	160	400
	490. 643	-	○	-	-	**CE**	-	-	-	2.45	2.45	2.30	3.03	4.00	4.70	5.77	6.60	7.61	160	400
	490. 683	-	○	-	-	**CE**	-	-	-	2.55	2.55	2.87	3.79	5.00	5.88	7.21	8.25	9.52	160	400
	490. 703	-	○	-	-	**CE**	-	-	-	2.65	2.65	3.22	4.24	5.60	6.59	8.08	9.24	10.66	160	400
	490. 723	○	○	-	-	**CE**	-	-	-	2.85	2.85	3.62	4.77	6.30	7.41	9.09	10.40	11.99	160	400
	490. 783	-	○	-	-	-	**CG**	-	-	3.45	3.45	5.17	6.82	9.00	10.58	12.98	14.85	17.12	160	400
	490. 843	-	○	-	-	-	**CG**	-	-	3.80	3.80	7.18	9.47	12.50	14.70	18.03	20.63	23.80	160	400
60°	**490. 404**	○	○	**CA**	-	-	-	-	-	1.15	1.15	0.57	0.76	1.00	1.18	1.44	1.65	1.90	220	560
	490. 444	○	-	**CA**	-	-	-	-	-	1.25	1.25	0.72	0.95	1.25	1.47	1.80	2.06	2.38	220	560
	490. 484	○	○	**CA**	-	-	-	-	-	1.45	1.45	0.92	1.21	1.60	1.88	2.31	2.64	3.05	220	560
	490. 524	○	○	**CA**	-	-	-	-	-	1.60	1.60	1.15	1.52	2.00	2.35	2.89	3.30	3.81	220	560
	490. 564	○	○	**CA**	-	-	-	-	-	1.80	1.80	1.44	1.89	2.50	2.94	3.61	4.13	4.76	220	560
	490. 604	○	○	**CA**	**CC**	**CE**	-	-	-	2.05	2.05	1.81	2.39	3.15	3.70	4.54	5.20	6.00	220	560
	490. 644	○	○	-	**CC**	**CE**	-	-	-	2.30	2.30	2.30	3.03	4.00	4.70	5.77	6.60	7.61	220	560
	490. 684	○	○	-	**CC**	**CE**	-	-	-	2.60	2.60	2.87	3.79	5.00	5.88	7.21	8.25	9.52	220	560
	490. 724	○	○	-	**CC**	**CE**	-	-	-	2.95	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	220	560
	490. 764	○	○	-	-	**CE**	-	-	-	3.25	3.25	4.59	6.06	8.00	9.41	11.54	13.20	15.22	220	560
	490. 804	○	○	-	-	**CE**	-	-	-	3.70	3.70	5.74	7.58	10.00	11.76	14.43	16.51	19.04	220	560
	490. 844	○	○	-	-	-	**CG**	-	-	4.05	4.05	7.18	9.47	12.50	14.70	18.03	20.63	23.80	220	560
	490. 884	○	○	-	-	-	**CG**	-	-	4.65	4.65	9.19	12.13	16.00	18.82	23.08	26.41	30.46	220	560
	490. 924	○	○	-	-	-	-	**AK**	-	5.20	5.20	11.49	15.16	20.00	23.52	28.85	33.01	38.07	220	560
	490. 964	○	○	-	-	-	-	**AK**	-	5.80	5.80	14.36	18.95	25.00	29.40	36.07	41.26	47.59	220	560
	491. 044	○	○	-	-	-	-	-	**AM**	7.25	7.25	22.97	30.31	40.00	47.04	57.71	66.02	76.15	220	560
	491. 084	○	○	-	-	-	-	-	**AM**	8.15	8.15	28.72	37.89	50.00	58.80	72.14	82.53	95.18	220	560

*Only available in material 30 · B = bore diameter · E = narrowest free cross section

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$
(≤ 10 bar)

Axial-flow full cone nozzles

Series 490 / 491

NEW Patent pending

Spray angle	Type	Ordering no. Mat. no. 1Y AISI 316L	30 Brass	Code 1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	1 BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p=2 bar H = 200 mm	H = 500 mm
90°	490. 406	○	○	CA	-	-	-	-	-	1.20	1.20	0.57	0.76	1.00	1.18	1.44	1.65	1.90	380	860
	490. 446	-	○	CA	-	-	-	-	-	1.30	1.30	0.72	0.95	1.25	1.47	1.80	2.06	2.38	380	860
	490. 486	○	○	CA	-	-	-	-	-	1.45	1.45	0.92	1.21	1.60	1.88	2.31	2.64	3.05	380	860
	490. 526	○	○	CA	-	-	-	-	-	1.70	1.55	1.15	1.52	2.00	2.35	2.89	3.30	3.81	380	860
	490. 566	○	○	CA	-	-	-	-	-	1.90	1.90	1.44	1.89	2.50	2.94	3.61	4.13	4.76	380	860
	490. 606	○	○	CA	-	CE	-	-	-	2.10	2.05	1.81	2.39	3.15	3.70	4.54	5.20	6.00	380	860
	490. 646	○	○	-	CC	CE	-	-	-	2.40	2.40	2.30	3.03	4.00	4.70	5.77	6.60	7.61	390	960
	490. 686	○	○	-	CC	CE	-	-	-	2.70	2.70	2.87	3.79	5.00	5.88	7.21	8.25	9.52	390	960
	490. 726	○	○	-	CC	CE	-	-	-	3.20	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	390	960
	490. 746	○	○	-	-	CE	-	-	-	3.15	3.15	4.08	5.38	7.10	8.35	10.24	11.72	13.52	390	960
	490. 766	○	○	-	-	CE	-	-	-	3.40	3.40	4.59	6.06	8.00	9.41	11.54	13.20	15.22	390	960
	490. 806	○	○	-	-	CE	-	-	-	3.90	3.90	5.74	7.58	10.00	11.76	14.43	16.51	19.04	390	960
	490. 846	○	○	-	-	CE	-	-	-	4.65	4.00	7.18	9.47	12.50	14.70	18.03	20.63	23.80	390	960
	490. 886	○	○	-	-	-	CG	-	-	5.45	4.50	9.19	12.13	16.00	18.82	23.08	26.41	30.46	390	960
	490. 926	○	○	-	-	-	CG	-	-	5.90	4.50	11.49	15.16	20.00	23.52	28.85	33.01	38.07	390	960
	490. 966	○	○	-	-	-	CG	AK	-	6.55	4.85	14.36	18.95	25.00	29.40	36.07	41.26	47.59	390	960
	491. 006	○	○	-	-	-	-	AK	-	7.55	5.50	18.09	23.87	31.50	37.05	45.45	51.99	59.97	390	960
	491. 046	○	○	-	-	-	-	AK	-	8.60	6.60	22.97	30.31	40.00	47.04	57.71	66.02	76.15	390	960
	491. 086	○	○	-	-	-	-	-	AM	9.45	7.25	28.72	37.89	50.00	58.80	72.14	82.53	95.18	390	960
	491. 126	○	○	-	-	-	-	-	AM	10.40	8.00	36.18	47.75	63.00	74.09	90.89	103.98	119.93	390	960
	491. 146	○	-	-	-	-	-	-	AM	11.00	7.50	40.78	53.81	71.00	83.50	102.43	117.19	135.16	390	960
120°	490. 368	○	○	CA	-	-	-	-	-	0.85	0.65	0.36	0.48	0.63	0.74	0.91	1.04	1.20	680	1220
	490. 408	○	○	CA	-	-	-	-	-	1.20	1.20	0.57	0.76	1.00	1.18	1.44	1.65	1.90	680	1220
	490. 448	○	○	CA	-	-	-	-	-	1.30	1.30	0.72	0.95	1.25	1.47	1.80	2.06	2.38	680	1220
	490. 488	○	○	CA	-	-	-	-	-	1.45	1.45	0.92	1.21	1.60	1.88	2.31	2.64	3.05	680	1220
	490. 528	○	○	CA	-	-	-	-	-	1.70	1.70	1.15	1.52	2.00	2.35	2.89	3.30	3.81	680	1220
	490. 568	○	○	CA	-	-	-	-	-	1.90	1.90	1.44	1.89	2.50	2.94	3.61	4.13	4.76	680	1220
	490. 608	○	○	CA	-	-	-	-	-	2.10	2.05	1.81	2.39	3.15	3.70	4.54	5.20	6.00	680	1220
	490. 648	○	○	-	CC	CE	-	-	-	2.40	2.40	2.30	3.03	4.00	4.70	5.77	6.60	7.61	680	1330
	490. 688	○	○	-	CC	CE	-	-	-	2.75	2.75	2.87	3.79	5.00	5.88	7.21	8.25	9.52	680	1330
	490. 728	○	○	-	CC	CE	-	-	-	3.20	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	680	1330
	490. 748	○	○	-	-	CE	-	-	-	3.20	3.20	4.08	5.38	7.10	8.35	10.24	11.72	13.52	680	1330
	490. 768	○	○	-	-	CE	-	-	-	3.45	3.45	4.59	6.44	8.00	9.41	11.54	13.20	15.22	680	1330
	490. 808	○	○	-	-	CE	-	-	-	3.90	3.90	5.74	7.58	10.00	11.76	14.43	16.51	19.04	680	1330
	490. 848	○	○	-	-	CE	-	-	-	4.70	4.00	7.18	9.47	12.50	14.70	18.03	20.63	23.80	680	1330
	490. 888	○	○	-	-	-	CG	-	-	5.10	4.50	9.19	12.13	16.00	18.82	23.08	26.41	30.46	680	1330
	490. 928	○	○	-	-	-	CG	-	-	5.80	4.75	11.49	15.16	20.00	23.52	28.85	33.01	38.07	680	1330
	490. 968	○	○	-	-	-	CG	AK	-	6.65	4.85	14.36	18.95	25.00	29.40	36.07	41.26	47.59	680	1330
	491. 048	○	○	-	-	-	-	AK	-	9.20	5.85	22.97	30.31	40.00	47.04	57.71	66.02	76.15	680	1330
	491. 128	○	○	-	-	-	-	-	AM	10.80	7.75	36.18	47.75	63.00	74.09	90.89	103.98	119.93	680	1330
	491. 148	○	-	-	-	-	-	-	AM	11.40	7.65	40.78	53.81	71.00	83.50	102.43	117.19	135.16	680	1330

B = bore diameter · E = narrowest free cross section

Other nozzle materials (special alloys, plastics) are available on request.

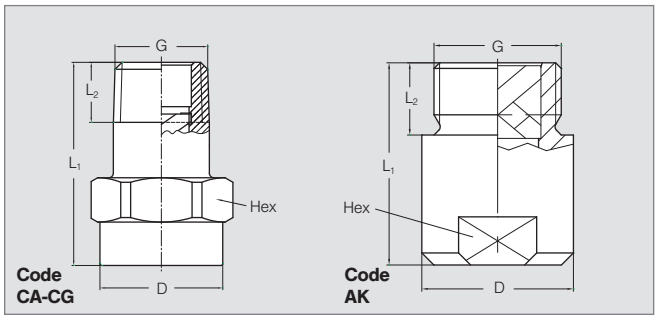
Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	490. 406	+	1Y	+	CA	=	490. 406. 1Y. CA

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$ **(≤ 10 bar)**

Axial-flow full cone nozzles

Series 460 / 461

Very uniform spray pattern. Large free cross-sections, due to optimized x-style swirl insert.
Applications:
Cleaning and washing process, cooling of gaseous fluids and solids, surface spraying, spraying onto mats in air washers, improving of chemical reactions.



Code	Dimensions [mm] G	L_1	L_2	D	Hex
CA	1/8 BSPT	22.0	6.5	13.0	14
CC	1/4 BSPT	22.0	9.7	13.0	14
CE	3/8 BSPT	30.0	10.0	17.0	17
CG	1/2 BSPT	43.5	13.2	22.0	22
AK	3/4 BSPP	42.0	15.0	31.5	27

Subject to technical modifications. Please enquire about the exact dimensions if the installation situation is critical!

Spray angle	Ordering no. Type	Mat.-no. 5E PVDF	Code 1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p=2 bar H = 200 mm	H = 500 mm
60°	**460. 644**	○	-	**CC**	-	-	-	2.40	1.90	2.30	3.03	4.00	4.70	5.77	6.60	7.61	220	560
	460. 964	○	-	-	-	-	**AK**	5.80	4.90	14.36	18.95	25.00	29.40	36.07	41.26	47.59	220	560
90°	**460. 326**	○	**CA**	-	-	-	-	0.80	0.55	0.23	0.30	0.40	0.47	0.58	0.66	0.76	380	860
	460. 406	○	**CA**	-	-	-	-	1.20	0.85	0.57	0.76	1.00	1.18	1.44	1.65	1.90	380	860
	460. 486	○	**CA**	-	-	-	-	1.45	1.20	0.92	1.21	1.60	1.88	2.31	2.64	3.05	380	860
	460. 526	○	**CA**	-	-	-	-	1.65	1.30	1.15	1.52	2.00	2.35	2.89	3.30	3.81	380	860
	460. 606	○	**CA**	-	**CE**	-	-	2.05	1.45	1.81	2.39	3.15	3.70	4.54	5.20	6.00	380	860
	460. 646	○	-	**CC**	-	-	-	2.30	1.80	2.30	3.03	4.00	4.70	5.77	6.60	7.61	390	960
	460. 726	○	-	-	**CE**	-	-	2.95	2.00	3.62	4.77	6.30	7.41	9.09	10.40	11.99	390	960
	460. 746	○	-	-	**CE**	-	-	3.30	1.90	4.08	5.38	7.10	8.35	10.24	11.72	13.52	390	960
	460. 766	○	-	-	**CE**	-	-	3.30	2.40	4.59	6.06	8.00	9.41	11.54	13.20	15.22	390	960
	460. 806	○	-	-	**CE**	-	-	3.70	2.70	5.74	7.58	10.00	11.76	14.43	16.51	19.04	390	960
	460. 846	○	-	-	**CE**	-	-	4.05	3.20	7.18	9.47	12.50	14.70	18.03	20.63	23.80	390	960
	460. 886	○	-	-	-	**CG**	-	4.70	3.10	9.19	12.13	16.00	18.82	23.08	26.41	30.46	390	960
	460. 966	○	-	-	-	**CG**	-	5.80	3.80	14.36	18.95	25.00	29.40	36.07	41.26	47.59	390	960
	461. 006	○	-	-	-	**CG**	-	6.40	3.80	18.09	23.87	31.50	37.05	45.45	51.99	59.97	390	960
	461. 046	⊗	-	-	-	-	**AK**	7.20	5.30	22.97	30.31	40.00	47.04	57.71	66.02	76.15	390	960

B = bore diameter · E = narrowest free cross section

⊗ Material PP (Material no. 53), connection 3/4 BSPT (Code CK)

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$
(≤ 10 bar)

Axial-flow full cone nozzles

Series 460 / 461

Spray angle	Ordering no. Type	Mat.-no. 5E PVDF	Code 1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p=2 bar H = 200 mm	H = 500 mm
120°	460. 408	○	CA	-	-	-	-	1.20	0.85	0.57	0.76	1.00	1.18	1.44	1.65	1.90	680	1220
	460. 488	○	CA	-	-	-	-	1.50	1.00	0.92	1.21	1.60	1.88	2.31	2.64	3.05	680	1220
	460. 528	○	CA	-	-	-	-	1.65	1.20	1.15	1.52	2.00	2.35	2.89	3.30	3.81	680	1220
	460. 608	○	CA	-	-	-	-	2.10	1.40	1.81	2.39	3.15	3.70	4.54	5.20	6.00	680	1220
	460. 648	○	-	CC	-	-	-	2.45	1.60	2.30	3.03	4.00	4.70	5.77	6.60	7.61	680	1330
	460. 728	○	-	-	CE	-	-	3.10	1.90	3.62	4.77	6.30	7.41	9.09	10.40	11.99	680	1330
	460. 748	○	-	-	CE	-	-	3.30	1.90	4.08	5.38	7.10	8.35	10.24	11.72	13.52	680	1330
	460. 768	○	-	-	CE	-	-	3.50	1.90	4.59	6.44	8.00	9.41	11.54	13.20	15.22	680	1330
	460. 808	○	-	-	CE	-	-	3.80	2.40	5.74	7.58	10.00	11.76	14.43	16.51	19.04	680	1330
	460. 848	○	-	-	CE	-	-	4.20	2.70	7.18	9.47	12.50	14.70	18.03	20.63	23.80	680	1330
	460. 888	○	-	-	-	CG	-	4.60	3.10	9.19	12.13	16.00	18.82	23.08	26.41	30.46	680	1330
	460. 968	○	-	-	-	CG	-	5.90	4.10	14.36	18.95	25.00	29.40	36.07	41.26	47.59	680	1330
	461. 048	⊗	-	-	-	-	AK	7.60	4.90	22.97	30.31	40.00	47.04	57.71	66.02	76.15	680	1330

B = bore diameter · E = narrowest free cross section

⊗ Material PP (Material no. 53), connection 3/4 BSPT (Code CK)

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

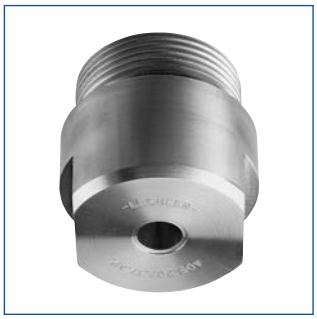
Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	460. 408	+	5E	+	CA	=	460. 408. 5E. CA

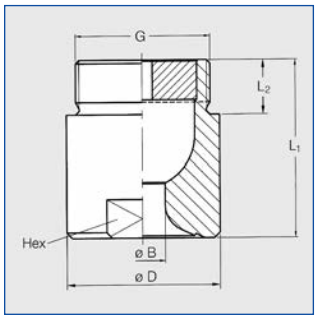
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$
(≤ 10 bar)

Axial-flow full cone nozzles

Series 405

Very uniform spray pattern.
Applications:
Surface spraying, spraying over packings, cleaning and washing process, chemical process engineering, cooling of gaseous fluids and solids, water treatment.





Dimensions [mm]				
G	L_1	L_2	D	Hex
1 1/4 BSPP	50	19	49	41
1 1/2 BSPP	60	19	59	50
2 BSPP	78	24	68	60

Spray angle	Ordering no. Type	Mat.-no. 1Y AISI 316L	Mat.-no. 30 Brass	Code 1 1/4 BSPP	Code 1 1/2 BSPP	Code 2 BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.3	0.5	1.0	2.0	3.0	5.0	Spray diameter D at p=2 bar H = 0.5 m	H = 1 m
60°	405. 204	○	○	AP	-	-	11.20	5.80	47	57	76	100	118	144	560	1040
	405. 284	○	○	-	AR	-	14.30	7.00	75	92	121	160	188	231	580	1080
	405. 324	○	○	-	-	AV	16.40	7.50	94	115	152	200	235	289	580	1080
	405. 364	○	○	-	-	AV	18.40	8.50	117	144	189	250	294	361	580	1080
	405. 404	○	○	-	-	AV	20.00	7.00	147	181	239	315	370	454	580	1100
90°	405. 206	○	○	AP	-	-	12.00	5.00	47	57	76	100	118	144	780	1450
	405. 286	○	○	-	AR	-	15.20	6.20	75	92	121	160	188	231	800	1550
	405. 326	○	○	-	-	AV	17.20	7.70	94	115	152	200	235	289	850	1600
	405. 366	○	○	-	-	AV	19.50	8.70	117	144	189	250	294	361	850	1600
	405. 406	○	○	-	-	AV	22.00	9.50	147	181	239	315	370	454	850	1600
120°	405. 208	○	○	AP	-	-	12.70	5.00	47	57	76	100	118	144	1450	2600
	405. 288	○	○	-	AR	-	16.00	6.60	75	92	121	160	188	231	1500	2700
	405. 328	○	○	-	-	AV	17.80	7.90	94	115	152	200	235	289	1500	2800
	405. 368	○	○	-	-	AV	20.10	8.80	117	144	189	250	294	361	1500	2800
	405. 408	○	○	-	-	AV	22.40	9.10	147	181	239	315	370	454	1500	2800

B = bore diameter · E = narrowest free cross section

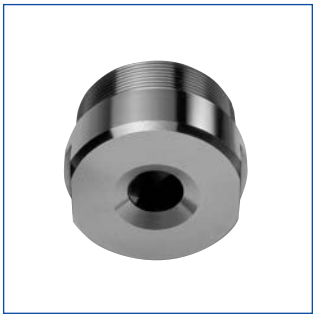
Example for Ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	405. 204	+	1Y	+	AP	=	405. 204. 1Y. AP

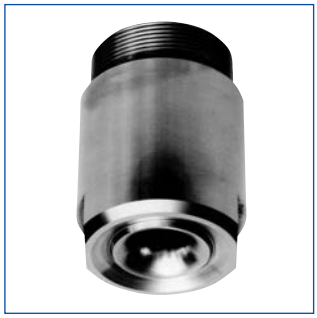
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$
(≤ 10 bar)

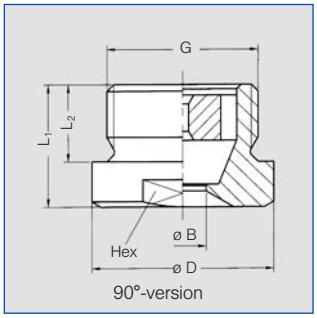
Axial-flow full cone nozzles

Series 403

Very uniform spray pattern.
Applications:
Surface spraying, spraying over packings, chemical process engineering, cooling of gaseous fluids and solids.







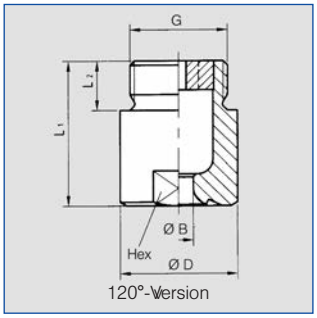
90°-version

90°-version

Dimensions [mm]					
Type	G ISO 228	L_1	L_2	D	Hex
403. 446/403. 486	G 2 1/2 A	52	27	83	75
403. 526	G 3 A	60	30	98	85
403. 606	G 3 1/2 A	70	32	118	105

120°-version

Dimensions [mm]					
Type	G ISO 228	L_1	L_2	D	Hex
403. 448/403. 488	G 2 1/2 A	124	27	83	75
403. 528	G 3 A	153	30	98	85
403. 608	G 3 1/2 A	156	32	118	105
403. 628	G 4 A	165	36	128	110



120°-Version

Spray angle	Ordering no. Type	Mat.-no. 1Y AISI 316L	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.3	0.5	1.0	2.0	3.0	5.0	7.0	Spray diameter D at p=2 bar H = 0.5 m	H = 1 m
90°	403. 446	○	25.00	12.00	187	230	303	400	470	577	660	900	1700
	403. 486	○	29.50	12.00	234	287	379	500	588	721	825	900	1700
	403. 526	○	32.00	13.80	295	362	477	630	741	909	1040	900	1700
	403. 606	○	40.00	15.00	468	574	758	1000	1176	1443	1651	980	1750
120°	403. 448	○	25.50	10.00	187	230	303	400	470	577	660	1500	2850
	403. 488	○	29.50	11.00	234	287	379	500	588	721	825	1500	2850
	403. 528	○	32.00	15.00	295	362	477	630	741	909	1040	1500	2850
	403. 608	○	42.00	12.00	469	574	758	1000	1176	1443	1651	1500	2850
	403. 628	○	45.00	15.00	585	718	947	1250	1470	1903	2063	1600	2900

B = bore diameter · E = narrowest free cross section

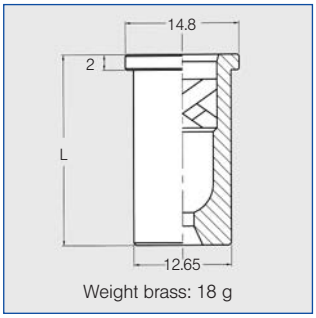
Example for ordering:	Type	+	Material-no.	=	Ordering no.
	403. 446	+	1Y	=	403. 446. 1Y

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$
(≤ 10 bar)

Axial-flow full cone nozzles for retaining nut

Series 468

Full cone nozzle for assembly with retaining nut. Uniform full cone spray.
Applications:
Surface spraying, spraying over packings, chemical process engineering, cleaning and washing processes, cooling of gaseous fluids and solids.



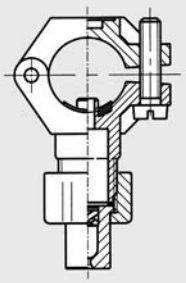
Weight brass: 18 g

Spray angle	Ordering no. Type	Mat.-no. 17[1] AISI 316Ti/AISI 316L	30 Brass	5E PVDF	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	L [mm]	Spray diameter D at p = 2 bar H = 200 mm	H = 500 mm
60°	468. 604	○	○	-	2.05	1.40	1.81	2.39	3.15	0.98	3.70	4.54	6.00	18	220	560
	468. 644	-	○	○	2.40	1.90	2.30	3.03	4.00	1.20	4.70	5.77	7.61	24.5	220	560
	468. 684	-	○	-	2.60	2.00	2.87	3.79	5.00	1.55	5.88	7.21	9.52	24.5	220	560
	468. 724	○	○	-	2.90	2.00	3.62	4.77	6.30	1.89	7.41	9.09	11.99	24.5	220	560
90°	468. 526	○	○	○	1.65	1.30	1.15	1.52	2.00	0.60	2.35	2.89	3.81	18	380	860
	468. 846	○	○	-	4.05	3.20	7.18	9.47	12.50	3.75	14.70	18.03	23.80	24.5	380	960
120°	468. 368	-	○	-	0.95	0.70	0.36	0.48	0.63	0.20	0.74	0.91	1.20	18	680	1540
	468. 408	○	○	-	1.20	0.85	0.57	0.76	1.00	0.30	1.18	1.44	1.90	18	680	1540
	468. 488	○	○	-	1.50	1.00	0.92	1.21	1.60	0.48	1.88	2.31	3.05	18	680	1540
	468. 528	○	○	-	1.65	1.20	1.15	1.52	2.00	0.60	2.35	2.89	3.81	18	680	1540

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
B = bore diameter · E = narrowest free cross section

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Example for ordering	Type	+	Material-no.	=	Ordering no.
	468. 604	+	17	=	468. 604. 17

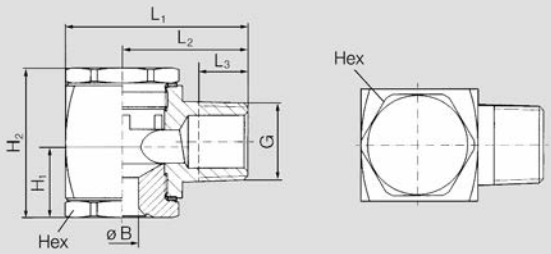

For assembly possibilities please refer to foldet page

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$
(≤ 10 bar)

Tangential-flow full cone nozzles

Series 422

Tangentially arranged liquid supply. Without swirl inserts. Non-clogging. Stable spray angle. Uniform spray.
Applications:
Cleaning and washing process, cooling of gaseous fluids and solids, surface spraying, spraying onto mats in air washers, improving on chemical reactions, continuous casting, foam control.



Material: Brass/316 Ti

Dimensions [mm]							Weight
G	L_1	L_2	L_3	H_1	H_2	Hex	Brass
1/4 BSPT	28.0	20.0	10.0	8.0	20.5	12.0	43 g
3/8 BSPT	36.0	25.0	10.0	11.0	26.5	19.0	105 g
1/2 BSPT	48.5	33.5	13.0	20.0	40.0	27.0	250 g
3/4 BSPT	58.0	38.0	14.5	23.5	57.0	36.0	660 g
1 BSPT	76.0	48.5	17.0	27.5	66.0	41.0	1.330 g

Spray angle	Ordering no. Type	Mat.-no. 30 Brass	Mat.-no. 17[1] AISI 316Ti/AISI 316L	Code 1/4 BSPT	Code 3/8 BSPT	Code 1/2 BSPT	Code 3/4 BSPT	Code 1 BSPT	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray diameter D at p=1-10 bar H = 200 mm	H = 500 mm
60°	422. 644	○	○	-	CE	-	-	-	3.00	3.00	2.00	2.83	4.00	1.24	4.90	6.32	8.94	225	510
90°	422. 406	○	○	CC	-	-	-	-	1.50	1.45	0.50	0.71	1.00	0.31	1.22	1.58	2.24	380	860
	422. 486	-	○	CC	-	-	-	-	1.90	1.80	0.80	1.13	1.60	0.50	1.96	2.53	3.58	380	860
	422. 566	○	○	CC	-	-	-	-	2.30	2.20	1.25	1.77	2.50	0.78	3.06	3.95	5.59	380	860
	422. 606	○	○	-	CE	-	-	-	2.60	2.50	1.57	2.23	3.15	0.98	3.86	4.98	7.04	380	860
	422. 646	○	○	-	CE	-	-	-	3.00	2.90	2.00	2.83	4.00	1.24	4.90	6.32	8.94	390	960
	422. 726	○	-	-	CE	-	-	-	3.70	3.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	390	960
	422. 766	-	○	-	CE	-	-	-	4.15	4.10	4.00	5.66	8.00	2.48	9.80	12.65	17.89	390	960
	422. 806	○	-	-	CE	-	-	-	4.65	4.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	390	960
	422. 846	○	○	-	CE	-	-	-	5.30	5.30	6.25	8.84	12.50	3.88	15.31	19.76	27.95	390	960
	422. 886	○	○	-	CE	-	-	-	5.80	6.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	390	960
	422. 966	-	○	-	-	CG	-	-	8.00	8.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	390	960
120°	422. 488	○	-	CC	-	-	-	-	1.90	1.90	0.80	1.13	1.60	0.50	1.96	2.53	3.58	680	1220
	422. 568	○	○	CC	-	-	-	-	2.40	2.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	680	1220
	422. 608	○	-	-	CE	-	-	-	2.60	2.50	1.57	2.23	3.15	0.98	3.86	4.98	7.04	680	1600
	422. 728	○	○	-	CE	-	-	-	4.00	3.90	3.15	4.45	6.30	1.95	7.72	9.96	14.09	680	1600
	422. 808	-	○	-	CE	-	-	-	4.65	4.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	680	1600
	422. 848	○	○	-	CE	-	-	-	5.20	5.10	6.25	8.84	12.50	3.88	15.31	19.76	27.95	680	1600
	422. 888	○	○	-	CE	-	-	-	6.60	6.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	680	1600
	422. 928	-	○	-	-	CG	-	-	7.30	7.30	10.00	14.14	20.00	6.20	24.49	31.62	44.72	680	1600
	422. 968	○	○	-	-	CG	-	-	8.00	8.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	680	1600
	423. 008	-	○	-	-	CG	-	-	8.70	8.70	15.75	22.27	31.50	9.77	38.88	49.81	70.44	680	1600
	423.128	-	○	-	-	-	CK	-	12.70	12.30	31.50	44.55	63.00	19.54	77.16	99.61	140.87	680	1600
	423.208	-	○	-	-	-	-	CM	19.00	16.00	50.00	70.71	100.00	31.00	122.47	158.11	223.61	680	1600

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
B = bore diameter · E = narrowest free cross section

Plastic version see next page.

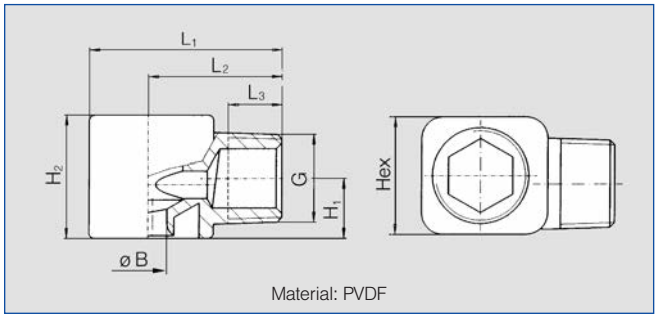
Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	422. 644	+	30	+	CE	=	422. 644. 30. CE

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories. please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$ **(≤ 10 bar)**

Tangential-flow full cone nozzles
Plastic version
Series 422 / 423

Tangentially arranged liquid supply. Without swirl inserts. Non-clogging. Stable spray angle. Uniform spray.
Applications:
Cleaning and washing process, cooling of gaseous fluids and solids, surface spraying, spraying onto mats in air washers, improving on chemical reactions, foam control.



Material: PVDF

Dimensions [mm]							Weight
G	L_1	L_2	L_3	H_1	H_2	Hex	PVDF
1/4 BSPT	28.0	20.0	9.8	8.0	16.0	16.0	7 g
3/8 BSPT	36.0	25.0	10.1	11.2	23.0	22.0	16 g
1/2 BSPT	49.5	33.5	13.2	19.2	38.0	32.0	40 g
3/4 BSPT	58.5	38.5	18.5	24.5	50.0	41.0	50 g

Spray angle	Ordering no. Type	Mat.-no. 5E PVDF	Code 1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPT	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray diameter D at p=1-10 bar H = 200 mm	H = 500 mm
60°	422. 724	○	-	CE	-	-	3.60	3.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	225	510
90°	422. 406	○	CC	-	-	-	1.50	1.45	0.50	0.71	1.00	0.31	1.22	1.58	2.24	380	860
	422. 566	○	CC	-	-	-	2.30	2.20	1.25	1.77	2.50	0.78	3.06	3.95	5.59	380	860
	422. 606	○	-	CE	-	-	2.60	2.50	1.57	2.23	3.15	0.98	3.86	4.98	7.04	380	860
	422. 646	○	-	CE	-	-	3.00	2.90	2.00	2.83	4.00	1.24	4.90	6.32	8.94	390	960
	422. 726	○	-	CE	-	-	3.70	3.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	390	960
	422. 806	○	-	CE	-	-	4.65	4.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	390	960
	422. 846	○	-	CE	-	-	5.30	5.30	6.25	8.84	12.50	3.88	15.31	19.76	27.95	390	960
	422. 886	○	-	CE	-	-	5.80	6.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	390	960
	422. 926	○	-	-	CG	-	7.30	7.30	10.00	14.14	20.00	6.20	24.49	31.62	44.72	390	960
	422. 966	○	-	-	CG	-	8.00	8.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	390	960
	423. 006	○	-	-	CG	-	8.70	8.70	15.75	22.27	31.50	9.77	38.58	49.81	70.44	390	960
	423. 126	○	-	-	-	CK	12.00	12.00	31.50	44.55	63.00	19.54	77.16	99.61	140.87	390	960
120°	422. 408	○	CC	-	-	-	1.50	1.45	0.50	0.71	1.00	0.31	1.22	1.58	2.24	680	1220
	422. 448	○	CC	-	-	-	1.65	1.60	0.62	0.88	1.25	0.39	1.53	1.98	2.80	680	1220
	422. 488	○	CC	-	-	-	1.90	1.90	0.80	1.13	1.60	0.50	1.96	2.53	3.58	680	1220
	422. 568	○	CC	-	-	-	2.40	2.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	680	1220
	422. 728	○	-	CE	-	-	4.00	3.90	3.15	4.45	6.30	1.95	7.72	9.96	14.09	680	1600
	422. 888	○	-	CE	-	-	6.60	6.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	680	1600
	422. 968	○	-	-	CG	-	8.00	8.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	680	1600
	423. 008	○	-	-	CG	-	8.70	8.70	15.75	22.27	31.50	9.77	38.58	49.81	70.44	680	1600
	423. 128	○	-	-	-	CK	12.70	12.30	31.50	44.55	63.00	19.54	77.16	99.61	140.87	680	1600

B = bore diameter · E = narrowest free cross section

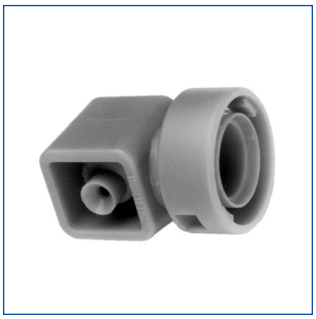
Example of ordering: Type **422. 724** + Material-no. **5E** + Code **CE** = Ordering no. **422. 724. 5E. CE**

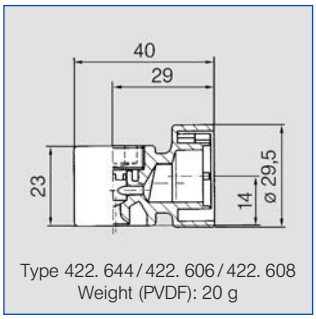
The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

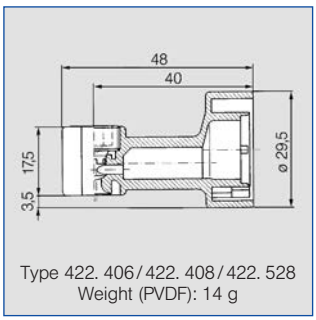
Tangential-flow full cone nozzles
Bayonet quick-release system
Series 422

Quick and safe assembly, without tool. Space-saving installation. Non-clogging and maintenance-free. High resistance to temperatures and chemicals.
Applications:
Cleaning problems, cooling process, foam control.





Type 422. 644 / 422. 606 / 422. 608
Weight (PVDF): 20 g



Type 422. 406 / 422. 408 / 422. 528
Weight (PVDF): 14 g

Spray angle	Ordering no. Type	Mat.-no. 5E PVDF	Mat.-no. 53 PP	Code Bayonet quick-release	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./mm] at 40 psi	3.0	5.0	10.0	Spray diameter D at p=1–10 bar H = 200 mm	H = 500 mm
60°	422. 644	-	○	KB	2.90	2.90	2.00	2.83	4.00	1.24	4.90	6.32	8.94	225	510
90°	422. 406	○	-	KB	1.50	1.45	0.50	0.71	1.00	0.31	1.22	1.58	2.24	380	860
	422. 606	○	-	KB	2.60	2.50	1.57	2.23	3.15	0.98	3.86	4.98	7.04	380	860
120°	422. 408	○	-	KB	1.50	1.45	0.50	0.71	1.00	0.31	1.22	1.58	2.24	680	1220
	422. 528	○	-	KB	2.10	2.00	1.00	1.41	2.00	0.62	2.45	3.16	4.47	680	1220
	422. 608	○	-	KB	2.60	2.50	1.57	2.23	3.15	0.98	3.86	4.98	7.04	680	1600

Simple assembly – just with a twist

Nozzle set assembled on pipe

B = bore diameter
E = narrowest free cross section

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

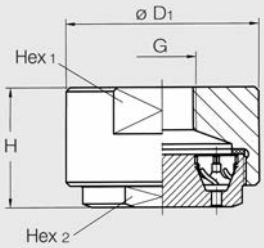
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Cluster head nozzles

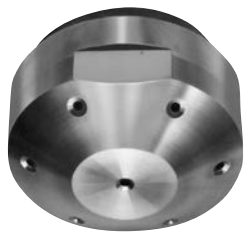
Series 502 / 503

Fine full cone atomization with the aid of several hollow cones spraying into one another.
Applications:
Cooling of gaseous and solid material, desuperheating, chlorine precipitation, absorption as well as for improvement of chemical reaction by enlarging the contact area.

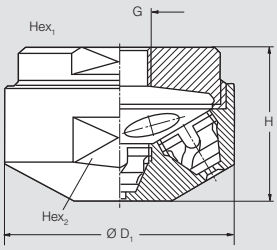
∢ 70°



Dimensions	1/2”	3/4”
Hex_1	46	65
Hex_2	38	55
H	25	46
D_1	50	75
Weight (Brass)	250 g	870 g



∢ 130°



Dimensions	1/2”	3/4”
Hex_1	27	50
Hex_2	36	55
H	28	53
D_1	40	60
Weight (Brass)	150 g	410 g

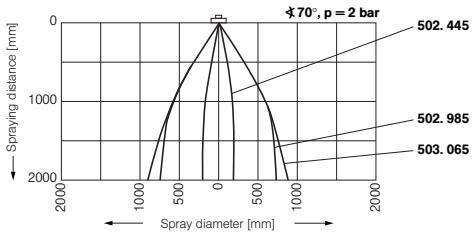
Spray angle ∢	Ordering no. Type	Mat.-no. 17[1] AISI 316Ti/AISI 316L	Mat.-no. 30 Brass	G BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	5.0	10.0	Spray diameter D at p = 2 bar H = 1000 mm	H = 2000 mm
70°	502. 445	-	○	1/2“	1.00	0.50	-	-	1.25	0.39	1.98	2.80	400	400
	502. 985	○	-	3/4“	3.50	2.00	14.00	19.80	28.00	8.68	44.30	62.60	1200	1500
	503. 065	○	-	3/4“	5.00	2.00	22.10	31.80	45.00	13.96	71.10	100.60	1200	1800
130°	502. 448	○	○	1/2“	1.00	0.50	-	-	1.25	0.39	1.98	2.80	500	500
	502. 548	○	○	1/2“	1.80	0.50	-	1.58	2.24	0.69	3.54	5.01	700	700
	502. 748	○	○	3/4“	2.00	2.00	3.50	5.00	7.10	2.20	11.20	15.90	1100	1200
	502. 838	○	○	3/4“	3.00	2.00	4.60	8.30	11.80	3.66	18.70	26.40	1400	1600
	502. 908	○	○	3/4“	4.00	2.00	8.80	12.70	18.00	5.58	28.40	40.20	1500	1800
	503. 028	○	○	3/4“	4.00	2.00	17.70	25.10	35.50	11.01	56.10	79.40	1600	1800
	503. 118	○	○	3/4“	6.00	2.00	30.00	42.00	60.00	18.61	95.00	134.00	2000	3000

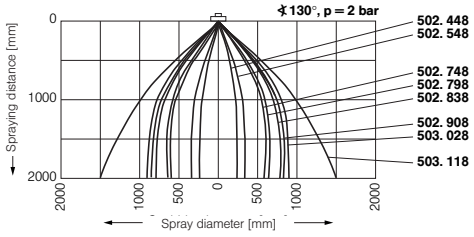
[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
B = bore diameter · E = narrowest free cross section

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	502. 445	+	30	=	502. 445. 30

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Diagram of spray diameter



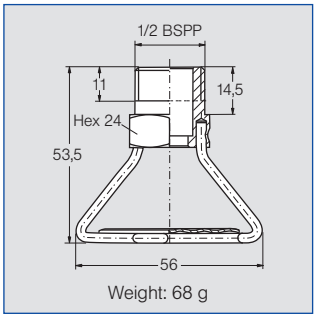


Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Deflector-plate nozzle

Series 525

Full cone spray. Non clogging nozzle without swirl insert.
Applications:
Fire fighting and broadcast spraying, wide area spray.



Weight: 68 g

Spray angle	Ordering no. Type	Mat.-no. 30 Brass	Mat.-no. 17[1] AISI 316Ti/AISI 316L	B Ø mm	V̇ [l/min] p [bar] 0.5	1.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray diameter [D] at p=3 bar ca. H = 1 m	H = 3 m
180°	524. 809	○	○	4.00	5.00	7.10	3.10	12.20	15.80	22.40	5.60 m	6.40 m
	525. 049	○	○	8.00	20.00	28.30	12.41	49.00	63.20	89.40	10.00 m	13.20 m
	525. 109	○	-	9.30	28.00	40.00	17.37	69.00	89.00	125.00	10.20 m	13.40 m
	525. 169	○	-	10.90	40.00	57.00	24.81	98.00	126.00	179.00	10.60 m	13.60 m
	525. 229	○	-	12.20	56.00	79.00	34.73	137.00	177.00	250.00	6.80 m	10.40 m
	525. 269	○	○	12.30	70.00	99.00	43.42	171.00	221.00	313.00	5.20 m	10.20 m

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
B = bore diameter

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	525.809	+	30	=	525. 809. 30

Version with dust protection cap on request.

For information on further fire fighting nozzles please refer to our brochure, »Lechler nozzles for fire fighting«. Please ask for this brochure, using the telefax form at the end of the catalogue.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

- Belt cleaning
- Coating
- Steam cleaning
- Degreasing
- High pressure cleaning
- Gravel washing
- Cooling
- Surface treatment
- Phosphating
- Rain curtains
- Foam control
- Foam spraying
- Lubrication
- Filter cleaning
- Spray cleaning
- Washing processes

and many others...

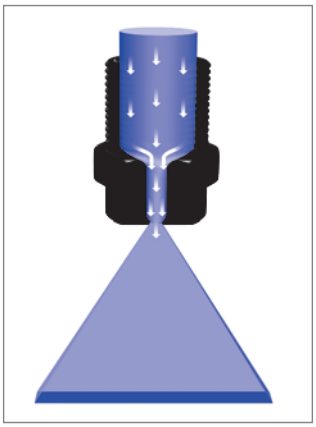
Flat fan nozzles

Lechler flat fan nozzles stand for uniform liquid distribution and jet pressures. Particularly powerful jets are generated with spray angles up to 60°. Nozzles with small flow rates are especially suited for humidifying and spraying in general. The flow geometry of the nozzle allows to produce accurate, compact jets, available with different liquid distribution patterns.

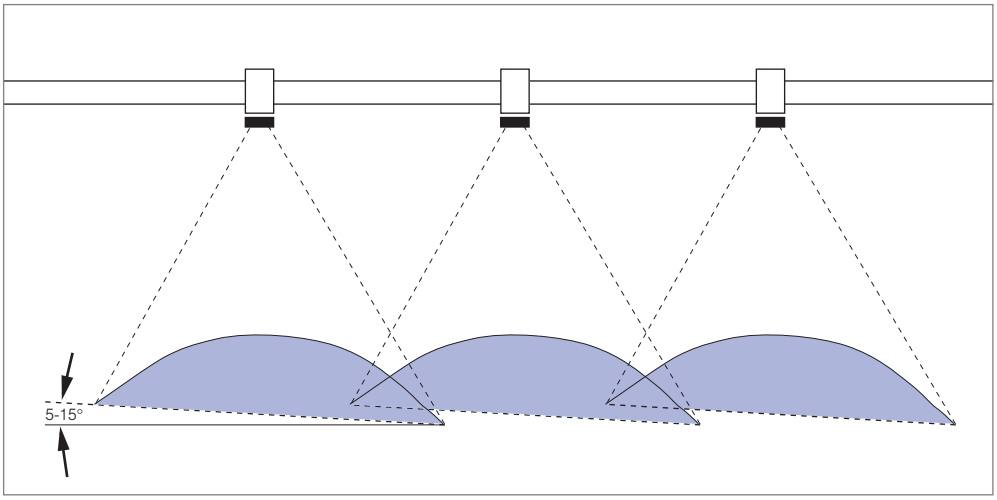
Basically, Lechler flat fan nozzles are designed for parabolic liquid distribution. Unaffected by transient pressures, they are suited for universal application. Their performance data are exactly defined. Operational values, such as flow rates, spray width, jet thickness and liquid distribution are readily available for a great variety of feed pressures. There are also special-design nozzles with rectangular or trapezoidal distribution of liquid.

Simple and cost-saving fixing attachments, as for instance dove-tail guides and eyelet clamps, considerably facilitate assembling and aligning of the nozzles.

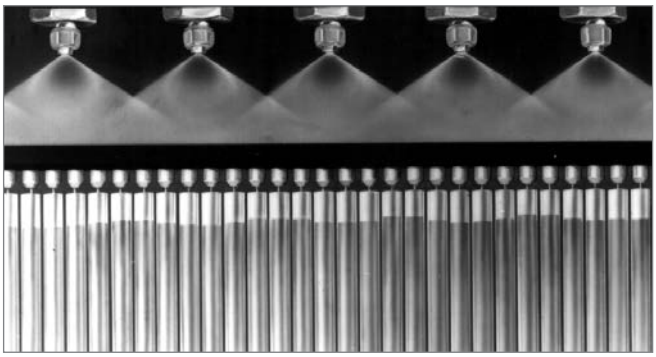
For all cleaning operations, in steelmaking and in many other fields of surface treatment, in short, wherever powerful, uniform water jets are required, Lechler flat fan nozzles constitute a decisive basis for achieving reliable process results.



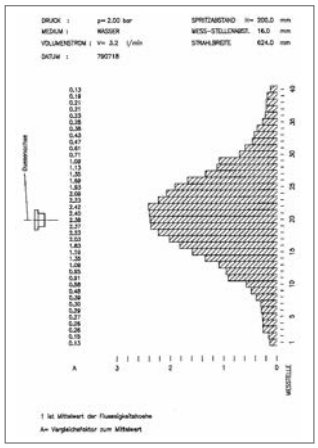
The **tongue-type nozzle** design represents a special kind of flat fan nozzle. With this nozzle type, the flat fan spray pattern is produced by a solid stream, impinging upon and deflecting from an outside deflector plate. As a result, a powerful, sharply delimited flat jet is shaped.
The deflector plate has the form of a tongue, which determines the spray angle formation. Due to large free cross-sections, tongue-type nozzles are particularly clog-proof.



Arrangement of nozzles

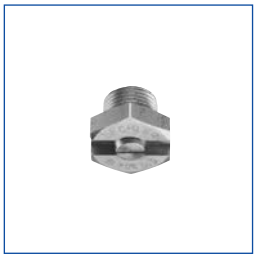


Total liquid distribution



Liquid distribution
single nozzle

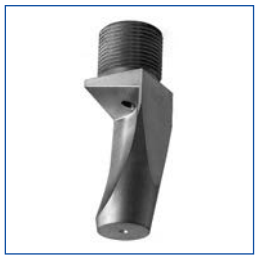
Flat fan nozzles

Low-pressure nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**632** **633**	20° 30° 45° 60° 75° 90° 120°	0.05 – 49.96	1/8 BSPP 1/4 BSPP 3/8 BSPP 1/2 BSPP	Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating. **Standard design with conical, self-sealing thread.**	**4.8**
	**610**	20° 30° 45° 60° 75° 90° 120°	0.05 – 4.00	1/8 BSPP	Cleaning installations, cooling headers, spray pipes. **Compact design, suited for narrow installation conditions.**	**4.11**
	**612**	20° 30° 45° 60° 75° 90° 120°	0.05 – 16.00	1/4 BSPP	Cleaning installations, cooling headers, spray pipes. **Compact design, suited for narrow installation conditions.**	**4.13**
	**616** **617**	20° 30° 45° 60° 90° 120°	6.30 – 63.00	3/4 BSPP	Cleaning installations, rain curtains, gravel washing, spray pipes, foam spraying, roll cooling, cooling of rolled stock. **Non-clogging features, more jet power.**	**4.15**

Flat fan nozzles

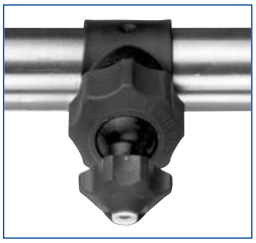
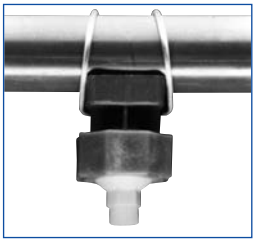
Low-pressure nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**652** 	20° 30° 45° 60° 75° 90° 120°	0.05 – 16.00	Assembly with 3/8" lock nut	Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating. **Easy nozzle changing. Simple jet alignment.**	**4.17**
 **Belt lubrication nozzles**	**652. xxx. 8H. 03**	75° 120°	0.05 – 0.22	Assembly with 3/8" lock nut	Belt lubrication, moistening, spraying of food products, moisturization of rollers, oiling, lubrication of metal sheets. **Especially low flow rates. Parabolic liquid distribution.**	**4.19**
 **Nozzles for pressing into pipes**	**612. xxx. 5E. 03**	90° 120°	0.63 – 4.00	For pressing into pipes	Cleaning and rinsing operations, dish washing machines. **For pressing into pipes.**	**4.20**
	**656** **657** 	20° 30° 45° 60° 90° 120°	6.30 – 40.00	Assembly with 3/4" lock nut	Cleaning installations, gravel washing, cooling headers, spray pipes, roll cooling, cooling of rolled stock. **Easy nozzle changing, simple jet alignement.**	**4.21**
	**660** 	20° 30° 45° 60° 75° 90° 120°	0.05 – 10.00	Assembly with 3/8" lock nut and dove-tail guide	Cleaning installations, cooling headers, spray pipes. **Automatic jet alignment, due to dove-tail guide.**	**4.23**

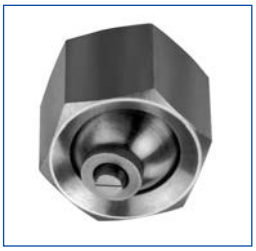
Flat fan nozzles

Low pressure Nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**664** **665**	20° 60° 30° 90° 45° 120°	6.30 – 63	Assembly with 3/4" lock nut and dove-tail guide	Cleaning installations, cooling headers, spray pipes, roll cooling cooling of rolled stock. **Automatic jet alignment, due to dove-tail guide.**	**4.25**
	**646**	20° 30° 45° 60° 90° 120°	0.32 – 3.15	Assembly with bayonet quick release system	Belt cleaning, surface treatment, cleaning, coating processes. **Quick and easy assembly, adjusted spray direction.**	**4.28**
	**688** **689**	45°	8.00 – 31.50	3/8" BSPT 3/4" BSPP	Cleaning, washing and phosphating process. **Particularly clog proof.**	**4.30**
	**686**	90° 140°	0.50 – 28.00	1/8" BSPT 1/4" BSPT 3/8" BSPT 1/2" BSPT	Foam control in storage tanks and sewage treatment plants, for cleaning and washing process. **Particularly clog proof.**	**4.31**
	**684** Assembly with lock nut 	140°	0.50 – 10.00	Assembly with 3/8" lock nut	Foam control in storage tanks and sewage treatment plants, for cleaning and washing process. **Particularly clog proof.**	**4.32**

Flat fan nozzles

High pressure nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 80 bar	Connection	Application/ Design	Page
	**602** **608** **652**	20° 30° 45° 60°	4.04 – 60.00	1/8" BSPT 1/4" BSPT NPT 1/8" NPT 1/4" Assembly with 3/8" lock nut	High pressure cleaning, steam cleaning.	**4.33**

Nozzle systems for surface technology	Series	∢	$\dot{V}$ [l/min] at p = 2 bar	Connection	Application/ Design	Page
	**676/677 MEMO-SPRAY®**	30° 60° 90° 120°	4.00 – 50.00	Assembly with clamp for the following pipe sizes: 1" 1 1/4" 1 1/2" 2"	Cleaning problems, phosphating, degreasing, rinsing in surface treatment techniques. **Ball joint, omnidirectional swivelling range of 20°. Simple quick assembling. Easy adjusting and cleaning.**	**4.34**
	**676 „Easy-Clip**	60°	6.30 – 20.00	Assembly with clip for the following pipe sizes: 1" 1 1/4" 1 1/2" 2"	Cleaning problems, phosphating, degreasing, rinsing in surface treatment techniques. **Ball joint, omnidirectional swivelling range of 30°. Simple quick assembling. Easy adjusting and cleaning.**	**4.38**

Swivelling nozzles	Series	∢	$\dot{V}$ [l/min] at p = 2 bar	Connection	Application/ Design	Page
	**676**	20° 30° 45° 60° 75° 90° 120°	0.05 – 10.00	3/8 BSPP Weld base Socket	Cleaning, cooling and lubricating process. **Swivelling nozzle to meet exact jet alignment requirements. Omnidirectional swivelling range of 30°.**	**4.40**

Descaling nozzles

Descaling nozzles SCALEMASTER® – the standard in descaling technology.

Upon request: Please ask for our brochures »SCALE-MASTER®«.

Flat fan nozzles

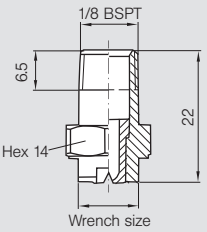
Series 632 / 633

Standard design with conical, self-sealing thread connection. Stable spray angle. Uniform, parabolical distribution of liquid. Spray pipes equiped with these nozzles show an extremely uniform total distribution of liquid.
Applications:
Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating.

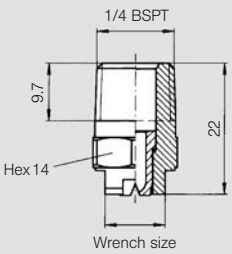
AISI 303/ AISI 316Ti/Brass (∢ 20°-75°)

AISI 303/ AISI 316Ti/Brass (∢ 90°-120°)

PVDF

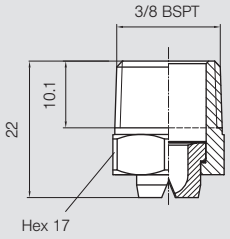


Weight Brass: 17 g

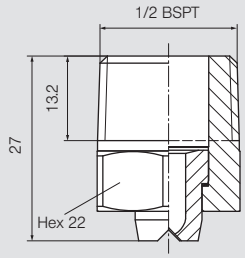


Weight Brass: 20 g

3/8" or 1/2" version



Weight Brass: 30 g



Weight Brass: 40 g

Spray angle ∢	Type	Ordering no. Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	5E PVDF	Code 1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray width B at p = 2 bar H= 250 mm	H= 500 mm
20°	632. 301	○	○	○	○	CA	CC	-	-	0.70	0.60	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	65	120
	632. 361	○	○	○	○	CA	CC	-	-	1.00	0.80	0.31*	0.44*	0.63	0.77	1.00	1.18	1.40	70	130
	632. 441	○	○	○	○	CA	CC	-	-	1.35	1.10	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	75	145
	632. 481	○	○	○	○	CA	CC	-	-	1.50	1.20	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	75	150
30°	632. 302	○	○	○	○	CA	CC	-	-	0.60	0.50	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	120	235
	632. 362	○	○	○	○	CA	CC	-	-	1.00	0.70	0.31*	0.44*	0.63	0.77	1.00	1.18	1.40	120	235
	632. 402	○	○	○	○	CA	CC	-	-	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	120	235
	632. 482	○	○	○	○	CA	CC	-	-	1.50	1.10	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	120	235
	632. 562	○	○	○	○	CA	CC	-	-	2.00	1.50	1.25	1.77	2.50	3.06	3.95	4.68	5.59	120	235
	632. 642	○	○	○	-	-	CC	-	-	2.50	1.80	2.00	2.83	4.00	4.90	6.33	7.48	8.94	120	240
	632. 722	○	○	○	-	-	CC	-	-	3.00	2.40	3.15	4.46	6.30	7.72	9.96	11.79	14.09	125	240
	632. 762	○	○	○	-	-	CC	-	-	3.50	2.70	4.00	5.66	8.00	9.80	12.65	14.97	17.89	125	240
	632. 802	○	○	○	-	-	CC	-	-	4.00	3.10	5.00	7.07	10.00	12.25	15.81	18.71	22.36	130	250

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
*Differing spray pattern
Subject to technical modifications.

Continued on next page.

Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	632. 301	+	16	+	CA	=	632. 301. 16. CC

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

Series 632 / 633

Spray angle	Ordering no. Type	Material-no. 16 AISI 303	Material-no. 17[1] AISI 316Ti/AISI 316L	Material-no. 30 Brass	Material-no. 5E PVDF	Code 1/8 BSPT	Code 1/4 BSPT	Code 3/8 BSPT	Code 1/2 BSPT	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray width B at p = 2 bar H= 250 mm	H= 500 mm
45°	632. 303	○	○	○	-	CA	CC	-	-	0.70	0.50	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	150	270
	632. 363	○	○	○	○	CA	CC	-	-	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.18	1.40	155	280
	632. 403	○	○	○	○	CA	CC	-	-	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	175	320
	632. 483	○	○	○	○	CA	CC	-	-	1.50	1.10	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	180	340
	632. 563	○	○	○	○	CA	CC	-	-	2.00	1.40	1.25	1.77	2.50	3.06	3.95	4.68	5.59	185	355
	632. 643	○	○	○	○	CA	CC		-	2.50	1.80	2.00	2.83	4.00	4.90	6.33	7.48	8.94	195	370
	632. 673	○	○	○	-	-	CC	CE	-	2.70	2.00	2.83	3.36	4.75	5.82	7.51	8.89	10.62	200	375
	632. 723	○	○	○	-	-	CC	CE	-	3.00	2.40	3.15	4.46	6.30	7.72	9.96	11.79	14.09	200	375
	632. 763	○	○	○	-	-	CC	CE	-	3.50	2.60	4.00	5.66	8.00	9.80	12.65	14.97	17.89	200	380
	632. 803	○	○	○	-	-	CC	CE	CG	4.00	3.00	5.00	7.07	10.00	12.25	15.81	18.71	22.36	205	385
	632. 843	○	○***	○	-	-	CC	-	CG	4.50	3.40	6.25	8.84	12.50	15.31	19.76	23.39	27.95	205	385
	632. 883	○	○	○	-	-	-	-	CG	5.00	3.80	8.00	11.31	16.00	19.60	25.30	29.93	35.78	220	440
	632. 923	○	○	○	-	-	-	-	CG	5.50	4.20	10.00	14.14	20.00	24.50	31.62	37.42	44.72	220	440
	632. 963	○	○	○	-	-	-	-	CG	6.00	4.40	12.50	17.68	25.00	30.62	39.53	46.77	55.90	220	440
60°	632. 304	○	○	○	○	CA	CC	-	-	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	215	425
	632. 334	○	○	○	○	CA	CC	-	-	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	0.84	1.01	220	440
	632. 364	○	○	○	○	CA	CC	-	-	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.18	1.40	230	460
	632. 404	○	○	○	○	CA	CC	-	-	1.20	0.80	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	245	485
	632. 444	○	○	○	○	CA	CC	-	-	1.35	0.90	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	255	495
	632. 484	○	○	○	○	CA	CC	-	-	1.50	1.00	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	260	510
	632. 514	○	○	○	○	CA	CC	-	-	1.65	1.10	0.95*	1.34	1.90	2.33	3.00	3.56	4.25	270	520
	632. 564	○	○	○	○	CA	CC	-	-	2.00	1.30	1.25	1.77	2.50	3.06	3.95	4.68	5.59	280	535
	632. 604	○	○	○	○	CA	CC	-	-	2.20	1.50	1.58	2.23	3.15	3.86	4.98	5.89	7.04	290	550
	632. 644	○	○	○	○**	-	CC	CE	-	2.50	1.60	2.00	2.83	4.00	4.90	6.33	7.48	8.94	295	565
	632. 674	○	○	○	○**	-	CC	CE	-	2.70	1.80	2.38	3.36	4.75	5.82	7.51	8.89	10.62	300	575
	632. 724	○	○	○	○**	-	CC	CE	-	3.00	2.10	3.15	4.46	6.30	7.72	9.96	11.79	14.09	305	590
	632. 764	○	○	○	-	-	CC	CE	-	3.50	2.30	4.00	5.66	8.00	9.80	12.65	14.97	17.89	310	595
	632. 804	○	○***	○	○**	-	CC	-	CG	4.00	2.60	5.00	7.07	10.00	12.25	15.81	18.71	22.36	310	595
	632. 844	○	○***	○	○**	-	CC	-	CG	4.50	3.00	6.25	8.84	12.50	15.31	19.76	23.39	27.95	310	590
	632. 884	○	○***	○	○**	-	CC	-	CG	5.00	3.40	8.00	11.31	16.00	19.60	25.30	29.93	35.78	300	570
	632. 924	○	○	○	-	-	-	-	CG	5.50	4.10	10.00	14.14	20.00	24.50	31.62	37.42	44.72	330	630
	632. 964	○	○	○	-	-	-	-	CG	6.00	4.20	12.50	17.68	25.00	30.62	39.53	46.77	55.90	330	630
	633. 004	○	○	-	-	-	-	-	CG	7.00	4.80	15.75	22.27	31.50	38.57	49.80	58.92	70.43	330	630
	633. 044	○	○	○	-	-	-	-	CG	8.00	5.50	20.00	28.28	40.00	48.99	63.25	74.83	89.44	340	640
	633. 084	○	○	○	-	-	-	-	CG	9.00	6.80	25.00	35.36	50.00	61.24	79.06	93.54	111.80	340	640
75°	632. 145	○	-	○	-	CA	CC	-	-	0.20	0.12	-	0.04*	0.05	0.06	0.08	0.09	0.11	280	550
	632. 165	○	-	○	-	CA	CC	-	-	0.20	0.08	-	0.05*	0.07	0.08	0.10	0.12	0.15	290	560
	632. 185	○	-	○	-	CA	CC	-	-	0.20	0.15	-	0.06*	0.08	0.10	0.13	0.15	0.18	300	575
	632. 215	○	-	○	-	CA	CC	-	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.21	0.25	300	580
	632. 245	○	-	○	-	CA	CC	-	-	0.50	0.30	-	0.12*	0.16	0.20	0.26	0.30	0.36	310	585
	632. 275	○	-	○	-	CA	CC	-	-	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.41	0.49	310	590

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
*Differing spray pattern
**Only available with code CC.
***Only available with code CG.
Subject to technical modifications.

Continued on next page.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example for ordering:	Type 632. 303.	+	Material-no. 16	+	Code CA	=	Ordering no. 632. 303. 16. CA

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

Series 632 / 633

Spray angle	Ordering no. Type	Material-no. 16 AISI 303	Material-no. 17[1] AISI 316Ti/AISI 316L	Material-no. 30 Brass	Material-no. 5E PVDF	Code 1/8 BSPT	Code 1/4 BSPT	Code 3/8 BSPT	Code 1/2 BSPT	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray width B at p = 2 bar H= 250 mm	H= 500 mm
90°	632. 216	○	-	○	-	CA	CC	-	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.21	0.25	370	700
	632. 276	○	-	○	-	CA	CC	-	-	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.41	0.49	375	720
	632. 306	○	○	○	○	CA	CC	-	-	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	380	740
	632. 336	○	○	○	○	CA	CC	-	-	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	0.84	1.01	415	800
	632. 366	○	○	○	○	CA	CC	-	-	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.18	1.41	420	810
	632. 406	○	○	○	○	CA	CC	-	-	1.20	0.70	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	430	820
	632. 446	○	○	○	○	CA	CC	-	-	1.35	0.80	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	435	830
	632. 486	○	○	○	○	CA	CC	-	-	1.50	0.80	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	440	835
	632. 516	○	○	○	○	CA	CC	-	-	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	3.56	4.25	440	840
	632. 566	○	○	○	○	CA	CC	-	-	2.00	1.10	1.25	1.77	2.50	3.06	3.95	4.68	5.59	445	850
	632. 606	○	○	○	○	CA	CC	-	-	2.20	1.20	1.58	2.23	3.15	3.86	4.98	5.89	7.04	450	860
	632. 646	○	○	○	○**	-	CC	CE	-	2.50	1.30	2.00	2.83	4.00	4.90	6.33	7.48	8.94	455	865
	632. 676	○	○	○	○**	-	CC	CE	-	2.70	1.40	2.38	3.36	4.75	5.82	7.51	8.89	10.62	465	875
	632. 726	○	○	○	○**	-	CC	CE	-	3.00	1.70	3.15	4.46	6.30	7.72	9.96	11.79	14.09	470	885
	632. 766	○	○	○	○**	-	CC	CE	-	3.50	1.90	4.00	5.66	8.00	9.80	12.65	14.97	17.89	475	890
	632. 806	○	○***	○	○**	-	CC	-	CG	4.00	2.40	5.00	7.07	10.00	12.25	15.81	18.71	22.36	480	900
	632. 846	○	○***	○	○**	-	CC	-	CG	4.50	2.40	6.25	8.84	12.50	15.31	19.76	23.39	27.95	480	900
	632. 886	○	○***	○	○**	-	CC	-	CG	5.00	3.10	8.00	11.31	16.00	19.60	25.30	29.93	35.78	480	910
	632. 926	○	○	○	-	-	-	-	CG	5.50	3.60	10.00	14.14	20.00	24.50	31.62	37.42	44.72	525	1020
	632. 966	○	○	○	-	-	-	-	CG	6.00	3.90	12.50	17.68	25.00	30.62	39.53	46.77	55.90	525	1020
120°	632. 187	○	-	○	-	CA	CC	-	-	0.35	0.20	-	0.06*	0.08	0.10	0.13	0.15	0.18	630	1200
	632. 217	○	-	○	-	CA	CC	-	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.21	0.25	640	1210
	632. 247	○	-	○	-	CA	CC	-	-	0.50	0.20	-	0.12*	0.16	0.20	0.26	0.30	0.36	650	1230
	632. 277	○	-	○	-	CA	CC	-	-	0.60	0.30	-	0.16*	0.22	0.27	0.35	0.41	0.49	660	1250
	632. 307	○	○	○	○	CA	CC	-	-	0.70	0.30	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	660	1250
	632. 337	○	○	○	○	CA	CC	-	-	0.90	0.40	0.22*	0.32*	0.45	0.55	0.71	0.84	1.01	670	1270
	632. 367	○	○	○	○	CA	CC	-	-	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.18	1.41	670	1270
	632. 407	○	○	○	○	CA	CC	-	-	1.20	0.60	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	670	1270
	632. 447	○	○	○	○	CA	CC	-	-	1.35	0.60	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	675	1270
	632. 487	○	○	○	○	CA	CC	-	-	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	680	1275
	632. 517	○	○	○	○	CA	CC	-	-	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	3.56	4.25	685	1280
	632. 567	○	○	○	○	CA	CC	-	-	2.00	0.90	1.25	1.77	2.50	3.06	3.95	4.68	5.59	690	1285
	632. 607	○	○	○	○	CA	CC	-	-	2.20	1.10	1.58	2.23	3.15	3.86	4.98	5.89	7.04	700	1300
	632. 647	○	○	○	-	-	CC	CE	-	2.50	1.30	2.00	2.83	4.00	4.90	6.33	7.48	8.94	700	1300
	632. 677	○	○	○	○**	-	CC	CE	-	2.70	1.40	2.38	3.36	4.75	5.82	7.51	8.89	10.62	720	1330
	632. 727	○	○	○	○**	-	CC	CE	-	3.00	1.60	3.15	4.46	6.30	7.72	9.96	11.79	14.09	740	1360
	632. 767	○	○	○	○**	-	CC	CE	-	3.50	1.70	4.00	5.66	8.00	9.80	12.65	14.97	17.89	760	1400
	632. 807	○	○***	○	-	-	CC	-	CG	4.00	2.00	5.00	7.07	10.00	12.25	15.81	18.71	22.36	790	1450
	632. 847	○***	○***	○***	○**	-	CC	-	CG	4.50	2.30	6.25	8.84	12.50	15.31	19.76	23.39	27.95	790	1450
	632. 887	○	○	○	-	-	-	-	CG	5.00	2.60	8.00	11.31	16.00	19.60	25.30	29.93	35.78	800	1460
	632. 927	○	○	○	-	-	-	-	CG	5.00	2.90	10.00	14.14	20.00	24.50	31.62	37.42	44.72	800	1460

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
*Differing spray pattern
**Only available with code CC.
***Only available with code CG.
Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

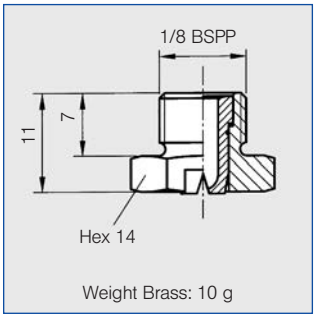
Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	632. 216.	+	16	+	CA	=	632. 216. 16. CA

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

Series 610

Compact design, suitable for narrow installation conditions. Stable spray angle. Uniform, parabolic distribution of liquid.
Applications:
Cleaning installations, cooling headers, spray pipes.



Weight Brass: 10 g

Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	Mat.-no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
20°	610. 301	○	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	65	125
	610. 361	○	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	65	125
	610. 441	○	○	1.35	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	65	125
	610. 481	○	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	65	125
30°	610. 302	○	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	115	230
	610. 362	○	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	115	230
	610. 402	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	115	230
	610. 482	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	115	230
	610. 562	○	○	2.00	1.50	1.25	1.77	2.50	0.78	3.06	3.95	5.59	115	230
45°	610. 303	○	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	185	340
	610. 363	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	185	340
	610. 403	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	185	340
	610. 483	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	185	340
	610. 563	○	○	2.00	1.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	185	340
	610. 643	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	185	340
60°	610. 304	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	275	525
	610. 334	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	275	525
	610. 364	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	275	525
	610. 404	○	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	275	525
	610. 444	○	○	1.35	0.90	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	280	530
	610. 484	○	○	1.50	1.00	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	280	530
	610. 514	○	○	1.65	1.10	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	280	530
	610. 564	○	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	280	530
	610. 604	○	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	280	530
75°	610. 145	○	○	0.20	0.12	-	0.04*	0.05	0.02	0.06	0.08	0.11	285	550
	610. 165	○	○	0.20	0.08	-	0.05*	0.07	0.02	0.08	0.10	0.15	285	555
	610. 185	○	○	0.20	0.15	-	0.06*	0.08	0.11	0.10	0.13	0.18	290	560
	610. 215	○	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	290	560
	610. 245	○	○	0.50	0.30	-	0.12*	0.16	0.05	0.20	0.26	0.36	290	560
	610. 275	○	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	290	560

A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern
Subject to technical modifications.

Continued on next page.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	610. 301	+	16	=	610. 301. 16

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

Series 610

Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	Mat.-no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
90°	610. 216	○	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	380	670
	610. 276	○	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	450	795
	610. 306	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	450	795
	610. 336	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	450	795
	610. 366	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	450	795
	610. 406	○	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	450	800
	610. 446	○	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	450	800
	610. 486	○	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	450	800
	610. 516	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	450	800
	610. 566	○	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	450	805
	610. 606	○	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	450	805
120°	610. 187	○	○	0.35	0.20	-	0.06*	0.08	0.02	0.10	0.13	0.18	640	1220
	610. 217	○	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	650	1230
	610. 247	○	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	655	1245
	610. 277	○	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	655	1250
	610. 307	○	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	660	1260
	610. 337	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	660	1260
	610. 367	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	660	1265
	610. 407	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	660	1270
	610. 447	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	665	1270
	610. 487	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	665	1270
	610. 517	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	670	1275
	610. 567	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	670	1280
	610. 607	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	675	1285

A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern
Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	610. 216	+	16	=	610. 216. 16

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

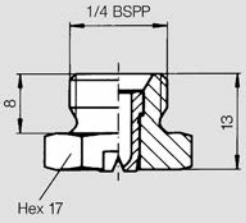
Flat fan nozzles

Series 612

Compact design, suitable for narrow installation conditions. Stable spray angle. Uniform, parabolic distribution of liquid.
Applications:
Cleaning installations. cooling headers spray pipes.

∢ 20°-75°

∢ 90°-120°



Weight Brass: 14 g

∢ Spray angle	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H= 250 mm	H= 500 mm
20°	612. 301	○	○	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	75	150
	612. 361	○	○	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	80	150
	612. 441	○	○	○	1.30	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	80	155
	612. 481	○	○	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	80	155
30°	612. 302	○	○	○	0.60	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	85	140
	612. 362	○	○	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	95	160
	612. 402	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	105	190
	612. 482	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	120	225
	612. 562	○	○	○	2.00	1.50	1.25	1.77	2.50	0.78	3.06	3.95	5.59	135	240
	612. 642	○	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	145	285
	612. 722	○	○	○	3.00	2.40	3.15	4.46	6.30	1.95	7.72	9.96	14.09	150	290
	612. 762	○	○	○	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	150	290
	612. 802	○	○	○	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	150	290
45°	612. 303	○	○	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	160	315
	612. 363	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	170	340
	612. 403	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	175	345
	612. 483	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	195	375
	612. 563	○	○	○	2.00	1.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	190	365
	612. 643	○	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	190	365
	612. 723	○	○	○	3.00	2.40	3.15	4.46	6.30	1.95	7.72	9.96	14.09	195	370
	612. 763	○	○	○	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	195	370
	612. 803	○	○	○	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	195	370
60°	612. 304	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	245	490
	612. 334	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	250	495
	612. 364	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	255	500
	612. 404	○	○	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	260	510
	612. 444	○	○	○	1.35	0.90	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	260	510
	612. 484	○	○	○	1.50	1.00	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	270	525
	612. 514	○	○	○	1.65	1.10	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	260	510
	612. 564	○	○	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	260	505
	612. 604	○	○	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	265	505
	612. 644	○	○	○	2.50	1.60	2.00	2.83	4.00	1.24	4.90	6.33	8.94	265	505
	612. 674	○	○	○	2.70	1.80	2.38	3.36	4.75	1.47	5.82	7.51	10.62	265	505
	612. 724	○	○	○	3.00	2.10	3.15	4.46	6.30	1.95	7.72	9.96	14.09	265	505
	612. 764	○	○	○	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	260	500
	612. 804	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	255	490
	612. 884	○	-	○	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	255	490

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
*Differing spray pattern Subject to technical modifications.

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

Series 612

Spray angle	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H= 250 mm	H= 500 mm
75°	612. 145	○	-	○	0.20	0.12	-	0.04*	0.05	0.02	0.06	0.08	0.11	300	580
	612. 165	○	-	○	0.20	0.08	-	0.05*	0.07	0.02	0.08	0.10	0.15	310	590
	612. 185	○	-	○	0.20	0.15	-	0.06*	0.08	0.02	0.10	0.13	0.18	320	600
	612. 215	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	325	610
	612. 245	○	-	○	0.50	0.30	-	0.12*	0.16	0.05	0.20	0.26	0.36	330	615
	612. 275	○	-	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	340	630
90°	612. 216	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	420	820
	612. 276	○	-	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	420	820
	612. 306	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	425	840
	612. 336	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	425	840
	612. 366	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	425	835
	612. 406	○	○	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	425	835
	612. 446	○	○	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	425	835
	612. 486	○	○	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	425	830
	612. 516	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	425	830
	612. 566	○	○	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	425	825
	612. 606	○	○	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	425	820
	612. 646	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	425	820
	612. 676	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	425	815
	612. 726	○	○	○	3.00	1.70	3.15	4.46	6.30	1.95	7.71	9.96	14.09	425	810
	612. 766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	425	810
	612. 806	○	-	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	425	805
120°	612. 187	○	-	○	0.35	0.20	-	0.06*	0.08	0.02	0.10	0.13	0.18	610	1140
	612. 217	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	615	1150
	612. 247	○	-	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	620	1160
	612. 277	○	-	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	620	1170
	612. 307	○	-	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	625	1175
	612. 337	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	630	1180
	612. 367	○	○	○	1.00	0.40	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	635	1190
	612. 407	○	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	640	1195
	612. 447	○	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	645	1200
	612. 487	○	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	650	1200
	612. 517	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	650	1205
	612. 567	○	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	655	1210
	612. 607	○	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	660	1215
	612. 647	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	660	1220
	612. 677	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	665	1230
	612. 727	○	○	○	3.00	1.60	3.15	4.46	6.30	1.95	7.71	9.96	14.09	675	1245
	612. 767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	680	1260
	612. 807	○	-	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	690	1280

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
*Differing spray pattern
Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	612. 145	+	16	=	612. 145. 16

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

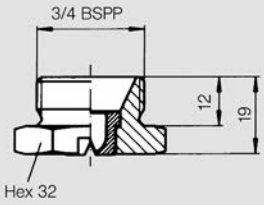
Flat fan nozzles

Series 616 / 617

Uniform, parabolic distribution of liquid. Increased non-clogging features, more jet power, less fog.
Applications:
Cleaning installations, rain curtains, gravel washing, spray pipes, foam spraying, roll cooling, cooling of rolled stock.

∢ 20° - 60°

∢ 90° - 120°



Weight Brass: 75 g

Spray angle ∢	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
20°	616. 721	○	○	○	3.00	2.50	3.15	4.45	6.30	1.95	7.72	9.96	14.09	80	140
	616. 801	○	○	○	4.00	3.20	5.00	7.07	10.00	3.10	12.25	15.81	22.36	80	145
	616. 881	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	80	145
	616. 921	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	80	145
	616. 961	○	○	○	6.00	5.10	12.50	17.68	25.00	7.75	30.62	39.53	55.90	80	145
30°	616. 722	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	120	230
	616. 762	○	○	○	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	120	230
	616. 802	○	○	○	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	120	235
	616. 882	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	120	235
	616. 922	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	120	235
	616. 962	○	-	○	6.00	5.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	125	240
45°	616. 723	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	175	330
	616. 763	○	○	○	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	175	330
	616. 803	○	○	○	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	175	335
	616. 843	○	○	○	4.50	3.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	180	335
	616. 883	○	○	○	5.00	3.80	8.00	11.31	16.00	4.96	19.60	25.30	35.78	185	350
	616. 923	○	○	○	5.50	4.20	10.00	14.14	20.00	6.20	24.49	31.62	44.72	190	360
	616. 963	○	○	○	6.00	4.40	12.50	17.68	25.00	7.75	30.62	39.53	55.90	200	375
60°	616. 724	○	○	○	3.00	2.10	3.15	4.45	6.30	1.95	7.72	9.96	14.09	295	575
	616. 764	○	○	○	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	300	580
	616. 804	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	300	580
	616. 844	○	○	○	4.50	3.00	6.25	8.84	12.50	3.88	15.31	19.76	27.95	300	580
	616. 884	○	○	○	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	300	580
	616. 924	○	○	○	5.50	4.10	10.00	14.14	20.00	6.20	24.49	31.62	44.72	300	580
	616. 964	○	○	○	6.00	4.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	300	580
	617. 044	○	-	○	8.00	5.50	20.00	28.28	40.00	12.41	48.99	63.25	89.44	300	580
	617. 124	-	-	○	10.00	7.40	31.50	44.55	63.00	19.54	77.16	99.61	140.87	300	580
90°	616. 726	○	○	○	3.00	1.70	3.15	4.45	6.30	1.95	7.72	9.96	14.09	540	1000
	616. 766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	550	1010
	616. 806	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	550	1010
	616. 846	○	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	550	1020
	616. 886	○	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	550	1020
	616. 926	○	○	○	5.50	3.60	10.00	14.14	20.00	6.20	24.49	31.62	44.72	555	1025
	616. 966	○	○	○	6.00	3.90	12.50	17.68	25.00	7.75	30.62	39.53	55.90	560	1030

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

Series 616 / 617

Spray angle	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
120°	616. 727	○	○	○	3.00	1.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	975	1755
	616. 767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	970	1750
	616. 807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	965	1740
	616. 887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	955	1730
	616. 927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	950	1720
	616. 967	-	-	○	6.00	3.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	950	1720
	617. 047	-	-	○	8.00	4.40	20.00	28.28	40.00	12.41	48.99	63.25	89.44	950	1720

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

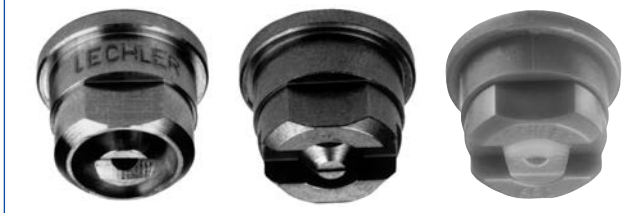
Example for ordering:	Type	+	Material-no.	=	Ordering no.
	616. 727	+	16	=	616. 727. 16

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

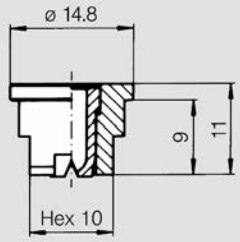
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles for retaining nut Series 652

Assembly with retaining nut. Easy nozzle changing, simple jet alignment. Uniform, parabolic distribution of liquid. Spray pipes equiped with these nozzles show an extremely uniform total liquid distribution.
Applications:
Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating.



AISI 303/AISI 316Ti/Brass (∢ 20°-75°) | AISI 303/AISI 316Ti/Brass (∢ 90°-120°) | PVDF



Weight Brass: 9 g

Spray angle ∢	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/ AISI 316L	30 Brass	5E PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
20°	652. 301	○	○	○	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	65	125
	652. 361	○	○	○	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	65	125
	652. 441	○	○	○	○	1.35	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	65	125
	652. 481	○	○	○	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	65	125
30°	652. 302	○	○	○	○	0.60	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	115	230
	652. 362	○	○	○	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	115	230
	652. 402	○	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	115	230
	652. 482	○	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	115	230
	652. 562	○	○	○	○	2.00	1.50	1.25	1.77	2.50	0.78	3.06	3.95	5.59	115	230
	652. 642	○	○	○	-	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	120	230
	652. 722	○	○	○	-	3.00	2.40	3.15	4.46	6.30	1.95	7.72	9.96	14.09	120	235
	652. 762	○	○	○	-	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	120	235
	652. 802	○	○	○	-	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	120	240
45°	652. 303	○	○	○	-	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	180	340
	652. 363	○	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	185	340
	652. 403	○	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	185	340
	652. 483	○	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	185	340
	652. 563	○	○	○	○	2.00	1.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	185	340
	652. 643	○	○	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	185	345
	652. 723	○	○	○	-	3.00	2.40	3.15	4.46	6.30	1.95	7.72	9.96	14.09	190	355
	652. 763	○	○	○	-	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	190	355
	652. 803	○	○	○	-	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	195	360
60°	652. 304	○	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	275	525
	652. 334	○	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	275	525
	652. 364	○	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	275	525
	652. 404	○	○	○	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	275	525
	652. 444	○	○	○	○	1.35	0.90	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	280	530
	652. 484	○	○	○	○	1.50	1.00	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	280	530
	652. 514	○	○	○	○	1.65	1.10	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	280	530
	652. 564	○	○	○	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	280	525
	652. 604	○	○	○	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	280	520
	652. 644	○	○	○	○	2.50	1.60	2.00	2.83	4.00	1.24	4.90	6.33	8.94	275	520
	652. 674	○	○	○	○	2.70	1.80	2.38	3.36	4.75	1.47	5.82	7.51	10.62	275	520
	652. 724	○	○	○	○	3.00	2.10	3.15	4.46	6.30	1.95	7.72	9.96	14.09	275	520
	652. 764	○	○	○	-	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	270	515
	652. 804	○	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	270	510
	652. 844	○	-	-	○	4.50	3.00	6.25	8.84	12.50	3.88	15.31	19.76	27.95	270	510
	652. 884	○	-	○	-	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	270	505

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section · *Differing spray pattern.

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles for retaining nut Series 652

Spray angle	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	5E PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
75°	652. 145	○	-	○	-	0.20	0.12	-	0.04*	0.05	0.02	0.06	0.08	0.11	285	550
	652. 165	○	-	○	-	0.20	0.08	-	0.05*	0.07	0.02	0.08	0.10	0.15	285	555
	652. 185	○	-	○	-	0.20	0.15	-	0.06*	0.08	0.02	0.10	0.13	0.18	290	560
	652. 215	○	-	○	-	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	290	560
	652. 245	○	-	○	-	0.50	0.30	-	0.12*	0.16	0.05	0.20	0.26	0.36	290	560
	652. 275	○	-	○	-	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	290	560
90°	652. 216	○	-	○	-	0.40	0.20	0.06*	0.08*	0.11	0.03	0.14	0.18	0.25	380	760
	652. 246	○	-	○	-	0.50	0.30	0.08*	0.12*	0.16	0.05	0.20	0.26	0.36	380	760
	652. 276	○	-	○	-	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	450	795
	652. 306	○	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	450	795
	652. 336	○	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	450	795
	652. 366	○	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	450	795
	652. 406	○	○	○	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	450	800
	652. 446	○	○	○	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	450	800
	652. 486	○	○	○	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	450	800
	652. 516	○	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	450	800
	652. 566	○	○	○	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	450	805
	652. 606	○	○	○	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	450	805
	652. 646	○	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	450	805
	652. 676	○	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	450	810
	652. 726	○	○	○	○	3.00	1.70	3.15	4.46	6.30	1.95	7.72	9.96	14.09	450	810
	652. 766	○	○	○	-	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	450	815
	652. 806	○	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	450	820
	652. 846	-	-	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	450	820
	652. 886	○	-	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	450	835
120°	652. 187	○	-	○	-	0.35	0.20	-	0.06*	0.08	0.02	0.10	0.13	0.18	640	1220
	652. 217	○	-	○	-	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	650	1230
	652. 247	○	-	○	-	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	655	1245
	652. 277	○	-	○	-	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	655	1250
	652. 307	○	-	○	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	660	1260
	652. 337	○	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	660	1260
	652. 367	○	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	660	1265
	652. 407	○	○	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	660	1270
	652. 447	○	○	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	665	1270
	652. 487	○	○	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	665	1270
	652. 517	○	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	670	1275
	652. 567	○	○	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	670	1280
	652. 607	○	○	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	675	1285
	652. 647	○	○	○	-	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	680	1295
	652. 677	○	○	○	-	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	685	1300
	652. 727	○	○	○	○	3.00	1.60	3.15	4.46	6.30	1.95	7.72	9.96	14.09	695	1315
	652. 767	○	○	○	-	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	705	1330
	652. 807	○	-	○	-	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	705	1330
	652. 847	-	-	-	○	4.50	2.30	6.25	8.84	12.50	3.88	15.31	19.76	27.95	800	1460
	652. 887	-	-	-	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	800	1460

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
*Differing spray pattern. Subject to technical modifications.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	652. 145	+	16	=	652. 145. 16

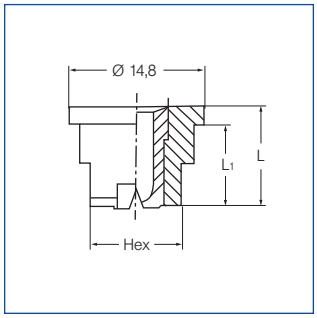
The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles for belt lubrication

Series 652. xxx. 8H. 03

Especially low flow rates.
Parabolic liquid distribution
Applications:
Belt lubrication, moistening, spraying of food products, moisturization of rollers, oiling, lubrication of metal sheets.



Operating pressure range:
1 to 5 bar

Recommended operating pressure:
3 bar

Viscosity:
The nozzles can be operated with viscous media, e. g. transmission fluid (max. approx. 200 mPas). However the spray angle decreases.

Return valve with gauze filter:
- Prevents dripping and saves medium
- Size of filter mesh: 0,08 mm (200 mesh)
- **095.016.53.11.00**
  Opening pressure: approx. 0,5 bar
  Closing pressure: approx. 0,3 bar
- **095.016.53.14.63**
  Opening pressure: approx. 2,8 bar
  Closing pressure: approx. 1,6 bar

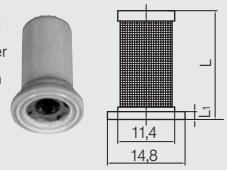
Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	Mat.-no. 8H.03* POM/AISI 303	Colour	E Ø [mm]	V̇ [l/min] p [bar] 1.0	2.0	3.0	5.0
75°	652. 145	○	○	green	0.30	0.04**	0.05	0.06	0.08
	652. 165	○	○	black	0.34	0.05**	0.07	0.08	0.10
	652. 185	○	○	red	0.20	0.06**	0.08	0.10	0.13
	652. 215	○	○	blue	0.20	0.08**	0.11	0.14	0.18
	652. 245	○	○	orange	0.30	0.12**	0.16	0.20	0.26
	652.275	○	○	brown	0.30	0.16**	0.22	0.27	0.35
120°	652. 187	○	○	grey	0.20	0.06**	0.08	0.10	0.13
	652. 247	○	○	black	0.20	0.12**	0.16	0.20	0.26
	652. 277	○	○	black	0.30	0.16**	0.22	0.27	0.35

E = narrowest free cross section
* Housing POM, nozzle insert AISI 303
** Differing spray pattern. Subject to technical modifications.

Pos.	Name	Ordering no.	Material	Dimensions [mm] L	L1	SW	** [mm]
1	Gauze filter with return valve	095. 016. 53. 11. 00	PP	21	1.5	-	0.08
		095. 016. 53. 14. 63	PP	21	1.5	-	0.08
2	Gasket	065. 240. 55	PTFE	-	-	-	-
		065. 240. 72	EWP 210	-	-	-	-
3	Nozzle	Ordering no. see flow tables	AISI 303	11	9	10	-
			POM/AISI 303*	12	10	8	-
4	Cap nut	065. 200. 16	AISI 303	13	10	22	-
		065. 200. 56	POM	14.5	11.5	22	-

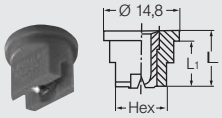
* Housing POM, Nozzle insert AISI 303
** Size of mesh

Position 1
Gauze filter with return valve

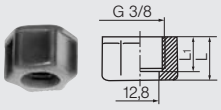


Position 2
Gasket

Position 3
Nozzle



Position 4
Cap nut

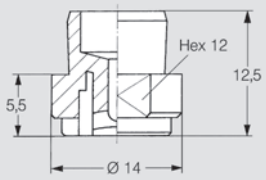


Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles for pressing into pipes

Series 612. XXX. 5E. 03

For pressing into pipes.
Stable spray pattern.
Uniform, parabolic distribution of liquid.
Applications:
Cleaning and rinsing, dish washing.



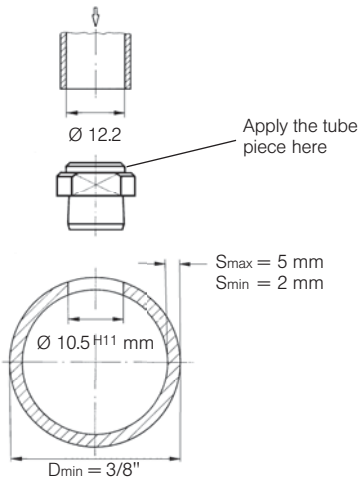
Material: PVDF
Weight: 2 g

Spray angle	Ordering no. Type	Mat.-no. 5E. 03 PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] Pmax = 2 bar 0.3	0.5	0.7	1.0	1.5	2.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
90°	612. 366	○	1.0	0.5	0.24	0.31	0.37	0.44	0.55	0.63	505	980
	612. 486	○	1.5	0.6	0.62	0.80	0.95	1.13	1.39	1.60	525	1020
120°	612. 487	○	1.5	0.6	0.62	0.80	0.95	1.13	1.39	1.60	800	1460
	612. 647	○	2.5	1.2	1.55	2.00	2.37	2.83	3.46	4.00	800	1460

A = Equivalent bore diameter · E = narrowest free cross section

Further nozzle sizes on request.

Assembly



Assembly:
Drill pipe (Ø 10 mm), ream to Ø 10,5^{H11} mm, adjust, put tube (Ø 12,2 mm) on nozzle and drive in with a rubber mallet. Flow velocity in the pipe max. 2–3 m/s.

Example for ordering:	Type	+	Mat.-no.	=	Ordering no.
	612. 366	+	5E. 03	=	612. 366. 5E. 03

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

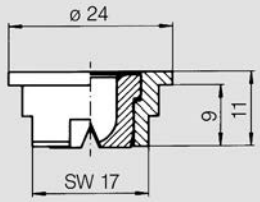
Flat fan nozzles for retaining nut Series 656 / 657

Assembly with retaining nut. Easy nozzle changing, simple jet alignment. Uniform, parabolic distribution of liquid. Increased non-clogging features, more jet power, less fog.

Applications:
Cleaning installations, gravel washing, cooling headers, spray pipes, roll cooling, cooling of rolled stock.

∢ 20° - 60°

∢ 90° - 120°



Weight Brass: 23 g

Spray angle ∢	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
20°	656. 721	○	○	○	3.00	2.50	3.15	4.45	6.30	1.95	7.72	9.96	14.09	110	205
	656. 801	○	○	○	4.00	3.20	5.00	7.07	10.00	3.10	12.25	15.81	22.36	110	205
	656. 881	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	110	205
	656. 921	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	110	205
	656.961	○	○	○	6.00	5.30	12.50	17.68	25.00	7.75	30.62	39.53	55.90	110	205
30°	656. 722	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	150	280
	656. 762	○	○	○	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	150	280
	656. 802	○	○	○	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	150	280
	656. 882	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	150	280
	656. 922	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	150	280
	656. 962	○	○	○	6.00	5.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	150	280
45°	656. 723	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	280	520
	656. 763	○	○	○	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	280	520
	656. 803	○	○	○	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	280	520
	656. 843	○	○	○	4.50	3.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	280	520
	656. 883	○	○	○	5.00	3.80	8.00	11.31	16.00	4.96	19.60	25.30	35.78	280	520
	656. 923	○	○	○	5.50	4.20	10.00	14.14	20.00	6.20	24.49	31.62	44.72	280	520
	656. 963	○	○	○	6.00	4.40	12.50	17.68	25.00	7.75	30.62	39.53	55.90	280	520
60°	656. 724	○	○	○	3.00	2.10	3.15	4.45	6.30	1.95	7.72	9.96	14.09	320	595
	656. 764	○	○	○	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	320	595
	656. 804	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	320	595
	656. 844	○	○	○	4.50	3.00	6.25	8.84	12.50	3.88	15.31	19.76	27.95	320	595
	656. 884	○	○	○	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	320	595
	656. 924	○	○	○	5.50	4.10	10.00	14.14	20.00	6.20	24.49	31.62	44.72	320	595
	656. 964	○	○	○	6.00	4.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	320	595
	657. 044	-	○	○	8.00	5.50	20.00	28.28	40.00	12.41	48.99	63.25	89.44	320	595
90°	656. 726	○	○	○	3.00	1.70	3.15	4.45	6.30	1.95	7.72	9.96	14.09	420	800
	656. 766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	420	800
	656. 806	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	420	800
	656. 846	○	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	420	800
	656. 886	○	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	420	800
	656. 926	○	○	○	5.50	3.60	10.00	14.14	20.00	6.20	24.49	31.62	44.72	420	800
	656. 966	○	○	○	6.00	3.90	12.50	17.68	25.00	7.75	30.62	39.53	55.90	420	800
	657. 046	-	-	○	8.00	4.90	20.00	28.28	40.00	12.41	48.99	63.25	89.44	420	800

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

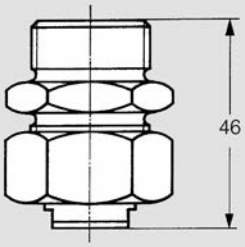
Flat fan nozzles for retaining nut Series 656 / 657

Spray angle	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
120°	656. 727	○	○	○	3.00	1.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	1240	2150
	656. 767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	1240	2150
	656. 807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	1240	2150
	656. 887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	1240	2150
	656. 927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	1240	2150

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	656. 727	+	16	=	656. 727. 16

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.



For assembly possibilities please refer to folded page

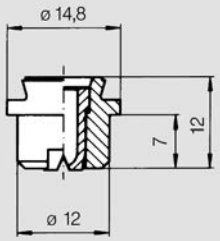
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles with dove-tail guide Series 660

Assembly with retaining nut. Automatic jet alignment due to dove-tail guide. Stable spray angle. Uniform, parabolic distribution of liquid. Spray pipes with these nozzles show an extremely uniform total liquid distribution.
Applications:
Cleaning installations. cooling headers. spray pipes.

∢ 20°-75°

∢ 90°-120°



Weight Brass: 10 g

Spray angle ∢	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
20°	660. 301	○	○	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	60	110
	660. 361	○	○	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	65	125
	660. 441	○	○	○	1.35	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	65	125
	660. 481	○	○	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	70	130
30°	660. 302	○	○	○	0.60	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	110	205
	660. 362	○	○	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	110	205
	660. 402	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	110	205
	660. 482	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.57	110	210
	660. 562	○	○	○	2.00	1.50	1.25	1.76	2.50	0.78	3.06	3.95	5.59	110	210
45°	660. 303	○	○	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	180	340
	660. 363	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	185	340
	660. 403	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	185	340
	660. 483	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	185	340
	660. 563	○	○	○	2.00	1.40	1.25	1.76	2.50	0.78	3.06	3.95	5.59	190	345
	660. 643	○	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	190	350
60°	660. 304	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	275	525
	660. 334	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	275	525
	660. 364	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	275	525
	660. 404	○	○	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	275	525
	660. 444	○	○	○	1.35	0.90	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	275	525
	660. 484	○	○	○	1.50	1.00	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	275	525
	660. 514	○	○	○	1.65	1.10	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	275	525
	660. 564	○	○	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	275	525
	660. 604	○	○	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	275	525
	660. 644	○	○	○	2.50	1.60	2.00	2.83	4.00	1.24	4.90	6.33	8.94	275	525
	660. 724	○	○	○	3.00	2.10	3.15	4.46	6.30	1.95	7.72	9.96	14.09	275	520
	660. 804	○	-	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	270	520
75°	660. 145	○	-	○	0.20	0.12	-	0.04*	0.05	0,02	0.06	0.08	0.11	320	600
	660. 165	○	-	○	0.20	0.08	-	0.05*	0.07	0,02	0.08	0.10	0.15	330	620
	660. 185	○	-	○	0.20	0.15	-	0.06*	0.08	0,02	0.10	0.13	0.18	335	625
	660. 215	○	-	○	0.50	0.20	-	0.08*	0.11	0,03	0.14	0.18	0.25	340	630
	660. 245	○	-	○	0.50	0.30	-	0.12*	0.16	0,05	0.20	0.26	0.36	345	640
	660. 275	○	-	○	0.60	0.30	0.11*	0.16*	0.22	0,07	0.27	0.35	0.49	345	645

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

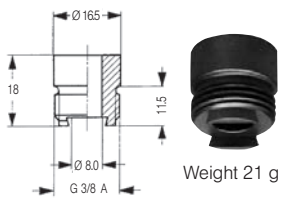
Flat fan nozzles with dove-tail guide Series 660

Spray angle	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/ AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
90°	660. 216	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	500	900
	660. 276	○	-	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	500	900
	660. 306	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	515	930
	660. 336	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	515	930
	660. 366	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	515	930
	660. 406	○	○	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	515	930
	660. 446	○	○	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	510	925
	660. 486	○	○	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	510	925
	660. 516	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	510	925
	660. 566	○	○	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	505	920
	660. 606	○	○	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	505	915
	660. 646	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	500	910
	660. 676	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	495	905
	660. 726	○	○	○	3.00	1.70	3.15	4.46	6.30	1.95	7.72	9.96	14.09	490	900
	660. 806	-	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	470	875
120°	660. 187	○	-	○	0.35	0.20	-	0.06*	0.08	0.02	0.10	0.13	0.18	650	1220
	660. 217	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	655	1230
	660. 247	○	-	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	655	1240
	660. 277	○	-	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	660	1250
	660. 307	○	-	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	660	1260
	660. 337	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.00	660	1260
	660. 367	○	○	○	1.00	0.40	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	660	1265
	660. 407	○	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	665	1270
	660. 447	○	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	670	1270
	660. 487	○	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	675	1270
	660. 517	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	675	1275
	660. 567	○	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	685	1280
	660. 607	○	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	695	1285
	660. 647	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	705	1295
	660. 727	○	○	○	3.00	1.60	3.15	4.46	6.30	1.95	7.72	9.96	14.09	735	1315
	660. 807	○	-	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	780	1345

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern

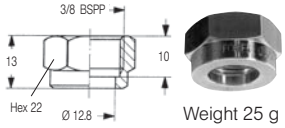
Example for ordering:	Type	+	Material-no.	=	Ordering no.
	660. 216.	+	16	=	660. 216. 16

Accessories



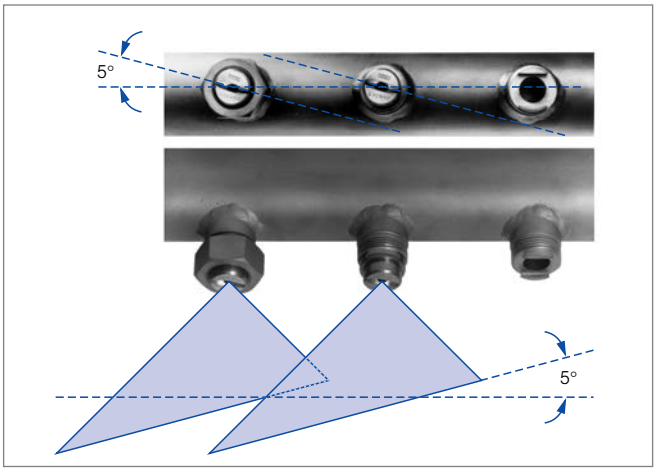
Weight 21 g

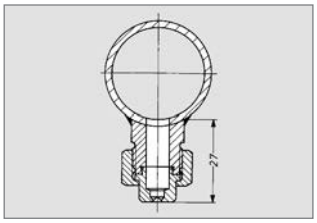
Nipple, **066. 011. 17** (316 SS)



Weight 25 g

Retaining nut, **065. 200. 16** (303 SS)
065. 200. 17 (316 SS)
065. 200. 30 (Brass)





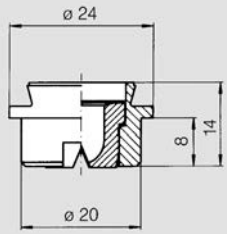
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles with dove-tail guide Series 664 / 665

Assembly with retaining nut. Automatic jet alignment due to dove-tail guide. Stable spray angle. Uniform, parabolic distribution of liquid. Spray pipes with these nozzles show an extremely uniform total liquid distribution.
Applications:
Cleaning installations, cooling headers, spray pipes, roll cooling, cooling of rolled stock.

∢ 20°-60°


∢ 90°-120°



Weight Brass: 35 g

Spray angle ∢	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/ AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
20°	664. 721	○	○	○	3.00	2.50	3.15	4.45	6.30	1.95	7.72	9.96	14.09	110	205
	664. 801	○	○	○	4.00	3.20	5.00	7.07	10.00	3.10	12.25	15.81	22.36	110	205
	664. 881	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	110	205
	664. 921	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	110	205
	664. 961	○	○	○	6.00	5.10	12.50	17.68	25.00	7.75	30.62	39.53	55.90	100	205
30°	664. 722	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	150	280
	664. 762	○	○	○	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	150	280
	664. 802	○	○	○	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	150	280
	664. 882	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	150	280
	664. 922	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	150	280
	664. 962	○	○	○	6.00	5.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	150	280
	665. 042	○	-	○	8.00	6.40	20.00	28.28	40.00	12.41	48.99	63.25	89.44	150	280
	665. 122	-	-	○	10.00	8.20	31.50	44.55	63.00	19.54	77.16	99.61	140.87	150	280
45°	664. 723	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	260	490
	664. 763	○	○	○	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	260	490
	664. 803	○	○	○	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	265	495
	664. 843	○	○	○	4.50	3.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	265	495
	664. 883	○	○	○	5.00	3.80	8.00	11.31	16.00	4.96	19.60	25.30	35.78	265	500
	664. 923	○	○	○	5.50	4.20	10.00	14.14	20.00	6.20	24.49	31.62	44.72	270	505
	664. 963	○	○	○	6.00	4.40	12.50	17.68	25.00	7.75	30.62	39.53	55.90	270	510
	665. 043	-	-	○	8.00	5.90	20.00	28.28	40.00	12.41	48.99	63.25	89.44	275	520
60°	664. 724	○	○	○	3.00	2.10	3.15	4.45	6.30	1.95	7.72	9.96	14.09	300	560
	664. 764	○	○	○	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	300	565
	664. 804	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	300	565
	664. 844	○	○	○	4.50	3.00	6.25	8.84	12.50	3.88	15.31	19.76	27.95	300	570
	664. 884	○	○	○	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	305	570
	664. 924	○	○	○	5.50	4.10	10.00	14.14	20.00	6.20	24.49	31.62	44.72	305	575
	664. 964	○	○	○	6.00	4.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	310	580
	665. 044	○	○	○	8.00	5.50	20.00	28.28	40.00	12.41	48.99	63.25	89.44	315	585
	665. 084	-	○	○	9.00	6.20	25.00	35.36	50.00	15.51	61.24	79.06	111.80	320	590
	665. 124	-	-	○	10.00	7.40	31.50	44.55	63.00	19.54	77.16	99.61	140.87	325	600

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

Continued on next page.

Example for Ordering:	Type	+	Material-no.	=	Ordering no.
	664. 721	+	16	=	664. 721. 16

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles with dove-tail guide Series 664 / 665

Spray angle	Ordering no. Type	Material-no. 16 AISI 303	17[1] AISI 316Ti/AISI 316L	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
90°	664. 726	○	○	○	3.00	1.70	3.15	4.45	6.30	1.95	7.72	9.96	14.09	420	800
	664. 766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	420	800
	664. 806	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	420	800
	664. 846	○	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	420	800
	664. 886	○	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	420	800
	664. 926	○	○	○	5.50	3.60	10.00	14.14	20.00	6.20	24.49	31.62	44.72	420	800
	664. 966	○	○	○	6.00	3.90	12.50	17.68	25.00	7.75	30.62	39.53	55.90	420	800
	665. 046	-	-	○	8.00	4.90	20.00	28.28	40.00	12.41	48.99	63.25	89.44	420	800
	665. 126	-	-	○	10.00	6.40	31.50	44.55	63.00	19.54	77.16	99.61	140.87	420	800
120°	664. 727	○	○	○	3.00	1.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	1240	2150
	664. 767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	1240	2150
	664. 807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	1240	2150
	664. 887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	1240	2150
	664. 927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	1240	2150
	664. 967	-	-	○	6.00	3.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	1240	2150
	665. 047	-	-	○	8.00	4.40	20.00	28.28	40.00	12.41	48.99	63.25	89.44	1240	2150

[1] We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

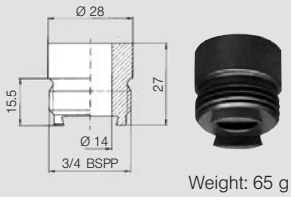
Example for ordering:	Type	+	Material-no.	=	Ordering no.
	664. 726	+	16	=	664. 726. 16

Accessories see next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

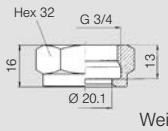
Flat fan nozzles with dove-tail guide Series 664 / 665

Accessories



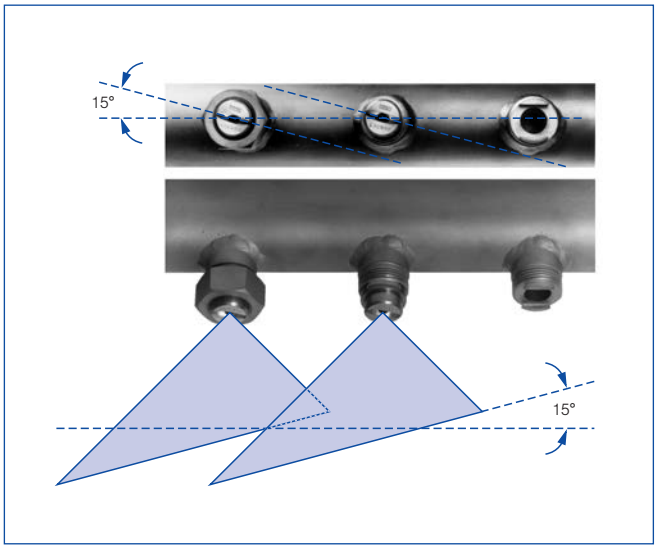
Weight: 65 g

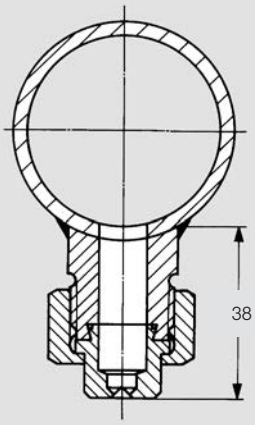
Nipple, **066.410.17** (AISI 316Ti)



Weight Brass: 60 g

Retaining nut, **065. 600. 16** (AISI 303)
065. 600. 17 (AISI 316Ti)
065. 600. 30 (Brass)



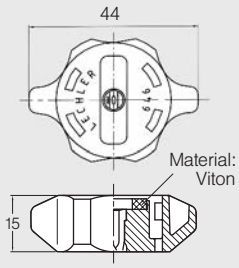


Pretreatment in a pickling line

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles with bayonet quick release cap Series 646

Quick and easy assembly with bayonet quick release cap. Adjusted spray direction. Uniform liquid distribution.
Applications:
Belt cleaning, surface treatment, cleaning, coating processes.



Spray angle	Ordering no. Type	Mat.-no. 5E PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
20°	646. 301	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	75	150
	646. 361	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	80	150
	646. 441	○	1.35	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	80	155
	646. 481	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	80	155
30°	646. 302	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	85	140
	646. 362	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	95	160
	646. 402	○	1.20	0.90	0.50*	0.71	1.00	0.39	1.23	1.58	2.24	105	190
	646. 482	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	120	225
	646. 562	○	2.00	1.50	1.25	1.77	2.50	0.78	3.06	3.95	5.59	135	240
45°	646. 363	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	185	340
	646. 403	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	185	340
	646. 483	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	185	340
	464. 563	○	2.00	1.40	1.20	1.77	2.50	0.78	3.06	3.95	5.59	185	340
	464. 643	○	2.50	1.80	200	2.83	4.00	1.24	4.90	6.33	8.94	185	345
60°	646. 304	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	245	490
	646. 334	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	250	495
	646. 364	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	255	500
	646. 404	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	260	510
	646. 444	○	1.35	0.90	0.62	0.88	1.25	0.39	1.53	1.98	2.80	260	510
	646. 484	○	1.50	1.00	0.80	1.13	1.60	0.50	1.96	2.53	3.58	270	525
	646. 514	○	1.65	1.10	0.95	1.34	1.90	0.59	2.33	3.00	4.25	260	510
	646. 564	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	260	505
	646. 604	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	265	505
90°	646. 306	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	425	840
	646. 336	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	425	840
	646. 366	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	425	840
	646. 406	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	425	835
	646. 446	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	425	835
	646. 486	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	425	830
	646. 516	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	425	830
	646. 566	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	425	825
	646. 606	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	425	820

A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern
Subject to technical modifications.

Continued on next page.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	646. 301	+	5E	=	646. 301. 5E

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles with bayonet quick release cap Series 646

Spray angle	Ordering no. Type	Mat.-no. 5E	Mat.-no. PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
120°	**646. 307**		○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	625	1175
	646. 337		○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	630	1180
	646. 367		○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	635	1190
	646. 407		○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	640	1195
	646. 447		○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	645	1200
	646. 487		○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	650	1200
	646. 517		○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	650	1205
	646. 567		○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	655	1210
	646. 607		○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	660	1215

A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern
Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	646. 307	+	5E	=	646. 307. 5E

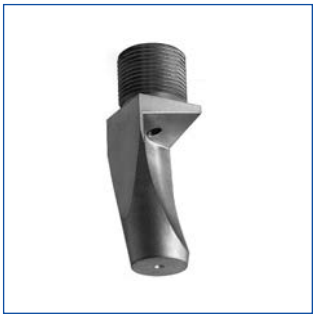
Assembly accessories see page 9.3

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

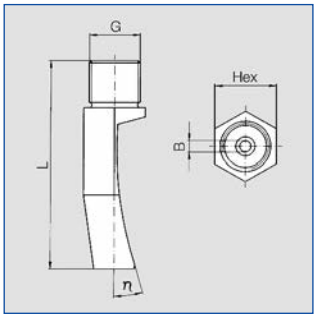
Tongue-type nozzles

Series 688 / 689

Hard, sharp flat fan, narrowly delimited jet pattern. Not prone to clogging.
Applications:
Cleaning, washing, degreasing and phosphating, preparation techniques.



Lock nut
for type 689. 003
095.011.16.00.15
(AISI 303/AISI 303)
095.011.5E.00.15
(PVDF)

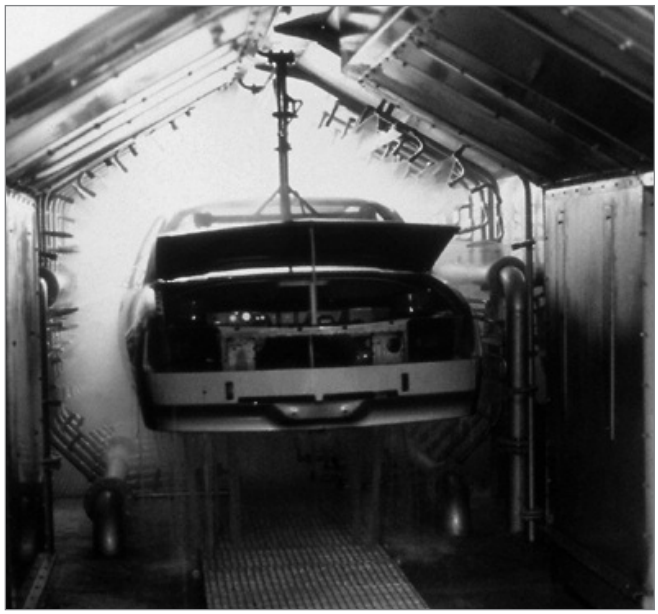


Spray angle	η	Ordering no. Type	Mat.-no. 16 AISI 303	Mat.-no. 5E PVDF	Code G 3/8 BSPT	Code G 3/4 BSPP	B Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	5.0	Dimensions L [mm]	SW [mm]	Weight	Spray width B at p=2 bar H = 250 mm	H = 500 mm
45°	35°	**688. 763**	○	-	**CE**	-	3.0	4.00	5.66	8.00	12.65	43	19	114 g	220	440
	30°	**688. 843**	○	-	**CE**	-	3.8	6.25	8.84	12.50	19.76	50	19	133 g	220	440
	29°	**688. 923**	○	-	**CE**	-	4.8	10.00	14.14	20.00	31.62	59	22	247 g	220	440
	35°	**689. 003**	○	○	-	**90**	6.0	15.75	22.27	31.50	49.81	80/80	32/24	306/33	250	490

B = Bore diameter

Example for ordering:	Type	+ Material-no.	+ Code	= Ordering no.
	688. 763	**+ 16**	**+ CE**	**= 688. 763.16. CE**

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.



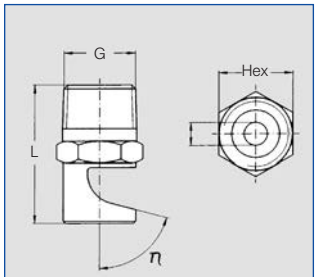
Phosphating line

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Tongue-type nozzles

Series 686

Wide flat fan with a sharply delimited jet pattern. Particularly clog-proof.
Applications:
Foam control in storage tanks and sewage treatment plants, cleaning and washing process, requiring powerful and concentrated water jets.



Weight Brass: 18 g

Spray angle	η	Ordering no. Type	Material-no. 16 AISI 303	30 Brass	5E PVDF	Code G 1/8 BSPT	1/4 BSPT	1/2 BSPT	B Ø [mm]	V̇ [l/min] p [bar] 1.0	2.0	5.0	Dimensions L [mm] R 1/8	R 1/4	R 3/8	R 1/2	Hex [mm] R 1/8	R 1/4	R 3/8	R 1/2	Spray width B at p=2 bar H = 250 mm
90°	53°	686. 366	-	○	-	CA	-	-	0.80	0.45	0.63	1.00	22	-	-	-	11	-	-	-	520
	75°	686. 406	○	○	-	CA	-	-	1.00	0.71	1.00	1.58	23	-	-	-	11	-	-	-	525
	40°	686. 686	○	○	-	-	CC	-	2.40	3.54	5.00	7.91	-	29	-	-	-	14	-	-	530
	40°	686. 726	-	○	-	CA	-	-	2.70	4.45	6.30	9.96	26	-	-	-	11	-	-	-	530
	40°	686. 806	○	○	-	-	CC	-	3.40	7.07	10.00	15.81	-	34	-	-	-	14	-	-	530
	40°	686. 886	○	-	-	-	CC	-	4.20	11.31	16.00	25.30	-	36	-	-	-	17	-	-	530
	40°	686. 926	○	-	-	-	-	-	4.70	14.14	20.00	31.62	-	-	39	-	-	-	17	-	530
140°	75°	686. 368	○	○	-	CA	-	-	0.80	0.45	0.63	1.00	23	-	-	-	11	-	-	-	1360
		686. 408	○	○	-	CA	-	-	1.00	0.71	1.00	1.58	23	-	-	-	11	-	-	-	1370
		686. 448	○	○	-	-	CC	-	1.20	0.88	1.25	1.98	-	28	-	-	-	14	-	-	1370
		686. 488	○	○	-	CA	CC	-	1.30	1.13	1.60	2.53	23	28	-	-	11	14	-	-	1370
		686. 528	○	○	-	CA	CC	-	1.50	1.41	2.00	3.16	23	28	-	-	11	14	-	-	1370
		686. 568	○	○	○*	CA	CC	-	1.70	1.77	2.50	3.59	23	-	-	-	11	-	-	-	1370
		686. 608	○	○	-	CA	CC	-	1.90	2.23	3.15	4.98	23	28	-	-	11	14	-	-	1370
		686. 648	○	○	-	-	CC	-	2.20	2.83	4.00	6.32	-	28	-	-	-	14	-	-	1370
		686. 688	○	○	-	CA	CC	-	2.40	3.54	5.00	7.91	23	28	-	-	11	14	-	-	1370
		686. 728	○	○	-	CA	CC	-	2.70	4.45	6.30	9.96	23	-	-	-	11	-	-	-	1370
		686. 768	○	○	-	-	CC	-	3.00	5.66	8.00	12.65	-	28	-	-	-	14	-	-	1370
		686. 808	○	○	-	CA	CC	-	3.40	7.07	10.00	15.81	23	28	-	-	11	14	-	-	1370
		686. 828	○	○	-	-	CC	-	3.60	7.92	11.20	17.71	-	28	-	-	-	14	-	-	1370
		686. 848	○	○	-	-	CC	-	3.80	8.80	12.50	19.76	-	28	-	-	-	14	-	-	1370
		686. 868	○	○	-	-	CC	-	4.00	9.90	14.00	22.14	-	28	-	-	-	14	-	-	1370
		686. 888	○	○	-	-	CC	-	4.20	11.31	16.00	25.30	-	28	-	-	-	14	-	-	1370
		686. 908	○	○	-	-	CC	-	4.50	12.73	18.00	28.46		28	-	-	-	14	-	-	1370
		686. 928	○	-	-	-	-	-	4.70	14.14	20.00	31.62	-	-	32	-	-	-	17	-	1370
		686. 968	-	○	-	-	-	CG	5.30	17.68	25.00	39.53	-	-	32	40	-	-	17	22	1370
		686. 988	○	-	-	-	-	CG	5.60	19.80	28.00	44.27	-	-	32	40	-	-	17	22	1370

B = Bore diameter
Can also be used for air or saturated steam (see page 6.8)
* Only available with code CA.

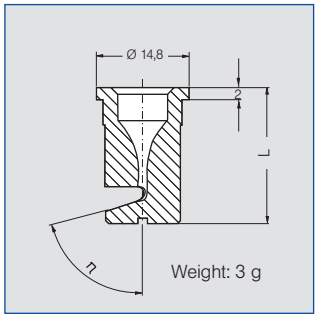
Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	686. 366	+	30	+	CA	=	686. 366. 30. CA

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Tongue-type nozzles for retaining nut Series 684

Assembly with retaining nut. Wide flat fan with a sharply delimited spray pattern. Particularly clog-proof. Easy nozzle changing, simple jet alignment.
Applications:
Foam control in storage tanks and sewage treatment plants. Cleaning and washing process, requiring powerful and concentrated water jets.



Spray angle	η	Ordering no. Type	Mat.-no. 56 POM	Mat.-no. 5E PVDF	Colour**	B Ø [mm]	V̇ [l/min] p [bar] 1.0	2.0	5.0	L [mm]	Spray width B at p = 2 bar H = 250 mm
140°	75°	684. 348	○	-	green	0.7	0.35*	0.50	0.79	20	1360
	75°	684. 368	○	○	yellow	0.8	0.45*	0.63	1.00	20	1360
	75°	684. 408	○	-	blue	1.0	0.71	1.00	1.58	20	1370
	75°	684. 448	○	-	red	1.2	0.88	1.25	1.98	20	1370
	75°	684. 488	○	○	brown	1.3	1.13	1.60	2.53	20	1370
	75°	684. 528	○	-	grey	1.5	1.41	2.00	3.16	20	1370
	75°	684. 568	○	○	white	1.7	1.77	2.50	3.95	19	1370
	75°	684. 608	○	-	light blue	1.9	2.23	3.15	4.98	19	1370
	75°	684. 688	○	-	green	2.4	3.54	5.00	7.91	17	1370
	75°	684. 728	○	○	black	2.7	4.45	6.30	9.96	17	1370
	75°	684. 808	○	-	purple	3.4	7.07	10.00	15.81	16	1370

B = Bore diameter
* Differing spray pattern.
** Material PVDF generally blue

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	684. 348	+	56	=	684. 348. 56

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

For assembly possibilities please refer to folded page.

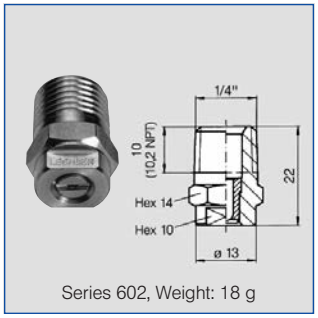
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

High pressure flat fan nozzles

Series 602 / 608 / 652

Sharp uniform flat fan with an extremely narrow jet depth.
Applications:
High pressure cleaners, steam jet cleaners
Materials:
Nozzle body: stainless steel AISI 303
Insert: hardened stainless steel 1.4034 S

Series 608, Weight: 13 g



Series 602, Weight: 18 g

Series 652, Weight: 13 g

US gal/min. bei 40 psi	Nozzle-Code			Flow rate code				A Ø [mm]	V̇ [l/min] p [bar]						
	Connection			Spray angle											
	1/8"	1/4"	nut	∢20°	∢30°	∢45°	∢60°		40	60	80	100	120	150	200
02	**608**	**602**	**652**	**361**	**362**	**363**	**364**	1.00	2.86	3.50	4.04	4.52	4.95	5.53	6.39
025	**608**	**602**	**652**	**381**	**382**	**383**	**384**	1.10	3.54	4.33	5.00	5.59	6.12	6.85	7.91
03	**608**	**602**	**652**	**401**	**402**	**403**	**404**	1.18	4.31	5.28	6.10	6.82	7.47	8.35	9.64
034	**608**	**602**	**652**	**411**	**412**	**413**	**414**	1.30	4.95	6.06	7.00	7.83	8.57	9.59	11.07
04	**608**	**602**	**652**	**451**	**452**	**453**	**454**	1.35	5.80	7.10	8.20	9.17	10.04	11.23	12.97
045	**608**	**602**	**652**	**471**	**472**	**473**	**474**	1.40	6.51	7.97	9.20	10.29	11.27	12.60	14.55
05	**608**	**602**	**652**	**481**	**482**	**483**	**484**	1.55	7.29	8.92	10.30	11.52	12.62	14.11	16.29
055	**608**	**602**	**652**	**501**	**502**	**503**	**504**	1.60	7.96	9.74	11.25	12.58	13.78	15.41	17.79
06	**608**	**602**	**652**	**521**	**522**	**523**	**524**	1.72	8.70	10.66	12.31	13.76	15.07	16.85	19.46
065	**608**	**602**	**652**	**531**	**532**	**533**	**534**	1.75	9.38	11.49	13.26	14.83	16.25	18.16	20.97
07	**608**	**602**	**652**	**541**	**542**	**543**	**544**	1.80	10.06	12.32	14.22	15.90	17.42	19.47	22.49
075	**608**	**602**	**652**	**551**	**552**	**553**	**554**	1.90	10.75	13.16	15.20	16.99	18.62	20.81	24.04
08	**608**	**602**	**652**	**571**	**572**	**573**	**574**	2.05	11.48	14.06	16.23	18.15	19.88	22.23	25.67
09	**608**	**602**	**652**	**591**	**592**	**593**	**594**	2.10	13.01	15.93	18.40	20.57	22.53	25.19	29.09
10	**608**	**602**	**652**	**601**	**602**	**603**	**604**	2.30	14.43	17.76	20.40	22.81	24.99	27.94	32.26
125	**-**	**602**	**652**	**641**	**642**	**643**	**644**	2.50	17.82	21.82	25.20	28.17	30.86	34.51	39.85
15	**-**	**602**	**652**	**671**	**672**	**673**	**674**	2.70	21.35	26.15	30.20	33.76	36.98	41.35	47.74
175	**-**	**602**	**652**	**701**	**702**	**703**	**704**	3.00	25.03	30.66	35.40	39.58	43.36	48.47	55.97
20	**-**	**602**	**652**	**-**	**-**	**723**	**724**	3.05	28.85	35.33	40.80	45.62	49.97	55.87	64.52
30	**-**	**602**	**652**	**-**	**-**	**793**	**-**	3.90	42.43	51.96	60.00	67.08	73.48	82.16	94.88

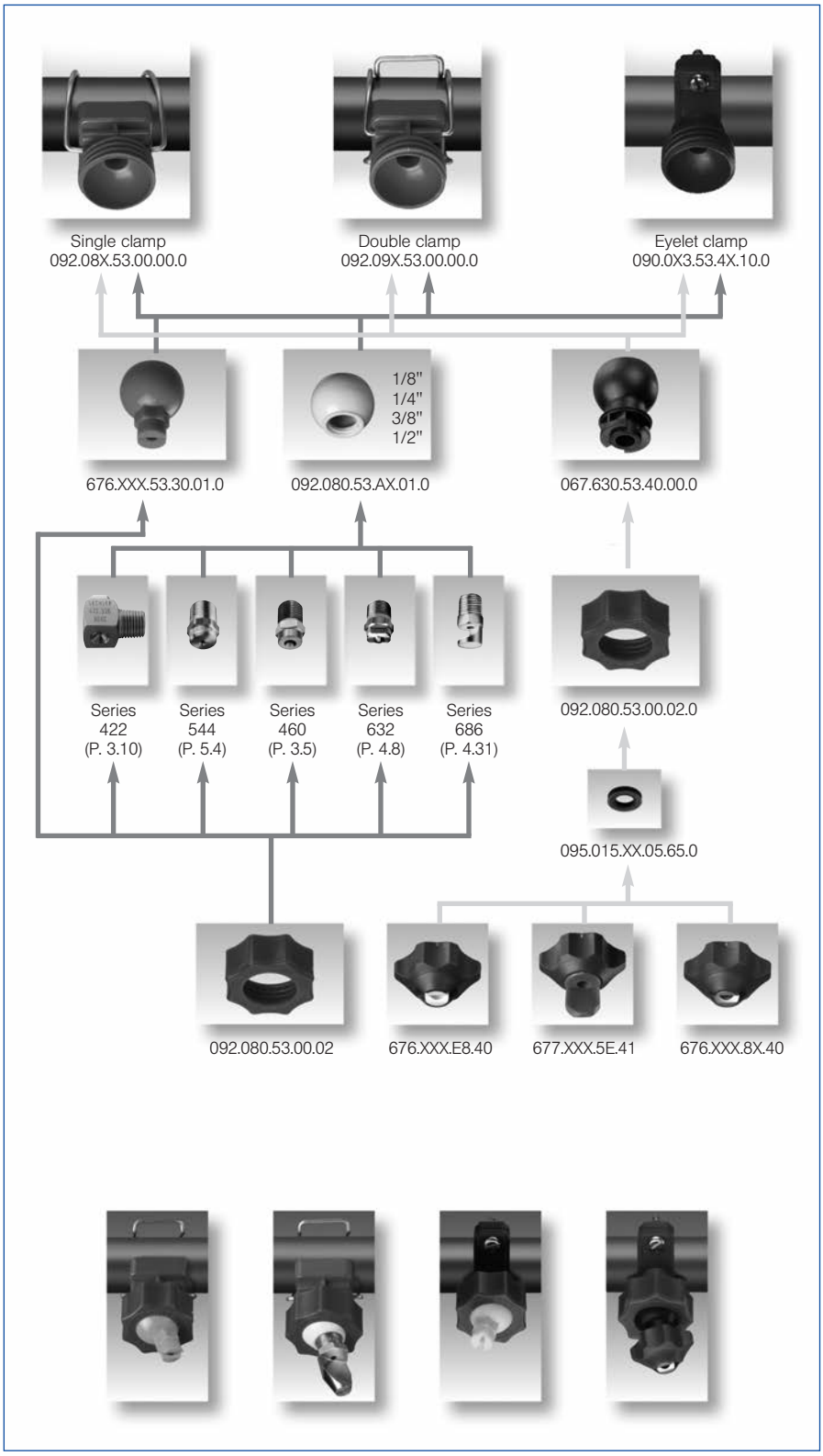
A = Equivalent bore diameter

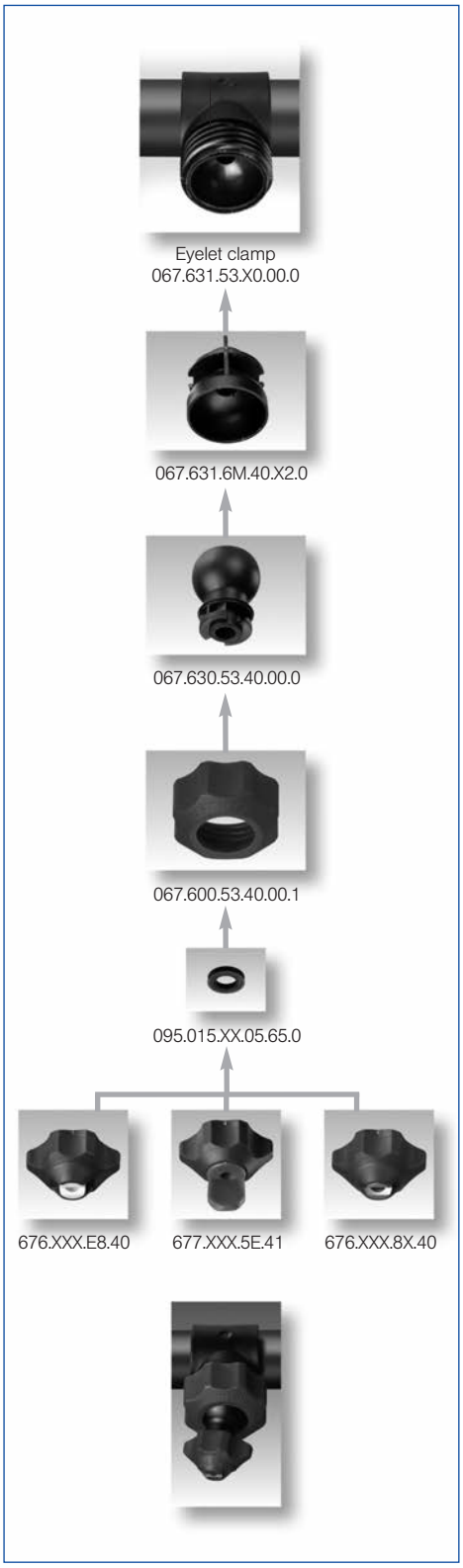
Connection Code	Connection	p_{max} [bar]
A3. 00	BSPT	ca. 350
A3. 07	NPT	ca. 350
A3. 29	Lock nut	ca. 200

Example for ordering:	**Nozzle-Code** **602**	+	**Flow rate code** **361**	+	**Connection-Code** **A3. 07**	=	**Ordering no.** **602. 361. A3. 07 (Flat fan 20°; 4.52 l/min. at 100 bar; 1/4“ NPT)**

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

MEMOSPRAY® / Easy-Clip combination

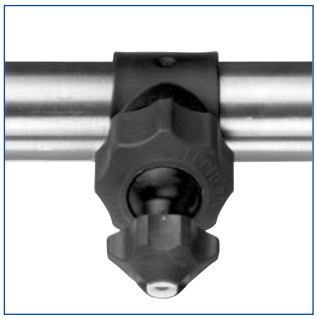


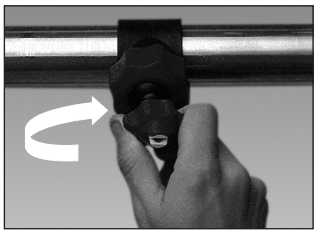


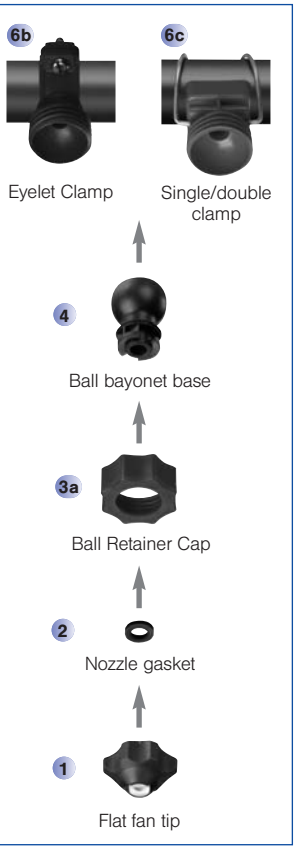
Nozzle systems for surface technology

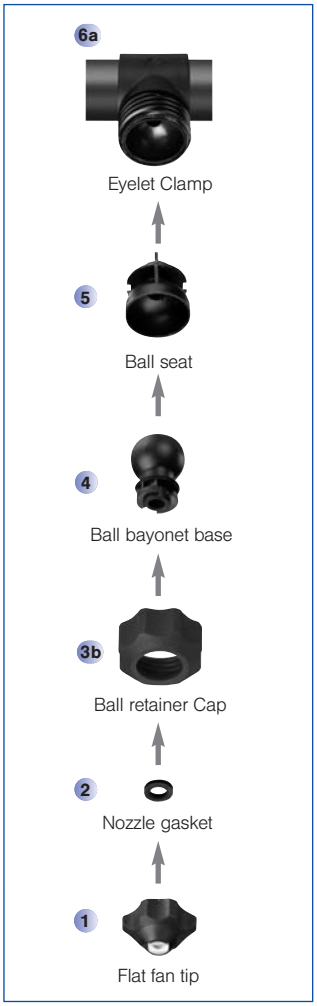
MEMOSPRAY® nozzle system

Maintaining of the adjusted spray direction by the »memory effect«. Very easy handling without the need for special tools. Especially pressure resistant pipe connector.
Application:
Degreasing, phosphating in surface treatment, cleaning.



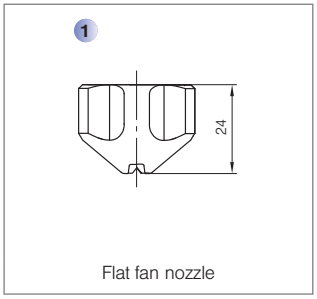






Type	∢	Ordering no.	Material 8F Housing: PP Insert: 303 SS	Material 8R Housing: PP Insert: 316 L	Material E8 Housing: PP Insert: ceramic	Material 53 Polypropylene (PP)	E Ø [mm]	Flow rate [l/min] bei p [bar] 1.0	1.5	2.0	2.5	5.0	Weight [g] PP/ AISI 316Ti	PP/ AISI 316L	PP/Ceramic	PP
1 Flat fan nozzle	30°	676. 642. xx. 40	○	○	-	-	1.6	2.83	3.46	4.00	4.47	6.33	15	15	–	–
	30°	676. 722. xx. 40	○	○	-	-	2.1	4.46	5.46	6.30	7.04	9.96	15	15	–	–
	30°	676. 762. xx. 40	○	○	-	-	2.3	5.66	6.93	8.00	8.94	12.65	15	15	–	–
	30°	676. 802. xx. 40	○	○	-	-	2.6	7.07	8.66	10.00	11.18	15.81	15	15	–	–
	30°	676. 842. xx. 40	○	○	-	-	3.0	8.84	10.82	12.50	13.97	19.76	15	15	–	–
	30°	676. 882. xx. 40	○	○	-	-	3.4	11.31	13.86	16.00	17.89	25.30	15	15	10	8
	30°	676. 922. xx. 40	○	○	-	-	4.1	14.14	17.32	20.00	22.36	31.62	15	15	10	8
	30°	676. 962. xx. 40	○	○	-	-	4.2	17.68	21.65	25.00	27.95	39.53	15	15	10	8
	30°	677. 002. xx. 40	○	-	-	-	4.7	22.27	27.28	31.50	35.22	49.81	15	–	–	–
1 Flat fan nozzle	60°	676. 644. xx. 40	○	○	-	-	1.6	2.83	3.46	4.00	4.47	6.33	15	15	–	–
	60°	676. 724. xx. 40	○	○	-	-	2.1	4.46	5.46	6.30	7.04	9.96	15	15	–	–
	60°	676. 764. xx. 40	○	○	-	-	2.3	5.66	6.93	8.00	8.94	12.65	15	15	–	–
	60°	676. 804. xx. 40	○	○	-	-	2.6	7.07	8.66	10.00	11.18	15.81	15	15	–	–
	60°	676. 844. xx. 40	○	○	-	-	3.0	8.84	10.82	12.50	13.97	19.76	15	15	–	–
	60°	676. 884. xx. 40	○	○	○	○	3.4	11.31	13.86	16.00	17.89	25.30	15	15	10	8
	60°	676. 924. xx. 40	○	○	○	○	4.1	14.14	17.32	20.00	22.36	31.62	15	15	10	8
	60°	676. 964. xx. 40	○	○	○	○	4.2	17.68	21.65	25.00	27.95	39.53	15	15	10	8
	60°	677. 004. xx. 40	○	○	○	○	4.7	22.27	27.28	31.50	35.22	49.81	15	15	10	8
	60°	677. 044. xx. 40	○	○	-	-	5.5	28.28	34.64	40.00	44.72	63.25	15	15	–	–
	60°	677. 084. xx. 40	○	○	-	-	6.2	35.36	43.30	50.00	55,90	79.06	15	15	–	–

Continued on next page.

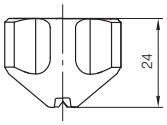


Flat fan nozzle

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

	Type	∢	Ordering no.	Material 8F Housing: PP Insert: AISI 303	Material 8R Housing: PP Insert: AISI 316L	Material E8 Housing: PP Insert: ceramic	Material 53 Polypropylene (PP)	E Ø [mm]	Flow rate [l/min] at p [bar] 1.0	1.5	2.0	2.5	5.0	Weight [g] PP/ AISI 316Ti	PP/ AISI 316L	PP/Ceramic	PP
1	Flat fan nozzle	90°	676. 646. xx. 40	○	○	-	-	1.6	2.83	3.46	4.00	4.47	6.33	15	15	–	–
		90°	676. 726. xx. 40	○	○	-	-	2.1	4.46	5.46	6.30	7.04	9.96	15	15	–	–
		90°	676. 766. xx. 40	○	○	-	-	2.3	5.66	6.93	8.00	8.94	12.65	15	15	–	–
		90°	676. 806. xx. 40	○	○	-	-	2.6	7.07	8.66	10.00	11.18	15.81	15	15	–	–
		90°	676. 846. xx. 40	○	○	-	-	3.0	8.84	10.82	12.50	13.97	19.76	15	15	–	–
		90°	676. 886. xx. 40	○	○	-	-	3.4	11.31	13.86	16.00	17.89	25.30	15	15	–	–
		90°	676. 926. xx. 40	○	○	-	-	4.1	14.14	17.32	20.00	22.36	31.62	15	15	–	–
		90°	676. 966. xx. 40	○	○	-	-	4.2	17.68	21.65	25.00	27.95	39.53	15	15	–	–
1	Flat fan nozzle	120°	676. 647. xx. 40	○	○	-	-	1.6	2.83	3.46	4.00	4.47	6.33	15	15	–	–
		120°	676. 727. xx. 40	○	○	-	-	2.1	4.46	5.46	6.30	7.04	9.96	15	15	–	–
		120°	676. 767. xx. 40	○	○	-	-	2.3	5.66	6.93	8.00	8.94	12.65	15	15	–	–
		120°	676. 807. xx. 40	○	○	-	-	2.6	7.07	8.66	10.00	11.18	15.81	15	15	–	–
		120°	676. 847. xx. 40	○	○	-	-	3.0	8.84	10.82	12.50	13.97	19.76	15	15	–	–
		120°	676. 887. xx. 40	○	○	-	-	3.4	11.31	13.86	16.00	17.89	25.30	15	15	–	–
		120°	676. 927. xx. 40	○	○	-	-	4.1	14.14	17.32	20.00	22.36	31.62	15	15	–	–

1



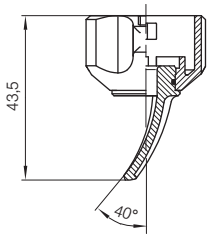
Flat fan nozzle

		∢	η	Ordering no.	Material 8R Housing: PP Insert: AISI 316L	Material 5E PVDF	E Ø [mm]	Flow rate [l/min] at p [bar] 1.0	1.5	2.0	2.5	5.0	Weight [g] PP/ AISI 316L	PVDF
1a	Tongue type nozzle	45°	35°	676. 803. XX. 41	○	-	3.4	7.07	8.66	10.00	11.18	15.81	25	–
		60°	35°	676. 874. XX. 41	○	-	4.2	10.61	12.99	15.00	16.77	23.72	25	–
		60°	35°	676. 924. XX. 41	○	-	4.7	14.14	17.32	20.00	22.36	31.62	25	–
		70°	40°	677. 005. XX. 41	○	○	6.0	22.27	27.28	31.50	35.22	49.81	25	11

E = narrowest free cross section

Example for Ordering:	Type	+	Material-no.	=	Ordering no.
	676. 646. xx. 40	+	8R	=	676. 646. 8R. 40

1a



Tongue type nozzle

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Nozzle systems for surface technology

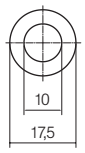
MEMOSPRAY® nozzle system

	Type	Ordering no.	Material 53 Polypropylene (PP)	Material 6M PP reinforced	Material 6C EPDM	Material 7A Viton	Bore-Ø B	For pipe-Ø	Weight [g] PP	Weight [g] EPDM/Viton
2	Nozzle gasket	095. 015. xx. 05. 65. 0	-	-	○	○			–	1
3a	Ball retainer cap	092. 080. xx. 00. 02	○	-	-	-			18	–
3b	Ball retainer cap	067. 600. xx. 40	○	-	-	-			18	–
4	Ball bayonet base	067. 630. xx. 40	○	-	-	-			12	–
5	Ball seat for Ball retainer cap no. 067.631.xx.40.00.0	067. 631. xx. 40. 22. 0	-	○	-	-	13.8 mm	1 1/4" (40.0-43.0 mm)	9	–
		067. 631. xx. 40. 02. 0	-	○	-	-	16.0 mm	1 1/4" (40.0-43.0 mm)	11	–
		067. 631. xx. 40. 12. 0	-	○	-	-	19.8 mm	1 1/4" (40.0-43.0 mm)	13	–
	Ball seat for Ball retainer cap no. 067.631.xx.50.00.0	067. 631. xx. 50. 22. 0	-	○	-	-	13.8 mm	1 1/2" (46.0-49.0 mm)	9	–
		067. 631. xx. 50. 02. 0	-	○	-	-	16.0 mm	1 1/2" (46.0-49.0 mm)	11	–
		067. 631. xx. 50. 12. 0	-	○	-	-	19.8 mm	1 1/2" (46.0-49.0 mm)	13	–
6a	Eyelet clamp	067. 631. xx. 40. 00. 0	○	-	-	-	–	1 1/4" (40.0-43.0 mm)	31	–
		067. 631. xx. 50. 00. 0	○	-	-	-	–	1 1/2" (46.0-49.0 mm)	33	–
6b	Eyelet clamp	090. 023. xx. 44. 10. 0	○	-	-	-	13.8 mm	1" (32.0-34.5 mm)	48	–
		090. 023. xx. 43. 10. 0	○	-	-	-	16.0 mm	1" (32.0-34.5 mm)	48	–
		090. 033. xx. 44. 10. 0	○	-	-	-	13.8 mm	1 1/4" (40.0-43.0 mm)	50	–
		090. 033. xx. 43. 10. 0	○	-	-	-	16.0 mm	1 1/4" (40.0-43.0 mm)	50	–
		090. 033. xx. 40. 10. 0	○	-	-	-	20.0 mm	1 1/4" (40.0-43.0 mm)	50	–
		090. 043. xx. 44. 10. 0	○	-	-	-	13.8 mm	1 1/2" (46.0-49.0 mm)	52	–
		090. 043. xx. 43. 10. 0	○	-	-	-	16.0 mm	1 1/2" (46.0-49.0 mm)	52	–
		090. 043. xx. 40. 10. 0	○	-	-	-	20.0 mm	1 1/2" (46.0-49.0 mm)	52	–
6c	Single clamp	092. 080. xx. 00	○	-	-	-	16.0 mm	1" (32.0-34.5 mm)	36	–
		092. 081. xx. 00	○	-	-	-	16.0 mm	1 1/4" (40.0-43.0 mm)	38	–
		092. 082. xx. 00	○	-	-	-	16.0 mm	1 1/2" (46.0-49.0 mm)	40	–
		092. 083. xx. 00	○	-	-	-	16.0 mm	2" (58.0-62.0 mm)	42	–

* other bore-Ø on request
E = narrowest free cross section

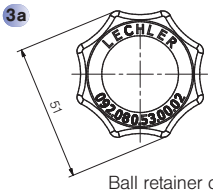
Example for ordering:	Type	+	Material-no.	=	Ordering no.
	095. 015. xx. 05. 065.0	+	53	=	095. 015. 53. 05. 065.0

2



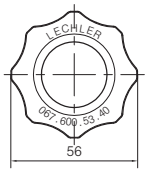
Nozzle gasket

3a



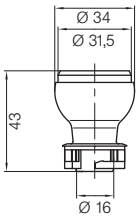
Ball retainer cap

3b



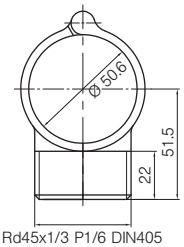
Ball retainer cap

4



Ball bayonet base

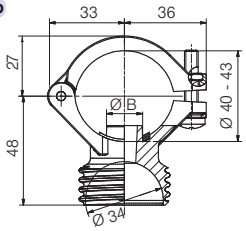
6a



Rd45x1/3 P1/6 DIN405

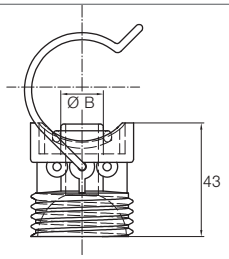
Eyelet clamp 1 1/2"

6b



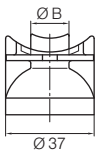
Eyelet clamp 1 1/4"

6c



Single clamp

5



Ball saet

Nozzle systems for surface technology

Easy-Clip nozzle system

Quick and easy assembly with clamp. No tools required. Allround swivelling by 30°. Easy adjustment and cleaning.
Applications:
Degreasing, phosphating in surface treatment.

Materials:
Clamp: Stainless steel AISI 301
Sealing: EPDM
Cylinder pin, Screw, Screw unit: 1.4401.
Body, ball retainer cap: PP, reinforced
Nozzle. ball joint: PP

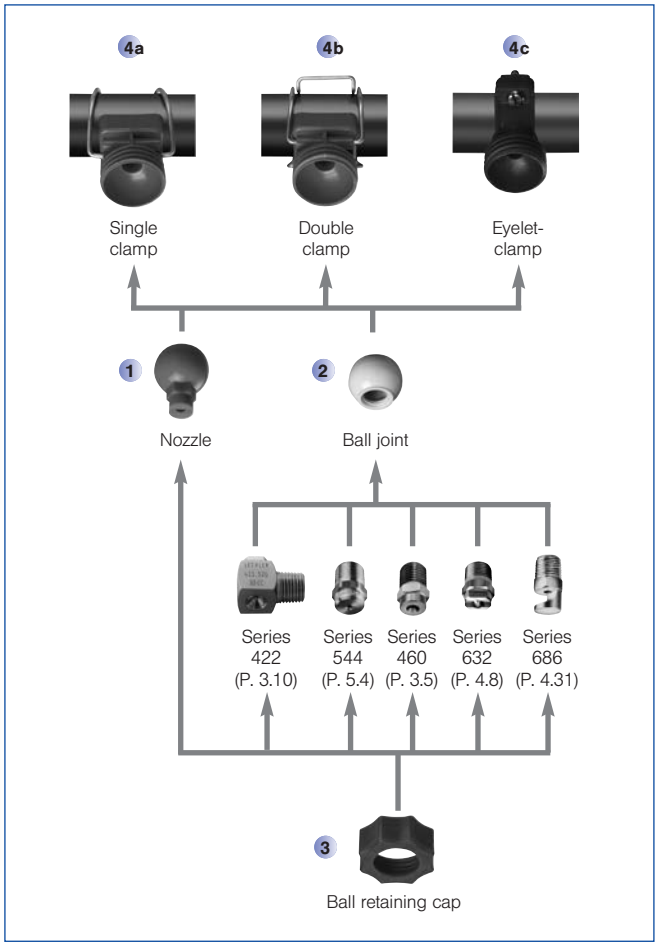
Sets

existing of
- **Nozzle**
- **Single clamp for 1 1/4" pipe**
- **Ball retainer cap**

Ordering no.	Nozzle Colour	∢	V̇ [l/min] p [bar] 0.5	1.0	1.5	2.0	2.5
676. 724. 53. 31	grey		3.15	4.45	5.45	6.30	7.04
676. 764. 53. 31	brown		4.00	5.66	6.93	8.00	8.94
676. 804. 53. 31	lilac		5.00	7.07	8.66	10.00	11.18
676. 844. 53. 31	yellow	60°	6.25	8.84	10.83	12.50	13.98
676. 884. 53. 31	red		8.00	11.31	13.85	16.00	17.89
676. 904. 53. 31	blue		9.10	12.87	15.76	18.20	20.35
676. 924. 53. 31	green		10.00	14.14	17.32	20.00	22.36

existing of
- **Ball joint**
- **Single clamp for 1 1/4" pipe**
- **Ball retainer cap**

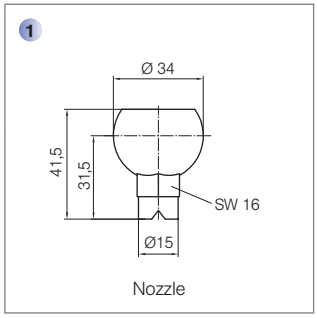
Ordering no.	Ball Colour	Nozzle connection	For nozzle series
092. 081. 53. AB	beige	G 1/8"	460, 632, 686,610, 544
092. 081. 53. AD	beige	G 1/4"	422, 460, 544, 612, 632, 686
092. 081. 53. AF	beige	G 3/8"	422, 460, 632, 686, 688
092. 081. 53. AH	beige	G 1/2"	422, 460, 632, 686



Components

1 Nozzle

Ordering no.	Colour	∢	V̇ [l/min] p [bar] 0.5	1.0	1.5	2.0	2.5
676. 724. 53. 30. 01	grey		3.15	4.45	5.45	6.30	7.04
676. 764. 53. 30. 01	brown		4.00	5.66	6.93	8.00	8.94
676. 804. 53. 30. 01	lilac		5.00	7.07	8.66	10.00	11.18
676. 844. 53. 30. 01	yellow	60°	6.25	8.84	10.83	12.50	13.98
676. 884. 53. 30. 01	red		8.00	11.31	13.85	16.00	17.89
676. 904. 53. 30. 01	blue		9.10	12.87	15.67	18.20	20.35
676. 924. 53. 30. 01	green		10.00	14.14	17.32	20.00	22.36
092. 080. 53. 00. 01	grey	Blind nozzle					

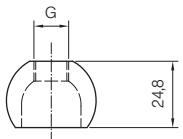


Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

2 Ball joint

Ordering no.	Colour	Nozzle connection	For nozzle series
092. 080. 53. AB. 01	beige	G 1/8"	460, 544, 610, 632, 686
092. 080. 53. AD. 01	beige	G 1/4"	422, 460, 544, 612, 632, 686
092. 080. 53. AF. 01	beige	G 3/8"	422, 460, 632, 686, 688
092. 080. 53. AH. 01	beige	G 1/2"	422, 460, 632, 686

2

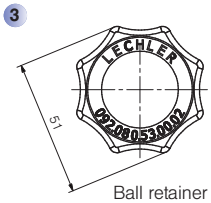


Ball joint

3 Ball retainer cap

Ordering no.
092. 080. 53. 00. 02

3



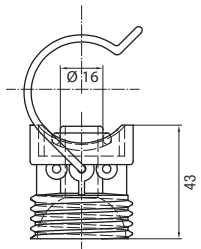
Ball retainer cap

4a Single clamp

Ordering no.	Bore-Ø	For pipe-Ø
092. 080. 53. 00	16 mm	1" (32.0-34.5 mm)
092. 081. 53. 00	16 mm	1 1/4" (40.0-43.0 mm)
092. 082. 53. 00	16 mm	1 1/2" (46.0-49.0 mm)
092. 083. 53. 00	16 mm	2" (58.0-62.0 mm)

Other bore-Ø (13.8 / 20.0 mm) on request.

4a



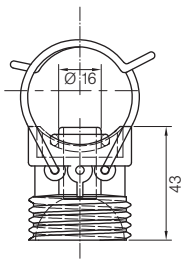
Single clamp

4b Double clamp

Ordering no.	Bore-Ø	For Pipe-Ø
092. 090. 53. 00	16 mm	1" (32.0-34.5 mm)
092. 091. 53. 00	16 mm	1 1/4" (40.0-43.0 mm)
092. 092. 53. 00	16 mm	1 1/2" (46.0-49.0 mm)
092. 093. 53. 00	16 mm	2" (58.0-62.0 mm)

Other bore-Ø (13.8 / 20.0 mm) on request.

4b



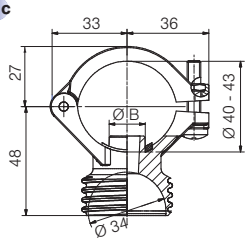
Double clamp

4c Eyelet clamp

Ordering no.	Bore-Ø	For pipe-Ø
090. 023. 53. 43. 10. 0	16 mm	1" (32.0-34.5 mm)
090. 033. 53. 43. 10. 0	16 mm	1 1/4" (40.0-43.0 mm)
090. 043. 53. 43. 10. 0	16 mm	1 1/2" (46.0-49.0 mm)

Other bore-Ø (13.8 / 20.0 mm) on request.

4c

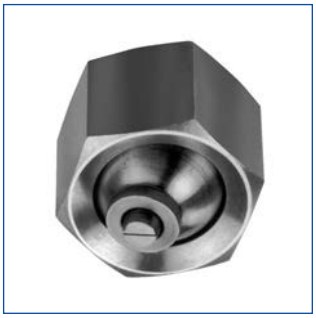


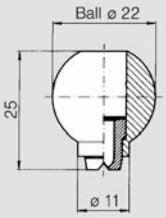
Eyelet clamp 1 1/4"

Flat fan nozzles with ball joint

Series 676

Swivelling nozzle for precise adjusting of jet direction.
No gaskets necessary.
Long, unproblematic service life.
Applications:
Cleaning, cooling, lubricating.





Allround swivelling by 30°
Weight brass: 45 g

Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	Mat.-no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] (pmax = 30 bar) 0.5	1.0	2.0	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
20°	676. 301	○	○	0.70	0.60	0.16*	0.23*	0.32	0.39	0.51	0.72	65	120
	676. 361	○	○	1.00	0.80	0.31*	0.44*	0.63	0.77	1.00	1.40	70	130
	676. 441	○	○	1.35	1.10	0.62*	0.88	1.25	1.53	1.98	2.80	75	145
	676. 481	○	○	1.50	1.20	0.80*	1.13	1.60	1.96	2.53	3.58	75	150
30°	676. 302	○	○	0.70	0.50	0.16*	0.23*	0.32	0.39	0.51	0.72	120	235
	676. 362	○	○	1.00	0.70	0.31*	0.44*	0.63	0.77	1.00	1.40	120	235
	676. 402	○	○	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	2.24	120	235
	676. 482	○	○	1.50	1.10	0.80*	1.13	1.60	1.96	2.53	3.58	120	235
	676. 562	○	○	2.00	1.50	1.25	1.77	2.50	3.06	3.95	5.59	120	235
	676. 642	○	○	2.50	1.80	2.00	2.83	4.00	4.90	6.33	8.94	120	240
	676. 722	○	○	3.00	2.40	3.15	4.46	6.30	7.72	9.96	14.09	125	240
	676. 762	○	○	3.50	2.70	4.00	5.66	8.00	9.80	12.65	17.89	125	245
	676. 802	○	○	4.00	3.10	5.00	7.07	10.00	12.25	15.81	22.36	130	250
45°	676. 303	○	○	0.70	0.50	0.16*	0.23*	0.32	0.39	0.51	0.72	150	270
	676. 363	○	○	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.40	155	280
	676. 403	○	○	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	2.24	175	320
	676. 483	○	○	1.50	1.10	0.80	1.13	1.60	1.96	2.53	3.58	180	340
	676. 563	○	○	2.00	1.40	1.25	1.77	2.50	3.06	3.95	5.59	185	355
	676. 643	○	○	2.50	1.80	2.00	2.83	4.00	4.90	6.33	8.94	195	370
	676. 723	○	○	3.00	2.40	3.15	4.46	6.30	7.72	9.96	14.09	200	375
	676. 763	○	○	3.50	2.60	4.00	5.66	8.00	9.80	12.65	17.89	200	380
	676. 803	○	○	4.00	3.00	5.00	7.07	10.00	12.25	15.81	22.36	205	385
60°	676. 304	○	○	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.72	215	425
	676. 334	○	○	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	1.01	220	440
	676. 364	○	○	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.40	230	460
	676. 404	○	○	1.20	0.80	0.50*	0.71	1.00	1.23	1.58	2.24	245	485
	676. 444	○	○	1.35	0.90	0.62*	0.88	1.25	1.53	1.98	2.80	255	495
	676. 484	○	○	1.50	1.00	0.80*	1.13	1.60	1.96	2.53	3.58	260	510
	676. 514	○	○	1.65	1.10	0.95*	1.34	1.90	2.33	3.00	4.25	270	520
	676. 564	○	○	2.00	1.30	1.25	1.77	2.50	3.06	3.95	5.59	280	535
	676. 604	○	○	2.20	1.50	1.58	2.23	3.15	3.86	4.98	7.04	290	550
	676. 644	○	○	2.50	1.60	2.00	2.83	4.00	4.90	6.33	8.94	295	565
	676. 674	○	○	2.70	1.80	2.38	3.36	4.75	5.82	7.51	10.62	300	575
	676. 724	○	○	3.00	2.10	3.15	4.46	6.30	7.72	9.96	14.09	305	590
	676. 764	○	○	3.50	2.30	4.00	5.66	8.00	9.80	12.65	17.89	310	595

A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles with ball joint

Series 676

Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	Mat.-no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] (pmax = 30 bar) 0.5	1.0	2.0	3.0	5.0	10.0	Spray width B at p = 2 bar H = 250 mm	H = 500 mm
75°	676. 145	○	○	0.20	0.12	-	0.04*	0.05	0.06	0.08	0.11	280	550
	676. 165	○	○	0.20	0.08	-	0.05*	0.07	0.08	0.10	0.15	290	560
	676. 185	○	○	0.20	0.15	-	0.06*	0.08	0.10	0.13	0.18	300	575
	676. 215	○	○	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	300	580
	676. 245	○	○	0.50	0.30	-	0.12*	0.16	0.20	0.26	0.30	310	585
	676. 275	○	○	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.49	310	590
90°	676. 216	○	○	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	370	700
	676. 276	○	○	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.49	375	720
	676. 306	○	○	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.72	380	740
	676. 336	○	○	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	1.01	415	800
	676. 366	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.40	420	810
	676. 406	○	○	1.20	0.70	0.50*	0.71	1.00	1.23	1.58	2.24	430	820
	676. 446	○	○	1.35	0.80	0.62*	0.88	1.25	1.53	1.98	2.80	435	830
	676. 486	○	○	1.50	0.80	0.80*	1.13	1.60	1.96	2.53	3.58	440	835
	676. 516	○	○	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	4.25	440	840
	676. 566	○	○	2.00	1.10	1.25	1.77	2.50	3.06	3.95	5.59	445	850
	676. 606	○	○	2.20	1.20	1.58	2.23	3.15	3.86	4.98	7.04	450	860
	676. 646	○	○	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	455	865
	676. 676	○	○	2.70	1.40	2.38	3.36	4.75	5.82	7.51	10.62	465	875
	676. 726	○	○	3.00	1.70	3.15	4.46	6.30	7.72	9.96	14.09	470	885
120°	676. 187	○	○	0.35	0.20	-	0.06*	0.08	0.10	0.13	0.18	630	1200
	676. 217	○	○	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	640	1210
	676. 247	○	○	0.50	0.20	-	0.12*	0.16	0.20	0.26	0.36	650	1230
	676. 277	○	○	0.60	0.30	-	0.16*	0.22	0.27	0.35	0.49	660	1250
	676. 307	○	○	0.70	0.30	0.16*	0.23*	0.32	0.39	0.51	0.72	660	1250
	676. 337	○	○	0.90	0.40	0.22*	0.32*	0.45	0.55	0.71	1.01	670	1270
	676. 367	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.40	670	1270
	676. 407	○	○	1.20	0.60	0.50*	0.71	1.00	1.23	1.58	2.24	670	1270
	676. 447	○	○	1.35	0.60	0.62*	0.88	1.25	1.53	1.98	2.80	675	1270
	676. 487	○	○	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	3.58	680	1275
	676. 517	○	○	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	4.25	685	1280
	676. 567	○	○	2.00	0.90	1.25	1.77	2.50	3.06	3.95	5.59	690	1285
	676. 607	○	○	2.20	1.10	1.58	2.23	3.15	3.86	4.98	7.04	700	1300
	676. 647	○	○	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	700	1300
	676. 677	○	○	2.70	1.40	2.38	3.36	4.75	5.82	7.51	10.62	720	1330
	676. 727	○	○	3.00	1.60	3.15	4.46	6.30	7.72	9.96	14.09	740	1360
	676. 767	○	○	3.50	1.70	4.00	5.66	8.00	9.80	12.65	17.89	760	1400

A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern

Accessories see next page.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	676. 145	+	16	=	676. 145. 16

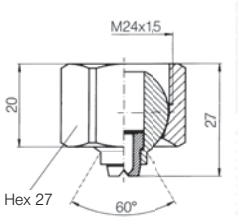
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles with ball joint

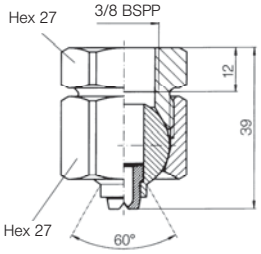
Series 676

Accessories

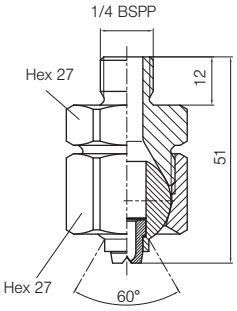
Retaining nut
092. 020. 16. 00. 02
Material: AISI 303
092. 020. 30. 00. 02
Material: Brass



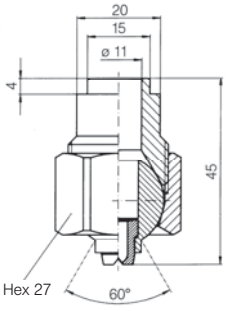
Socket
092. 020. 16. AF. 03
Material: AISI 303
092. 020. 30. AF. 03
Material: Brass

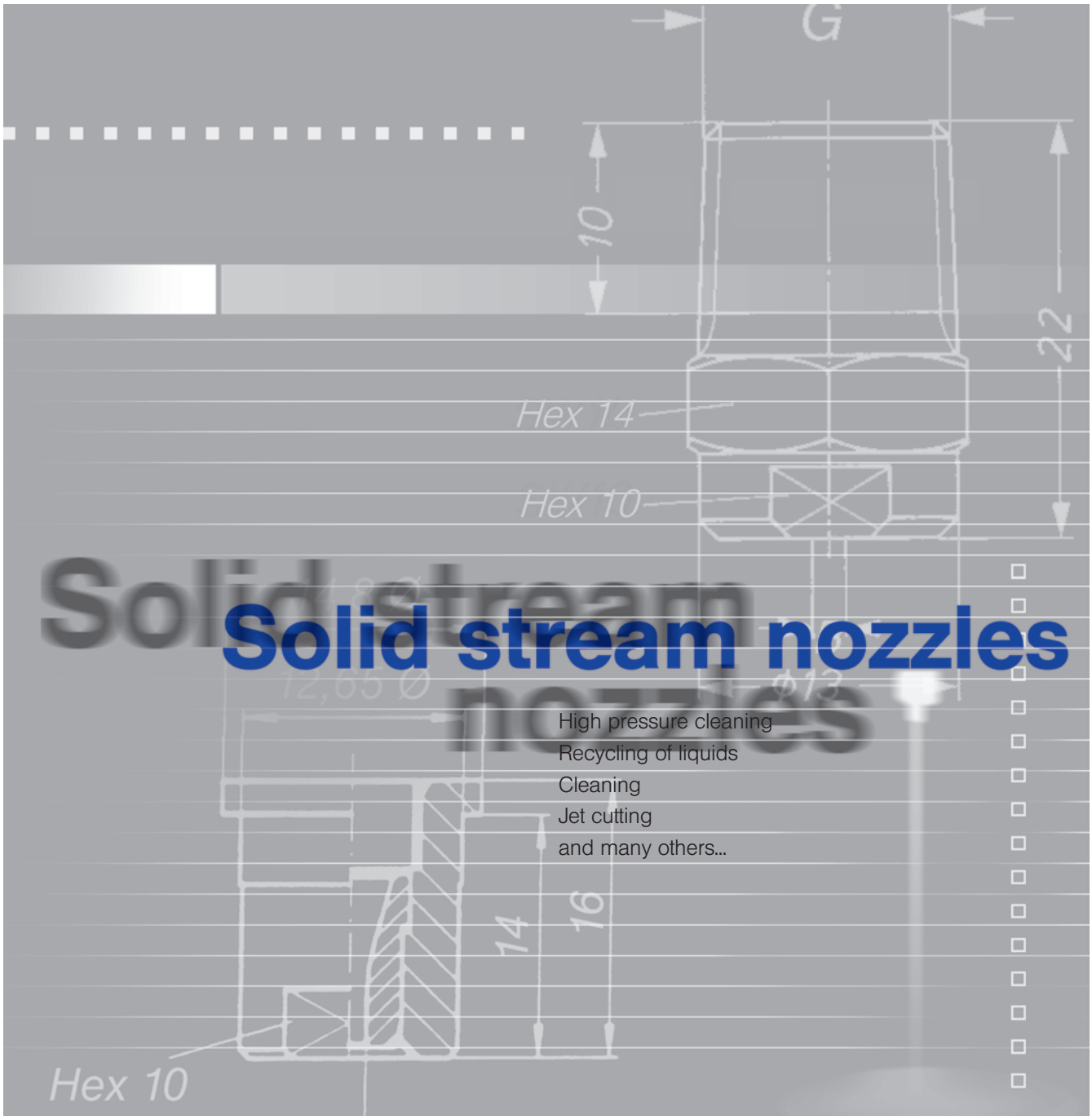


Retaining nipple
092. 024. 16. AC. 03
Material: AISI 303
092. 024. 30. AC. 03
Material: Brass



Welding nipple
092. 020. 17. 00. 04
Material: AISI 316Ti





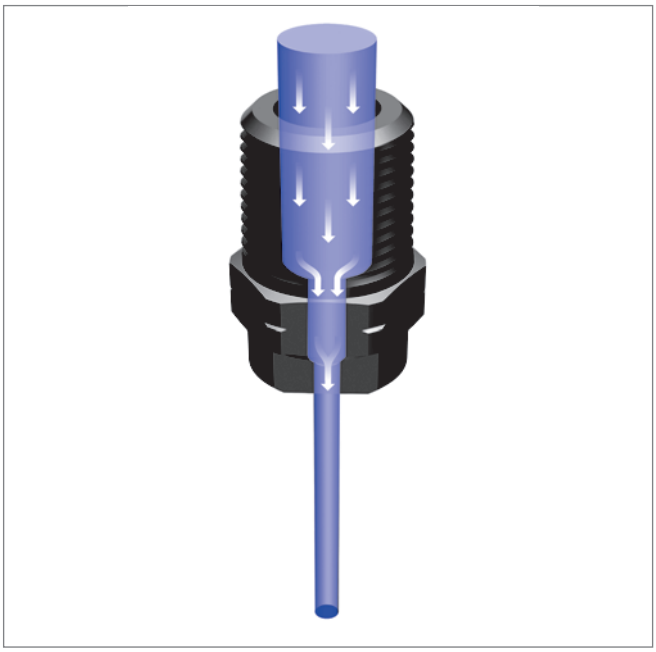
Solid stream nozzles

High pressure cleaning
Recycling of liquids
Cleaning
Jet cutting
and many others...

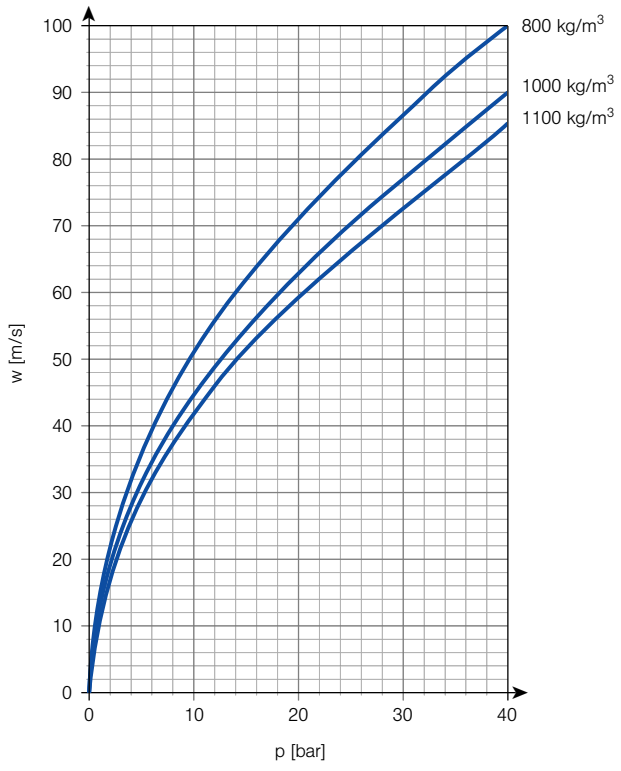
Solid stream nozzles

Thanks to optimum flow geometries, **Lechler solid stream nozzles** produce compact, transparent solid stream jets of defined lengths. The almost turbulence-free liquid inflow achieves excellent efficiency, even without jet stabilizer inserts.
For all cleaning processes, cutting operations and applications requiring perfect, punctiform jet impacts, i.e. whenever the point is to generate concentrated jet power, the precision of Lechler solid stream nozzles enhances productivity and performance of your plant.

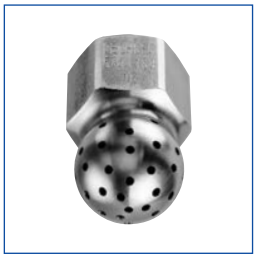
There is a comprehensive range of solid stream nozzles in stainless steel with special hardening or with TC inserts for high-pressure use.
Lechler high-pressure solid stream nozzles excel in closed, stable and powerful solid jets, not even breaking at very high pressures.



Typical exit speed of solid stream nozzles



Solid stream nozzles

Low-pressure nozzles	Series	$\dot{V}$ [l/min] at p = 2 bar	Connection	Application/ Design	Page
	**544**	0.04 – 10.00	1/8 BSPT 1/4 BSPT	Cleaning installations. **Optimized flow technology. Extreme jet power. Concentrated solid stream jet.**	**5.4**
	**540** **541**	18.00 – 118.00	1/2 BSPP	Storage tank cleaning, aerating of bulk goods, recycling of liquids, as well as for accelerating chemical process reactions. **Cluster solid stream nozzle.**	**5.6**

High-pressure nozzles	Series	$\dot{V}$ [l/min] at p = 2 bar	Connection	Application/ Design	Page
	**546** **548** **550**	4.04 – 40.80 (at 80 bar)	1/8 BSPT 1/4 BSPT NPT 1/8 NPT 1/4 Assembly with lock nut	High-pressure cleaning	**5.5**

Solid stream nozzles

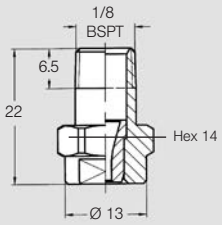
Series 544

Long, closed jet with punctiform impact pattern. Optimized flow conditions. Highest jet power. Concentrated solid stream jet.
Applications:
Cleaning installations.

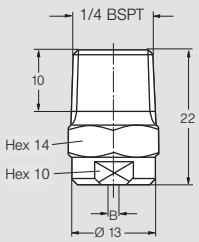
Series 544.110 – 544.400
(Material 16 and 30)

Series 544.480 – 544.800
(Material 16)

Series 544.480 – 544.800
(Material 30)



Weight brass: 14 g



Weight brass: 16 g

Ordering no.					B Ø [mm]	V̇ [l/min]									
Type	Mat. no.		Code			p [bar]									
	16 AISI 303	30 Brass	1/8 BSPT	1/4 BSPT		0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	15.0	20.0	30.0
544. 110	○	○	**CA**	**CC**	0.23	0.02	0.03	0.04	0.01	0.05	0.06	0.09	0.11	0.13	0.15
544. 160	○	-	**CA**	**CC**	0.33	0.03	0.04	0.06	0.02	0.07	0.09	0.13	0.16	0.19	0.23
544. 200	○	○	**CA**	**CC**	0.39	0.05	0.07	0.10	0.03	0.12	0.16	0.22	0.27	0.32	0.39
544. 240	○	-	**CA**	**CC**	0.50	0.08	0.11	0.16	0.05	0.20	0.25	0.36	0.44	0.51	0.62
544. 280	○	-	**CA**	**CC**	0.63	0.13	0.18	0.25	0.08	0.31	0.40	0.56	0.68	0.79	0.97
544. 320	○	○	**CA**	**CC**	0.80	0.20	0.28	0.40	0.12	0.49	0.63	0.89	1.10	1.26	1.55
544. 360	○	○	**CA**	**CC**	1.05	0.32	0.45	0.63	0.20	0.77	1.00	1.41	1.73	1.99	2.44
544. 400	○	○	**CA**	**CC**	1.30	0.50	0.71	1.00	0.31	1.22	1.58	2.24	2.74	3.16	3.87
544. 480	○	○	**CA**	**CC**	1.33	0.80	1.13	1.60	0.50	1.96	2.53	3.58	4.38	5.06	6.20
544. 560	○	○	**CA**	**CC**	1.69	1.25	1.77	2.50	0.78	3.06	3.95	5.59	6.85	7.91	9.68
544. 640	○	○	**CA**	**CC**	1.69	2.00	2.83	4.00	1.24	4.90	6.32	8.94	10.95	12.65	15.49
544. 720	○	○	**CA**	**CC**	2.66	3.15	4.45	6.30	1.95	7.72	9.96	14.09	17.25	19.92	24.40
544. 800	○	○	**CA**	**CC**	2.66	5.00	7.07	10.00	3.10	12.25	15.81	22.36	27.39	31.62	38.73

B = bore diameter
Can also be used for air or steam (see page 6.9).

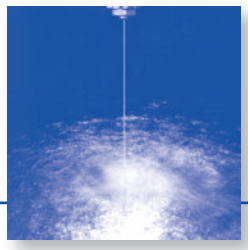
Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	544. 360	+	**16**	+	**CC**	=	**544. 360. 16. CC**

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

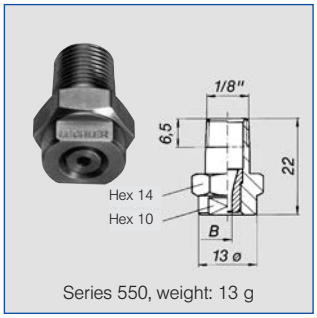
High-pressure solid stream nozzles

Series 546 / 548 / 550

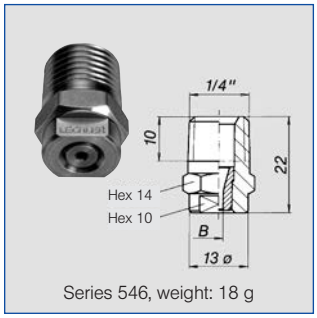


Punctiform, extremely tight, non-dispersing solid stream. Highest impact.
Applications:
High-pressure cleaning, cutting and separating.

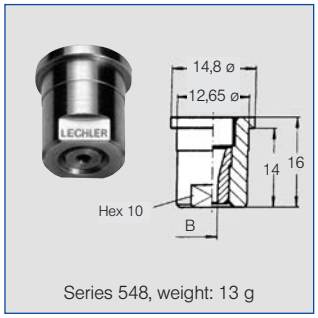
Materials:
Nozzle body: Stainless steel AISI 303
Insert: Hardened steel 1.4034S



Series 550, weight: 13 g



Series 546, weight: 18 g



Series 548, weight: 13 g

US gal/min. at 40 psi	Nozzle Code: Connection 1/8"	Nozzle Code: Connection 1/4"	Nozzle Code: Retaining nut	Flow rate code	B Ø [mm]	V̇ [l/min] (Tolerance ± 2%) p [bar] 40	60	80	100	150	200	300
02	**550**	**546**	**548**	**360**	0.84	2.86	3.50	4.04	4.52	5.54	6.39	7.83
03	**550**	**546**	**548**	**400**	1.03	4.31	5.28	6.10	6.82	8.35	9.64	11.81
034	**550**	**546**	**548**	**410**	1.07	4.70	5.80	6.70	7.49	9.17	10.59	12.97
035	**550**	**546**	**548**	**420**	1.11	5.06	6.20	7.16	8.00	9.80	11.32	13.86
04	**550**	**546**	**548**	**450**	1.19	5.80	7.10	8.20	9.17	11.23	12.97	15.88
045	**550**	**546**	**548**	**470**	1.26	6.54	8.00	9.25	10.34	12.66	14.62	17.91
05	**550**	**546**	**548**	**480**	1.33	7.29	8.92	10.30	11.52	14.11	16.29	19.95
055	**550**	**546**	**548**	**500**	1.39	7.96	9.75	11.26	12.59	15.42	17.80	21.81
06	**550**	**546**	**548**	**520**	1.46	8.70	10.66	12.31	13.76	16.85	19.46	23.83
08	**550**	**546**	**548**	**570**	1.69	11.48	14.06	16.23	18.15	22.23	25.67	31.44
10	**550**	**546**	**548**	**600**	1.88	14.32	17.54	20.25	22.64	27.73	32.02	39.21
15	**550**	**546**	**548**	**670**	2.30	21.60	26.46	30.55	34.16	41.84	48.31	59.17
20	**550**	**546**	**548**	**720**	2.66	28.85	35.34	40.80	45.62	55.87	64.52	79.02

B = bore diameter

Connection code	Connection	p_{max} [bar]
A3. 00	BSPT	approx. 350
A3. 07	NPT	approx. 350
A3. 29	Lock nut	approx. 200

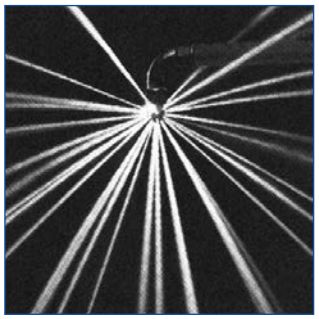
Example for ordering:	Nozzle Code	+	Flow rate code	+	Connection code	=	Ordering no.
	550	+	**360**	+	**A3. 07**	=	**550. 360. A3. 07 (Solid stream; 4.52 l/min. at 100 bar; 1/8" NPT)**

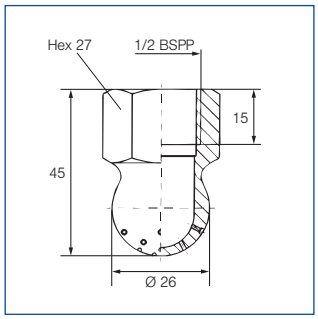
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Cluster solid stream nozzle

Series 540/541

Several sharp solid jets. Also to use with air or saturated steam (see chapter „Air nozzles“).
Application
Storage tank cleaning, aerating of bulk goods, recycling of liquids, as well as for accelerating chemical process reactions.





Spray angle ∢	Ordering no. Type	E Ø [mm]	V̇ [l/min] p [bar] 0,5	2	5	40 psi [US gal./min]
approx. 240°	**540.909.16**	0.8	9.0	18.0	28.5	5.6
	540.989.16	1.0	14.0	28.0	44.3	8.7
	541.109.16	1.5	28.5	57.0	90.1	17.7
	541.189.16	2.0	45.0	90.0	142.3	27.9
	541.239.16	2.3	59.0	118.0	186.6	36.6

E = narrowest free cross section

Air nozzles

Air curtains
Blowing off and out
Cleaning
Cooling
Drying
Reheating
Transporting
and many others...

Air nozzles

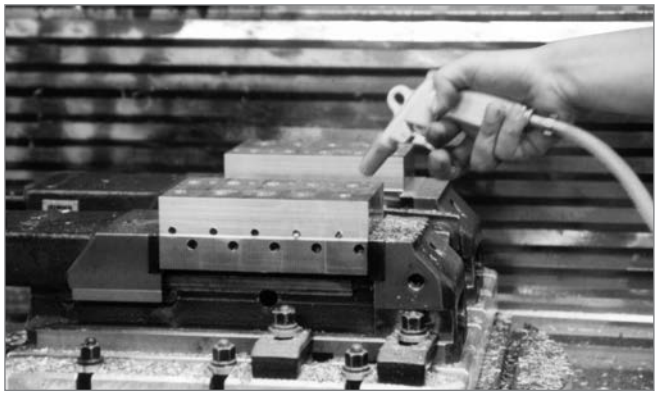
As a rule, any flat fan or solid stream nozzle can be operated with air instead of liquid. However, you'll obtain the best results using the nozzle designs we specially engineered for applications of compressed air or saturated steam. For further details, please refer to the next pages.
In addition to air, various nozzle types are also suited for injecting saturated steam. Typical applications of Lechler air nozzles are, for instance, efficient blowing off and blowing out, cooling, drying or cleaning.

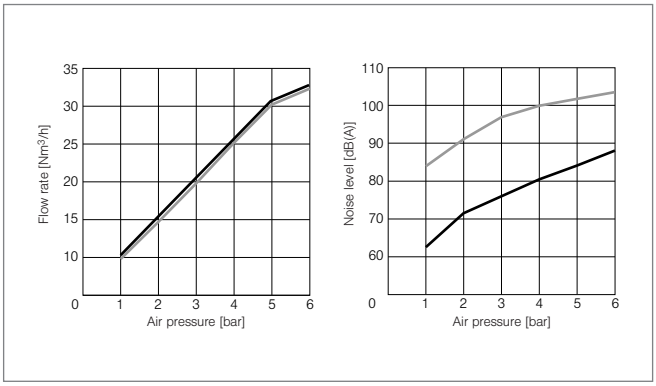
Multi-channel air nozzles

In many industries and workshops compressed air has become an indispensable tool.
Compressed air is needed for cleaning, blowing off, drying, conveying and for numerous other applications.
Where uncontrolled compressed air is applied, very often annoying, high-frequency hiss noises arise, which may cause serious harm to hearing. These »noises« are produced by turbulences generated at the air outlet. Their intensity depends on the shape of the nozzle orifice and on the air pressure.
This means: the better and stronger the air jet is supposed to be, the higher the health-injuring noise level and the higher the air consumption and its cost.
The solution: Lechler multi-channel air nozzles, featuring a significantly reduced sound level, high blowing power and low air consumption.
The performance of multi-channel air nozzles is based on partitioning the air inflow into single air jets. 16 air channels, arranged to ensure optimum flow conditions, provide for a particularly uniform, straight and powerful overall air jet.

In comparison to single-hole air nozzles the advantages are as follows:

- Reduction of the noise level of up to 12 dB
- Low service air pressure with the same blowing power
- Lower air consumption
- Better blowing effect over a longer reach
- Lower operating costs





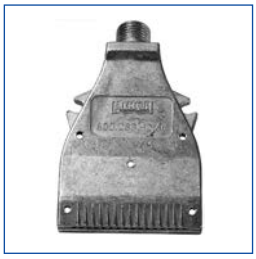
Comparison of a conventional, single-hole nozzle with the Lechler multi-channel round jet nozzle type 600.326

Lechler multi-channel round jet nozzle

Conventional single-hole nozzle

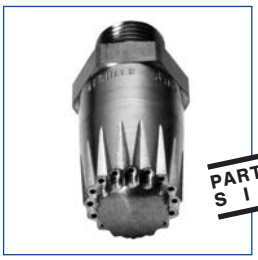
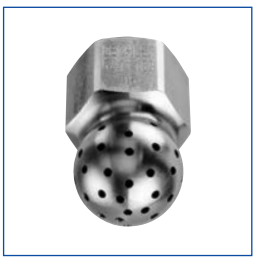
Note for calculation of measuring values:
Blowing power: Blowing distance vertical 50 mm on a scale, area 400 x 500 mm.

Air nozzles

Flat fan nozzles for Air	Series	Air consumption [m³/h] at **p** = 2 bar	Connection	Application/ Design	Page
 PARTICULARLY S I L E N T	**600. 130** **600. 484**	8.00 - 18.00	1/4 BSPP 1/4 BSPP NPT 1/4 M 12 x 1.25 Quick release cuppling NW5	Blowing off and blowing out, cleaning, drying, cooling, conveying with air. **Multi-channel flat fan nozzle.** **Plastic versions.**	**6.5**
	**600.283** **600.493** **600.562**	7.50 – 30.00	1/8 BSPP 1/4 BSPP 1/4 NPT	Blowing off and blowing out, cleaning, drying, cooling, conveying with air. **Multi-channel flat fan nozzle.** **Metallic versions.**	**6.6**
 	**679**	2.60 – 32.80	Assembly with 3/8" lock nut	Blowing off liquids, cooling, reheating, drying. **Easy nozzle changing.** **Simple jet alignment.**	**6.7**
	**686**	1.00 – 16.00	1/8 BSPT	Blowing off liquids, cooling, reheating, drying. **Tongue-type nozzle.**	**6.8**

For more information please ask for our special brochure »Nozzles and Accessories for Compressed Air«.

Air nozzles

Solid stream nozzles for air	Series	∢	Air consumption [m³/h] ati **p** = 2 bar	Connection	Application/ Design	Page
	**600.326**		15.00	1/4 BSPP M 12 x 1.25	Targeted blowing out and blowing off with the aid of air guns. **Multi-channel round jet nozzle, producing a powerful air jet with punctiform impact pattern.**	**6.9**
	**600.388**		8.60	1/8 BSPP M 12 x 1.25	Targeted blowing out and blowing off with the aid of air guns. **Multi-channel round jet nozzle. Compact design. Especially for blowing out of pocket holes.**	**6.9**
	**544**		1.00 – 16.00	1/8 BSPT 1/4 BSPT	Targeted blowing out and blowing off. **Powerful air jet with punctiform impact pattern.**	**6.10**
	**540** **541**	240°	39.30 – 325.00	1/2 BSPP	Injection of steam into liquids, injection of compressed air into bulk goods, gas injection. **Multi-channel solid stream nozzle.**	**6.11**

For more information please ask for our special brochure »Nozzles and Accessories for Compressed Air«.

Multi-channel flat fan nozzles for air
Whisperblast®, Plastic versions
Series 600. 130 / 600. 484

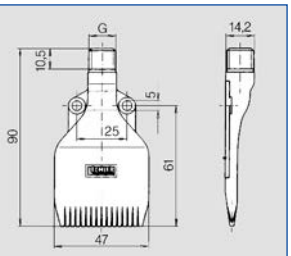
Particularly silent !

NEW: Also available in PP for galvanic and food industry (FDA-conform material)

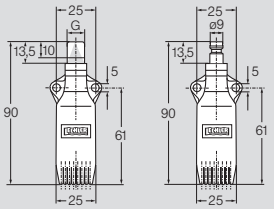
Highly efficient air stream, acting upon areas. Reduced noise levels. Low air consumption.
Applications:
Blowing off and blowing out, cleaning, drying, cooling, conveying with air.

600. 130 (POM or PP)

600. 484. 56 (POM)

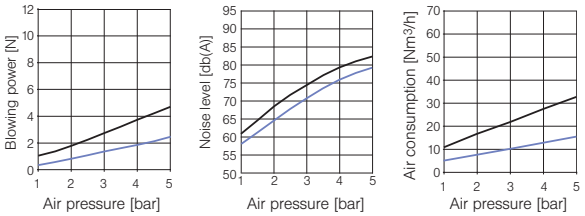


Weight: 23 g · T_{max} POM: 50 °C
Weight: 15 g · T_{max} PP: 60 °C

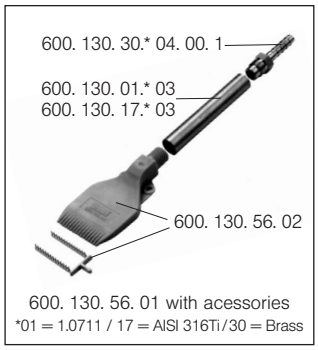


Weight: 16 g · T_{max}: 50 °C

Technical Data



Type 600. 130 Type 600. 484



600. 130. 56. 01 with acessories
*01 = 1.0711 / 17 = AISI 316Ti / 30 = Brass

Ordering no.						
Type	Material no.		Code			
	S2 PP	56 POM	1/4 BSPP	1/4 NPT	M12 x 1.25	Quick connection NW 5
600. 130	○	○	AC	BC	-	-
600. 130 with plug	-	○	02	-	-	-
600. 130 with plug, hose barb (D = 8 mm) and extension tube, steel (L = 85 mm)	-	○	01	-	-	-
600. 484	-	○	AC	BC	HG	00

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	600. 130.	+	56.	+	AC	=	600. 130. 56. AC

1/4 BSPP

M 12 x 1,25

Socket
Ordering no.
095.016.30.14.23.0

Material: Brass

For connection of series 600.130 with compressed air guns.

Ball joints see page 9.7

For more information please ask for our special brochure »Nozzles and Accessories for Compressed Air«.

Multi-channel flat fan nozzles for air
Whisperblast®, metalic versions
Series 600. 283 / 600. 493 / 600. 562

Particularly silent !

Metalic versions for higher temperatures.
Highly efficient air stream, acting upon areas. Reduced noise levels. Low air consumption.
Applications:
Blowing off and blowing out, cleaning, drying, cooling, conveying with air.

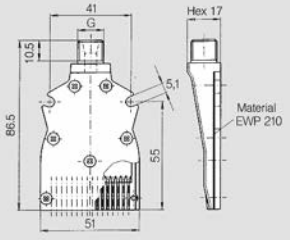
600. 283. 42 (Aluminium)

600. 493. 1Y (Stainless steel 316L)

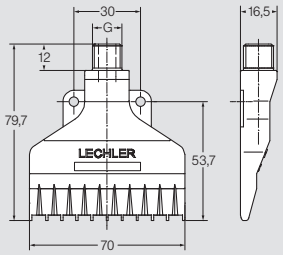
600. 562. 1Y. 10 (Stainless steel 316L)

1/4 BSPP

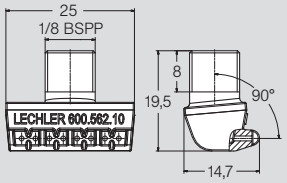
M 12 x 1,25



Weight: 60 g · T_{max}: 200 °C



Weight: 126 g · T_{max}: 550 °C



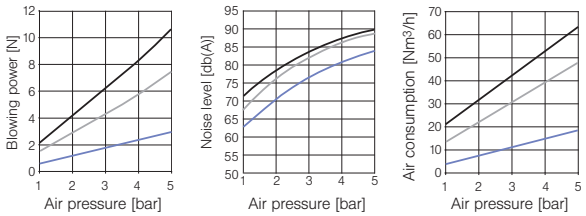
Weight: 17 g · T_{max}: 180 °C

Socket
Ordering no.
095.016.30.14.23.0

Material: Brass

For connection with compressed air guns for the following series:
- 600. 283
- 600. 493

Technical data



Ordering no.					
Type	Material-no.		Code		
	42 Aluminium	**1Y** Stainless steel	**1/8 BSPP**	**1/4 BSPP**	**1/4 NPT**
600. 283	○	-	-	AC	BC
600. 493	-	○	-	AC	BC
600. 562. 1Y. 10	-	○	○	-	-

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	600. 283.	+	42.	+	AC	=	600. 283. 42. AC

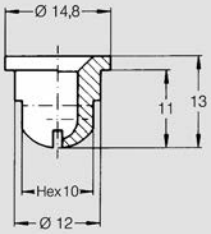
Ball joints see page 9.7

For more information please ask for our special brochure »Nozzles and Accessories for Compressed Air«.

Flat fan nozzles for air or saturated steam

Series 679

Particularly wide-angle, powerful air jet. Assembling with retaining nut. Easy nozzle changing. Simple jet alignment.
Applications:
Blowing off liquids, cooling, reheating, drying.



Weight brass: 8 g

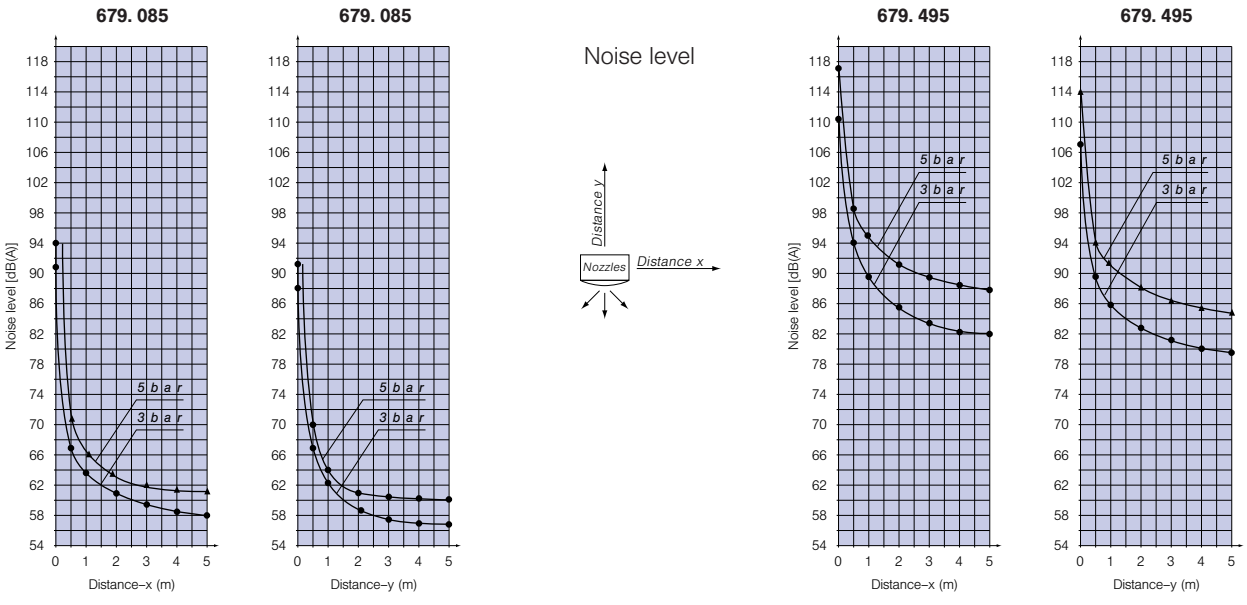
For assembling possibilities please refer to folded page.

Spray angle	Ordering no. Type	Mat.-no. 17 AISI 316Ti	Mat.-no. 30 Brass	A Ø [mm]	$\dot{V}_n$ L = Air [m³/h] / $\dot{M}$ S = Saturated Steam [kg/h] p [bar] 0.5 L	0.5 S	2.0 L	2.0 S	5.0 L	5.0 S	10.0 L	10.0 S
ca. 70°	679. 037	–	○	1.2	1.50	1.20	3.00	2.30	6.00	4,60	11.00	8.30
	679. 085	○	○	1.3	2.00	1.60	4.00	3.10	8.00	6.10	14.70	11.10
	679. 117	○	○	1.5	2.10	1.70	4.20	3.30	8.40	6.50	15.40	11.70
	679. 165	○	○	1.8	2.60	2.00	5.10	4.10	10.30	8.00	18.80	14.30
	679. 255	○	○	2.1	3.60	2.80	7.30	5.70	14.50	11.20	26.60	20.20
	679. 365	○	○	2.8	6.30	5.00	12.70	10.00	25.40	19.60	46.50	35.30
	679. 415	○	○	3.6	10.20	8.00	20.30	16.00	40.70	31.40	74.60	56.70
	679. 495	○	○	4.3	15.60	12.40	31.10	24.80	62.20	48.50	114.00	87.60

A = Equivalent bore diameter

Example for ordering:	Type	+	Material no.	=	Ordering no.
	679. 037	+	30	=	679. 037. 30

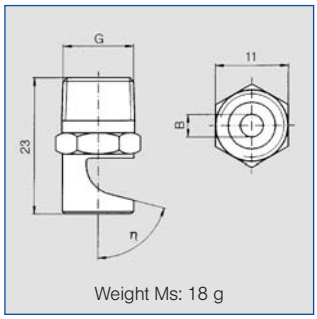
The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.



Tongue-type nozzles for air or saturated steam

Series 686

Wide-angle, powerful air jet.
Applications:
Blowing off liquids, cooling, reheating, drying.



Weight Ms: 18 g

Ball joints see page 9.7

Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	Mat.-no. 30 Brass	Code 1/8 BSPT	B [mm]	η	$\dot{V}_n$ Air [m³/h] p [bar] 1.0	2.0	5.0	10.0	$\dot{M}$ Saturated steam [kg/h] p [bar] 1.0	2.0	5.0	10.0
ca. 70°	**686. 408**	○	○	**CA**	1.0	75°	1.07	1.60	3.20	5.86	0.88	1.31	2.57	4.64
	686. 488	○	○	**CA**	1.3	75°	1.76	2.64	5.29	9.69	1.46	2.17	4.25	7.67
	686. 528	○	○	**CA**	1.5	75°	2.20	3.31	6.61	12.13	1.83	2.71	5.31	9.59
	686. 568	○	○	**CA**	1.7	75°	2.73	4.09	8.19	15.01	2.27	3.36	6.57	11.87
	686. 608	○	○	**CA**	1.9	75°	3.35	5.02	10.04	18.40	2.78	4.11	8.06	14.55
	686. 688	○	○	**CA**	2.4	75°	5.45	8.18	16.36	30.00	4.53	6.71	13.14	23.72
	686. 728	○	○	**CA**	2.7	75°	6.88	10.33	20.65	37.86	5.71	8.46	16.58	29.94
	686. 808	○	○	**CA**	3.4	75°	10.89	16.33	32.66	59.87	9.04	13.28	26.22	47.35

B = bore diameter

Example for Ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	684. 408	+	**16**	+	**CA**	=	**684. 408. 16. CA**

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Multi-channel round jet nozzles for air

Series 600. 326 / 600.388

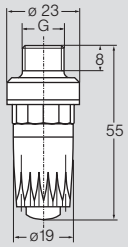
Particularly silent !

Powerful air jet, producing punctiform impact patterns. Low noise level. Low air consumption.
Applications:
Targeted blowing out and blowing off with compressed air guns.

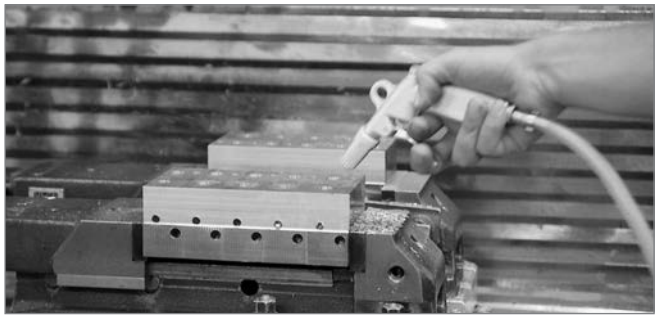
Reduction of noise level of up to 12 dB (A).

600. 326. 5K/3W mounted on a compressed air gun.

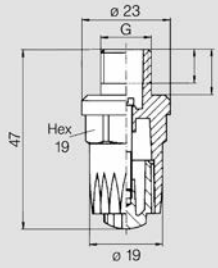
600. 326. 5K (ABS)



T_{max}: 50 °C



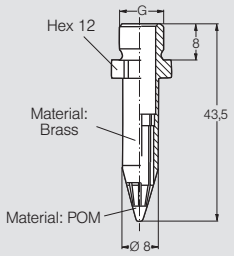
600. 326. 3W (Zinc)



T_{max}: 90 °C

Mini-round jet nozzle. Compact design
Applications:
Especially for blowing out pocket holes.

600. 388. 30 (Brass, POM)



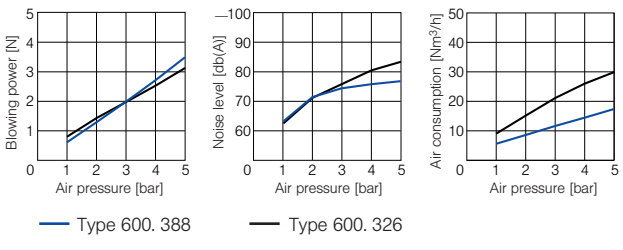
T_{max}: 50 °C

Ball joints see page 9.7

Ordering no.		Connection thread G	Weight
Type	Code		
600. 326. 5K (Material: ABS)	**AC**	1/4 BSPP	9 g
	HG	M 12 x 1.25	
600. 326. 3W (Material: Zinc)	**AC**	1/4 BSPP	47 g
	HG	M 12 x 1.25	
600. 388. 30 (Material: Brass/POM)	**AA**	1/8 BSPP	12 g
	HG	M 12 x 1.25	

Example:	**Type**	**+**	**Code**	**=**	**Ordering no.**
for ordering	**600. 326. 5K**	**+**	**AC**	**=**	**600. 326. 5K. AC**

Technical data



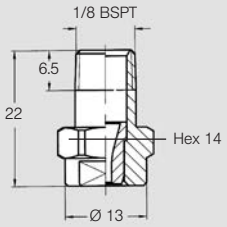
Solid stream nozzles for air or saturated steam

Series 544

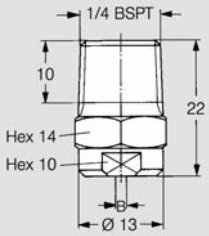
Powerful air jet. producing punctiform impact patterns.
Applications:
Targeted blowing out and blowing off.

Series 544.360 to 544.400

Series 544.480 to 544.800



Weight: 14 g



Weight: 16 g

Ordering no.				B Ø [mm]	$\dot{V}_n$ Air [m³/h]				$\dot{M}$ Saturated steam [kg/h]			
Type	Mat.-no.	Code			p [bar]				p [bar]			
	16 303 SS	1/8 BSPT	1/4 BSPT		1	2	3	5	1	2	3	5
544. 360	○	**CA**	**CC**	0.84	0.80	1.00	1.30	2.00	0.80	1.20	1.50	2.20
544. 400	○	**CA**	**CC**	1.03	1.00	2.00	2.40	3.00	1.30	1.90	2.50	3.70
544. 480	○	**CA**	**CC**	1.33	1.50	2.50	3.00	4.60	1.90	2.80	3.70	5.50
544. 560	○	**CA**	**CC**	1.69	2.50	4.00	5.00	7.50	2.80	4.10	5.40	8.20
544. 640	○	**CA**	**CC**	2.09	4.00	6.00	8.00	12.00	5.00	7.20	9.50	14.00
544. 720	○	**CA**	**CC**	2.66	7.00	10.00	14.00	21.00	7.40	10.00	13.00	20.00
544. 800	○	**CA**	**CC**	3.30	11.00	16.00	21.00	32.00	11.00	16.50	22.00	33.00

B = bore diameter

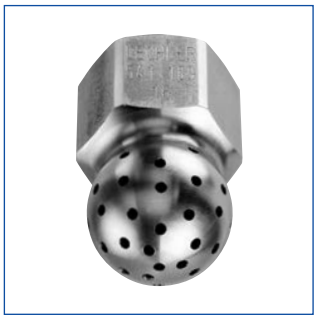
Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	544. 360	+	**16**	+	**CC**	=	**544. 360. 16. CC**

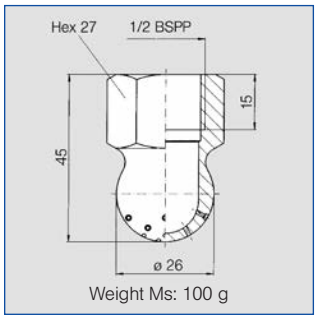
Ball joints see page 9.7

Cluster solid stream nozzles for air or saturated steam

Series 540 / 541

Powerful air jet with 40 individual bore holes.
Applications:
Injection of steam into liquids, injection of compressed air into bulk goods, gas injection (acid and neutralization baths).



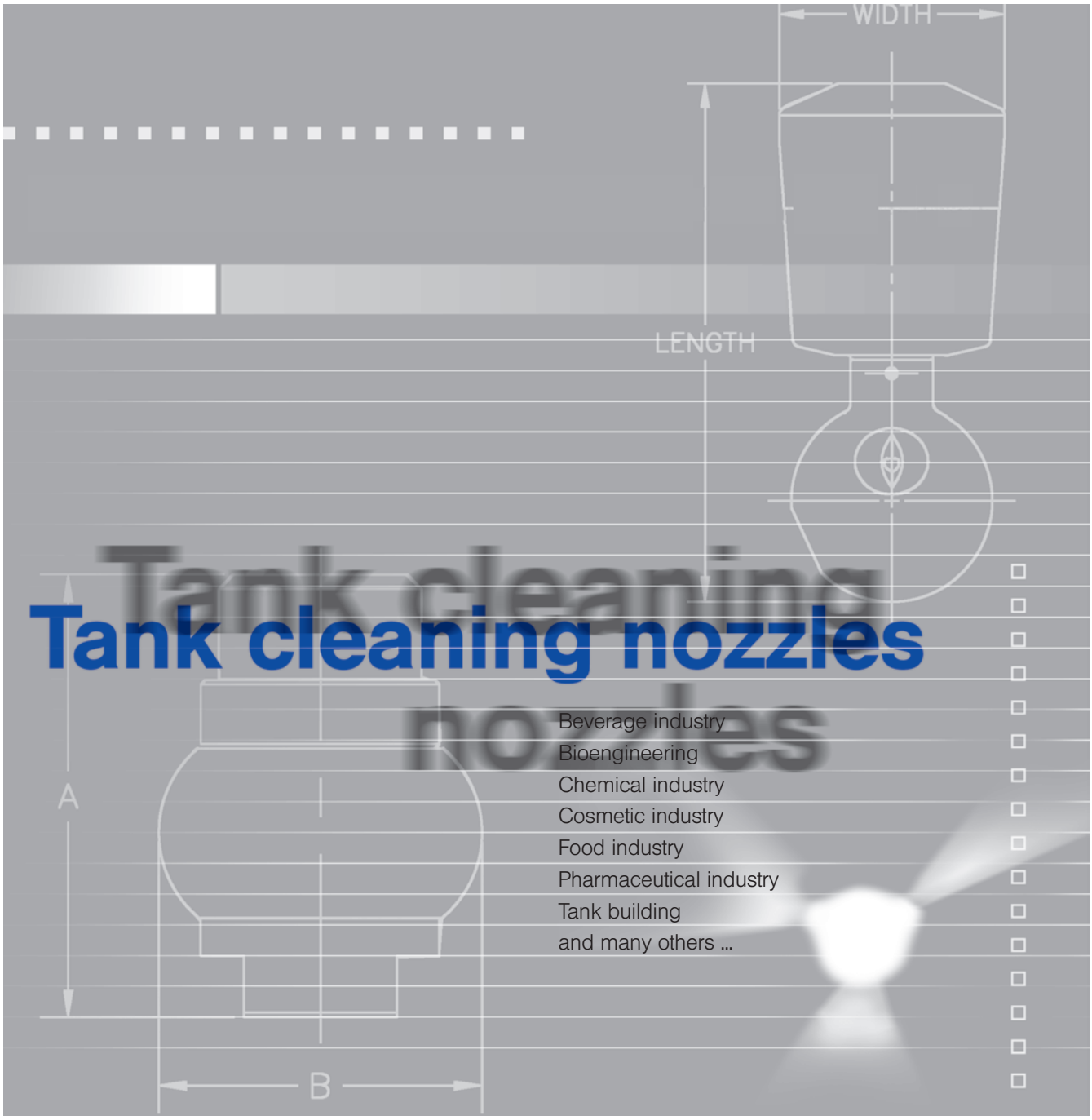


Weight Ms: 100 g

Spray angle	Ordering no. Type	Mat.-no. 16 AISI 303	B Ø [mm]	$\dot{V}_n$ Air [m³/h] p [bar] 1.0	2.0	3.0	5.0	$\dot{M}$ Saturated steam [kg/h] p [bar] 1.0	2.0	3.0	5.0
ca. 240°	**540. 909**	○	0.8	22.80	34.20	45.50	68.30	18.10	26.90	35.50	52.70
	540. 989	○	1.0	35.50	53.30	71.00	106.50	28.20	41.70	55.10	81.70
	541. 109	○	1.5	83.30	124.90	166.50	249.80	66.00	97.70	129.20	191.60
	541. 189	○	2.0	129.70	194.50	259.30	389.00	103.00	152.60	201.70	299.10
	541. 239	○	2.3	167.20	250.80	334.30	501.50	133.20	197.30	260.80	386.60

B = bore diameter

Example for ordering:	Type	+	Material no.	=	Ordering no.
	540. 909	+	**16**	=	**540. 909. 16**



Tank cleaning nozzles

Beverage industry
Bioengineering
Chemical industry
Cosmetic industry
Food industry
Pharmaceutical industry
Tank building
and many others ...

Tank cleaning nozzles

General design families

Shared characteristics:

- **Low-pressure application.** Your benefit: lower energy consumption coupled with less wear and tear.
- **Rotational cleaners:** driven and lubricated by the cleaning liquid. Your benefit: no need for elaborate drive mechanisms.

Free-spinning heads

The cleaning liquid turns the spray head by means of specially positioned nozzles. Rapid-repetition impact loosens the dirt and washes it off of the tank surfaces. The effect is best at low pressures in small to medium-size tanks.

➔ Series
500. 186, 500. 191,
500. 234,
5MC/5MI
566/569/573/583/594

Internal regulated drive

The liquid flow powers the head by way of an internal turbine. This keeps the speed of the head within its optimal range across a wider span of pressures, and the nozzle develops more powerful spray propagation and a wider range.

➔ Series 515/5TM

Static spray balls

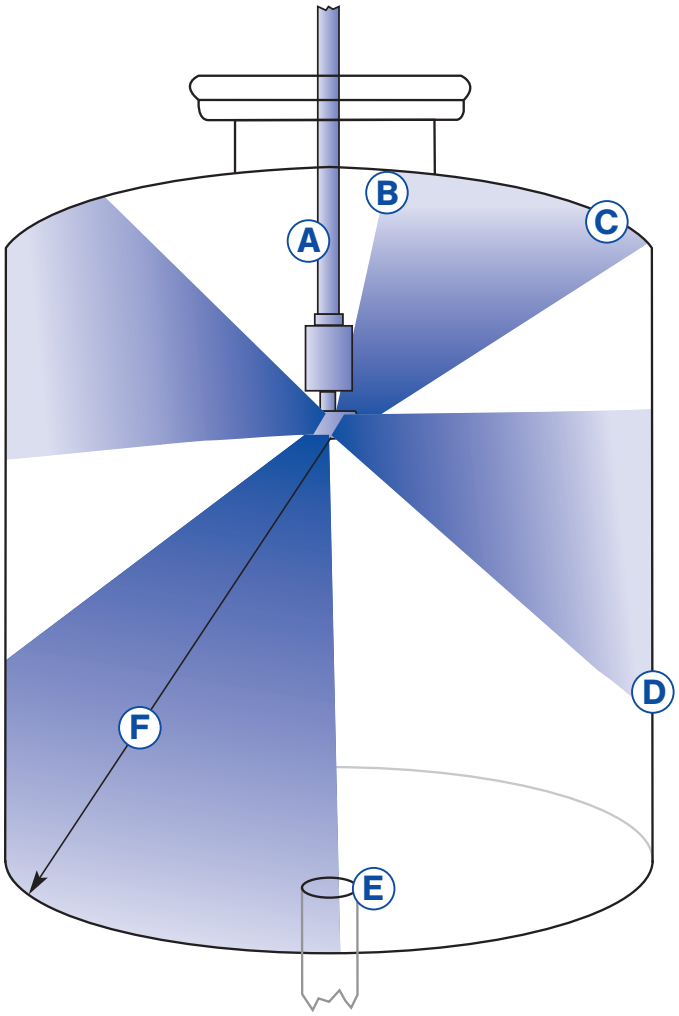
Static spray balls do not rotate, so they require a comparatively large amount of liquid in order to generate turbulent flow. They are used primarily for washing down relatively small tanks and vessels.

➔ Series 540/591

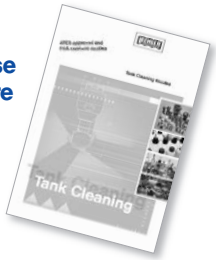
ATEX- and FDA-approval

A number of Lechler tank cleaning nozzles are available with ATEX or FDA approval. For detailed information please ask for our brochure »Tank Cleaning Nozzles«

Typical gravity drainage flow	
1"	23 l/min
1 1/2"	50 l/min
2"	87 l/min
2 1/2"	132 l/min
3"	190 l/min
4"	330 l/min



For more information please ask for our special brochure »Tank Cleaning Nozzles«



Typical applications

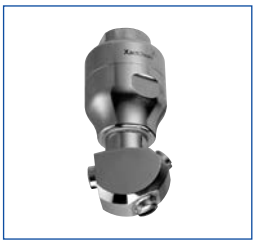
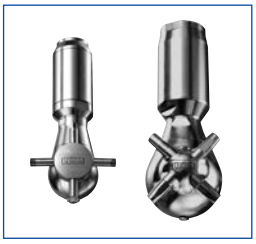
- (A) - Position the tank cleaning nozzle(s) at the center of the tank, roughly one-quarter of the distance from top to bottom.
- (B) - Nozzles invariably leave an unsprayed shadow area directly overhead, the size of which varies according to the type of nozzle and the piping.
- (C) - The distance between the top of the tank and the nozzle should amount to approximately one-quarter of the nozzle's action radius. Size your unit to ensure sufficient flow to the top part of the tank wall.
- (D) - The film of liquid grows thicker toward the bottom of the tank, where the washing effect is the most pronounced.
- (E) - Standing water reduces impact and allows solids to accumulate. Make sure that the drain can handle whatever you put into the tank.
- (F) - The longest spray distance is from the nozzle to the bottom corner, so the nozzle should be sized for this "effective washing distance".

All pressure data are stated in terms of differential pressure directly at the nozzle, so be sure to take the line-pressure drop into account.

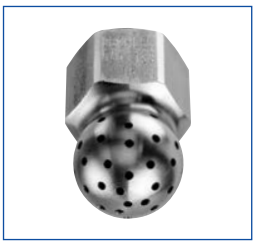
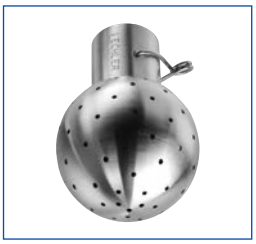
Tank cleaning nozzles

Self-rotating Tank cleaning nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application / Design	Page
	**566 MicroWhirly** **500.234 PicoWhirly**	180° 300° 360°	8 – 21	M6 3/8 BSPP	Cleaning of small tanks, up to 1,5 m in diameter. **Self-rotating.** **Stainless steel versions.**	**7.6**
	**500.186 MiniWhirly** **500.191 PVDF MicroWhirly**	180° 300° 360°	13 – 20	1/2 BSPP	Cleaning of small tanks, up to 1,5 m in diameter. **Self-rotating.** **Plastic versions.**	**7.7**
	**5MC MicroSpinner** **5MI MiniSpinner**	60° 180° 360°	30 – 69	3/8 BSPP 3/4 BSPP	Cleaning of tanks up to 3 m in diameter. **Self-rotating.** **Stainless steel version.**	**7.8**
	**594** **595** **Hygienic Whirly**	360°	48 – 145 11 – 67	3/8 BSPP 3/4 BSPP 3/8 Pin connection	Cleaning of tanks with liquid or foam up to 1,5 m in diameter. **Self-rotating.** **Stainless steel and plastic version.**	**7.9**
	**569 Whirly**	270° 360°	48 – 145	3/4 BSPP 3/4 Pin connection	Cleaning of tanks up to 3 m in diameter. **Self-rotating.** **Double bearings.**	**7.10**

Tank cleaning nozzles

Self-rotating Tank cleaning nozzles	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application / Design	Page
	**573/583 Teflon® Whirly**	270° 360°	58 – 225	3/4 BSPP 1 BSPP Pin connection	Cleaning of tanks up to 3 m in diameter. Teflon Version. **Self-rotating. Special version for CIP applications.**	**7.11**
	**5W2/5W3 XactClean®**	270° 360°	15 – 130	318 BSPP 1/2 BSPP 3/4 BSPP 1 BSPP 1/2 Slip-on BSPP 3/4 BSPP	Cleaning of plant and equipment, tanks and machines. **Controlled rotation, self-rotating.**	**7.12**
	**515 ACCU*Clean***	360°	97 – 419	3/4 BSPP 1 BSPP	Cleaning of tanks up to 6 m in diameter. **Self-rotating. Controlled rotation for maximum spray impact.**	**7.13**
	**5TA/5TB IntenseClean Hygienic**	360°	22 – 165	3/4 BSPP 1 1/2 BSPP	Cleaning of systems, machines and large tanks. **Gear-controlled. Powerfull solid jets.**	**7.14**
	**5TM IntenseClean**	360°	120 – 247	1 1/2 BSPP 2/8 BSPP	Cleaning of tanks up to 24 m in diameter. **Gear driven tank cleaning machine.**	**7.15**

Tank cleaning nozzles

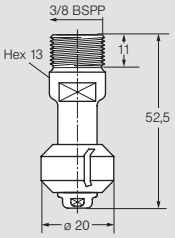
Static spray balls	Series	∢	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application / Design	Seite
	**540**	240°	18 - 118	1/2 BSPP	Cleaning of tanks up to 3 m in diameter. **Static spray ball with sharp solid jets.**	**7.16**
	**591**	180° 360°	14 - 460	Pin connection	Cleaning of tanks up to 5 m in diameter. **Static spray ball for higher flow rates.**	**7.16**

Miniature nozzles for kegs and drums
Stainless steel versions
Series 566 / 500.234

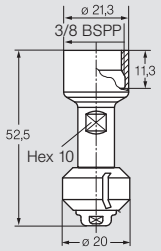
Also available with ATEX-approval

MicroWhirly Series 566

- Only 20 mm diameter to insert in small openings
- Excellent cleaning power
- Stainless steel AISI 316L
- PEEK Slide Bearing
- All materials (including slide bearing) are FDA-conform



3/8 BSPP male thread



3/8 BSPP female thread

Max. spray diameter:
1 - 1.5 m

Operating pressure:
1 - 2 bar

Max. temperature:
80 °C

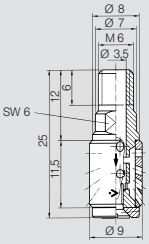
Installation:
Operates in every position

Spray-angle	Ordering no. Type	Connection 3/8 BSPP male	Connection 3/8 BSPP female	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	40 psi [US gal./min]	Length [mm]	Ø [mm]
180°	**566.873.1Y**	AE	AF	2.4	12	15	18	4.7	52.5	20
	566.933.1Y	AE	AF	2.4	15	21	26	6.5	52.5	20
180°	**566.874.1Y**	AE	AF	2.4	12	15	18	4.7	52.5	20
	566.934.1Y	AE	AF	2.4	15	21	26	6.5	52.5	20
360°	**566.879.1Y**	AE	AF	2.4	12	15	18	4.7	52.5	20
	566.939.1Y	AE	AF	2.4	15	21	26	6.5	52.5	20

E = narrowest free cross-section

PicoWhirly series 500.234

- Unique extremely small nozzle design
- For bottles and narrow spacing
- All stainless steel AISI 316L, colsterised
- Slide bearing
- All materials are FDA-conform



Max. spray diameter:
1 m

Operating pressure:
1 - 2 bar

Max. temperature:
200 °C

Installation:
Operates in every position

Spray-angle	Ordering no. Type	E Ø [mm]	Connection	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	40 psi [US gal./ min]	Length [mm]	Ø [mm]
300°	**500.234.G9.00**	1.8	M6	5.7	8.0	9.8	2.5	25	9

E = narrowest free cross-section

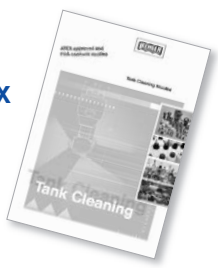
Common features of these series

- Very compact design
- Self-rotating
- Driven and lubricated by the cleaning fluid
- Operate in every position

Applications

- Kegs
- Cans
- Autoclaves
- Barrels
- Machines

For versions with ATEX approval please refer to our brochure »Tank Cleaning Nozzles«

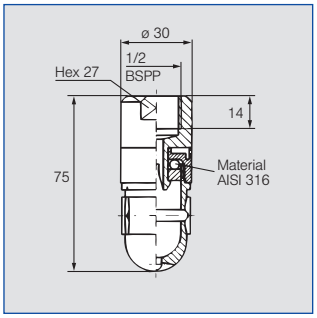


Please note: We do not recommend the operation with compressed air. Higher pressure generally means higher wear and smaller droplets. This might have adverse effects on the cleaning result.
We recommend the use of a line strainer 0.3 mm/50 mesh.

Miniature nozzles for kegs and drums
Plastic versions
Series 500.186 / 500.191

MiniWhirly series 500.186

- Robust design, especially reliable in operation
- 300° spray angle
- Material: POM
- Stainless steel ball bearing AISI 316



Max. spray diameter:
1 - 1.5 m

Operating pressure:
1 - 2 bar

Max. temperature:
50 °C

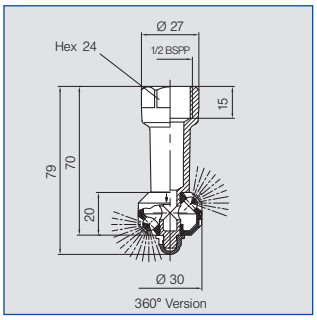
Installation:
Vertically facing downward

Spray-angle	Ordering no. Type	E Ø [mm]	Connection BSPP	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	40 psi [US gal./ min]	Length [mm]	Maximum width [mm]
300°	**500.186.56.AH**	1.9	1/2	13	18	22	5.5	75	30

E = narrowest free cross-section

PVDF MicroWhirly series 500.191

- Inexpensive rotating head
- Good corrosion resistance
- 360° and partial coverage
- Material: PVDF
- Slide bearing
- All materials are FDA-conform



Max. tank diameter:
1 - 1.5 m

Operating pressure:
1 - 2 bar

Max. temperature:
90 °C

Installation:
Operate in every position

Spray-angle	Ordering no. Type	E Ø [mm]	Connection BSPP	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	40 psi [US gal./ min]	Length [mm]	Ø [mm]
180°	**500.191.5E.02**	2.2	1/2	9	13	16	4	79	30
180°	**500.191.5E.01**	2.2	1/2	9	13	16	4	79	30
360°	**500.191.5E.00**	2.2	1/2	14	20	24	6.2	79	30

E = narrowest free cross-section

Common features of these series

- Very compact design
- Self rotating
- Driven and lubricated by the cleaning fluid
- Operate in every position

Applications

- Kegs
- Cans
- Autoclaves
- Barrels
- Machines

Please note: We do not recommend the operation with compressed air. Higher pressure generally means higher wear and smaller droplets. This might have adverse effects on the cleaning result.
We recommend the use of a line strainer 0.3 mm/50 mesh.

Rotating cleaning nozzles »MicroSpinner / MiniSpinner« Series 5MC / 5MI

Series 5MC / 5MI

- Excellent coverage
- Cleaning at low pressures
- Driven and lubricated by the cleaning fluid
- All materials are FDA-conform

Applications
Rinsing and cleaning of
- vessels
- machines

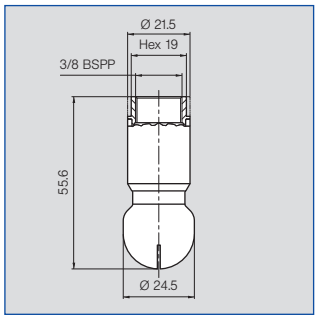
Operating pressure:
1.0 - 2.5 bar

Max. temperature:
140°C

Installation:
Operate in every position

Materials:
Stainless steel AISI 316L

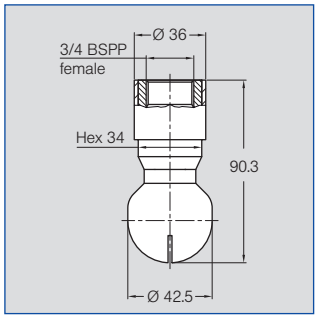
Bearing:
Double ball bearing made of corrosion-resistant stainless steel AISI 304



Max. tank diameter:
1.3 m

Spray-angle	Ordering no. Type	Connection BSPP	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	40 psi [US gal./min]
60°	**5MC. 042. 1Y. AF**	3/8	3.0	28	40	49	12
180°	**5MC. 004. 1Y. AF**	3/8	0.8	22	32	39	10
360°	**5MC. 049. 1Y. AF**	3/8	0.9	28	39	48	12

E = narrowest free cross-section



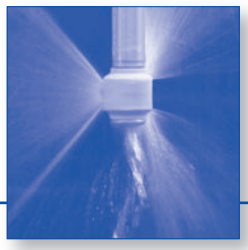
Max. tank diameter:
3.0 m

Spray-angle	Ordering no. Type	Connection G ISO 228	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	4
60°	**5MI. 162. 1Y. AH**	1/2"	2.6	45	63	77	20
180°	**5MI. 114. 1Y. AL**	3/4"	1.0	47	67	62	21
360°	**5MI. 054. 1Y. AL**	3/4"	0.5	21	30	37	9
	5MI. 074. 1Y. AL	3/4"	0.6	35	49	60	15
	5MI. 014. 1Y. AL	3/4"	0.9	49	69	85	21
	5MI. 209. 1Y. AL	3/4"	1,5	71	100	122	31

E = narrowest free cross-section
* NPT on request · More slip-on sizes on request. · Weld-on versions on request
Operation with compressed air only for short-term usage. Operation above the recommended operating pressure means higher wear and smaller droplets. This might have adverse effects on the cleaning result.
Slip-on versions: R-clip made of stainless steel AISI 316 L is included (Ordering number: 095.022.1Y.50.60 (5MI) 095.013.1E.05.59 (5MC)). Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

Rotating cleaning nozzles »HygienicWhirly«

Series 594 / 595



FDA-conform

CERTIFIED EHEDG TYPE EL - CLASS I APRIL 2012

Series 594 / 595

- Cleaning with foam at low pressure is possible
- Self rotating
- Effective flat jet nozzles

Applications
Cleaning of
- Machines
- Plants
- Tanks

e.g. beverage, food and pharmaceutical industry

Max. tank diameter:
1.5 m
Type 595.139 up to 2.5 m

Operating pressure:
0.5 - 3.0 bar

Max. temperature:
100°C, short-term up to 140°C

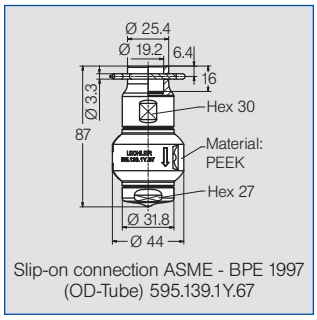
Installation:
Operation in every direction is possible

Material:
PEEK and stainless steel AISI 316 L, EHEDG-version: O-ring made of EPDM

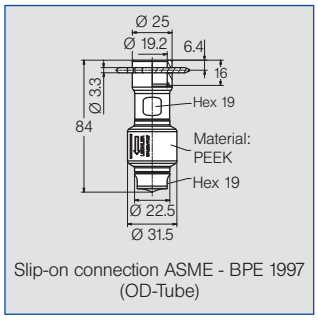
Bearing:
Slide bearing made of PEEK

Filtration:
Line strainer with a mesh size of 0.3 mm/50 mesh

EHEDG-version

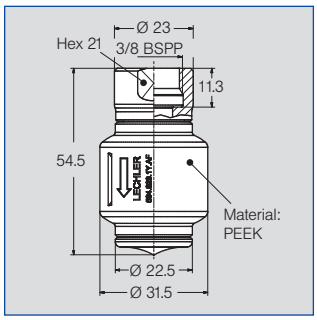


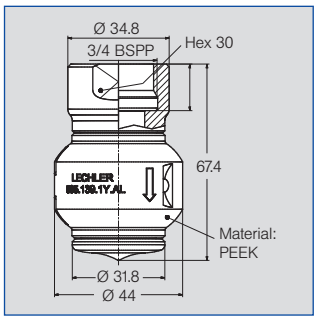
Slip-on connection ASME - BPE 1997 (OD-Tube) 595.139.1Y.67



Slip-on connection ASME - BPE 1997 (OD-Tube)

Standard version





Spray-angle	Ordering no. Type	Connection 3/8 BSPP* female	Connection 3/4 BSPP* female	Connection EHEDG-version	E Ø [mm]	V̇ [l/min] p [bar] (pmax = 6 bar) 0.5	1	2	3	40 psi [US gal./min]
360°	**594.829.1Y.XX**	**AF**	**-**	**67**	1.7	6	8	11	14	3
	594.879.1Y.XX	**AF**	**-**	**67**	2.5	8	11	15	18	5
	595.009.1Y.XX	**AF**	**-**	**67**	4.0	16	22	32	39	10
	595.049.1Y.XX	**AF**	**-**	**67**	4.2	20	28	40	49	12
	595.139.1Y.XX	**-**	**AL**	**67**	5.0	34	47	67	82	21

E = Narrowest free cross-section · * NPT on request

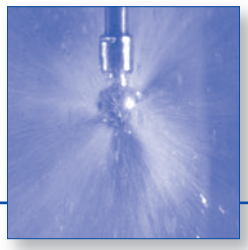
Please note: Operation with compressed air only for short-term usage. Operation above the recommended operating pressure means higher wear and smaller droplets. This might have adverse effects on the cleaning result.

Slip-on versions:
- R-clip made of stainless steel AISI 316 L is included (Ordering number: 095.022.1Y.50.94.E)
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

Example for ordering:	Type	+	Connection	=	Ordering no.
	594.829.1Y.	+	**AF**	=	**594.829.1Y.AF**

Rotating cleaning nozzle »Whirly«

Series 569



Also available with ATEX-approval

- Flat jet nozzles with improved vertical coverage
- Better balance for smoother operation
- Fits through smaller openings
- Slip-on or thread connection (adapter) or Tri-Clamp
- Replaces former series 566-569.xxx.17
- In horizontal installation position no rotating until 2 bar
- All materials are FDA-conform

Applications
For small and medium sized tanks e.g. in Chemical, Beverage, Food industries

There are three standard inlets available:
- For general industrial use: 3/4" ISO female
- For sanitary CIP use: Slip-on 3/4" or 1" OD tubing includes R-Clip made of stainless steel 316L (Ord. no. 095.022.1Y.50.60.E)
- For manual insertion: 1" Tri-Clamp (on request)

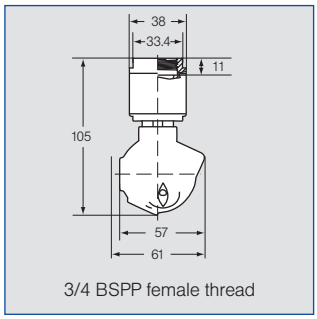
Max. tank diameter:
Rinsing: 5 m
Cleaning: 3 m

Operating pressure:
1 – 2.5 bar

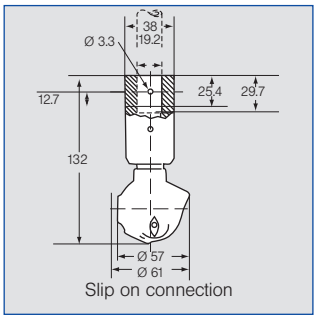
Max. temperature:
140 °C

Material:
Stainless steel AISI 316L

Bearing:
Double bearings made of stainless steel AISI 316L with PEEK-cage (FDA-conform) and Rulon bushing.



3/4 BSPP female thread



Slip on connection

Spray angle	Ordering no. Type	Connection 3/4 BSPP	Connection 3/4" slip on connection	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 6 bar) 1	2	3	40 psi [US gal./min]
270°	**569.055.1Y**	**AL**	**TF07**	3.6	36	48	62	15
	569.135.1Y	**AL**	**TF07**	4.8	52	71	87	22
	569.195.1Y	**AL**	**TF07**	5.6	69	97	119	30
270°	**569.056.1Y**	**AL**	**TF07**	3.6	36	48	62	15
	569.106.1Y	**AL**	**TF07**	4.8	41	58	71	18
	569.196.1Y	**AL**	**TF07**	5.6	69	97	119	30
360°	**569.059.1Y**	**AL**	**TF07**	3.2	36	48	62	15
	569.139.1Y	**AL**	**TF07**	3.6	52	71	87	22
	569.199.1Y	**AL**	**TF07**	4.8	69	97	119	30
	569.279.1Y	**AL**	**TF07**	7.1	103	145	178	45

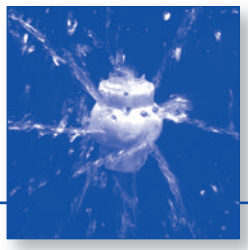
E = narrowest free cross-section · *NPT on request

Example for ordering:	Type	+	Connection	=	Ordering no.
	569.055.1Y.	+	AL	=	569.055.1Y.AL

For versions with ATEX approval, for additional spray angles and nozzle sizes please refer to our brochure »Tank Cleaning Nozzles«.

Please note: We do not recommend the operation with compressed air. Higher pressure generally means higher wear and smaller droplets. This might have adverse effects on the cleaning result.
We recommend the use of a line strainer 0.3 mm/50 mesh.

Rotating cleaning nozzle »Teflon® Whirly« — especially for CIP applications Series 573 / 583



Slip-on version certified according to »3-A®«.

Whirling nozzles made entirely from PTFE combine maximum corrosion resistance with minimum weight and size.
The rotating head uses solid stream nozzles. which offer concentrated impact combined with rinsing action between individual streams.

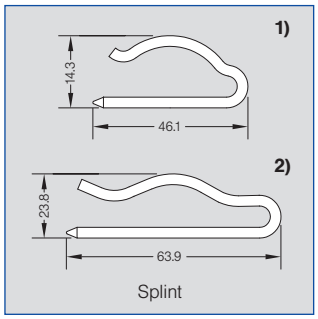
- Balanced rotating action
- Gap-free all-around cleaning
- All materials are FDA-conform

For environments with special sanitary requirements: use the Sanitary slip-on pin connection:

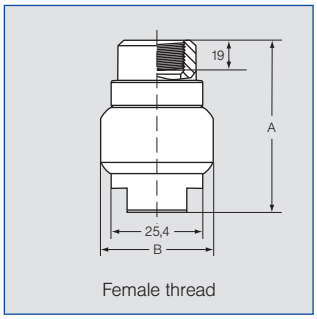
- Design meets 3-A® standards. e.g.
- Smooth surface finish
- Self draining and flushing design

There are three standard inlets available:

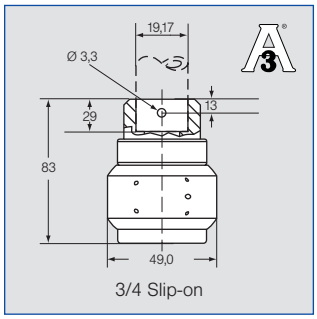
- For general industrial use: 3/4" or 1" ISO female
- For sanitary CIP use: Slip-on 3/4"
- For manual insertion: 1 1/2" Tri-Clamp (on request)



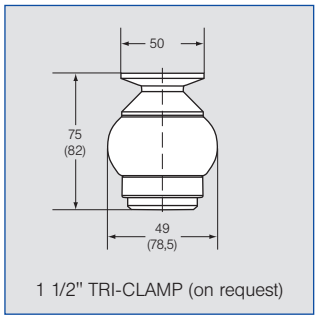
Splint



Female thread



3/4 Slip-on



1 1/2" TRI-CLAMP (on request)

Spray-angle	Ordering no.					E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 6 bar)					Length A [mm]	Ø B [mm]
	Splint	Type	Connection 3/4 BSPP*	Connection 1 BSPP*	Connection Slip-on		1	2	3	4	40 psi [US gal./min]		
270°	1	583.266.55	AL	-	TF07	3.4	103	145	178	205	45	74	49
270°	1	573.266.55	AL	-	TF07	3.4	103	145	178	205	45	74	49
360°	1	583.209.55	AL	-	TF07	3.5	71	100	122	141	31	74	49
	1	583.269.55	AL	-	TF07	4.8	103	145	178	205	45	74	49
	2	583.279.55	-	AN	TF10	3.7	106	150	184	212	47	100	78.5
	2	583.349.55	-	AN	TF10	5.6	159	225	276	318	70	100	78.5

E = narrowest free cross-section · *NPT on request

Example for ordering:	Type	+	Connection	=	Ordering no.
	583.266.55.	+	AL	=	583.266.55.AL

Applications
For rinsing of small and medium sized vessels, e.g. in the Chemical, Pharmaceutical, Food Industry

- Excellent for corrosive environments
- Recommended for glass-lined or email tanks

Max. tank diameter:
Rinsing: 5 m
Cleaning: 3 m

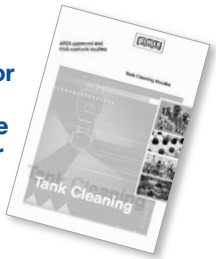
Operating pressure:
1 – 2 bar

Max. temperature:
95 °C

Materials:
Completely made of PTFE (Teflon®).
R-pin: Stainless steel AISI 316L
1) Ordering no. 095.022.1Y.50.88.E
2) Ordering no. 095.022.1Y.50.60.E

Bearing:
PTFE slide bearing

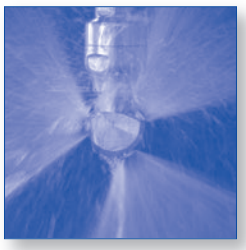
For versions with ATEX approval, for additional spray angles and nozzle sizes please refer to our brochure »Tank Cleaning Nozzles«.



Please note: We do not recommend the operation with compressed air. Higher pressure generally means higher wear and smaller droplets. This might have adverse effects on the cleaning result.
We recommend the use of a line strainer 0.3 mm/50 mesh.

Rotating cleaning nozzle »XactClean®«

Series 5W2 / 5W3



FDA-conform

NEW!

- Controlled rotation
- Powerfull flat jet nozzles
- Very efficient tank cleaning nozzle

Applications:
Cleaning of
- Plant and equipment
- Tanks
- Machines

Max. tank diameter:
Rinsing: 9.0 m
Cleaning: 6.0 m

Operating pressure:
3.0 - 7.0 bar

Max. temperature:
80 °C

Installation:
Operation in every direction is possible

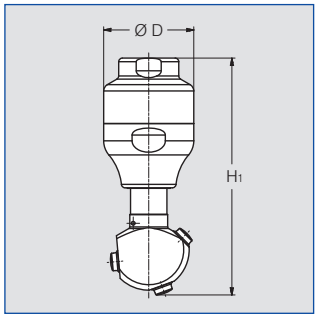
Material:
Stainless steel AISI 316L and PTFE

Bearing:
Slide bearing made of PTFE

Filtration:
Line strainer with a mesh size of 0.1 mm/170 mesh

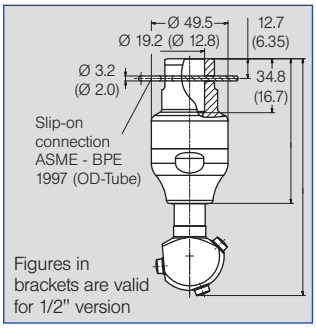
Rotation monitoring sensor:
This series is qualified for rotation monitoring with the Lechler sensor.

Rotation monitoring sensor
Please ask for more information.



Spray angle	Ordering number: Type	Connection: 3/8 BSPP* female	1/2 BSPP* female	3/4 BSPP* female	1 BSPP* female	1/2" Slip-on	3/4" Slip-on	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 20 bar): 2	5	10	at 40 psi [US gal./min]
270°	**5W2.875.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.7	15	24	34	4.7
	5W2.995.1Y	**-**	**AH**	**-**	**-**	**TF05**	**-**	2.2	30	47	67	9.3
	5W3.065.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.2	42	66	94	13.0
	5W3.145.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	3.8	70	111	157	21.7
	5W3.205.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	4.8	100	158	224	31.0
	5W3.255.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	5.5	130	206	291	40.3
270°	**5W2.876.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.7	15	24	34	4.7
	5W2.996.1Y	**-**	**AH**	**-**	**-**	**TF05**	**-**	2.2	30	47	67	9.3
	5W3.066.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.2	42	66	94	13.0
	5W3.146.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	3.8	70	111	157	21.7
	5W3.206.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	4.8	100	158	224	31.0
	5W3.256.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	5.5	130	206	291	40.3
360°	**5W2.879.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.52	15	24	34	4.7
	5W2.999.1Y	**-**	**AH**	**-**	**-**	**TF05**	**-**	2.0	30	47	67	9.3
	5W3.069.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.0	42	66	94	13.0
	5W3.149.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	3.5	70	111	157	21.7
	5W3.209.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	4.4	100	158	224	31.0
	5W3.259.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	5.0	130	206	291	40.3

E = Narrowest free cross-section. · * NPT on request
Operation with compressed air only for short-term usage. Operation above the recommended operating pressure means higher wear and smaller droplets. This might have adverse effects on the cleaning result.
Slip-on versions: R-clip made of stainless steel AISI 316 L is included (Ordering number: 095.022.1Y.50.60.E (5W3), 095.013.1E.05.59.0 (5W2)). Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.



Max. tank diameter [m]

Type	Rinsing	Cleaning
5W2.87X	4	3
5W2.99X	5	3
5W3.06X	7	4
5W3.14X	8	5
5W3.20X	9	6
5W3.25X	9	6

Type	H1 (Thread version)	H2 (Slip-on)	Ø
5W2.87X	114	118	43
5W2.99X	114	118	43
5W3.06X	114	136	43
5W3.14X	146	167	60
5W3.20X	146	167	60
5W3.25X	146	167	60

Rotating cleaning nozzle »ACCU*Clean*« Stainless steel version Series 515

The consequent redesign of the successful ACCU*Clean* concept combines now even more efficient cleaning technology in an economical package:

- Controlled rotation for maximum spray impact
- Optimized drive mechanism
- Special nozzle geometry for sharp sprays
- Excellent vertical coverage
- Smooth, self-draining and self-flushing design
- Long-life bearing
- Wide flow and pressure range

Applications
- For use in all applications, where a high cleaning performance is required

Max. tank diameter:
Rinsing: 6 – 9 m
Cleaning: 4 – 6 m
depends on nozzle size

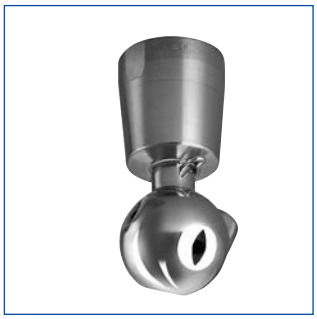
Operating pressure:
2 - 5 bar

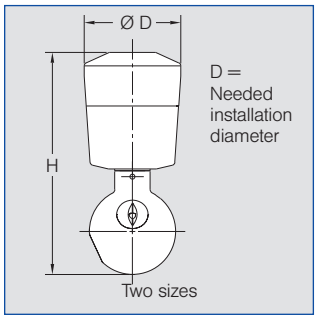
Temperature range:
5 - 140 °C

Installation:
Vertically facing downward

Materials:
Body: Stainless steel 316L
Gear parts: PEEK

Bearing:
Ball bearing made of stainless steel AISI 316L



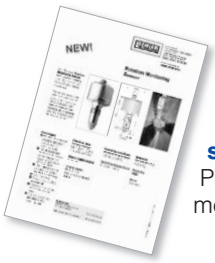


Spray-angle	Ordering no. Type	E Ø [mm]	Connection G*	V̇ [l/min] p [bar] (p_{max} = 6 bar) 1	2	3	5	7	40 psi [US gal./ min]	Length H [mm]	Ø D [mm]
360°	**515.219.7T.AL**	1,0	3/4"	68	97	118	153	181	30	170	85
	515.289.7T.AL	1,0	3/4"	103	145	178	229	271	45	170	85
	515.339.7T.AN	1,0	1"	137	193	237	306	361	60	170	85

E = narrowest free cross-section · *NPT on request

Please Note: We do not recommend the operation with compressed air. In order to protect the bearing a line-strainer with a mesh size of 0.3 mm/50 mesh is recommended. For further ordering data please turn to your Lechler contact person.

For versions with ATEX approval, for additional spray angles and nozzle sizes please refer to our brochure »Tank Cleaning Nozzles«.



Rotation monitoring sensor
Please ask for more information.

Please note: We do not recommend the operation with compressed air. Higher pressure generally means higher wear and smaller droplets. This might have adverse effects on the cleaning result.
We recommend the use of a line strainer 0.3 mm/50 mesh.

High impact tank cleaning machines »IntenseClean Hygienic« Series 5TA / 5TB

NEW!

- Gear-controlled
- Particularly powerful solid jets
- Two different sizes for a variety of container sizes
- Operating pressures up to 15 and 25 bar possible

Application:
Cleaning of
- Systems
- Machines
- Tankers
- Large tanks

Max. tank diameter:
See table

Operating pressure:
2.0 - 10.0 bar

Temperature:
95 °C, 130 °C ((Environment)

Installation:
Operation in any installation position

Material:
AISI 316L, PEEK, PTFE, Zirconium oxide

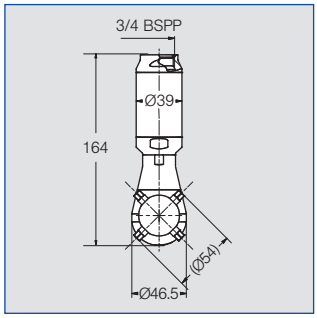
Weight:
5TA approx. 0.9 kg
5TB approx. 4.0 kg

Bearing:
Ball bearing

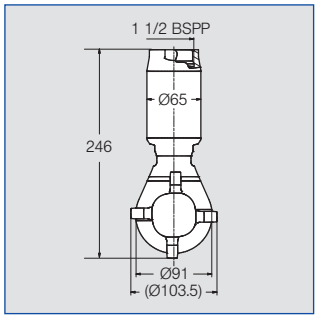
Required prefiltration:
Line filter with 0.2 mm/ 80 mesh

Rotation monitoring sensor:
This series is qualified for rotation monitoring with the Lechler sensor.

5TA



5TB



The new Lechler rotating jet cleaner enables containers and systems to be cleaned very efficiently. Thanks to the powerful solid jets, it also performs even the most difficult cleaning tasks.
Its high-quality and hygienic design makes it especially well suited for use in the chemicals and pharmaceuticals industry.

Spray angle	Ordering number / Type	E Ø [mm]	Number, Ø nozzles [mm]	V̇ [l/min] p [bar] (p_{max} = 15 bar) 2	5	10	40 psi [US gal./min]	Max. tank-diameter (at 5 bar) [m]
360°	**5TA.403.1Y.AL**	1.5	4 x 3.0	25	40	56	7.8	8.0
	5TA.404.1Y.AL	1.5	4 x 4.0	42	66	93	12.9	11.0
	5TA.405.1Y.AL	1.5	4 x 5.0	50	79	112	15.5	12.0

Spray angle	Ordering number / Type	E Ø [mm]	Number, Ø nozzles [mm]	V̇ [l/min] p [bar] (p_{max} = 25 bar) 2	5	10	40 psi [US gal./min]	Max. tank-diameter (at 5 bar) [m]
360°	**5TB.406.1Y.AS**	6.0	4 x 6.0	107	169	239	33.1	13.0
	5TB.407.1Y.AS	6.0	4 x 7.0	135	213	302	41.9	14.0
	5TB.408.1Y.AS	6.0	4 x 8.0	165	261	369	51.2	14.0

E = Narrowest free cross-section

Rotation monitoring sensor
Please ask for more information.

High impact tank cleaning machine »IntenseClean« Series 5TM

Series 5TM

Gear driven tank cleaning machine for the largest tanks and most difficult applications, this gear driven tank washing machine is our most powerful.

- Very high cleaning performance already at low pressures
- Driven and lubricated by the cleaning fluid
- Systematically cleans the entire tank interior (360°)
- Robust, low-maintenance stainless steel construction

The standard machine configuration uses two or four nozzles to blast the tank walls and rinse all surfaces. In operation, the unit has to run for the cycle time between 7 and 41 min depending on type and pressure. This ensures full cleaning. For extremely difficult applications the cleaning time might have to be extended.

Applications:
Large tanks and installations, e.g. in the chemical, beverage, food industry

Max. tank diameter for:
Rinsing: 24 m
Cleaning: 15 m

Operating pressure:
2 – 5 bar

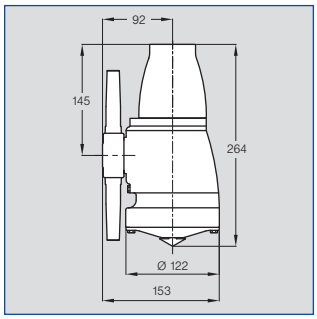
Temperature range:
2 – 60 °C

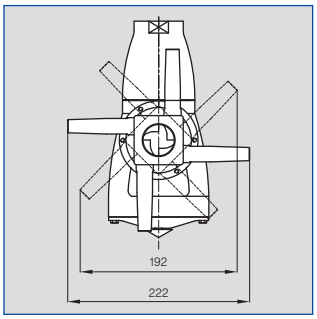
Installation:
Operation in every direction is possible

Materials:
Stainless steel AISI 316L.
Gear components made of PTFE and carbon fibre.

Weight:
approx. 7.5 kg

Connection:
Female thread 1 1/2 BSPP





Spray-angle	Ordering no. Type	E Ø [mm]	Number ø nozzles mm	V̇ [l/min] p [bar] 2	3	5	40 psi [US gal./min]
360°	**5TM.208.1Y.AS**	8	2 x 8.0	125	153	198	39
	5TM.210.1Y.AS	10	2 x 10.0	160	196	253	50
	5TM.406.1Y.AS	6	4 x 6.0	140	171	221	43
	5TM.407.1Y.AS	7	4 x 7.0	170	208	269	53
	5TM.408.1Y.AS	8	4 x 8.0	200	245	316	62
	5TM.410.1Y.AS	10	4 x 10.0	260	318	411	81

E = narrowest free cross-section. NPT on request.

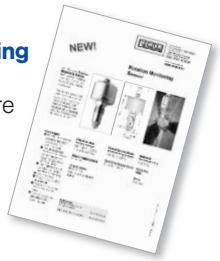
The cycle time takes between 7 and 41 min depending on type and pressure.

We recommend the use of a line strainer (approx. 0.2 mm/80 mesh).

If you are not sure what you need for your application, ask for assistance.
We can discuss your specific needs and configure the best system.

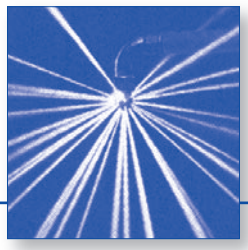
Rotation monitoring sensor

Please ask for more information.



Static spray balls

Series 540 / 541 / 591



Series 540

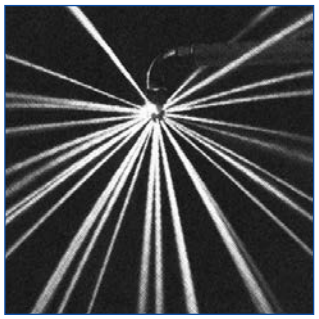
- Very compact static spray ball
- Sharp solid jets, excellent for rinsing small drums
- Also to use with saturated steam
- Nozzles 120° on request

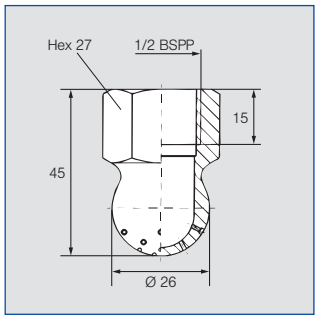
Max. tank diameter:
1 – 3 m

Operating pressure:
1 – 3 bar

Max. temperature:
200 °C

Materials:
Stainless steel AISI 303





Spray-angle	Ordering no. Type	E Ø [mm]	V̇ [l/min] p [bar] 0.5	2	5	40 psi [US gal./min]
240°	**540.909.16**	0.8	9.0	18.0	28.5	5.6
	540.989.16	1.0	14.0	28.0	44.3	8.7
	541.109.16	1.5	28.5	57.0	90.1	17.7
	541.189.16	2.0	45.0	90.0	142.3	27.9
	541.239.16	2.3	59.0	118.0	186.6	36.6

E = narrowest free cross section. · NPT on request.

Series 591

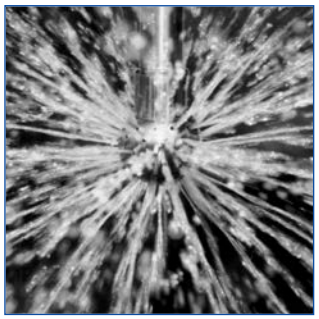
- Popular sprayball design
- For higher flow rates
- Corrosion resistant material
- Available in different sizes
- All materials are FDA-conform

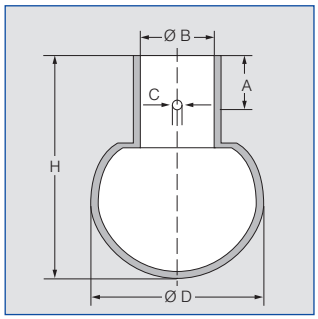
Max. tank diameter:
1 – 5 m

Operating pressure:
1 – 3 bar

Max. temperature:
200 °C

Materials:
Stainless steel AISI 316Ti,
Pin: Stainless steel AISI 316L





Spray-angle	Ordering no. Type	E Ø [mm]	Effective cleaning approx. [m]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 0.5 bar	1.0 bar	2.0 bar	3.0 bar	40 psi [US gal./min]	Dimensions ca. [mm] Ø D	Length H	Connection B	Slip-on connection	C	A
360°	**591.M11.17.00**	0.8	0.5	7	10	14	17	4	20	32.5	8.2	DN8	2.2	9.0
	591.X11.17.00	1.2	0.5-1.0	25	35	49	61	15	24	37.5	12.2	DN10	2.2	9.0
	591.Y11.17.00	1.2	1-1.5	49	70	99	121	31	30	42	18.2	DN15	2.2	9.0
	591.A21.17.00	2.0	2-2.5	91	128	181	222	56	40	53	22.2	DN20	2.5	9.0
	591.B31.17.00	2.1	2.0-3.0	130	183	259	318	80	64	90	28.2	DN25	2.8	18.0
	591.B51.17.00	3.0	3.0-4.0	206	292	412	505	128	64	90	28.2	DN25	2.8	18.0
180°	**591.A23.17.00**	2.0	2.0-2.5	74	105	148	182	46	40	53	22.2	DN20	2.5	9.0
	591.B53.17.00	3.0	3.0-4.0	146	207	292	358	91	64	90	28.2	DN25	2.8	18.0
180°	**591.B32.17.00**	2.1	2.5-3.0	103	145	205	251	64	64	90	28.2	DN25	2.8	18.0
	591.D42.17.00	2.2	4.0-4.5	230	325	460	563	142	90	122	52.3	DN50	3.3	25.0

E = narrowest free cross section.
Higher pressure generally means higher wear and smaller droplets.
This might have adverse effects on the cleaning result.

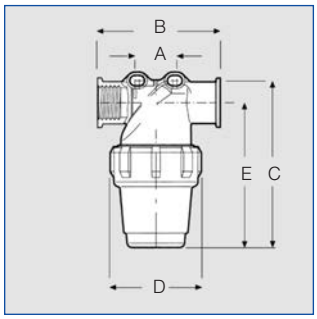
Strainers

Strainers

Strainers	Design	Connection	Nominal pressure at 20 °C	Material of housing	Page
	**Strainer**	1/2 BSPP 3/4 BSPP 1 BSPP 1 1/4 BSPP 1 1/2 BSPP	12 bar	Polypropylene	**8.3**
	**Basket strainer**	3 BSPP	8 bar	Polypropylene	**8.4**

Strainer, max. pressure 12 bar

Standard strainer for industrial applications.
For service pressures up to 12 bar. With large screening surfaces.
Screening fineness is colour-marked:
(0.6 mm = red,
0.3 mm = blue,
0.2 mm = green).
Easy handling. Robust construction. Slim design.



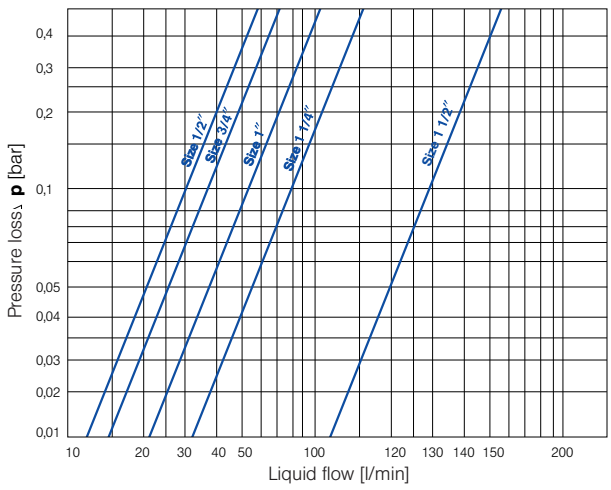
Type		Dimensions [mm]						Weight [g]
		Connection	A	B	C	D	E	
S. GA 2.	**S. GI 2.**	1/2 BSPP	27	97	140	74	118	200
S. GA 3.	**S. GI 3.**	3/4 BSPP	27	97	140	74	118	200
S. GA 4.	**S. GI 4.**	1 BSPP	40	112	175	86	143	300
S. GA 5.	**S. GI 5.**	1 1/4 BSPP	39	146	280	116	239	630
S. GA 6.	**S. GI 6.**	1 1/2 BSPP	39	146	280	116	239	630

Pressure/temperature range

T	p_{max}
20 °C	12 bar
60 °C	7 bar

	Ordering no.			Standard screen Standard strainer		Further screens			
	Type	Size	Mat. hous. Code*	[mm]	Type (blue)	[mm]	Type (red)	[mm]	Type (green)
Male thread	**S. GA 2.**	**012.**	**53**	0.3	**S. 000. 012. 00. 26. 03**	0.6	**S. 000. 012. 00. 26. 06**	0.2	**S. 000. 012. 00. 26. 02**
	S. GA 3.	**034.**	**53**	0.3	**S. 000. 012. 00. 26. 03**	0.6	**S. 000. 012. 00. 26 .06**	0.2	**S. 000. 012. 00. 26. 02**
	S. GA 4.	**100.**	**53**	0.3	**S. 000. 100. 00. 26. 03**	0.6	**S. 000. 100. 00. 26. 06**	0.2	**S. 000. 100. 00. 26. 02**
	S. GA 5.	**114.**	**53**	0.3	**S. 000. 114. 00. 26. 03**	0.6	**S. 000. 114. 00. 26. 06**	0.2	**S. 000. 114. 00. 26. 02**
	S. GA 6.	**112.**	**53**	0.3	**S. 000. 114. 00. 26. 03**	0.6	**S. 000. 114. 00. 26. 06**	0.2	**S. 000. 114. 00. 26. 02**
Female thread	**S. GI 2.**	**012.**	**53**	0.3	**S. 000. 012. 00. 26. 03**	0.6	**S. 000. 012. 00. 26. 06**	0.2	**S. 000. 012. 00. 26. 02**
	S. GI 3.	**034.**	**53**	0.3	**S. 000. 012. 00. 26. 03**	0.6	**S. 000. 012. 00. 26. 06**	0.2	**S. 000. 012. 00. 26. 02**
	S. GI 4.	**100.**	**53**	0.3	**S. 000. 100. 00. 26. 03**	0.6	**S. 000. 100. 00. 26. 06**	0.2	**S. 000. 100. 00. 26. 02**
	S. GI 5.	**114.**	**53**	0.3	**S. 000. 114. 00. 26. 03**	0.6	**S. 000. 114. 00. 26. 06**	0.2	**S. 000. 114. 00. 26. 02**
	S. GI 6.	**112.**	**53**	0.3	**S. 000. 114. 00. 26. 03**	0.6	**S. 000. 114. 00. 26. 06**	0.2	**S. 000. 114. 00. 26. 02**

* Code 53 = Polypropylen

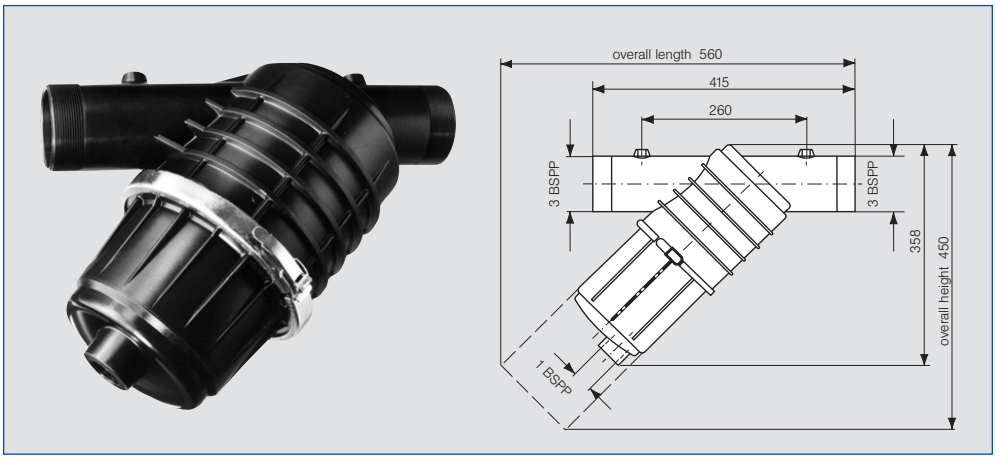


Correction factors for △p

Viscosity m Pa s	Mesh size of screen basket [mm]		
	0.6	0.3	0.2
1 (Water)	1.0	1.2	1.4
100	1.6	1.9	2.0
200	1.7	2.2	2.3

Basket strainer, max. pressure 8 bar

Strainers, designed for high flow volumes and low pressure loss. The strainer is fitted with a flow defector, avoiding obstruction of the screen insert in front of the outlet and allowing the dirt particles to settle on the filter bottom. From there they can easily be removed from below through an offset discharge port. The strainer is prepared for the connection of 2 pressure gauges, allowing to control the pressure loss occuring on the screen insert. The strainer is available with various screen insert types.



Strainer with screen

Ordering no.			Screen mesh size
Type	Size	Material	
SGA.2	**300**	**53** (Polypropylen)	500 µm / 32 mesh
SGA.3	**300**	**53** (Polypropylen)	360 µm / 50 mesh
SGA.4	**300**	**53** (Polypropylen)	170 µm/100 mesh
SGA.5	**300**	**53** (Polypropylen)	135 µm/120 mesh

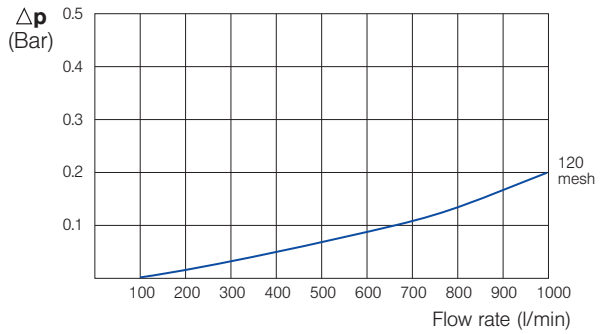
Example for ordering:	Type	+	Size	+	Material	=	Ordering no.
	SGA.2		**300**		**53**		**SGA.2. 300. 53**

Screen

Ordering no.			Screen mesh size
Type	Size	Material	
S.002	**300.00**	**26** (Monel)	500 µm / 32 mesh
S.003	**300.00**	**26** (Monel)	360 µm / 50 mesh
S.004	**300.00**	**26** (Monel)	170 µm/100 mesh
S.005	**300.00**	**5A** (Polyester/ Monel)	135 µm/120 mesh

Example for ordering:	Type	+	Size	+	Material	=	Ordering no.
	S.002		**300.00**		**26**		**S.002. 300.00. 26**

Pressure loss chart



Technical data

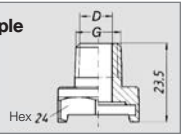
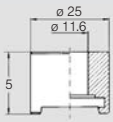
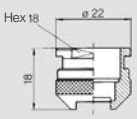
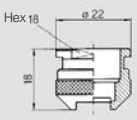
Screening surface	860 cm²
Screening insert ø	145 mm
Height of screening insert	320 mm
Inflow and outflow port dia. Ø	3"
Pressure gauge connection dia. Ø	1/4"
Maximum service pressure	8 bar

Accessories

TWISTLOC
Quick-change nozzle system

Lechler TWISTLOC - nozzle changing in less than no time.
The quick-change nozzle system makes you save time and money.
Quick:
For putting in or taking out a nozzle, just give it a twist.
Easy:
Without tool, just with one hand, even at locations hard to get at and under bad lighting conditions.
Safe:
Constant pre-setting of the nozzle to the correct direction prevents any assembling errors.
Max. pressure: 15 bar.

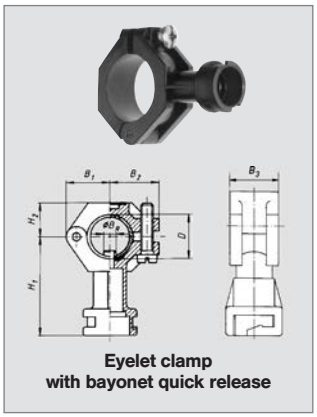
Non return valve with filter,
For use with nipple with inner diameter 11.6 cm (see page 9.8)

Type	Material no. 1C AISI 304	16 AISI 303	30 Brass	5E PVDF	7A Viton	7E Silicon	Code 1/4 BSPT	3/8 BSPT	Welding connection	Inside-ø D [mm]
Threaded nipple 										
092. 102	-	○	○	-	-	-	**CC**	-	-	8.0
	-	○	○	-	-	-	-	**CE**	-	11.6
	-	-	-	○	-	-	-	**CE**	-	8.0
Welding nipple 										
092.104	○	-	-	-	-	-	-	-	**00**	11.6
Sealing 										
092. 113	-	-	-	-	○	○	-	-	-	-
Sealing, including rubber gasket for use with non-return valves or nozzle filters. 										
092. 116	-	-	-	-	○	○	-	-	-	-
Quick-lock attachment for series 652/679 										
092. 106	-	○	○	○	-	-	-	-	-	-
Quick-lock attachment for series 684 										
092. 108	-	○	○	○	-	-	-	-	-	-

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	092. 102	+	**16**	+	**CC**	=	**092. 102. 16. CC**

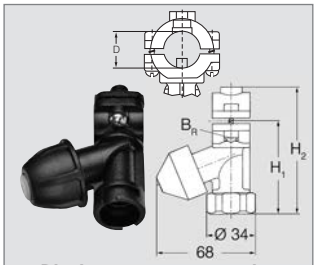
Accessories

Bayonet quick release system



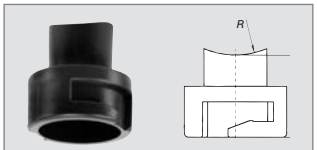
Eyelet clamp with bayonet quick release

For series	Ordering no. Type	Material no. 51 Polyamid	53 Polypropylene	5E PVDF	56 POM	Code	Screw (Material)	Pipe ø	D ø [mm]	Opening pressure [bar]	Closing pressure [bar]	Dimensions [mm] H_1	H_2	B_R ø	B_1	B_2	B_3	Weight
302 Bayonet 422 Bayonet / 2TR 468/548/646 652/679/684	**090. 003**	○	○	○	-	**KA**	303 SS	1/2"	20 - 22.0	-	-	49.5	16.5	6.2	21.2	23.8	18.5	22g
	090. 013	○	○	○	-	**KA**		3/4"	25 - 27.5	-	-	52.5	17.5	7.8	24.5	26.5	22.0	26g
	090. 023	○	○	○	-	**KA**		1"	32 - 34.5	-	-	57.0	21.0	10.8	30.0	31.0	22.0	32g

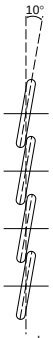


Diaphragm non-return valve with bayonet quick release

For series	Ordering no. Type	Material	Dimensions [mm] L	R	Weight
302 Bayonet 422 Bayonet 2TR/468/548/646 652/679/684	**095. 016. 50. 08. 05**	PVC	25	16	
	095. 016. 53. 08. 05	PP	25	16	



Bayonet welding nipple
Turn to pipe axle:
Direction: right, angle: 10°



Turn to pipe axle to the right.
Angle 10°.

For nozzle size	Ordering no. Type	Mat.-no. 7J POM/Santoprene	Mesh width [mm]	Colour	Dimensions [mm] H_1	H_2	D_1	D_2	Weight
xxx.32x-xxx.44x	**065.268**	○	0.25	blue	21.5	2.5	18.0	11.0	2 g
xxx.48x-xxx.56x	**065.269**	○	0.65	red	21.5	2.5	18.0	11.0	2 g

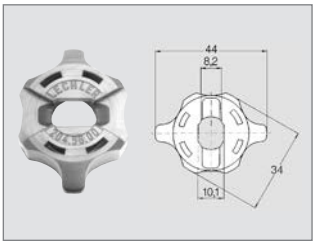
Filter with gasket, for bayonet retainer cap 065.202

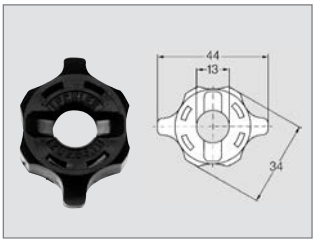
Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	090. 003	+	51	+	KA	=	090. 003. 51. KA

Accessories

Bayonet quick release system

Bayonet quick release retainer caps
incl. gasket 065. 242. 73
(Material: rubber)

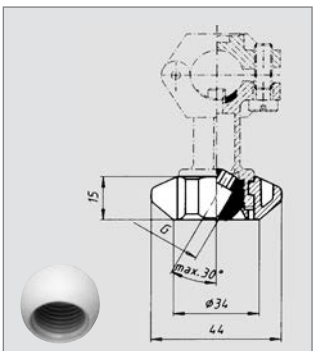




For series	Ordering no.	Material	Colour
652/679	**065. 202. 56. 00**	POM	red
	065. 202. 53. 00	Polypropylene	grey
	065. 202. 5E. 00	PVDF	blue
2TR/468/548/684	**065. 202. 56. 11**	POM	black
	065. 202. 53. 11	Polypropylene	grey

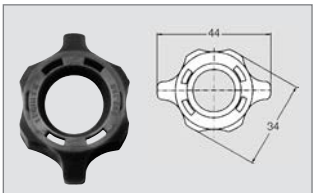
Ball joint for bayonet quick release system

Inexpensive ball joint system for nozzles with 1/8" and 1/4" male thread.



Ball joint for bayonet quick release eyelet clamp

For series	Ordering no. Type	Mat.-no. 5E PVDF	Code 1/8 BSPP	Code 1/4 BSPP	Colour
For all nozzles with 1/8"- or 1/4"-male thread.	**092. 150**	○	**AB**	**AD**	blue



Bayonet quick release retainer caps for ball joint
incl. gasket 095. 015. 7C. 04. 16. 0
(Material: 72 NBR 872)

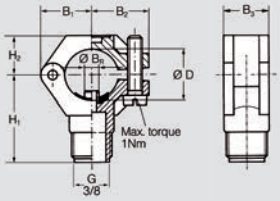
For series	Ordering no.	Material	Colour
For ball joint	**092. 150. 5E. 00**	PVDF	blue

Pressure/Temperature

T	p_{max}
65 °C	10 bar
80 °C	8 bar
100 °C	4 bar

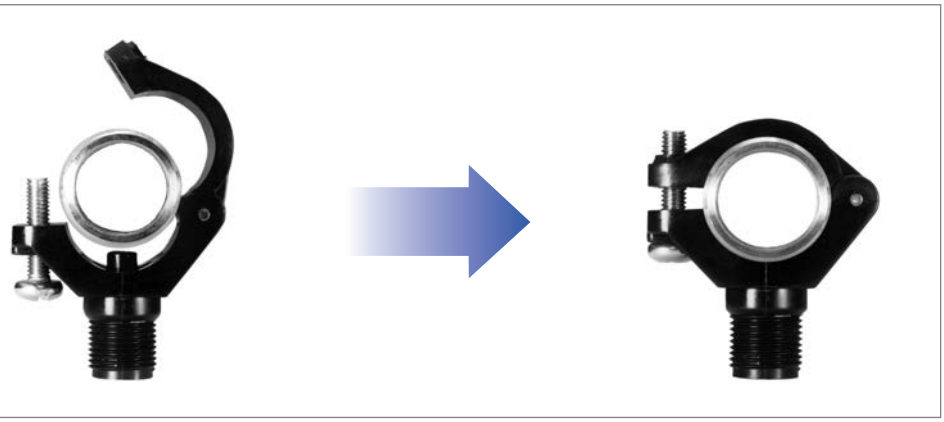
Accessories

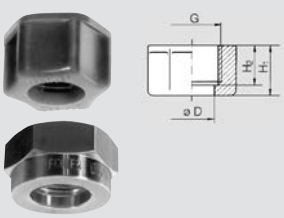
Eyelet clamps / Retaining nuts



Eyelet clamp for retaining nut

For series	Ordering no. Type	Material no. 51 Polyamid	53 Polypropylene	5E PVDF	Screw	Dimensions [mm] BSPP	Pipe ø	D ø	B_R ø	B_1	B_2	B_3	H_1	H_2	Weight (Polyamid)
2TR/216/302/308/350 468/548/679/684/652	**090. 053**	○	○	○	Material 303 SS	3/8	3/8"	16.5-18.0	6.2	19.0	22.0	18.5	34.5	14.5	20 g
	090. 003	○	○	○		3/8	1/2"	20-22.0	6.2	21.2	23.8	18.5	36.5	16.5	20 g
	090. 013	○	○	○		3/8	3/4"	25-27.5	7.8	24.5	26.5	22.0	39.5	17.5	25 g
	090. 023	○	○	○		3/8	1"	32-34.5	10.8	30.0	31.0	22.0	44.0	21.0	32 g
	090. 033	○	○	○		3/8	1 1/4"	40-43.0	12.8	34.0	35.5	25.0	48.0	25.0	38 g





Retaining nuts

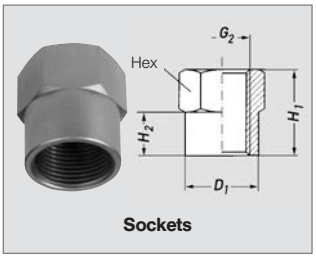
For series	Ordering no. Type	Material no. 16 AISI 303	17 AISI 316Ti	30 Brass	56 POM	5E PVDF	Dimensions [mm] BSPP	H_1	H_2	D	Hex	Weight (Brass)
2TR/468/548 652/660/679 684	**065. 200**	○	○	○	-	-	3/8	13.0	10.0	12.8	22	25 g
	065. 200	-	-	-	○	○	3/8	14.5	11.5	12.8	22	
	069. 000	○	○	○	-	-	UNF 11/16	13.0	10.0	12.8	22	
656/657 664/665	**065. 600**	○	○	○	-	○	3/8	16.0	13.0	20.1	32	60 g

For filters and non-return valves please refer to page 9.8

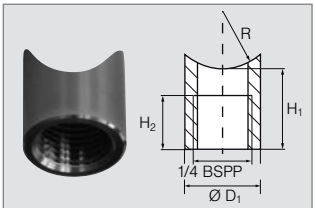
Example for ordering:	Type	+	Material no.	=	Ordering no.
	090. 053	+	51	=	090. 053. 51

Accessories

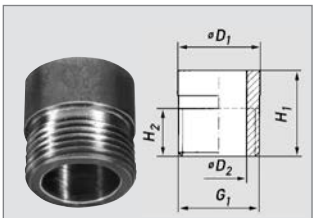
Sockets / Nipples



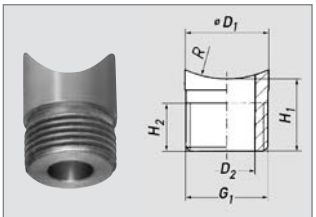
Sockets



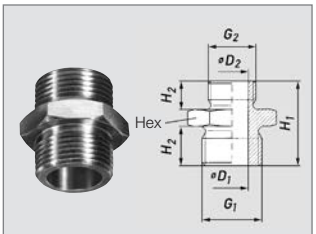
Sockets with radius
(R=10/13/16/20/25 or 31 mm)



Nipple



Nipple with radius
(R=10/13/16/20/25 or 31 mm)



Double nipples

For series	Type	Material no. 02 Steel	1Y AISI 316L	17 AISI 316Ti	30 Brass	53 Polypropylene	G_1	G_2	H_1	H_2	D_1	D_2	Hex	Weight (Brass)
For all nozzles with 1/8" male thread.	**040. 270**	-	○	-	○	-	-	1/8 BSPP	20	10	13.8	-	14	20 g
For all nozzles with 1/4" male thread.	**061. 220**	-	○	-	○	-	-	1/4 BSPP	20	10	16.8	-	17	25 g
For all nozzles with 3/8" male thread.	**040. 271**	-	-	○	○	-	-	3/8 BSPP	20	10	21.5	-	22	25 g
	040. 271	-	-	-	-	○	-	3/8 BSPP	20	10	24.5		22	25 g
For all nozzles with 1/4" male thread.	**040.228. xx.yy***	-	○	-	-	-	1/4 BSPP	-	18	12	17	-	-	16 g
2TR/216/302 308/350/548/468 679/684/652	**065. 210**	○	-	○	○	○	3/8 BSPP	-	18	10	17.2	11.5	-	20 g
306/307 502/503 656/657	**065. 610**	○	-	○	-	○	3/4 BSPP	-	27	14	28	18	-	61 g
2TR/216/302/308/350 548/468/679/684/652	**065. 217. xx. yy***	-	-	○	-	-	3/8 BSPP	-	18	10	17.2	11.5	-	20 g
2TR/216/302/308 350/548/468 679/684/652	**065. 215**[1)]	-	-	○	○	-	3/8 BSPP	1/4 BSPP	25	10	10	7	22	30 g
	065. 211	-	-	○	○	-	3/8 BSPP	3/8 BSPP	25	10	11.5	-	22	25 g
656/657	**065. 611**	-	-	○	○	-	3/4 BSPP	3/4 BSPP	35	14	18	-	32	90 g

* Replace **xx** by material no. and **yy** by radius R

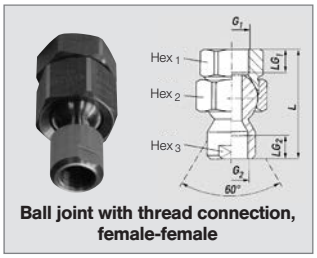
[1)] Not to be used with non-return valve or filter.

Example for ordering:	Type	+	Material no.	=	Ordering no.
	040. 270	+	**1Y**	=	**040. 270. 1Y**

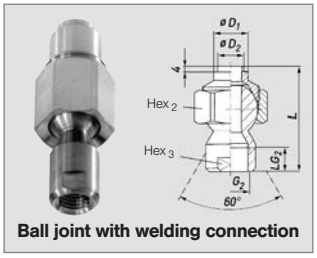
Accessories

Ball joints

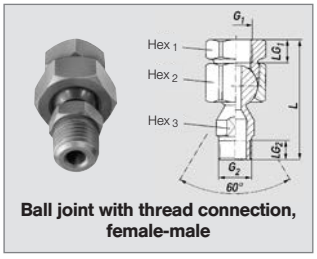
Allround swivelling action of 30°.
No sealings, no wear.
Long service life even after many adjustments.
P_{max}: 25 bar.



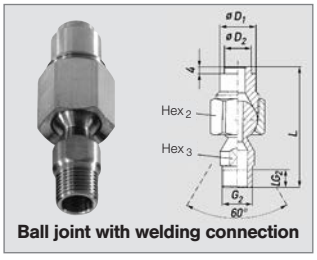
Ball joint with thread connection, female-female



Ball joint with welding connection



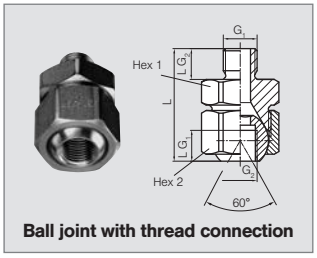
Ball joint with thread connection, female-male



Ball joint with welding connection

For series	Type	Ordering no. Material no. 16 AISI 303/AISI316Ti	16 AISI 303	30 Brass	Code	Dimensions [mm] D_1	D_2	G_1 BSPP	G_2 BSPP	L_{G1}	L_{G2}	L	Hex 1	Hex 2	Hex 3	Weight (Brass)
For all nozzles with 1/4" male thread.	**092. 020**	-	○	○	**AD**	-	-	1/4	1/4	12.0	11.5	60.3	27	27	17	60 g
	092. 021	-	○	○	**AF**	-	-	3/8	1/4	12.0	11.5	58.3	27	27	17	80 g
For all nozzles with 3/8" male thread.	**092. 030**	-	○	○	**AF**	-	-	3/8	3/8	12.0	12.0	56.7	27	30	19	80 g
For all nozzles with 1/4" male thread.	**092. 020**	○	-	-	**SD**	20.0	15.0	-	1/4	-	11.5	64.3	-	27	17	60 g
For all nozzles with 3/8" male thread.	**092. 030**	○	-	-	**SF**	22.0	15.0	-	3/8	-	12.0	58.7	-	30	19	80 g
2TR/216/302/308/350 548/468/679/684/652	**092. 022**	-	○	○	**AD**	-	-	1/4	3/8	12.0	10.0	63.8	27	27	17	80 g
	092. 022	-	○	○	**AF**	-	-	3/8	3/8	12.0	10.0	61.8	27	27	17	85 g
2TR/216/302/308/350 548/468/679/684/652	**092. 022**	○	-	-	**SE**	20.0	15.0	-	3/8	-	10.0	67.8	-	27	17	80 g

Compact ball joints for narrow installation conditions



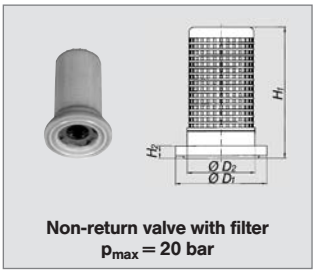
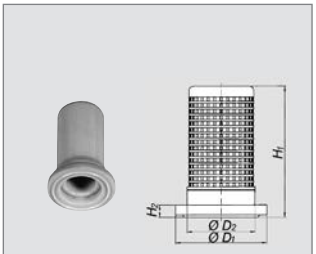
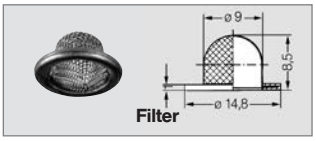
Ball joint with thread connection

For all nozzles with 1/8" male thread.	**092. 010**	-	○	○	**AA**	-	-	1/8	1/8	8.0	8.0	29.3	22	24	-	70 g
For all nozzles with 1/4" male thread.	**092. 024**	-	○	○	**AC**	-	-	1/4	1/4	12.0	12.0	44	27	27	-	140 g
For all nozzles with 3/8" male thread.	**092. 030**	-	○	○	**AE**	-	-	3/8	3/8	12.0	12.0	44	27	30	-	160 g

Example for ordering:	Type 092. 020	+	Material no. 16	+	Code AD	=	Ordering no. 092. 020. 16. AD

Accessories

Non-return valves / filters

	For nozzle size	Ordering no. Type	Mat.-no. 56 POM	Mat.-no. 26 Monel/Copper	Colour	Opening pressure [bar]	Closing pressure [bar]	Mesh size [mm]	Dimensions [mm] H_1	H_2	D_1	D_2	Weight
 Non-return valve with filter p_{max} = 20 bar	xxx.32x-xxx.44x	**065.265** Ball 1.4034 Spring 1.4310	○	–	blue	0.5–1.0	0.4–0.9	0.25	21.5	2.0	14.8	11.0	2 g
	xxx.48x-xxx.56x	**065.266** Ball 1.4034 Spring 1.4310	○	–	red	0.4-0.5	0.35-0.45	0.65	21.5	2.0	14.8	11.0	2 g
 Filter	xxx.32x-xxx.44x	**065.257**	○	–	blue	–	–	0.25	21.5	2.0	14.8	11.0	2 g
	xxx.48x-xxx.56x	**065.256**	○	–	red	–	–	0.65	21.5	2.0	14.8	11.0	2 g
 Filter	xxx.32x-xxx.44x	**065.252**	–	○	–	–	–	0.50	8.5	1.0	14.8	9.0	1 g

Example for ordering:	Type	+	Material no.	=	Ordering no.
	065. 265	+	56	=	065. 265. 56

Accessories

Gaskets / Teflon sealing tape

Gaskets

For series	For nozzle size	Ordering no. Type	Material no. 55 PTFE	71 Cu. ISOPL. 750	72 EWP 210 (asbestos free)	73 Soft rubber	Dimensions [mm]	Weight ca.
610	1/8 BSPP	**061. 040**	-	-	○	-	ø 10 x ø 14 x 1	0.13 g
212/612	1/4 BSPP	**061. 240**	○	○*	○	-	ø 13.2 x ø 17 x 1(*2)	0.20 g
460/461 616/617 689	3/4 BSPP	**061. 640**	-	○*	○	-	ø 26.5 x ø 32 x 1(*2.5)	0.50 g
461	1 1/4 BSPP	**062. 140**	-	-	○	-	ø 42 x ø 50 x 1	1.20 g
461	2 BSPP	**062. 540**	-	-	○	-	ø 60 x ø 70 x 2	3.92 g
468/652 679/684	retaining nut 3/8"	**065. 240**	○	-	○	○	ø 11 x ø 15 x 1	0.14 g
656/657	retaining nut 3/4"	**065. 640**	-	-	○	-	ø 18 x ø 24 x 1	0.50 g

Teflon sealing tape for connecting cylindrical female threads and conical male threads.	**Ordering no. 095. 009. 55. 09. 30.0**	Dimensions: 12 mm x 0.1 mm x 12 m

Example for ordering:	**Type** **061. 040**	**+**	**Material no.** **72**	**=**	**Ordering no.** **061. 040. 72**

QUESTIONNAIRE NOZZLE ARRANGEMENT

Name _____ Phone _____

Company / Function _____ Telefax _____

P.O. Box / Street _____ E-Mail _____

Post Code / Town _____

Country _____

Description of application

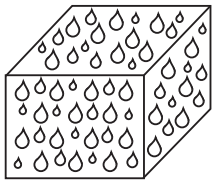
Operating conditions _____

Atmosphere _____

Pressure _____ Temperature _____

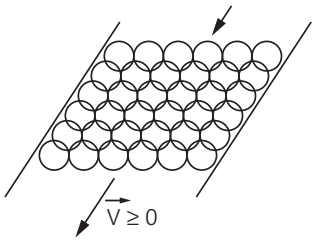
1. Distribution of liquid

1.1 Droplet distribution in space



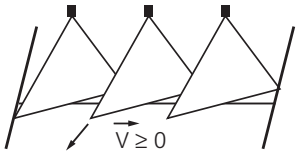
Atomization
☐ Very fine 20 µm – 150 µm
☐ Fine 150 µm – 300 µm
☐ Middle 300 µm – 1000 µm
☐ Coarse >1000 µm
Space
dimensions _____

1.2 Liquid distribution on surface



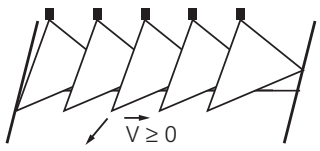
☐ Normal liquid distribution
☐ Thin film
☐ Thick film
Surface width _____
Belt speed _____

1.3 Even distribution in one line on moving belt



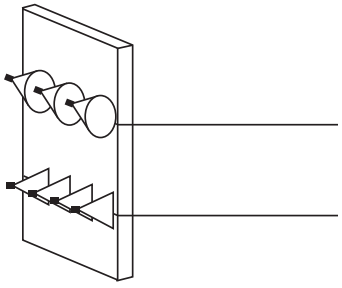
☐ Normal liquid distribution
☐ Thin film
☐ Thick film
Belt speed _____

1.4 Even distribution in one line with high power



Belt width _____
Belt speed _____

1.5 Application: Spraying on vertical surfaces



☐ Surface distribution
(Full cone nozzles)

☐ Distribution in line
(Flat fan nozzles)

1.6 Other applications

2. Kind of distribution

1.) Full cone _____

2.) Hollow cone _____

3.) Flat jet _____

4.) Solid jet _____

Spray angle ☐ 0° ☐ 15° ☐ 30° ☐ 45° ☐ 60° ☐ 90° ☐ 120°

3. Liquid to atomize _____

Volume of liquid

Ingredients

_____

_____

_____

Density _____ Viscosity: _____

Solid material content _____ in %

Liquid temperature _____ °C

4. Further plant equipment

4.1 Liquid

Pump _____ bar _____

Volume of flow _____ m^3/h

4.2 Possibility of twin fluid atomization

Assisting agent

☐ Compressed air Pressure/Volume _____

☐ Steam Pressure/Volume _____

☐ Others _____

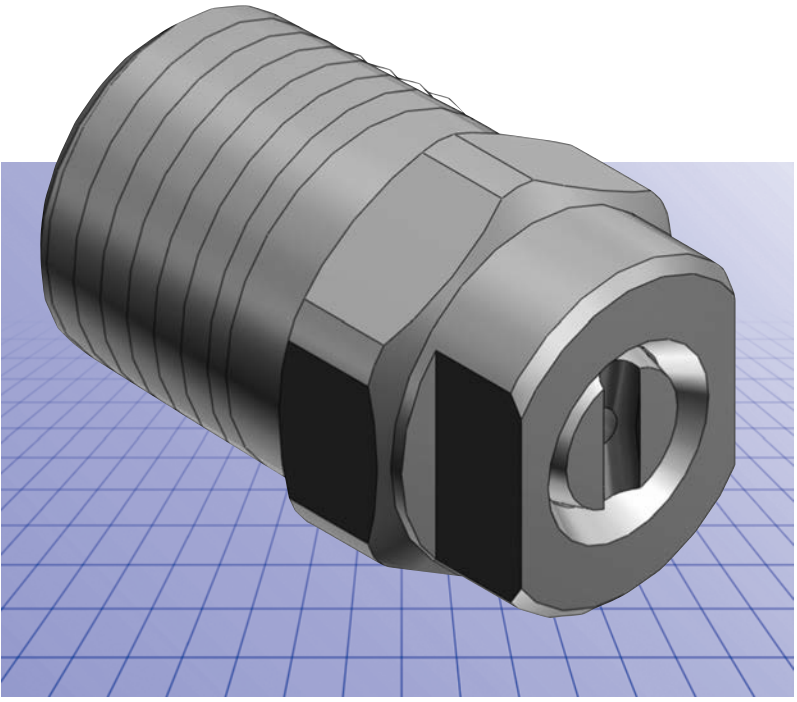
Temperature of assisting agent: _____ °C

ON THE INTERNET, YOU CAN FIND EVEN MORE INFORMATION AND SUPPORT FOR YOUR WORK AT www.lechler.com

This catalogue gives you an overview of our wide product range.

On the Internet you can also find additional information about our entire range of services, work aids, our global presence and much more besides - we are looking forward to your visit.

LECHLER NOZZLES AND ACCESSORIES AS 3D DESIGN DATA AT: http://lechler.partcommunity.com



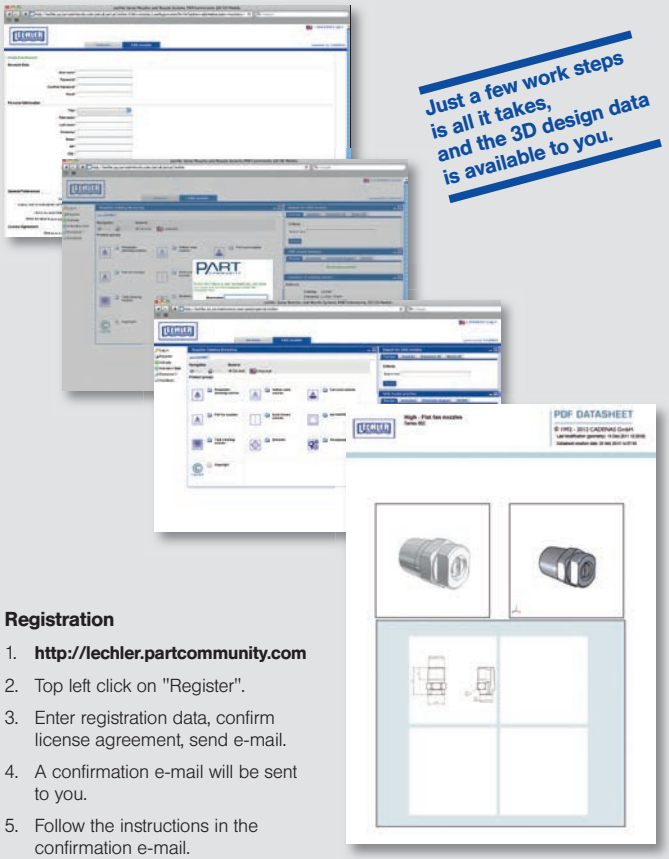
3D design data for Lechler nozzles and accessories is now available to you free of charge for your design work.

- Time-saving, direct download of design drawings and technical data.
- Simple product selection like from the Lechler printed catalogue.
- Preview function with product photo and 3D graphic.
- Available in all common 3D file formats.
- Free use after one-time registration.

http://lechler.partcommunity.com

By offering this service, Lechler once again demonstrates its competence and proofs its technology leadership claim.

Take advantage of this offer to make your work easier. We would be happy to support you.



Registration

1. **http://lechler.partcommunity.com**
2. Top left click on "Register".
3. Enter registration data, confirm license agreement, send e-mail.
4. A confirmation e-mail will be sent to you.
5. Follow the instructions in the confirmation e-mail.
6. Top right click on "Log in".
7. Login: User name + password.
8. Setting the CAD file format:
   a) "Select CAD formats" (left column).
   b) "CAD MODEL for download" (left column).
   c) Select 3D format.
   d) Save.

Download

1. File download: Select nozzle chapter, nozzle design, nozzle series.
2. Select series, click on "Generate CAD MODEL".
3. Click on "Download" in pop-up window.
4. Pop-up window: Click on "Save", select destination folder, "Save" again.

EXPERT KNOWLEDGE FROM THE RELEVANT FIELD IS ALSO ALWAYS A NECESSITY FOR PERFECT USE OF THE NOZZLE TECHNOLOGY.

We have detailed information for you in special brochures.

Yes, I want to know more!
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- ☐ Tank cleaning nozzles
- ☐ Precision spray nozzles for the food and beverage industry
- ☐ Precision spray nozzles for the chemical industry
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- ☐ Precision nozzles for the automotive industry
- ☐ Nozzles for compressed air
- ☐ Nozzles for fire protection
- ☐ SCALEMASTER® HP SUPERIOR Descaling nozzles
- ☐ SCALEMASTER® HP »High Performance«
- ☐ MiniSCALEMASTER®
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- ☐ Pollution control from Lechler
- ☐ VarioCool® Gas conditioning systems
- ☐ VarioClean - NO_x Nozzle lanzes and systems for gaz denitrification
- ☐ Droplet separators
- ☐ Agricultural nozzles and accessories

☐ **Please call me**

My telephone number is:

_____

We want to use nozzles from Lechler for the following application:

_____

_____

_____

We belong to the following industry:

_____

_____

Our address

Name _____

Company/Department _____

Postcode/City _____

P.O. Box/Street _____

Telephone _____

Telefax _____

E-mail _____

FOR YOUR NOTES

FOR YOUR NOTES

Profit from our experts' broad knowledge of nozzles and applications, and from their experience in the industry.

There are **special brochures** for many applications, containing useful tips that you can request simply by using the fax form below, or via e-mail.

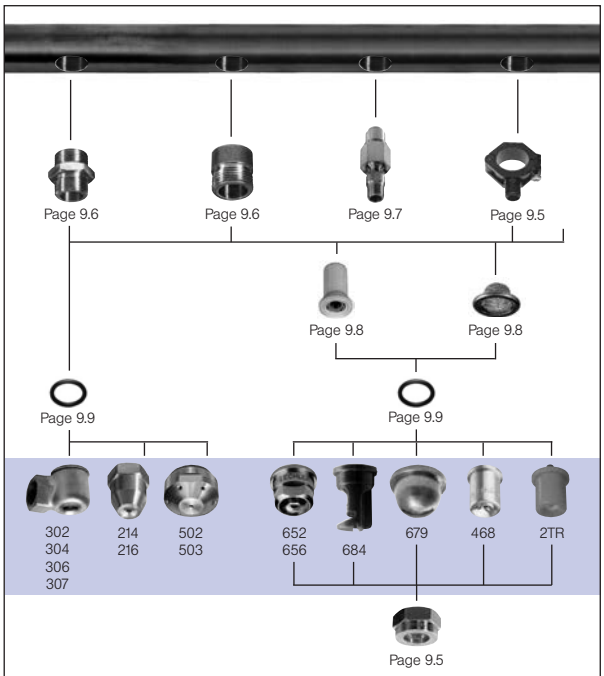
On the fold-out page, we have put together for you a whole host of **assembling possibilities** for Lechler nozzles.

THE RIGHT INFORMATION
IS HALF A PROBLEM SOLUTION.

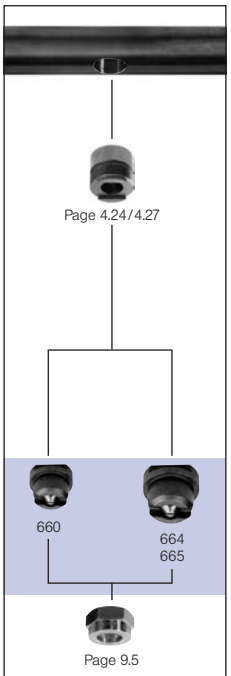
Our experts have documented their knowledge in a professional practice-related language, leaving out all unnecessary theoretical considerations. Background knowledge, technical data and a lot of practical examples show how Lechler spray technologies can simplify work processes, cut down costs, improve on product quality or just enhance productivity the easy way. Success starts with deciding on something that needs to be done. So, just fill in the form opposite and let us know which information you require on Lechler quality spray nozzles and equipment. We'll reply immediately.

IN THIS WAY YOU CAN MATCH NOZZLE ASSEMBLING TO YOUR VERY SPECIAL REQUIREMENTS.

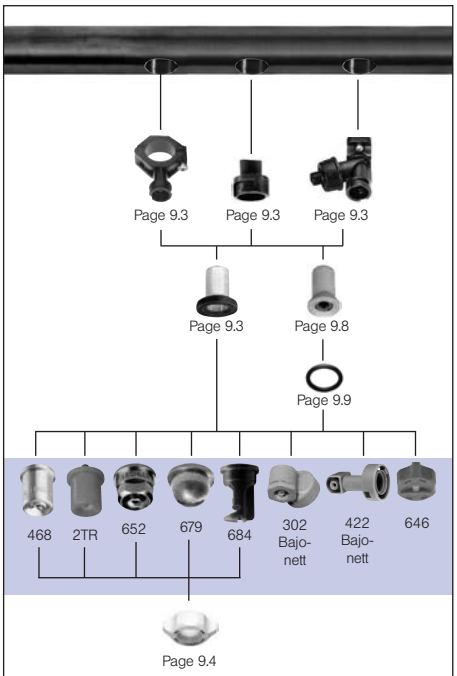
Assembling accessories for nozzles without thread or with female thread.



Assembling accessories for nozzles without thread or with female thread. Standard accessories.

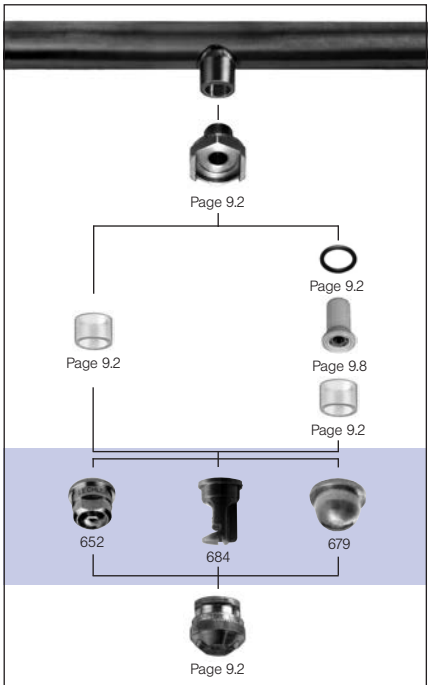


Assembling accessories for nozzles with dove-tail design.



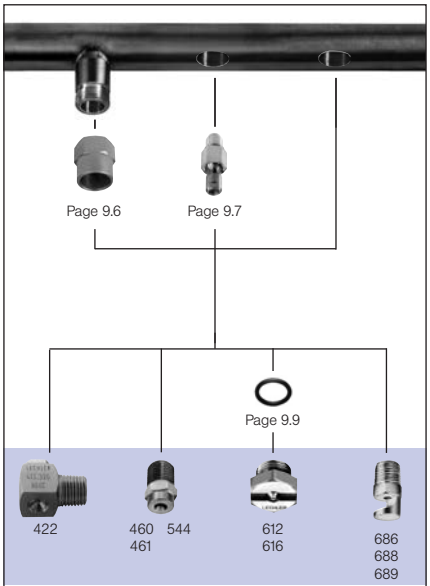
Assembling accessories for nozzles without thread or with female thread. Bayonet quick release system.

TWISTLOC

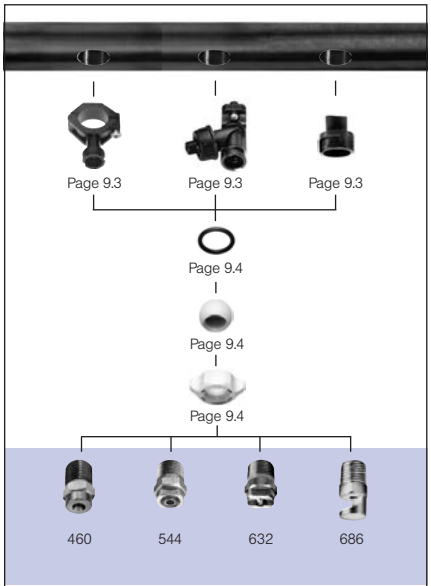


**Assembling accessories for nozzles without thread.
TWISTLOC quick-change nozzle system.**

Assembling accessories for nozzles with male thread.



**Assembling accessories for nozzles with male thread.
Standard accessories.**



**Assembling accessories for nozzles with male thread.
Bayonet quick release system with ball joint.**

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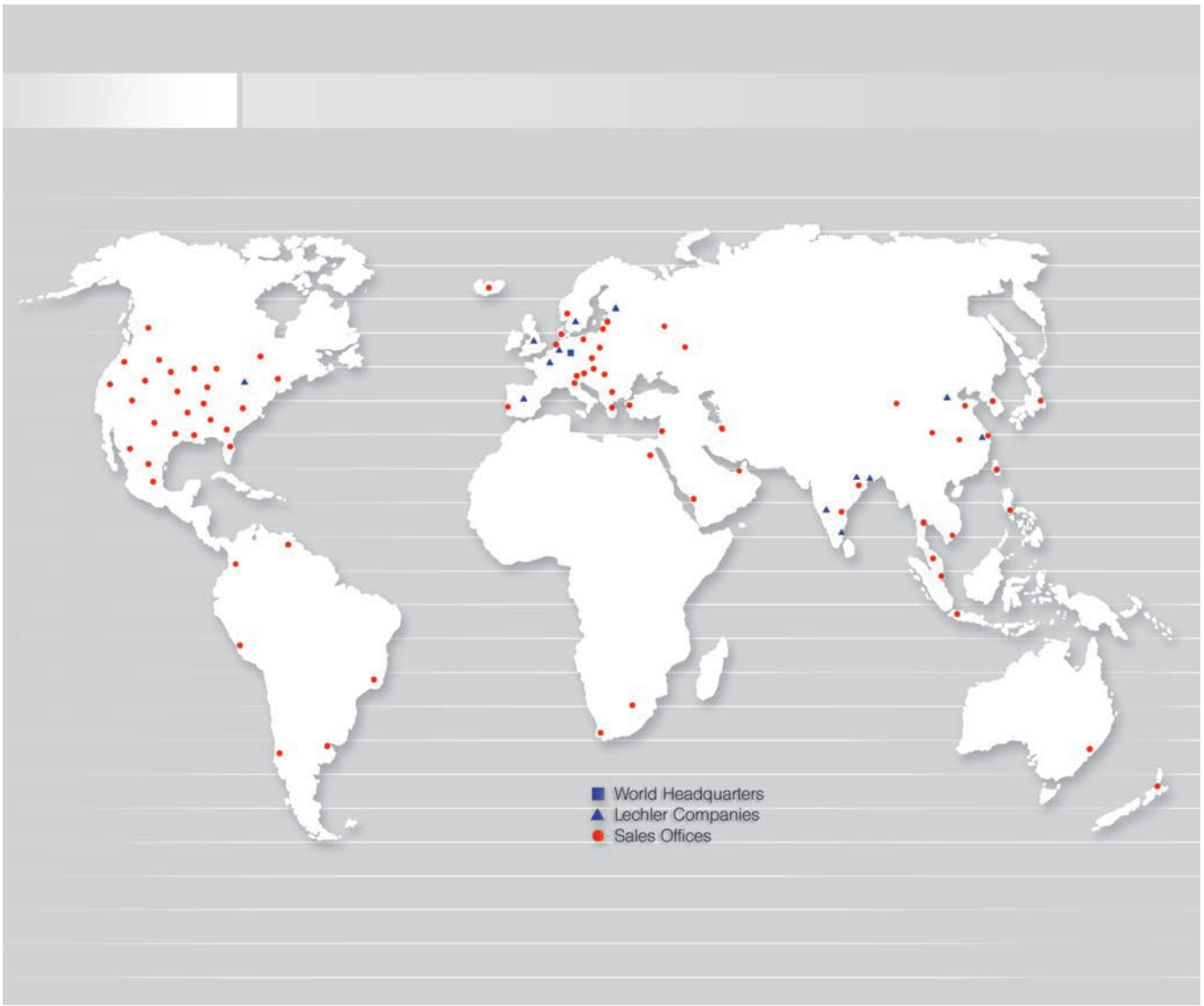
Internet: www.lechler.com



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