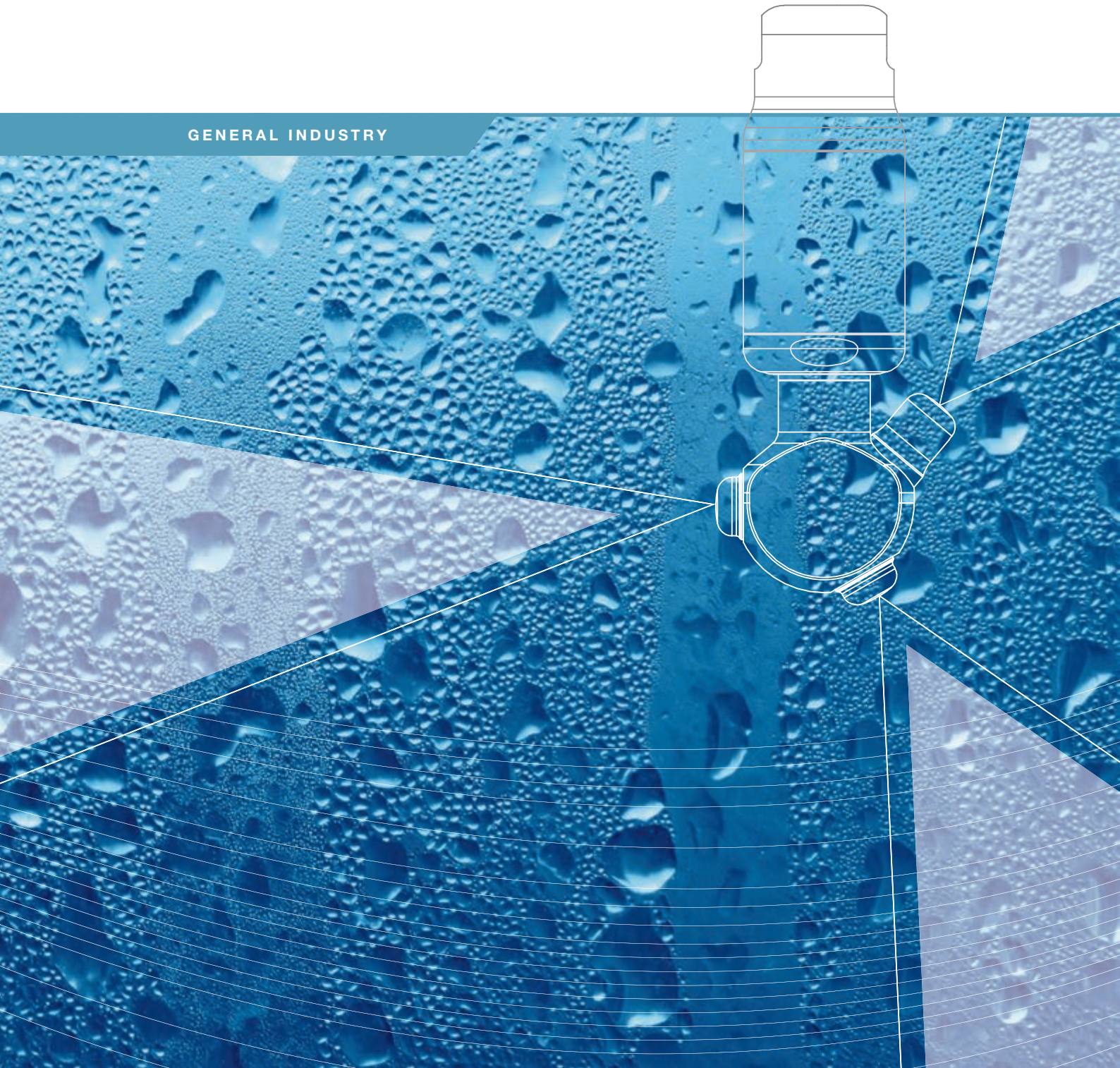
ENGINEERING
YOUR SPRAY SOLUTION

TANK AND EQUIPMENT CLEANING

Cleaning diversity of the highest quality

GENERAL INDUSTRY



LECHLER NOZZLES FOR TANK AND EQUIPMENT CLEANING – ECONOMICAL, SAFE AND PROVEN OVER TIME

Lechler is a world leader in nozzle technology. For over 140 years, we have pioneered numerous groundbreaking developments in this field. Comprehensive nozzle engineering and a deep understanding of application-specific requirements 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

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.

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.

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 & beverage industry
- Tank and equipment engineering
- Machine tool engineering
- Cosmetics industry
- Pharmaceutical industry
- Biotechnology
- Agricultural engineering

THE ART OF MAKING THE RIGHT CHOICE

Unique range of solutions

There is no one 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 sight

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, information on the tank size and recommended operating pressure allows 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 define the best possible solution for the most efficient cleaning.

CONTENT

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 in the installation 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.

WHAT YOU SHOULD KEEP IN MIND WHEN PLANNING

① 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 that 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.

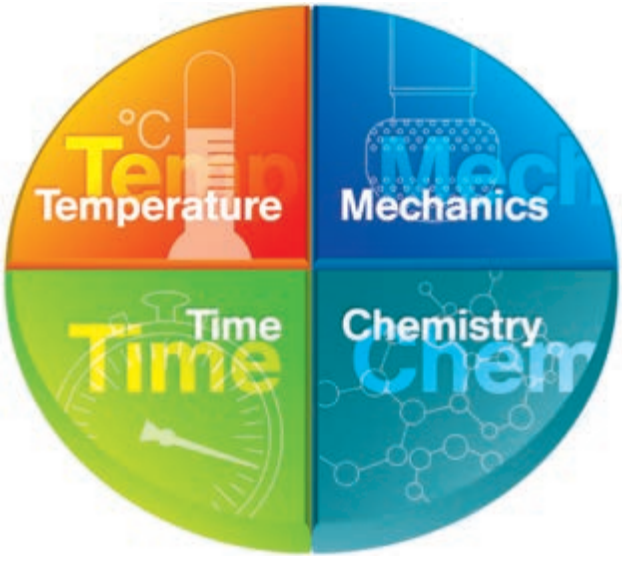


Figure 1: Sinner‘s circle with equal proportions of the temperature, time, chemistry and mechanical factors.

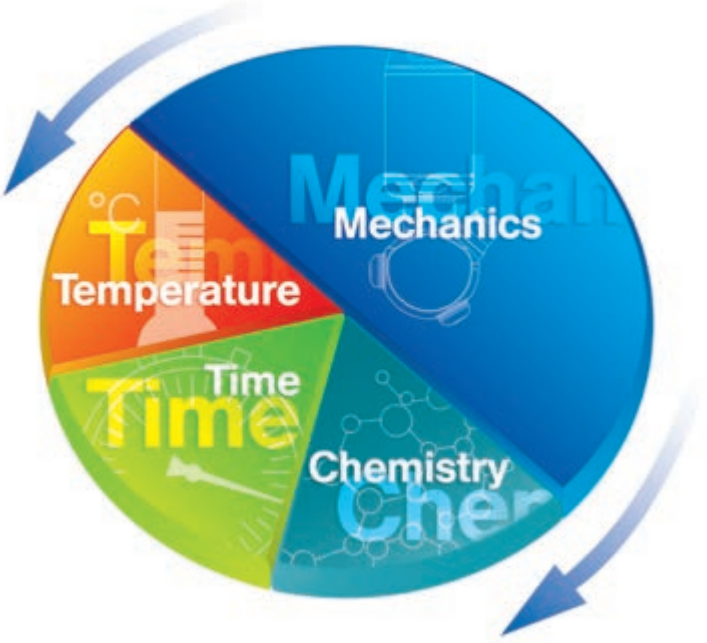


Figure 2: Lechler nozzles and rotating cleaning nozzles have high mechanical cleaning efficiency. This reduces the proportion of the other factors, as well as the resulting costs.

② Mechanical cleaning effects with Lechler rotating cleaning nozzles

Mechanical cleaning

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).

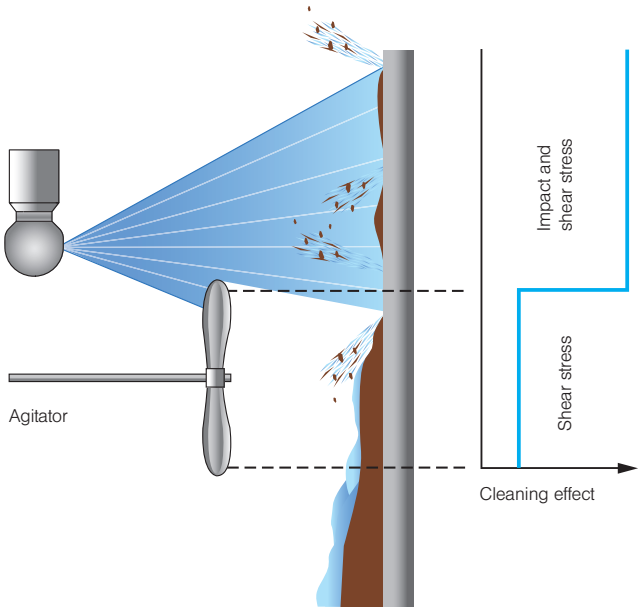


Figure 5: Cleaning mechanisms, impact and shear stress

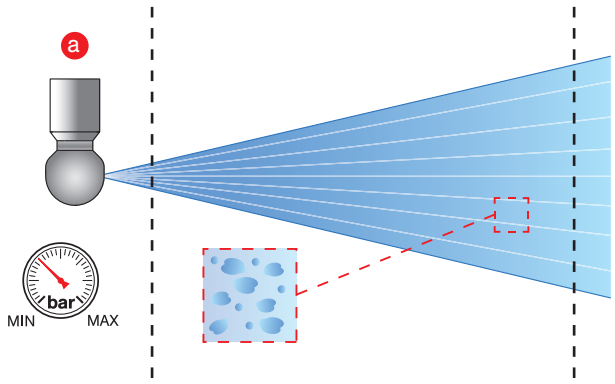


Figure 3: Rotating cleaning nozzles with recommended operating pressure

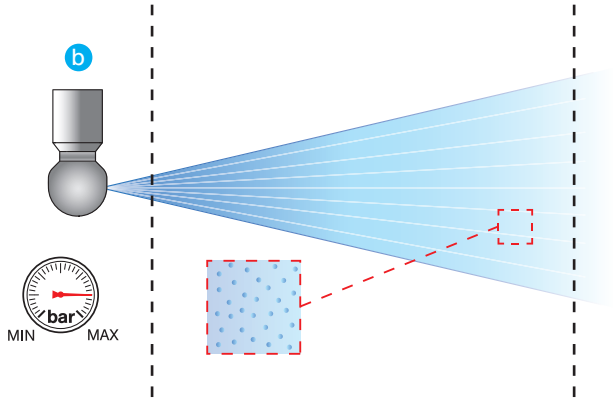


Figure 4: Rotating cleaning nozzles with operating pressure too high

WHAT YOU SHOULD KEEP IN MIND WHEN PLANNING

Impact

The force of impact when using of 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).

$$I = \frac{\text{Impact force}}{\text{Impact surface}} = \frac{F}{A}\left[\frac{N}{m^2}\right]$$

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

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.

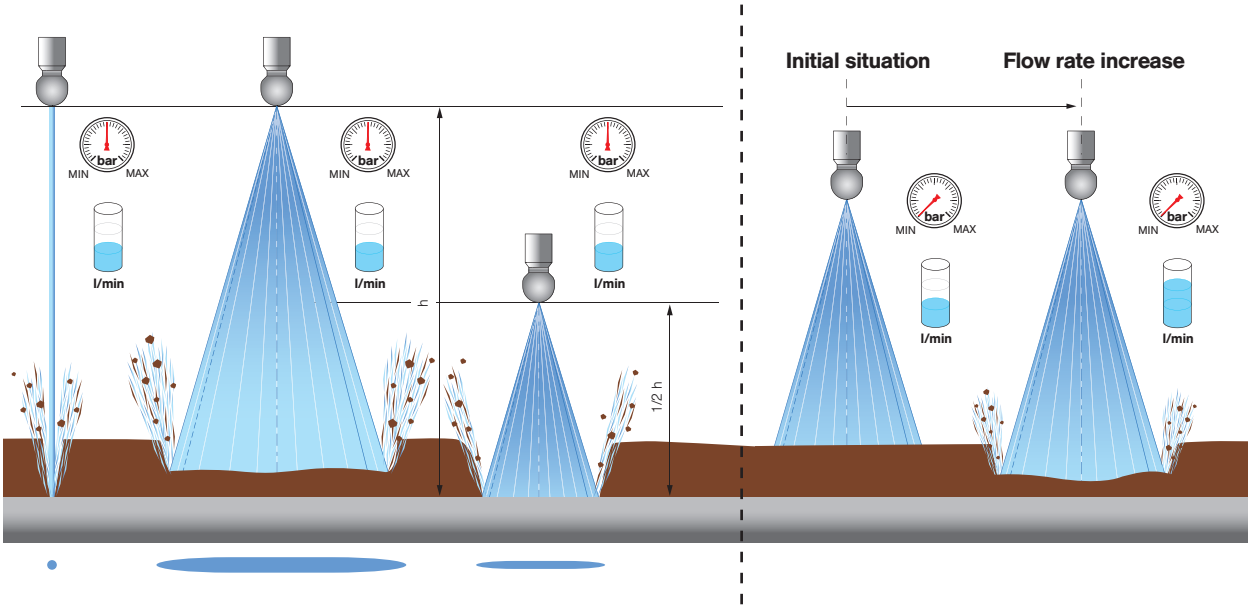


Figure 6:

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 with rotating cleaning nozzles.

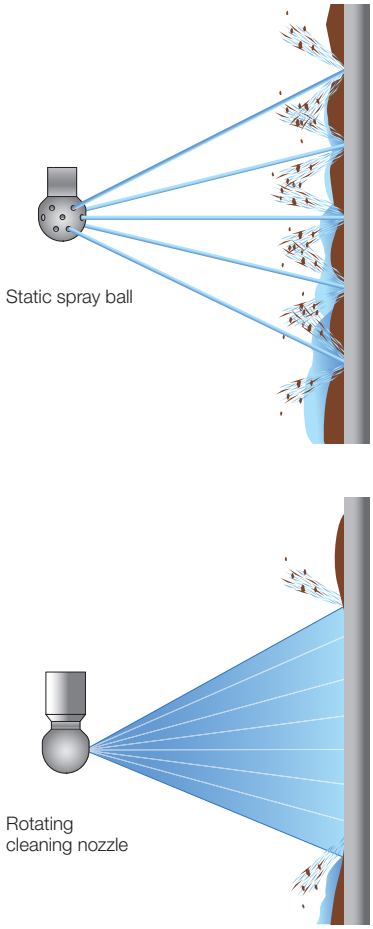


Figure 7: Comparison of rotating cleaning nozzles and static spray balls

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.

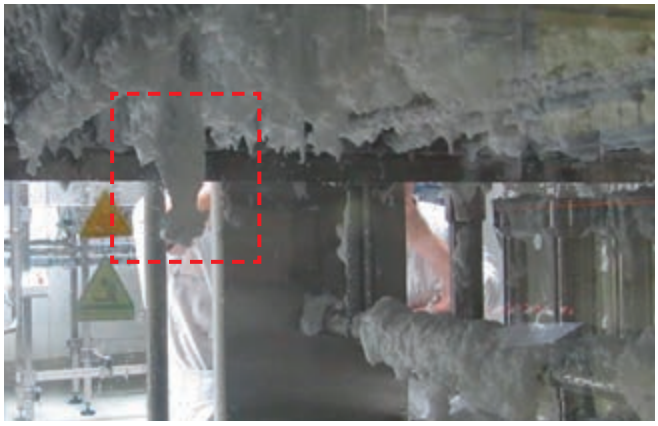


Figure 8: Foam cleaning with a Lechler PVDF MicroWhirly

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 installed in the systems and do not need to be dismounted during the process.

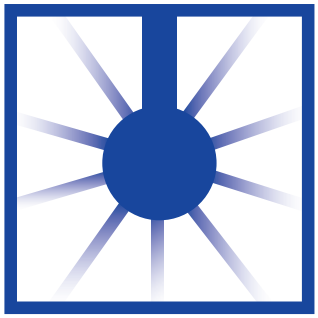
The correct combination of steps from Sinner‘s circle leads to a reliable and reproducible process. Almost all Lechler rotating cleaning nozzles and static spray nozzles are capable of CIP.

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

WHAT YOU SHOULD KEEP IN MIND WHEN PLANNING

③ Lechler rotating cleaning nozzles designs

Operating principles



Static

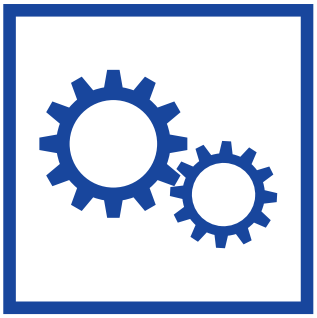
Static spray balls do not rotate and therefore require considerably more fluid. They are used primarily for rinsing tanks. They are inexpensive to purchase and are very robust (trouble-free).

Free-spinning

The cleaning fluid drives the spray head by means of specially positioned nozzles. The rapidly repeated impacts remove 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 thus achieve an even higher impact which is especially for large tanks important.



Gear-controlled

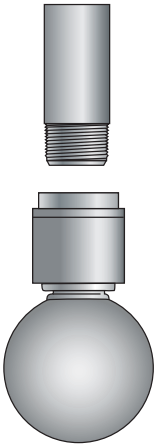
The cleaning fluid drives an internal gear by means of a turbine wheel so that the spray head rotates by two axes. The solid jet nozzles mounted on the spray head produce powerful jets. These jets sweep the entire tank surface in a pre-programmed, model-specific pattern during a spray cycle. This requires 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:

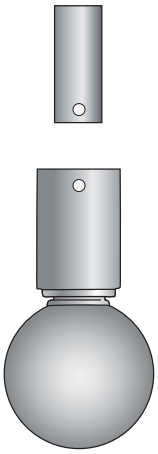
Threaded connection

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



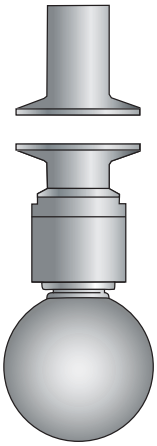
Slip-on connection

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.



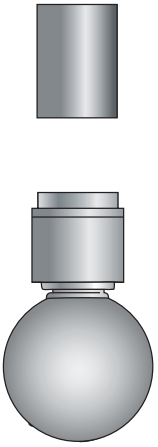
Tri-Clamp

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

Almost all nozzles are also available with welded connection on request. These are particularly suitable for applications where sanitary requirements have to be taken into account. Please contact us for further information.



WHAT YOU SHOULD KEEP IN MIND WHEN PLANNING

Materials

Lechler tank and equipment cleaning nozzles are made of extremely high-grade materials that are designed to meet high requirements such as resistance to cleaning chemicals or temperature influences. The large choice of different materials – e.g. 316L SS, 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.

FDA

The FDA, the U.S. Food & Drug Administration, is a federal agency which overseas those two industries. Materials used in making Lechler products are compliant 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.

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

Hygienic 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. The »PTFE Whirly« and 527 series are conforming to 3-A, for example.

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

The 3-A council is an organization in the USA that defines criteria for the cleanability of components in the dairy and food industry. Components and systems are examined to establish whether germs adhere to surfaces or existing soiling can be removed.

Components and systems are awarded a »3-A certificate« only if they are easy to clean or if soil cannot be deposited in the first place.

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. Different nozzle series have an ATEX approval that was issued by an external certification institute.

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

④ Conversion tables

p Pressure

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

V Volume

Unit	Conversion			
	l	m³	Imp. gal	US gal
1 l (1 dm³)	1	$1 \cdot 10^{-3}$	0.22	0.264
1 m³	1000	1	220	264.2
1 Imp. gallon	4.546	$4.546 \cdot 10^{-3}$	1	1.201
1 US gallon	3.785	$3.785 \cdot 10^{-3}$	0.8327	1

V̇ Flow rate

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

ρ Change in specific weight

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

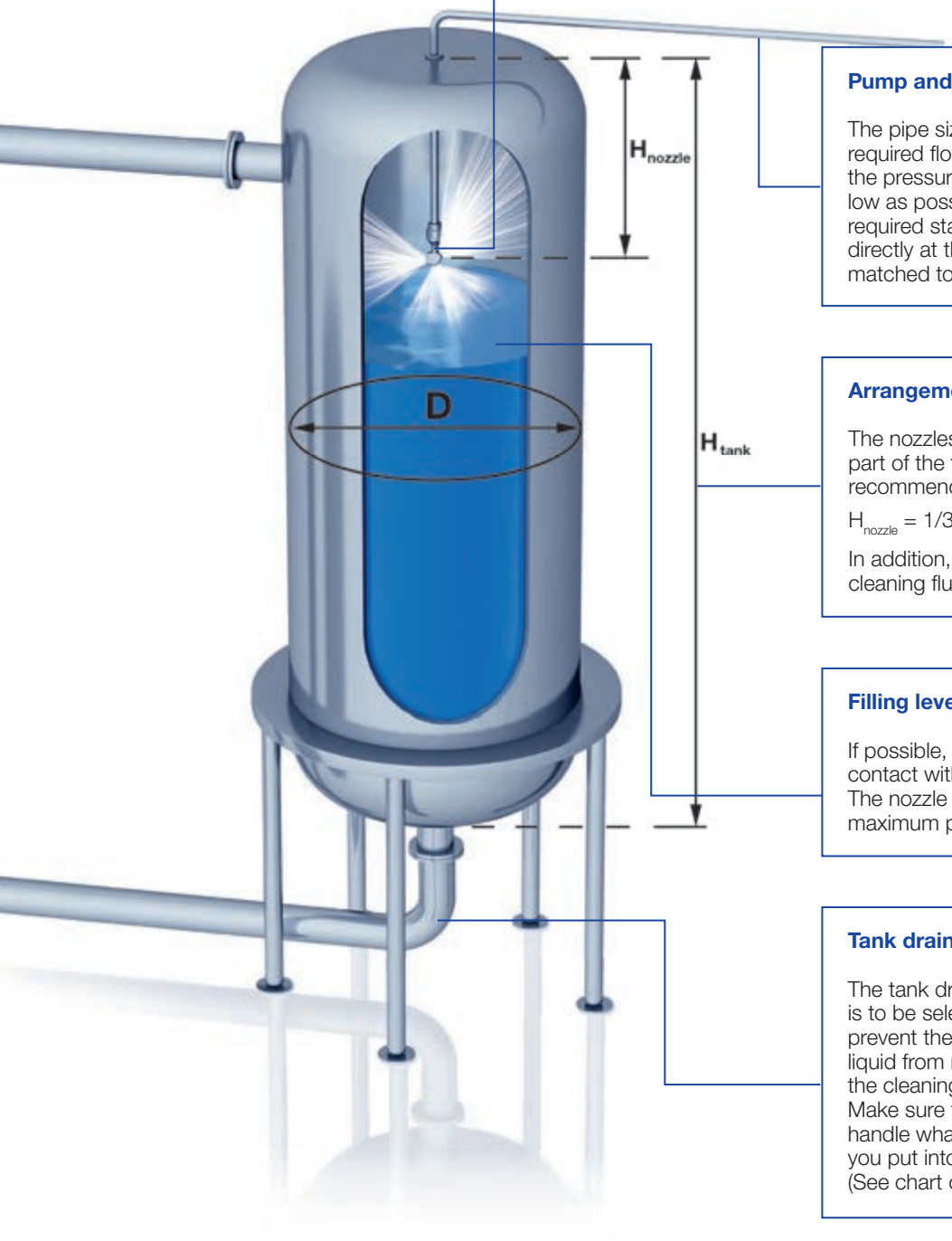
$\frac{\rho_{Fl}}{X}$	500	600	700	800	900	1000	1100	1200
	1.41	1.29	1.20	1.12	1.06	1.0	0.95	0.91
$\frac{\rho_{Fl}}{X}$	1300	1400	1500	1600	1700	1800	1900	2000
	0.88	0.85	0.82	0.79	0.77	0.75	0.73	0.71

p/V̇ Pressure/Flow rate

Valid for **single-fluid nozzles and rotating nozzles** except for axial-flow full cone nozzles	$\dot{V}_2 = \sqrt{\frac{p_2}{p_1}} \cdot \dot{V}_1$ [l/min]	Ratio of both, given and required pressure – flow rate values
	$p_2 = \left(\frac{\dot{V}_2}{\dot{V}_1}\right)^2 \cdot p_1$ [bar]	
Valid for **axial-flow full cone nozzles**	$\dot{V}_2 = \left(\frac{p_2}{p_1}\right)^{0.4} \cdot \dot{V}_1$ [l/min]	
	$p_2 = \left(\frac{\dot{V}_2}{\dot{V}_1}\right)^{2.5} \cdot p_1$ [bar]	

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

WHAT YOU SHOULD KEEP IN MIND WHEN PLANNING



Nozzle selection

The choice of 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:

$H_{nozzle} = 1/3 \cdot H_{tank}$

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.

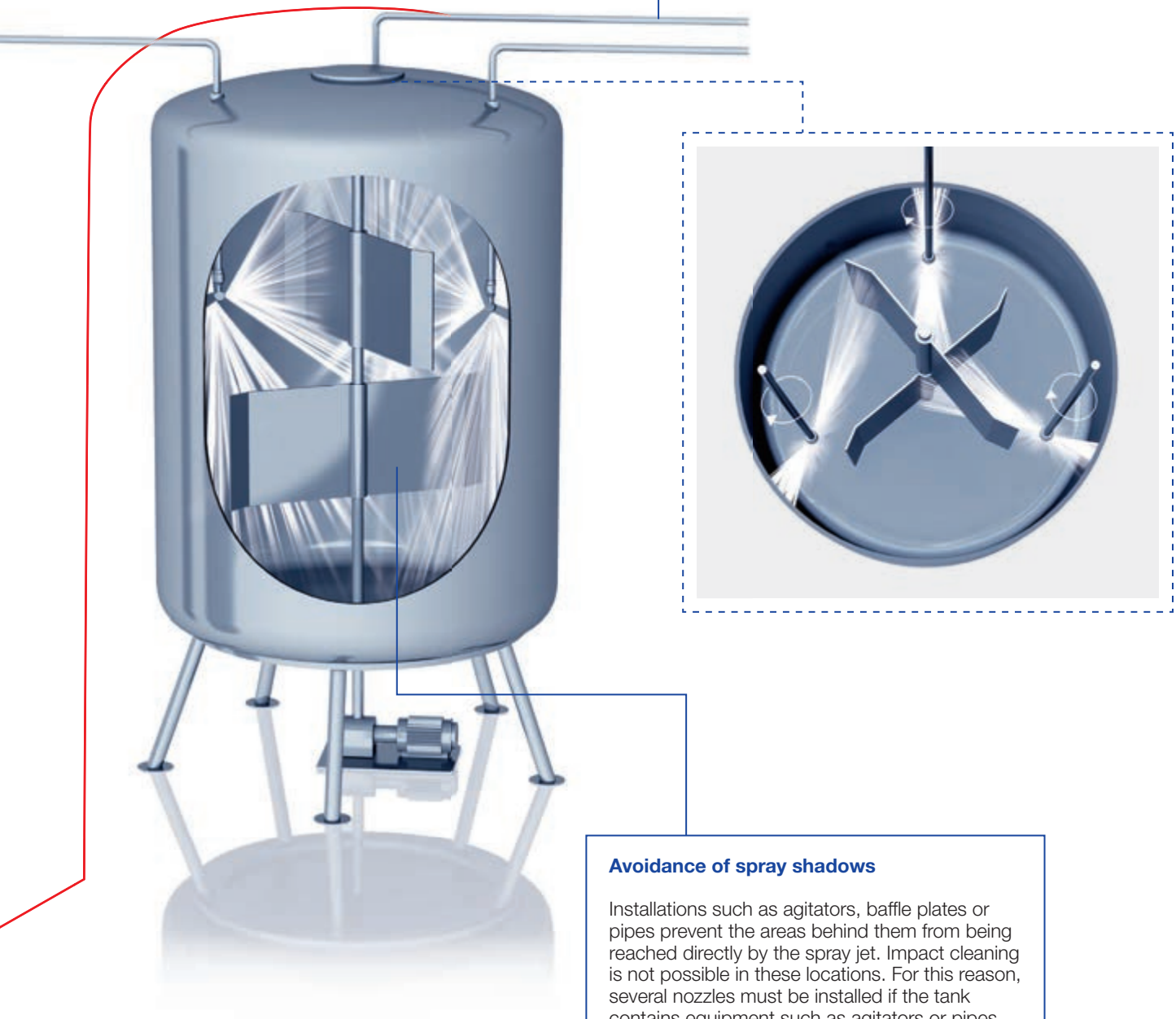
Tank drainage rate

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.)

1"	23 l/min
1 1/2"	50 l/min
2"	87 l/min
2 1/2"	132 l/min
3"	190 l/min
4"	330 l/min

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.

PERFECT FOR RELIABLE PLANNING
Tank*Clean* SIMULATION SOFTWARE

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.

TankClean

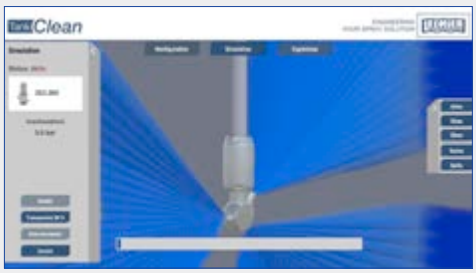
Function video

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

TankClean

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 Tank*Clean*? Ask your Lechler contact person for further information or give us a call. We will gladly help you in planning your tank cleaning solution.

WHAT YOU SHOULD KEEP IN MIND WHEN PLANNING

⑤ Cleaning efficiency classes

Lechler precision nozzles for tank and equipment cleaning are divided into different cleaning efficiency classes. A distinction is made between five different cleaning efficiency classes.

The subdivision into cleaning efficiency classes 1–5 is intended to facilitate nozzle selection for users. These classes make it possible to find the right nozzle for the respective application.

Every nozzle from Lechler is assigned to a class. 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, persistent soil. Several classes are generally always suitable for one type of soiling. 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.

RELIABLE RINSING OF TANKS AND EQUIPMENT INSTALLATIONS

Cleaning efficiency class 1

These static spray balls of cleaning efficiency class 1 are designed for hygienic rinsing with a flow rate of 15 to 670 l/min at 2 bar, 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 therefore are 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.

Max. tank diameter [m]

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Operating principles
Static

Flow rates at 2 bar
15 to 670 l/min

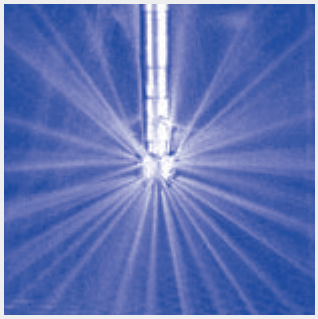
Recommended operating pressures
1.5 to 3 bar

Max. temperatures
to 200 °C

Static spray balls
Series 527

Series 527

The 3-A certification also makes the products of series 527 suitable for areas with the highest of hygiene requirements. They clean with powerful solid jets, have a high surface quality and are also reliably resistant to high temperatures.



Max. tank diameter [m]

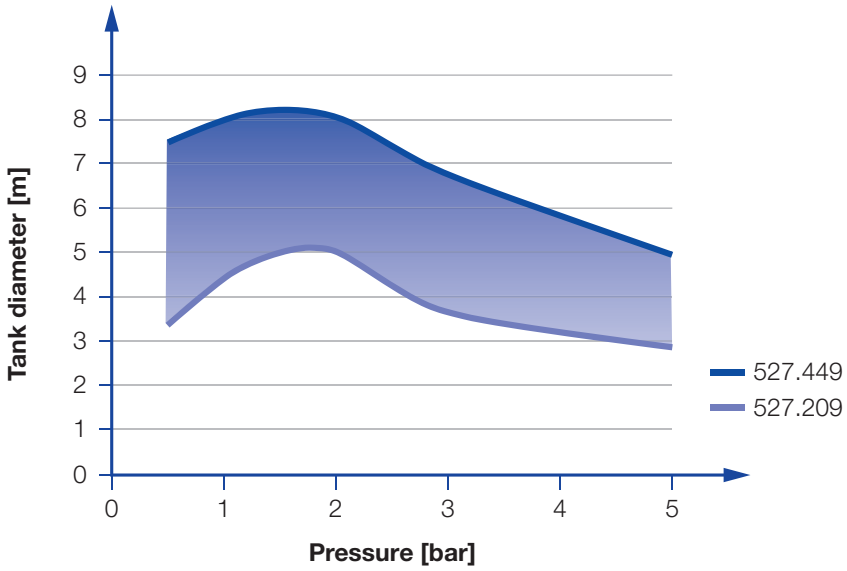
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Material
316L SS

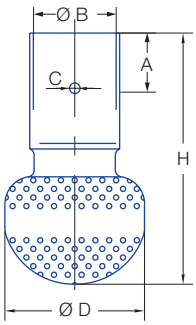
Max. temperature
200 °C

Recommended operating pressure
1.5 bar

Installation
Operation in every direction is possible



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



Dimensions slip-on connection according to ASME-BPE (OD-tube)

Spray angle	Ordering number Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar)					Dimensions approx. [mm]					Max. tank diameter [m]
			1	2	3	5	at 40 psi [US gal/min]	Height H	Ø D	Ø B	Ø C	Ø A	
360°	**527.209.1Y.00.75**	0.8	42	60	73	95	19	68	32	19.0	3.3	12.7	5.2
	527.289.1Y.01.50	1.1	120	170	208	269	50	116	65	38.3	4.9	25.4	6.0
	527.449.1Y.02.00	1.7	297	420	514	664	127	152	102	51.0	4.9	25.4	8.2

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.

Information on operation

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

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

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

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

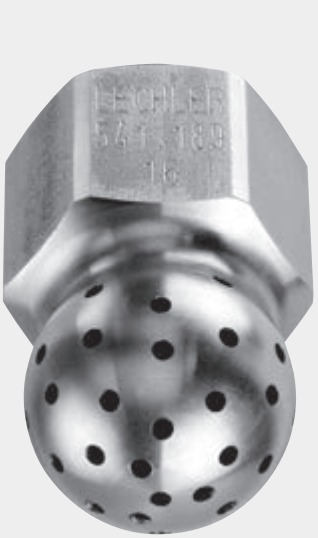
Slip-on information

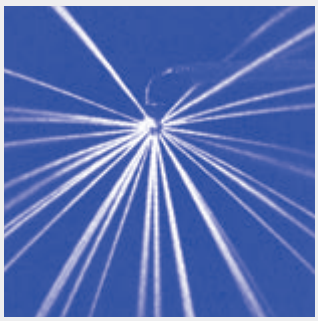
- R-clip made of 316L SS is included.
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and static spray ball.

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 [m]

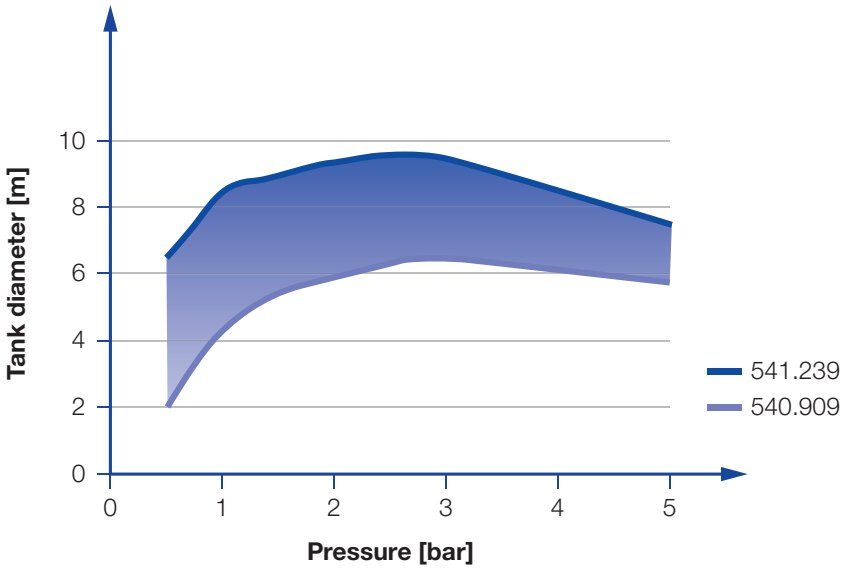
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Material
303 SS

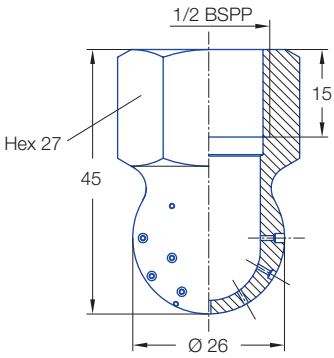
Max. temperature
200 °C

Recommended operating pressure
3 bar

Installation
Operation in every direction is possible



Overview of the tank diameter, depending upon the pressure of series 540/541



Female thread

Spray angle	Ordering number Type	E Ø [mm]	$\dot{V}$ [l/min] p [bar] (p_{max} = 10 bar) 0.5	1	2	3	at 40 psi [US gal/min]	Max. tank diameter [m]
240°	**540.909.16**	0.8	9	13	18	22	6	6.5
	540.989.16	1.0	14	20	28	34	9	7.0
	541.109.16	1.5	29	40	57	70	18	7.5
	541.189.16	2.0	45	64	90	110	28	8.3
	541.239.16	2.3	59	83	118	145	37	9.5

E = narrowest free cross-section · NPT on request

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

Information on operation

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

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

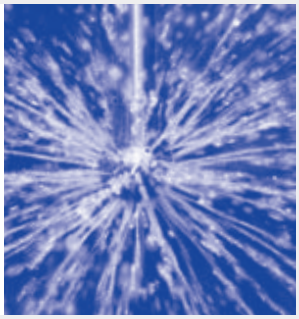
Should a rotating nozzle stop turning for some reason, parts of the tank may remain uncleaned. This cannot happen with spray balls. However, gaps can occur in the spray pattern if individual openings are blocked with soil.

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

Static spray balls »RinseClean«
Series 5B2/5B3

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.



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

Max. tank diameter [m]

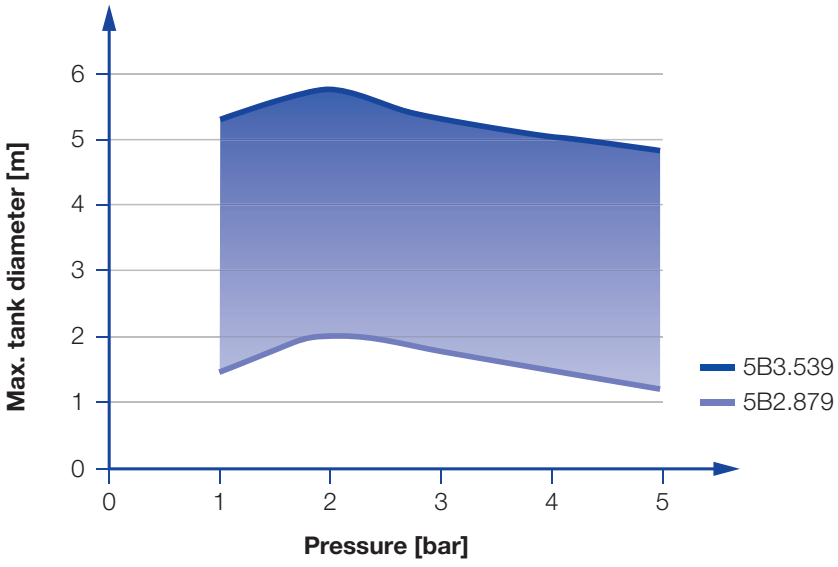
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Material
316L SS,
Pin: 316L SS

Max. temperature
200 °C

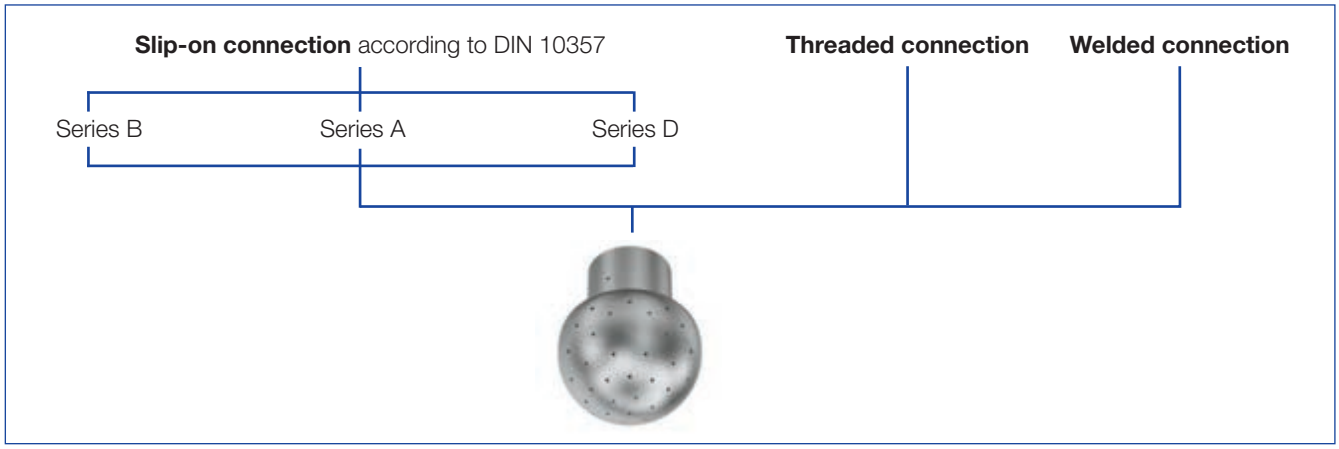
Recommended operating pressure
2 bar

Installation
Operation in every direction is possible

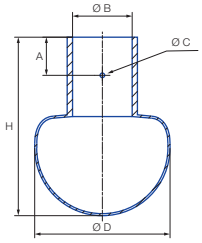


Overview of the tank diameter, depending upon the pressure of series 5B2/5B3

Connection options

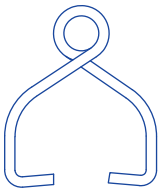


Slip-on connection



Dimensions slip-on connection according to DIN 10357

Pin 1



Pin 2–5

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.

Pin	Ordering no.
1	**095.013.1Y.06.55.0**
2	**095.013.1Y.06.58.0**
3	**095.013.1Y.06.56.0**
4	**095.013.1Y.06.59.0**
5	**095.013.1Y.06.57.0**

Slip-on connection according to DIN EN 10357 series B (replaces DIN 11850 series 1)

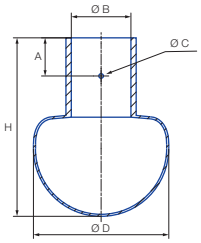
Spray angle	Ordering no. Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 0.5	1	2	3	at 40 psi [US gal/min]	Dimensions [mm] Ø D	Height H	Connection Ø B	Ø C	Distance to bore hole A	Pin	Max. tank diameter [m]
360°	**5B2.879.1Y.D0.80**	0.8	8	11	15	18	4.7	20	37	8.2	2.2	9	1	2.0
	5B3.089.1Y.D1.20	1.0	25	35	50	61	15.5	28	42	12.2	2.2	9	1	2.2
	5B3.139.1Y.D1.20	1.6	33	46	65	80	20.2	28	42	12.2	2.2	9	1	2.3
	5B3.209.1Y.D1.80	1.5	50	71	100	123	31.0	28	42	18.2	2.2	9	1	2.5
	5B3.309.1Y.D2.20	1.7	90	127	180	221	55.8	64	84	22.2	2.2	18	2	3.5
	5B3.379.1Y.D2.80	2.1	130	184	260	318	80.7	64	84	28.2	2.2	18	3	5.2
	5B3.389.1Y.D4.00	2.1	140	198	280	343	86.9	64	84	40.3	2.2	18	4	5.2
	5B3.409.1Y.D3.40	2.3	160	226	320	392	99.3	64	84	34.2	2.2	18	4	5.2
	5B3.449.1Y.D2.80	3.0	205	290	410	502	127.2	64	84	28.2	2.2	18	3	5.4
	5B3.489.1Y.D3.40	2.9	255	361	510	625	158.2	64	84	34.2	2.2	18	4	5.5
	5B3.499.1Y.D4.00	2.8	270	382	540	661	167.5	64	84	40.3	2.2	18	4	5.5
	5B3.539.1Y.D5.20	3.2	335	474	670	821	207.8	90	111	52.3	3.0	25	5	5.6
180°	**5B3.083.1Y.D1.80**	1.2	25	35	50	61	15.5	28	42	18.2	2.2	9	1	2.2
	5B3.253.1Y.D2.20	1.8	65	92	130	159	40.3	64	84	22.2	2.2	18	2	3.0
	5B3.323.1Y.D2.80	2.3	100	141	200	245	62.0	64	84	28.2	2.2	18	3	3.5
	5B3.463.1Y.D5.20	3.3	230	325	460	563	142.7	90	111	52.3	3.0	25	5	5.4
180°	**5B3.114.1Y.D1.80**	1.4	30	42	60	74	18.6	28	42	18.2	2.2	9	1	2.2
	5B3.274.1Y.D2.20	2.3	75	106	150	184	46.5	64	84	22.2	2.2	18	2	3.0
	5B3.394.1Y.D2.80	3.0	145	205	290	355	90.0	64	84	28.2	2.2	18	3	5.0
	5B3.444.1Y.D5.20	3.2	200	283	400	490	124.1	90	111	52.3	3.0	25	5	5.2

E = narrowest free cross-section

Continued on next page.

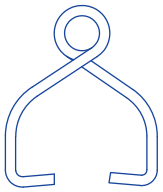
Static spray balls »RinseClean«
Series 5B2/5B3

Slip-on connection



Dimensions slip-on connection according to DIN 10357

Pin 1



Pin 2–5

Slip-on connection according to DIN EN 10357 series A (replaces DIN 11850 series 2)

Spray angle	Ordering no. / Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 0.5	1	2	3	at 40 psi [US gal/min]	Dimensions [mm] Ø D	Height H	Con-nection B	Ø C	Distance to bore hole A	Pin	Max. tank [m]
360°	**5B3.149.1Y.D2.90**	0.9	35	50	70	86	21.7	64	84	29.2	2.2	18	3	2.3
	5B3.299.1Y.D2.90	1.5	83	117	165	202	51.2	64	84	29.2	2.2	18	3	3.2
	5B3.359.1Y.D2.90	1.9	115	163	230	282	71.3	64	84	29.2	2.2	18	3	5.0
	5B3.399.1Y.D2.90	2.2	150	212	300	367	93.1	64	84	29.2	2.2	18	3	5.2
	5B3.429.1Y.D2.90	2.6	180	255	360	441	111.7	64	84	29.2	2.2	18	3	5.2
	5B3.539.1Y.D5.30	3.2	335	474	670	821	207.8	90	111	53.3	3.0	25	5	5.6

E = narrowest free cross-section

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

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

Spray angle	Ordering no. / Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 0.5	1	2	3	at 40 psi [US gal/min]	Dimensions [mm] Ø D	Height H	Con-nection B	Ø C	Distance to bore hole A	Pin	Max. tank diameter [m]
360°	**5B3.089.1Y.A1.00**	1.0	25	35	50	61	15.5	28	42	9.8	2.2	9	1	2.2
	5B3.209.1Y.A1.90	1.5	50	71	100	123	31.0	28	42	19.3	2.2	9	1	2.5
	5B3.309.1Y.A1.90	1.7	90	127	180	221	55.8	64	84	19.3	2.2	18	1	3.5
	5B3.379.1Y.A2.60	2.1	130	184	260	318	80.7	64	84	25.6	2.2	18	3	5.2
	5B3.449.1Y.A3.80	3.0	205	290	410	502	127.2	64	84	38.3	2.2	18	4	5.4
	5B3.539.1Y.A5.10	3.2	335	474	670	821	207.8	90	111	51.1	3.0	25	5	5.6

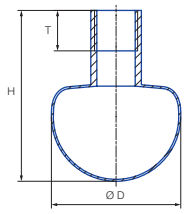
E = narrowest free cross-section

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

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 thread
(exception 5B2.872.1Y.AA.00 has a male thread)

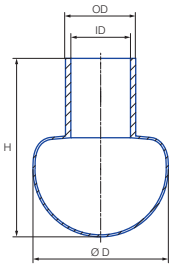
Threaded connection

Spray angle	Ordering no. / Type	Connection BSPP	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 0.5	1	2	3	at 40 psi [US gal/min]	Dimensions [mm] Ø D	Height H	Screw-in length T	Max. tank diameter [m]
360°	**5B2.879.1Y.AA.00**	1/8 male	0.8	8	11	15	18	4.7	20	37	8	2.0
	5B3.309.1Y.AH.00	1/2	1.9	90	127	180	221	55.8	64	84	14	3.5
	5B3.379.1Y.AN.00	1	2.1	130	184	260	318	80.7	64	84	18	5.2
	5B3.539.1Y.AW.00	2	3.1	335	474	670	821	207.8	90	111	24	5.6

E = narrowest free cross-section

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

Welded connection



Welded connection according to ISO 2037

Spray angle	Ordering no. / Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 0.5	1	2	3	at 40 psi [US gal/min]	Dimensions [mm] OD = outside diameter ID = inside diameter Ø D	Height H	Dimensions of the connection piece	Max. tank diameter [m]
360°	**5B2.879.1Y.W1.20**	0.8	8	11	15	18	4.7	20	37	OD 12 ID 10	2.0
	5B3.089.1Y.W1.20	1.0	25	35	50	61	15.5	28	42	OD 12 ID 10	2.2
	5B3.209.1Y.W1.70	1.5	50	71	100	123	31.0	28	42	OD 17.2 ID 15.2	2.5
	5B3.309.1Y.W2.50	1.7	90	127	180	221	55.8	64	84	OD 25 ID 22.6	3.5
	5B3.379.1Y.W2.50	2.1	130	184	260	318	80.7	64	84	OD 25 ID 22.6	5.2
	5B3.449.1Y.W3.80	3.0	205	290	410	502	127.2	64	84	OD 38 ID 35.6	5.4

E = narrowest free cross-section

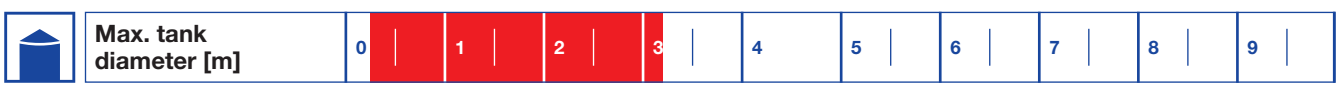
The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

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 tasks and the removal of light soiling, particularly the kind that frequently occurs in the food and beverage industry as well as in the chemical and pharmaceutical industry.

The Lechler products in this class are free-spinning and made from particularly high-grade materials such as stainless steel, PVDF, PEEK and PTFE. This ensures the use of a wide range of different cleaning agents.



Operating principles
Free-spinning

Flow rates at 2 bar
8 to 225 l/min

Recommended operating pressures
2 to 3 bar

Max. temperatures
50 to 200 °C

Rotating cleaning nozzle »PicoWhirly«
Series 500.234

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 kolsterised slide bearing is made entirely from stainless steel and can also be used in very small spaces, thanks to its extremely compact construction.

FDA

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

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

Material
316L SS

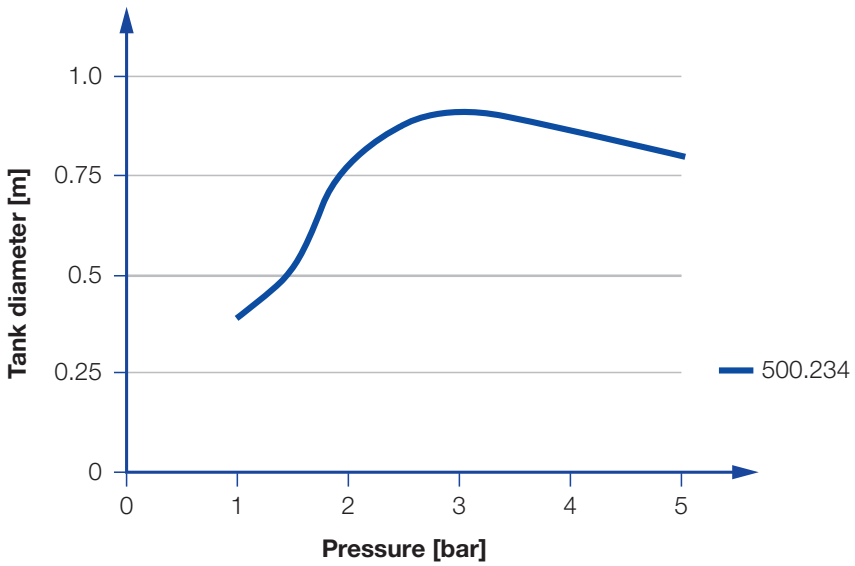
Max. temperature
200 °C

Recommended operating pressure
3 bar

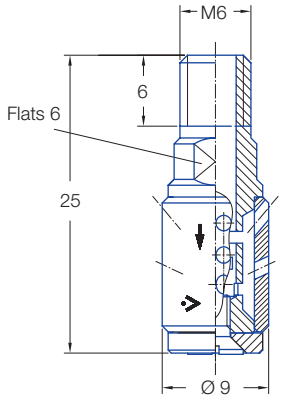
Installation
Operation in every direction is possible

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

Bearing
Kolsterised slide bearing



Overview of the tank diameter, depending upon the pressure of series 500.234



Male thread

Spray angle	Ordering number Type	E Ø [mm]	$\dot{V}$ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal/min]	Max. tank diameter [m]
300°	**500.234.G9.00**	1.8	5.7	8.0	9.8	2.5	0.9

E = narrowest free cross-section

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

Information on operation

- Operation with compressed air only for short-term usage. Operation above the recommended operating pressure has negative effects on the cleaning result and wear.

Rotating cleaning nozzle »MicroWhirly«
Series 566

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.

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

Max. tank diameter [m]

0	1	2	3	4	5	6	7	8	9

Materials
316L SS, PEEK, PEEK ESD (ATEX version only)

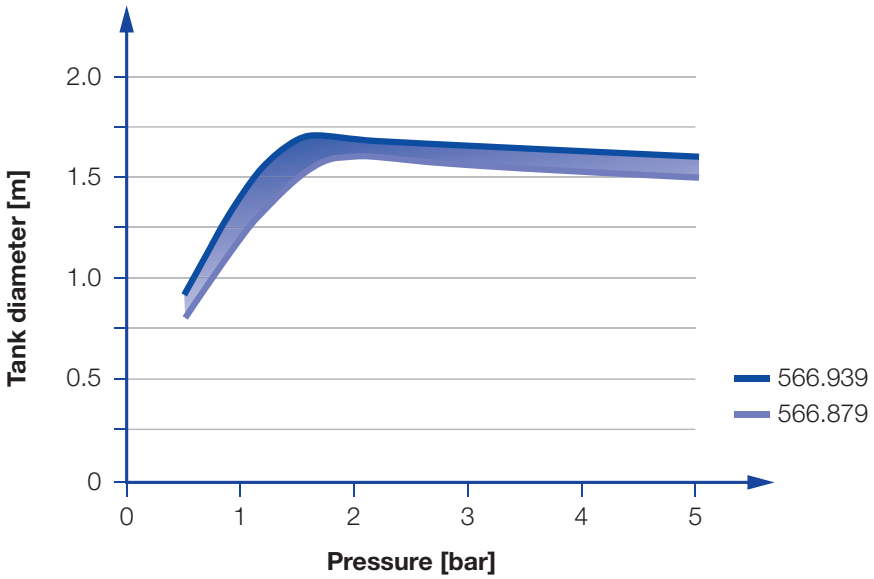
Max. temperature
130 °C
90 °C ATEX Version

Recommended operating pressure
2 bar

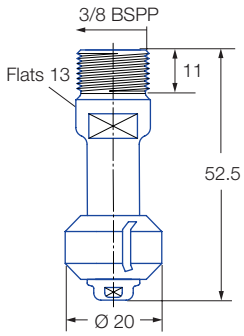
Installation
Operation in every direction is possible

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

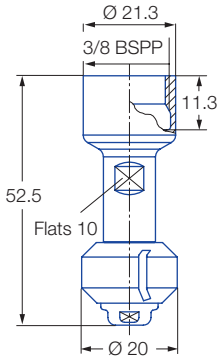
Bearing
Slide bearing made of PEEK



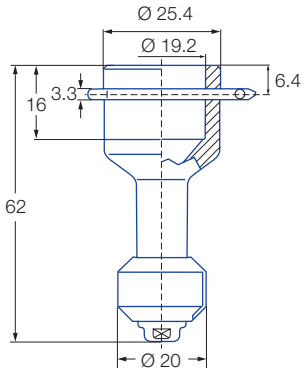
Overview of the tank diameter, depending upon the pressure of series 566



Male thread



Female thread



Dimensions slip-on connection according to ASME-BPE (OD-tube)

Spray angle	Ordering number: Type	Connection: 3/8 BSPP* male	Connection: 3/8 BSPP* female	Connection: 3/4" Slip-on	E Ø [mm]	V̇ [l/min] p [bar] (p$_{max}$ = 6 bar): 1	2	3	at 40 psi [US gal/min]	Max. tank diameter [m]
180°	**566.873.1Y**	**AE**	**AF**	**TF**	1	12	15	18	5	1.6
	566.933.1Y	**AE**	**AF**	**TF**	2.4	15	21	26	7	1.7
180°	**566.874.1Y**	**AE**	**AF**	**TF**	1	12	15	18	5	1.6
	566.934.1Y	**AE**	**AF**	**TF**	2.4	15	21	26	7	1.7
360°	**566.879.1Y**	**AE**	**AF**	**TF**	1	12	15	18	5	1.6
	566.939.1Y	**AE**	**AF**	**TF**	2.4	15	21	26	7	1.7

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

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

Information on operation

- Operation with compressed air only for short-term usage. Operation above the recommended operating pressure has negative effects on the cleaning result and wear.

Slip-on information

- R-clip made of 316L SS 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 connecting pipe and rotating cleaning nozzle.

Example of ordering with ATEX approval. No FDA and (EC) 1935/2004 conformity.

Unit group/category/zones:

Ⓔx II 1G Ex h IIB T6…T3 Ga

Ⓔx II 1D Ex h IIIC T85 °C…T150 °C Da

Example of ordering:	Type	+	Connection	=	Ordering no.
	566.873.1Y.XX.EX	+	AE	=	566.873.1Y.AE.EX

Example of ordering with FDA and (EC) 1935/2004 conformity.

All Materials are suitable for contact with food.

FDA

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

ATTENTION: For the **ATEX** version of the slip-on connection the code for the connection changes. For a 566.873.1Y**.TF.07** with ATEX the order number changes to 566.873.1Y.**TF.EX**

Rotating cleaning nozzle »MiniWhirly«
Series 500.186

Series 500.186

The MiniWhirly made from POM is the economical entry-level model in the area of tank cleaning. The rotating nozzle has effective flat fan nozzles and was specifically designed for applications in barrel and canister cleaning.

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

Max. tank diameter [m]

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Materials
POM,
316 SS

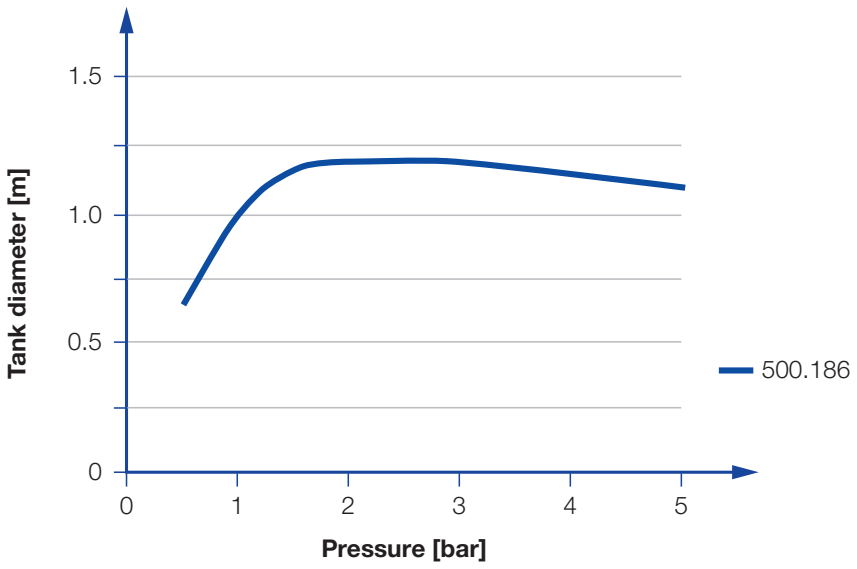
Max. temperature
50 °C

Recommended operating pressure
2 bar

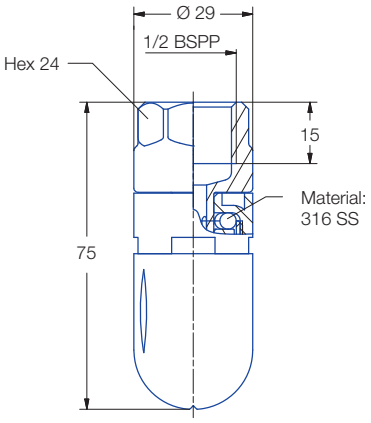
Installation
Vertically facing downward

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

Bearing
Ball bearing made of stainless steel



Overview of the tank diameter, depending upon the pressure of series 500.186



Female thread

Spray angle	Ordering number Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal/min]	Max. tank diameter [m]
300°	**500.186.56.AH**	1.9	13	18	22	6	1.3

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.

Information on operation

- Operation with compressed air only for short-term usage. Operation above the recommended operating pressure has negative effects on the cleaning result and wear.

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.

FDA

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

Max. tank diameter[m]

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Material
PVDF

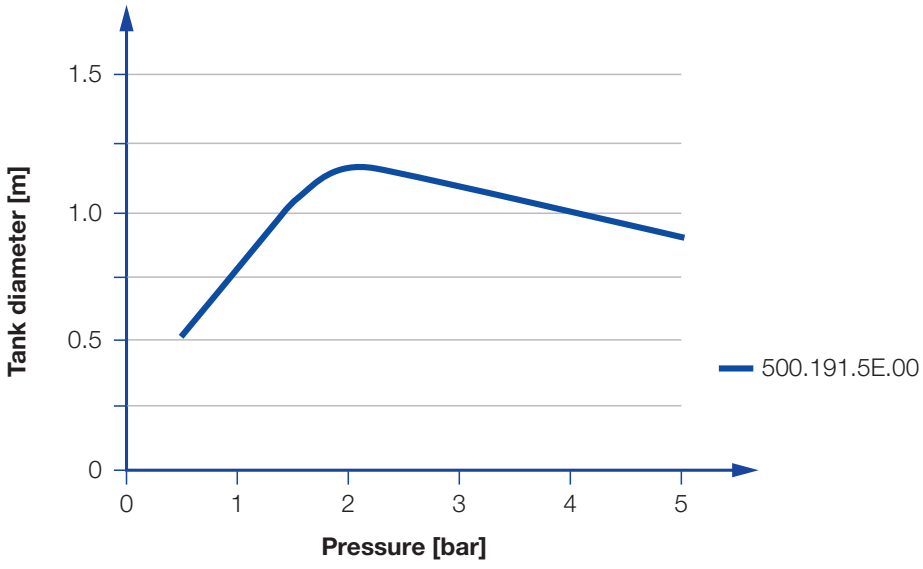
Max. temperature
90 °C

Recommended operating pressure
2 bar

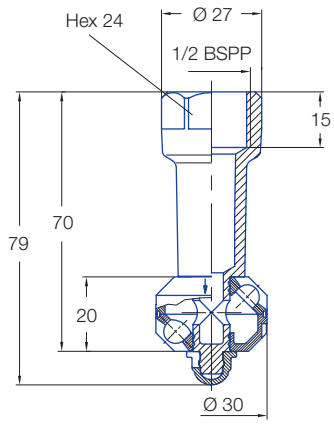
Installation
Operation in every direction is possible

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

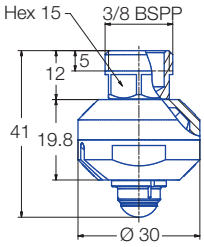
Bearing
Slide bearing made of PVDF



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



Standard version
Female thread



Compact version
Male thread

Standard version

Spray angle	Ordering number Type	E Ø [mm]	Connection BSPP female	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal/min]	Max. tank diameter [m]
180°	**500.191.5E.02**	2.2	1/2"	9	13	16	4	0.8
180°	**500.191.5E.01**	2.2	1/2"	9	13	16	4	0.8
270°	**500.191.5E.31**	2.2	1/2"	14	20	25	6	1.1
360°	**500.191.5E.00**	2.2	1/2"	14	20	25	6	1.1

E = narrowest free cross-section

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

Compact version

Spray angle	Ordering number Type	E Ø [mm]	Connection BSPP male	V̇ [l/min] p [bar] (p_{max} = 5 bar) 1	2	3	at 40 psi [US gal/min]	Max. tank diameter [m]
180°	**500.191.5E.21**	2.2	3/8"	9	13	16	4	0.8
360°	**500.191.5E.22**	2.2	3/8"	14	20	25	6	1.1

E = narrowest free cross-section

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

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.

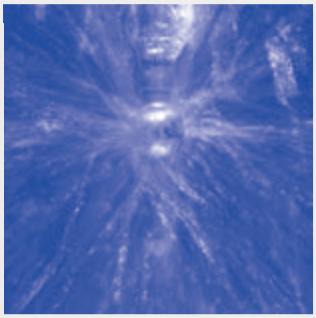
Rotating cleaning nozzle »NanoSpinner 2«
Series 5M1

Series 5M1

The NanoSpinner 2 convinces by its compact design which allows cleaning in confined spaces. In addition, the rotating cleaning nozzle is characterized by its popular design and a double ball bearing. It is made entirely of stainless steel and is thus also suitable for high ambient temperatures.

NEW

FDA



Function video
Scan the QR-Code or go to:
www.lechler.com/de-en/medialibrary

Max. tank diameter [m]

0	1	2	3	4	5	6	7	8	9

Materials
Stainless steel 316L

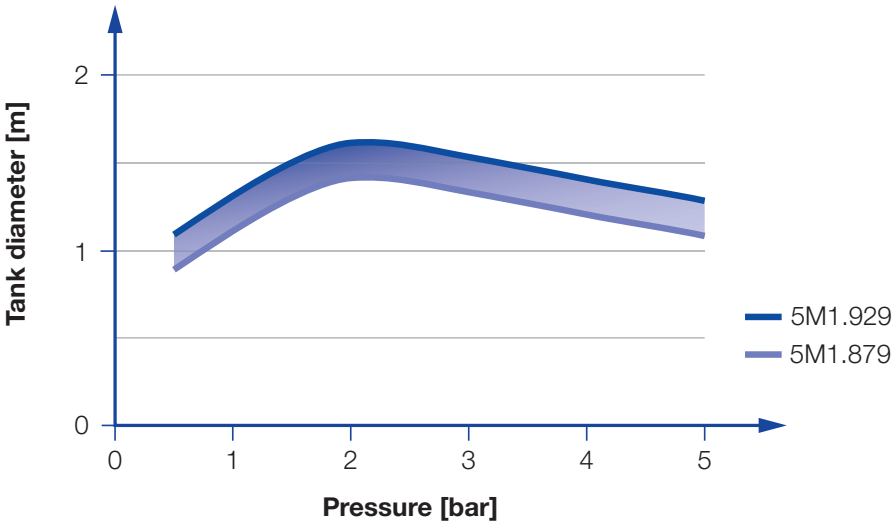
Max. temperature
250 °C

Recommended operating pressure
2 bar

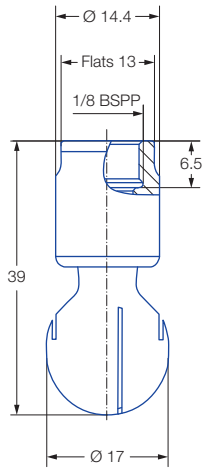
Installation
Operation in every direction is possible

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

Bearing
Double ball bearing made of stainless steel 316L



Overview of the tank diameter, depending upon the pressure of series 5M1



Female thread

Spray angle	Ordering number / Type	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 7 bar) 1	2	3	at 40 psi [US gal./ min]	Max. tank diameter [m]
360°	**5M1.879.1Y.AB**	0,4	11	15	18	5	1,4
	5M1.929.1Y.AB	0,5	14	20	25	6	1,6

E = narrowest free cross-section
NPT, slip-on connection and weld-on versions on request

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

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.

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

Unit group / category / zones:
Ⓔx II 1G Ex h IIB T6…T2 Ga
Ⓔx II 1D Ex h IIIC T85 °C…T250 °C Da

Example of ordering:	Type/Ordering no.
	5M1.879.1Y.AB.EX

Example of ordering with FDA and (EC) 1935/2004 conformity.

All Materials are suitable for contact with food.

Example of ordering:	Type	+	Connection	= Ordering no.
	5M1.879.1Y	+	AB	= 5M1.879.1Y.AB

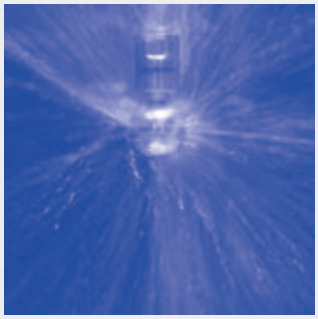
Rotating cleaning nozzle »MicroSpinner 2« Series 5M2

NEW

Series 5M2

The MicroSpinner 2 convinces by its compact design which allows cleaning in confined spaces. The MicroSpinner 2 is made entirely from stainless steel and designed for use also at high temperatures. It is available with many different flow rates and spray angles.

FDA



Function video
Scan the QR-Code or go to:
www.lechler.com/de-en/medialibrary

Max. tank diameter [m]

0	1	2	3	4	5	6	7	8	9

Materials
Stainless steel 316L

Max. temperature
250 °C

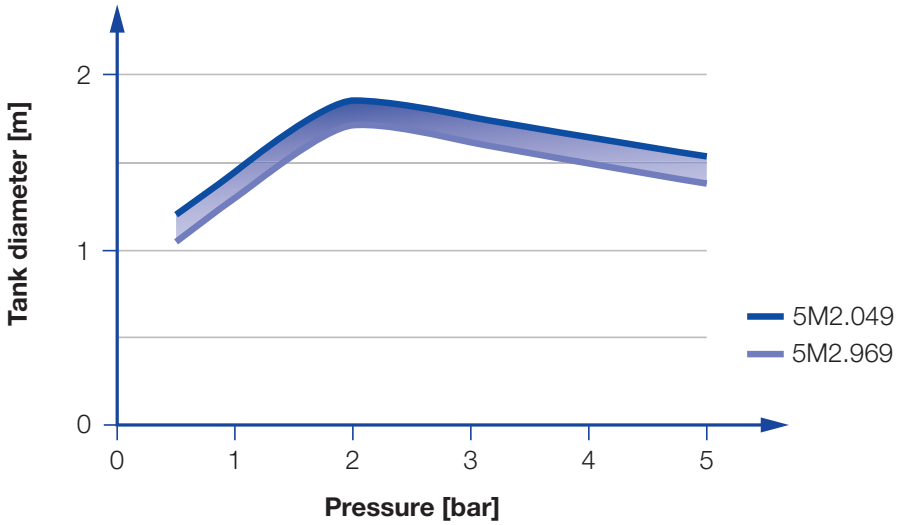
Recommended operating pressure
2 bar

Installation
Operation in every direction is possible

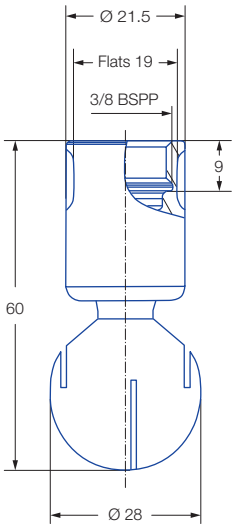
Filtration
Line strainer with a mesh size of 0.1 mm/170 Mesh

Bearing
Double ball bearing made of stainless steel 316L

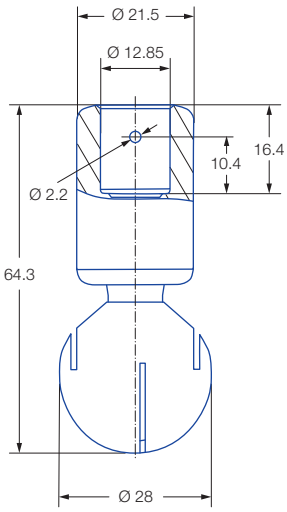
Adapter
3/8 BSPP is compatible with HygienicFit



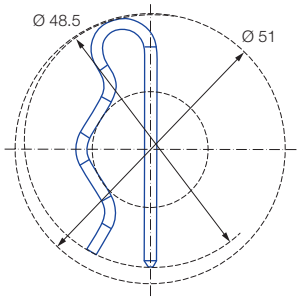
Overview of the tank diameter, depending upon the pressure of series 5M2



Female thread



1/2" Slip-on connection
Dimensions slip-on connection according to ASME-BPE (OD-tube)



Dimensions slip-on connection top view

Spray angle	Ordering number: Type	Connection: 3/8 BSPP	Connection: 1/2" Slip-on	E Ø [mm]	V̇ [l/min] p [bar] (p$_{max}$ = 7 bar): 1	2	3	at 40 psi [US gal./ min]	Max. tank diameter [m]
60°	**5M2.952.1Y**	**AF**	**TF05**	1,5	16	23	28	7	-
	5M2.042.1Y	**AF**	**TF05**	3,0	28	40	49	12	-
180°	**5M2.004.1Y**	**AF**	**TF05**	0,9	22	32	39	10	1,8
360°	**5M2.969.1Y**	**AF**	**TF05**	0,8	18	25	31	8	1,7
	5M2.049.1Y	**AF**	**TF05**	0,9	28	39	48	12	1,8

E = narrowest free cross-section
NPT, slip-on connection and weld-on versions on request

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

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

- Split pin made of 316L SS is included. (Ordering no. 05M.230.1Y.00.00.0).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.
- Minimum insertion diameter (with mounted split pin) is 48,5 mm.

Example of ordering with ATEX approval. FDA and (EG) 1935/2004 conform.
Only material 316L SS available with ATEX approval.
Unit group / category / zones:
Ⓔx II 1G Ex h IIB T6…T2 Ga
Ⓔx II 1D Ex h IIIC T85 °C…T250 °C Da

Example of ordering:	Type 5M2.952	+ Mat. no. + 1Y	+ Connection + AF	= Ordering no. = 5M2.952.1Y.AF.EX

Attention: for the ATEX version of the slip-connection the code for the connection changes. Ordering example for connection: 5M2.042.1Y.T1.EX

Example of ordering with FDA and (EC) 1935/2004 conformity.

All Materials are suitable for contact with food.

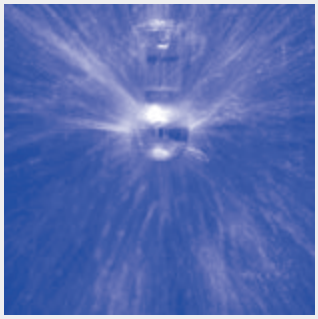
Example of Ordering:	Type 5M2.952.1Y	+	Connection AF	= Ordering no. = 5M2.952.1Y.AF

Rotating cleaning nozzle »MiniSpinner 2« Series 5M3

Series 5M3

The MiniSpinner 2 convinces with its popular design and effective cleaning. The MiniSpinner 2 is made entirely from stainless steel and designed for use also at high temperatures. It is available with many different flow rates and spray angles.

NEW



Function video
Scan the QR-Code or go to:
www.lechler.com/de-en/medialibrary

Max. tank diameter [m]

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Materials
Stainless steel 316L

Max. temperature
250 °C

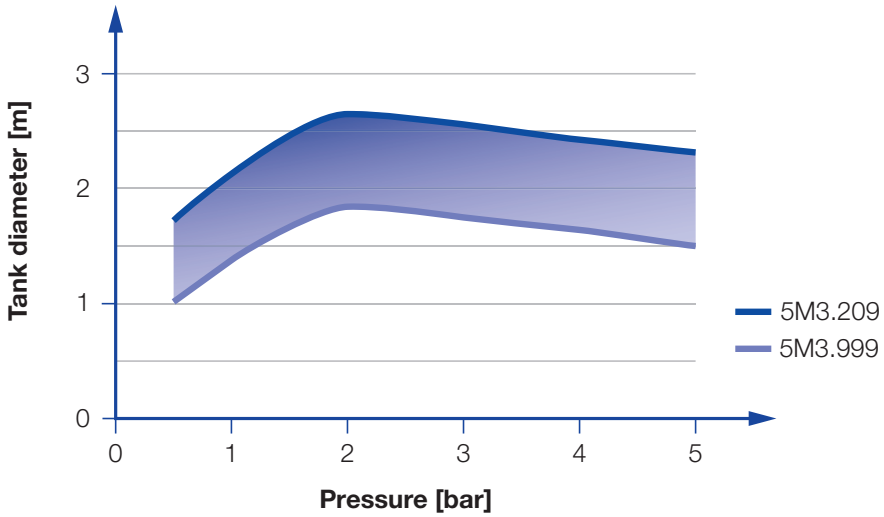
Recommended operating pressure
2 bar

Installation
Operation in every direction is possible

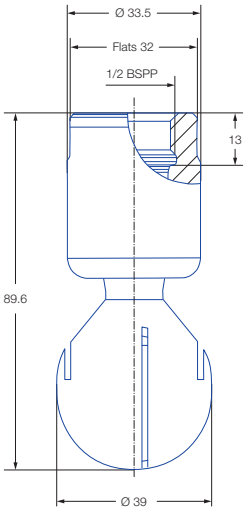
Filtration
Line strainer with a mesh size of 0.1 mm/170 Mesh

Bearing
Double ball bearing made of stainless steel 316L

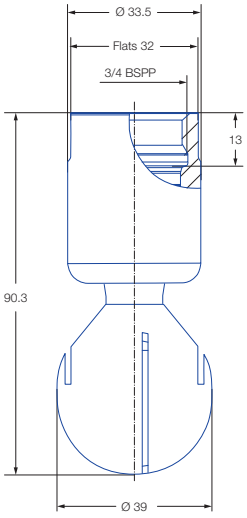
Adapter
1/2 BSPP and 3/4 BSPP are compatible with HygienicFit



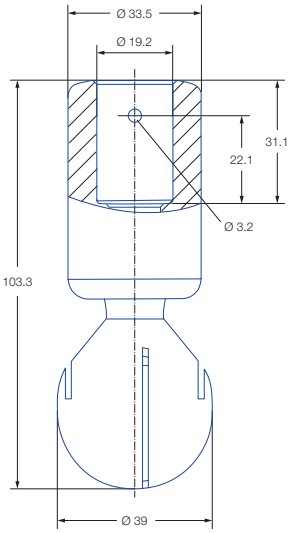
Overview of the tank diameter, depending upon the pressure of series 5M3



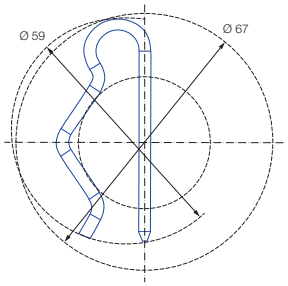
Female thread



Female thread



3/4" Slip-on connection
Dimensions slip-on connection
according to ASME-BPE (OD-tube)



Dimensions
slip-on connection
top view

Spray angle	Ordering number: Type	Connection: 1/2 BSPP	Connection: 3/4 BSPP	Connection: 3/4" Slip-on	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 7 bar): 1	2	3	at 40 psi [US gal./ min]	Max. tank diameter [m]
60°	**5M3.122.1Y**	**AH**	**-**	**TF07**	2,6	45	63	77	20	-
180°	**5M3.133.1Y**	**-**	**AL**	**TF07**	1,2	47	67	82	21	2,6
180°	**5M3.134.1Y**	**-**	**AL**	**TF07**	1,3	47	67	82	21	2,6
360°	**5M3.999.1Y**	**-**	**AL**	**TF07**	0,4	21	30	37	9	1,8
	5M3.089.1Y	**-**	**AL**	**TF07**	0,7	35	49	60	15	2,1
	5M3.139.1Y	**-**	**AL**	**TF07**	0,8	49	69	85	21	2,3
	5M3.209.1Y	**-**	**AL**	**TF07**	1,5	71	100	122	31	2,6

E = narrowest free cross-section
NPT, slip-on connection and weld-on versions on request

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

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

- Split pin made of 316L SS is included. (Ordering no.: 05M.330.1Y.00.00.0).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.
- Minimum insertion diameter (with mounted split pin) is 59 mm.

Example of ordering with ATEX approval. FDA and (EG) 1935/2004 conform.
Only material 316L SS available with ATEX approval.

Unit group / category / zones:
Ⓔx II 1G Ex h IIB T6…T2 Ga
Ⓔx II 1D Ex h IIIC T85 °C…T250 °C Da

Example of ordering:	Type	+ Mat. no.	+ Connection	= Ordering no.
	5M3.122	+ 1Y	+ AH	= 5M3.122.1Y.AH.EX

Attention: for the ATEX version of the slip-connection the code for the connection changes. Ordering example for connection: 5M3.122.1Y.T2.EX

Example of ordering with FDA and (EC) 1935/2004 conformity.

All Materials are suitable for contact with food.

Example of ordering:	Type	+	Connection	= Ordering no.
	5M3.122.1Y	+	AH	= 5M3.122.1Y.AH

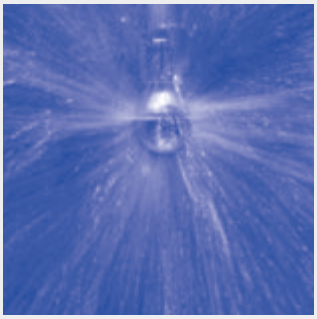
Rotating cleaning nozzle »MaxiSpinner 2«
Series 5M4

NEW

Series 5M4

The newly developed MaxiSpinner 2 is similar to the Mini, Micro and NanoSpinner 2 series in many respects. As the largest product of this series, it also convinces with effective cleaning results and a reliable as well as durable bearing construction. The MaxiSpinner 2 is made entirely of stainless steel (316L) and is also designed for high ambient temperatures.

FDA



Function video
Scan the QR-Code or go to:
www.lechler.com/de-en/medialibrary

Max. tank diameter [m]

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Materials
Stainless steel 316L

Max. temperature
250 °C

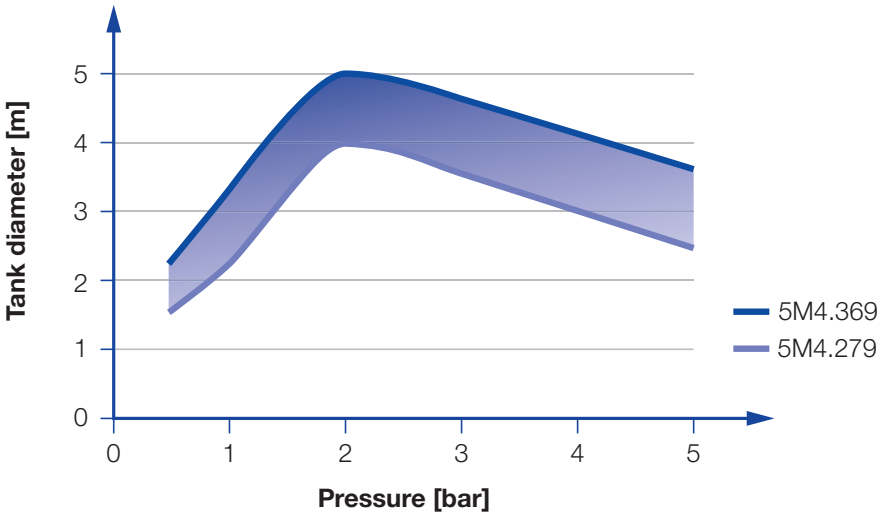
Recommended operating pressure
2 bar

Installation
Operation in every direction is possible

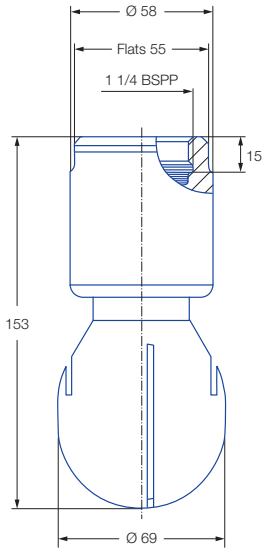
Filtration
Line strainer with a mesh size of 0.1 mm/170 Mesh

Bearing
Double ball bearing made of stainless steel 316L

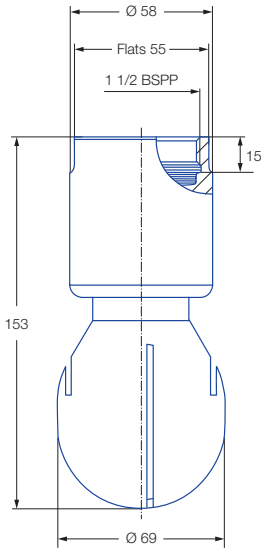
Adapter
1 1/4 BSPP and 1 1/2 BSPP are compatible with HygienicFit



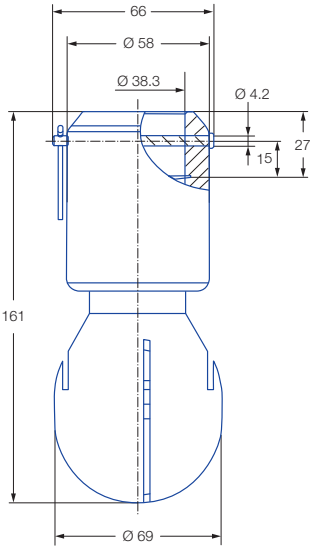
Overview of the tank diameter, depending upon the pressure of series 5M4



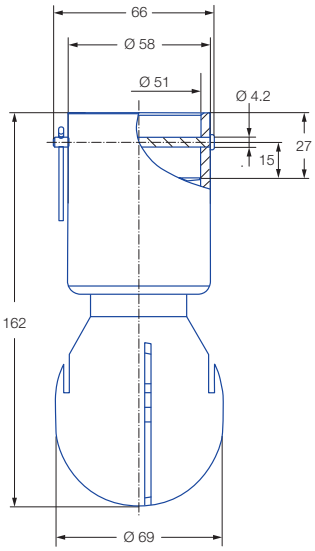
Female thread



Female thread



1 1/2” slip-on connection
Dimensions slip-on connection
according to ASME-BPE (OD-tube)



2” slip-on connection
Dimensions slip-on connection
according to ASME-BPE (OD-tube)

Spray angle	Ordering number: Type	Connection: 1 1/4 BSPP	Connection: 1 1/2 BSPP	Connection: 1 1/2” Slip-on	Connection: 2” Slip-on	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 7 bar)*: 1	2	3	at 40 psi [US gal./ min]	Max. tank diameter [m]
180°	**5M4.253.1Y**	**AQ**	**AS**	**TF15**	**TF20**	1.8	95	135	165	42	4.0
180°	**5M4.254.1Y**	**AQ**	**AS**	**TF15**	**TF20**	2.1	95	135	165	42	4.0
270°	**5M4.365.1Y**	**AQ**	**AS**	**TF15**	**TF20**	2.5	177	250	306	78	5.0
360°	**5M4.279.1Y**	**AQ**	**AS**	**TF15**	**TF20**	1.7	107	150	184	46	4.0
	5M4.329.1Y	**AQ**	**AS**	**TF15**	**TF20**	2.0	141	200	245	62	4.5
	5M4.369.1Y	**AQ**	**AS**	**TF15**	**TF20**	2.3	177	250	306	78	5.0

E = narrowest free cross-section
NPT and weld-on versions on request
* Please note the maximum operating pressure of 4 bar for the 2" slip-on version (TF.20).

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

- Bolt with head incl. pin made of stainless steel 316L included. (Ordering no. 05M.431.1Y.00.00.0)
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.
- Minimum insertion diameter (with mounted bolt) is the same as for the threaded variants 69 mm.

Example of ordering with ATEX approval. FDA and (EG) 1935/2004 conform.
Only material 316L SS available with ATEX approval.

Unit group / category / zones:
Ⓔx II 1G Ex h IIB T6…T2 Ga
Ⓔx II 1D Ex h IIIC T85 °C…T250 °C Da

Example of ordering:	Type	+ Mat. no.	+ Connection	= Ordering no.
	5M4.369	+ 1Y	+ AQ	= 5M4.369.1Y.AQ.EX

Example of ordering with FDA and (EC) 1935/2004 conformity.

All Materials are suitable for contact with food.

Example of Ordering:	Type	+	Connection	= Ordering no.
	5M4.369.1Y	+	AQ	= 5M4.369.1Y.AQ

Attention: for the ATEX version of the 1 1/2” slip-connection and the 2” slip-connection the code for the connection changes. Ordering example for 1 1/2” connection: 5M4.369.1Y.T5.EX. Ordering example for 2” connection: 5M4.369.1Y.T6.EX.

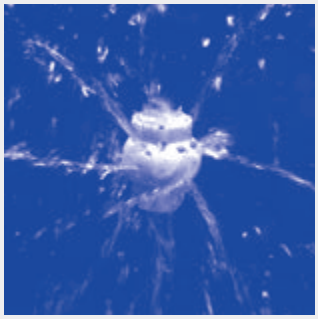
Rotating cleaning nozzles »PTFE Whirly«
Series 573/583

Series 573/583

The PTFE Whirly is of particular interest 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 has a 3-A certification and can be used in areas subject to particularly high hygiene requirements, such as contact with food.

FDA

3-A



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

Max. tank diameter [m]

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Material
PTFE

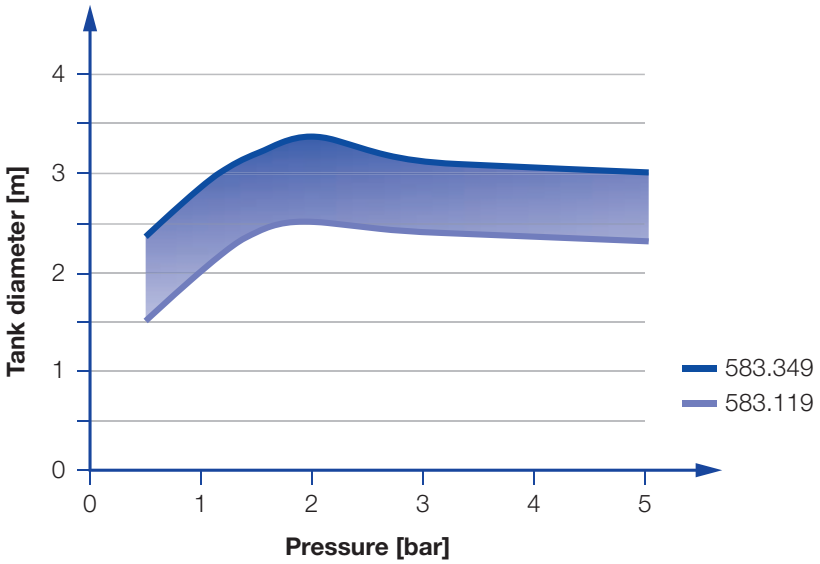
Max. temperature
95 °C (versions for use with higher temperature (130 °C) on request)

Recommended operating pressure
2 bar

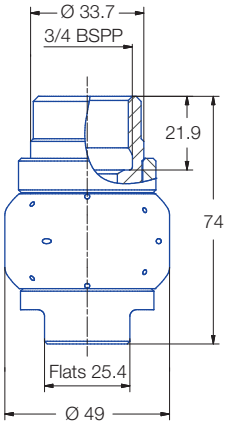
Installation
Operation in every direction is possible

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

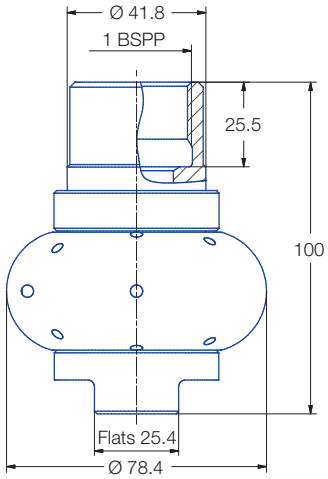
Bearing
Slide bearing made of PTFE



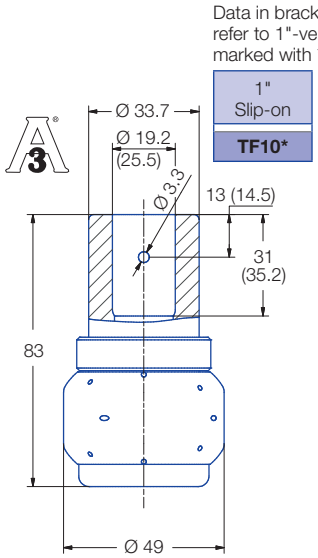
Overview of the tank diameter, depending upon the pressure of series 573/583



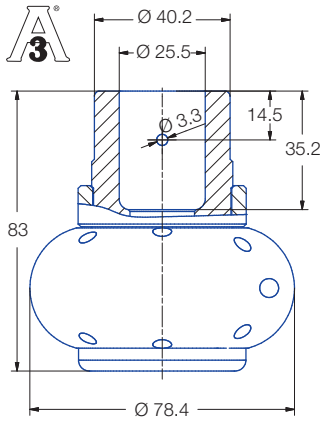
Female thread



Female thread



3/4" and 1" Slip-on connection (conforming to 3-A) Dimensions according to ASME-BPE (OD-tube)



1" Slip-on connection (conforming to 3-A) Dimensions according to ASME-BPE (OD-tube)

Spray angle	R-clip	Ordering no. Type	Connection 3/4 BSPP	Connection 1 BSPP	Connection 3/4" Slip-on	Connection 1" Slip-on	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 6 bar) 1	2	3	at 40 psi [US gal/min]	Max. tank diameter [m]
270°	1)	**583.116.55**	**AL**	**-**	**TF07**	**-**	2.4	47	67	82	21	2.5
	2)	**583.346.55**	**-**	**-**	**-**	**TF10**	5.9	159	225	276	70	3.2
270°	1)	**573.116.55**	**AL**	**-**	**TF07**	**-**	2.4	47	67	82	21	2.5
360°	1)	**583.119.55**	**AL**	**-**	**TF07**	**TF10***	1.8	41	58	71	18	2.4
	1)	**583.209.55**	**AL**	**-**	**TF07**	**TF10***	3.5	71	100	122	31	2.5
	1)	**583.269.55**	**AL**	**-**	**TF07**	**-**	4.8	103	145	178	45	2.8
	2)	**583.279.55**	**-**	**AN**	**-**	**TF10**	3.7	106	150	184	47	3.0
	2)	**583.349.55**	**-**	**AN**	**-**	**TF10**	5.6	159	225	276	70	3.2

E = narrowest free cross-section · NPT on request
* See drawing 3 for details

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 has negative effects on the cleaning result and wear.

Slip-on information

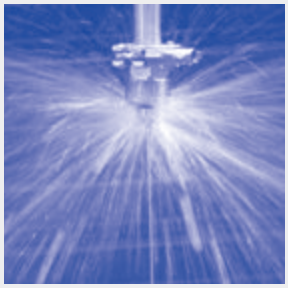
- R-clip made of 316L SS is included (Ordering no.: R-clip 1: 095.013.17.06.60,
- R-clip 2: 095.013.17.06.61).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

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

Retractable rotating cleaning nozzle »PopUp Whirly«
Series 5P2/5P3

Series 5P2/5P3

The PopUp Whirly is designed for cleaning in confined spaces and for tanks or pipelines where conventional cleaning systems could affect the process. The free-spinning rotating nozzle can be installed flush with the wall. When a certain liquid pressure is applied, the rotating cleaning nozzle of the PopUp Whirly extends automatically and starts cleaning. The PopUp Whirly is also suitable for pipe cleaning and for applications that use foam. It is particularly interesting for applications in the food and beverage industry as well as in the chemical and pharmaceutical industry. The ATEX approval makes the PopUp Whirly suitable for use in explosive areas.



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

Max. tank diameter [m]

Materials
316L SS, 316Ti SS, 316 SS, FKM

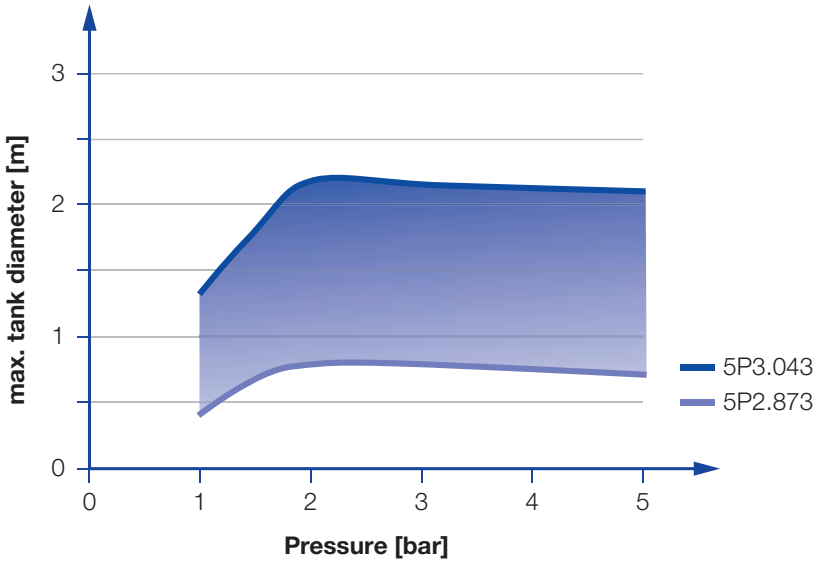
Max. temperature
140 °C

Recommended operating pressure
2 bar
5P2: opening pressure approx. 1.0 bar
closing pressure approx. 0.5 bar
5P3: opening pressure approx. 0.9 bar
closing pressure approx. 0.5 bar

Installation
Operation in every direction is possible

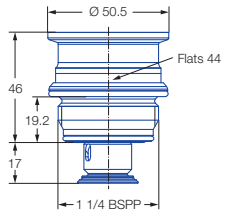
Filtration
Line strainer with a mesh size of 0.3 mm/50 mesh

Bearing
Slide bearing

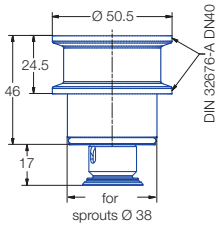


Overview of the tank diameter, depending upon the pressure of series 5P2/5P3

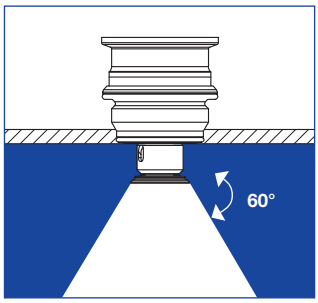
Series 5P2



Male thread



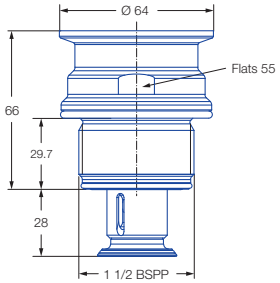
Tri-Clamp



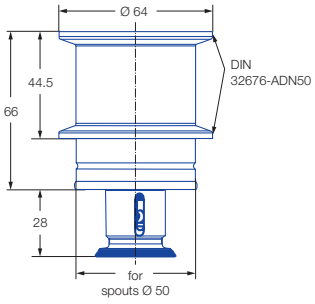
Spray angle	Ordering no.	Tank connection		E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 6 bar)				Max. tank diameter [m]
		1 1/4 BSPP	Tri-Clamp		1	2	3	at 40 psi [US gal/min]	
	5P2.873.1Y.AP	○	-	2.5	10.6	15.0	18.4	5	0.8
	5P2.873.1Y.00	-	○	2.5	10.6	15.0	18.4	5	0.8
	5P2.923.1Y.AP	○	-	3.5	14.1	20.0	24.5	6	1.0
	5P2.923.1Y.00	-	○	3.5	14.1	20.0	24.5	6	1.0

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.

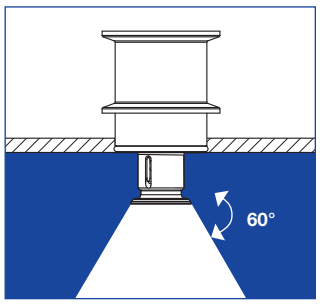
Series 5P3



Male thread



Tri-Clamp

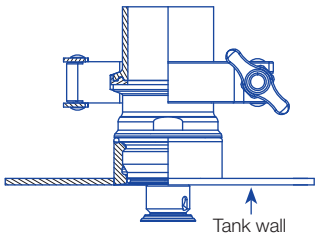


Spray angle	Ordering no.	Tank connection		E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 6 bar)				Max. tank diameter [m]
		1 1/2 BSPP	Tri-Clamp		1	2	3	at 40 psi [US gal/min]	
	5P3.043.1Y.AR	○	-	3.3	28.3	40	49	12	2.2
	5P3.043.1Y.00	-	○	3.3	28.3	40	49	12	2.2

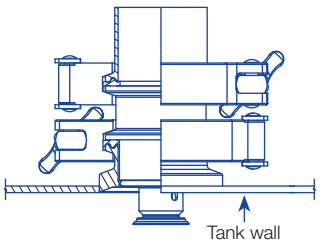
The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

Nozzle installation

With thread



With Tri-Clamp

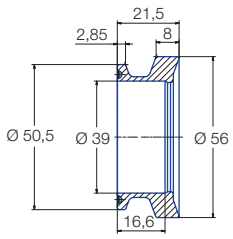


Information on operation

- The PopUp Whirly 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.

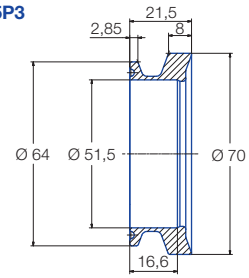
Weld-in flange for Tri-Clamp-Version

5P2



Ord.-no. 050.020.1Y.01.00

5P3



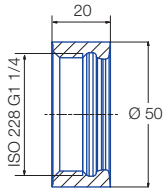
Ord.-no. 050.020.1Y.01.01

Information
Gasket with a thickness of 2 mm must be used if the PopUp Whirly is installed with this weld-in flange.

Material
316L SS

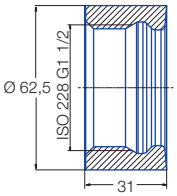
Weld-in socket for Thread-Version

5P2



Ord.-no. 050.020.1Y.AQ.00

5P3



Ord.-no. 050.020.1Y.AS.00

Information
The thread is hygienically sealed with 2 O-rings included in the scope of delivery.

Material
316L SS

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

All Materials are suitable for contact with food.

Example of ordering:	Type 5P2.873.1Y	+ Connection + AP	= Ordering no. = 5P2.873.1Y.AP

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

Only material 316L SS available with ATEX approval.

Unit group / category / zones

Ⓔx II 1G Ex h IIB T6...T3 Ga

Ⓔx II 1D Ex h IIIC T85 ° C...T170 ° C Da

Example of ordering:	Type 5P2.873	+ Mat.-No. + 1Y	+ Connection + AP	= Ordering no. = 5P2.873.1Y.AP.EX

EFFICIENT REMOVAL OF LIGHT AND MEDIUM SOILING

Cleaning efficiency class 3

Due to their special nozzle geometry and flow rates from 11 to 639 l/min at 2 bar, 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 and 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 Whirly series is also available as an ATEX version and can therefore also be used in explosive environments.

Operating principles
Free-spinning

Flow rates at 2 bar
11 to 639 l/min

Recommended operating pressures
2 to 3 bar

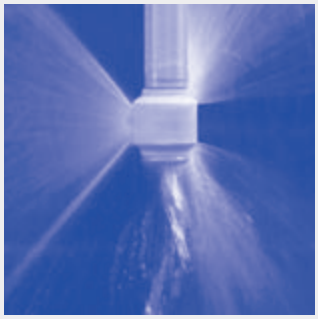
Max. temperatures
90 to 140 °C

Rotating cleaning nozzles »HygienicWhirly« Series 594/595

Series 594/595

The HygienicWhirly with its highly effective flat jets is particularly suited for high hygiene requirements and for the application of foam. Operation at low pressure with good cleaning effect is also possible.

FDA



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

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

Materials
316L SS, PEEK, Slip-on connection version: O-ring made of EPDM

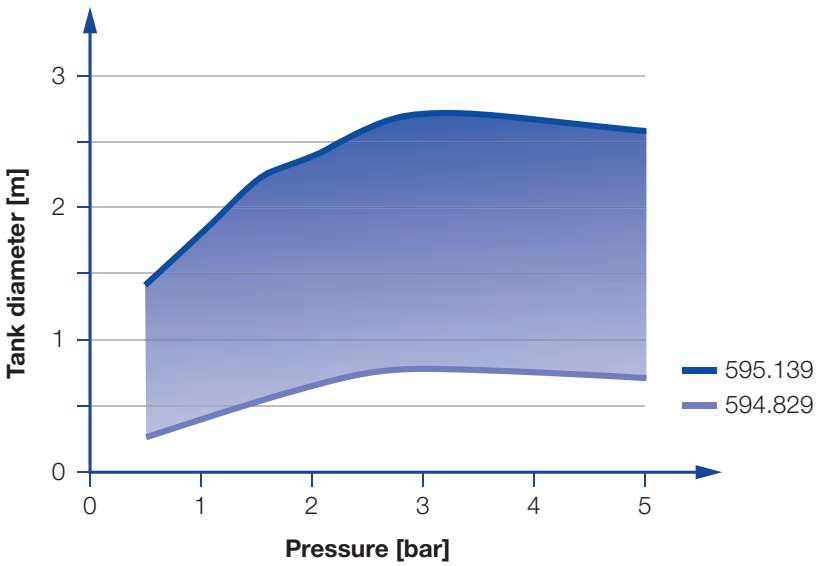
Max. temperature
100 °C, short-term up to 140 °C

Recommended operating pressure
3 bar

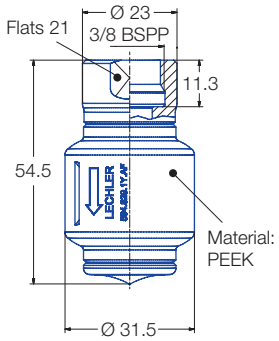
Installation
Operation in every direction is possible

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

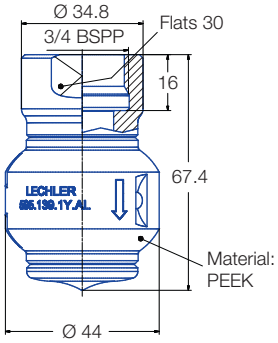
Bearing
Slide bearing made of PEEK



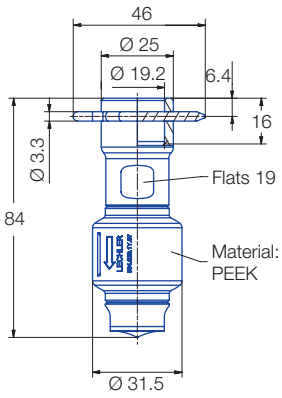
Overview of the tank diameter, depending upon the pressure of series 594/595



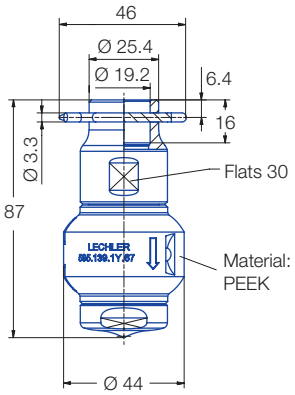
Standard version
Female tread
59X.XX9.1Y.AF



Standard version
Female tread
595.139.1Y.AL



Dimensions slip-on connection
according to ASME-BPE (OD-tube)
59X.XX9.1Y.67



Dimensions slip-on connection
according to ASME-BPE (OD-tube)
595.139.1Y.67

Spray angle	Ordering no.				E Ø [mm]	V̇ [l/min]					Max. tank diameter [m]
	Type	Connection				p [bar] (p_{max} = 5 bar)					
		3/8 BSPP female	3/4 BSPP female	3/4" Slip-on		0.5	1	2	3	at 40 psi [US gal/min]	
360°	**594.829.1Y**	**AF**	**-**	**67**	1.7	6	8	11	14	3	0.8
	594.879.1Y	**AF**	**-**	**67**	2.5	8	11	15	18	5	1.2
	595.009.1Y	**AF**	**-**	**67**	4.0	16	22	32	39	10	1.5
	595.049.1Y	**AF**	**-**	**67**	4.2	20	28	40	49	12	2.0
	595.139.1Y	**-**	**AL**	**67**	5.0	34	47	67	82	21	2.7

E = narrowest free cross-section · NPT on request

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

Information on operation

- Operation with compressed air only for short-term usage. Operation above the recommended operating pressure has negative effects on the cleaning result and wear.

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

Slip-on information

- R-clip made of 316L SS 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 connecting pipe and rotating cleaning nozzle.

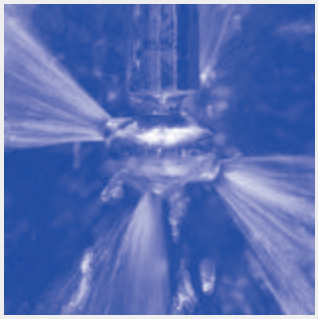
Rotating cleaning nozzle »Whirly 2«
Series 5W9

Series 5W9

Popular and proven:
the design of the Whirly 2.
It generates effective flat jets, offers various connection options and is available in a very wide range of flow rates. It is also available in an ATEX-approved version and in a range of versions with different spray angles.

NEW

FDA



Function video
www.lechler.com/de-en/medialibrary
Or scan the QR Code.

Max. tank diameter [m]

0	1	2	3	4	5	6	7	8

Materials
316L, PEEK

Max. temperature
140 °C

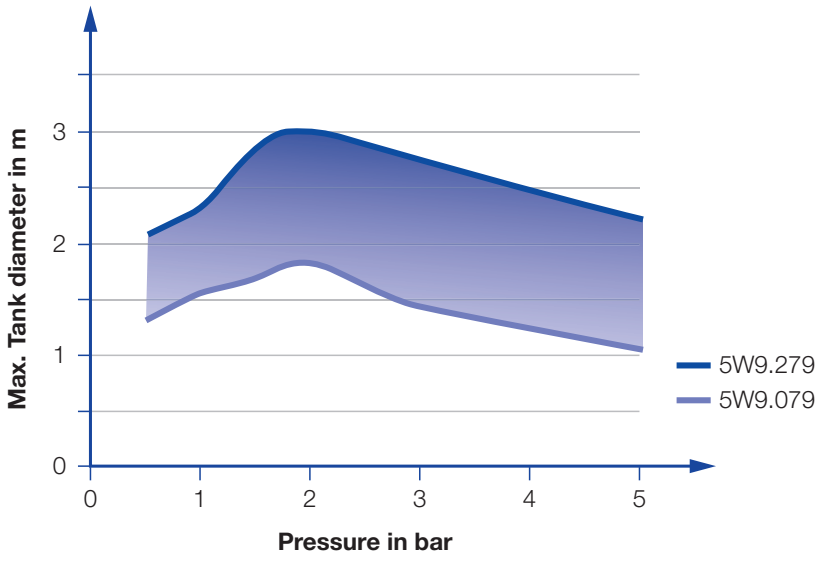
Recommended operating pressure
2 bar

Installation
Operation in every direction is possible

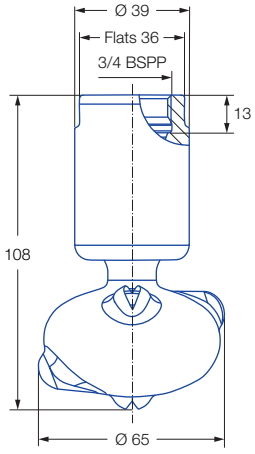
Filtration
Line strainer with a mesh size of 0.1 mm/170 Mesh

Bearing
Double ball bearing made of 316L

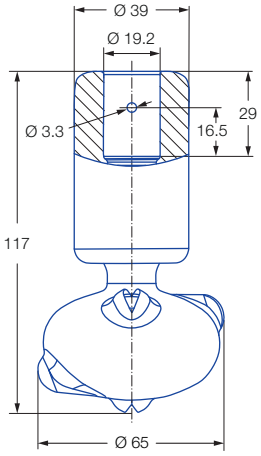
Adapter
3/4 BSPP
is compatible with HygienicFit



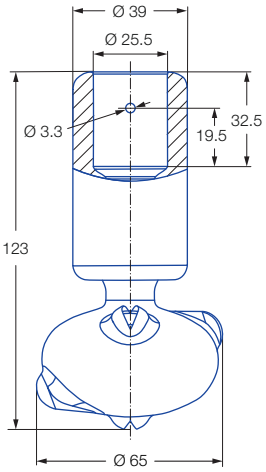
Overview of the maximum tank diameter, depending upon the pressure of series 5W9



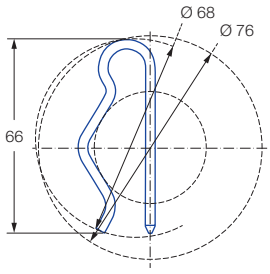
Female thread



Dimensions of the 3/4" slip-on connection according to ASME-BPE (OD-tube)



Dimensions of the 1" slip-on connection according to ASME-BPE (OD-tube)



Dimensions slip-on connection top-view

Spray angle	Ordering no. Type	Code 3/4 BSPP	Code 3/4" Connection	Code 1" Connection	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 6 bar) 1	2	3	at 40 psi [US gal./min]	Max. tank diameter [m]
270°	**5W9.075.1Y**	**AL**	**TF07**	**TF10**	2.0	34	48	59	15	1.8
	5W9.145.1Y	**AL**	**TF07**	**TF10**	2.8	50	71	87	22	2.1
	5W9.195.1Y	**AL**	**TF07**	**TF10**	3.3	69	97	119	30	2.6
270°	**5W9.076.1Y**	**AL**	**TF07**	**TF10**	2.0	34	48	59	15	1.8
	5W9.106.1Y	**AL**	**TF07**	**TF10**	2.5	41	58	71	18	2.1
	5W9.196.1Y	**AL**	**TF07**	**TF10**	3.4	69	97	119	30	2.6
360°	**5W9.079.1Y**	**AL**	**TF07**	**TF10**	1.6	34	48	59	15	1.8
	5W9.149.1Y	**AL**	**TF07**	**TF10**	2.4	50	71	87	22	2.1
	5W9.199.1Y	**AL**	**TF07**	**TF10**	3.0	69	97	119	30	2.6
	5W9.279.1Y	**AL**	**TF07**	**TF10**	3.5	103	145	178	45	3.0

E = narrowest free cross-section · NPT on request

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

Information on operation

- Operation with compressed air only for short-term usage. Operation above the recommended operating pressure has negative effects on the cleaning result and wear.

Slip-on information

- Split pin made of 316L SS is included (Ordering no.: 095.022.1Y.06.72.0).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.
- Minimum insertion diameter (with mounted split pin) is 68 mm.

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

Unit group/category/zones:
Ⓔx II 1G Ex h IIB T6…T3 Ga
Ⓔx II 1D Ex h IIIC T85 °C…T170 °C Da

Ordering	Type	+	Connection	=	Ordering no.
example:	5W9.075.1Y.XX.EX	+	AL	=	5W9.075.1Y.AL.EX

Example of ordering with FDA and (EC) 1935/2004 conformity.

All Materials are suitable for contact with food.

Ordering	Type	+	Connection	=	Ordering no.
example:	5W9.075.1Y.XX	+	AL	=	5W9.075.1Y.AL

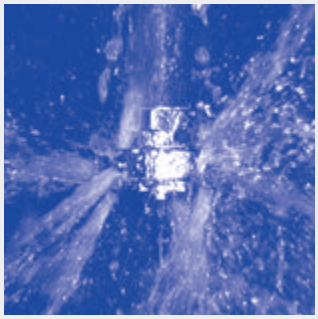
Attention: for the ATEX version of the slip-on connection the code for the connection changes. Ordering example for connection TF.07: 5W9.075.1Y.T2.EX/ ordering example for connection TF.10: 5W9.075.1Y.T3.EX

Rotating cleaning nozzles »Gyro«
Series 577

Series 577

The Gyro cleans with powerful nozzle inserts and is available in many flow rates and spray angles. It is also suitable for very large tanks and is insensitive to clogging.

FDA



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

Max. tank diameter [m]

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Materials
316L SS, PTFE

Max. temperature
90 °C

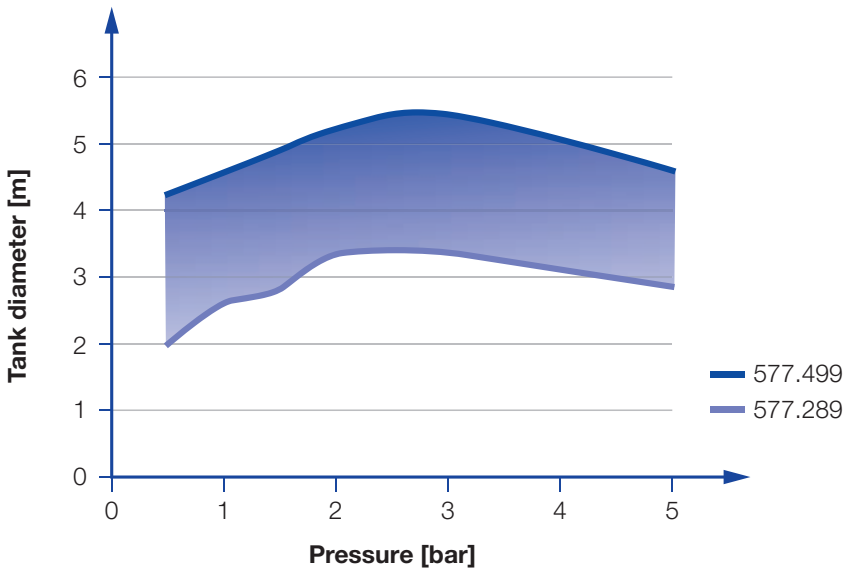
Recommended operating pressure
3 bar

Installation
Vertically facing downward

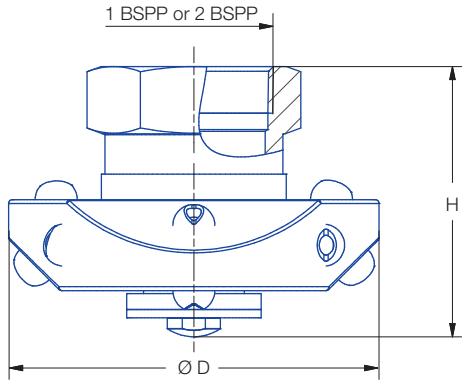
Filtration
Line strainer with a mesh size of 0.3 mm/50 mesh

Bearing
Slide bearing made of PTFE

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



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



Female thread

Spray angle	Ordering no.			$\dot{V}$ [l/min]					Dimensions		Max. tank diameter [m]
	Type	Connection		**p** [bar] (p_{max} = 5 bar)							
		1 BSPP	2 BSPP	1	2	3	5	at 40 psi [US gal/min]	Height H [mm]	Diameter D [mm]	
180°	**577.283.1Y**	**AN**	**-**	115	163	200	258	50	72	118	3.4
	577.363.1Y	**AN**	**-**	182	258	316	408	80	72	118	3.9
	577.403.1Y	**-**	**AW**	228	322	394	509	100	103	156	4.2
	577.433.1Y	**-**	**AW**	273	386	473	610	120	103	156	4.6
	577.523.1Y	**-**	**AW**	452	639	783	1,010	170	103	156	5.4
180°	**577.284.1Y**	**AN**	**-**	115	163	200	258	50	72	118	3.4
	577.364.1Y	**AN**	**-**	182	258	316	408	80	72	118	3.9
	577.404.1Y	**-**	**AW**	228	322	394	509	100	103	156	4.2
	577.434.1Y	**-**	**AW**	273	386	473	610	120	103	156	4.6
	577.494.1Y	**-**	**AW**	380	538	659	851	170	103	156	5.4
270°	**577.285.1Y**	**AN**	**-**	115	163	200	258	50	72	118	3.4
	577.365.1Y	**AN**	**-**	182	258	316	408	80	72	118	3.9
	577.405.1Y	**-**	**AW**	228	322	394	509	100	103	156	4.2
	577.435.1Y	**-**	**AW**	273	386	473	610	120	103	156	4.6
	577.495.1Y	**-**	**AW**	380	538	659	851	170	103	156	5.4
360°	**577.289.1Y**	**AN**	**-**	115	163	200	258	50	72	118	3.4
	577.369.1Y	**AN**	**-**	182	258	316	408	80	72	118	3.9
	577.409.1Y	**-**	**AW**	228	322	394	509	100	103	156	4.2
	577.439.1Y	**-**	**AW**	273	386	473	610	120	103	156	4.6
	577.499.1Y	**-**	**AW**	380	538	659	851	170	103	156	5.4

NPT on request

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

Information on operation

- Operation with compressed air only for short-term usage. Operation above the recommended operating pressure has negative effects on the cleaning result and wear.

Example for Ordering:	Type	+	Connection	=	Ordering no.
	577.283.1Y.	+	AN	=	577.283.1Y.AN

EFFECTIVE REMOVAL OF HEAVY SOILING

Cleaning efficiency class 4

The Lechler products in this class have controlled rotating cleaning nozzles. They are suitable for contact with food and the cleaning of large tanks. The cleaning nozzles of cleaning efficiency class 4 are available in many different sizes and flow rates.

The efficient flat spray nozzle geometry of the rotating cleaners in cleaning efficiency class 4 ensures the removal of heavy soiling at temperatures of up to 140 °C. Process reliability is increased through combination with the Lechler rotation monitoring sensor.

Max. tank diameter [m]

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Operating principles
Controlled rotation

Flow rates at 2 bar
25 to 300 l/min

Recommended operating pressures
3 to 5 bar

Max. temperatures
95 to 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.

FDA

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

Max. tank diameter [m]

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

Max. temperature
95 °C

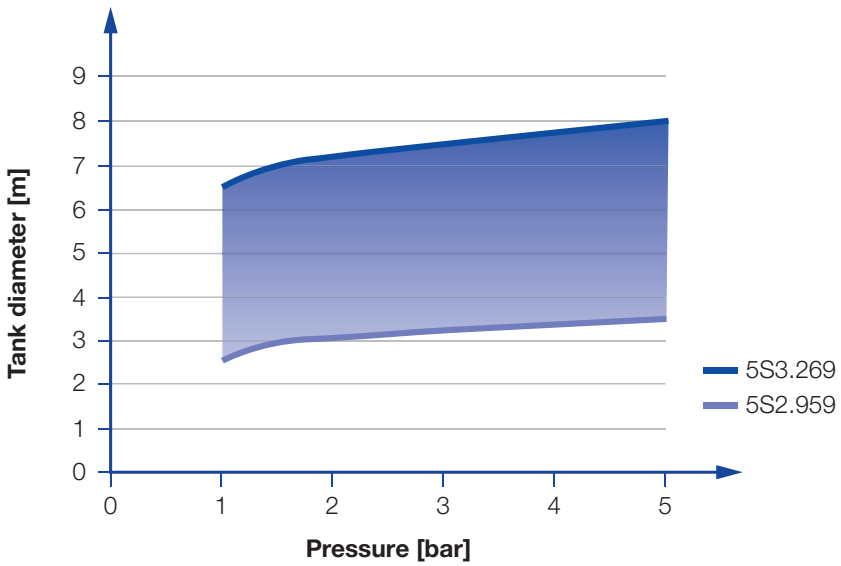
Recommended operating pressure
5 bar

Installation
Operation in every direction is possible

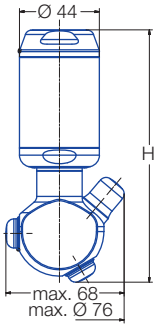
Filtration
Line strainer with a mesh size of 0.3 mm/50 mesh

Bearing
Double ball bearing

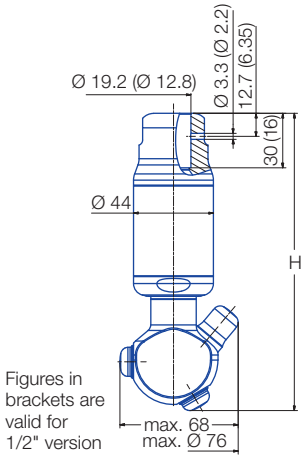
Rotation monitoring sensor
Sensor compatible
Info: see page 65



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



Female thread



Dimensions slip-on connection according to ASME-BPE (OD-tube)

Nozzle dimensions [mm]

Connection	Max. Height [H]
AF	146
AH	149
AL	139
AN	139
TF05	148
TF07	164

Spray angle	Ordering no.							E Ø [mm]	V̇ [l/min]				Max. tank diameter [m]
	Type	Connection							p [bar] (p_{max} = 15 bar)				
		3/8 BSPP female	1/2 BSPP female	3/4 BSPP female	1 BSPP female	1/2" Slip-on	3/4" Slip-on		2	5	10	at 40 psi [US gal/min]	
180°	**5S2.953.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.7	25	40	57	7.8	3.5
	5S3.053.1Y	**-**	**AH**	**-**	**-**	**-**	**TF07**	2.0	41	65	92	12.8	4.0
	5S3.113.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.0	60	94	133	18.4	6.0
	5S3.183.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	89	141	199	27.7	7.0
	5S3.233.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	111	175	248	34.3	7.5
	5S3.263.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	2.0	135	213	301	41.8	8.0
180°	**5S2.954.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.7	25	40	57	7.8	3.5
	5S3.054.1Y	**-**	**AH**	**-**	**-**	**-**	**TF07**	2.0	41	65	92	12.8	4.0
	5S3.114.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.0	60	94	133	18.4	6.0
	5S3.184.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	89	141	199	27.7	7.0
	5S3.234.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	111	175	248	34.3	7.5
	5S3.264.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	2.0	135	213	301	41.8	8.0
270°	**5S2.955.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.7	25	40	57	7.8	3.5
	5S3.055.1Y	**-**	**AH**	**-**	**-**	**-**	**TF07**	2.0	41	65	92	12.8	4.0
	5S3.115.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.0	60	94	133	18.4	6.0
	5S3.185.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	89	141	199	27.7	7.0
	5S3.235.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	111	175	248	34.3	7.5
	5S3.265.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	2.0	135	213	301	41.8	8.0
270°	**5S2.956.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.7	25	40	57	7.8	3.5
	5S3.056.1Y	**-**	**AH**	**-**	**-**	**-**	**TF07**	2.0	41	65	92	12.8	4.0
	5S3.116.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.0	60	94	133	18.4	6.0
	5S3.186.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	89	141	199	27.7	7.0
	5S3.236.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	111	175	248	34.3	7.5
	5S3.266.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	2.0	135	213	301	41.8	8.0
360°	**5S2.959.1Y**	**AF**	**AH**	**-**	**-**	**TF05**	**-**	1.5	25	40	57	7.8	3.5
	5S3.059.1Y	**-**	**AH**	**-**	**-**	**-**	**TF07**	2.0	41	65	92	12.8	4.0
	5S3.119.1Y	**-**	**AH**	**AL**	**-**	**-**	**TF07**	2.0	60	94	133	18.4	6.0
	5S3.189.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	89	141	199	27.7	7.0
	5S3.239.1Y	**-**	**-**	**AL**	**-**	**-**	**TF07**	2.0	111	175	248	34.3	7.5
	5S3.269.1Y	**-**	**-**	**AL**	**AN**	**-**	**TF07**	2.0	135	213	301	41.8	8.0

E = narrowest free cross-section · NPT on request

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

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

Information on operation

- Operation with compressed air only for short-term usage. Operation above the recommended operating pressure has negative effects on the cleaning result and wear.

Slip-on information

- R-clip made of 316L SS 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.

Example of ordering with ATEX approval.
No FDA and (EC) 1935/2004 conformity.

Unit group/category/zones:

Ⓔx II 1G Ex h IIB T6…T3 Ga

Ⓔx II 1D Ex h IIIC T85 °C…T150 °C Da

Example of Ordering:	Type	+	Connection	=	Ordering no.
	5S2.953.1Y.XX.EX	+	AL	=	5S2.953.1Y.AL.EX

Example of ordering with FDA and (EC) 1935/2004 conformity.

All Materials are suitable for contact with food.

FDA

Example of Ordering:	Type	+	Connection	=	Ordering no.
	5S2.953.1Y.XX	+	AL	=	5S2.953.1Y.AL

ATTENTION: For the **ATEX** version of the slip-on connection the code for the connection changes.
For a 5S2.XXX.1Y.**TF.05** with ATEX the order number changes to 5S2.XXX.1Y.**T5.EX**
For a 5S3.XXX.1Y.**TF.07** with ATEX the order number changes to 5S3.XXX.1Y.**T7.EX**

Rotating cleaning nozzle »XactClean HP+«
Series 5S5

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.

FDA

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

Max. tank diameter [m]

Material
316L SS, 316 SS, PEEK, EPDM

Max. temperature
95 °C

Recommended operating pressure
3 bar

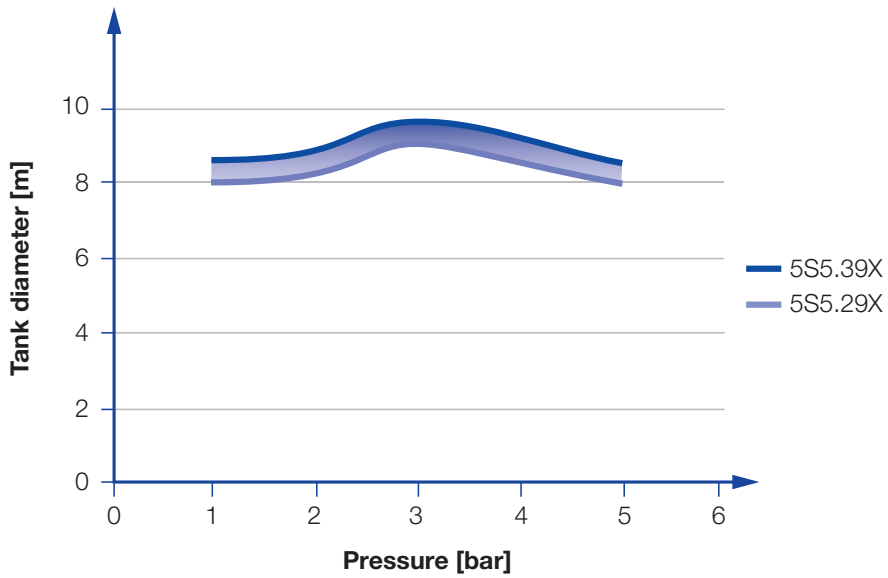
Installation
Operation in every direction is possible

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

Bearing
Double ball bearing

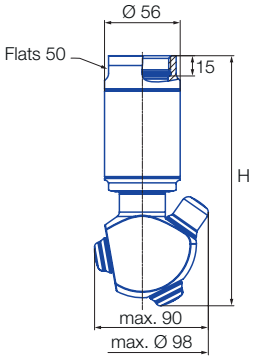
Rotation monitoring sensor
Sensor compatible, Info: see page 65.

Adapter
1 BSPP, 1 1/4 BSPP and 1 1/2 BSPP are compatible with HygienicFit

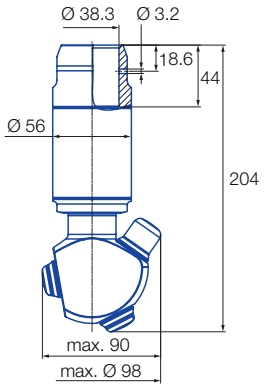


Overview of the tank diameter, depending upon the pressure of series 5S5

4 Cleaning efficiency class



Female thread



Dimensions slip-on connection according to ASME-BPE (OD-tube)

Nozzle dimensions [mm]

Connection	Max. Height [H]
AN	185
AQ	185
AS	187

Spray angle	Ordering no.					E Ø [mm]	V̇ [l/min]				Max. tank diameter [m]
	Type	Connection					p [bar] (p_{max} = 10 bar)				
		1 BSPP	1 1/4 BSPP	1 1/2 BSPP	1 1/2" Slip-on		2	3	5	at 40 psi [US gal/ min]	
180°	**5S5.293.1Y**	**AN**	**-**	**-**	**TF15**	3.0	165	202	261	51.2	9.0
	5S5.323.1Y	**AN**	**AQ**	**-**	**TF15**	3.0	200	245	316	62.0	9.2
	5S5.363.1Y	**-**	**AQ**	**AS**	**TF15**	3.0	250	306	395	77.6	9.4
180°	**5S5.294.1Y**	**AN**	**-**	**-**	**TF15**	3.0	165	202	261	51.2	9.0
	5S5.324.1Y	**AN**	**AQ**	**-**	**TF15**	3.0	200	245	316	62.0	9.2
	5S5.364.1Y	**-**	**AQ**	**AS**	**TF15**	3.0	250	306	395	77.6	9.4
270°	**5S5.295.1Y**	**AN**	**-**	**-**	**TF15**	3.0	165	202	261	51.2	9.0
	5S5.325.1Y	**AN**	**AQ**	**-**	**TF15**	3.0	200	245	316	62.0	9.2
	5S5.365.1Y	**-**	**AQ**	**AS**	**TF15**	3.0	250	306	395	77.6	9.4
270°	**5S5.296.1Y**	**AN**	**-**	**-**	**TF15**	3.0	165	202	261	51.2	9.0
	5S5.326.1Y	**AN**	**AQ**	**-**	**TF15**	3.0	200	245	316	62.0	9.2
	5S5.366.1Y	**-**	**AQ**	**AS**	**TF15**	3.0	250	306	395	77.6	9.4
360°	**5S5.299.1Y**	**AN**	**-**	**-**	**TF15**	3.0	165	202	261	51.2	9.0
	5S5.329.1Y	**AN**	**AQ**	**-**	**TF15**	3.0	200	245	316	62.0	9.2
	5S5.369.1Y	**-**	**AQ**	**AS**	**TF15**	3.0	250	306	395	77.6	9.4
	5S5.399.1Y	**-**	**AQ**	**AS**	**TF15**	3.0	300	367	474	93.1	9.6

E = narrowest free cross-section · NPT on request

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

Information on operation

- Operation with compressed air only for short-term usage. Operation above the recommended operating pressure has negative effects on the cleaning result and wear.

Slip-on information

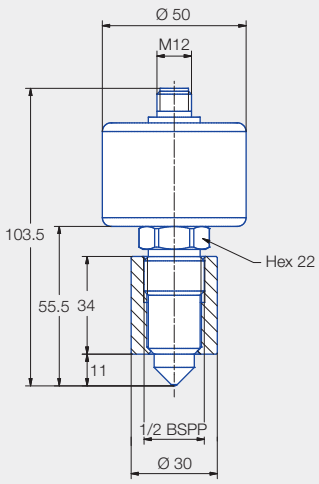
- R-clip made of 316L SS is included (Ordering no.: 095.013.1Y.06.45.0).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

Example of ordering:	Type	+	Connection	=	Ordering no.
	5S5.293.1Y.	+	**AN**	=	**5S5.293.1Y.AN**

Rotation Monitoring Sensor

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

FDA



Electrical data
- Supply voltage: Ub = 24 V +/–20% (18 to 32 VDC)
- Power requirements: < 20 mA
- Output signal: PNP, 50 mA short circuit protected, active

Operating conditions
- Ambient temperature: –10° up to +60 °C
- Process temperature: 0° up to +100 °C

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

Operating principle
- Capacitive

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

Ordering data	Ordering no.
Rotation monitoring sensor with weld-in sleeve	050.040.00.00.00.0
Cable set for first-time operation	050.040.00.00.01.0

Rotation monitoring sensor with weld-in sleeve

Cable set for first-time operation/installation

Main adapter with cable

USB adapter with cable

Programming adapter Y-piece

Weld-in mandrel

* Software download (free of charge): www.lechler.com/software/rotationcontrolsystem

THE EFFECTIVE MEDIUM AGAINST THE MOST PERSISTENT SOILING

Cleaning efficiency class 5

Persistent soiling requires special measures. That's why the Lechler high impact tank cleaning nozzles in efficiency class 5 are equipped with high-grade gear units and work with deliberately controlled rotation. They prove their capabilities in tasks in the food and beverage industry, the chemical and petrochemical industry and the paper industry.

Solid jet nozzles ensure maximum efficiency and maximum impact. Cleaning efficiency 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.

Max. tank diameter [m]

0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27

Operating principles
Gear-controlled

Flow rates at 2 bar
25 to 260 l/min

Recommended operating pressures
5 bar

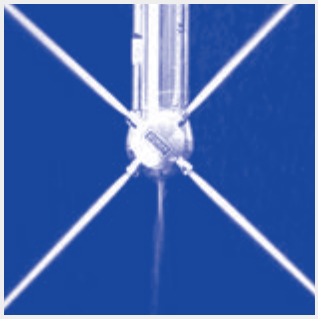
Max. temperatures
60 to 95 °C

High impact tank cleaning machine »IntenseClean Hygienic« Series 5TA

Series 5TA

The IntenseClean Hygienic 5TA is a permanent feature, especially in 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 persistent soiling. The series can resist pressures of up to 15 bar and high temperatures without any problem. All parts used exhibit a particularly high surface quality.

FDA



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

Max. Tank diameter [m]

0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27

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

Max. temperature
95 °C

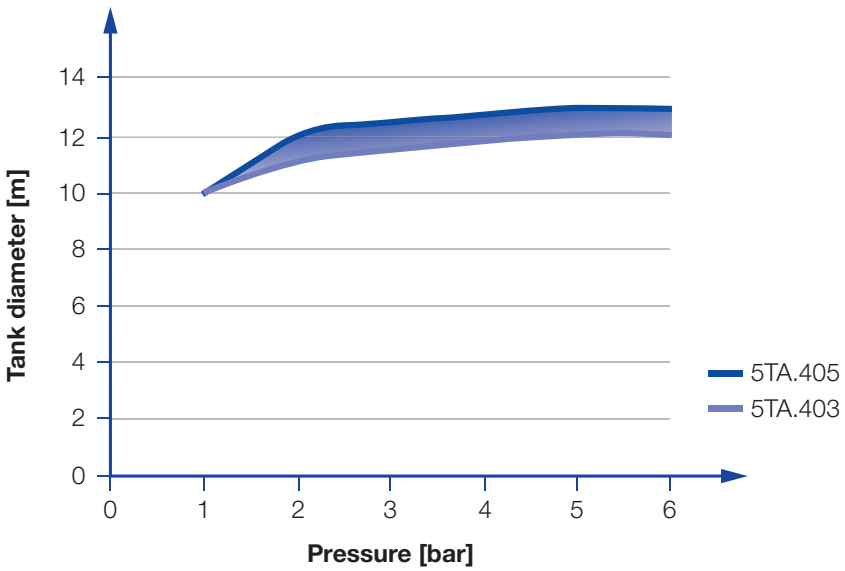
Recommended operating pressure
5 bar

Installation
Operation in every direction is possible

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

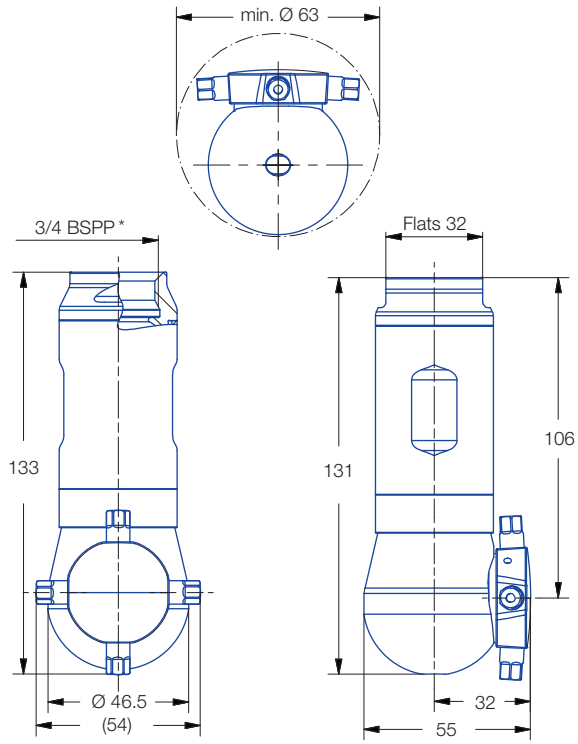
Bearing
Ball bearing

Weight
0.9 kg

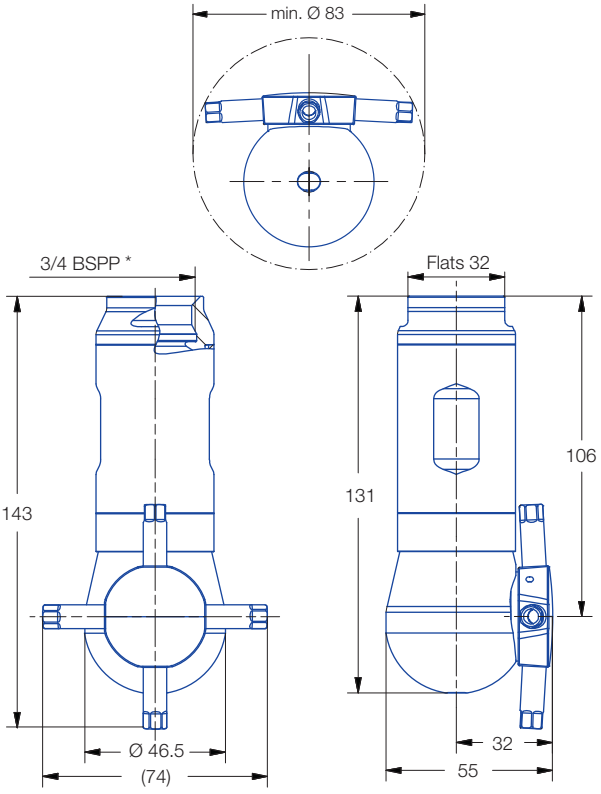


Overview of the tank diameter, depending upon the pressure of series 5TA

Rotation monitoring sensor
Sensor compatible,
Info: see page 76



Female thread
5TA.403.1Y.AL and 5TA.404.1Y.AL

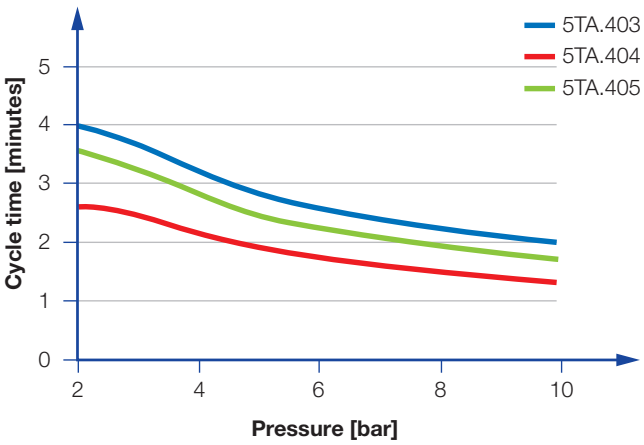


Female thread
5TA.405.1Y.AL

Spray angle	Ordering no. Type	E Ø [mm]	Number. Ø Nozzles [mm]	V̇ [l/min] p [bar] (p_{max} = 15 bar) 2	5	10	at 40 psi [US gal/min]	Max. tank diameter [m]
360°	**5TA.403.1Y.AL**	1.5	4 x 3.0	24	39	55	7.7	12.0
	5TA.404.1Y.AL	1.5	4 x 4.0	35	56	79	11	12.5
	5TA.405.1Y.AL	1.5	4 x 5.0	50	79	111	15.5	13.0

E = narrowest free cross-section
* Slip-on connection on request

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



Cycle time depending on pressure of series 5TA

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

Unit group/category/zones:

II 1G Ex h IIB T6…T4 Ga

II 1D Ex h IIIC T85 °C…T135 °C Da

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

Example of ordering with FDA and (EC) 1935/2004 conformity.

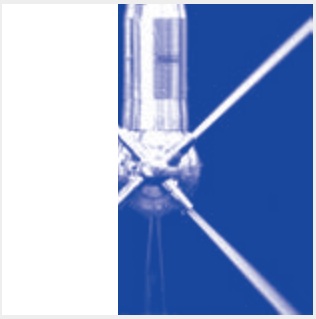
All Materials are suitable for contact with food.

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

High impact tank cleaning machine »IntenseClean Hygienic« Series 5TB

Series 5TB

The IntenseClean Hygienic 5TB has firmly established itself, above all in the pharmaceutical, food and beverage industries – and with good reason: The especially strong solid jets produce an extremely high degree of effectiveness, while the gear-controlled rotation ensures high levels of efficiency. All parts used are noted for their particularly high surface quality. This series is suitable for high pressures and temperatures.



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

Max. Tank diameter [m]

0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27

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

Max. temperature
95 °C

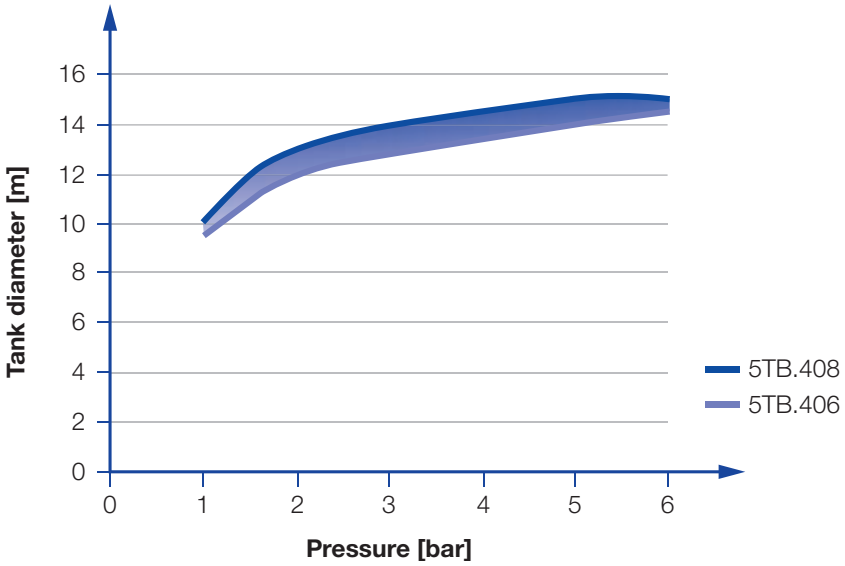
Recommended operating pressure
5 bar

Installation
Operation in every direction is possible

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

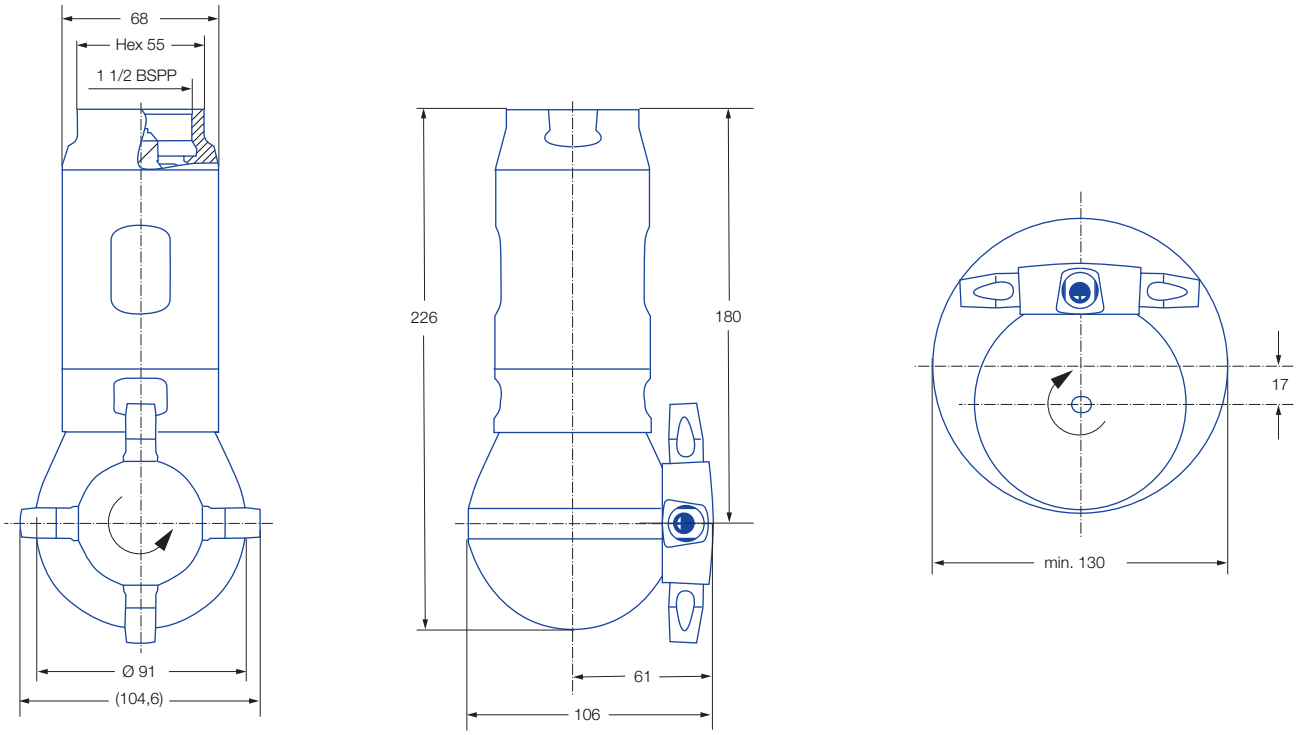
Bearing
Ball bearing

Weight
4.0 kg



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

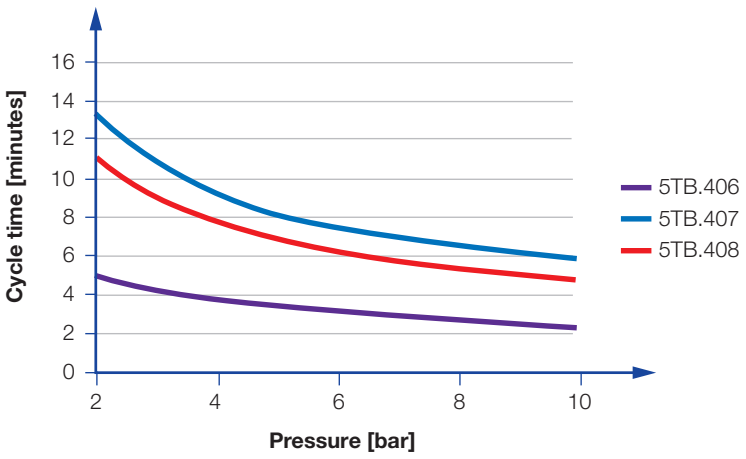
Rotation monitoring sensor
Sensor compatible,
Info: see page 76



Spray angle	Ordering no. Type	E Ø [mm]	Number, Ø Nozzles [mm]	V̇ [l/min] p [bar] (p_{max} = 25 bar) 2	5	10	at 40 psi [US gal/min]	Max. tank diameter [m]
360°	**5TB.406.1Y.AS**	6.0	4 x 6.0	107	169	239	33.1	14.0
	5TB.407.1Y.AS	6.0	4 x 7.0	132	209	296	41.0	14.0
	5TB.408.1Y.AS	6.0	4 x 8.0	150	238	336	46.7	15.0

E = narrowest free cross-section

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



Cycle time depending on pressure of series 5TB

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

Unit group/category/zones:

II 1G Ex h IIB T6…T4 Ga

II 1D Ex h IIIC T85 °C…T135 °C Da

Example of Ordering:	Type/Ordering no. 5TB.406.1Y.AS.EX

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

All Materials are suitable for contact with food.

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

High impact tank cleaning machine »IntenseClean« Series 5TM

Series 5TM

The IntenseClean is used in many applications, amongst others in the petrochemical industry. It is noted for its robust and proven construction, effective solid jets and gear-controlled rotation.

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

Max. tank diameter [m]

0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27

Materials
Stainless steel 1.4404 (316L), 1.4301 (304), 1.4310, 1.4571 (316Ti), 1.4401 (316), AISI 302, PTFE, PEEK, PTFE ELS (only ATEX-version)

Max. temperature
95 °C

Recommended operating pressure
5 bar

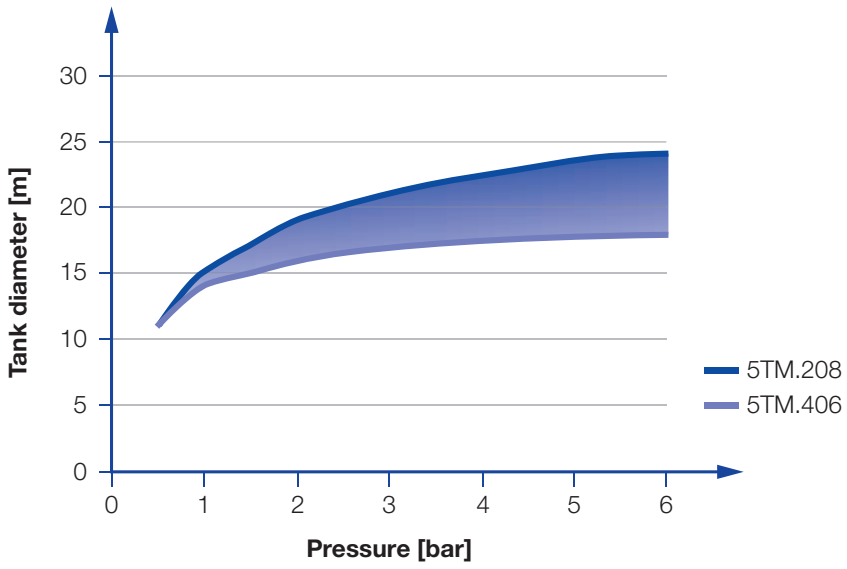
Installation
Operation in every direction is possible

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

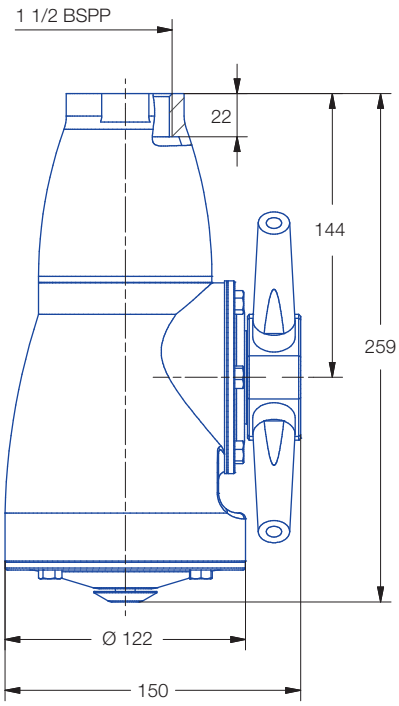
Bearing
Ball bearing

Weight
7.5 kg

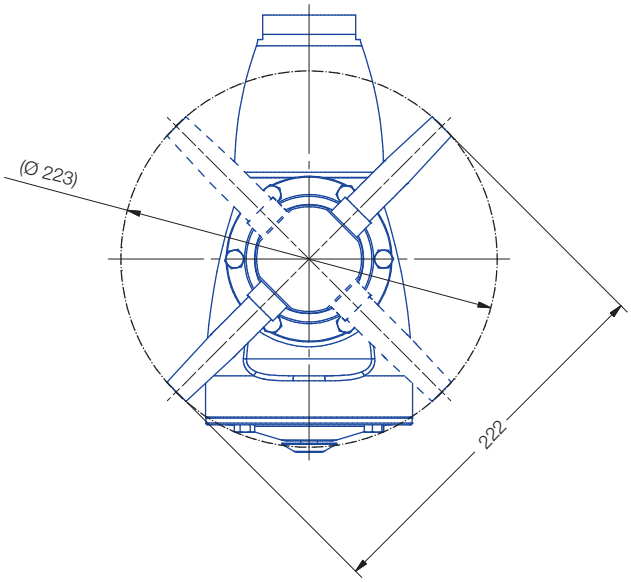
Rotation monitoring sensor
Sensor compatible,
Info: see page 76

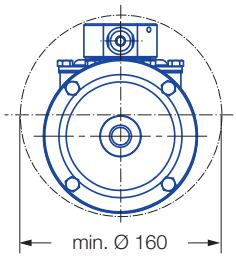


Overview of the tank diameter, depending upon the pressure of series 5TM

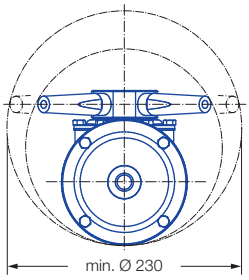


Female thread





5TM.2XX.1Y.AS (2 nozzles)

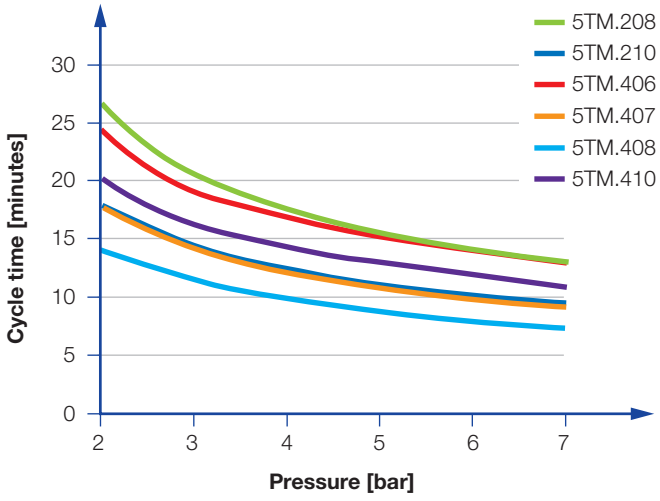


5TM.4XX.1Y.AS (4 nozzles)

Spray angle	Ordering no.	E Ø [mm]	Number, Ø Nozzles [mm]	V̇ [l/min] p [bar] (p_{max} = 7 bar) 2	3	5	at 40 psi [US gal/min]	Max. tank diameter [m]
360°	**5TM.208.1Y.AS**	8	2 x 8.0	125	153	198	39	24.0
	5TM.210.1Y.AS	10	2 x 10.0	160	196	253	50	24.0
	5TM.406.1Y.AS	6	4 x 6.0	140	171	221	43	18.0
	5TM.407.1Y.AS	7	4 x 7.0	170	208	269	53	20.0
	5TM.408.1Y.AS	8	4 x 8.0	200	245	316	62	22.0
	5TM.410.1Y.AS	10	4 x 10.0	260	318	411	81	23.0

E = narrowest free cross-section

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



Cycle time depending on pressure of series 5TM

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

All Materials are suitable for contact with food.

Example of Ordering:	Type 5TM.208	+ Mat.-Nr. + 1Y	+ Anschluss + AS	= Bestell-Nr. = 5TM.208.1Y.AS

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

Unit group / category / zones:

Ⓔx II 1G Ex h IIB T6…T3 Ga

Ⓔx II 1D Ex h IIIC T85 °C…T150 °C Da

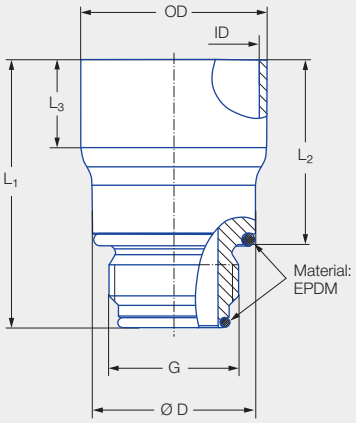
Example of Ordering:	Type 5TM.208	+ Mat.-Nr. + 1Y	+ Anschluss + AS	= Bestell-Nr. = 5TM.208.1Y.AS.EX

Adapter »HygienicFit«
Series 05C

Series 05C

The HygienicFit ensures a hygienic connection between your tank cleaning nozzle and the supply line. The adaptor is welded onto the connection pipe, while the Lechler tank cleaning nozzle is screwed onto it. The O-rings on the adapter completely encapsulate the thread, thereby providing a perfectly hygienic connection to the system. Through the use of the O-rings, the HygienicFit also offers a reliable thread lock.

FDA



Materials
316L SS;
EPDM (O-Ring)

Max. temperature
150 °C

Installation
Operation in every direction is possible

Ordering no.	Connection thread BSPP male	Dimensions [mm]				Dimensions OD = Outer diameter ID = Inner diameter [mm]		Pipe standard
		L_1	L_2	L_3	Ø D	OD	ID	
05C.190.1Y.AE.16	3/8	48	35,7	18	21,5	19,05	15,8	DIN EN 10357 series D
05C.230.1Y.AE.15	3/8	48	35,7	18	21,5	23	20	DIN EN 10357 series A
05C.250.1Y.AE.12	3/8	48	35,7	17	21,5	25	22,6	DIN EN 10357 series D
05C.250.1Y.AG.12	1/2	56	39	18	31	25	22,6	DIN EN 10357 series D
05C.350.1Y.AK.15	3/4	55	37,8	21	33,5	35	32	DIN EN 10357 series A
05C.380.1Y.AK.12	3/4	55	37,8	18	33,5	38	35,6	ISO 2037
05C.381.1Y.AK.15	3/4	55	37,8	18	33,5	38,1	35,1	DIN EN 10357 series D
05C.381.1Y.AM.16	1	59	39	23	40,5	38,1	34,9	DIN EN 10357 series D
05C.508.1Y.AP.15	1 1/4	57	38	22	49,4	50,8	47,8	DIN EN 10357 series D
05C.635.1Y.AR.16	1 1/2	63	44	22	56	63,5	60,3	DIN EN 10357 series D

Spare parts set of O-rings, EPDM

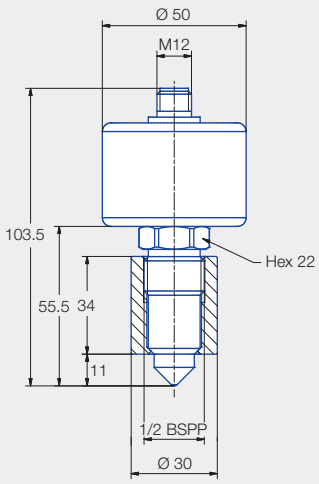
Thread type BSPP	Ordering no.
3/8	**05C.000.E9.AE.00**
1/2	**05C.000.E9.AG.00**
3/4	**05C.000.E9.AK.00**
1	**05C.000.E9.AM.00**
1 1/4	**05C.000.E9.AP.00**
1 1/2	**05C.000.E9.AR.00**

O-ring set is also available on request in FKM.

Rotation Monitoring Sensor

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

FDA



Electrical data

- Supply voltage: Ub = 24 V +/–20% (18 to 32 VDC)
- Power requirements: < 20 mA
- Output signal: PNP, 50 mA short circuit protected, active

Operating conditions

- Ambient temperature: –10° up to +60 °C
- Process temperature: 0° up to +100 °C

Materials

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

Operating principle

- Capacitive

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

Ordering data	Ordering no.
Rotation monitoring sensor with weld-in sleeve	050.040.00.00.00.0
Cable set for first-time operation	050.040.00.00.01.0

Rotation monitoring sensor with weld-in sleeve

Cable set for first-time operation/installation

Main adapter with cable

USB adapter with cable

Programming adapter Y-piece

Weld-in mandrel

* Software download (free of charge): www.lechler.com/software/rotationcontrolsystem

FOR A COMPLETE CLEANING SPRAY SHADOW REMOVER

Spray Shadow Remover

The range of applications of the static cleaning nozzles in the support of rotating cleaners focuses on particularly difficult tasks, such as equipment cleaning and the avoidance of spray shadows.

They deliberately support the cleaning efficiency of the process and are used in addition to rotating cleaners or spray balls to reach hard to access places and for removing persistent soiling.

Pop-up cleaning nozzles »PopUp Clean«
Series 5P5

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.

FDA

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

Max. temperature
95 °C

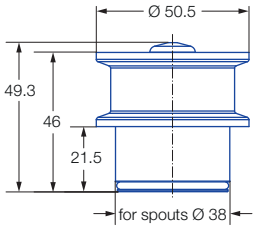
Recommended operating pressure
2 – 5 bar
opening pressure
0.3 bar
closing pressure
0.3 bar

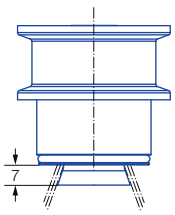
Installation
Operation in every direction is possible

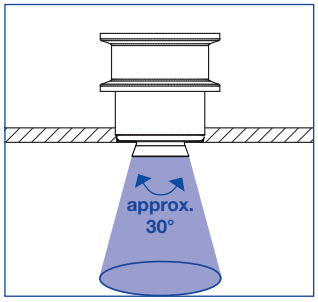
Filtration
Line strainer with a mesh size of 0.3 mm/ 50 mesh

Spray angle	Ordering no. Type	E Ø [mm]	V̇ [l/min] p [bar] 1	2	3
30°	**5P5.081.1Y.00.00.0**	0.7	35	50	61

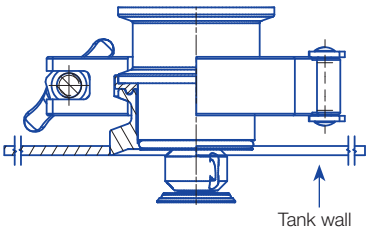
E = narrowest free cross-section







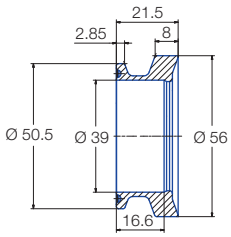
Nozzle installation



Information on operation

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

Weld-in flange

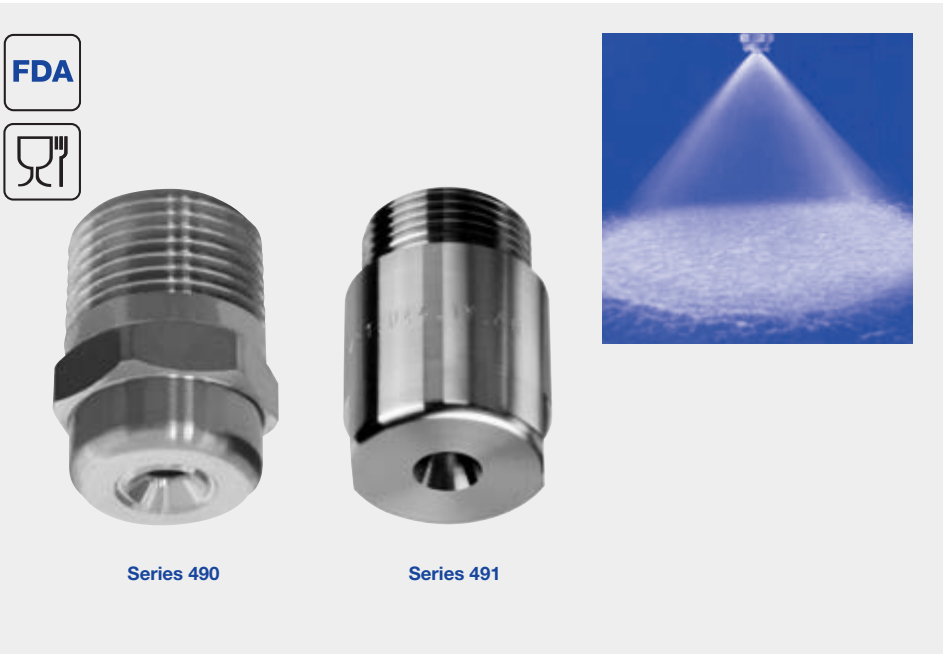


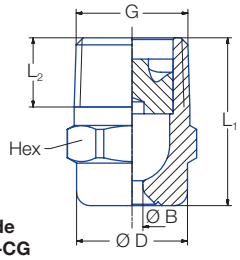
Information
Gasket with a thickness of 2 mm must be used if the PopUp Clean is installed with this weld-in flange.

Ordering number
050.020.1Y.01.00
Material
316L SS

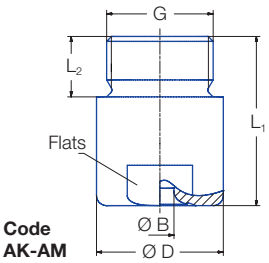
Axial-flow full cone nozzles
Series 490/491

Non-clogging nozzle design. Stable spray angle. Particularly even liquid distribution.





Code CC-CG



Code AK-AM

Code	Dimensions [mm]				
	G	L_1	L_2	D	Hex/Flats
CC	1/4 BSPT	22.0	10.0	13.0	14
CE	3/8 BSPT	24.5	10.0	16.0	17
CG	1/2 BSPT	32.5	13.0	21.0	22
AK	3/4 BSPP	42.0	15.0	32.0	27
AM	1 BSPP	56.0	17.0	40.0	36

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

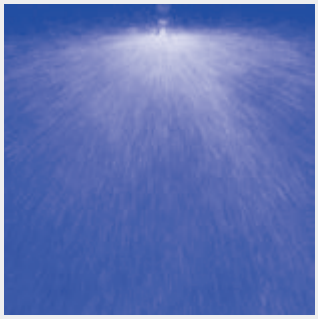
Spray angle	Ordering no.							B Ø [mm]	E Ø [mm]	V̇ [l/min]							Spray diameter D	
	Type	Mat. no.	Code							p [bar]							at p=2 bar	
		1Y 316L SS	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	1 BSPP			0.5	1.0	2.0	3.0	5.0	7.0	10.0	H = 200 mm	H = 500 mm
60°	**490.644**	○	**CC**	**CE**	-	-	-	2.30	2.30	2.30	3.03	4.00	4.70	5.77	6.60	7.61	220	560
	490.684	○	**CC**	**CE**	-	-	-	2.60	2.60	2.87	3.79	5.00	5.88	7.21	8.25	9.52	220	560
	490.724	○	**CC**	**CE**	-	-	-	2.95	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	220	560
	490.764	○	-	**CE**	-	-	-	3.25	3.25	4.59	6.06	8.00	9.41	11.54	13.20	15.22	220	560
	490.804	○	-	**CE**	-	-	-	3.70	3.70	5.74	7.58	10.00	11.76	14.43	16.51	19.04	220	560
	490.844	○	-	-	**CG**	-	-	4.05	4.05	7.18	9.47	12.50	14.70	18.03	20.63	23.80	220	560
	490.884	○	-	-	**CG**	-	-	4.65	4.65	9.19	12.13	16.00	18.82	23.08	26.41	30.46	220	560
	490.924	○	-	-	-	**AK**	-	5.20	5.20	11.49	15.16	20.00	23.52	28.85	33.01	38.07	220	560
	490.964	○	-	-	-	**AK**	-	5.80	5.80	14.36	18.95	25.00	29.40	36.07	41.26	47.59	220	560
	491.044	○	-	-	-	-	**AM**	7.25	7.25	22.97	30.31	40.00	47.04	57.71	66.02	76.15	220	560
	491.084	○	-	-	-	-	**AM**	8.15	8.15	28.72	37.89	50.00	58.80	72.14	82.53	95.18	220	560

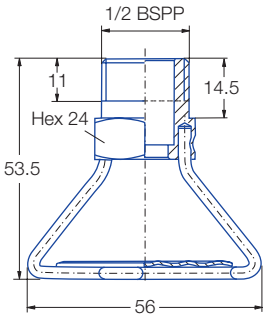
E = narrowest free cross-section · B = bore diameter

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	490.644	+	**1Y**	+	**CC**	=	**490.644.1Y.CC**

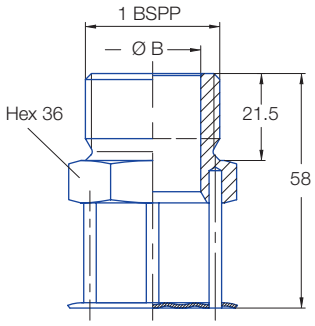
Deflector-plate nozzle
Series 524/525

Full cone spray. Non clogging nozzle without swirl insert.





Type 524.809 – 525.269



Type 525.349 – 525.489

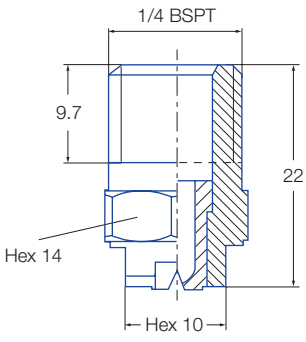
Spray angle	Ordering no. Type	Mat. no. 17[1] 316Ti SS/316L SS	B Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	10.0	Spray diameter D [m] at p=3 bar approx. H = 1 m	H = 3 m
180°	**524.809**	○	4.00	5.00	7.10	10.00	12.20	15.80	22.40	5.60	6.40
	524.969	○	6.20	12.50	17.70	25.00	30.60	39.50	55.90	8.00	9.00
	525.049	○	8.00	20.00	28.30	40.00	49.00	63.20	89.40	10.00	13.20
	525.269	○	12.30	70.00	99.00	140.00	171.00	221.00	313.00	5.20	10.20
	525.349	○	16.20	112.00	158.40	224.00	274.30	354.20	500.80	4.80	9.70
	525.469	○	23.80	222.70	315.00	445.50	545.60	704.40	996.20	4.50	9.50
	525.489	○	25.30	250.00	353.60	500.00	612.40	790.60	1,118.00	4.00	9.00

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

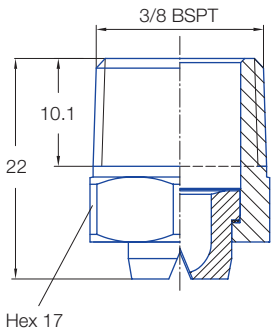
Example of ordering:	Type	+	Material-no.	=	Ordering no.
	525.809	+	17	=	525.809.17

Flat fan nozzles
Series 632/633

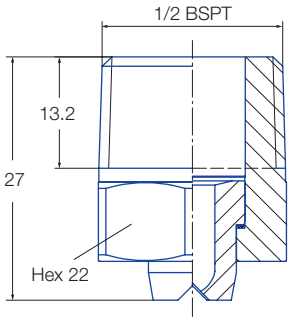
Standard design with conical, self-sealing thread connection. Stable spray angle. Uniform, parabolical distribution of liquid.



1/4" version



3/8" version



1/2" version

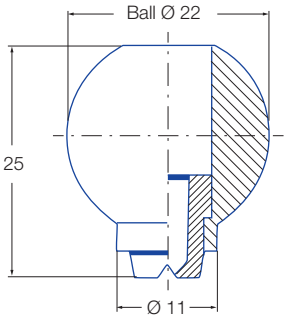
Spray angle	Ordering no.						A Ø [mm]	E Ø [mm]	V̇ [l/min]							Spray width B at p=2 bar	
	Type	Mat. no.		Code					p [bar] (p_{max} = 20 bar)								
		16[1] 303 SS/304 SS	17[2] 316Ti SS/316L SS	1/4 BSPT	3/8 BSPT	1/2 BSPT			0.5	1.0	2.0	3.0	5.0	7.0	10.0	H = 250 mm	H = 500 mm
30°	**632.642**	○	○	**CC**	**-**	**-**	2.50	1.80	2.00	2.83	4.00	4.90	6.33	7.48	8.94	120	240
	632.722	○	○	**CC**	**-**	**-**	3.00	2.40	3.15	4.46	6.30	7.72	9.96	11.79	14.09	125	240
	632.762	○	○	**CC**	**-**	**-**	3.50	2.70	4.00	5.66	8.00	9.80	12.65	14.97	17.89	125	240
	632.802	○	○	**CC**	**-**	**-**	4.00	3.10	5.00	7.07	10.00	12.25	15.81	18.71	22.36	130	250
45°	**632.643**	○	○	**CC**	**-**	**-**	2.50	1.80	2.00	2.83	4.00	4.90	6.33	7.48	8.94	195	370
	632.673	○	○	**CC**	**CE**	**-**	2.70	2.00	2.83	3.36	4.75	5.82	7.51	8.89	10.62	200	375
	632.723	○	○	**CC**	**CE**	**-**	3.00	2.40	3.15	4.46	6.30	7.72	9.96	11.79	14.09	200	375
	632.763	○	○	**CC**	**CE**	**-**	3.50	2.60	4.00	5.66	8.00	9.80	12.65	14.97	17.89	200	380
	632.803	○	○	**CC**	**CE**	**CG**	4.00	3.00	5.00	7.07	10.00	12.25	15.81	18.71	22.36	205	385
	632.843	○	○*	**CC**	**-**	**CG**	4.50	3.40	6.25	8.84	12.50	15.31	19.76	23.39	27.95	205	385
	632.883	○	○	**-**	**-**	**CG**	5.00	3.80	8.00	11.31	16.00	19.60	25.30	29.93	35.78	220	440
	632.923	○	○	**-**	**-**	**CG**	5.50	4.20	10.00	14.14	20.00	24.50	31.62	37.42	44.72	220	440
	632.963	○	○	**-**	**-**	**CG**	6.00	4.40	12.50	17.68	25.00	30.62	39.53	46.77	55.90	220	440
60°	**632.644**	○	○	**CC**	**CE**	**-**	2.50	1.60	2.00	2.83	4.00	4.90	6.33	7.48	8.94	295	565
	632.674	○	○	**CC**	**CE**	**-**	2.70	1.80	2.38	3.36	4.75	5.82	7.51	8.89	10.62	300	575
	632.724	○	○	**CC**	**CE**	**-**	3.00	2.10	3.15	4.46	6.30	7.72	9.96	11.79	14.09	305	590
	632.764	○	○	**CC**	**CE**	**-**	3.50	2.30	4.00	5.66	8.00	9.80	12.65	14.97	17.89	310	595
	632.804	○	○*	**CC**	**-**	**CG**	4.00	2.60	5.00	7.07	10.00	12.25	15.81	18.71	22.36	310	595
	632.844	○	○*	**CC**	**-**	**CG**	4.50	3.00	6.25	8.84	12.50	15.31	19.76	23.39	27.95	310	590
	632.884	○	○*	**CC**	**-**	**CG**	5.00	3.40	8.00	11.31	16.00	19.60	25.30	29.93	35.78	300	570
	632.924	○	○	**-**	**-**	**CG**	5.50	4.10	10.00	14.14	20.00	24.50	31.62	37.42	44.72	330	630
	632.964	○	○	**-**	**-**	**CG**	6.00	4.20	12.50	17.68	25.00	30.62	39.53	46.77	55.90	330	630
	633.004	○	○	**-**	**-**	**CG**	7.00	4.80	15.75	22.27	31.50	38.57	49.80	58.92	70.43	330	630
	632.044	○	○	**-**	**-**	**CG**	8.00	5.50	20.00	28.28	40.00	48.99	63.25	74.83	89.44	340	640
	632.084	○	○	**-**	**-**	**CG**	9.00	6.80	25.00	35.36	50.00	61.24	79.06	93.54	111.80	340	640

E = narrowest free cross-section · A = equivalent bore diameter
[1] We reserve the right to deliver 303 SS or 304 SS under the material no. 16.
[2] We reserve the right to deliver 316Ti SS or 316L SS under the material no. 17.
* Only available with code CG.
Subject to technical modifications.

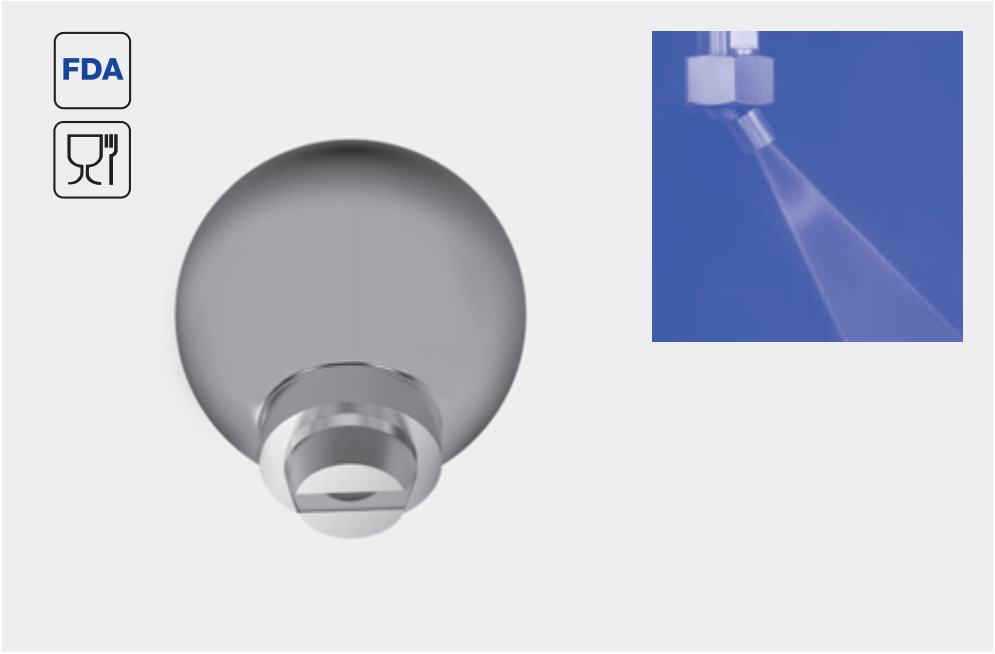
Example of ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	632.642.	+	**16**	+	**CC**	=	**632.642.16.CC**

Flat fan nozzles with ball joint
Series 676

Swivelling nozzle for precise adjusting of jet direction. No gaskets necessary. Long, unproblematic service life.



Allround swivelling by 30°



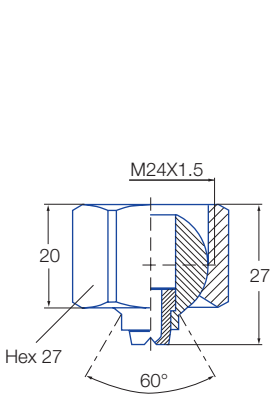
Spray angle	Ordering no. Type	Mat. no. 16 303 SS	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 30 bar) 0.5	1.0	2.0	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
30°	**676.642**	○	2.50	1.80	2.00	2.83	4.00	4.90	6.33	8.94	120	240
	676.722	○	3.00	2.40	3.15	4.46	6.30	7.72	9.96	14.09	125	240
	676.762	○	3.50	2.70	4.00	5.66	8.00	9.80	12.65	17.89	125	245
	676.802	○	4.00	3.10	5.00	7.07	10.00	12.25	15.81	22.36	130	250
45°	**676.643**	○	2.50	1.80	2.00	2.83	4.00	4.90	6.33	8.94	195	370
	676.723	○	3.00	2.40	3.15	4.46	6.30	7.72	9.96	14.09	200	375
	676.763	○	3.50	2.60	4.00	5.66	8.00	9.80	12.65	17.89	200	380
	676.803	○	4.00	3.00	5.00	7.07	10.00	12.25	15.81	22.36	205	385
60°	**676.644**	○	2.50	1.60	2.00	2.83	4.00	4.90	6.33	8.94	295	565
	676.674	○	2.70	1.80	2.38	3.36	4.75	5.82	7.51	10.62	300	575
	676.724	○	3.00	2.10	3.15	4.46	6.30	7.72	9.96	14.09	305	590
	676.764	○	3.50	2.30	4.00	5.66	8.00	9.80	12.65	17.89	310	595

E = narrowest free cross-section · A = equivalent bore diameter

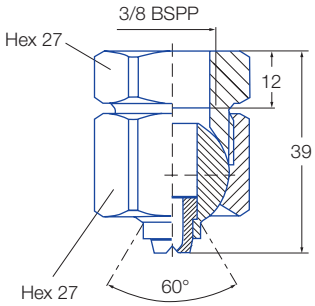
Example for ordering:	Type 676.642	+	Material no. 16	=	Ordering no. 676.642.16

Flat fan nozzles with ball joint
Series 676 – Accessories

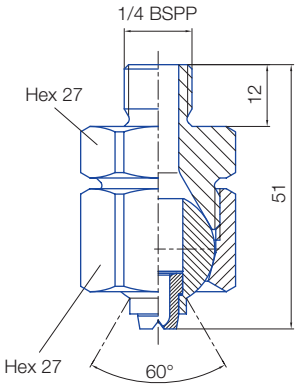
Retaining nut
092.020.16.00.02
Material: 303 SS



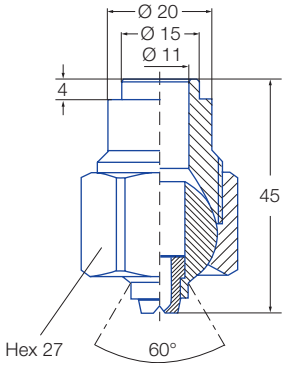
Socket
092.020.16.AF.03
Material: 303 SS



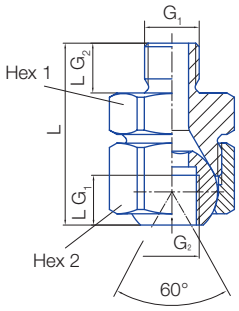
Retaining nipple
092.024.16.AC.03
Material: 303 SS



Welding nipple
092.020.17.00.04
Material: 316Ti SS



Compact ball joints for narrow installation conditions

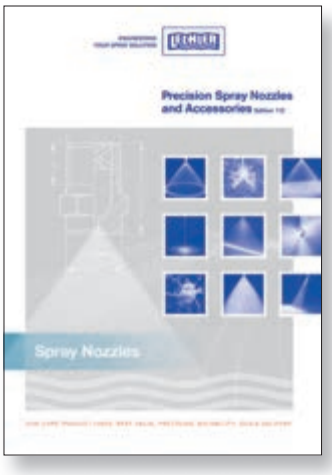


For series	Ordering no.			Dimensions						
	Type	Mat. no. 16 303 SS	Code	G_1 BSPP	G_2 BSPP	L_{G1} [mm]	L_{G2} [mm]	L [mm]	Hex_1	Hex_2
For all nozzles with 1/8" male thread	**092.010**	○	**AA**	1/8A	1/8	8.0	8.0	29.3	22	24
For all nozzles with 1/4" male thread	**092.024**	○	**AC**	1/4A	1/4	12.0	12.0	44	27	27
For all nozzles with 3/8" male thread	**092.030**	○	**AE**	3/8A	3/8	12.0	12.0	44	27	30

YOU CAN FIND MORE NOZZLES IN OUR STANDARD CATALOGUE …

The catalogue „Precision Spray Nozzles and Accessories“ is a sought-after manual of nozzle technology.

It contains valuable working aids and extensive technical information on Lechler products and ordering instructions.

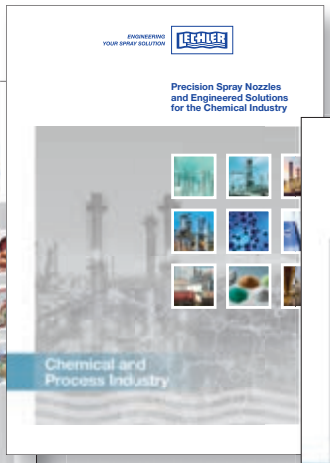


… AND IN OUR INDUSTRY BROCHURES

Information is available for various industries in special industry brochures.

All documents can be downloaded from our website at www.lechler.com. We would also be happy to send you the brochures.

Brochure „Precision Spray Nozzles for the Food and Beverage Industry“



Brochure „Precision Spray Nozzles and Engineered Solutions for the Chemical Industry“

Brochure „Precision Spray Nozzles for Surface Technology“

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www.lechler.com/tankcleaning/questionnaire_tankcleaning

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Our website contains further information on our products as well as useful resources. In addition to technical data, there is also a product finder to help you in your search for the right nozzle.

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Ulmer Strasse 128 · 72555 Metzingen, Germany · Phone +49 7123 962-0 · info@lechler.de · www.lechler.com

ASEAN: Lechler Spray Technology Sdn. Bhd. • 22, Jln. Astaka 4B/KU2 • Bdr. Bukit Raja • 41050 Klang • Malaysia • Phone +603 3359 1118 • info@lechler.com.my
Belgium: Lechler S.A./N.V. • Avenue Newton 4 • 1300 Wavre • Phone +32 10 225022 • info@lechler.be
China: Lechler Nozzle Systems (Changzhou) Co., Ltd. • No.99 Decheng Rd, Jintan, Changzhou, JS 213200, P.R.C • Phone +86 519-6822 8088 • info@lechler.com.cn
Finland: Lechler Oy • Ansatie 6 a C 3 krs • 01740 Vantaa • Phone +358 207 856880 • info@lechler.fi
France: Lechler France SAS • Bât. CAP2 • 66–72 Rue Marceau • 93100 Montreuil • Phone +33 1 49882600 • info@lechler.fr
Great Britain: Lechler Ltd. • 1 Fell Street, Newhall • Sheffield, S9 2TP • Phone +44 114 2492020 • info@lechler.com
India: Lechler (India) Pvt. Ltd. • Plot B-2 • Main Road • Wagle Industrial Estate Thane • 400604 Maharashtra • Phone +91 22 40634444 • lechler@lechlerindia.com
Italy: Lechler Spray Technology S.r.l. • Via Don Dossetti, 2 • 20080 Carpiano (Mi) • Phone +39 2 98859027 • info@lechleritalia.com
Spain: Lechler, S.A. • C / Isla de Hierro, 7 – Oficina 1.3 • 28703 San Sebastián de los Reyes (Madrid) • Phone +34 91 6586346 • info@lechler.es
Sweden: Lechler AB • Hävertgatan 29 • 252 423 Helsingborg • Phone +46 18 167030 • info@lechler.se
USA: Lechler Inc. • 445 Kautz Road • St. Charles, IL 60174 • Phone +1 630 3776611 • info@lechlerusa.com

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