ENGINEERING
YOUR SPRAY SOLUTION

LECHLER

Precision Spray Nozzles for Tank and Equipment Cleaning









Tank and Equipment Cleaning

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

Lechler is a world leader in nozzle technology. For over 135 years, we have pioneered numerous groundbreaking developments in this field. Comprehensive nozzle engineering and an in-depth understanding of application-specific requirements help us to create products that offer outstanding performance and reliability.

Optimized cleaning processes

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

Your advantages

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

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.

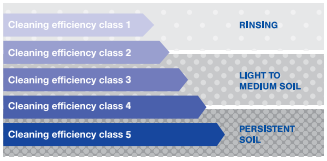
Industries

- Chemical industry
- Food and 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 glance

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

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

Individual advice

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

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 installed during the production process.

Hygienic equipment cleaning

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

The right nozzle for every tank

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

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.

Cost reduction by efficient cleaning processes

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

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.

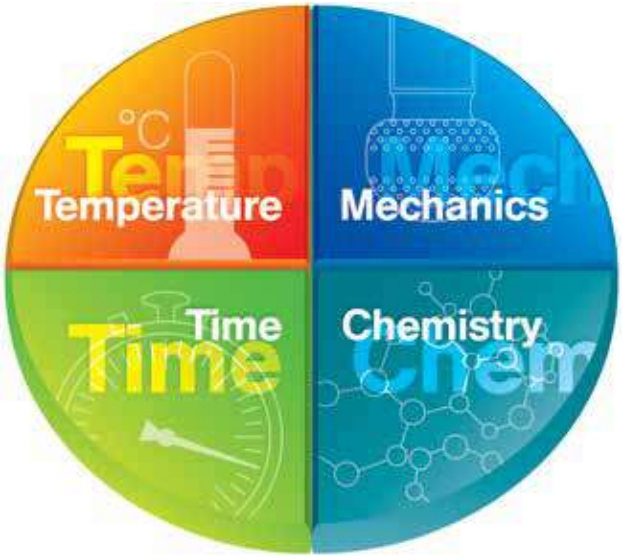


Figure 1: Sinner's circle with equal proportions of the temperature, time, chemistry and mechanical factors.

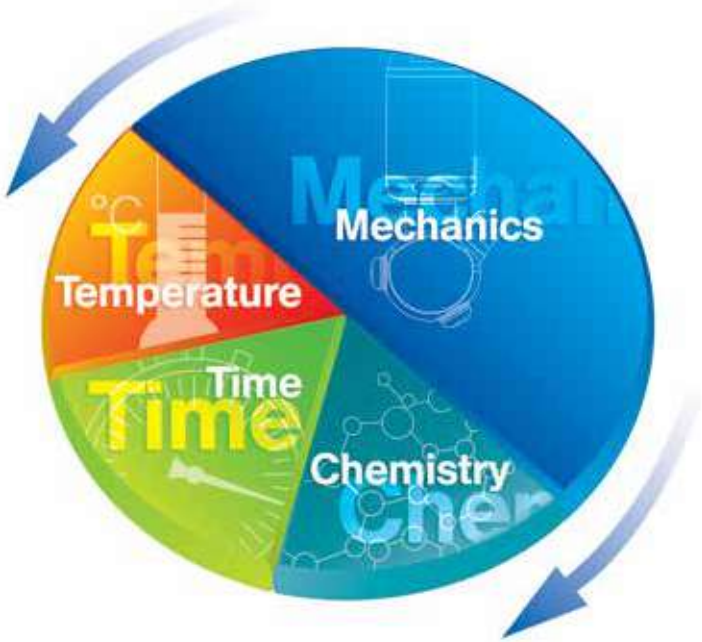


Figure 2: Lechler nozzles and rotating cleaning nozzles have high mechanical cleaning efficiency. This reduces the proportion of the other factors, as well as the resulting costs.

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).

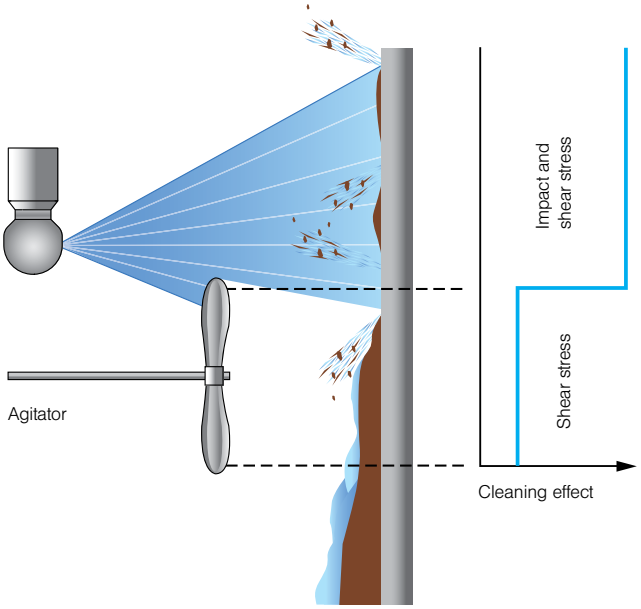


Figure 5: Cleaning mechanisms, impact and shear stress

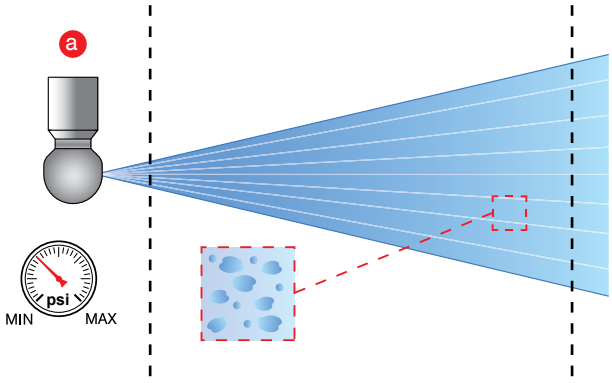


Figure 3: Rotating cleaning nozzles with recommended operating pressure

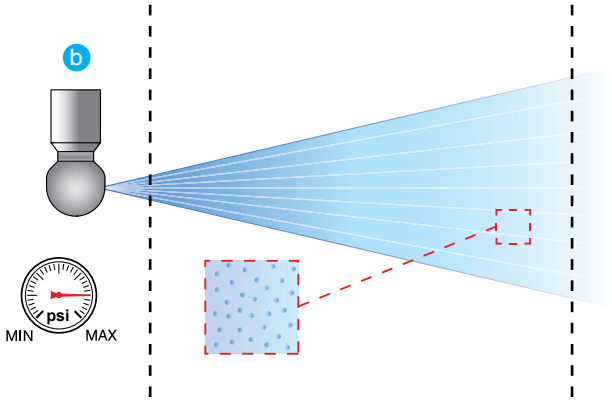


Figure 4: Rotating cleaning nozzles with operating pressure too high

WHAT YOU SHOULD KEEP IN MIND WHEN PLANNING

Impact

The force of impact when using 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).

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

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

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

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

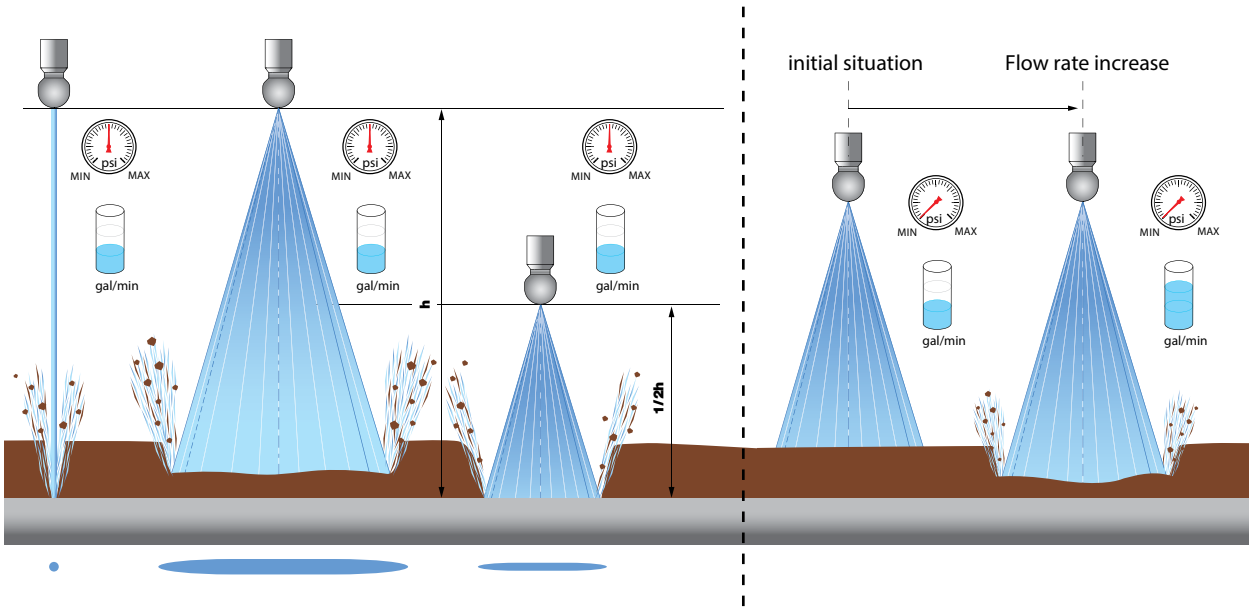


Figure 6:

a) Constant pressure and flow rate, variable spray shape and spray distance

b) Constant pressure, spray shape and spray distance, variable flow rate

Comparison of rotating cleaning nozzles and static spray balls

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

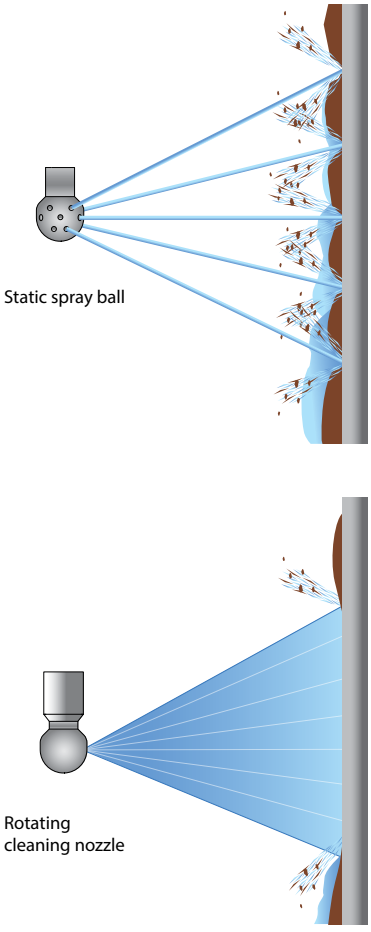


Figure 7: Comparison of rotating cleaning nozzles and static spray balls

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.

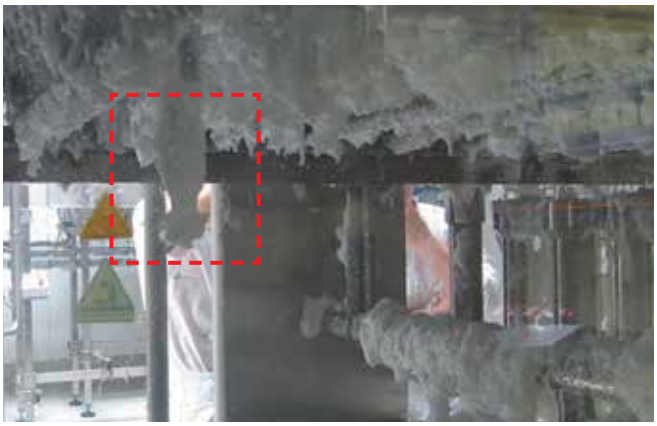


Figure 8: Foam cleaning with a Lechler PVDF MicroWhirly

CIP- and SIP-cleaning

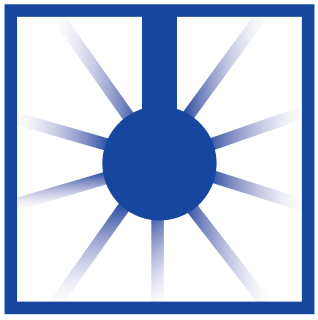
Cleaning in Place (CIP) is one of the standard cleaning methods in the food and pharmaceutical industries. This is a process where the cleaning and disinfectant solutions circulate in the production systems during the cleaning process. The nozzles are installed in the system and do not need to be dismounted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

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

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

③ Lechler rotating cleaning nozzles designs

Operating principles

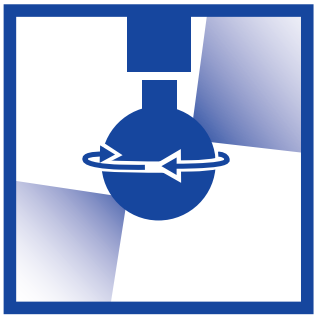


Static

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).

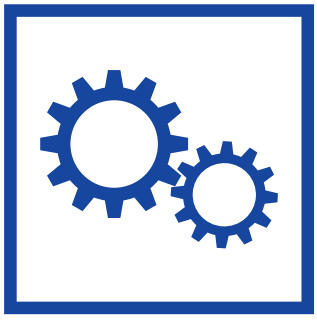
Free-spinning

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



Controlled rotation

The rotating head is driven by the fluid. A turbine wheel with an internal gear is used to control the rotation. This ensures that the speed remains in the optimum range even at higher pressures. The droplets produced are larger and strike the tank wall at higher speed. These rotating cleaning nozzles achieve an even higher impact which is especially important for large tanks.



Gear-controlled

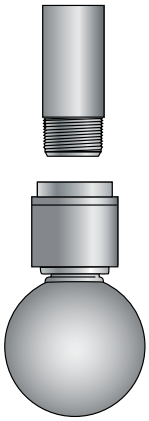
The cleaning fluid drives an internal gear by means of a turbine wheel so that the spray head rotates by two axes. The solid jet nozzles mounted on the spray head produce powerful jets. These jets sweep the entire tank surface in a pre-programmed, model-specific pattern during a spray cycle. This requires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

Connection options

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

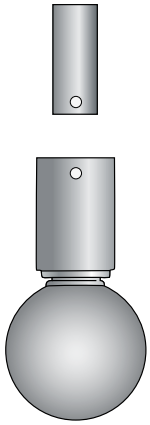
Threaded connection

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



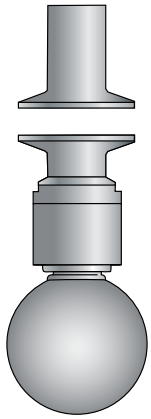
Slip-on connection

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



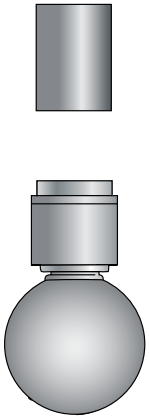
Tri-Clamp

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



Welded connection

Welded connections are particularly suitable for applications where sanitary requirements have to be taken into account. Please contact us for further information.



PERFECT FOR RELIABLE PLANNING
TankClean 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

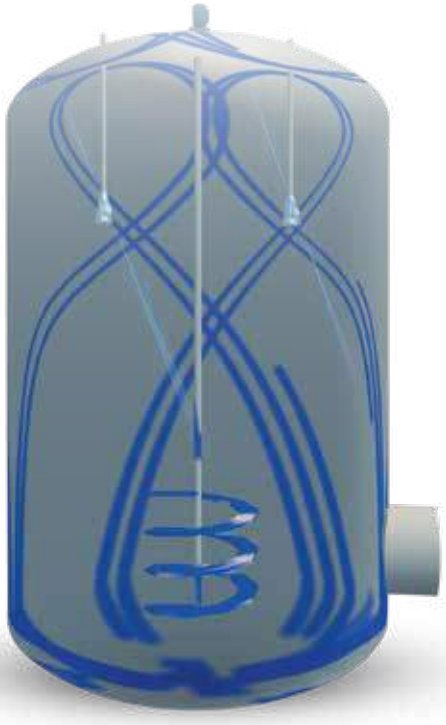
Planning certainty
We assist you in planning your tank cleaning solution to ensure cleaning without any gaps.

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.

NEW



TankClean

Function video

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

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

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 requirements such as resistance to cleaning chemicals or temperature influences.
The large choice of different materials — e.g. stainless steel AISI 316L, PVDF, PEEK or PTFE — allows nozzle selection customized to the individual application and operating conditions. In addition, the materials used for the tank and equipment cleaning nozzles are perfectly matched to each other and are 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 compliant

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

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

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

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

Hygiene requirements

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

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

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

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

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

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

Nozzle Wear

Nozzle wear depends mainly on the operating conditions.

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

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

Material certificates

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

ATEX

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

④Conversion 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

V̇Flow 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]

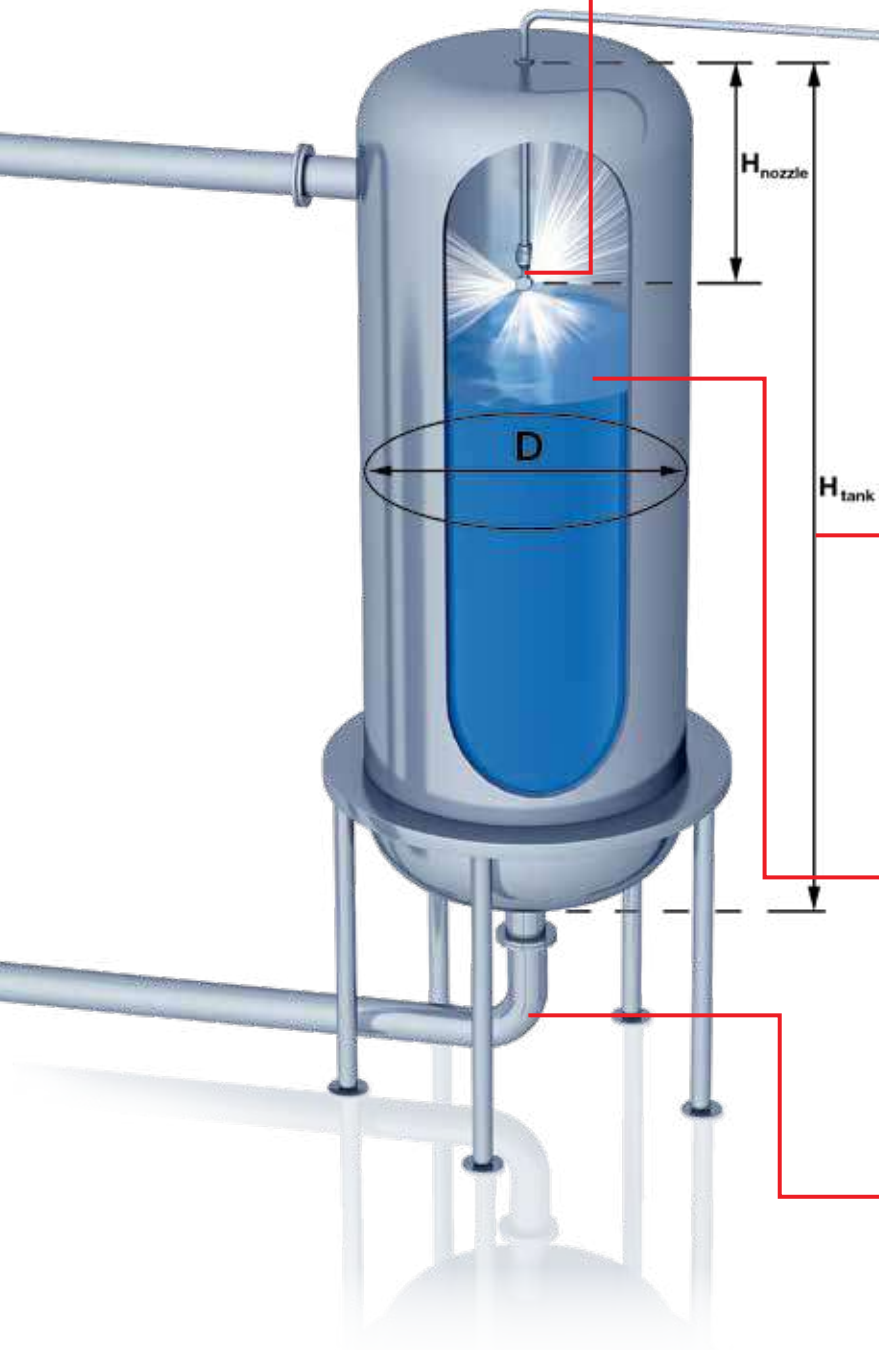
$\frac{\rho_{Fl}}{X}$	500	600	700	800	900	1000	1100	1200
	1.41	1.29	1.20	1.12	1.06	1.0	0.95	0.91
$\frac{\rho_{Fl}}{X}$	1300		1500	1600	1700	1800	1900	2000
	0.88	0.85	0.82	0.79	0.77	0.75	0.73	0.71

p/V Pressure/Flow rate

Valid for single-fluid nozzles and rotating nozzles except for axi-al-flow full cone nozzles	$\dot{V}_2 = \sqrt{\frac{p_2}{p_1}} \cdot \dot{V}_1$ [gpm]	Ratio of both, given and required pressure — flow rate values
	$p_2 = \left(\frac{\dot{V}_2}{\dot{V}_1}\right)^2 \cdot p_1$ [psi]	
Valid for axial-flow full cone nozzles	$\dot{V}_2 = \left(\frac{p_2}{p_1}\right)^{0,4} \cdot \dot{V}_1$ [gpm]	
	$p_2 = \left(\frac{\dot{V}_2}{\dot{V}_1}\right)^{2,5} \cdot p_1$ [psi]	

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

Choosing the right Lechler rotating cleaning nozzle or static spray ball is determined primarily by the type of soil to be cleaned and the tank diameter. You can find this information on the product pages. It must be guaranteed that the diameter of the tank to be cleaned is smaller than the specified maximum possible tank diameter of the nozzles.

Pump and pipes

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

Arrangement

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

$H_{nozzle} = 1/3 \cdot H_{tank}$ and $H_{nozzle} < 1/3 \cdot D_{max\ spray\ diameter\ nozzle}$

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

Filling level

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

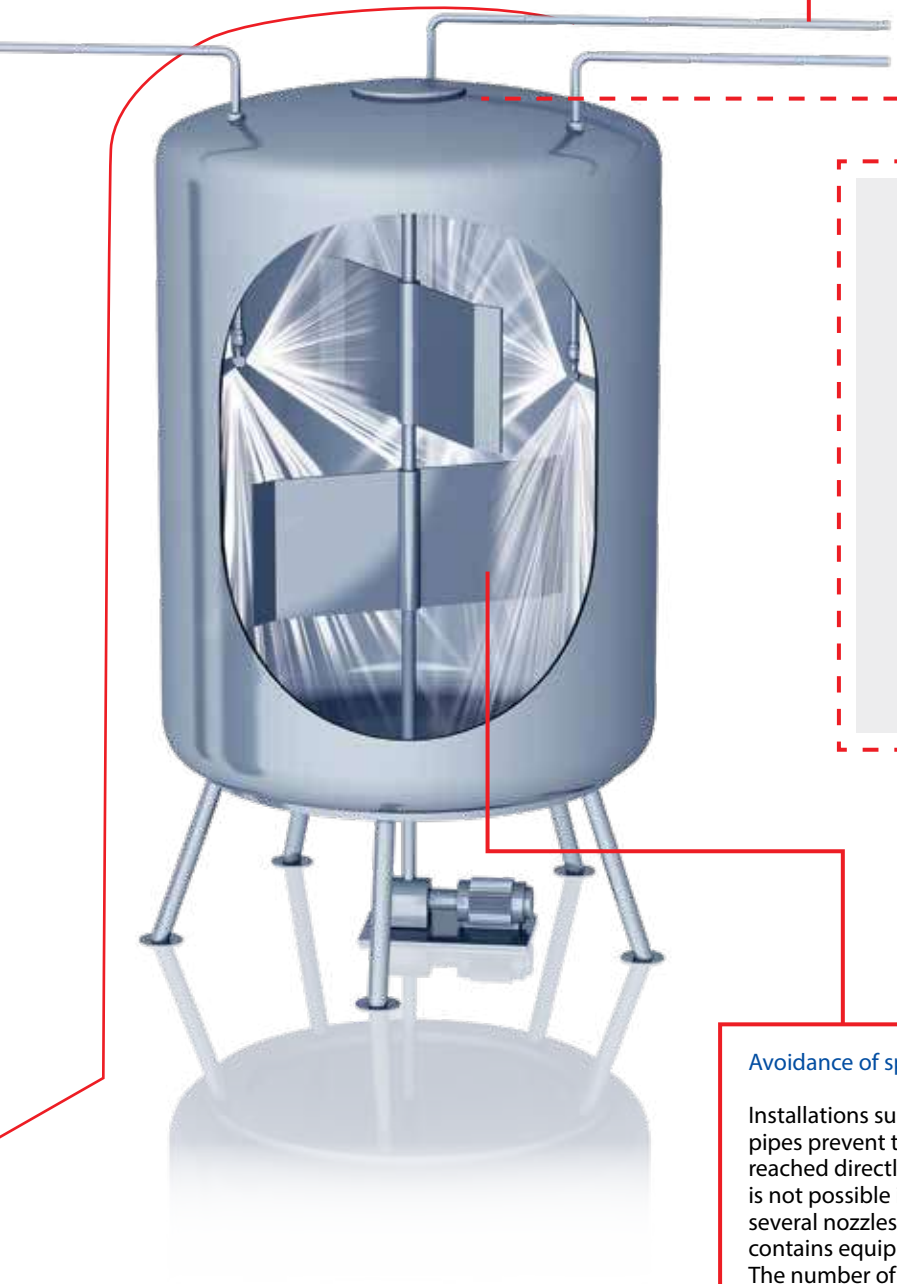
Tank drainage rate

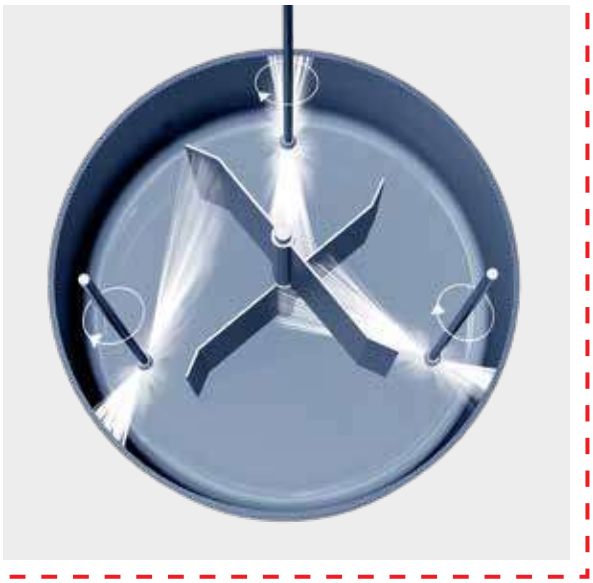
The tank drainage rate is to be selected to prevent the level of liquid from rising during the cleaning process. Make sure the drain can handle whatever volume you put into the tank. (See chart on the right)

1"	6 gal/min
1 1/2"	13 gal/min
2"	23 gal/min
2 1/2"	35 gal/min
3"	50 gal/min
4"	87 gal/min
5"	141 gal/min
6"	204 gal/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.

⑤ Cleaning efficiency classes

Lechler precision nozzles for tank and equipment cleaning are divided into five different cleaning efficiency classes.

Every nozzle from Lechler is assigned to a class. These classes make it possible to find the right nozzle for the respective application. The subdivision into cleaning efficiency classes 1 to 5 is intended to facilitate nozzle selection for users. The respective class is suitable for specific cleaning tasks.

First, the required cleaning efficiency class is defined on the basis of the soil type — rinsing, light to medium soil, and persistent soil. Several classes are generally always suitable for one type of 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 4.0 to 89 gpm at 20 psi, as is frequently required in the food and beverage industry. In addition to liquid media, the static spray balls can also be operated with media such as steam and air and are also especially suitable for SIP-cleaning (Sterilization in Place).

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

Operating principles
Static

Flow rates at 30 psi
4.0 to 177 gpm

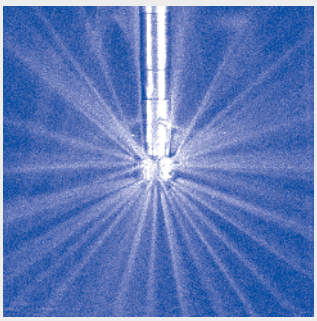
Recommended operating pressures
20-40 psi

Max. temperatures
to 392°F/ 200°C

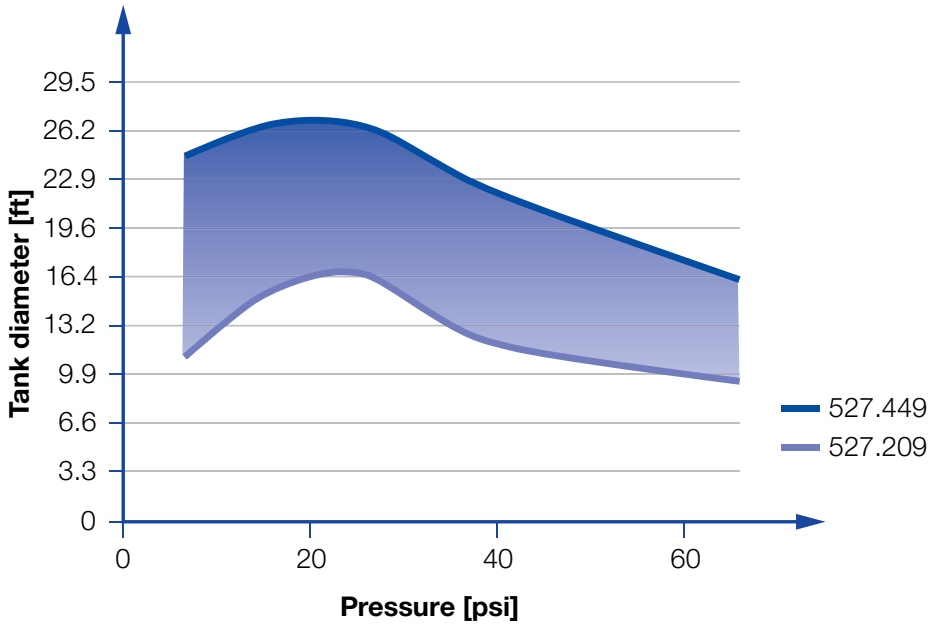
Static spray balls
Series 527

Series 527

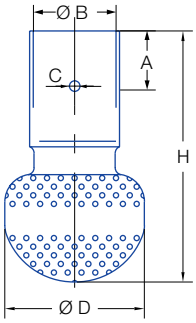
Series 527 complies with 3-A® standards and makes this product suitable for hygienic applications. They clean with powerful solid jets, have a high surface quality and are also reliably resistant to high temperatures.



Max. tank diameter [ft]	0 – 5 – 10 – 15 – 20 – 25 – 30
Material	AISI 316L SS
Max. temperature	392°F/ 200°C
Recommended operating pressure	20 psi
Installation	Operates in every direction



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



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

Spray angle	Ordering no.	Free Passage (in.)	Flow Rate (Gallons Per Minute)				Dimensions approx. (in.)					Max. tank diameter [ft]
			20 psi	40 psi	2 bar	60 psi	Height H (in.)	Diameter D (in.)	B	C	A	
360°	527. 209. 1Y. 00. 75	.031	13	19	60	23	2.7	1.3	.75	.13	.50	17
	527. 289. 1Y. 01. 50	.043	37	53	170	65	4.6	2.6	1.51	.19	1.00	20
	527. 449. 1Y. 02. 00	.067	92	130	420	160	6.0	4.0	2.01	.19	1.00	27

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, however, they do have advantages that make them indispensable for certain tasks:

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

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

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

Slip-on information

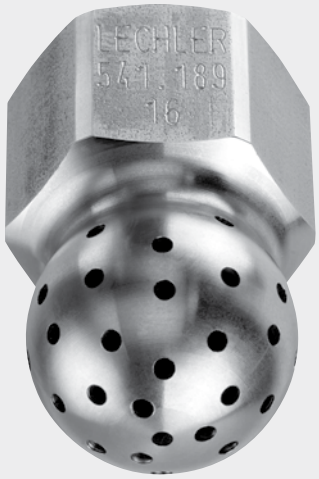
- R-clip made of stainless steel AISI 316L is included.
- Depending on diameter of the adapter the flow rate can increase due to leakage between the connection and static spray ball.

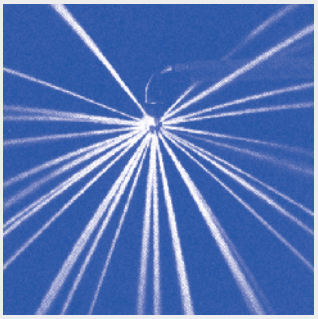
Static spray balls
Series 540 / 541

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.

FDA compliant





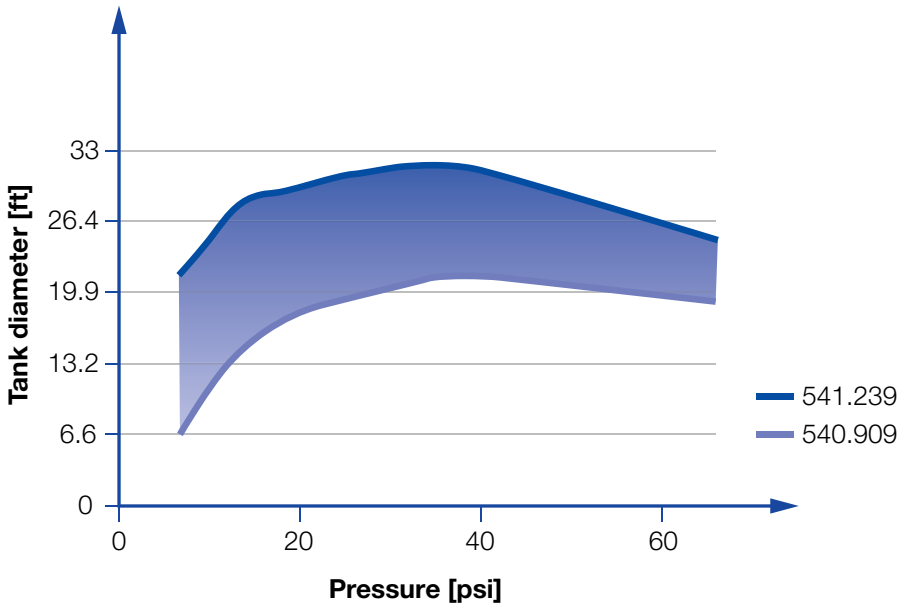
Max. tank diameter [ft]

Material
AISI 303 SS

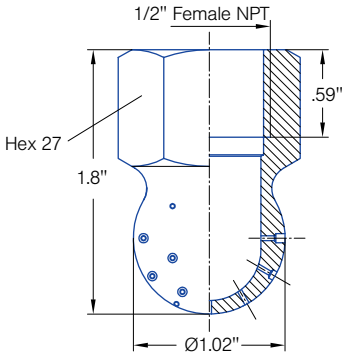
Max. temperature
392°F/ 200°C

Recommended operating pressure
40 psi

Installation
Operates in every direction



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



Spray angle	Ordering no.	Free Passage (in.)	Flow Rate (Gallons Per Minute)				Max. tank diameter [ft]
			20 psi	40 psi	liters per minute 2 bar	60 psi	
240°	540. 909. 16. BH	.031	4	6	18	7	21
	540. 989. 16. BH	.039	6	9	28	11	23
	541. 109. 16. BH	.059	13	18	57	22	25
	541. 189. 16. BH	.079	20	28	90	34	27
	541. 239. 16. BH	.090	26	37	118	45	31

*Note; BSPP threads available upon 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, however, they do have advantages that make them indispensable for certain tasks:

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

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

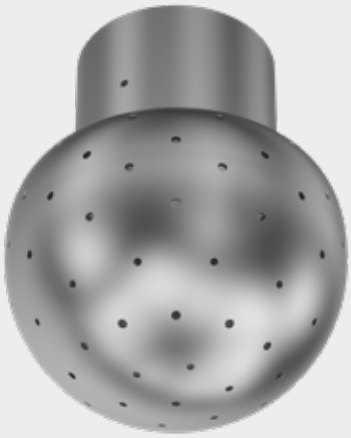
Compared to rotating nozzles, static spray balls usually need two to three times the amount of liquid.

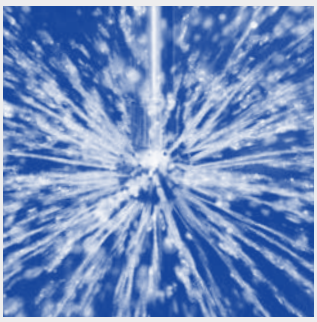
Static spray balls »RinseClean«
Series 5B2/5B3

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.

FDA compliant





Max. tank diameter [ft]

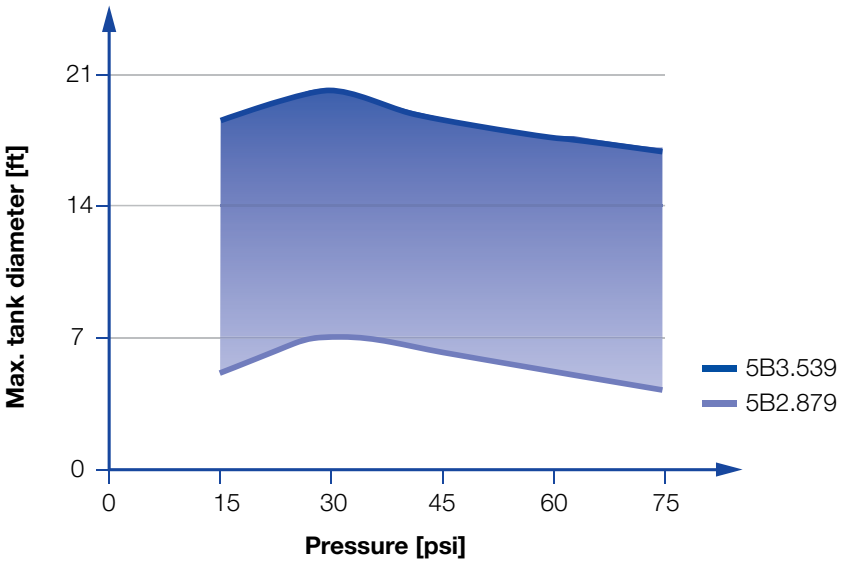
0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45

Material
316L SS,
R-clip: 316L SS

Max. temperature
392 °F / 200 °C

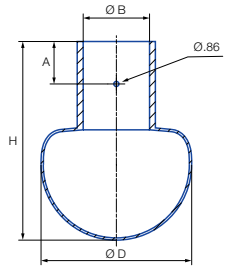
Recommended operating pressure
30 psi

Installation
Operation in every direction is possible



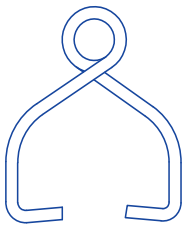
Overview of the tank diameter, depending upon the pressure of series 5B2/5B3

Slip-on connection



Dimensions slip-on connection according to DIN 10357

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 D (ASME BPE 1997, OD tube compatible)

Spray angle	Ordering no. Type	E Ø [in]	Flow Rate (Gallons per minute) 20 psi	30 psi	liters per minute 2 bar	40 psi	60 psi	Dimensions [in] Ø D	Height H	Con-nection B	Distance to bore hole A	Pin	Max. tank diameter [ft]
360°	5B3.089.1Y.A1.00.0	.04	10.9	13.4	50	15.5	19	1.10	1.65	0.39	.35	1	7
	5B3.209.1Y.A1.90.0	.06	22.0	26.9	100	31.0	38	1.10	1.65	0.76	.35	1	8
	5B3.309.1Y.A1.90.0	.07	39.4	48.4	180	55.9	68.4	2.52	3.31	0.76	.71	2	11
	5B3.379.1Y.A2.60.0	.08	57.1	69.9	260	80.7	98.8	2.52	3.31	1.01	.71	3	17
	5B3.449.1Y.A3.80.0	.12	89.9	110.2	410	127.2	155.8	2.52	3.31	1.51	.71	3	18
	5B3.539.1Y.A5.10.0	.13	147.0	180	670	207.9	254.6	3.54	4.37	2.01	.98	5	18

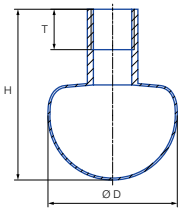
E = narrowest free cross-section

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

Slip-on information

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

Threaded connection



Female Threaded connection

Spray angle	Ordering no. Type	Con-nection NPT	E Ø [in]	Flow Rate (Gallons per minute) 20 psi	30 psi	liters per minute 2 bar	40 psi	60 psi	Dimensions [in] Ø D	Height H	Screw-in length T	Max. tank diameter [ft]
360°	5B2.879.1Y.BB.00.0	1/8"	.03	3.4	4.0	15	4.7	5.7	.79	1.5	.31	7
	5B3.309.1Y.BH.00.0	1/2"	.07	39.5	48.4	180	55.9	68.4	2.5	3.3	.55	11
	5B3.379.1Y.BN.00.0	1"	.08	57.1	69.9	260	80.7	98.8	2.5	3.3	.71	17
	5B3.539.1Y.BW.00.0	2"	.12	147.0	180.0	670	207.9	254.6	3.5	4.4	.94	18

E = narrowest free cross-section

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

PERFECT RINSING AND REMOVAL OF LIGHT SOILING

Cleaning efficiency class 2

The typical task profile of the rotating nozzles in cleaning efficiency class 2 includes rinsing and the removal of light soiling, particularly the kind that frequently occurs in the food and beverage industry, as well as the chemical and pharmaceutical industry.

The Lechler products in this class are free-spinning and made from high-grade materials such as stainless steel, PVDF, PEEK and PTFE. This allows a wide range of various cleaning agents to be used.

Operating principles
Free-spinning

Flow rates at 30 psi
2 to 59 gpm

Recommended operating pressures
30 to 40 psi

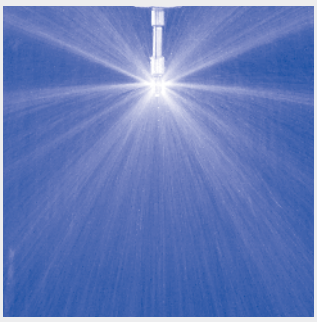
Max. temperatures
122 to 392°F
50 to 200°C

Rotating cleaning nozzle “PicoWhirly” Series 500.234

Series 500.234

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

FDA compliant



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

Material
AISI 316L SS

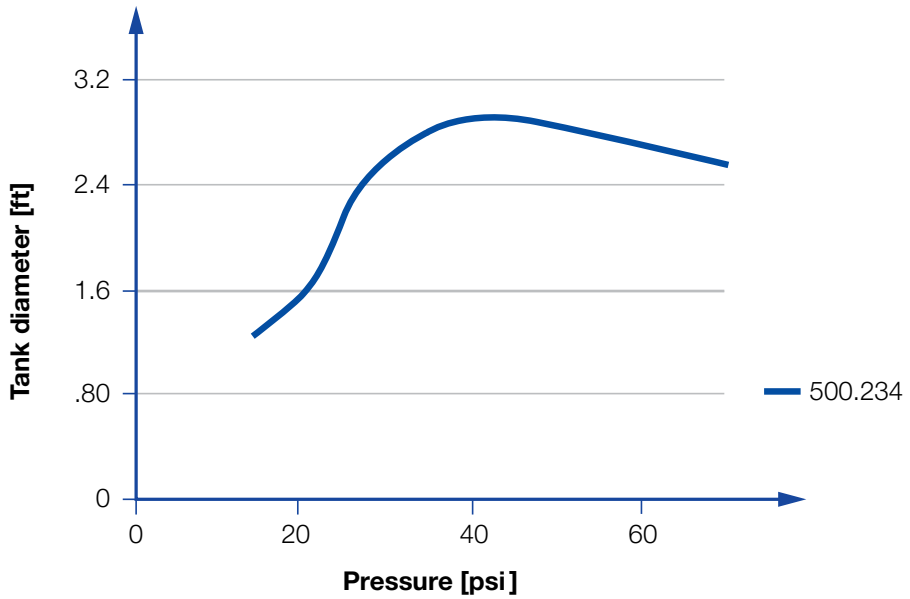
Max. temperature
400°F/ 200°C

Recommended operating pressure
40 psi

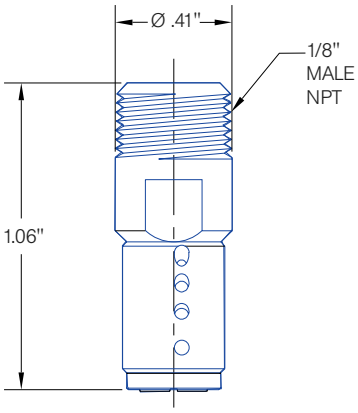
Installation
Operates in every direction

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

Bearing
Kolsterized Sleeve bearing



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



Spray angle	Ordering no. Connection 1/8" Male NPT	Free Passage (in.)	Flow Rate (Gallons Per Minute) 20 psi	liters per minute 2 bar	40 psi	60 psi	Max. tank diameter [ft]
300°	500. 234. G9. BA	.07	1.8	8	2.5	3.0	3

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 or steam purge only for short-term usage. Operation above the recommended operating pressure means higher wear and smaller droplets. This might have adverse effects on the cleaning result.

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.

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

Material
PVDF

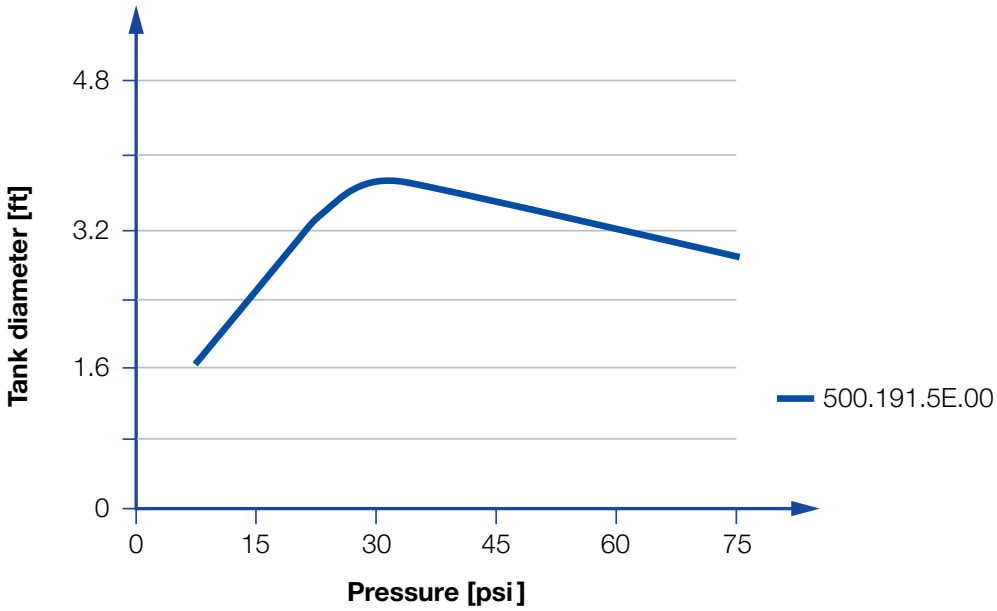
Max. temperature
194°F/ 90°C

Recommended operating pressure
30 psi

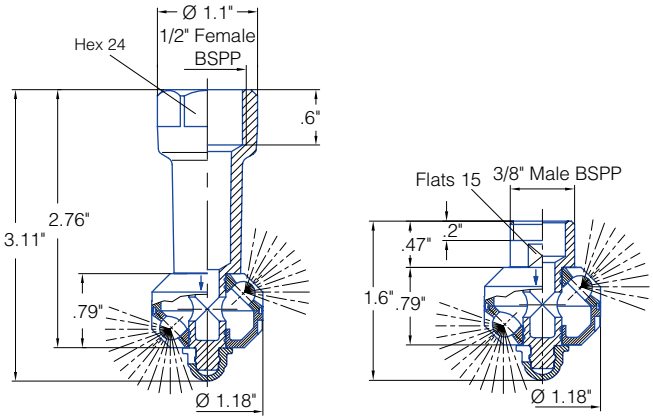
Installation
Operates in every direction

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

Bearing
Sleeve bearing made of PVDF



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



Standard version

Compact version

Standard version

Spray angle	Ordering no.	Free Passage (in.)	Connection	Flow Rate (Gallons Per Minute)					Max. tank diameter [ft]
				20 psi	30 psi	liters per minute 2 bar	40 psi	60 psi	
180°	500. 191. 5E. 02	.086	1/2" Female BSPP	2.9	3.5	13	4.0	4.9	2.6
180°	500. 191. 5E. 01	.086	1/2" Female BSPP	2.9	3.5	13	4.0	4.9	2.6
360°	500. 191. 5E. 00	.086	1/2" Female BSPP	4.4	5.4	20	6.2	7.6	3.6

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 no.	Free Passage (in.)	Connection	Flow Rate (Gallons Per Minute)				Max. tank diameter [ft]
				20 psi	liters per minute 2 bar	40 psi	60 psi	
180°	500. 191. 5E. 21	.086	3/8" Male BSPP	2.9	13	4.0	4.9	2.6
360°	500. 191. 5E. 22	.086	3/8" Male BSPP	4.4	20	6.2	7.6	3.6

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 “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.

FDA compliant

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

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

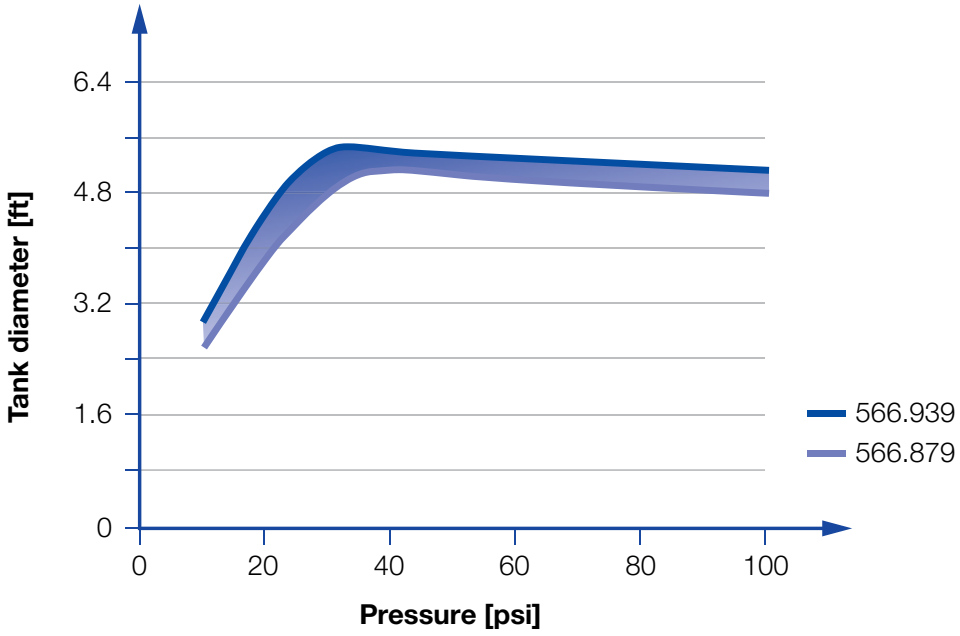
Max. temperature
266°F/ 130°C
194°F/ 90°C ATEX Version

Recommended operating pressure
40 psi

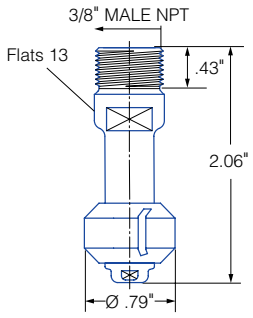
Installation
Operates in every direction

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

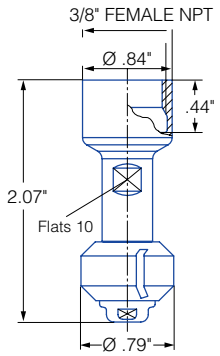
Bearing
Sleeve bearing made of PEEK



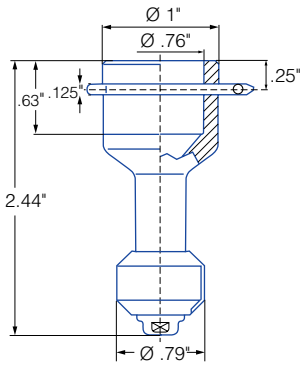
Overview of the tank diameter, depending upon the pressure of series 566



3/8" Male NPT



3/8" Female NPT



Slip-on connection
3/4" OD Slip-on

Spray angle	Ordering no.				Free Passage (in.)	Flow Rate (Gallons Per Minute)				Max. tank diameter [ft]
	Type	Connection				20 psi	liters per minute 2 bar	40 psi	60 psi	
		3/8" Male NPT	3/8" Female NPT	3/4" OD Slip-on						
180°	566. 873. 1Y	BE	BF	TF07	.04	3.3	15	4.7	5.7	5.2
	566. 933. 1Y	BE	BF	TF07	.04	4.6	21	6.5	8.0	5.6
180°	566. 874. 1Y	BE	BF	TF07	.04	3.3	15	4.7	5.7	5.2
	566. 934. 1Y	BE	BF	TF07	.04	4.6	21	6.5	8.0	5.6
360°	566. 879. 1Y	BE	BF	TF07	.04	3.3	15	4.7	5.7	5.2
	566. 939. 1Y	BE	BF	TF07	.04	4.6	21	6.5	8.0	5.6

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

Information on operation

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

Slip-on information

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

Example of ordering with ATEX approval.

Unit group / category / zones:
Ⓔx II 1G Ex h LLB 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	+	BE	=	566.873.1Y.BE.EX

Attention: for the ATEX version of the slip-on connection the code for the connection changes. Example of ordering slip-on connection: 566.873.1Y.TF.EX

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

FDA compliant

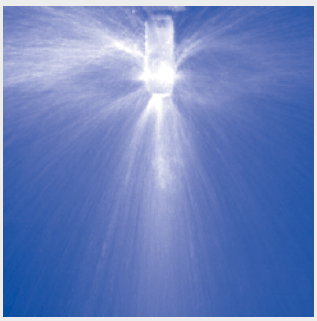
All Materials are suitable for contact with food.

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

Rotating cleaning nozzle “MiniWhirly” Series 500.186

Series 500.186

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



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

Materials
POM,
316 SS

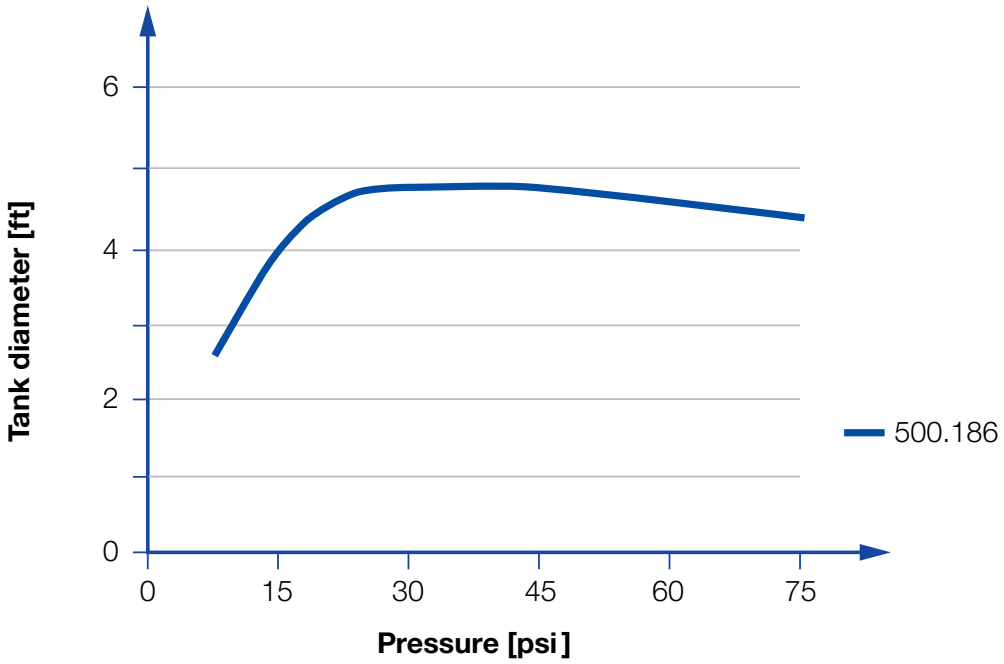
Max. temperature
122°F/ 50°C

Recommended operating pressure
30 psi

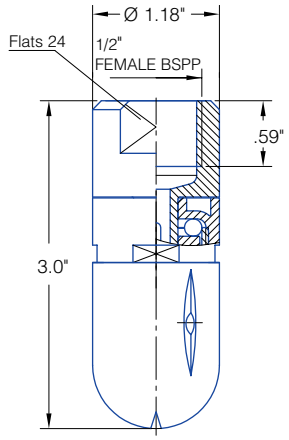
Installation
Vertically facing downward

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



Spray angle	Ordering no.	Free Passage (in.)	Flow Rate (Gallons Per Minute)					Max. tank diameter [ft]
			20 psi	30 psi	liters per minute 2 bar	40 psi	60 psi	
300°	500. 186. 56. AH	.075	4.0	4.8	18	5.6	6.8	4.3

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

Information on operation

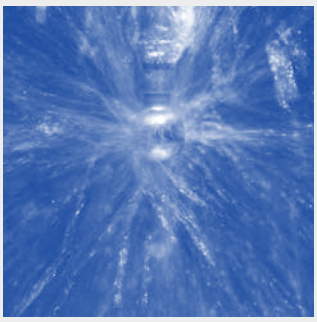
- Operation with compressed air purge only for short-term usage. Operation above the recommended operating pressure means higher wear and smaller droplets. This might have adverse effects on the cleaning result.

Rotating cleaning nozzle »NanoSpinner 2«
Series 5M1

NEW

Series 5M1

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



Max. tank diameter [ft]

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

Materials
Stainless steel 316L

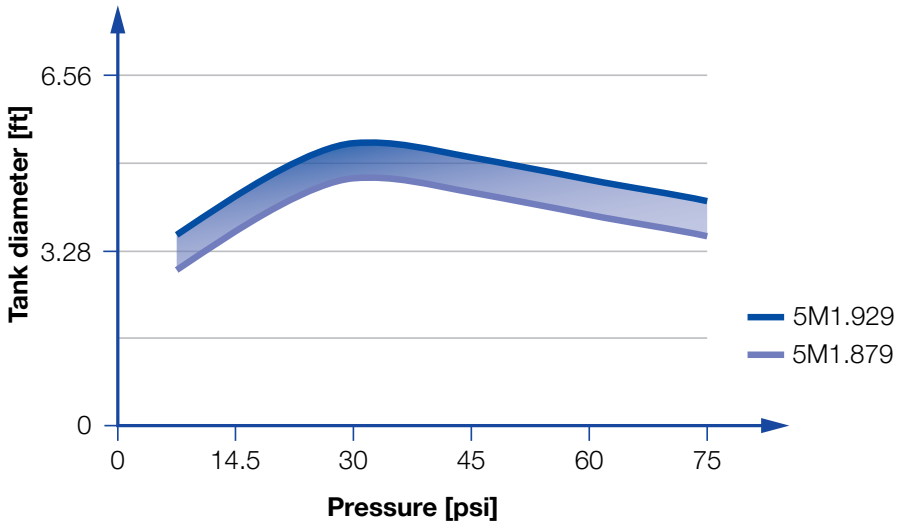
Max. temperature
482°F/ 250°C

Recommended operating pressure
30 psi

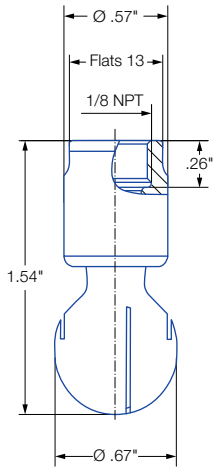
Installation
Operation in every direction is possible

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 1/8 NPT	E Ø [in]	V̇[l/min] p [psi] (p_{max} = 100 psi) 20 psi	30 psi	2 bar	40 psi	Max. tank diameter [ft]
360°	5M1.879.1Y.BB	0.016	3.2	4.0	15	4.6	4.6
	5M1.929.1Y.BB	0.019	4.5	5.5	20	6.3	5.2

E = narrowest free cross-section
Slip-on connection and weld-on versions on request

*This product is also available in Hastelloy C22

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.BB.EX

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

All Materials are suitable for contact with food.

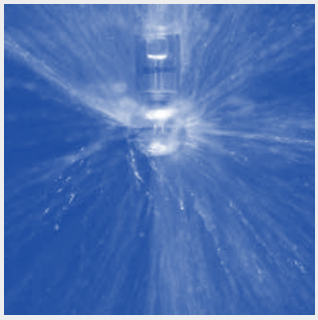
Example of ordering:	Type	+	Connection	= Ordering no.
	5M1.879.1Y	+	BB	= 5M1.879.1Y.BB

Rotating cleaning nozzle »MicroSpinner 2«
Series 5M2

NEW

Series 5M2

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



Max. tank diameter [ft]

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

Materials
Stainless steel 316L

Max. temperature
482°F/ 250°C

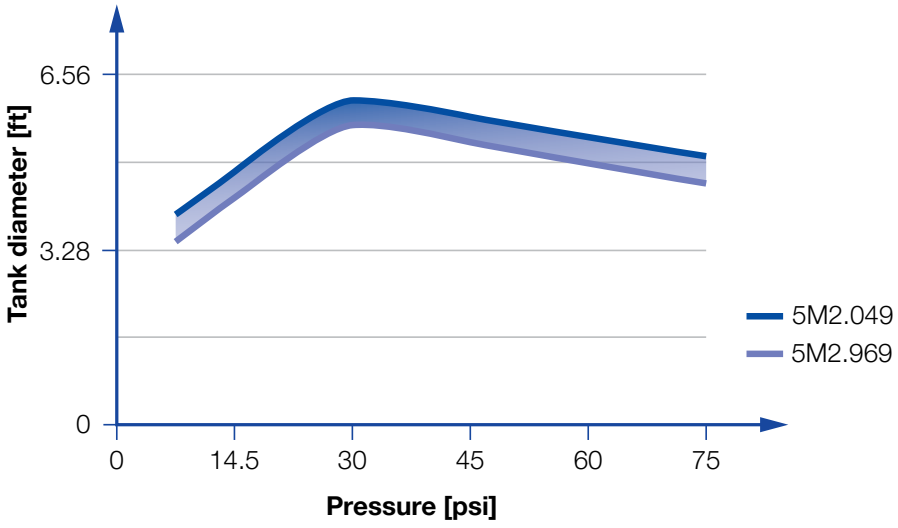
Recommended operating pressure
30 psi

Installation
Operation in every direction is possible

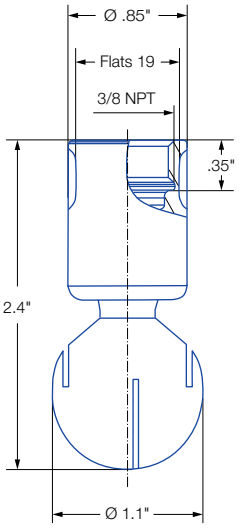
Filtration
Line strainer with a mesh size of 0.1 mm/170 Mesh

Bearing
Double ball bearing made of stainless steel 316L

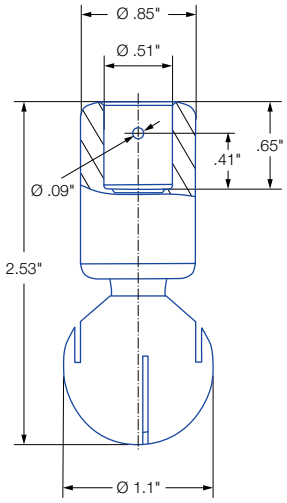
Adapter
3/8 BSPP is compatible with HygienicFit



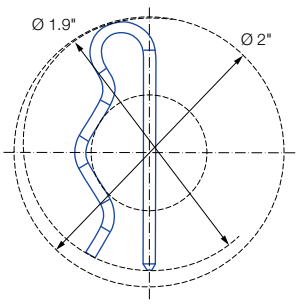
Overview of the tank diameter, depending upon the pressure of series 5M2



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			E Ø [in]	V̇[gal/min] p [psi] (p_{max} = 100 psi)				Max. tank diameter [ft]
	Type	Connection 3/8 NPT	Connection 1/2" Slip-on		20 psi	30 psi	2 bar	40 psi	
60°	5M2.952.1Y	BF	TF05	.06	5.0	6.2	23	7.1	-
	5M2.042.1Y	BF	TF05	.12	8.8	10.8	40	12.4	-
180°	5M2.004.1Y	BF	TF05	.04	7.0	8.6	32	9.9	5.9
360°	5M2.969.1Y	BF	TF05	.03	5.6	6.8	25	7.9	5.6
	5M2.049.1Y	BF	TF05	.04	8.6	10.5	39	12.2	5.9

E = narrowest free cross-section
Slip-on connection and weld-on versions on request

*This product is also available in Hastelloy C22

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	+ Mat. no.	+ Connection	= Ordering no.
	5M2.952	+ 1Y	+ BF	= 5M2.952.1Y.AF.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.
	5M2.952.1Y	+	BF	= 5M2.952.1Y.AF

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

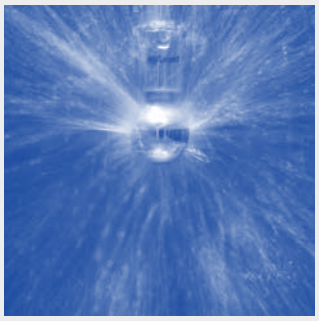
Rotating cleaning nozzle »MiniSpinner 2« Series 5M3

NEW

Series 5M3

The MiniSpinner 2 has a popular design for effective cleaning. The MiniSpinner 2 is made of stainless steel and designed for use at high temperatures. It is available with many different flow rates and spray angles.

FDA compliant



Max. tank diameter [ft]

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

Materials
Stainless steel 316L

Max. temperature
482°F/ 250°C

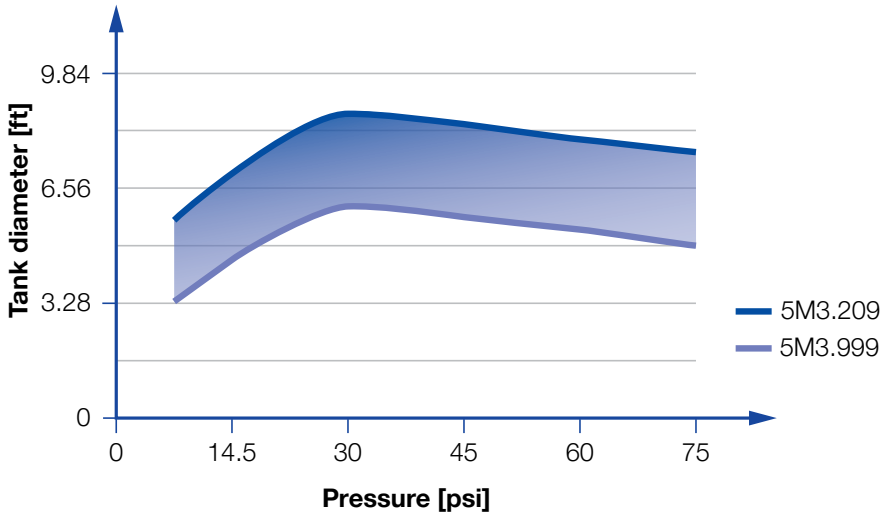
Recommended operating pressure
30 psi

Installation
Operation in every direction is possible

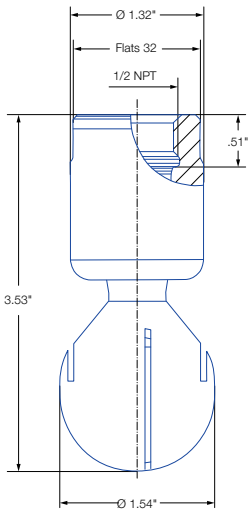
Filtration
Line strainer with a mesh size of
0.1 mm/170 Mesh

Bearing
Double ball bearing made of stainless steel 316L

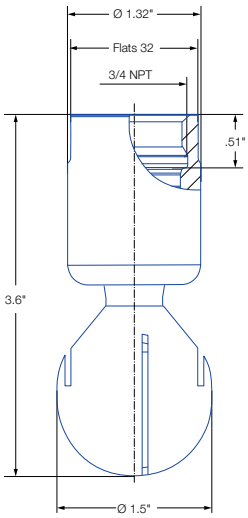
Adapter
1/2 BSPP and 3/4 BSPP are compatible with HygienicFit



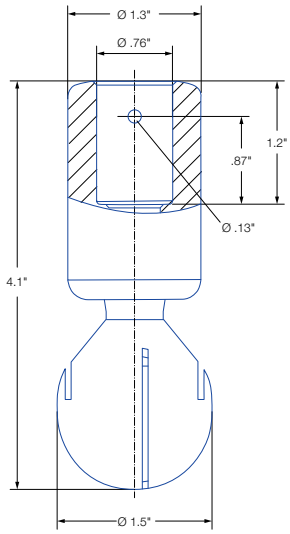
Overview of the tank diameter, depending upon the pressure of series 5M3



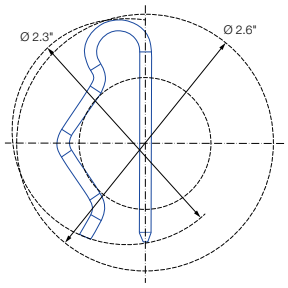
Female thread



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 NPT	Connection: 3/4 NPT	Connection: 3/4" Slip-on	E Ø [in]	V̇[gal/min] p [psi] (p_{max} = 100 psi): 20 psi	30 psi	2 bar	40 psi	Max. tank diameter [ft]
60°	5M3.122.1Y	BH	-	TF07	.10	13.8	16.6	63	19.5	-
180°	5M3.133.1Y	-	BL	TF07	.05	14.7	18.0	67	20.8	8.5
180°	5M3.134.1Y	-	BL	TF07	.05	14.7	18.0	67	20.8	8.5
360°	5M3.999.1Y	-	BL	TF07	.02	6.6	8.1	30	9.4	5.9
	5M3.089.1Y	-	BL	TF07	.03	10.8	13.2	49	15.2	6.9
	5M3.139.1Y	-	BL	TF07	.03	15.2	18.7	69	21.5	7.5
	5M3.209.1Y	-	BL	TF07	.06	21.9	26.8	100	30.9	8.5

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

*This product is also available in Hastelloy C22

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 2.32in.

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	+ BH	= 5M3.122.1Y.BH.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	+	BH	= 5M3.122.1Y.BH

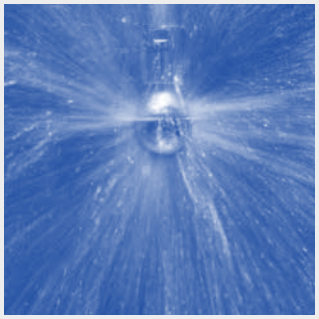
Rotating cleaning nozzle »MaxiSpinner 2« Series 5M4

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 provides effective cleaning results and a reliable with a durable bearing construction. The MaxiSpinner 2 is made of stainless steel (316L) and is designed for high ambient temperatures.

FDA compliant



Max. tank diameter [ft]

0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18

Materials
Stainless steel 316L

Max. temperature
482°F/ 250°C

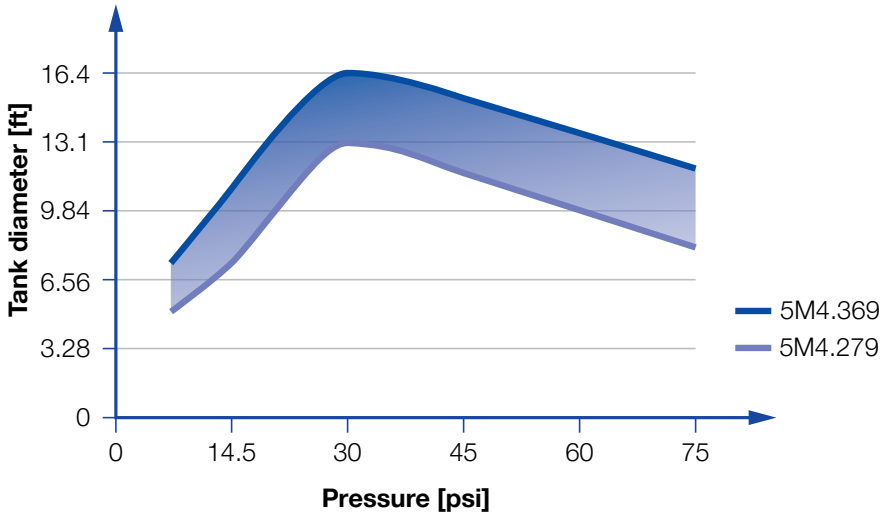
Recommended operating pressure
30 psi

Installation
Operation in every direction is possible

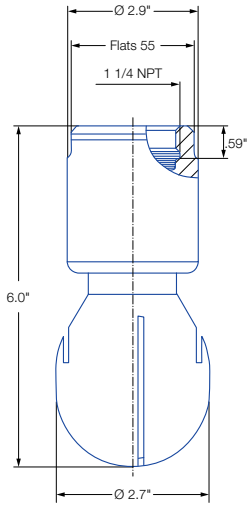
Filtration
Line strainer with a mesh size of 0.1 mm/170 Mesh

Bearing
Double ball bearing made of stainless steel 316L

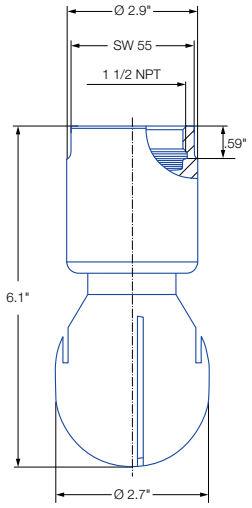
Adapter
1 1/4 BSPP and 1 1/2 BSPP are compatible with HygienicFit



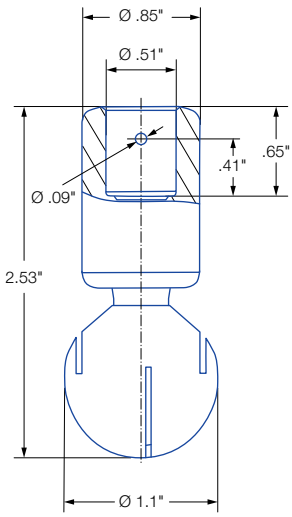
Overview of the tank diameter, depending upon the pressure of series 5M4



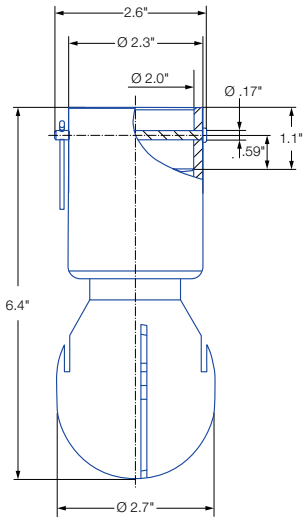
Female thread



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					E Ø [in]	V̇[gal/min]				Max. tank diameter [ft
							p [psi] (p_{max} = 100 psi)*				
	Type	Connection					20 psi	30 psi	2 bar	40 psi	
		1 1/4 NPT	1 1/2 NPT	1 1/2" Slip-on	2" Slip-on						
360°	5M4.279.1Y	BQ	BS	TF15	TF20	.07	33.0	40.4	150	46.6	13.1
	5M4.329.1Y	BQ	BS	TF15	TF20	.08	43.9	53.8	200	62.1	14.8
	5M4.369.1Y	BQ	BS	TF15	TF20	.09	54.8	67.2	250	77.5	16.4

E = narrowest free cross-section
Weld-on versions on request
* Please note the maximum operating pressure of 60 psi for the 2" slip-on version (TF.20).

*This product is also available in Hastelloy C22

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 2.72in.

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

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

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

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

All Materials are suitable for contact with food.

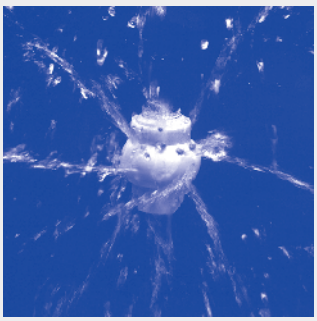
Example of Ordering:	Type	+	Connection	= Ordering no.
	5M4.369.1Y	+	BQ	= 5M4.369.1Y.BQ

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



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

Material
PTFE

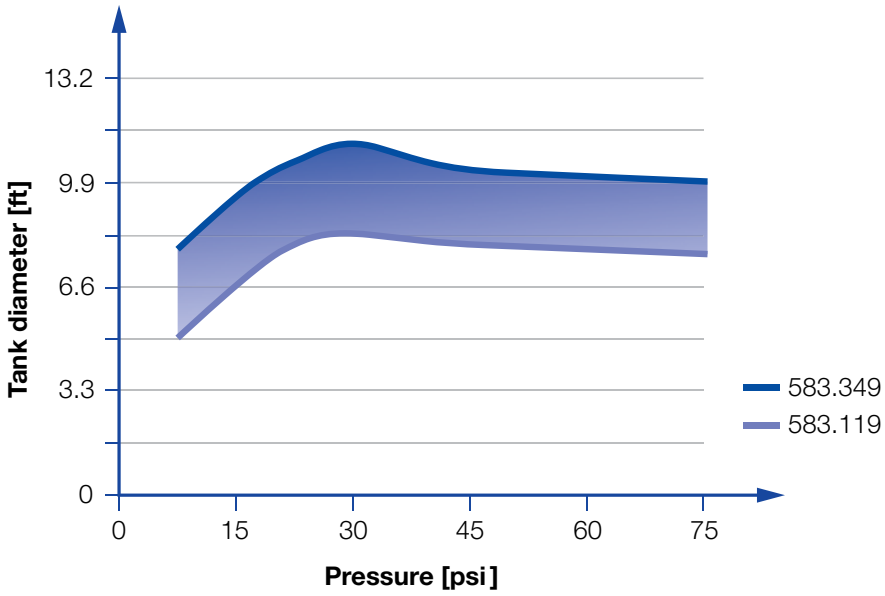
Max. temperature
203°F/ 95°C
(Versions for use with higher temperature on request)

Recommended operating pressure
30 psi

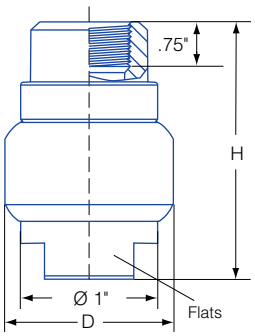
Installation
Operates in every direction

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

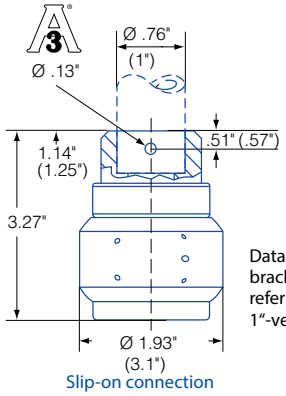
Bearing
Sleeve bearing made of PTFE



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

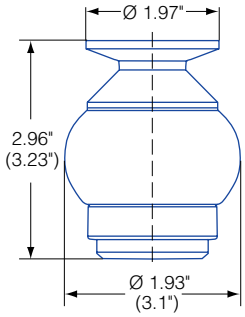


NPT female thread



Slip-on connection
for sanitary tube 3-A*

Data in brackets refer to 1"-version.



1 1/2" Tri-Clamp

Spray angle	R-clip	Ordering no. Type	Connection ¾" Female NPT	Connection 1" Female NPT	Connection ¾" Slip-on	Connection 1" Slip-on	Connection 1½" Tri-Clamp	Free Passage (in.)	Flow Rate (Gallons Per Minute) 20 psi	30 psi	liters per minute 2 bar	40 psi	60 psi	Dimensions for female thread version Height H [in]	Dia-meter D [in]	Max. tank diameter [ft]
180°	1)	583. 114. 55	BL	-	TF07*	-	15	.083	15	18	67	21	26	2.91	1.93	8.2
	1)	583. 264. 55	BL	-	TF07*	-	15	.129	32	39	145	45	55	2.91	1.93	9.2
	2)	583. 344. 55	-	BN	-	-	15	.279	49	60	225	70	85	3.94	3.09	10.5
180°	1)	573. 114. 55	BL	-	TF07*	-	15	.083	16	18	67	21	26	2.91	1.93	8.2
	1)	573. 264. 55	BL	-	TF07*	-	15	.129	32	39	145	45	55	2.91	1.93	9.2
	2)	573. 344. 55	-	BN	-	-	15	.279	49	60	225	70	85	3.94	3.09	10.5
270°	1)	583. 116. 55	BL	-	TF07*	-	15	.094	15	18	67	21	26	2.91	1.93	8.2
	1)	583. 266. 55	BL	-	TF07*	-	15	.133	32	39	145	45	55	2.91	1.93	9.2
	2)	583. 346. 55	-	BN	-	-	15	.232	49	60	225	70	85	3.94	3.09	10.5
270°	1)	573. 116. 55	BL	-	TF07*	-	15	.094	15	18	67	21	26	2.91	1.93	8.2
	1)	573. 266. 55	BL	-	TF07*	-	15	.133	32	39	145	45	55	2.91	1.93	9.2
	2)	573. 346. 55	-	BN	-	-	15	.232	49	60	225	70	85	3.94	3.09	10.5
360°	1)	583. 119. 55	BL	-	TF07*	-	15	.071	13	16	58	18	22	2.91	1.93	7.9
	1)	583. 209. 55	BL	-	TF07*	-	15	.138	22	27	100	31	38	2.91	1.93	8.2
	1)	583. 269. 55	BL	-	TF07*	-	15	.189	32	39	145	45	55	2.91	1.93	9.2
	2)	583. 279. 55	-	BN	-	TF10*	15	.146	33	40	150	47	57	3.94	3.09	9.8
	2)	583. 349. 55	-	BN	-	TF10*	15	.220	50	61	226	70	86	3.94	3.09	10.5

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

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

Information on operation

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

Slip-on information

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

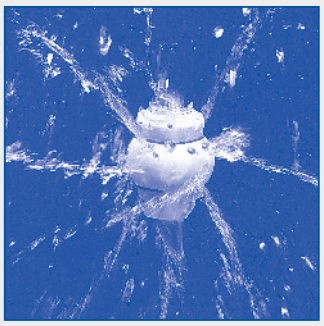
Example of ordering:	Type	+	Connection	=	Ordering no.
	583. 114. 55.	+	BL	=	583. 114. 55. BL

Rotating cleaning nozzle “PTFE Hi Temp Whirly” Series 599

Series 599

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

FDA compliant



Max. tank diameter [ft]	0	10	20

Material
PTFE
Rings: Alloy C-276

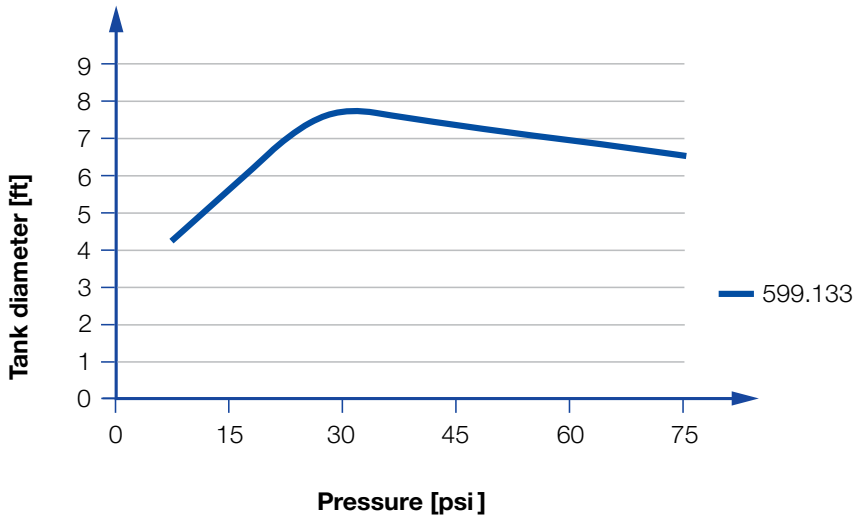
Max. temperature
274°F/ 134°C

Recommended operating pressure
30 psi

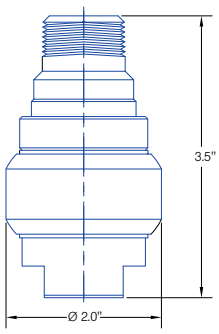
Installation
Operates in every direction

Filtration
Line strainer with a mesh size of 50 Mesh

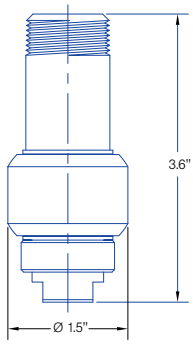
Bearing
Slide bearing



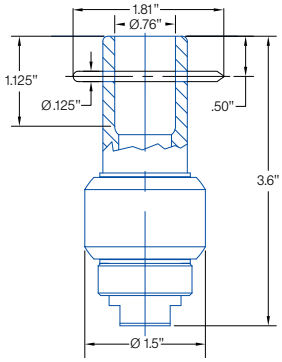
Overview of the tank diameter, depending upon the pressure of series 599



599.133



599.170



599.174 Female Tube Slip-on

Spray angle	Ordering no.	Connection		Flow Rate (Gallons Per Minute)					Max. tank diameter [ft]
		¾" Male NPT	¾" OD Female Slip-on	20 psi	30 psi	liters per minute 2 bar	40 psi	60 psi	
360°	599. 133. 55	BK	-	22	27	100	31	38	8.2
	599. 170. 55	BK	-	19	23	84	26	32	8
	599. 174. J7	-	TF07	19	23	84	26	32	8

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

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

Example of ordering:	Type	+	Connection	=	Ordering no.
	599. 133. 55.	+	BK	=	599. 133. 55. BK

Slip-on information

- R-clip made of Alloy C-276 is included (Ordering no.: R-clip 1: 095.022.1Y.50.60.E).
- The nozzles with a slip-on connection type fitting may have a higher flow rate than listed due to the self-flushing design around the customer's tube which is inserted into the nozzle socket.

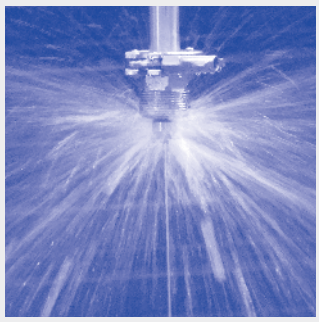
Pop-up rotating cleaning nozzles “PopUp Whirly” Series 5P2 / 5P3

NEW

Series 5P2 / 5P3

When a certain fluid pressure is reached, the rotating of the PopUp Whirly is automatically extended from the enclosure. These free-spinning rotating nozzles can be installed flush in the tank wall. They are also suitable for cleaning pipes and for applications that use foam. They are of particular interest for applications in the food and beverage industry as well as for the pharmaceutical and chemical industry.

FDA compliant



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

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

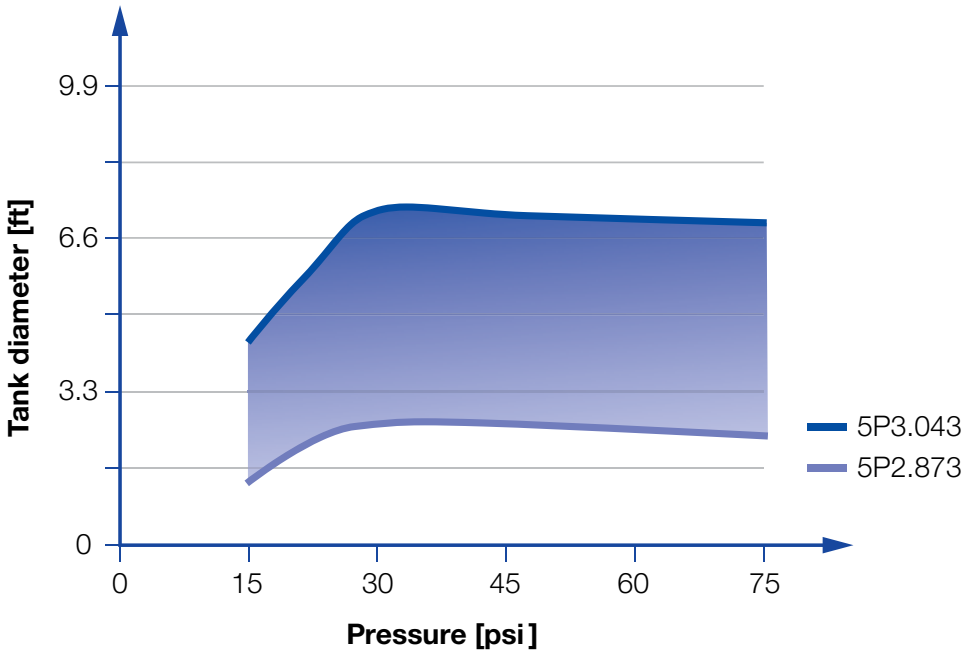
Max. temperature
284°F / 140°C

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

Installation
Operates in every direction

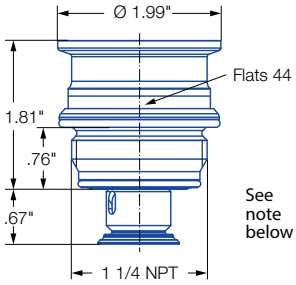
Filtration
Line strainer with a mesh size of 0.3 mm/50 Mesh

Bearing
Sleeve bearing made of PEEK

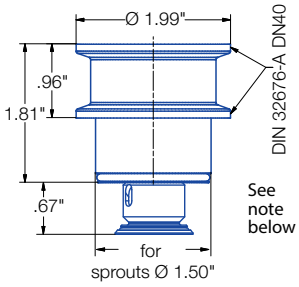


Overview of the tank diameter, depending upon the pressure of series 5P2/5P3

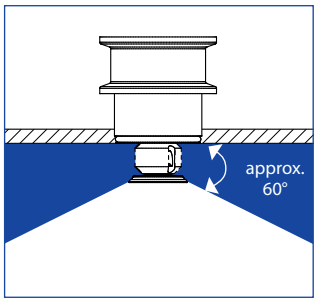
Series 5P2



Male thread



Tri-Clamp

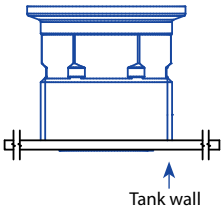


Spray angle	Ordering no.	Tank connection		Free Passage (in.)	Flow Rate (Gallons Per Minute)				Max. tank diameter [ft]
		1¼" Male BSPP	Tri Clamp		20 psi	30 psi	liters per minute 2 bar	40 psi	
	5P2. 873. 1Y. AP	○	-	.04	3.3	4	15.0	4.7	2.6
	5P2. 873. 1Y. 00	-	○	.04	3.3	4	15.0	4.7	2.6
	5P2. 923. 1Y. AP	○	-	.04	4.4	5.4	20.0	6	3.3
	5P2. 923. 1Y. 00	-	○	.04	4.4	5.4	20.0	6	3.3

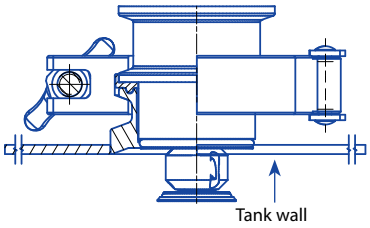
The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

Nozzle installation

With thread in idle position



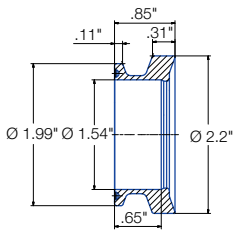
With Tri-Clamp in operating position



Information on operation

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

Weld-in flange for Tri-Clamp-Version

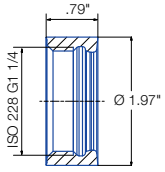


Ordering number
050.020.1Y.01.00

Material
316L SS

Information
Gasket with a thickness of .08 in must be used if the nozzle is installed with this weld-in flange. Not sold with nozzle.Use standard DIN32676-A / DN40

Weld-in socket for Thread-Version



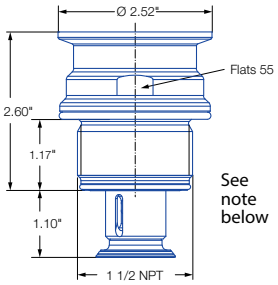
Ordering number
050.020.1Y.AQ.00

Material
316L SS

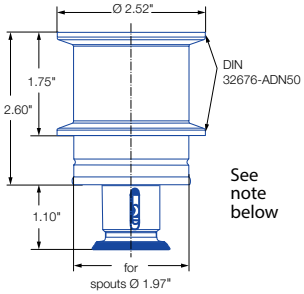
Information
The thread is hygienically sealed with 2 O-rings included in the scope of delivery.

Pop-up rotating cleaning nozzles “PopUp Whirly” Series 5P2 / 5P3

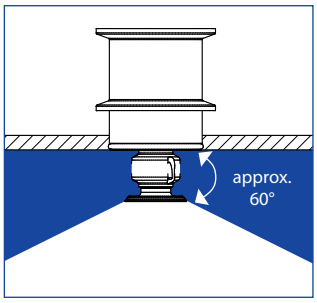
Series 5P3



Male thread



Tri-Clamp

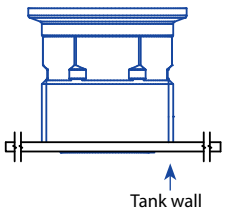


Spray angle	Ordering no.	Tank connection		Free Passage (in.)	Flow Rate (Gallons Per Minute)				Max. tank diameter [ft]
		1¹/₂" Male BSPP	Tri Clamp		20 psi	30 psi	liters per minute 2 bar	40 psi	
	5P3. 043. 1Y. AR	○	-	.05	3.3	4	15.0	4.7	7.2
	5P3. 043. 1Y. 00	-	○	.05	3.3	4	15.0	4.7	7.2

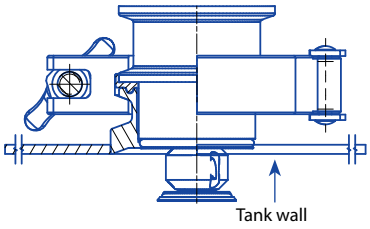
The maximum tank diameter shown above applies for the recommended operating pressure and is indicative only. The cleaning result is also affected by the type of soiling.

Nozzle installation

With thread in idle position



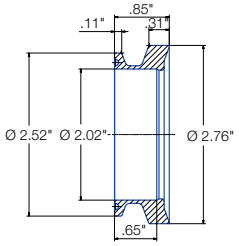
With Tri-Clamp in operating position



Information on operation

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

Weld-in flange for Tri-Clamp-Version

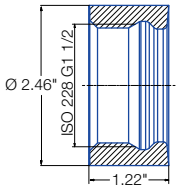


Ordering number
050.020.1Y.01.01

Material
316L SS

Information
Gasket with a thickness of .08 in must be used if the nozzle is installed with this weld-in flange.Not sold with nozzle. Use standard DIN32676-A / DN50

Weld-in socket for Thread-Version



Ordering number
050.020.1Y.AS.00

Material
316L SS

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

EFFICIENT REMOVAL OF LIGHT AND MEDIUM SOILING

Cleaning efficiency class 3

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

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

The Stainless Steel Whirly series is also available as an ATEX version and can therefore also be used in explosive environments.

Max. tank diameter [ft]	0	10	20	30	40

Operating principles
Free-spinning

Flow rates at 30 psi
3 to 169 gpm

Recommended operating pressures
30 to 40 psi

Max. temperatures
194 to 284°F
90 to 140°C

Rotating cleaning nozzles “HygienicWhirly” Series 594 / 595

Series 594 / 595

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

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

Materials
AISI 316L SS,
PEEK

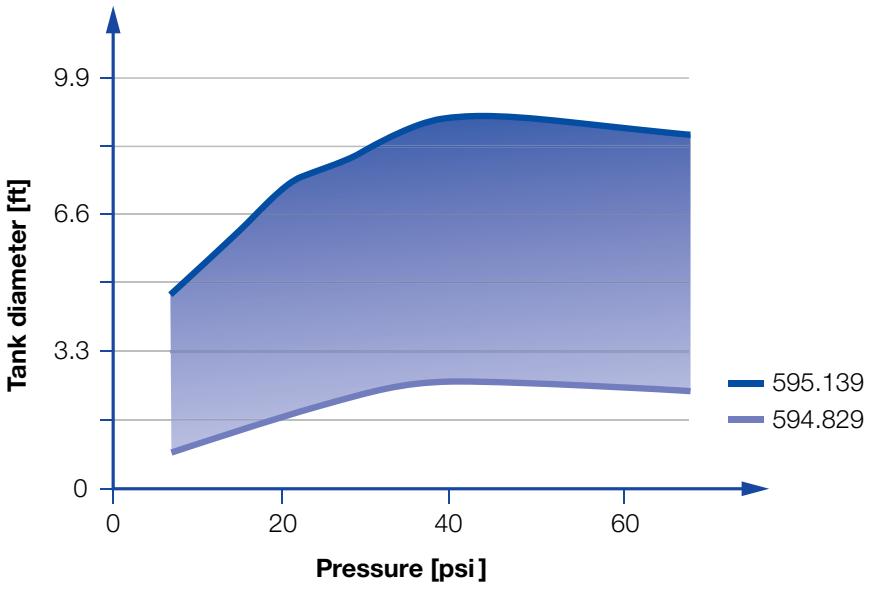
Max. temperature
212°F/ 100°C,
short-term
up to 284°F/ 140°C

Recommended
operating pressure
40 psi

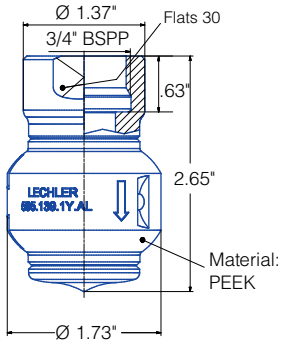
Installation
Operates in every
direction

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

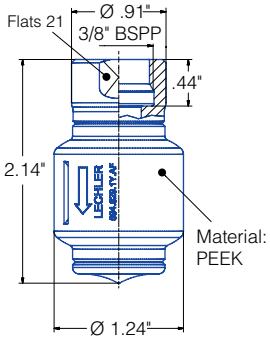
Bearing
Sleeve bearing
made of PEEK



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



Standard version
female thread
595.139.1Y.AL



Standard version
female thread
594.XX9.1Y.AF

Spray angle	Ordering no.			Free Passage (in.)	Flow Rate (Gallons Per Minute)					Max. tank diameter [ft]
	Type	Connection								
		3/8" Female BSPP	3/4" Female BSPP		7 psi	15 psi	liters per minute 2 bar	30 psi	40 psi	
360°	594. 829. 1Y	AF	-	.067	1.4	2.1	11	3.0	3.4	3
	594. 879. 1Y	AF	-	.098	1.9	2.9	15	4.0	4.7	4
	595. 009. 1Y	AF	-	.157	4.2	6.1	32	8.6	9.8	5
	595. 049. 1Y	AF	-	.165	5.2	7.6	40	10.7	12.4	7
	595. 139. 1Y	-	AL	.197	8.7	12.7	67	18.0	20.8	9

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

Information on operation

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

Example of ordering:	Type	+	Connection	=	Ordering no.
	594. 829. 1Y	+	AF	=	594. 829. 1Y. AF

Slip-on information

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

Rotating cleaning nozzle “Whirly 2” Series 5W9

Series 5W9

The Whirly 2 has a hygienic design, and provides efficient cleaning due to its powerful flat jet sprays. Also available in ATEX approved version.

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

Materials
Stainless steel
316L, PEEK

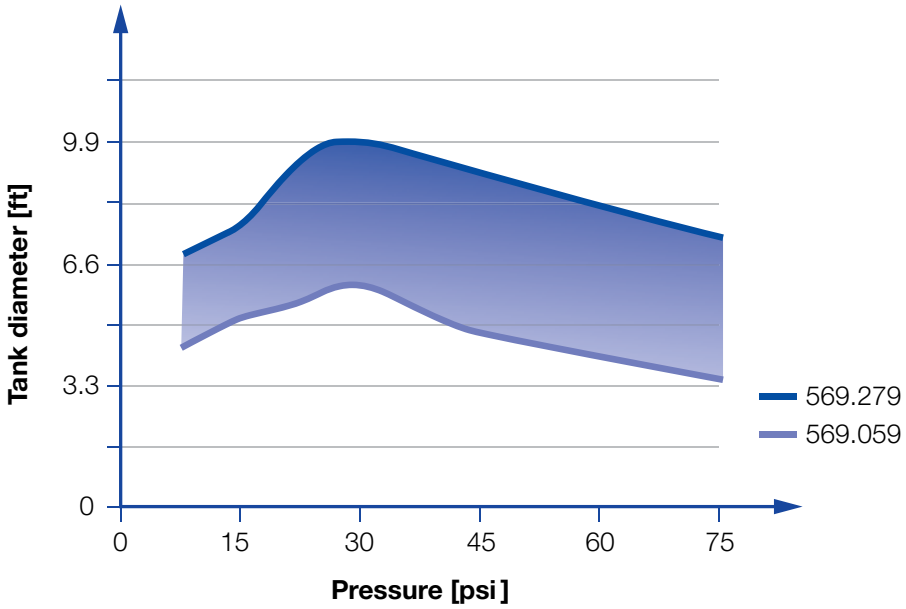
Max. temperature
284°F/ 140°C
194°F/ 90°C ATEX version

Recommended operating pressure
30 psi

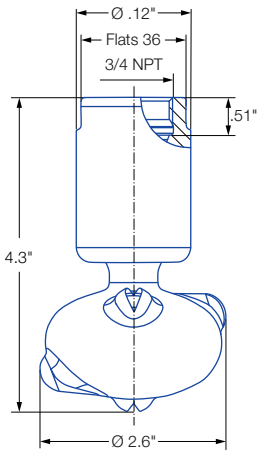
Installation
Operates in every direction. is possible

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

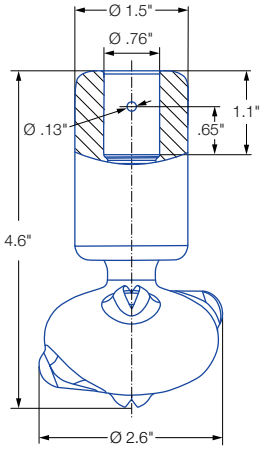
Bearing
Double ball bearing made of stainless steel



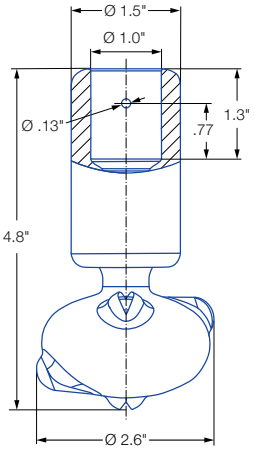
Overview of the tank diameter, depending upon the pressure of series 569



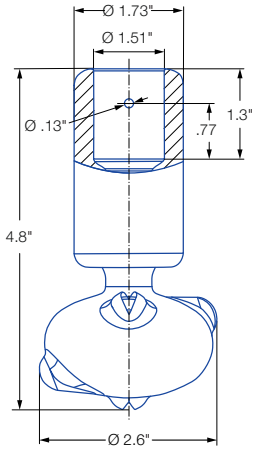
Female thread



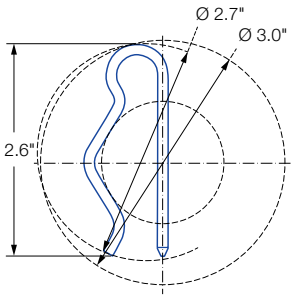
Dimensions slip-on connection according to ASME-BPE (OD-tube)



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



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



Dimensions slip-on connection top-view

Spray angle	Ordering no. Type	Connection 3/4 NPT	Connection 3/4"-Slip-on connection	Connection 1" Slip-on connection	Connection 1.5" Slip-on connection	Narrowest free cross section Ø [in]	V water [gal/min] p [psi] (p_{max} = 87 psi) 20 psi	30 psi	2 bar	40 psi	60 psi	Max. tank diameter [ft]
270°	5W9.075.1Y	BL	TF07	TF10	TF15	.79	10.6	12.9	48	15	18.3	5.9
	5W9.145.1Y	BL	TF07	TF10	TF15	.11	15.6	19.1	71	22	27.0	6.9
	5W9.195.1Y	BL	TF07	TF10	TF15	.13	21.3	26.1	97	30	36.9	8.5
270°	5W9.076.1Y	BL	TF07	TF10	TF15	.79	10.6	12.9	48	15	18.3	5.9
	5W9.106.1Y	BL	TF07	TF10	TF15	1.0	12.8	15.6	58	18	22.0	6.9
	5W9.196.1Y	BL	TF07	TF10	TF15	1.3	21.3	26.1	97	30	36.9	8.5
360°	5W9.079.1Y	BL	TF07	TF10	TF15	.06	10.6	12.9	48	15	18.3	5.9
	5W9.149.1Y	BL	TF07	TF10	TF15	.09	15.6	19.1	71	22	27.0	6.9
	5W9.199.1Y	BL	TF07	TF10	TF15	.12	21.3	26.1	97	30	36.9	8.5
	5W9.279.1Y	BL	TF07	TF10	TF15	.20	31.9	39.1	145	45	55.2	9.8

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

Information on operation

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

Slip-on information

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

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

FDA compliant

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

Example of Ordering:	Type	+ Connection	= Ordering no.
	569.055.1Y.XX.EX	+ BL	= 569.055.1Y.BL.EX

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

FDA compliant

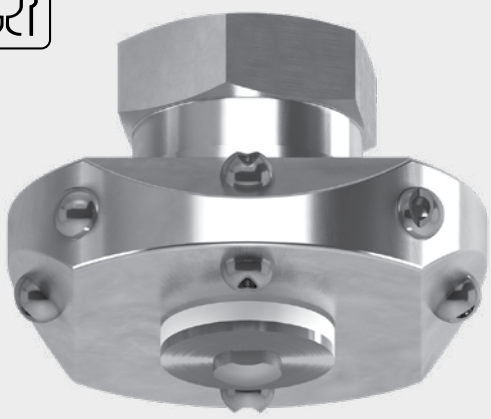
All Materials are suitable for contact with food.

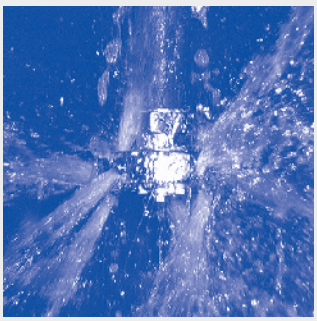
Example of ordering:	Type	+ Connection	= Ordering no.
	569.103.1Y.XX	+ BL	= 569.103.1Y.BL

Rotating cleaning nozzles “Gyro” Series 577

Series 577

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





Max. tank diameter [ft]	0	5	10	15	20

Materials
316 SS, PTFE

Max. temperature
194°F/ 90°C

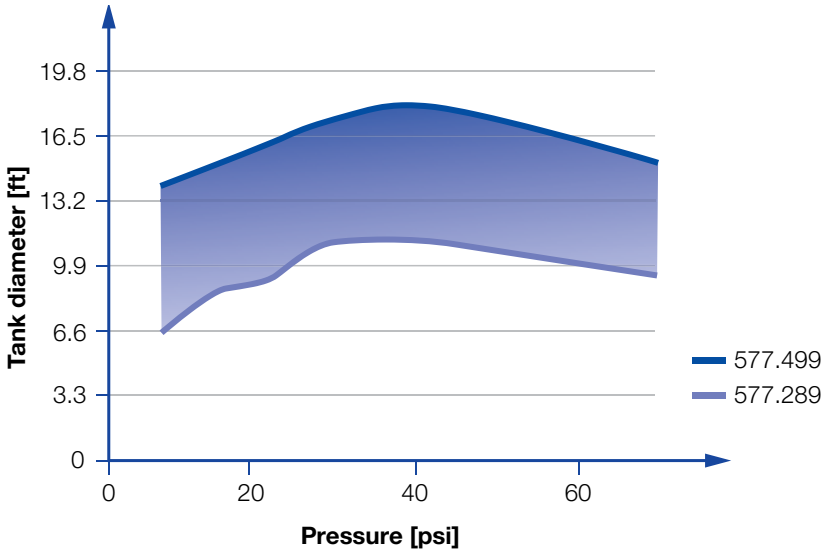
Recommended operating pressure
40 psi

Installation
Vertically facing downward

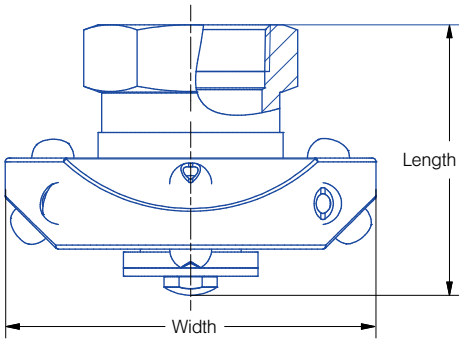
Filtration
Line strainer with a mesh size of 0.3 mm/50 mesh

Bearing
Slide bearing made of PTFE

Accessories
Spare parts set consisting of: top seal, bottom seal and complete instructions.



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



Spray angle	Ordering no.			Flow Rate (Gallons Per Minute)				Dimensions		Max. tank diameter [ft]
	Type	Connection								
		1" NPT	2" NPT	20 psi	liters per minute 2 bar	40 psi	60 psi	Length (in.)	Width (in.)	
180°	577. 283. 1Y	BN	-	36	163	51	62	2.8	4.6	11.2
	577. 363. 1Y	BN	-	57	258	80	98	2.8	4.6	12.5
	577. 403. 1Y	-	BW	71	322	100	122	4.1	6.1	14.4
	577. 433. 1Y	-	BW	85	386	120	147	4.1	6.1	16.4
	577. 523. 1Y	-	BW	140	639	199	243	4.1	6.1	18
180°	577. 284. 1Y	BN	-	36	161	51	62	2.8	4.6	11.2
	577. 364. 1Y	BN	-	57	258	80	98	2.8	4.6	12.5
	577. 404. 1Y	-	BW	71	322	100	122	4.1	6.1	14.4
	577. 434. 1Y	-	BW	85	386	120	147	4.1	6.1	16.4
	577. 494. 1Y	-	BW	145	538	167	205	4.1	6.1	18
270°	577. 285. 1Y	BN	-	36	161	51	62	2.8	4.6	11.2
	577. 365. 1Y	BN	-	57	258	80	98	2.8	4.6	12.5
	577. 405. 1Y	-	BW	71	322	100	122	4.1	6.1	14.4
	577. 435. 1Y	-	BW	85	386	120	147	4.1	6.1	16.4
	577. 495. 1Y	-	BW	145	538	167	205	4.1	6.1	18
360°	577. 289. 1Y	BN	-	36	161	51	62	2.8	4.6	11.2
	577. 369. 1Y	BN	-	57	258	80	98	2.8	4.6	12.5
	577. 409. 1Y	-	BW	71	322	100	122	4.1	6.1	14.4
	577. 439. 1Y	-	BW	85	386	120	147	4.1	6.1	16.4
	577. 499. 1Y	-	BW	145	538	167	205	4.1	6.1	18

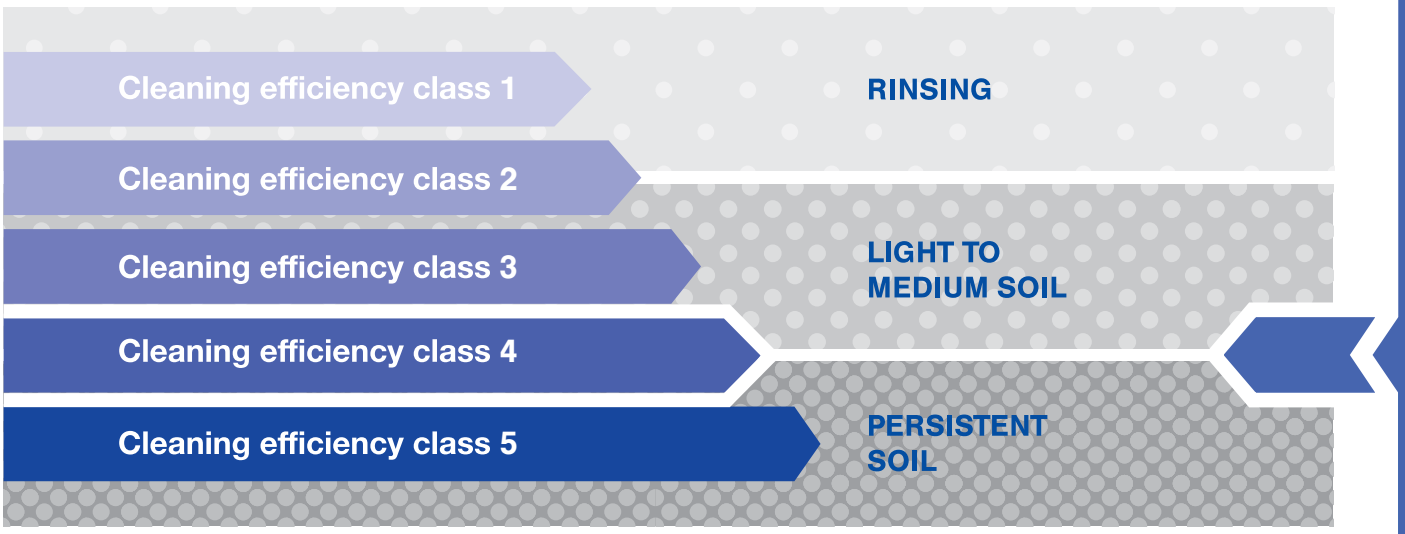
Information on operation

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

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

Example for Ordering:	Type 577. 283. 1Y.	+	Connection BN	= Ordering no. 577. 283. 1Y. BN

EFFECTIVE REMOVAL OF HEAVY SOILING



Cleaning efficiency class 4

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

The flat spray nozzle design of the rotating cleaners in class 4 ensure the removal of heavy soiling at temperatures of up to 284°F / 140°C.

Operating principles
Controlled rotation

Flow rates at 30 psi
6 to 79 gpm

Recommended operating pressures
40 to 75 psi

Max. temperatures
203 to 284°F
95 to 140°C

Rotating cleaning nozzle "XactClean® HP2"
Series 5S6 / 5S7

Series 5S6 / 5S7

Specially developed flat fan nozzles provide high impact and uniform cleaning for the XactClean HP 2. The controlled rotation ensures that the XactClean HP 2 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 compliant

ATEX version available on request

Max. tank diameter [ft]

Materials
Stainless steel 1.4404 (316L) PEEk, EPDM

Max. temperature
302°F/ 150°C

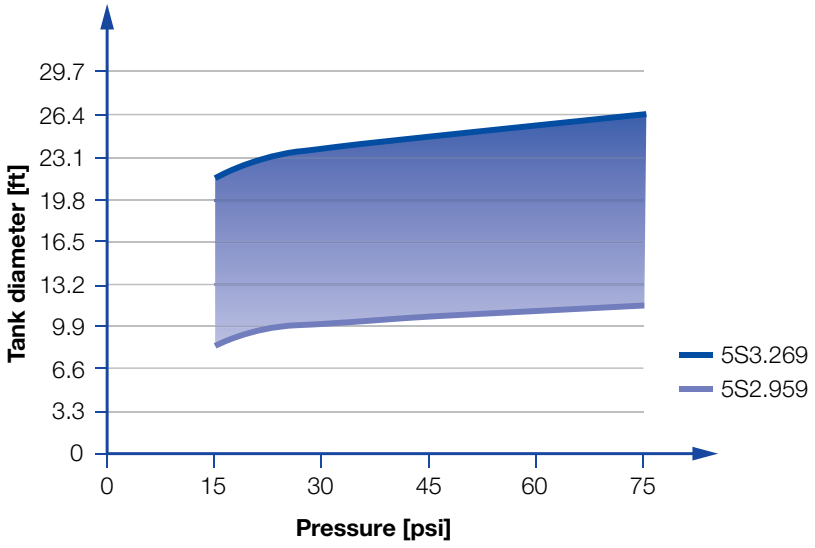
Recommended operating pressure
45 psi

Installation
Operates in every direction

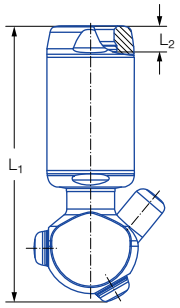
Filtration
Line strainer with a mesh size of 0.3 mm/50 mesh

Bearing
Double ball bearing

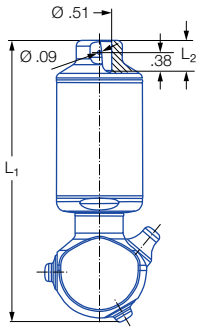
Rotation monitoring sensor
Sensor compatible,
Info: see page 64



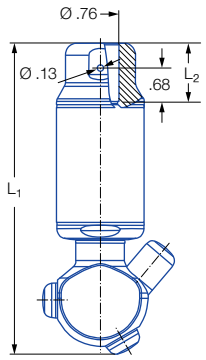
Overview of the tank diameter, depending upon the pressure of series 5S2 / 5S3



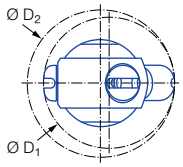
Female thread



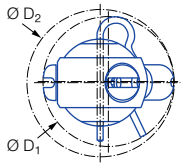
Dimensions of 1/2" slip-on connection according to ASME-BPE (OD tube)



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



Insertion diameter D_1 and interference circle diameter D_2 of the threaded connection



Insertion diameter D_1 and interference circle diameter D_2 of the slip-on connection

Connection		Dimensions [in]			
		L_1	L_2	Insertion diameter D_1	Interference circle diameter D_2
BF	3/8 NPT	5.55	0.35	1.97–2.60	1.97–2.64
BH	1/2 NPT	5.63	0.51	1.97–2.91	1.97–2.99
BL	3/4 NPT	5.63	0.52	1.97–3.11	1.97–3.19
BN	1 NPT	5.51	0.65	2.01–3.11	2.09–3.15
TF05	1/2" slip-on connection	5.91	0.63	2.05–2.60	1.97–2.64
TF07	3/4" slip-on connection	6.30	1.18	2.60–3.11	1.97–3.19

Spray angle	Order number							Narrowest cross-section Ø [in]	V̇ water [gal/min]					Max. tank diameter [ft]
	Type	Connection							p [psi]					
		3/8" Female NPT	1/2" Female NPT	3/4" Female NPT	1" Female NPT	1/2" slip-on	3/4" slip-on		30	**45**	**3 bar**	75	145	
180°	**5S6.963.1Y**	**BF**	**BH**			**TF05**		0.07	6.80	**8.33**	**31**	10.75	14.95	11
	5S7.043.1Y		**BH**				**TF07**	0.08	10.97	**13.43**	**50**	17.34	24.11	13
	5S7.113.1Y		**BH**	**BL**			**TF07**	0.08	16.01	**19.61**	**73**	25.32	35.20	19
	5S7.183.1Y			**BL**			**TF07**	0.08	23.91	**29.28**	**109**	37.80	52.56	23
	5S7.223.1Y			**BL**			**TF07**	0.08	29.83	**36.54**	**136**	47.17	65.59	24
	5S7.253.1Y			**BL**	**BN**		**TF07**	0.08	36.19	**44.33**	**165**	57.23	79.57	26
180°	**5S6.964.1Y**	**BF**	**BH**			**TF05**		0.07	6.80	**8.33**	**31**	10.75	14.95	11
	5S7.044.1Y		**BH**				**TF07**	0.08	10.97	**13.43**	**50**	17.34	24.11	13
	5S7.114.1Y		**BH**	**BL**			**TF07**	0.08	16.01	**19.61**	**73**	25.32	35.20	19
	5S7.184.1Y			**BL**			**TF07**	0.08	23.91	**29.28**	**109**	37.80	52.56	23
	5S7.224.1Y			**BL**			**TF07**	0.08	29.83	**36.54**	**136**	47.17	65.59	24
	5S7.254.1Y			**BL**	**BN**		**TF07**	0.08	36.19	**44.33**	**165**	57.23	79.57	26

270° 	**5S6.965.1Y**	**BF**	**BH**			**TF05**		0.07	6.80	**8.33**	**31**	10.75	14.95	11
	5S7.045.1Y		**BH**				**TF07**	0.08	10.97	**13.43**	**50**	17.34	24.11	13
	5S7.115.1Y		**BH**	**BL**			**TF07**	0.08	16.01	**19.61**	**73**	25.32	35.20	19
	5S7.185.1Y			**BL**			**TF07**	0.08	23.91	**29.28**	**109**	37.80	52.56	23
	5S7.225.1Y			**BL**			**TF07**	0.08	29.83	**36.54**	**136**	47.17	65.59	24
	5S7.255.1Y			**BL**	**BN**		**TF07**	0.08	36.19	**44.33**	**165**	57.23	79.57	26
270° 	**5S6.966.1Y**	**BF**	**BH**			**TF05**		0.07	6.80	**8.33**	**31**	10.75	14.95	11
	5S7.046.1Y		**BH**				**TF07**	0.08	10.97	**13.43**	**50**	17.34	24.11	13
	5S7.116.1Y		**BH**	**BL**			**TF07**	0.08	16.01	**19.61**	**73**	25.32	35.20	19
	5S7.186.1Y			**BL**			**TF07**	0.08	23.91	**29.28**	**109**	37.80	52.56	23
	5S7.226.1Y			**BL**			**TF07**	0.08	29.83	**36.54**	**136**	47.17	65.59	24
	5S7.256.1Y			**BL**	**BN**		**TF07**	0.08	36.19	**44.33**	**165**	57.23	79.57	26
360° 	**5S6.969.1Y**	**BF**	**BH**			**TF05**		0.06	6.80	**8.33**	**31**	10.75	14.95	11
	5S7.049.1Y		**BH**				**TF07**	0.08	10.97	**13.43**	**50**	17.34	24.11	13
	5S7.119.1Y		**BH**	**BL**			**TF07**	0.08	16.01	**19.61**	**73**	25.32	35.20	19
	5S7.189.1Y			**BL**			**TF07**	0.08	23.91	**29.28**	**109**	37.80	52.56	23
	5S7.229.1Y			**BL**			**TF07**	0.08	29.83	**36.54**	**136**	47.17	65.59	24
	5S7.259.1Y			**BL**	**BN**		**TF07**	0.08	36.19	**44.33**	**165**	57.23	79.57	26

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

Information on operation

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

Slip-on information

- R-clip made of stainless steel AISI 316L is included Ordering no.: 095.022.1Y.50.60.E (TF07), 095.013.1E.05.59.0 (TF05).
- Depending on diameter of the adapter the flow rate can increase due to leakage between connecting pipe and rotating cleaning nozzle.

Example of ordering with ATEX approval.

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

Example of ordering:	Type 5S6.963.1Y.XX.EX	+ Connection BF	= Ordering no. 5S6.963.1Y.BF.EX

Attention: For the ATEX version of the slip-on-connection, the code for the connection changes.
$^{1}/_{2}$" slip-on: T5 $^{3}/_{4}$" slip-on: T7
Example of ordering slip-on connection:
5S2.955.1Y.T5.EX

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

FDA compliant

All Materials are suitable for contact with food.

Example of ordering:	Type 5S6.963.1Y.XX	+ Connection BF	= Ordering no. 5S6.963.1Y.BF

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 compliant

Max. tank diameter [ft]

Material
316L SS, 316 SS, PEEK, EPDM

Max. temperature
203°F/95 °C

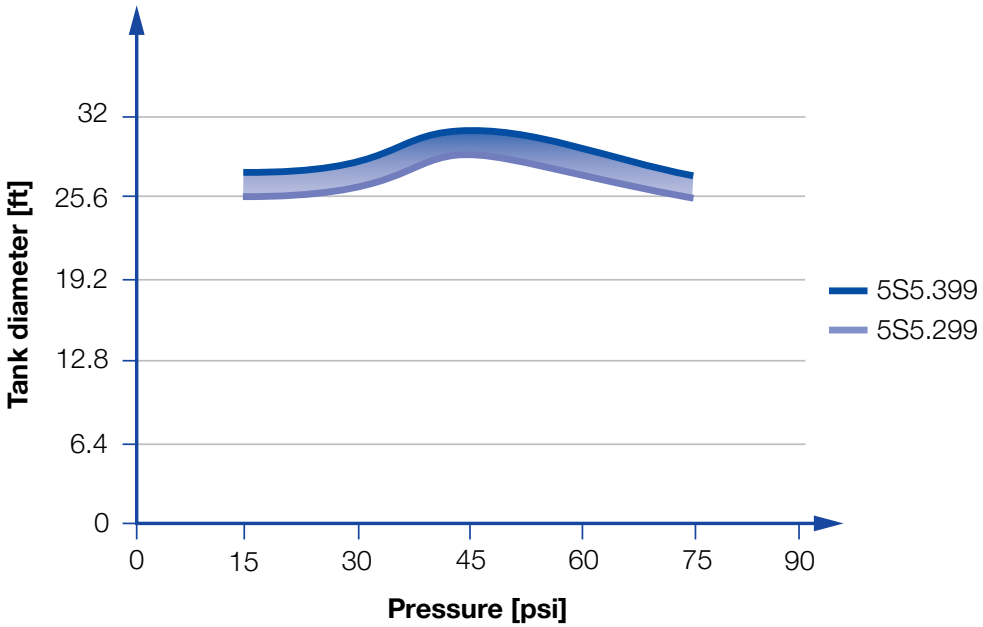
Recommended operating pressure
45 psi

Installation
Operation in every direction is possible

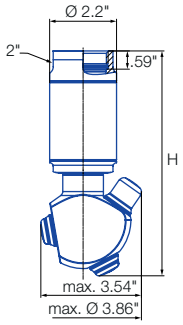
Filtration
Line strainer with a mesh size of 0.3 mm/50 mesh

Bearing
Double ball bearing

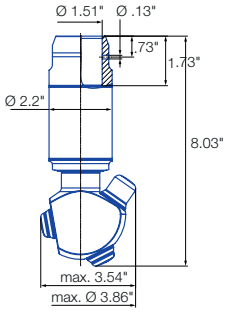
Rotation monitoring sensor
Sensor compatible, please ask for more information.



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



Female thread



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

Nozzle dimensions [in]

Connection	Max. Height [H]
BN	7.28
BQ	7.28
BS	7.36

Spray angle	Ordering no. Type	Connection 1 NPT	1 1/4 NPT	1 1/2 NPT	1 1/2" Slip-on	Free passage Ø [in]	Flow Rate (Gallons Per Minute) liters per minute 2 bar	30 psi	45 psi	75 psi	Max. tank diameter [ft]
180°	5S5.293.1Y	BN	-	-	TF15	.12	165	44.3	54.3	70.1	29.5
	5S5.323.1Y	BN	BQ	-	TF15	.12	200	53.7	65.8	84.9	30.2
	5S5.363.1Y	-	BQ	BS	TF15	.12	250	67.2	82.3	106.1	30.8
180°	5S5.294.1Y	BN	-	-	TF15	.12	165	44.3	54.3	70.1	29.5
	5S5.324.1Y	BN	BQ	-	TF15	.12	200	53.7	65.8	84.9	30.2
	5S5.364.1Y	-	BQ	BS	TF15	.12	250	67.2	82.3	106.1	30.8
270°	5S5.295.1Y	BN	-	-	TF15	.12	165	44.3	54.3	70.1	29.5
	5S5.325.1Y	BN	BQ	-	TF15	.12	200	53.7	65.8	84.9	30.2
	5S5.365.1Y	-	BQ	BS	TF15	.12	250	67.2	82.3	106.1	30.8
270°	5S5.296.1Y	BN	-	-	TF15	.12	165	44.3	54.3	70.1	29.5
	5S5.326.1Y	BN	BQ	-	TF15	.12	200	53.7	65.8	84.9	30.2
	5S5.366.1Y	-	BQ	BS	TF15	.12	250	67.2	82.3	106.1	30.8
360°	5S5.299.1Y	BN	-	-	TF15	.12	165	44.3	54.3	70.1	29.5
	5S5.329.1Y	BN	BQ	-	TF15	.12	200	53.7	65.8	84.9	30.2
	5S5.369.1Y	-	BQ	BS	TF15	.12	250	67.2	82.3	106.1	30.8
	5S5.399.1Y	-	BQ	BS	TF15	.12	300	80.6	98.7	127.3	31.5

E = narrowest free cross-section · BSPP 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

- 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.

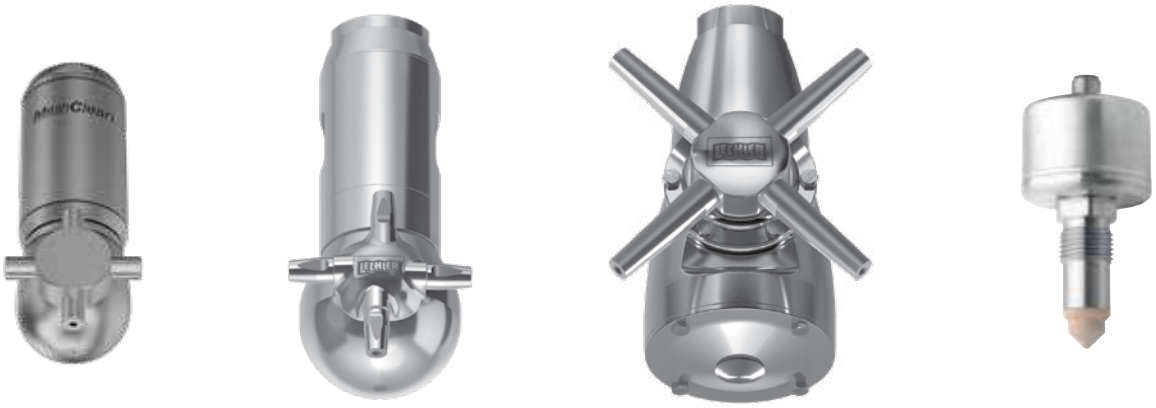
Example of ordering:	Type	+	Connection	=	Ordering no.
	5S5.293.1Y.	+	BN	=	5S5.293.1Y.BN

THE EFFECTIVE MEDIUM AGAINST THE MOST PERSISTENT SOILING

Cleaning efficiency class 5

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

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



Operating principles
Gear-controlled

Flow rates
at 30 psi
7 to 69 gpm

Recommended operating pressures
75 psi

Max. temperatures
140 to 203°F
60 to 95°C

High impact tank cleaning machine
MeshClean
Series 5T2/5T3

Series 5T2/5T3

The MeshClean is extremely effective thanks to the particularly powerful solid jet nozzles and is also suitable for small tanks with persistent soiling. The series is able to withstand pressures of up to 217 psi. The MeshClean is designed for the chemical and pharmaceutical industry as well as for the food and beverage industry.

FDA compliant

Max. Tank diameter [ft]	0	15	30	45	60

Materials
Stainless steel 1.4404 (316L), PTFE, PEEK, EPDM

Max. temperature
302°F/ 150°C

Recommended operating pressure
75 psi

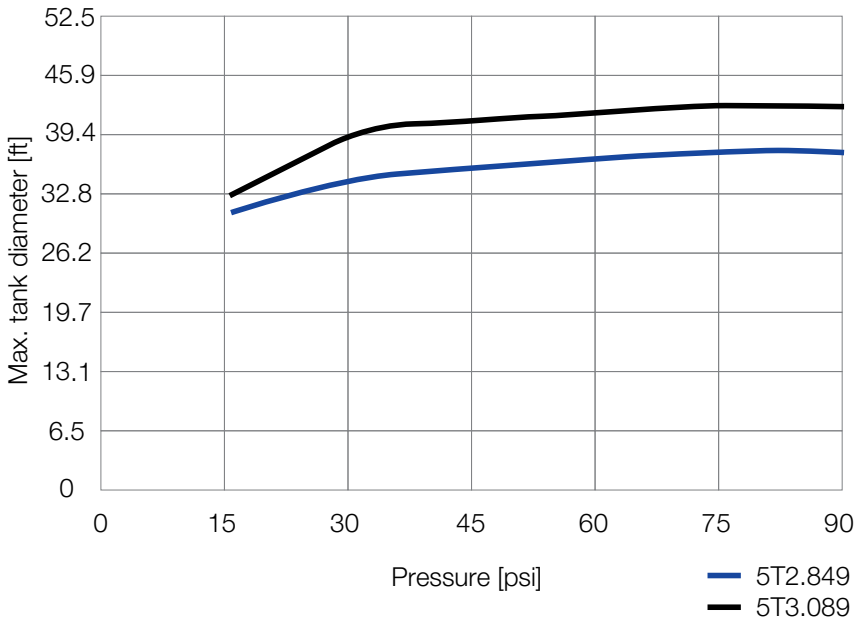
Installation
Operates in every direction

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

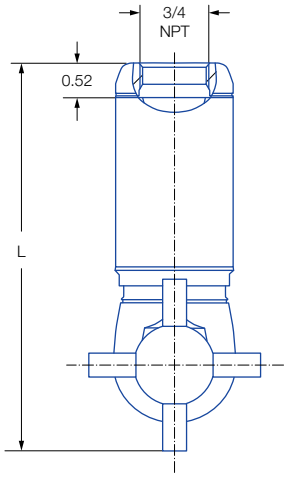
Bearing
Ball bearing

Weight
2.2 lbs

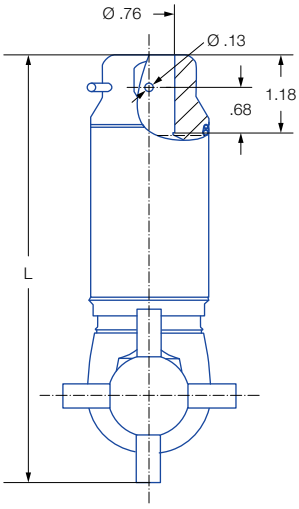
Rotation monitoring sensor
Sensor compatible
Info: see page 72



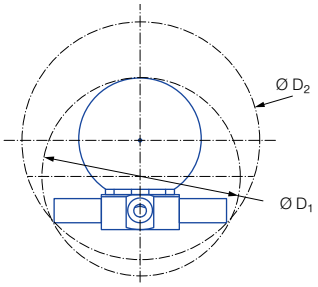
Overview of the tank diameter, depending upon the pressure of series 5T2/5T3



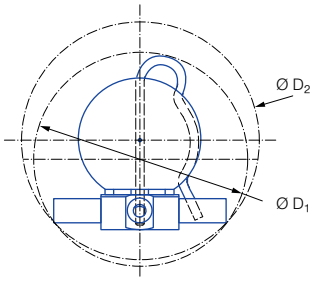
Female thread



Dimensions of the slip-on connection according to ASME-BE (OD-tube)



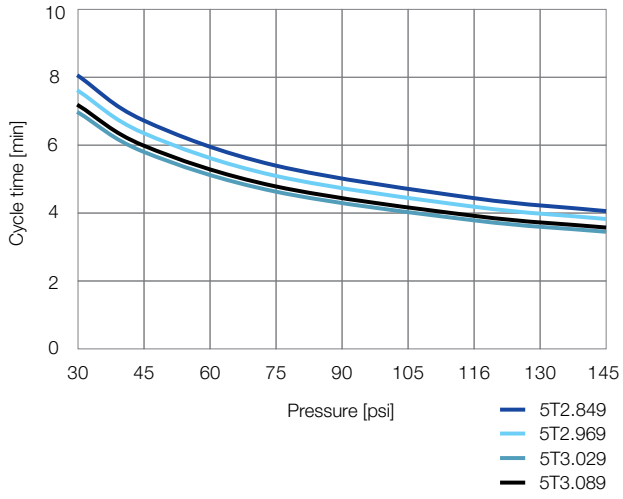
Insertion diameter D_1 and interference circle diameter D_2 of the threaded connection



Insertion diameter D_1 and interference circle diameter D_2 of the slip-on connection

Spray angle	Ordering no.			Flow Rate (Gallons Per Minute)				Dimensions [in]						Max. tank diameter [ft]
	Type	Code		p [psi] (p_{max} = 218 psi)				Female thread			Slip-on connection			
		3/4" NPT	3/4"-Slip-on connection	30	75	5.0	at 75 psi [SCFM]	L	Ø D_1	Ø D_2	L	Ø D_1	Ø D_2	
360°	5T2.849.1Y	BL	TF07	3.43	0.79	20	0.7	5.59	2.68	3.23	6.18	3.03	3.23	37.7
	5T2.969.1Y	BL	TF07	6.60	1.57	40	1.4	5.59	2.68	3.23	6.18	3.03	3.23	39.4
	5T3.029.1Y	BL	TF07	9.25	2.17	55	1.9	5.59	2.68	3.23	6.18	3.03	3.23	41.0
	5T3.089.1Y	BL	TF07	13.21	3.11	79	2.8	5.83	2.91	3.58	6.42	3.23	3.58	42.7

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 5T2/5T3

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

FDA compliant

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

Example of ordering:	Type/Ordering no.
	5T2.849.1Y.BL.EX

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

FDA compliant

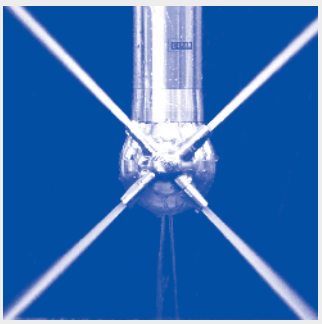
All Materials are suitable for contact with food.

Example of ordering:	Type/Ordering no.
	5T2.849.1Y.BL

High impact tank cleaning machine
Series 5TB

Series 5TB

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



Max. Tank diameter [ft]	0	15	30	45	60

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

Max. temperature
203°F/ 95°C

Recommended operating pressure
75 psi

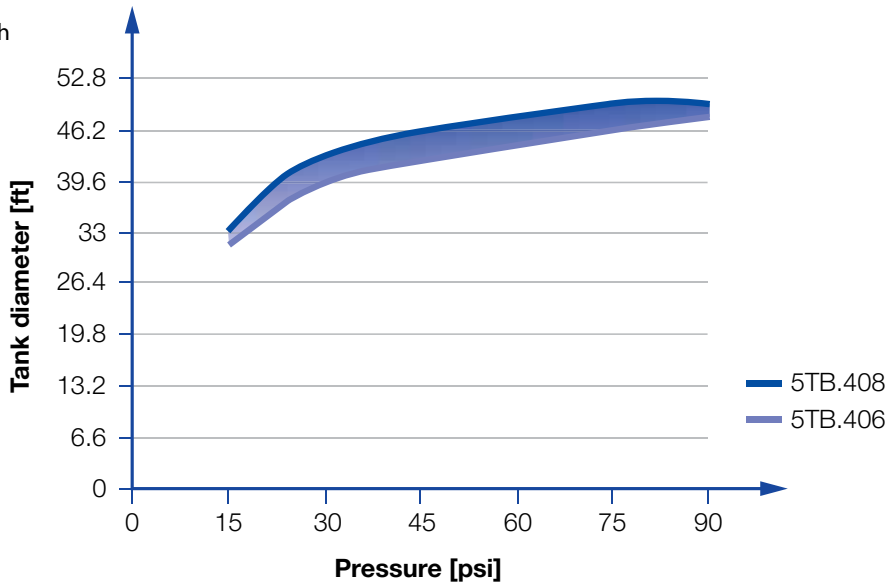
Installation
Operates in every direction

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

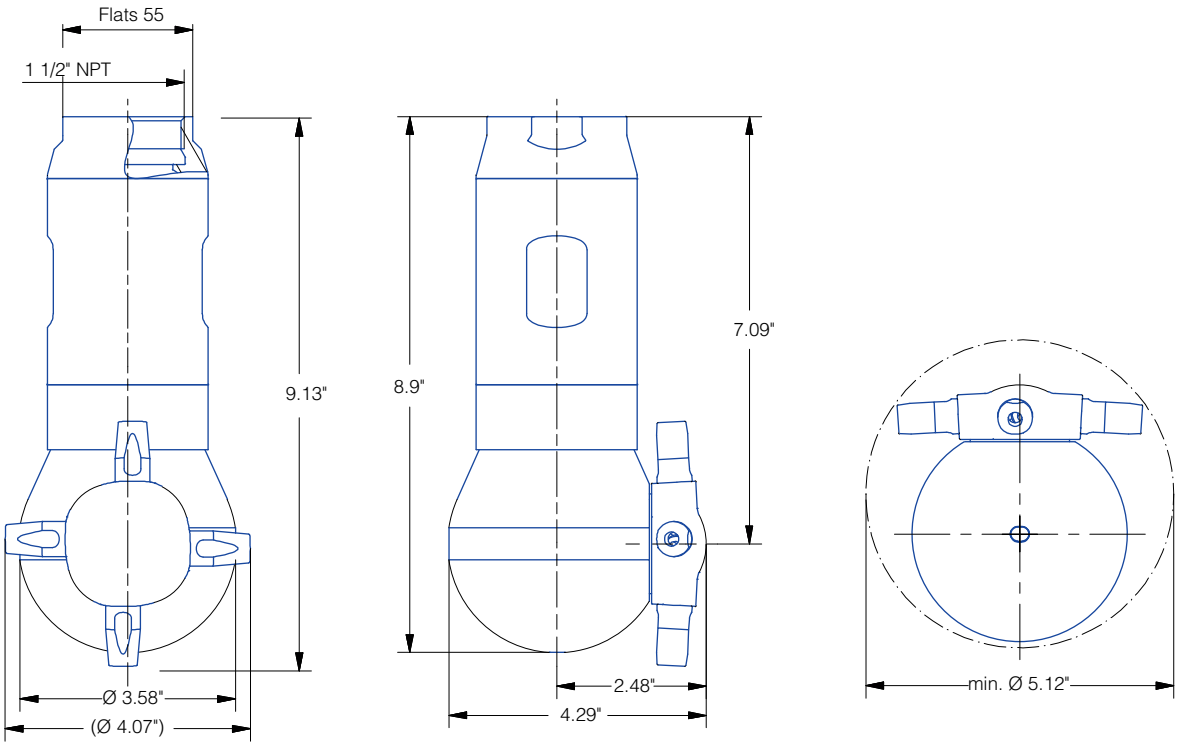
Bearing
Ball bearing

Weight
8.8 lbs

Rotation monitoring sensor
Sensor compatible
Info: see page 72

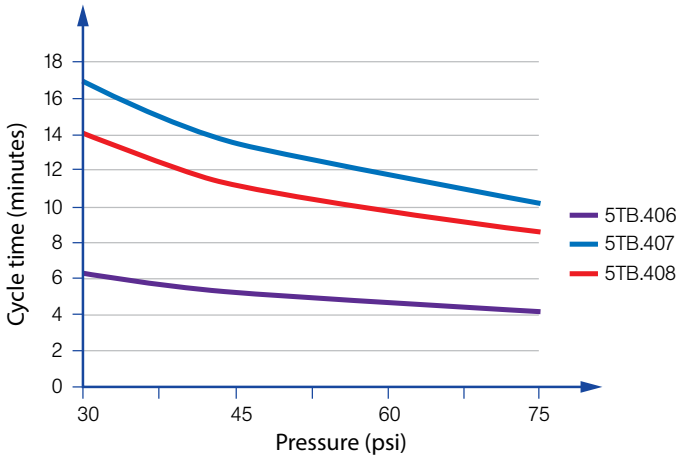


Overview of the tank diameter, depending upon the pressure of series 5TB



Spray angle	Ordering no.	Free Passage (in.)	Number, Ø Nozzles [mm]	Flow Rate (Gallons Per Minute)					Max pressure (psi)	Max. tank diameter [ft]
				liters per minute 2 bar	30 psi	40 psi	75 psi	145 psi		
360°	5TB. 406. 1Y. BS	.236	4 x 6.0	107	29	33	45	63	362	46
	5TB. 407. 1Y. BS	.236	4 x 7.0	132	35	41	56	78	362	46
	5TB. 408. 1Y. BS	.236	4 x 8.0	150	40	47	64	89	362	49

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 (EG) 1935/2004 conform.

FDA compliant

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

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

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

FDA compliant

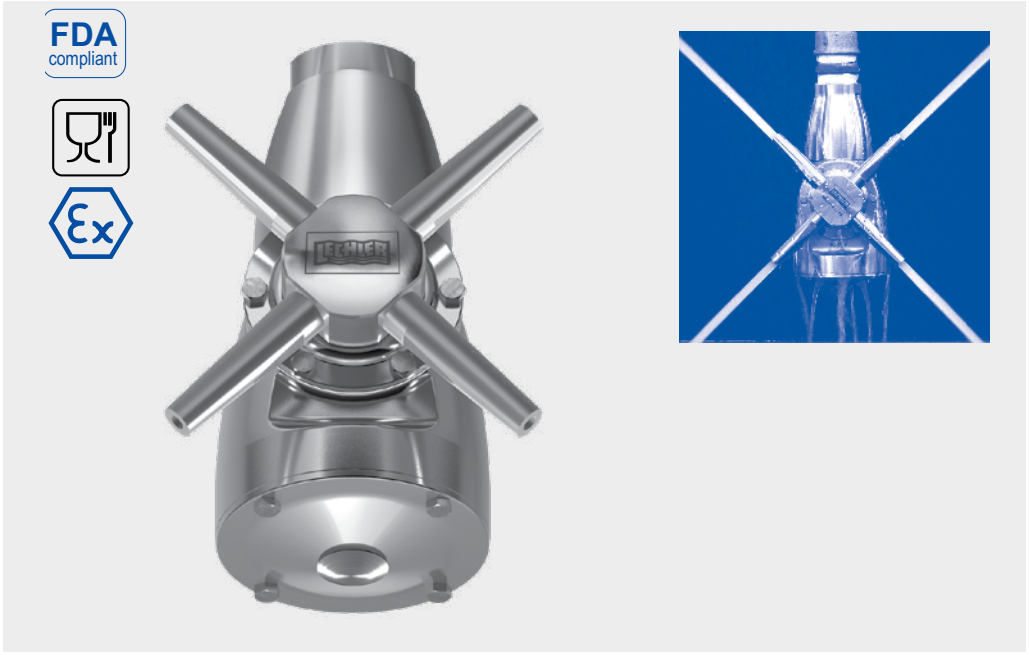
All Materials are suitable for contact with food.

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

High impact tank cleaning machine
Series 5TM

Series 5TM

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



Max. tank diameter [ft]	0	20	40	60	80

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

Max. temperature
5TM: 203°F/ 95°C

Recommended operating pressure
75 psi

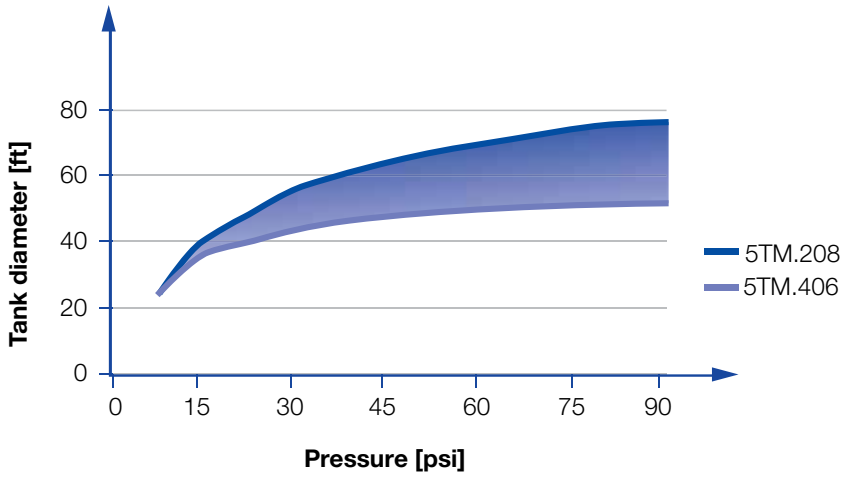
Installation
Operates in every direction

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

Bearing
Ball bearing

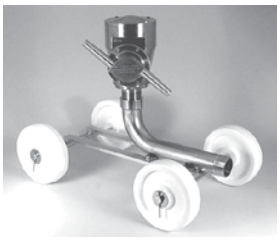
Weight
16.5 lbs

Rotation monitoring sensor
Sensor compatible
Info: see page 72

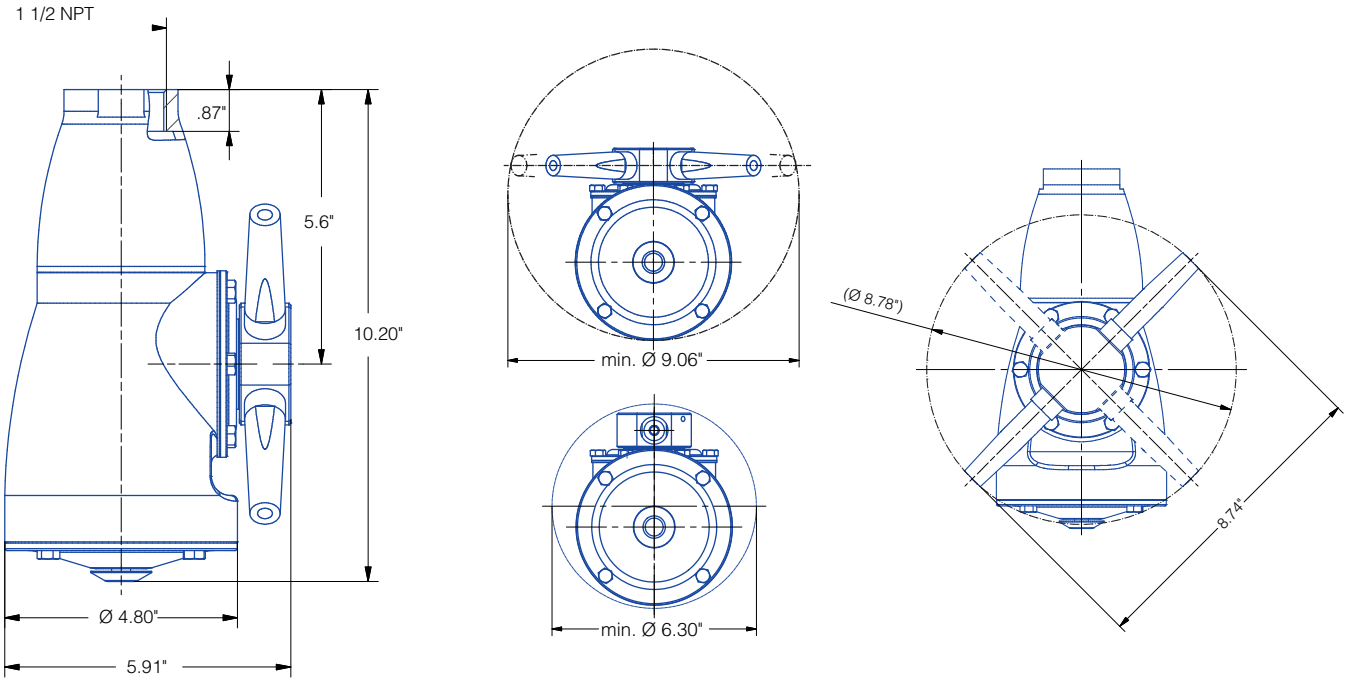


Overview of the tank diameter, depending upon the pressure of series 5TM

Our special mounting bracket provides the ability for the 5TM to reach the far ends of long horizontal tanks/ tankers. Mounting bracket part number: 099.164.17.00.00.0



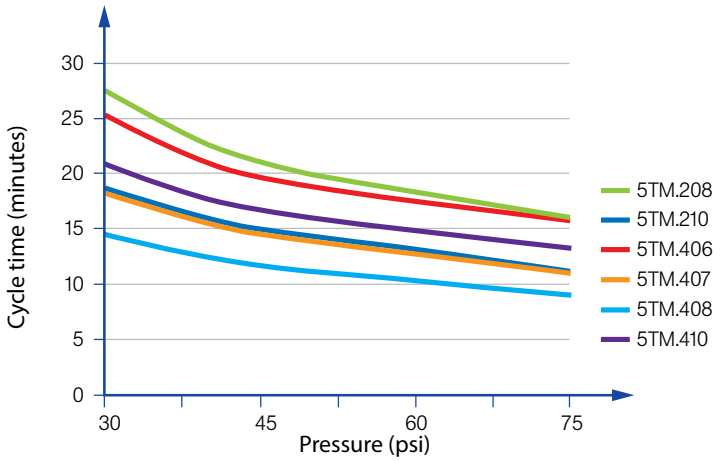
Portable cart for easier transporting of your 5TM from tank to tank. The cart part number is M20.000.17.BR. For use with "BR" connection only.



Ordering no.				Free Passage (in.)	No. of Nozzles x Diameter	Operating Pressure				Max. tank diameter [ft]
Type	Connection					40 psi	60 psi	80 psi	100 psi	
	1 1/2" Male NPT	1 1/2" Female NPT	1 1/2" CL150 Flange							
5TM. 208. 1Y	BR	BS	015	.314	2 x 8mm	39 gpm	48 gpm	55 gpm	61 gpm	79
5TM. 209. 1Y	BR	BS	015	.354	2 x 9mm	45 gpm	54 gpm	60 gpm	65 gpm	79
5TM. 210. 1Y	BR	BS	015	.394	2 x 10mm	50 gpm	61 gpm	70 gpm	79 gpm	79
5TM. 211. 1Y	BR	BS	015	.433	2 x 11mm	57 gpm	68 gpm	78 gpm	80 gpm	75
5TM. 406. 1Y	BR	BS	015	.236	4 x 6mm	43 gpm	53 gpm	61 gpm	69 gpm	59
5TM. 407. 1Y	BR	BS	015	.276	4 x 7mm	53 gpm	65 gpm	75 gpm	83 gpm	66
5TM. 408. 1Y	BR	BS	015	.315	4 x 8mm	62 gpm	76 gpm	88 gpm	98 gpm	72
5TM. 409. 1Y	BR	BS	015	.354	4 x 9mm	74 gpm	88 gpm	98 gpm	106 gpm	75
5TM. 410. 1Y	BR	BS	015	.394	4 x 10mm	81 gpm	99 gpm	114 gpm	128 gpm	75

ATEX available upon 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 5TM

Rotation Monitoring Sensor

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

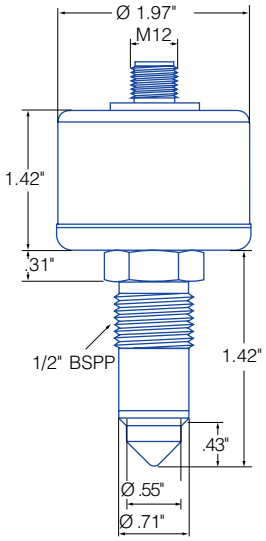
FDA compliant

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

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

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

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



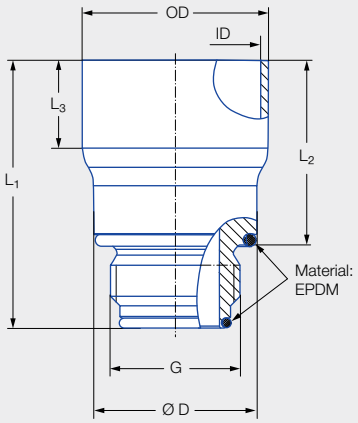
For use with series: 5S2, 5S3, 5T2/5T3, 5TB, 5TM, 5S3 & 5S5

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

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.



Materials
316L SS;
EPDM (O-Ring)

Max. temperature
302 °F/ 150 °C

Installation

Ordering no.	Connection thread BSPP male	Dimensions [in]				Dimensions OD = Outer diameter ID = Inner diameter [in]		Pipe standard
		L_1	L_2	L_3	Ø D	OD	ID	
05C.190.1Y.AE.16	3/8	1.89	1.41	.71	.85	.75	.62	DIN EN 10357 series D
05C.230.1Y.AE.15	3/8	1.89	1.41	.71	.85	.91	.79	DIN EN 10357 series A
05C.250.1Y.AE.12	3/8	1.89	1.41	.67	.85	.98	22,6	DIN EN 10357 series D
05C.250.1Y.AG.12	1/2	2.20	1.54	.71	1.22	.98	.89	DIN EN 10357 series D
05C.350.1Y.AK.15	3/4	2.17	1.49	.83	1.32	1.38	1.26	DIN EN 10357 series A
05C.380.1Y.AK.12	3/4	2.17	1.49	.71	1.32	1.50	1.40	ISO 2037
05C.381.1Y.AK.15	3/4	2.17	1.49	.71	1.32	1.50	1.39	DIN EN 10357 series D
05C.381.1Y.AM.16	1	2.32	1.54	.91	1.59	1.50	1.37	DIN EN 10357 series D
05C.508.1Y.AP.15	1 1/4	2.24	1.50	.87	1.94	2.00	1.88	DIN EN 10357 series D
05C.635.1Y.AR.16	1 1/2	2.48	1.73	.87	2.20	2.50	2.37	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.

FOR SPECIAL REQUIREMENTS:
OUR STATIC CLEANING NOZZLES

Static cleaning nozzles

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

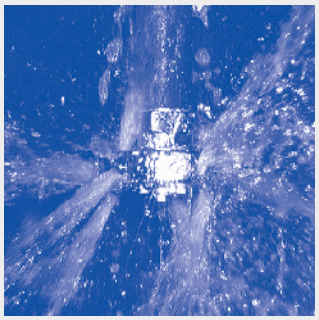
These types of static nozzles reach hard to access places while removing persistent soiling — which rotating cleaners or spray balls cannot.

Special cleaning nozzles Flushing Nozzle Assembly Series 597

Series 597

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

FDA compliant



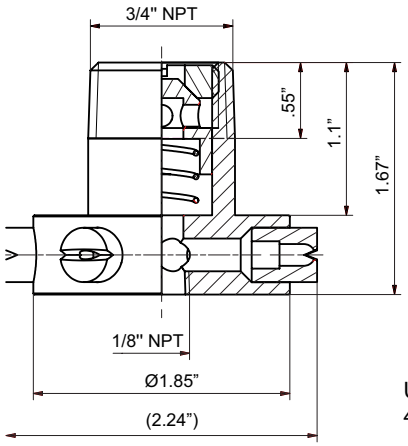
Materials
304 SS, PTFE

Max. temperature
194°F/ 90°C

Recommended operating pressure
45 psi

Installation
Vertically facing upward

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



Uses full cone nozzle series 490.568.1Y.BA

Ordering no.		Flow Rate (Gallons Per Minute)				
Type	Connection					
	3/4" NPT	20 psi	liters per minute 2 bar	30 psi	45 psi	60 psi
597.085.1C	BK	5	22	6	7.2	8.5

Information on operation

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

PopUp Clean
Series 5P5

NEW

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 compliant

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

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

Max. temperature
203°F/95 °C

Recommended operating pressure
30-75 psi

Installation
Operation in every direction is possible

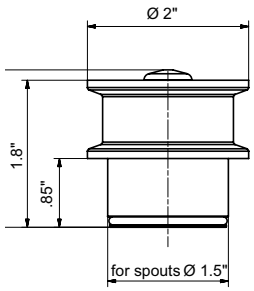
Filtration
Line strainer with a mesh size of
0.3 mm/50 mesh

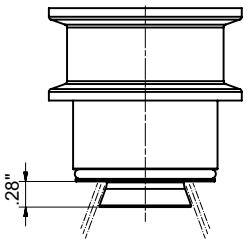
Information on operation
The PopUp Clean is not suitable for operation with compressed air or any other gas.

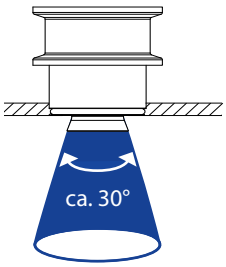
Spray angle	Ordering no.	Free Passage (in.)	Flow Rate (Gallons Per Minute) 20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	Max. tank diameter [ft]
30°	5P5.081.1Y.00.00.0	.03	11	50	13	16	19	9.8

E = Narrowest free cross-section

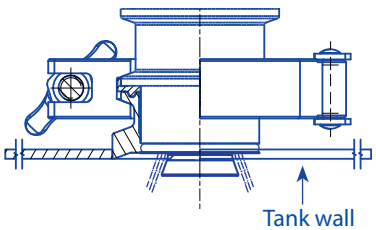
*This product is also available in a ATEX version



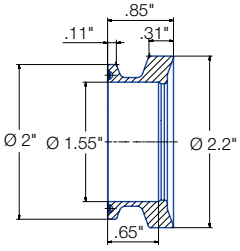




Nozzle installation



Weld-in flange



Ordering no.
050.020.1Y.01.00
Material
316L SS
Information
Gasket with a thickness of .08 in. must be used with weld-in-flange.
Not sold with nozzle.
Use standard DIN32676-A / DN40

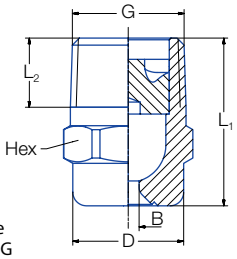
Axial-flow full cone nozzles
Series 490 / 491

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

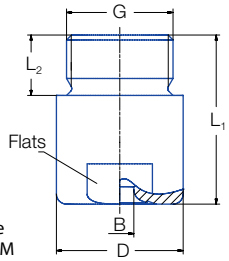
FDA compliant

Series 490

Series 491



Code BC-BG



Code BK-BM

Code	Dimensions (in.)					Weight Brass
	G	L_1	L_2	D	Hex/Flat	
BC	1/4 NPT	0.87	0.39	0.51	9/16	.04
BE	3/8 NPT	0.96	0.39	0.63	11/16	.07
BE	3/8 NPT	1.18	0.39	0.63	11/16	.11
BG	1/2 NPT	1.28	0.51	0.83	14/16	.13
BG	1/2 NPT	1.71	0.51	0.83	14/16	.19
BK	3/4 NPT	1.65	0.59	1.26	1-1/16	.42
BK	3/4 NPT	1.97	0.59	1.26	1-1/16	.44
BM	1 NPT	2.20	0.67	1.57	1-7/16	.77

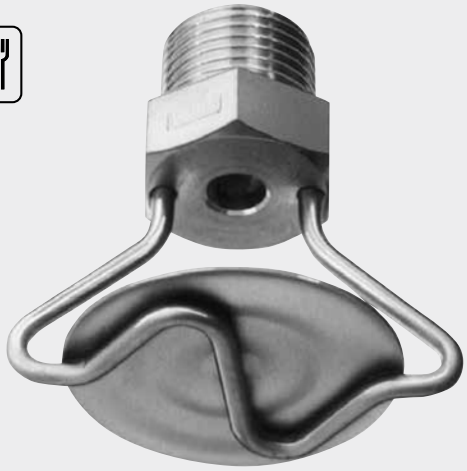
Subject to technical modification.
In a critical installation situation, please ask for the exact dimensions.

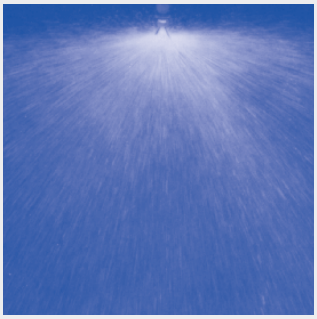
Spray angle	Ordering no.																			Spray diameter D at 30 psi	
	Type	Mat.no.		Connection Male NPT						Orifice diam.	Free Passage	Flow Rate (Gallons Per Minute)									
		1Y AISI 316L	30 Brass	1/8"	1/4"	3/8"	1/2"	3/4"	1"	(in.)	(in.)	10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi	150 psi	H =8"	H =20"
60°	490. 644	○	○	-	BC	BE	-	-	-	.091	.091	.69	.091	4.00	1.07	1.20	1.41	1.59	1.73	2.04	9	22
	490. 684	○	○	-	BC	BE	-	-	-	.102	.102	.86	1.14	5.00	1.34	1.50	1.77	1.98	2.17	2.55	9	22
	490. 724	○	○	-	BC	BE	-	-	-	.112	.110	1.09	1.43	6.30	1.69	1.89	2.23	2.50	2.73	3.21	9	22
	490. 764	○	○	-	-	BE	-	-	-	.128	.128	1.38	1.82	8.00	2.14	2.40	2.83	3.17	3.47	4.08	9	22
	490. 804	○	○	-	-	BE	-	-	-	.146	.146	1.72	2.28	10.00	2.68	3.00	3.53	3.97	4.34	5.10	9	22
	490. 844	○	○	-	-	-	BG	-	-	.159	.159	2.16	2.85	12.50	3.35	3.76	4.42	4.96	5.42	6.37	9	22
	490. 884	○	○	-	-	-	BG	-	-	.183	.183	2.76	3.67	16.00	4.28	4.81	5.65	6.34	6.94	8.16	9	22
	490. 924	○	○	-	-	-	-	BK	-	.205	.205	3.45	4.56	20.00	5.36	6.01	7.07	7.93	8.67	10.20	9	22
	490. 964	○	○	-	-	-	-	BK	-	.228	.228	4.31	5.69	25.00	6.70	7.51	8.83	9.91	10.84	12.74	9	22
	491. 044	○	○	-	-	-	-	-	BM	.285	.285	6.90	9.11	40.00	10.71	12.02	14.14	15.86	17.34	20.39	9	22
	491. 084	○	○	-	-	-	-	-	BM	.321	.321	8.63	11.38	50.00	13.39	15.02	17.67	19.82	21.67	25.49	9	22

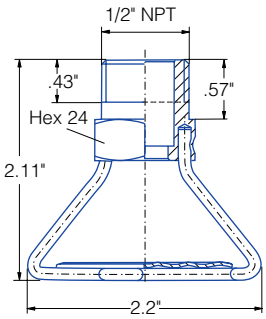
Deflector-plate nozzle
Series 524 / 525

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

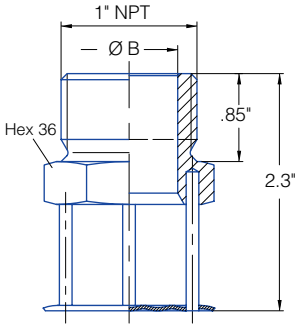
FDA compliant







Type 524. 809 – 525. 269



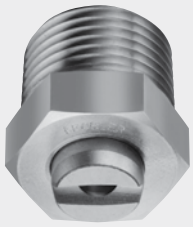
Type 525. 349 – 525. 489

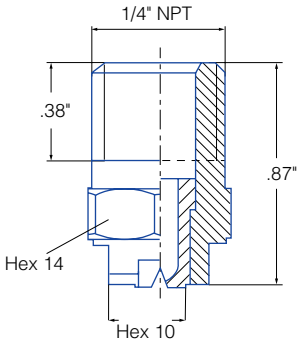
Spray angle	Ordering no. Type	Mat. no. 17 316 SS	Mat. no. 30 Brass	Orifice diam.	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	150 psi	Spray Diameter D (ft.) (ft) @ 45 psi	
	Connection: 1/2" Male NPT													
180°	524. 809	○	○	.158	1.6	7.10	10	3.1	3.8	4.4	4.9	6.0	18	21
	525. 049	○	○	.315	6.2	8.8	40	12.4	15.2	17.6	19.6	24	33	43
	525. 109	-	○	.366	8.8	12.5	57	17.7	22	25	28	34	33	44
	525. 169	-	○	.429	12.6	17.8	81	25	31	36	40	49	35	44
	525. 229	-	○	.481	17.4	25	112	35	43	49	55	67	22	34
	525. 489	○	○	.485	22	31	140	43	53	61	69	84	17	33

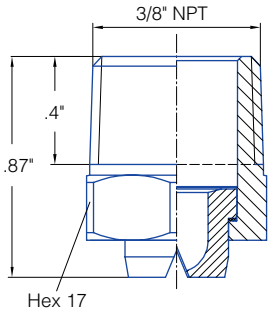
Flat fan nozzles
Series 632 / 633

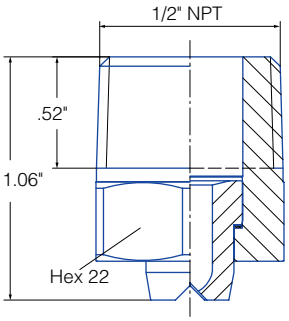
Standard design with conical, self-sealing thread connection. Stable spray angle. Uniform, parabolical distribution of liquid.

FDA compliant









Spray angle	Ordering no.									Flow Rate (Gallons Per Minute)							Spray width B at p=2 bar	
	Type	Material no.				Connection			Equivalent Orifice diam.	Free Passage								
		303 SS	316 SSSS	Brass	PVDF	Male NPT					10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	
		16	17[1)]	30	5E	1/4"	3/8"	1/2"	(in.)	(in.)								H =10" B =20"
30°	632. 722	○	○	○	-	BC	BE	-	.118	.095	.98	1.4	6.3	2.0	2.4	2.8	3.1	5 9
	632. 802	○	○	○	-	BC	BE	-	.158	.122	1.6	2.2	10.0	3.1	3.8	4.4	4.9	5 10
45°	632. 673	○	○	○	-	BC	BE	BG	.106	.083	.74	1.0	4.8	1.5	1.8	2.1	2.3	8 15
	632. 723	○	○	○	-	BC	BE	BG	.118	.095	.98	1.4	6.3	2.0	2.4	2.8	3.1	8 15
	632. 803	○	○	○	-	BC	BE	BG	.158	.118	1.6	2.2	10.0	3.1	3.8	4.4	4.9	8 15
	632. 843	○	○	○	-	-	-	BG	.177	.138	1.9	2.7	12.5	3.9	4.8	5.5	6.1	8 15
	632. 883	○+	○+	○+	○*	BC	-	BG	.197	.157	2.5	3.5	16.0	5.0	6.1	7.0	7.9	9 17
	632. 923	○	○	○	-	-	-	BG	.217	.165	3.1	4.4	20.0	6.2	7.6	8.8	9.8	9 17
	632. 963	○	○	○	-	-	-	BG	2.36	.185	3.9	5.5	25.0	7.8	9.5	11.0	12.3	9 17
60°	632. 644	○	○	○	-	BC	-	-	.099	.063	.62	.88	4.0	1.2	1.5	1.8	2.0	12 22
	632. 674	○	○	○	○	BC	BE	BG	.106	.071	.74	1.0	4.8	1.5	1.8	2.1	2.3	12 23
	632. 724	○	○	○	○	BC	BE	BG	.118	.083	.98	1.4	6.3	2.0	2.4	2.8	3.1	12 23
	632. 764	○	○	○	-	BC	BE	-	.138	.091	1.2	1.8	8.0	2.5	3.0	3.5	3.9	12 23
	632. 804	○	○	○	○*	BC	-	BG	.158	.102	1.6	2.2	10.0	3.1	3.8	4.4	4.9	12 23
	632. 844	○	○	○	○*	BC	-	BG	.177	.118	1.9	2.7	12.5	3.9	4.8	5.5	6.1	12 23
	632. 884	○	○	○	○*	BC	-	BG	.197	.134	2.5	3.5	16.0	5.0	6.1	7.0	7.9	12 22
	632. 924	○	○+	○+	○	BC	-	BG	.217	.165	3.1	4.4	20.0	6.2	7.6	8.8	9.8	13 25
	632. 964	○	○	○	-	-	-	BG	.236	.185	3.9	5.5	25.0	7.8	9.5	11.0	12.3	13 25
	633. 004	○	○	-	-	-	-	BG	.276	.205	4.9	6.9	31.5	9.8	12.0	13.9	15.5	13 25
	632. 084	○	○	○	-	-	-	BG	.354	.268	7.7	11.0	50.0	15.5	19.0	21.9	24.5	13 25

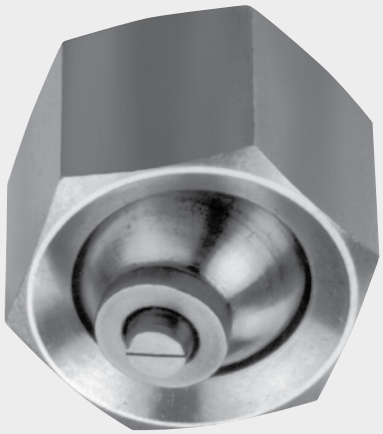
[1]We reserve the right to deliver AISI 303 or AISI 304 under the material no. 16.
* Only available with connection BC.
\+ Only available with connection BG.
Subject to technical modifications.

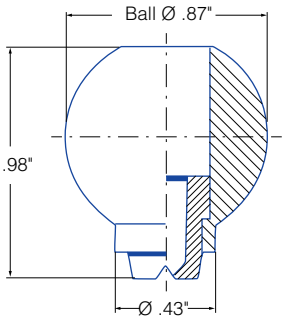
Example of ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	632. 642.	+	16	+	BC	=	632. 642. 16. BC

Flat fan nozzles with ball joint
Series 676

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

FDA compliant



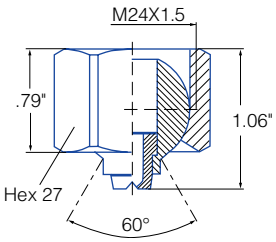


Adjustable swivel range up to 30°

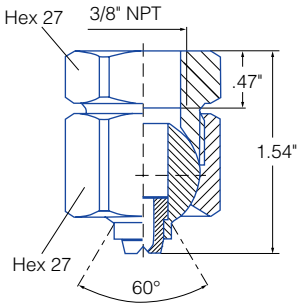
Spray angle	Ordering no. Type	Mat.no. 16 AISI 303	Equivalent Orifice diameter (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute) 20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	Spray width B (in.) @ 30 psi H =10"	H =20"
30°	676. 642	○	.098	.071	.88	4.0	1.2	1.5	1.8	2.0	5	9
	676. 722	○	.118	.071	1.4	6.3	2.0	2.4	2.8	3.1	5	9
	676. 762	○	.139	.106	1.8	8.0	2.5	3.0	3.5	3.9	5	10
	676. 802	○	.157	.122	2.2	10	3.1	3.8	4.4	4.9	5	10
45°	676. 643	○	.098	.071	.88	4.0	1.2	1.5	1.8	2.0	8	15
	676. 723	○	.118	.094	1.4	6.3	2.0	2.4	2.8	3.1	8	15
	676. 763	○	.138	.102	1.8	8.0	2.5	3.0	3.5	3.9	8	15
	676. 803	○	.157	.118	2.2	10.0	3.1	3.8	4.4	4.9	8	15
60°	676. 644	○	.098	.063	.88	4.0	1.2	1.5	1.8	2.0	12	22
	676. 674	○	.106	.071	1.0	4.8	1.5	1.8	2.1	2.3	12	23
	676. 724	○	.118	.083	1.4	6.3	2.0	2.4	2.8	3.1	12	23
	676. 764	○	.138	.091	1.8	8.0	2.5	3.0	3.5	3.9	12	23

Flat fan nozzles with ball joint
Series 676 – Accessories

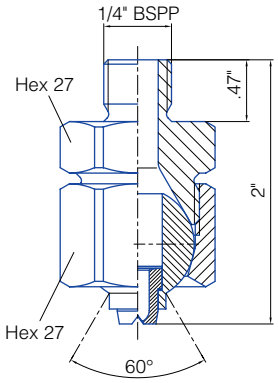
Retaining nut
092. 020. 16. 00. 02
Material: AISI 303



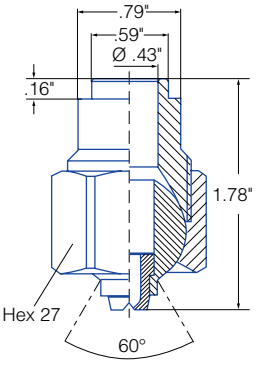
Socket
092. 020. 16. AF. 03
Material: AISI 303



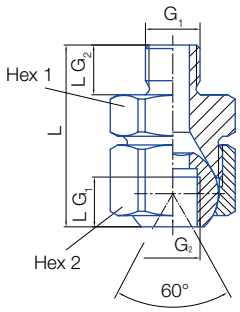
Retaining nipple
092. 024. 16. AC. 03
Material: AISI 303



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



Compact ball joints for narrow installation conditions



For series	Ordering no.			Dimensions						
	Type	Mat. no. 16 AISI 303	Code	G_1 BSPP	G_2 BSPP	L_{G1} (in.)	L_{G2} (in.)	L (in.)	Hex_1	Hex_2
For all nozzles with 1/8" male thread	092. 010	○	BB	1/8A	1/8	.24	.24	1.69	22	24
For all nozzles with 1/4" male thread	092. 024	○	BD	1/4A	1/4	.28	.28	1.69	27	27
For all nozzles with 3/8" male thread	092. 030	○	BF	3/8A	3/8	.28	.28	2.28	27	30

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