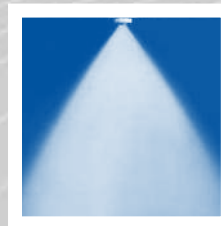
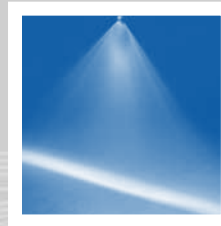
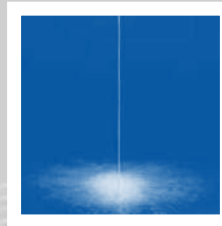
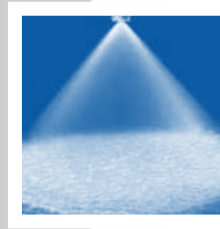
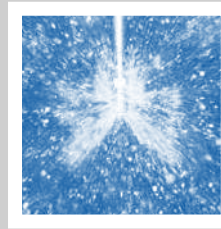
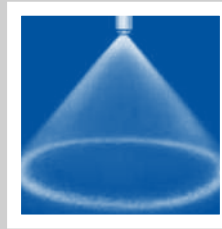


ENGINEERING  
YOUR SPRAY SOLUTION






## Precision Spray Nozzles and Accessories Edition 501



# Spray Nozzles

OUR CORE PRODUCT LINES: BEST VALUE, PRECISION, RELIABILITY, QUICK DELIVERY.

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# TERMS OF EXPLANATION

Here you will find explanations of the special terms and abbreviations used in the tables on the following pages.

Lechler nozzles are manufactured with the highest precision and undergo numerous quality checks. Nevertheless, production-related tolerances can affect the spray angle, flow rate, droplet size, and droplet distribution of the nozzle's performance.

**Equivalent orifice diameter**  
Applies to elliptical discharge holes of flat fan nozzles. A cylindrical hole with the listed diameter has the same surface area as the ellipse. Otherwise, for full cones and solid streams, the orifice diameter simply is a measure of the diameter of the round nozzle orifice.

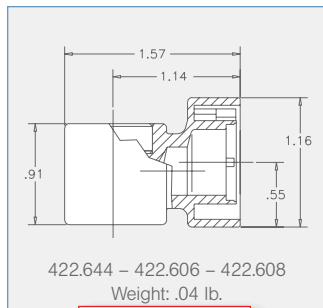
**Free passage**  
Diameter size of the largest particle which can successfully pass through the nozzle. Can be less than the orifice diameter on certain nozzles due to the presence of internal swirl inserts.

**Flow rate**  
All volume flow rate data in this catalog is based upon measurements with water.

**Spray width**  
Spray widths listed as theoretical are based upon table values for a given spray height and spray angle. Otherwise spray widths are actual, based upon empirical testing.

Spray angle	Type	Ordering no.				Flow Rate (Gallons Per Minute)											Theoretical Spray Width				
		Material no.				Connection				(Gallons Per Minute)								Spray Width (in.)			
		303 SS 16	316 SS 17	Brass 30	PVDf 5E	1/8"	1/4"	3/8"	1/2"	litres per minute	10 psi	20 psi	2 bar	40 psi	60 psi	80 psi	100 psi	H=10"	H=24"		
15°	632.301	○	○	○	○	BA	BC	BE	-	.028	.024	.05	.07	.32	.10	.12	.14	.16	3	6	
	632.361	○	○	○	○	BA	BC	-	-	.039	.032	.10	.14	.63	.20	.24	.28	.31	3	6	
	632.401	○	○	○	○	BA	BC	-	-	.047	.035	.16	.22	1.0	.31	.38	.44	.49	3	6	
	632.441	○	○	○	○	BA	BC	-	-	.053	.043	.19	.27	1.3	.39	.48	.55	.61	3	6	
	632.481	○	○	○	○	BA	BC	-	-	.059	.047	.25	.35	1.6	.50	.61	.70	.78	3	6	
	632.511	○	○	○	○	BA	BC*	-	-	.065	.055	.29	.42	1.9	.59	.72	.83	.93	3	6	
	632.561	○	○	○	○	BA	BC**	-	-	.079	.059	.25	.35	1.6	.50	.61	.70	.78	3	6	
	632.601	○	○	○	○	BA	BC***	-	-	.087	.067	.49	.69	3.2	.98	1.2	1.4	1.5	3	6	
	632.671	○	○	○	○	-	BC	BE	-	-	.106	.087	.74	1.0	4.8	1.5	1.8	2.1	2.3	3	6
	632.721	○	○	○	○	-	BC	BE	-	-	.118	.098	.98	1.4	6.3	2.0	2.4	2.8	3.1	3	6
	632.801	○	○	○	○	-	BC	BE	-	-	.157	.126	1.6	2.2	10.0	3.1	3.8	4.4	4.9	3	6
	632.841	○	○	○	○	-	BC	BE	-	-	.177	.142	1.9	2.7	12.5	3.9	4.8	5.5	6.1	3	6
	632.881	○	○	○	○	-	BC	BE	BG	-	.197	.157	2.5	3.5	16.0	5.0	6.1	7.0	7.9	3	6
	632.921	○	○	○	○	-	BC	BE	-	-	.217	.165	3.1	4.4	20.0	6.2	7.6	8.8	9.8	3	6
	632.941	○	○	○	○	-	BC	-	-	-	.224	.189	3.5	4.9	22.4	7.0	8.5	9.8	11.0	3	6
	632.961	○	○	○	○	-	BE	BG	-	-	.236	.185	3.9	5.5	25.0	7.8	9.5	11.0	12.3	3	6
	633.011	○	○	○	○	-	BE	BG	-	-	.272	.229	5.2	7.4	50.0	12.7	14.7	16.4	18.3	3	6
	633.041	○	○	○	○	-	BE	-	-	-	.315	.236	6.2	8.8	40.0	12.4	15.2	17.6	19.8	3	6
	633.081	○	○	○	○	-	BE	BG	-	-	.354	.268	7.7	11.0	50.0	15.5	19.0	21.9	24.5	3	6
	633.121	○	○	○	○	-	BE	-	-	-	.390	.288	8.7	12.2	50.0	16.7	20.4	23.7	26.7	3	6

Spray Diam. D (in.) @ 30 psi



Weight

**Weight**  
All weight information refers to nozzles made of brass, unless otherwise stated. See page 16 for conversion factors for other materials.

Spray angle	Type	Ordering no.				Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)											(in.) @ 30 psi			
		Material no.						Connection				(Gallons Per Minute)								Spray Width (in.)		
		316 SS 17	Brass 30	PVDf 5E	1/8"			1/4"	3/8"	1/2"	3/4"	1"	litres per minute	10 psi	20 psi	2	30 psi	40 psi	60 psi	80 psi	100 psi	150 psi
45°	460.403	○	○	-	BA	-	-	-	-	.047	.033	-	-	-	.30	.35	.40	.43	.51	6	16	
	460.523	○	○	-	BA	-	-	-	-	.059	.053	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	6	16
	460.603	○	○	-	BC	BE	-	-	-	.075	.071	.54	.72	3.2	.84	.95	1.1	1.2	1.4	1.6	6	16
	460.643	○	○	-	BC	BE	-	-	-	.085	.079	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	6	16
	460.683	○	○	-	BC	BE	-	-	-	.095	.079	.86	1.1	5.0	1.3	1.5	1.8	2.0	2.2	2.5	6	16
	460.703	○	○	-	BE	-	-	-	-	.100	.087	.97	1.3	5.6	1.5	1.7	2.0	2.2	2.4	2.9	6	16
	460.723	○	○	-	BE	BG	-	-	-	.106	.093	1.1	1.4	6.3	1.7	1.9	2.2	2.5	2.7	3.2	6	16
	460.783	○	○	-	BE	BG	-	-	-	.126	.126	1.6	2.0	9.0	2.4	2.7	3.2	3.6	3.9	4.6	6	16
	460.803	○	○	-	BE	BG	-	-	-	.133	.130	1.7	2.3	10.0	2.7	3.0	3.5	4.0	4.3	5.1	6	16
	460.843	○	○	-	BE	BG	-	-	-	.150	.146	2.2	2.8	12.5	3.3	3.8	4.4	5.0	5.4	6.4	6	16
60°	460.404	○	○	-	BA	-	-	-	-	.047	.033	.17	.23	1.0	.27	.30	.35	.40	.43	.51	9	22
	460.444	○	○	-	BA	-	-	-	-	.051	.041	.22	.28	1.3	.33	.38	.44	.50	.54	.64	9	22
	460.484	○	○	-	BA	-	-	-	-	.057	.045	.28	.36	1.6	.43	.48	.57	.63	.69	.82	9	22
	460.524	○	○	-	BA	-	-	-	-	.063	.047	.35	.46	1.9	.53	.60	.70	.79	.87	1.0	9	22
	460.564	○	○	-	BA	-	-	-	-	.066	.051	.43	.57	2.2	.63	.72	.83	.93	1.08	1.27	9	22
	460.604	○	○	-	BA	BC	BE	-	-	.081	.055	.54	.72	2.5	.77	.89	1.0	1.1	1.3	1.5	9	22

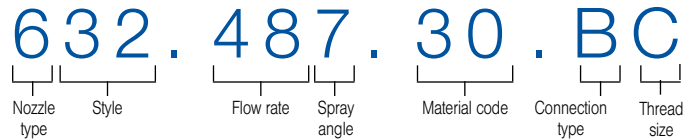
**Pressure (in psi)**  
Pressure is the differential pressure to the nozzle surrounding. If you require a pressure stage not given in the tables, you can calculate the volume flow rate at the desired pressure with the formula at the bottom of the respective table page.

# PRODUCT CLASSIFICATION

## Lechler product number system

The following diagram will help explain product number codes in relation to the Lechler spray nozzle line.

Please note that some products, such as pneumatic atomizing, do not exactly follow this product coding system.



### Nozzle type code

- 1= Pneumatic
- 2= Axial Hollow Cone
- 3= Tangential Hollow Cone
- 4= Full Cone
- 5= Tank Cleaning, Solid Stream and Special Purpose
- 6= Flat Spray
- 7= Air Atomizing
- 8= Lances  
Supersonic/Spillback
- 9= Special Projects
- 0= Accessories

### Style code

See specific nozzle chart for style code

### Flow rate code

See specific nozzle chart for style code

### Spray angle code

- 0= 0° (Solid Stream)
- 1= 20°
- 2= 30°
- 3= 45°
- 4= 60°
- 5= 75°
- 6= 95°
- 7= 120°
- HOLLOW AND FULL CONE**
- 1= 20°
- 2= 30°
- 3= 45°
- 4= 60°
- 5= 80°
- 6= 90°
- 8= 120° or larger
- 9= 180°

### Material code

- 02 Mild Steel
- 11 430 FSS
- 15 321 SS
- 16 303 SS
- 17 316 SS
- 1C 304 SS
- 1D 304L SS
- 1Y 316L SS
- 22 Hastelloy® B
- 23 Hastelloy® C-4
- 24 Hastelloy® C-276
- 25 Titanium GR2
- 26 Monel 400
- 27 Tungsten Carbide
- 2A Nickel 200
- 2E Nickel 201
- 30 Brass
- 32 Bronze
- 35 Nickel-Plated Brass
- 3W Zinc
- 42 Aluminum, Alloy
- 50 PVC (Polyvinylchloride)
- 51 Nylon (Polyamide)
- 53 PP (Polypropylene)
- 55 PTFE (Polytetrafluoroethylene) or Teflon®
- 56 POM (Polyacetate) or Delrin®
- 5D PVDF (Natural)
- 5E PVDF (Polyvinylidene fluoride)
- 5K ABS (Acrylonitrile Butadiene Styrene) Plastic
- 6C EPDM (Ethylene Propylene Diene Monomer) Rubber
- 6D Nitride-Bonded Silicon Carbide
- 7A Viton®
- 7E Silicone
- 7J Santoprene
- 7T 316L SS with Peek
- 73 Soft Rubber
- A3 Hardened Stainless
- C8 POM Shell with Zirconium Oxide Insert
- C9 316L SS Kolsterized
- J7 PTFE and Hastelloy® C-276
- S2 PP (Polypropylene) conforming to FDA standards

### Connection type

- A=BSPP Connection
- B=NPT Connection
- C=BSPT Connection

### Thread size code

- | male       | female     |
|------------|------------|
| A = 1/8"   | B = 1/8"   |
| C = 1/4"   | D = 1/4"   |
| E = 3/8"   | F = 3/8"   |
| G = 1/2"   | H = 1/2"   |
| K = 3/4"   | L = 3/4"   |
| M = 1"     | N = 1"     |
| P = 1 1/4" | Q = 1 1/4" |
| R = 1 1/2" | S = 1 1/2" |
| V = 2"     | W = 2"     |
| Y = 2 1/2" | Z = 2 1/2" |
| MA = 3"    | MB = 3"    |
| ME = 4"    | MF = 4"    |
| MG = 5"    | MH = 5"    |
| MK = 6"    | ML = 6"    |

(3"-6" designations are NPT only)

Lechler manufactures thousands of individual products which are constantly being changed and redesigned for many reasons. While we do our best to make sure the data in our publications accurately reflects our products, there are times when some aspect of performance or physical configuration of a product may change. We reserve the right to make such changes when required, but we will do our best to alert you to any modifications that could affect your application. When any nozzle attribute is particularly critical, please feel free to contact us to address any concerns you may have.

In most cases, products are manufactured to performance rather than dimensions. This could result in manufacturing batches that do not match dimensionally, particularly critical points like orifice diameters. If you see something that causes you concern, please consult with your Lechler representative.

For the most up-to-date information regarding our catalog, please refer to our web site, [www.lechlerusa.com](http://www.lechlerusa.com), where you can download whatever sections of the catalog you need.

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# SELECTING THE RIGHT SPRAY CHARACTERISTICS

## Principles of Spray Technology

Atomization is the process of breaking a mass of fluid into smaller droplets for a twofold purpose: Control the distribution of liquid and increase the amount of liquid surface area to best achieve the spray's ultimate purpose. Nozzles follow these basic principles of atomization:

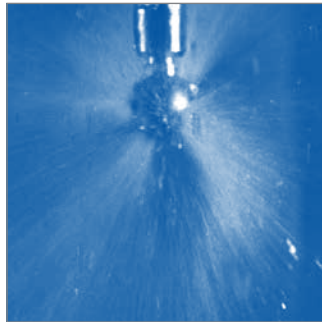
### Single fluid atomization

Forcing pressurized liquid through a specifically-shaped chamber and orifice increases its velocity and breaks it into droplets. Each nozzle combines internal liquid collision, turbulence, spinning action, and its own specific design to create the desired shape and distribution of the liquid as it leaves the orifice.

### Pneumatic (twin fluid) atomization

Gas streams collide with liquid, transferring energy to the liquid to create very small droplets. This method allows atomization of liquids whose viscosity is too high for single fluid nozzles. Air atomizing nozzles are either internal or external mix, meaning the gas and liquid mix either inside or outside the nozzle chamber.

Nozzles are also classified by their spray pattern and physical configuration. Here are the primary types you will find in this catalog:



**Tank cleaning nozzles**

Tank cleaning nozzles are either rotating or static sprays. Rotating nozzles are either free spinning (i.e., driven by reactive force of the cleaning fluid) or gear-driven by turbine or internal gears. These nozzles effectively clean tank surfaces through rapid repetition impact and flow movement, which loosens the soil and rinses it away. Free spinning nozzles operate best at lower pressures (20-60 psi), as higher pressures cause the head to rotate too fast, creating more of an atomized mist spray which is less effective for cleaning. Gear-driven models can successfully operate at slightly elevated pressures, and these generate more impact, as their head rotation is controlled by the gears.

Static spray balls do not rotate. They are used primarily for washing down relatively small tanks and vessels.

**Pneumatic atomizing**

This is a wide-ranging product family used where low liquid capacities and fine droplets are required. While these are normally used with pressurized air and water-like fluids, certain of these nozzles are well suited for higher viscosity liquids or situations where pressurized air is not available and gravity feed or siphoning measures must be used instead. Applications include: Humidification, dust control, gas cooling, precision coating, and spray drying.

#### Flat fan air atomizers:

These produce a flat spray pattern with extremely fine droplets. Spray angles can range as high as 80°. They are available in both internal and external mix configurations.

#### Full cone air atomizers:

These produce a round, conical spray with extremely fine droplets distributed throughout. Spray angles range from 20° to 60°. They are available in both internal and external mix configurations.

**Hollow cone spray**

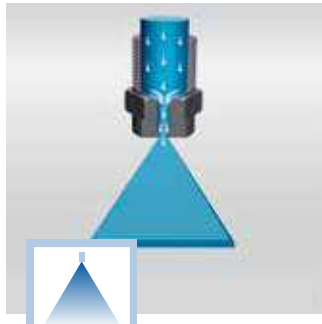
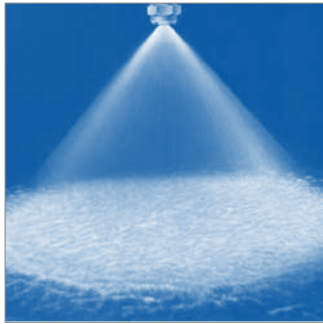
This design is employed more frequently for its ability to create fine droplets rather than the shape of the spray. Applications include: Scrubbers, chemical reactors, gas cooling, and dust control.

#### Axial flow:

An internal vane (swirl insert) creates a conical spray with a hollow center. The resulting impact area is ring-shaped. This configuration is generally limited to small capacities but generates some of the finest droplet size profiles of any single fluid nozzle.

#### Tangential flow:

The liquid enters the nozzle on a path perpendicular to the output cone to generate swirling action without an internal vane. Most hollow cone nozzles use this design approach, especially in larger capacities, due to its higher clog resistance. The centrifugal force on the swirling liquid helps form the droplets as the liquid leaves the orifice.



**Full cone spray**

**Flat fan spray**

**Solid stream spray**

**Air nozzles**

Internal swirling action creates a cone with uniform distribution throughout. This is most appropriate when trying to completely cover a large area with medium-sized droplets. Applications include: Product cooling, washing, and conveyor cleaning.

**Axial flow:**

The most common configuration uses an internal vane (swirl insert) to create a spray angle as wide as 120°. Vanes are designed to reduce clogging potential with uniform liquid distribution.

**Tangential flow:**

Due to their vaneless design, these nozzles can offer an even more clog-resistant approach for smaller capacities if the inlet position is not a constraint. Critical internal geometry allows the spray to fill in to achieve distribution similar to axial counterparts.

This design is the first choice when a sharply defined spray is needed for concentrated impact and cleaning power. There are a wide variety of capacities, spray angles and distributions to create the desired effect very precisely. Applications include: Parts cleaning, product cooling, conveyor washing, and strip coating.

**Axial flow:**

Most designs use a precisely shaped orifice to create controlled turbulence which breaks apart the liquid. Spray angles range from 15° to 110° with specific liquid distribution.

**Tangential (deflector) flow:**

Some designs use a solid stream orifice that sprays against a deflecting surface, sometimes referred to as a "tongue." One such model produces an exceptionally wide spray angle while another channels the fluid into a powerful narrow angle jet. The round orifice of each minimizes clog potential.

Calling this nozzle a spray is misleading in that it is the only family designed specifically not to produce droplets. This nozzle creates a solid shaft of water that retains its shape as long as possible before it begins to atomize. This generates the most concentrated impact possible. All conventional designs are axial. Applications include: Concentrated cleaning, cutting, and trimming.

Air does not have the same spray characteristics as liquids, so most liquid nozzles are not suited for air. Air nozzle designs typically concentrate the stream into a small area, or disperse it into a flat fan. Compressed air can create very high noise levels, so effective designs minimize this while achieving the desired distribution. Many of Lechler's air nozzles use a multi-channel orifice configuration for just this purpose.

# NOZZLE PERFORMANCE AND CHARACTERISTICS

## The most essential nozzle operating attributes are:

- Flow rate
- Spray angle
- Liquid distribution
- Spray impact
- Droplet size

### Flow rate and spray angle

Flow rate varies directly with pressure (except for internal pneumatic atomizers). Flow rate and spray angle are also dependent upon the fluid being sprayed. **All data shown in our catalog is based upon spraying water.** A spray angle is measured from the nozzle orifice. As spray distances increase, the measure of spray width or pattern diameter is significantly less accurate and largely dependent upon gravity and ambient conditions, such as air friction losses. This results in an actual spray width which is less than the theoretical one for the nozzle's stated spray angle. In critical situations, only empirical testing can determine the final spray width.

### Liquid distribution

Liquid distribution refers to the distribution of droplets of a spray within the spray area. For most spray applications, an even distribution of liquid upon the target is paramount. Most axial flat fan nozzles have distribution which is parabolic across the nozzle's spray width—i.e., heavier in the middle and less on either end. This is due to the elliptical shape of the nozzle orifice required to create the fan pattern. Thus, flat fan nozzles must be overlapped on headers to create an even distribution across the total



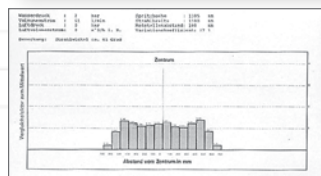
spray width. Certain deflector flat fan nozzles spray more uniformly, however, and can be used individually for even distribution.

### Spray impact

Impact is the impingement of a spray upon its target. It is a factor of:

- The droplet size created by the specific nozzle
- The feed pressure through the nozzle
- The flow rate of the nozzle at the feed pressure.

While impact is quantitatively measurable, it is more typically qualitatively measured. That is, testing with various nozzles and operating conditions can determine what impact is most effective for that spray application.



### Surface tension

Surface tension is an important physical property affecting surface formation. This quality makes the liquid resist breaking into droplets. The main effect of the surface tension is on the spray angle and droplet size of the spray nozzle as well as on the spray distribution.

### Temperature

Temperature influences a liquid's viscosity, surface tension, and specific gravity, which in turn can affect spray nozzle performance.

### Pressure

The greatest influence on the flow rate is pressure. Flow rate not only increases directly with an increase in pressure but does so at a consistent rate. Please see the Flow rate/pressure chart below for formulas to determine for either flat fans or full cones (1) a flow rate when pressures are known or (2) the necessary pressure to create a desired flow rate.

### Flow rate/pressure chart\*

Formulas for determining unknown flow rate ( $v_2$ ) and pressure ( $p_2$ ) for nozzles other than Axial Full Cones	$v_2 = \sqrt{\frac{p_2}{p_1}} \cdot v_1 \text{ [gpm]}$ $p_2 = \left(\frac{v_2}{v_1}\right)^2 \cdot p_1 \text{ [psi]}$
Formulas for determining unknown flow rate ( $v_2$ ) and pressure ( $p_2$ ) for Axial Full Cones	$v_2 = \left(\frac{p_2}{p_1}\right)^{0.4} \cdot v_1 \text{ [gpm]}$ $p_2 = \left(\frac{v_2}{v_1}\right)^{2.5} \cdot p_1 \text{ [psi]}$

### Viscosity

Viscosity is probably the most significant of all liquid properties because it can vary over an extreme range. Liquid viscosity resists surface formation. If the viscosity is great enough, a nozzle may produce a mass of filaments instead of a spray. Liquid viscosity is remarkably sensitive to temperature. Thus, liquid viscosity has a significant effect on all of the spray characteristics.

### Specific gravity

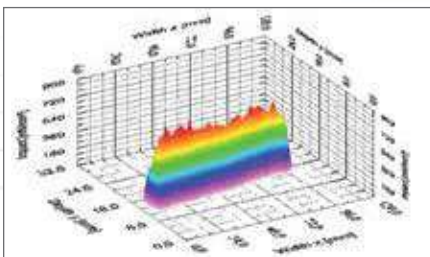
The main effect of the specific gravity of a fluid being sprayed is on the flow rate of the nozzle. The lower the specific gravity of a liquid, the higher the velocity through the nozzle, and vice versa. Thus, for lower specific gravity, the flow rate is larger than the liquid with a higher specific gravity at the same pressure. To find the expected flow rate for liquid whose specific gravity is different from that of water, use the formula in the chart below.

### \* Flow rate/pressure chart key

For either flat fans or full cones,  $v_1$  and  $p_1$  are the known flow rate and pressure respectively. For an unknown flow rate,  $v_2$  is the resulting flow rate at the desired pressure  $p_2$ . For an unknown pressure,  $p_2$  is the resulting pressure required to achieve the desired flow rate  $v_2$ .

### Specific gravity

<p>SG = Specific gravity</p> <p><math>SG_{FL}</math> = Specific gravity of fluid</p> <p>Density<sub>FL</sub> = Density (g/mL) of fluid</p>	<p>SG = Density<sub>FL</sub> (g/mL)/Density of water (1g/mL)</p> <p>Therefore, specific gravity of water = 1.00</p>
<p>Expected flow rate of fluid other than water = Any given flow rate of water <math>\times (1/\sqrt{p_{FL}})</math></p>	<p>Example: For fluid with <math>SG_{FL} = 1.2</math> and given flow rate of 4.0 gpm, expected flow = <math>4.0 \times (1/\sqrt{1.2}) = 3.6</math> gpm</p>



# DROPLET SIZE INFORMATION

## Droplet size

Droplet size is important both as a part of achieving an even spray distribution and in the accomplishment of goals required by certain spray applications. The spray from a given nozzle does not break into uniform droplets but atomizes into a wide range of individual droplet sizes. Lechler measures droplet size and velocity of a given spray with a Phase Doppler Particle Analyzer. If droplet size is critical to your application, contact us to discuss your specific requirements.



A spray nozzle breaks up a mass of fluid into a multitude of smaller droplets for the purpose of achieving one of these end results:

- Cleaning
- Cooling
- Coating
- Combustion

Droplet size is typically measured in microns. A micron is 1/1000 of a millimeter (mm), and for this purpose, relates to a mean or median droplet diameter.

## Droplet size considerations

Droplet size is important in a spray's performance. Large droplets are best when impact is important, such as for cleaning. Smaller droplets are best when more uniform coverage is required or if a fine mist is required (such as for humidification or evaporation). There are several different ways that droplet sizes are expressed but the main two ways are as follows:

### • Sauter Mean (or SMD)

The diameter of a droplet whose ratio of volume to surface area is equal to that of the entire spray sample; also called "volume surface mean."

### • Mass (Volume) Median

The mass (volume) median diameter of a droplet which divides the mass (volume) of the spray into two equal halves.

Significant factors influencing droplet size include:

- Nozzle type
- Flow capacity
- Inlet feed flow pressure (psig)
- Spray pattern

All other factors being equal, the following nozzle types produce droplet size from smallest to largest:

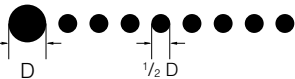
- Pneumatic atomizing
- Hollow cone
- Flat fan
- Full cone

Refer to the chart on [page 14](#) regarding Spray Performance to see how other operating and fluid conditions can affect droplet size.

### Droplet sizes

(One inch = 25,400 microns)

- 500 microns
- 1,200 microns
- 5,500 microns



Given a large droplet and a smaller droplet which is half the diameter of the large one: The volume of the large droplet corresponds to the total volume of eight of the smaller droplets. The surface area of the large droplet is four times the size of that of the smaller droplet. The total surface of the eight smaller droplets, however, is twice the size of the large droplet.

## Droplet size range according to nozzle type (Sauter Mean Diameter, SMD)

Single fluid nozzles	Liquid pressure (psi)					
	15		30		75	
	Flow rate (gpm)	Droplet size (µm)	Flow rate (gpm)	Droplet size (µm)	Flow rate (gpm)	Droplet size (µm)
Axial flow hollow cone nozzle	-	-	.03	140	.04	100
	-	-	.30	240	.42	180
Tangential hollow cone nozzle	-	-	.30	320	.38	240
	.48	-	6.6	640	9.5	490
Full cone nozzle	.21	540	.30	400	.42	300
	5.0	1300	6.6	1100	10.6	750
Cluster head nozzle	.24	200	.33	175	.53	150
	5.3	400	7.4	265	11.6	190
Flat fan nozzle	.18	400	.30	360	.42	300
	4.8	1200	6.6	1000	10.6	690

Pneumatic atomizing nozzles	Air/water ratio (m³/h:l/min)					
	5		10		20	
	Flow rate (l/min)	Droplet size (µm)	Flow rate (l/min)	Droplet size (µm)	Flow rate (l/min)	Droplet size (µm)
Various	Various	90	Various	55	Various	40



# SPRAY NOZZLE CONSIDERATIONS

How well and how long any nozzle will perform is largely affected by its operating conditions. A nozzle's spray performance should be regularly checked and evaluated to determine if it is acceptable. The nozzle itself should also be visually inspected during a maintenance shutdown and checked for signs of wear or damage. Reasons for a poor or deteriorating spray performance include:

### Wear/Erosion

- *What is it*—Gradual reduction of the nozzle material resulting in an enlarged orifice or internal passages.
- *Symptoms*
  - Larger flow rate
  - Reduced spray angle
  - Decreased impact
  - Larger droplets
  - Irregular spray pattern
- *Solution*—Replace nozzle.

### Corrosion

- *What is it*—Deterioration of the essential properties of a material due to the chemical reaction to the material it is spraying. Can result in a build-up of oxides or salt on the outside of the nozzle near the orifice.
- *Symptoms*
  - Same as for Wear/Erosion
  - Damage to the nozzle
- *Solution*—Replace nozzle.

### Bearding/Caking

See page 54.

### Clogging

- *What is it*—Unwanted particles from the sprayed fluid which become lodged in the orifice, restricting the incoming flow.
- *Symptoms*
  - Reduced flow rate
  - Reduced spray angle
  - Irregular spray pattern
- *Solution*—Clean out nozzle orifice and internals (CAUTION: Do NOT clean with a metal utensil).

### High Temperature

- *What is it*—Breakdown of the nozzle material due to elevated temperatures of either the fluid being sprayed, the surrounding environment, or both.
- *Symptoms*
  - Softened material
  - Unpredictable performance
- *Solution*—Replace nozzle and ensure that material of replacement nozzle is more resistant to high temperatures.

### Accidental Damage

- *What is it*—Physical damage to the nozzle or its orifice by dropping during installation, falling during operation, or scratching while attempting to clean with inappropriate tools.
- *Symptoms*
  - Noticeable damage to outside of nozzle
  - Possible leakage around nozzle if damage to threads
  - Unpredictable performance if damage to orifice
- *Solution*—Replace nozzle, especially if performance is affected or nozzle leaks due to thread damage.

### Service life

The service life of a given nozzle is dependent on various circumstances:

- Operating pressure
- The liquid being sprayed
- The surrounding environment
- Solids in the liquid
- Deposits on the nozzle
- Installation and handling

Therefore we cannot predict how long a nozzle will last in a given application. Select from our long list of materials one that works best for you.

### Nozzle wear

Nozzle wear is manifested by an increased flow and the subsequent deterioration of spray performance.

A reduction in system operating pressure is often an indication of increased nozzle wear, especially when positive displacement pumps are used.

Flat fan axial nozzles exhibit a narrowing of the spray pattern with wear. Other type spray nozzles reveal a loss in distribution uniformity within the spray pattern, though without a noticeable change in pattern size.

Please call and consult with our sales engineers to determine the best nozzle design and material to satisfy your specific spray requirements. We will be glad to help.

### Conditions affecting spray nozzle performance

The charts below are for:

- The basic cause-and-effect relationship between spraying conditions and performance
- The ratio of abrasion resistance differences between various nozzle materials

### Spray Performance

	Increase in operating pressure	Increase in viscosity	Increase in specific gravity	Increase in fluid temperature	Increase in surface tension
Pattern quality	+	*	—	+	○
Capacity	+	—	*	*	○
Spray angle	+ then -	○	—	+	—
Velocity	+	—	—	—	○
Droplet size	—	○	+	—	+
Impact	+	○	—	+	○
Wear	+	○	—	*	○

\* Depends on Fluid Being Sprayed and Spray Nozzle Used.  
 + Increases — Decreases ○ Negligible or no effect

	Ratio of abrasion resistance											
	1	2	4	6	10	15	40	90	130	180	200	250
Carbide												
Ceramics												
Silicon Carbide (Nitride Bonded)												
Stellite												
Hardened Stainless Steel												
Hastelloys												
Stainless Steel												
Steel												
Brass												
Aluminum												

# SELECTING NOZZLE MATERIAL

There are more than 100 different materials from which our nozzles can be made but for most applications, a handful of compositions can handle the task.

## Brass

- Economical
- Long-lasting metal material for low pressure applications where chemical corrosion is not an issue

## Stainless steel and nickel-based alloys

- Excellent performance in more aggressive environments where higher temperatures and corrosive products may shorten the life of a lesser material
- Good value for the above conditions

## Ceramic and refractory-based materials

- Best for erosive wear conditions
- Can handle extreme temperatures that might melt or corrode common metals or plastics
- Provide long life in the toughest applications

## Plastics

- Includes PVDF, PP, PTFE, and POM among others (more info on PVDF on this page)
- High value combination of economy, long service life, and resistance to a broad range of chemicals (where temperatures allow)

## PVDF – Polyvinylidene fluoride

PVDF is one of the more sophisticated materials today that can be used as nozzle material. Lechler's injection molded PVDF material offers spray quality and durability as good as its best brass and stainless steel counterparts. And because of its low cost, we say that PVDF provides "the performance of stainless steel at the price of brass". Lechler has its own in-house mold-making and injection-molding equipment which allows us to control quality and manufacturing while keeping costs low. See our product

offerings for nozzles in PVDF. PVDF is an outstanding choice as a nozzle material for many reasons:

### • Chemical resistance

PVDF is typically resistant to:

- Most acids
- Salts and weak bases
- Halogens and halogenated solvents
- Alcohol
- Oxidants
- DI water
- UV and nuclear radiation

### • Temperature range

PVDF can be used at temperatures as high as 285°F depending on the chemical environment.

### • Abrasion resistance

In most nozzle applications, PVDF will outlast brass, mild steel, PVC, PTFE, and most grades of stainless steel

### • FDA acceptance

The FDA accepts PVDF for uses in a broad range of food and pharmaceutical applications where stainless steel used to be the only choice.

## Conversion factors for determining the weight of various materials

Material	Factor
Brass	1.00
Stainless steel	.95
Plastics (PVDF)	.21
Aluminum	.33
Silicon carbide	.39
Titanium	.54
Cast iron	.89
Tantalum	2.00

Most weights in this catalog refer to brass. By applying the conversion factors of this chart, the approximate weight of nozzles in selected other materials can be easily calculated.



Stainless steel



Brass



Plastic material



Silicon carbide



# CONVERSION TABLES AND COVERAGE CHART

Multiply	by	to obtain	Multiply	by	to obtain	Multiply	by	to obtain
Bar.....	100	Kpa	Cubic Meters.....	61023	Cubic Inches	Imperial Gallons.....	1.2	Gallons
Bar.....	14.5	P.S.I.	Cubic Meters.....	264.2	Gallons	Inches.....	2.54	Centimeters
Centimeters.....	0.3937	Inches	Cubic Meters.....	1000	Liters	Kgf./Sq. Cms. ....	14.22	P.S.I.
Centistokes.....	Sp. gravity	Centipoise	Degree (Celsius).....	(°Cx1.8)+32	Degree (Fahrenheit)	Liters.....	1000	Cubic Centimeters
Cubic Centimeters.....	0.061	Cubic Inches	Degree (Fahrenheit).....	(°F-32)x0.56	Degree (Celsius)	Liters.....	0.264	Gallons
Cubic Centimeters.....	0.000264	Gallons	Feet.....	0.3048	Meters	Liters.....	0.22	Imperial Gallons
Cubic Centimeters.....	0.001	Liters	Feet of Water.....	0.0295	Atmospheres	Liters.....	33.8	Ounces (Fluids)
Cubic Feet.....	1728	Cubic Inches	Feet of Water.....	0.433	P.S.I.	Meters.....	3.281	Feet
Cubic Feet.....	0.02832	Cubic Meters	Gallons.....	3785	Cubic Centimeters	Microns.....	0.0394	Thousandth of an Inch
Cubic Feet.....	7.48	Gallons	Gallons.....	0.1337	Cubic Feet	Millimeters.....	0.0394	Inches
Cubic Feet.....	28.32	Liters	Gallons.....	0.83267	Imperial Gallons	Pounds.....	453.6	Grams
Cubic Feet (Water).....	62.43	Pounds (Water)	Gallons.....	3.785	Liters	Pounds (Water).....	0.1198	Gallons
Cubic Inches.....	16.39	Cubic Centimeter	Gallons.....	8.34	Pounds (Water)	P.S.I.....	0.068	Atmospheres
Cubic Inches.....	0.00433	Gallons	Grams.....	.0022	Pounds	P.S.I.....	0.06895	Bar
Cubic Inches.....	0.0164	Liters				P.S.I.....	2.307	Feet of Water
Cubic Meters.....	35.31	Cubic Feet				P.S.I.....	0.0703	Kgf./Sq. Cms.
						P.S.I.....	6.895	Kpa
<b>to obtain</b>	<b>by</b>	<b>divide</b>	<b>to obtain</b>	<b>by</b>	<b>divide</b>	<b>to obtain</b>	<b>by</b>	<b>divide</b>

## P Pressure

Unit	bar	Pascal [Pa] = N/m <sup>2</sup>	kp/cm <sup>2</sup> = 1 at	psi	lb/sq ft
1 bar	1	100000	1.02	14.5	2089
1 Pascal [Pa]	1·10 <sup>-5</sup>	1	1.02·10 <sup>-5</sup>	14.5·10 <sup>-5</sup>	0.0209
1 at = kp/cm <sup>2</sup>	0.9807	98070	1	14.22	2048
1 psi	0.06895	6895	0.07031	1	144
1lb/sq ft	0.479·10 <sup>-3</sup>	47.9	0.4882·10 <sup>-3</sup>	6.94·10 <sup>-3</sup>	1

## V Volume

Unit	l	m <sup>3</sup>	Imp. gal	US gal
1 l (1 dm <sup>3</sup> )	1	1·10 <sup>-3</sup>	0.22	0.264
1 m <sup>3</sup>	1000	1	220	264.2
1 Imp. gallon	4.546	4.546·10 <sup>-3</sup>	1	1.201
1 US gallon	3.785	3.785·10 <sup>-3</sup>	0.8327	1

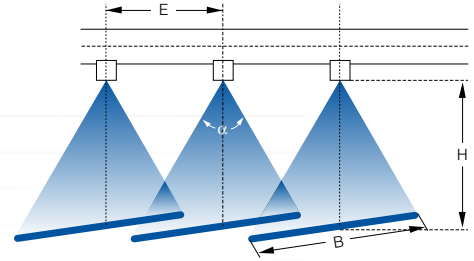
## Theoretical Spray Coverages

Spray angle	Distance from nozzle orifice													
	2"	4"	6"	8"	10"	12"	15"	18"	24"	30"	36"	48"	60"	72"
5°	0.2"	0.4"	0.5"	0.7"	0.9"	1.1"	1.3"	1.6"	2.1"	2.6"	3.1"	4.2"		
10°	0.4"	0.7"	1.1"	1.4"	1.8"	2.1"	2.6"	3.1"	4.2"	5.2"	6.3"	8.4"		
15°	0.5"	1.1"	1.6"	2.1"	2.6"	3.2"	3.9"	4.7"	6.3"	7.9"	9.5"	12.6"		
20°	0.7"	1.4"	2.1"	2.8"	3.5"	4.2"	5.3"	6.4"	8.5"	10.6"	12.7"	16.9"		
25°	0.9"	1.8"	2.7"	3.5"	4.4"	5.3"	6.6"	8.0"	10.6"	13.3"	15.9"	21.2"		
30°	1.1"	2.1"	3.2"	4.3"	5.4"	6.4"	8.1"	9.7"	12.8"	16.1"	19.3"	25.7"	32.2"	38.6"
35°	1.3"	2.5"	3.8"	5.0"	6.3"	7.6"	9.5"	11.3"	15.5"	18.9"	22.7"	30.3"	37.8"	45.4"
40°	1.5"	2.9"	4.4"	5.8"	7.3"	8.7"	10.9"	13.1"	17.5"	21.8"	26.2"	34.9"	43.6"	52.4"
45°	1.7"	3.3"	5.0"	6.6"	8.3"	9.9"	12.4"	14.9"	19.9"	24.8"	29.8"	39.7"	49.6"	59.6"
50°	1.9"	3.7"	5.6"	7.5"	9.3"	11.2"	14.0"	16.8"	22.4"	28.0"	33.6"	44.8"	56.0"	67.2"
55°	2.1"	4.2"	6.3"	8.3"	10.3"	12.5"	15.6"	18.7"	25.0"	31.2"	37.5"	50.0"	62.4"	75.0"
60°	2.3"	4.6"	6.9"	9.2"	11.5"	13.8"	17.3"	20.6"	27.7"	34.6"	41.6"	55.4"	69.2"	83.0"
65°	2.5"	5.1"	7.6"	10.2"	12.7"	15.3"	19.2"	22.9"	30.5"	38.2"	45.8"	61.2"	76.4"	91.6"
70°	2.8"	5.6"	8.4"	11.2"	14.0"	16.8"	21.0"	25.2"	33.6"	42.0"	50.4"	67.2"	84.0"	101.0"
75°	3.1"	6.1"	9.2"	12.3"	15.3"	18.4"	23.0"	27.6"	36.8"	46.0"	55.2"	73.6"	92.0"	110.0"
80°	3.4"	6.7"	10.1"	13.4"	16.8"	20.2"	25.2"	30.3"	40.3"	50.4"	60.4"	80.6"	101.0"	121.0"
85°	3.7"	7.3"	11.0"	14.7"	18.3"	22.0"	27.5"	33.0"	44.0"	55.0"	66.0"	88.0"	110.0"	132.0"
90°	4.0"	8.0"	12.0"	16.0"	20.0"	24.0"	30.0"	36.0"	48.0"	60.0"	72.0"	96.0"	120.0"	144.0"
95°	4.4"	8.7"	13.1"	17.5"	21.8"	26.2"	32.8"	39.3"	52.4"	65.5"	78.6"	105.0"		
100°	4.8"	9.5"	14.3"	19.1"	23.8"	28.6"	35.8"	43.0"	57.2"	71.6"	85.9"	114.0"		
110°	5.7"	11.4"	17.1"	22.8"	28.5"	34.3"	42.8"	51.4"	68.5"	85.6"	103.0"			
120°	6.9"	13.9"	20.8"	27.7"	34.6"	41.6"	52.0"	62.4"	83.2"	104.0"				
130°	8.6"	17.2"	25.7"	34.3"	42.9"	51.5"	64.4"	77.3"	103.0"					
140°	10.9"	21.9"	32.9"	43.8"	54.8"	65.7"	82.2"	98.6"						
150°	14.9"	29.8"	44.7"	59.6"	74.5"	89.5"	112.0"							
160°	22.7"	45.4"	68.0"	90.6"	113.0"									
170°	45.8"	91.6"												

# EXAMPLES FOR NOZZLE ARRANGEMENTS

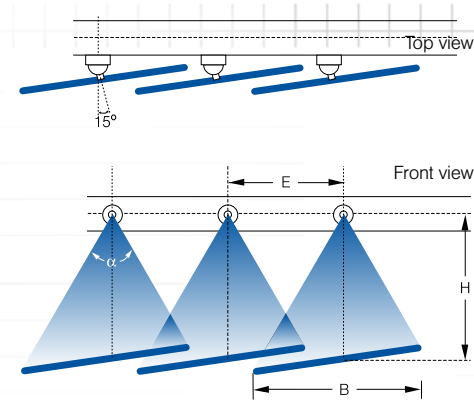
## Arrangement of flat fan nozzles with parabolic liquid distribution

Lechler flat fan nozzles provide a consistent, parabolic coverage over the impact area. For this purpose, the spray widths  $B$  ought to overlap each other by  $1/3$  to  $1/4$ . To avoid interferences of the sprays, the nozzle orifices must be offset  $5^\circ$ - $15^\circ$  to the pipe axis.



## Alignment of tongue-type nozzles

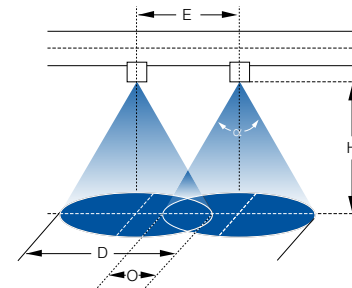
Lechler tongue-type nozzles have an even or uniform liquid distribution. In order to achieve an even surface coverage the nozzles need to be aligned in such a way that spray widths  $B$  overlap by either  $0\%$  or  $50\%$ . Therefore the nozzles should be inclined in an angle of  $15^\circ$  to the vertical of the horizontal axis of the tube (either with a weld base at an angle or a Lechler ball joint nozzle mount) in order to prevent a disturbance of the spray.



## Arrangement of full cone and hollow cone nozzles

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

- $O$  = Overlap of spray angles
- $D$  = Spray diameter
- $E$  = Nozzle distance
- $H$  = Installation distance of nozzles
- $\alpha$  = Spray angle



## Square or offset arrangement of full cone or hollow cone nozzles

**Square arrangement**

Nozzle distance:  $E = \frac{D}{\sqrt{2}}$

Overlap:  $O = D - E$

**Offset arrangement**

Nozzle distance:  $E_1 = \frac{D}{2} \times \sqrt{3}$

Nozzle distance:  $E_2 = \frac{3}{4} D$

Overlap:  $O = D - E_1$

# ACCESSORIES TO SIMPLIFY OPERATION

Choosing one of our nozzles is only half of the total process. It can't do its job without being connected properly to the liquid supply. Our range of accessories can help you optimize nozzle mounting and placement to save time and ensure reliable operation.

The most useful approach may be a custom fabricated header. Lechler can design and build a header to support and supply multiple nozzles in a way that will simplify plumbing, speed installation, and create a trouble-free spray process.

With a few moments of planning ahead, you can consider some well-placed accessories that might make your job a lot easier.

### Standard threaded nozzles:

Clip-on nozzle bases for quick, inexpensive header mounting, [pages 103, 137](#)

Ball joints allow precise nozzle aim and alignment, [pages 128, 133](#)

Custom headers provide structure, simple plumbing, and ideal nozzle placement, [page 142-143](#)

### Tip configurations:

Threaded bases and caps, [page 126](#)

Special accessories for dovetail fan nozzles provide presetting of the spray alignment, [page 132](#)

Strainers to prevent clogging and check valve assemblies to prevent dripping, [pages 131, 132](#)

Split eyelet mounts for custom headers, [page 130](#)



### TWISTLOC and bayonet quick release systems:

TWISTLOC stainless steel and brass bases and caps, [pages 131-133](#)

Plastic bayonet bases and caps, [pages 131-133](#)

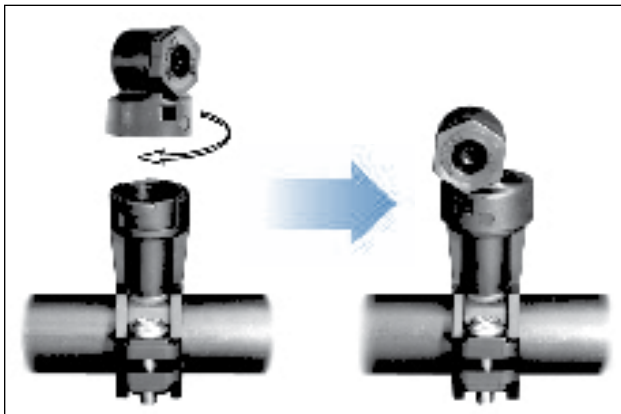
Split eyelet bayonet mounts, [page 135](#)

### Custom headers:

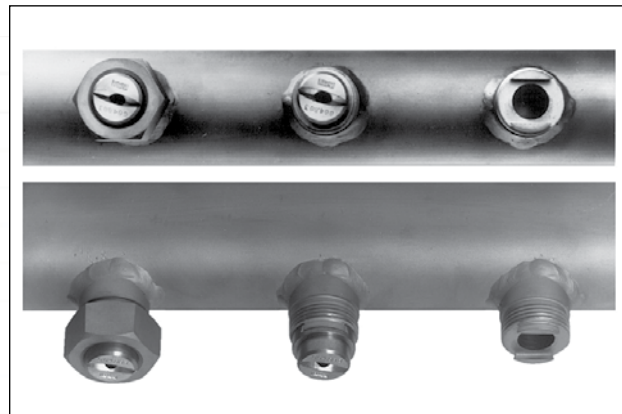
Brush and flush header systems, [page 144](#)

Fabricated headers, [page 142-143](#)

**For quick reference, Lechler's mounting options are illustrated in the Accessories section of this catalog, [page 129](#)**



Bayonet quick release system



Dovetail guide



# Tank cleaning nozzles

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





## How to choose the right tank cleaning nozzle

The following step-by-step procedure will help you define your cleaning task and get the most out of our products.

### Begin by analyzing your cleaning task:

- How large is the tank in terms of size and interior surface area?
- Where is the dirt located; how bad is it; and what is its nature?
- Which method of cleaning is required: strong blasts of cleaner or repetitive rinsing?
- What kind of cleaning fluid products are you using?
- Are there any internal obstacles (e.g., mixing blades, baffles, etc.)?
- [More information on page 21.](#)



### When planning your tank cleaning nozzle installation, be sure to observe the following four parameters:

#### 1) Rinsing effect — a function of flow rate

Determine the required liquid flow rate by testing the applied pressure and the liquid's ability to clean the dirt from the tank's surface.

- As the nozzle head revolves, it should cover the entire area to be cleaned with an effective amount of cleaning liquid.
- In comparison with rotational cleaners, static spray balls require roughly twice as much liquid flow.
- Remember: Your drain must be able to handle the flow rate of what you're putting in the tank.
- [More information on flow rate guidelines on page 25.](#)

#### 2) Force of impact — helps strip off crusty dirt

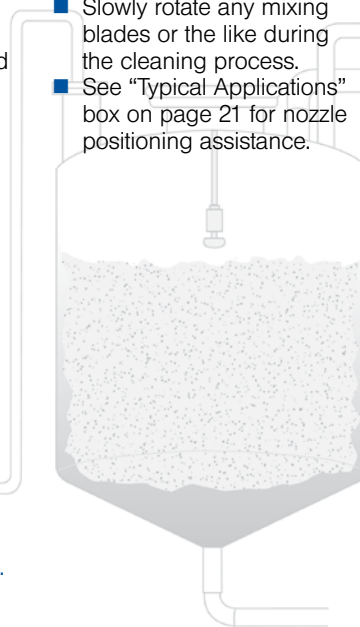
The force of impact depends upon:

- Adherence to the optimal operating pressure range for the type of nozzle in use.
- The right cleaning radius and volumetric flow for the size of tank in question.
- Concentration of the spray jets on the most badly soiled areas, e.g., 270° up or down.

As pressure increases, relative droplet size (mass) decreases. If pressure is elevated too high, an ineffectual mist is created. Increasing flow rate rather than pressure is a more efficient method of increasing impact. Lechler highly suggests contacting us if you have an application requiring operating pressures outside of the ranges for tank cleaning products listed herein.

#### 3) Proper positioning — for optimal targeting

- In case of internal obstacles, either use several nozzles or place the nozzle at different locations.
- Slowly rotate any mixing blades or the like during the cleaning process.
- See "Typical Applications" box on page 21 for nozzle positioning assistance.



#### 4) Application suitability — ensures safe operation

- When using any type of plastic spray nozzle, there is the possibility for static charge buildup that could create potential problems in some applications.
- For all tank applications involving combustible gas, flammable liquids, and/or other potentially explosive materials, please consult Lechler prior to purchasing tank cleaning nozzles.
- ATEX comprises two EU (European Union) directives describing what equipment and work is allowed in an explosive atmosphere. For companies in such areas who must also follow EU directives, Lechler makes tank cleaning nozzles which have ATEX approval. Contact Lechler for more information.



**Contact Lechler for assistance in evaluating your particular tank cleaning application.**



## Rotating tank cleaning nozzle advantages

- Low-pressure application for lower energy consumption.
- Increased cleaning effectiveness due to fluid flow movement compared to static spray.

## Types of rotating tank cleaning nozzles:

### ■ Free-spinning heads

The cleaning liquid turns the spray head by means of specially positioned nozzles. The greater the inlet pressure, the faster the head rotation. Repetitive impact cleans the tank surfaces. The effect is best at low pressures in small to medium-size tanks.

- See pages 26-30, 33-36, and 39 for free-spinning nozzle design families

### ■ Internal regulated drive

The liquid flow powers the head by way of an internal propeller. This keeps the speed of the head within its optimal range across a wider span of pressures, and the nozzle creates more powerful spray impact.

- See page 37 for XactClean® HP nozzles

## Programmed rotation machines

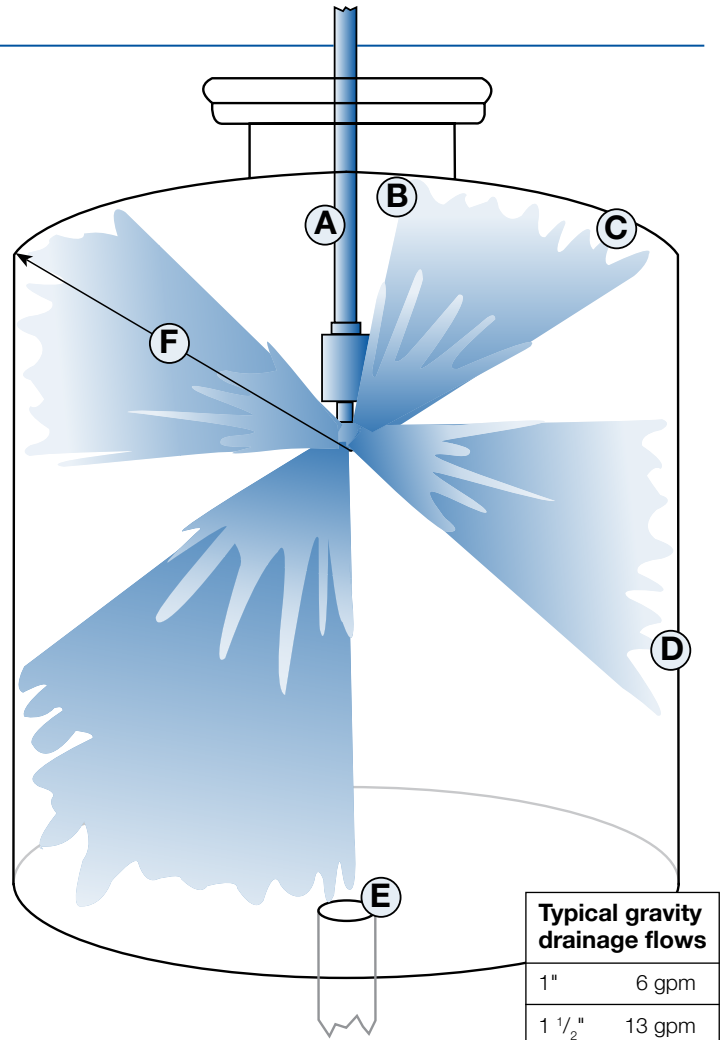
One variation of the internally-regulated drive is the programmed machine. Here, the cleaning fluid drives an internal gear reducer that keeps the sprayer turning in two planes. During a spray cycle, the jets sweep the entire tank interior following a programmed pattern. These models generate the highest impact and are therefore ideal for very large tanks and the toughest of cleaning tasks.

- See page 40 for the 5TM design family

## Static spray balls

Static spray balls do not rotate, so they require a comparatively large amount of liquid in order to generate turbulent flow, up to 2 to 3 times the amount compared to rotating nozzles. They are not as effective for most cleaning tasks as a comparable rotating nozzle. Their advantages include (1) having no moving parts, (2) being self draining, and (3) being traditionally used in sanitary environments. Whereas if a rotating nozzle stops turning, its cleaning effectiveness suffers, this is not a concern with a static ball. However, if a static ball has any of its orifices clogged, this can result in voids in coverage. Static balls are used primarily for washing down relatively small tanks and vessels.

- See pages 31-32 for spray balls



Typical gravity drainage flows

1"	6 gpm
1 1/2"	13 gpm
2"	23 gpm
2 1/2"	35 gpm
3"	50 gpm
4"	91 gpm
5"	142 gpm
6"	204 gpm
7"	278 gpm
8"	363 gpm
9"	459 gpm
10"	567 gpm

## Typical applications

- Ⓐ – Position the tank cleaning nozzle(s) at the center of the tank. For the best nozzle depth location in the tank, see point Ⓒ below.
- Ⓑ – Nozzles invariably leave an unsprayed shadow area directly overhead, the size of which varies according to the type of nozzle and the piping.
- Ⓒ – The distance between the top of the tank and the nozzle should amount to 40%–70% of the nozzle's cleaning radius. Size your unit to ensure sufficient flow to the top part of the tank wall. Nozzles work under a "line of sight" principle. You may need more than one nozzle to eliminate spray shadowing produced by internal components of a tank, such as mixers, agitators, dip tubes, etc. Generally, the nozzle should be located so that it is at least 1/2" to 1" above the maximum fill level of the tank so that the nozzle does not become submerged in the product of the tank. Also, the nozzle should be located in the upper third of the tank height to ensure cleaning of the top as well as to take maximum use of the cascading effect of the cleaning fluid against the walls of the tank.
- Ⓓ – The film of liquid grows thicker toward the bottom of the tank, where the washing effect is the most pronounced.
- Ⓔ – Standing water reduces impact and allows solids to accumulate. Make sure that the drain can handle whatever you put into the tank (see chart at right).
- Ⓕ – The critical spray distance is from the nozzle to the top corner, so the nozzle should be sized for this "effective washing distance".

All pressure data is stated in terms of differential pressure directly at the nozzle, so be sure to take the line-pressure drop into account.





# Mounting configurations Requirements for critical CIP applications

Tank cleaning

## Mounting configurations

All Lechler tank cleaning nozzles are designed to be mounted on a pipe or tube. However there are several options for making the connection:

### Threaded

Most designs use a female pipe thread for mounting on a male threaded pipe.

### Slip-on

Nozzles for sanitary use do not use threads but slip around the end of a tube that has a cross hole drilled. A pin is then inserted to hold the head in place.

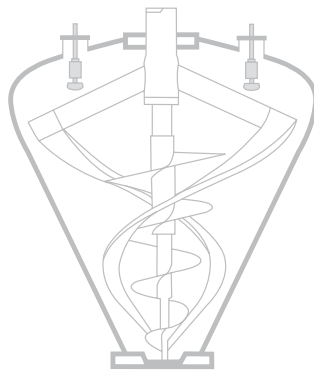
### Tri-Clamp

Some manufacturers use tri-clamp connectors to join pipe. Lechler makes tank cleaning nozzles which have a compatible flange to mate with those. Each product section describes the mounting options in detail.

## CIP nozzles for sanitary applications

Some installations leave the cleaning nozzle in the tank during production cycles such that it has contact with the product. If the product is critical, such as food or pharmaceutical materials, the nozzle has to be designed following specific protocols so that it will not contaminate the product.

- See pages 32 and 35 for CIP nozzles



## Typical washing sequences

A thorough tank cleaning sequence depends on the interaction between the soil, the cleaning solution and spray impact. The following sequence of steps are used in many applications:

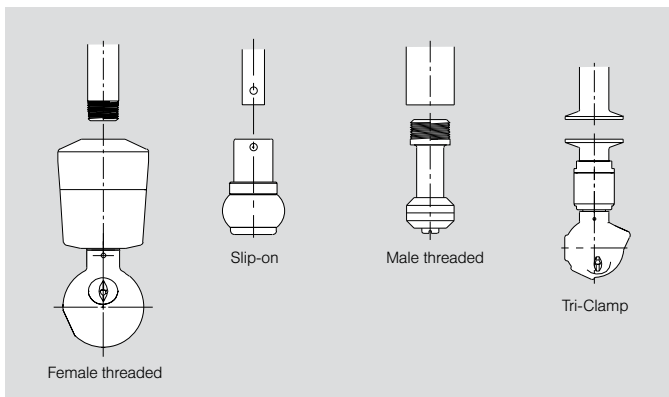
- Pre-rinse — Begin with low grade or “used” water to rinse the interior, washing out the heaviest soil.
- Alkali wash — Use a mild solution such as 1% sodium hydroxide or trisodium phosphate. This removes most types of deposits.
- Second rinse — Follow with cleaner water to rinse out the alkali. This water can be used next time for the pre-rinse.
- Acid wash — A mild acid wash will neutralize any alkalinity and remove mineral deposits
- Final rinse — Use your cleanest water as the final step.

## Documentation

Once the sequence is established, all steps of the process should be documented for consistency in future operations. This includes many operational details:

- Washing sequence with number of execution times for each step
- Cleaning chemical selection and concentration
- Washing temperatures and pressures
- Maximum time between the shut-down of the process and cleaning cycle
- Operation of any internal equipment, mixers, etc.
- Manual valve settings, equipment disassembly or other personnel-dependent operations
- Order information and operation parameters of the installed nozzle

This approach may not be suitable for every application but it is adaptable. The degree of soiling in the tank and the cleaning chemical selected to clean it will determine how many times you can use the same chemicals and rinse water. If the pre-rinse is effective, it can extend the life of chemicals in the other steps.





## Resources for maximizing your tank cleaning capabilities

### Service and support

As mentioned below, each 5TM (M20) customer may choose to maintain their own unit by following the directions in the Operation Manual. But for even greater ease of maintenance, send your unit to Lechler and let our service staff do all of the maintenance work for you. We have years of experience in maintaining these units and guarantee to return your freshly-refurbished unit back to you within 48 hours of our receiving it. So let our experienced staff take the worry out of the maintenance of your 5TM (M20) machine.

### Rent vs. own

The purchase of a Lechler 5TM (M20) High Impact Tank Cleaning Machine is a major decision. To help assist you in this decision-making, Lechler offers its customers the option of renting an 5TM (M20) first. And if you eventually decide to purchase that unit, all rental fees paid to that point will be applied to the purchase price. While rentals are generally for trials by our customers, we at Lechler feel confident that once you have used your 5TM (M20) machine, you won't want to be without it again.

### The five factors of cleaning

Tank cleaning, or any type of cleaning for that matter, is the result of four inter-related factors which can be manipulated for the greatest effectiveness:

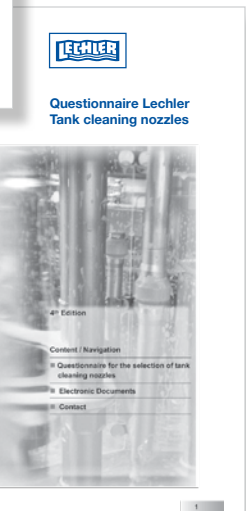
- Temperature
- Chemical Reaction
- Mechanical Force
- Time
- Soil Composition

A tank cleaning nozzle (or machine) requires fluid (typically water) of a certain temperature, some type of chemical cleaning agent to interact with the cleaning medium, the mechanical action of the nozzle (typically its rotation) to project the fluid, and a period of time for the cleaning to occur. If any factor's effectiveness is reduced, it

must be compensated by one or more of the other factors in order to ensure proper cleaning. For instance, to reduce the cleaning time for a tank, a greater inlet pressure (mechanical force) may need to be applied for higher impact and faster soil removal. Hotter water (temperature) for assistance in loosening that soil may also be required and perhaps even a greater amount of soap (chemical reaction) is needed to further assist the soil removal. And in comparing the two most common tank cleaning methods, a spray ball requires much more time and chemical action to clean when compared to a typical Lechler rotating nozzle, which relies more on the mechanical force of the rotating head (therefore using less time) to get the job done.

### 5TM (M20) Operation Manual

If you purchase our 5TM (M20) High Impact Tank Cleaning Machine, you will receive an Operation Manual for the unit. This manual explains how to maintain your unit for a long, reliable service life. This can either involve simply sending the unit to Lechler for regular maintenance or following the instructions in the manual for self-maintenance of the unit. Let this manual be your guide to years and years of effective tank cleaning.



### Tank cleaning design assistance

If you need to design a tank cleaning system for your application, let Lechler assist you. We have more than 25 years of experience in designing and manufacturing tank cleaning products for any size job. If you go to our web site, [www.lechlerusa.com](http://www.lechlerusa.com), you can access a questionnaire which you can complete and email to Lechler for assistance in selecting the right nozzle(s) and quantity for your application.





## Nozzle selection guide

**FDA** The FDA, the U.S. Food & Drug Administration, is a federal agency which oversees those two industries. Where so noted in the catalog, materials used in making Lechler products are compliant with the requirements of FDA regulation 21 CFR for use in food applications.

**A<sup>®</sup> 78-03** The 3-A council is a U.S. organization which has set up a comprehensive inventory of sanitary standards and accepted practices for food and dairy processing equipment and systems. Manufacturer's equipment must meet these standards before the 3-A symbol is authorized to be used with it.

**ATEX product availability** Lechler offers specific tank cleaning nozzles that conform to Directive 94/9/AC (ATEX) for European Union (EU) organizations for use in applications where an explosion hazard may exist. Please consult Lechler, Inc. if you have any questions regarding use of our products in your application.

**European Hygienic Engineering and Design Group** The EHEDG verifies and certifies the hygienic design of products. The certification process is similar to 3A authority.



### Chart Heading Explanations

#### Tank diameter cleaning range

This is the range of sizes of the largest spherical tank in which the given tank cleaning product, while operating at the maximum recommended pressure, can deposit a thick film of liquid with a high force of impact.

#### Tank diameter rinsing range

This is the range of sizes of the

largest spherical tank that can be covered with a somewhat thinner film of water by the given tank cleaning product operating at the maximum recommended pressure.

#### Operating pressure

This is the recommended range for maximum cleaning efficiency. The individual product tabulations may extend beyond these levels.

#### Flow rate range

This term includes the smallest through the largest flow rates in a family across the recommended pressure range.

#### Safe use of products

Lechler, Inc. bears responsibility towards all of its spray products to (1) be free of manufacturing defects and (2) perform within normal tolerance values for the specific flow and coverage

parameters that have been established. The customer using our products is responsible for the safe use and suitability of our tank cleaning products.

#### Explosion protection

Due to the occurrence of static electricity, plastic heads are not suitable for spraying combustible cleansing media in potentially explosive atmospheres.

The following table will help you compare the various characteristics of Lechler's diverse products. The basic technical data of each design family is provided here to enable quick selection of the most suitable type(s).

Series	Page	Type of rotation	Cleaning mechanism/action	Tank diameter cleaning range (Ø ft.)	Tank diameter rinsing range (Ø ft.)	Operating pressure (psi)	Flow rate range (gal./min.)	Coverage options
PicoWhirly 500 MicroWhirly 500.191, 566	26-28	Free spinning	Flat fan, solid-stream nozzles	up to 5	up to 6	0 15 30 45 60 75 90 105	3-6	
PopUp Whirly 5P2/5P3	29	Free spinning, friction bearing	Flat fan nozzles	3-5	5-7	0 15 30 45 60 75 90 105	2-12	
Hygienic Whirly 594/595	30	Free spinning, friction bearing	Flat fan nozzles	5-8	8-12	0 15 30 45 60 75 90 105	1-20	
Spray ball 540/541, 527 (3A)	31-32	No rotation, static spray	Solid stream nozzle, max. impact	5-25	8-35	0 15 30 45 60 75 90 105	4-155	
Spinner 5MC/5MI	33	Free spinning, ball bearing	Flat fan nozzle, wash-down actions	4-9	6-12	0 15 30 45 60 75 90 105	6-21	
Stainless Steel Whirly 569	34	Free spinning, ball bearing	Flat fan nozzle, washdown action	4-10	10-15	0 15 30 45 60 75 90 105	15	
Teflon Whirly 583/573 (3A) Hi-Temp Whirly 599	35-36	Free spinning, friction bearing	Solid stream nozzle, wash-down actions	4-10	10-15	0 15 30 45 60 75 90 105	18-70	
XactClean® HP 5S2/5S3	37	Controlled rotation, Internal turbine	Flat fan nozzles, high impact	10-20	15-30	0 15 30 45 60 75 90 105	3-54	
IntenseClean Hygienic 5TA/5TB	38	Gear-controlled	Solid stream, high impact	42-46	26-39	0 30 60 90 120 150 180 210	30-100	
Gyro 577	39	Free spinning, friction bearing	Flat fan nozzle, Solid stream, high impact	8-20	25-40	0 15 30 45 60 75 90 105	35-429	
Tank Cleaning Machine 5TM	40	Gear-controlled	Solid stream nozzle, max. impact	20-50	40-75	0 15 30 45 60 75 90 105	40-110	



## Orientation aid for flow-rate determination

### Flow rate guidelines

These charts can help you choose a tank cleaning nozzle based on its size and configuration. Find the closest shape and size to yours and match the color to the key at the bottom. For purposes of flow sizing, we recommend evaluation based on flow per unit of interior surface area. For most washing applications using a rotating nozzle, a flow rate of 0.1 gpm per square foot of interior surface area is sufficient. This ensures coverage with a full sheet of liquid at the least adequately washed areas of the tank.

Light rinsing with full coverage requires at least 0.04 gpm per square foot. With less than that, there will be areas where the flow can tend to pull itself into channels.

Heavier washing will require greater flows. In severe cases, it can require as much as 0.2 gpm per square foot or more.

**Static spray balls require at least 0.2 gpm per square foot (heavy wash column).**

**Tank cleaning machines, like the 5TM, should be sized using a different approach discussed on page 40. This includes the number of nozzles on the machine and the desired cycle time for a complete revolution.**

**SMALL SPRAY BALLS**  
 "Mini designs"  
 Small PVDF 500  
 Pop-up 5P2/5P3  
 Low capacity 5S2/5S3 or 594/595  
 High capacity 595  
 Low capacity 569 or 583  
 High capacity 569 or 583  
**LARGE SPRAY BALLS**  
 High capacity 5S3  
 High capacity Gyro 577/579

#### Spherical

Diameter (feet)	Interior Surface (sq. feet)	Rinse (gpm)	Regular Wash (gpm)	Heavy Wash (gpm)
3	28	1	3	6
4	50	2	5	10
5	79	4	8	16
6	113	5	11	23
7	154	7	15	31
8	201	9	20	40
9	254	11	25	51
10	314	14	31	63
12	452	20	45	90
15	707	32	71	141
20	1256	57	126	251
25	1963	88	196	393
30	2826	127	283	565
35	3847	173	385	769
40	5024	226	502	1005

#### Short Cylinder (height = diameter)

Diameter (feet)	Height (feet)	Interior Surface (sq. feet)	Rinse (gpm)	Regular Wash (gpm)	Heavy Wash (gpm)
3	3	42	2	4	8
4	4	75	3	8	15
5	5	118	5	12	24
6	6	170	8	17	34
7	7	231	10	23	46
8	8	301	14	30	60
9	9	382	17	38	76
10	10	471	21	47	94
12	12	678	31	68	136
15	15	1060	48	106	212
20	20	1884	85	188	377
25	25	2944	132	294	589
30	30	4239	191	424	848
35	35	5770	260	577	1154
40	40	7536	339	754	1507

#### Medium Cylinder (height = 1.5 x diameter)

Diameter (feet)	Height (feet)	Interior Surface (sq. feet)	Rinse (gpm)	Regular Wash (gpm)	Heavy Wash (gpm)
3	4.5	57	3	6	11
4	6.0	100	5	10	20
5	7.5	157	7	16	31
6	9.0	226	10	23	45
7	10.5	308	14	31	62
8	12.0	402	18	40	80
9	13.5	509	23	51	102
10	15.0	628	28	63	126
12	18.0	904	41	90	181
15	22.5	1413	64	141	283
20	30.0	2512	113	251	502
25	37.5	3925	177	393	785
30	45.0	5652	254	565	1130
35	52.5	7693	346	769	1539
40	60.0	10048	452	1005	2010

#### Tall Cylinder (height = 2 x diameter)

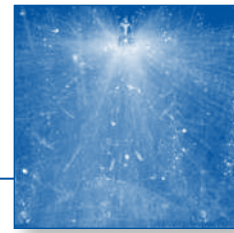
Diameter (feet)	Height (feet)	Interior Surface (sq. feet)	Rinse (gpm)	Regular Wash (gpm)	Heavy Wash (gpm)
3	6	71	3	7	14
4	8	126	6	13	25
5	10	196	9	20	39
6	12	283	13	28	57
7	14	385	17	38	77
8	16	502	23	50	100
9	18	636	29	64	127
10	20	785	35	79	157
12	24	1130	51	113	226
15	30	1766	79	177	353
20	40	3140	141	314	628
25	50	4906	221	491	981
30	60	7065	318	707	1413
35	70	9616	433	962	1923
40	80	12560	565	1256	2512







**PicoWhirly –  
for cleaning compact spaces  
Series 500**



Tank cleaning

**PicoWhirly  
series 500.234**

**Product features:**

- Unique extremely compact nozzle design
- All stainless steel Kolsterized
- Slide bearing
- Free spinning, self-lubricating, and self-flushing
- Operates in every position
- FDA Compliant (see page 24)

**Applications:**

- Kegs
- Cans
- Bottles
- Autoclaves
- Barrel washers
- Machines

**Max. tank diameter:**  
3 ft.

**Operating pressure:**  
15 – 40 psi, max. 70 psi

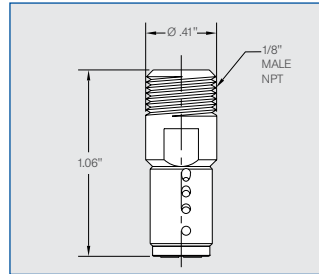
**Max. fluid temperature\*:**  
200°F



**Weight:**  
.025 lb.

**Material:**  
Kolsterized 316L stainless steel

**Bearing:**  
Sleeve bearing

**Filtration:**  
Line strainer with 50 mesh size



Spray Angle 	Ordering no.					Free Passage (in.)	Flow Rate (Gallons Per Minute)			
	Type	Connection					20 psi	liters per minute	40 psi	60 psi
		1/8" Male NPT	3/8" Male NPT	3/8" Female NPT	3/4" OD Slip-on					
300° down 	<b>500. 234. G9</b>	<b>BA</b>	-	-	-	.04	1.8	8	2.5	3.0

**Example**    **Type**    +    **Conn.**    =    **Ordering no.**  
 for ordering: 500. 234. G9    +    BA    =    500. 234. G9. BA

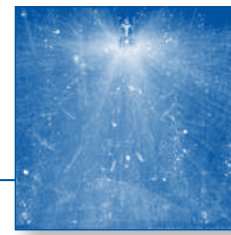
\* Contact Lechler for maximum ambient temperature.

For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.





# Miniature stainless steel rotating nozzles – compact design with powerful spray impact Series 566



**Ex** Also available with ATEX approval. Call us for details.

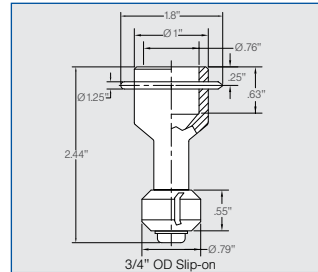
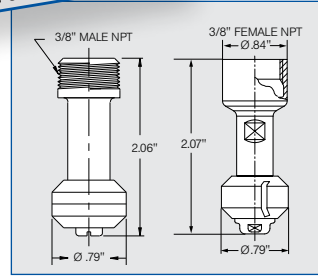
## Stainless Steel Micro Whirly series 566

### Product features:

- Very compact design
- Free spinning, self-lubricating, and self-flushing
- Operates in every position
- Suitable for use with steam
- FDA Compliant (see page 24)

### Applications:

- Kegs
- Cans
- Bottles
- Autoclaves
- Barrel washers
- Machines



**Max. tank diameter:**  
5 ft.

**Operating pressure:**  
15 – 40 psi, max. 70 psi

**Max. fluid temperature\*:**  
266°F

**Weight:**  
566 thread .1 lb.  
566 slip-on .2 lb.

**Material:**  
316L stainless steel  
PEEK

**Bearing:**  
Sleeve bearing

**Filtration:**  
Line strainer with 50 mesh size

Spray Angle	Ordering no.					Free Passage (in.)	Flow Rate (Gallons Per Minute)			
	Type	Connection					20 psi	liters per minute	40 psi	60 psi
		1/8" Male NPT	3/8" Male NPT	3/8" Female NPT	3/4" OD Slip-on					
180° up	566. 873. 1Y	-	BE	BF	TF07	.094	3.3	15	4.7	5.7
	566. 933. 1Y	-	BE	BF	TF07	.094	4.6	21	6.5	8.0
180° down	566. 874. 1Y	-	BE	BF	TF07	.094	3.3	15	4.7	5.7
	566. 934. 1Y	-	BE	BF	TF07	.094	4.6	21	6.5	8.0
360°	566. 879. 1Y	-	BE	BF	TF07	.094	3.3	15	4.7	5.7
	566. 939. 1Y	-	BE	BF	TF07	.094	4.6	21	6.5	8.0

**Please note:** We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 50 mesh size. For further information, please contact Lechler.

**Example**    **Type**        +    **Conn.**    =    **Ordering no.**  
**for ordering:** 566. 939. 1Y + BE = 566. 939. 1Y. BE

Tank cleaning

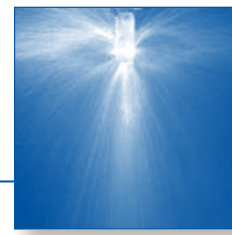
For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.







# Miniature plastic nozzles – compact design with powerful spray impact Series 500



Tank cleaning

## PVDF Micro Whirly series 500.191

### Product features:

- Good corrosion resistance
- Very compact design
- Free spinning, self-lubricating, and self-flushing
- Operates in every position
- Fits 1/2" NPT connections
- FDA Compliant (see page 24)

### Applications:

- Kegs
- Cans
- Bottles
- Autoclaves
- Barrel washers
- Machines

**Max. tank diameter:** 5 ft.

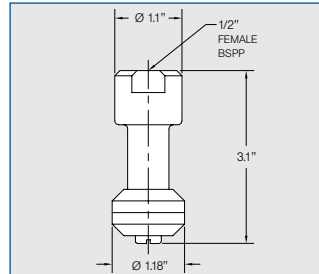
**Operating pressure:**  
15 – 30 psi, max. 70 psi

**Max. fluid temperature:**  
190°F

**Weight:** .06 lb.

**Material:** PVDF

**Bearing:** Sleeve bearing



**Filtration:** Line strainer with 50 mesh size

Spray Angle	Ordering no.	Free Passage (in.)	Material	Connection	Flow Rate (Gallons Per Minute)			
					20 psi	liters per minute	40 psi	60 psi
180° up 	<b>500. 191. 5E. 02</b>	.086	PVDF	1/2" Female BSPP	2.9	13	4.0	4.9
180° down 	<b>500. 191. 5E. 01</b>	.086	PVDF	1/2" Female BSPP	2.9	13	4.0	4.9
360° 	<b>500. 191. 5E. 00</b>	.086	PVDF	1/2" Female BSPP	4.4	20	6.2	7.6

## Plastic Mini Whirly series 500.186

### Product features:

- Good corrosion resistance
- Very compact design
- Free spinning, self-lubricating, and self-flushing
- Operates in every position
- Fits 1/2" NPT connections
- FDA Compliant (see page 24)

### Applications:

- Kegs
- Cans
- Bottles
- Autoclaves
- Barrel washers
- Machines

**Max. tank diameter:** 5 ft.

**Operating pressure:**  
15 – 30 psi, max. 70 psi

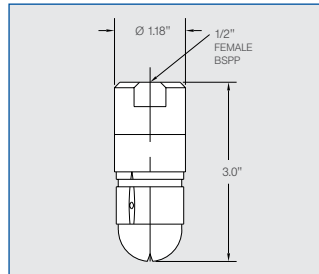
**Max. fluid temperature:**  
120°F

**Weight:** .15 lb.

**Material:** PVDF or POM, 316 stainless steel

**Bearing:** Ball bearing

**Filtration:** Line strainer with



50 mesh size

Spray Angle	Ordering no.	Free Passage (in.)	Material	Connection	Flow Rate (Gallons Per Minute)			
					20 psi	liters per minute	40 psi	60 psi
300° down 	<b>500. 186. 56. AH</b> <b>500. 186. 5D. AH</b>	.075 .075	POM PVDF	1/2" Female BSPP	4.0	18	5.6	6.8

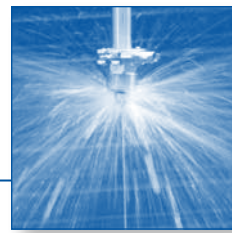
**For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.**

**Please note:** We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 50 mesh size. For further information, please contact Lechler.





# Rotating pop-up nozzles — “PopUp Whirly” Series 5P2 / 5P3



## PopUp Whirly series 5P2 / 5P3

With minimal liquid pressure, this nozzle pops up and rotates to clean. Can be installed in container wall or used when installation conditions are difficult due to presence of agitators, baffles, etc. Appropriate for CIP when nozzle cannot remain in container during production.

### Product features:

- For installation in the tank wall
  - Suitable for cleaning with foam
  - Self rotating
  - FDA Compliant
- (see page 24)

### Applications:

- For cleaning and rinsing of small tanks, containers or duct work
- Where nozzle cannot remain in container during production
- Hard-to-reach areas in a vessel

### 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

### Max. fluid temperature:

284°F

### Weight:

5P2 series approx. .66 lb.  
5P3 series approx. 1.21 lb.

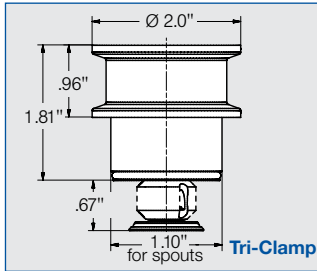
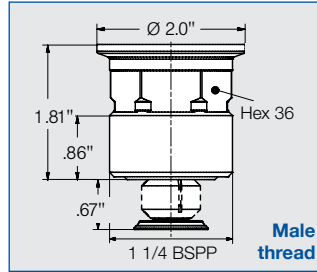
### Bearing:

Sleeve bearing made of PEEK

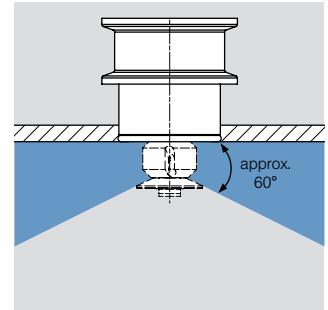
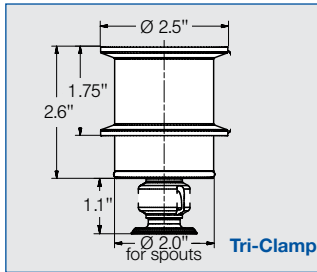
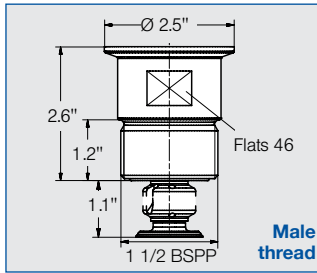
### Filtration:

Line strainer with 50 mesh size

**5P2**

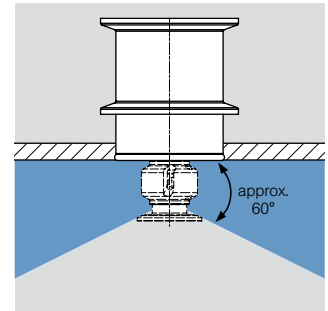


**5P3**



### Material:

316L stainless steel, spring made of 301 stainless steel, PEEK, O-ring made of EPDM



### Material:

316L stainless steel, spring made of 301 stainless steel, PEEK, O-ring made of FPM

**For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.**

Spray angle	Ordering no.	Tank connection			Free Passage (in.)	Flow Rate (Gallons Per Minute)			Max. tank diameter [ft]
		1 1/4" Male BSPP	1 1/2" Male BSPP	Tri Clamp		15 psi	liters per minute	40 psi	
	<b>5P2. 873. 1Y. AP</b>	○	-	-	.04	2.8	15.0	5	2.6
	<b>5P2. 873. 1Y. 00</b>	-	-	○	.04	2.8	15.0	5	2.6
	<b>5P2. 923. 1Y. AP</b>	○	-	-	.04	3.7	20.0	6	3.3
	<b>5P2. 923. 1Y. 00</b>	-	-	○	.04	3.7	20.0	6	3.3
	<b>5P3. 043. 1Y. AR</b>	-	○	-	.05	7.5	15.0	12	7.2
	<b>5P3. 043. 1Y. 00</b>	-	-	○	.05	7.5	15.0	12	7.2



# Hygienic Whirly — designed to clean with foam Series 594 / 595



Tank cleaning

## Series 594 / 595

The hygienic Whirly is specifically designed for both (1) cleaning with foam from a mixture of liquid detergent and water and (2) sterilizing with steam. Optionally available as part of a fabricated lance containing two Hygienic Whirlies for even greater coverage.

### Product features:

- Low water and detergent consumption
- Optimum cleaning efficiency due to slow rotation
- Sprays steam for sterilizing purposes
- Operates in any position
- FDA Compliant (see page 24)

### Applications:

For cleaning of:

- Tanks with liquids and/or with foam from detergent/water mixtures
- Bottling machines, especially for cold aseptic filling

### Max. tank diameter:

5 feet  
Type 595.139.1Y up to 8 feet

### Operating pressure:

10-45 psi

### Max. fluid temperature\*:

212°F; short-term up to 280°F

### Weight:

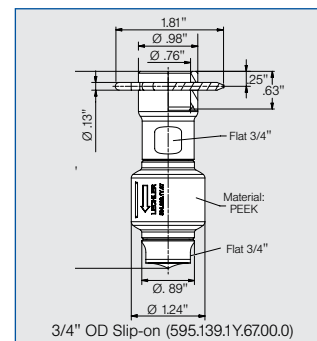
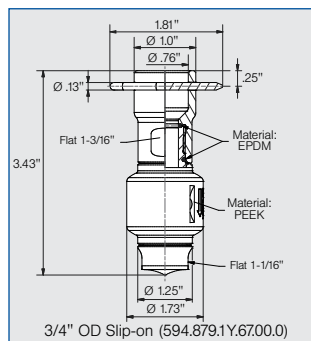
594 .4 lb.  
595 .6 lb.

### Material:

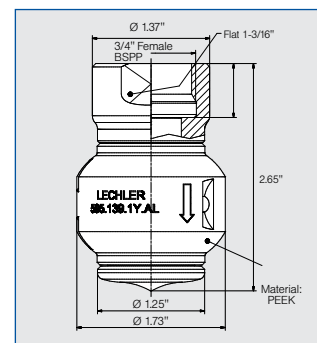
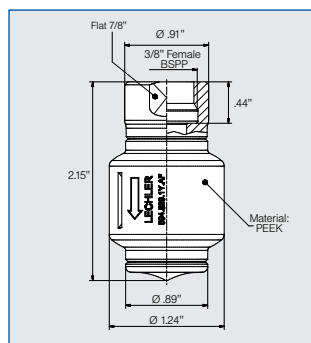
316L stainless steel  
PEEK  
EHEDG-version:  
O-ring made of EPDM  
R-Clip made of 316L stainless steel included with the tube slip-on. For reordering: 095.022.1Y.50.94.E

\* Contact Lechler for maximum ambient temperature.

## EHEDG-version



## Standard version



Spray Angle	Ordering no.				Free Passage (in.)	Flow Rate (Gallons Per Minute)				
	Type	Connection				7 psi	15 psi	liters per minute 2 bar	30 psi	40 psi
360°		3/8" Female BSPP**	3/4" Female BSPP**	3/4" OD Slip-on (EHEDG)						
	594. 829. 1Y	AF	-	67	.067	1.6	2.1	11	2.9	3.4
	594. 879. 1Y	AF	-	67	.098	2.1	2.9	15	4.0	4.5
	595. 009. 1Y	AF	-	67	.157	4.2	5.8	32	8.4	9.7
	595. 049. 1Y	AF	-	67	.165	5.3	7.4	40	10.6	12.2
	595. 139. 1Y	-	AL	67	.197	9.0	12.4	67	17.7	20.3

\*\* NPT on request.

**Please note:** To protect the products' inner workings, we suggest use of a line strainer with a 50 mesh size. For further information, please contact Lechler.

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.

### Bearing:

Sleeve bearing

### Filtration:

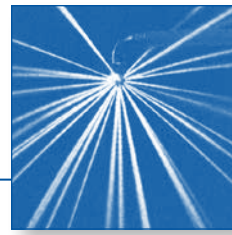
Line strainer with 50 mesh size

For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.





# Static Spray Balls – for rinsing or producing steam Series 540 / 541



## Series 540 / 541

This nozzle is a very compact static spray ball. As it produces sharp solid jets, it is excellent for rinsing small drums.

### Product features:

- For use with air or saturated steam
- Partial coverage (240°)

### Applications:

- Small kegs
- Drums
- Barrel washers
- Totes
- Carboys

### Max. tank diameter:

Rinsing: 10 ft.  
Cleaning: 5 ft.

### Operating pressure:

15 – 45 psi, max. 150 psi

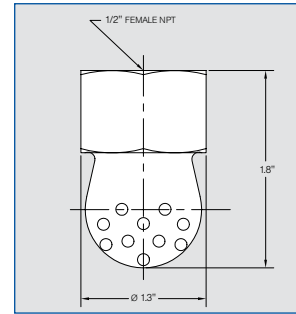
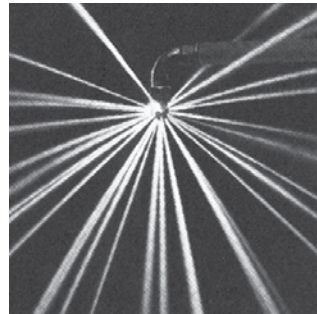
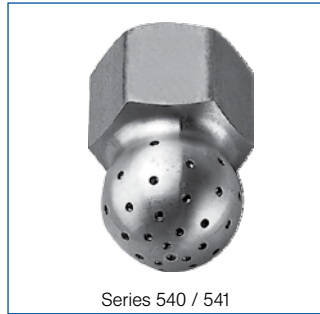
### Max. fluid temperature:


400°F

**Weight:** .20 lb.

**Material:** 303 stainless steel

**Filtration:** Line strainer with 50 mesh size



Spray Angle	Ordering no.	Free Passage (in.)	Connection Female NPT	Flow Rate (Gallons Per Minute)				Length (in.)	Maximum Width (in.)
				20 psi	liters per minute 2 bar	40 psi	60 psi		
240° down 	<b>540. 909. 16. BH</b>	.031	1/2"	4.0	18	5.6	6.8	1.8	1.3
	<b>540. 989. 16. BH</b>	.039	1/2"	6.1	28	8.7	10.6	1.8	1.3
	<b>541. 109. 16. BH</b>	.059	1/2"	13	57	18	22	1.8	1.3
	<b>541. 189. 16. BH</b>	.079	1/2"	20	90	28	34	1.8	1.3
	<b>541. 239. 16. BH</b>	.090	1/2"	26	118	37	45	1.8	1.3

**Please note:** To protect against clogging, we suggest use of a line strainer with an appropriate line strainer sized to trap particles larger than the free passage. For further information, please contact Lechler.

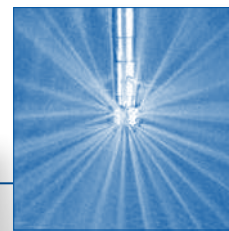
**For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.**

Tank cleaning





# Static Spray Balls – for sanitary CIP applications Series 527



**3-A<sup>®</sup>**  
78-03  
Fulfills the hygienic requirements of 3-A\*.

## Series 527

For critical sanitary applications Lechler provides these specially designed spray balls:

### Product features:

- Meets the requirements of 3A standards
- Very fine surface finish inside and outside
- All mount using slip-on fittings and pins
- For use with air or saturated steam
- FDA Compliant (see page 24)

### Applications:

- For sanitary environments, e.g., dairies, pharmaceutical processing, food and beverage manufacturing, high purity chemicals

### Max. tank diameter:

- 3/4" inlet 17 ft.
- 1-1/2" inlet 20 ft.
- 2" inlet 27 ft.

### Operating pressure:

15 – 45 psi, max. 75 psi

### Max. fluid temperature:

400°F

### Weight:

- 3/4" inlet .11 lb.
- 1-1/2" inlet .52 lb.
- 2" inlet 1.43 lb.

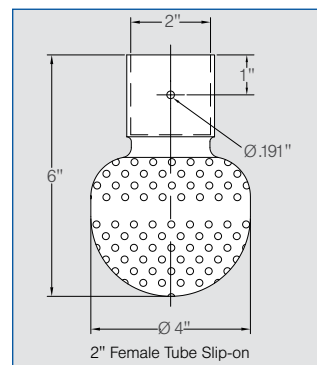
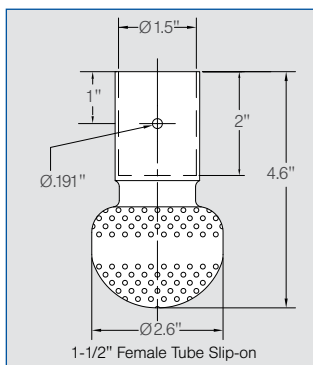
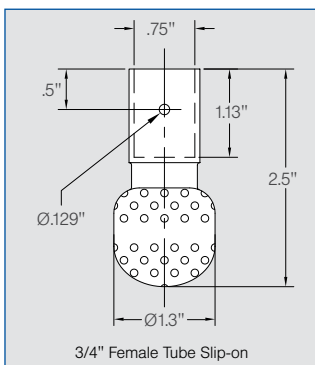
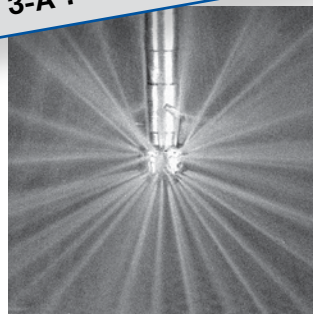
### Material:

316L stainless steel

### Filtration:

- 3/4" – Line strainer with 50 mesh size
- 1-1/2" – Line strainer with 50 mesh size
- 2" – Line strainer with 30 mesh size

**Note:** There are no threaded inlets available.



Spray Angle	Ordering no.	Free Passage (in.)	Connection	Flow Rate (Gallons Per Minute)					Length (in.)	Max. Width (in.)
				liters per minute						
360°	527. 209. 1Y. 00. 75	.031	3/4"	20 psi	25 psi	2 bar	40 psi	60 psi	2.5	1.3
				527. 289. 1Y. 01. 50	.043	1-1/2"	36	40		
527. 449. 1Y. 02. 00	.067	2"	89	100	420	127	155	6.0	4.0	

The 3/4" spray ball has a minimum orifice size of .033".  
The 1-1/2" spray ball has a minimum free passage size of .045".  
The 2" spray ball has a minimum free passage size of .068".

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.

\* This product has been authorized to use the 3-A<sup>®</sup> Symbol by the 3-A<sup>®</sup> Sanitary Symbol Council Administrative Council for Spray Cleaning Devices (78-01).

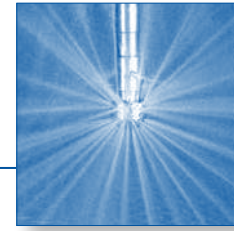
For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.







# 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.

### Product features:

- Very fine surface finish inside and outside
- For use with air or saturated steam
- FDA Compliant

### Applications:

- For sanitary environments, e.g. pharmaceutical processing, food and beverage manufacturing, high purity chemicals

### Max. tank diameter:

1/8" inlet	7 ft.
1/2" inlet	11 ft.
1" inlet	17 ft.
2" inlet	18 ft.

### Operating pressure:

30 psi

### Max. fluid temperature:

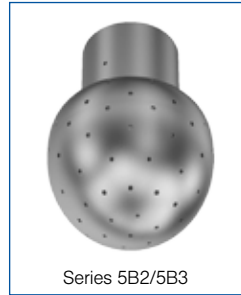
392°F

### Weight:

3/4" inlet	.11 lb.
1-1/2" inlet	.52 lb.
2" inlet	1.43 lb.

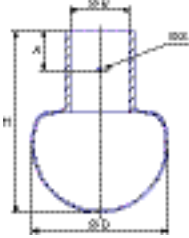
### Material:

316L stainless steel



Series 5B2/5B3

### Slip-on connection



Dimensions slip-on connection according to DIN 10357

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

### Slip-on information

- R-clip made of 316/316L SS is included.
- Ordering no.: See table on page 3
- Depending on diameter of adapter, the flow rate can increase due to leakage between connecting pipe and static spray ball.

R-clip	Ordering no.
1	095.013.17.06.02.0
2	095.013.17.06.03.0
3	095.013.17.06.04.0
4	095.013.17.06.05.0
5	095.013.17.06.06.0

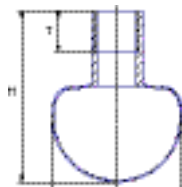
### Slip-on connection according to DIN EN 10357 series D (ASME BPE 1997, OD tube compatible)

Spray angle	Ordering no. Type	E Ø [in]	Flow Rate (Gallons per minute)				Dimensions [in]					Max. tank diameter [ft]
			20 psi	40 psi	liters per minute 2 bar	60 psi	Ø D	Height H	Con-nection B	Dis-tance to bore hole A	R-clip	
360°	<b>5B3.089.1Y.A1.00.0</b>	.04	10.9	15.5	50	10.9	1.10	1.65	0.39	.35	1	7
	<b>5B3.209.1Y.A1.90.0</b>	.06	22.0	31.0	100	22.0	1.10	1.65	0.76	.35	2	8
	<b>5B3.309.1Y.A1.90.0</b>	.07	39.4	55.8	180	39.6	2.52	3.31	0.76	.71	2	11
	<b>5B3.379.1Y.A2.60.0</b>	.08	57.1	80.7	260	56.9	2.52	3.31	1.01	.71	3	17
	<b>5B3.449.1Y.A3.80.0</b>	.12	89.9	127.2	410	89.9	2.52	3.31	1.51	.71	4	18
	<b>5B3.539.1Y.A5.10.0</b>	.13	147.0	207.8	670	147.0	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.

### Threaded connection



Threaded connection

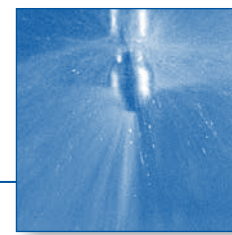
Spray angle	Ordering no. Type	Con-nection NPT	E Ø [in]	Flow Rate (Gallons per minute)				Dimensions [in]			Max. tank diameter [ft]
				20 psi	40 psi	liters per minute 2 bar	60 psi	Ø D	Height H	Screw-in length T	
360°	<b>5B2.879.1Y.BA.00.0</b>	1/8 A	.03	3.4	4.7	15	5.6	.79	1.5	.31	7
	<b>5B3.309.1Y.BH.00.0</b>	1/2"	.07	39.4	55.8	180	68.6	2.5	3.3	.55	11
	<b>5B3.379.1Y.BN.00.0</b>	1"	.08	57.1	80.7	260	98.7	2.5	3.3	.71	17
	<b>5B3.539.1Y.BW.00.0</b>	2"	.12	147.0	207.8	670	254.7	3.5	4.4	.94	18





# Spinners – thin profiles for small openings Series 5MC / 5MI

**ATEX version on request**



Tank cleaning

## Series 5MC / 5MI

When small tank openings restrict the size of the nozzle, the Spinner series offers high flow rates with a thin profile that will slip into tight spuds.

### Product features:

- High flow slot orifices produce big sprays from a small head
- Head balanced for minimum vibration
- Operates in any position
- Free spinning, self-lubricating, and self-flushing
- FDA Compliant (see page 24)

### Applications:

- Barrel washing
- For small and medium processing tanks
- CNC machining centers

### Max. tank diameter:

- Micro rinsing: 6 ft.
- Micro cleaning: 4 ft.
- Mini rinsing: 12 ft.
- Mini cleaning: 9 ft.

### Operating pressure:

15 – 30 psi, max. 60 psi

### Max. fluid temperature\*:

200°F

### Weight:

Micro: .15 lb. Mini: .68 lb.

### Materials:

316L stainless steel  
440C stainless steel  
R-Clip made of 316L stainless steel included. For reordering: 095.022.1Y,50.60 (5MI)  
095.013.1E,05.59 (5MC)

### Bearing:

Double ball bearing

### Filtration:

Line strainer with 170 mesh size

### Materials

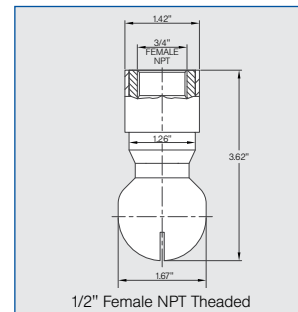
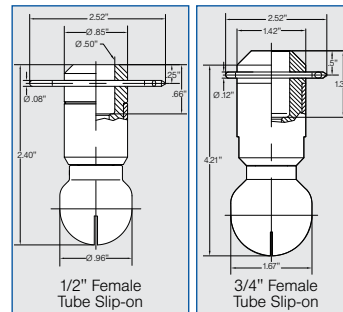
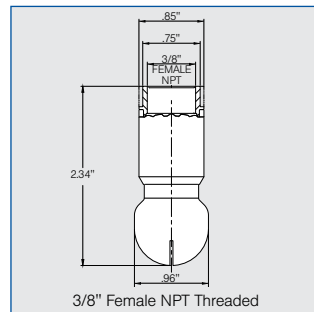
#### (5MI with narrower profile):

316L stainless steel  
302 stainless steel

### Bearing:

Contact ball bearings

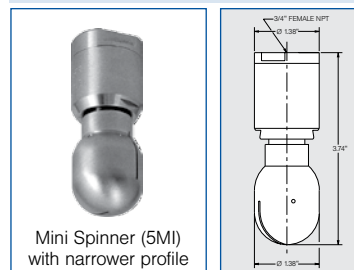
\* Contact Lechler for maximum ambient temperature. We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 170 mesh size.



Spray Angle	Type	Ordering no.					Free Passage (in.)	Flow Rate (Gallons Per Minute)					
		Connection						10 psi	20 psi	liters per minute		40 psi	60 psi
		3/8" Female NPT	1/2" Female NPT	3/4" Female NPT	1/2" OD Slip-on	3/4" OD Slip-on				2 bar	40 psi		
60° down	5MC. 042. 1Y	BF	-	-	TF05	-	.118	6.2	8.8	40	12.4	15.2	
180° down	5MC. 004. 1Y	BF	-	-	TF05	-	.031	5.0	7.0	32	9.9	12.2	
360°	5MC. 049. 1Y	BF	-	-	TF05	-	.035	6.1	8.6	39	12.1	14.8	
60° down	5MI. 162. 1Y	-	BH	-	TF07	-	.102	9.8	13.8	63	20	24	
180° up	5MI. 113. 1Y	-	-	BL	-	TF07	.039	10.4	14.7	67	21	25	
180° down	5MI. 114. 1Y	-	-	BL	-	TF07	.039	10.4	14.7	67	21	25	
360°	5MI. 054. 1Y	-	-	BL	-	TF07	.019	4.7	6.6	30	9.3	11.4	
	5MI. 074. 1Y	-	-	BL	-	TF07	.023	7.6	10.8	49	15.2	18.6	
	5MI. 014. 1Y	-	-	BL	-	TF07	.035	10.7	15.1	69	21	26	

**Example for ordering:** 5MC. 004. 1Y. + BF = 5MC. 004. 1Y. BF

**Please note:** 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.

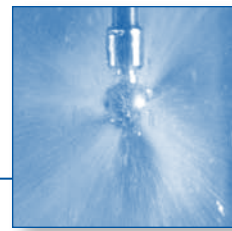


Spray Angle	Ordering no.	Free Passage (in.)	Conn. Female NPT	Flow Rate (Gallons Per Minute)			
				20 psi	2 bar	40 psi	60 psi
360°	5MI. 089. 17. BL	.038	3/4"	11	49	15	19
	5MI. 139. 17. BL	.059	3/4"	15	69	21	26





# Stainless Steel Whirly – the versatile standard solution Series 569



## Series 569

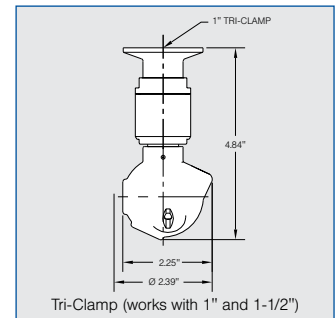
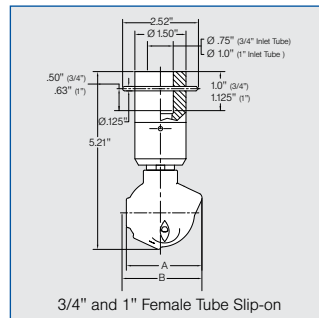
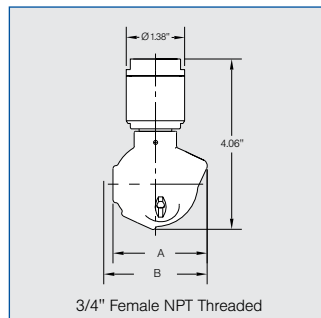
The time-tested design of the Lechler Whirly nozzle now has been made even better:

### Product features:

- Flat jet nozzles with improved vertical coverage
- Better balance for smoother operation
- Fits through smaller openings (569.106.1Y.BL fits through 1.8" opening)
- Slip-on or Tri-Clamp thread connection available
- Free spinning, self-lubricating, and self-flushing
- FDA Compliant (see page 24)

### Applications:

- For cleaning small and medium-sized tanks, e.g., in chemical, beverage, food industries



### Max. tank diameter:

Rinsing: 15 ft.  
Cleaning: 10 ft.

### Operating pressure:

15 – 40 psi, max. 80 psi

### Max. fluid temperature\*:

200°F

### Weight:

Threaded 1.1 lb.  
Slip-on 1.6 lb.  
Tri-Clamp 1.3 lb.

### Material:

316L stainless steel  
PEEK and Rulon 641  
R-Clip made of 316L stainless steel included with the tube slip-on. For reordering: 095.022.1Y.50.60.E

### Bearing:

Double ball bearing

### Filtration:

Line strainer with 170 mesh size

Spray Angle	Type	Ordering no.					Free Passage (in.)	Flow Rate (Gallons Per Minute)				Dim. A (in.)	Dim. B (in.)
		Connection						20 psi	liters per minute 2 bar	40 psi	60 psi		
		3/4" Female NPT	3/4" OD Slip-on	1" OD Slip-on	1 1/2" OD Slip-on	Tri-Clamp							
270° up	569. 055. 1Y	BL	TF07	TF10	TF15	10	.141	11	48	15	18	2.25	2.39
	569. 135. 1Y	BL	TF07	TF10	TF15	10	.189	16	71	22	27	2.25	2.39
	569. 195. 1Y	BL	TF07	TF10	TF15	10	.220	21	97	30	37	2.25	2.39
270° down	569. 056. 1Y	BL	TF07	TF10	TF15	10	.141	11	48	15	18	2.25	2.39
	569. 106. 1Y	BL	TF07	TF10	TF15	10	.189	13	58	18	22	1.78	1.78
360°	569. 059. 1Y	BL	TF07	TF10	TF15	10	.126	11	48	15	18	2.25	2.39
	569. 139. 1Y	BL	TF07	TF10	TF15	10	.141	16	71	22	27	2.25	2.39
	569. 199. 1Y	BL	TF07	TF10	TF15	10	.189	21	97	30	37	2.25	2.39
	569. 279. 1Y	BL	TF07	TF10	TF15	10	.280	32	145	45	55	2.25	2.39

Stainless Steel Whirlies in 180° versions available upon request.

**Please note:** We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 170 mesh size. For further information, please contact Lechler.

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.

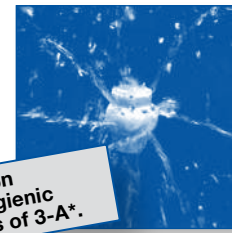
<b>Example</b>	<b>Type</b>	<b>+</b>	<b>Conn.</b>	<b>=</b>	<b>Ordering no.</b>
<b>for ordering:</b>	<b>569. 055. 1Y.</b>	<b>+</b>	<b>BL</b>	<b>=</b>	<b>569. 055. 1Y. BL</b>

**ATEX version on request**

For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.



# PTFE Whirly – especially designed for sanitary requirements Series 583 / 573



**3** Slip-on version fulfills the hygienic requirements of 3-A\*.

## Series 583 / 573

### Product features:

- Corrosion resistance
- Lightweight
- Balanced rotating action
- Operates in every position
- 3/4" size fits through a 2" opening
- Slip-on version design meets 3A standards
- Smooth surface finish
- Free spinning, self-lubricating, and self-flushing
- FDA Compliant (see page 24)

### Applications:

- For rinsing of small and medium-sized vessels, e.g. in the dairy, chemical, pharmaceutical or food industries

### Max. tank diameter:

Rinsing: 18 ft.  
Cleaning: 10 ft.

### Operating pressure:

20 – 40 psi, max. 90 psi

### Max. fluid temperature\*\*:

200°F

### Weight:

3/4" .32 lb.  
1" .68 lb.

### Material:

PTFE  
R-Clip made of 316L stainless steel included with the tube slip-on. For reordering: 095.022.1Y.50.88.E (3/4") 095.022.1Y.50.60.E (1")

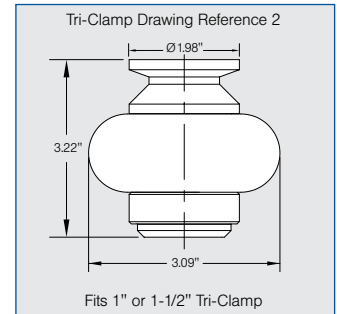
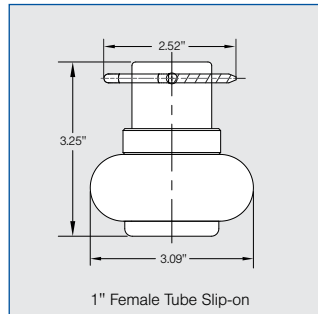
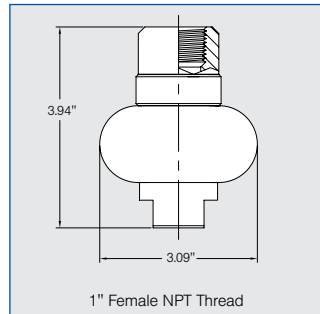
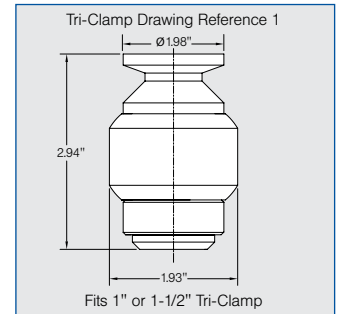
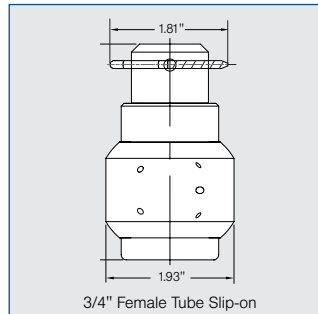
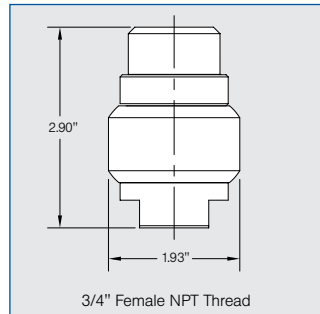
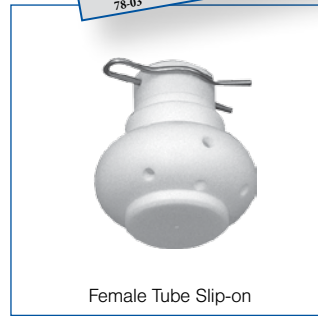
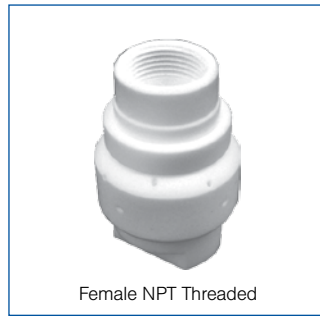
**Bearing:** Sleeve bearing

### Filtration:

Line strainer with 50 mesh size

**Please note:** We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 50 mesh size. For further information, please contact Lechler.

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.



Spray Angle	Ordering no.						Eye Passage (in.)	Flow Rate (Gallons Per Minute)				Tri-Clamp Drawing Reference
	Type	Connection						liters per minute				
		3/4" Female NPT	1" Female NPT	Sanitary Pin 3/4" Slip-on	1" Slip-on	1 1/2" Tri-Clamp		20 psi	2 bar	40 psi	60 psi	
270° up	583. 116. 55	BL	-	TF07	-	15	.081	16	67	21	25	1
	583. 266. 55	BL	-	TF07	-	15	.133	32	145	45	55	1
270° down	573. 266. 55	BL	-	TF07	-	15	.133	32	145	45	55	1
360°	583. 119. 55	BL	-	TF07	-	15	.056	13	58	18	22	1
	583. 209. 55	BL	-	TF07	-	15	.136	22	100	31	38	1
	583. 269. 55	BL	-	TF07	-	15	.187	32	145	45	55	1
	583. 279. 55	-	BN	-	TF10	15	.146	33	150	47	58	2
	583. 349. 55	-	BN	-	TF10	15	.219	50	226	70	86	2

**Example** Type + Conn. = Ordering no.  
**for ordering:** 583. 266. 55. + BL = 583. 266. 55. BL

\* The slip-on version has been authorized to use the 3-A® Symbol by the 3-A® Sanitary Symbol Council Administrative Council for Spray Cleaning Devices (78-01). See page 24.

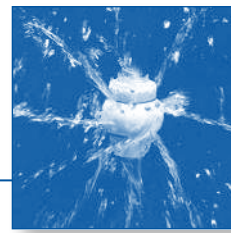
\*\* Contact Lechler for maximum ambient temperature.

For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.





# PTFE Hi Temp Whirly – solution for high temperature cleaning 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.

### Product features:

- Balanced rotating action
- Operates in every position
- Free spinning, self-lubricating, and self-flushing
- Withstands repeated high temperature cycles
- Suitable for low pressure steam; slip-on sanitary model has been tested with steam up to 30 psig @ 274°F.
- FDA Compliant (see page 24)

### Applications:

- For small and medium-sized vessels and reactors in higher temperature processing environments
- Corrosive environments

### Max. tank diameter:

Rinsing: 18 ft.  
Cleaning: 10 ft.

### Operating pressure:

15 – 40 psi, max. 90 psi

### Max. fluid temperature:

274°F

### Weight:

3/4" .36 lb.

### Materials:

PTFE  
Rings: Hastelloy® C-276  
R-clip made of Hastelloy® C-276 included with the tube slip on. For reordering: 095.022.24.50.94.1

**Bearing:** Sleeve bearing

### Filtration:

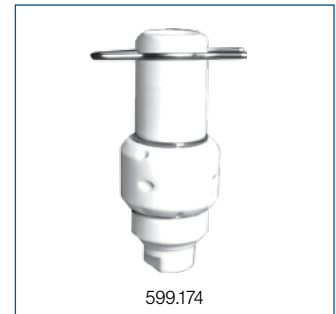
Line strainer with 50 mesh size



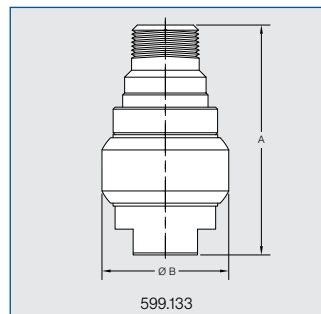
599.133



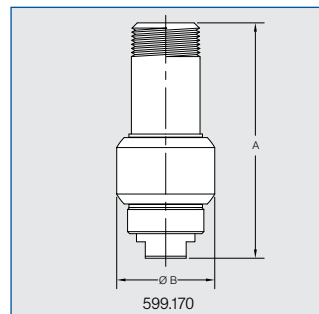
599.170



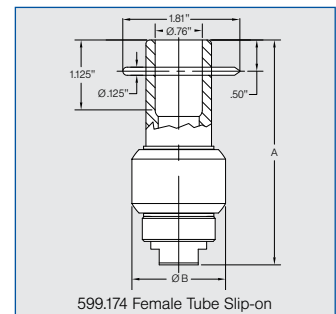
599.174



599.133



599.170



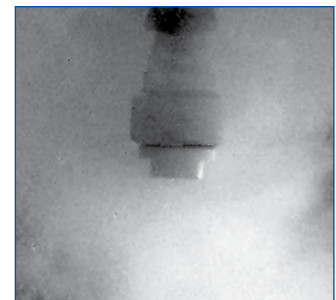
599.174 Female Tube Slip-on

Spray Angle	Ordering no.			Free Passage (in.)	Flow Rate (Gallons Per Minute)				Length A (in.)	Width B (in.)	Weight (lb.)
	Type	Connection			20 psi	2 bar	40 psi	60 psi			
360°	599. 133. 55	BK	-	.063	22	100	31	38	3.5	2.0	.35
	599. 170. 55	BK	-	.063	19	84	26	32	3.6	1.5	.25
	599. 174. J7	-	TF07	.063	19	84	26	32	3.6	1.5	.25

**Please note:** We do not recommend operation of these products with compressed air or gases. However, these products have been shown to be suitable for spraying 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. 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.

**Example**    **Type**        +    **Conn.**    =    **Ordering no.**  
**for ordering:** 599. 170. 55.    +    **BK**        =    **599. 170. 55. BK**

Hastelloy® is a registered trademark of Haynes International Inc.



PTFE Whirly spraying steam

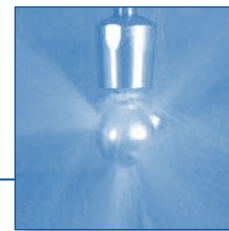
Tank cleaning

For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.





# ACCUClean – the efficient way to clean Series 515



## Series 515

The design of the ACCUClean combines more efficient cleaning technology in an economical package.

### Product features:

- Controlled rotation for maximum spray impact
- Optimized drive mechanism
- Special nozzle geometry for sharp sprays
- Excellent vertical coverage
- Self-lubricating and self-flushing
- Long-life bearing

### Applications:

- Difficult soils or baked-on substances
- For medium tanks, such as chemical or pharmaceutical processing

### Max. tank diameter:

Inlet Size	Activity	Tank Diam.
3/4"	Rinsing	15 ft.
3/4"	Cleaning	10 ft.
1"	Rinsing	18 ft.
1"	Cleaning	12 ft.

### Operating pressure:

20 – 75 psi

### Max. fluid temperature\*:

200°F

### Weight:

3/4"	3.1 lb.
1"	3.1 lb.

### Material:

316L stainless steel  
PEEK

### Bearing:

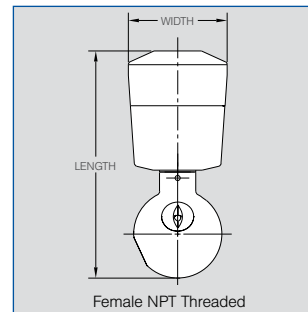
Ball bearing

### Filtration:

Line strainer with 50 mesh size

### Rotation monitoring sensor:

This series is qualified for rotation monitoring with the Lechler sensor. Please see page 42 for more information.



Spray Angle 	Ordering no.			Free Passage (in.)	Flow Rate (Gallons Per Minute)				Length (in.)	Max. Width (in.)
	Type	Connection			20 psi	2 bar liters per minute	40 psi	60 psi		
		3/4" Female NPT	1" Female NPT							
360° 	<b>515. 219. 7T</b>	<b>BL</b>	-	.039	21	97	30	37	6.7	3.4
	<b>515. 289. 7T</b>	<b>BL</b>	-	.039	32	145	45	55	6.7	3.4
	<b>515. 339. 7T</b>	-	<b>BN</b>	.039	42	193	60	73	10.5	5.5

Contact Lechler for other spray angles available.

**Please note:** We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 50 mesh size. For further information, please contact Lechler.

**Example**    **Type**        +    **Conn.**    =    **Ordering no.**  
**for ordering:**    **515. 219. 7T**    +    **BL**        =    **515. 219. 7T. BL**

\* Contact Lechler for maximum ambient temperature.

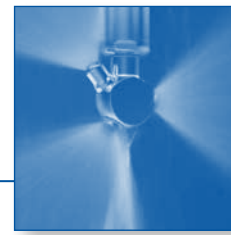
For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.







# XactClean® HP – solution for high impact cleaning Series 5S2 / 5S3



## Series 5S2 / 5S3

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

### Product features:

- Controlled rotation
- Powerful flat jet nozzles
- Very efficient tank cleaning nozzle
- FDA Compliant (see page 24)

### Materials:

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

### Max. temperature:

203°F/ 95°C

### Max. tank dimension:

11.5-26 ft.

### Recommended

### operating pressure:

75 psi

### Installation:

Operation in every direction is possible

### Filtration:

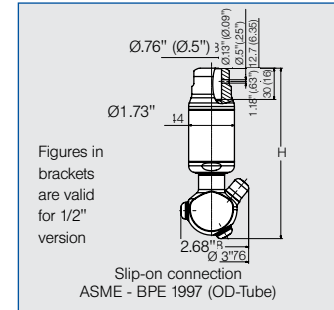
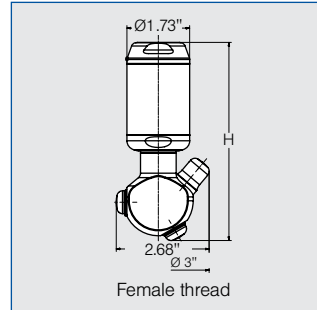
Line strainer with a mesh size of 0.3 mm/50 mesh

### Bearing:

Double ball bearing

### Rotation monitoring sensor:

Sensor compatible,  
Info: see page 42



### Nozzle dimensions [in]

Connection	H
<b>BF</b>	5.83
<b>BH</b>	5.87
<b>BL</b>	5.47
<b>BN</b>	5.47
<b>TF05</b>	5.91
<b>TF07</b>	6.46

**ATEX version on request**

Spray angle	Type	Ordering no.						Free Passage (in.)	Flow Rate (Gallons Per Minute)				
		Connection							2 bar	30 psi	40 psi	75 psi	145 psi
		3/8" Female NPT	1/2" Female NPT	3/4" Female NPT	1" Female NPT	1/2" OD Slip-on	3/4" OD Slip-on						
270°	5S2. 955. 1Y	BF	BH	-	-	TF05	-	.08	25	6.6	7.8	10.6	15.1
	5S3. 055. 1Y	-	BH	-	-	TF05	-	.08	41	10.8	12.8	17.2	24.3
	5S3. 115. 1Y	-	BH	BL	-	-	TF07	.08	60	15.9	18.4	24.8	35.1
	5S3. 185. 1Y	-	-	BL	-	-	TF07	.08	89	23.5	27.7	37.3	52.6
	5S3. 235. 1Y	-	-	BL	-	-	TF07	.08	111	29.3	34.3	46.2	65.5
	5S3. 265. 1Y	-	-	BL	BN	-	TF07	.08	135	35.7	41.8	56.3	79.5
270°	5S2. 956. 1Y	BF	BH	-	-	TF05	-	.08	25	6.6	7.8	10.6	15.1
	5S3. 056. 1Y	-	BH	-	-	TF05	-	.08	41	10.8	12.8	17.2	24.3
	5S3. 116. 1Y	-	BH	BL	-	-	TF07	.08	60	15.9	18.4	24.8	35.1
	5S3. 186. 1Y	-	-	BL	-	-	TF07	.08	89	23.5	27.7	37.3	52.6
	5S3. 236. 1Y	-	-	BL	-	-	TF07	.08	111	29.3	34.3	46.2	65.5
	5S3. 266. 1Y	-	-	BL	BN	-	TF07	.08	135	35.7	41.8	56.3	79.5
360°	5S2. 959. 1Y	BF	BH	-	-	TF05	-	.07	25	6.6	7.8	10.6	15.1
	5S3. 059. 1Y	-	BH	-	-	TF05	-	.08	41	10.8	12.8	17.2	24.3
	5S3. 119. 1Y	-	BH	BL	-	-	TF07	.08	60	15.9	18.4	24.8	35.1
	5S3. 189. 1Y	-	-	BL	-	-	TF07	.08	89	23.5	27.7	37.3	52.6
	5S3. 239. 1Y	-	-	BL	-	-	TF07	.08	111	29.3	34.3	46.2	65.5
	5S3. 269. 1Y	-	-	BL	BN	-	TF07	.08	135	35.7	41.8	56.3	79.5

<b>Example</b>	<b>Type</b>	<b>+</b>	<b>Conn.</b>	<b>=</b>	<b>Ordering no.</b>
<b>for ordering:</b>	<b>5S2. 956. 1Y</b>	<b>+</b>	<b>BF</b>	<b>=</b>	<b>5S2. 956. 1Y. BF</b>

For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.

**Please note:** We do not recommend operation of these products with compressed air. In order to protect the bearing, a line strainer with a 50 mesh size should be used. Operation without a line strainer may result in damage to the nozzle. For further information, please contact Lechler.

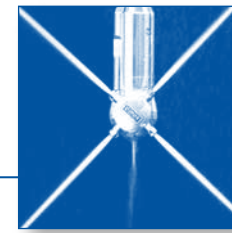
The nozzles with a slip-on connection type fitting may have a higher flow rate than listed due to the self-flushing design around the customer's tube which is inserted into the nozzle socket.

Tank cleaning





# High impact tank cleaning machine "IntenseClean Hygienic" Series 5TA / 5TB



## 5TA

### Product features:

- Gear-controlled
- Particularly powerful solid jets
- Two different sizes for a variety of container sizes
- Operating pressures up to 362 psi possible
- FDA Compliant (see page 24)

### Applications:

For cleaning of:

- Systems
- Machines
- Tankers
- Large tanks

### Max. tank diameter:

See table

### Operating pressure:

29 - 145 psi

### Temperature:

203°F, 266°F (Environment)

### Weight:

5TA approx. 2 lb.

5TB approx. 8.8 lb.

### Materials:

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

### Bearing:

Ball bearing

### Required prefiltration:

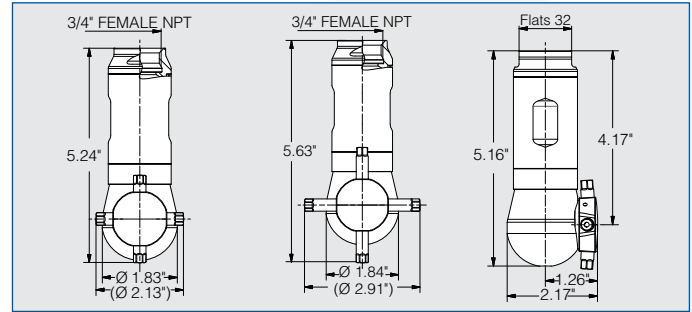
Line filter with 0.2 mm/ 80 mesh

### Installation:

Operation in every direction is possible

### Rotation monitoring sensor:

This series is qualified for rotation monitoring with the Lechler sensor. Please see page 42 for more information.

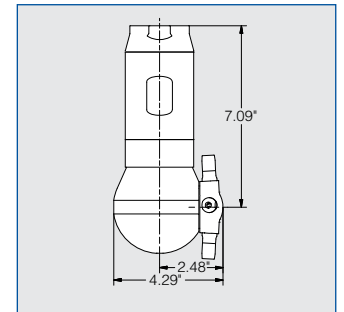
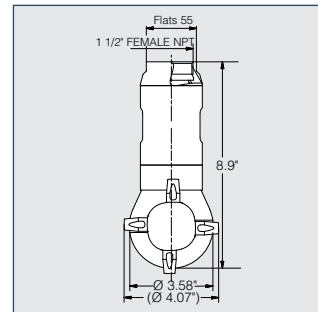
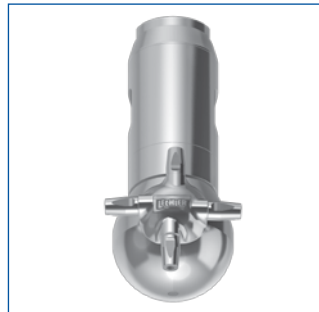


5TA.403.1Y.AL and 5TA.404.1Y.AL

5TA.405.1Y.AL

Spray Angle	Ordering no.	Free Passage (in.)	Number, Ø of nozzles (mm)	Flow Rate (Gallons Per Minute)				Max. tank Ø (ft.)	Max. pressure (psi)	
				liters per minute	2 bar	30 psi	40 psi			75 psi
360°	5TA. 403. 1Y. BL	.059	4 x 3.0 mm	25.0	6.8	7.9	10.8	14.9	26	217
	5TA. 404. 1Y. BL	.059	4 x 4.0 mm	42.0	11.2	13.0	17.7	24.7	36	217
	5TA. 405. 1Y. BL	.059	4 x 5.0 mm	50.0	13.4	15.5	21.2	29.5	39	217

## 5TB



Spray Angle	Ordering no.	Free Passage (in.)	Number, Ø of nozzles (mm)	Flow Rate (Gallons Per Minute)				Max. tank Ø (ft.)	Max. pressure (psi)	
				liters per minute	2 bar	30 psi	40 psi			75 psi
360°	5TB. 406. 1Y. BS	.236	4 x 6.0 mm	107.0	28.7	33.1	45.4	63.1	42	362
	5TB. 407. 1Y. BS	.236	4 x 7.0 mm	135.0	35.5	41.0	56.2	78.2	46	362
	5TB. 408. 1Y. BS	.236	4 x 8.0 mm	165.0	40.3	46.7	63.9	88.8	46	362

**ATEX version on request**

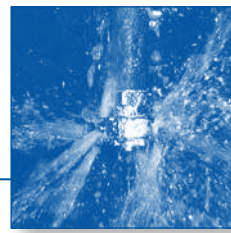
The new Lechler rotating jet cleaner enables containers and systems to be cleaned very efficiently. Thanks to the powerful solid jets, it also performs even the most difficult cleaning tasks.

Its high-quality and hygienic design makes it especially well suited for use in the chemicals and pharmaceuticals industry.





# Gyro — heavy duty, high capacity Series 577



## Series 577

With our largest capacity free spinning designs, the Gyro family is the high flow work horse of our tank cleaning nozzle line.

### Product features:

- Highest flow rates of all our tank cleaning nozzles
- High cleaning performance at low pressures
- PTFE bearings easily replaced to extend the service life
- Free spinning, self-lubricating, and self-flushing
- FDA Compliant (see page 24)

### Applications:

- Medium to large tanks
- Ethanol fermenters
- Paper machine headboxes
- Chemical storage
- Breweries

### Max. tank diameter:

Inlet Size	Tank Diameter
1"	11'
2"	18'

### Operating pressure:

20 – 50 psi, max. 65 psi

### Max. fluid temperature\*:

200°F

### Weight:

1"	1.65 lb.
2"	4 lb.

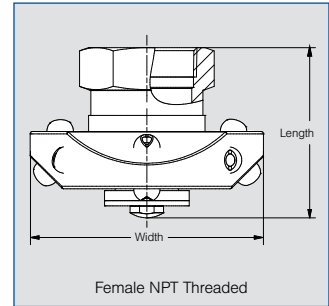
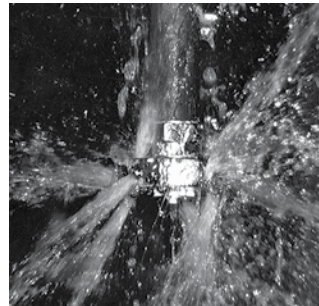
### Material:




316 stainless steel  
PTFE

**Bearing:** Sleeve bearing

### Filtration:

Line strainer with 20 mesh size

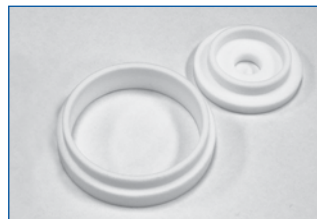


Spray Angle	Ordering no.			Flow Rate (Gallons Per Minute)				Length (in.)	Width (in.)
	Type	Connection		20 psi	liters per minute	40 psi	60 psi		
		1" Female NPT	2" Female NPT						
180° down 	<b>577. 284. 1Y</b>	<b>BN</b>	-	35	161	50	61	2.7	4.6
	<b>577. 364. 1Y</b>	<b>BN</b>	-	56	258	80	98	2.7	4.6
	<b>577. 494. 1Y</b>	-	<b>BW</b>	120	538	170	208	4.0	5.9
270° up 	<b>577. 285. 1Y</b>	<b>BN</b>	-	35	161	50	61	2.7	4.6
	<b>577. 405. 1Y</b>	-	<b>BW</b>	70	322	100	123	4.0	5.9
360° 	<b>577. 289. 1Y</b>	<b>BN</b>	-	35	161	50	61	2.7	4.6
	<b>577. 369. 1Y</b>	<b>BN</b>	-	57	258	80	98	2.7	4.6
	<b>577. 409. 1Y</b>	-	<b>BW</b>	70	322	100	123	4.0	5.9
	<b>577. 439. 1Y</b>	-	<b>BW</b>	85	387	120	147	4.0	5.9
	<b>577. 499. 1Y</b>	-	<b>BW</b>	120	548	170	208	4.0	5.9

The PTFE bearings and other wear parts can be replaced easily to extend the life of the unit. A rebuild kit contains: Bearing sleeves, bolt, nut, spacer, and complete instructions.

Size	Product code
1"	057.701.55.01
2"	057.702.55.01

### Contents of Gyro rebuild kit



**Please note:** We do not recommend operation of these products with compressed air, steam, or gases. For further information, please contact Lechler.

**Example**    **Type**    +    **Conn.**    =    **Ordering no.**  
**for ordering: 577. 284. 1Y**    +    **BN**    =    **577. 284. 1Y. BN**

\* Contact Lechler for maximum ambient temperature.



# High impact tank cleaning machine – for the largest tanks and the toughest cleaning jobs Series 5TM



## Series 5TM

For the largest tanks and most difficult applications, this gear-driven tank washing machine is our most powerful.

### Product features:

- Very high cleaning performance at low pressures
- Requires no lubricants
- Systematically sweeps the entire tank interior (360°)
- Regular maintenance by replacement of wetted parts ensures long product life
- Can be mounted in any orientation

### Applications:

- Large tanks
- Tough cleaning tasks, e.g., wine and beer fermenters, tank trucks, rail cars, chemical processing

### Max. tank diameter:

Cleaning: 50 ft.

### Operating pressure:

30–100 psi, max. 150 psi

### Max. fluid temperature\*:

5TM: 140°F/60°C

### Weight:

Approx. 16.5 lb.

### Material:

316L stainless steel  
PTFE and carbon fiber

### Bearing:

Ball and slide bearings

### Filtration:

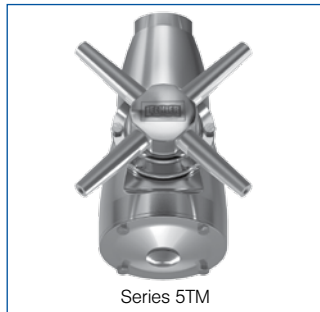
Line strainer with 80 mesh size

### Opening requirement:

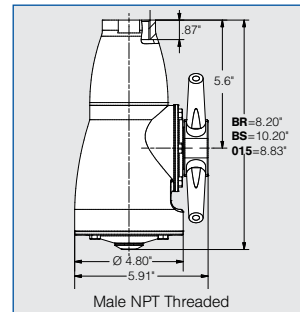
(Round hole diameter)  
2 nozzle 5.9 inches  
4 nozzle 7.8 inches

### Rotation monitoring sensor:

This series is qualified for rotation monitoring with the Lechler sensor. Please see page 42 for more information.



Series 5TM



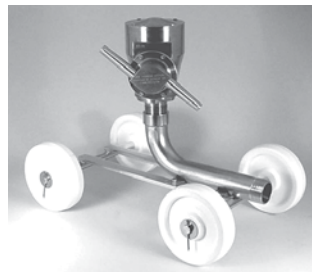
Male NPT Threaded

Type	Ordering no.			Free Passage (in.)	No. of Nozzles x Diameter		Operating Pressure			
	Connection						40 psi	60 psi	80 psi	100 psi
	1 1/2" Male NPT	1 1/2" Female NPT	1 1/2" CL150 Flange							
<b>5TM. 208. 1Y</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	.314	2x8mm	Flow Rate	40 gpm	49 gpm	56 gpm	59 gpm
<b>5TM. 209. 1Y</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	.354	2x9mm	Flow Rate	45 gpm	54 gpm	60 gpm	65 gpm
<b>5TM. 210. 1Y</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	.394	2x10mm	Flow Rate	50 gpm	62 gpm	69 gpm	72 gpm
<b>5TM. 211. 1Y</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	.433	2x11mm	Flow Rate	57 gpm	68 gpm	78 gpm	<b>80 gpm</b>
<b>5TM. 407. 1Y</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	.276	4x7mm	Flow Rate	53 gpm	70 gpm	78 gpm	<b>82 gpm</b>
<b>5TM. 408. 1Y</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	.315	4x8mm	Flow Rate	62 gpm	74 gpm	<b>84 gpm</b>	<b>92 gpm</b>
<b>5TM. 410. 1Y</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	.394	4x10mm	Flow Rate	<b>80 gpm</b>	<b>95 gpm</b>	<b>107 gpm</b>	<b>110 gpm</b>

**Bold type** under operating pressure column indicates flows in excess of 80 gpm, which exceeds the normal maximum flow through the machine. Operating beyond this point can cause excessive speed and premature wear to the internal gear train. If you require this high a flow rate, contact us to discuss modifications to your unit. The operating **Cycle Time** is typically the minimum required for a full cleaning of a tank 30' in diameter or smaller. Larger tanks or difficult cleaning situations may require longer cycle times.



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



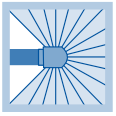
If you have multiple large tanks to clean, Lechler offers a portable cart for easier transporting and operation of your 5TM from tank to tank. The cart part number is **M20.000.17.BR**. For use with "BR" connection only.

**Please note:** We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 80 mesh size. For further information, please contact Lechler.

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

\* Contact Lechler for maximum ambient temperature.

**Example** Type + Conn. = Ordering no.  
**for ordering:** 5TM. 208. 17 + BR = 5TM. 208. 17. BR



### Rotation Monitoring Sensor

The new Rotation Monitoring Sensor is a reliable way to confirm that your rotating tank cleaning nozzle is actually moving inside the tank. This is especially important for enclosed tanks where the operator has no access to view the interior of the tank.

The sensor is mounted from outside the tank with a weld-in sleeve that allows the probe tip to fit directly inside the tank so that cascading liquid can come in direct contact with the probe tip. Special software monitors the flow of cascading liquid intervals to determine if the nozzle is rotating. It will show a green light when proper rotation is detected and a red light when it is not.

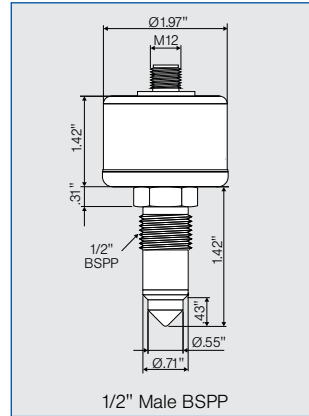


#### Product features:

- Reliable detection for rotating spray devices
- Free software, easy to configure for installation
- PC is no longer required after configuration
- Can be integrated into a PLC via M12 connector
- FDA Compliant (see page 24)

#### Applications:

- Tank and vessel cleaning



#### Material:

Socket: 316L stainless steel  
Body: 303 stainless steel  
Probe Tip: PEEK

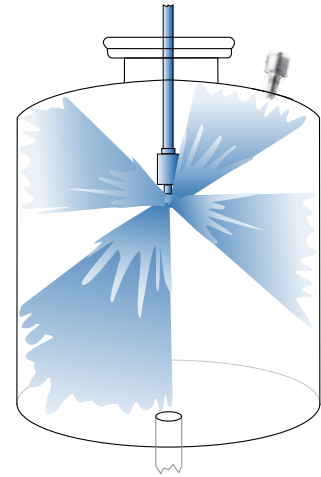
**Electrical:** 18 up to 32 VDC

**Power:** <20 mA

**Output signal:** PNP, 50 mA  
short circuit protected

**Operating temperature:**  
0° up to +212°F

**Ambient temperature:**  
14°F up to 140°F



#### Ordering Numbers:

**050.040.00.00.00.0**  
Rotation Monitoring Sensor  
with Weld-In Sleeve

**050.040.00.00.01.0**  
Cable Set for first-time  
operation

### Lances

A common way to insert a tank cleaning nozzle into a tank for cleaning is by way of a lance. As with any inlet connection for a tank cleaning product, nozzles may be connected to a lance in these ways:

- Threaded
- Tri-Clamp
- Slip-on (secured with an R-clip)
- Welded
- Flanged

There are two types of lances that can be used for tank cleaning:

- Standard (or fixed length)
- Retractable

Either can simply be bolted to the tank wall while the lance end is inserted into the tank.

The standard lance (see **Figures 1-3**) has a fixed length so care must be taken to ensure the lance is of the proper length for the size of the tank. On the retractable lance (see **Figure 4**), the shaft actually retracts, returning the nozzle back into the flange portion of the assembly so it only comes out when cleaning is performed.

Whatever your tank cleaning lance needs, even for something special like **Figure 3**, Lechler can fabricate one specifically for your application, be it for food, pharmaceutical, chemical processing or any other industry.



Figure 1



Figure 2



Figure 3

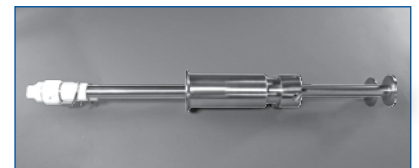


Figure 4





# Pneumatic atomizing nozzles

- Atomization of viscous liquids
- Cooling
- Gas cooling
- Humidification of air
- Humidification of goods
- Lubrication
- Web dampening
- and many others...





Pneumatic atomizing nozzles are available in various designs to generate specific spray and flow requirements:

- Pressure principle (supply from a pressurized source)
- Gravity principle (supply located above the nozzle)
- Siphon principle (self-aspirating)
- Internal or external mix
- Full cone or flat fan spray pattern
- Optional pneumatic valve (with Series 136) or standard pneumatic valve (on Series 176)

The Series 136 atomizing nozzles have a number of optional nozzle control attachments which can be used to adjust the liquid flow; affect droplet size; flush the nozzle (to prevent clogging); or control on-off operation of the flow. These accessories are listed on [page 53](#).

### Criteria for selecting pneumatic atomizing nozzles

#### 1. Spray pattern

Pneumatic flat fan atomizing nozzles are appropriate for humidifying and cooling of product, for web dampening, or for whenever a broad linear coverage is required (such as applying paint or food toppings). Pneumatic full cone atomizing nozzles are appropriate when circular impact or coverage is required (such as for fluid injection into a duct or pipe).

#### 2. Liquid supply source

Whenever liquid can be supplied under pressure, it is most appropriate to use nozzles which function by the liquid pressure principle. Use of pneumatic atomizing nozzles operating by the siphon or gravity principle is

more appropriate when liquid is to be sprayed in very low quantities (such as spraying disinfectants) and little pressure is required.

#### 3. Internal vs. external mix

In pneumatic nozzles, the supply of air or gas mixes with the liquid flow, breaking up the fluid into the smallest droplet particles, either inside (internal mix) or outside (external mix) the nozzle chamber. An internal mix nozzle is appropriate when water, low viscosity liquids, or liquids without solid matter are to be atomized. An external mix nozzle is more appropriate for atomizing viscous liquids which might otherwise tend

to clog the nozzle. Low liquid pressures should be used with this type of nozzle due to its design.

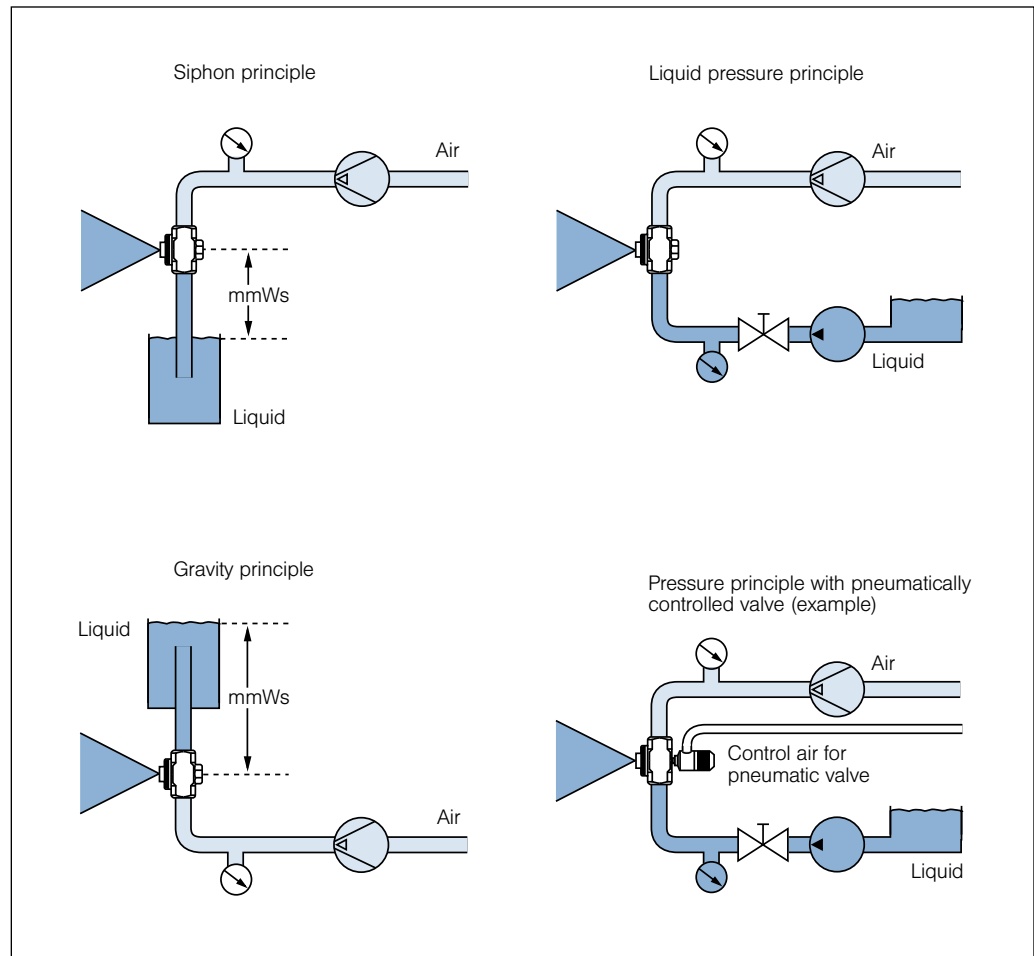
#### 4. Style of nozzle

Series 136 nozzles (AirMists) are most appropriate when there is a need to finely atomize low viscous fluids, such as water. These are also able to have any of the various attachments on [page 53](#) applied to them. This includes the pneumatic valve, which can separately and remotely control on-off operations, especially when intermittent spraying is required. Series 176 nozzles (ViscoMists) are external mix nozzles only and are most

appropriate for spraying more viscous fluids (such as syrups and heavy oils) than AirMists are designed for.

Series 166 AirMists include a solenoid for electronic activation of the nozzle through operation of a needle valve. This could be more appropriate if metered air is limited.

Lechler also offers additional atomizing nozzles which are not featured in this catalog. Please refer to [page 59](#) for more information on the 150, 166, 170, 171 and 180 (Supersonic) series of Pneumatic atomizing nozzles.









# AirMist pneumatic atomizing nozzles

## Full cone, gravity/siphon liquid supply, external mix

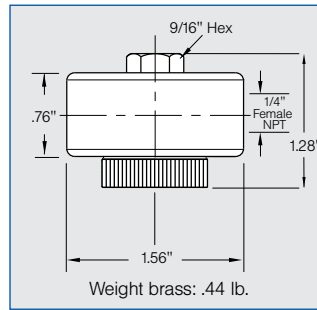
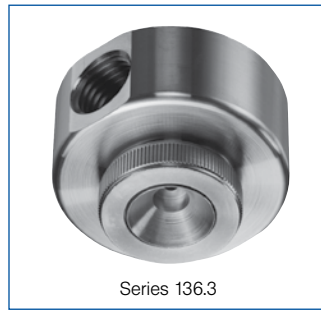
### Series 136.3



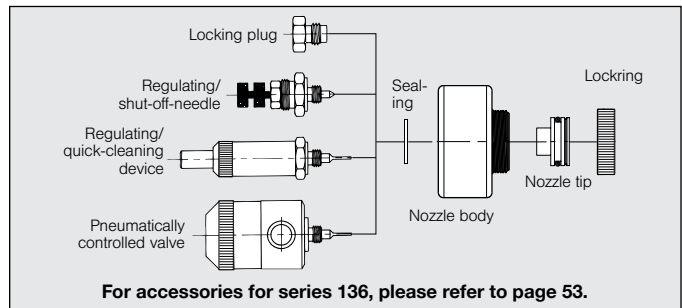
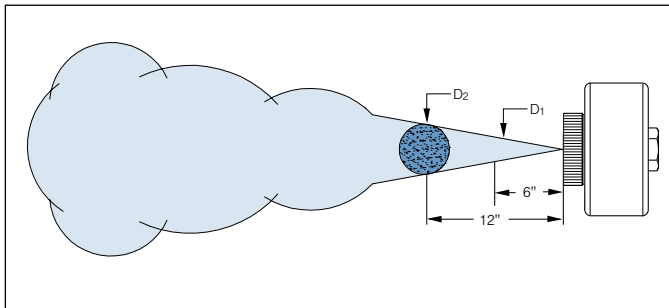
**Particularly fine full cone atomization with air or gas. Siphon principle. External mixing of fluids.**

**Applications:**

- Chemical industry
- Cooling
- Atomization of viscous liquids



Additional flow rate data available upon request. The body is also available in a rectangular design.



Pneumatic atomizing

Spray angle	Ordering no.		Maximum Free Passage (in.)	Flow Rate (Gallons Per Hour)										Spray Dimensions					
	Type	Mat. no.		Air Pressure psi	Air Capacity SCFM	Gravity Head			Siphon Height					Air psi	Siphon Height (in.)	D1 (in.)	D2 (in.)		
						6"	12"	18"	4"	8"	12"	24"	36"						
20°	136. 316. xx. B2	○	○	.016	9	10	.36	.35							20	12	2	4	
					20	17	.40	.44	.43	.30	.25	.17				46	12	2	5
					29	23	.44	.49	.47	.35	.31	.25				70	12	3	5
					46	32	.52	.55	.52	.44	.40	.36	.25	.13		87	12	3	5
					70	45	.59	.62	.60	.51	.49	.47	.40	.30					
	136. 324. xx. B2	○	○	.028	17	16				.82	.67	.49			17	12	2	5	
					26	22				.99	.85	.71			46	12	3	5	
					35	26				1.1	.99	.85	.37		70	12	3	5	
					46	32	1.5			1.3	1.1	1.0	.59		87	12	3	5	
					70	45	1.7	1.7	1.8	1.6	1.4	1.4	1.0	.51					
	136. 334. xx. B2	○	○	.028	12	20				.70	.60	.38	.00		12	12	3	5	
					26	33	1.4			1.1	1.0	.93	.57		46	12	3	5	
					35	41	1.5	1.7	1.8	1.3	1.2	1.1	.87	.38	70	12	3	5	
					46	51	1.7	1.8	1.9	1.5	1.4	1.3	1.1	.67	87	12	3	5	
					70	71	2.2	2.3	2.4	1.9	1.8	1.8	1.5	1.3					
	136. 342. xx. B2	○	○	.059	26	61				2.5	2.2	2.0	1.4	.90	26	12	3	5	
					35	75	3.2			2.7	2.5	2.3	1.8	1.4	44	12	3	5	
					44	88	3.2	3.5	3.7	2.8	2.7	2.5	2.0	1.7	61	12	3	5	
					55	106	3.3	3.5	3.7	3.0	2.9	2.8	2.5	2.2	87	12	3	5	
					61	116	3.5	3.7	3.8	3.2	3.1	3.0	2.8	2.6					
136. 351. xx. B2	○	○	.098	52	181				12	11			8.8	55	12	4	5		
				55	190				13	12	11		9.3	67	12	4	6		
				61	206				14	13	12	10	7.9	78	12	4	6		
				70	231		17		15	14	14	12	9.2	87	12	4	6		
				78	255	16	17	18	15	15	14	13	1.0						
87	278	16	17	17	15	14	14	12	9.8										

**Example**    **Type**            + **Material code (xx)=**    **Ordering no.**  
**for ordering:**    136. 324 xx. B2    +    1Y                                = 136. 324. 1Y. B2

**For accessories and spare parts, see page 53 of this section. For various configurations to mount your pneumatic air nozzles, see the Lances and Nozzle Headers section beginning on page 141.**









**AirMist pneumatic atomizing nozzles**  
**Wide flat fan, pressurized liquid supply, internal mix**  
**Series 136.4**



Spray angle $\Delta$	Ordering no.				Liquid Flow GPH (Gallons Per Hour) at Indicated Liquid Pressure Air Flow SCFM (Standard Cubic Feet Per Minute)												Spray Dimensions						
	Type	Mat. no.		Maximum Free Passage (in.)	10 psi			20 psi			40 psi			60 psi			Air psi	Liq. psi	D1 (in.)	D2 (in.)			
		1Y	316L SS		35	Brass	Nickel Plate	Air psi	GPH	SCFM	Air psi	GPH	SCFM	Air psi	GPH	SCFM					Air psi	GPH	SCFM
60°	136. 425. xx. B2	○	○	.020	12	1.7	.71	20	2.5	1.0	35	3.5	1.5	35	4.3	1.5	17	10	6	8			
					17	1.5	.94	26	2.3	1.2	38	3.4	1.6	41	4.1	1.7	32	20	6	10			
					23	1.2	1.1	32	2.1	1.4	44	3.2	1.8	46	4.0	1.9	44	30	7	10			
					29	1.1	1.4	38	1.9	1.6	49	3.1	2.0	52	3.8	2.1	49	40	8	13			
					35	.85	1.5	44	1.7	1.8	55	2.9	2.2	58	3.7	2.2							
					41	.69	1.7	49	1.5	2.0	61	2.7	2.4	64	3.5	2.4							
					44	.58	1.8	55	1.3	2.2	67	2.6	2.5	70	3.4	2.6							
								58	1.3	2.3	73	2.4	2.7	75	3.2	2.8							
								64	1.1	2.5	78	2.3	2.9	81	3.1	3.0							
								70	.95	2.6	84	2.1	3.1	87	3.0	3.2							
								75	.74	2.8	87	2.1	3.2										
								81	.58	3.0													
								87	.42	3.2													
								15	5.0	2.3	26	8.2	3.1	46	13	4.5	55	19	4.8	15	10	5	7
								20	2.3	3.4	29	6.7	3.7	52	10	5.5	61	15	5.7	26	20	6	9
								26	2.0	4.1	32	5.3	4.2	58	8.3	6.6	67	13	6.6	38	30	6	10
								32	1.1	4.9	35	4.1	4.7	64	6.3	7.6	73	11	7.7	52	40	7	11
								38	.26	5.8	38	3.3	5.2	70	4.7	8.5	78	8.9	8.7				
			41	.03	6.1	41	2.7	5.7	75	3.5	9.4	84	7.3	9.7									
									81	2.8	10	87	6.4	10									
									87	2.3	11												
80°	136. 433. xx. B2	○	○	.016	15	3.1	1.2	26	4.8	1.6	44	8.2	2.2	55	9.9	2.6	20	10	6	8			
					17	2.1	1.4	29	4.0	1.9	49	6.7	2.6	61	8.6	2.9	32	20	7	10			
					20	1.4	1.6	32	3.2	2.1	55	5.4	3.0	67	7.3	3.4	44	30	8	12			
					23	.98	1.9	35	2.6	2.4	61	4.3	3.5	73	6.2	3.8	55	60	12	19			
					38	2.0	2.5	67	3.3	3.9	78	5.1	4.2										
								41	1.6	2.8	73	2.5	4.3	84	4.2	4.6							
								44	1.2	2.9	78	1.7	4.7	87	3.8	4.9							

Pneumatic atomizing

**Example**    Type            +    Material no. (xx) =    Ordering no.  
**for ordering:** 136. 425. xx. B2 + 1Y                                = 136. 425. 1Y. B2

For accessories and spare parts, see page 53 of this section.  
 For various configurations to mount your pneumatic air nozzles, see the Lances and Nozzle Headers section beginning on page 141.







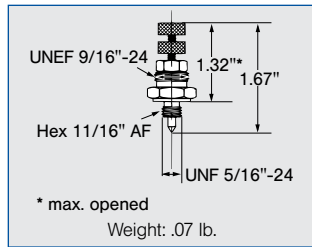
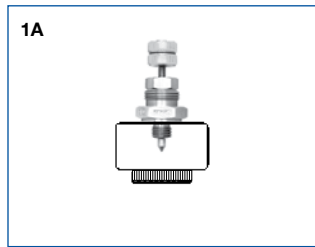




# Accessories for the AirMist pneumatic atomizing nozzles Series 136

## Regulating device and shut-off needle:

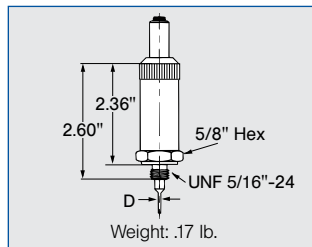
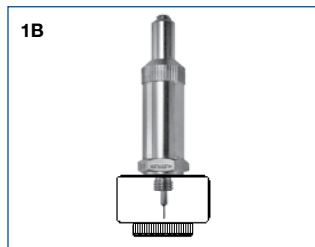
Shuts off flow and controls liquid supply – manually operated



Ordering no.		For all 136 series nozzles
Assembly part no.	Mat. no.	
	303 SS <b>16</b>	
<b>015. 600</b>	○	

## Regulating device with quick-cleaning needle:

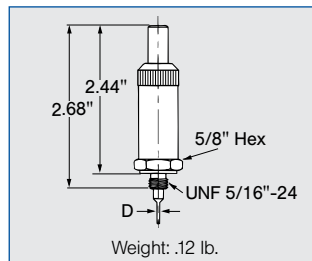
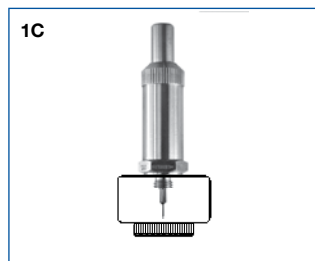
Combines orifice cleaning with liquid flow control – manually operated



Ordering no.		Use the 6th digit to determine appropriate accessory Example: 136.414.1Y.B2	Needle diameter D (in.)	
Assembly part no.	Mat. no.			
	303 SS <b>16</b>	Brass Nickel Plate <b>35</b>		
<b>013. 601. xx. 30</b>	○	○	136. xx1. xx. B2	.085
<b>013. 602. xx. 30</b>	○	○	136. xx2. xx. B2	.048
<b>013. 603. xx. 30</b>	○	○	136. xx3. xx. B2	.034
<b>013. 604. xx. 30</b>	○	○	136. xx4. xx. B2	.024
<b>013. 605. xx. 30</b>	○	○	136. xx5. xx. B2	.016
<b>013. 606. xx. 30</b>	○	○	136. xx6. xx. B2	.012

## Quick-cleaning device:

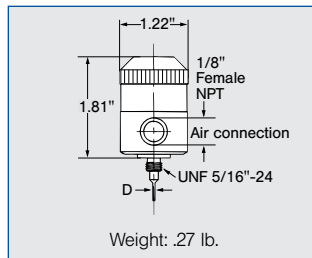
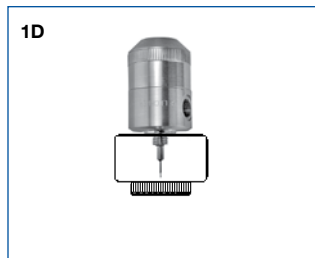
Does orifice cleaning with push-button pin – manually operated



<b>013. 601. xx. 20</b>	○	○	136. xx1. xx. B2	.085
<b>013. 602. xx. 20</b>	○	○	136. xx2. xx. B2	.048
<b>013. 603. xx. 20</b>	○	○	136. xx3. xx. B2	.034
<b>013. 604. xx. 20</b>	○	○	136. xx4. xx. B2	.024
<b>013. 605. xx. 20</b>	○	○	136. xx5. xx. B2	.016
<b>013. 606. xx. 20</b>	○	○	136. xx6. xx. B2	.012

## Pneumatically controlled valve:

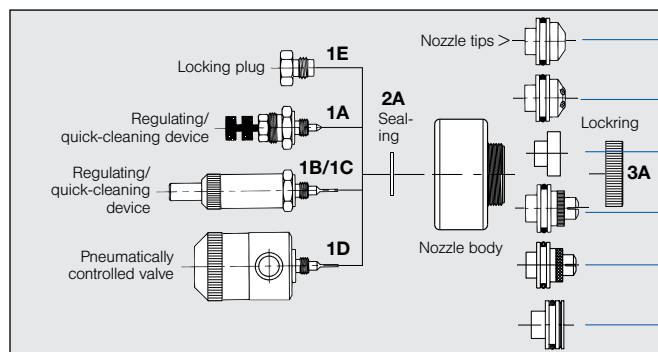
Opening pressure 30 psi, max. 180 cycles/min. Connects to separate air inlet for fast on/off operation – externally controlled



<b>013. 601. xx. 10</b>	○	○	136. xx1. xx. B2	.085
<b>013. 602. xx. 10</b>	○	○	136. xx2. xx. B2	.048
<b>013. 603. xx. 10</b>	○	○	136. xx3. xx. B2	.034
<b>013. 604. xx. 10</b>	○	○	136. xx4. xx. B2	.024
<b>013. 605. xx. 10</b>	○	○	136. xx5. xx. B2	.016
<b>013. 606. xx. 10</b>	○	○	136. xx6. xx. B2	.012

**Example**    **Type**    +    **Material no. (xx)** = **Ordering no.**  
for ordering: 013. 602. xx. 20 + 16 = 013. 602. 16. 20

- 1E** for Series 136/166  
Locking plug  
**136. 000. 1Y. 00. 04**
- 2A** for Series 136  
Seal  
**095. 015. 7A. 03. 04**
- 3A** for Series 136/166  
Lockring  
**136. 000. 1Y. 00. 07**



### Nozzle tips\*

- Series 136.1/166.1  
**136. xxx. 1Y. 00. 03**
- Series 136.2/166.2  
**136. xxx. 1Y. 00. 03**
- Series 136.3/166.3  
**136. xxx. 1Y. 00. 03**
- Series 136.4/166.4  
**136. xxx. 1Y. 00. 03**
- Series 136.5/166.5  
**136. xxx. 1Y. 00. 03**
- Series 136.6/166.6  
**136. xxx. 1Y. 00. 03**

\* Use the 3 digits from the full nozzle assembly for the spare tip part number  
Example:  
136.414.17B2

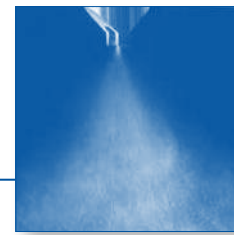


Pneumatic atomizing



# Pneumatic atomizing nozzles

## ViscoMist™ flat fan, external mix Series 176

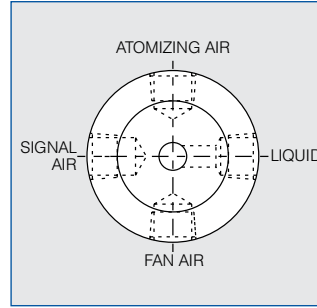
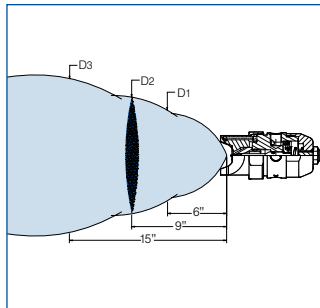
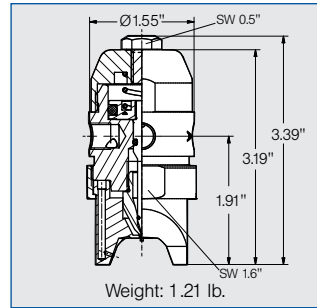
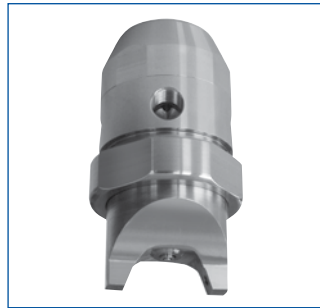


**Versatile design with built-in pneumatic needle valve for liquid flow control and automatic clean-out. Three nozzle body configurations offer flexible tailoring to your specific application needs. Models feature individual controls for on-off operation, atomizing air, and fan air, allowing adjustments to droplet size and spray pattern as appropriate without compromising required flow. Has been newly redesigned for greater anti-bearding.**

**Applications:**

- Spraying viscous fluids
- Coating
- Glazing
- Sanitizing
- Humidification
- Recirculating liquids

All nozzle inlet connections: 1/8" female NPT



\* For additional body styles, contact Lechler.

**Nozzle Body 4\***

This configuration has four process connections: one for liquid, and three for air. One air connection controls atomizing air, one controls fan air, and the third controls signal air for on-off operations, so each aspect can be individually adjusted. Therefore, atomizing air can be set at less than 40 psi if desired without affecting the on-off operation, for instance.

The ViscoMist™ has greatly minimized the following problem, but it is still a situation to be aware of:

**Bearding/Caking**

- *What is it*—Build-up of material around the inside or outside of the orifice due to evaporation of the liquid being sprayed. This dried solid material blocks all or part of the nozzle orifice or internal flow passages.
- *Symptoms*
  - Reduced flow rate
  - Reduced spray angle
  - Irregular spray pattern
- *Solution*—Thoroughly clean nozzle, if necessary, using cleansers and solvents which will not affect the nozzle material.

**Description of inlet ports and their symbols**

The ViscoMist™ has three Nozzle Body styles available. For all styles, next to each inlet port on the nozzle is stamped one or more letters representing the spray aspect(s) that port controls. These spray aspects and the letter representing each are as follows:

**Atomizing Air (A)**

The Atomizing Air Port influences the atomization of the liquid into either small or large droplet sizes, simultaneously affecting spray distribution in the center of the spray pattern. To achieve finer liquid atomization, increase the atomizing air pressure.

**Fan Air (F)**

The Fan Air Port flattens the atomized liquid, thus giving it a flat fan spray distribution. With the appropriate nozzle body configuration, this distribution can be adjusted independently to control the liquid spray width. To achieve a wider spray distribution, increase the fan air pressure.

**Liquid(M)**

The liquid flow rate is directly proportional to the liquid pressure rate. Subsequently, the higher the liquid pressure rate is, the higher the liquid flow rate will be. The liquid "On" or "Off" cycle is dependent on the Piston-controlled Signal Air supply.

**Signal Air (P)**

Air supplied to this port actuates a piston located within the nozzle to retract or extend the Clean-Out/Liquid Shut-Off Needle. Retracting the needle allows the liquid to flow from the nozzle. A minimum of 40 psi air pressure to this port is required to operate the nozzle.



**For ViscoMist replacement kits, see page 58.**



# Pneumatic atomizing nozzles

## ViscoMist flat fan, external mix

### Series 176



Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*		Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)											
										0*			5			10			20		
			D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3							
4	176. 401. 1Y. 01	.015	2.2	.50	2.2	.44	.59	5	5	2	3	5	5	5	8	5	7	9	7	8	9
			3.6	.66	3.6	.57	.76		10	2	2	4	4	7	9	7	9	13	10	12	14
			4.4	.74	4.4	.64	.85		20	-	-	6	8	12	9	13	15	11	13	16	
			5	.80	5	.67	.91	10	5	2	3	4	5	6	7	6	7	10	8	10	13
			10	1.2	10	.96	1.3		10	2	3	4	4	5	7	6	8	10	9	11	14
			15	1.5	15	1.2	1.7		20	-	-	5	7	8	7	10	14	10	13	17	
			20	1.7	20	1.4	2.0	20	5	2	3	4	3	4	6	4	5	7	6	8	10
			30	2.1	30	1.8	2.7		10	2	3	4	2	4	5	4	5	7	6	8	10
			40	2.4	40	2.3	3.3		20	-	-	3	4	6	5	7	8	7	10	13	
			50	2.7	50	2.7	4.0	40	5	2	2	4	2	2	4	2	4	5	7	6	7
			58	3.0	58	3.1	4.5		10	2	3	5	2	3	5	3	4	5	5	7	8
									20	1	2	3	2	3	5	3	4	6	5	7	9

Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*		Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)											
										0*			5			10			20		
			D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3							
4	176. 402. 1Y. 01	.023	2.2	1.1	2.2	.46	.59	5	5	2	2	3	6	7	9	6	8	9	8	9	10
			3.6	1.4	3.6	.59	.76		10	-	-	-	5	7	9	8	10	15	12	14	20
			4.4	1.6	4.4	.65	.85		20	-	-	-	-	-	9	12	15	14	16	20	
			5	1.7	5	.69	.91	10	5	2	3	4	4	6	7	5	7	9	7	9	10
			10	2.5	10	.98	1.3		10	2	2	4	5	7	8	6	7	10	10	11	14
			15	3.0	15	1.2	1.7		20	-	-	-	-	-	7	9	12	11	13	16	
			20	3.5	20	1.4	2.0	20	5	2	3	4	3	4	4	5	6	8	5	7	9
			30	4.3	30	1.9	2.7		10	2	2	3	4	5	7	5	6	8	7	8	11
			40	5.1	40	2.3	3.3		20	-	-	-	4	5	8	5	7	9	8	9	13
			50	5.7	50	2.7	4.0	40	5	2	2	3	2	3	4	3	4	5	5	6	7
			58	6.2	58	3.1	4.5		10	1	2	4	2	3	4	4	4	5	5	6	8
									20	2	3	4	3	4	6	4	5	7	6	8	12

Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*		Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)											
										0*			5			10			20		
			D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3							
4	176. 403. 1Y. 01	.031	2.2	2.2	2.2	.28	.59	5	5	-	-	-	7	10	12	12	15	18	13	16	20
			3.6	2.9	3.6	.38	.76		10	-	-	-	8	10	12	13	15	19	18	21	27
			4.4	3.3	4.4	.42	.85		20	-	-	-	-	-	12	15	21	17	22	27	
			5	3.5	5	.46	.91	10	5	1	2	3	6	8	11	11	14	18	12	15	19
			10	5.1	10	.68	1.3		10	-	-	-	7	9	13	11	14	18	15	18	23
			15	6.3	15	.86	1.7		20	-	-	-	-	-	11	13	18	14	18	23	
			20	7.3	20	.97	2.0	20	5	2	2	3	5	6	8	7	9	10	9	11	13
			30	9.0	30	1.3	2.7		10	-	-	-	5	7	10	7	9	12	10	12	14
			40	1.4	40	1.6	3.3		20	-	-	-	-	-	9	11	16	12	14	20	
			50	11.7	50	1.9	4.0	40	5	2	2	4	4	5	7	6	7	9	8	9	12
			58	12.7	58	2.2	4.5		10	-	-	-	5	6	8	6	8	10	9	11	15
									20	-	-	-	-	-	7	9	13	9	12	16	

\*These pressures are independently controlled so any combination of liquid, atomizing air, and fan air pressures can be selected.  
 Total SCFM output is the sum of the separate atomized air and fan air amounts for the individual inlet pressures used. Continued on next page.  
 \* A cone-shaped spray is most likely to be produced if the fan air function is not utilized.

**Material:** 316L SS – We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 1Y.

**For ViscoMist replacement kits, see page 58.**  
**For various configurations to mount your pneumatic air nozzles, see the Lances and Nozzle Headers section beginning on page 141.**



Pneumatic atomizing



# Pneumatic atomizing nozzles

## ViscoMist flat fan, external mix

### Series 176



Pneumatic atomizing

Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*			Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)												
										0*			5			10			20			
										D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3	
4	176. 404. 1Y. 01	.042	2.2	4.5	2.2	1.4	1.2	5	5	-	-	-	7	10	13	12	15	18	14	16	21	
			3.6	5.8	3.6	1.8	1.6		10	-	-	-	7	10	14	12	15	20	18	21	26	
			4.4	6.4	4.4	2.0	1.7		20	-	-	-	-	-	-	-	-	15	18	17	21	29
			5	6.9	5	2.2	1.9		10	5	-	-	-	5	7	10	8	10	13	11	13	17
			10	9.9	10	3.3	2.7			10	-	-	-	5	6	9	8	10	15	13	16	20
			15	12.1	15	4.3	3.4			20	-	-	-	-	-	-	7	9	13	12	15	23
			20	14.0	20	5.2	4.1	20	5	2	3	4	4	5	7	5	7	9	8	10	13	
			30	17.2	30	6.8	5.3		10	-	-	-	4	5	7	5	7	9	9	11	15	
			40	2.0	40	8.4	6.6		20	-	-	-	4	5	7	6	8	11	8	11	16	
			50	22.4	50	1.1	7.8	40	5	2	3	4	3	4	6	4	5	7	6	7	10	
			58	24.2	58	11.5	8.9		10	2	3	4	3	4	6	4	5	7	6	8	10	
										20	-	-	-	3	4	6	4	5	7	6	8	12

Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*			Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)												
										0*			5			10			20			
										D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3	
4	176. 405. 1Y. 01	.052	2.2	6.5	2.2	1.3	1.2	5	5	-	-	-	9	11	17	13	17	22	18	21	28	
			3.6	8.4	3.6	1.7	1.6		10	-	-	-	-	-	-	14	18	24	19	23	22	
			4.4	9.3	4.4	1.9	1.7		20	-	-	-	6	9	13	9	13	18	13	16	21	
			5	1.0	5	2.0	1.9		10	10	-	-	-	-	-	-	10	12	19	14	18	24
			10	14.4	10	3.0	2.7			20	-	-	-	-	-	-	9	13	17	13	18	27
			15	17.7	15	4.0	3.4			20	5	-	-	-	4	6	8	6	8	11	9	11
			20	20.2	20	4.7	4.1	10	-		-	-	4	6	8	6	8	12	9	12	15	
			30	25	30	6.1	5.3	20	-		-	-	-	-	-	5	8	11	9	12	17	
			40	29	40	7.5	6.6	40	5	2	3	4	3	4	6	4	5	8	6	7	11	
			50	33	50	8.9	7.8		10	-	-	-	3	4	6	4	5	8	6	8	12	
			58	35	58	1.1	8.9															
										20	-	-	-	3	4	6	4	5	8	6	8	12

Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*			Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)												
										10			15			20			30			
										D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3	
4	176. 406. 1Y. 01	.067	2.2	11.0	2.2	.90	1.2	20	5	8	11	17	10	14	20	12	15	23	12	15	20	
			3.6	14.1	3.6	1.2	1.6		10	8	11	17	10	13	20	12	15	22	-	-	-	
			4.4	15.7	4.4	1.3	1.7		20	8	11	17	10	13	20	12	16	24	-	-	-	
			5	16.8	5	1.4	1.9		30	5	6	9	13	8	11	16	9	12	18	10	13	17
			10	24	10	2.0	2.7			10	7	9	12	8	10	15	9	12	18	11	14	20
			15	30	15	2.6	3.4			20	6	9	13	7	10	14	9	11	17	11	14	20
			20	34	20	3.0	4.1	40	5	6	7	11	7	9	12	7	10	14	8	11	17	
			30	42	30	4.0	5.3		10	6	8	12	7	9	13	7	10	15	9	12	16	
			40	48	40	4.9	6.6		20	5	7	10	6	8	13	7	10	15	9	13	19	
			50	54	50	5.8	7.8	50	5	6	8	12	7	8	13	7	10	14	8	11	16	
			58	58	58	6.6	8.9		10	5	7	10	6	8	13	7	9	14	8	11	17	
										20	5	7	11	6	8	12	7	9	14	9	11	17

\*These pressures are independently controlled so any combination of liquid, atomizing air, and fan air pressures can be selected.  
 Total SCFM output is the sum of the separate atomized air and fan air amounts for the individual inlet pressures used. Continued on next page.  
 \* A cone-shaped spray is most likely to be produced if the fan air function is not utilized.

**Material:** 316L SS – We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 1Y.

**For ViscoMist replacement kits, see page 58.**  
**For various configurations to mount your pneumatic air nozzles, see the Lances and Nozzle Headers section beginning on page 141.**





# Pneumatic atomizing nozzles

## ViscoMist flat fan, external mix

### Series 176



Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*		Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)											
										10			15			20			30		
			D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3							
4	176. 407. 1Y. 01	.081	2.2	15.6	2.2	2.1	2.0	20	5	5	8	12	8	10	14	10	12	18	13	16	21
			3.6	20	3.6	2.8	2.6		10	5	7	11	7	10	15	9	12	17	12	16	24
			4.4	22	4.4	3.1	2.9	30	5	4	6	9	6	8	11	7	9	14	10	13	19
			5	24	5	3.4	3.1		10	4	6	9	6	8	11	7	10	15	10	13	19
			10	34	10	5.0	4.6	40	20	-	-	-	-	-	-	6	9	13	9	12	17
			15	42	15	6.4	5.9		5	4	5	7	5	7	10	6	8	12	8	11	15
			20	49	20	7.6	7.2	50	10	4	5	8	5	7	10	6	8	12	8	11	16
			30	60	30	1.0	9.4		20	4	5	8	5	6	10	6	8	12	8	11	15
			40	69	40	12.3	11.6	50	5	4	5	6	5	6	9	6	8	10	7	10	16
			50	78	50	14.6	13.7		10	4	5	7	4	6	9	5	8	12	7	10	14
			58	84	58	16.4	15.5		20	3	5	8	4	6	9	5	7	10	7	10	14

Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*		Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)											
										10			15			20			30		
			D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3							
4	176. 408. 1Y. 01	.093	2.2	20	2.2	1.6	2.0	20	5	7	10	14	9	12	18	10	14	21	15	19	28
			3.6	26	3.6	2.3	2.6		10	6	8	14	8	11	17	11	15	22	15	21	30
			4.4	28	4.4	2.5	2.9	30	5	5	8	12	7	10	14	8	11	16	11	18	22
			5	30	5	2.7	3.1		10	5	7	10	7	9	14	9	11	16	11	15	21
			10	43	10	4.0	4.6	40	20	-	-	-	6	8	13	8	11	15	11	15	22
			15	53	15	5.1	5.9		5	5	7	9	6	8	11	7	10	14	10	14	18
			20	61	20	6.0	7.2	50	10	4	6	9	6	8	12	7	10	14	9	13	19
			30	74	30	7.9	9.4		20	4	5	8	5	7	11	6	9	14	9	13	18
			40	86	40	9.6	11.6	50	5	4	6	7	5	7	9	6	8	11	8	12	17
			50	95	50	11.3	13.7		10	4	5	7	5	7	10	6	8	12	8	11	18
			58	103	58	12.8	15.5		20	3	5	8	5	6	9	6	8	13	8	12	18

Nozzle Body Configuration (see pg. 54)	Ordering no.	Orifice diam. (in.)	Liq. Capacity*		Air Capacity*			Spray Coverage (in.) at Indicated Distance from Nozzle													
			Inlet Press. (psi)	Liq. Flow (GPH)	Inlet Press. (psi)	Atom. Air (SCFM)	Fan Air (SCFM)	Atom. Air (psi)	Liq. Flow (psi)	Fan Air Pressure (psi)											
										15			20			30					
			D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3							
4	176. 409. 1Y. 01	.100	2.2	22	2.2	1.1	2.0	20	5	7	10	16	9	12	18	11	16	21	15	20	27
			3.6	29	3.6	1.9	2.6		10	6	9	14	9	12	18	10	14	22	16	21	31
			4.4	32	4.4	2.2	2.9	30	5	5	8	12	7	10	15	8	11	18	11	14	22
			5	34	5	2.4	3.1		10	5	7	11	7	9	14	8	11	18	11	15	24
			10	48	10	3.9	4.6	40	20	-	-	-	-	-	-	8	10	17	10	15	22
			15	58	15	5.0	5.9		5	4	6	9	6	8	13	7	9	16	10	14	20
			20	68	20	6.0	7.2	50	10	4	6	9	6	8	12	7	10	16	9	14	22
			30	83	30	7.7	9.4		20	4	6	8	6	8	12	7	10	16	9	13	20
			40	96	40	9.6	11.6	50	5	4	6	9	5	7	11	6	8	13	9	12	18
			50	107	50	11.3	13.7		10	4	6	9	6	8	12	6	8	14	9	12	17
			58	115	58	12.9	15.6		20	4	5	8	5	7	10	6	8	13	9	12	18

\*These pressures are independently controlled so any combination of liquid, atomizing air, and fan air pressures can be selected.

Total SCFM output is the sum of the separate atomized air and fan air amounts for the individual inlet pressures used.

\* A cone-shaped spray is most likely to be produced if the fan air function is not utilized.

**Material:** 316L SS – We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 1Y.

**For ViscoMist replacement kits, see page 58.**

**For various configurations to mount your pneumatic air nozzles, see the Lances and Nozzle Headers section beginning on page 141.**





# Replacement kits for the ViscoMist pneumatic atomizing nozzles Series 176



## Replacement Kits for the ViscoMist

For replacing the basic wear parts for the ViscoMist, order from the following list:

Ordering no.	Fluid nozzle orifice size (in.)	Description Includes: ① Needle assembly ② O-ring ③ Fluid nozzle
<b>017. 601. 1Y. 01</b>	.015	Wear Replacement Kit, Nozzle #1, 316 SS
<b>017. 602. 1Y. 01</b>	.023	Wear Replacement Kit, Nozzle #2, 316 SS
<b>017. 603. 1Y. 01</b>	.031	Wear Replacement Kit, Nozzle #3, 316 SS
<b>017. 604. 1Y. 01</b>	.042	Wear Replacement Kit, Nozzle #4, 316 SS
<b>017. 605. 1Y. 01</b>	.052	Wear Replacement Kit, Nozzle #5, 316 SS
<b>017. 606. 1Y. 01</b>	.067	Wear Replacement Kit, Nozzle #6, 316 SS
<b>017. 607. 1Y. 01</b>	.081	Wear Replacement Kit, Nozzle #7, 316 SS
<b>017. 608. 1Y. 01</b>	.093	Wear Replacement Kit, Nozzle #8, 316 SS
<b>017. 609. 1Y. 01</b>	.100	Wear Replacement Kit, Nozzle #9, 316 SS

Nozzle fluid tips and spreaders (air caps) are interchangeable to provide various set-up combinations.

For replacing the wear parts and the spreader of the ViscoMist, order the following:

Ordering no.	Fluid nozzle orifice size (in.)	Description Includes: ① Needle assembly ② O-ring ③ Fluid nozzle ④ Spreader (air cap)
<b>017. 601. 1Y. 00</b>	.015	Capacity Replacement Kit, Nozzle #1
<b>017. 602. 1Y. 00</b>	.023	Capacity Replacement Kit, Nozzle #2
<b>017. 603. 1Y. 00</b>	.031	Capacity Replacement Kit, Nozzle #3
<b>017. 604. 1Y. 00</b>	.042	Capacity Replacement Kit, Nozzle #4
<b>017. 605. 1Y. 00</b>	.052	Capacity Replacement Kit, Nozzle #5
<b>017. 606. 1Y. 00</b>	.067	Capacity Replacement Kit, Nozzle #6
<b>017. 607. 1Y. 00</b>	.081	Capacity Replacement Kit, Nozzle #7
<b>017. 608. 1Y. 00</b>	.093	Capacity Replacement Kit, Nozzle #8
<b>017. 609. 1Y. 00</b>	.100	Capacity Replacement Kit, Nozzle #9

Pneumatic atomizing

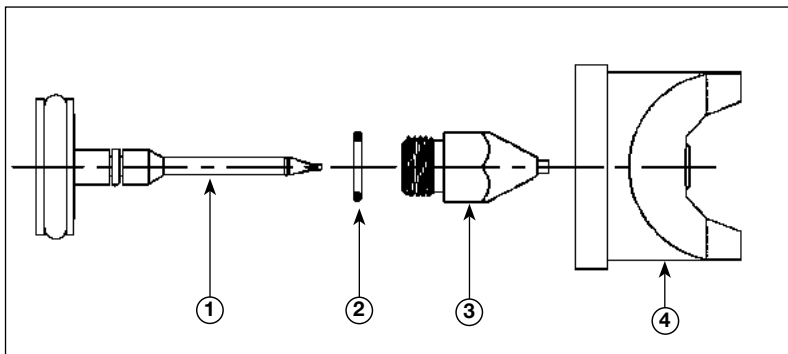
**Material:** 316L SS

Note: Instructions for changing out any and all ViscoMist component parts come with each Replacement Kit purchased.

To just replace the o-ring in the ViscoMist, order the following:

Ordering no.		Description
Type	Mat. no.*	
	Viton <b>7A</b>	
	EPDM <b>6C</b>	
<b>017. 600. xx. 01. 03</b>	○ ○	O-ring Replacement Kit

\* 7A (Viton) is the standard material for the O-ring while 6C (EPDM) is optional.



- | Position # | Description     |
|------------|-----------------|
| ①          | Needle Assembly |
| ②          | O-ring          |
| ③          | Fluid Nozzle    |
| ④          | Spreader        |

For various configurations to mount your pneumatic air nozzles, see the Lances and Nozzle Headers section beginning on page 141.








## Additional pneumatic atomizing nozzles



Lechler offers several other atomizing nozzles besides those in this catalog which may be appropriate for your application. If a nozzle in either of the styles below is specified for a job of yours or you would just like more information about either one, please contact Lechler.

Spray pattern	Mode of liquid supply	Occurrence of atomization	Series	Spray angle	Flow rate range	Application	More information
Full cone	Pressure principle	External mix	<b>150</b>	20°–30°	.13–17 gph	Chemical process engineering Cooling Atomization of viscous liquids	<b>Please ask for our “Chemical” brochure</b> 
Flat fan	Pressure principle	Internal mix	<b>166</b>	20°–80°	.11–25 gph	Web dampening Cooling Humidification of goods Atomization of viscous liquids	<b>Please ask for our “Chemical” brochure</b> 
Full cone	Pressure principle	Internal mix	<b>170</b> <b>171</b> <b>180</b>	15°	2.25–77 gph	Gas cooling FGD Exhaust gas conditioning Dust control	<b>Please ask for our “Chemical” brochure</b> 

Pneumatic atomizing



# Hollow cone nozzles

- Absorption
- Chemical process engineering
- Cooling
- Disinfection
- Desuperheating
- Dust control
- Fire protection
- Foam destruction
- Gas treatment
- Humidification of air, goods, or textiles
- Oil spraying
- Protection of storage tanks
- Spraying onto filters
- Spraying over germinating boxes
- Water recooling
- and many others...

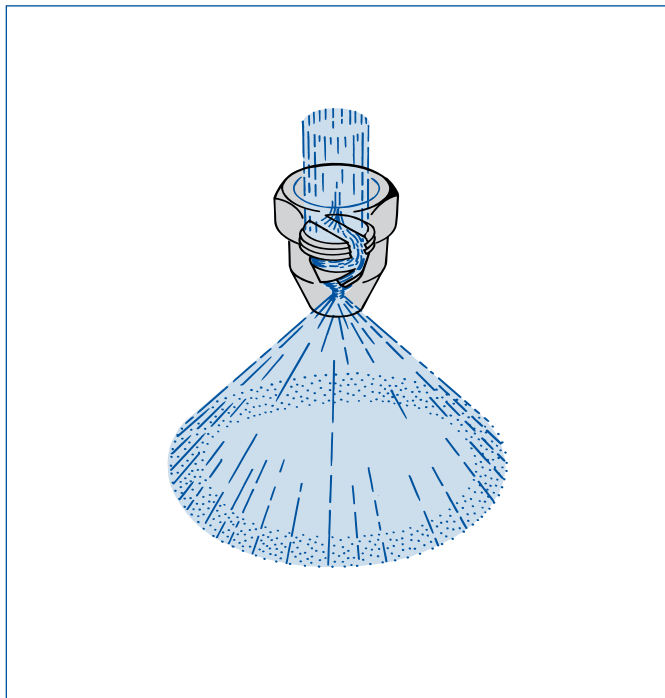




## Hollow cone nozzles

### Axial hollow cone nozzles

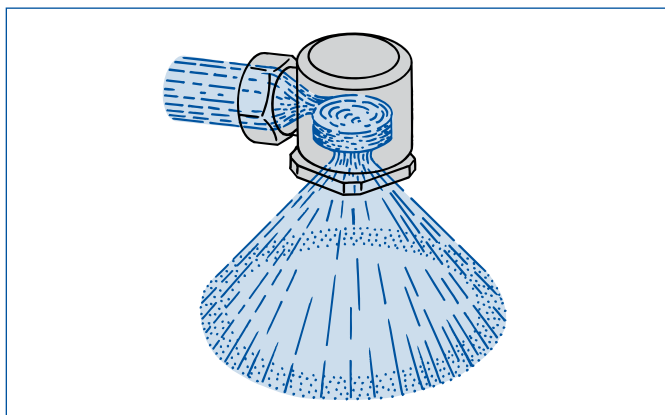
Hollow cone nozzles produce the smallest average droplet sizes of any purely hydraulic nozzle. Axial hollow cones create the smallest droplets of any type of hollow cone nozzle. The spiral grooves in the swirl inserts of these nozzles ensure an efficient whirling of the liquid which creates uniform droplets throughout and maximizes the total exposed surface area. Creation of such a spray means that the liquid can be absorbed faster, cool quicker, and moisturize better for more effective application spraying. As a result, these nozzles are suitable for applications where fine, uniform spray is required, such as for cooling and cleaning of gas, absorption processes, dust control, product dampening, oil spraying, and air humidifying.



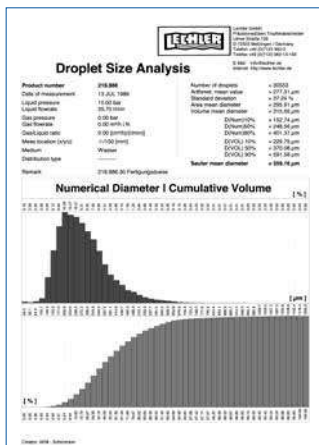
- Finest droplet particles
- Narrow free cross-sections
- Maximum spray angle: 90°

### Tangential hollow cone nozzles

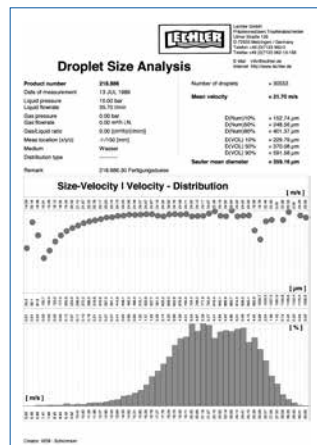
Tangential hollow cone nozzles also provide a very uniform hollow cone spray. This is due to the right-angle flow the fluid takes inside the nozzle body. An off-center inlet combines with the 90° turn the fluid makes to create a whirling rotation of the liquid within the nozzle chamber, ultimately resulting in smaller droplets and a consistent distribution upon discharge. With tangential hollow cones, spray angles up to 130° can be achieved. Due to their insert-free interiors, tangential hollow cone nozzles are basically self-cleaning and resistant to clogging, even with rather poor water conditions. Typical applications for tangential hollow cone nozzles include: air humidification in air conditioning systems, spray pond cooling, cooling of plastic pipes after extrusion, and gas cleaning in chemical and environmental engineering installations.



- Coarser droplets than axial hollow cone nozzles
- Large free cross-sections
- Wide spray angles up to 130°
- Self-cleaning, clog-resistant



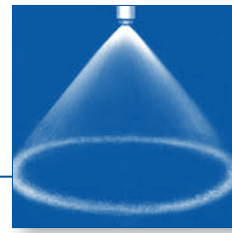
Cumulated volume distribution



Velocity distribution by number



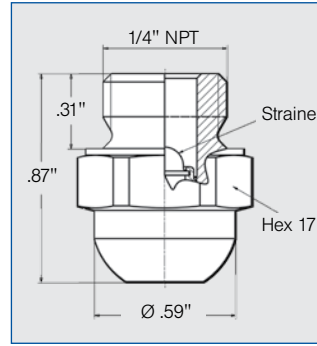
## Hollow cone nozzles Axial-low flow Series 220



**Extremely fine, fog-like hollow cone spray.**

**Applications:**

- Disinfection
- Humidification
- Cooling



**Nozzles of series 220 replace series 212 which are still available on request.**

Spray angle	Ordering no.				Orifice diam. (in.)	Free Passage (in.)	Mesh size Strainer (in.)	Flow Rate (Gallons Per Minute)								Spray Diam. D (in.) @ 72 psi H=4"	Theoretical Spray Width @ 72.5 psi (5 bar) H=100mm
	Type	Material no.		Connection				liters per minute									
		11 AISI 430F	1Y AISI 316L					Male 1/4" NPT	30 psi	45 psi	5 bar	75 psi	100 psi	150 psi	300 psi		
60°	220. 004	○	○	BC	.004	.004	.002	-	-	.013	.003	.004	.005	.007	4	100	
	220. 014	○	○	BC	.006	.006	.002	-	.004	.019	.005	.006	.007	.010	4	100	
80°	220. 085	○	○	BC	.010	.010	.004	.007	.008	.040	.011	.012	.015	.021	6	140	
	220. 125	○	○	BC	.014	.014	.004	.010	.013	.062	.016	.019	.023	.033	6	140	
	220. 145	○	○	BC	.016	.016	.004	.014	.017	.082	.022	.026	.031	.043	6	140	
	220. 165	○	○	BC	.018	.018	.004	.017	.021	.103	.027	.032	.039	.054	6	140	

**Example**    Type    +    Material no.    +    Conn.    =    Ordering no.  
for ordering: 220. 004 + 1Y                    +    BC            =    220. 004. 1Y. BC

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

**\* Materials**

Mat. no.	Housing	Nozzle insert	Strainer
11	AISI 430F	AISI 430F	AISI 316L
1Y	AISI 316L	AISI 316L	AISI 316L

Hollow cone

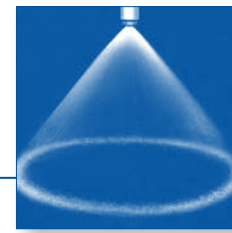
Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)







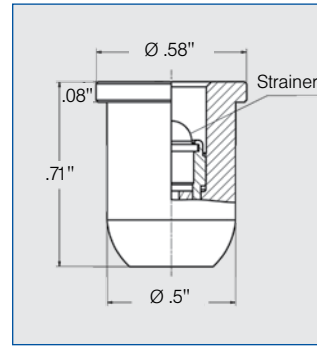
## Hollow cone nozzles Axial-low flow for retaining nut Series 226




**Hollow cone nozzle for assembly with retaining nut. Extremely fine, fog-like hollow cone spray.**

**Applications:**

- Disinfection
- Humidification
- Cooling



Spray angle	Ordering no.		Orifice diam. (in.)	Free Passage (in.)	Mesh size Strainer (in.)	Flow Rate (Gallons Per Minute)						Spray Diam. D (in.) @ 72 psi  H=4"	Theoretical Spray Width @ 72.5 psi (5 bar) H=100mm	
	Type	Material no. AISI 303*				liters per minute								
						30 psi	45 psi	5 bar	75 psi	100 psi	150 psi			300 psi
60°	226. 004	○	.004	.004	.002	-	-	.013	.003	.004	.005	.007	4	100
	226. 014	○	.006	.006	.002	-	.004	.019	.005	.006	.007	.010	4	100
80°	226. 085	○	.010	.010	.004	.007	.008	.040	.011	.012	.015	.021	6	140
	226. 125	○	.014	.014	.004	.010	.013	.062	.016	.019	.023	.033	6	140
	226. 145	○	.016	.016	.004	.014	.017	.082	.022	.026	.031	.043	6	140
	226. 165	○	.018	.018	.004	.017	.021	.103	.027	.032	.039	.054	6	140

Hollow cone

**Example**    Type    +    Material no.    =    Ordering no.  
for ordering: 226. 004    +    16                                    =    220. 004. 16

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

**\* Materials**

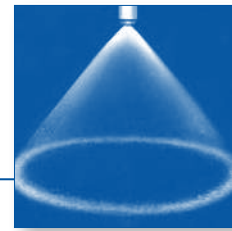
Mat. no.	Housing	Nozzle insert	Strainer
16	AISI 303	AISI 430F	AISI 316L



# Hollow cone nozzles

## Axial-low flow

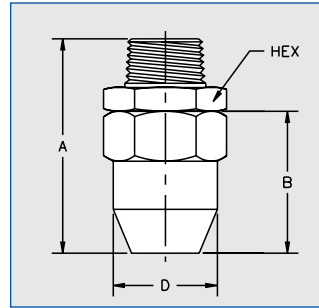
### Series 214 / 216



**Precision axial design offers fine atomization and uniform distribution. Swirl insert removable for cleaning.**

**Applications:**

- Gas cooling or cleaning
- Steam de-superheating
- Spray drying
- Dust suppression



Ordering no.	Dimensions (in.)					Approx. Wt. (lb.) Brass
	Thread Size Male NPT	Hex Size	A	B	D	
<b>214. xxx. YY. BA</b>	1/8	11/16	1.531	.718	.625	.15
<b>214. xxx. YY. BC</b>	1/4	11/16	1.593	.718	.625	.20
<b>216. xxx. YY. BC</b>	1/4	7/8	1.468	1.156	.843	.25
<b>216. xxx. YY. BE</b>	3/8	7/8	1.468	1.156	.843	.25

Spray angle	Ordering no.					Orifice diam. (in.)	Free Passage (in.)	Flow Rate (Gallons Per Minute)							Spray Diam. D (in.) @ 40 psi H=10"
	Type	Material no.		Connection				10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	
		17	30	Male NPT 1/8" 1/4" 3/8"											
60°	<b>214. 184</b>	○	○	<b>BA BC</b>	-	.020	.020	.01	.02	.08	.02	.03	.04	.04	8
	<b>214. 245</b>	○	○	<b>BA BC</b>	-	.039	.020	.02	.04	.16	.05	.06	.07	.08	18
60°	<b>214. 305</b>	○	○	<b>BA BC</b>	-	.071	.020	.05	.07	.32	.10	.12	.14	.16	18
	<b>216. 324</b>	○	○	-	<b>BC BE</b>	.039	.039	.06	.09	.40	.12	.15	.18	.20	8
	<b>216. 364</b>	○	○	-	<b>BC BE</b>	.055	.055	.10	.14	.63	.20	.24	.28	.31	8
90°	<b>216. 404</b>	○	○	-	<b>BC BE</b>	.079	.079	.16	.22	1.0	.31	.38	.44	.49	8
	<b>216. 496</b>	○	○	-	<b>BC BE</b>	.118	.079	.26	.37	1.7	.53	.65	.75	.83	20
	<b>216. 566</b>	○	○	-	<b>BC BE</b>	.158	.079	.39	.55	2.5	.78	.95	1.1	1.2	20
	<b>216. 646</b>	○	○	-	<b>BC BE</b>	.138	.079	.62	.88	4.0	1.2	1.5	1.8	2.0	20
	<b>216. 686</b>	○	○	-	<b>BC BE</b>	.158	.079	.78	1.1	5.0	1.6	1.9	2.2	2.5	20
	<b>216. 726</b>	○	○	-	<b>BC BE</b>	.197	.079	.98	1.4	6.3	2.0	2.4	2.8	3.1	20
	<b>216. 776</b>	○	○	-	<b>BC BE</b>	.236	.079	1.3	1.9	8.5	2.6	3.2	3.7	4.2	20

**Example**    Type    + Material no.    + Conn.    = Ordering no.  
**for ordering:** 216. 496 + 17                    + BC        = 216. 496. 17. BC

**This product line is also available in larger capacities up to 5 gpm @ 40 psi. Please contact Lechler if you require a larger size.**

Hollow cone

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
 (See page 12 for symbol definitions.)

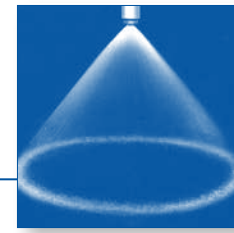




# Hollow cone nozzles

## Axial-flow

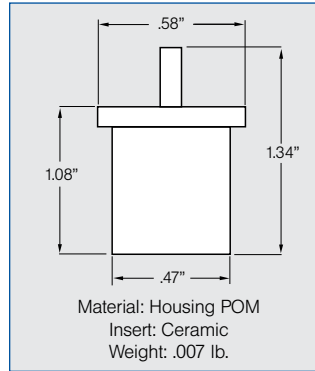
### Series 2TR



**Hollow cone nozzle with fine uniform spray. Assembly with retaining nut.**

**Applications:**

- Humidification of air
- Cooling of gases
- Dust control
- Spraying onto filters



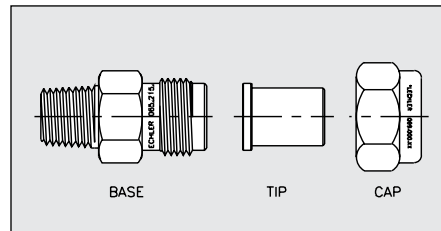
Hollow cone

Spray angle	Ordering no.	Color	Orifice diam. (in.)	Free Passage (in.)	Flow Rate (Gallons Per Minute)							Spray Diam. D (in.) @ 40 psi H=10"
					10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	
80°	<b>2TR. 245. C8</b>	Magenta	.026	.022	.02	.04	.16	.05	.06	.07	.08	18
	<b>2TR. 275. C8</b>	Black	.032	.028	.03	.05	.22	.07	.08	.10	.11	18
	<b>2TR. 305. C8</b>	Orange	.035	.032	.05	.07	.32	.10	.12	.14	.16	18
	<b>2TR. 345. C8</b>	Green	.043	.035	.07	.11	.48	.15	.18	.21	.24	18
	<b>2TR. 365. C8</b>	Yellow	.055	.037	.10	.14	.63	.20	.24	.28	.31	18
	<b>2TR. 405. C8</b>	Blue	.067	.043	.15	.21	.96	.30	.36	.42	.47	18
	<b>2TR. 445. C8</b>	Red	.079	.047	.20	.28	1.3	.39	.48	.55	.62	18
	<b>2TR. 485. C8</b>	Brown	.087	.051	.24	.34	1.6	.49	.60	.69	.77	18

Materials		
Material no.	Nozzle housing	Nozzle insert
C8	POM	Zirconium Oxide

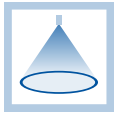
**Bases and Caps for Mounting**

Inlet NPT Male	Outlet Male	Part No.	Standard Materials: 17 316 SS 30 Brass
1/4"	11/16 x 16	065. 215. XX. 10	
3/8"	11/16 x 16	065. 211. XX. 10	
1/4"	3/8 BSPP	065. 215. XX. 11	
3/8"	3/8 BSPP	065. 215. XX. 12	
Caps			Other materials available. See Accessories beginning on page 127.
To fit 11/16x16		069. 000. XX. 00	
To fit 3/8 BSPP		065. 200. XX. 00	

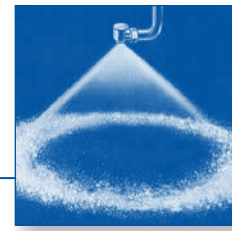


A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.





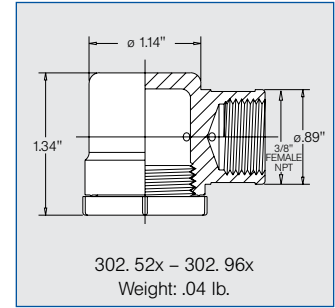
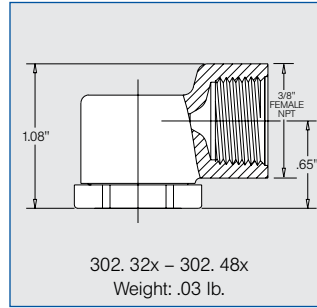
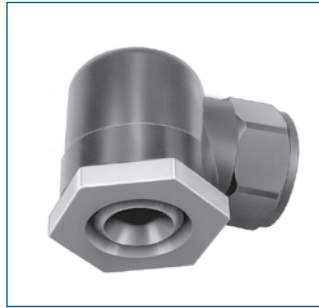
# Hollow cone nozzles Tangential-flow Series 302 Plastic version



**Uniform hollow cone spray using a clog-resistant design**

**Applications:**

- Humidification
- Air washing
- Dust collectors
- Pasteurizer cooling lines
- Tunnel coolers



Spray angle	Ordering no.				Orifice diam. (in.)	Free Passage (in.)	Flow Rate (Gallons Per Minute)								Spray Diameter D (in.) @ 30 psi		
	Type	Material no.		Connection			10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi	H=10"	H=20"	
		Nylon 51	PE 53	Female 3/8" NPT													Female 3/8" BSPP
90°	302.326	○	-	-	00	.047	.035	.06	.09	.40	.11	.12	.15	.18	.20	16	28
	302.366	○	-	-	00	.050	.051	.10	.14	.63	.17	.20	.24	.28	.31	16	28
	302.406	○	-	-	00	.102	.055	.16	.22	1.0	.27	.31	.38	.44	.49	16	35
	302.526	○	○	BF	-	.197	.079	.31	.44	2.0	.54	.62	.76	.88	.98	16	35
	302.606	○	○	BF	-	.197	.126	.49	.69	3.2	.86	.98	1.2	1.4	1.5	18	37
	302.766	○	-	BF	-	.355	.169	1.2	1.8	8.0	2.2	2.5	3.0	3.5	3.9	20	41
	302.846	○	○	BF	-	.433	.205	1.9	2.7	12.5	3.4	3.9	4.8	5.5	6.1	22	45
	302.886	○	○	BF	-	.433	.252	2.5	3.5	16.0	4.3	5.0	6.1	7.0	7.8	22	45
302.966	○	-	BF	-	.433	.339	3.9	5.5	25.0	6.7	7.8	9.5	11.0	12.3	22	45	
130°	302.408	○	-	-	00	.144	.051	.16	.22	1.0	.27	.31	.38	.44	.49	28	54
	302.528	○	-	BF	-	.197	.079	.31	.44	2.0	.54	.62	.76	.88	.98	28	54
	302.608	○	-	BF	-	.197	.126	.49	.69	3.2	.86	.98	1.2	1.4	1.5	31	60
	302.648	-	○	BF	-	.296	.118	.62	.88	4.0	1.1	1.2	1.5	1.8	2.0	37	73
	302.728	○	-	BF	-	.296	.162	.98	1.4	6.3	1.7	2.0	2.4	2.8	3.1	37	73
	302.768	○	-	BF	-	.355	.169	1.2	1.8	8.0	2.2	2.5	3.0	3.5	3.9	37	73
	302.848	○	-	BF	-	.433	.205	1.9	2.7	12.5	3.7	3.9	4.8	5.5	6.1	37	73
	302.888	○	-	BF	-	.433	.252	2.5	3.5	16.0	4.3	5.0	6.1	7.0	7.9	37	73

**Example**    Type    +    Material no.    +    Conn.    =    Ordering no.  
for ordering: 302.566 + 51                    + BF                    = 302.566.51.BF

Hollow cone

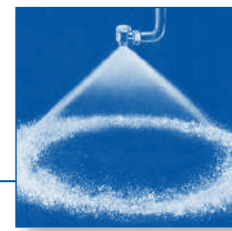
A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)





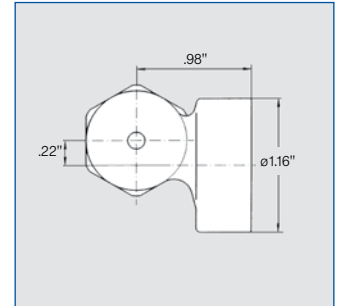
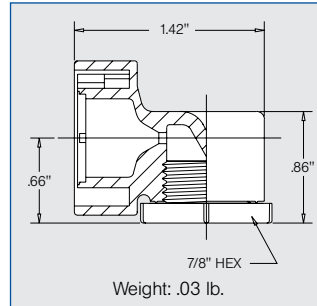
# Hollow cone nozzles Tangential-flow TWISTLOC quick release mount Series 302 Plastic version



**Uniform hollow cone spray using a clog-resistant design. Connects by hand with a quick twist.**

**Applications:**

- Humidification
- Air washing
- Dust collectors
- Pasteurizer cooling lines
- Tunnel coolers



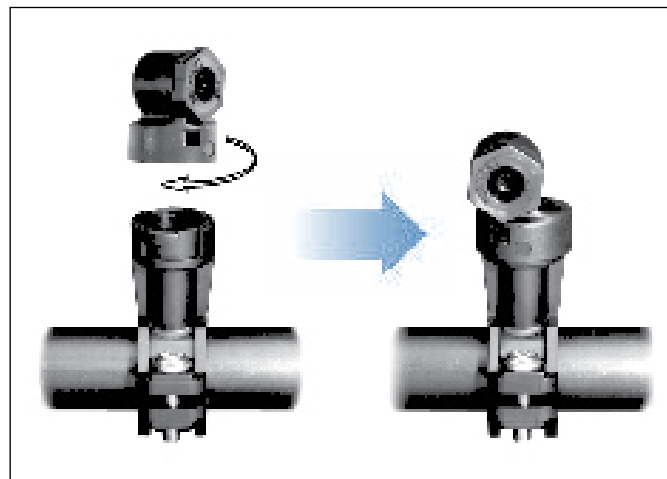
Hollow cone

Spray angle	Ordering no.				Orifice diam. (in.)	Free Passage (in.)	Flow Rate (Gallons Per Minute)								Spray Diameter D (in.) @ 30 psi	
	Type	Material no.		Conn.			10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi	H=10"	H=20"
		Nylon 51	POM 56													
45°	302.503	○	-	KB	.193	.081	.28	.39	1.8	.48	.56	.68	.79	.88	9	22
60°	302.464	-	○	KB	.150	.077	.22	.31	1.4	.38	.43	.53	.61	.69	12	22
80°	302.545	-	○	KB	.193	.091	.35	.49	2.2	.59	.70	.85	.98	1.10	16	28
90°	302.326	○	○	KB	.055	.041	.06	.09	.40	.11	.12	.15	.18	.20	16	28
	302.406	○	○	KB	.150	.061	.16	.22	1.0	.27	.31	.38	.44	.49	16	35
	302.486	○	-	KB	.150	.083	.25	.35	1.6	.43	.50	.61	.70	.78	16	35
	302.606	○	-	KB	.209	.116	.49	.69	3.2	.86	.98	1.2	1.4	1.5	19	35
130°	302.368	-	○	KB	.083	.051	.10	.14	.63	.17	.20	.24	.28	.31	28	54
	302.408	○	○	KB	.083	.079	.16	.22	1.0	.27	.31	.38	.44	.49	28	54
	302.468	○	-	KB	.110	.095	.22	.31	1.4	.38	.43	.53	.61	.69	28	54
	302.488	○	-	KB	.110	.108	.25	.35	1.6	.43	.50	.61	.70	.78	28	54

**Example** Type + Material no. + Conn. = Ordering no.  
for ordering: 302. 408 + 51 + KB = 302. 408. 51. KB

**Plastic TWISTLOC mounting system**

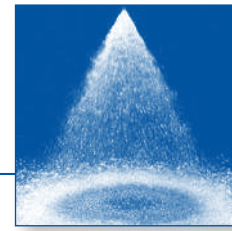
These nozzles mount by hand with a quarter turn using Lechler's TWISTLOC bases and accessories.







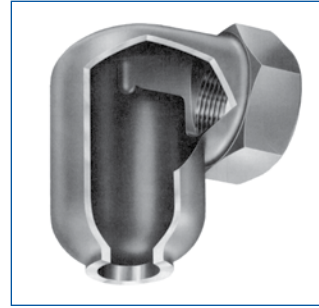
# Hollow cone nozzles Tangential-flow Ramp Bottom® Series 373



**Hollow cone spray with fine droplets and uniform distribution even at low pressure. Patented swirl chamber design with built-in ramp extends service life.**

**Applications:**

- Wet scrubbers
- Gas cooling and conditioning
- Dust suppression
- Chemical reactors
- Spray pond cooling



Inlet (Female NPT)	Dimensions (in.)				Wt. (lb.)
	A	B (Hex)	C	D	
1	2.62	1-5/8	2.05	1.78	.8
1-1/4	3.03	1-7/8	2.56	2.00	1.4
1-1/2	3.81	2-3/16	3.19	2.56	2.4
2	4.25	2-13/16	3.69	2.81	3.1
3	6.03	4	4.62	4.50	17

Type	Ordering no.					Orifice diam. (in.)	Flow Rate (Gallons Per Minute)								Spray Angle in degrees at				
	Mat. no.	Connection					liters per minute								5 psi	15 psi	40 psi		
		316 SS 17	Female NPT					5 psi	10 psi	15 psi	20 psi	2 bar	40 psi	60 psi				80 psi	100 psi
373. 115	○	BN	-	-	-	-	0.45	6.6	9.3	11	13	60	19	23	26	29	64	64	71
373. 175	○	BN	-	-	-	-	0.52	9.4	13	16	19	85	27	32	37	42	80	80	82
373. 235	○	-	BQ	-	-	-	0.64	13	19	23	27	121	38	46	53	59	66	66	75
373. 285	○	-	BQ	-	-	-	0.74	18	26	32	37	167	52	63	73	82	80	80	84
373. 325	○	-	-	BS	-	-	0.8	21	30	37	43	196	61	74	86	96	80	80	85
373. 365	○	-	-	BS	-	-	0.95	27	39	47	54	248	77	94	109	122	74	74	77
373. 445	○	-	-	-	BW	-	1.14	45	63	77	89	406	126	154	178	199	77	77	80
373. 465	○	-	-	-	BW	-	1.21	51	72	88	101	461	143	175	202	226	82	82	90
373. 514	○	-	-	-	-	MB	1.45	65	92	112	129	590	183	224	259	289	56*	62**	-
373. 554	○	-	-	-	-	MB	1.62	81	115	141	163	741	230	282	325	364	62*	68**	-

\* degree is for 3 psi  
\*\* degree is for 7 psi

**Example for ordering:** Type 373. 325 + Material no. 17 + Conn. BS = Ordering no. 373. 325. 17. BS

**This product line is also available in larger capacities with inlets up to 6" in size. Please contact Lechler if you have an application requiring a larger size.**

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)



Hollow cone



# Full cone nozzles

- Absorption
- Chemical process engineering
- Chlorine precipitation
- Cleaning
- Cooling
- Desuperheating
- Dust control
- Fire protection
- Foam control
- Gas treatment
- Spraying onto mats in air washers
- Spraying over packings
- Surface spraying
- Water treatment
- and many others...





## Full cone nozzles

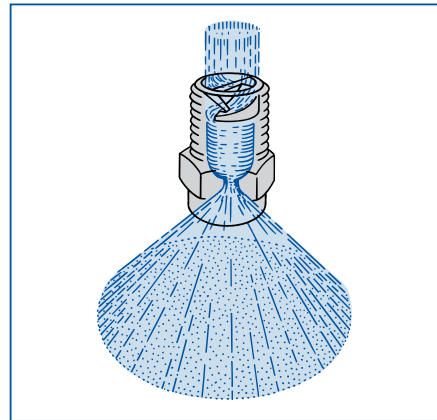
Full cone nozzles spray completely within the interior of a circular area. They are especially appropriate for cleaning, coating, dust suppression, or any application where the target is static. There are two different styles of full cone nozzles: **Axial** and **Tangential**.

### Axial full cone nozzles

Axial full cone nozzles spray on the same axis as the inlet fluid. Lechler axial full cone nozzles evenly distribute liquid spray over the whole circular impact area. This high precision of distribution is due to internal vanes which create swirl chambers inside the nozzle. These vanes break up the inlet flow so that the liquid exits the orifice in a circular mass of droplets. While an axial full cone nozzle's vane typically has a smaller free passage than the nozzle's orifice diameter, the Series 460's x-style swirl insert

has larger free cross-sections, making it easier to spray particle-filled fluid. Axial full cone nozzles are available with several different spray angles and in a wide range of flow rates. Consequently, matching a specific axial full cone to your application can more easily be made. Therefore, axial full cones offer these advantages:

- Even liquid distribution
- Wide flow rate range
- Large number of available spray angles

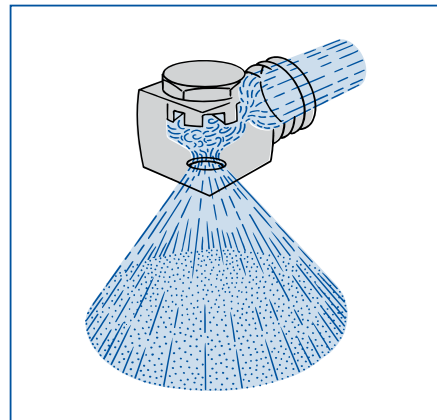


### Tangential full cone nozzles

Tangential full cone nozzles spray at a 90° angle (or tangent) to the inlet fluid. Tangential full cone nozzles are particularly suited for spraying liquids with a high amount of particulate matter or for fire fighting applications. This is because unlike axial full cones, tangential full cone nozzles have no internal vanes, making them much less prone to clogging. The inlet fluid is tangentially supplied to a swirl chamber where it is put into rotation, much like in a tangential hollow cone nozzle. However, in this case the full

cone spray is obtained when a sufficient amount of the fluid is disturbed by specially-arranged grooves, milled into the nozzle bottom, which cause a portion of the rotating liquid flow to diverge to the center of the swirl chamber. The result is a liquid spray which exits the nozzle orifice in an evenly distributed full cone pattern. Tangential full cone nozzles offer these advantages:

- Clog resistant, as they have no internal vanes
- Uniform liquid distribution
- Stable spray angles at various liquid pressures

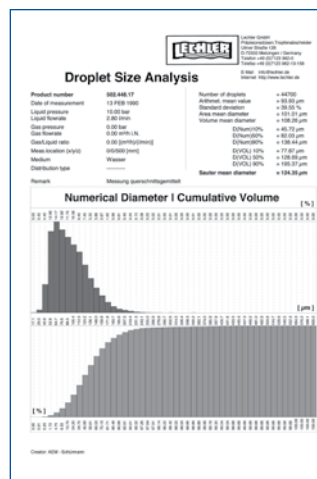


### Cluster head nozzles

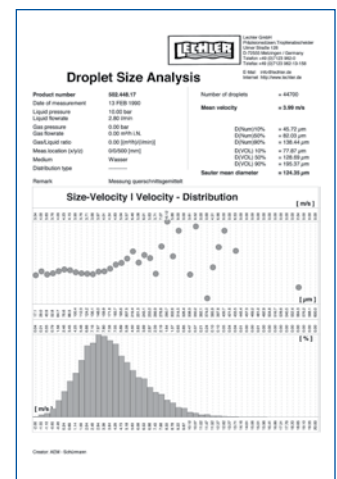
Lechler cluster head nozzles create a full cone spray of finely atomized droplets. This makes it particularly appropriate for applications in which a fine, fog-like, full cone atomized spray with a relatively large flow rate is necessary (e.g., gas exchange processes, steam cooling, or dust suppression). The cluster head nozzle achieves this pattern by overlapping seven separate hollow cones to form a full cone pattern with a larger droplet surface area compared to a similar standard full cone. It therefore creates the best of both worlds: it has the smaller droplet size and

increased surface area of a hollow cone nozzle but with the overall coverage of a full cone. Such droplet sizes cannot be achieved by a single-orifice full cone spray nozzle with the same flow rate. The increased droplet surface area of the atomized liquid provides great efficiency in gas treatment and cooling applications. Cluster head nozzles offer these advantages:

- Large droplet surface area (i.e., fine or small droplet sizes)
- Full cone spray pattern
- Largest flow rates for the average droplet size produced



Cumulated volume distribution



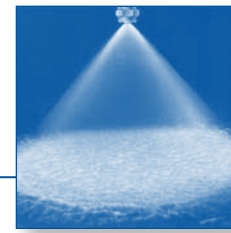
Velocity distribution by number



# Full cone nozzles

## Axial-flow

### Series 460 / 461



**Uniform spray pattern.**  
**Offered in a wide range of spray angles and flow rates.**

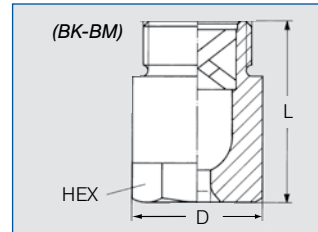
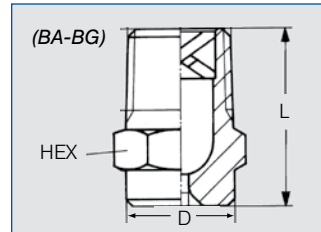
**Applications:**

- Washing and cleaning
- Dust suppression
- Mist eliminator washing
- Chemical reactors
- Surface spraying
- Chemical injection



Dimensions (in.)					
Connection Code	Inlet (Male NPT)	L	D	Hex	Weight Brass (lb.)
BA	1/8	.71	.51	9/16	.03
BC	1/4	.87	.51	9/16	.04
BE	3/8	1.18	.63	11/16	.07
BG	1/2	1.65	.83	7/8	.15
BK	3/4	1.97	1.09	1-1/8	.38
BM	1	2.20	1.32	1-3/8	.79

Subject to technical modifications



Spray angle	Ordering no.										Flow Rate (Gallons Per Minute)								Spray Diam. D (in.) @ 30 psi			
	Type	Mat. no.		Connection						Orifice diam. (in.)	Free passage (in.)											
		PVDF 5E	Polypro 53	Male NPT								10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi			150 psi
60°	460.644	○	-	-	BC	BE	-	-	-	.095	.075	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	9	22
	460.964	○	-	-	-	-	-	BK	-	.229	.193	4.3	5.7	25	6.7	7.5	8.8	9.9	10.8	12.7	9	22
90°	460.326	○	-	-	BA	-	-	-	-	.032	.022	.07	.09	0.4	.11	.12	.14	.16	.17	.20	15	34
	460.406	○	-	-	BA	-	-	-	-	.047	.033	.17	.23	1.0	.27	.30	.35	.40	.43	.51	15	34
	460.486	○	-	-	BA	-	-	-	-	.057	.047	.28	.36	1.6	.43	.48	.57	.63	.69	.82	15	34
	460.526	○	-	-	BA	-	-	-	-	.065	.051	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	15	34
	460.606	○	-	-	BA	-	BE	-	-	.081	.057	.54	.72	3.2	.84	.95	1.1	1.2	1.4	1.6	15	34
	460.646	○	-	-	BC	BE	-	-	-	.091	.071	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	15	38
	460.726	○	-	-	-	BE	-	-	-	.116	.079	1.1	1.4	6.3	1.7	1.9	2.2	2.5	2.7	3.2	15	38
	460.746	○	-	-	-	BE	-	-	-	.130	.075	1.2	1.6	7.1	1.9	2.1	2.5	2.8	3.1	3.6	15	38
	460.766	○	-	-	-	BE	-	-	-	.130	.095	1.4	1.8	8.0	2.1	2.4	2.8	3.2	3.5	4.1	15	38
	460.806	○	-	-	-	BE	-	-	-	.146	.106	1.7	2.3	10.0	2.7	3.0	3.5	4.0	4.3	5.1	15	38
	460.846	○	-	-	-	BE	-	-	-	.160	.126	2.2	2.8	12.5	3.3	3.8	4.4	5.0	5.4	6.4	15	38
	460.886	○	-	-	-	BE	BG	-	-	.185	.122	2.8	3.6	16.0	4.3	4.8	5.7	6.3	6.9	8.2	15	38
	460.926	○	-	-	-	-	BG	-	-	.205	.150	3.5	4.6	20	5.4	6.0	7.1	7.9	8.7	10.2	15	38
	460.966	○	-	-	-	-	BG	BK	-	.229	.150	4.3	5.7	25	6.7	7.5	8.8	9.9	10.8	12.7	15	38
461.006	○	-	-	-	-	BG	-	-	.252	.150	5.4	7.2	32	8.4	9.5	11.1	12.5	13.7	16.1	15	38	
461.046	-	○	-	-	-	-	BK	-	.284	.209	6.9	9.1	40	10.7	12.0	14.1	15.9	17.3	20	15	38	
461.086	○	-	-	-	-	-	BK	-	.323	.209	8.6	11.4	50	13.4	15.0	17.7	19.8	22	25	15	38	
461.126	○	-	-	-	-	-	-	BM	.366	.256	10.9	14.3	63	16.9	18.9	22	25	27	32	15	38	
461.146	○	-	-	-	-	-	-	BM	.390	.264	12.3	16.2	71	19.0	21	25	28	31	36	15	38	
120°	460.408	○	-	-	BA	-	-	-	-	.047	.033	.17	.23	1.0	.27	.30	.35	.40	.43	.51	27	48
	460.488	○	-	-	BA	-	-	-	-	.059	.039	.28	.36	1.6	.43	.48	.57	.63	.69	.82	27	48
	460.528	○	-	-	BA	-	-	-	-	.065	.047	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	27	48
	460.608	○	-	-	BA	-	-	-	-	.083	.055	.54	.72	3.2	.84	.95	1.1	1.2	1.4	1.6	27	48
	460.648	○	-	-	BC	BE	-	-	-	.097	.063	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	27	52
	460.728	○	-	-	-	BE	-	-	-	.122	.075	1.1	1.4	6.3	1.7	1.9	2.2	2.5	2.7	3.2	27	52
	460.748	○	-	-	-	BE	-	-	-	.130	.075	1.2	1.6	7.1	1.9	2.1	2.5	2.8	3.1	3.6	27	52
	460.768	○	-	-	-	BE	-	-	-	.138	.075	1.4	1.8	8.0	2.1	2.4	2.8	3.2	3.5	4.1	27	52
	460.808	○	-	-	-	BE	-	-	-	.150	.095	1.7	2.3	10.0	2.7	3.0	3.5	4.0	4.3	5.1	27	52
	460.848	○	-	-	-	BE	-	-	-	.165	.106	2.2	2.8	12.5	3.3	3.8	4.4	5.0	5.4	6.4	27	52
	460.888	○	-	-	-	BE	BG	-	-	.181	.122	2.8	3.6	16.0	4.3	4.8	5.7	6.3	6.9	8.2	27	52
	460.968	○	-	-	-	-	BG	-	-	.232	.162	4.3	5.7	25	6.7	7.5	8.8	9.9	10.8	12.7	27	52
	461.048	-	○	-	-	-	-	BK	-	.299	.193	6.9	9.1	40	10.7	12.0	14.1	15.9	17.3	20	27	52

**Example** Type + Material no. + Conn. = Ordering no.  
 for ordering: 460.728 + 5E + BE = 460.728.5E.BE

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
 (See page 12 for symbol definitions.)

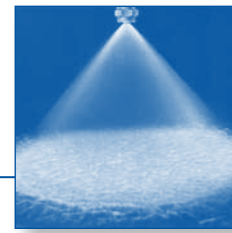


Full cone



**Full cone nozzles**  
**Axial-flow**  
**Series 490 / 491**

**NEW Patent pending**



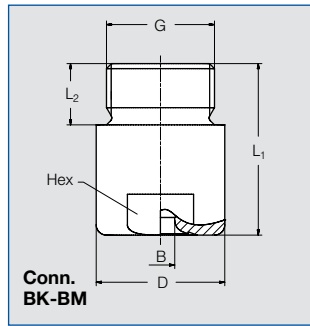
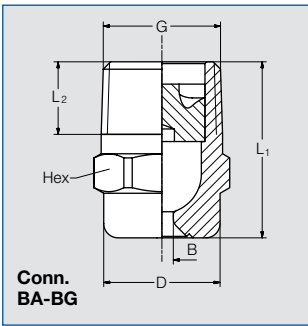
**Excellent uniform full cone distribution and thorough atomization. Non-clogging nozzle design. Stable spray angle and particularly even liquid distribution.**

**Applications:**

Cleaning and washing processes, surface spraying, container cleaning, foam precipitation, degassing of liquids.



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



Conn.	Dimensions (in.)					Weight Brass
	G	L <sub>1</sub>	L <sub>2</sub>	D	Hex	
<b>BA</b>	1/8 NPT	0.71	0.26	0.39	7/16	.03
<b>BC</b>	1/4 NPT	0.87	0.39	0.51	9/16	.04
<b>BE</b>	3/8 NPT	0.96	0.39	0.63	11/16	.07
<b>BE</b>	3/8 NPT	1.18	0.39	0.63	11/16	.11
<b>BG</b>	1/2 NPT	1.28	0.51	0.83	14/16	.13
<b>BG</b>	1/2 NPT	1.71	0.51	0.83	14/16	.19
<b>BK</b>	3/4 NPT	1.65	0.59	1.26	1-1/16	.42
<b>BK</b>	3/4 NPT	1.97	0.59	1.26	1-1/16	.44
<b>BM</b>	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.

Full cone

Spray angle	Ordering no.										Orifice diam. (in.)	Free Passage (in.)	Flow Rate (Gallons Per Minute)									Spray Diam. D (in.) @ 30 psi	
	Type	Mat. no.		Connection									liters per minute		Gallons Per Minute							H=8"	H=20"
		316 L 1Y	Brass 30	Male NPT									10 psi	20 psi	Gallons Per Minute								
				1/8"	1/4"	3/8"	1/2"	3/4"	1"	2 bar					30 psi	40 psi	60 psi	80 psi	100 psi	150 psi			
60°	490.404	○	○	BA	-	-	-	-	-	-	.045	.045	.17	.23	1.00	.27	.30	.35	.40	.43	0.51	9	22
	490.444	○	○	BA	-	-	-	-	-	-	.049	.049	.22	.29	1.25	.33	.38	.44	.49	.54	0.64	9	22
	490.524	○	○	BA	-	-	-	-	-	-	.063	.063	.35	.46	2.00	.54	.60	.71	.79	.87	1.02	9	22
	490.644	○	○	-	BC	BE	-	-	-	-	.091	.091	.69	.91	4.00	1.07	1.20	1.41	1.59	1.73	2.04	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
	490.804	○	○	-	-	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	3.64	16.00	4.28	4.81	5.65	6.34	6.94	8.16	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
491.084	○	○	-	-	-	-	-	BM	-	.321	.321	8.63	11.38	50.00	13.39	15.02	17.67	19.82	21.67	25.49	9	22	
90°	490.406	○	○	BA	-	-	-	-	-	-	.047	.047	.17	.23	1.00	.27	.30	.35	.40	.43	.51	15	34
	490.486	○	○	BA	-	-	-	-	-	-	.057	.057	.28	.36	1.60	.43	.48	.57	.63	.69	.82	15	34
	490.526	○	○	BA	-	-	-	-	-	-	.067	.067	.35	.46	2.00	.54	.60	.71	.79	.87	1.02	15	34
	490.606	○	○	BA	-	-	-	-	-	-	.081	.081	.54	.72	3.15	.84	.95	1.11	1.25	1.37	1.61	15	34
	490.646	○	○	-	BC	-	-	-	-	-	.094	.094	.69	.91	4.00	1.07	1.20	1.41	1.59	1.73	2.04	15	38
	490.726	○	○	-	BC	BE	-	-	-	-	.126	.110	1.09	1.43	6.30	1.69	1.89	2.23	2.50	2.73	3.21	15	38
	490.806	○	○	-	-	BE	-	-	-	-	.154	.154	1.72	2.28	10.00	2.68	3.00	3.53	3.97	4.34	5.10	15	38
	490.846	○	○	-	-	BE	-	-	-	-	.183	.157	2.16	2.85	12.50	3.35	3.76	4.42	4.96	5.42	6.37	15	38
	490.886	○	○	-	-	-	BG	-	-	-	.215	.177	2.76	3.64	16.00	4.28	4.81	5.65	6.34	6.94	8.16	15	38
	490.926	○	○	-	-	-	BG	-	-	-	.232	.177	3.45	4.56	20.00	5.36	6.01	7.07	7.93	8.67	10.20	15	38
	490.966	○	○	-	-	-	BG	-	-	-	.258	.191	4.31	5.69	25.00	6.70	7.51	8.83	9.91	10.84	12.74	15	38
	491.086	○	○	-	-	-	-	-	BM	-	.372	.285	8.63	11.38	50.00	13.39	15.02	17.67	19.82	21.67	25.49	15	38

Continued on next page.

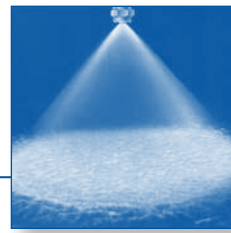




# Full cone nozzles

## Axial-flow

### Series 490 / 491



Spray angle	Ordering no.										Orifice diam. (in.)	Free Passage (in.)	Flow Rate (Gallons Per Minute)										Spray Diam. D (in.) @ 30 psi	
	Type	Mat. no.		Connection									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"	
		1Y	30	Male NPT																				
				1/8"	1/4"	3/8"	1/2"	3/4"	1"															
120°	490. 368	○	○	BA	-	-	-	-	-	-	.033	.026	.11	.14	.63	.17	.19	.22	.25	.27	.32	27	48	
	490. 408	○	○	BA	-	-	-	-	-	-	.047	.047	.17	.23	1.00	.27	.30	.35	.40	.43	.51	27	48	
	490. 488	○	○	BA	-	-	-	-	-	-	.057	.057	.28	.36	1.60	.43	.48	.57	.63	.69	.82	27	48	
	490. 568	○	○	BA	-	-	-	-	-	-	.075	.075	.43	.57	2.50	.67	.75	.88	.99	1.08	1.27	27	48	
	490. 648	○	○	-	BC	BE	-	-	-	-	.094	.094	.69	.91	4.00	1.07	1.20	1.41	1.59	1.73	2.04	27	52	
	490. 728	○	○	-	BC	BE	-	-	-	-	.126	.110	1.09	1.43	6.30	1.69	1.89	2.23	2.50	2.73	3.21	27	52	
	490. 748	○	-	-	-	BE	-	-	-	-	.126	.126	1.23	1.62	7.10	1.90	2.13	2.51	2.82	3.08	3.62	27	52	
	490. 808	○	○	-	-	BE	-	-	-	-	.154	.154	1.72	2.28	10.00	2.68	3.00	3.53	3.97	4.34	5.10	27	52	
	490. 848	○	○	-	-	BE	-	-	-	-	.185	.157	2.16	2.85	12.50	3.35	3.76	4.42	4.96	5.42	6.37	27	52	
	490. 928	○	○	-	-	-	BG	-	-	-	.228	.187	3.45	4.56	20.00	5.36	6.01	7.07	7.93	8.67	10.20	27	52	
	490. 968	○	○	-	-	-	BG	BK	-	-	.262	.191	4.31	5.69	25.00	6.70	7.51	8.83	9.91	10.84	12.74	27	52	
	491. 048	○	○	-	-	-	-	BK	-	-	.362	.230	6.90	9.11	40.00	10.71	12.02	14.14	15.86	17.34	20.39	27	52	
	491. 148	○	-	-	-	-	-	-	BM	-	.449	.301	12.25	16.17	71.00	19.01	21.33	25.09	28.15	30.78	36.20	27	52	

**Example**    Type    +    Material no.    +    Conn.    =    Ordering no.  
**for ordering:** 490. 368 + 1Y                    +    BA                    =    490. 368. 1Y. BA

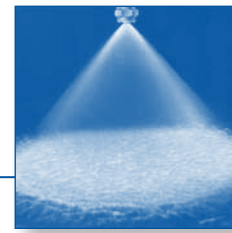
Full cone

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
 (See page 12 for symbol definitions.)





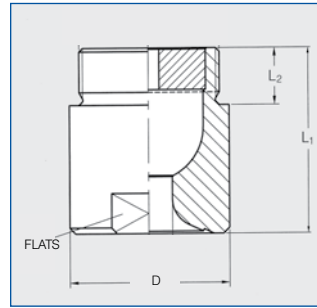
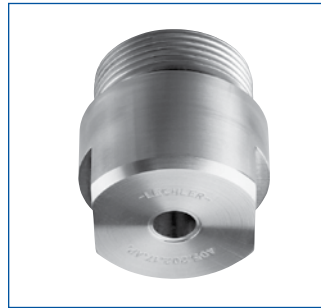
# Full cone nozzles Axial-flow Series 405



**Uniform spray pattern.  
Large free passage cross-  
sections due to optimized  
x-style swirl insert.**

**Applications:**

- Surface spraying
- Spraying over packings
- Cleaning and washing processes
- Chemical process engineering
- Cooling of gaseous fluids and solids
- Water treatment



Dimensions (in.)				
Inlet (Male NPT)	L1	L2	D	Flats
1-1/4	1.97	.75	1.93	1-5/8
1-1/2	2.36	.75	2.32	2
2	3.07	.94	2.68	2-3/8

Spray angle	Ordering no.				Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)								Spray Diam. D (in.) @ 30 psi		
	Type	Material no.	Connection				liters per minute				psi				H=20"	H=40"	
			Male NPT				5 psi	10 psi	20 psi	2 bar	30 psi	40 psi	60 psi				
90°	405. 206	○	BP	-	-	.473	.197	13	17	23	100	27	30	35	31	57	
	405. 286	○	-	BR	-	.599	.244	21	28	36	160	43	48	57	31	61	
	405. 326	○	-	-	BV	-	.678	.303	26	35	46	200	54	60	71	33	63
	405. 366	○	-	-	BV	-	.768	.343	33	43	57	250	67	75	88	33	63
	405. 406	○	-	-	BV	-	.867	.374	41	54	72	315	85	95	111	33	63
120°	405. 208	○	BP	-	-	.500	.197	13	17	23	100	27	30	35	57	102	
	405. 288	○	-	BR	-	.630	.260	21	28	36	160	43	48	57	59	106	
	405. 328	○	-	-	BV	-	.701	.311	26	35	46	200	54	60	71	59	110
	405. 368	○	-	-	BV	-	.792	.347	33	43	57	250	67	75	88	59	110
	405. 408	○	-	-	BV	-	.883	.359	41	54	72	315	85	95	111	59	110

**Example**    Type    +    Material no.    +    Conn.    =    Ordering no.  
for ordering: 405. 204    +    1Y                    +    BP            =    405. 204. 1Y. BP

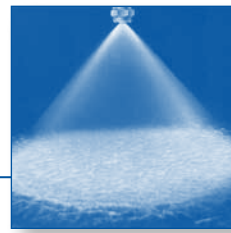
Full cone



# Full cone nozzles

## Axial-flow

### Series 419



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

**Applications:**

- Gas washing
- Spraying over packings
- Dust control
- Absorption
- Distillation



Figure 1

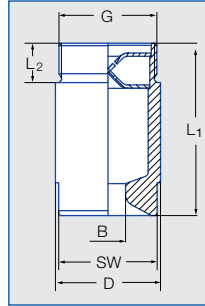


Figure 2

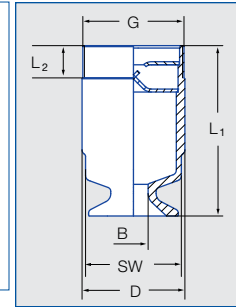
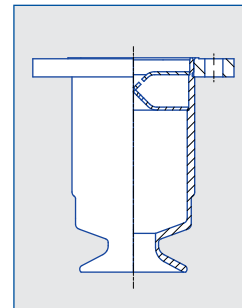
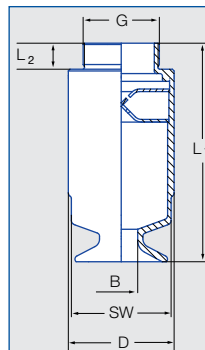


Figure 3



Other materials and flange versions are available on request

Spray Angle	Type	Code	Figure	Dimensions [in]					Weight (lbs)
				G NPT Male	L <sub>1</sub>	L <sub>2</sub>	D	Flats	
90° + 120°	419.3XX	BR	3	1 1/2	5.20	.87	2.52	2.36	3.31
		BV	1	2	4.49	.94	2.52	2.36	2.65
	419.4XX	BV	3	2	6.42	1.06	3.15	2.95	4.41
		BY	2	2 1/2	5.28	.94	3.15	2.95	3.75
	419.51X 419.54X	BV	3	2	7.83	1.06	4.02	3.74	8.16
		BY	3	2 1/2	7.95	1.18	4.02	3.74	8.38
		MA	3	3	8.07	1.26	4.02	3.74	11.46
	419.57X	MC	2	3 1/2	6.65	1.06	4.02	3.74	7.05
		BY	3	2 1/2	9.09	1.18	4.53	4.13	11.46
		MA	3	3	9.17	1.42	4.53	4.13	11.46
	419.6XX	ME	2	4	7.64	.36	4.53	4.13	9.70
		MA	3	3	9.92	.30	4.41	4.53	11.90
MC		3	3 1/2	10.00	.32	4.41	4.53	12.13	

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
 (See page 12 for symbol definitions.)



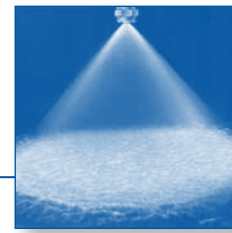
Full cone



# Full cone nozzles

## Axial-flow

### Series 419

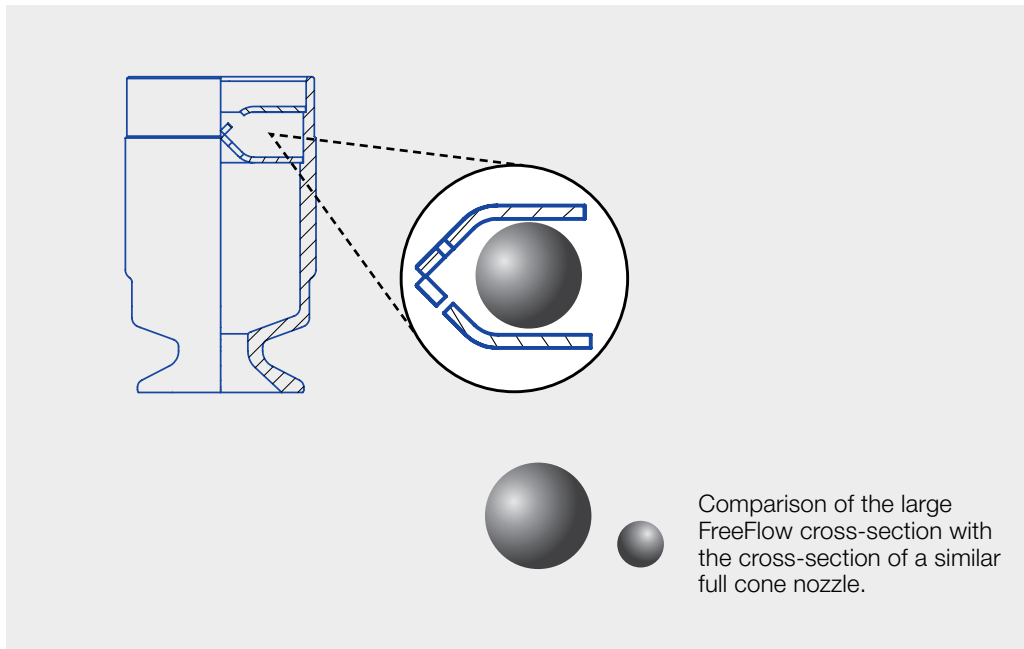


Spray angle*	Type	Mat.-Nr.		Ordering no. Code								B Ø [in]	E Ø [in]	Flow Rate (Gallons Per Minute)					Spray Diameter D [in] at p = 15 psi	
		1Y	2P	1 1/2 Male NPT	2 Male NPT	2 1/2 NPT male	3 NPT male	3 1/2 NPT male	4 NPT male	5 psi	10 psi			15 psi	30 psi	75 psi	H = 20 in	D = 40 in		
		316L SS	904 L																	
90°	419.366	○	○	BR	BV	-	-	-	-	.70	.69	33	43	51	67	97	39	79		
	419.396	○	○	BR	BV	-	-	-	-	.81	.69	39	52	61	80	116	39	79		
	419.446	○	○	-	BV	BY	-	-	-	.91	.81	52	69	81	107	155	39	79		
	419.486	○	○	-	BV	BY	-	-	-	1.10	.81	65	86	101	134	193	39	79		
	419.516	○	○	-	BV	BY	MA	MC	-	1.07	.95	78	104	122	161	232	39	79		
	419.546	○	○	-	BV	BY	MA	MC	-	1.30	.95	93	124	144	190	274	39	79		
	419.576	○	○	-	-	BY	MA	-	ME	1.34	1.07	111	147	172	228	328	39	79		
	419.606	○	○	-	-	-	MA	MC	-	1.48	1.19	131	172	203	268	386	39	79		
419.626	○	○	-	-	-	MA	MC	-	1.69	1.19	163	216	254	335	483	39	79			
120°	419.368	○	○	BR	BV	-	-	-	-	.81	.69	33	43	51	67	97	67	114		
	419.398	○	○	BR	BV	-	-	-	-	.93	.69	39	52	61	80	116	67	114		
	419.448	○	○	-	BV	BY	-	-	-	.96	.81	52	69	81	107	155	67	114		
	419.488	○	○	-	BV	BY	-	-	-	1.16	.81	65	86	101	134	193	67	114		
	419.518	○	○	-	BV	BY	MA	MC	-	1.07	.95	78	104	122	161	232	67	114		
	419.548	○	○	-	BV	BY	MA	MC	-	1.34	.95	93	124	144	190	274	67	114		
	419.578	○	○	-	-	BY	MA	-	ME	1.34	1.13	111	147	172	228	328	67	114		
	419.608	○	○	-	-	-	MA	MC	-	1.50	1.27	131	172	203	268	386	67	114		
419.628	○	○	-	-	-	MA	MC	-	1.71	1.27	163	216	254	335	483	67	114			

B = Orifice diameter-Ø · E = Free passage · \* Spray angle at 15 psi

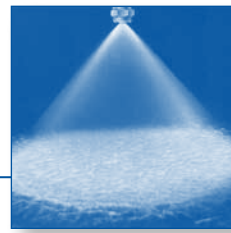
**Example**    **Type**    +    **Material-Nr.**    +    **Code**    =    **Ordering no.**  
**for ordering:**    419.366    +    1Y                         +    BR    =    419.366.1Y.BR

Full cone





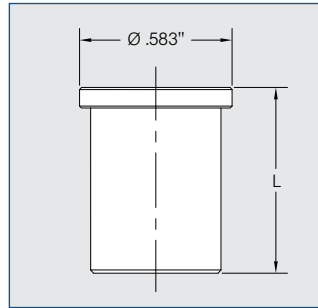
# Full cone tips Axial-flow Series 468



**Excellent uniform full cone distribution and thorough atomization. Spray angles are consistent over the full capacity range.**

**Applications:**

- Washing and cleaning
- Mist eliminator washing
- Chemical reactors
- Surface spraying

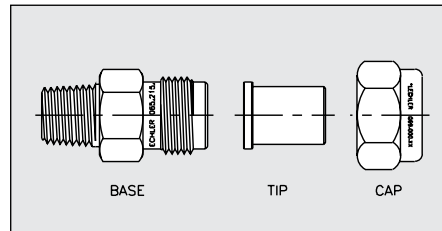


Dimensions (in.)		
Capacity	Length (L)	Wt. brass (lb.)
468.36X-468.60X	.71	.04
468.64X-468.84X	.97	.04

Spray angle	Ordering no.				Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)									L (in.)	Spray Diam. D (in.) @ 30 psi	
	Type	Material no.					10 psi			20 psi			liters per minute				H=8"	H=20"
		316 SS 17 <sup>1)</sup>	Brass 30	PVDF 5E			10 psi	20 psi	liters per minute	30 psi	40 psi	60 psi	80 psi	100 psi	150 psi			
60°	468. 604	-	○	-	.081	.055	.54	.72	3.2	.84	.95	1.1	1.2	1.4	1.6	.71	9	22
	468. 644	-	○	○	.095	.075	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	.97	9	22
	468. 684	-	○	-	.102	.079	.86	1.1	5.0	1.3	1.5	1.8	2.0	2.2	2.5	.97	9	22
	468. 724	○	○	-	.114	.079	1.1	1.4	6.3	1.7	1.9	2.2	2.5	2.7	3.2	.97	9	22
90°	468. 526	○	○	○	.065	.051	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	.71	15	34
	468. 846	-	○	-	.160	.126	2.2	2.9	12.5	3.4	3.8	4.4	5.0	5.4	6.4	.97	15	34
120°	468. 368	-	○	-	.037	.028	.11	.14	.60	.17	.19	.22	.25	.27	.32	.71	27	61
	468. 408	○	○	-	.047	.033	.17	.23	1.0	.27	.30	.35	.40	.43	.51	.71	27	61
	468. 488	○	○	-	.059	.039	.28	.36	1.6	.43	.48	.57	.63	.69	.82	.71	27	61
	468. 528	○	○	-	.065	.047	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	.71	27	61

**Bases and Caps for Mounting**

Inlet NPT Male	Outlet Male	Part No.	Standard Materials:
1/4"	11/16 x 16	065. 215. XX. 10	17 316 SS
3/8"	11/16 x 16	065. 211. XX. 10	30 Brass
1/4"	3/8 BSPP	065. 215. XX. 11	
3/8"	3/8 BSPP	065. 215. XX. 12	
Caps			
To fit 11/16x16		069. 000. XX. 00	Other materials available. See Accessories beginning on page 127.
To fit 3/8 BSPP		065. 200. XX. 00	



**Example** Type + Material no. = Ordering no.  
for ordering: 468. 526 + 17 = 468. 526. 17

1) We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 17.

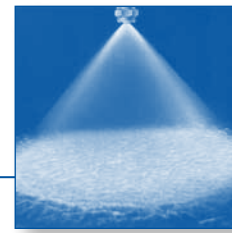
A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $v_2 = v_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)





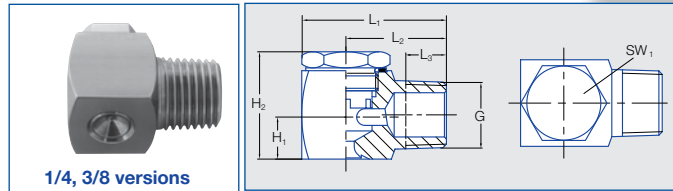
# Full cone nozzles Tangential-flow Series 422 / 423 Metal version



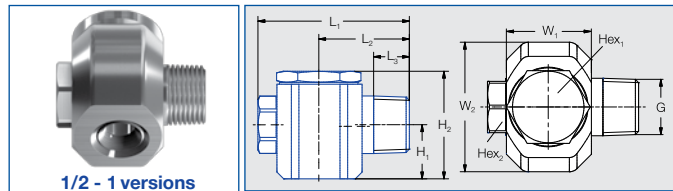
**Tangential design has no internal swirl device for maximum clog resistance. Spray distribution and angle are stable over a wide range of pressures.**

**Applications:**

- Cleaning and washing processes
- Mist eliminator washing
- Scrubber towers
- Chemical reactors
- Chemical injection



1/4, 3/8 versions



1/2 - 1 versions

G (male NPT)	Dimensions [in]										Weight (lb.)
	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	H <sub>1</sub>	H <sub>2</sub>	W <sub>1</sub>	W <sub>2</sub>	Hex <sub>1</sub>	Hex <sub>2</sub>		
1/4"	1.1	.79	.38	.31	.83	.61	.63	.43	-	.097	
3/8"	1.42	.98	.4	.43	1.05	.91	.87	.75	-	.222	
1/2"	2.2	1.32	.52	.79	1.57	1.26	1.89	1.06	0.75	.816	
3/4"	2.58	1.52	.57	.93	2.24	1.5	2.48	1.42	1.06	1.83	
1"	3.35	1.91	.66	1.07	2.6	2.17	3.07	1.61	1.42	3.49	

Spray angle	Ordering no.										Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)							Spray Diam. D (in.) @ 40 psi		
	Type	Mat. no.		Connection									liters per minute							H=8"	H=20"	
		AISI 316L 1Y	Brass 30	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"			2"	10 psi	20 psi	2 bar	40 psi	60 psi	80 psi			100 psi
60°	422. 644	○	○	-	BE	-	-	-	-	-	.118	.118	.62	.88	4.0	1.2	1.5	1.8	2.0	9	20	
90°	422. 406	○	○	BC	-	-	-	-	-	-	.059	.057	.16	.22	1.0	.31	.38	.44	.49	15	34	
	422. 486	○	○	BC	-	-	-	-	-	-	.075	.071	.25	.35	1.6	.50	.61	.70	.78	15	34	
	422. 566	○	○	BC	-	-	-	-	-	-	.091	.087	.39	.55	2.5	.78	.95	1.1	1.2	15	34	
	422. 606	○	○	-	BE	-	-	-	-	-	.102	.099	.49	.69	3.2	.98	1.2	1.4	1.6	15	34	
	422. 646	○	○	-	BE	-	-	-	-	-	.118	.114	.62	.88	4.0	1.2	1.5	1.8	2.0	15	38	
	422. 766	○	-	-	BE	-	-	-	-	-	.164	.162	1.2	1.8	8.0	2.5	3.0	3.5	3.9	15	38	
	422. 886	○	○	-	BE	-	-	-	-	-	.230	.230	2.5	3.5	16.0	5.0	6.1	7.0	7.9	15	38	
	422. 966	○	-	-	BG	-	-	-	-	-	.315	.315	3.9	5.5	25	7.8	9.5	11.0	12.3	15	38	
	423. 006	○	-	-	BG	-	-	-	-	-	.343	.343	4.8	6.8	31	9.6	11.8	13.6	15.2	15	38	
	423. 046	○	-	-	-	BK	-	-	-	-	.426	.402	6.2	8.8	40	12	15	18	20	15	38	
	423. 086	○	-	-	-	BK	-	-	-	-	.449	.433	7.8	11.0	50	15.5	19.0	22	25	15	38	
	423. 126	○	-	-	-	BK	-	-	-	-	.500	.485	9.8	13.8	63	19.5	24	28	31	15	38	
	423. 146	○	-	-	-	-	BM	-	-	-	.552	.532	11.0	15.6	71	22	27	31	35	15	38	
	423. 206	○	-	-	-	-	BM	-	-	-	.670	.630	15.5	21.9	100	31	38	44	49	15	38	
423. 286	○	-	-	-	-	BP	-	-	-	.748	.748	25.0	35.0	160	50	61	71	79	15	38		
423. 366	○	-	-	-	-	-	BR	-	-	.875	-	38.0	54.0	246	76	93	107	120	15	38		
423. 406	○	-	-	-	-	-	-	BV	-	-	-	49.0	69.0	315	98	120	139	155	15	38		
423. 446	○	-	-	-	-	-	-	BV	-	-	-	62.0	88.0	400	124	152	175	196	27	38		
120°	422. 568	○	○	BC	-	-	-	-	-	-	.091	.087	.39	.55	2.5	.78	.95	1.1	1.2	27	48	
	422. 728	○	○	-	BE	-	-	-	-	-	.146	.142	.98	1.4	6.3	2.0	2.4	2.8	3.1	27	63	
	422. 808	○	○	-	BE	-	-	-	-	-	.183	.181	1.6	2.2	10.0	3.1	3.8	4.4	4.9	27	63	
	422. 848	○	○	-	BE	-	-	-	-	-	.205	.201	1.9	2.7	12.5	3.9	4.8	5.5	6.1	27	63	
	422. 888	○	○	-	BE	-	-	-	-	-	.229	.225	2.5	3.5	16.0	5.0	6.1	7.0	7.9	27	63	
	422. 928	○	-	-	BG	-	-	-	-	-	.288	.288	3.1	4.4	20	6.2	7.6	8.8	9.8	27	63	
	422. 968	○	○	-	BG	-	-	-	-	-	.315	.315	3.9	5.5	25	7.8	9.5	11.0	12.3	27	63	
	423. 008	○	-	-	BG	-	-	-	-	-	.343	.343	4.8	6.8	31	9.6	11.8	13.6	15.2	27	63	
	423. 128	○	-	-	-	BK	-	-	-	-	.500	.485	9.8	13.8	63	19.5	24	28	31	27	63	
	423. 208	○	-	-	-	BM	-	-	-	-	.670	.630	15.5	21.9	100	31	38	44	49	27	63	

**Example** Type + Material no. + Conn. = Ordering no.  
for ordering: 422. 846 + 1Y + BE = 422. 846. 1Y. BE

Different metallurgies may be available upon request.

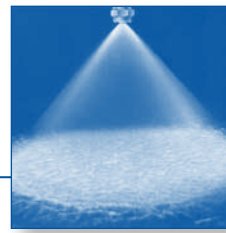
A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.







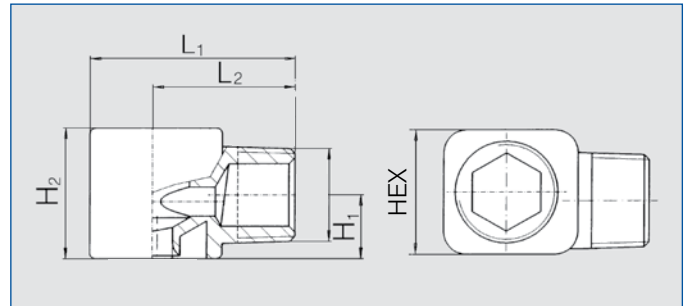
# Full cone nozzles Tangential-flow Series 422 / 423 Plastic version



Vaneless tangential design combined with PVDF construction offers an excellent nozzle for critical environmental and chemical processing uses.

**Applications:**

- Mist eliminator washing
- Chemical reactors
- Scrubbers



Dimensions (in.)						
Inlet (Male NPT)	L1	L2	H1	H2	Hex	Wt. (lb.)
1/4	1.10	.79	.31	.63	5/8	.02
3/8	1.42	.98	.44	.91	7/8	.04
1/2	1.95	1.32	.76	1.50	1-5/16	.09
3/4	2.30	1.52	.96	1.97	1-5/8	.11

Spray angle	Ordering no.					Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)							Spray Diameter D (in.) @ 40 psi		
	Type	Mat. no.	Connection		10 psi			20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	H=8"	H=20"		
			Male NPT 1/4" 3/8"	Male BSPT 1/2" 3/4"													
60°	422. 724	○	-	BE	-	.142	.142	.98	1.4	6.3	2.0	2.4	2.8	3.1	9	20	
90°	422. 406	○	BC	-	-	.059	.057	.16	.22	1.0	.31	.38	.44	.49	15	34	
	422. 486	○	BC	-	-	.075	.071	.25	.35	1.6	.50	.61	.70	.78	15	34	
	422. 566	○	BC	-	-	.091	.087	.39	.55	2.5	.78	.95	1.1	1.2	15	34	
	422. 606	○	-	BE	-	.102	.099	.49	.69	3.2	.98	1.2	1.4	1.6	15	34	
	422. 646	○	-	BE	-	.118	.114	.62	.88	4.0	1.2	1.5	1.8	2.0	15	38	
	422. 726	○	-	BE	-	.146	.142	.98	1.4	6.3	2.0	2.4	2.8	3.1	15	38	
	422. 806	○	-	BE	-	.183	.181	1.6	2.2	10.0	3.1	3.8	4.4	4.9	15	38	
	422. 846	○	-	BE	-	.205	.201	1.9	2.7	12.5	3.9	4.8	5.5	6.1	15	38	
	422. 886	○	-	BE	-	.229	.225	2.5	3.5	16.0	5.0	6.1	7.0	7.9	15	38	
	422. 926	○	-	-	CG	-	.288	.288	3.1	4.4	20	6.2	7.6	8.8	9.8	15	38
	422. 966	○	-	-	CG	-	.315	.315	3.9	5.5	25	7.8	9.5	11.0	12.3	15	38
423. 006	○	-	-	CG	-	.343	.343	4.8	6.8	31	9.6	11.8	13.6	15.2	15	38	
423. 126	○	-	-	-	CK	.473	.473	9.8	13.8	63	19.5	24	28	31	15	38	
120°	422. 408	○	BC	-	-	.059	.057	.16	.22	1.0	.31	.38	.44	.49	27	63	
	422. 448	○	BC	-	-	.065	.063	.19	.26	1.2	.37	.46	.53	.59	27	63	
	422. 488	○	BC	-	-	.075	.071	.25	.35	1.6	.50	.61	.70	.78	27	63	
	422. 568	○	BC	-	-	.091	.087	.39	.55	2.5	.78	.95	1.1	1.2	27	63	
	422. 728	○	-	BE	-	.146	.142	.98	1.4	6.3	2.0	2.4	2.8	3.1	27	63	
	422. 888	○	-	BE	-	.229	.225	2.5	3.5	16.0	5.0	6.1	7.0	7.9	27	63	
	423. 008	○	-	-	CG	-	.343	.343	4.8	6.8	31	9.6	11.8	13.6	15.2	27	63
	423. 128	○	-	-	-	CK	.500	.485	9.8	13.8	63	19.5	24	28	31	27	63

Example Type + Material no. + Conn. = Ordering no.  
for ordering: 422. 888 + 5E + BE = 422. 888. 5E. BE

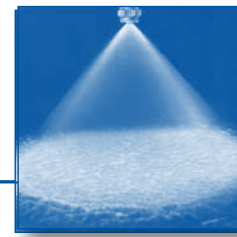
A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)





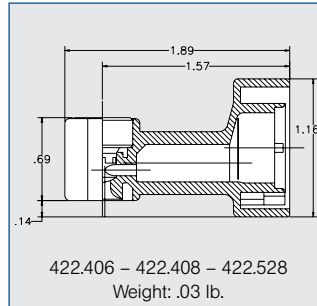
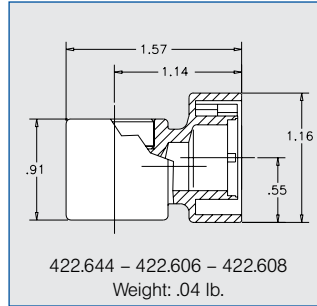
# Full cone nozzles Tangential-flow TWISTLOC quick release mount Series 422



Bayonet PVDF nozzles mount by hand with a quick twist. Lechler's vaneless full cone design paired with a quick-disconnect offers an unbeatable combination where nozzles may need to be changed, cleaned, or inspected quickly.

**Applications:**

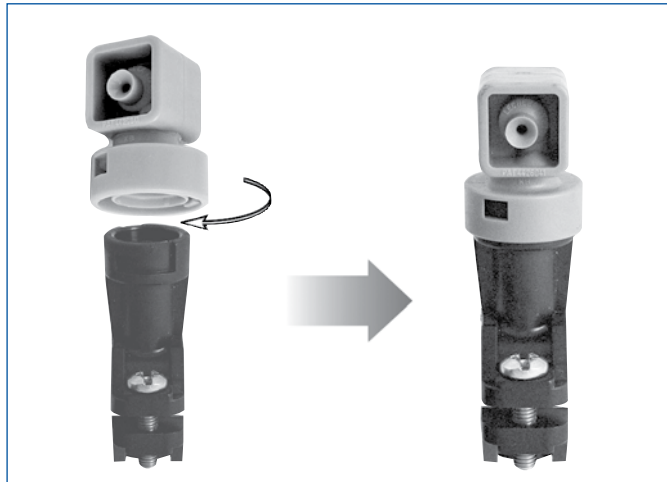
- Mist eliminator washing
- Critical cleaning operations
- Chemical reactors
- Scrubbers



Spray angle	Ordering no.				Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)						Spray Diameter D (in.) @ 40 psi		
	Type	Mat. no.		Conn.			10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	H=8" H=20"	
		PVDF 5E	Polycyc 53											Bayonet	9
60°	422. 644	-	○	KB	.114	.114	.62	.88	4.0	1.2	1.5	1.8	2.0	9	20
90°	422. 406	○	-	KB	.059	.057	.16	.22	1.0	.31	.38	.44	.49	15	34
	422. 606	○	-	KB	.102	.099	.49	.69	3.2	.98	1.2	1.4	1.6	15	34
120°	422. 408	○	-	KB	.059	.057	.16	.22	1.0	.31	.38	.44	.49	27	48
	422. 528	○	-	KB	.083	.079	.32	.44	2.0	.62	.76	.88	.98	27	48
	422. 608	○	-	KB	.102	.099	.49	.69	3.2	.98	1.2	1.4	1.6	27	63

Example    Type    + Material no.    + Conn.    = Ordering no.  
for ordering: 422. 608    + 5E                    + KB            = 422. 608. 5E. KB

Simple assembly – with just a twist



A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.





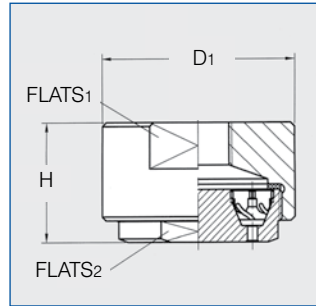
# Full cone nozzles Cluster head Series 502 / 503



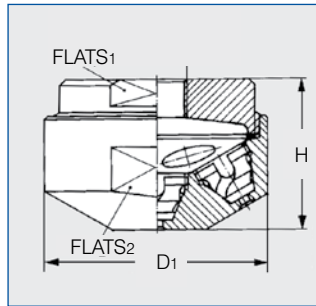
Each unit uses seven individual hollow cone orifices to generate small droplets. Sprays overlap into one wide angle full cone pattern.

**Applications:**

- Gas cooling
- Steam de-superheating
- Chemical reactors



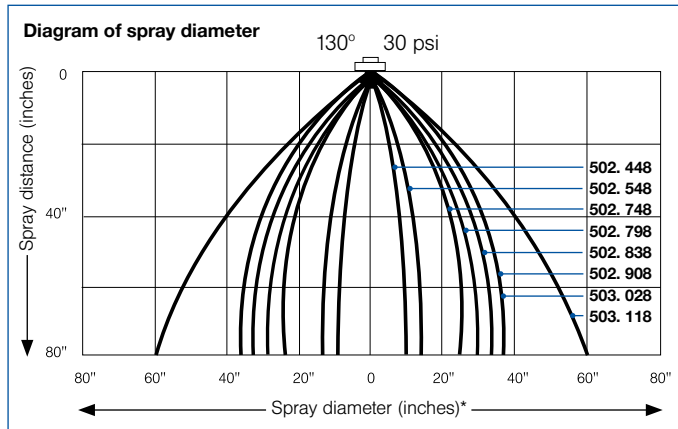
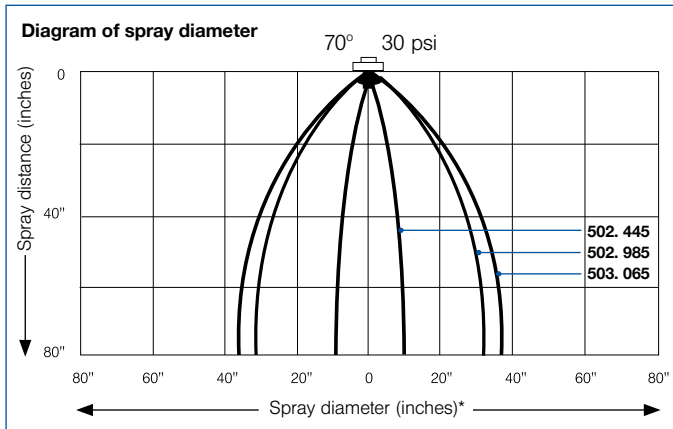
70° Version Dimensions (in.)		
	1/2"	3/4"
FLATS1	1.8	2.6
FLATS2	1.5	2.2
H	1.0	1.8
D	2.0	3.0
Weight (Brass)	.55 lb.	1.92 lb.



130° Version Dimensions (in.)		
	1/2"	3/4"
FLATS1	1.1	2.0
FLATS2	1.4	2.2
H	1.1	2.1
D	1.6	2.4
Weight (Brass)	.33 lb.	.90 lb.

Spray angle	Ordering no.				Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)								Spray Diam. D (in.) @ 30 psi		
	Type	Material no.		Connection			10 psi	20 psi	liters per minute		30 psi	40 psi	60 psi	80 psi	100 psi	H=40"	H=80"
		316 SS	Brass						Female NPT	2							
17	30	1/2"	3/4"														
70°	502.445	-	○	BH	-	.035	.020	.19	.27	1.3	.35	.39	.48	.55	.61	16	16
	502.985	○	-	-	BL	.129	.079	4.3	6.1	28	7.5	8.7	10.6	12.3	13.7	47	59
	503.065	○	-	-	BL	.193	.079	7.0	9.9	45	12.1	14.0	17.1	19.8	22	47	70
	503.115	○	○	-	BL	.236	.079	9.2	13.1	60	16.1	18.7	23	26	29	51	78
130°	502.448	○	○	BH	BL	.035	.020	.19	.27	1.3	.35	.39	.48	.55	.61	20	20
	502.548	○	○	BH	BL	.071	.020	.35	.49	2.2	.59	.70	.86	.99	1.1	27	27
	502.588	○	○	-	BL	.039	.039	1.6	2.3	2.8	.87	.87	1.1	1.2	1.4	32	35
	502.748	○	○	-	BL	.075	.079	1.2	1.6	7.1	1.9	2.2	2.7	3.1	3.5	43	47
	502.798	○	-	-	BL	.114	.079	1.5	2.1	9.5	2.6	3.0	3.6	4.2	4.7	47	51
	502.838	○	○	-	BL	.118	.079	1.8	2.6	11.8	3.2	3.7	4.5	5.2	5.8	55	63
	502.908	○	○	-	BL	.157	.079	2.8	3.9	18.0	4.8	5.6	6.8	7.9	8.8	59	70
	503.028	○	○	-	BL	.165	.079	5.5	7.7	36	9.7	11.0	13.5	15.6	17.4	63	70
	503.118	○	○	-	BL	.256	.079	9.2	13.1	60	16.1	18.7	23	26	29	79	118

**Example** Type + Material no. + Conn. = Ordering no.  
for ordering: 503.028 + 17 + BL = 503.028.17.BL



\* Spray diameter coordinates represent distance from zero (0) coordinate. For each curve, add both coordinate values to obtain spray diameter.

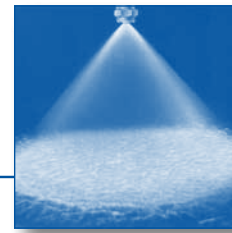
**Conversion formula for the above series:**  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)



Full cone



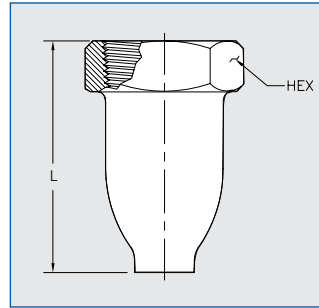
# Full cone nozzles Axial-flow CenterJet™ Series 459



**Turbine-style vane for uniform atomization and distribution.**

**Applications:**

- Surface spraying
- Quench cooling
- Fire suppression
- Chemical processing



Dimensions (in.)			
Inlet (Female NPT)	L	HEX	Wt. (lb.)
1-1/2	4.31	2-3/16	1.8
2	5.45	2-3/4	2.4
2-1/2	6.00	3-1/4	4.18
3	6.89	3-7/8	6.0

Type	Ordering no.		Orifice diam. (in.)	Flow Rate (Gallons Per Minute)								Spray Angle in degrees @ 40 psi (* = 15 psi)			
	Mat. no.	Connection				liters per minute									
	316 SS 17	Female NPT				5 psi	10 psi	20 psi	2 bar	40 psi	60 psi	80 psi	100 psi		
<b>STANDARD ANGLE</b>															
459. 244	○	BS	-	-	-	.500	14	20	27	124	38	47	54	60	<b>62</b>
459. 284	○	BS	-	-	-	.625	18	25	36	165	50	62	71	79	<b>62</b>
459. 355	○	BS	-	-	-	.687	26	37	52	233	72	86	100	112	<b>70</b>
459. 356	○	BS	-	-	-	.687	26	37	52	233	72	86	100	112	<b>84</b>
459. 343	○	-	BW	-	-	.500	25	35	48	222	68	82	94	105	<b>43</b>
459. 365	○	-	BW	-	-	.656	28	39	53	242	72	86	98	110	<b>*80</b>
459. 415	○	-	BW	-	-	.796	38	53	74	339	105	125	144	160	<b>66</b>
459. 455	○	-	BW	-	-	.906	48	68	95	434	132	160	183	205	<b>68</b>
459. 475	○	-	-	BZ	-	.910	54	75	104	475	143	172	200	221	<b>83</b>
459. 515	○	-	-	BZ	-	1.06	68	94	132	603	185	225	260	290	<b>67</b>
459. 584	○	-	-	-	MB	1.31	103	144	200	925	285	345	400	440	<b>57</b>
<b>WIDE ANGLE</b>															
459. 238	○	BS	-	-	-	.562	15	20	27	124	37	45	51	56	<b>120</b>
459. 266	○	BS	-	-	-	.500	14	19	26	117	35	42	48	53	<b>98</b>
459. 286	○	BS	-	-	-	.625	18	25	36	165	50	62	71	79	<b>94</b>
459. 288	○	BS	-	-	-	.625	19	26	36	162	49	58	66	73	<b>120</b>
459. 348	○	BS	-	-	-	.781	26	36	49	226	69	83	95	105	<b>120</b>
459. 378	○	-	BW	-	-	.781	33	45	61	273	82	98	110	122	<b>118</b>
459. 386	○	-	BW	-	-	.796	37	50	68	311	92	111	129	141	<b>*99</b>
459. 408	○	-	BW	-	-	.937	40	55	74	332	100	118	135	147	<b>118</b>
459. 488	○	-	-	BZ	-	1.03	64	86	117	521	157	187	212	232	<b>119</b>
459. 496	○	-	-	BZ	-	0.98	63	87	119	543	165	200	233	259	<b>*86</b>
459. 575	○	-	-	-	MB	1.31	110	150	205	938	275	330	380	421	<b>*90</b>
459. 608	○	-	-	-	MB	1.43	146	200	274	1255	372	450	520	590	<b>120</b>

This product line is also available in larger capacities with inlets up to 6" in size. Please contact Lechler if you have an application requiring a larger size.

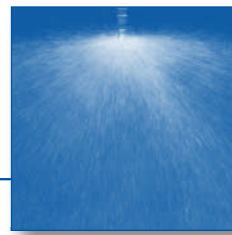
Example    Type    + Material no.    + Conn.    = Ordering no.  
for ordering: 459. 455    + 17                    + BW            = 459. 455. 17. BW

Full cone



# Deflector-plate nozzles

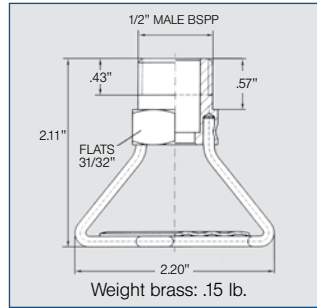
## Series 524 / 525



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

**Applications:**

- Fire fighting
- Broadcast spraying
- Wide area spraying
- Tank cleaning



Spray angle	Ordering no.			Orifice diam. (in.)	Flow Rate (Gallons Per Minute)									Spray Diameter D (ft.) @ 45 psi	
	Type	Material no.			10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	150 psi	Diagram		
		Connection: 1/2" Male BSPP	316 SS <b>17</b>										Brass <b>30</b>	H=40"	H=120"
180°	<b>524. 809</b>	○	○	.158	1.6	2.2	10	3.1	3.8	4.4	4.9	6.0	18	21	
	<b>525. 049</b>	○	○	.315	6.2	8.8	40	12.4	15.2	17.6	19.6	24	33	43	
	<b>525. 109</b>	-	○	.366	8.8	12.5	57	17.7	22	25	28	34	33	44	
	<b>525. 169</b>	-	○	.429	12.6	17.8	81	25	31	36	40	49	35	44	
	<b>525. 229</b>	-	○	.481	17.4	25	112	35	43	49	55	67	22	34	
	<b>525. 269</b>	○	○	.485	22	31	140	43	53	61	69	84	17	33	

**Example**      **Type**      +      **Material no.**      =      **Ordering no.**  
**for ordering:**    525. 049      +      30                              =      525. 049. 30

Full cone





# Flat fan nozzles

- Belt cleaning
- Coating
- Steam cleaning
- Degreasing
- High pressure cleaning
- Gravel washing
- Cooling
- Surface treatment
- Phosphating
- Rain curtains
- Foam control
- Foam spraying
- Lubrication
- Filter cleaning
- Spray cleaning
- Washing processes
- and many others...



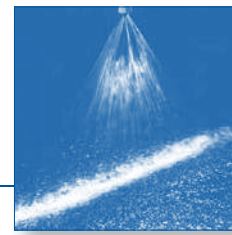






# Flat fan nozzles

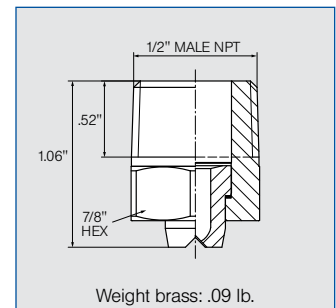
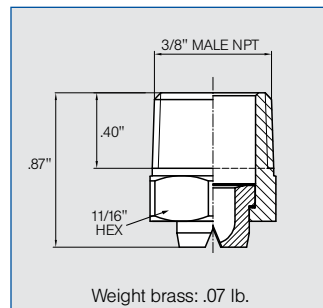
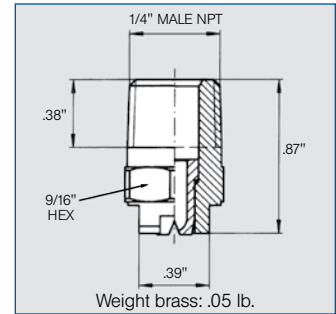
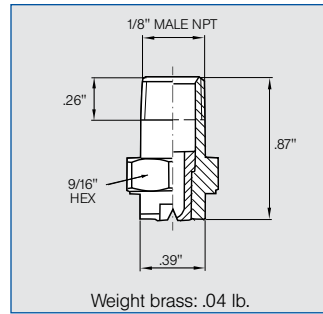
## Series 632 / 633



**Precision standard design axial flat fan nozzles. Stable spray angles at a wide range of pressures. Uniform parabolic distribution. Most capacities use Lechler's insert design.**

**Applications:**

- Spray cleaning
- Lubricating
- Board and web rinsing
- Parts washing



Spray angle	Type	Ordering no.				Material no.				Connection				Equivalent Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)							Spray Coverage @ 30 psi	
		Material no.				Male NPT				10 psi	20 psi	liters per minute 2 bar	40 psi			60 psi	80 psi	100 psi	H=10"	H=20"				
		303 SS 16 <sup>1)</sup>	316 SS 17 <sup>2)</sup>	Brass 30	PVDF 5E	1/8"	1/4"	3/8"	1/2"															
20°	632.301	○	○	○	○	BA	BC	-	-	.028	.024	.05	.07	.32	.10	.12	.14	.16	3	5				
	632.361	○	○	○	○	BA	BC	-	-	.039	.032	.10	.14	.63	.20	.24	.28	.31	3	5				
	632.441	○	○	○	○	BA	BC	-	-	.053	.043	.19	.27	1.3	.39	.48	.55	.61	3	6				
	632.481	○	○	○	○	BA	BC	-	-	.059	.047	.25	.35	1.6	.50	.61	.70	.78	3	6				
30°	632.302	○	○	○	-	BA	BC	-	-	.024	.020	.05	.07	.32	.10	.12	.14	.16	5	9				
	632.362	○	○	○	○	BA	BC	-	-	.039	.028	.10	.14	.63	.20	.24	.28	.31	5	9				
	632.402	○	○	○	○	BA	BC	-	-	.047	.035	.16	.22	1.0	.31	.38	.44	.49	5	9				
	632.482	○	○	○	○	BA	BC	-	-	.059	.043	.25	.35	1.6	.50	.61	.70	.78	5	9				
	632.562	○	○	○	○	BA	BC	-	-	.079	.059	.39	.55	2.5	.78	.95	1.1	1.2	5	9				
	632.642	○	○	○	-	-	BC	-	-	.099	.071	.62	.88	4.0	1.2	1.5	1.8	2.0	5	9				
	632.722	○	○	○	-	-	BC	-	-	.118	.095	.98	1.4	6.3	2.0	2.4	2.8	3.1	5	9				
	632.762	○	○	○	-	-	BC	-	-	.138	.091	1.2	1.8	8	2.5	3	3.5	3.9	12	23				
	632.802	○	○	○	-	-	BC	-	-	.158	.122	1.6	2.2	10.0	3.1	3.8	4.4	4.9	5	10				
	632.882	○	○	○	-	-	-	BG	-	.197	.157	2.5	3.5	16.0	5.0	6.1	7.0	7.9	5	10				
	632.922	○	○	○	-	-	-	BG	-	.217	.165	3.1	4.4	20.0	6.2	7.6	8.8	9.8	5	10				
	632.962	○	○	○	-	-	-	BG	-	.236	.185	3.9	5.5	25.0	7.8	9.5	11.0	12.3	5	10				
	633.002	○	-	-	-	-	-	BG	-	.276	.220	4.9	6.9	31.5	9.8	12.0	13.9	15.5	5	10				

**Example** Type + Material no. + Conn. = Ordering no.  
**for ordering:** 632.402 + 16 + BA = 632.402.16.BA

1) We reserve the right to deliver AISI 303 or AISI 304 under the material no. 16.  
 2) We reserve the right to deliver AISI 316L under the material no. 17.

Continued on next page.

Other sizes available upon request.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
 (See page 12 for symbol definitions.)



Flat fan



# Flat fan nozzles

## Series 632 / 633



Spray angle	Type	Ordering no.				Material no.				Connection				Equivalent Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)								Spray Coverage @ 30 psi	
		Material no.				Male NPT				10 psi	20 psi	liters per minute 2 bar	40 psi			60 psi	80 psi	100 psi	H=10"	H=20"					
		303 SS 16 <sup>1)</sup>	316 SS 17 <sup>2)</sup>	Brass 30	PVDF 5E	1/8"	1/4"	3/8"	1/2"																
45°	632.303	○	○	○	-	BA	BC	-	-	.028	.020	.05	.07	.32	.10	.12	.14	.16	6	11					
	632.363	○	○	○	○	BA	BC	-	-	.039	.024	.10	.14	.63	.20	.24	.28	.31	6	11					
	632.403	○	○	○	○	BA	BC	-	-	.047	.035	.16	.22	1.0	.31	.38	.44	.49	7	13					
	632.483	○	○	○	○	BA	BC	-	-	.059	.043	.25	.35	1.6	.50	.61	.70	.78	7	13					
	632.563	○	○	○	○	BA	BC	-	-	.079	.055	.39	.55	2.5	.78	.95	1.1	1.2	7	14					
	632.603	○	○	○	○	BA	BC	-	-	.087	.067	.49	.69	3.2	.98	1.2	1.4	1.5	7	14					
	632.643	○	○	○	○	BA	BC	-	-	.099	.063	.62	.88	4.0	1.2	1.5	1.8	2	12	22					
	632.673	○	○	○	-	-	BC	BE	-	-	.106	.083	.74	1.0	4.8	1.5	1.8	2.1	2.3	8	15				
	632.723	○	○	○	-	-	BC	BE	-	-	.118	.095	.98	1.4	6.3	2.0	2.4	2.8	3.1	8	15				
	632.763	○	○	○	-	-	BC	BE	-	-	.138	.091	1.2	1.8	8.0	2.5	3	3.5	3.9	12	23				
	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	-	.236	.185	3.9	5.5	25.0	7.8	9.5	11.0	12.3	9	17					
60°	632.304	○	○	○	○	BA	BC	-	-	.028	.016	.05	.07	.32	.10	.12	.14	.16	8	17					
	632.334	○	○	○	○	BA	BC	-	-	.035	.020	.07	.10	.45	.14	.17	.20	.22	9	17					
	632.364	○	○	○	○	BA	BC	-	-	.039	.024	.10	.14	.63	.20	.24	.28	.31	9	18					
	632.404	○	○	○	○	BA	BC	-	-	.047	.032	.16	.22	1.0	.31	.38	.44	.49	10	19					
	632.444	○	○	○	○	BA	BC	-	-	.053	.035	.19	.27	1.3	.39	.48	.55	.61	10	19					
	632.484	○	○	○	○*	BA	BC	-	-	.059	.039	.25	.35	1.6	.50	.61	.70	.78	10	20					
	632.514	○	○	○	○	BA	BC	-	-	.065	.043	.29	.42	1.9	.59	.72	.83	.93	11	20					
	632.564	○	○	○	○	BA	BC	-	-	.079	.051	.39	.55	2.5	.78	.95	1.1	1.2	11	21					
	632.604	○	○	○	○	BA	BC	-	-	.087	.059	.49	.69	3.2	.98	1.2	1.4	1.5	11	22					
	632.644	○	○	○	○*	-	BC	BE	-	-	.099	.063	.62	.88	4.0	1.2	1.5	1.8	2.0	12	22				
	632.674	○	○	○	○*	-	BC	BE	-	-	.106	.071	.74	1.0	4.8	1.5	1.8	2.1	2.3	12	23				
	632.724	○	○	○	○*	-	BC	BE	-	-	.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	○	○	○	-	-	-	-	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					
633.044	○	○	○	-	-	-	-	BG	-	.315	.217	6.2	8.8	40.0	12.4	15.2	17.6	19.6	13	23					
633.084	○	○	○	-	-	-	-	BG	-	.354	.268	7.7	11.0	50.0	15.5	19.0	21.9	24.5	13	25					
75°	632.145	○	-	○	-	BA	BC	-	-	.006	.012	.008	.011	.05	.016	.019	.022	.025	11	22					
	632.165	○	-	○	-	BA	BC	-	-	.008	.013	.011	.015	.07	.022	.027	.031	.034	11	22					
	632.185	○	-	○	-	BA	BC	-	-	.014	.008	.012	.018	.08	.025	.030	.035	.039	12	23					
	632.215	○	-	○	-	BA	BC	-	-	.016	.008	.017	.024	.11	.034	.042	.048	.054	12	23					
	632.245	○	-	○	-	BA	BC	-	-	.020	.012	.025	.035	.16	.05	.06	.07	.08	12	23					
	632.275	○	-	○	-	BA	BC	-	-	.024	.012	.03	.05	.22	.07	.08	.10	.11	12	23					

\* Only available in connection BC  
 + Only available in connection BG

Continued on next page.

Other sizes available upon request.

**Example** Type + Material no. + Conn. = Ordering no.  
 for ordering: 632.403 + 16 + BA = 632.403.16.BA

1) We reserve the right to deliver AISI 303 or AISI 304 under the material no. 16.  
 2) We reserve the right to deliver AISI 316L under the material no. 17.

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.





# Flat fan nozzles

## Series 632 / 633



Spray angle A	Ordering no.										Equivalent Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)						Spray Coverage @ 30 psi	
	Type	Material no.				Connection				10 psi			20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	H=10"	H=20"
		303 SS 16 <sup>1)</sup>	316 SS 17 <sup>2)</sup>	Brass 30	PVDF 5E	Male NPT 1/8" 1/4" 3/8" 1/2"														
90°	632. 216	○	-	○	-	BA	BC	-	-	.016	.008	.017	.024	.11	.034	.042	.048	.054	15	28
	632. 276	○	-	○	-	BA	BC	-	-	.024	.012	.034	.05	.22	.07	.08	.10	.11	15	29
	632. 306	○	○	○	○	BA	BC	-	-	.028	.016	.05	.07	.32	.10	.12	.14	.16	15	29
	632. 336	○	○	○	○	BA	BC	-	-	.035	.020	.07	.10	.45	.14	.17	.20	.22	16	31
	632. 366	○	○	○	○	BA	BC	-	-	.039	.020	.10	.14	.63	.20	.24	.28	.31	17	32
	632. 406	○	○	○	○	BA	BC	-	-	.047	.028	.16	.22	1.0	.31	.38	.44	.49	17	32
	632. 446	○	○	○	○	BA	BC	-	-	.053	.032	.19	.27	1.3	.39	.48	.55	.61	17	33
	632. 486	○	○	○	○	BA	BC	-	-	.059	.032	.25	.35	1.6	.50	.61	.70	.78	17	33
	632. 516	○	○	○	○	BA	BC	-	-	.065	.035	.29	.42	1.9	.59	.72	.83	.93	17	33
	632. 566	○	○	○	○	BA	BC	-	-	.079	.043	.39	.55	2.5	.78	.95	1.1	1.2	18	33
	632. 606	○	○	○	○	BA	BC	-	-	.087	.047	.49	.69	3.2	.98	1.2	1.4	1.5	18	34
	632. 646	○	○	○	○*	-	BC	BE	-	.099	.051	.62	.88	4.0	1.2	1.5	1.8	2.0	27	51
	632. 676	○	○	○	○*	-	BC	BE	-	.106	.055	.74	1.0	4.8	1.5	1.8	2.1	2.3	18	34
	632. 726	○	○	○	○*	-	BC	BE	-	.118	.067	.98	1.4	6.3	2.0	2.4	2.8	3.1	19	35
	632. 766	○	○	○	○*	-	BC	BE	-	.138	.067	1.2	1.8	8.0	2.5	3.0	3.5	3.9	30	55
	632. 806	○+	○+	○+	○*	-	BC	-	BG	.158	.095	1.6	2.2	10.0	3.1	3.8	4.4	4.9	19	35
	632. 846	○+	○+	○+	○*	-	BC	-	BG	.177	.095	1.9	2.7	12.5	3.9	4.8	5.5	6.1	19	35
632. 886	○+	○+	○+	○*	-	BC	-	BG	.197	.122	2.5	3.5	16.0	5.0	6.1	7.0	7.9	19	36	
632. 926	○+	○+	○+	○*	-	BC	-	BG	.217	.165	3.1	4.4	20.0	6.2	7.6	8.8	9.8	21	40	
632. 966	○	○	○	-	-	-	-	BG	.236	.185	3.9	5.5	25.0	7.8	9.5	11.0	12.3	21	40	
120°	632. 187	○	-	○	-	BA	BC	-	-	.014	.008	.012	.018	.08	.025	.030	.035	.039	25	47
	632. 217	○	-	○	-	BA	BC	-	-	.016	.008	.017	.024	.11	.034	.042	.048	.054	25	48
	632. 247	○	-	○	-	BA	BC	-	-	.020	.008	.025	.035	.16	.05	.06	.07	.08	26	48
	632. 277	○	-	○	-	BA	BC	-	-	.024	.012	.034	.05	.22	.07	.08	.10	.11	26	49
	632. 307	○	○	○	○	BA	BC	-	-	.028	.012	.05	.07	.32	.10	.12	.14	.16	26	49
	632. 337	○	○	○	○	BA	BC	-	-	.035	.016	.07	.10	.45	.14	.17	.20	.22	26	50
	632. 367	○	○	○	○	BA	BC	-	-	.039	.020	.10	.14	.63	.20	.24	.28	.31	26	50
	632. 407	○	○	○	○	BA	BC	-	-	.047	.024	.16	.22	1.0	.31	.38	.44	.49	26	50
	632. 447	○	○	○	○	BA	BC	-	-	.053	.024	.19	.27	1.3	.39	.48	.55	.61	27	50
	632. 487	○	○	○	○	BA	BC	-	-	.059	.024	.25	.35	1.6	.50	.61	.70	.78	27	50
	632. 517	○	○	○	○	BA	BC	-	-	.065	.035	.29	.42	1.9	.59	.72	.83	.93	27	50
	632. 567	○	○	○	○	BA	BC	-	-	.079	.035	.39	.55	2.5	.78	.95	1.1	1.2	27	51
	632. 607	○	○	○	○	BA	BC	-	-	.087	.043	.49	.69	3.2	.98	1.2	1.4	1.5	27	51
	632. 647	○	○	○	-	-	BC	BE	-	.099	.051	.62	.88	4.0	1.2	1.5	1.8	2.0	27	51
	632. 677	○	○	○	○*	-	BC	BE	-	.106	.055	.74	1.0	4.8	1.5	1.8	2.1	2.3	28	52
	632. 727	○	○	○	○*	-	BC	BE	-	.118	.063	.98	1.4	6.3	2.0	2.4	2.8	3.1	29	54
	632. 767	○	○	○	○*	-	BC	BE	-	.138	.067	1.2	1.8	8.0	2.5	3.0	3.5	3.9	30	55
632. 807	○	○	○	-	-	BC	-	BG	.158	.079	1.6	2.2	10.0	3.1	3.8	4.4	4.9	31	57	
632. 847	○+	○+	○+	○*	-	BC	-	BG	.177	.091	1.9	2.7	12.5	3.9	4.8	5.5	6.1	31	57	
632. 887	○	○	○	-	-	-	-	BG	.197	.102	2.5	3.5	16.0	5.0	6.1	7.0	7.9	31	57	
632. 927	○	○	○	-	-	-	-	BG	.217	.114	3.1	4.4	20.0	6.2	7.6	8.8	9.8	31	57	

\* Only available in connection BC  
+ Only available in connection BG

Other sizes available upon request.

**Example**    Type    +    Material no.    +    Conn.    =    Ordering no.  
for ordering: 632. 406 + 16                    +    BA            =    632. 406. 16. BA

1) We reserve the right to deliver AISI 303 or AISI 304 under the material no. 16.  
2) We reserve the right to deliver AISI 316L under the material no. 17.

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)



Flat fan







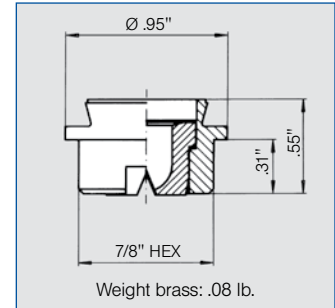
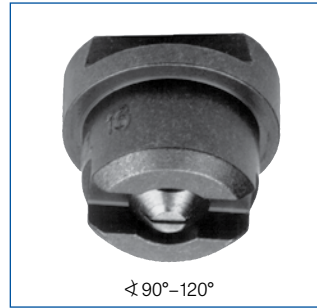




# Flat fan nozzle tips with dovetail guide Series 664 / 665



**Automatic jet alignment due to dovetail guide (this tip requires dovetail base). Stable spray angle. Uniform parabolic distribution of liquid. With appropriate spray height and distance between centers on spray bar, provides an even total liquid distribution. Assembles with 3/4" retaining nut.**



### Applications:

- Cleaning installations
- Cooling headers
- Spray pipes
- Roll cooling
- Cooling of rolled stock

Spray angle	Ordering no.				Equivalent Orifice diam. (in.)	Free passage psi	Flow Rate (Gallons Per Minute)							Spray Coverage @ 30 psi	
	Type	Material no.					10 psi	20 bar	liters per minute	40 psi	60 psi	80 psi	100 H=10"	H=20"	
		303 SS 16	316 SS 17 <sup>1)</sup>	Brass 30 (in.)										4	8
20°	664. 721	○	○	○	.118	.099	.98	1.4	6.3	2.0	2.4	2.8	3.1	4	8
	664. 801	○	○	○	.158	.126	1.6	2.2	10.0	3.1	3.8	4.4	4.9	4	8
	664. 881	○	○	○	.197	.158	2.5	3.5	16.0	5.0	6.1	7.0	7.8	4	8
	664. 921	○	○	○	.217	.173	3.1	4.4	20.0	6.2	7.6	8.8	9.8	4	8
	664. 961	○	○	○	.236	.201	3.9	5.5	25.0	7.8	9.5	11.0	12.3	4	8
30°	664. 722	○	○	○	.118	.095	.98	1.4	6.3	2.0	2.4	2.8	3.1	6	11
	664. 762	○	○	○	.138	.106	1.2	1.8	8.0	2.5	3.0	3.5	3.9	6	11
	664. 802	○	○	○	.158	.122	1.6	2.2	10.0	3.1	3.8	4.4	4.9	6	11
	664. 882	○	○	○	.197	.158	2.5	3.5	16.0	5.0	6.1	7.0	7.8	6	11
	664. 922	○	○	○	.217	.173	3.1	4.4	20.0	6.2	7.6	8.8	9.8	6	11
	664. 962	○	○	○	.236	.197	3.9	5.5	25.0	7.8	9.5	11.0	12.3	6	11
	665. 042	○	-	-	.315	.252	6.2	8.8	40.0	12.4	15.2	17.6	19.6	6	11
665. 122	-	-	○	.394	.323	9.8	13.8	63.0	19.5	23.9	27.6	30.9	6	11	
45°	664. 723	○	○	○	.118	.095	.98	1.4	6.3	2.0	2.4	2.8	3.1	10	19
	664. 763	○	○	○	.138	.102	1.2	1.8	8.0	2.5	3.0	3.5	3.9	10	19
	664. 803	○	○	○	.158	.118	1.6	2.2	10.0	3.1	3.8	4.4	4.9	10	19
	664. 843	○	○	○	.177	.134	1.9	2.7	12.5	3.9	4.8	5.5	6.1	10	19
	664. 883	○	○	○	.197	.150	2.5	3.5	16.0	5.0	6.1	7.0	7.8	10	20
	664. 923	○	○	○	.217	.165	3.1	4.4	20.0	6.2	7.6	8.8	9.8	11	20
	664. 963	○	○	○	.236	.165	3.9	5.5	25.0	7.8	9.5	11.0	12.3	11	20
	665. 043	-	-	○	.315	.232	6.2	8.8	40.0	12.4	15.2	17.6	19.6	11	20
60°	664. 724	○	○	○	.118	.083	.98	1.4	6.3	2.0	2.4	2.8	3.1	12	22
	664. 764	○	○	○	.138	.091	1.2	1.8	8.0	2.5	3.0	3.5	3.9	12	22
	664. 804	○	○	○	.158	.102	1.6	2.2	10.0	3.1	3.8	4.4	4.9	12	22
	664. 844	○	○	○	.177	.118	1.9	2.7	12.5	3.9	4.8	5.5	6.1	12	22
	664. 884	○	○	○	.197	.134	2.5	3.5	16.0	5.0	6.1	7.0	7.8	12	22
	664. 924	○	○	○	.217	.162	3.1	4.4	20.0	6.2	7.6	8.8	9.8	12	23
	664. 964	○	○	○	.236	.165	3.9	5.5	25.0	7.8	9.5	11.0	12.3	12	23
	665. 044	○	○	○	.315	.217	6.2	8.8	40.0	12.4	15.2	17.6	19.6	12	23
	665. 084	○	○	○	.355	.244	7.8	11.0	50.0	15.5	19.0	21.9	24.5	13	23
	665. 124	-	-	○	.394	.292	9.8	13.8	63.0	19.5	23.9	27.6	30.9	13	24

**Example**    Type    +    Material no.    =    Ordering no.  
**for ordering:** 664. 721    +    16    =    664. 721. 16

Continued on next page.

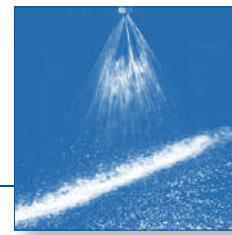
1) We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 17.

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.





# Flat fan nozzle tips with dovetail guide Series 664 / 665



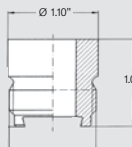
Spray angle	Ordering no.				Equivalent Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)							Spray Coverage @ 30 psi	
	Type	Material no.					10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	H=10"	H=20"
		303 SS 16	316 SS 17 <sup>1)</sup>	Brass 30											
90°	664. 726	○	○	○	.118	.200	.98	1.4	6.3	2.0	2.4	2.8	3.1	17	31
	664. 766	○	○	○	.138	.300	1.2	1.8	8.0	2.5	3.0	3.5	3.9	17	31
	664. 806	○	○	○	.158	.095	1.6	2.2	10.0	3.1	3.8	4.4	4.9	17	31
	664. 846	○	○	○	.177	.095	1.9	2.7	12.5	3.9	4.8	5.5	6.1	17	31
	664. 886	○	○	○	.197	.122	2.5	3.5	16.0	5.0	6.1	7.0	7.8	17	31
	664. 926	○	○	○	.217	.142	3.1	4.4	20.0	6.2	7.6	8.8	9.8	17	31
	664. 966	○	○	○	.236	.154	3.9	5.5	25.0	7.8	9.5	11.0	12.3	17	31
	665. 046	-	-	○	.315	.193	6.2	8.8	40.0	12.4	15.2	17.6	19.6	17	31
	665. 126	-	-	○	.394	.252	9.8	13.8	63.0	19.5	23.9	27.6	30.9	17	31
120°	664. 727	○	○	○	.118	.063	.98	1.4	6.3	2.0	2.4	2.8	3.1	49	85
	664. 767	○	○	○	.138	.067	1.2	1.8	8.0	2.5	3.0	3.5	3.9	49	85
	664. 807	○	○	○	.158	.079	1.6	2.2	10.0	3.1	3.8	4.4	4.9	49	85
	664. 887	○	○	○	.197	.102	2.5	3.5	16.0	5.0	6.1	7.0	7.8	49	85
	664. 927	○	○	○	.217	.114	3.1	4.4	20.0	6.2	7.6	8.8	9.8	49	85
	664. 967	-	-	○	.236	.126	3.9	5.5	25.0	7.8	9.5	11.0	12.3	49	85
	665. 047	-	-	○	.315	.173	6.2	8.8	40.0	12.4	15.2	17.6	19.6	49	85




**Example**    **Type**    +    **Material no.**    =    **Ordering no.**  
**for ordering:**    664. 727    +    16    =    664. 727. 16

1) We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 17.

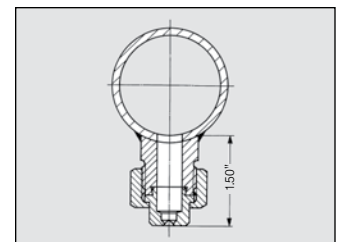
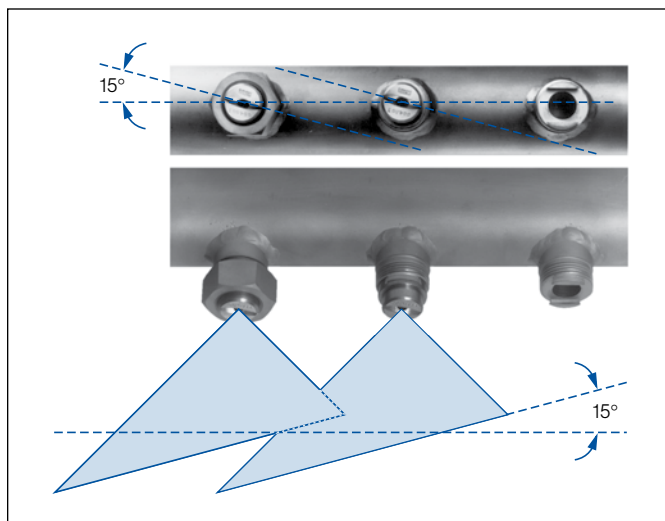
## Accessories



Weight: .14 lb.  
Nipple **066. 410. 17** (316 SS)



Weight: .13 lb.  
Retaining nut **065. 600. 16** (303 SS)  
**065. 600. 17** (316 SS)  
**065. 600. 30** (Brass)



Standard accessories, alignment, and installation for the Series 664 dovetail nozzle tip

Flat fan

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)







# Flat fan nozzle tips

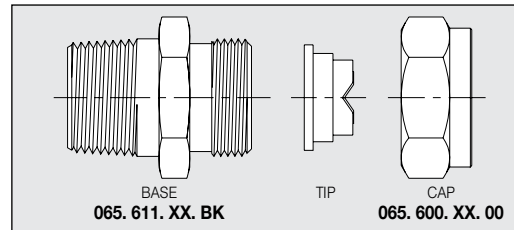
## Series 656 / 657



Spray angle X	Ordering no.				Equivalent Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)							Spray Coverage @ 30 psi	
	Type	Material no.					10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	H=10"	H=20"
		303 SS 16	316 SS 17 <sup>1)</sup>	Brass 30											
90°	656. 726	○	○	○	.118	.067	.98	1.4	6.3	2.0	2.4	2.8	3.1	17	31
	656. 766	○	○	○	.138	.075	1.2	1.8	8.0	2.5	3.0	3.5	3.9	17	31
	656. 806	○	○	○	.158	.095	1.6	2.2	10.0	3.1	3.8	4.4	4.9	17	31
	656. 846	○	○	○	.177	.095	1.9	2.7	12.5	3.9	4.8	5.5	6.1	17	31
	656. 886	○	○	○	.197	.122	2.5	3.5	16.0	5.0	6.1	7.0	7.8	17	31
	656. 926	○	○	○	.217	.142	3.1	4.4	20	6.2	7.6	8.8	9.8	17	31
	656. 966	○	○	○	.236	.154	3.9	5.5	25	7.8	9.5	11.0	12.3	17	31
	657. 046	-	-	○	.315	.193	6.2	8.8	40	12.4	15.2	17.6	19.6	17	31
120°	656. 727	○	○	○	.118	.063	.98	1.4	6.3	2.0	2.4	2.8	3.1	27	53
	656. 767	○	○	○	.138	.067	1.2	1.8	8.0	2.5	3.0	3.5	3.9	31	63
	656. 807	○	○	○	.158	.079	1.6	2.2	10.0	3.1	3.8	4.4	4.9	29	58
	656. 887	○	○	○	.197	.102	2.5	3.5	16.0	5.0	6.1	7.0	7.8	31	61
	656. 927	○	○	○	.217	.114	3.1	4.4	20	6.2	7.6	8.8	9.8	32	64

### Base and Cap for Mounting

Inlet Male NPT	Outlet Male	Part No.	Standard Materials: 17 316 SS 30 Brass
3/4" BK	3/4" BSPP	065. 611. XX.	
<b>Cap</b>			Other materials available. See <a href="#">Accessories beginning on page 127.</a>
To fit 3/4" BSPP		065. 600. XX. 00	



**Example**    Type    +    Material no.    =    Ordering no.  
for ordering: 656. 727    +    16    =    656. 727. 16

1) We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 17.

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)

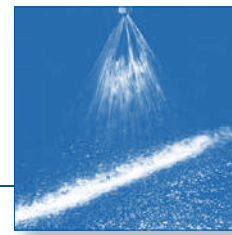






# Flat fan nozzle tips

## Series 652



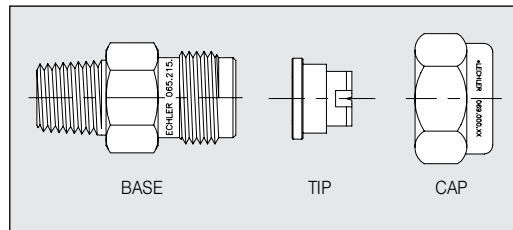
Spray angle	Ordering no.	Material no.				Equivalent Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute)						Spray Coverage @ 30 psi		
		Type						10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	H=10"	H=20"
		303 SS 16	316 SS 17 <sup>1)</sup>	Brass 30	P.P.D.F. 5E											
75°	652. 145	○	-	○	-	.008	.005	.008	.011	.05	.016	.019	.022	.025	11	22
	652. 165	○	-	○	-	.008	.003	.011	.015	.07	.022	.027	.031	.034	11	22
	652. 185	○	-	○	-	.008	.006	.012	.018	.08	.025	.030	.035	.039	11	22
	652. 215	○	-	○	-	.016	.008	.017	.024	.11	.034	.042	.048	.054	11	22
	652. 245	○	-	○	-	.020	.012	.025	.035	.16	.05	.06	.07	.08	11	22
	652. 275	○	-	○	-	.024	.012	.034	.05	.22	.07	.08	.10	.11	11	22
90°	652. 216	○	-	○	-	.016	.008	.017	.024	.11	.034	.042	.048	.054	15	30
	652. 276	○	-	○	-	.024	.012	.034	.05	.22	.07	.08	.10	.11	18	31
	652. 306	○	○	○	○	.028	.016	.05	.07	.32	.10	.12	.14	.16	18	31
	652. 336	○	○	○	○	.035	.020	.07	.10	.45	.14	.17	.20	.22	18	31
	652. 366	○	○	○	○	.039	.020	.10	.14	.63	.20	.24	.28	.31	18	31
	652. 406	○	○	○	○	.047	.028	.16	.22	1.0	.31	.38	.44	.49	18	31
	652. 446	○	○	○	○	.053	.032	.19	.27	1.3	.39	.48	.55	.61	18	31
	652. 486	○	○	○	○	.059	.032	.25	.35	1.6	.50	.61	.70	.78	18	31
	652. 516	○	○	○	○	.065	.035	.29	.42	1.9	.59	.72	.83	.93	18	31
	652. 566	○	○	○	○	.079	.043	.39	.55	2.5	.78	.95	1.1	1.2	18	32
	652. 606	○	○	○	○	.087	.047	.49	.69	3.2	.98	1.2	1.4	1.5	18	32
	652. 646	○	○	○	○	.099	.051	.62	.88	4.0	1.2	1.5	1.8	2.0	18	32
	652. 676	○	○	○	○	.106	.055	.74	1.0	4.8	1.5	1.8	2.1	2.3	18	32
	652. 726	○	○	○	○	.118	.067	.98	1.4	6.3	2.0	2.4	2.8	3.1	18	32
	652. 766	○	○	○	-	.138	.075	1.2	1.8	8.0	2.5	3.0	3.5	3.9	18	32
	652. 806	○	○	○	○	.158	.095	1.6	2.2	10.0	3.1	3.8	4.4	4.9	18	32
652. 846	-	-	○	○	.177	.095	1.9	2.7	12.5	3.9	4.8	5.5	6.1	18	32	
652. 886	○	-	○	○	.197	.122	2.5	3.5	16.0	5.0	6.1	7.0	7.8	18	33	
120°	652. 187	○	-	○	-	.014	.008	.012	.018	.08	.025	.030	.035	.039	25	48
	652. 217	○	-	○	-	.016	.008	.017	.024	.11	.034	.042	.048	.054	26	48
	652. 247	○	-	○	-	.020	.008	.025	.035	.16	.05	.06	.07	.08	26	49
	652. 277	○	-	○	-	.024	.012	.034	.05	.22	.07	.08	.10	.11	26	49
	652. 307	○	-	○	○	.028	.012	.05	.07	.32	.10	.12	.14	.16	26	50
	652. 337	○	○	○	○	.035	.016	.07	.10	.45	.14	.17	.20	.22	26	50
	652. 367	○	○	○	○	.039	.020	.10	.14	.63	.20	.24	.28	.31	26	50
	652. 407	○	○	○	○	.047	.024	.16	.22	1.0	.31	.38	.44	.49	26	50
	652. 447	○	○	○	○	.053	.024	.19	.27	1.3	.39	.48	.55	.61	26	50
	652. 487	○	○	○	○	.059	.024	.25	.35	1.6	.50	.61	.70	.78	26	50
	652. 517	○	○	○	○	.065	.035	.29	.42	1.9	.59	.72	.83	.93	26	50
	652. 567	○	○	○	○	.079	.035	.39	.55	2.5	.78	.95	1.1	1.2	26	50
	652. 607	○	○	○	○	.087	.043	.49	.69	3.2	.98	1.2	1.4	1.5	27	51
	652. 647	○	○	○	-	.099	.051	.62	.88	4.0	1.2	1.5	1.8	2.0	27	51
	652. 677	○	○	○	-	.106	.055	.74	1.0	4.8	1.5	1.8	2.1	2.3	27	51
	652. 727	○	○	○	○	.118	.063	.98	1.4	6.3	2.0	2.4	2.8	3.1	27	52
	652. 767	○	○	○	-	.138	.067	1.2	1.8	8.0	2.5	3.0	3.5	3.9	28	52
	652. 807	○	○	○	-	.158	.079	1.6	2.2	10.0	3.1	3.8	4.4	4.9	28	52
652. 847	-	-	-	○	.177	.091	1.9	2.7	12.5	3.9	4.8	5.5	6.1	31	57	
652. 887	-	-	-	○	.197	.102	2.5	3.5	16.0	5.0	6.1	7.0	7.8	31	57	



Flat fan

### Bases and Caps for Mounting

Inlet NPT Male	Outlet Male	Part No.	Standard Materials: 17 316 SS 30 Brass
1/4"	11/16 x 16	065. 215. XX. 10	
3/8"	11/16 x 16	065. 211. XX. 10	
1/4"	3/8 BSPP	065. 215. XX. 11	
3/8"	3/8 BSPP	065. 215. XX. 12	
<b>Caps</b>			Other materials available. See Accessories beginning on page 127.
To fit 11/16x16		069. 000. XX. 00	
To fit 3/8 BSPP		065. 200. XX. 00	



**Example**    Type    +    Material no.    =    Ordering no.  
for ordering: 652. 407    +    30                                =    652. 407. 30

1) We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 17.

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)

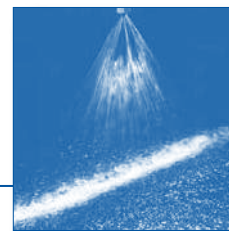






# Flat fan nozzle tips for conveyor lubrication

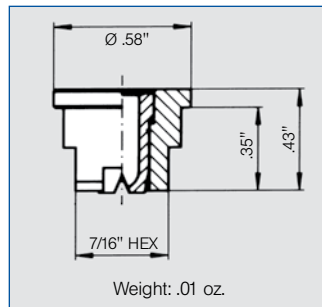
## Series 652. xxx. 8H. 03



**Especially low flow rates. Parabolic liquid distribution**

**Applications:**

- Belt lubrication
- Spraying of food products
- Oiling of metal sheets



**Operating pressure range:**  
14.5 to 72.5 psi

**Recommended operating pressure:**  
45 psi

**Viscosity:**  
The nozzles can be operated with viscous media, e.g. transmission fluid (max. approx. 200 mPas). However the spray angle decreases.

Spray angle	Ordering no.				Color	Free Passage (in.)	Flow Rate (Gallons Per Minute)				
	Type	Mat. no.					15 psi	liters per minute	2 bar	45 psi	75 psi
		303 SS	POM/303 SS	POM							
		16	8H.03*	56.03							
75°	652. 145	○	○	○	green	.012	.011	.050	.016	.021	
	652. 165	○	○	○	black	.013	.013	.070	.023	.030	
	652. 185	○	○	○	red	.008	.016	.080	.026	.034	
	652. 215	○	○	○	blue	.008	.021	.110	.036	.050	
	652. 245	○	○	○	orange	.012	.032	.160	.050	.070	
652.275	○	○	○	brown	.012	.042	.220	.070	.090		
120°	652. 187	○	○	○	grey	.008	.060	.080	.026	.034	
	652. 247	○	○	○	black	.008	.120	.160	.050	.070	
	652. 277	○	○	○	black	.012	.160	.220	.070	.090	

\* Housing POM, nozzle insert 303 SS

**Return valve with gauze filter:**

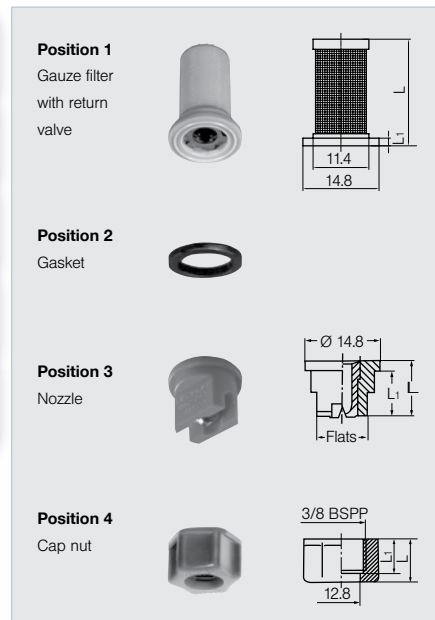
- Prevents dripping and saves medium
- Size of filter mesh: .003 in. (200 mesh)
- **095.016.53.11.00**  
Opening pressure: approx. 7 psi  
Closing pressure: approx. 4 psi
- **095.016.53.14.63**  
Opening pressure: approx. 40 psi  
Closing pressure: approx. 23 psi

Flat fan

Pos.	Name	Ordering no.	Material	Dimensions (in.)			Hex/ Flats (in.)	**
				L	L1			
1	Gauze filter with return valve	095. 016. 53. 11. 00	PP	.83	.06	-	-	.003
		095. 016. 53. 14. 63	PP	.83	.06	-	-	.003
2	Gasket	065. 240. 55	PTFE	-	-	-	-	-
		065. 240. 72	EWP 210	-	-	-	-	-
3	Nozzle	Ordering no. see flow tables	303 SS	11	9	.39	-	-
			POM/303 SS*	12	10	.32	-	-
4	Cap nut	065. 200. 16	303 SS	13	10	.32	-	-
		065. 200. 56	POM	14.5	11.5	.87	-	-

\* Housing POM, Nozzle insert 303 SS

\*\* Size of mesh

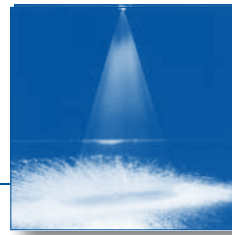




# Flat fan nozzles

## High pressure

### Series 602 / 608 / 652



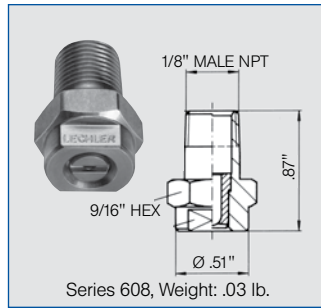
**Sharp uniform flat fan for high pressure usage.**

**Applications:**

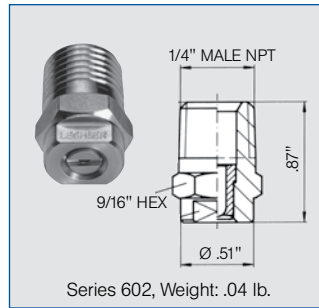
- High pressure cleaners
- Steam jet cleaners

**Materials:**

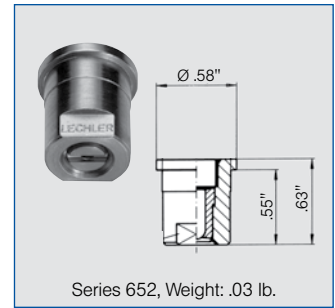
Nozzle body: 303 SS  
Insert: Hardened stainless steel



Series 608, Weight: .03 lb.



Series 602, Weight: .04 lb.



Series 652, Weight: .03 lb.

Nozzle Code			Flow Rate Code				Equivalent Orifice diam. (in.)	Flow Rate (Gallons Per Minute)							
1/8"	1/4"	nut	Spray Angle					40 psi	600 psi	1000 psi	1500 psi	liters per minute 100 bar	2000 psi	3000 psi	4500 psi
			20°	30°	45°	60°									
608	602	652	361	362	363	364	.039	.20	.77	.99	1.2	4.5	1.4	1.7	2.1
608	602	652	381	382	383	384	.043	.25	.95	1.2	1.5	5.6	1.7	2.1	2.6
608	602	652	401	402	403	404	.046	.30	1.2	1.5	1.8	6.8	2.1	2.6	3.2
608	602	652	411	412	413	414	.051	.34	1.3	1.7	2.1	7.8	2.4	3.0	3.6
608	602	652	451	452	453	454	.053	.40	1.6	2.0	2.5	9.2	2.8	3.5	4.3
608	602	652	471	472	473	474	.055	.45	1.7	2.3	2.8	10.3	3.2	3.9	4.8
608	602	652	481	482	483	484	.061	.51	2.0	2.5	3.1	11.5	3.6	4.4	5.4
608	602	652	501	502	503	504	.063	.55	2.1	2.8	3.4	12.6	3.9	4.8	5.9
608	602	652	521	522	523	524	.067	.60	2.3	3.0	3.7	13.8	4.3	5.2	6.4
608	602	652	531	532	533	534	.070	.65	2.5	3.3	4.0	14.8	4.6	5.6	6.9
608	602	652	541	542	543	544	.070	.70	2.7	3.5	4.3	15.9	4.9	6.0	7.4
608	602	652	551	552	553	554	.074	.75	2.9	3.7	4.6	17.0	5.3	6.5	7.9
608	602	652	571	572	573	574	.080	.80	3.1	4.0	4.9	18.2	5.6	6.9	8.4
608	602	652	591	592	593	594	.082	.90	3.5	4.5	5.5	21	6.4	7.8	9.6
608	602	652	601	602	603	604	.090	1.0	3.9	5.0	6.1	23	7.1	8.7	10.6
-	602	652	641	642	643	644	.098	1.2	4.8	6.2	7.6	28	8.7	10.7	13.1
-	602	652	671	672	673	674	.106	1.5	5.7	7.4	9.1	34	10.5	12.8	15.7
-	602	652	701	702	703	704	.118	1.7	6.7	8.7	10.6	40	12.3	15.0	18.4
-	602	652	-	-	723	724	.120	2.0	7.8	10.0	12.3	46	14.2	17.3	21
-	602	652	-	-	793	-	.154	2.9	11.4	14.7	18.0	67	21	25	31

Connection Code	Connection	Maximum pressure
A3. 00	Male BSPT	Approx. 5000 psi
A3. 07	Male NPT	Approx. 5000 psi
A3. 29	Retainer cap	Approx. 3000 psi

**Example**    Nozzle code + Flow rate code + Connection code = Ordering no.  
**for ordering:** 602.                    + 361                    + A3. 07                    = 602. 361. A3. 07  
 (see bolded column headings above)                    (.99 gpm & 20° spray angle @ 1000 psi; 1/4" Male NPT)

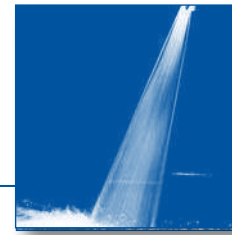
Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
 (See page 12 for symbol definitions.)



Flat fan



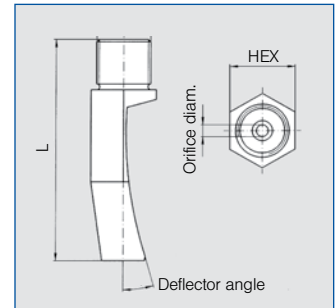
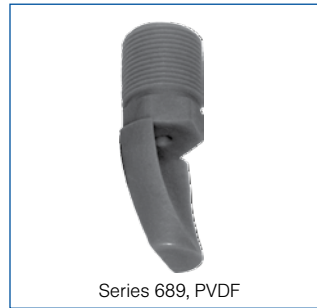
# Flat fan nozzles Tongue-type impactor deflector Series 688 / 689



**Deflector design provides clog resistance and high impact at low pressures. Even distribution.**

**Applications:**

- Heavy impact washing
- Drum filter cleaning
- Knock-off showers
- Phosphating lines

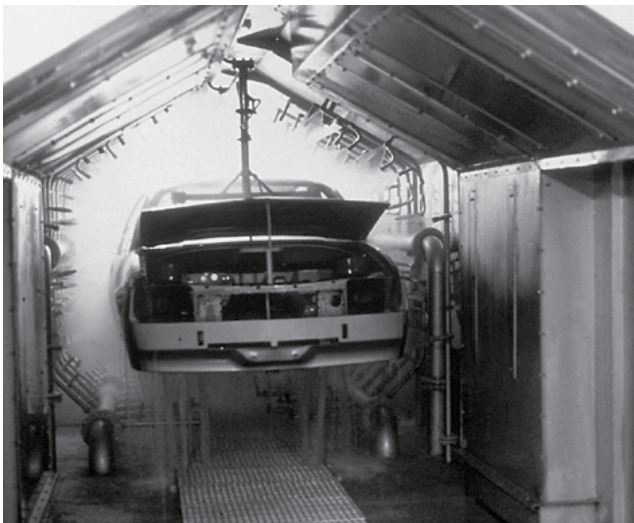


Spray angle	Deflector angle	Ordering no.				Orifice diam. (in.)	Flow Rate (Gallons Per Minute)							Dimensions (in.)		Weight 303 SS (lb.)	Spray Width B (in.) @ 30 psi			
		Type	Material no.		Connection		10 psi	20 psi	liters per minute	30 psi	40 psi	60 psi	80 psi	100 psi	L		Hex	H=10"	H=20"	
			303 SS 16	PVDF 5E	Male NPT															
45°	35°	688. 763	○	-	BE	-	.118	1.2	1.8	8.0	2.1	2.5	3.0	3.5	3.9	1.7	3/4	.25	9	17
	30°	688. 843	○	-	BE	-	.150	1.9	2.7	12.5	3.4	3.9	4.8	5.5	6.1	2.0	3/4	.29	9	17
	29°	688. 923	○	-	BE	-	.189	3.1	4.4	20	5.4	6.2	7.6	8.8	9.8	2.3	7/8	.54	9	17
	35°	689. 003	○	○	-	BK	.236	4.9	6.9	32	8.6	9.8	12.0	13.8	15.5	3.1	1-1/4	.67	10	19
																3.1*	15/16*	.07*		

\* Measurement for PVDF model

**Example for ordering:** Type + Material no. + Conn. = Ordering no.  
688. 923 + 16 + BE = 688. 923. 16. BE

Flat fan



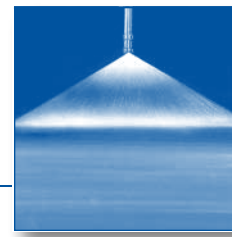
Phosphating line

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.





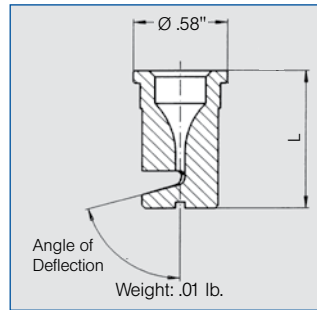
# Flat fan nozzle tips Tongue-type deflector wide angle Series 684



**Deflector produces moderate impact with a very wide spray angle. Clog resistant. Even distribution. Assembles with 3/8" retaining nut.**

**Applications:**

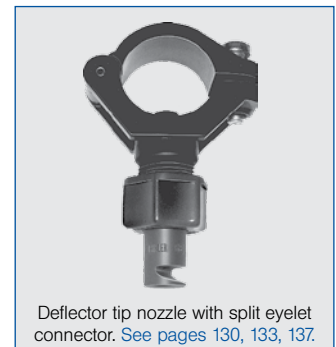
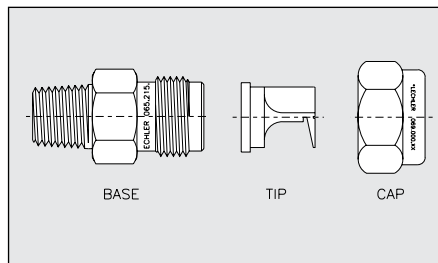
- Foam control for storage tanks, wastewater treatment plants
- Dust suppression
- Light washing
- Spray cooling
- Degreasing and phosphating



Spray angle	Deflector angle	Ordering no.		Color for version 56 POM *version 5E PVDF is blue	Orifice diam. (in.)	Flow Rate (Gallons Per Minute)									Length (L) (in.)	Spray Width B (in.) @ 30 psi 
		Type	Material no.			10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi			
			56											5E		
140°	75°	684. 348	○	-	Green	.028	.08	.11	.50	.13	.16	.19	.22	.25	.8	54
		684. 368	○	○	Yellow	.032	.10	.14	.63	.17	.20	.24	.28	.31	.8	54
		684. 408	○	-	Blue	.039	.16	.22	1.0	.27	.31	.38	.44	.49	.8	54
		684. 448	○	-	Red	.047	.19	.27	1.3	.35	.39	.48	.55	.61	.8	54
		684. 488	○	○	Brown	.051	.25	.35	1.6	.43	.50	.61	.70	.78	.8	54
		684. 528	○	-	Grey	.059	.31	.44	2.0	.54	.62	.76	.88	.98	.8	54
		684. 568	○	○	White	.067	.39	.55	2.5	.67	.78	.95	1.1	1.2	.7	54
		684. 608	○	-	Light blue	.075	.49	.69	3.2	.86	.98	1.2	1.4	1.5	.7	54
		684. 688	○	-	Green	.095	.78	1.1	5.0	1.3	1.6	1.9	2.2	2.5	.7	54
		684. 728	○	○	Black*	.106	.98	1.4	6.3	1.7	2.0	2.4	2.8	3.1	.7	54
		684. 808	○	-	Purple	.134	1.6	2.2	10.0	2.7	3.1	3.8	4.4	4.9	.6	54

**Bases and Caps for Mounting**

Inlet NPT Male	Outlet Male	Part No.	Standard Materials: 17 316 SS 30 Brass
1/4" 3/8"	11/16 x 16 11/16 x 16	065. 215. XX. 10 065. 211. XX. 10	
1/4" 3/8"	3/8 BSPP 3/8 BSPP	065. 215. XX. 11 065. 215. XX. 12	
Caps			Other materials available. See Accessories beginning on page 127.
To fit 11/16x16 To fit 3/8 BSPP		069. 000. XX. 00 065. 200. XX. 00	



**Example**    Type    +    Material no.    =    Ordering no.  
for ordering: 684. 608    +    56    =    684. 608. 56

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
(See page 12 for symbol definitions.)



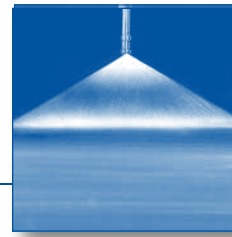
Flat fan



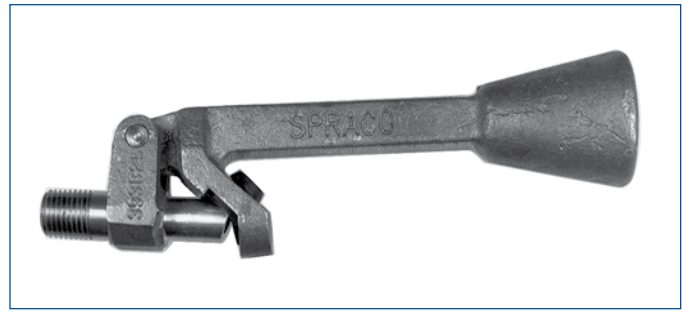
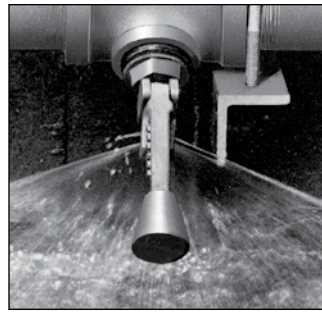


# Easy Flush foam control nozzles

## Series 564

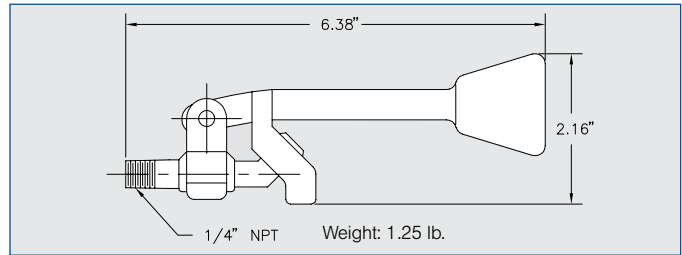


Designed to control foam within aeration tanks in waste treatment plants, the Easy Flush nozzle has a unique orifice configuration which produces an efficient flat fan spray. The Easy Flush nozzle also utilizes a Buna N deflector insert for quick removal upon wear, without complete nozzle replacement.



Easy Flush nozzles feature larger free passage than conventional flood type nozzles which limits clogging. They utilize low pressure liquid flow, for reduced pumping costs. In the event of a clog, simply lift the counterweight to flush the nozzle clean.

Select the Easy Flush nozzle size that provides maximum coverage at the lowest possible pressure and flow rate. Typical installation uses .3 to .4 GPM per foot of coverage, with nozzles mounted on 3 to 5 foot centers.



Spray angle	Ordering no.	Stamp	Flow and Coverage Data (Gallons Per Minute)						
			Pressure psi	Flow rate gpm	Width of spray coverage at elevation of nozzle above water line				
					12"	18"	24"	30"	36"
90°	564. 846. 32. BC	1	3	1.1	22"	30"	39"	46"	54"
			5	1.4	25"	35"	44"	53"	62"
			7	1.7	27"	38"	48"	58"	68"
			10	2.0	29"	43"	53"	64"	73"
120°	564. 847. 32. BC	2	3	1.1	34"	45"	56"	66"	75"
			5	1.4	36"	49"	62"	72"	82"
			7	1.7	40"	54"	67"	79"	90"
			10	2.0	44"	60"	73"	86"	—
140°	564. 848. 32. BC	3	3	1.1	41"	57"	72"	85"	—
			5	1.4	50"	66"	82"	—	—
			7	1.7	56"	74"	92"	—	—
			10	2.0	65"	84"	—	—	—
90°	564. 916. 32. BC	4	3	1.7	23"	31"	39"	47"	56"
			5	2.1	27"	36"	45"	54"	63"
			7	2.5	29"	39"	50"	60"	70"
			10	2.9	31"	42"	54"	65"	76"
120°	564. 917. 32. BC	5	3	1.7	38"	49"	60"	70"	81"
			5	2.1	43"	57"	69"	81"	93"
			7	2.5	48"	64"	79"	93"	—
			10	2.9	56"	71"	86"	100"	—
140°	564. 918. 32. BC	6	3	1.7	50"	62"	74"	86"	—
			5	2.1	60"	73"	87"	—	—
			7	2.5	65"	78"	92"	—	—
			10	2.9	—	—	—	—	—
90°	564. 946. 32. BC	7	3	2.1	24"	33"	41"	50"	58"
			5	2.6	27"	37"	48"	58"	68"
			7	3.0	29"	40"	52"	63"	73"
			10	3.5	32"	44"	57"	69"	80"
120°	564. 947. 32. BC	8	3	2.1	45"	60"	76"	90"	—
			5	2.6	50"	66"	84"	98"	—
			7	3.0	54"	71"	90"	—	—
			10	3.5	59"	78"	100"	—	—
140°	564. 948. 32. BC	9	3	2.1	54"	67"	80"	—	—
			5	2.6	62"	75"	88"	—	—
			7	3.0	—	—	—	—	—
			10	3.5	—	—	—	—	—

Material: Bronze

Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$

(See page 12 for symbol definitions.)



Flat fan





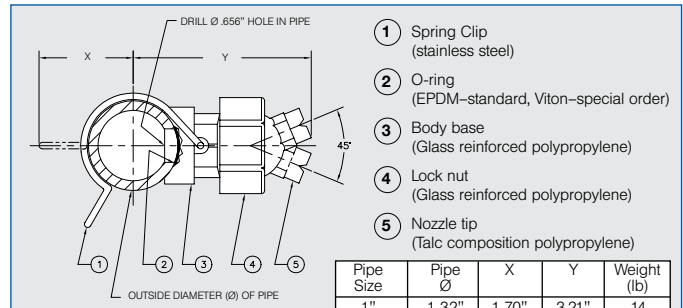
# Flat fan nozzles Easy Clip ball joint nozzle assembly Series 676



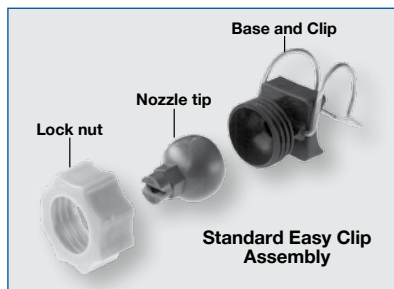
Excellent for quick and easy header construction. These spring mounting bases allow flexible nozzle alignment and a wide range of angles and flow rates. Drill .656" hole in the pipe for mounting. Assembly clamps to pipe. Nozzle ball tip adjusts as needed. No welding or threading. Maximum pressure 60 psi.

### Applications:

- Parts washing and degreasing
- Phosphating lines
- Pre-painting processing



Pipe Size	Pipe Ø	X	Y	Weight (lb)
1"	1.32"	1.70"	3.21"	.14
1 1/4"	1.66"	1.89"	3.41"	.15
1 1/2"	1.90"	2.02"	3.50"	.15
2"	2.38"	2.25"	3.74"	.17



### Easy Clip complete nozzle assembly

Spray angle	Ordering no.						Flow Rate (Gallons Per Minute)					Color	Item 5 (see top chart) Replacement Nozzle Tip Ordering no.
	Type	Mat. no.	To Mount on Pipe size				10 psi	20 psi	40 psi	60 psi	80 psi		
			PP 53	1"	1 1/4"	1 1/2"							
60°	676. 724	○	30	31	32	33	.98	1.4	2	2.4	2.8	Gray	676. 724. 53. 30. 01
	676. 764	○	30	31	32	33	1.2	1.8	2.5	3	3.5	Brown	676. 764. 53. 30. 01
	676. 804	○	30	31	32	33	1.6	2.2	3.1	3.8	4.4	Purple	676. 804. 53. 30. 01
	676. 844	○	30	31	32	33	1.9	2.7	3.9	4.8	5.5	Yellow	676. 844. 53. 30. 01
	676. 884	○	30	31	32	33	2.5	3.5	5	6.1	7	Red	676. 884. 53. 30. 01
	676. 904	○	30	31	32	33	2.8	4.0	5.7	6.9	8.0	Blue	676. 904. 53. 30. 01
	676. 924	○	30	31	32	33	3.1	4.4	6.2	7.6	8.8	Green	676. 924. 53. 30. 01

### Replacement parts

Item no. (see top chart)	Type	Ordering no.	For Pipe Size
1 and 3	Base and Clip	092. 080. 53. 00. 00	1"
		092. 081. 53. 00. 00	1 1/4"
		092. 082. 53. 00. 00	1 1/2"
		092. 083. 53. 00. 00	2"
4	Lock nut	092. 080. 53. 00. 02	
2	O-ring	092. 015. 6C. 04. 32	

Example Type + Material no. + Pipe Size = Ordering no.  
for ordering: 676. 884 + 53 + 32 = 676. 884. 53. 32 (Nozzle assembly to mount on 1 1/2" pipe)

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.











## Additional flat fan nozzles available from Lechler



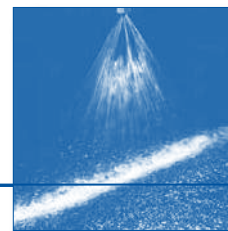
Lechler offers several other flat fan nozzles besides those in this catalog which may be appropriate for your application. If a nozzle in the series below is specified for a job of yours or you would just like more information about any of these products, please contact Lechler.





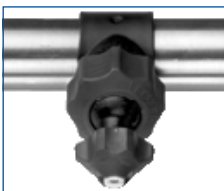

Low-pressure nozzles	Nozzle Series	Spray angles	Flow range (gpm @ 30psi)	Connection	Application/ Design
	<b>610</b>	20° 30° 45° 60° 75° 90° 120°	0.01 – 1.06	1/8" Male BSPP	Cleaning installations, cooling headers, spray pipes. <b>Compact design, suited for narrow installation conditions.</b>
	<b>612</b>	20° 30° 45° 60° 75° 90° 120°	0.01 – 4.23	1/4" Male BSPP	Cleaning installations, cooling headers, spray pipes. <b>Compact design, suited for narrow installation conditions.</b>
	<b>616</b> <b>617</b>	20° 30° 45° 60° 90° 120°	1.66 – 16.6	3/4" Male BSPP	Cleaning installations, rain curtains, gravel washing, spray pipes, foam spraying, roll cooling, cooling of rolled stock. <b>Compact design, suited for narrow installation conditions.</b>
	<b>612.xxx.5E.03</b>	90° 120°	0.17 – 1.06	For pressing into pipe	Cleaning and rinsing operations, dish washing machines. <b>For pressing into pipes.</b>
	<b>669</b>	20° 30° 45° 60°	10.5 – 42	Tip	Cooling. <b>Self-aligning dovetail connection ensures correct spray offset.</b>
	<b>672 cleaning</b>	15° 25° 40° 50° 80° 110°	0.62 – 12.2	Tip	Cooling, lubricating. <b>Socket alignment flats.</b>

Continued on next page.



## Additional flat fan nozzles available from Lechler



Low-pressure nozzles	Nozzle Series	Spray angles	Flow range (gpm @ 30psi)	Connection	Application/ Design
	<b>6F</b>	20° 30° 45° 60°	1.6 – 26	Tip	Cooling. <b>Automatic self-aligning feature ensures correct spray offset angle.</b>
	<b>6E</b>	20° 30° 45° 60°	1.6 – 26	Tip	Cooling. <b>No welding nipple is required because the tip geometry can be machined directly into a header.</b>
	<b>Descaling nozzles SCALEMASTER®</b> The standard in descaling technology			$\frac{3}{4}$ " BSPP	Descaling.  <b>Please ask for our brochures "Scalemaster HP" and "Nozzles for Hydromechanical Descaling"</b>
	<b>646</b>	20° 30° 45° 60° 90° 120°	0.08 – 0.83	Assembly with bayonet quick release system	Belt cleaning, surface treatment, cleaning, coating processes. <b>Quick and easy assembly, adjusted spray direction.</b>
	<b>676 / 677 MEMO-SPRAY®</b>	30° 60° 90° 120°	1.06 – 13.2	$\frac{3}{4}$ " BSPP Assembly with clamp for the following sizes: $\frac{1}{4}$ ", $1\frac{1}{4}$ ", $1\frac{1}{2}$ ", 2"	Cleaning problems, phosphating, degreasing, rinsing in surface treatment techniques. Ball joint, multi-directional swivelling range of 20°. Simple, quick assembly. <b>Easy adjusting and cleaning. Retains orientation upon replacement.</b>
	<b>676</b>	20° 30° 45° 60° 75° 90° 120°	0.01 – 2.64	$\frac{3}{8}$ " Female BSPP Weld base	Cleaning, cooling, and lubricating processes. <b>Swivelling nozzle to meet exact jet alignment requirements. Multi-directional swivelling range of 30°.</b>



# Solid stream nozzles

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





## Solid stream nozzles

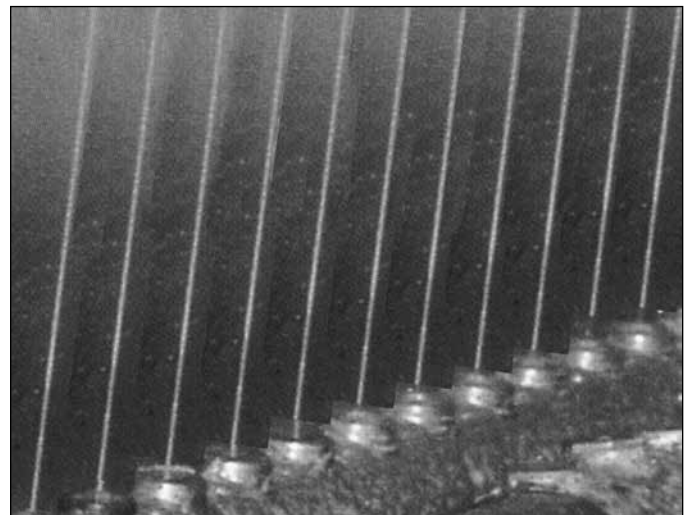
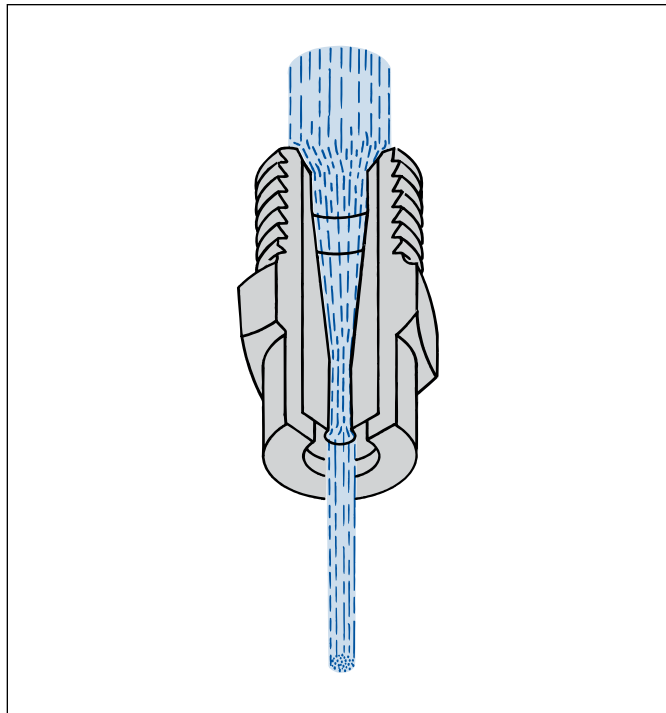


Thanks to optimum flow geometries, Lechler solid stream nozzles produce compact, solid stream jets of defined lengths. The almost turbulence-free liquid inflow results in excellent spray efficiency, even without jet stabilizer inserts.

Solid stream nozzles provide the greatest impact per square inch of any other type of nozzle, all other factors being equal (such as flow rate, pressure, and spray distance). A solid stream nozzle is considered a 0° flat fan nozzle, and a flat fan nozzle's impact per square inch increases as the spray angle decreases. That is why a 0° nozzle (i.e., a solid stream nozzle) provides the greatest impact.

So for all cleaning processes, cutting operations, and applications requiring perfect columnar impacts in order to generate concentrated jet power, the precision and power of Lechler solid stream nozzles enhance the productivity and performance of your plant.

For applications requiring high pressure, Lechler has a comprehensive range of solid stream nozzles in stainless steel with special hardening. **Lechler high pressure solid stream nozzles** create tight, stable, and powerful solid jets which do not break apart even when operating at high pressures.

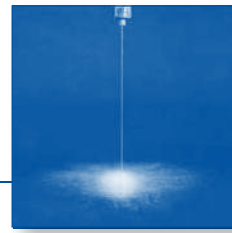


Solid stream header in use at a paper mill



## Solid stream nozzles

### Series 544



**Solid stream with excellent stability offers the highest impact. Orifice design maintains integrity over long distances.**

**Applications:**

- Concentrated cleaning
- Paper trimming



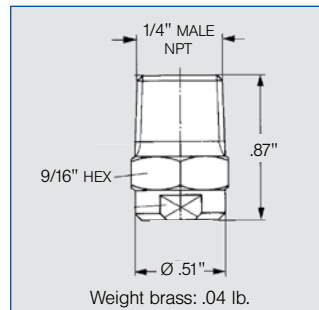
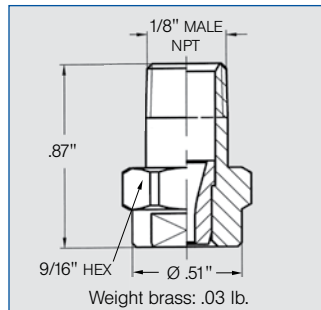
Series 544.110 – 544.400



Series 544.480 – 544.800



Series 544.480 – 544.800



Type	Ordering no.		Orifice diam. (in.)	Flow Rate (Gallons Per Minute)								
	Mat. no.			10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	150 psi	
	303 SS 16	Brass 30										Male NPT 1/8" 1/4"
544.110	○	○	BA BC	.009	.006	.009	.04	.012	.015	.018	.020	.023
544.160	○	-	BA BC	.013	.009	.013	.06	.019	.023	.026	.029	.034
544.200	○	○	BA BC	.015	.016	.022	.10	.031	.038	.044	.049	.058
544.240	○	-	BA BC	.020	.025	.035	.16	.05	.06	.07	.08	.10
544.280	○	-	BA BC	.025	.04	.05	.25	.08	.10	.11	.12	.15
544.320	○	○	BA BC	.031	.06	.09	.40	.12	.15	.18	.20	.24
544.360	○	○	BA BC	.033	.10	.14	.63	.20	.24	.28	.31	.37
544.400	○	○	BA BC	.041	.16	.22	1.0	.31	.38	.44	.49	.59
544.480	○	○	BA BC	.052	.25	.35	1.6	.50	.61	.70	.78	.95
544.560	○	○	BA BC	.065	.39	.55	2.5	.78	.95	1.1	1.2	1.5
544.640	○	○	BA BC	.082	.62	.88	4.0	1.2	1.5	1.8	2.0	2.4
544.720	○	○	BA BC	.105	.98	1.4	6.3	2.0	2.4	2.8	3.1	3.7
544.800	○	○	BA BC	.130	1.6	2.2	10.0	3.1	3.8	4.4	4.9	5.9

**Example**    Type    +    Material no.    +    Conn.    =    Ordering no.  
**for ordering:** 544.720 + 30                    +    BC            =    544.720.30.BC

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

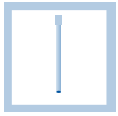
Conversion formula for the above series:  $V_2 = V_1 \sqrt{\frac{P_2}{P_1}}$   
 (See page 12 for symbol definitions.)



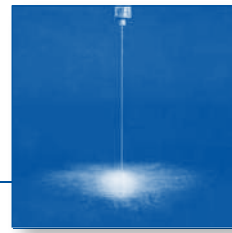
Solid stream







**Solid stream nozzles**  
**High pressure**  
**Series 599**



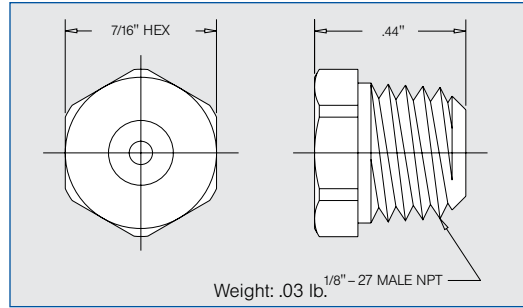
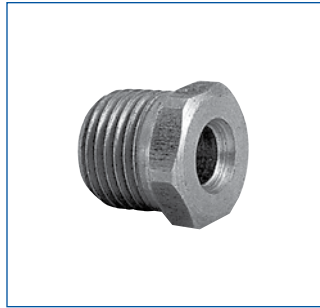
**For tight clearance installation, these small nozzles create a very precise, collimated stream at a wide range of pressures. The rear orifice position helps minimize clogging and facilitates cleaning.**

**Applications:**

- Paper production
- High pressure cleaning

**Material:**

316 SS



Ordering no.	Orifice Diameter
<b>599.040.17.00.15</b>	.015" (0.38 mm)
<b>599.040.17.00.25</b>	.025" (0.64 mm)
<b>599.040.17.00.31</b>	.031" (0.79 mm)
<b>599.040.17.00.40</b>	.040" (1.0 mm)



## Solid stream nozzles Trimming Series 599



**Second only to a diamond in wear resistance, the ruby orifice offers amazing precision, performance consistency and long operational-life.**

**Applications:**

- Paper production
- Trimming
- High pressure cleaning
- Jet cuttings

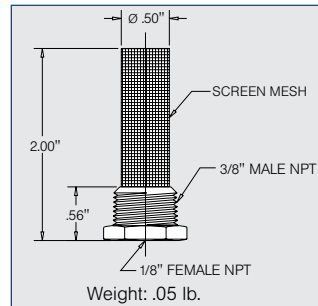
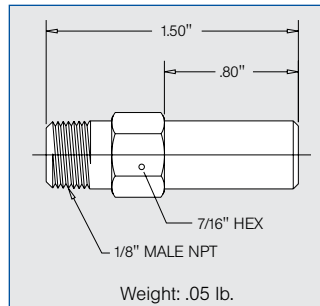
If you're tired of poor trims, replacing worn nozzles, and sheet breaks, it's time to move up to Lechler's ruby orifice trimming nozzles. It's another step in Lechler's 130 year tradition of innovation and technological development.

**Materials:**

Nozzle body: Brass housing  
Orifice: Ruby  
Strainer: 316 SS



*The ruby orifice produces a tightly collimated solid stream for precise, predictable cutting action. The optional strainer offers a convenient way to protect against clogging caused by stray fibers or loose bits of debris in your liquid supply.*

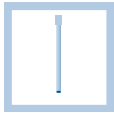


*The ruby orifice is permanently mounted in a brass housing. The optional strainer is 316 stainless steel.*

Ordering no.	Orifice diam. (in.)	Flow Rate (Gallons Per Minute)							
		100 psi	200 psi	300 psi	400 psi	500 psi	600 psi	800 psi	1000 psi
<b>599. 128. 8J. BA. 15</b>	.015	.05	.07	.09	.10	.11	.12	.14	.16
<b>599. 128. 8J. BA. 20</b>	.020	.09	.13	.16	.18	.20	.22	.25	.28
<b>599. 128. 8J. BA. 25</b>	.025	.14	.20	.24	.28	.31	.34	.40	.44
<b>599. 128. 8J. BA. 30</b>	.030	.20	.28	.35	.40	.45	.49	.57	.63
<b>599. 128. 8J. BA. 35</b>	.035	.28	.40	.48	.56	.63	.69	.79	.89
<b>599. 128. 8J. BA. 40</b>	.040	.36	.51	.62	.72	.80	.88	1.02	1.14
<b>599. 128. 8J. BA. 45</b>	.045	.45	.64	.78	.90	1.01	1.10	1.27	1.42
<b>599. 128. 8J. BA. 50</b>	.050	.55	.78	.95	1.10	1.23	1.35	1.56	1.74



Ordering no.	Mesh size
Screen	
<b>099. 104. 17. BE. 05</b>	50
<b>099. 104. 17. BE. 10</b>	100
<b>099. 104. 17. BE. 20</b>	200



## Solid stream nozzles

### Needle jet

### Series 599



**This series is designed for use on high pressure showers.**

**Applications:**

- Paper production
- High pressure cleaning

For longer service life, we offer this nozzle with a ruby orifice. The ruby insert resists wear and maintains a precise stream longer than stainless steel.

The alternate version, with the clog preventer, is designed for installing on showers without self-cleaning features. When the nozzle is spraying down, the extension draws fresh water from the shower above the sediment level.

**Materials:**

599.009.17: 316 SS

599.009.8J: 316 SS

Orifice: Ruby

599.028.17: 316 SS



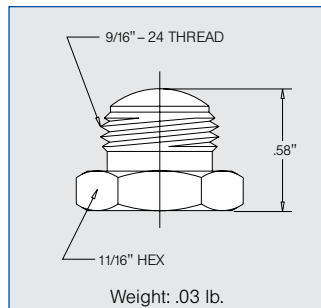
Series 599.009.17



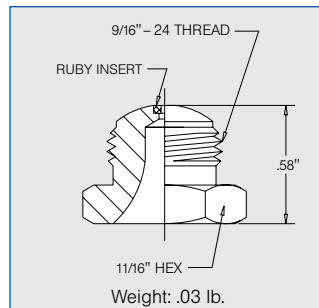
Series 599.009.8J



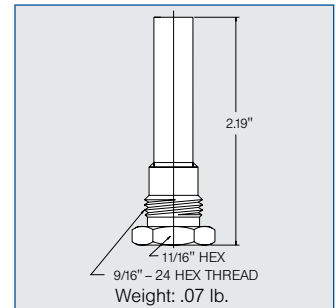
Series 599.028.17



Weight: .03 lb.



Weight: .03 lb.



Weight: .07 lb.

Ordering no.			Orifice Diameter
Standard Nozzle	Standard with Ruby Orifice	Clog Resistant	
599.009.17.00.14	599.009.8J.00.14	599.028.17.00.14	.014" (0.36 mm)
599.009.17.00.28	599.009.8J.00.28	599.028.17.00.28	.028" (0.71 mm)
599.009.17.00.33	599.009.8J.00.33*	599.028.17.00.33	.033" (0.84 mm)
599.009.17.00.40	599.009.8J.00.40	599.028.17.00.40	.040" (1.0 mm)
599.009.17.00.55	599.009.8J.00.55	599.028.17.00.55	.055" (1.40 mm)
599.009.17.00.70	599.009.8J.00.70**	599.028.17.00.70	.070" (1.78 mm)
599.009.17.00.94	599.009.8J.00.94	599.028.17.00.94	.094" (2.39 mm)
599.009.17.01.25	599.009.8J.01.25	599.028.17.01.25	.125" (3.18 mm)

\* Actual orifice diameter of this ruby orifice nozzle is .032".

\*\* Actual orifice diameter of this ruby orifice nozzle is .073".

Solid stream





# Air nozzles

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





As a rule, any flat fan or solid stream nozzle can be operated with air instead of liquid. However, you'll obtain the best results using the nozzle designs we specifically engineered for compressed air or saturated steam applications. Typical applications for Lechler air nozzles include blowing off or out, cooling, drying, or cleaning.

### The problem: noisy air sprayers

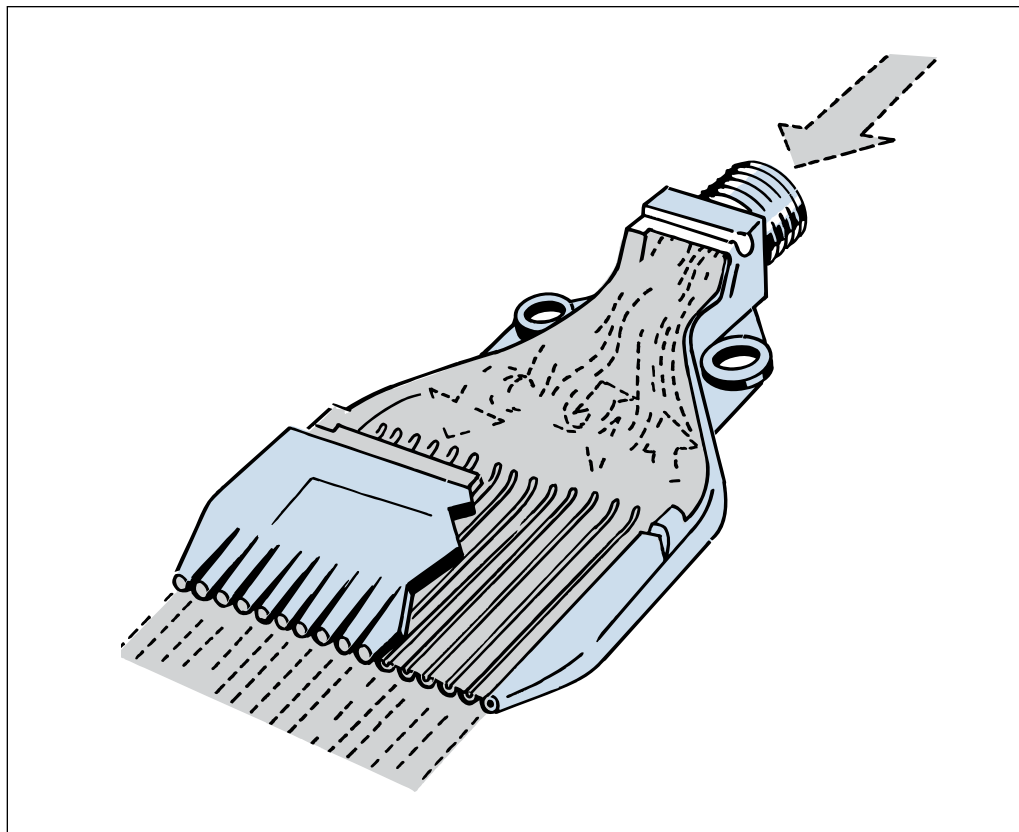
In many industries and workshops, compressed air is an indispensable tool.

Compressed air is needed for cleaning, drying, blowing off, and many other applications.

Typically, when uncontrolled compressed air is used, annoying, high-frequency hissing noises occur, which can affect or even harm hearing. These "noises" are produced by turbulences generated at the air outlet. Their intensity depends on the shape of the nozzle orifice and on the amount of inlet air pressure. Therefore, the stronger the output air jet needs to be, the higher the noise level, air consumption, and cost as a result.

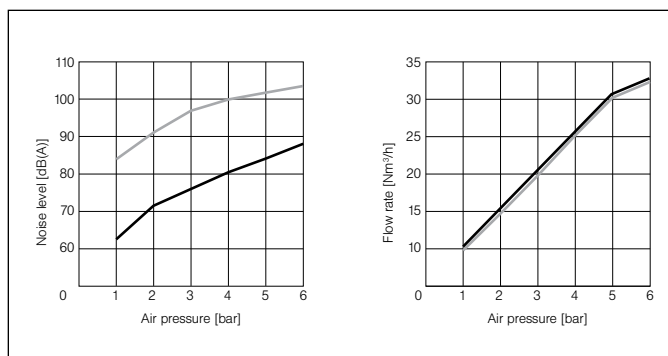
### The solution: Lechler multi-channel air nozzles, featuring a significantly reduced sound level, high blowing power, and low air consumption.

The performance of multi-channel nozzles is based on partitioning the air inflow into single air jets. A total of 16 air channels, arranged to ensure optimum flow conditions, provides for a uniform, straight, and powerful overall air jet.



### In comparison to single-hole air nozzles, the advantages are as follows:

- Reduction of the noise level by up to 12 dB
- Lower inlet air pressure with the same blowing force
- Lower air consumption
- Better blowing effect over a greater distance
- Lower operating costs



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

- Lechler multi-channel round jet nozzle
- Conventional single-hole nozzle

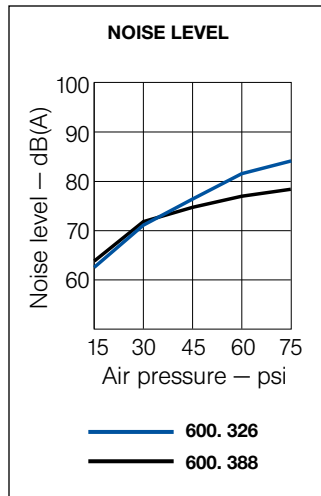




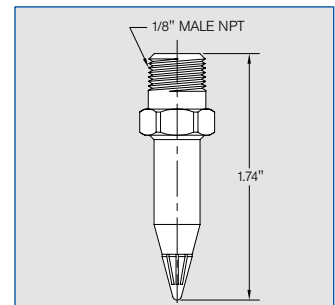
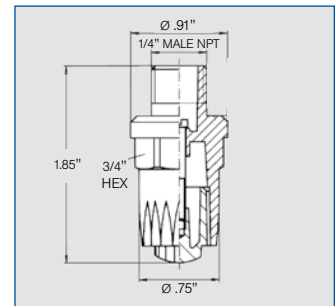
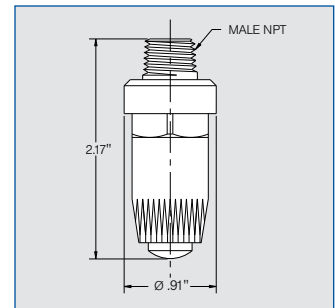
# WHISPERBLAST® compressed air nozzles

## Round Series 600

Provides focused blasting power with minimal air consumption and noise. Round configuration excellent for spot blasting, clearing holes, or use on hand guns.



Round WHISPERBLAST gives a focused blast with low air consumption. Best for hand gun use.



Type	Ordering no.			Description	Capacity for Air (Standard Cubic Feet per Minute)					Approx. Wt. (lb.)	Max. Pressure	Max. Temp. °F	
	Material no.		Connection		15 psi	30 psi	45 psi	60 psi	75 psi				
	Brass 30	ABS 5K	Zinc 3W										Male NPT 1/8" 1/4"
600.326	○	○	-	BA BC	Round WHISPERBLAST	5.3	8.8	12.4	16.0	19.5	0.05	100 psi	120
600.326	-	-	○	- BC	Round WHISPERBLAST	5.3	8.8	12.4	16.0	19.5	0.10	100 psi	200
600.388	○	-	-	BA -	MiniBlast	3.0	4.6	6.2	7.8	9.4	0.14	100 psi	120

Example Type + Material no. + Conn. = Ordering no.  
for ordering: 600.326 + 5K + BC = 600.326.5K.BC

Please see the Lances and Nozzle Headers section for various configurations to mount your WHISPERBLAST air nozzles beginning on page 141.



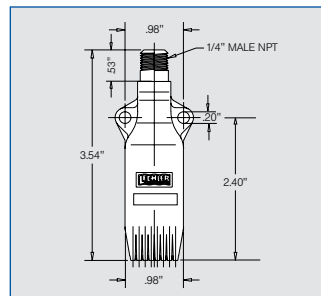
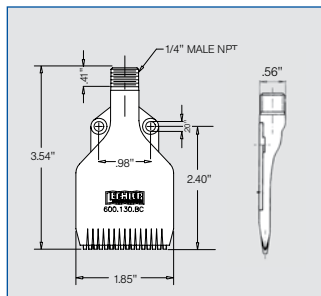
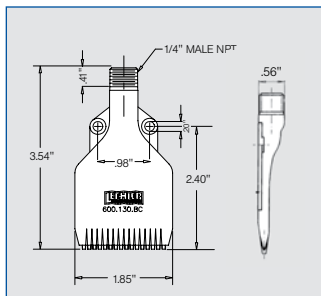
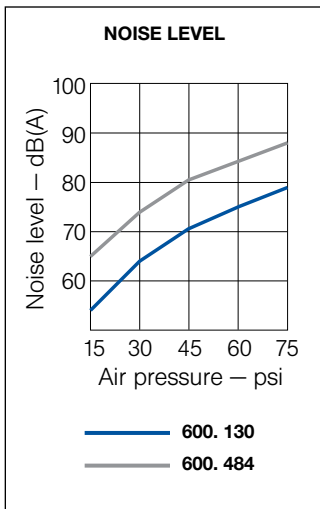
# WHISPERBLAST® compressed air nozzles

## Flat

### Series 600 Plastic version

Provides focused blasting power with minimal air consumption and noise. Flat configuration can be used individually or side-by-side to create a very effective air knife.

**NEW:**  
Polypropylene for the food industry  
(FDA-conform material)



While standard plastic WHISPERBLAST nozzles come in a distinctive blue color, model 600.130.S2.BC is made from natural Polypro, a colorless material. Since no color dyes have been added to this model, it meets FDA requirements for use in food or pharmaceutical applications. See page 24.

Type	Ordering no.		Description	Accessories	Capacity for Air (Standard Cubic Feet per Minute)				Approx. Wt. (lb.)	Max. Pressure	Max. Temp. °F	
	Material no.	Connection			15 psi	30 psi	45 psi	60 psi				
	Natural PP <b>S2</b>	POM <b>56</b>	1/4" Male NPT Hose Barb									
<b>600.130</b>	○	○	<b>BC</b> -	Original flat WHISPERBLAST	6.5	10.8	14.9	19.1	.05	75 psi	120	
<b>600.130</b>	-	○	- <b>01</b>	Flat WHISPERBLAST (1/4" Male NPT) w/accessories	Hose nipple (5/16" barb) Steel Extension (L=3.3")	6.5	10.8	14.9	19.1	.05	75 psi	120
<b>600.484</b>	-	○	<b>BC</b> -	Flat Mini-WHISPERBLAST	3.1	4.7	6.4	8.0	.03	75 psi	120	

Example for ordering: **600.130** + **56** + **BC** = **600.130.56.BC**



Air nozzles

Please see the Lances and Nozzle Headers section for various configurations to mount your WHISPERBLAST air nozzles beginning on page 141.

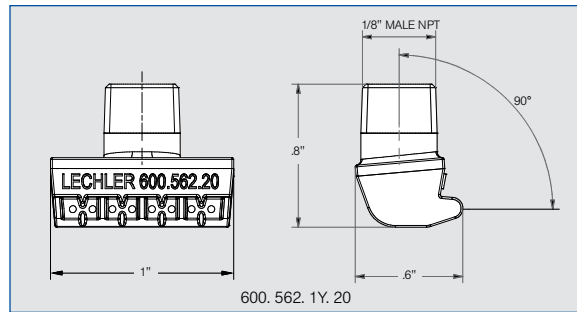
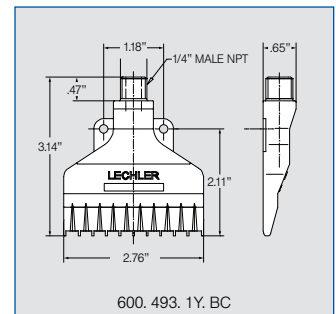
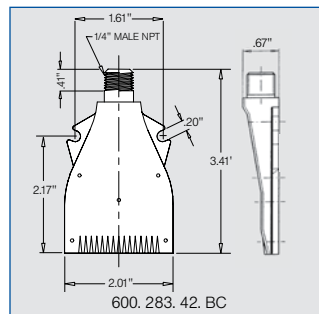
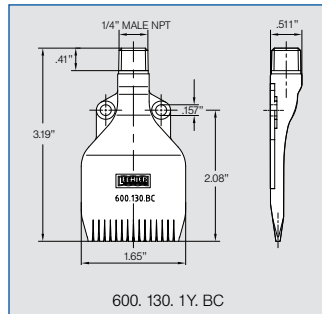
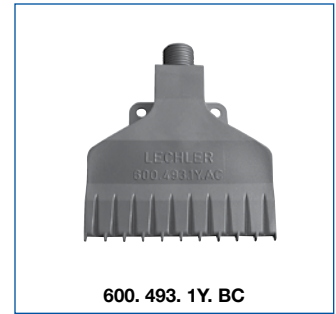
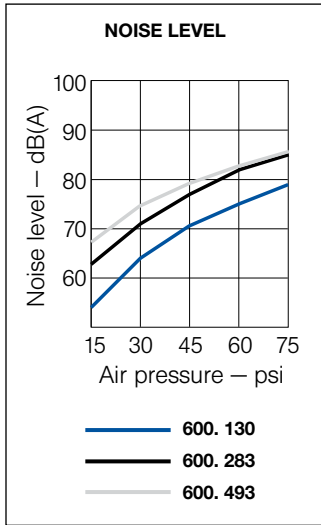




# WHISPERBLAST® compressed air nozzles

## Flat Series 600 Metal version

Provides focused blasting power with minimal air consumption and noise. Flat configuration can be used individually or side-by-side to create a very effective air knife.



Type	Ordering no.		Description	Capacity for Air (Standard Cubic Feet per Minute)				Approx. Wt. (lb.)	Max. Pressure	Max. Temp. °F
	Material no.	Connection		15 psi	30 psi	45 psi	60 psi			
	316 SS 1Y	Aluminum 42								
<b>600.130</b>	○	- BC	Flat WHISPERBLAST	6.5	10.8	14.9	19.1	.05	75 psi	1000
<b>600.283</b>	-	○ BC	Aluminum flat WHISPERBLAST	8.5	13.5	18.6	23.8	.14	120 psi	400
<b>600.493</b>	○	- BC	Flat WHISPERBLAST	11.1	16.9	22.7	28.5	.28	150 psi	1000
<b>600.562</b>	○	- 20	Tangential air nozzle	-	5.3	-	-	.06	150 psi	1022

**Example** Type + Material no. + Conn. = Ordering no.  
 for ordering: 600.130 + 1Y + BC = 600.130.1Y.BC

Please see the Lances and Nozzle Headers section for various configurations to mount your WHISPERBLAST air nozzles beginning on page 141.





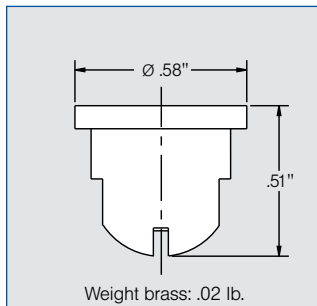
# Air nozzle tips

## Series 679

Designed specifically to create a wide spray angle flat fan, with air or steam. Orifice size options allow for varying SCFM output for the same air input psi. For use with nozzle base and and cap.

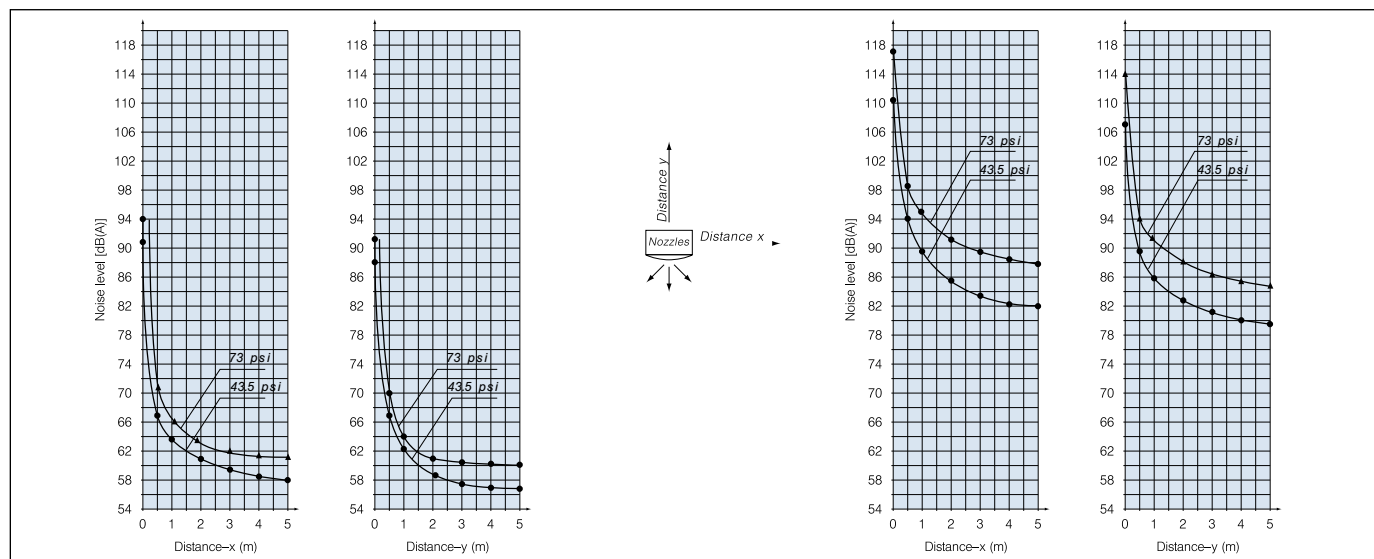
**Applications:**

- Strip and web drying
- Liquid blow-off
- Chip removal



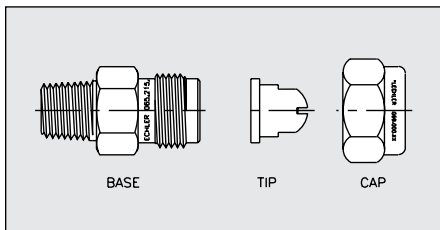
Spray angle	Ordering no.				Equip. Orifice diam. (in.)	Capacity for Air (Standard Cubic Feet per Minute)				Capacity for Saturated Steam (lb/hr)			
	Type	Mat. no.		7 psi		29 psi	73 psi	145 psi	7 psi	29 psi	73 psi	145 psi	
		316 SS	Brass										
70°	679. 037	-	17	30	.047	.9	1.8	3.5	6.5	2.6	5.1	10.1	18.3
	679. 085	○	○	○	.051	1.2	2.4	4.7	8.7	3.5	6.8	13.4	24.4
	679. 117	○	○	○	.059	1.2	2.5	4.9	9.1	3.8	7.3	14.3	25.8
	679. 165	○	○	○	.071	1.5	3.0	6.1	11.1	4.4	9.0	17.6	31.5
	679. 255	○	○	○	.083	2.1	4.3	8.5	15.7	6.2	12.6	24.7	44.5
	679. 365	○	○	○	.110	3.7	7.5	15.0	27.4	11.0	22.0	43.1	77.7
	679. 415	○	○	○	.142	6.0	12.0	24.0	43.9	17.6	35.1	69.1	124.8
	679. 495	○	○	○	.169	9.2	18.3	36.6	67.1	27.3	54.6	106.8	192.6

**Example** Type + Material no. = Ordering no.  
**for ordering:** 679. 255 + 17 = 679. 255. 17



**Bases and Cap for Mounting**

Inlet Male NPT	Outlet Male	Part No.	Standard Materials: 17 316 SS 30 Brass
1/4"	11/16 x 16	065. 215. XX. 10	
3/8"	11/16 x 16	065. 211. XX. 10	
<b>Cap</b>			
To fit 11/16x16		069. 000. XX. 00	Other materials are available. See page 127.



A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.



# Air or saturated steam nozzles

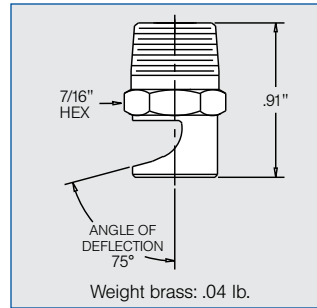
## Deflector

### Series 686

**Wide-angle, powerful air jet.**

**Applications:**

- Blowing off liquids
- Cooling
- Reheating
- Drying



Spray angle	Ordering no.				Orifice diam. (in.)	Capacity for Air (Standard Cubic Feet per Minute)						Capacity for Saturated Steam (lb/hr)					
	Type	Mat. no.		Conn.		10 psi	20 psi	40 psi	60 psi	80 psi	100 psi	10 psi	20 psi	40 psi	60 psi	80 psi	100 psi
		316 SS 17	Brass 30														
70°	686. 408	○	○	BA	.039	.4	.5	.8	1.1	1.4	1.7	1.8	2.4	3.5	4.6	5.7	6.6
	686. 488	○	○	BA	.051	.6	.9	1.4	1.9	2.4	2.9	2.6	3.7	5.7	7.5	9.3	11
	686. 528	○	○	BA	.059	.9	1.1	1.9	2.5	3.2	3.8	3.5	5.1	7.5	10	12	14
	686. 568	○	○	BA	.067	1.0	1.5	2.4	3.4	4.2	5.0	4.6	6.6	10	13	16	19
	686. 608	○	○	BA	.075	1.3	1.8	3.0	4.2	5.2	6.2	5.7	8.2	13	17	20	24
	686. 688	○	○	BA	.094	2.2	2.9	4.7	6.6	8.3	9.9	9.0	13	20	26	32	37
	686. 728	○	○	BA	.106	4.0	5.0	7.9	11	14	17	9.9	16	24	32	39	47
	686. 808	○	○	BA	.134	6.1	8.0	13	18	23	27	16	25	39	50	62	74

**Example**    Type    +    Material no.    +    Conn.    =    Ordering no.  
**for ordering:** 686. 408 + 17                    + BA    = 686. 408. 17. BA

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.





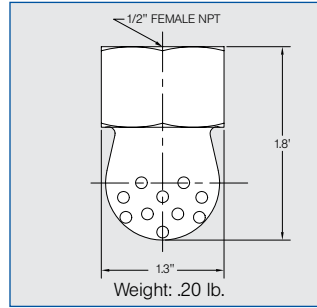
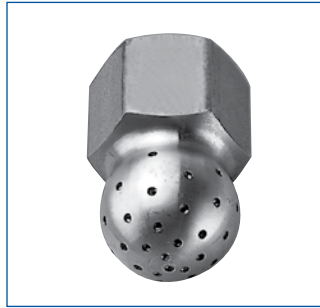


**Air or saturated steam nozzles**  
**Cluster solid stream**  
**Series 540 / 541**

**Powerful air jet with 40 individual bore holes.**

**Applications:**

- Injection of steam into liquids
- Injection of compressed air into bulk goods
- Gas injection (acid and neutralization baths)



Spray angle	Ordering no.			Orifice diam. (in.)	Capacity for Air (Standard Cubic Feet per Minute)				Capacity for Saturated Steam (lb/hr)			
	Type	Mat.no.	Conn.		15 psi	29 psi	44 psi	73 psi	15 psi	29 psi	44 psi	73 psi
240°	540. 909	○	BH	.032	13.4	20.1	26.8	40.2	14.7	21.7	29.1	43.6
	540. 989	○	BH	.039	20.9	31.4	41.8	62.7	22.9	33.7	45.4	67.9
	541. 109	○	BH	.059	49.0	73.5	98.0	147.0	53.8	79.3	106.6	159.4
	541. 189	○	BH	.079	76.3	114.5	152.6	229.0	83.9	123.7	166.3	248.6
	541. 239	○	BH	.091	98.4	147.6	196.8	295.2	107.5	158.5	213.2	318.8

**Example**    **Type**    +    **Material no.**    +    **Conn.**    =    **Ordering no.**  
**for ordering:** 540. 909    +    16                    +    BH            =    540. 909. 16. BH

For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 141.

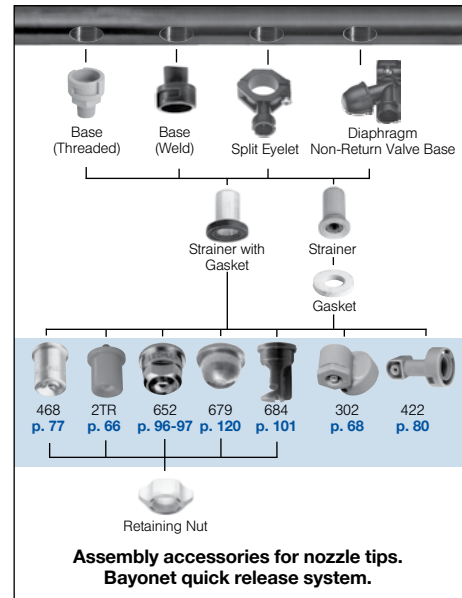
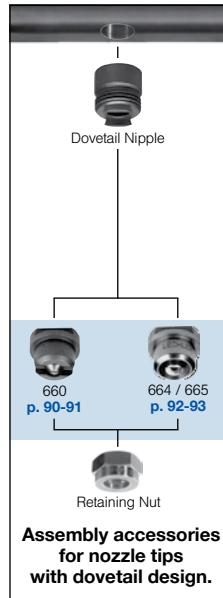
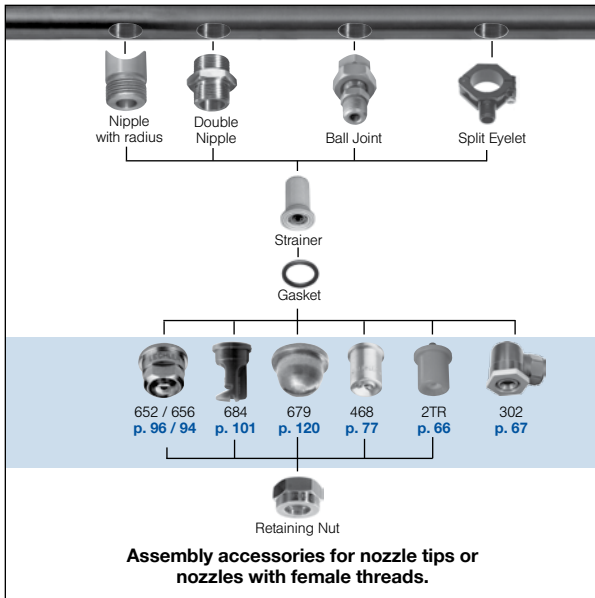




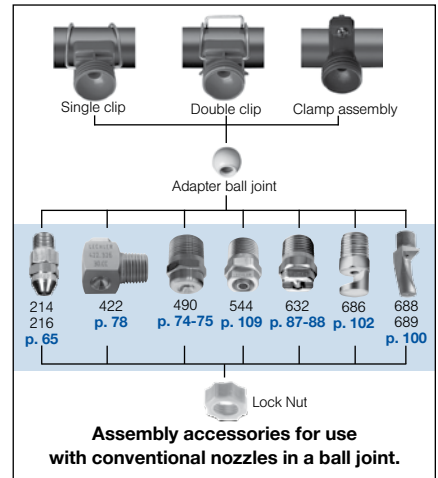
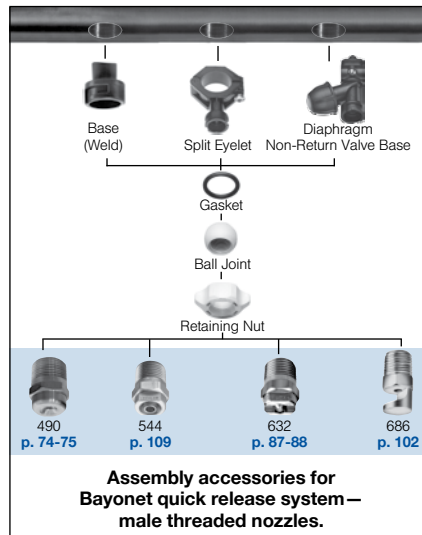
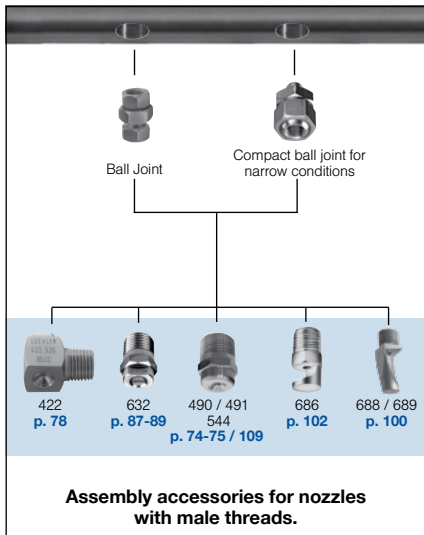


# Match the right assembly accessories to your specific application.

## Assembly accessories for nozzle tips or nozzles with female threads



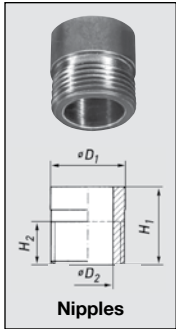
## Assembly accessories for nozzles with male threads



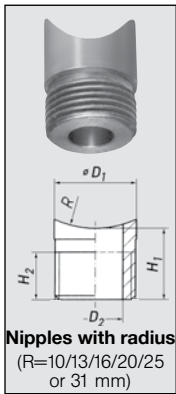


# Assembly accessories for nozzle tips or nozzles with female threads

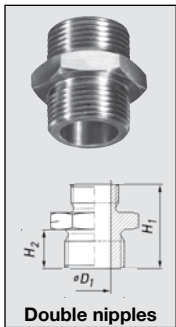
## Nipples



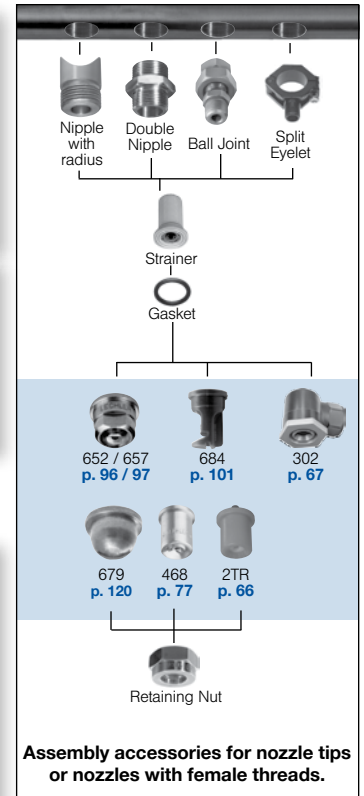
For series	Ordering no.				Dimensions (in.)								Weight (Brass) lb.	
	Type	Material no.				Inlet	Outlet	H <sub>1</sub>	H <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	R		HEX
		Steel	316 SS	Brass	PP									
2TR 468 652 679 684	<b>065. 210. xx. 00</b>	02	17	30	53	-	3/8" Male BSPP	.71	.39	.68	.45	-	-	.04
656 657	<b>065. 610. xx. 00</b>	02	02	-	02	-	3/4" Male BSPP	1.06	.55	1.10	.71	-	-	.13



2TR 468 652 679 684	<b>065. 217. xx. 10</b>	-	02	-	-	-	3/8" Male NPT	.71	.39	.68	.45	.39	-	.04
	<b>065. 217. xx. 13</b>	-	02	-	-	-	3/8" Male NPT	.71	.39	.68	.45	.51	-	.04
	<b>065. 217. xx. 16</b>	-	02	-	-	-	3/8" Male NPT	.71	.39	.68	.45	.63	-	.04
	<b>065. 217. xx. 20</b>	-	02	-	-	-	3/8" Male NPT	.71	.39	.68	.45	.79	-	.04
	<b>065. 217. xx. 25</b>	-	02	-	-	-	3/8" Male NPT	.71	.39	.68	.45	.98	-	.04
	<b>065. 217. xx. 31</b>	-	02	-	-	-	3/8" Male NPT	.71	.39	.68	.45	1.22	-	.04



2TR 468 652 679 684	<b>065. 215. xx. 11</b>	-	02	02	-	1/4" Male NPT	3/8" Male NPT	1.44	.56	-	-	-	11/16	.06
	<b>065. 215. xx. 12</b>	-	02	02	-	3/8" Male NPT	3/8" Male NPT	1.38	.50	-	-	-	11/16	.06
	<b>065. 215. xx. 10</b>	-	02	02	-	1/4" Male NPT	11/16"-16 Male NPT	1.44	.56	-	-	-	11/16	.06
	<b>065. 211. xx. 10</b>	-	02	02	-	3/8" Male NPT	11/16"-16 Male NPT	1.25	.50	-	-	-	11/16	.06
656 657 664 665	<b>065. 611. xx. BK</b>	-	02	02	-	3/4" Male NPT	3/4" Male NPT	1.65	.55	.71	-	-	1-1/4	.20



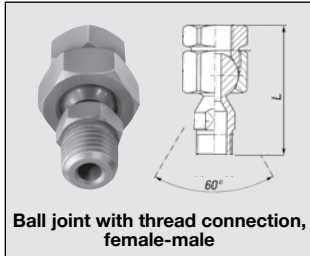
**Example**    Type    +    Material no. (xx)    =    Ordering no.  
**for ordering:** 065. 215. xx. 11 + 17    =    065. 215. 17. 11

1) We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 17.



## Assembly accessories for nozzle tips or nozzles with female threads

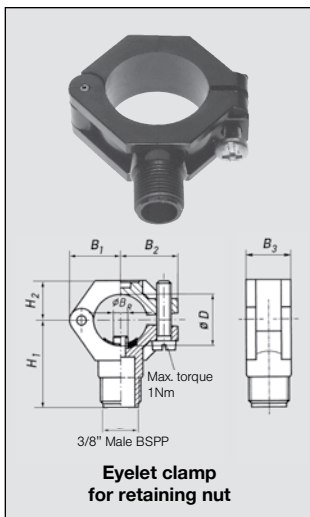
### Ball joints



For series	Ordering no.			Dimensions (in.)						Weight (Brass) lb.	
	Type	Material no.			Inlet	Outlet	D <sub>1</sub>	D <sub>2</sub>	Largest HEX		L
		303 SS/316 SS	303 SS	Brass							
	16	16	30								
2TR 302 468 652 679 684	092. 022. xx. BE. BD	-	○	-	1/4" Female NPT	3/8" Male NPT	-	-	1-1/16	2.51	.18
	091. 124. xx. BE. BF	-	○	○	3/8" Female NPT	3/8" Male NPT	-	-	1-1/8	2.10	.19

**Example**    **Type**                    +    **Material no. (xx)** =    **Ordering no.**  
**for ordering:**    092. 022. xx. BE. BD +    16                                    =    092. 022. 16. BE. BD

### Split eyelet



For series	Ordering no.			Screw (Material)	Dimensions (in.)								Weight (Nylon)		
	Type	Material no. (Color)			Pipe ø	Drill hole diameter	B <sub>R</sub> * ø	B <sup>**</sup> ø	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	H <sub>1</sub>		H <sub>2</sub>	
		51 Nylon (Black)	53 PP (Clear)												5E PVDf (Blue)
2TR 302 468 652 679 684	090. 053	○	○	○	303 SS	3/8"	1/4"	.24	.24	.75	.87	.73	1.36	.57	.05
	090. 003	○	○	○		1/2"	1/4"	.24	.25	.84	.94	.73	1.44	.65	.05
	090. 013	○	○	○		3/4"	5/16"	.31	.31	.96	1.05	.87	1.56	.69	.06
	090. 023	○	○	○		1"	7/16"	.42	.43	1.18	1.22	.87	1.73	.83	.07
	090. 033	○	○	○		1 1/4"	1/2"	.51	.51	1.34	1.40	.99	1.89	.99	.09

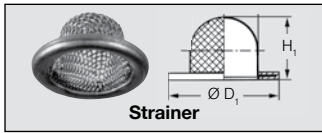
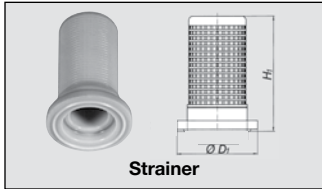
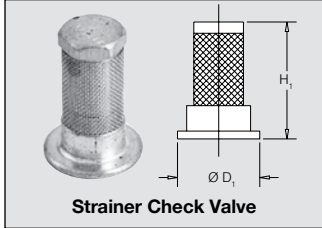
B<sub>R</sub>\*ø = Spigot diameter  
 B<sup>\*\*</sup>ø = Recommended bore diameter

**Example**    **Type**    +    **Material no.** =    **Ordering no.**  
**for ordering:**    090. 053 +    51                                    =    090. 053. 51



# Assembly accessories for nozzle tips or nozzles with female threads

## Strainers



For series	Valve option	Ordering no.				Color	Opening pressure (psi)	Dimensions (in.)				Weight (Brass) lb.
		Type	Material no.					Mesh size	Mesh opening	H <sub>1</sub>	D <sub>1</sub>	
			26 Monel	30 Brass	56 POM							
xxx.32x-xxx.44x	With check valve	065. 265	-	-	○	Blue	8	50	.011	.81	.58	.004
	No check valve	065. 257	-	-	○	Blue	-	50	.011	.81	.58	.004
xxx.32x-xxx.44x	With check valve	065. 266	-	-	○	Red	8	24	.026	.81	.58	.004
	No check valve	065. 256	-	-	○	Red	-	24	.026	.81	.58	.004
xxx.48x-xxx.56x	No check valve	065. 252	○	-	-	-	-	80	.007	.31	.58	.004

**Example** Type + Material no. = Ordering no.  
**for ordering:** 065. 260 + 30 = 065. 260. 30

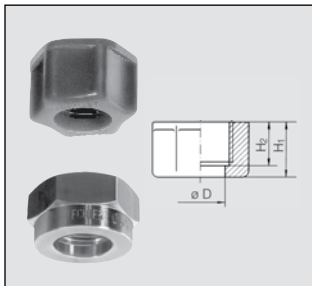
For series	For nozzle size	Ordering no.					Dimensions (in.)	
		Type	Material no.				D	Weight (oz.)
			55 PTFE	71 Copper-filled fiber	72 Aramid fiber	73 Soft rubber		
468/652 679/684	retaining nut 3/8" and 11/16"	065. 240	○	-	○	○	.59	.005
656/657	retaining nut 3/4"	065. 640	-	-	○	-	.94	.018

**Example** Type + Material no. = Ordering no.  
**for ordering:** 065. 240 + 55 = 065. 240. 55

## Gaskets



## Retaining nuts



For series	Type	Ordering no.						Dimensions (in.)				Weight (Brass) lb.	
		Material no.						For thread	H <sub>1</sub>	H <sub>2</sub>	D		Hex
		16 303 SS	17 316SS	1Y 316L SS	30 Brass	56 POM	5E PVDF						
2TR 468 548*	065. 200	○	○	-	○	○	○	3/8" BSPP	.57	.40	.50	.87	.06
652 660 679 684	069. 000	○	-	○	○	-	-	11/16"-16	.57	.40	.50	.87	.06
656/664	065. 600	○	○	-	○	-	○	3/4" BSPP	.63	.51	.79	1.26	.13

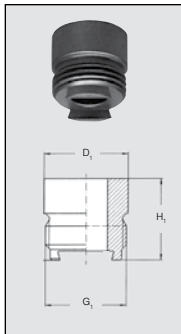
**Example** Type + Material no. = Ordering no.  
**for ordering:** 065. 200 + 17 = 065. 200. 17

\* POM and PVDF not recommended for nuts for Series 548, High Pressure Tips.





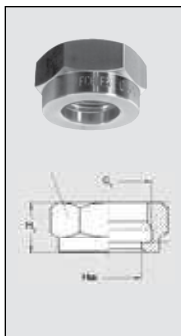
## Dovetail nipples



For series	Ordering no.			Dimensions (in.)				Weight (Brass) lb.	
	Type	Material no.			For thread G <sub>1</sub>	H <sub>1</sub>	D <sub>1</sub>		Hex
		303 SS 16	316 SS 17	Brass 30					
660	<b>066. 011</b>	-	○	-	3/8" BSPP	.71	.65	-	.05
664/665	<b>066. 410</b>	-	○	-	3/4" BSPP	1.06	1.10	-	.14

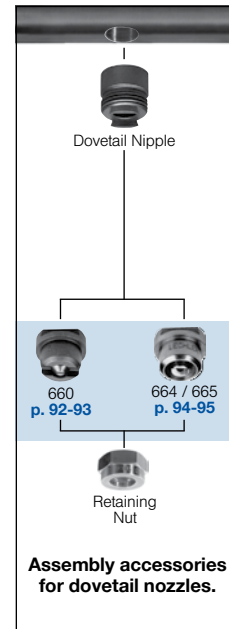
**Example**    Type    +    Material no.    =    Ordering no.  
**for ordering:**    066. 410    +    17    =    066. 410. 17

## Retaining nuts



For series	Ordering no.			Dimensions (in.)				Weight (Brass) lb.	
	Type	Material no.			For thread G <sub>1</sub>	H <sub>1</sub>	D <sub>1</sub>		Hex
		303 SS 16	316 SS 17	Brass 30					
660	<b>065. 200</b>	○	○	○	3/8" BSPP	.51	-	1/2"	.06
664/665	<b>065. 600</b>	○	○	○	3/4" BSPP	.51	-	1 1/4"	.13

**Example**    Type    +    Material no.    =    Ordering no.  
**for ordering:**    065. 200    +    17    =    065. 200. 17

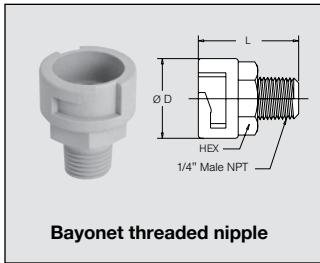


Dovetail nozzles have an automatic alignment guide which requires a matching dovetail base. Once the base is set, the nozzle can be removed and replaced without need to readjust the alignment. Nozzle is secured to the base with a retaining nut.

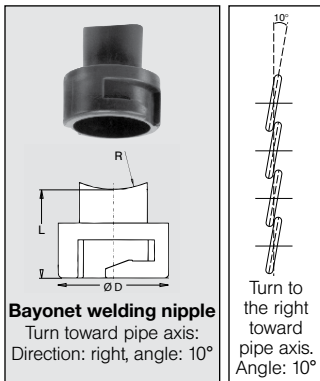


# Assembly accessories for nozzle tips or nozzles with female threads Bayonet quick release system

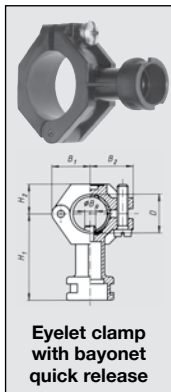
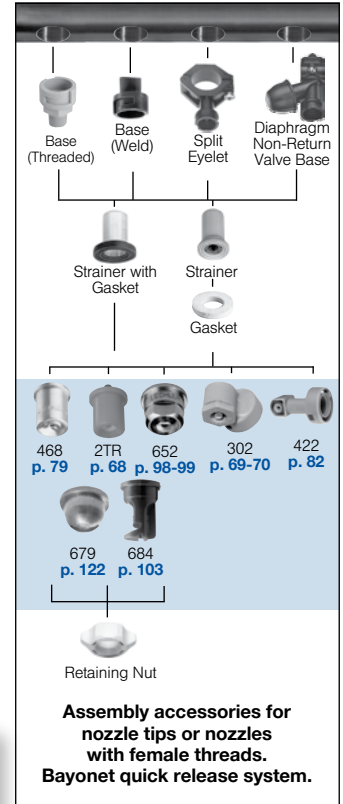
## Bayonet bases (split eyelets, diaphragm non-return valve, threaded nipple, and welding nipple)



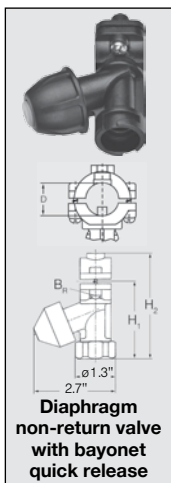
For series	Ordering no.	Material	Conn.	Dimensions (in.)			Weight (lb.)
				L	D	HEX	
302 bay, 422 bay, 2TR 468 652 679 684	<b>090. 075. 53. 00</b>	PP	1/4" Male NPT	1.29	1.02	13/16	.01



For series	Ordering no.	Material	Dimensions (in.)			Weight (lb.)
			L	R	D	
302 bay, 422 bay, 2TR 468 652 679 684	<b>095. 016. 53. 08. 05</b>	PVC	.98	.63	1.02	.01
	<b>095. 016. 50. 08. 05</b>	PP	.98	.63	1.02	.01



For series	Type	Ordering no.				Conn.	Screw (Material)	Pipe $\phi$	Drill hole diameter	Opening pressure (psi)	Closing pressure (psi)	Dimensions (in.)							Weight (lb.)	
		Material no. (Color)										Bayonet	$H_1$	$H_2$	$B_R^* \phi$	$B^{**} \phi$	$B_1$	$B_2$		$B_3$
		51	53	5E	56															
302 bay, 422 bay, 2TR 468 652 679 684	<b>090. 003</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	KA	304 SS	9/32"	-	-	1.95	.65	.24	.25	.84	.94	.73	.05		
	<b>090. 013</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	KA	304 SS	3/4"	5/16"	-	2.07	.69	.31	.31	.97	1.04	.87	.06		
	<b>090. 023</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	KA	304 SS	7/16"	-	-	2.25	.83	.42	.43	1.18	1.22	.87	.07		



302 bay, 422 bay, 2TR 468 652 679 684	<b>065. 272</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	KH	304 SS	1/2"	1/4"	12	9	2.32	3.31	.24					.11
	<b>065. 272</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	KL	304 SS	3/4"	25/64"	12	9	2.60	3.55	.38					.12

$B_R^* \phi$  = Spigot diameter  
 $B^{**} \phi$  = Recommended bore diameter

**Example** Type + Material no. + Conn. = Ordering no.  
**for ordering:** 090. 003 + 51 + KA = 090. 003. 51. KA



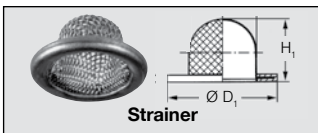
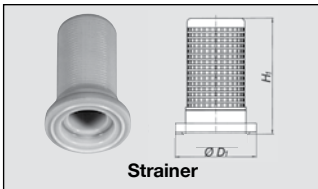
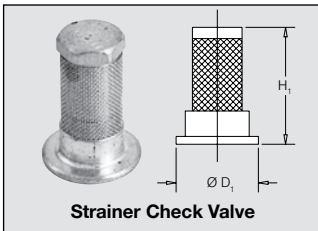
# Assembly accessories for nozzle tips or nozzles with female threads Bayonet quick release system

## Strainers



For nozzle size	Ordering no.	Material	Strainer mesh	Color	Dimensions (in.)				Weight (lb.)
					H <sub>1</sub>	H <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	
xxx.32x-xxx.44x	<b>065. 268. 7J</b>	Santoprene	50	Blue	.85	.10	.71	.44	.004
xxx.48x-xxx.56x	<b>065. 269. 7J</b>	Santoprene	25	Red	.85	.10	.71	.44	.004

## Strainers



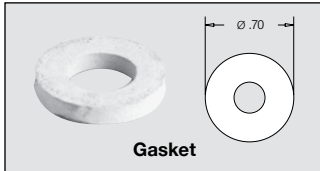
Valve option	Ordering no.				Color	Opening pressure (psi)	Dimensions (in.)				Weight (Brass) lb.
	Type	Material no.					Mesh size	Mesh opening	H <sub>1</sub>	D <sub>1</sub>	
		26	30	56							
With check valve	<b>065. 265</b>	-	-	○	Blue	8	50	.011	.81	.58	.004
	<b>065. 266</b>	-	-	○	Yellow	8	24	.026	.81	.58	.004
No check valve	<b>065. 257</b>	-	-	○	Blue	-	50	.011	.81	.58	.004
	<b>065. 256</b>	-	-	○	Red	-	24	.026	.81	.58	.004
No check valve	<b>065. 252</b>	○	-	-	-	-	80	.007	.31	.58	.004

**Example**    Type    +    Material no.    =    Ordering no.  
for ordering: 065. 260    +    30    =    065. 260. 30



## Assembly accessories for nozzle tips or nozzles with female threads Bayonet quick release system

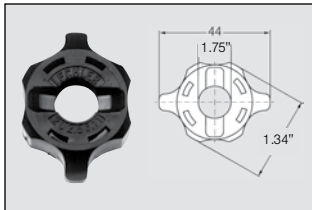
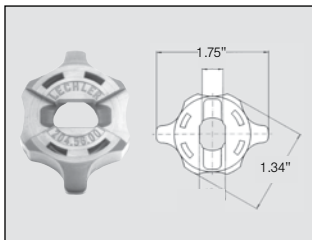
### Gaskets



Ordering no.		Description	Weight (oz.)
Type	Mat. no.		
	Rubber 73		
<b>095. 015. 7J. 01. 65</b>		<b>Santoprene</b> Replacement gasket for use with strainer	.016
<b>065. 242. 73. 00. 00</b>		<b>Rubber</b> Replacement gasket	.016

### Bayonet quick release retainer caps

incl. gasket 065.242.73 (rubber)



For series	Ordering no.	Material	Color	Weight (oz.)
652 679	<b>065. 202. 56. 00</b>	POM	Red	.016
	<b>065. 202. 53. 00</b>	PP	Gray	.016
	<b>065. 202. 5E. 00*</b>	PVDF	Blue	.016
2TR 468 652 684	<b>065. 202. 56. 11</b>	POM	Black	.016
	<b>065. 202. 53. 11</b>	PP	Gray	.016

\* does not work with 090.075.53.00.0 base,  
incl. gasket 065.242.7A (viton)

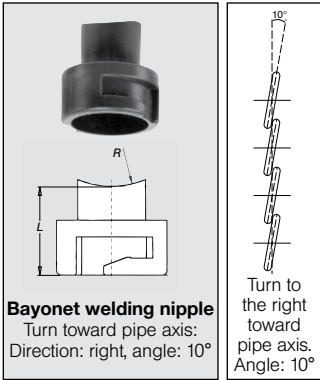




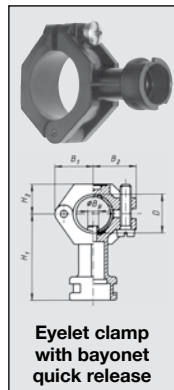


# Assembly accessories for Bayonet quick release system BSPT – male threaded nozzles

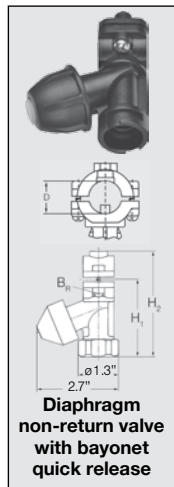
## Bayonet bases (split eyelets, diaphragm non-return valve, and welding nipple)



For series	Ordering no.	Material	Dimensions (in.)			Weight (lb.)
			L	R	D	
302 bay, 422 bay, 2TR 468 652 679 684	<b>095. 016. 53. 08. 05</b>	PP	.98	.63	1.02	.01
	<b>095. 016. 50. 08. 05</b>	PVC	.98	.63	1.02	.01



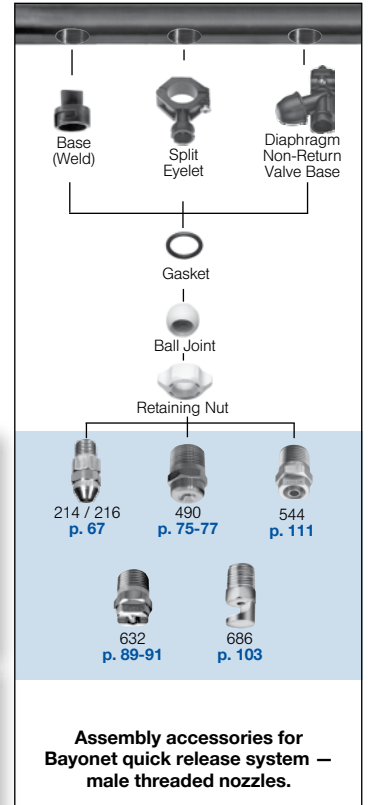
For series	Ordering no.				Bayonet	Screw (Material)	Pipe $\phi$	Drill hole diameter	Opening pressure (psi)	Closing pressure (psi)	Dimensions (in.)							Weight (lb.)		
	Type	Material no. (Color)									Conn.	$H_1$	$H_2$	$B_R^* \phi$	$B^{**} \phi$	$B_1$	$B_2$		$B_3$	
		51	53	5E																56
302 bay, 422 bay, 2TR 468 652 679 684	<b>090. 003</b>	○	○	○	-	KA	303 SS	9/32"	-	-	1.95	.65	.24	.25	.84	.94	.73	.05		
	<b>090. 013</b>	○	○	○	-	KA	303 SS	3/4"	5/16"	-	2.07	.69	.31	.31	.97	1.04	.87	.06		
	<b>090. 023</b>	○	○	○	-	KA	303 SS	7/16"	-	-	2.25	.83	.42	.43	1.18	1.22	.87	.07		



302 bay, 422 bay, 2TR 468 652 679 684	<b>065. 272</b>	-	-	-	○	KH	303 SS	1/2"	1/4"	12	9	2.32	3.31	.24					.11
	<b>065. 272</b>	-	-	-	○	KL	303 SS	3/4"	25/64"	12	9	2.60	3.55	.38					.12

$B_R^* \phi$  = Spigot diameter  
 $B^{**} \phi$  = Recommended bore diameter

**Example** Type + Material no. + Conn. = Ordering no.  
for ordering: 090. 003 + 51 + KA = 090. 003. 51. KA

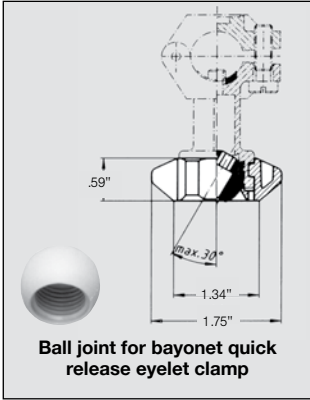






## Assembly accessories for Bayonet quick release system BSPT – male threaded nozzles

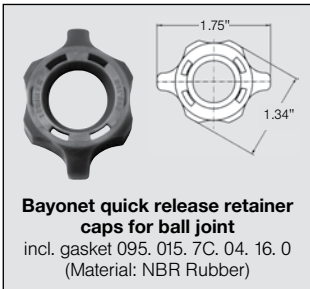
### Ball joint system for nozzles with 1/8" or 1/4" female thread.



For series	Ordering no.			Color	Weight (oz.)
	Type	Mat. no.	Connection		
			PVDF 5E	Female BSPT 1/8"   1/4"	
For all nozzles with 1/8" or 1/4" female thread	092. 150	○	AB   AD	Blue	.064

**Example**    Type    +    Material no.    +    Conn.    =    Ordering no.  
**for ordering:** 092. 150    +    5E                    +    AB                =    092. 150. 5E. AB

### Retaining nut with gasket for ball joint



For series	Ordering no.	Material	Color	Weight (oz.)
For ball joint	092. 150. 5E. 00	PVDF	Blue	.16



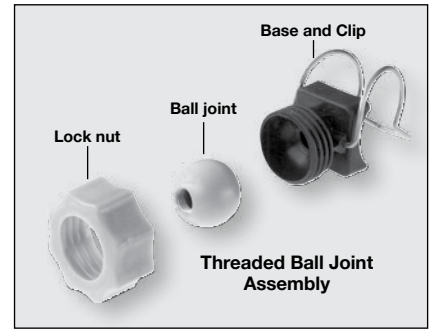
## Assembly accessories for use with conventional nozzles in a ball joint

Allows quick installation of conventional nozzles onto a metal or plastic header pipe. For pipe sizes of 1", 1-1/4", 1-1/2", and 2". Requires drilling of a 21/32" hole in the pipe, no threading required. Adapter clamps to pipe. For use with male NPT nozzles of sizes 1/8", 1/4", 3/8", and 1/2".

Easy Clip assembly nozzle tip (see page 101) can be replaced with a threaded ball joint, for added positioning flexibility for mounting 1/4" and 3/8" nozzles. Adapter and ball joint can both stand up to many acids and caustics, at temperatures up to 180°F.

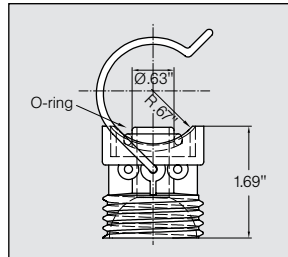
### Applications:

- Phosphating lines
- Parts washers and degreasing
- Conveyor washing
- Dust suppression



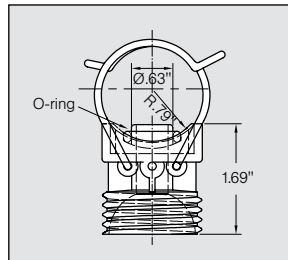
### Single clip with o-ring

Ordering no.	Material	For Pipe		Weight (lb.)
		Tap Ø	D	
092.080.53.00	PP	.63"	1"	.08
092.081.53.00	PP	.63"	1-1/4"	.09
092.082.53.00	PP	.63"	1-1/2"	.11
092.083.53.00	PP	.63"	2"	.11



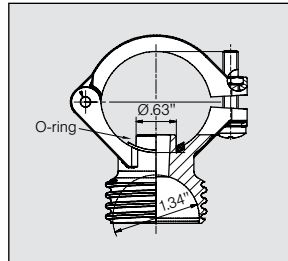
### Double clip with o-ring

Ordering no.	Material	For Pipe		Weight (lb.)
		Tap Ø	D	
092.090.53.00	PP	.63"	1"	.08
092.091.53.00	PP	.63"	1-1/4"	.09
092.092.53.00	PP	.63"	1-1/2"	.11
092.093.53.00	PP	.63"	2"	.11



### Clamp assembly with o-ring

Ordering no.	Material	For Pipe		Weight (lb.)
		Tap Ø	D	
090.023.53.43.10	PP	.63"	1"	.08
090.033.53.43.10	PP	.63"	1-1/4"	.09
090.043.53.43.10	PP	.63"	1-1/2"	.11



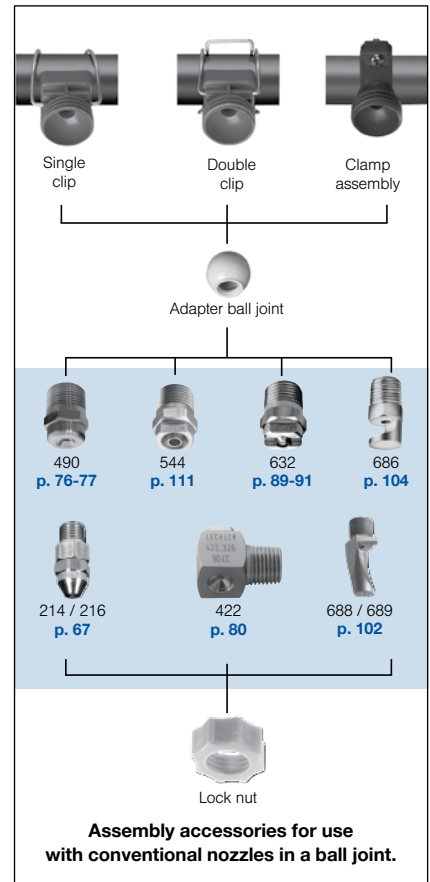
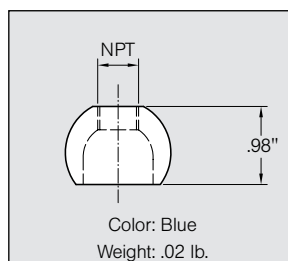
### Replacement pipe o-ring

Ordering no.
092.015.6C.04.32



### Adapter ball joint

Ordering no.	Material	For Nozzle	
		Connection Female NPT	Series
092.080.53.00.01	PP	blind nozzle	blind nozzle
092.080.53.BD.01	PP	1/4"	490, 544, 632, 686
092.080.53.BF.01	PP	3/8"	490, 632, 686



### Lock nut

Ordering no.
092.080.53.00.02



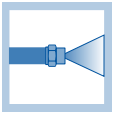
Weight: .03 lb.



# Lances and nozzle headers

- Sanitary Retractable Lances
- Standard Flanged Lances
- Tank Cleaning Lances
- STAMM® Showers
- Pneumatic Atomizing
- Air Blowoff
- Quick Disconnect
- Flat Fan
- Plastic
- Specialty





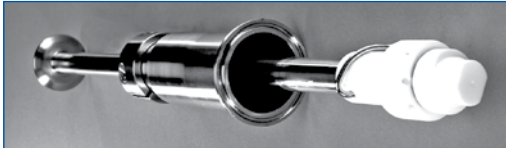
## Lances

### Custom fabricated for your application

#### Fabricated Lances

Whereas a header or spray bar is a pipe containing multiple nozzles, a lance is a pipe in which one nozzle is attached to the end of it (see photos). The lance can then be inserted into the target area. This could be a tank, a larger pipe, or a gas or fluid system. The purpose of the lance is to spray at a specific target (such as to clean a tank) or inject fluid into the system (such as gas conditioning). Lechler can fabricate a nozzle lance to perform any spray requirement you may have. Here are some examples:

#### Sanitary retractable lance



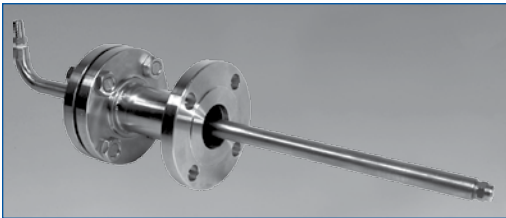
#### Applications

- Tank cleaning

#### Features

- Manually inserts and retracts into tank for a non-CIP sanitary application
- Accepts a variety of nozzle types
- Polished finish for sanitary applications

#### Industrial retractable lance



#### Applications

- Fluid injection

#### Features

- Manually inserts; retracts into vessel or pipe
- Flexibility; accepts a variety of nozzles, adjusts to various size flanges; has variable insertion lengths

#### Standard flanged lance



#### Applications

- Tank cleaning
- Fluid injection

#### Features

- Inserts into tank for CIP applications
- Accepts a variety of nozzle types

#### Standard flanged Sanitary Lance



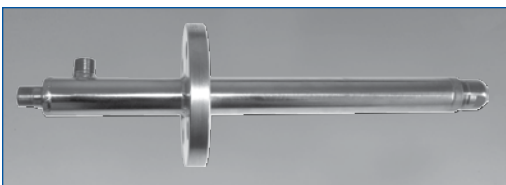
#### Applications

- Tank cleaning
- Fluid injection

#### Features

- Inserts into tank for CIP applications
- Accepts a variety of nozzle types
- Materials and connections suitable for sanitary applications

#### Pneumatic Twin Fluid lance



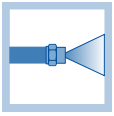
#### Applications

- Gas treatment
- Spray drying
- Fluidized bed granulation
- Atomizing of liquids to small droplets
- Combustion of liquids

#### Features

- Two styles: solid jet atomization and pre-atomization
- Solid jet atomization (for higher viscosity fluids)
  - Single atomization of solid fluid jet
  - Maximum free passage (less clogging risk)
  - Suitable for medium to high viscosity fluids
- Pre-atomization (for highest atomization efficiency)
  - Atomization of previously atomized cone spray
  - Finest droplets possible due to double atomization

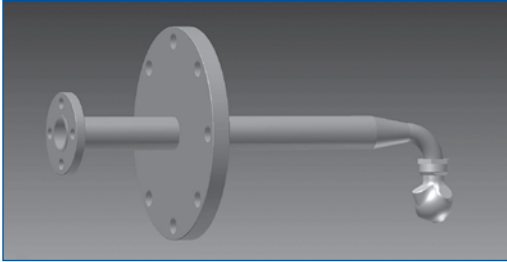
CIP=Clean-in-Place



## Lances

Custom fabricated for your application

### ANSI flanged lance



#### Applications

- Tank cleaning
- CIP applications

#### Features

- Accepts a variety of sizes
- Flanged connection for more permanent installation of nozzle and lance
- 90° elbow allows for side entry

### Tri-clamp connection lance



#### Applications

- Tank cleaning
- Fluid injection

#### Features

- Accepts a variety of nozzles
- Quick disconnect for easier use in non-CIP applications

### Branched flanged lance



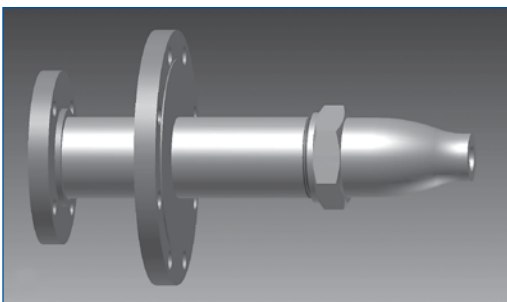
#### Applications

- Tank cleaning
- Chemical processing

#### Features

- Accepts a variety of nozzles
- Dual arms allow spraying in multiple directions

### CenterJet full cone lance



#### Applications

- Surface spraying
- Quench cooling
- Fire suppression
- Chemical processing
- CIP applications

#### Features

- Accepts a variety of nozzle types
- Available in various materials for maximum chemical resistance



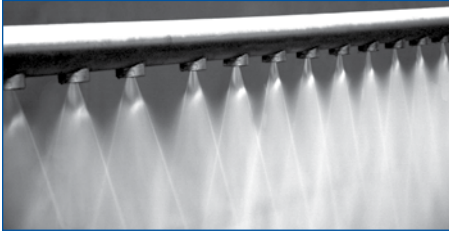
## Spray headers

### Custom fabricated for your application

#### Fabricated Headers – Our Specialty

In addition to single nozzles and accessories, Lechler can make fabricated headers in any size or shape for any application you may have in mind. With our knowledge of nozzles and applications, we can design and build a header specifically to perform the task you need for your process. Here are some examples of systems we have designed over the years:

#### STAMM® Headers (without a self-cleaning device)



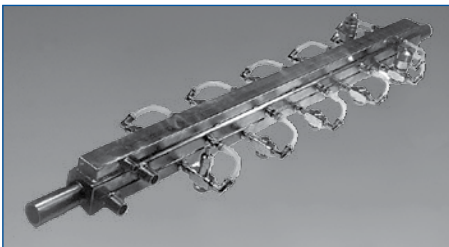
#### Applications

- Cleaning
- Coating

#### Features

- Renowned STAMM® quality
- Self-aligning nozzles
- Easy nozzle replacement

#### AirMist Atomizing Headers



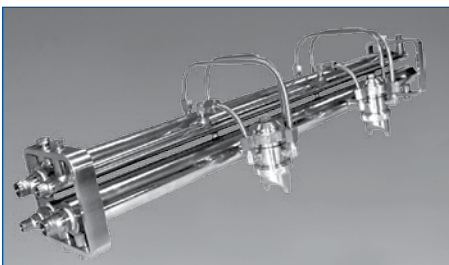
#### Applications

- Coating
- Lubricating
- Humidification

#### Features

- AirMist atomizing nozzles
- Optional pneumatic valves for operational control
- Sprays water-like fluids
- Simplifies installation

#### ViscoMist Atomizing Headers



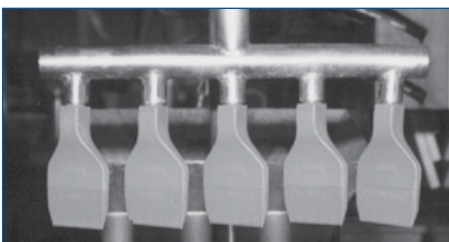
#### Applications

- Coating
- Lubricating

#### Features

- ViscoMist atomizing nozzles
- Standard pneumatic valves for operational control
- Sprays more viscous fluids (e.g. oils, syrups)
- Simplifies installation

#### Air Blowoff Headers



#### Applications

- Air blowoff
- Cooling
- Drying

#### Features

- WhisperBlast air nozzles
- ABS Plastic header pipe





## Spray headers

Custom fabricated for your application

### Flat Fan Nozzle Headers



#### Applications

- Cleaning
- Coating
- Cooling
- Lubricating

#### Features

- Any style of flat fan nozzles
- Threaded tip (with base and cap)
- Split eyelet (with base and cap)

### Full Cone Nozzle Headers



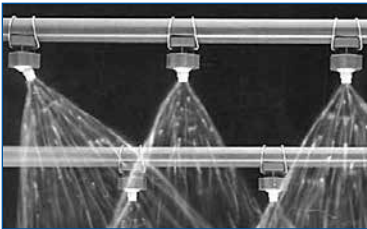
#### Applications

- Cleaning
- Dust suppression
- Surface spraying

#### Features

- Axial or tangential full cones
- Nozzles cover an area; target does not need to move through spray to get covered

### Quick Disconnect Nozzle Headers



#### Applications

- Surface treatment
- Parts washing
- Phosphating lines

#### Features

- Easy Clips clamp to pipe
- Split eyelets tighten around pipe
- Twistloc nozzles apply with a hand twist

### Custom Specialty Headers

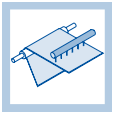


#### Applications

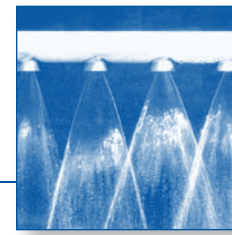
- Foam control (circular header)
- Surface spraying (inverted U header)
- Poultry processing (custom-shaped header)

#### Features

- Custom-made for application
- Nozzles aimed only at target regardless of header shape



# STAMM® shower headers with built-in cleaning device



**Engineered and manufactured by Lechler Inc. in the USA under license by the STAMM® Company in Germany, these shower headers with built-in cleaning device are recognized worldwide as the original “brush and flush” shower system.**

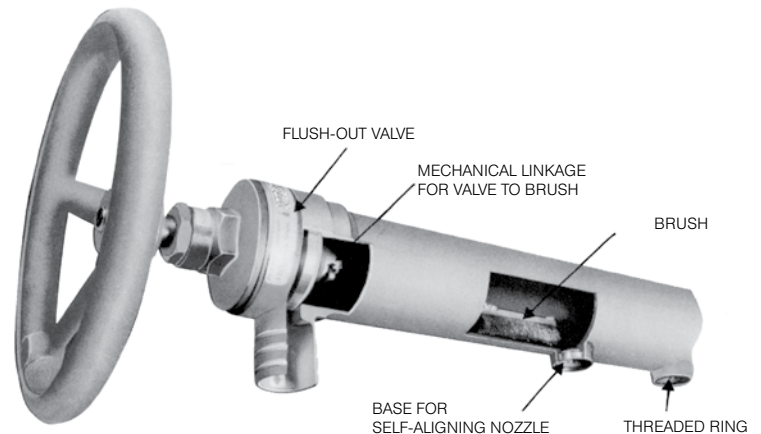
Shower pipe and nozzles remain clog-free due to the unique flush system design. A simple turn of the handwheel sweeps contaminants away from the nozzle orifices and directs the debris down the flush-out valve. Since these showers eliminate costly down time for cleaning, they are especially cost-effective in applications subject to high fluid contamination. Some features of the self-

- cleaning shower system are:
- Header pipe available in sizes from 1½" to 6" in diameter.
  - Contaminants flushed via special valve, preventing them from clogging orifices or reaching showered surface.
  - System accommodates wide range of flow rates.
  - Stainless steel construction throughout.
  - Highly efficient, interchangeable nozzles are self-aligning.
  - Systems are tailored to your specific application.

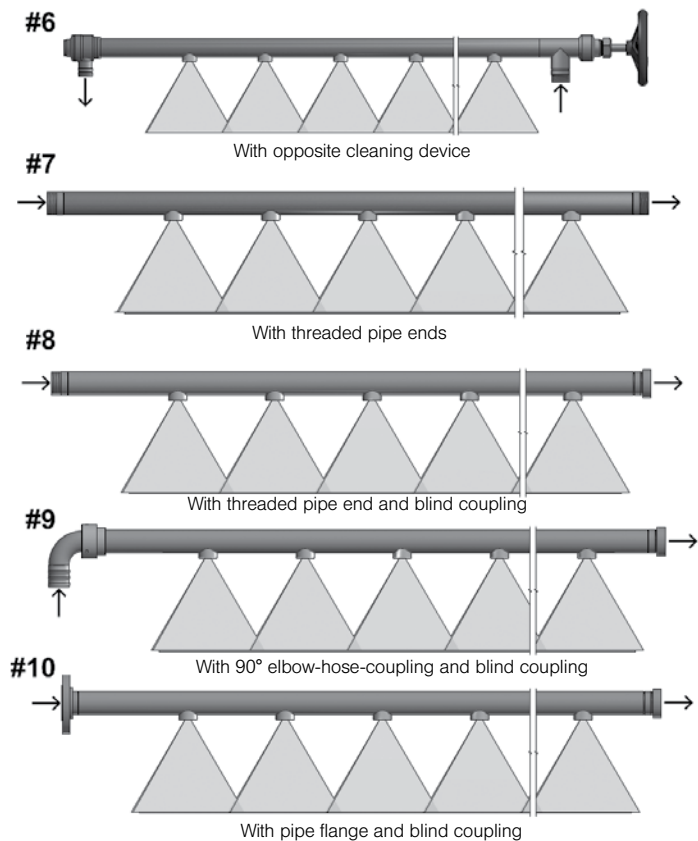
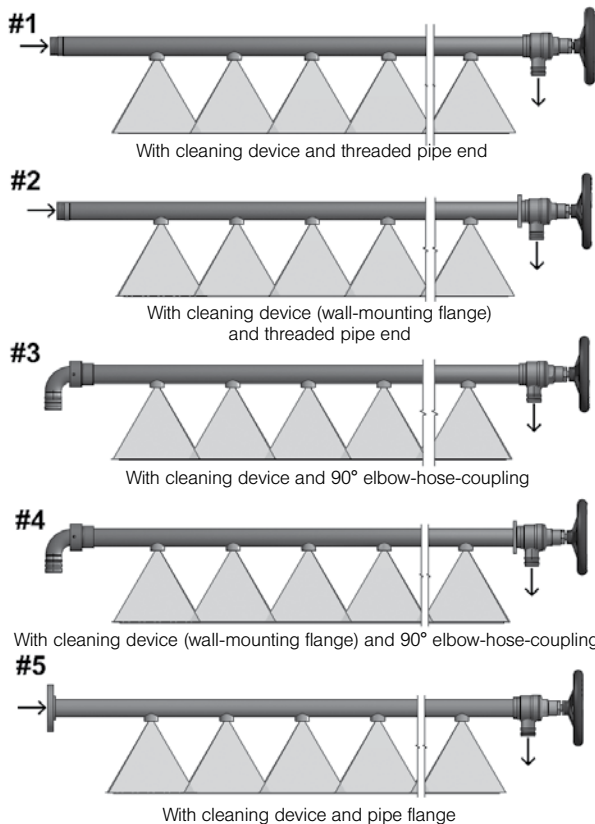
Refer to the next page for a selection of nozzles specifically designed for use in STAMM® showers.

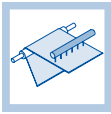
### Typical applications:

- Cleaning of wires and felts
- Humidification
- Knock-off
- Lubrication

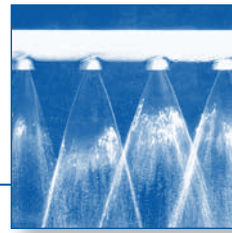


### Standard shower models (Other configurations also available; note that models #7–10 have no cleaning device)





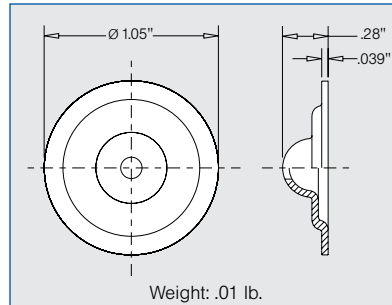
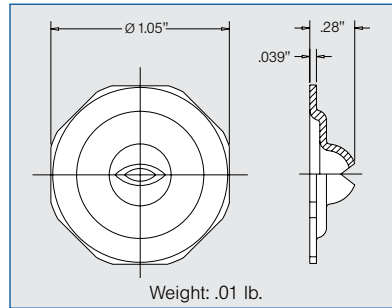
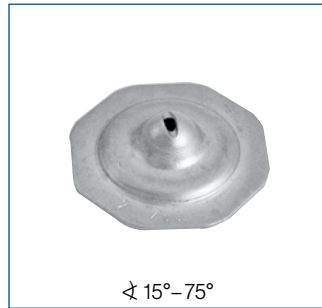
# Nozzles for STAMM® shower headers Series 626 / 5SW



Designed specifically for STAMM® shower headers, these nozzles can serve as replacements or to change the flow rate of an existing unit. Self aligning when used with STAMM® or Lechler bases. 317 LN stainless steel construction for long service life. Available in 75°, 60°, 30°, and 15° flat fans or 0° solid stream ("needle jet") versions.

### Applications:

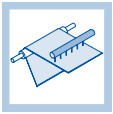
- For use on STAMM® showers
- Paper production
- Belt filter press cleaning in wastewater treatment



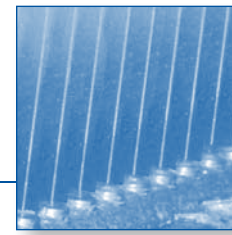
Notes: Also available upon request are: (1) nozzles with other flow rates and (2) solid stream nozzles (0°) with a ruby tip orifice. The number in the Equip. Orifice Diam. column represents the Nozzle # and spray angle stamped on each nozzle; e.g., the nozzle stamped 1.0 / 60 refers to 626.364.1F.37. Lechler has blank shower nozzles with no orifices which can be used on STAMM® showers when a particular nozzle opening needs to be blocked. The part number for this blank nozzle is **006.261.1F.00**.

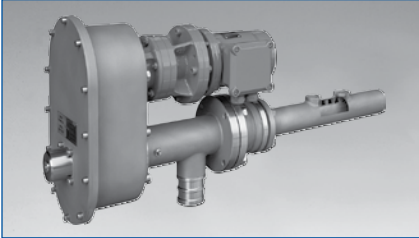
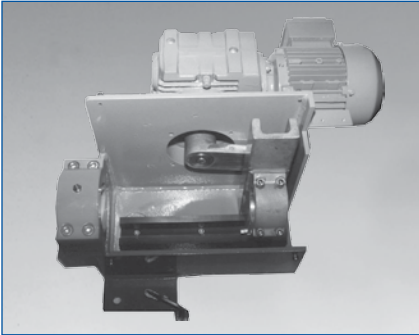
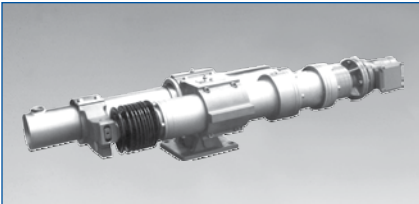
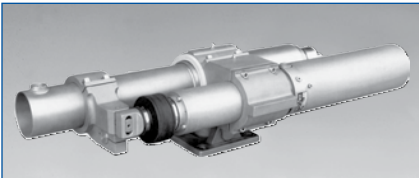
Spray angle	Ordering no.	Equip. Orifice Diam. (mm)	Flow Rate (Gallons Per Minute)						
			40 psi	60 psi	100 psi	150 psi	250 psi	500 psi	1000 psi
75°	626. 485. 1F. 37	1.5	.50	.61	.79	.96	1.2	1.8	2.5
	626. 565. 1F. 37	2.0	.77	.95	1.2	1.5	1.9	2.7	3.9
	626. 645. 1F. 37	2.5	1.2	1.5	2.0	2.4	3.1	4.4	6.2
	626. 725. 1F. 37	3.0	2.0	2.4	3.1	3.8	4.9	6.9	9.8
60°	626. 364. 1F. 37	1.0	.20	.24	.31	.38	.49	.69	.98
	626. 404. 1F. 37	1.2	.31	.38	.49	.60	.77	1.1	1.6
	626. 464. 1F. 37	1.5	.50	.61	.79	.96	1.2	1.8	2.5
	626. 564. 1F. 37	2.0	.77	.95	1.2	1.5	1.9	2.7	3.9
	626. 644. 1F. 37	2.5	1.2	1.5	2.0	2.4	3.1	4.4	6.2
	626. 724. 1F. 37	3.0	2.0	2.4	3.1	3.8	4.9	6.9	9.8
	626. 804. 1F. 37	4.0	3.1	3.8	4.9	6.0	7.8	11.0	15.5
	626. 884. 1F. 37	5.0	4.9	6.0	7.8	9.6	12.3	17.4	25
	626. 964. 1F. 37	6.0	7.8	9.5	12.3	15.0	19.4	27	39
	627. 004. 1F. 37	7.0	9.8	12.0	15.5	18.9	24	35	49
627. 044. 1F. 37	8.0	12.4	15.2	19.6	24	31	44	62	
30°	626. 362. 1F. 37	1.0	.20	.24	.31	.38	.49	.69	.98
	626. 482. 1F. 37	1.5	.50	.61	.79	.96	1.2	1.8	2.5
	626. 562. 1F. 37	2.0	.77	.95	1.2	1.5	1.9	2.7	3.9
	626. 642. 1F. 37	2.5	1.2	1.5	2.0	2.4	3.1	4.4	6.2
	626. 722. 1F. 37	3.0	2.0	2.4	3.1	3.8	4.9	6.9	9.8
	626. 802. 1F. 37	4.0	3.1	3.8	4.9	6.0	7.8	11.0	15.5
15°	626. 882. 1F. 37	5.0	4.9	6.0	7.8	9.6	12.3	17.4	25
	626. 361. 1F. 37	1.0	.20	.24	.31	.38	.49	.69	.98
	626. 561. 1F. 37	2.0	.77	.95	1.2	1.5	1.9	2.7	3.9
0°	626. 721. 1F. 37	3.0	2.0	2.4	3.1	3.8	4.9	6.9	9.8
	5SW. 300. 1F. 00	0.7	.09	.11	.14	.17	.22	.31	.44
	5SW. 320. 1F. 00	0.8	.13	.15	.20	.24	.32	.45	.63
	5SW. 340. 1F. 00	0.9	.15	.19	.25	.30	.39	.55	.77
	5SW. 360. 1F. 00	1.0	.20	.24	.31	.38	.49	.69	.98
	5SW. 390. 1F. 00	1.2	.31	.38	.49	.60	.77	1.1	1.6
	5SW. 460. 1F. 00	1.5	.50	.61	.79	.96	1.2	1.8	2.5
	5SW. 540. 1F. 00	2.0	.77	.95	1.2	1.5	1.9	2.7	3.9
	5SW. 620. 1F. 00	2.5	1.2	1.5	2.0	2.4	3.1	4.4	6.2
	5SW. 680. 1F. 00	3.0	2.0	2.4	3.1	3.8	4.9	6.9	9.8
	5SW. 780. 1F. 00	4.0	3.1	3.8	4.9	6.0	7.8	11.0	15.5
	5SW. 860. 1F. 00	5.0	4.9	6.0	7.8	9.6	12.3	17.4	25

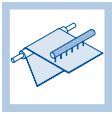




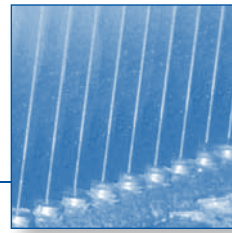
## Automatic cleaning device and oscillators for STAMM® headers

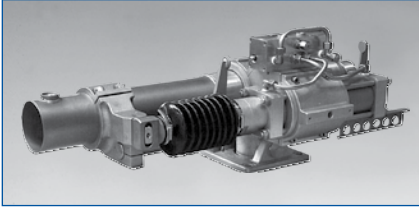
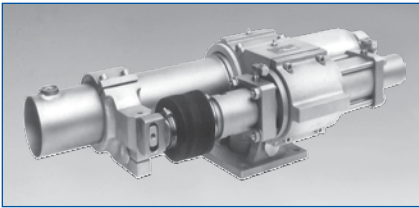
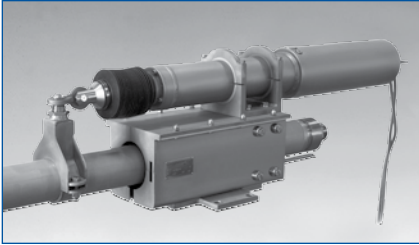


Part Number	Description	Stroke length	Shower size
<b>10.900</b> <b>Automatic Cleaning Device</b> 	Automatic regular cleaning of nozzles at programmable intervals; existing showers can be retrofitted with this device.	N/A	All sizes
<b>10.200 E</b> <b>Oscillator</b> 	Oscillator with electro-mechanical crank drive for side-to-side movement by a sliding block and axial guide rail.	200 mm Non-adjustable	2" to 4"
<b>10.510 LSE-R</b> <b>Oscillator</b> 	Oscillator with electro-mechanical gear motor that rotates a double ball screw spindle which converts rotation into linear stroke movement.	2" to 3": 206.4 mm or 301.4 mm  4" to 6": 203.2 mm or 304.2 mm	One size for 2" to 3" diameter  One size for 4" to 6" diameter
<b>10.510 EC</b> <b>Oscillator</b> 	Oscillator with electro-mechanical step motor with a planetary gear reducer to drive a ball screw spindle.	1–200 mm Infinitely adjustable	2" to 6"



## Automatic cleaning device and oscillators for STAMM® headers



Part Number	Description	Stroke length	Shower size
<b>10.591 S</b> <b>Oscillator</b> 	Oscillator with oil-hydraulic drive with infinitely adjustable stroke speed provided by micro-flow control valve.	50–200 mm Infinitely adjustable  50–300 mm Infinitely adjustable	2" to 6"
<b>10.691 S</b> <b>Oscillator</b> 	Oscillator with oil-hydraulic drive with electronic oil flow control for automatic adjustment of stroke speed.	1–200 mm Infinitely adjustable  1–300 mm Infinitely adjustable	2" to 6"
<b>10.700</b> <b>Oscillator bearing</b> 	Wear-resistant bearing made of stainless steel; installs in any position and fits all drive alternatives.	N/A	All sizes

