Precision Spray Nozzles for Tank and Equipment Cleaning

Tank and Equipment Cleaning
Lechler is a world leader in nozzle technology.

For over 135 years, we have pioneered numerous groundbreaking developments in this field.

Comprehensive nozzle engineering and an in-depth understanding of application-specific requirements help us to create products that offer outstanding performance and reliability.

Optimized cleaning processes

Companies all over the world, in a wide range of industries, rely on Lechler tank and equipment cleaning nozzles for thorough cleaning of all kinds of tank sizes, machines and equipment.

Your advantages

- None of the risks, restrictions and costs related to manual tank cleaning
- Modern nozzle technology cuts cleaning fluid consumption and reduces downtimes
- The cleaning process is trouble-free, repeatable and verifiable

High cleaning performance at low pressure

Thanks to their sophisticated technology, Lechler tank and equipment cleaning nozzles already achieve high cleaning performance even at low pressures. This saves on high energy costs. The nozzles are driven and lubricated by the cleaning fluid and are therefore maintenance-free and reliable.

New products for practically any application

The Lechler tank and equipment cleaning nozzle range features innovative drive concepts, state-of-the-art nozzle design, as well as a large choice of sizes and materials. The scope of our portfolio is unique to the market and offers the perfect solution for every application.

Your experienced specialist — anywhere in the world

With subsidiaries in Hungary, the USA, England, India, China, France, Belgium, Sweden, Finland and Spain as well as qualified agents in over 40 countries, Lechler is represented all over the world. We will help you solve your cleaning problems — wherever you are.

Industries

- Chemical industry
- Food and beverage industry
- Tank and equipment engineering
- Machine tool engineering
- Cosmetics industry
- Pharmaceutical industry
- Biotechnology
- Agricultural engineering
**Unique range of solutions**

There is no single perfect tank and equipment cleaning nozzle. That is because requirements differ greatly in each individual application. Over the course of the years, we have developed specialized nozzles for a wide variety of different purposes. Today we offer the world’s largest nozzle range. This includes everything from standard nozzles to individual nozzles for very specific tasks.

**Cleaning efficiency at a glance**

At first sight, finding the right nozzle for your particular application from the variety of nozzles we offer may appear overwhelming. That is why we have defined five cleaning efficiency classes — from a simple rinse to removing the most difficult soil. These individual efficiency classes use information such as tank size and recommended operating pressure to allow you to quickly find the most suitable nozzle for your application.

You will find a detailed description of the cleaning efficiency classes on page 18.

**Individual advice**

It goes without saying that we provide you with personal service on the subject of tank and equipment cleaning and explain the different possibilities to you. Contact us and let us help you find the best possible solution for the most efficient cleaning.
LECHLER NOZZLES FOR TANK AND EQUIPMENT CLEANING

For every application

From the easiest to most difficult soils – Lechler has the optimum solution for removing soils of all kinds.

Cleaning in Place (CIP)

Many of Lechler’s precision nozzles for tank and equipment cleaning are CIP-capable and can remain installed during the production process.
Hygienic equipment cleaning

Even difficult cleaning tasks with special requirements, such as in the food and beverage industry, can be performed easily with Lechler nozzles.

The right nozzle for every tank

Our extensive product range includes the right nozzle size for every application – from a small test tube to a large fermentation tank for bioethanol production.
The fundamentals of cleaning technology

Sinner’s circle

The Sinner’s circle illustrates the interplay between the four main factors for successful cleaning:

- Chemistry (choice of cleaning agent)
- Mechanical (removal of soil via pressure or friction)
- Temperature (at which cleaning is performed)
- Time (duration of the total cleaning processes)

The proportion of the individual factors as a part of the entire cleaning can be varied, provided that the total is 100 per cent. This results in significant savings potentials.

As a result, the intensification of mechanical cleaning enables the consumption of cleaning agents or the duration of cleaning to be reduced. Consequently, the mechanical factor takes up a greater part of the Sinner’s circle, while the other factors can end up being reduced.

Cost reduction by efficient cleaning processes

This is precisely where our nozzles and rotating cleaning nozzles come into play, having been specially developed for delivering a high mechanical cleaning action. Their greater efficiency helps to permanently reduce on going costs for energy and cleaning agents, and also the duration of cleaning. Consequently a one-off investment in improved nozzle technology pays for itself after only a short time.

Figure 1: Sinner’s circle with equal proportions of the temperature, time, chemistry and mechanical factors.

Figure 2: Lechler nozzles and rotating cleaning nozzles have high mechanical cleaning efficiency. This reduces the proportion of the other factors, as well as the resulting costs.
Mechanical cleaning effects with Lechler rotating cleaning nozzles

Rotating cleaning nozzles deliver the greatest impact when cleaning the surface area of the tank. To achieve this, large droplets must strike at high speed. This enables thick soil to be removed that cannot dissolve in the cleaning fluid. Important influencing factors are the distance between the nozzle and wall, and the operating pressure.

If either are too great the fluid will break down into smaller droplets (see Figs. 3 and 4) and the impact will be reduced.

Besides the impact, the fluid running down the tank wall also has a significant cleaning effect. If the formed film is thick enough, the resulting shear stresses can remove light to moderate soil. In that case, unsprayed patches are less of an issue than is the case during impact cleaning (see Fig. 5).

Figure 3: Rotating cleaning nozzles with recommended operating pressure

Figure 4: Rotating cleaning nozzles with operating pressure too high

Figure 5: Cleaning mechanisms, impact and shear stress
Impact

The force of impact when using a liquid jet on a surface plays an important role in cleaning technology. The ratio of the force (F) to the surface (A) is referred to as the Impact (I).

\[ I = \frac{\text{Impact force}}{\text{Impact surface}} = \frac{F}{A} \text{ lbs in}^2 \]

It can be controlled via the following parameters:

- Impact surface and spray angle (a)
  - The impact surface is the area where the droplet strikes. The smaller the surface area, the greater the impact values.
  - Nozzles with high impact are, for example, solid stream nozzles and flat fan nozzles with a narrow spray angle (see Fig. 6).
- Flow rate (b)
  - Increasing the flow rate by using a larger nozzle increases the impact, assuming that the other parameters (spray angle, pressure and medium) remain the same (see Fig. 6).

Pressure

In contrast to static cleaning nozzles, there is no linear relationship between pressure and impact for rotating nozzles. With rotating nozzles, the supply pressure normally influences the rotation speed. The higher the rotation speed, the greater the tendency of rotating nozzles to atomize the fluid into much smaller droplets.

This effect has a negative influence on impact. Lechler rotating cleaning nozzles should therefore be used at the recommended operating pressure range.

Figure 6:

a) Constant pressure and flow rate, variable spray shape and spray distance
b) Constant pressure, spray shape and spray distance, variable flow rate
Comparison of rotating cleaning nozzles and static spray balls

Due to their simple construction, static spray balls are economical and are likely to miss important areas. Whereas rotating cleaning nozzles spray the entire tank wall in a fan-like pattern, the jets from spray balls strike only in concentrated spots. The remaining surface is simply cleaned by the shear stresses of the fluid running off (see Fig. 7). The fluid consumption is therefore significantly greater in comparison to rotating cleaning nozzles.

Influence of chemistry and temperature

The chemical cleaning effect takes part in almost all tank cleaning applications when the soil is dissolved in the cleaning medium or the bonding between soil and tank surface is reduced. Higher temperatures can support the chemical cleaning effect.

Foam cleaning with nozzles

Foam cleaning is primarily based on the chemical cleaning effect. Since the foam sticks more firmly to the surface, it can be more effective than cleaning fluids that drip off quickly. The mechanical cleaning effect plays a correspondingly subordinate role. Here, the task of the nozzle is to distribute the foam evenly. Your end result for this application depends on the type of foam.

CIP- and SIP-cleaning

Cleaning in Place (CIP) is one of the standard cleaning methods in the food and pharmaceutical industries. This is a process where the cleaning and disinfectant solutions circulate in the production systems during the cleaning process. The nozzles are installed in the system and do not need to be dismounted during the process.

The correct combination of steps from Sinner’s circle leads to a reliable and reproducible process. Almost all Lechler rotating cleaning nozzles and static spray nozzles are capable of CIP.

If sterilization is performed after CIP-cleaning with hot water or saturated steam, this is referred to as SIP-cleaning (Sterilization in Place).
Lechler rotating cleaning nozzles designs

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 orifices. The rapidly repeated impact 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. A turbine wheel with an internal gear 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 achieve an even higher impact which is especially important for large tanks.

**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.
Connection options

Lechler offers various options for connecting the rotating cleaning nozzles to the supply line:

**Threaded connection**
Most nozzles have a female thread that is screwed onto a male thread on the pipe.

**Slip-on connection**
Slip-on connections without threads are often preferred in applications with high sanitary requirements. Here, the nozzle is slipped onto the outer pipe and secured through a horizontal hole by a pin or clamp.

**Tri-Clamp**
Tri-Clamp fittings are frequently used in the food and beverage industry. Some rotating cleaning nozzles can be supplied with a compatible adapter.

**Welded connection**
Welded connections are particularly suitable for applications where sanitary requirements have to be taken into account. Please contact us for further information.
Planing for a perfect clean tank can be a challenge. Many tanks have built-in equipment such as agitators or baffles which can create spray shadows. Whether a certain nozzle is able to reliably clean all surfaces of the tank under these conditions cannot be decided with certainty on the basis of just a visual inspection.

With our new and unique TankClean software, we can help you to find the optimum solution for perfectly cleaning your tank. To do this, we replicate the tank geometry in the software and then simulate the spraying operation. Operation of all Lechler tank cleaning nozzles can be simulated – from the static spray ball to the high-impact tank cleaning machine. The result of the simulation is documented and provided in a PDF or video file. Simulation with TankClean can already be used as the basis for optimum cleaning in the planning phase of new tanks, but is also suitable for optimizing existing tank cleaning processes.

Our unique service – your individual benefit

**Planning certainty**
We assist you in planning your tank cleaning solution to ensure cleaning without any gaps.

**Process optimization**
By simulating the existing cleaning processes, we show you the optimization potentials for these processes.

**Process reliability**
Thanks to realistic and individually customized process simulation, we can offer you individual solution concepts.

**Cost and time savings**
Simulation makes it possible to detect any potential problem areas before final definition of the cleaning concept. This makes it possible to significantly reduce the number of time- and cost-intensive practical cleaning tests.

Scan the QR-code or go to: www.lechler.de/TankCleanGB
Individual adaptation of tank geometries and built-in equipment

Selection of the right tank cleaning nozzles

Realistic simulation of the cleaning process

Documentation of the simulation results, including additional planning aids

Talk to us

Are you interested in tank cleaning simulations with TankClean? Ask your Lechler contact person for further information or give us a call. We will gladly help you in planning your tank cleaning solution.
Materials

Lechler tank and equipment cleaning nozzles are made of extremely high-grade materials that are designed to meet requirements such as resistance to cleaning chemicals or temperature influences. The large choice of different materials — e.g. stainless steel AISI 316L, PVDF, PEEK or PTFE — allows nozzle selection customized to the individual application and operating conditions. In addition, the materials used for the tank and equipment cleaning nozzles are perfectly matched to each other and are thus characterized by very low wear.

The product pages for the individual nozzles provide information on the materials available for the different nozzle types.

In addition to the requirements for material resistance and wear, the materials must also be food grade for use in the beverage, food and pharmaceutical industries. Depending on the application area, the materials must meet different demands.

A large number of the materials used for Lechler tank and equipment cleaning nozzles comply with the requirements of the FDA or conform to (EC) 1935/2004.

Further information on conformity is provided on the product pages.

The FDA, the U.S. Food & Drug Administration, is a federal agency which oversees those two industries. Materials used in making some of Lechler’s products comply with the requirements of FDA regulation 21 CFR for use in food applications.

The regulation (EC) No. 1935/2004 of the European Parliament regulates general safety requirements to all food and beverage contact materials.

Within this regulation, it is additionally stipulated that plastics must comply with (EU) 10/2011.

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

Hygiene requirements

Lechler’s tank and equipment cleaning nozzles are designed so that they meet hygiene requirements.

This is reflected, for example, in the self-draining function, minimized dead space in the nozzles as well as an external design without unnecessary gaps and edges. At the same time, the nozzles are designed with the lowest possible surface roughness.

Lechler also offers specially certified nozzles for particular hygiene requirements. For example, the “PTFE Whirly” and 527 series are 3A-certified.

3-A® Sanitary Symbol Council
Administrative Council for Spray Cleaning Devices (78-01)

3-A® SSI is an independent, not-for-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries. The display of the 3-A symbol requires that processing equipment meets certain material, design, and fabrication standards for cleanability and inspection.

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

Nozzle Wear

Nozzle wear depends mainly on the operating conditions.

Like with all rotating parts, the bearing assembly is subjected to the highest amount of stress. The following operating conditions accelerate wear:

- Solids in the fluid and hard particles
- Use in a chemically aggressive environment
- Spraying of chemically aggressive substances
- Operating the nozzle above the recommended pressure range or temperature

Material certificates

Material certificates in accordance with DIN EN 10204 can be issued on request for almost all Lechler tank and equipment cleaning nozzles.

ATEX

Lechler offers specially designed nozzle series for use in explosive atmospheres. The "MicroWhirly" and "Whirly" series have an ATEX approval that was issued by an external certification institute.
Conversion tables

### p Pressure

<table>
<thead>
<tr>
<th>Unit</th>
<th>Conversion</th>
<th>bar</th>
<th>Pascal [Pa] = N/m²</th>
<th>psi</th>
<th>lb/sq ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 bar</td>
<td>1</td>
<td>1·10⁵</td>
<td>14.5</td>
<td>2089</td>
<td></td>
</tr>
<tr>
<td>1 Pascal [Pa]</td>
<td>1·10⁻¹</td>
<td>1</td>
<td>14.5·10⁻¹</td>
<td>0.0209</td>
<td></td>
</tr>
<tr>
<td>1 psi</td>
<td>0.06895</td>
<td>6895</td>
<td>1</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>1 lb/sq ft</td>
<td>0.479·10⁻²</td>
<td>47.9</td>
<td>6.94·10⁻³</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### V Volume

<table>
<thead>
<tr>
<th>Unit</th>
<th>Conversion</th>
<th>l</th>
<th>m³</th>
<th>Imp. gal</th>
<th>US gal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 l (1 dm³)</td>
<td>1</td>
<td>1·10⁻³</td>
<td>0.22</td>
<td>0.264</td>
<td></td>
</tr>
<tr>
<td>1 m³</td>
<td>1000</td>
<td>1</td>
<td>220</td>
<td>264.2</td>
<td></td>
</tr>
<tr>
<td>1 Imp. gallon</td>
<td>4.546</td>
<td>4.546·10⁻³</td>
<td>1</td>
<td>1.201</td>
<td></td>
</tr>
<tr>
<td>1 US gallon</td>
<td>3.785</td>
<td>3.785·10⁻²</td>
<td>0.8327</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### ũ Flow rate

<table>
<thead>
<tr>
<th>Unit</th>
<th>Conversion</th>
<th>l/min</th>
<th>l/s</th>
<th>m³/h</th>
<th>US gal/min</th>
<th>Imp. gal/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 l/s</td>
<td>60</td>
<td>1</td>
<td>3.6</td>
<td>15.85</td>
<td>13.20</td>
<td></td>
</tr>
<tr>
<td>1 l/min</td>
<td>1</td>
<td>0.01667</td>
<td>0.06</td>
<td>0.2642</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>1 m³/h</td>
<td>16.67</td>
<td>0.28</td>
<td>1</td>
<td>4.40</td>
<td>3.66</td>
<td></td>
</tr>
<tr>
<td>1 US gal/min</td>
<td>3.785</td>
<td>0.0631</td>
<td>0.227</td>
<td>1</td>
<td>0.8327</td>
<td></td>
</tr>
<tr>
<td>1 Imp. gal/min</td>
<td>4.546</td>
<td>0.076</td>
<td>0.273</td>
<td>1.201</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### p Change in specific weight

\[ \frac{V_{w}}{X} = \frac{V_{n}}{X} \] \[ V_{w} = \text{Flow rate (water) [l/min, l/h]} \]
\[ V_{n} = \text{Flow rate of liquid, with a specific weight that differs from 1} \]
\[ X = \sqrt{\frac{\rho_{w}}{\rho_{n}}} \]
\[ X = \text{Multiplier} \]
\[ p = \text{Specific weight [kg/m}^3] \]
\[ \rho_{w} \]
\[ \rho_{n} \]

<table>
<thead>
<tr>
<th>p/¹ Pressure/Flow rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid for single-fluid nozzles and rotating nozzles except for axial-flow full cone nozzles</td>
</tr>
<tr>
<td>[ \dot{V}<em>{j} = \sqrt{\frac{p</em>{2}}{p_{1}}} \cdot \dot{V}_{i} ] [gpm]</td>
</tr>
<tr>
<td>[ p_{2} = \left( \frac{\dot{V}<em>{j}}{\dot{V}</em>{i}} \right)^{2} \cdot p_{1} ] [psi]</td>
</tr>
<tr>
<td>Valid for axial-flow full cone nozzles</td>
</tr>
<tr>
<td>[ \dot{V}<em>{j} = \left( \frac{p</em>{2}}{p_{1}} \right)^{1.4} \cdot \dot{V}_{i} ] [gpm]</td>
</tr>
<tr>
<td>[ p_{2} = \left( \frac{\dot{V}<em>{j}}{\dot{V}</em>{i}} \right)^{2.5} \cdot p_{1} ] [psi]</td>
</tr>
</tbody>
</table>

All flow rate data of this brochure have been measured with water and consider the individual flow parameters of the nozzle designs.
Nozzle selection
Choosing the right Lechler rotating cleaning nozzle or static spray ball is determined primarily by the type of soil to be cleaned and the tank diameter. You can find this information on the product pages. It must be guaranteed that the diameter of the tank to be cleaned is smaller than the specified maximum possible tank diameter of the nozzles.

Pump and pipes
The pipe size used depends mainly on the required flow rate and should be chosen so that the pressure losses in the pipe system are as low as possible. It must be guaranteed that the required static operating pressure is available directly at the nozzle. The pump power must be matched to this.

Arrangement
The nozzles must be positioned in the upper part of the tank where possible. The following recommendation applies:

\[ H_{\text{nozzle}} = \frac{1}{3} \cdot H_{\text{tank}} \quad \text{and} \quad H_{\text{nozzle}} < \frac{1}{3} \cdot D_{\text{max spray diameter nozzle}} \]

In addition, it must be ensured that sufficient cleaning fluid strikes the tank top.

Filling level
If possible, the nozzle should not come into contact with the product during production. The nozzle should be positioned above the maximum product level in the tank.

Tank drainage rate
The tank drainage rate is to be selected to prevent the level of liquid from rising during the cleaning process. Make sure the drain can handle whatever volume you put into the tank. (See chart on the right)

<table>
<thead>
<tr>
<th>Size</th>
<th>Drainage Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>6 gal/min</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>13 gal/min</td>
</tr>
<tr>
<td>2&quot;</td>
<td>23 gal/min</td>
</tr>
<tr>
<td>2 1/2&quot;</td>
<td>35 gal/min</td>
</tr>
<tr>
<td>3&quot;</td>
<td>50 gal/min</td>
</tr>
<tr>
<td>4&quot;</td>
<td>87 gal/min</td>
</tr>
<tr>
<td>5&quot;</td>
<td>141 gal/min</td>
</tr>
<tr>
<td>6&quot;</td>
<td>204 gal/min</td>
</tr>
</tbody>
</table>

WHAT YOU SHOULD KEEP IN MIND WHEN PLANNING
Number of nozzles
When cleaning large tanks or complex installations, you will need to install several nozzles. The nozzles must be positioned for the spray jets to overlap. These nozzles effectively clean the tank surface area.

Avoidance of spray shadows
Installations such as agitators, baffle plates or pipes prevent the areas behind them from being reached directly by the spray jet. Impact cleaning is not possible in these locations. For this reason, several nozzles must be installed if the tank contains equipment such as agitators or pipes. The number of nozzles should be chosen so that the spray shadows of the individual nozzles are eliminated. In addition, static spray nozzles can also be used for targeted removal of deposits left as a result of spray shadows or in areas that are difficult to clean.
Lechler precision nozzles for tank and equipment cleaning are divided into five different cleaning efficiency classes. Every nozzle from Lechler is assigned to a class. These classes make it possible to find the right nozzle for the respective application. The subdivision into cleaning efficiency classes 1 to 5 is intended to facilitate nozzle selection for users. The respective class is suitable for specific cleaning tasks.

First, the required cleaning efficiency class is defined on the basis of the soil type — rinsing, light to medium soil, and persistent soil. Several classes are generally always suitable for one type of soil. It is not possible or expedient to differentiate exactly between the soil types or recommended nozzle types since there are a large number of different applications. The information should be seen as recommendations intended to make it easier to choose the right nozzle.

If your application is to clean a non-adhering powder material from a tank surface, for example, the cleaning task can be defined as “rinsing.” The nozzle series in cleaning efficiency class 1, e.g. static spray ball, or class 2, e.g. MicroWhirly or MiniSpinner, are suitable for this. In the next step, the maximum possible tank diameter and the flow rate range of the individual series are considered. Lechler static spray balls are very economical. For cleaning medium soil, Lechler MicroSpinners or MiniSpinners are recommended.

However, it is also possible that there will be no nozzle series from the two cleaning efficiency classes that is suitable at first sight in the case of very large tanks. To check this, it is recommended to refer to the overview page of the respective cleaning efficiency class. Using the number line, it is possible to see at a glance whether there is a suitable series for the specific tank diameter in the corresponding cleaning efficiency class. The following possibilities exist if there is no recommended series for the required tank diameter:

- Several nozzles are positioned in the tank so that the distance between nozzle and tank is within the required dimensions.
- By referring to the overview pages of the different cleaning efficiency classes, choose a suitable nozzle series for the respective tank diameter.

Static cleaning nozzles

In addition to the classes described above, there is also an additional subdivision into static cleaning nozzles. These include flat fan or full cone nozzles, for example. These can be used for the shadowing effect to provide complete spray coverage.
CLEANING EFFICIENCY CLASS 1

These static spray balls of cleaning efficiency class 1 are designed for hygienic rinsing with a flow rate of 4.0 to 89 gpm at 20 psi, as is frequently required in the food and beverage industry. In addition to liquid media, the static spray balls can also be operated with media such as steam and air and are also especially suitable for SIP-cleaning (Sterilization in Place).

Lechler products in this class are also designed for operation at higher temperatures and guarantee high process reliability.

**Operating principles**
Static

**Flow rates at 30 psi**
4.0 to 177 gpm

**Recommended operating pressures**
20-40 psi

**Max. temperatures**
to 392°F/ 200°C
Series 527

Series 527 complies with 3-A® standards and makes this product suitable for hygienic applications. They clean with powerful solid jets, have a high surface quality and are also reliably resistant to high temperatures.

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
</table>

**Material**
AISI 316L SS

**Max. temperature**
392°F/ 200°C

**Recommended operating pressure**
20 psi

**Installation**
Operates in every direction

Overview of the tank diameter, depending upon the pressure of series 527

FDA compliant
Information on operation

In most applications, static spray balls do not deliver the same cleaning power as rotating nozzles, however, 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

If for some reason, a rotating nozzle should stop turning, parts of the tank may remain uncleaned. This will not 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.

Slip-on information

- R-clip made of stainless steel AISI 316L is included.
- Depending on diameter of the adapter the flow rate can increase due to leakage between the connection and static spray ball.

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.
Static spray balls
Series 540 / 541

Series 540 / 541

The robust series 540 / 541 have a threaded connection and an especially compact design. They can also be used at high temperatures as well as for the output of steam and air.

- Max. tank diameter [ft]:
  - 0
  - 5
  - 10
  - 15
  - 20
  - 25
  - 30

- Material: AISI 303 SS
- Max. temperature: 392°F / 200°C
- Recommended operating pressure: 40 psi
- Installation: Operates in every direction

Overview of the tank diameter, depending upon the pressure of series 540 / 541.
Information on operation

In most applications, static spray balls do not deliver the same cleaning power as rotating nozzles, however, 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

If for some reason, a rotating nozzle should stop turning, parts of the tank may remain uncleaned. This will not 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.
**Static spray balls »RinseClean«**

**Series 5B2/5B3**

The spray ball design has proven itself in many applications. It can be used in areas with high hygienic requirements and high temperatures. Our RinseClean spray ball is available with various slip-on connections, as well as in threaded or welded versions.

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
</tr>
</thead>
</table>

**Material**

316L SS, R-clip: 316L SS

**Max. temperature**

392 °F / 200 °C

**Recommended operating pressure**

30 psi

**Installation**

Operation in every direction is possible

Overview of the tank diameter, depending upon the pressure of series 5B2/5B3
Slip-on connection

Dimensions slip-on connection according to DIN 10357

With the slip-on connection, the spray ball is pushed onto the customer’s connection pipe and secured with the supplied cotter pin. Lechler offers the right connection sizes for the three most common pipe standards.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Ordering no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>095.013.1Y.06.55.0</td>
</tr>
<tr>
<td>2</td>
<td>095.013.1Y.06.58.0</td>
</tr>
<tr>
<td>3</td>
<td>095.013.1Y.06.66.0</td>
</tr>
<tr>
<td>4</td>
<td>095.013.1Y.06.59.0</td>
</tr>
<tr>
<td>5</td>
<td>095.013.1Y.06.57.0</td>
</tr>
</tbody>
</table>

Slip-on connection according to DIN EN 10357 series D (ASME BPE 1997, OD tube compatible)

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>E (in)</th>
<th>Flow Rate (Gallons per minute)</th>
<th>Dimensions (in)</th>
<th>Max. tank diameter (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20 psi</td>
<td>30 psi</td>
<td>liters per minute</td>
<td>2 bar</td>
</tr>
<tr>
<td>360°</td>
<td>5B3.089.1Y.A1.00.0</td>
<td>.04</td>
<td>10.9</td>
<td>13.4</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>5B3.209.1Y.A1.90.0</td>
<td>.06</td>
<td>22.0</td>
<td>26.9</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>5B3.309.1Y.A1.90.0</td>
<td>.07</td>
<td>39.4</td>
<td>48.4</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>5B3.379.1Y.A2.60.0</td>
<td>.08</td>
<td>57.1</td>
<td>69.9</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>5B3.449.1Y.A3.80.0</td>
<td>.12</td>
<td>89.9</td>
<td>110.2</td>
<td>410</td>
</tr>
<tr>
<td></td>
<td>5B3.539.1Y.A5.10.0</td>
<td>.13</td>
<td>147.0</td>
<td>180.0</td>
<td>670</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.

Slip-on information

- Pin made of 316L SS is included.
- Depending on diameter of adapter, the flow rate can increase due to leakage between connecting pipe and static spray ball.

Threaded connection

Female Threaded connection

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Connection NPT</th>
<th>E (in)</th>
<th>Flow Rate (Gallons per minute)</th>
<th>Dimensions (in)</th>
<th>Max. tank diameter (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>20 psi</td>
<td>30 psi</td>
<td>liters per minute</td>
<td>2 bar</td>
</tr>
<tr>
<td>360°</td>
<td>5B2.879.1Y.BB.00.0</td>
<td>1/8&quot;</td>
<td>.03</td>
<td>3.4</td>
<td>4.0</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>5B3.309.1Y.BH.00.0</td>
<td>1/2&quot;</td>
<td>.07</td>
<td>39.5</td>
<td>48.4</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>5B3.379.1Y.BN.00.0</td>
<td>1&quot;</td>
<td>.08</td>
<td>57.1</td>
<td>69.9</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>5B3.539.1Y.BW.00.0</td>
<td>2&quot;</td>
<td>.12</td>
<td>147.0</td>
<td>180.0</td>
<td>670</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.
PERFECT RINSING AND REMOVAL OF LIGHT SOILING

Cleaning efficiency class 2

The typical task profile of the rotating nozzles in cleaning efficiency class 2 includes rinsing and the removal of light soiling, particularly the kind that frequently occurs in the food and beverage industry, as well as the chemical and pharmaceutical industry. The Lechler products in this class are free-spinning and made from high-grade materials such as stainless steel, PVDF, PEEK and PTFE. This allows a wide range of various cleaning agents to be used.

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
</table>

- Operating principles: Free-spinning
- Flow rates at 30 psi: 2 to 59 gpm
- Recommended operating pressures: 30 to 40 psi
- Max. temperatures: 122 to 392°F (50 to 200°C)
Rotating cleaning nozzle “PicoWhirly”
Series 500.234

The PicoWhirly works with rotating solid jets and is also suitable for cleaning at very high temperatures. This rotating cleaning nozzle with kolsterized slide bearing is made entirely from stainless steel and can also be used in very small spaces, thanks to its extremely compact construction.

Series 500.234

- Material: AISI 316L SS
- Max. temperature: 400°F/200°C
- Recommended operating pressure: 40 psi
- Installation: Operates in every direction
- Filtration: Line strainer with a mesh size of 0.3 mm/50 mesh
- Bearing: Kolsterized Sleeve bearing

To see video
Scan the QR-code or go to: www.lechlerusa.com

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
</table>

Overview of the tank diameter, depending upon the pressure of series 500.234
<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Free Passage (in.)</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter [ft]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500. 234. G9. BA</td>
<td>.07</td>
<td>1.8</td>
<td>8</td>
</tr>
<tr>
<td>300°</td>
<td>.41&quot;</td>
<td>1.06&quot;</td>
<td>20 psi</td>
<td>2 bar</td>
</tr>
<tr>
<td></td>
<td>1/8&quot; Male NPT</td>
<td>2.5</td>
<td>40 psi</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60 psi</td>
<td>3</td>
</tr>
</tbody>
</table>

**Information on operation**

- Operation with compressed air or steam purge 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.

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 “PVDF MicroWhirly”
Series 500.191

Series 500.191

The PVDF MicroWhirly is made entirely from PVDF and designed to work in a corrosive environment. It is also suitable for contact with food and the application of foam, and can be used for cleaning equipment — all for a very good price-performance ratio.

### Material
- PVDF

### Max. temperature
- 194°F / 90°C

### Recommended operating pressure
- 30 psi

### Installation
- Operates in every direction

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

### Bearing
- Sleeve bearing made of PVDF

---

**To see video**

Scan the QR-code or go to: [www.lechlerusa.com](http://www.lechlerusa.com)

---

**Overview of the tank diameter, depending upon the pressure of series 500.191**

<table>
<thead>
<tr>
<th>Material</th>
<th>PVDF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. temperature</td>
<td>194°F / 90°C</td>
</tr>
<tr>
<td>Recommended operating pressure</td>
<td>30 psi</td>
</tr>
<tr>
<td>Installation</td>
<td>Operates in every direction</td>
</tr>
<tr>
<td>Filtration</td>
<td>Line strainer with a mesh size of 0.3 mm / 50 mesh</td>
</tr>
<tr>
<td>Bearing</td>
<td>Sleeve bearing made of PVDF</td>
</tr>
</tbody>
</table>
### Standard version

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Free Passage (in.)</th>
<th>Connection</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 psi 1/2 Female BSPP</td>
<td></td>
</tr>
<tr>
<td>180°</td>
<td>500. 191. 5E. 02</td>
<td>.086</td>
<td>1/2&quot; Female BSPP</td>
<td>2.9 3.5 13 4.0 4.9 2.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 psi 1/2 Female BSPP</td>
<td></td>
</tr>
<tr>
<td>180°</td>
<td>500. 191. 5E. 01</td>
<td>.086</td>
<td>1/2&quot; Female BSPP</td>
<td>2.9 3.5 13 4.0 4.9 2.6</td>
<td></td>
</tr>
<tr>
<td>360°</td>
<td>500. 191. 5E. 00</td>
<td>.086</td>
<td>1/2&quot; Female BSPP</td>
<td>4.4 5.4 20 6.2 7.6 3.6</td>
<td></td>
</tr>
</tbody>
</table>

### Compact version

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Free Passage (in.)</th>
<th>Connection</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 psi 3/8 Male BSPP</td>
<td></td>
</tr>
<tr>
<td>180°</td>
<td>500. 191. 5E. 21</td>
<td>.086</td>
<td>3/8&quot; Male BSPP</td>
<td>2.9 13 4.0 4.9 2.6</td>
<td></td>
</tr>
<tr>
<td>360°</td>
<td>500. 191. 5E. 22</td>
<td>.086</td>
<td>3/8&quot; Male BSPP</td>
<td>4.4 20 6.2 7.6 3.6</td>
<td></td>
</tr>
</tbody>
</table>

### Information on operation

- The PVDF MicroWhirly is not suitable for operation with compressed air or any other gas.
- Operation above the recommended operating pressure has negative effects on the cleaning result and wear.
- 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.

---

The cleaning efficiency class is divided into 5 levels:

1. **Clean**
2. **Regular**
3. **Medium**
4. **Strong**
5. **Very strong**

The PVDF MicroWhirly is suitable for all levels of cleaning efficiency class.
Rotating cleaning nozzle “MicroWhirly”
Series 566

The MicroWhirly, with effective flat fan nozzles, is licensed for contact with food. Thanks to the robust slide bearing made from PEEK, the MicroWhirly has a particularly long service life. The MicroWhirly is alternatively available with an internal or external thread and in an ATEX version, which allows it to be adapted to a wide range of uses.

**Series 566**

- **Materials:**
  - AISI 316L SS, PEEK,
  - PEEK ESD (ATEX version only)

- **Max. temperature**
  - 266°F/ 130°C
  - 194°F/ 90°C ATEX Version

- **Recommended operating pressure**
  - 40 psi

- **Installation**
  - Operates in every direction

- **Filtration**
  - Line strainer with a mesh size of
    - 0.3 mm/50 mesh
    - 0.2 mm/80 mesh
  - ATEX Version

- **Bearing**
  - Sleeve bearing made of PEEK

To see video
Scan the QR-code or go to: www.lechlerusa.com

### Materials

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
</table>

**Overview of the tank diameter, depending upon the pressure of series 566**

**Max. tank diameter [ft]**

- 0
- 5
- 10
- 15
- 20
- 25
- 30

**Materials**

- AISI 316L SS, PEEK, PEEK ESD (ATEX version only)

**Max. temperature**

- 266°F/ 130°C
- 194°F/ 90°C ATEX Version

**Recommended operating pressure**

- 40 psi

**Installation**

- Operates in every direction

**Filtration**

- Line strainer with a mesh size of
  - 0.3 mm/50 mesh
  - 0.2 mm/80 mesh
- ATEX Version

**Bearing**

- Sleeve bearing made of PEEK
**Information on operation**

- Operation with compressed air purge 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.

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Type</th>
<th>Ordering no.</th>
<th>Connection</th>
<th>Free Passage (in.)</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>180°</td>
<td>566.873.1Y</td>
<td>BE</td>
<td>BF</td>
<td>TF07</td>
<td>0.04</td>
<td>3.3</td>
</tr>
<tr>
<td>180°</td>
<td>566.933.1Y</td>
<td>BE</td>
<td>BF</td>
<td>TF07</td>
<td>0.04</td>
<td>4.6</td>
</tr>
<tr>
<td>360°</td>
<td>566.874.1Y</td>
<td>BE</td>
<td>BF</td>
<td>TF07</td>
<td>0.04</td>
<td>3.3</td>
</tr>
<tr>
<td>360°</td>
<td>566.934.1Y</td>
<td>BE</td>
<td>BF</td>
<td>TF07</td>
<td>0.04</td>
<td>4.6</td>
</tr>
</tbody>
</table>

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 AISI 316L is included (Ordering no.: 095.022.1Y.50.94.E).
- Depending on diameter of the adapter the flow rate can increase due to leakage between the connection and rotating cleaning nozzle.

**Example of ordering with ATEX approval.**

**Unit group / category / zones:**

- II 1G Ex h LLB T6... T3 Ga
- II 1D Ex h III C T85 °C... T150 °C Da

**Example of ordering with FDA and (EG) 1935/2004 conform.**

All Materials are suitable for contact with food.

**Example of ordering slip-on connection: 566.873.1Y.TF.EX**

**Example of ordering:**

- Example Type + Connection = Ordering no. of ordering: 566.873.1Y.XX + BE = 566.873.1Y.BE.XX
- Example Type + Connection = Ordering no. of ordering: 566.873.1Y.XX + BE = 566.873.1Y.BE

**Attention:** for the ATEX version of the slip-on connection the code for the connection changes. Example of ordering slip-on connection: 566.873.1Y.TF.EX
Rotating cleaning nozzle “MiniWhirly”
Series 500.186

The MiniWhirly made from POM is the economical choice for tank cleaning. The rotating nozzle has effective flat fan nozzles and was specifically designed for applications in barrel and canister cleaning.

Overview of the tank diameter, depending upon the pressure of series 500.186
Information on operation

Operation with compressed air purge 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.

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 “NanoSpinner”
Series 5NA

The NanoSpinner has a compact design which helps it efficiently clean confined spaces. This rotating cleaning nozzle has a popular design with its double ball bearing. It is made entirely from stainless steel and is designed for use at high temperatures.

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
</table>

Materials
AISI 316L SS,
AISI 440C SS

Max. temperature
284°F/140°C

Recommended operating pressure
30 psi

Installation
Operates in every direction

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

Bearing
Double ball bearing made of AISI 440C

To see video
Scan the QR-code or go to: www.lechlerusa.com

Overview of the tank diameter, depending upon the pressure of series 5NA
Information on operation

- Operation with compressed air purge 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.

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.

### Example of ordering with ATEX approval. FDA and (EG) 1935/2004 conform.

Unit group / category / zones:
- II 1G Ex h IIB T6... T3 Ga
- II 1D Ex h IIIIC T85 °C...T200 °C Da

Example of ordering:
- Type/Ordering no.
  - 5NA.879.1Y.BB.EX

### Example of ordering with FDA and (EG) 1935/2004 conform.

All Materials are suitable for contact with food.

Example of ordering:
- Type/Ordering no.
  - 5NA.879.1Y.BB.EX
Rotating cleaning nozzle “MicroSpinner”
Series 5MC

The innovative slot design gives the MicroSpinner its high degree of effectiveness. Due to the modern bearing construction, it is particularly reliable and durable. The MicroSpinner is made entirely from stainless steel and designed for use also at high temperatures. Apart from stainless steel, it is also available in Hastelloy® and in many flow rates.

Materials
AISI 316L SS,
AISI 440C SS
Hastelloy® C22,
Hastelloy® C276

Max. temperature
284°F/ 140°C

Recommended operating pressure
30 psi

Installation
Operates in every direction

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

Bearing
Double ball bearing made of AISI 440C
Double ball bearing made of C276

Overview of the tank diameter, depending upon the pressure of series 5MC

To see video
Scan the QR-code or go to:
www.lechlerusa.com
### Types of Nozzles

<table>
<thead>
<tr>
<th>Spray Angle</th>
<th>Ordering no.</th>
<th>Type</th>
<th>Material no.</th>
<th>Connection</th>
<th>Free Passage (in.)</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60°</td>
<td>5MC.022</td>
<td>1Y</td>
<td>21</td>
<td>BF TF05</td>
<td>.04</td>
<td>5</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>5MC.042</td>
<td>1Y</td>
<td>21</td>
<td>BF TF05</td>
<td>.118</td>
<td>8.8</td>
<td>10.8</td>
</tr>
<tr>
<td>180°</td>
<td>5MC.004</td>
<td>1Y</td>
<td>21</td>
<td>BF TF05</td>
<td>.031</td>
<td>7.0</td>
<td>8.6</td>
</tr>
<tr>
<td>360°</td>
<td>5MC.069</td>
<td>1Y</td>
<td>21</td>
<td>BF TF05</td>
<td>.035</td>
<td>5.5</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>5MC.049</td>
<td>1Y</td>
<td>21</td>
<td>BF TF05</td>
<td>.035</td>
<td>8.6</td>
<td>10.48</td>
</tr>
</tbody>
</table>

* Material no. 21 (Hastelloy C22) not FDA and (EG) 1935/2004 conform

#### Information on operation

- Operation with compressed air purge 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.

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

#### Example of ordering

**Example of ordering with ATEX approval.**
FDA and (EG) 1935/2004 conform.

**Unit group / category / zones:**
- II 1G Ex h LLB T6... T3 Ga
- II 1D Ex h IIIC T85 °C...T150 °C Da

Example of ordering:

<table>
<thead>
<tr>
<th>Type</th>
<th>Material no.</th>
<th>Connection</th>
<th>Ordering no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5MC.042</td>
<td>1Y</td>
<td>BF</td>
<td>5MC.042.1Y.BF. EX</td>
</tr>
</tbody>
</table>

**Example of ordering with FDA and (EG) 1935/2004 conform.**

All Materials are suitable for contact with food.

Example of ordering:

<table>
<thead>
<tr>
<th>Type</th>
<th>Material no.</th>
<th>Connection</th>
<th>Ordering no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5MC.042</td>
<td>1Y</td>
<td>BF</td>
<td>5MC.042.1Y.BF.EX</td>
</tr>
</tbody>
</table>
Rotating cleaning nozzle “MiniSpinner”
Series 5MI

The innovative slot design gives the MiniSpinner its high degree of effectiveness. Due to the modern bearing construction, it is particularly reliable and durable. The MiniSpinner is made entirely from stainless steel and designed for use also at high temperatures. Apart from stainless steel, it is also available in Hastelloy® and in many flow rates.

**Materials**
- AISI 316L SS
- AISI 440C SS
- Hastelloy® C22
- Hastelloy® C276

**Max. temperature**
284°F / 140°C

**Recommended operating pressure**
30 psi

**Installation**
Operates in every direction

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

**Bearing**
Double ball bearing made of AISI 440C
Double ball bearing made of C276

---

**Overview of the tank diameter, depending upon the pressure of series 5MI**

<table>
<thead>
<tr>
<th>Pressure [psi]</th>
<th>Max. tank diameter [ft]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>15</td>
<td>5.0</td>
</tr>
<tr>
<td>30</td>
<td>5.5</td>
</tr>
<tr>
<td>45</td>
<td>6.0</td>
</tr>
<tr>
<td>60</td>
<td>6.5</td>
</tr>
<tr>
<td>75</td>
<td>7.0</td>
</tr>
</tbody>
</table>

To see video
Scan the QR-code or go to: www.lechlerusa.com
### Spray Angle

<table>
<thead>
<tr>
<th>Type</th>
<th>Material no.</th>
<th>Connection</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter [ft]</th>
</tr>
</thead>
<tbody>
<tr>
<td>60°</td>
<td>5MI. 162</td>
<td>BH</td>
<td>Free Passage (in.)</td>
<td>20 psi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TF07</td>
<td>.102</td>
<td>13.8</td>
</tr>
<tr>
<td>180°</td>
<td>5MI. 113</td>
<td>BL</td>
<td>TF07</td>
<td>.039</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TF07</td>
<td>.039</td>
<td>14.7</td>
</tr>
<tr>
<td>360°</td>
<td>5MI. 054</td>
<td>BL</td>
<td>TF07</td>
<td>.019</td>
</tr>
<tr>
<td></td>
<td>5MI. 074</td>
<td>BL</td>
<td>TF07</td>
<td>.023</td>
</tr>
<tr>
<td></td>
<td>5MI. 014</td>
<td>BL</td>
<td>TF07</td>
<td>.035</td>
</tr>
<tr>
<td></td>
<td>5MI. 209</td>
<td>BL</td>
<td>TF07</td>
<td>.059</td>
</tr>
</tbody>
</table>

* NPT, more slip-on sizes and weld-on versions on request
** Material no. 21 (Hastelloy C22) to FDA and (EG) 1935/2004 conform

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.

### Information on Operation

- Operation with compressed air purge 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.

### Information

- R-clip made of stainless steel AISI 316L is included (Ordering nos.: 095.013.1E.05.59, Hastelloy® C22 (Ordering nos.: 095.013.21.50.60).
- Depending on diameter of the adapter the flow rate can increase due to leakage between the connection and rotating cleaning nozzle.
Rotating cleaning nozzles “PTFE Whirly”
Series 573 / 583

Series 573 / 583

The PTFE Whirly is commonly used for applications in the chemical, pharmaceutical and food industries. It works with rotating solid jets and is suitable for use in corrosive environments. The slip-on connection meets 3A standards and is excellent for dairy applications.

Material
PTFE

Max. temperature
203°F / 95°C
(Versions for use with higher temperature on request)

Recommended operating pressure
30 psi

Installation
Operates in every direction

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

Bearing
Sleeve bearing made of PTFE

To see video
Scan the QR-code or go to: www.lechlerusa.com

Overview of the tank diameter, depending upon the pressure of series 573 / 583
### Spray angle

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection</th>
<th>Ordering no.</th>
<th>3/4&quot; Female NPT</th>
<th>1&quot; Female NPT</th>
<th>3/4&quot; Slip-on</th>
<th>1&quot; Slip-on</th>
<th>1 1/2&quot; Tri-Clamp</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>180°</td>
<td>3/4&quot;, BL -</td>
<td>583.114.55</td>
<td>0.083</td>
<td>15</td>
<td>15</td>
<td>0.129</td>
<td>15</td>
<td>2.91</td>
</tr>
<tr>
<td></td>
<td>1/2&quot;, BL -</td>
<td>583.344.55</td>
<td>0.279</td>
<td>15</td>
<td>15</td>
<td>0.279</td>
<td>15</td>
<td>3.94</td>
</tr>
<tr>
<td>180°</td>
<td>1&quot; SL -</td>
<td>573.114.55</td>
<td>0.083</td>
<td>15</td>
<td>15</td>
<td>0.129</td>
<td>15</td>
<td>2.91</td>
</tr>
<tr>
<td></td>
<td>1/2&quot;, BL -</td>
<td>573.344.55</td>
<td>0.279</td>
<td>15</td>
<td>15</td>
<td>0.279</td>
<td>15</td>
<td>3.94</td>
</tr>
<tr>
<td>270°</td>
<td>1/2&quot;, BL -</td>
<td>583.116.55</td>
<td>0.094</td>
<td>15</td>
<td>15</td>
<td>0.133</td>
<td>15</td>
<td>2.91</td>
</tr>
<tr>
<td></td>
<td>1/2&quot;, BN -</td>
<td>583.346.55</td>
<td>0.232</td>
<td>15</td>
<td>15</td>
<td>0.232</td>
<td>15</td>
<td>3.94</td>
</tr>
<tr>
<td>270°</td>
<td>1/2&quot;, BL -</td>
<td>583.116.55</td>
<td>0.094</td>
<td>15</td>
<td>15</td>
<td>0.133</td>
<td>15</td>
<td>2.91</td>
</tr>
<tr>
<td></td>
<td>1/2&quot;, BN -</td>
<td>583.346.55</td>
<td>0.232</td>
<td>15</td>
<td>15</td>
<td>0.232</td>
<td>15</td>
<td>3.94</td>
</tr>
<tr>
<td>360°</td>
<td>1/2&quot;, BL -</td>
<td>583.119.55</td>
<td>0.071</td>
<td>15</td>
<td>15</td>
<td>0.138</td>
<td>15</td>
<td>2.91</td>
</tr>
<tr>
<td></td>
<td>1/2&quot;, BN -</td>
<td>583.349.55</td>
<td>0.220</td>
<td>15</td>
<td>15</td>
<td>0.220</td>
<td>15</td>
<td>3.94</td>
</tr>
</tbody>
</table>

* Complies with and is authorized to use with 3-A® symbol.

### Information on operation

- Operation with compressed air purge 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 AISI 316 L is included (Ordering no.: R-clip 1: 095.022.1Y.50.88.E, R-clip 2: 095.022.1Y.50.60.E).
- Depending on diameter of the adapter the flow rate can increase due to leakage between the connection and rotating cleaning nozzle.

---

**Example of ordering:** Type, + Connection = Ordering no.

- 583.114.55, + BL = 583.114.55.BL

---

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 “PTFE Hi Temp Whirly”
Series 599

While PTFE can withstand high temperatures, its dimensional stability limits its range as a tank cleaning device. Lechler’s design incorporates Hastelloy rings to control the expansion of the material so it can continue to operate reliably in hotter environments than normally possible. The nozzle’s temperature range is actually extended, since it can perform equally well under normal conditions.

**Series 599**

- **Material**: PTFE
  - Rings: Alloy C-276
- **Max. temperature**: 274°F/ 134°C
- **Recommended operating pressure**: 30 psi
- **Installation**: Operates in every direction
- **Filtration**: Line strainer with a mesh size of 50 Mesh
- **Bearing**: Slide bearing

To see video
Scan the QR-code or go to: www.lechlerusa.com

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>10</th>
<th>20</th>
</tr>
</thead>
</table>

**Overview of the tank diameter, depending upon the pressure of series 599**
Information on operation

- We do not recommend operation of these products with compressed air or gases. However, these products have been shown to be suitable for spraying on low pressure steam (refer to Applications above). To protect the products’ inner workings when spraying liquid, we suggest use of a line strainer with a 50 mesh size. For further information, please contact Lechler.

Slip-on information

- R-clip made of Alloy C-276 is included (Ordering no.: R-clip 1: 095.022.1Y.50.60.E).
- The nozzles with a slip-on connection type fitting may have a higher flow rate than listed due to the self-flushing design around the customer’s tube which is inserted into the nozzle socket.
When a certain fluid pressure is reached, the rotating of the PopUp Whirly is automatically extended from the enclosure. These free-spinning rotating nozzles can be installed flush in the tank wall. They are also suitable for cleaning pipes and for applications that use foam. They are of particular interest for applications in the food and beverage industry as well as for the pharmaceutical and chemical industry.

### Materials
- 316L SS
- 316Ti SS (spring)
- 316 SS (snap ring)
- PEEK (slide-bearing)
- FKM (O-ring)

### Max. temperature
- 284°F / 140°C

### Recommended operating pressure
- 30 psi, 5P2: opening pressure approx. 14.5 psi; closing pressure approx. 7 psi
- 5P3: opening pressure approx. 13 psi, closing pressure approx. 7 psi

### Installation
- Operates in every direction

### Filtration
- Line strainer with a mesh size of 0.3 mm/50 Mesh

### Bearing
- Sleeve bearing made of PEEK

Overview of the tank diameter, depending upon the pressure of series 5P2/5P3
Series 5P2

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.

Information on operation
- The PopUp Whirly is not suitable for operation with compressed air or any other gas.
- Operation above the recommended operating pressure means higher wear and smaller droplets. This might have adverse effects on the cleaning result.

Nozzle installation
With thread in idle position

With Tri-Clamp in operating position

Information on nozzle installation

Weld-in flange for Tri-Clamp-Version

Ordering number
050.020.1Y.01.00
Material
316L SS

Information
Gasket with a thickness of .08 in must be used if the nozzle is installed with this weld-in flange.
Pop-up rotating cleaning nozzles “PopUp Whirly”
Series 5P2 / 5P3

Information on operation

- The PopUp Whirly is not suitable for operation with compressed air or any other gas.
- Operation above the recommended operating pressure means higher wear and smaller droplets. This might have adverse effects on the cleaning result.

Nozzle installation

With thread in idle position

With Tri-Clamp in operating position

Information on operation

- The PopUp Whirly is not suitable for operation with compressed air or any other gas.
- Operation above the recommended operating pressure means higher wear and smaller droplets. This might have adverse effects on the cleaning result.

Weld-in flange for Tri-Clamp-Version

Ordering number
050.020.1Y.O1.01
Material
316L SS

Information
Gasket with a thickness of .08 in must be used if the nozzle is installed with this weld-in flange.
Cleaning efficiency class 3

Due to their special nozzle geometry and flow rates from 3 to 303 gpm at 30 psi, the rotating nozzles in efficiency class 3 are suitable for cleaning medium soiling from tanks and equipment. Such soiling is especially found in the food and beverage industry, but also in the chemical and pharmaceutical industry. The free-spinning rotating nozzles in Class 3 are made from especially high-grade materials, are available in tank sizes from small to large.

The HygienicWhirly is perfectly suited for hygienically sensitive areas and can also be used for the output of foam.

The Stainless Steel Whirly series is also available as an ATEX version and can therefore also be used in explosive environments.
Rotating cleaning nozzles “HygienicWhirly”
Series 594 / 595

Series 594 / 595
The HygienicWhirly is designed for spraying foam and its highly effective flat jets still provide excellent cleaning effects.

Materials
AISI 316L SS, PEEK

Max. temperature
212°F/ 100°C, short-term up to 284°F/ 140°C

Recommended operating pressure
40 psi

Installation
Operates in every direction

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

Bearing
Sleeve bearing made of PEEK

Overview of the tank diameter, depending upon the pressure of series 594 / 595
### Spray Nozzles

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Free Passage (in.)</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter [in.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>360°</td>
<td>594. 829. 1Y</td>
<td>AF</td>
<td>.067</td>
<td>1.4 2.1 11 3.0 3.4</td>
</tr>
<tr>
<td></td>
<td>594. 879. 1Y</td>
<td>AF</td>
<td>.098</td>
<td>1.9 2.9 15 4.0 4.7</td>
</tr>
<tr>
<td></td>
<td>595. 009. 1Y</td>
<td>AF</td>
<td>.157</td>
<td>4.2 6.1 32 8.6 9.8</td>
</tr>
<tr>
<td></td>
<td>595. 049. 1Y</td>
<td>AF</td>
<td>.165</td>
<td>5.2 7.6 40 10.7 12.4</td>
</tr>
<tr>
<td></td>
<td>595. 139. 1Y</td>
<td>- AL</td>
<td>.197</td>
<td>8.7 12.7 67 18.0 20.8</td>
</tr>
</tbody>
</table>

- Operation with compressed air purge 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 AISI 316L is included (Ordering no.: 095.022.1Y.50.94.E).
- Depending on diameter of the adapter the flow rate can increase due to leakage between the connection and rotating cleaning nozzle.
Rotating cleaning nozzle “Whirly”
Series 569

The design of the stainless steel Whirly has been proven over time. The flat jet nozzles provide effective cleaning. Available in a wide range of connection sizes and flow rates. Also available in ATEX approved version.

Materials
Stainless steel
AISI 316L, PEEK, Rulon 641

Max. temperature
284°F/ 140°C
194°F/ 90°C ATEX version

Recommended operating pressure
30 psi

Installation
Operates in every direction. Requires at least 30 psi or more for operation with horizontal installation. ATEX version operates in vertical position only.

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

Bearing
Double ball bearing made of stainless steel

To see video
Scan the QR-code or go to: www.lechlerusa.com

Overview of the tank diameter, depending upon the pressure of series 569
### Spray nozzle properties

<table>
<thead>
<tr>
<th>Spray Angle</th>
<th>Ordering no.</th>
<th>Type</th>
<th>Connection</th>
<th>Free Passage (in.)</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>270°</td>
<td>569.055.1Y</td>
<td>BL</td>
<td>TF07</td>
<td>TF10</td>
<td>TF15</td>
<td>10</td>
</tr>
<tr>
<td>270°</td>
<td>569.135.1Y</td>
<td>BL</td>
<td>TF07</td>
<td>TF10</td>
<td>TF15</td>
<td>10</td>
</tr>
<tr>
<td>270°</td>
<td>569.056.1Y</td>
<td>BL</td>
<td>TF07</td>
<td>TF10</td>
<td>TF15</td>
<td>10</td>
</tr>
<tr>
<td>360°</td>
<td>569.059.1Y</td>
<td>BL</td>
<td>TF07</td>
<td>TF10</td>
<td>TF15</td>
<td>10</td>
</tr>
<tr>
<td>360°</td>
<td>569.139.1Y</td>
<td>BL</td>
<td>TF07</td>
<td>TF10</td>
<td>TF15</td>
<td>10</td>
</tr>
</tbody>
</table>

### Information on operation

- Operation with compressed air purge 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 AISI 316L 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 the connection and rotating cleaning nozzle.

### Example of ordering with ATEX approval, FDA and (EG) 1935/2004 conform.

**Unit group / category / zones:**
- II 1 G Ex h LLB T6... T3 G a
- II 1 D Ex h IIIC T85 °C...T150 °C Da

Example of Ordering: 569.055.1Y,XX,EX + BL = 569.055.1Y,BL,EX

### Example of ordering with FDA and (EG) 1935/2004 conform.

All Materials are suitable for contact with food.

Example of Ordering: 569.103.1Y,XX,EX + BL = 569.103.1Y,BL,EX
**Rotating cleaning nozzles “Gyro”**

**Series 577**

The Gyro cleans with powerful nozzle inserts and is the largest capacity free spinning design. The Gyro is capable of cleaning very large tanks and is clog-resistant.

### Overview of the tank diameter, depending upon the pressure of series 577

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
</tr>
</thead>
</table>

**Materials**

316 SS, PTFE

**Max. temperature**

194°F/ 90°C

**Recommended operating pressure**

40 psi

**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 and complete instructions.

To see video

Scan the QR-code or go to: www.lechlerusa.com

FDA compliant
### Spray angle

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection</th>
<th>Ordering no.</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Dimensions</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1&quot; NPT</td>
<td>2&quot; NPT</td>
<td>20 psi</td>
</tr>
<tr>
<td>180°</td>
<td>577. 283. 1Y</td>
<td>BN</td>
<td>-</td>
<td>36</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>577. 363. 1Y</td>
<td>BN</td>
<td>-</td>
<td>57</td>
<td>258</td>
</tr>
<tr>
<td></td>
<td>577. 403. 1Y</td>
<td>-</td>
<td>BW</td>
<td>71</td>
<td>322</td>
</tr>
<tr>
<td></td>
<td>577. 433. 1Y</td>
<td>-</td>
<td>BW</td>
<td>85</td>
<td>386</td>
</tr>
<tr>
<td></td>
<td>577. 523. 1Y</td>
<td>-</td>
<td>BW</td>
<td>145</td>
<td>538</td>
</tr>
<tr>
<td>180°</td>
<td>577. 284. 1Y</td>
<td>BN</td>
<td>-</td>
<td>36</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>577. 364. 1Y</td>
<td>BN</td>
<td>-</td>
<td>57</td>
<td>258</td>
</tr>
<tr>
<td></td>
<td>577. 404. 1Y</td>
<td>-</td>
<td>BW</td>
<td>71</td>
<td>322</td>
</tr>
<tr>
<td></td>
<td>577. 434. 1Y</td>
<td>-</td>
<td>BW</td>
<td>85</td>
<td>386</td>
</tr>
<tr>
<td></td>
<td>577. 494. 1Y</td>
<td>-</td>
<td>BW</td>
<td>145</td>
<td>538</td>
</tr>
<tr>
<td>270°</td>
<td>577. 285. 1Y</td>
<td>BN</td>
<td>-</td>
<td>36</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>577. 365. 1Y</td>
<td>BN</td>
<td>-</td>
<td>57</td>
<td>258</td>
</tr>
<tr>
<td></td>
<td>577. 405. 1Y</td>
<td>-</td>
<td>BW</td>
<td>71</td>
<td>322</td>
</tr>
<tr>
<td></td>
<td>577. 435. 1Y</td>
<td>-</td>
<td>BW</td>
<td>85</td>
<td>386</td>
</tr>
<tr>
<td></td>
<td>577. 495. 1Y</td>
<td>-</td>
<td>BW</td>
<td>145</td>
<td>538</td>
</tr>
<tr>
<td>360°</td>
<td>577. 289. 1Y</td>
<td>BN</td>
<td>-</td>
<td>36</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>577. 369. 1Y</td>
<td>BN</td>
<td>-</td>
<td>57</td>
<td>258</td>
</tr>
<tr>
<td></td>
<td>577. 409. 1Y</td>
<td>-</td>
<td>BW</td>
<td>71</td>
<td>322</td>
</tr>
<tr>
<td></td>
<td>577. 439. 1Y</td>
<td>-</td>
<td>BW</td>
<td>85</td>
<td>386</td>
</tr>
<tr>
<td></td>
<td>577. 499. 1Y</td>
<td>-</td>
<td>BW</td>
<td>145</td>
<td>538</td>
</tr>
</tbody>
</table>

#### Information on operation

- Operation with compressed air purge 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.

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.

Example Type + Connection = Ordering no.

for Ordering: 577. 283. 1Y. + BN = 577. 283. 1Y. BN
Cleaning efficiency class 4

The Lechler products in this class use controlled rotation. They are suitable for contact with food, the cleaning of large tanks and for use in combination with the Lechler rotation monitoring sensor. The cleaning nozzles of Class 4 are available in many different sizes and flow rates.

The flat spray nozzle design of the rotating cleaners in class 4 ensure the removal of heavy soiling at temperatures of up to 284°F / 140°C.
Rotating cleaning nozzle “XactClean® HP”
Series 5S2 / 5S3

Series 5S2 / 5S3
Specially developed flat fan nozzles provide high impact and uniform cleaning for the XactClean® HP. The controlled rotation ensures that the XactClean® HP works extremely efficient. Thanks to the robust drive unit the XactClean® HP is very reliable and ensures increased operation liability. It is available in various spray angles and flow rates and is also compatible with the Lechler rotating monitoring sensor.

Materials
316L SS, 316 SS, 632 SS, PEEK, PEEK ESD (ATEX version only), PTFE, Zirconium oxide, EPDM

Max. temperature
203°F / 95°C

Recommended operating pressure
75 psi

Installation
Operates in every direction

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

Bearing
Double ball bearing

Rotation monitoring sensor
Sensor compatible, Info: see page 64

Overview of the tank diameter, depending upon the pressure of series 5S2 / 5S3

To see video
Scan the QR-code or go to: www.LechlerUSA.com
Nozzle dimensions [in]

<table>
<thead>
<tr>
<th>Connection</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>BF</td>
<td>6.83</td>
</tr>
<tr>
<td>BH</td>
<td>5.87</td>
</tr>
<tr>
<td>BL</td>
<td>5.47</td>
</tr>
<tr>
<td>BN</td>
<td>5.47</td>
</tr>
<tr>
<td>TF05 (T5)</td>
<td>5.91</td>
</tr>
<tr>
<td>TF07 (T7)</td>
<td>6.46</td>
</tr>
</tbody>
</table>

Spray angle

270°

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering no.</th>
<th>Free Passage (in.)</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female NPT</td>
<td>BF</td>
<td>.08 25 6.6 7.8</td>
<td>10.6 15.1 11.5</td>
<td>13</td>
</tr>
<tr>
<td>Female NPT</td>
<td>BH</td>
<td>.08 41 10.8 12.8</td>
<td>17.2 24.3 13</td>
<td>23</td>
</tr>
<tr>
<td>Female NPT</td>
<td>BL</td>
<td>.08 60 15.9 18.4</td>
<td>24.8 35.1 20</td>
<td>23</td>
</tr>
<tr>
<td>Female NPT</td>
<td>TF05 (T5)</td>
<td>.08 89 23.5 27.7</td>
<td>37.3 52.6 23</td>
<td>23</td>
</tr>
<tr>
<td>Female NPT</td>
<td>TF07 (T7)</td>
<td>.08 111 29.3 34.3</td>
<td>46.2 65.5 25</td>
<td>25</td>
</tr>
<tr>
<td>Female NPT</td>
<td>TF05 (T5)</td>
<td>.08 135 35.7 41.8</td>
<td>56.3 79.5 26</td>
<td>26</td>
</tr>
</tbody>
</table>

360°

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering no.</th>
<th>Free Passage (in.)</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max. tank diameter (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female NPT</td>
<td>BF</td>
<td>.07 25 6.6 7.8</td>
<td>10.6 15.1 11.5</td>
<td>13</td>
</tr>
<tr>
<td>Female NPT</td>
<td>BH</td>
<td>.08 41 10.8 12.8</td>
<td>17.2 24.3 13</td>
<td>23</td>
</tr>
<tr>
<td>Female NPT</td>
<td>BL</td>
<td>.08 60 15.9 18.4</td>
<td>24.8 35.1 20</td>
<td>23</td>
</tr>
<tr>
<td>Female NPT</td>
<td>TF05 (T5)</td>
<td>.08 89 23.5 27.7</td>
<td>37.3 52.6 23</td>
<td>23</td>
</tr>
<tr>
<td>Female NPT</td>
<td>TF07 (T7)</td>
<td>.08 111 29.3 34.3</td>
<td>46.2 65.5 25</td>
<td>25</td>
</tr>
<tr>
<td>Female NPT</td>
<td>TF05 (T5)</td>
<td>.08 135 35.7 41.8</td>
<td>56.3 79.5 26</td>
<td>26</td>
</tr>
</tbody>
</table>

Example of ordering with ATEX approval.

Unit group / category / zones:

\[
\text{Ex II 1G Ex h LLB T6...T3 Ga IIC T85 °C...T150 °C Da}
\]

Attention: For the ATEX version of the slip-on-connection, the code for the connection changes.

\[\frac{1}{2}'' \text{ slip-on: T5} \quad \frac{3}{4}'' \text{ slip-on: T7} \]

Example of ordering slip-on connection:

5S2.955.1Y.T5.EX

Example of ordering with FDA and (EG) 1935/2004 conform.

All Materials are suitable for contact with food.

Example of ordering with FDA compliant:

5S2.955.1Y.XX + BF = 5S2.955.1Y.BF

Information on operation:

- 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 AISI 316L is included

Ordering no.: 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.
Rotating cleaning nozzle “XactClean® HP+”
Series 5S5

The XactClean® HP+ provides uniform cleaning and high impact, thanks to specially developed flat fan nozzles. Controlled rotation, along with higher flow rates, ensures effective results, especially in larger tanks. The robust drive unit makes the XactClean® HP+ extremely dependable and increases operational reliability. This nozzle is compatible with the Lechler rotation monitoring sensor, making it easy to oversee the cleaning process.

Overview of the tank diameter, depending upon the pressure of series 5S5

### Material
- 316L SS, 316 SS, PEEK, EPDM

### Max. temperature
- 203°F/95 °C

### Recommended operating pressure
- 45 psi

### 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.

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure [psi]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spray angle</td>
<td>Ordering no.</td>
<td>Connection</td>
<td>Max. Height [H]</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>180°</td>
<td>5S5.293.1Y</td>
<td>BN - -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.323.1Y</td>
<td>BN BQ -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.365.1Y</td>
<td>- BQ BS</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td>180°</td>
<td>5S5.294.1Y</td>
<td>BN - -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.324.1Y</td>
<td>BN BQ -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.364.1Y</td>
<td>- BQ BS</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td>270°</td>
<td>5S5.295.1Y</td>
<td>BN - -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.325.1Y</td>
<td>BN BQ -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.365.1Y</td>
<td>- BQ BS</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td>270°</td>
<td>5S5.296.1Y</td>
<td>BN - -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.326.1Y</td>
<td>BN BQ -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.366.1Y</td>
<td>- BQ BS</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td>360°</td>
<td>5S5.299.1Y</td>
<td>BN - -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.329.1Y</td>
<td>BN BQ -</td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.369.1Y</td>
<td>- BQ BS</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5S5.399.1Y</td>
<td>- BQ BS</td>
<td>7.36</td>
<td></td>
</tr>
</tbody>
</table>

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.

### Information on operation
- 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 no.: D65.013.1Y.06.45.0).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

Example Type + Connection = Ordering no.
of ordering: 5S5.293.1Y. + BN = 5S5.293.1Y.BN
Cleaning processes can be easily and reliably monitored with the Lechler rotation monitoring sensor. The sensor records the presence of liquid flowing over the sensor tip. With the aid of the supplied software, the sensor function can be specifically adjusted to the tank size, pressure and nozzle.

**Electrical data**
- Supply voltage: \( U_b = 18 \) to 32 VDC
- Power requirements: < 20 mA
- Output signal: PNP, 50 mA short circuit protected, active

**Operating conditions**
- Ambient external temperature: -14° up to +140°F
- Process internal temperature: 32° up to +212°F

**Materials**
- Socket (G 1/2"): AISI 316L
- Probe tip: PEEK
- Body: AISI 303

**Advantages**
- Reliable recognition of any faults during the cleaning cycle
- The process connection of the sensor is in compliance with the hygiene guidelines of the EHEDG
- Simple operation
- Can be connected to PLC
- Only needs to be set up once using the software provided
- Can be specifically adapted to each cleaning task

For use with series: 5S2, 5S3, 5TA, 5TB, 5TM, 5S3 & 5S5

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Ordering no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotation monitoring sensor with weld-in sleeve</td>
<td>050.040.00.00.00.0</td>
</tr>
<tr>
<td>Cable set for first-time operation</td>
<td>050.040.00.00.01.0</td>
</tr>
</tbody>
</table>
Cleaning efficiency class 5

Heavy soiling requires special measures. That’s why the Lechler high impact tank cleaning nozzles in Class 5 are equipped with high-grade gear units and work with deliberately controlled rotation. These nozzles have proven their capabilities precisely in the food and beverage industry, the chemical and petrochemical industry and the paper industry.

Solid jet nozzles ensure total cleaning efficiency with maximum impact. Class 5 includes rotating cleaners that are suitable for medium to very large tanks. Process reliability is increased through combination with the Lechler rotation monitoring sensor.

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>20</th>
<th>40</th>
<th>60</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating principles</td>
<td>Gear-controlled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow rates at 30 psi</td>
<td>7 to 69 gpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended operating pressures</td>
<td>75 psi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Max. temperatures       | 140 to 203°F  
60 to 95°C |
**High impact tank cleaning machine**

**Series 5TA**

The hygienic design and high quality of the 5TA are well suited for the pharmaceutical, food and beverage industries. It is extremely effective thanks to the particularly powerful solid jet nozzles and is also suitable for small tanks with difficult soils. The series can resist pressures of up to 217 psi and high temperatures without any problem.

### Materials

AISI 316L SS, AISI 632, PTFE, PEEK, Zirconium oxide, EPDM, 32 RA surface finish is included with every material.

### Max. temperature

203°F / 95°C

### Recommended operating pressure

75 psi

### Installation

Operates in every direction

### Filtration

Line strainer with a mesh size of 0.2 mm/80 Mesh

### Bearing

Ball bearing

### Weight

2 lbs

### Rotation monitoring sensor

Sensor compatible

Info: see page 72

To see video

Scan the QR-code or go to:

[www.lechlerusa.com](http://www.lechlerusa.com)

---

**Overview of the tank diameter, depending upon the pressure of series 5TA**

**Max. Tank diameter [ft]**

<table>
<thead>
<tr>
<th>Max. Tank diameter [ft]</th>
<th>0</th>
<th>15</th>
<th>30</th>
<th>45</th>
<th>60</th>
</tr>
</thead>
</table>

---

**Overview of tank diameter, depending upon pressure of series 5TA**

**Series 5TA**

- **Filtration**: Line strainer with a mesh size of 0.2 mm/80 Mesh
- **Bearing**: Ball bearing
- **Weight**: 2 lbs
- **Rotation monitoring sensor**: Sensor compatible
- **Materials**: AISI 316L SS, AISI 632, PTFE, PEEK, Zirconium oxide, EPDM, 32 RA surface finish included with every material
- **Max. temperature**: 203°F / 95°C
- **Recommended operating pressure**: 75 psi
- **Installation**: Operates in every direction
- **FDA compliant**
Spray angle | Ordering no. | Free Passage (in.) | Number, Ø Nozzles (mm) | Flow Rate (Gallons Per Minute) | Max. tank diameter (ft)
---|---|---|---|---|---
360° | 5TA. 403.1Y.BL | .059 | 4 x 3.0 | 24 | 39
| 5TA. 404.1Y.BL | .059 | 4 x 4.0 | 35 | 41
| 5TA. 405.1Y.BL | .059 | 4 x 5.0 | 50 | 43

Slip-on connection available 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.

Example of ordering with ATEX approval. FDA and (EG) 1935/2004 conform.

Unit group / category / zones:
- II 1G Ex h LLB T6... T3 Ga
- II 1D Ex h III C T85 °C...T150 °C Da

Example Type/Ordering no. of ordering: 5TA.403.1Y.BL.EX

Example of ordering with FDA and (EG) 1935/2004 conform.
All Materials are suitable for contact with food.

Example Type/Ordering no. of ordering: 5TA.403.1Y.BL

Cycle time depending on pressure of series STA
High impact tank cleaning machine
Series 5TB

Series 5TB
The 5TB has firmly established itself, above all in the pharmaceutical, food and beverage industries because of its hygienic design and high quality. The especially strong solid jets produce an extremely high degree of effectiveness, while the gear-controlled rotation ensures high levels of efficiency. This series is suitable for high pressures and temperatures.

Materials
AISI 316L SS, AISI 632, PTFE, PEEK, Zirconium oxide, EPDM, 32 RA surface finish is included with every material

Max. temperature
203°F/ 95°C

Recommended operating pressure
75 psi

Installation
Operates in every direction

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

Bearing
Ball bearing

Weight
8.8 lbs

Rotation monitoring sensor
Sensor compatible
Info: see page 72

Overview of the tank diameter, depending upon the pressure of series 5TB
<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Free Passage (in.)</th>
<th>Number, Ø Nozzles [mm]</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Max pressure [psi]</th>
<th>Max. tank diameter [ft]</th>
</tr>
</thead>
<tbody>
<tr>
<td>360°</td>
<td>5TB. 406. 1Y. BS</td>
<td>.236 4 x 6.0</td>
<td>107 29 33 45 63</td>
<td>145 psi</td>
<td>362</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>5TB. 407. 1Y. BS</td>
<td>.236 4 x 7.0</td>
<td>132 35 41 56 78</td>
<td>145 psi</td>
<td>362</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>5TB. 408. 1Y. BS</td>
<td>.236 4 x 8.0</td>
<td>150 40 47 64 89</td>
<td>145 psi</td>
<td>362</td>
<td>49</td>
</tr>
</tbody>
</table>

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.

Example of ordering with ATEX approval. FDA and (EG) 1935/2004 conform.

Unit group / category / zones:

- II 1G Ex h LLB T6... T3 Ga
- II 1D Ex h IIIC T85 °C...T150 °C Da

Example: Type/Ordering no. of ordering: 5TA.406.1Y.BS.EX

Example of ordering with FDA and (EG) 1935/2004 conform. All Materials are suitable for contact with food.

Example: Type/Ordering no. of ordering: 5TB.406.1Y.BL

Cycle time depending on pressure of series STB.
High impact tank cleaning machine
Series 5TM

Series 5TM

The 5TM is used for large tank cleaning applications. It is noted for its robust and proven construction, effective solid jets and gear-controlled rotation. This unit operates on low pressures while still providing excellent cleaning.

* Note: The previous M20/M29 series has been replaced with the 5TM series. 5TM components are compatible with all existing M20/M29 tank cleaning machines.

To see video
Scan the QR-code or go to: www.lechlerusa.com

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>15</th>
<th>30</th>
<th>45</th>
<th>60</th>
</tr>
</thead>
</table>

Materials
316L, 304 SS, 302 SS, PTFE, PEEK

Max. temperature
5TM: 203°F/ 95°C

Recommended operating pressure
75 psi

Installation
Operates in every direction

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

Bearing
Ball bearing

Weight
16.5 lbs

Rotation monitoring sensor
Sensor compatible Info: see page 72

Pressure [psi]

Tank diameter [ft]

Overview of the tank diameter, depending upon the pressure of series 5TM

A special mounting attachment allows the 5TM version to double the spray volume to the end bulkheads of long, horizontal tanks or tankers. That part number is 099.164.17.00.

If you have multiple large tanks to clean, Lechler offers a portable cart for easier transporting and operation of your 5TM from tank to tank. The cart part number is M20.000.17.BR.

For use with “BR” connection only
<table>
<thead>
<tr>
<th>Ordering no.</th>
<th>Connection</th>
<th>Free Passage (in.)</th>
<th>No. of Nozzles x Diameter</th>
<th>Operating Pressure (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>1 1/2&quot; Male NPT</td>
<td>1 1/2&quot; Female NPT</td>
<td>1 1/2&quot; CL150 Flange</td>
<td>40 psi</td>
</tr>
<tr>
<td>5TM. 208.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.314</td>
</tr>
<tr>
<td>5TM. 209.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.354</td>
</tr>
<tr>
<td>5TM. 210.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.394</td>
</tr>
<tr>
<td>5TM. 211.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.433</td>
</tr>
<tr>
<td>5TM. 406.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.236</td>
</tr>
<tr>
<td>5TM. 407.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.276</td>
</tr>
<tr>
<td>5TM. 408.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.315</td>
</tr>
<tr>
<td>5TM. 409.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.354</td>
</tr>
<tr>
<td>5TM. 410.1Y</td>
<td>BR</td>
<td>BS</td>
<td>015</td>
<td>.394</td>
</tr>
</tbody>
</table>

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.
Cleaning processes can be easily and reliably monitored with the Lechler rotation monitoring sensor. The sensor records the presence of liquid flowing over the sensor tip. With the aid of the supplied software, the sensor function can be specifically adjusted to the tank size, pressure and nozzle.

**Electrical data**
- Supply voltage: \( U_b = 18 \text{ to } 32 \text{ VDC} \)
- Power requirements: < 20 mA
- Output signal: PNP, 50 mA short circuit protected, active

**Operating conditions**
- Ambient internal temperature: \(-14^\circ \text{ up to } +140^\circ \text{F}\)
- Process external temperature: \(32^\circ \text{ up to } +212^\circ \text{F}\)

**Materials**
- Socket (G 1/2"): AISI 316L
- Probe tip: PEEK
- Body: AISI 303

**Advantages**
- Reliable recognition of any faults during the cleaning cycle
- The process connection of the sensor is in compliance with the hygiene guidelines of the EHEDG
- Simple operation
- Can be connected to PLC
- Only needs to be set up once using the software provided
- Can be specifically adapted to each cleaning task

For use with series: 5S2, 5S3, 5TA, 5TB, 5TM, 5S3 & 5S5

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Ordering no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotation monitoring sensor with weld-in sleeve</td>
<td>050.040.00.00.00.0</td>
</tr>
<tr>
<td>Cable set for first-time operation</td>
<td>050.040.00.00.01.0</td>
</tr>
</tbody>
</table>
FOR SPECIAL REQUIREMENTS: OUR STATIC CLEANING NOZZLES

Static cleaning nozzles

The range of applications for the static cleaning nozzles provide support for rotating cleaners focusing on particularly difficult tasks, such as equipment cleaning and the avoidance of spray shadows. These types of static nozzles reach hard to access places while removing persistent soiling — which rotating cleaners or spray balls cannot.
Special cleaning nozzles Flushing Nozzle Assembly
Series 597

Series 597
The flushing nozzle assembly was designed especially for the brewing industry for cleaning the plate screen in lauter tun tanks. A full cone nozzle inserted at the bottom delivers excellent spray coverage and the flat fan jets provide powerful impact for cleaning.

Materials
304 SS, PTFE

Max. temperature
194°F / 90°C

Recommended operating pressure
45 psi

Installation
Vertically facing upward

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

Uses full cone nozzle series 490.568.1Y.BA

Information on operation
- Operation with compressed air purge 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.

<table>
<thead>
<tr>
<th>Ordering no.</th>
<th>Flow Rate (Gallons Per Minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Connection</td>
</tr>
<tr>
<td>3/4&quot; NPT</td>
<td>22</td>
</tr>
<tr>
<td>1/8&quot; NPT</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection</th>
<th>20 psi</th>
<th>30 psi</th>
<th>45 psi</th>
<th>60 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>597.085.1C</td>
<td>BK</td>
<td>22</td>
<td>6</td>
<td>7.2</td>
<td>8.5</td>
</tr>
</tbody>
</table>
**PopUp Clean**

**Series 5P5**

The series PopUp Clean is used for cleaning agitators or other spray shadow areas. The tank cleaning nozzle made of high-quality materials convinces with its compact and robust design and can be installed flush with the wall.

### Material
- 316L SS, 316Ti SS (spring), 316 SS (snap ring), FKM (O-ring)

### Max. temperature
- 203°F/95 °C

### Recommended operating pressure
- 30-75 psi

### Installation
- Operation in every direction is possible

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

<table>
<thead>
<tr>
<th>Max. tank diameter [ft]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spray angle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordering no.</td>
<td>Free Passage (in.)</td>
<td>Flow Rate (Gallons Per Minute)</td>
<td>Max. tank diameter [ft]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 psi</td>
<td>2 bar</td>
<td>30 psi</td>
<td>40 psi</td>
<td>60 psi</td>
</tr>
<tr>
<td>30°</td>
<td>5P5.081.1Y.00.00.0</td>
<td>.03</td>
<td>11</td>
<td>50</td>
<td>13</td>
<td>16</td>
</tr>
</tbody>
</table>

E = Narrowest free cross-section

### Information on operation
- The PopUp Clean is not suitable for operation with compressed air or any other gas.

### Ordering no.
- 050.020.1Y.01.00

### Material
- 316L SS

### Information
- Gasket with a thickness of .08in must be used if the PopUp Clean is installed with this weld-in flange
Axial-flow full cone nozzles
Series 490 / 491

Clog-resistant design. Stable spray angle. Particularly even liquid distribution.

<table>
<thead>
<tr>
<th>Code</th>
<th>Dimensions (in.)</th>
<th>Weight Brass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G</td>
<td>L₁</td>
</tr>
<tr>
<td>BC</td>
<td>0.87</td>
<td>0.39</td>
</tr>
<tr>
<td>BE</td>
<td>0.98</td>
<td>0.39</td>
</tr>
<tr>
<td>BE</td>
<td>1.18</td>
<td>0.39</td>
</tr>
<tr>
<td>BG</td>
<td>1.28</td>
<td>0.51</td>
</tr>
<tr>
<td>BG</td>
<td>1.71</td>
<td>0.51</td>
</tr>
<tr>
<td>BK</td>
<td>1.65</td>
<td>0.59</td>
</tr>
<tr>
<td>BK</td>
<td>1.97</td>
<td>0.59</td>
</tr>
<tr>
<td>BM</td>
<td>2.20</td>
<td>0.67</td>
</tr>
</tbody>
</table>

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

Spray angle

<table>
<thead>
<tr>
<th>Type</th>
<th>Mat.no.</th>
<th>1Y</th>
<th>30</th>
<th>Connection</th>
<th>Male NPT</th>
<th>Free Passage</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Spray diameter D</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(in.)</td>
<td>(Gpm)</td>
<td>at 30 psi</td>
</tr>
<tr>
<td>490</td>
<td>644</td>
<td></td>
<td></td>
<td>BC</td>
<td>BE</td>
<td>.091</td>
<td>.69</td>
<td>.91</td>
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<tr>
<td>490</td>
<td>684</td>
<td></td>
<td></td>
<td>BC</td>
<td>BE</td>
<td>.102</td>
<td>.86</td>
<td>1.14</td>
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<tr>
<td>490</td>
<td>724</td>
<td></td>
<td></td>
<td>BC</td>
<td>BE</td>
<td>.112</td>
<td>1.09</td>
<td>1.43</td>
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<tr>
<td>490</td>
<td>764</td>
<td></td>
<td></td>
<td>BE</td>
<td>BE</td>
<td>.128</td>
<td>.83</td>
<td>.83</td>
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<tr>
<td>490</td>
<td>804</td>
<td></td>
<td></td>
<td>BE</td>
<td>BE</td>
<td>.146</td>
<td>.72</td>
<td>2.28</td>
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<tr>
<td>490</td>
<td>844</td>
<td></td>
<td></td>
<td>BG</td>
<td>BE</td>
<td>.159</td>
<td>.16</td>
<td>2.86</td>
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<td>490</td>
<td>884</td>
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<td></td>
<td>BG</td>
<td>BE</td>
<td>.183</td>
<td>.26</td>
<td>3.67</td>
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<tr>
<td>490</td>
<td>924</td>
<td></td>
<td></td>
<td>BK</td>
<td>BE</td>
<td>.205</td>
<td>.34</td>
<td>4.56</td>
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<tr>
<td>490</td>
<td>964</td>
<td></td>
<td></td>
<td>BK</td>
<td>BE</td>
<td>.228</td>
<td>.43</td>
<td>5.69</td>
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<tr>
<td>491</td>
<td>044</td>
<td></td>
<td></td>
<td>BM</td>
<td>BM</td>
<td>.285</td>
<td>.69</td>
<td>9.11</td>
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<tr>
<td>491</td>
<td>084</td>
<td></td>
<td></td>
<td>BM</td>
<td>BM</td>
<td>.321</td>
<td>8.63</td>
<td>11.38</td>
</tr>
</tbody>
</table>

2 psi 4 psi 6 psi 8 psi 10 psi 12 psi 14 psi 16 psi 18 psi 20 psi

60°
### Deflector-plate nozzle

**Series 524 / 525**

Full cone spray has no swirl insert for greater clog resistance.

![Full cone spray](image)

---

#### Spray Angle

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>Orifice diam.</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Spray Diameter D (ft) @ 45 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>180°</td>
<td>524. 809</td>
<td>17 30</td>
<td>.158</td>
<td>1.6 7.10 10 3.1 3.8 4.4 4.9 6.0</td>
<td>18 21</td>
</tr>
<tr>
<td></td>
<td>525. 049</td>
<td></td>
<td>.315</td>
<td>6.2 8.8 40 12.4 15.2 17.6 19.6 24</td>
<td>33 43</td>
</tr>
<tr>
<td></td>
<td>525. 109</td>
<td></td>
<td>.366</td>
<td>8.8 12.5 57 17.7 22 25 28 34</td>
<td>33 44</td>
</tr>
<tr>
<td></td>
<td>525. 169</td>
<td></td>
<td>.429</td>
<td>12.6 17.8 81 25 31 36 40 49 49 55 67</td>
<td>35 44</td>
</tr>
<tr>
<td></td>
<td>525. 229</td>
<td></td>
<td>.481</td>
<td>17.4 25 112 35 43 49 55 67 67 82 84</td>
<td>22 34</td>
</tr>
<tr>
<td></td>
<td>525. 489</td>
<td></td>
<td>.485</td>
<td>22 31 140 43 53 61 69 84 84 17 33</td>
<td></td>
</tr>
</tbody>
</table>
Flat fan nozzles
Series 632 / 633


FDA compliant
### Static Cleaning Nozzles

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Type</th>
<th>Material no.</th>
<th>Connection</th>
<th>Equivalent Orifice diam. (in.)</th>
<th>Free Passage (in.)</th>
<th>Flow Rate (Gallons Per Minute) at p=2 bar</th>
<th>Spray width B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 psi</td>
<td>20 psi</td>
</tr>
<tr>
<td>30°</td>
<td>63.72</td>
<td>16 17</td>
<td>30 5E</td>
<td>1/4”</td>
<td>1/2”</td>
<td>3/8”</td>
<td>.118</td>
</tr>
<tr>
<td>45°</td>
<td>63.73</td>
<td>16 17</td>
<td>30 5E</td>
<td>1/4”</td>
<td>1/2”</td>
<td>3/8”</td>
<td>.118</td>
</tr>
<tr>
<td></td>
<td>63.80</td>
<td>16 17</td>
<td>30 5E</td>
<td>1/4”</td>
<td>1/2”</td>
<td>3/8”</td>
<td>.158</td>
</tr>
<tr>
<td>60°</td>
<td>63.74</td>
<td>16 17</td>
<td>30 5E</td>
<td>1/4”</td>
<td>1/2”</td>
<td>3/8”</td>
<td>.118</td>
</tr>
</tbody>
</table>

*We reserve the right to deliver AISI 303 or AISI 304 under the material no. 16.
* Only available with connection BC.
+ Only available with connection BG.

Subject to technical modifications.

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

Example of ordering: 632. 642. + 16 + BC = 632. 642. 16. BC
Flat fan nozzles with ball joint
Series 676

Flat fan nozzle swivels for precise adjusting of spray direction. Designed for long service life.

Adjustable swivel range up to 30°

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Mat.no.</th>
<th>Equivalent Orifice diameter (in.)</th>
<th>Flow Rate (Gallons Per Minute)</th>
<th>Spray width (in.) @ 30 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type</td>
<td>16</td>
<td>.098 .071 .88 4.0 1.2 1.5 1.8 2.0</td>
<td>20 psi 2 bar 40 psi 60 psi 80 psi 100 psi</td>
<td>H =10° H =20°</td>
</tr>
<tr>
<td>30°</td>
<td>676. 642</td>
<td></td>
<td>.098 .071 .88 4.0 1.2 1.5 1.8 2.0</td>
<td>5 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 722</td>
<td></td>
<td>.118 .071 1.4 6.3 2.0 2.4 2.8 3.1</td>
<td>5 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 762</td>
<td></td>
<td>.139 .106 1.8 8.0 2.5 3.0 3.5 3.9</td>
<td>5 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 802</td>
<td></td>
<td>.157 .122 2.2 10 3.1 3.8 4.4 4.9</td>
<td>5 10</td>
<td></td>
</tr>
<tr>
<td>45°</td>
<td>676. 643</td>
<td></td>
<td>.098 .071 .88 4.0 1.2 1.5 1.8 2.0</td>
<td>8 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 723</td>
<td></td>
<td>.118 .094 1.4 6.3 2.0 2.4 2.8 3.1</td>
<td>8 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 763</td>
<td></td>
<td>.138 .102 1.8 8.0 2.5 3.0 3.5 3.9</td>
<td>8 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 803</td>
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<td>.157 .118 2.2 10 3.1 3.8 4.4 4.9</td>
<td>8 15</td>
<td></td>
</tr>
<tr>
<td>60°</td>
<td>676. 644</td>
<td></td>
<td>.098 .063 .88 4.0 1.2 1.5 1.8 2.0</td>
<td>12 22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 674</td>
<td></td>
<td>.106 .071 1.0 4.8 1.5 1.8 2.1 2.3</td>
<td>12 23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 724</td>
<td></td>
<td>.118 .083 1.4 6.3 2.0 2.4 2.8 3.1</td>
<td>12 23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>676. 764</td>
<td></td>
<td>.138 .091 1.8 8.0 2.5 3.0 3.5 3.9</td>
<td>12 23</td>
<td></td>
</tr>
</tbody>
</table>
Flat fan nozzles with ball joint
Series 676 – Accessories

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

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

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

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

Compact ball joints for narrow installation conditions

<table>
<thead>
<tr>
<th>For series</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>Code</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type</td>
<td>Code</td>
<td>G1</td>
<td>G2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For all nozzles with 1/8&quot; male thread</td>
<td>092. 010</td>
<td>BB</td>
<td>1/8A</td>
<td>1/8</td>
</tr>
<tr>
<td>For all nozzles with 1/4&quot; male thread</td>
<td>092. 024</td>
<td>BD</td>
<td>1/4A</td>
<td>1/4</td>
</tr>
<tr>
<td>For all nozzles with 3/8&quot; male thread</td>
<td>092. 030</td>
<td>BF</td>
<td>3/8A</td>
<td>3/8</td>
</tr>
</tbody>
</table>