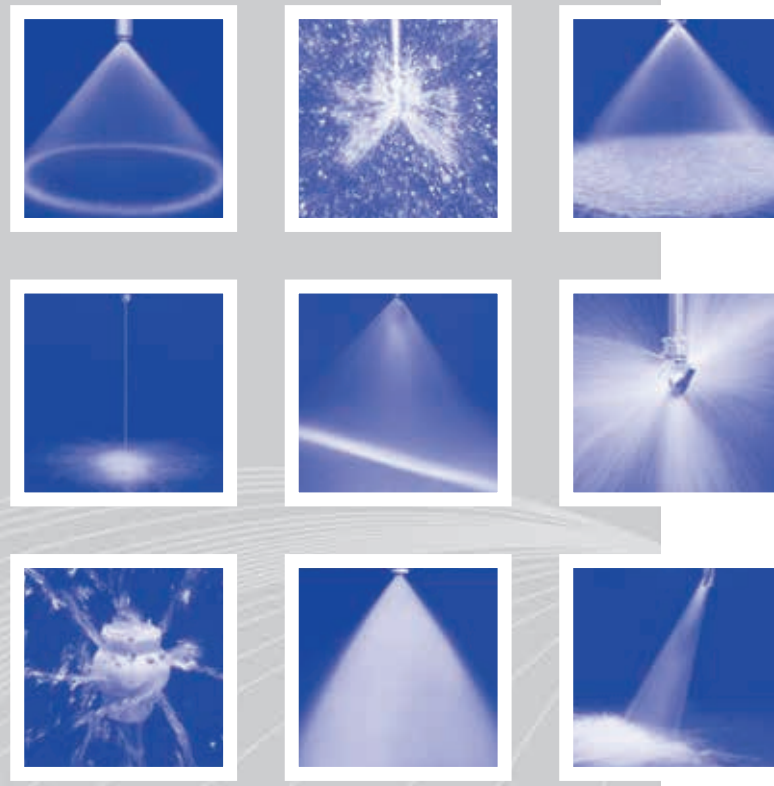
ENGINEERING
YOUR SPRAY SOLUTION

LECHLER

Quick Delivery
Best Value

Precision Spray Nozzles and Accessories Edition ASEAN



Spray Nozzles

INCREASE YOUR PRODUCTIVITY WITH LECHLER SPRAY TECHNOLOGY.

Lechler GmbH is a German family-owned company located in Metzingen near Stuttgart, Baden-Wurttemberg and was founded 1879. The company develops and manufactures approx. 30,000 models of spray nozzles.

Our precision nozzles and systems are widely used in **general industry** (e.g. food and beverage, chemical, pharmaceutical, automotive, electronic industries); **metallurgical industry** (e.g. descaling, roll cooling, continuous casting); **environmental technology** (e.g. SNCR, SCR, and gas cooling) and **agriculture**.

For over 135 years, Lechler products have earned a reputation for excellent quality. The decisive factor was always to meet our customers' requirements through our state of the art and experience. Today, Lechler manufactures nozzles in Germany, China, England, Hungary, India and the USA with more than 700 employees in the group. But despite this international alignment, at our heart, we remain a family-owned company with the typical passion for precision, innovation and the drive to always become that little bit better.

Lechler Spray Technology Sdn. Bhd. in Petaling Jaya, Kuala Lumpur, Malaysia was founded in 2016 and is a wholly owned affiliate of Lechler GmbH, Germany. Our business scope is to supply Lechler group's products, technical solutions and services to customers in South-East Asia. Lechler Spray Technology is very successful in bringing the advanced spray technology and spray solutions from Germany to meet our customer's requirements.

Following the increasing ASEAN market demands and to provide products with high quality, short delivery lead time and competitive price, we are able to deliver from stock in Malaysia to the whole region. Our sales force provides first-class service to customers on-site.

Lechler company in Malaysia

Lechler Germany, headquarters

TABLE OF CONTENTS

TRADITION AND PROGRESS IN SPRAY TECHNOLOGY

Your advantage lies in our productivity

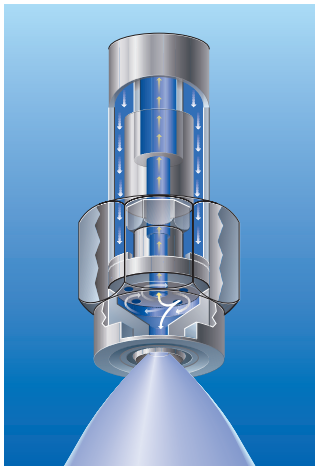
New custom-made manufacturing techniques guarantee productivity and flexibility.

Process automation ensures repeatability and steady properties. For us, this means not only that 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 defines »quality« as the ability of our products to surpass the customers individual requirements for performance.



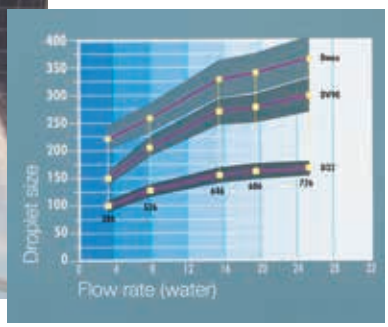
Lechler staff have always worked carefully and carried out permanent quality control from material reception through manufacturing to shipment.
Our products will keep in daily service what we are promising here and now.

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.

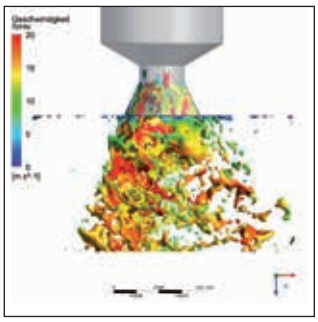


Thanks to this data we can help solve your spraying problem.

Research and development for a better future

For more than 135 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.

PERFECT NOZZLE TECHNOLOGY TO SOLVE MANY INDUSTRIAL TASKS

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.

Chemical and Petrochemical Industry

- Gas treatment
- Gas cooling
- Absorption
- Tank cleaning
- Filter cleaning
- Steam desuperheating
- Gas conditioning
- Fire protection

Pharma, Biotech and Cosmetics

- Tank wetting
- Tank cleaning
- Coating
- Sterilization

Food and Beverage Industry

- Bottling and packaging
- Handling and conveying
- Machine cleaning
- Tank cleaning
- Pasteurisation
- Sterilization and disinfection
- Blanching and cooling
- Humidification
- Blowing off and drying

Breweries and Distilleries

- Bottling and packaging
- Handling and conveying
- Machine cleaning
- Tank cleaning
- Pasteurisation
- Sterilization and disinfection
- Blanching and cooling
- Humidification
- Blowing off and drying
- Sparging
- Evaporative cooling

Surface Technology

- Degreasing
- Phosphating
- Surface treatment
- Cleaning
- Blowing off and drying

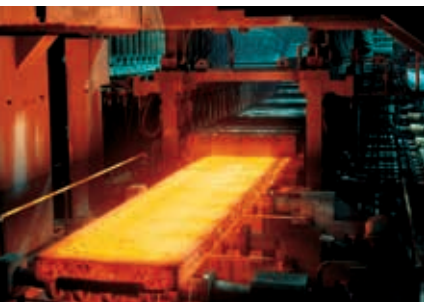
Parts Washing

- Rinsing
- Cleaning
- Degreasing
- Blowing off and drying

METALLURGICAL INDUSTRY

Extreme environmental conditions along with areas having a high need for specialization characterize the metallurgical industry.

To meet the special requirements of this sector beside our standard nozzles we provide a wide range of specially developed and proven nozzles in different versions and materials. With numerous special products and custom-made solutions we are able to optimally support our world-wide customers.



For applications such as

- secondary cooling in continuous casting
- hydro-mechanical descaling in hot rolling
- roll cooling in hot and cold rolling mills
- cooling of hot surfaces and gases
- rinsing of media in pickling lines

we offer suitable, efficient nozzles and nozzle systems for any production stage. As nozzles and nozzle systems play a crucial role in all production stages in terms of process optimization aimed at increasing quality and perfecting production, with our nozzle solutions you also get the benefits of cost-efficiency.

At the same time, customers have at their disposal a competent team of experienced specialists employing state-of-the-art design and production methods.

With our unsurpassed nozzle know-how and a well-founded knowledge of the metallurgical industry we are a reliable partner for every field of application.

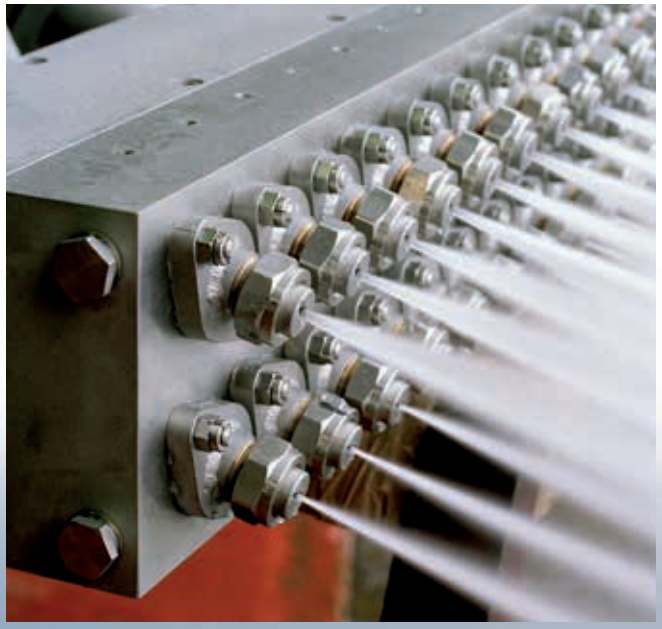
Besides the construction of new plants, one alternative can be the optimization of existing ones. The most common reasons for this are

- identifying and remedying quality problems
- improving ease of maintenance and lowering maintenance costs
- increasing production by increasing the production speeds
- changing the product formats and the material qualities (product mix)

In most cases, the decision involves a combination of the above reasons. It is therefore important for the aims to be clearly defined.

Lechler products and services for the metallurgical industry

- Precision nozzles
- Nozzles and application systems
- Nozzle configurations
- Application software
- Computer simulation
- Nozzle measuring technology
- Plant audits and process optimization
- Maintenance and commissioning
- Training
- Spare part management



METALLURGICAL INDUSTRY

Lechler system audits

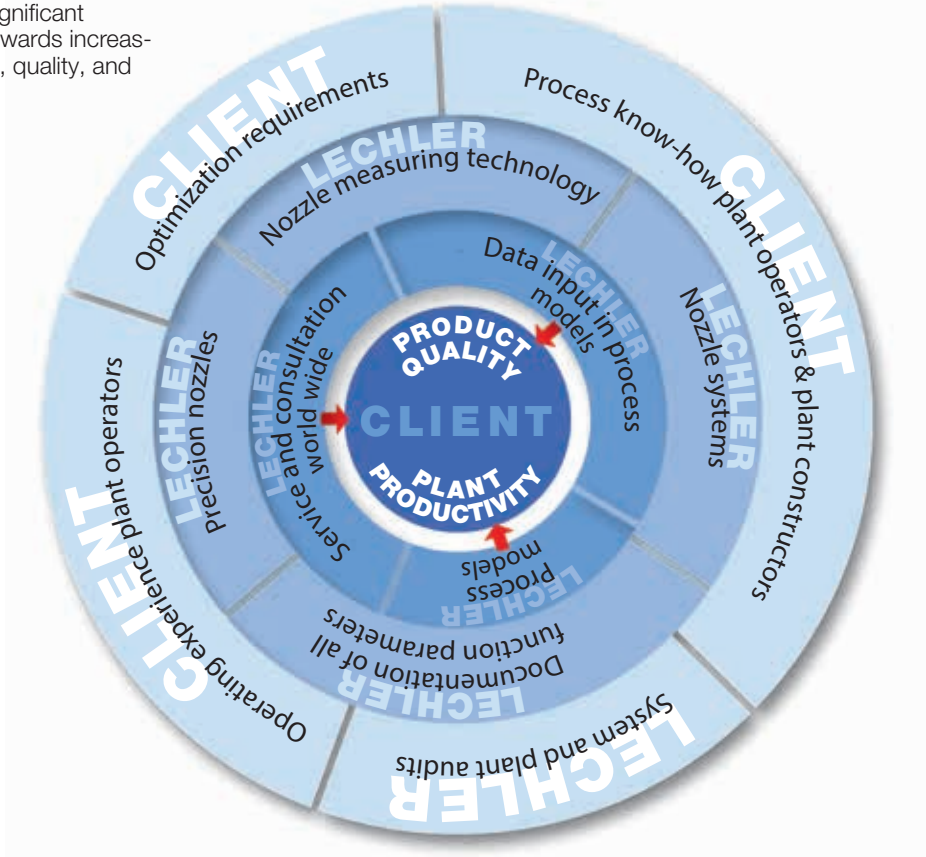
Roll cooling in hot and cold rolling mills (steel, aluminium and non-ferrous metals) and also secondary cooling in continuous casting machines for steel are very complex systems and form part of the complete production processes. The full optimization potential can often be determined only via a precise study of all the important details. Lechler system audits include an evaluation of the existing production, performance and quality data, along with a carefully documented final report which, in addition to the collected and analyzed data, also contains suggestions for optimizing your system.

Lechler nozzle configuration

An optimum nozzle configuration is the main prerequisite for fulfilling the production and quality specifications of all plants.

New nozzle solutions open up many different possibilities for saving costs. The optimization of nozzle systems can also make a significant contribution towards increasing production, quality, and flexibility.

With the help of Lechler's own PC-based simulation programs, we can analyze the current situation and make optimization suggestions based on state-of-the-art nozzle technology.



METALLURGICAL INDUSTRY

Continuous casting of steel

From simple billet casters for rebars to sophisticated machines for tire cord grades or for casters for beam blanks and round blooms, Lechler offers the optimal nozzle solution both for water only cooling or airmist systems. The same goes for thick or thin slab casters. Solutions for Hard Hard Cooling®, intensive cooling and soft reduction applications are also available.

Rolling mill technology

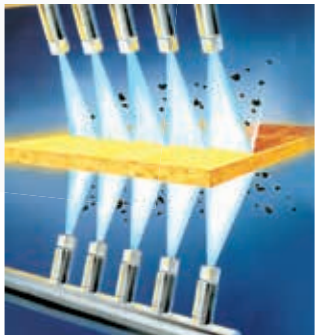
The Lechler product portfolio for this process step comprises nozzles for roll cooling solutions as well as nozzles for hydromechanical descaling. Selective roll cooling systems and valves are also available.

Typical nozzles used in rolling mills are

- Descaling nozzles, e.g. SCALEMASTER®
- Flat jet nozzles

Typical nozzles used for continuous casting are

- Twin fluid nozzles / Air-mist nozzles (pneumatic), e.g. Billetcooler, Mastercooler
- Single fluid nozzles, e.g. full cone or flat jet nozzles

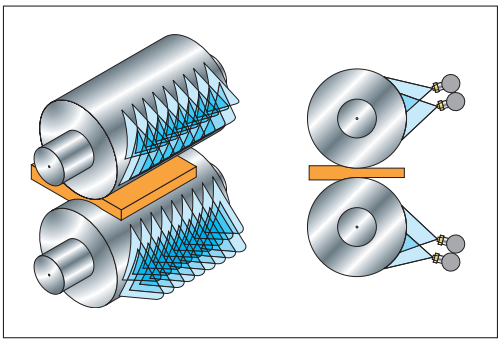


METALLURGICAL INDUSTRY

SELECTOSPRAY®
roll cooling systems

With the SELECTOSPRAY® roll cooling system, Lechler provides an industry standard for selective roll cooling in the rolling of flat steel, aluminium and other non-ferrous strips.

With the help of Lechler's own PC-based simulation programs, we can analyze the current situation and make optimization suggestions based on state-of-the-art nozzle technology.



Pickling lines

The closer it comes to the final step of a production process, the more important the direct result is. Hence, the pickling line has a decisive function in the entire production chain of steel. There is an amazing number of options to improve and optimize your process by nozzles and nozzle arrangements.

The most common nozzles used in pickling lines are

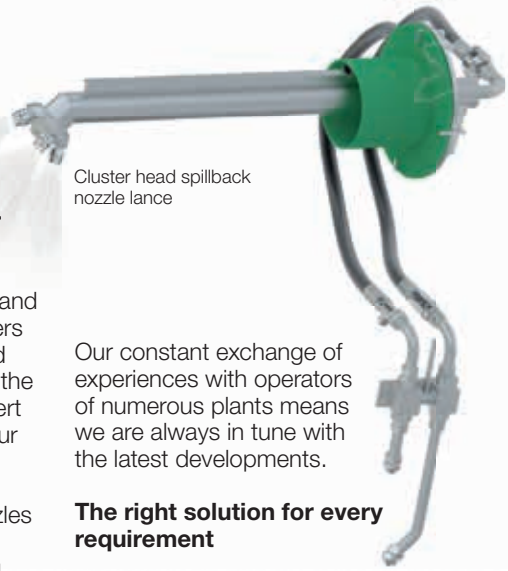
- flat jet nozzles
- tongue-type flat jet nozzles
- axial-flow full cone nozzles
- air nozzles, eductor nozzles and tangential nozzles

For other applications such as cooling processes, dedusting or quenching, Lechler also offers the suitable nozzles.

ENVIRONMENTAL TECHNOLOGIES

Nozzle lance for SCR applications

VarioJet® lance



Cluster head spillback nozzle lance

Efficient cooling and conditioning with Lechler lances and systems

When it comes to effective protection of our environment, know-how, a sense of responsibility and commitment are imperative.

As an international specialist for nozzle engineering, we have access to a wide-ranging knowledge and experience in the field of energy and environmental technology. Therefore, we are a competent partner in this sector.

Leading OEMs 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 organization.

Specializing in systems along with the understanding of processes – our solutions for environmental applications are successful world-wide.

We provide nozzles, nozzle lances, and systems for applications such as:

- Gas cooling and conditioning
- Denitrification (DeNOx)
- Desulphurization (DeSOx)
- Droplet separators

Lechler products and services for cooling and conditioning applications

The base frame and the base modules are identical for all three configurations. The difference lies in the number of lances and injection levels, as well as in the software and sensor packages for the successful control of all necessary influencing factors.

Innovative solutions for trending markets

Lechler is your innovative and reliable partner in all matters relating to gas cooling and conditioning. Always with the aim of employing our expert knowledge to optimize your process.

For many years now, nozzles and spray systems for industrial gas conditioning have been an integral part of our Environmental Technologies portfolio.

An international team of outstanding engineers and process engineers continuously develop new solutions and adapt them to new challenges. Through the use of global databases and close cooperation with external specialized institutes and renowned plant manufacturers, we have built up an interdisciplinary knowledge base – and with it optimal process integration.

Our constant exchange of experiences with operators of numerous plants means we are always in tune with the latest developments.

The right solution for every requirement

With our wide range of nozzles and gas conditioning systems, we offer the perfect solution for every application. Every plant naturally comes with its own set of challenges.

Our nozzle lances and systems have proved in different applications and plants all over the world:

- Cement and lime industry
- Waste incineration plants
- Power plants
- Steel industry
- Glass industry
- Chemical industry

ENVIRONMENTAL TECHNOLOGIES

VarioCool® gas cooling system

Our valve skid units for regulating the flow rates of water and atomizing air are individual customer-specific solutions. Based on the requirements in each case, our first step is to design an overall concept and select the best components in order to create a perfectly tailored solution.

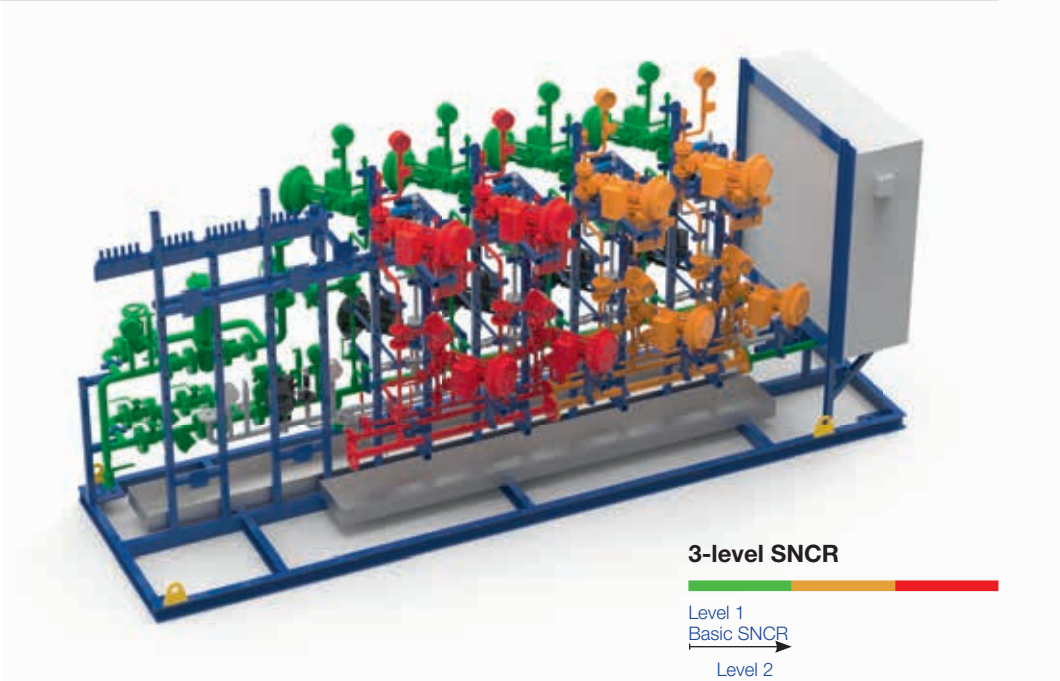
An exact knowledge of the characteristic properties of our nozzles is the key here. For only a complete system that is coordinated to how the nozzles function and operate will ensure smooth and economical operation of the gas cooling system.

Electrical wiring on junction box

Control cabinet with complete PLC

VarioClean® - NOx The denitrification solution that grows with you

Depending on the legal situation, the modular system can be flexibly upgraded across the three configuration levels Basic, Efficiency, and High Efficiency SNCR.



3-level SNCR

Level 1
Basic SNCR

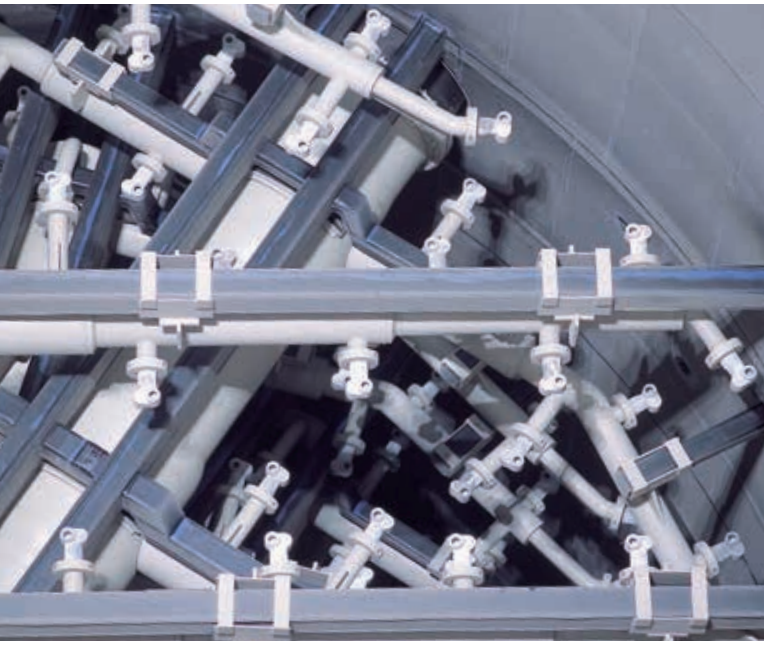
Level 2
Efficiency SNCR

Level 3
High Efficiency SNCR

Talk to us

Your requirements are the first step towards a solution. We are more than happy to help you solve your individual tasks. Tell us your objectives and we will take care of the solution. If the solution is not yet available, we will tailor-make one for you. That is our promise.

ENVIRONMENTAL TECHNOLOGIES



Flue gas desulphurization

Air pollution, caused by the emissions of power stations, waste incineration plants, factories, etc., severely affects our environment. Since its effects are to be seen in every direction, operators of combustion and steam raising plants have become deeply aware of the problem and government authorities are issuing ever more stringent regulations aimed at reducing environmental pollution.

As a specialist in the field of flue gas cleaning systems, Lechler too has faced a challenge, because the majority of flue gas cleaning plants is equipped with precision nozzles of Lechler manufacture – atomizing nozzles designed exactly to meet the needs of modern pollution control systems.

Criteria for the design of such nozzles include:

- Tower cross-section
- Flue gas analysis
- Gas flow rate
- Gas temperature
- Installation conditions
- The nature of the liquid to be sprayed and its composition

Being optimally designed from a fluidics viewpoint, Lechler nozzles meet all the demands of modern technology for nozzles used for the cleaning of outgoing air – narrow dropletsize spectrum and even droplet distribution over the tower cross-section – as essentials for intensive mass transfer between the gas and liquid. The types of nozzles offered are as widely varied as the materials used for their construction.

In selecting the most suitable nozzle for a particular application, these major factors have to be considered

- the necessary droplet spectrum
- the even distribution of the droplets
- an intensive water vorticity
- internal geometries to avoid nozzle blockages
- the choice of wear-resistant material
- reliable means of mounting the precision nozzles

Lechler precision nozzles play an extremely important role in flue gas desulphurization plants

- in the quench zone
- in the absorber zone
- in the droplet separator zone

In a great many desulphurization plants around the world, Lechler precision nozzles are selected to suit the desulphurization process requirements and have been installed to provide a reliable solution.

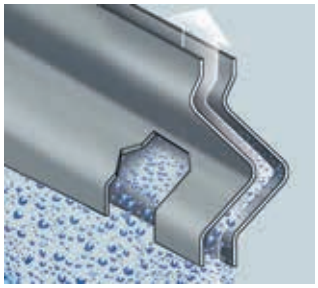
ENVIRONMENTAL TECHNOLOGIES

Droplet separators

Droplet separators have long played a vital role in many process operations in pulp and paper, sugar, or gas washing plants applications. They become even more important through more stringent environmental protection regulations, higher efficiency, and higher product quality requirements.

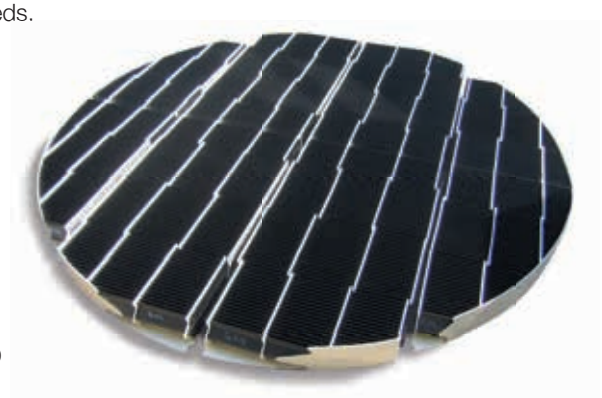
Lechler droplet separators are reliable figures in your plant. Wherever liquid has to be separated efficiently and benificially, Lechler high-performance separators are the right choice.

Whether vertical or horizontal flow direction, whether made of plastics or stainless steel, or as frame unit ready for installation or complete with housing or pressure vessel – Lechler droplet separators are designed and manufactured completely according to your needs.



Vertical gas flow

Horizontal gas flow



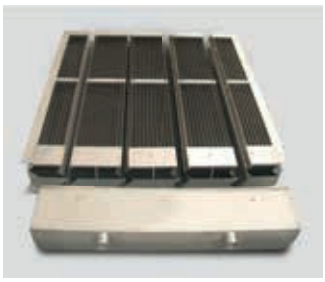
LTV 400

Applications

- **Energy industry**
  e.g. steam drums, steam generation, exhaust gas cleaning
- **Pulp & paper industry**
  e.g. black liquor evaporation, chemical recovery, exhaust gas cleaning
- **Food industry**
  e.g. juice evaporation, sugar evaporation
- **Chemical industry**
  e.g. condensation, desalination, evaporation, gas scrubbing systems
- **Oil and gas industry**
- **Metallurgy**

Whatever your application looks like. We take care of your problem – with tailor-made solutions.

LTH 100



LTH 600

WHICH (SPRAY) CHARACTER GOES WITH YOU?

Spray technology has its own rules

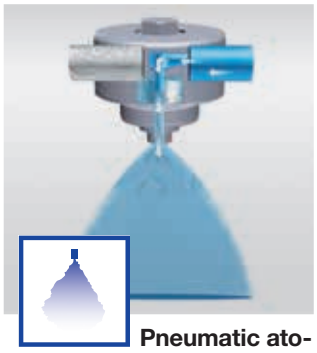
When a liquid flow is made to disintegrate into more or less fine droplets, this is called atomization. The necessary prerequisites are mainly reached by the following principles of atomization:

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

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.

Hollow cone spray

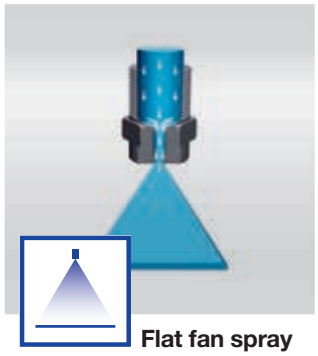
Axial-flow hollow cone nozzles
The liquid supply is axial, rotary motion of the liquid is generated by so-called swirl inserts or vanes. Axial-flow hollow cone nozzles allow to produce the finest droplets achievable with pressure-operated nozzle designs. This is also called hydraulic atomization.

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.

Full cone spray

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.

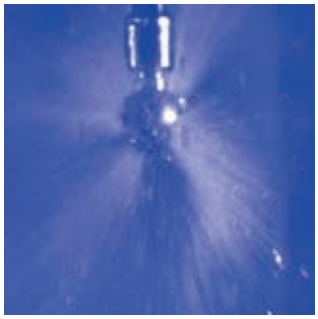
Tongue-type nozzles are of a special kind.
The flat fan pattern is generated by a solid stream, impinging upon an external deflector plate (»the tongue«). Tongue-type nozzles are particularly clog-proof and produce a sharply delimited flat fan pattern.

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

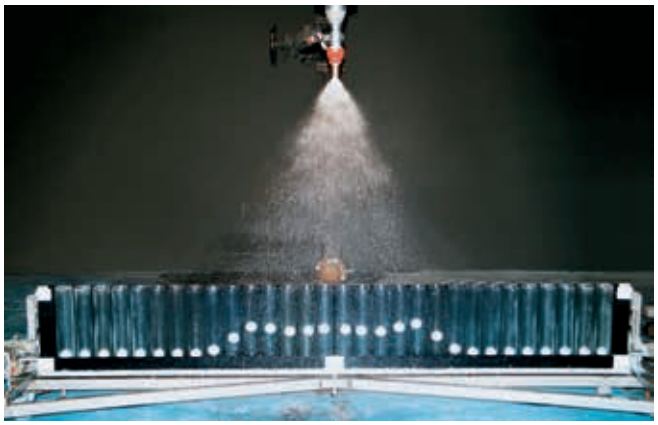
- Flow rate
- Spray angle
- Liquid distribution
- Spray impact
- Droplet size and droplet spectrum

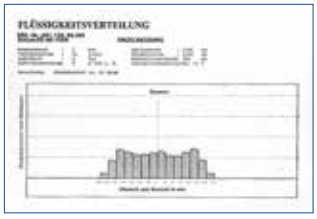
Flow rate, pressure and spray angle

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.

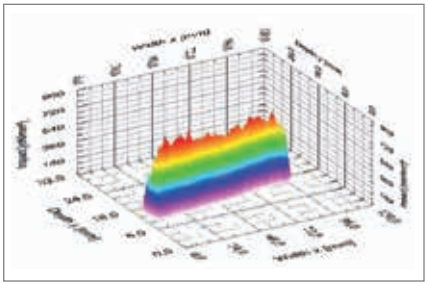
Jet pressure distribution measurements show the regularity of the jet force curve on the impacted surface.
In highpressure applications in particular, this data is of great practical use because it relates to the maximum conversion of pump energy into cleaning effect.

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.

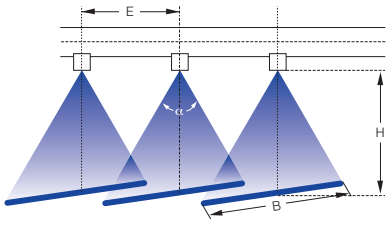
One of the most precise measuring devices for this is the laser doppler particle analyser. Since this measuring method simultaneously measures both droplet size and droplet velocities, we obtain a complete description of the atomization characteristic.



EXAMPLES FOR NOZZLE ARRANGEMENT

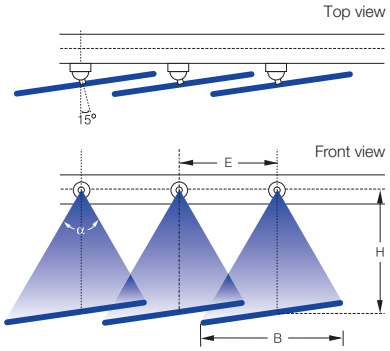
Arrangement of flat fan nozzles with parabolic liquid distribution

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

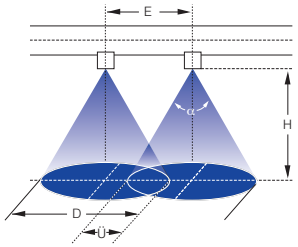
In order to achieve an even surface coverage the nozzles need to be aligned in such a way that spray widths B overlap by 1/3 to 1/4. Therefore the nozzles should be inclined in an angle of 15° to the vertical of the horizontal axis of the tube (either with a weld base at an angle or a Lechler ball joint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



Arrangement of full cone and hollow cone nozzles

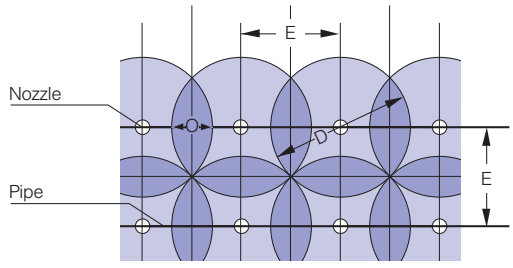
For full cone and hollow cone nozzles, the distance E should be sized so that the spray cones overlap by about 1/3 to 1/4.

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

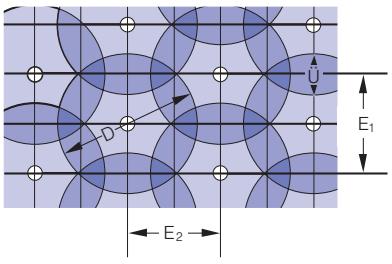
Square arrangement



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.

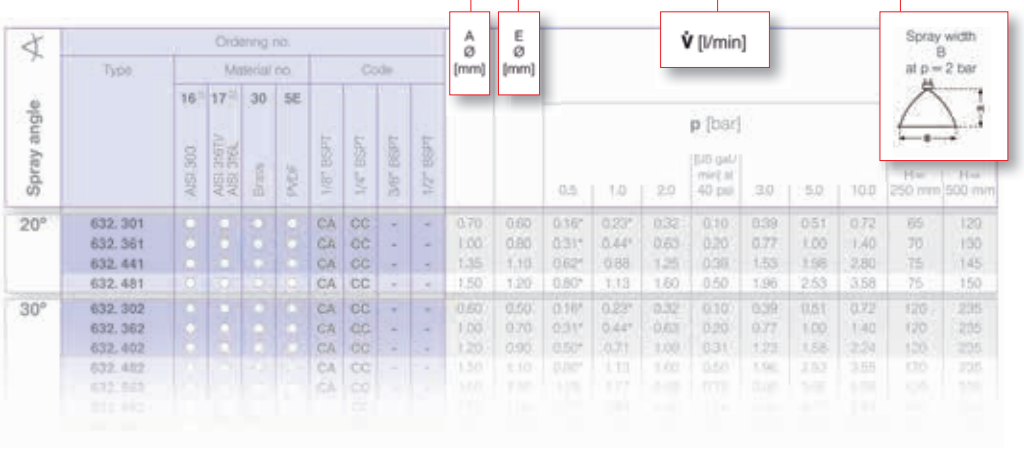
Lechler nozzles are manufactured with the highest precision and undergo permanent quality checks. Nevertheless, production-related tolerances can affect the jet angle, volume flow, droplet size and droplet distribution.

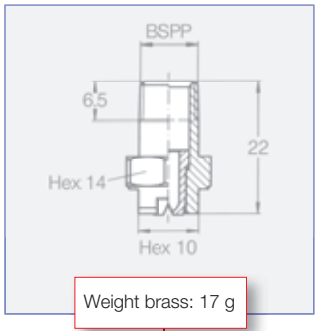
A (equivalent bore diameter)
Applies to elliptical discharge holes of flat fan nozzles. A cylindrical hole with a diameter A has the same surface area as the ellipse.

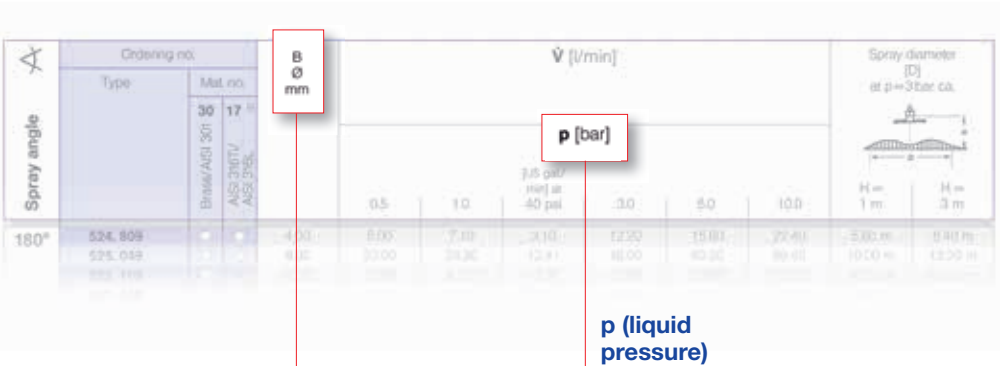
E (narrowest free cross section of the nozzle)
Important characteristic for determining the pre-filtration. Can be less than B due to several swirl ducts. (Nozzle filter see page 68)

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
All weight information refers to brass, unless otherwise stated. See page 12 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.

Single fluid nozzles	Liquid Pressure 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

Unit	Conversion			
	bar	Pascal [Pa] = N/m²	psi	lb/sq ft
1 bar	1	100000	14.5	2089
1 Pascal [Pa]	$1 \cdot 10^{-5}$	1	$14.5 \cdot 10^{-5}$	0.0209
1 psi	0.06895	6895	1	144
1lb/sq ft	$0.479 \cdot 10^{-3}$	47.9	$6.94 \cdot 10^{-3}$	1

V Volume

Unit	Conversion			
	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

Unit	Conversion				
	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

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

ρ Change in specific weight

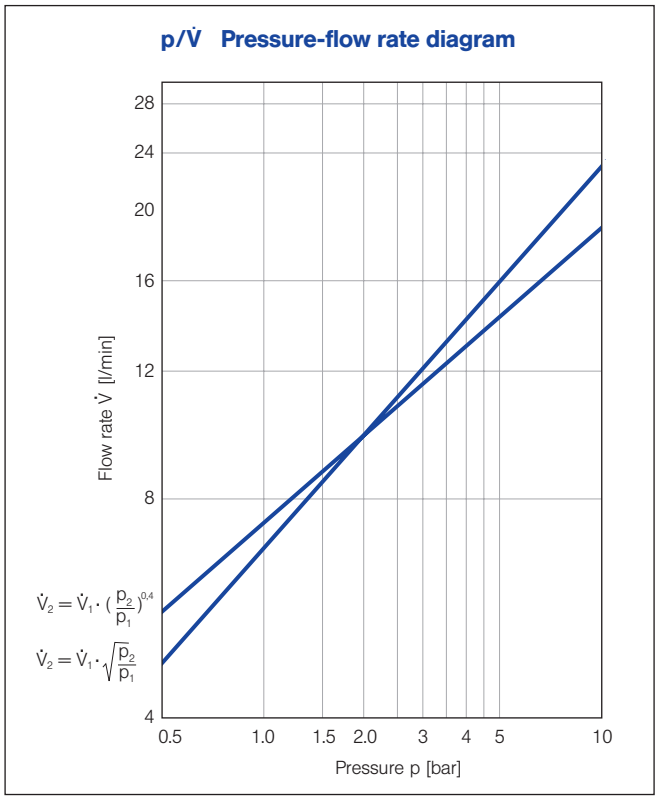
$\dot{V}_w = \frac{\dot{V}_{Fl}}{X}$	$\dot{V}_w$ = Flow rate (water) [l/min, l/h]
$\dot{V}_{Fl} = \dot{V}_w \sqrt{\frac{\rho_w}{\rho_{Fl}}} = \dot{V}_w \cdot X$	$\dot{V}_{Fl}$ = Flow rate of liquid, with a specific weight that differs from 1
$X = \sqrt{\frac{\rho_w}{\rho_{Fl}}}$	X = Multiplier ρ = Specific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

p/V̇ Pressure-flow rate diagram

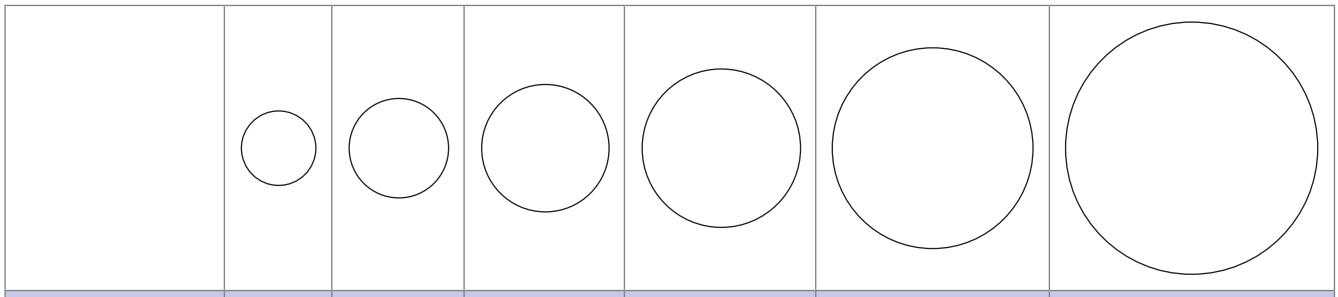


Conversion factors for determining the weight of various materials/ diameters

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.

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

NEW

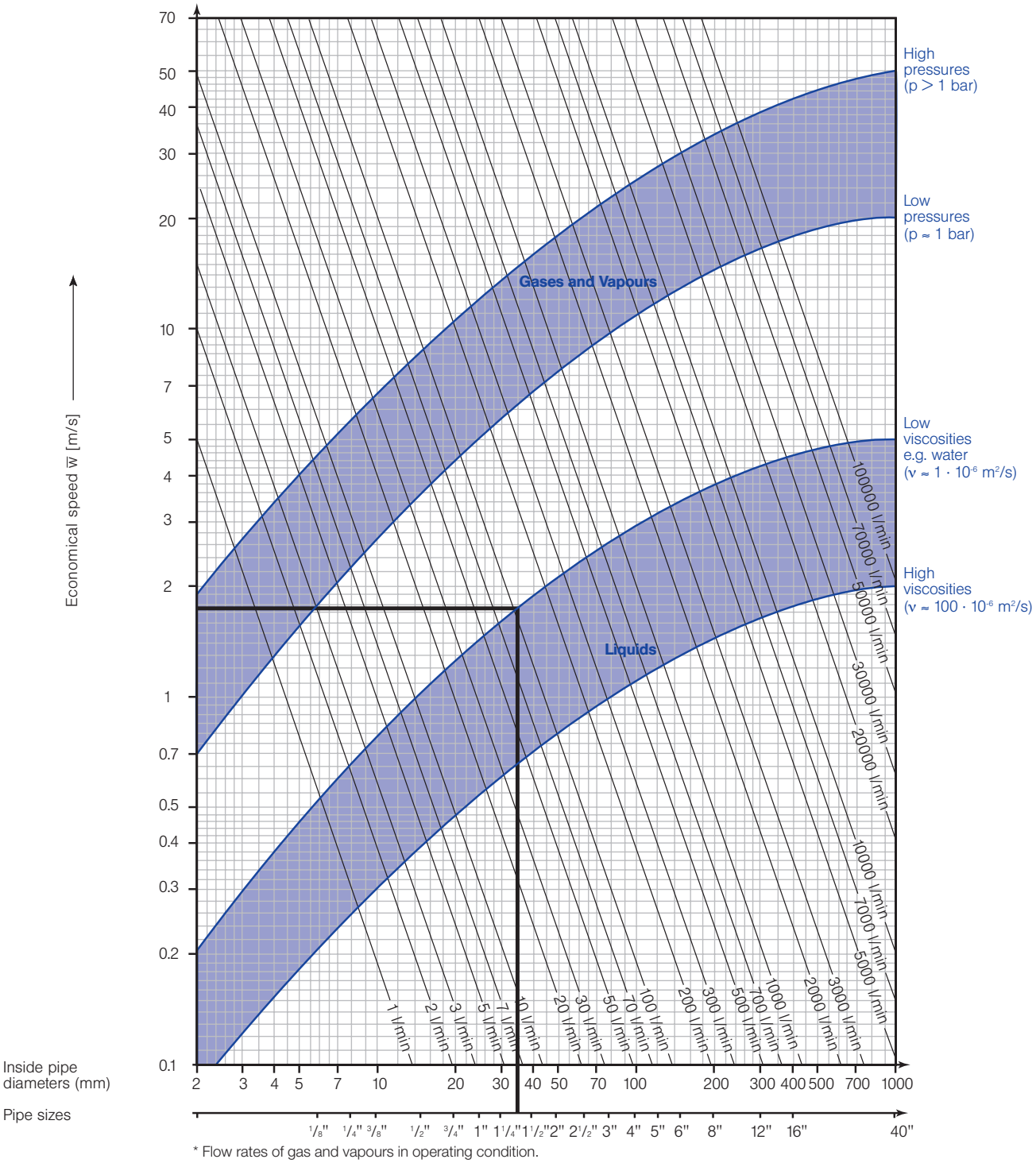
Android (Google) IOS (Apple)

Online nozzle calculator

Lechler Industry App:
all important calculation and conversion programs for nozzle technology combined in one App.

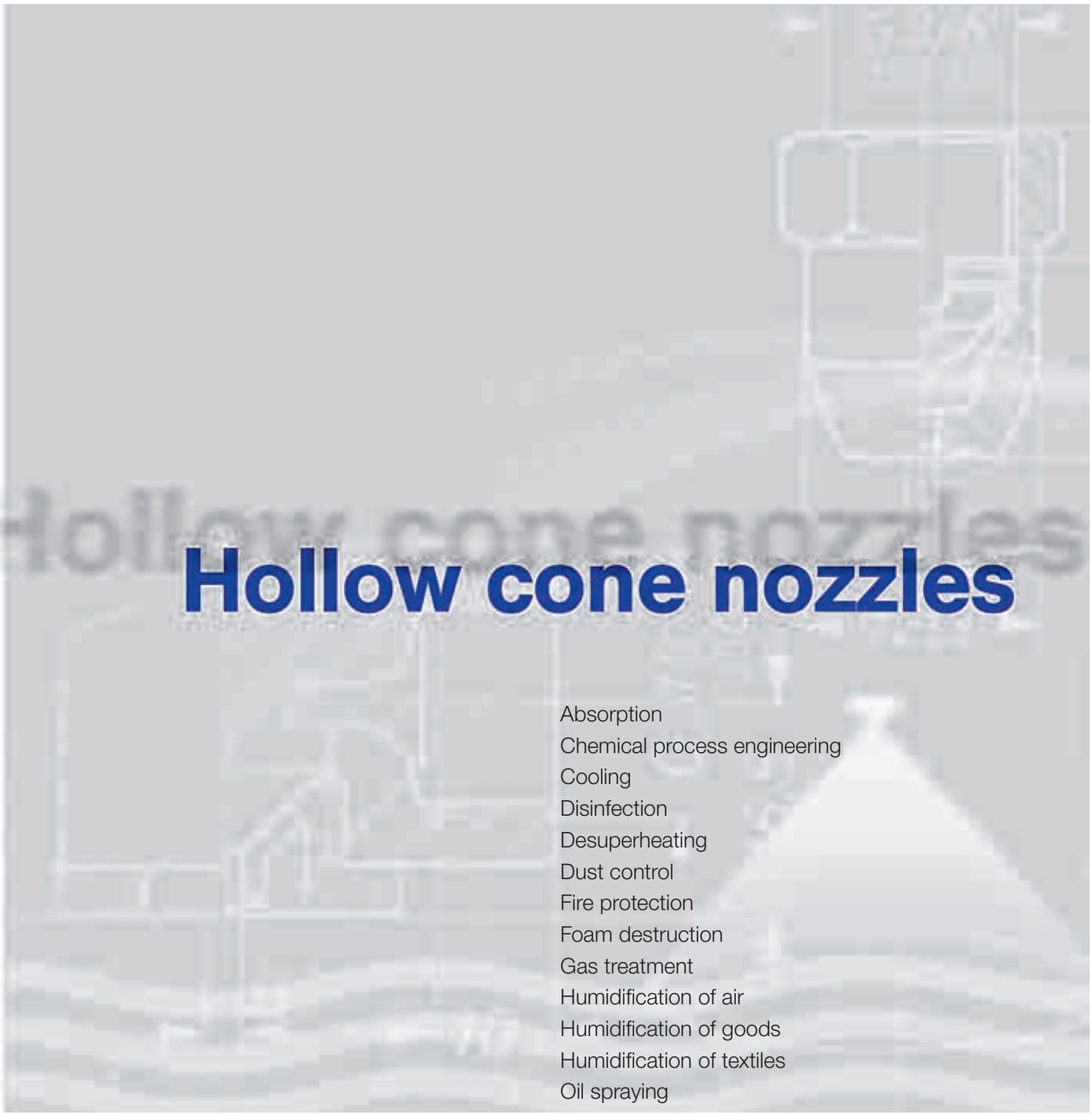
- Unit converter for pressure, volume and flow rate
- Pressure/flow rate calculator for single-fluid nozzles incl. axial-flow full cone nozzles
- Calculation of pipe diameters

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.



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

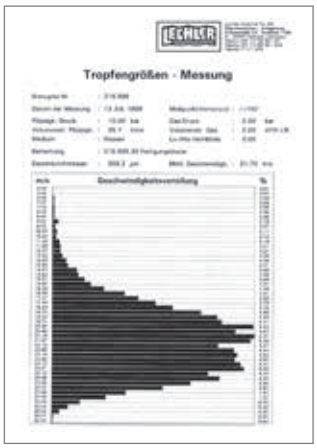
Wherever a fine, uniform hollow cone spray is needed, e.g. for cooling and cleaning of gas, absorption processes, dust control, product dampening, oil spraying and air humidifying, axial-flow hollow cone nozzles have proved very efficient. The spiral grooves in the swirl inserts ensure an efficient whirling 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°

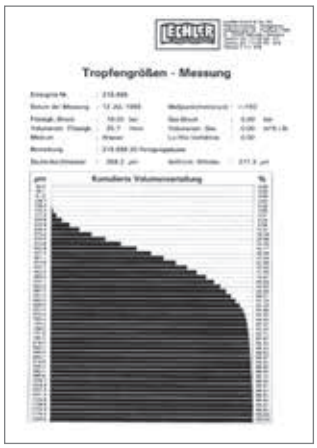
Tangential-flow hollow cone nozzles

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

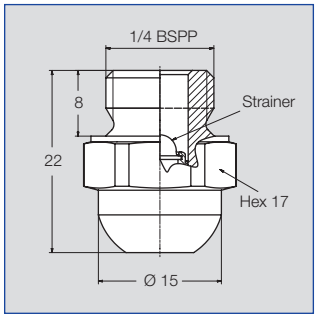
Axial-flow hollow cone nozzles	Series		$\dot{V}$ [l/min] at **p =** 2 bar	Connection	Application/ Design	Page
	**220**	80°	0.040 – 0.390 (at p = 5 bar)	1/4 BSPP	Disinfection, humidification, cooling. **Extremely fine, fog-like hollow cone spray.**	**26**
	**216**	60° 90°	0.63 – 1.70	3/8 BSPP	Cooling and cleaning of air and gas, dust control, spraying onto filters, spray drying, desuperheating. **Fine, uniform hollow cone spray.**	**27**
	**2TR**	80°	0.32 – 0.96	Assembly with 3/8" retaining nut	Humidification of air, cooling and cleaning of gases, dust control, spraying onto filters. **Fine, uniform hollow cone spray.**	**28**

Tagential-flow hollow cone nozzles	Series		$\dot{V}$ [l/min] at **p =** 2 bar	Connection	Application/ Design	Page
	**302**	60° 90°	1.40 – 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.**	**29**
	**302 with bayonet-quick-release system**	80° 90°	2.24 – 5.00	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.**	**30**

Axial-flow hollow cone nozzles

Series 220

Extremely fine, fog-like hollow cone spray.
Applications:
Disinfection, humidification, cooling.



Spray angle	Ordering no.			B Ø [mm]	E Ø [mm]	Mesh size [mm]	V̇ [l/min] p [bar]								Spray diameter D at p = 5 bar H = 100 mm
	Type	Mat. no. 1Y 316L SS	Code 1/4 BSPP				2.0	3.0	5.0	7.0	10.0	20.0	50.0	100.0	
80°	**220.085**	○	**AC**	0.25	0.25	0.10	0.025	0.031	0.040	0.047	0.057	0.080	0.126	0.179	140
	220.145	○	**AC**	0.40	0.40	0.10	0.052	0.064	0.082	0.097	0.116	0.164	0.259	0.367	140
	220.185	○	**AC**	0.55	0.35	0.20	0.082	0.101	0.130	0.154	0.184	0.260	0.411	0.581	140
	220.245	○	**AC**	0.70	0.50	0.20	0.165	0.202	0.261	0.309	0.369	0.522	0.825	1.167	140
	220.285	○	**AC**	0.90	0.55	0.20	0.247	0.302	0.390	0.461	0.552	0.780	1.233	1.744	140

B = bore diameter · E = Narrowest free cross section

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

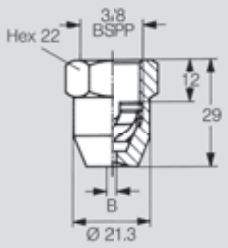
Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	220.085	+	**1Y**		**AC**	=	**220.085.1Y.AC**

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

Axial-flow hollow cone nozzles

Series 216

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



Weight Mat. 17: 60 g

Spray angle	Ordering no. Type	Mat. no. 17 316Ti SS	G BSPP	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 1.0	2.0	3.0	5.0	10.0	20.0	Spray diameter D at p = 3 bar H = 250 mm
60°	**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

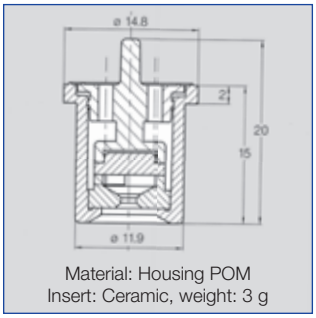
B = bore diameter · E = Narrowest free cross section

Example for ordering:	**Type** 216.364	+	**Material-no.** 17	=	**Ordering no.** 216.364.17

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

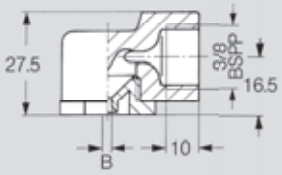
Spray angle	Ordering no. / Type	Colour	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] [p_{max} = 20 bar] 1.0	2.0	3.0	5.0	7.0	10.0	Spray diameter D at p = 3 bar H = 250 mm
80°	**2TR.305.C6**	orange	0.90	0.80	0.23	0.32	0.39	0.51	0.60	0.72	450
	2TR.365.C6	yellow	1.40	0.95	0.45	0.63	0.78	1.01	1.19	1.42	450
	2TR.405.C6	blue	1.70	1.10	0.68	0.96	1.17	1.52	1.79	2.14	450

B = bore diameter · E = Narrowest free cross section

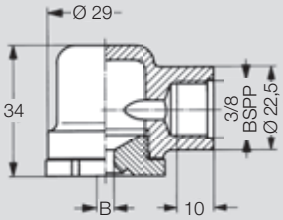
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

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 302.40X–302.46X
Weight: 13 g



Type 302.52X–302.96X
Weight: 18 g

Spray angle	Ordering no. Type	Mat. no. 5E PVDF	51 PA	53 PP	56 POM	B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	10.0	Spray diameter D at p = 2 bar H = 250 mm	H = 500 mm
60°	**302.464**	-	○	-	○	3.80	1.95	0.70	0.99	1.40	1.71	2.21	3.13	300	560
90°	**302.406**	-	○	-	-	2.60	1.40	0.50	0.71	1.00	1.22	1.58	2.24	400	880
	302.526	-	○	○	-	5.00	2.00	1.00	1.41	2.00	2.45	3.16	4.47	400	880
	302.566	-	-	○	-	5.00	2.40	1.25	1.77	2.50	3.06	3.95	5.59	400	880
	302.606	-	○	-	-	5.00	3.20	1.57	2.23	3.15	3.86	4.98	7.04	450	950
	302.766	-	○	-	-	9.00	4.30	4.00	5.66	8.00	9.80	12.65	17.89	500	1050
	302.886	-	-	○	-	11.00	6.40	8.00	11.31	16.00	19.60	25.30	35.78	550	1130
	302.966	-	-	○	-	11.00	8.60	12.50	17.68	25.00	30.62	39.53	55.90	550	1130

B = bore diameter · E = Narrowest free cross section

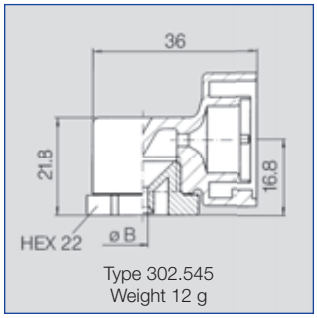
Example for ordering:	**Type** 302.464	+	**Material-no.** 51	=	**Ordering no.** 302.464.51

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

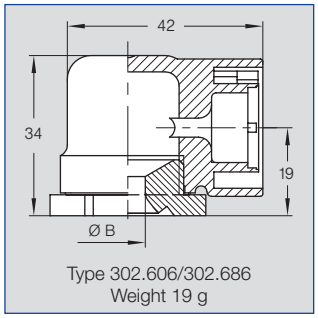
Tangential-flow hollow cone nozzles
Bayonet quick-release system
Series 302

1

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.



Type 302.545
Weight 12 g



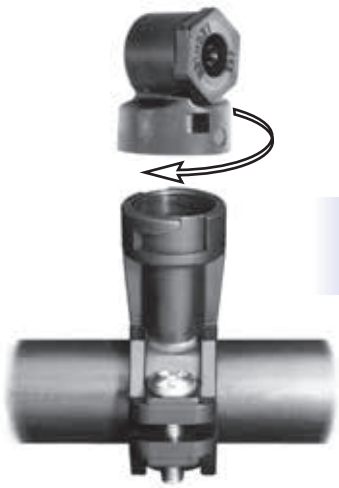
Type 302.606/302.686
Weight 19 g

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	3.0	5.0	10.0	Spray diameter D at p = 2 bar H = 250 mm	H = 500 mm
80°	**302.545**	-	○	**KB**	2.30	2.30	1.12	1.58	2.24	2.74	3.54	5.01	400	700
90°	**302.606**	○	-	**KB**	5.00	3.20	1.58	2.23	3.15	3.86	4.98	7.04	450	880
	302.686	-	○	**KB**	7.50	3.40	2.50	3.54	5.00	6.12	7.91	11.18	500	1050

B = bore diameter · E = Narrowest free cross section

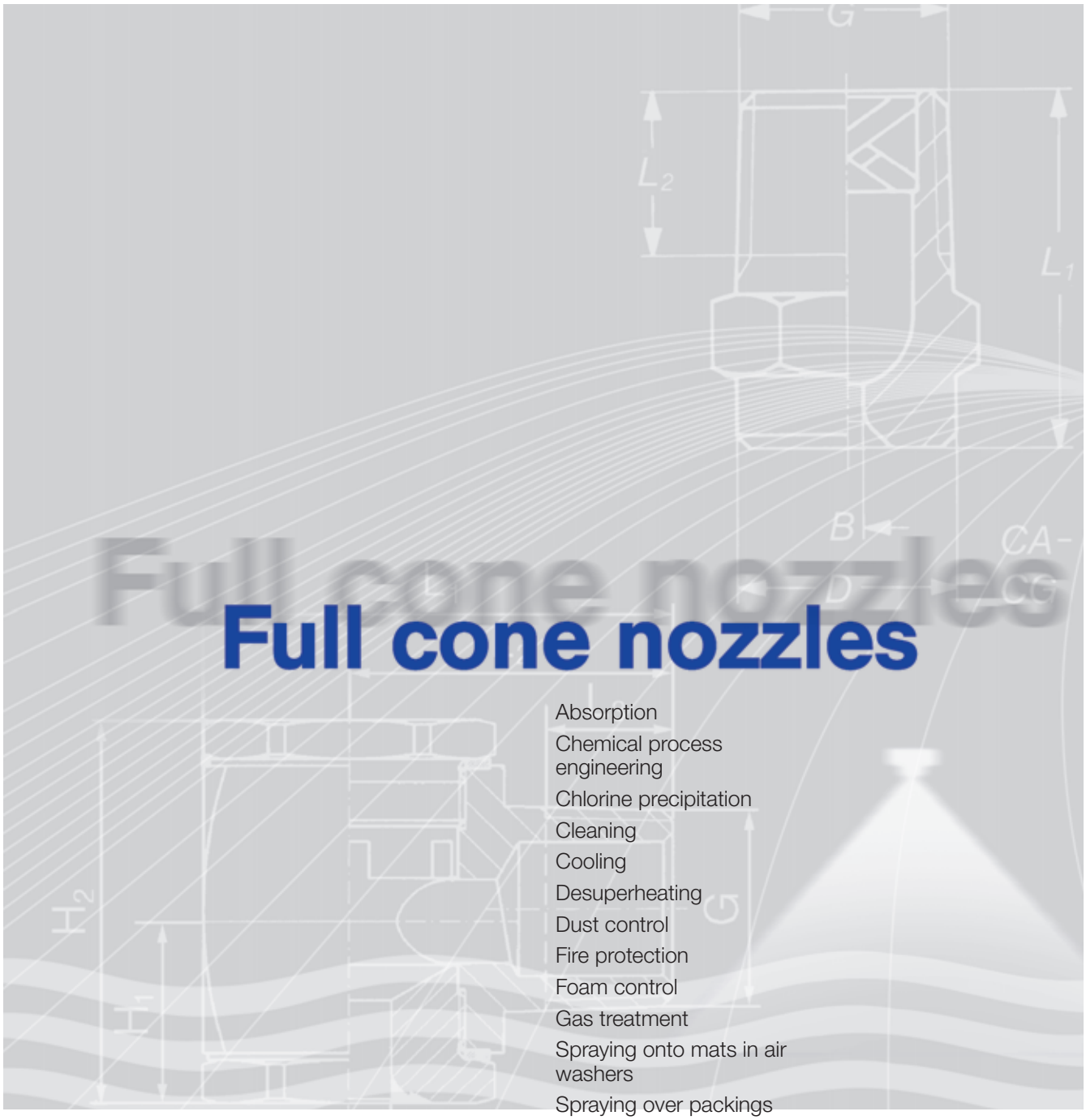
Example for ordering:	Type 302.545	+	Material-no. 56	+	Code KB	=	Ordering no. 302.545.56.KB

Simple assembling – just with a twist



Nozzle set assembled on pipe

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 many 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.

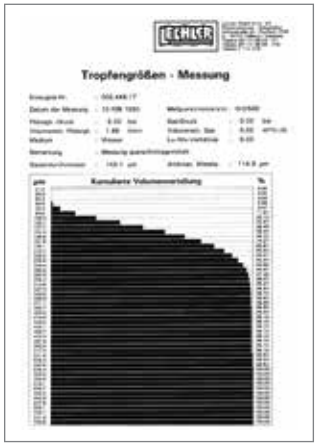
- Reliable in service
- Non-clogging
- Stable spray angles, unaffected by transient pressures

Typical liquid distribution chart

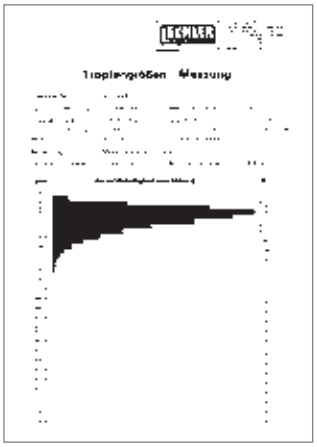
Cluster Head Nozzles

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.



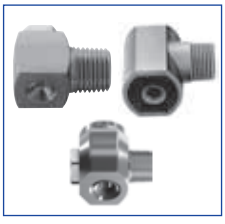
Cumulated volume distribution



Number distribution

Full cone nozzles

Axial-flow full cone nozzles	Series		V̇ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**490** **491**	45° 60° 90° 120°	1.00 – 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.**	**34** **35**
	**460** **461**	60° 90°	2.00 – 71.00	1/8 BSPT 1/4 BSPT 3/8 BSPT 1/2 BSPT 1 1/4 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.**	**36**
	**405**	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. **Very uniform spray pattern.**	**37**
	**403**	90° 120°	400.00 – 1250.00	2 1/2 BSPP 3 BSPP 3 1/2 BSPP 4 BSPP	Surface spraying, spraying over packings, chemical process engineering, cooling of gaseous fluids and solids. **Very uniform spray pattern.**	**38**

Tangential-flow full cone nozzles	Series		V̇ [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, foam control. **Without swirl inserts, non-clogging. Stable spray angle. Uniform spray.**	**39** **40**

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.

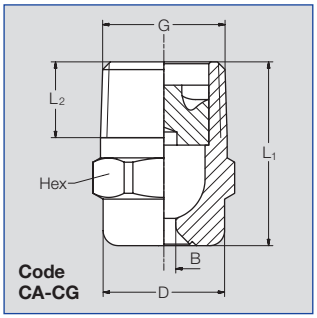
Series 490

Series 491

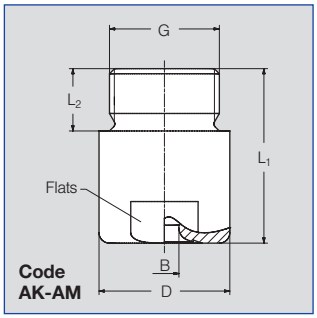
Series 490/491 represents a new generation within the axial-flow full cone nozzles product group. These nozzles were developed using state-of-the-art design and simulation methods (CFD).

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

2



Code CA-CG



Code AK-AM

Code	Dimensions [mm]					Weight Brass
	G	L_1	L_2	D	Hex/Flats	
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
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	Ordering no.									B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar]							Spray diameter D at p = 2 bar	
	Type	Mat. no.		Code															H = 200 mm	H = 500 mm
		1Y 316L SS	30 Brass	1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	1 BSPP			0.5	1.0	2.0	3.0	5.0	7.0	10.0		
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**	-	-	-	-	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
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
	490.604	○	○	**CA**	-	-	-	-	-	2.05	2.05	1.81	2.39	3.15	3.70	4.54	5.20	6.00	220	560
	490.644	○	-	-	**CC**	-	-	-	-	2.30	2.30	2.30	3.03	4.00	4.70	5.77	6.60	7.61	220	560
	490.684	○	-	-	**CC**	-	-	-	-	2.60	2.60	2.87	3.79	5.00	5.88	7.21	8.25	9.52	220	560
	490.724	○	○	-	**CC**	-	-	-	-	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

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	Ordering no.									B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar]							Spray diameter D at p = 2 bar	
	Type	Mat. no.		Code															H = 200 mm	H = 500 mm
		1Y 316L SS	30 Brass	1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	1 BSPP			0.5	1.0	2.0	3.0	5.0	7.0	10.0		
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
	490.606	○	-	**CA**	-	-	-	-	-	2.10	2.05	1.81	2.39	3.15	3.70	4.54	5.20	6.00	380	860
	490.646	○	-	-	**CC**	-	-	-	-	2.40	2.40	2.30	3.03	4.00	4.70	5.77	6.60	7.61	390	960
	490.686	○	-	-	**CC**	-	-	-	-	2.70	2.70	2.87	3.79	5.00	5.88	7.21	8.25	9.52	390	960
	490.726	○	-	-	**CC**	-	-	-	-	3.20	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	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	-	-	6.55	4.85	14.36	18.95	25.00	29.40	36.07	41.26	47.59	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**	-	-	-	-	2.40	2.40	2.30	3.03	4.00	4.70	5.77	6.60	7.61	680	1330
	490.688	○	○	-	**CC**	-	-	-	-	2.75	2.75	2.87	3.79	5.00	5.88	7.21	8.25	9.52	680	1330
	490.728	○	○	-	**CC**	-	-	-	-	3.20	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	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**	-	-	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

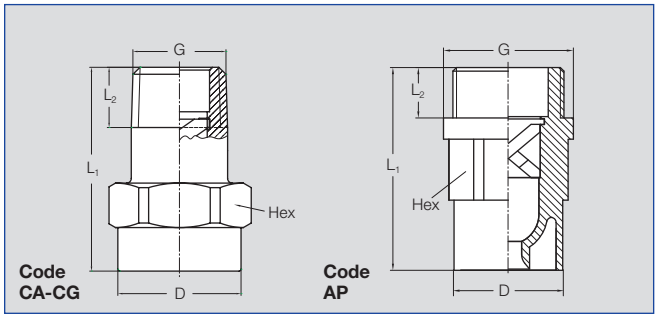
Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	490.406	+	1Y	+	CA	=	490.406.1Y.CA

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
AP	1 1/4 BSPP	76.5	19.0	49.0	41

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

Spray angle	Ordering no.							B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar]							Spray diameter D at p = 2 bar	
	Type	Mat. no.	Code														H = 200 mm	H = 500 mm
		5E PVDF	1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	1 1/4 BSPP			0.5	1.0	2.0	3.0	5.0	7.0	10.0		
60°	**460.524**	○	**CA**	**-**	**-**	**-**	**-**	1.60	1.20	1.15	1.52	2.00	2.35	2.89	3.30	3.81	220	560
	460.644	○	**-**	**CC**	**-**	**-**	**-**	2.40	1.90	2.30	3.03	4.00	4.70	5.77	6.60	7.61	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
	460.606	○	**CA**	**-**	**-**	**-**	**-**	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
	460.806	○	**-**	**-**	**CE**	**-**	**-**	3.70	2.70	5.74	7.58	10.00	11.76	14.43	16.51	19.04	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
	461.146	○	**-**	**-**	**-**	**-**	**AP**	9.90	6.70	40.78	53.81	71.00	83.50	102.43	117.19	135.16	390	960

B = Bore diameter · E = Narrowest free cross section

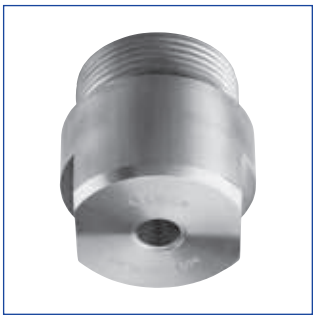
Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	460.524	+	**5E**	+	**CA**	=	**460.524.5E.CA**

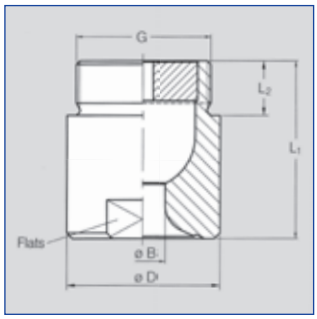
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$ (≤ 10 bar)

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]					Weight
G	L_1	L_2	D	Flats	
1 1/4 BSPP	50	19	49	41	525 g
1 1/2 BSPP	60	19	59	50	920 g
2 BSPP	78	24	68	60	1550 g

Spray angle	Ordering no. Type	Mat. no. 1Y 316L SS	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
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

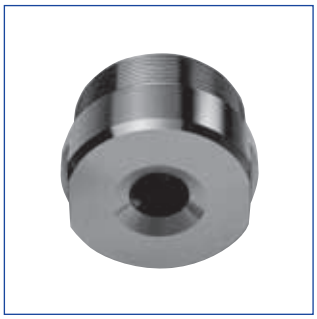
Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	405.206	+	**1Y**		**AP**	=	**405.206.1Y.AP**

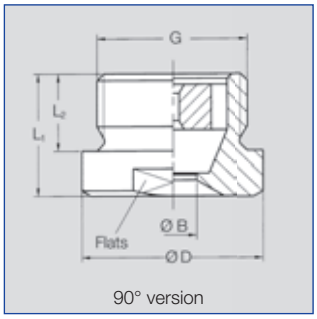
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0,4}$
(≤ 10 bar)

Axial-flow full cone nozzles

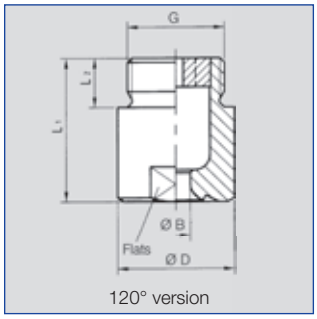
Series 403

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





90° version



120° version

90° version

Dimensions [mm]						Weight
Type	BSPP	L_1	L_2	D	Flats	
403.446/403.486	2 1/2	52	27	83	75	1300 g
403.526	3	60	30	98	85	2000 g
403.606	3	70	32	118	105	3600 g

120° version

Dimensions [mm]						Weight
Type	BSPP	L_1	L_2	D	Flats	
403.448/403.488	2 1/2	124	27	83	75	3200 g
403.528	3	153	30	98	85	5400 g
403.608	3 1/2	156	32	118	105	8300 g
403.628	4	165	36	128	110	9600 g

Spray angle	Ordering no.		B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar]							Spray diameter D at p = 2 bar	
	Type	Mat. no. 1Y AISI 316L			0.3	0.5	1.0	2.0	3.0	5.0	7.0	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

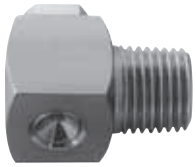
Example for ordering:	Type	+	Material no.	=	Ordering no.
	403.446	+	1Y	=	430.446.1Y

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

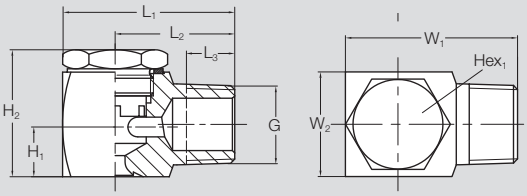
Tagential-flow full cone nozzles

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, continuous casting, foam control.

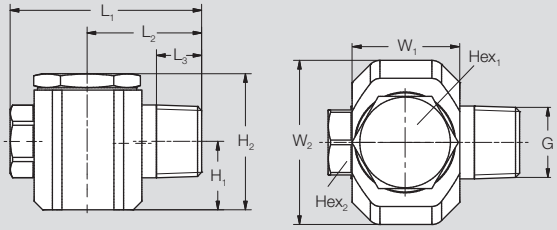


3/8" version



Material: 316L SS

1/2" - 1" version



Material: 316L SS

Dimensions [mm]										Weight
G	L_1	L_2	L_3	H_1	H_2	W_1	W_2	Hex_1	Hex_2	
1/4 BSPT	28.0	20.0	9.7	8.0	21.0	15.6	16.0	11	-	44 g
3/8 BSPT	36.0	25.0	10.1	11.0	26.7	23.2	22.0	19	-	101 g
1/2 BSPT	56.0	33.5	13.2	20.0	40.0	32.0	48.0	27	19	370 g
3/4 BSPT	65.5	38.5	14.5	23.5	57.0	40.0	63.0	36	27	830 g
1 BSPT	85.0	48.5	16.8	27.3	66.0	55.0	78.0	41	36	1581 g

Spray angle	Ordering no.						B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar]						Spray diameter D at p = 1-10 bar	
	Type	Mat. no.	Code													
		1Y 316L SS	3/8 BSPT	1/2 BSPT	3/4 BSPT	1 BSPT			0.5	1.0	2.0	3.0	5.0	10.0	H = 200 mm	H = 500 mm
90°	**422.606**	○	**CE**	-	-	-	2.60	2.50	1.57	2.23	3.15	3.86	4.98	7.04	380	860
	422.766	○	**CE**	-	-	-	4.15	4.10	4.00	5.66	8.00	9.80	12.65	17.89	390	960
	422.886	○	**CE**	-	-	-	5.80	5.70	8.00	11.31	16.00	19.60	25.30	35.78	390	960
120°	**422.808**	○	**CE**	-	-	-	4.65	4.60	5.00	7.07	10.00	12.25	15.81	22.36	680	1600
	422.848	○	**CE**	-	-	-	5.20	5.10	6.25	8.84	12.50	15.31	19.76	27.95	680	1600
	422.928	○	-	**CG**	-	-	7.30	7.30	10.00	14.14	20.00	24.49	31.62	44.72	680	1600
	422.968	○	-	**CG**	-	-	8.00	8.00	12.50	17.68	25.00	30.62	39.53	55.90	680	1600
	423.008	○	-	**CG**	-	-	8.70	8.70	15.75	22.27	31.50	38.88	49.81	70.44	680	1600
	423.128	○	-	-	**CK**	-	12.70	12.30	31.50	44.55	63.00	77.16	99.61	140.87	680	1600
	423.208	○	-	-	-	**CM**	19.00	16.00	50.00	70.71	100.00	122.47	158.11	223.61	680	1600

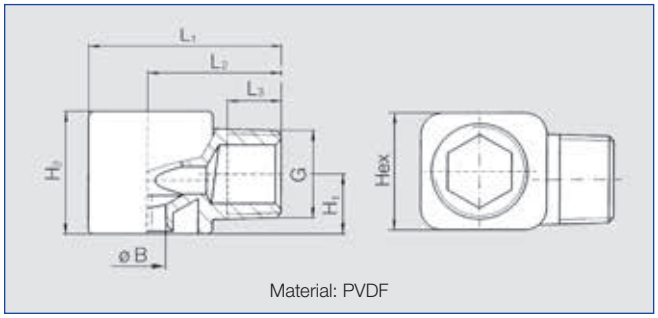
B = bore diameter · E = Narrowest free cross section

Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	422.606	+	**1Y**		**CE**	=	**422.606.1Y.CE**

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

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

2

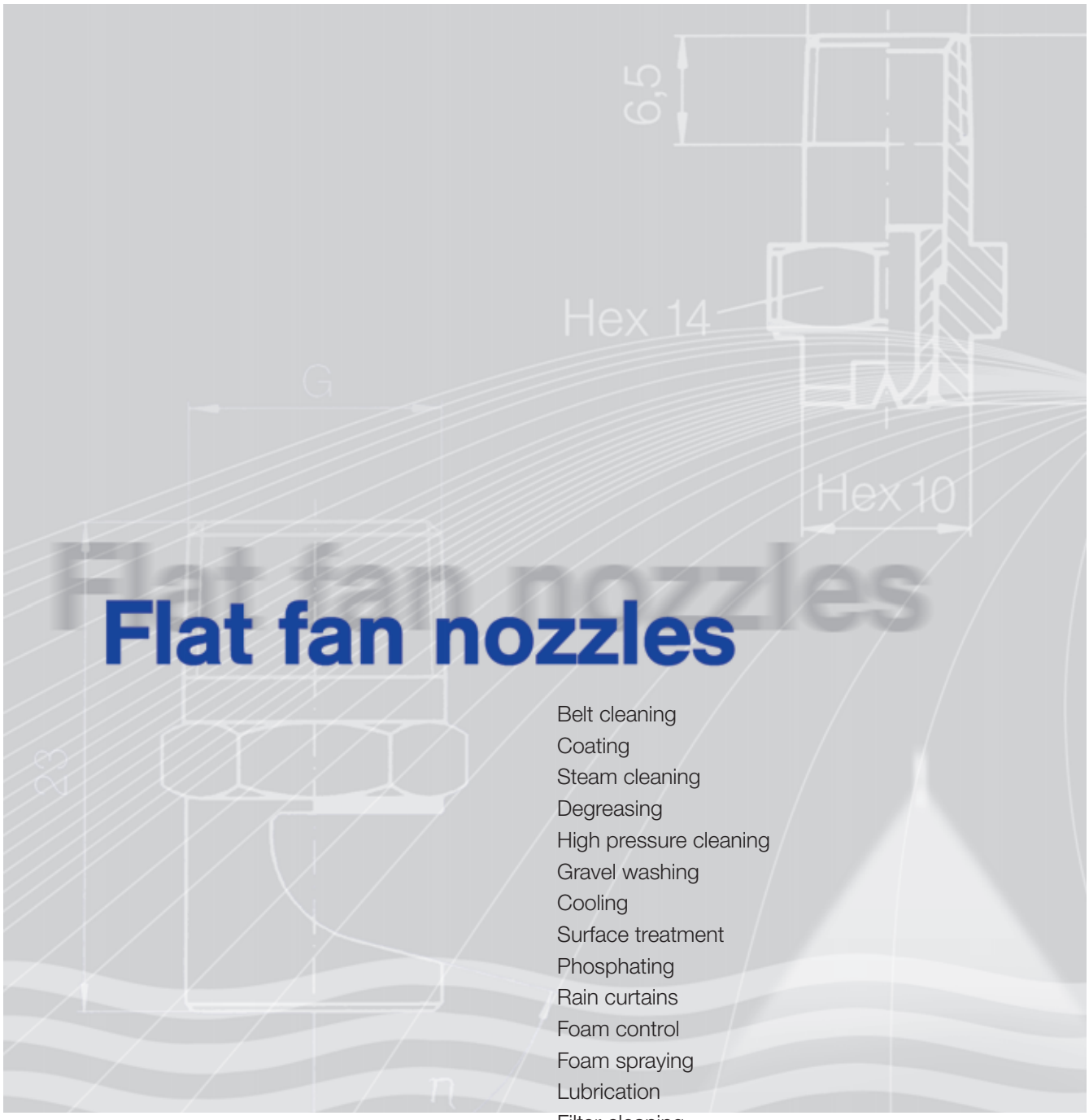
Dimensions [mm]							Weight
G	L_1	L_2	L_3	H_1	H_2	Hex	
1/4 BSPT	28.0	20.0	9.8	8.0	16.0	16.0	7 g
3/8 BSPT	36.0	25.0	10.1	11.2	23.0	22.0	16 g
1/2 BSPT	49.5	33.5	13.2	19.2	38.0	32.0	40 g
3/4 BSPT	58.5	38.5	18.5	24.5	50.0	41.0	50 g

Spray angle	Ordering no.						B Ø [mm]	E Ø [mm]	V̇ [l/min]						Spray diameter D at p = 1-10 bar	
	Type	Mat. no.	Code						p [bar]							
		5E PVDF	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPT			0.5	1.0	2.0	3.0	5.0	10.0	H = 200 mm	H = 500 mm
60°	**422.724**	○	-	**CE**	-	-	3.60	3.60	3.15	4.45	6.30	7.72	9.96	14.09	225	510
90°	**422.406**	○	**CC**	-	-	-	1.50	1.45	0.50	0.71	1.00	1.22	1.58	2.24	380	860
	422.566	○	**CC**	-	-	-	2.30	2.20	1.25	1.77	2.50	3.06	3.95	5.59	380	860
	422.726	○	-	**CE**	-	-	3.70	3.60	3.15	4.45	6.30	7.72	9.96	14.09	390	960
	422.806	○	-	**CE**	-	-	4.65	4.60	5.00	7.07	10.00	12.25	15.81	22.36	390	960
	422.886	○	-	**CE**	-	-	5.80	6.00	8.00	11.31	16.00	19.60	25.30	35.78	390	960
	423.006	○	-	-	**CG**	-	8.70	8.70	15.75	22.27	31.50	38.58	49.81	70.44	390	960
120°	**422.408**	○	**CC**	-	-	-	1.50	1.45	0.50	0.71	1.00	1.22	1.58	2.24	680	1220
	422.568	○	**CC**	-	-	-	2.40	2.40	1.25	1.77	2.50	3.06	3.95	5.59	680	1220
	422.728	○	-	**CE**	-	-	4.00	3.90	3.15	4.45	6.30	7.72	9.96	14.09	680	1600
	422.888	○	-	**CE**	-	-	6.60	6.00	8.00	11.31	16.00	19.60	25.30	35.78	680	1600
	423.008	○	-	-	**CG**	-	8.70	8.70	15.75	22.27	31.50	38.58	49.81	70.44	680	1600
	423.128	○	-	-	-	**CK**	12.70	12.30	31.50	44.55	63.00	77.16	99.61	140.87	680	1600

B = bore diameter · E = Narrowest free cross section

Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	422.724	+	**5E**		**CE**	=	**422.724.5E.CE**

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...

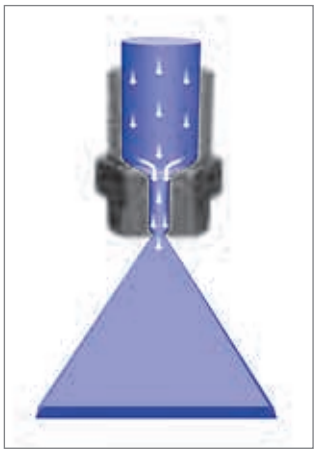
Flat fan nozzles

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.

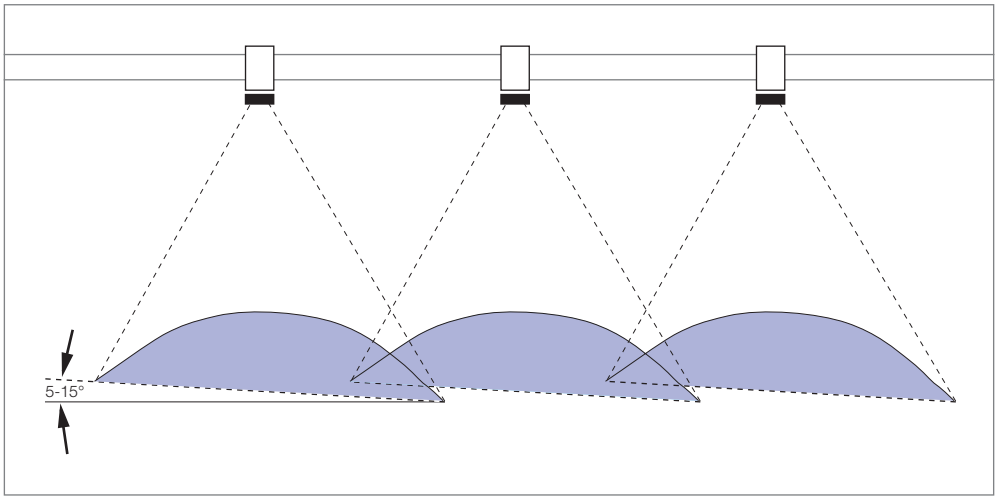
Basically, Lechler flat fan nozzles are designed for parabolic liquid distribution. Unaffected by transient pressures, they are suited for universal application. Their performance data are exactly defined. Operational values, such as flow rates, spray width, jet thickness and liquid distribution are 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.

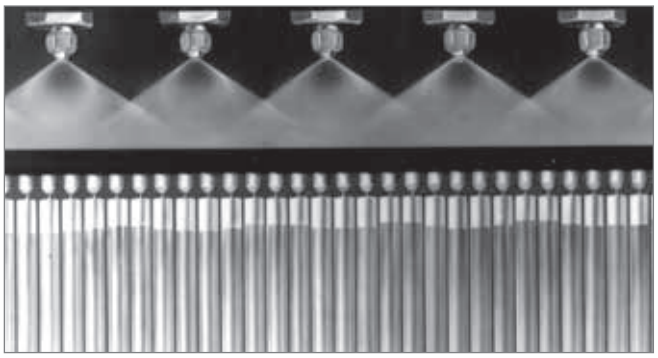
For all cleaning operations, in steelmaking and in many other fields of surface treatment, in short, wherever powerful, uniform water jets are required, Lechler flat fan nozzles constitute a decisive basis for achieving reliable process results.



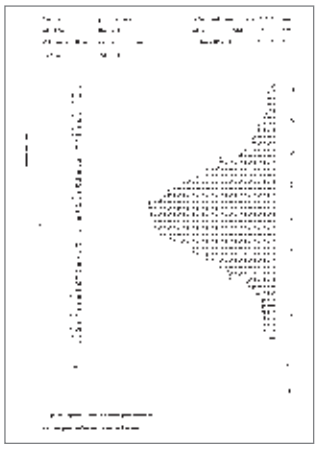
The **tongue-type nozzle** design represents a special kind of flat fan nozzle. With this nozzle type, the flat fan spray pattern is produced by a solid stream, impinging upon and deflecting from an outside deflector plate. As a result, a powerful, sharply delimited flat jet is shaped. The deflector 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		V̇ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**650** **651**	45° 60° 90° 120°	1.60 – 40.00	1/8 BSPT 1/4 BSPT 3/8 BSPT	Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating. **Standard design with conical, self-sealing thread.**	**45** **46**
	**632**	60° 90°	1.00 – 16.00	1/8 BSPT 1/4 BSPT	Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating. **Standard design with self-sealing thread.**	**47**
 	**652**	20° 30° 60° 90° 120°	0.32 – 12.50	Assembly with 3/8" lock nut	Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating. **Easy nozzle changing.** **Simple jet alignment.**	**48**
 **Belt lubrication nozzles**	**652. XXX. 8H / 56. 03**	75°	0.05 – 0.11	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.**	**49**
	**686**	90° 140°	1.00 – 18.00	1/8 BSPT 1/4 BSPT	Foam control in storage tanks and sewage treatment plants, for cleaning and washing process. **Particularly clog proof.**	**50**

Continued on next page.

Flat fan nozzles

Low-pressure nozzles	Series		V̇ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**684**	140°	0.63 – 5.00	Assembly with 3/8" lock nut	Foam control in storage tanks and sewage treatment plants, for cleaning and washing process. **Particularly clog-proof.**	**51**

High pressure nozzles	Series		V̇ [l/min] at **p** = 80 bar	Connection	Application/ Design	Page
	**602**	20° 45° 60°	4.04 – 18.40	1/4" BSPT NPT 1/4"	High pressure cleaning, steam cleaning.	**52**

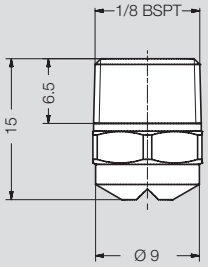
Nozzle systems for surface technology	Series		V̇ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**676 Easy-Clip**	60°	10.00 – 20.00	Assembly with clamp for the following pipe sizes: 1" 1 1/4"	Cleaning problems, phosphating, degreasing, rinsing in surface treatment techniques. **Ball joint, omnidirectional swivelling range of 30°. Simple quick assembling. Easy adjusting and cleaning.**	**53**

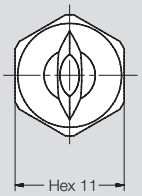
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

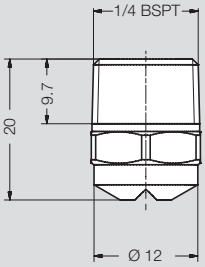
Series 650 / 651

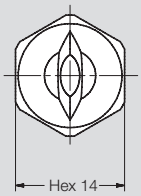
Standard design with conical, self-sealing thread connection. Stable spray angle. Uniform, parabolical distribution of liquid. Spray pipes equiped with these nozzles show an extremely uniform total distribution of liquid.
Applications:
Spray cleaning, surface treatment, filter cleaning, belt cleaning,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



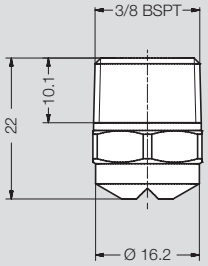


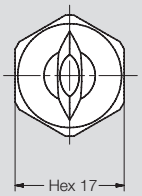
Weight: approx. 70 g





Weight approx.: 150 g





Weight approx.: 260 g

Spray angle	Ordering no. Type	Mat. no. 1C 304 SS	Code 1/8 BSPT	1/4 BSPT	3/8 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°	**650. 483**	○	**CA**	**CC**	**-**	1.50	1.10	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	180	340
	650. 563	○	**CA**	**CC**	**-**	2.00	1.40	1.25	1.77	2.50	3.06	3.95	4.68	5.59	185	355
	650. 603	○	**CA**	**CC**	**-**	2.20	1.60	1.58	2.23	3.15	3.86	4.98	5.89	7.04	195	370
	650. 643	○	**CA**	**CC**	**-**	2.50	1.80	2.00	2.83	4.00	4.90	6.33	7.48	8.94	195	370
	650. 723	○	**CA**	**CC**	**-**	3.00	2.40	3.15	4.46	6.30	7.72	9.96	11.79	14.09	200	375
	650. 763	○	**-**	**CC**	**-**	3.50	2.60	4.00	5.66	8.00	9.80	12.65	14.97	17.89	200	380
	650. 803	○	**-**	**CC**	**-**	4.00	3.00	5.00	7.07	10.00	12.25	15.81	18.71	22.36	205	385
	650. 843	○	**-**	**CC**	**CE**	4.50	3.40	6.25	8.84	12.50	15.31	19.76	23.39	27.95	205	385
	650. 883	○	**-**	**CC**	**CE**	5.00	3.80	8.00	11.31	16.00	19.60	25.30	29.93	35.78	220	440
	650. 923	○	**-**	**CC**	**CE**	5.50	4.20	10.00	14.14	20.00	24.50	31.62	37.42	44.72	220	440
	650. 963	○	**-**	**-**	**CE**	6.00	4.40	12.50	17.68	25.00	30.62	39.53	46.77	55.90	220	440
	650. 993	○	**-**	**-**	**CE**	6.50	4.80	15.00	21.21	30.00	36.74	47.43	56.12	67.08	220	440
	651. 003	○	**-**	**-**	**CE**	7.00	5.20	15.75	22.27	31.50	38.57	49.80	58.92	70.43	220	440
	651. 043	○	**-**	**-**	**CE**	8.00	5.90	20.00	28.28	40.00	48.99	63.25	74.83	89.44	220	440

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.
	650.483	+	1C		CA	=	650.483.1C.CA

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

Flat fan nozzles

Series 650 / 651

Spray angle	Ordering no. Type	Mat. no. 1C 304 SS	Code 1/8 BSPT	Code 1/4 BSPT	Code 3/8 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
60°	**650. 484**	○	**CA**	**CC**	**-**	1.50	1.00	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	260	510
	650. 564	○	**CA**	**CC**	**-**	2.00	1.30	1.25	1.77	2.50	3.06	3.95	4.68	5.59	280	535
	650. 604	○	**CA**	**CC**	**-**	2.20	1.50	1.58	2.23	3.15	3.86	4.98	5.89	7.04	290	550
	650. 644	○	**CA**	**CC**	**-**	2.50	1.60	2.00	2.83	4.00	4.90	6.33	7.48	8.94	295	565
	650. 724	○	**CA**	**CC**	**-**	3.00	2.10	3.15	4.46	6.30	7.72	9.96	11.79	14.09	305	590
	650. 764	○	**-**	**CC**	**-**	3.50	2.30	4.00	5.66	8.00	9.80	12.65	14.97	17.89	310	595
	650. 804	○	**-**	**CC**	**-**	4.00	2.60	5.00	7.07	10.00	12.25	15.81	18.71	22.36	310	595
	650. 844	○	**-**	**CC**	**CE**	4.50	3.00	6.25	8.84	12.50	15.31	19.76	23.39	27.95	310	590
	650. 884	○	**-**	**CC**	**CE**	5.00	3.40	8.00	11.31	16.00	19.60	25.30	29.93	35.78	300	570
	650. 924	○	**-**	**CC**	**CE**	5.50	4.10	10.00	14.14	20.00	24.50	31.62	37.42	44.72	330	630
	650. 964	○	**-**	**-**	**CE**	6.00	4.20	12.50	17.68	25.00	30.62	39.53	46.77	55.90	330	630
	650. 994	○	**-**	**-**	**CE**	6.50	4.40	15.00	21.21	30.00	36.74	47.43	56.12	67.08	330	630
	651. 004	○	**-**	**-**	**CE**	7.00	4.80	15.75	22.27	31.50	38.57	49.80	58.92	70.43	330	630
	651. 044	○	**-**	**-**	**CE**	8.00	5.50	20.00	28.28	40.00	48.99	63.25	74.83	89.44	340	640
90°	**650. 486**	○	**CA**	**CC**	**-**	1.50	0.80	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	440	835
	650. 566	○	**CA**	**CC**	**-**	2.00	1.10	1.25	1.77	2.50	3.06	3.95	4.68	5.59	445	850
	650. 606	○	**CA**	**CC**	**-**	2.20	1.20	1.58	2.23	3.15	3.86	4.98	5.89	7.04	450	860
	650. 646	○	**CA**	**CC**	**-**	2.50	1.30	2.00	2.83	4.00	4.90	6.33	7.48	8.94	455	865
	650. 726	○	**CA**	**CC**	**-**	3.00	1.70	3.15	4.46	6.30	7.72	9.96	11.79	14.09	470	885
	650. 766	○	**-**	**CC**	**-**	3.50	1.90	4.00	5.66	8.00	9.80	12.65	14.97	17.89	475	890
	650. 806	○	**-**	**CC**	**-**	4.00	2.40	5.00	7.07	10.00	12.25	15.81	18.71	22.36	480	900
	650. 846	○	**-**	**CC**	**CE**	4.50	2.40	6.25	8.84	12.50	15.31	19.76	23.39	27.95	480	900
	650. 886	○	**-**	**CC**	**CE**	5.00	3.10	8.00	11.31	16.00	19.60	25.30	29.93	35.78	480	910
	650. 926	○	**-**	**CC**	**CE**	5.50	3.60	10.00	14.14	20.00	24.50	31.62	37.42	44.72	525	1020
	650. 966	○	**-**	**-**	**CE**	6.00	3.90	12.50	17.68	25.00	30.62	39.53	46.77	55.90	525	1020
	650. 996	○	**-**	**-**	**CE**	6.50	3.70	15.00	21.21	30.00	36.74	47.43	56.12	67.08	525	1020
	651. 006	○	**-**	**-**	**CE**	7.00	4.20	15.75	22.27	31.50	38.57	49.80	58.92	70.43	525	1020
	651. 046	○	**-**	**-**	**CE**	8.00	4.90	20.00	28.28	40.00	48.99	63.25	74.83	89.44	525	1020
120°	**650. 487**	○	**CA**	**CC**	**-**	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	680	1275
	650. 567	○	**CA**	**CC**	**-**	2.00	0.90	1.25	1.77	2.50	3.06	3.95	4.68	5.59	690	1285
	650. 607	○	**CA**	**CC**	**-**	2.20	1.10	1.58	2.23	3.15	3.86	4.98	5.89	7.04	700	1300
	650. 647	○	**CA**	**CC**	**-**	2.50	1.30	2.00	2.83	4.00	4.90	6.33	7.48	8.94	700	1300
	650. 727	○	**CA**	**CC**	**-**	3.00	1.60	3.15	4.46	6.30	7.72	9.96	11.79	14.09	740	1360
	650. 767	○	**-**	**CC**	**-**	3.50	1.70	4.00	5.66	8.00	9.80	12.65	14.97	17.89	760	1400
	650. 807	○	**-**	**CC**	**-**	4.00	2.00	5.00	7.07	10.00	12.25	15.81	18.71	22.36	790	1450
	650. 847	○	**-**	**CC**	**CE**	4.50	2.30	6.25	8.84	12.50	15.31	19.76	23.39	27.95	790	1450
	650. 887	○	**-**	**CC**	**CE**	5.00	2.60	8.00	11.31	16.00	19.60	25.30	29.93	35.78	800	1460
	650. 927	○	**-**	**CC**	**CE**	5.00	2.90	10.00	14.14	20.00	24.50	31.62	37.42	44.72	800	1460
	650. 967	○	**-**	**-**	**CE**	6.00	3.20	12.50	17.68	25.00	30.62	39.53	46.77	55.90	800	1460
	650. 997	○	**-**	**-**	**CE**	6.50	3.40	15.00	21.21	30.00	36.74	47.43	56.12	67.08	800	1460
	651. 007	○	**-**	**-**	**CE**	7.00	3.70	15.75	22.27	31.50	38.57	49.80	58.92	70.43	800	1460
	651. 047	○	**-**	**-**	**CE**	8.00	4.40	20.00	28.28	40.00	48.99	63.25	74.83	89.44	800	1460

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

Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	650. 484	+	**1C**		**CA**	=	**650. 484. 1C. CA**

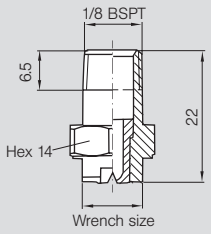
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Flat fan nozzles

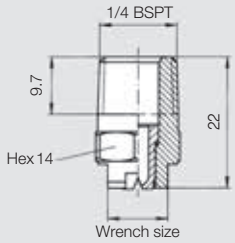
Series 632

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.

PVDF



Weight Brass: 17 g



Weight Brass: 20 g

Spray angle	Ordering no. Type	Mat. no. 5E PVDF	Code 1/8 BSPT	Code 1/4 BSPT	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 width B at p=2 bar H = 250 mm	H = 500 mm
60°	**632. 404**	○	**CA**	**-**	1.20	0.80	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	245	485
	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	○	**-**	**CC**	2.00	1.30	1.25	1.77	2.50	3.06	3.95	4.68	5.59	280	535
	632. 644	○	**-**	**CC**	2.50	1.60	2.00	2.83	4.00	4.90	6.33	7.48	8.94	295	565
	632. 724	○	**-**	**CC**	3.00	2.10	3.15	4.46	6.30	7.72	9.96	11.79	14.09	305	590
	632. 804	○	**-**	**CC**	4.00	2.60	5.00	7.07	10.00	12.25	15.81	18.71	22.36	310	595
	632. 884	○	**-**	**CC**	5.00	3.40	8.00	11.31	16.00	19.60	25.30	29.93	35.78	300	570
90°	**632. 406**	○	**CA**	**-**	1.20	0.70	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	430	820
	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	○	**-**	**CC**	2.00	1.10	1.25	1.77	2.50	3.06	3.95	4.68	5.59	445	850
	632. 646	○	**-**	**CC**	2.50	1.30	2.00	2.83	4.00	4.90	6.33	7.48	8.94	455	865
	632. 726	○	**-**	**CC**	3.00	1.70	3.15	4.46	6.30	7.72	9.96	11.79	14.09	470	885
	632. 806	○	**-**	**CC**	4.00	2.40	5.00	7.07	10.00	12.25	15.81	18.71	22.36	480	900
	632. 886	○	**-**	**CC**	5.00	3.10	8.00	11.31	16.00	19.60	25.30	29.93	35.78	480	910

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

Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	632. 404	+	**5E**		**CA**	=	**632. 404. 5E. CA**

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

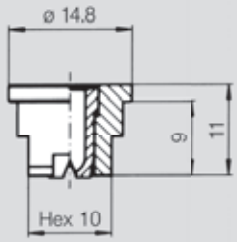
Flat fan nozzles for retaining nut Series 652

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.

303 SS
(<) 20°-75°)

303 SS
(<) 90°-120°)

PVDF



Weight Mat. 16: 10 g

3

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 5E PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [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°	**652.301**	○	-	0.70	0.60	0.16*	0.23*	0.32	0.39	0.51	0.72	65	125
	652.361	○	-	1.00	0.80	0.31*	0.44*	0.63	0.77	1.00	1.40	65	125
	652.441	○	-	1.35	1.10	0.62*	0.88	1.25	1.53	1.98	2.80	65	125
	652.481	○	-	1.50	1.20	0.80*	1.13	1.60	1.96	2.53	3.58	65	125
30°	**652.402**	○	-	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	2.24	115	230
	652.482	○	-	1.50	1.10	0.80*	1.13	1.60	1.96	2.53	3.58	115	230
60°	**652.364**	○	○	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.40	275	525
	652.404	○	○	1.20	0.80	0.50*	0.71	1.00	1.23	1.58	2.24	275	525
	652.444	○	○	1.35	0.90	0.62*	0.88	1.25	1.53	1.98	2.80	280	530
	652.484	○	○	1.50	1.00	0.80*	1.13	1.60	1.96	2.53	3.58	280	530
	652.514	○	○	1.65	1.10	0.95*	1.34	1.90	2.33	3.00	4.25	280	530
	652.564	○	○	2.00	1.30	1.25	1.77	2.50	3.06	3.95	5.59	280	525
	652.674	-	○	2.70	1.80	2.38	3.36	4.75	5.82	7.51	10.62	275	520
	652.724	○	○	3.00	2.10	3.15	4.46	6.30	7.72	9.96	14.09	275	520
	652.844	○	○	4.50	3.00	6.25	8.84	12.50	15.31	19.76	27.95	270	510
90°	**652.306**	-	○	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.72	450	795
	652.336	-	○	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	1.01	450	795
	652.366	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.41	450	795
	652.406	○	○	1.20	0.70	0.50*	0.71	1.00	1.23	1.58	2.24	450	800
	652.446	○	○	1.35	0.80	0.62*	0.88	1.25	1.53	1.98	2.80	450	800
	652.486	○	○	1.50	0.80	0.80*	1.13	1.60	1.96	2.53	3.58	450	800
	652.516	-	○	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	4.25	450	800
	652.566	○	○	2.00	1.10	1.25	1.77	2.50	3.06	3.95	5.59	450	805
	652.606	○	○	2.20	1.20	1.58	2.23	3.15	3.86	4.98	7.04	450	805
	652.646	○	-	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	450	805
	652.726	○	○	3.00	1.70	3.15	4.46	6.30	7.72	9.96	14.09	450	810
	652.806	○	-	4.00	2.40	5.00	7.07	10.00	12.25	15.81	22.36	450	820
	652.846	-	○	4.50	2.40	6.25	8.84	12.50	15.31	19.76	27.95	450	820
120°	**652.337**	-	○	0.90	0.40	0.22*	0.32*	0.45	0.55	0.71	1.01	660	1260
	652.367	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.41	660	1265
	652.407	○	○	1.20	0.60	0.50*	0.71	1.00	1.23	1.58	2.24	660	1270
	652.447	○	-	1.35	0.60	0.62*	0.88	1.25	1.53	1.98	2.80	665	1270
	652.487	○	○	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	3.58	665	1270
	652.567	○	○	2.00	0.90	1.25	1.77	2.50	3.06	3.95	5.59	670	1280
	652.607	-	○	2.20	1.10	1.58	2.23	3.15	3.86	4.98	7.04	675	1285
	652.647	○	-	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	680	1295
	652.727	○	○	3.00	1.60	3.15	4.46	6.30	7.72	9.96	14.09	695	1315
	652.807	○	-	4.00	2.00	5.00	7.07	10.00	12.25	15.81	22.36	705	1330

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

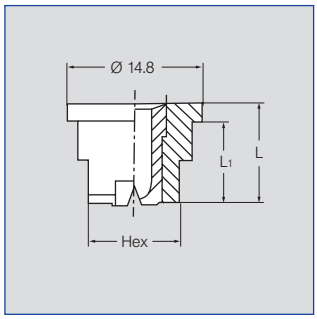
Example for ordering:	Type	+	Material no.	=	Ordering no.
	652.301	+	**16**	=	**652.301.16**

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

Flat fan nozzles

Series 652. XXX. 8H / 56. 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 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

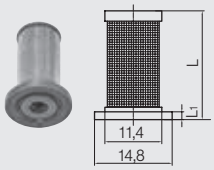
Spray angle	Ordering no.			Colour	E Ø [mm]				
	Type	Mat. no. 8H.03* POM/303 SS	Mat. no. 56.03 POM			1.0	2.0	3.0	5.0
75°	**652.145**	○	○	green	0.12	0.04**	0.05	0.06	0.08
	652.165	○	-	black	0.14	0.05**	0.07	0.08	0.10
	652.185	○	○	red	0.16	0.06**	0.08	0.10	0.13
	652.215	○	-	blue	0.20	0.08**	0.11	0.14	0.18

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

Pos.	Name	Ordering no.	Material	Colour	Dimensions [mm] L	L1	Hex	** [mm]
1	Filter with return valve	095. 016. 53. 11.00	PP	blue	21	1.5	-	0.08
		095. 016. 53. 14. 63	PP	green	21	1.5	-	0.08
2	Gasket	065. 240. 55	PTFE	-	-	-	-	-
		065. 240. 72	EWP 210	-	-	-	-	-
3	Nozzle	Ordering no. see flow tables	POM	-	11	9	-	-
			POM/303 SS*	-	12	10	-	-
4	Cap nut	065. 200. 16	303 SS	-	13	10	22	-
		065. 200. 56	POM	black	14.5	11.5	22	-

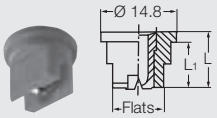
* Housing POM, nozzle insert 303 SS
** Size of mesh

Position 1
Filter with return valve

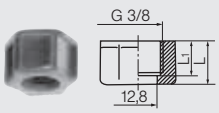


Position 2
Gasket

Position 3
Nozzle



Position 4
Cap nut

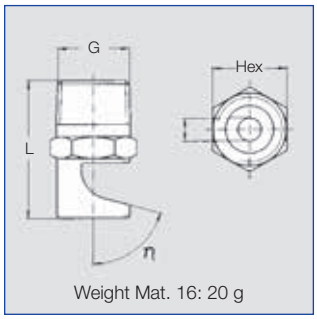


Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

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 Mat. 16: 20 g

Spray angle	η	Ordering no. Type	Mat. no. 16 303 SS	Code G 1/8 BSPT	Code G 1/4 BSPT	B Ø [mm]	V̇ [l/min] p [bar] 1.0	2.0	5.0	Dimensions L [mm] R 1/8	L [mm] R 1/4	Hex [mm] R 1/8	Hex [mm] R 1/4	Spray width B at p=2 bar H = 250 mm
90°	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
140°	75°	**686. 448**	○	**-**	**CC**	1.20	0.88	1.25	1.98	-	28	-	14	1370
		686. 528	○	**-**	**CC**	1.50	1.41	2.00	3.16	23	28	11	14	1370
		686. 568	○	**-**	**CC**	1.70	1.77	2.50	3.59	23	-	11	-	1370
		686. 608	○	**-**	**CC**	1.90	2.23	3.15	4.98	23	28	11	14	1370
		686. 728	○	**-**	**CC**	2.70	4.45	6.30	9.96	23	-	11	-	1370
		686. 808	○	**-**	**CC**	3.40	7.07	10.00	15.81	23	28	11	14	1370
		686. 908	○	**-**	**CC**	4.50	12.73	18.00	28.46		28	-	14	1370

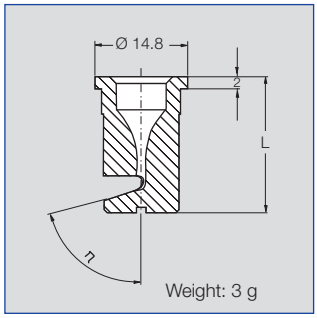
B = Bore diameter
Can also be used for air or saturated steam.

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	686.406	+	16		CA	=	650.406.16.CA

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	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°	**684.368**	○	yellow	0.8	0.45*	0.63	1.00	20	1360
		684.408	○	blue	1.0	0.71	1.00	1.58	20	1370
		684.448	○	red	1.2	0.88	1.25	1.98	20	1370
		684.568	○	white	1.7	1.77	2.50	3.95	19	1370
		684.688	○	green	2.4	3.54	5.00	7.91	17	1370

B = bore diameter
* Differing spray pattern.

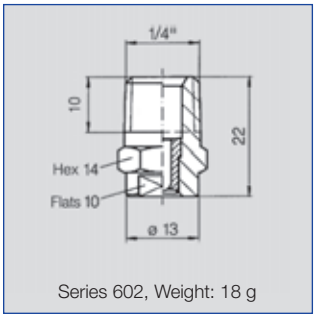
Example for ordering:	Type	+	Material no.	=	Ordering no.
	684.368	+	**56**	=	**684.368.56**

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

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



Series 602, Weight: 18 g

US gal/min. at 40 psi	Nozzle-Code	Flow rate code			A Ø [mm]	V̇ [l/min]						
	Connection 1/4"	Spray angle				p [bar]						
		20°	45°	60°		40	60	80	100	120	150	200
02	**602**	**361**	**363**	**364**	1.00	2.86	3.50	4.04	4.52	4.95	5.53	6.39
025	**602**	**381**	**383**	**384**	1.10	3.54	4.33	5.00	5.59	6.12	6.85	7.91
03	**602**	**401**	**403**	**404**	1.18	4.31	5.28	6.10	6.82	7.47	8.35	9.64
034	**602**	**411**	**413**	**414**	1.30	4.95	6.06	7.00	7.83	8.57	9.59	11.07
04	**602**	**451**	**453**	**454**	1.35	5.80	7.10	8.20	9.17	10.04	11.23	12.97
045	**602**	**471**	**473**	**474**	1.40	6.51	7.97	9.20	10.29	11.27	12.60	14.55
05	**602**	**481**	**483**	**484**	1.55	7.29	8.92	10.30	11.52	12.62	14.11	16.29
055	**602**	**501**	**503**	**504**	1.60	7.96	9.74	11.25	12.58	13.78	15.41	17.79
06	**602**	**521**	**523**	**524**	1.72	8.70	10.66	12.31	13.76	15.07	16.85	19.46
07	**602**	**541**	**543**	**544**	1.80	10.06	12.32	14.22	15.90	17.42	19.47	22.49
075	**602**	**551**	**553**	**554**	1.90	10.75	13.16	15.20	16.99	18.62	20.81	24.04
08	**602**	**571**	**573**	**574**	2.05	11.48	14.06	16.23	18.15	19.88	22.23	25.67
09	**602**	**591**	**593**	**594**	2.10	13.01	15.93	18.40	20.57	22.53	25.19	29.09

A = Equivalent bore diameter

Connection Code	Connection	p_{max}* [bar]
A3.00	BSPT	ca. 700

* Only valid for operation at constant pressure

Example for ordering:	Nozzle code	+	Flow rate code	+	Connection code	=	Ordering no.
	602	+	361	+	A3.00	=	602.361.A3.00 (Flat fan 20°; 4.52 l/min. at 100 bar; 1/4" BSPT)

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

Nozzle systems for surface technology

Easy-Clip nozzle system

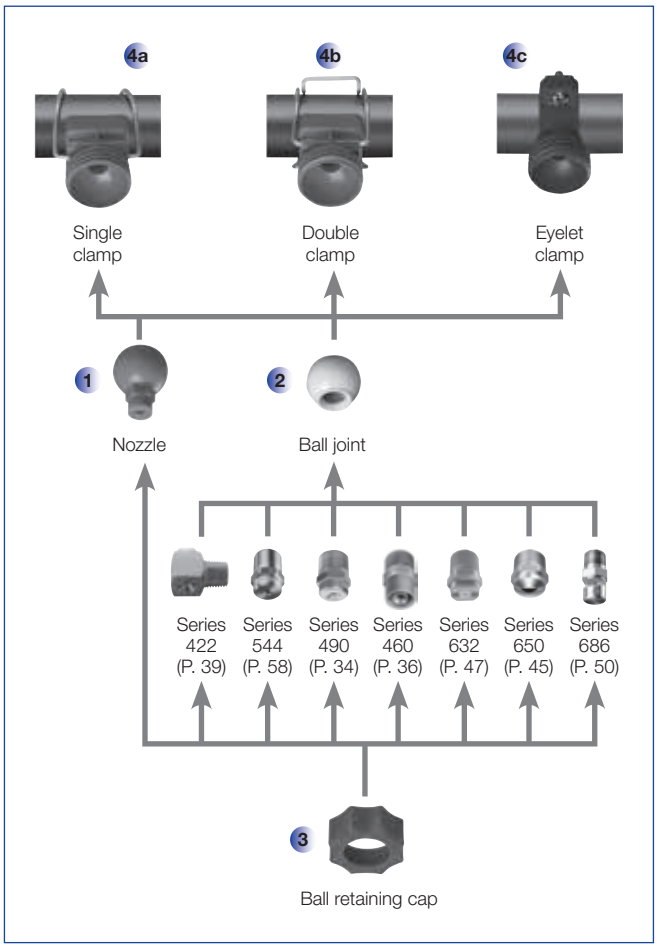
Quick and easy assembly with clamp. No tools required. Allround swivelling by 30°. Easy adjustment and cleaning.
Applications:
Degreasing, phosphating in surface treatment.

Materials:
Clamp: Stainless steel 301 SS
Sealing: EPDM
Cylinder pin, Screw and Screw unit: 316 SS.
Body, ball retainer cap: PP, reinforced.
Nozzle, ball joint: PP

Sets

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

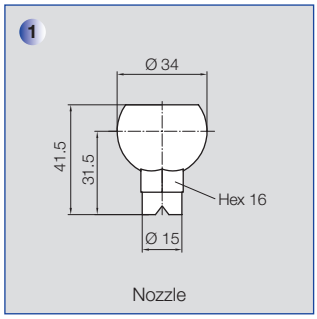
Ordering no.	Nozzle colour		V̇ [l/min] p [bar] 0.5	1.0	1.5	2.0	2.5
676.804.53.31	lilac	60°	5.00	7.07	8.66	10.00	11.18
676.844.53.31	yellow	60°	6.25	8.84	10.83	12.50	13.98
676.884.53.31	red	60°	8.00	11.31	13.85	16.00	17.89
676.924.53.31	green	60°	10.00	14.14	17.32	20.00	22.36



Components

1 Nozzle

Ordering no.	Nozzle colour		V̇ [l/min] p [bar] 0.5	1.0	1.5	2.0	2.5
676.804.53.30.01	lilac	60°	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	60°	8.00	11.31	13.85	16.00	17.89
676.924.53.30.01	green	60°	10.00	14.14	17.32	20.00	22.36
092.080.53.00.01	grey	Blind nozzle					

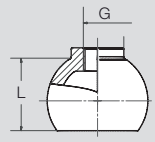


Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

2 Ball joint

Ordering no.	Colour	Nozzle connection	L [mm]	For nozzle series
092.080.53.AD.01	beige	1/4 BSPP	32.4	422, 460, 490, 544, 632, 686
092.080.53.AF.01	beige	3/8 BSPP	31.4	422, 460, 490, 632, 686, 688

2

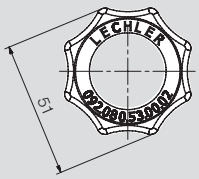


Ball joint

3 Ball retainer cap

Ordering no.
092.080.53.00.02

3



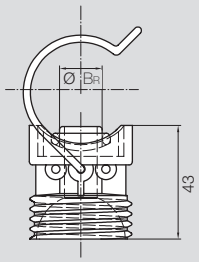
Ball retainer cap

4a Single clamp

Ordering no.	Spigot-Ø BR	Recommended bore-Ø	For Pipe-Ø
092.080.53.00	16.3 mm	16.5-17.0 mm	1" (32.0-34.5 mm)
092.081.53.00	16.3 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)

Other Spigot-Ø (13.8/18.5 mm) on request.

4a



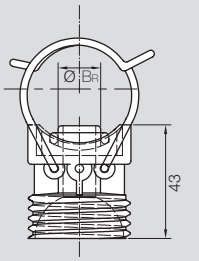
Single clamp

4b Double clamp

Ordering no.	Spigot-Ø BR	Recommended bore-Ø	For Pipe-Ø
092.090.53.00	16.3 mm	16.5-17.0 mm	1" (32.0-34.5 mm)
092.091.53.00	16.3 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)

Other bore-Ø (13.8/18.5 mm) on request.

4b



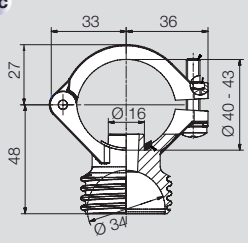
Double clamp

4c Eyelet clamp

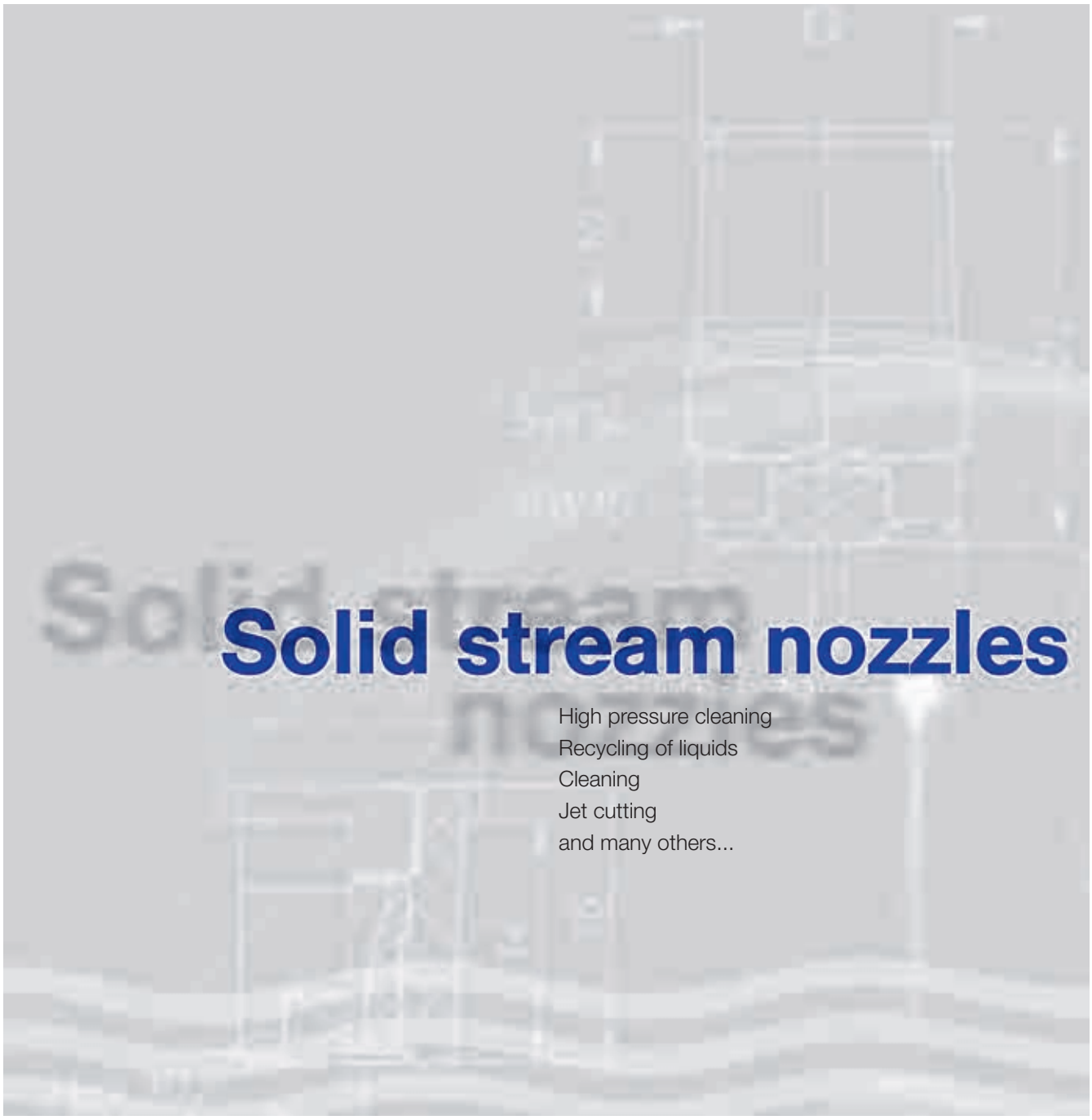
Ordering no.	Spigot-Ø BR	Recommended bore-Ø	For Pipe-Ø
090.033.53.43.10	16 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)

Other bore diameter (13.8/20.0 mm) on request.

4c



Eyelet clamp 1 1/4"



Solid stream nozzles

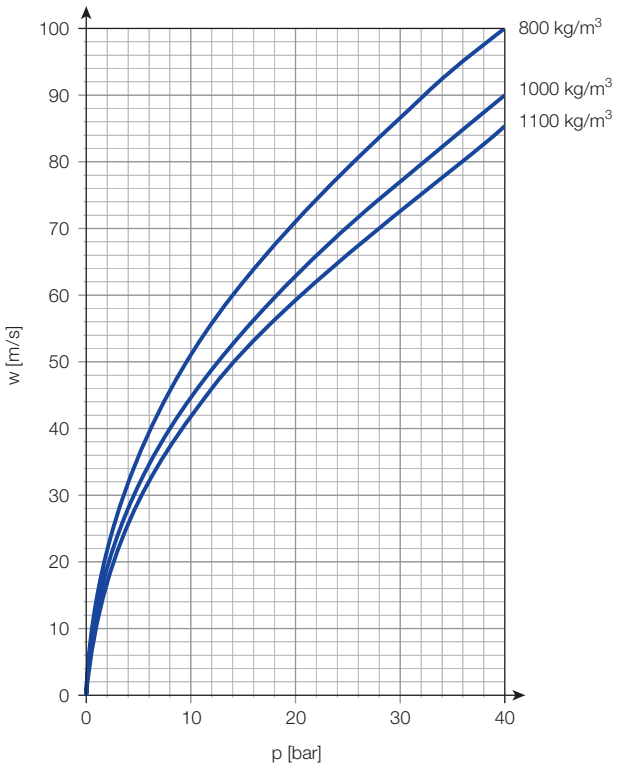
High pressure cleaning
Recycling of liquids
Cleaning
Jet cutting
and many others...

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**	0.40 – 10.00	1/8 BSPT 1/4 BSPT	Cleaning installations. **Optimized flow technology. Extreme jet power. Concentrated solid stream jet.**	**58**

High-pressure nozzles	Series	$\dot{V}$ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**546**	4.04 – 16.23 (at 80 bar)	1/4 BSPT	High-pressure cleaning.	**59**

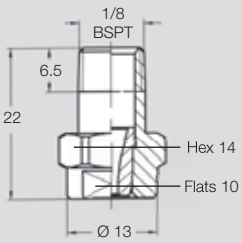
Solid stream nozzles

Series 544

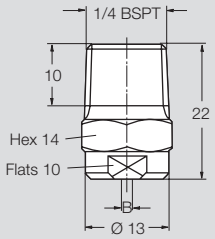
Long, closed jet with punctiform impact pattern. Optimized flow conditions. Highest jet power. Concentrated solid stream jet.
Applications:
Cleaning installations.

Series 544.320 – 544.400

Series 544.480 – 544.800



Weight Mat. 16: 20 g



Weight Mat. 16: 20 g

4

Ordering no.				B Ø [mm]	V̇ [l/min]								
	Mat. no.	Code			p [bar]								
Type	16 AISI 303	1/8 BSPT	1/4 BSPT		0.5	1.0	2.0	3.0	5.0	10.0	15.0	20.0	30.0
544.320	○	**CA**	**-**	0.80	0.20	0.28	0.40	0.49	0.63	0.89	1.10	1.26	1.55
544.400	○	**-**	**CC**	1.30	0.50	0.71	1.00	1.22	1.58	2.24	2.74	3.16	3.87
544.480	○	**-**	**CC**	1.33	0.80	1.13	1.60	1.96	2.53	3.58	4.38	5.06	6.20
544.560	○	**-**	**CC**	1.65	1.25	1.77	2.50	3.06	3.95	5.59	6.85	7.91	9.68
544.640	○	**-**	**CC**	2.09	2.00	2.83	4.00	4.90	6.32	8.94	10.95	12.65	15.49
544.720	○	**-**	**CC**	2.66	3.15	4.45	6.30	7.72	9.96	14.09	17.25	19.92	24.40
544.800	○	**-**	**CC**	3.30	5.00	7.07	10.00	12.25	15.81	22.36	27.39	31.62	38.73

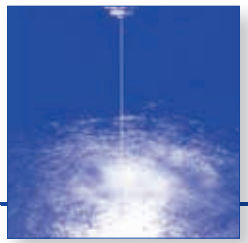
B = bore diameter

Example	**Type**	**+**	**Material no.**	**+**	**Code**	**=**	**Ordering no.**
for ordering:	**544.320**	**+**	**16**	**+**	**CA**	**=**	**544.320.16.CA**

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

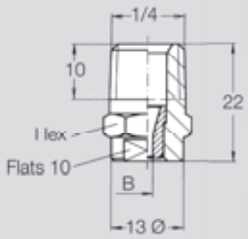
High-pressure solid stream nozzles

Series 546



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

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



Weight: 18 g

[US gal/ min.] at 40 psi	Nozzle code / Connection 1/4"	Flow rate code	B Ø [mm]	V̇ [l/min] p [bar] 40	60	80	100	150	200	300
02	**546**	**360**	0.84	2.86	3.50	4.04	4.52	5.54	6.39	7.83
03	**546**	**400**	1.03	4.31	5.28	6.10	6.82	8.35	9.64	11.81
04	**546**	**450**	1.19	5.80	7.10	8.20	9.17	11.23	12.97	15.88
045	**546**	**470**	1.26	6.54	8.00	9.25	10.34	12.66	14.62	17.91
05	**546**	**480**	1.33	7.29	8.92	10.30	11.52	14.11	16.29	19.95
06	**546**	**520**	1.46	8.70	10.66	12.31	13.76	16.85	19.46	23.83
08	**546**	**570**	1.69	11.48	14.06	16.23	18.15	22.23	25.67	31.44

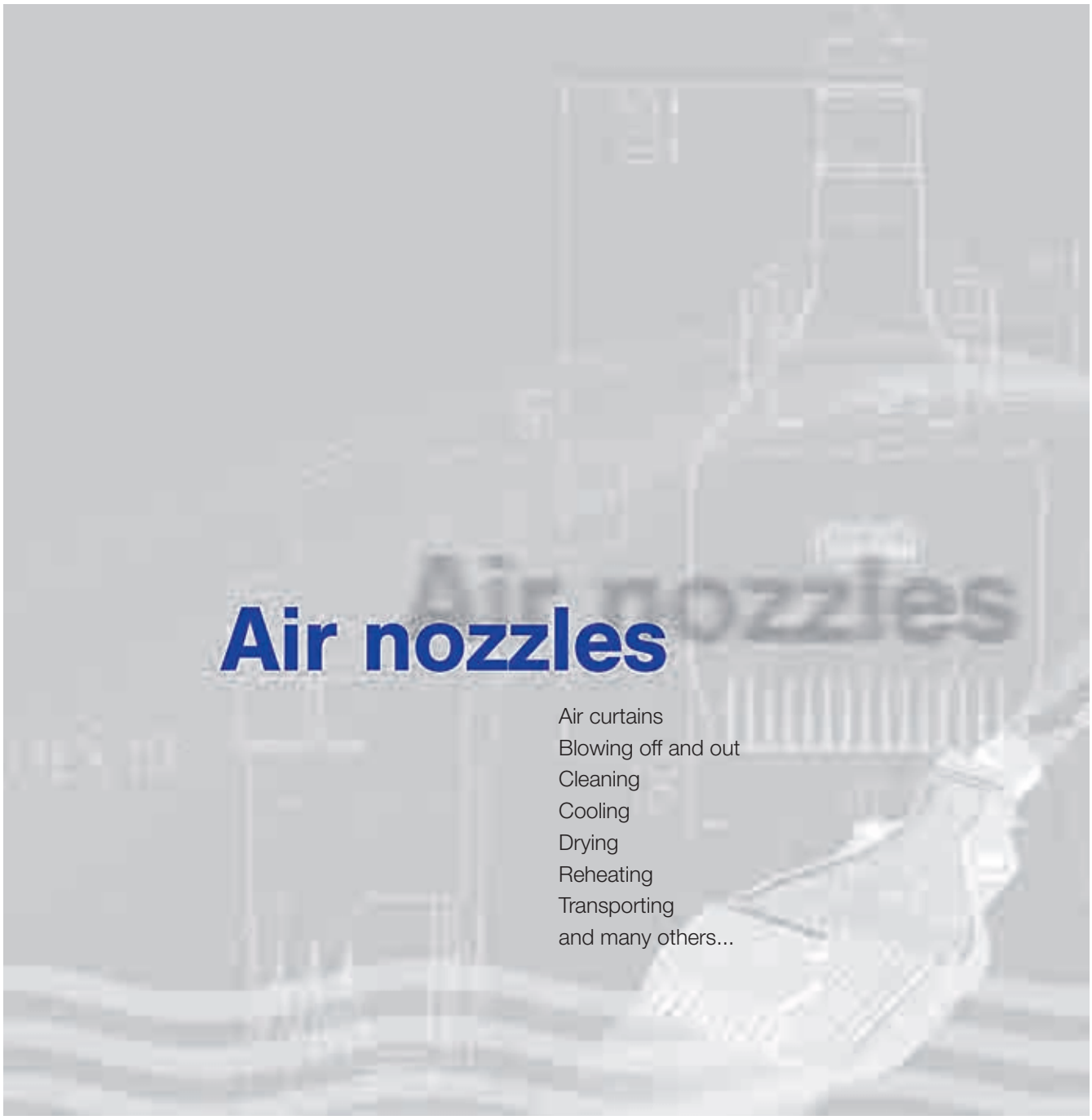
B = bore diameter

Connection code	Connection	p_{max}* [bar]
A3.00	BSPT	approx. 700

* Only valid for operation at constant pressure

Example for ordering:	Nozzle code	+	Flow rate code	+	Connection code	=	Ordering no.
	546	+	**360**	+	**A3.00**	=	**546.360.A3.00 (Solid stream; 4.52 l/min. at 100 bar; 1/4˝ BSPT)**

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



Air nozzles

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

Air nozzles

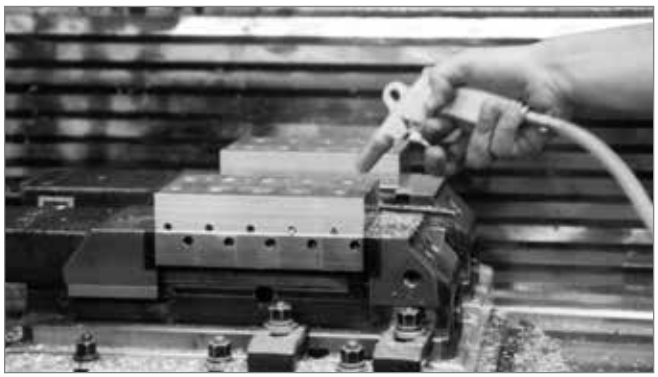
As a rule, any flat fan or solid stream nozzle can be operated with air instead of liquid.
However, you'll obtain the best results using the nozzle designs we specially engineered for applications of compressed air or saturated steam. For further details, please refer to the next pages.
In addition to 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.

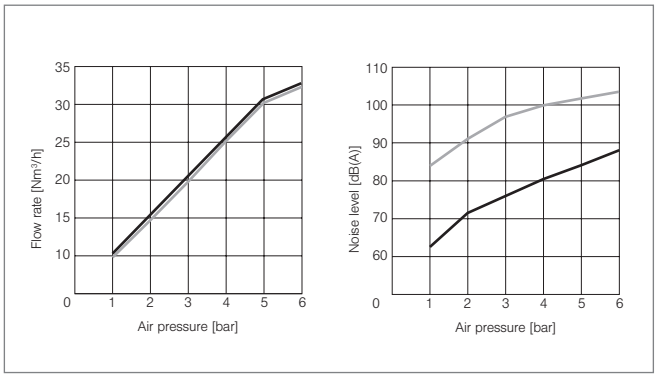
Multi-channel air nozzles

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





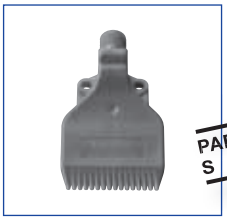
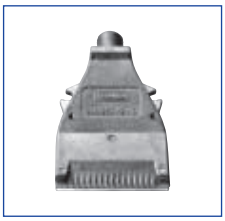
Comparison of a conventional, single-hole nozzle with the Lechler multi-channel round jet nozzle type 600.326

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
	**600.130** **600.484**	8.00 - 18.00	1/4 BSPP	Blowing off and blowing out, cleaning, drying, cooling, conveying with air. **Multi-channel flat fan nozzle.** **Plastic versions.**	**64**
	**600.283** **600.493**	18.00-30.00	1/4 BSPP	Blowing off and blowing out, cleaning, drying, cooling, conveying with air. **Multi-channel flat fan nozzle.** **Metallic versions.**	**65**

Solid stream nozzles for Air	Series	Air consumption [m³/h] at **p** = 2 bar	Connection	Application/ Design	Page
	**600.326**	15.00	1/4 BSPP	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.**	**66**

5

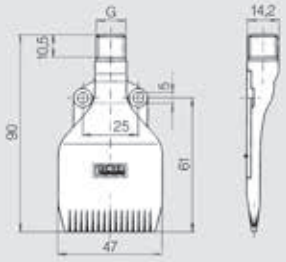
Multi-channel flat fan nozzles for air »Whisperblast®«, plastic versions Series 600.130 / 600.484

Particularly silent!

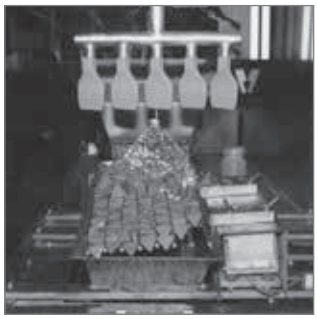
NEW: Also available in PP for galvanic and food industry (FDA-conform material)

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.

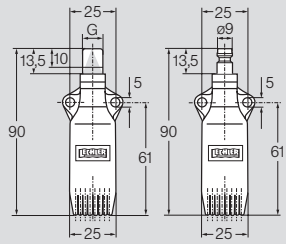
600.130 (POM)



Weight: 23 g · T_{max} POM: 50 °C

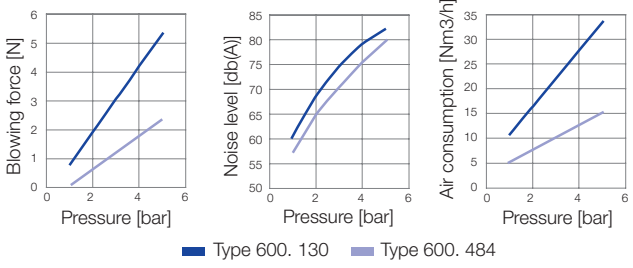


600.484.56 (POM)



Weight: 16 g · T_{max}: 50 °C

Technical Data



Ordering no.		
Type	Material no. 56 POM	Code 1/4 BSPP
600.130	○	**AC**
600.484	○	**AC**

Ball joints see page 89

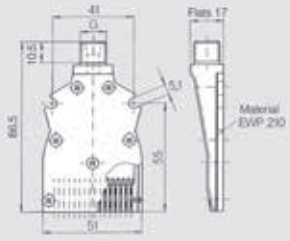
Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	600.130	+	**56**	+	**AC**	=	**600.130.56.AC**

Multi-channel flat fan nozzles for air »Whisperblast®«, metalic versions Series 600.283 / 600.493

Particularly silent!

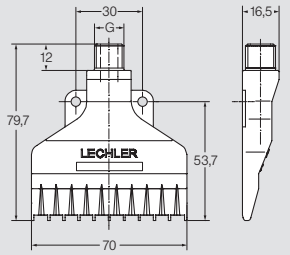
Metalic versions for higher temperatures. Highly efficient air stream, acting upon areas. Reduced noise levels. Low air consumption.
Applications:
Blowing off and blowing out, cleaning, drying, cooling, conveying with air.

600. 283. 42 (Aluminium)



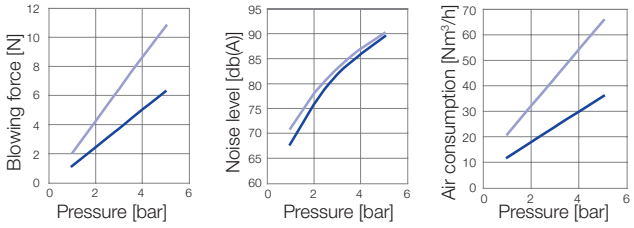
Weight: 60 g · T_{max}: 200 °C

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



Weight: 126 g · T_{max}: 550 °C

Technical Data



Ordering no.			
Type	Material no.		Code
	42 Aluminium	**1Y** Stainless steel	1/4 BSPP
600.283	○	-	**AC**
600.493	-	○	**AC**

Ball joints see page 89

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	600.283	+	**42**	+	**AC**	=	**600.283.42.AC**

Multi-channel round jet nozzles for air

Series 600.326

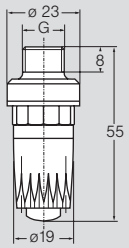
Particularly silent!

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

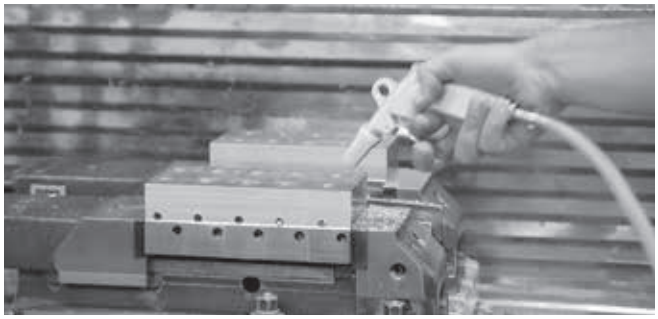
Reduction of noise level of up to 12 dB (A).

600.326.5K/3W mounted on a compressed air gun.

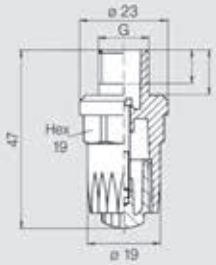
600.326.5K (ABS)



T_{max}: 50 °C



600. 326. 3W (Zinc)

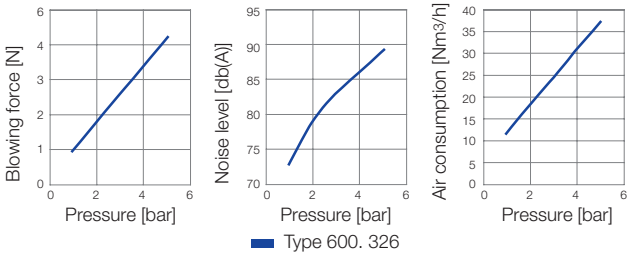


T_{max}: 90 °C

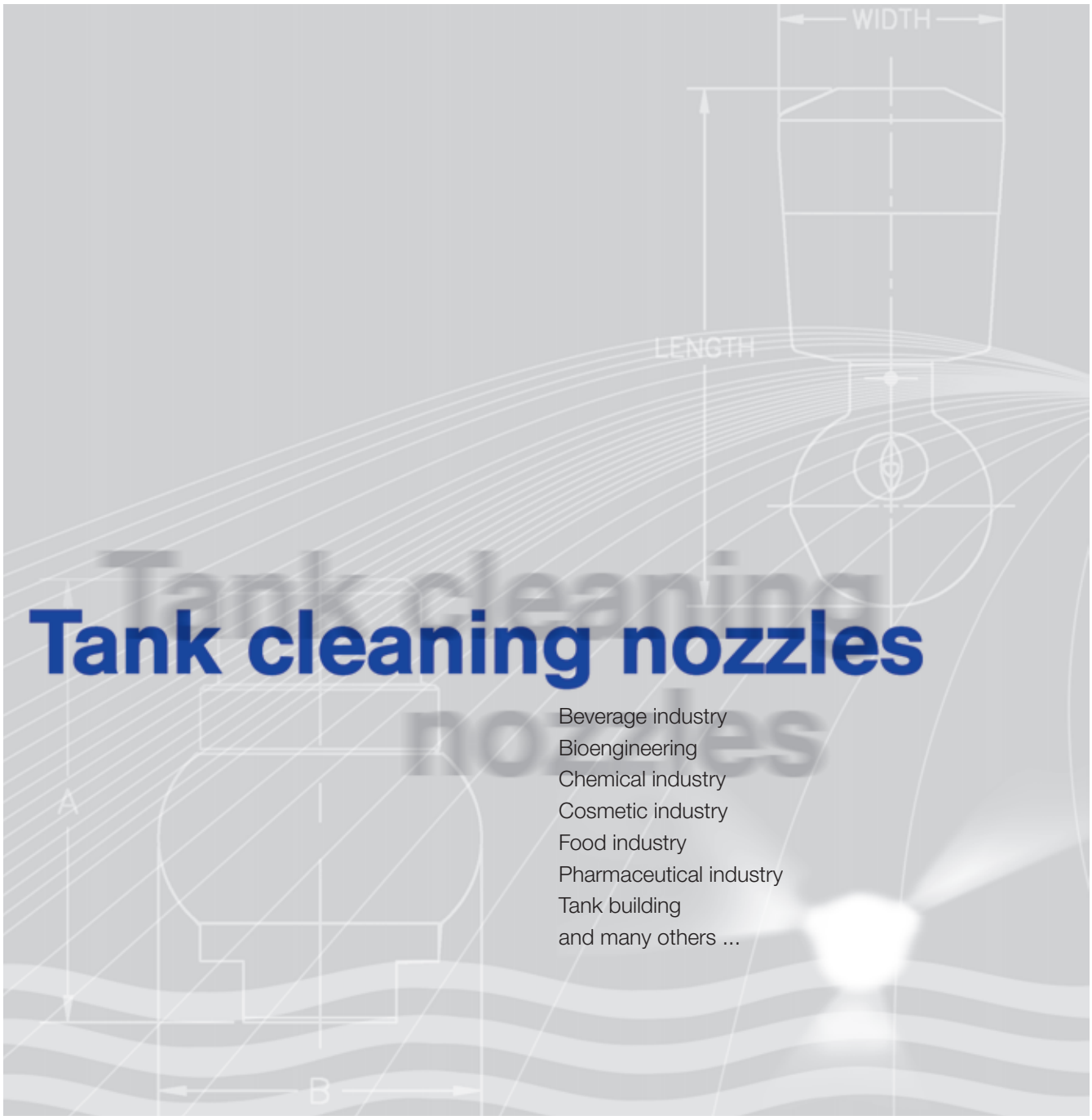
Ordering no. / Type	Code AC	Connection thread G	Weight
600.326.5K (Material: ABS)	○	1/4 BSPP	9 g
600.326.3W (Material: Zinc)	○	1/4 BSPP	47 g

Example of ordering:	**Type 600.326.5K**	**+**	**Code AC**	**=**	**Ordering no. 600.326.5K.AC**

Technical data



Ball joints see page 89



Tank cleaning nozzles

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

Tank cleaning nozzles

Operating principles

Static

Static spray balls do not rotate and therefore require considerably more fluid. They are used primarily for rinsing tanks. They are inexpensive to purchase and are very robust (trouble-free).

Free-spinning

The cleaning fluid drives the spray head by means of specially positioned nozzles. The rapidly repeated impacts removes the soil and rinses it from the tank surface. This results in optimum cleaning efficiency at low pressures in small to medium-sized tanks.

Controlled rotation

The rotating head is driven by the fluid. Either a turbine wheel with an internal gear or a hydraulic brake is used to control the rotation. This ensures that the speed remains in the optimum range even at higher pressures. The droplets produced are larger and strike the tank wall at higher speed. These rotating cleaning nozzles thus achieve an even higher impact.

Gear-controlled

The cleaning fluid drives an internal gear by means of a turbine wheel so that the spray head rotates by two axes. The solid jet nozzles mounted on the spray head produce powerful jets. These jets sweep the entire tank surface in a pre-programmed, model-specific pattern during a spray cycle. This requires a certain minimum time. These models generate the highest impact and are therefore ideal for very large tanks and the toughest cleaning tasks.

Materials

Lechler tank cleaning nozzles are made of highest-quality materials, such as stainless steel AISI 316L, PVDF, PEEK, or Teflon®. In addition to meeting the requirements for resistance and wear, materials used in the beverage, food and pharmaceutical industries must also be food-grade.

Many of the materials used for Lechler tank cleaning nozzles fully comply with FDA requirements and conform to (EC) 1935/2004.

The respective logo on the product pages indicates which requirements are met.

Hygiene requirements

All Lechler precision nozzles for tank cleaning are designed to meet hygiene requirements. In addition, Lechler also offers special nozzles for particularly stringent hygienic applications – certified to 3A® or EHEDG.

ATEX

Lechler offers several nozzle series designed especially for use in explosive atmospheres. For more detailed information, please request our brochure "Precision nozzles for tank and equipment cleaning".

For detailed information and planning resources, please request our brochure „Precision nozzles for tank and equipment cleaning“.

Tank cleaning nozzles

Free-spinning Tank cleaning nozzles	Series		V̇ [l/min] at recommended operating pressure	Recommended operating pressure	Max. Temperature	Connection	Page
	**500.234 PicoWhirly**	300°	9.8	3 bar	200 °C	M6	**72**
	**566.939 MicroWhirly**	360°	21	2 bar	130 °C	3/8 BSPP 3/4" Slip-on	**73**
	**500.191 PVDF MicroWhirly**	180° 360°	13 – 20	2 bar	90 °C	1/2 BSPP	**74**
	**5NA NanoSpinner**	360°	15 – 20	2 bar	140 °C	1/8 BSPP	**75**
	**5MC MicroSpinner**	360°	39	2 bar	140 °C	3/8 BSPP	**76**

Max. tank diameter [m]	0	1	2	3	4	5	6	7	8	9
500.234 PicoWhirly	■									
566.939 MicroWhirly	■	■								
500.191 PVDF MicroWhirly	■	■								
5NA NanoSpinner	■	■								
5MC MicroSpinner	■	■								

Continued on next page.

Tank cleaning nozzles

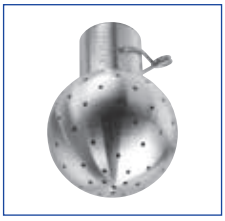
Free-spinning Tank cleaning nozzles	Series		V̇ [l/min] at recommended operating pressure	Recommended operating pressure	Max. Temperature	Connection	Page
	**5MI MiniSpinner**	360°	30 – 100	2 bar	140 °C	3/4 BSPP 3/4" Slip-on	**77**
	**569 Whirly**	360°	48 – 145	2 bar	140 °C	3/4 BSPP 1" Slip-on	**78**
	**577 Gyro**	360°	200 – 394	3 bar	90 °C	1 BSPP 2 BSPP	**79**
	**583 Teflon® Whirly**	360°	58 – 150	2 bar	95 °C	3/4 BSPP 1 BSPP	**80**

Controlled rotating Tank cleaning nozzles	Series		V̇ [l/min] at recommended operating pressure	Recommended operating pressure	Max. Temperature	Connection	Page
	**5S2/5S3 XactClean® HP**	360°	40 – 213	5 bar	95 °C	3/8 BSPP 1/2 BSPP 3/4 BSPP 1 BSPP 1/2" Slip-on 3/4" Stlip-on	**81**

Tank cleaning nozzles

Gear-controlled Tank cleaning nozzles	Series		V̇ [l/min] at recommended operating pressure	Recommended operating pressure	Max. Temperature	Connection	Page
	**5TM IntenseClean**	360°	221 – 411	5 bar	60 °C	1 1/2 BSPP	**82**

Max. tank diameter [m]: 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27

Static spray balls	Series		V̇ [l/min] at recommended operating pressure	Recommended operating pressure	Max. Temperature	Connection	Page
	**591**	360°	17 – 505	3 bar	200 °C	Slip-on connection	**83**

Max. tank diameter [m]: 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Rotating cleaning nozzle »PicoWhirly« Series 500.234

- Very compact design
- Self rotating
- Rotating solid jets
- Completely made of stainless steel

Material:
316L SS

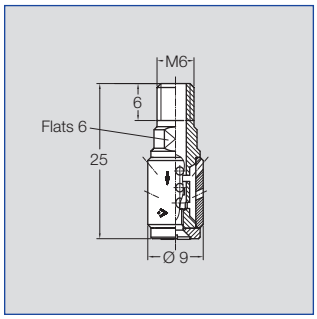
Max. temperature:
200 °C

Recommended operating pressure:
3 bar

Installation:
Operation in every direction is possible

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

Bearing:
Kolsterised slide bearing



Spray angle	Ordering no. Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal./ min]	Max. tank diameter [m]
300°	**500.234.G9.00**	1.8	5.7	8.0	9.8	2.5	0.9

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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.

Function video

Scan the QR-code or go to:
www.lechler.de/PicoWhirlyGB

6

Rotating cleaning nozzle »MicroWhirly« Series 566

- Compact design
- Self rotating
- Effective flat jet nozzles

Materials:
316L SS and PEEK

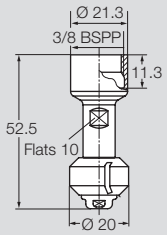
Max. temperature:
130 °C

Recommended operating pressure:
2 bar

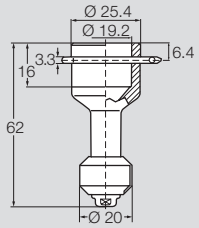
Installation:
Operation in every direction is possible

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

Bearing:
Slide bearing made of PEEK



3/8 BSPP female thread



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

Spray angle	Ordering no.			E Ø [mm]	V̇ [l/min]				Max. tank diameter [m]
	Type	Connection			p [bar] (p_{max} = 6 bar)				
		3/8 BSPP female	3/4" Slip-on		1	2	3	at 40 psi [US gal./ min]	
360°	**566.939.1Y**	**AF**	**TF**	2.4	15	21	26	7	1.7

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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 information: - R-clip made of 316L SS 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.

Function video

Scan the QR-code or go to:
www.lechler.de/MicroWhirlyGB

Example for ordering:	Type	+	Connection	=	Ordering no.
	566.939.1Y	+	**AF**	=	**566.939.1Y.AF**

6

Rotating cleaning nozzle »PVDF MicroWhirly« Series 500.191

- Very inexpensive
- Self rotating
- Effective flat jet nozzles
- Completely made of PVDF

Material:
PVDF

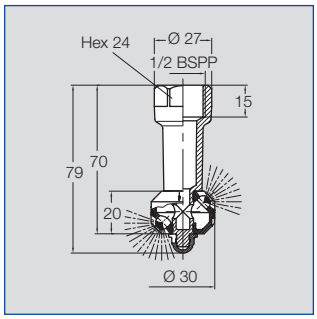
Max. temperature:
90 °C

Recommended operating pressure:
2 bar

Installation:
Operation in every direction is possible

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

Bearing:
Slide bearing made of PVDF



Spray angle	Ordering no. Type	E Ø [mm]	Connection BSPP female	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal./min]	Max. tank diameter [m]
180°	**500.191.5E.02**	2.2	1/2"	9	13	16	4	0.8
180°	**500.191.5E.01**	2.2	1/2"	9	13	16	4	0.8
360°	**500.191.5E.00**	2.2	1/2"	14	20	24	6	1.1

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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.

Function video

Scan the QR-code or go to:
www.lechler.de/PVDFMicroWhirlyGB

6

Rotating cleaning nozzle »NanoSpinner« Series 5NA

- Entirely made from stainless steel
- Self-rotating
- Efficient slot design
- Modern double ball bearing

Materials:
316L SS, 440C SS

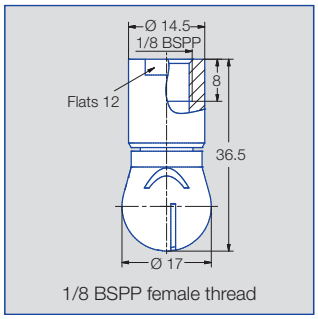
Max. temperature:
140 °C

Recommended operating pressure:
2 bar

Installation:
Operation in every direction is possible

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

Bearing:
Double ball bearing made of 440C SS



1/8 BSPP female thread

Spray angle	Ordering number / Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal./ min]	Max. tank diameter [m]
360°	**5NA.879.1Y.AB**	0.5	11	15	18	5	1.4
	5NA.929.1Y.AB	0.5	14	20	25	6	1.6

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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.

Function video

Scan the QR-code or go to:
www.lechler.de/NanoSpinnerGB

Rotating cleaning nozzle »MicroSpinner« Series 5MC

- Entirely made from stainless steel
- Self-rotating
- Efficient slot design
- Modern double ball bearing

Materials:
316L SS,
440C SS

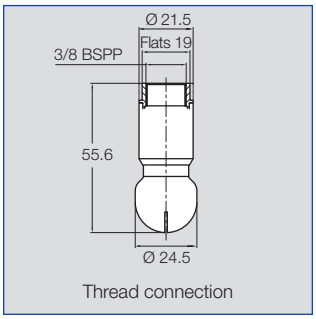
Max. temperature:
140 °C

Recommended operating pressure:
2 bar

Installation:
Operation in every direction is possible

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

Bearing:
Double ball bearing made of 440C SS



Thread connection

Spray angle	Ordering no. Type	Ordering no. Connection 3/8 BSPP female	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal./min]	Max. tank diameter [m]
360°	**5MC.049.1Y.**	**AF**	0.9	28	39	48	12	1.8

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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.

Example for ordering:	Type	+	Connection	=	Ordering no.
	5MC.049.1Y	+	AF	=	5MC.049.1Y.AF

Function video

Scan the QR-code or go to:
www.lechler.de/SpinnerGB

6

Rotating cleaning nozzle »MiniSpinner« Series 5MI

- Entirely made from stainless steel
- Self-rotating
- Efficient slot design
- Modern double ball bearing

Materials:
316L SS,
440C SS

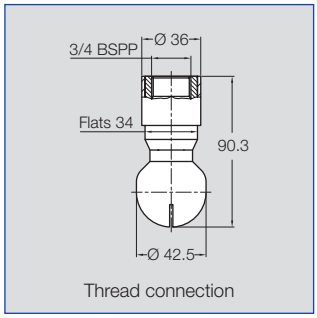
Max. temperature:
140 °C

Recommended operating pressure:
2 bar

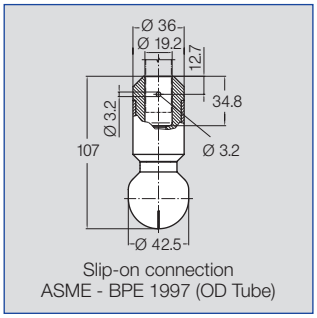
Installation:
Operation in every direction is possible

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

Bearing:
Double ball bearing made of 440C SS



Thread connection



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

Spray angle	Ordering no. Type	Connection 3/4 BSPP female	Connection 3/4" Slip-on	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal./min]	Max. tank diameter [m]
360°	**5MI.054.1Y**	**AL**	**TF07**	0.5	21	30	37	9	1.8
	5MI.074.1Y	**AL**	**TF07**	0.6	35	49	60	15	2.1
	5MI.014.1Y	**AL**	**TF07**	0.9	49	69	85	21	2.3
	5MI.209.1Y	**AL**	**TF07**	1.5	71	100	122	31	2.6

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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 information: - R-clip made of stainless steel 316L SS is included (Ordering no.: 095.022.1Y.50.60).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

Function video

Scan the QR-code or go to:
www.lechler.de/SpinnerGB

Example for ordering:	Type	+	Connection	=	Ordering no.
	5MI.054.1Y	+	**AL**	=	**5MI.054.1Y.AL**

Rotating cleaning nozzle »Whirly« Series 569

- Popular and proven design
- Powerful flat jets
- Wide range of flow rates

Materials:
316L SS,
PEEK, Rulon 641

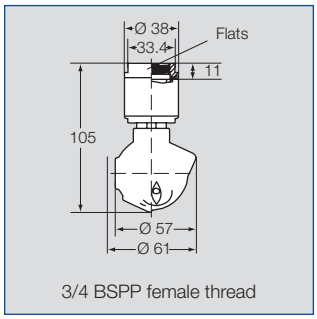
Max. temperature:
140 °C

Recommended operating pressure:
2 bar

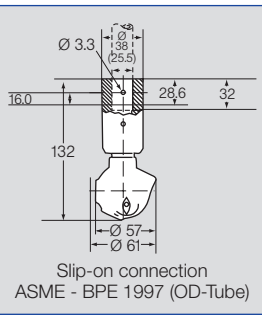
Installation:
Operation in every direction is possible; in horizontal installation position no rotating until 2 bar

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

Bearing:
Double ball bearing made of stainless steel



3/4 BSPP female thread



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

Spray angle	Ordering no.			E Ø [mm]	V̇ [l/min]				Max. tank diameter [m]
	Type	Connection			p [bar] (p_{max} = 6 bar)				
		3/4 BSPP female	1" Slip-on		1	2	3	at 40 psi [US gal./ min]	
360°	**569.059.1Y**	**AL**	**TF10**	3.2	36	48	62	15	1.8
	569.139.1Y	**AL**	**TF10**	3.6	52	71	87	22	2.1
	569.199.1Y	**AL**	**TF10**	4.8	69	97	119	30	2.6
	569.279.1Y	**AL**	**TF10**	7.1	103	145	178	45	3.0

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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 information: - R-clip made of stainless steel 316L SS is included (Ordering no.: 095.022.1Y.50.60.E).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

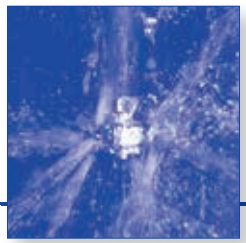
Example for ordering:	Type	+	Connection	=	Ordering no.
	569.059.1Y	+	**AL**	=	**569.059.1Y.AL**

Function video

Scan the QR-code or go to:
www.lechler.de/WhirlyGB

6

Rotating cleaning nozzle »Gyro« Series 577



- Self rotating
- Effective flat jet nozzles
- Large free cross sections, insensitive to clogging

Max. tank diameter:
5.5 m

Materials:
316L SS,
PTFE

Max. temperature:
90 °C

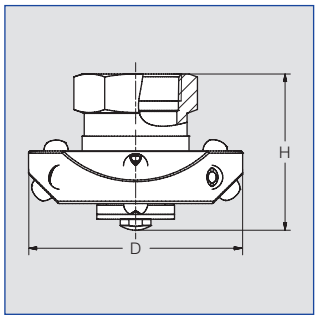
Recommended operating pressure:
3 bar

Installation:
Vertically facing downward

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

Bearing:
Slide bearing made of PTFE

Accessories:
Spare parts set consisting of: top seal, bottom seal, bolt, nut, sleeve, instructions for use



Spray angle	Ordering no.			$\dot{V}$ [l/min]					Dimensions	
	Type	Connection		**p** [bar] (p_{max} = 5 bar)						
		1 BSPP	2 BSPP	1	2	3	5	at 40 psi [US gal./ min]	Height H [mm]	Diameter D [mm]
360°	**577.289.1Y**	**AN**	**-**	115	163	200	258	50	72	118
	577.369.1Y	**AN**	**-**	182	258	316	408	80	72	118
	577.409.1Y	**-**	**AW**	228	322	394	509	100	103	156

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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.

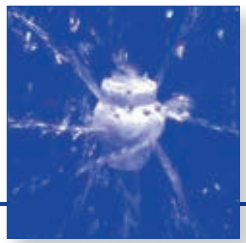
Example for ordering:	Type	+	Connection	=	Ordering no.
	577.289.1Y	+	**AN**	=	**577.289.1Y.AN**

Function video

Scan the QR-code or go to:
www.lechler.de/GyroGB

6

Rotating cleaning nozzle »Teflon® Whirly« Series 583



- Self rotating
- Rotating solid jets
- Recommended for tanks made of glass and enamel

Material:
PTFE (Teflon®)

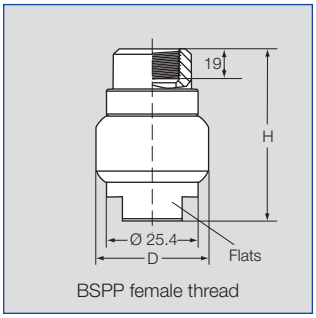
Max. temperature:
95 °C

Recommended operating pressure:
2 bar

Installation:
Operation in every direction is possible

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

Bearing:
Slide bearing made of PTFE



BSPP female thread

Spray angle	Ordering no.			E Ø [mm]	V̇ [l/min]				Dimmensions for female thread version		Max. tank diameter [m]
	Type	Connection			p [bar] (p_{max} = 6 bar)						
		3/4 BSPP female	1 BSPP female		1	2	3	at 40 psi [US gal./ min]	Height H [mm]	Dia-meter D [mm]	
360°	**583.119.55**	**AL**	**-**	1.8	47	58	71	18	74	49	2.4
	583.209.55	**AL**	**-**	3.5	71	100	122	31	74	49	2.5
	583.279.55	**-**	**AN**	3.7	106	150	184	47	100	78.5	3.0

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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.
Teflon® is a registered trademark of E. I. Dupont de Nemours and Company.

Function video

Scan the QR-code or go to:
www.lechler.de/TeflonWhirlyGB

Example for ordering:	Type	+	Connection	=	Ordering no.
	583.119.55	+	**AL**	=	**583.119.55.AL**

6

Rotating cleaning nozzle »XactClean® HP« Series 5S2 / 5S3

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

Materials:
316L SS, 316 SS, 632 SS, PEEK, PTFE, Zirconium oxide, EPDM

Max. temperature:
95 °C

Recommended operating pressure:
5 bar

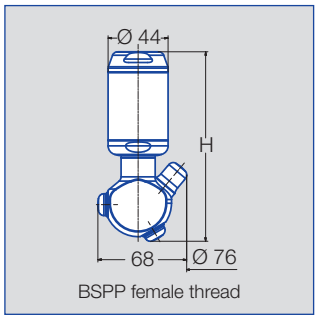
Installation:
Operation in every direction is possible

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

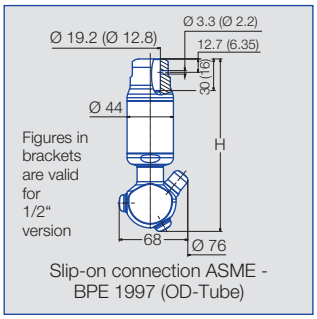
Bearing:
Double ball bearing

Function video

Scan the QR-code or go to:
www.lechler.de/XactCleanHPGB



BSPP female thread



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

Nozzle dimensions [mm]

Connection	H
AF	148
AH	149
AL	139
AN	139
TF05	150
TF07	164

Spray angle	Ordering no.							E Ø [mm]	V̇ [l/min]				Max. tank diameter [m]
	Type	Connection							p [bar] (p_{max} = 15 bar)				
		3/8 BSPP* female	1/2 BSPP* female	3/4 BSPP* female	1 BSPP* female	1/2" Slip-on	3/4" Slip-on		2	5	10	at 40 psi [US gal./min]	
360°	**5S2.959.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.7	25	40	57	7.8	3.5
	5S3.059.1Y	**-**	**AH**	**-**	**-**	**TF05**	**-**	2.0	41	65	92	12.8	4.0
	5S3.119.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.0	60	94	133	18.4	6.0
	5S3.189.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	89	141	199	27.7	7.0
	5S3.239.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	111	175	248	34.3	7.5
	5S3.269.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	2.0	135	213	301	41.8	8.0

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

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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

Slip-on information:
- R-clip made of stainless steel 316L SS is included (Ordering number: 095.022.1Y.50.60.E (TF07), 095.013.1E.05.59.0 (TF05)).
- 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.
	5S2.959.1Y	+	**AF**	=	**5S2.959.1Y.AF**

High impact tank cleaning machine »IntenseClean« Series 5TM

- Gear driven
- Very powerful solid jets
- Popular and proven design

Materials*:
316L SS, PTFE, carbon fibre

Max. temperature:
60 °C

Recommended operating pressure:
5 bar

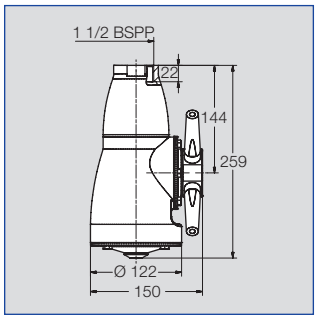
Installation:
Operation in every direction is possible

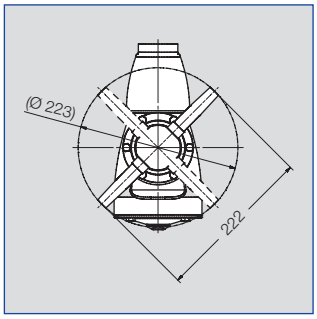
Filtration:
Line strainer with a mesh size of 0.2 mm/80 mesh

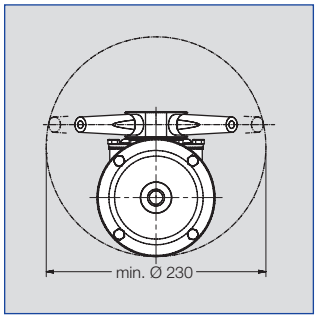
Bearing:
Ball bearing

Weight:
7.5 kg

*The mentioned materials refer to the main components of the tank cleaning machine.
A detailed list of all contained materials is available on request.







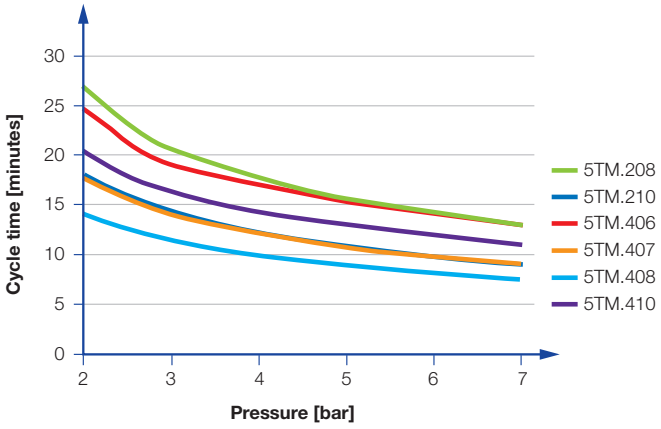
Spray angle	Ordering no. / Type	E Ø [mm]	Number Ø Nozzles [mm]	V̇ [l/min] p [bar] (p_{max} = 7 bar) 2	3	5	at 40 psi [US gal./min]	Max. tank diameter [m]
360°	5TM.406.1Y.AS	6	4 x 6.0	140	171	221	43	18.0
	5TM.407.1Y.AS	7	4 x 7.0	170	208	269	53	20.0
	5TM.408.1Y.AS	8	4 x 8.0	200	245	316	62	22.0
	5TM.410.1Y.AS	10	4 x 10.0	260	318	411	81	23.0

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

Function video

Scan the QR-code or go to:
www.lechler.de/IntenseCleanGB



Cycle time depending on pressure of series 5TM

Static spray balls

Series 591

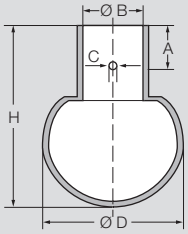
- Popular spray ball design
- Powerful solid jets

Material:
316Ti SS,
Pin: 316L SS

Max. temperature:
200 °C

Recommended operating pressure:
3 bar

Installation:
Operation in every direction is possible



Slip-on connection
DIN 11850, row 1

Spray angle	Ordering no. Type	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	at 40 psi [US gal./min]	Dimensions pprox. [mm] Diameter D	Height H	Connection B	Slip-on	C	A	Max. tank diameter [m]
360°	**591.M11.17.00**	0.8	7	10	14	17	4	20	32.5	8.2	DN8	2.2	9.0	2.8
	591.X11.17.00	1.2	25	35	49	61	15	24	37.5	12.2	DN10	2.2	9.0	2.2
	591.Y11.17.00	1.6	49	70	99	121	31	30	42	18.2	DN15	2.2	9.0	2.5
	591.A21.17.00	2.0	91	128	181	222	56	40	53	22.2	DN20	2.5	9.0	3.5
	591.B31.17.00	2.1	130	183	259	318	80	64	90	28.2	DN25	2.8	18.0	5.2
	591.B51.17.00	3.0	206	292	412	505	128	64	90	28.2	DN25	2.8	18.0	5.4

E = Narrowest free cross-section

The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

Slip-on information: - R-clip made of stainless steel 316L SS or similar is included.
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and static spray ball.

Function video

Scan the QR-code or go to:
www.lechler.de/StaticSprayBallGB

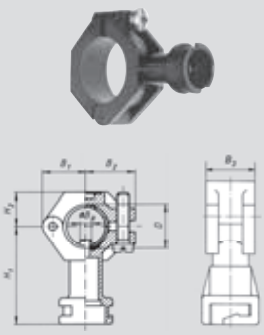
In most applications, static spray balls do not deliver the same cleaning power as rotating nozzles, anyway they do have advantages that make them indispensable for certain tasks:

- No moving parts
- Self-draining
- Easy to inspect
- Proven use in hygienically sensitive environments

Should a rotating nozzle stop turning for some reason, parts of the tank may remain uncleaned. This cannot happen with spray balls. However, gaps can occur in the spray pattern if individual openings are blocked with soil.

Compared to rotating nozzles, static spray balls usually need two to three times the amount of liquid.

Accessories

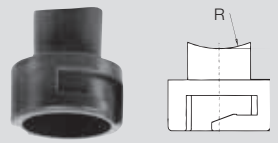


Eyelet clamp with bayonet quick release

For series	Ordering no. Type	Material no. 51 Polyamid	Material no. 53 Polypropylene	Code	Screw (Material)	Pipe Ø	D Ø [mm]	Dimensions [mm] H_1	H_2	B_R*Ø	B**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	6.0	6.2-6.4	21.2	23.8	18.5	22 g
	090.013	○	○	**KA**		3/4"	25-27.5	52.5	17.5	7.6	7.8-8.0	24.5	26.5	22.0	26 g
	090.023	○	○	**KA**		1"	32-34.5	57.0	21.0	10.6	10.8-11.0	30.0	31.0	22.0	32 g

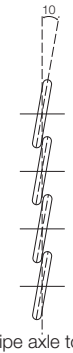
*B_R Ø = Spigot diameter
**B Ø = Recommended bore diameter
Information: Please consider the material combination if you use bayonet quick release eyelet clamps in combination with bayonet quick release retainer caps. When different materials are used, the cap may become difficult to turn.

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	090.003	+	**51**	+	**KA**	=	**090.003.51.KA**



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

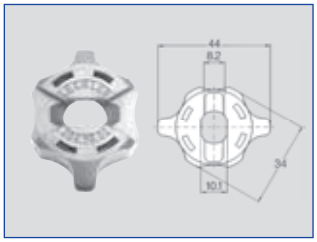
For series	Ordering no.	Material	Dimensions [mm] L	R
302 Bayonet 422 Bayonet 2TR / 468 / 548 / 646 652 / 679 / 684	**095.016.50.08.05**	PVC	25	16
	095.016.53.08.05	PP	25	16

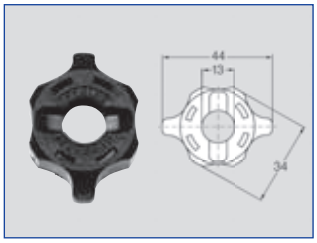


Turn to pipe axle to the right.
Angle 10°.

7

Bayonet quick-release system
incl. gasket 065.242.73
(Material: rubber)



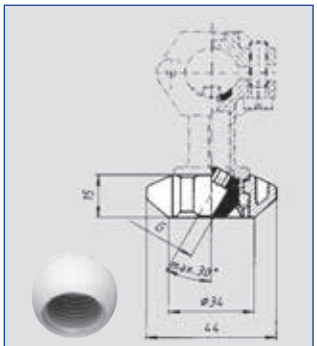


For series	Ordering no.	Material	Colour
652 / 679	**065.202.53.00**	Polypropylene	grey
	065.202.56.00	POM	red
	065.202.5E.00	PVDF	blue
2TR / 468 / 548 684	**065.202.53.11**	Polypropylene	grey
	065.202.56.11	POM	black
Gaskets	**065.242.73.00**	Rubber	-
	065.242.7A.00	Viton	-

Information: Please consider the material combination if you use bayonet quick release eyelet clamps in combination with bayonet quick release retainer caps. When different materials are used, the cap may become difficult to turn.

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

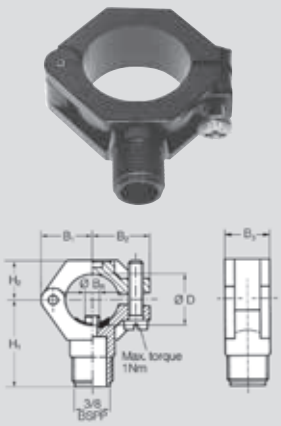
Bayonet quick release retainer caps for ball joint
incl. gasket 095. 015. 7C. 04. 16. 0
(Material: 72 NBR 872)

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

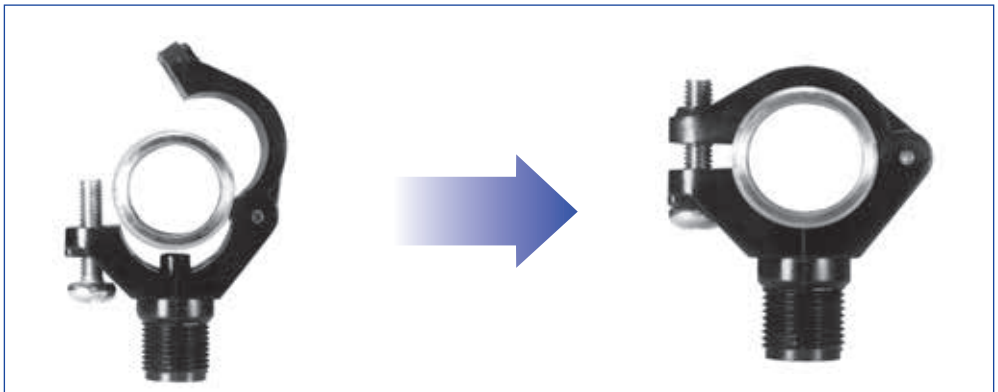
Eyelet clamps / Retaining nuts



Eyelet clamp for retaining nut

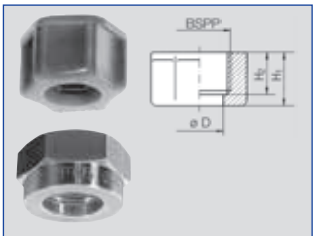
For Series	Ordering no. Type	Material no. 51 Polyamid	53 Polypropylene	5E PVDF	Screw	Dimensions [mm] BSPP	Pipe Ø	D Ø	B_R* Ø	B** Ø	B_1	B_2	B_3	H_1	H_2	Weight (Polyamid)
2TR / 216 / 302 / 308 350 / 468 / 548 / 679 684 / 652	**090.003**	○	○	○	Material 303 SS	3/8	1/2"	20-22.0	6	6.2-6.4	21.2	23.8	18.5	36.5	16.5	20 g
	090.013	○	○	○		3/8	3/4"	25-27.5	7.6	7.8-8.0	24.5	26.5	22.0	39.5	17.5	25 g
	090.023	○	○	○		3/8	1"	32-34.5	10.6	10.8-11.0	30.0	31.0	22.0	44.0	21.0	32 g

*B_R Ø = Spigot diameter
**B Ø = Recommended bore diameter



For Series	Ordering no. Type	Material no. 16 303 SS	17[1] 316Ti SS/ 316L SS	30 Brass	56 POM	5E PVDF	Dimensions [mm] BSPP	H_1	H_2	D Ø	Hex	Weight (brass)
2TR / 652 684	**065.200**	○	○	○	-	-	3/8	13.0	10.0	12.8	22	25 g
	065.200	-	-	-	○	○	3/8	14.5	11.5	12.8	22	25 g

[1] We reserve the right to deliver 316Ti SS or 316L SS under the material no. 17.

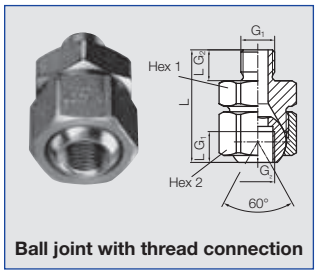


Retaining nuts

For filters and non-return valves please refer to page 89

Example for ordering:	Type	+	Material no.	=	Ordering no.
	090.003	+	51	=	090.003.51

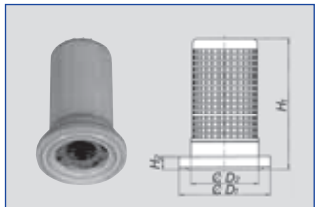
Accessories
Compact ball joints for narrow installation conditions
Non-return valves / filters



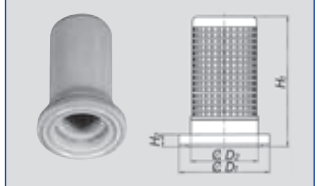
Ball joint with thread connection

For Series	Ordering no. Type	Mat. no. 16 316 SS	Code	G_1 BSPP	G_2 BSPP	L_{G1}	L_{G2}	L	Hex_1	Hex_2	Weight
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	+	Material no.	+	Code	=	Ordering no.
	092.010	+	16	+	AA	=	092.010.16.AA



Non-return valve with filter
p_{max} = 20 bar



Filter

For nozzle Series	Ordering no. Type	Mat. no. 56 POM	Colour	Opening pressure [mm]	Closing pressure [mm]	Mesh size [mm]	Dimensions [mm] H_1	H_2	D_1	D_2	Weight
xxx.32x - xxx.44x	**065. 265** Ball 420 SS Spring 301 SS	○	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 420 SS Spring 301 SS	○	red	0.4 - 0.5	0.35 - 0.45	0.65	21.5	2.0	14.8	11.0	2 g
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

Example for ordering:	Type	+	Material no.	=	Ordering no.
	065. 265	+	56	=	065. 265. 56

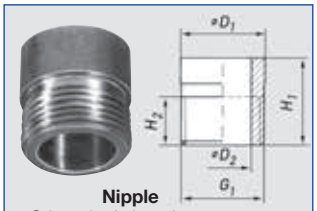
7

Gaskets

For Series	For nozzle Series	Ordering no. Type	Material no. 55 PTFE	72 EWP 210 (asbestos free)	73 Soft rubber	Dimensions [mm]	Weight ca.
226 / 468 652 / 679 684	retaining nut 3/8"	**065.240**	○	○	○	Ø 11 x Ø 15 x 1	0.14 g

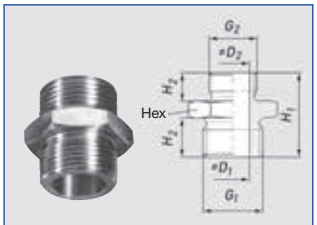
Sockets

For Series	Ordering no. Type	Mat. no. 1Y AISI 316L	G_1	G_2	H_1	H_2	D_1	D_2	Hex	Weight
For all nozzles with 1/8" male thread.	**040.270**	○	-	1/8 BSPP	20	10	13.8	-	14	20
For all nozzles with 1/8" male thread.	**040.271**	○	-	3/8 BSPP	20	10	21.5	22	22	25
For all nozzles with 1/4" male thread.	**061.220**	○	-	1/4 BSPP	20	10	16.8	-	17	25



Nipple
Other nipple lengths on request.

For Series	Ordering no. Type	Mat. no. 1Y AISI 316L	G_1	G_2	H_1	H_2	D_1	D_2	Hex	Weight
2TR / 216 /302 / 308 350 / 548 / 468 / 679 684 / 652	**065.210**	○	3/8 BSPP	-	18	10	17.2	11.5	-	20



Double nipples

For Series	Ordering no. Type	Mat. no. 1Y AISI 316L	G_1	G_2	H_1	H_2	D_1	D_2	Hex	Weight
2TR / 216 /302 / 308 350 / 548 / 468 / 679 684 / 652	**065.215**[1)]	○	3/8 BSPP	1/4 BSPP	25	10	10	7	22	20
	065.211[1)]	○	3/8 BSPP	3/8 BSPP	25	10	11.5	-	22	25

[1)] Not to be used with non-return valve or filter.

Example for ordering:	Type	+	Material no.	=	Ordering no.
	065.240	+	55	=	065.240.55

FOR YOUR NOTES

ENGINEERING
YOUR SPRAY SOLUTION

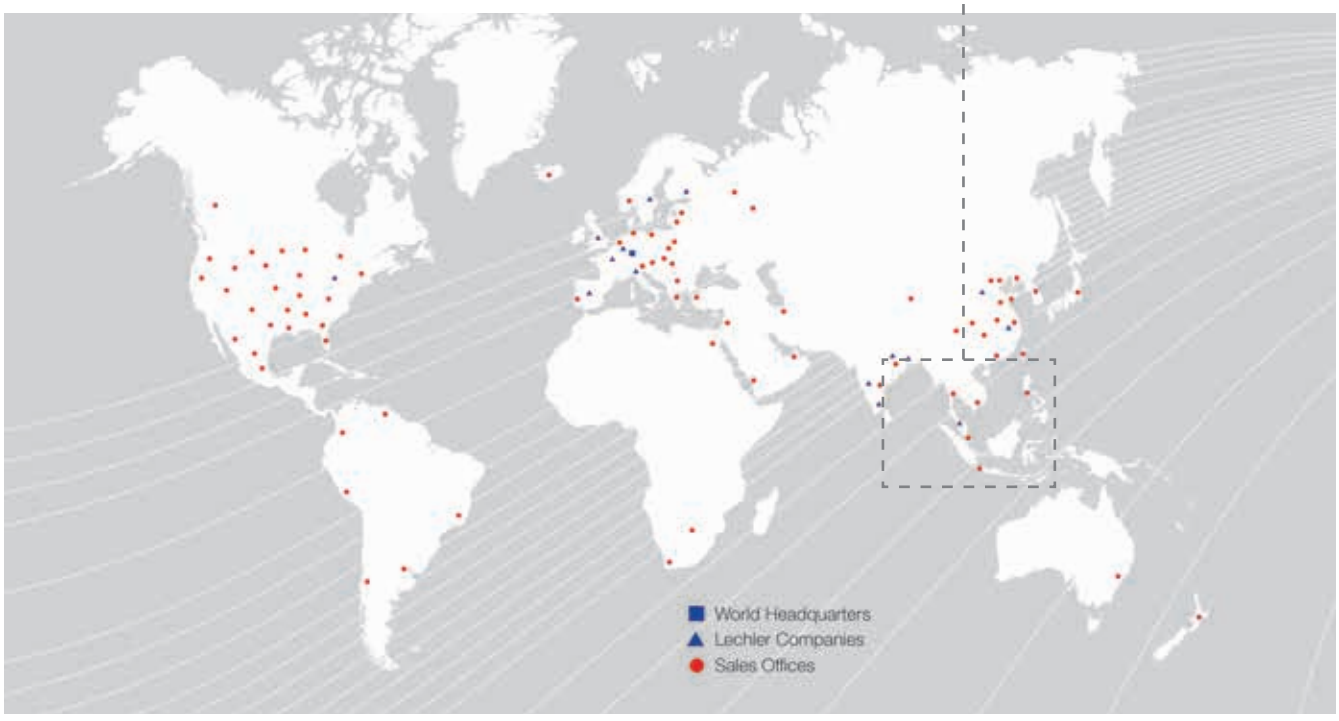
PLEASE CONTACT US
LECHLER ASEAN

ASEAN Headquarters

Lechler Spray Technology Sdn. Bhd.
No. 23, Jalan Teknologi 3/3A
Taman Sains Selangor 1
Kota Damansara, PJU 5
47810 Petaling Jaya
Malaysia

Phone +603 6142 1288
Fax +603 6156 1153

info@lechler.com.my · www.lechler.com



Lechler companies:

Germany (headquarters) · Belgium · China · Finland · France · Great Britain · Italy · Malaysia · Sweden · Spain · USA

Edition 01/17 · ASEAN · M-206-3550-134 · www.dgm-walliser.de · Subject to technical modification.