Precision Spray Nozzles and Engineered Solutions for the Chemical Industry
On the one hand every company needs to develop and constantly optimize its production processes. In automated systems, even minor discrepancies can provide optimization opportunities. On the other side processes in the chemical industry are extremely complex and mutually dependent, each adjustment extends far beyond its immediate scope. That’s why for over 135 years, Lechler provides nozzle and spray technology that always involves the understanding of all the processes involved.

As early as when his trading company was founded in 1879, Paul Lechler believed in chemistry. Initially the main focus was on technical products, machine oils and wood preservatives, and in 1905 the company gained exclusive sales rights to the protective coating Inertol®. By 1919 he had added his self-produced protective coatings to this portfolio.

Later, our company’s focus shifted from chemical production to application and atomization of liquids. In 1961, all chemical products were finally combined in a separate company. But nevertheless, chemistry kept playing a major role in our company.

Today Lechler offers a wide product range for the optimization of technical processes. Throughout our history, chemistry has played a major role in our company. Over the course of many decades, this gave rise to a unique understanding of spraying and atomization processes.

We are familiar with a wide range of applications at various pressures, temperatures and atmospheres. The following pages will provide you with several examples of this.
COMPETENCE –
THE ADVANTAGE OF MULTIPLE PERSPECTIVES

Maximum precision and reliably reproducible spray patterns – that’s what Lechler nozzles and spray solutions stand for. Today we not only offer a unique selection of quickly available standard nozzles, but are also prepared, to develop individual solutions customized to your needs. We would also be very pleased to advise you in person about how you can make your own processes even more efficient.

Our competence
Lechler is world leader in nozzle and spraying technology. Our products and solutions are used worldwide in an extremely wide range of sectors – including the chemical and process industry.

Our application engineers are familiar with practical use from many successful applications, and are therefore competent partners in the development and realization of exemplary solutions.

This know-how combined with our sophisticated technical achievements in research, design and production, provides you with the security needed for safe and reliable plant operation.

Take us at our word and let’s discuss your process needs in an obligation-free consultation.

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1988
Environmental Technologies division founded

1995
Production, sales and administration are concentrated in Metzingen

2010
Expansion of production with new 13,000 m² production hall

2016
Opening of the ultra-modern Development and Technology Center in Metzingen
Whether pinpoint precision or broad coverage – spray solutions from Lechler perfectly support your processes at any point. Thanks to our profound process understanding Lechler is far more than just a nozzle manufacturer. In fact, we can help to optimize the efficiency of a large number of your processes. E.g. in the petrochemical industry from the well to the refinery.

### Upstream

**Applications**

- Fire Suppression
- Dust Control
- Truck Cleaning
- Upgrader Froth Control
- Evaporation Ponds
- Waste Water Control
- Heat Exchanger Cooling

### Midstream

**Applications**

- Corrosion Inhibitor Injection
- Bearing Grease Sprays
- Fire Suppression
- Additive Injection
- Storage Tank Cooling
- Hydrogen Scavenger Control
- Biocide Injection
- Glycol Injection
- Tank Cleaning
- Methanol Injection
- Rail Car Washing

### Downstream

**Applications**

- FCC Injectors
- Distillation Sprays
- Deoaming
- Hydrotreater Water Wash
- Packed Tower Cleaning Sprays
- Coker Off Gas Cooling
- Desuperheating
- Water Wash Sprays
- Condenser Spray Cooling
- Amine Scrubber
- Air Pollution Control
Intense heat, high pressure, corrosive agents – every aspect of our nozzles has to be well defined right from the beginning in order to maintain the ultimate precision. This begins with the internal dimensions and doesn’t end at the choice of the material. After the design phase every nozzle is rigorously examined in our test facilities. This way, we can ensure that the spray patterns of our nozzles match perfectly the needs of your processes.
The variety of different products synthesized and processed by the chemical industry is enormous. The same is true for the involved processes. Most of them are widely used and well understood. Others were specially developed and require extreme ambient conditions, occasionally customized to single reaction vessels.

Lechler supplies you in both areas with state-of-the-art nozzles and spray technologies.
For large industry framework conditions special engineered solutions are necessary. That’s why we also present to you additional Lechler customized products and solutions that we make only to order to meet the special needs of the chemical and petrochemical industry, e.g. pump and control skid units, lances, special nozzles, gas cooling and conditioning systems, droplet separators and more. If you can’t find what you’re looking for, don’t hesitate to contact us.

We would be happy to examine the possibilities available to us for developing the optimum atomization nozzle to suit your needs – custom made and in close collaboration with you. Please note the production related delivery times and costs for the nozzles presented here.

- Customized products and solutions
- Tailored to your needs
- Extensive consultation
- Individual design and process support

For most applications, our precision spray nozzles will provide excellent results.

These parts have not only been meticulously designed but also have stood the test of time. Thanks to large-volume production, they are readily available at a reasonable price for the various applications in chemical-related applications. In this brochure you’ll find our most commonly used products.

- Thousands of standardized nozzles
- Tried and tested
- Great value for money
- Short delivery time
Droplet separators

Droplets can be carried along in the gas flow. Lechler droplet separators remove droplets from the gas flow in order to prevent down-stream measuring devices from being affected. Special full cone nozzles are available for cleaning droplet separators.

Tank sprinklers and fire protection

For cooling and sprinkling tanks and systems, it is extremely important to spray the entire object with water on all sides or to provide an even water film on the object. The narrowest cross section of the nozzles should be ≥ 6 mm (DIN 14495). Tongue-type nozzles and full cone nozzles are frequently used.

Gas cooling (Quenching)

In gas cooling, a liquid is added via nozzles that, under some circumstances, evaporates completely and thereby absorbs the thermal energy of the gas. Complete evaporation requires very fine droplets which can be produced with hollow cone or twin-fluid nozzles.
Absorption (Gas washing)

If the waste gas is to undergo absorption, Lechler full cone, hollow cone, or cluster nozzles are used. It is of crucial importance here to create a large specific reaction surface. The efficiency of the process can be decisively enhanced by making the right nozzle selection and having an optimum nozzle arrangement.

Material separation in centrifuges

Centrifuges are used to separate materials. Full cone and flat fan nozzles are used for this purpose to spray water on and wash out the material that is to be removed.
Cleaning containers

Optimum container cleaning requires targeted harmonization with the customized application. Lechler offers a wide range of nozzles for tank and equipment cleaning and will support you in finding the right arrangement.

System and large tank cleaning

High impact tank cleaning machines can be used in this application. These traverse a precisely defined path with gear-controlled solid stream nozzles. This gives them a great range. In smaller containers and systems, the precision jets can remove even persistent dirt.
**Examples engineered solutions**

**Tank lances**
- Fully customized tank lance
- Different materials
- Different connection types

**Spray headers**
- Fully customized spray headers
- Different materials
- Twin-fluid nozzles possible

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**Nozzles for air cooling and humidification**

The thermodynamic processes of evaporation are normally applied in air cooling and humidification. This requires fine droplets that are injected directly into the air flow by hollow cone or cluster nozzles. Producing the suitable droplet size and even distribution over the intake channel are particularly important here.

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**Examples spray nozzle solutions**

**High impact tank cleaning machine – series 5TA/5TB/5TM**
- Powerful solid jets – highest impact
- For persistent soil
- Robust and proven construction

**Free spinning tank cleaning nozzles – series 569**
- Popular and proven
- Effective flat jets
- ATEX-approved version

**Cluster nozzles – series 502/503**
- Full cone like distribution
- Small droplets
LECHLER NOZZLES AND ENGINEERED SOLUTIONS ARE USED IN MANY FIELDS IN THE CHEMICAL INDUSTRY

**Distillation/fractionation column**

Spray nozzles are an essential item used in distillation of liquid mixtures for separating the mixture into its component parts or fractions, based on the volatilities. **Tangential full cone nozzles** provide large free cross sections and excellent spray distribution for this task.

**Froth control**

In some distillation processes, frothing can be a problem that occurs throughout. **Full cone nozzles** are used to control the foam because they provide full uniform spray coverage.
Steam condenser sprays

These types of heat exchangers convert steam from its gaseous state to a liquid state by using full cone nozzles. These nozzles provide good spray coverage for the large area with the greatest pump efficiency.

Venturi scrubber

Incoming gas is accelerated to a high velocity at the scrubber’s throat where it comes into contact with the scrubbing liquid. The liquid is atomized into fine droplets with hollow cone or full cone nozzles, which entrap the particulate with high collection efficiency.

Examples engineered solutions

- **Nozzle lances and injectors**
  - Optimal spray placement
  - Individual adapted
  - Several options

- **Pump and control skid units**
  - High-quality components
  - Tested quality
  - Perfectly tailored solution

Examples spray nozzle solutions

- **Tangential full cone nozzles – series 422/423**
  - No swirl insert
  - Non-clogging
  - Stable spray angles

- **Full cone nozzles – series 403/405**
  - High flow rates
  - Even spray distribution
  - Big droplets
Evaporative gas cooling
Cooling hot gas with water using twin-fluid nozzles to increase the surface area and speed of evaporation. Additionally the process can be controlled with a Lechler pump and control skid VarioCool®.

Feedstock oil
Heavy oil is injected into a reactor and the end result is a dry carbon product. Full cone nozzles with large free cross section are most suitable for this application.

Fuel burner
A small hollow cone nozzle sprays fuel oil to produce the high temperatures required by the reactor.
It is key in many chemical processes to rapidly quench the temperatures to control product output. Hollow cone nozzles are used for quenching because they produce fine droplets.

A pug mill is a machine in which clay or other materials are mixed into a plastic state or a similar machine for the trituration of ore. In this process full cone nozzles are used.

Examples engineered solutions

Nozzle lances and injectors

- Optimal spray placement
- Individual adapted
- Several options

Pump and control skid units

- High-quality components
- Tested quality
- Perfectly tailored solution

Examples spray nozzle solutions

Hollow cone nozzles – series 214/216/218

- Small droplets
- Low flow rates

Twin-fluid nozzles – series 170/180

- Efficient atomization
- Extremely fine atomization
- Large free cross sections

Twin-fluid nozzles – VarioJet®

- Internal mixing
- Innovative design
- Very fine droplet spectrum

Quenching water

It is key in many chemical processes to rapidly quench the temperatures to control product output. Hollow cone nozzles are used for quenching because they produce fine droplets.

Pug mill/pelletizer sprays

A pug mill is a machine in which clay or other materials are mixed into a plastic state or a similar machine for the trituration of ore. In this process full cone nozzles are used.
Particulate washing

An electrostatic precipitator (ESP) is a filtration device that removes fine particles from a flowing gas using the force of electrostatic charge minimally impeding the flow of gases through the unit. **Full cone nozzles** are used to wash the collected particulate from the collecting tube or plate.

Prescrubbing and gas cooling

At the bottom of the wet ESP, above the gas distribution plates **hollow cone** and **full cone nozzles** are used in the vessel for pre-cleaning, gas cooling, scrubbing and particulate removal.
**Water washing of salts**

These injectors use **full nozzles**, which are used to scrub salt-forming contaminants from preflash and atmospheric tower overhead systems before they react and cause corrosion.
LECHLER NOZZLES AND ENGINEERED SOLUTIONS ARE USED IN MANY FIELDS IN THE CHEMICAL INDUSTRY

Gas cooling tower
Precise cooling and conditioning of hot flue gases create stable outlet conditions for the safe and efficient operation of downstream plant components. Lechler is offering a wide range of engineered solutions to control the outlet conditions of a gas cooling tower.

SNCR NOx reduction
The selective non-catalytic reduction (SNCR) is an industrial technique for NOx reduction. Twin-fluid or flat fan nozzle lances spray fine droplets of urea or aqueous ammonia directly into a furnace.
NOx reduction with SCR

With the selective catalytic reaction (SCR), achieving a high separation efficiency is possible only with the aid of a catalyst. Such a solution requires special precautions to keep the efficiency high and catalyst waste low. The reagent is added immediately before the catalyst using twin-fluid nozzle lances in a temperature window appropriate to the reaction.

Examples engineered solutions

Nozzle lances and injectors
- Optimal spray placement
- Individual adapted
- Many options

Pump and control skid units
- High-quality components
- Tested quality
- Perfectly tailored solution

Examples spray nozzle solutions

Spillback nozzles
- Fine hollow cone atomization
- Constant pressure
- No compressed air

Twin-fluid nozzles – Laval
- Fine full cone atomization
- Droplet size and spectrum can be adapted
- For high temperatures
ENGINEERED SOLUTIONS FOR PROCESS SOLUTIONS: SOPHISTICATED SOLUTIONS FOR ADVANCED APPLICATIONS

If you are breaking new ground there is no standard solution available. But that’s no problem. With our decade-long experience we are able to develop customized nozzles, spray systems and droplet separators on short hand. Let’s talk and find your perfect solution.

Nozzle Lances and Injectors

Pump and Control Skids

Droplet Separators

CFD Analysis and Testing Capabilities
Lechler nozzle lances ensure optimal spray placement and alignment in flue gas ducts. The choice of nozzles and the consideration of local and process-related matters mean they can be individually adapted to the respective requirements.

The nozzles themselves have a low-maintenance design and can be quickly cleaned or exchanged with minimal effort.

The robust, high-quality stainless steel construction ensures a high degree of functional reliability. Lances are available in a variety of materials to suit specific process requirements.

Lechler nozzle lances are manufactured in line with ultramodern production processes and according to the state of the art.

Material
Lances are manufactured from stainless steel (316/316L) as standard, but depending on requirements can also be made of alternative materials.

Accessories are available in galvanized steel or stainless steel and the hoses are available in rubber or stainless steel.

Lechler nozzle lances are available with many options, including but not limited to:
- Protection tube to increase the service life in case of higher temperatures, high dust loads and aggressive gases, with barrier air as an option.
- Wedge flange, standard flange and special flange in accordance with customer requirements
- Guiding rail to facilitate lance installation
- Shifting device to change the insertion length – with or without gastight sealing
- Expansion joint or stuffing box for expansion compensation at high temperatures
- Assembly connecting piece with flange connector for welding onto flue gas duct
- Further special customizations including wear protection, insulation, water cooling or coating
- Pre-assembled accessory kits for process media connections (e.g. quick release couplings, shut-off ball valves, strainers)

Lechler nozzle lances

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Design features

Connection accessories
- Quick release coupling
- Conical screw connection
- According to customer requirements

Protection features
- No protection features
- With protection tube and cap
- According to customer requirements

Nozzle arrangement
- Single nozzle
- Cluster head

Flange connections
- Wedge
- Standard flange
  e.g. DIN, ANSI etc.
- According to customer requirements

Multi nozzle lances
- Number of nozzles according to customer requirements

Lechler nozzle lances

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Lechler nozzle lances
Meeting customer requirements

Catalyst retractable lance

Neutralizer retractable lance

Water wash injector

Liquid injection sparger

Chemical injection quill

Mounting example
## Nozzle lances and injectors

### Taylor made solutions

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### Material Selection
- Stainless Steel 316L
- Hastelloy
- PP, PVC
- And many more

### Code Compliance
- ASME B31.1 Power Piping code
- Metallic industrial piping: DIN EN 13480
- Unfired pressure vessels: DIN EN 13445
- ASME B31.3 Process Piping code
- Welder Performance Qualification Records per ASME BPVC section IX
- Qualification test of welders: DIN EN 287

### Testing
- ANSI and ASTM testing
- Non-destructive testing – Penetrant testing: DIN EN ISO 3452
- Hardness
- Spray and flow testing
- Phase Doppler Anemometry (PDA) measurement system
- Magnetic particle inspection: DIN EN ISO 17638
- Positive Material Identification

### Flange connections
- Wedge
- Standard flange e.g. DIN, ANSI etc.
- Special flange according to customer specification

### Additional features
- Shifting device to change the insertion length – with or without gastight sealing
- Expansion joint or stuffing box for expansion compensation at high temperatures
- Pre-assembled accessory kits for process media connections (e.g. quick release couplings, shut-off ball valves, strainers)
- Further special customizations including wear protection, insulation, water cooling or coating
- Assembly connecting piece with flange connector for welding onto flue gas duct
- Guide rail to facilitate lance installation
According to customer requirements
- Spray direction
- Insertion length
- Single nozzle
- Multi-nozzle arrangement
- Cluster head design

Nozzle type selection
- Hydraulic nozzles
- Twin-fluid nozzles
- Spillback nozzles

Spargers and Quills
- According to customer requirements
Our pump and control 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.

First-class engineering

To perform our engineering, we determine all relevant parameters and define the plant’s design. This includes determining the nominal widths and pressure levels as well as designing the pumps and control valves. We draw up the P&I diagram and make detailed equipment and signal lists as an option. Of course, the project is fully documented to ensure that technology and processes can be quickly traced even after years of use.

High-quality components

An exact knowledge of the characteristic properties of our nozzles is key here. 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. Unexpected failures can quickly lead to plant stoppages and costly production outages. This is why we fit our pump and control skid units with high-quality components from well-known manufacturers as standard and the most important functional components are even realized in redundant design.

The components are interconnected with pipes and mounted on a stable base frame with eyelets for crane transportation, at the same time ensuring that all components for operation and maintenance are arranged in an easily accessible manner.

Tested quality

The design (e.g. dimensioning of nominal widths) and production are in line with the latest state of the art and comply with all relevant standards. They are equally subject to the Lechler quality management system certified to DIN EN ISO 9001, as is the final acceptance. Before delivery, the pump and control skid unit undergoes a pressure and tightness test and is checked by our experienced engineers. This will avoid any problems during commissioning.

Control concept from the nozzle specialist

Numerous installations of VarioCool® systems, years of commissioning experience, plus expertise in nozzle technology all contribute to the constant improvement and optimization of Lechler control systems. By installing a control solution from Lechler you will benefit considerably from this wealth of experience. The flexible and fully automatic concept can be perfectly adapted to your process. You will have start-up and shut-down scenarios and dynamic process conditions under perfect control with our solution.
Option packages for our VarioCool® pump and control skid

Electrical wiring of the components:

Junction box

All components except the pump motors are wired to a junction box within the pump and control skid unit.

This assures that the customer has a central connection point for all electrical components and measuring devices for further processing in the higher-level control.

Control cabinet with complete PLC

All components including the pumps are wired to a control cabinet. The control cabinet is integrated into the base frame of the pump and control skid unit.

The complete injection control is tested in accordance with valid electrical standards and regulations and allows all relevant process parameters to be visualized over a control panel on the control cabinet.

Specific configuration and extensive testing make commissioning much faster. Communication and the exchange of signals (setpoint, plant status, error messages) with the customer’s logic system is carried out via PROFIBUS or PROFINET.

The control has several modes of operation such as automatic mode and manual mode for tests during plant downtimes. In the event of faults, our engineers can quickly perform a remote diagnosis via the installed modem without the need for an on-site visit.

Talk to us

Customer requirements are different. Which is why standard solutions do not always make sense. Speak with us and let us work together to find the best solution for your purposes.
DROPLET SEPARATORS
WHEN PERFORMANCE COUNTS

Droplet separators have played a vital role in many process operations and gas washing plants as functional elements that protect downstream installation parts, increase product yield or reduce energy consumption. They are now becoming even more important due to increasingly stringent environmental protection regulations that require a drastic reduction in the residual pollutant content.

This makes it necessary to use high-performance droplet separators which are capable of separating even the finest droplets with a size of less than 10 microns, while at the same time minimizing pressure losses. This task requires effective separation systems with compact dimensions that can deal with high flow rates.

When designing and planning droplet separators, it is necessary to have precise knowledge of the functional and performance data of the separation system, as well as an in-depth process understanding of the respective application.

Knowledge about droplet formation and droplet movement in a gas flow is essential to ensure fault-free operation of the droplet separator. For more than 100 years, we have worked on detection, measurement and definition of droplets. It is therefore not a coincidence that Lechler nozzles and Lechler droplet separators are now considered integral elements in process engineering.

Each installation requires a specific droplet separator design and construction. Design, construction and selection of the optimum Lechler droplet separators are based fully on your requirements, specifications and drawings. That is why we do not offer standard solutions, but customize systems individually for your specific needs.

In order to guarantee accurate operation, materials must be used that are matched to the relevant variables of the installation in question. For this reason, Lechler offers a wide range of different materials – from stock.

The available materials include:

- Stainless steels in the grades 304 SS, 316L SS, 316Ti SS, 318LN SS, 904L SS, 254SMO SS as well as special alloys such as Hastelloy
- Plastics such as PP, PPTV, PE, PVDF

Talk to us

Do you know your process but are not sure which droplet separator is best suited for your purposes? No problem. Based on your individual requirements, we will choose from a finely graded range of vane profiles with single or multiple deflection.

Lechler GmbH
Droplet Separator Division
Charlottenburger Allee 7
52068 Aachen/Germany
Phone: +49 241-463751-40
E-Mail: dropletseparator@lechler.de
In vane-type separators with vertical gas flow, the baffle vanes are arranged horizontally or at a slight horizontal angle. The liquid that is separated at the profile forms a film which drains downwards in the opposite direction to the gas flow. This liquid film interacts with the opposing gas flow. At the bottom end, larger droplets are formed from the liquid film which then fall down.

Reliable operation – even under tough conditions

Lechler droplet separators are characterized by the optimized-flow design. However, if the gas flows are heavily loaded with dust, deposits can occur under unfavorable conditions which impair the efficiency of the droplet separators. In this case, an additional cleaning system helps to guarantee availability during continuous operation.

An arrangement that performs cyclical washing of the droplet separators with full-cone nozzles has proven particularly suitable for this. This allows you to increase functional reliability, avoid encrustations and also ensure that your plant operates with optimum efficiency over long periods.
**Droplet separators**
for horizontal gas flow

Vane-type separators for horizontal gas flow use different design features for secondary separation than vertical systems. In vane-type separators for horizontal gas flow, the separation vanes are arranged vertically to the gas flow so that the liquid runs down the baffles due to gravity. The creation of flow-calmed zones allows the liquid film to specifically drain in these areas without renewed contact with the gas flow. The fact that liquid run-off is assisted by the forces of gravity results in high-performance separation systems. Depending on the separator design, particularly high flow rates are possible. The flow-optimized shape of the baffle vanes minimizes pressure losses. Based on your individual requirements, it is possible to choose from a finely-graded range of vane profiles with single or multiple deflection.
Extreme droplet separation

Finest droplets
In some applications, it is necessary to separate droplets that are significantly smaller than the limit droplet diameter of a vane-type droplet separator. In these cases, we use fiber packs as agglomerators in combination with vane-type separators.

Large liquid volumes
Optimum pre-separation is necessary if there are liquid surges in the inlet. The Lechler Inlet Device (LID) separates large liquid quantities with maximum efficiency and thus optimizes the flow of the rising gas.
Our services:

- Simple flow field and pressure loss simulations with one or more gas/liquid in containers, pipes and fittings
- Full spray propagation in almost every environment including heat and mass transfer with the surrounding gases
- Calculation of the internal flow field in nozzles and prediction of the spray pattern as well as water distribution and spray characteristic close to the nozzle

Your advantages:

- Maximum efficiency in
  - media consumption for nozzles and applications
  - geometric dimensions of the whole process
- Through optimized
  - nozzle selection
  - nozzle operation (for efficient use of pumps, compressors and fans)
  - spray distribution
  - droplet sizes
  - optimized fluid flow upstream and downstream of the spraying process

Fluid Dynamics simulation as a process optimization tool

For us, perfection is not just a promise, but is based on calculation of computational Fluid Dynamics (CFD).

No matter what the spray application may be, the goal is always to achieve the maximum effect with the minimum possible use of material, spray media and energy. It is therefore essential to have a detailed understanding of how spray mist is formed and propagated.

This is made possible by computer-assisted simulation of the flow processes of one or more media in static and dynamic environments, taking into account heat and mass transfer and almost every physical effect. These simulations incorporate our know-how from many decades of nozzle development.

Formerly mainly used as an internal R&D tool, we are now able to offer this know-how – paired with our high-performance computer – as an integrated service.

We can simulate nozzle applications and processes individually for your environment and requirements. The aim is to make your spray processes working exactly how you want them to.

CFD ANALYSIS
MEASURING TECHNOLOGY
HOW OUR RESOURCES HELP US ACHIEVE PRECISION

The basis for precision nozzle development
At Lechler, exact measurements have long been the basis for clearly defined spray characteristics. The data obtained in our laboratories form the foundation for any development and make it easier for our customers to choose nozzles for specific applications. This saves time, lowers costs and provides planning security.

Advanced technology
We have further expanded our research capacities by opening our own Development and Technology Center.
A highlight here is a laser-assisted phase doppler anemometer. As one of the most modern optical measuring procedures, it measures the velocity and the diameter of spherical droplets simultaneously and without contact. Using the data obtained, spectra can be reliably derived for particle size distributions and velocities.

Measurements range from tiny water droplets in the micrometer region to very large droplets of around 8 millimeters. These are performed with a high temporal and spatial resolution.
Individual positions in the spray can be automatically approached and measured with extremely high accuracy – in x, y and z directions.

International cooperation
We at Lechler value the importance of international cooperation. For this is often what opens up new perspectives on a problem. In addition, cooperation offers us the possibility of testing nozzles in very special test environments and of discovering new use scenarios in this way.

Our unique selling point: Practice-based knowledge
Since it was founded, Lechler has stood out for its development of new technologies. In more than a century we have successfully filed a large number of patents. Starting with the “Centrifugal Sprayer” from 1893 and going up to state-of-the-art technologies of the 21st Century. We will continue this proud tradition into the future, and our new technical center will be key to doing so. After seven years of construction, the Lechler Development and Technology Center was opened in the summer of 2016. Since then it has offered everything nozzle developers dream of on a surface of over 630 m². In addition to extensive measuring facilities, state-of-the-art test benches with a wide range of pump performances are available to measure and investigate sprays, from microfine mist to fuller sprays with varying jetting characteristics.
In the chemical industry there are innumerable applications that require the atomization of liquids of all kinds in different ways. The combination of all these parameters leads to thousands of different nozzles. At Lechler, we have them all. In this brochure, we present you with a selection of our most common nozzles used in chemical applications. If for some reason, you cannot find what you are looking for, please contact our experts to help you with finding the right nozzle for your application.
Lechler spillback nozzles
atomize liquids as a fine hollow cone.

This single-fluid nozzle works according to the pressure atomization principle. The water is sent to the nozzle with an almost constant feed pressure, irrespectively of the atomized flow rate.

The amount injected is steplessly controlled via a valve in the spillback line, whereby part of the flow is taken from the inlet flow rate and carried back to the tank. The maximum atomized flow rate is achieved with the control valve closed.

Uniform and fine liquid atomization is achieved across the entire control range.

If the volume to be atomized is distributed over cluster heads with up to six small spillback nozzles, this leads to an improvement in the droplet quality compared to a single nozzle.

Thanks to the cluster heads’ total spray angle of about 120°, the distribution of the water volume over the entire channel cross-section improves. The number of lances can be reduced in this way. We also recommend this option when upgrading existing gas cooling towers in particular.

Properties

- **Spray angle of the individual nozzles**: 90° or 60° as hollow cone
- **High turn-down ratio**: of up to 12:1
- **Low operating costs**: as no atomizing air required
- **Even and fine liquid atomization**: over the entire control range
- **Execution**: as single or cluster nozzle lances possible
- **Typical pressure range**: of 35 bar, g in the supply line at the nozzle

Use:
- Gas cooling in medium-sized and large gas cooling towers

Spray pattern of a single spillback nozzle

Spray pattern of a cluster spillback nozzle lance

Scheme of the spillback nozzle
**VarioJet® nozzles**

Twin-fluid nozzles with low air consumption despite large outlet angle

---

**Lechler VarioJet® nozzles** atomize according to the principle of internal mixing. With this twin-fluid nozzle, the water is fed in axially via a bore hole.

After arriving at the cone tip, the liquid is split up into a thin liquid film. This thin liquid film is split into finest droplets by the atomizing air in the mixing chamber. The resulting two-phase mixture is then atomized a second time when exiting via several bore holes arranged in a circular pattern.

Thanks to the innovative design of the nozzle, a spray with a large outlet angle is achieved. This is characterized by an even liquid distribution as well as a fine droplet spectrum with a low specific air consumption.

The fineness of the droplet spectrum is decisively influenced by the air/liquid ratio and by the pressure level of the two fluids. As a general rule: the higher the air/liquid ratio and the higher the pressure level of atomizing air and liquid is, the finer the droplet spectrum.

The large free cross-sections in the nozzle keep the risk of clogging and the maintenance effort to a minimum.

---

**Use:**
- Gas cooling in gas cooling towers as well as gas-bearing pipes (ducts)

---

**Properties**

- **Large spray angle**
  60°, 90° for good coverage of the cross-section of the duct

- **High turn-down ratio**
  up to 20:1

- **Adjustment of the droplet spectrum**
  by changing the air/liquid ratio

- **Low air consumption**

- **Clog-resistant**
  thanks to large free cross-sections without internal fittings

- **Typical pressure range**
  Liquid 1-9 bar, g
  Atomizing air 1-6 bar, g
Laval nozzles
Twin-fluid nozzles for a wide droplet spectrum in special applications

Lechler Laval nozzles
atomize liquids as a fine full cone. These twin-fluid nozzles work according to the supersonic principle.

A dual-phase mixture is created from atomizing air and liquid in the mixing chamber inside the nozzle. The shape of the nozzle causes this mixture to be accelerated to supersonic speed, resulting in an extremely fine atomization of the droplets.

By changing the air/liquid ratio, the droplet size and the droplet spectrum can be adapted within a wide range. The large free cross sections of the nozzle also allow atomization of viscous or solids-laden liquids.

Choosing the right material prevents wear even where abrasive media are present, and enables use at high temperatures.

Properties

- **Small spray angle**
  15°, suitable for small cross-sections and horizontal ducts

- **Very large turn down ratio**
  20:1 (in some cases up to 40:1)

- **Very fine droplet spectrum**

- **Adjustment of the droplet spectrum**
  by changing the air/liquid ratio

- **Clog-resistant**
  thanks to large free cross-sections without internal fittings

- **Typical pressure range**
  Liquid 1-6 bar, g
  Atomizing air 1-6 bar, g

Use:
- Gas cooling in gas-bearing pipes (ducts) and medium-sized and small gas cooling towers
- Injection of solids-laden water
- Introduction of lime water in the desulfurization process
- Injection of aqueous ammonia or urea solution for the DeNOx process (SNCR/SCR)
- Chemical process engineering (spray dryers etc.)
Efficient atomization by mixing liquid and gas.
- Internal mixing principle
- Mixing chamber inside the nozzle combines a gas and a liquid to form an intensive dual-phase mixture
- Extremely fine atomization with good regulating performance
- Large free cross sections
- Lower air consumption than with nozzles that mix externally
- Maintenance-free operation

Applications:
Gas cooling, air humidification, flue gas desulphurisation, spray drying, absorption

Liquid pressure:
1.0-5.0 bar

Air pressure:
1.0-5.0 bar

Regulating range up to max.:
1: 30

Spray angle:
approx. 20°

The nozzle’s large free cross sections allow maintenance-free operation even when atomizing viscous and abrasive media with a high solid content.

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions [mm]</th>
<th>Weight 316L SS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
<td>H1</td>
</tr>
<tr>
<td>180.641</td>
<td>48.0</td>
<td>28.0</td>
</tr>
<tr>
<td>170.801</td>
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<td>29.5</td>
</tr>
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<td>170.881</td>
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<td>29.5</td>
</tr>
<tr>
<td>170.961</td>
<td>112.0</td>
<td>42.0</td>
</tr>
</tbody>
</table>

Ordering no. = Type no. + Material no. + Optional nozzle no.

E = narrowest free cross section
Twin-fluid nozzles
Series 150

Fine liquid atomization by means of air or vapour.
- Liquid, air or vapour are supplied under pressure
- The air or vapour pressure must always be higher than liquid pressure
- A higher air-/water ratio leads to finer atomization

Applications:
Chemical process engineering, cooling processes, atomizing viscous liquids.

<table>
<thead>
<tr>
<th>Type</th>
<th>Gw BSPP</th>
<th>Gl BSPP</th>
<th>H [mm]</th>
<th>D [mm]</th>
<th>L [mm]</th>
<th>L1 [mm]</th>
<th>Flats [mm]</th>
<th>Flats1 [mm]</th>
<th>Weight 316Ti SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>150.005.17 – 150.013.17</td>
<td>G 3/8</td>
<td>G 1 1/4 A</td>
<td>38.0</td>
<td>28.0</td>
<td>32.5</td>
<td>10.0</td>
<td>24.0</td>
<td>24.0</td>
<td>140 g</td>
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<tr>
<td>150.032.17</td>
<td>G 1</td>
<td>G 3/8 A</td>
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<td>48.0</td>
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<td>G 1/2 A</td>
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<td>65.0</td>
<td>58.0</td>
<td>15.0</td>
<td>55.0</td>
<td>55.0</td>
<td>1,350 g</td>
</tr>
</tbody>
</table>

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

B = bore diameter · E = narrowest free cross section

### Applications Table

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>B [Ø] [mm]</th>
<th>E [Ø] [mm]</th>
<th>V [l/min]</th>
<th>Vn [m³/h]</th>
<th>p [bar]</th>
<th>p [bar]</th>
</tr>
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<tr>
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<td>0.59</td>
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<tr>
<td></td>
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<td>4.0</td>
<td>2.0</td>
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<td>1.25</td>
<td>1.48</td>
<td>1.77</td>
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<td>150.010</td>
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<td>3.5</td>
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<td>4.73</td>
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<td>4.9</td>
<td>24.40</td>
<td>31.50</td>
<td>37.27</td>
<td>44.55</td>
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</table>

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

B = bore diameter · E = narrowest free cross section

Example: Type + Material no. = Ordering no.

for ordering: 150.005 + 17 = 150.005.17
Axial-flow hollow cone nozzles
Series 214/216/218

Fine, uniform hollow cone spray.

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

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>Ø G [mm]</th>
<th>Ø E [mm]</th>
<th>V [l/min]</th>
<th>p [bar]</th>
<th>ρ [mm]</th>
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</thead>
<tbody>
<tr>
<td>60°</td>
<td>214.184</td>
<td>3/8</td>
<td>60°</td>
<td>0.50</td>
<td>0.50</td>
<td>0.88</td>
<td>0.10</td>
</tr>
<tr>
<td>80°</td>
<td>214.245</td>
<td>1/8</td>
<td>80°</td>
<td>1.00</td>
<td>0.50</td>
<td>0.16</td>
<td>0.20</td>
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<tr>
<td>60°</td>
<td>216.305</td>
<td>1/8</td>
<td>60°</td>
<td>1.80</td>
<td>0.50</td>
<td>0.23</td>
<td>0.32</td>
</tr>
<tr>
<td>80°</td>
<td>216.324</td>
<td>3/8</td>
<td>80°</td>
<td>1.00</td>
<td>1.00</td>
<td>0.26</td>
<td>0.40</td>
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<tr>
<td>90°</td>
<td>216.364</td>
<td>3/8</td>
<td>90°</td>
<td>1.40</td>
<td>1.40</td>
<td>0.45</td>
<td>0.63</td>
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<td>60°</td>
<td>216.404</td>
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<td>60°</td>
<td>2.00</td>
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<td>216.686</td>
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<td>80°</td>
<td>4.00</td>
<td>2.00</td>
<td>2.50</td>
<td>3.54</td>
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<td>216.726</td>
<td>3/8</td>
<td>90°</td>
<td>5.00</td>
<td>2.00</td>
<td>3.15</td>
<td>4.45</td>
</tr>
<tr>
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<td>2.00</td>
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</tr>
<tr>
<td>80°</td>
<td>216.846</td>
<td>1/2</td>
<td>80°</td>
<td>5.00</td>
<td>2.00</td>
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<td>4.00</td>
</tr>
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<td>60°</td>
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<td>216.846</td>
<td>1/2</td>
<td>90°</td>
<td>7.50</td>
<td>2.00</td>
<td>6.25</td>
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<td>60°</td>
<td>218.886</td>
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<td>60°</td>
<td>9.00</td>
<td>2.40</td>
<td>8.00</td>
<td>11.31</td>
</tr>
</tbody>
</table>

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

B = bore diameter · E = narrowest free cross section

Example Type + Material no. = Ordering no.
for ordering 214.184 + 17 = 214.184.17

Conversion formula for the above series: \[ V_2 = V_1 \times \sqrt{\frac{p_2}{p_1}} \]
Eccentric hollow cone nozzles

Series 373 »Ramp Bottom«

Fine, uniform hollow cone spray, also at low pressures.

Applications:
cooling and cleaning of gas, water re-cooling, dust control, chemical process engineering.

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

### Spray angle

<table>
<thead>
<tr>
<th>Type</th>
<th>70°</th>
<th>80°</th>
</tr>
</thead>
<tbody>
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<td>373.175</td>
<td>373.235</td>
</tr>
<tr>
<td>AN</td>
<td>-</td>
<td>AO</td>
</tr>
<tr>
<td>V [l/min]</td>
<td>11.40</td>
<td>12.90</td>
</tr>
<tr>
<td>Ø [mm]</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>B</td>
<td>67.0</td>
<td>77.0</td>
</tr>
<tr>
<td>L</td>
<td>45.0</td>
<td>51.0</td>
</tr>
<tr>
<td>D</td>
<td>52.0</td>
<td>65.0</td>
</tr>
<tr>
<td>H</td>
<td>6.3</td>
<td>7.9</td>
</tr>
<tr>
<td>E</td>
<td>41</td>
<td>48</td>
</tr>
<tr>
<td>Hex</td>
<td>285 g</td>
<td>570 g</td>
</tr>
<tr>
<td>BSPP</td>
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</tr>
<tr>
<td>Weight</td>
<td>650 g</td>
<td>700 g</td>
</tr>
<tr>
<td>H = 500 mm</td>
<td>1,300</td>
<td>1,550</td>
</tr>
<tr>
<td>H = 1000 mm</td>
<td>1,550</td>
<td>1,550</td>
</tr>
</tbody>
</table>

**Dimensions [mm]**

- BSPP
- L
- D
- H
- E
- Hex
- Weight
- 316 SS

<table>
<thead>
<tr>
<th>BSPP</th>
<th>1</th>
<th>1 1/4</th>
<th>1 1/2</th>
<th>2</th>
<th>2 1/2</th>
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</thead>
<tbody>
<tr>
<td>L</td>
<td>67.0</td>
<td>77.0</td>
<td>97.0</td>
<td>108.0</td>
<td>134.0</td>
</tr>
<tr>
<td>D</td>
<td>45.0</td>
<td>51.0</td>
<td>65.0</td>
<td>71.0</td>
<td>92.0</td>
</tr>
<tr>
<td>H</td>
<td>52.0</td>
<td>65.0</td>
<td>81.0</td>
<td>94.0</td>
<td>114.0</td>
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<td>6.3</td>
<td>7.9</td>
<td>7.9</td>
<td>12.7</td>
<td>20.6</td>
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<tr>
<td>Hex</td>
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<td>48</td>
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<tr>
<td>Weight</td>
<td>285 g</td>
<td>570 g</td>
<td>900 g</td>
<td>670 g</td>
<td>2,050 g</td>
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</tbody>
</table>

**Fine, uniform hollow cone spray, also at low pressures.**

Applications:
cooling and cleaning of gas, water re-cooling, dust control, chemical process engineering.

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

**Example**

<table>
<thead>
<tr>
<th>for ordering:</th>
<th>Type</th>
<th>Material no.</th>
<th>Code</th>
<th>Ordering no.</th>
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<tbody>
<tr>
<td>373.115</td>
<td>17</td>
<td>AN</td>
<td>373.115.17.AN</td>
<td></td>
</tr>
</tbody>
</table>
Axial-flow full cone nozzles
Series 490/491

Non-clogging nozzle design with a very stable spray angle, particularly even liquid distribution and large free cross sections.

Applications:
Cleaning and washing processes, surface spraying. Container cleaning, foam precipitation, degassing of liquids.

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.

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

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Series 490/491 repre- sent 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).

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

Subject to technical modifications. Please enquire about the exact dimensions if the installation situation is critical.
### Axial-flow full cone nozzles
#### Series 490/491

<table>
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<tr>
<th>Type Code</th>
<th>B (mm)</th>
<th>E (mm)</th>
<th>V (l/min)</th>
<th>Spray diameter D at p = 2 bar</th>
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<tbody>
<tr>
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### Specifications
- **Spray angle**: 60°
- **Bore diameter**: 0.57 + 0.05 mm
- **Free cross section**: 0.76 mm
- **Spray diameter**: 1.8 mm

### Tables

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<th>Material no.</th>
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<th>B (mm)</th>
<th>E (mm)</th>
<th>V (l/min)</th>
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### Notes
- Other nozzle materials (special alloys, plastics) are available on request.
- Example for ordering: 490.644 + 1Y + CC = 490.644.1Y.CC
Very uniform spray pattern.

Applications:
Cleaning and washing process, cooling of gaseous fluids and solids, surface spraying, spraying onto mats in air washers, improving of chemical reactions.

Conversion formula for the above series: \( \dot{V}_2 = \dot{V}_1 \left( \frac{p_2}{p_1} \right)^{0.4} \) (≤ 10 bar)

<table>
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<tr>
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<th>L1</th>
<th>L2</th>
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<th>D2</th>
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Subject to technical modifications. Please enquire about the exact dimensions if the installation situation is critical!

Example Type + Material no. + Code = Ordering no. for ordering: 460.524 + 5E + CA = 460.524.5E.CA
# Axial-flow full cone nozzles
## Series 460/461

### Material and Compatibility
- Material PP (material no. 53)
- Connection 3/4 BSPT

### Conversion Formula
For the above series, the conversion formula is:
\[
\dot{V}_2 = \dot{V}_1 \times \left( \frac{p_2}{p_1} \right)^{0.4}
\]

### Order Example
- Example Type: 460.368
- Material no.: 5E
- Code: CA
- Order no.: 460.368.5E.CA

### Tables
#### Spray Angle 120°

<table>
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<tr>
<th>Type</th>
<th>Mat. no.</th>
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<th>B [mm]</th>
<th>E [mm]</th>
<th>(\dot{V} [l/min])</th>
<th>p [bar]</th>
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<th>H = 500 mm</th>
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</table>

B = bore diameter · E = narrowest free cross section

* Connection 3/4 BSPT

Example Type + Material no. + Code = Ordering no.
- for ordering: 460.368 + 5E + CA = 460.368.5E.CA
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.

<table>
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<th>Dimensions [mm]</th>
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<tbody>
<tr>
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Other nozzle sizes and materials are available on request.

Example Type + Material-no. + Code = Ordering no.

for ordering: 405.204 + 1Y AP = 405.204.1Y.AP

Conversion formula for the above series: \( \dot{V}_2 = \dot{V}_1 \cdot \left( \frac{p_1}{p_2} \right)^{0.4} \) (≤ 10 bar)

### Specifications

- **Spray angle**
  - **60°**
  - **90°**
  - **120°**

- **Ordering no.**
  - **Type**
  - **Material-no.**
  - **Code**

- **Spray diameter D at p = 2 bar**

- **Spray angle**
  - **Type**
  - **Material-no.**
  - **Code**

- **Dimensions [mm]**
  - **B**
  - **E**
  - **\( \dot{V} \) [l/min]**

- **H = 0.5 m**
  - **H = 1 m**

- **B = bore diameter · E = narrowest free cross section**
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.

Other nozzle sizes and materials are available on request.

60° / 90°-version

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120°-version

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<th>E [mm]</th>
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B = bore diameter · E = narrowest free cross section

Conversion formula for the above series: \( \dot{V}_2 = \dot{V}_1 \cdot \left( \frac{p_2}{p_1} \right)^{0.54} \) (≤ 10 bar)
**Axial-flow full cone nozzles**

**Series 419 »FreeFlow«**

Particularly insensitive to clogging thanks to very large free cross sections. Stable spray angle. Uniform spray pattern.

**Applications:**
Gas washing, spraying over packings, dust control, absorption, distillation column

---

**FreeFlow**

![Image of Axial-flow full cone nozzles](image)

**Precision Spray Nozzles**

*Other materials and flanges are available on request.*

---

<table>
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*Figure 1*  
*Figure 2*  
*Figure 3*
### Axial-flow full cone nozzles

**Series 419 »FreeFlow«**

**Conversion formula for the above series:**

\[ \dot{V}_2 = \dot{V}_1 \times \left( \frac{p_2}{p_1} \right)^{0.4} \]

\((\leq 10 \text{ bar})\)

---

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<th>Type</th>
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<th>Code</th>
<th>Ordering no.</th>
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<th>E [mm]</th>
<th>(\dot{V}) [l/min]</th>
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</table>

- **B** = bore diameter · **E** = narrowest free cross section · \* Spray angle at 1 bar

---

Example:

- **Type + Material-no. + Code** for ordering: 419.366 + 1Y AR = 419.366.1Y.AR
Axial-flow full cone nozzles
Series 421

Even full cone distribution, high flow rates.

Applications:
Scrubber, for even surface irrigation, cooling and cleaning of gases, water recooling, column irrigation and for improving chemical reactions via surface enlargement.

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<th>E [mm]</th>
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<td>5,853</td>
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B = bore diameter · E = narrowest free cross section
* Spray angle at p = 2 bar

Conversion formula for the above series: \( V_2 = V_1 \cdot \left( \frac{p_2}{p_1} \right)^{0.4} \) (≤ 10 bar)
### Axial-flow full cone nozzles

**Series 421**

#### Table of Dimensions and Flange Holes

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<th>Mat. no.</th>
<th>Fig.</th>
<th>Dimensions [mm]</th>
<th>Flange hole</th>
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<td>H4 140</td>
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</table>

#### Conversion Formula

For the above series: \( \dot{V}_2 = \dot{V}_1 \cdot \left( \frac{p_2}{p_1} \right)^{0.4} \)

#### Example Ordering

Type + Material no. = Ordering no.

- 421.564 + 05.84 = 421.564.05.84

---

**Figure 1**

**Figure 2**

**Figure 3**

**Figure 4**
Tangential-flow full cone nozzles
Series 422/423


Applications:
Cleaning and washing process, cooling of gaseous fluids and solids, surface spraying, spraying onto mats in air washers, improving of chemical reactions, continuous casting, foam control.

Material: 316L SS


Applications:
Cleaning and washing process, cooling of gaseous fluids and solids, surface spraying, spraying onto mats in air washers, improving of chemical reactions, continuous casting, foam control.

Material: 316L SS

### Dimensions [mm]

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<th>Material-no.</th>
<th>Code</th>
<th>B [mm]</th>
<th>Ø [mm]</th>
<th>E [mm]</th>
<th>V [l/min]</th>
<th>p [bar]</th>
<th>H = 200 mm</th>
<th>H = 500 mm</th>
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<td>422.646</td>
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<tr>
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<td>422.766</td>
<td>4.15</td>
<td>4.15</td>
<td>5.66</td>
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<td>9.80</td>
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<td>422.846</td>
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<td>23.39</td>
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<td>6.00</td>
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<td>19.60</td>
<td>29.93</td>
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<tr>
<td></td>
<td>- CG - - -</td>
<td>422.966</td>
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<td>8.00</td>
<td>12.50</td>
<td>17.68</td>
<td>25.00</td>
<td>30.62</td>
<td>46.77</td>
</tr>
</tbody>
</table>

**Example Type + Material-no. + Code = Ordering no.**

**For ordering:** 422.644 + 1Y + CE = 422.644.1Y.CE

**Conversion formula for the above series:**

\[ V_s = V_1 \times \sqrt{\frac{p_2}{p_1}} \]
Tangential-flow full cone nozzles
Plastic version
Series 422/423


Applications:
Cleaning and washing processes, surface spraying, bottle cleaning, keg cleaning, sausage showers, foam control, degassing, pasteurization.

**Material:** PVDF

---

### Table: Dimensions [mm] and Weight

<table>
<thead>
<tr>
<th>G</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>H1</th>
<th>H2</th>
<th>Hex</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 BSPT</td>
<td>28.0</td>
<td>20.0</td>
<td>9.8</td>
<td>8.0</td>
<td>16.0</td>
<td>16.0</td>
<td>7 g</td>
</tr>
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<td>3/8 BSPT</td>
<td>36.0</td>
<td>25.0</td>
<td>10.1</td>
<td>11.2</td>
<td>23.0</td>
<td>22.0</td>
<td>16 g</td>
</tr>
<tr>
<td>1/2 BSPT</td>
<td>49.5</td>
<td>33.5</td>
<td>13.2</td>
<td>19.2</td>
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<td>40 g</td>
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<td>3/4 BSPT</td>
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<td>24.5</td>
<td>50.0</td>
<td>41.0</td>
<td>50 g</td>
</tr>
</tbody>
</table>

---

**Example of ordering:**
- **Type:** 422.724
- **Material-no.:** 5E
- **Code:** CE

**Ordering no.:** 422.724.5E.CE

---

**Conversion formula for the above series:**

\[
\dot{V}_2 = \dot{V}_1 \times \sqrt{\frac{p_2}{p_1}}
\]
Fine full cone atomization with the aid of several hollow cones spraying into one another.

**Applications:**
Cooling of gaseous and solid material, desuperheating, chlorine precipitation, absorption as well as for improvement of chemical reaction by enlarging the contact area.

### Abbreviations:
- **B**: bore diameter
- **E**: narrowest free cross section

### Conversion formula for the above series:
\[ V_2 = V_1 \times \sqrt{\frac{p_2}{p_1}} \]

---

### Specifications for Cluster Head Nozzles Series 502/503

#### Spray angle 70°

<table>
<thead>
<tr>
<th></th>
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<td>502.454</td>
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<td>-</td>
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<tr>
<td>502.585</td>
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<td>1.98</td>
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<tr>
<td>502.665</td>
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<td>502.905</td>
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<td>2.00</td>
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<td>12.70</td>
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<td>2.00</td>
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<td>19.80</td>
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<td>503.025</td>
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<td>2.00</td>
<td>17.70</td>
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<td>503.115</td>
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#### Spray angle 130°

<table>
<thead>
<tr>
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<td>502.548</td>
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<td>-</td>
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<tr>
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</tbody>
</table>

---

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

B = bore diameter · E = narrowest free cross section
Full cone spray. Non clogging nozzle without swirl insert.

Applications:
Fire fighting and broadcast spraying, wide area spray.

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>B [mm]</th>
<th>Ø [mm]</th>
<th>( \dot{V} ) [l/min]</th>
<th>p [bar]</th>
<th>H = 1 m</th>
<th>H = 3 m</th>
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<tbody>
<tr>
<td>180°</td>
<td>524.809</td>
<td></td>
<td>4.00</td>
<td>5.00</td>
<td>7.10</td>
<td>10.00</td>
<td>12.20</td>
<td>15.80</td>
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<tr>
<td></td>
<td>524.939</td>
<td></td>
<td>5.90</td>
<td>10.60</td>
<td>15.00</td>
<td>21.20</td>
<td>25.90</td>
<td>33.50</td>
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<td></td>
<td>524.969</td>
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<td>6.20</td>
<td>12.50</td>
<td>17.70</td>
<td>25.00</td>
<td>30.60</td>
<td>39.50</td>
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<tr>
<td></td>
<td>525.049</td>
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<td>8.00</td>
<td>20.00</td>
<td>28.30</td>
<td>40.00</td>
<td>49.00</td>
<td>63.20</td>
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<td></td>
<td>525.109</td>
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<td>9.30</td>
<td>28.00</td>
<td>40.00</td>
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<td>525.169</td>
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<td>98.00</td>
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<td>525.229</td>
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<td>12.20</td>
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<td>79.00</td>
<td>112.00</td>
<td>137.00</td>
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<td>525.269</td>
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<td>70.00</td>
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<td>140.00</td>
<td>171.00</td>
<td>221.00</td>
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<tr>
<td></td>
<td>525.469</td>
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<td>16.20</td>
<td>112.00</td>
<td>158.40</td>
<td>224.00</td>
<td>274.30</td>
<td>354.20</td>
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<tr>
<td></td>
<td>525.489</td>
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<td>23.80</td>
<td>222.70</td>
<td>315.00</td>
<td>445.50</td>
<td>545.60</td>
<td>704.40</td>
</tr>
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</table>

\(^1\) We reserve the right to deliver 316Ti SS or 316L SS under the material no. 17. B = bore diameter

Version with dust protection cap on request.

Example of ordering: 524.809 + 30 = 524.809.30

Conversion formula for the above series: \( \dot{V}_2 = \dot{V}_1 \times \sqrt{\frac{p_2}{p_1}} \)
Rotating cleaning nozzle »MiniSpinner«
Series 5MI

- Entirely made from stainless steel/Hastelloy
- Self-rotating
- Efficient slot design
- Modern bearing construction

Materials: 316L SS, 440C SS, Hastelloy C22, Hastelloy C276

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
Double ball bearing made of C276

ATEX version on request

### Spray angle

<table>
<thead>
<tr>
<th>Type</th>
<th>Mat. no.</th>
<th>Connection</th>
<th>E Ø [mm]</th>
<th>V [l/min]</th>
<th>p [bar] (pmax = 5 bar)</th>
<th>Max. tank diameter [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>60°</td>
<td>5MI.162</td>
<td>1Y AH -</td>
<td>2.6 45 63 77 20</td>
<td>1 2 3 at 40 psi [US gal/min]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180°</td>
<td>5MI.113</td>
<td>- AL TF07</td>
<td>1.0 47 67 82 21</td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180°</td>
<td>5MI.114</td>
<td>- AL TF07</td>
<td>1.0 47 67 82 21</td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>360°</td>
<td>5MI.054</td>
<td>- AL TF07</td>
<td>0.5 21 30 37 9</td>
<td>1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5MI.074</td>
<td>- AL TF07</td>
<td>0.6 35 49 60 15</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5MI.014</td>
<td>- AL TF07</td>
<td>0.9 49 69 85 21</td>
<td>2.3</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5MI.209</td>
<td>- AL TF07</td>
<td>1.5 71 100 122 31</td>
<td>2.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

E = Narrowest free cross-section
NPT, more slip-on sizes and weld-on versions 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 means higher wear and smaller droplets. This might have adverse effects on the cleaning result.

Slip-on information:
- R-clip is included. Mat. no. 1Y: R-clip made of stainless steel 316L SS (Ordering no. 095.022.1Y.50.60).
- Mat. no. 21: R-clip made of Hastelloy C22 (Ordering no. 095.022.21.50.60).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

Example of ordering: 5MI.162. + 1Y + AH = 5MI.162.1Y.AH

---

**Function video**
Scan the QR-code or go to: www.lechler.com/spinner
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

---

**Example Type + Connection = Ordering no.**

**ATEX version on request**

**Function video**
Scan the QR-code or go to:
www.lechler.com/whirly

---

**Spray angle**

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Connection</th>
<th>E (°)</th>
<th>V ([l/min])</th>
<th>p [bar]</th>
<th>p_{max} = 6 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>270°</td>
<td>569.055.1Y AL TF07 TF10 10</td>
<td>3.6</td>
<td>36</td>
<td>48</td>
<td>62</td>
<td>15</td>
</tr>
<tr>
<td>270°</td>
<td>569.135.1Y AL TF07 TF10 10</td>
<td>4.8</td>
<td>52</td>
<td>71</td>
<td>87</td>
<td>22</td>
</tr>
<tr>
<td>270°</td>
<td>569.195.1Y AL TF07 TF10 10</td>
<td>5.6</td>
<td>69</td>
<td>97</td>
<td>119</td>
<td>30</td>
</tr>
<tr>
<td>360°</td>
<td>569.056.1Y AL TF07 TF10 10</td>
<td>3.6</td>
<td>36</td>
<td>48</td>
<td>62</td>
<td>15</td>
</tr>
<tr>
<td>360°</td>
<td>569.196.1Y AL TF07 TF10 10</td>
<td>5.6</td>
<td>69</td>
<td>97</td>
<td>119</td>
<td>30</td>
</tr>
<tr>
<td>360°</td>
<td>569.279.1Y AL TF07 TF10 10</td>
<td>7.1</td>
<td>103</td>
<td>145</td>
<td>178</td>
<td>45</td>
</tr>
</tbody>
</table>

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 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 of ordering:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection</th>
<th>Ordering no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>569.055.1Y</td>
<td>AL</td>
<td>569.055.1Y:AL</td>
</tr>
</tbody>
</table>
Self rotating
Rotating solid jets
Recommended for tanks made of glass and enamel
3A® version available

Materials:
PTFE

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

### Function video
Scan the QR-code or go to: www.lechler.com/ptfewhirly

### 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
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

### Example of ordering:
Type 583.114.55. + Connection AL = Ordering no. 583.114.55.AL

### Data in brackets refer to 1”-version marked with *
Rotating cleaning nozzle »PTFE Whirly«
Series 599

- PTFE whirling nozzle for high temperature applications
- Balanced rotating action
- Gap-free all-around cleaning
- Free spinning, self-lubricating and self-flushing
- All used materials are FDA conform

Applications:
For rinsing of small and medium-sized vessels and reactors in higher temperature processing environments.

Max. tank diameter:
Rinsing: 5.0 m
Cleaning: 3.0 m

Recommended operating pressure:
1.0–2.0 bar, max. 6.0 bar

Installation:
Operation in every direction is possible

Max. temperature:
130 °C

Materials:
- PTFE
- Rings: Hastelloy®

Please note:
Higher pressure generally means higher wear and smaller droplets. This might have adverse effects on the cleaning result. We do not recommend the operation with compressed air.

Example of ordering:
599.133.55. + BK = 599.133.55.BK
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, PEKK, 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

Rotation monitoring sensor:
Sensor compatible, please ask for more information.

ATEX version 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.
**Rotating cleaning nozzle »XactClean® HP«**

**Series 5S2/5S3**

---

**Spray angle**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering no.</th>
<th>E (mm)</th>
<th>V [l/min]</th>
<th>p [bar] (pmax = 15 bar)</th>
<th>Max. tank diameter [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>270°</td>
<td>SS2.955.1Y</td>
<td>2.0</td>
<td>25 40 57</td>
<td>7.8 3.5</td>
<td>2.0 25 40 57 7.8 3.5</td>
</tr>
<tr>
<td></td>
<td>SS3.055.1Y</td>
<td>2.0</td>
<td>41 65 92</td>
<td>12.8 4.0</td>
<td>2.0 41 65 92 12.8 4.0</td>
</tr>
<tr>
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<td>SS3.115.1Y</td>
<td>2.0</td>
<td>60 94 133</td>
<td>18.4 6.0</td>
<td>2.0 60 94 133 18.4 6.0</td>
</tr>
<tr>
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<td>SS3.185.1Y</td>
<td>2.0</td>
<td>89 141 199</td>
<td>27.7 7.0</td>
<td>2.0 89 141 199 27.7 7.0</td>
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<tr>
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<td>SS3.235.1Y</td>
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<td>111 175 248</td>
<td>34.3 7.5</td>
<td>2.0 111 175 248 34.3 7.5</td>
</tr>
<tr>
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<td>SS3.265.1Y</td>
<td>2.0</td>
<td>135 213 301</td>
<td>41.8 8.0</td>
<td>2.0 135 213 301 41.8 8.0</td>
</tr>
</tbody>
</table>

| 270° | SS2.956.1Y   | 2.0    | 25 40 57  | 7.8 3.5                 | 2.0 25 40 57 7.8 3.5   |
|      | SS3.056.1Y   | 2.0    | 41 65 92  | 12.8 4.0                | 2.0 41 65 92 12.8 4.0  |
|      | SS3.116.1Y   | 2.0    | 60 94 133 | 18.4 6.0                | 2.0 60 94 133 18.4 6.0 |
|      | SS3.186.1Y   | 2.0    | 89 141 199| 27.7 7.0                | 2.0 89 141 199 27.7 7.0|
|      | SS3.236.1Y   | 2.0    | 111 175 248| 34.3 7.5               | 2.0 111 175 248 34.3 7.5|
|      | SS3.266.1Y   | 2.0    | 135 213 301| 41.8 8.0               | 2.0 135 213 301 41.8 8.0|

| 360° | SS2.959.1Y   | 1.7    | 25 40 57  | 7.8 3.5                 | 2.0 25 40 57 7.8 3.5   |
|      | SS3.059.1Y   | 2.0    | 41 65 92  | 12.8 4.0                | 2.0 41 65 92 12.8 4.0  |
|      | SS3.119.1Y   | 2.0    | 60 94 133 | 18.4 6.0                | 2.0 60 94 133 18.4 6.0 |
|      | SS3.189.1Y   | 2.0    | 89 141 199| 27.7 7.0                | 2.0 89 141 199 27.7 7.0|
|      | SS3.239.1Y   | 2.0    | 111 175 248| 34.3 7.5               | 2.0 111 175 248 34.3 7.5|
|      | SS3.269.1Y   | 2.0    | 135 213 301| 41.8 8.0               | 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 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 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.

---

**Female thread**

**Slip-on connection**

ASME - BPE 1997 (OD-Tube)
Rotating cleaning nozzle »XactClean® HP+«
Series 5S5

- Controlled rotation
- Powerful flat fan nozzles
- Very efficient tank cleaning nozzle, especially for larger tanks

Materials: 316L SS, 316 SS, PEEK, EPDM

Max. temperature: 95 °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:
Double ball bearing

Nozzle dimensions [mm]

<table>
<thead>
<tr>
<th>Connection</th>
<th>Max. Height [H]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN</td>
<td>185</td>
</tr>
<tr>
<td>AQ</td>
<td>185</td>
</tr>
<tr>
<td>AS</td>
<td>187</td>
</tr>
</tbody>
</table>

Spray angle

Function video
Scan the QR-code or go to: www.lechler.com/xactcleanhpplus

Rotation monitoring sensor
Sensor compatible, please ask for more information.

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 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 number: 095.013.1Y.06.45.0).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no. Type</th>
<th>Connection</th>
<th>E [mm]</th>
<th>NPT</th>
<th>V [l/min] 2</th>
<th>3</th>
<th>5</th>
<th>at 40 psi [US gal/min]</th>
<th>Max. tank diameter [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>180°</td>
<td>5S5.293.1Y AN</td>
<td>- -</td>
<td>TF15</td>
<td>3.0</td>
<td>165</td>
<td>202</td>
<td>261</td>
<td>51.2</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>5S5.323.1Y AN</td>
<td>AQ -</td>
<td>TF15</td>
<td>3.0</td>
<td>200</td>
<td>245</td>
<td>316</td>
<td>62.0</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>5S5.363.1Y AN</td>
<td>AQ AS</td>
<td>TF15</td>
<td>3.0</td>
<td>250</td>
<td>306</td>
<td>395</td>
<td>77.6</td>
<td>9.4</td>
</tr>
<tr>
<td>270°</td>
<td>5S5.296.1Y AN</td>
<td>- -</td>
<td>TF15</td>
<td>3.0</td>
<td>165</td>
<td>202</td>
<td>261</td>
<td>51.2</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>5S5.326.1Y AN</td>
<td>AQ -</td>
<td>TF15</td>
<td>3.0</td>
<td>200</td>
<td>245</td>
<td>316</td>
<td>62.0</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>5S5.366.1Y AN</td>
<td>AQ AS</td>
<td>TF15</td>
<td>3.0</td>
<td>250</td>
<td>306</td>
<td>395</td>
<td>77.6</td>
<td>9.4</td>
</tr>
<tr>
<td>360°</td>
<td>5S5.299.1Y AN</td>
<td>- -</td>
<td>TF15</td>
<td>3.0</td>
<td>165</td>
<td>202</td>
<td>261</td>
<td>51.2</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>5S5.329.1Y AN</td>
<td>AQ -</td>
<td>TF15</td>
<td>3.0</td>
<td>200</td>
<td>245</td>
<td>316</td>
<td>62.0</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>5S5.369.1Y AN</td>
<td>AQ AS</td>
<td>TF15</td>
<td>3.0</td>
<td>250</td>
<td>306</td>
<td>395</td>
<td>77.6</td>
<td>9.4</td>
</tr>
</tbody>
</table>

E = narrowest free cross-section · NPT on request
**Rotating cleaning nozzle »Gyro«**

**Series 577**

- Self rotating
- Effective flat jet nozzles
- Large free cross sections, less prone 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

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>( V ) (US gal./min)</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>180°</td>
<td>577.283.1Y AN -</td>
<td>115 163 200 258 50</td>
<td>Height H [mm] Diameter D [mm]</td>
</tr>
<tr>
<td></td>
<td>577.363.1Y AN -</td>
<td>182 258 316 408 80</td>
<td>72 118</td>
</tr>
<tr>
<td></td>
<td>577.403.1Y - AW</td>
<td>228 322 394 509 100</td>
<td>103 156</td>
</tr>
<tr>
<td></td>
<td>577.433.1Y - AW</td>
<td>273 386 473 610 120</td>
<td>103 156</td>
</tr>
<tr>
<td></td>
<td>577.523.1Y - AW</td>
<td>452 639 783 1010 170</td>
<td>103 156</td>
</tr>
</tbody>
</table>

| 180°        | 577.284.1Y AN - | 115 163 200 258 50 | Height H [mm] Diameter D [mm] |
|             | 577.364.1Y AN - | 182 258 316 408 80 | 72 118     |
|             | 577.404.1Y - AW | 228 322 394 509 100 | 103 156    |
|             | 577.434.1Y - AW | 273 386 473 610 120 | 103 156    |
|             | 577.494.1Y - AW | 380 538 659 851 170 | 103 156    |

| 270°        | 577.285.1Y AN - | 115 163 200 258 50 | Height H [mm] Diameter D [mm] |
|             | 577.365.1Y AN - | 182 258 316 408 80 | 72 118     |
|             | 577.405.1Y - AW | 228 322 394 509 100 | 103 156    |
|             | 577.435.1Y - AW | 273 386 473 610 120 | 103 156    |
|             | 577.495.1Y - AW | 380 538 659 851 170 | 103 156    |

| 360°        | 577.289.1Y AN - | 115 163 200 258 50 | Height H [mm] Diameter D [mm] |
|             | 577.369.1Y AN - | 182 258 316 408 80 | 72 118     |
|             | 577.409.1Y - AW | 228 322 394 509 100 | 103 156    |
|             | 577.439.1Y - AW | 273 386 473 610 120 | 103 156    |
|             | 577.499.1Y - AW | 380 538 659 851 170 | 103 156    |

**Function video**
Scan the QR-code or go to: www.lechler.com/gyro

---

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 soil ing.

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**

Type + Connection = Ordering no.

for Ordering: 577.283.1Y. + AN = 577.283.1Y.AN
High impact tank cleaning machine
»IntenseClean Hygienic«
Series 5TA/5TB

- Gear-controlled
- Particularly powerful solid jets
- Operating pressures up to 15 and 25 bar possible

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

Max. temperature:
95 °C

Recommended operating pressure:
5 bar

Installation:
Operation in every direction possible

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

Bearing:
Ball bearing

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

Rotation monitoring sensor:
Sensor compatible, please ask for more information.

ATEX version
on request

Function video
Scan the QR-code or go to:
www.lechler.com/intensecleanhygienic5ta
www.lechler.com/intensecleanhygienic5tb

---

### Spray Angle

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Type</th>
<th>E Ø [mm]</th>
<th>Number, Ø Nozzles [mm]</th>
<th>V [l/min]</th>
<th>Max. tank diameter [m]</th>
<th>p [bar]</th>
<th>Pmax = 25 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>360°</td>
<td>5TA.403.1Y.AL</td>
<td>1.5</td>
<td>4 x 3.0</td>
<td>25</td>
<td>56</td>
<td>7.8</td>
<td>12.0</td>
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</tr>
<tr>
<td>360°</td>
<td>5TA.404.1Y.AL</td>
<td>1.5</td>
<td>4 x 4.0</td>
<td>35</td>
<td>58</td>
<td>10.9</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>360°</td>
<td>5TA.405.1Y.AL</td>
<td>1.5</td>
<td>4 x 5.0</td>
<td>50</td>
<td>82</td>
<td>15.5</td>
<td>13.0</td>
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</tr>
</tbody>
</table>

E = Narrowest free cross-section · Slip-on connection 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.

---

### Spray Angle

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Type</th>
<th>E Ø [mm]</th>
<th>Number, Ø Nozzles [mm]</th>
<th>V [l/min]</th>
<th>Max. tank diameter [m]</th>
<th>p [bar]</th>
<th>Pmax = 25 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>360°</td>
<td>STB.406.1Y.AS</td>
<td>6.0</td>
<td>4 x 6.0</td>
<td>107</td>
<td>239</td>
<td>33.1</td>
<td>14.0</td>
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<tr>
<td>360°</td>
<td>STB.407.1Y.AS</td>
<td>6.0</td>
<td>4 x 7.0</td>
<td>135</td>
<td>302</td>
<td>41.9</td>
<td>14.0</td>
<td></td>
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<tr>
<td>360°</td>
<td>STB.408.1Y.AS</td>
<td>6.0</td>
<td>4 x 8.0</td>
<td>165</td>
<td>369</td>
<td>51.2</td>
<td>15.0</td>
<td></td>
</tr>
</tbody>
</table>

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.
High impact tank cleaning machine
»IntenseClean«
Series 5TM

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

Materials:
316L SS, 304 SS, PTFE, PEEK

Max. temperature:
95 °C

Recommended operating pressure:
5 bar

Installation:
Operation in every direction possible

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

Bearing:
Ball bearing

Weight:
7.5 kg

Rotation monitoring sensor:
Sensor compatible, please ask for more information.

Scan the QR-code or go to:
www.lechler.com/intenseclean

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>E Ø [mm]</th>
<th>Number, Ø Nozzles [mm]</th>
<th>V [l/min] at 40 psi [US gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>360°</td>
<td>5TM.206.1Y.AS</td>
<td>8 2 x 8.0</td>
<td>125 153 198 39</td>
<td>24.0</td>
</tr>
<tr>
<td></td>
<td>5TM.210.1Y.AS</td>
<td>10 2 x 10.0</td>
<td>160 196 253 50</td>
<td>24.0</td>
</tr>
<tr>
<td></td>
<td>5TM.406.1Y.AS</td>
<td>6 4 x 6.0</td>
<td>140 171 221 43</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>5TM.407.1Y.AS</td>
<td>7 4 x 7.0</td>
<td>170 208 269 53</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>5TM.408.1Y.AS</td>
<td>8 4 x 8.0</td>
<td>200 245 316 62</td>
<td>22.0</td>
</tr>
<tr>
<td></td>
<td>5TM.410.1Y.AS</td>
<td>10 4 x 10.0</td>
<td>260 318 411 81</td>
<td>23.0</td>
</tr>
</tbody>
</table>

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.
Lechler products are used in a wide variety of sectors and applications. Which is why the products’ requirements are often very specific to certain applications. We define the term „quality“ as the extent to which our products fulfill our customer’s individual requirements.

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### Certifications and Quality
- ISO 9001-2008 Certification
- DIN EN 10204 Inspection Certificate
- Classification according to Pressure Equipment Directive 2014/68/EU
- Declaration of Incorporation of partly completed machinery according to 2006/42/EC
- Declaration of Conformity of machinery according to 2006/42/EC
- ASME qualified welding procedure specifications
- Welding procedure specification DIN EN ISO 15609

### Testing
- ANSI and ASTM testing
- Non-destructive testing – Penetrant testing: DIN EN ISO 3452
- Hardness
- Spray and flow testing
- Phase Doppler Anemometry (PDA) measurement system
- Magnetic particle inspection: DIN EN ISO 17638
- Positive Material Identification

### Code Compliance
- ASME B31.1 Power Piping Code
- Metallic industrial piping: DIN EN 13480
- Unfired pressure vessels: DIN EN 13445
- ASME B31.3 Process Piping Code
- Welder Performance Qualification Records per ASME BPVC Section IX
- Qualification test of welders: DIN EN 287

### 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 tailormake one for you. That is our promise.
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www.lechler.com

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- Pressure/flow rate calculator for single-fluid nozzles incl. axial-flow full cone nozzles
- Calculation of pipe diameters