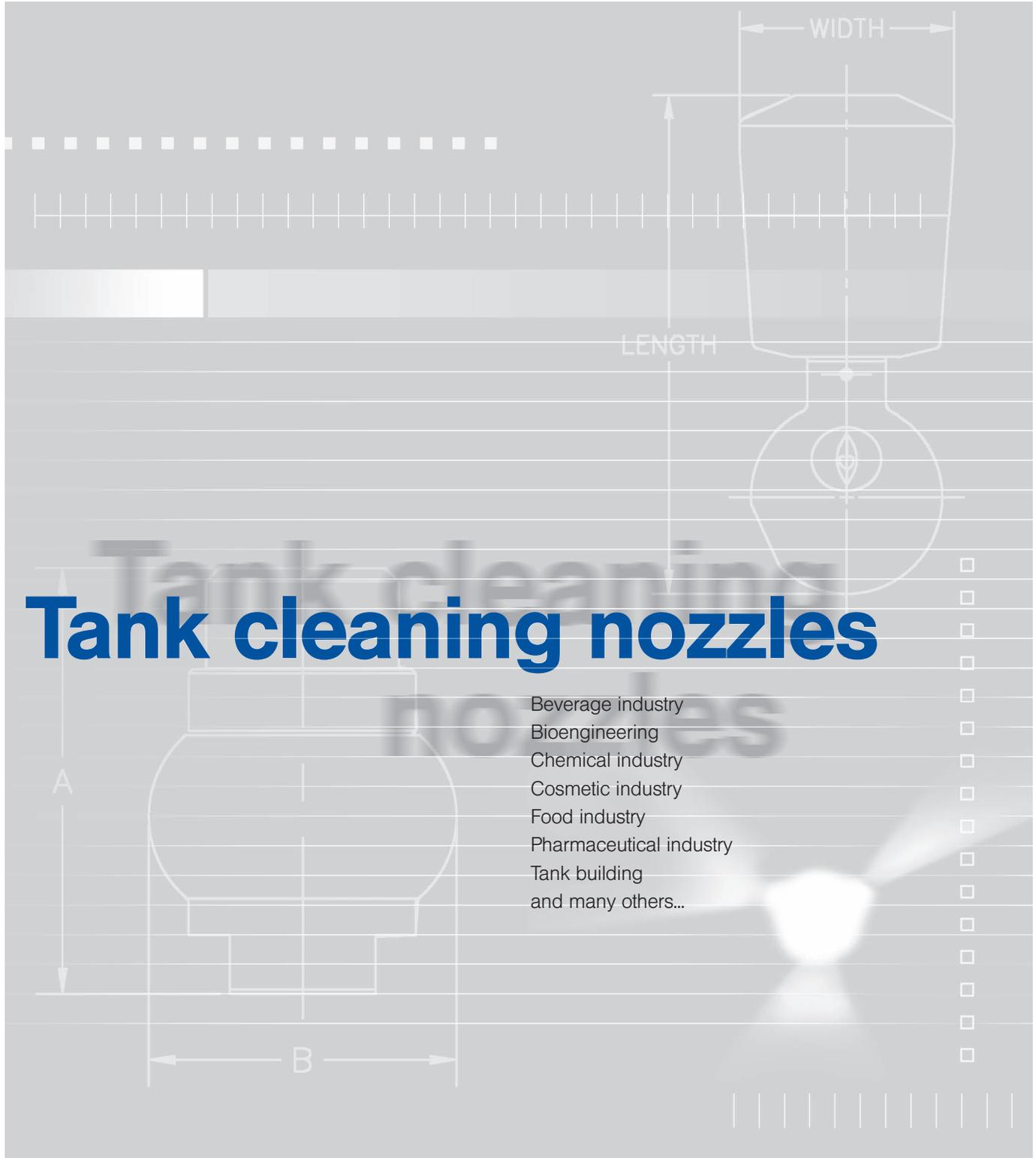




# Tank cleaning nozzles

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

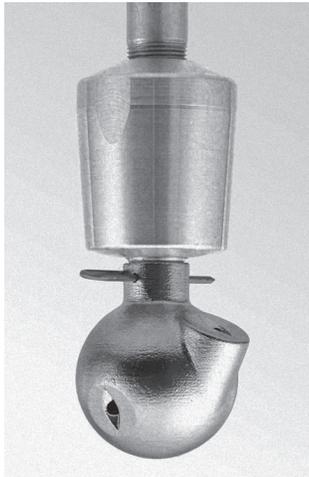




The following step-by-step procedure will help you define your cleaning task and get the most out of our corresponding products.

### 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 chemicals are you using?
  - Are there any internal obstacles (e.g., mixing blades, baffles, etc.)?
- More information on page 103.



### In defining 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 trial and error as a function of 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 whatever you're putting in the tank.

→ More information on page 106.

#### 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.

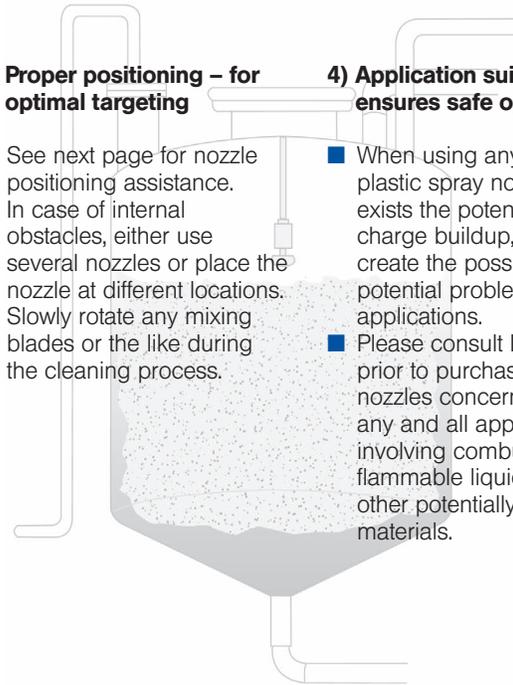
As pressure increases, relative droplet size (mass) decreases. If pressure is elevated too high, an ineffectual mist is created. Increasing flow rate rather than pressure is a more efficient method of increasing impact. Lechler highly suggests contacting us if you have an application requiring operating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

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

- See next page for nozzle positioning assistance.
- 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.

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

- When using any type of plastic spray nozzle, there exists the potential for static charge buildup, which can create the possibility for a potential problem in some applications.
- Please consult Lechler prior to purchasing tank nozzles concerning any and all applications involving combustible gas, flammable liquids, and/or other potentially explosive materials.



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



## Rotating tank cleaner advantages

Shared characteristics:

- Low-pressure application.  
Your benefit: lower energy consumption coupled with less wear and tear.
- Rotational cleaners: driven and lubricated by the cleaning liquid.  
Your benefit: no need for elaborate drive mechanisms.

## Free-spinning heads

The cleaning liquid turns the spray head by means of specially positioned nozzles. Rapid-repetition impact loosens the dirt and washes it off of the tank surfaces. The effect is best at low pressures in small to medium-size tanks. → See pages 107-112 and 114 for free-spinning nozzle design families

## Internal regulated drive

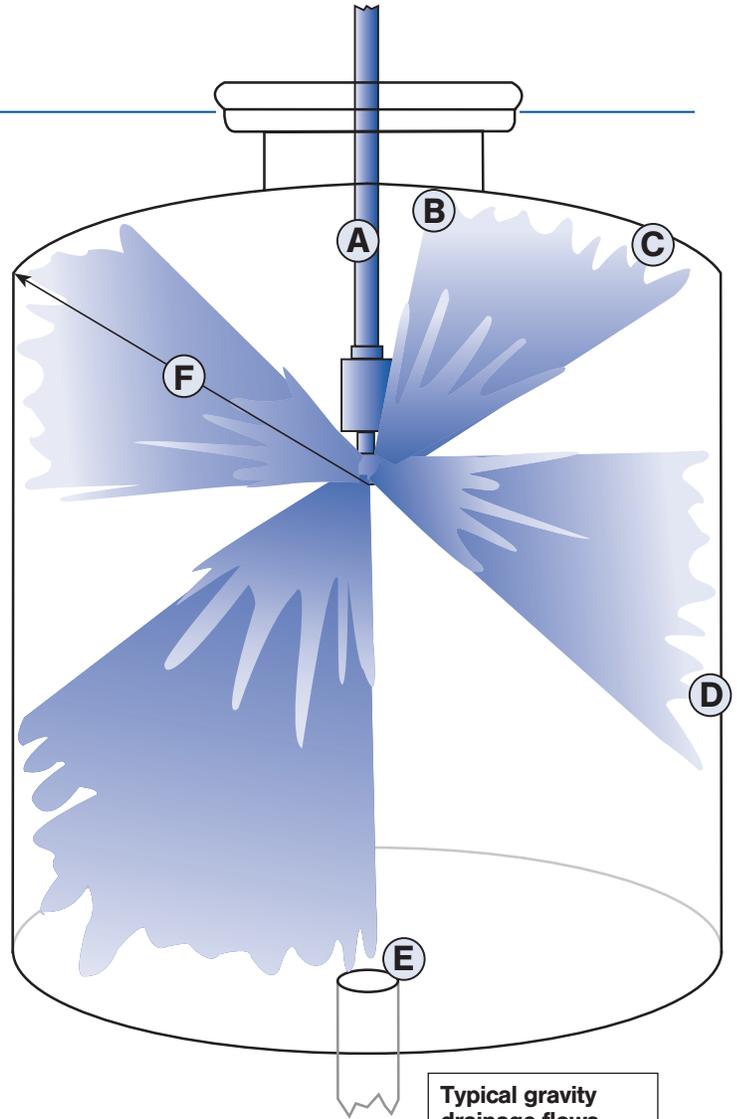
The liquid flow powers the head by way of an internal propeller. This keeps the speed of the head within its optimal range across a wider span of pressures, and the nozzle develops more powerful spray impact. → See page 113 for ACCUClean nozzles

## Programmed rotation machines

Here, the cleaning fluid drives an internal gear reducer that keeps the sprayer turning in two planes. In the course of a spraying cycle, the jets sweep the entire inside surface of the tank according to a preprogrammed, model-specific pattern. This takes a certain amount of time, but these models generate the highest jet pressures (= force of impact) and are therefore ideal for very large tanks and the toughest of cleaning tasks. → See page 115 for the M20 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. They are used primarily for washing down relatively small tanks and vessels. → See pages 116 and 117 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

## Typical applications

- (A) – Position the tank cleaning nozzle(s) at the center of the tank. For the best nozzle depth location in the tank, see point (C) below.
- (B) – Nozzles invariably leave an unsprayed shadow area directly overhead, the size of which varies according to the type of nozzle and the piping.
- (C) – 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.
- (D) – The film of liquid grows thicker toward the bottom of the tank, where the washing effect is the most pronounced.
- (E) – 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).
- (F) – 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

#### Mounting configurations

All Lechler tank cleaning nozzles are designed to be mounted on a pipe. 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 pipe that has a cross hole drilled. A pin is then inserted to hold the head in place.

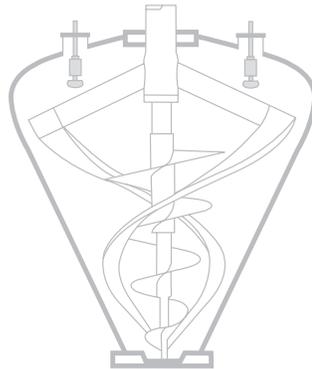
##### Tri-Clamp

Food and beverage manufacturers use tri-clamp connectors to join pipe. Some tank cleaning nozzles are available with 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 109, 111, and 116 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 type of process is used in many applications:

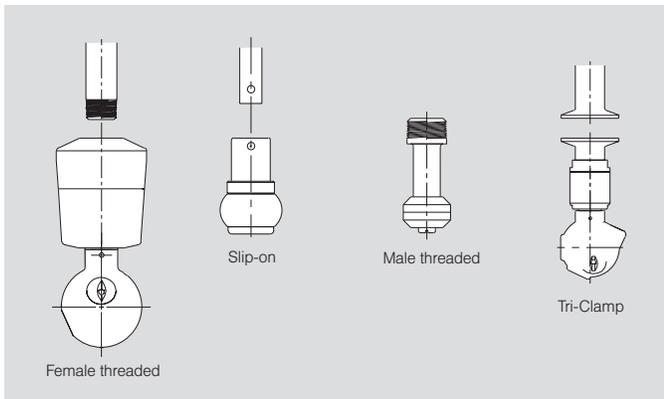
- Pre-rinse — Begin with low grade or “used” water to rinse the interior, washing out the heaviest soil.
- Alkali wash — Use a mild solution such as 1% sodium hydroxide or TSP. This removes most types of deposits.
- Second rinse — Follow with cleaner water to rinse out the alkali. This water can be used 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 is not suitable for every application but it is adaptable. The degree of soiling and cleaning chemical selection 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 the others.





## 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.



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.

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	Max. tank size for washing (dia., ft.)	Max. tanksize for rinsing (dia., ft.)	Operating pressure (psi)	Flow rate range (gal./min.)	Coverage options
Miniature rotating nozzles 500.186, 500.191, 500.234, 566	107-108	Free spinning	Flat-fan, solid-stream nozzles	3	6	0 15 30 45 60 75 90 105	3-6	
Spray balls CIP (3A) 527, Compact 540	116-117	No rotation, static spray	Solid-stream nozzles, max. impact	10	15	0 15 30 45 60 75 90 105	5-150	
Whirling Nozzle 569 Spinner 5MI Stainless steel	109-110	Free spinning, ball bearing	Flat-fan nozzle, washdown action	10	15	0 15 30 45 60 75 90 105	10-45	
Whirling Nozzle 583, 599 PTFE	111-112	Free spinning, friction bearing	Solid-stream nozzles, wash-down actions	10	15	0 15 30 45 60 75 90 105	15-80	
ACCUClean 515 Stainless steel	113	Slow, gear drive	Flat-fan nozzle, medium impact	12	18	0 15 30 45 60 75 90 105	25-70	
Gyro 577 Stainless steel	114	Free spinning, friction bearing	Flat-fan nozzle, high impact	18	30	0 15 30 45 60 75 90 105	50-350	
ACCUClean 519 Stainless steel	113	Slow, gear drive	Flat-fan nozzle, medium impact	20	24	0 15 30 45 60 75 90 105	65-150	
M20 Tank Cleaning Machine	115	Gear-driven	Solid-stream nozzles, max. impact	50	75	0 15 30 45 60 75 90 105	40-100	

### Notes:

#### 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 covers the smallest through the largest unit in a family across the recommended pressure range.

#### Maximum tank size for washing

This is the size of the largest spherical tank in which the largest unit of a family, while operating at the maximum recommended pressure, can deposit a thick film of liquid with a high force of impact.

#### Maximum tank size for rinsing

This is the size of the largest spherical tank that can be covered with a somewhat thinner film of water by the largest unit of the family operating at the maximum recommended pressure.

#### Explosion protection

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

#### 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 of our products is responsible for the safe use and suitability of our tank cleaning products.

#### 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.



## Orientation aid for flow-rate determination

### Flow rate guidelines

#### 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

These charts can help you choose a tank cleaner 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.

#### 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

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

**Tank cleaning machines, like the M20, should be sized using a different approach discussed on page 115.**

Small spray balls  
 "Mini designs"  
 Small PVDF 511  
 Low capacity 569 or 583  
 Low capacity ACCUClean 515  
 High capacity 569 or 583  
 Large spray balls  
 High capacity ACCUClean 515  
 Low capacity ACCUClean 519  
 Low capacity M20  
 High capacity ACCUClean 519  
 High capacity Gyro 577  
 High capacity M20

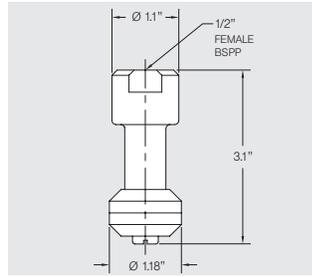


# Miniature plastic nozzles – for kegs, drums, barrels, totes, and carboys Series 500



## Mini Whirly series 500.191

- Inexpensive rotating head
- Good corrosion resistance
- 360° and partial coverage
- Material: PVDF, a material which is FDA Compliant (see page 105)



**Max. spray diameter:**  
3 – 5 ft.

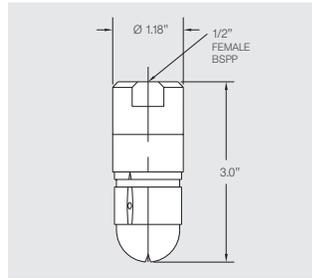
**Operating pressure:**  
15 – 30 psi, max. 70 psi

**Max. temperature:**  
190°F

**Weight:**  
.06 lb.

## Mini Whirly series 500.186

- Robust design, especially reliable
- 300° spray angle
- Material: POM or PVDF
- 316 stainless steel ball bearing



**Max. spray diameter:**  
3 – 5 ft.

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

**Max. temperature:**  
120°F

**Weight:**  
.15 lb.

### Common features of these series

- Very compact design
- Free spinning, self-lubricating, and self-flushing
- Operates in every position
- Fits 1/2" NPT connections

### Applications

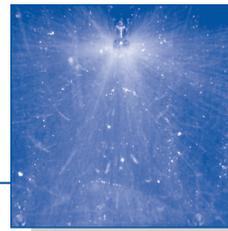
- Kegs
- Cans
- Bottles
- Autoclaves
- Barrels
- Machines

Spray Angle	Ordering no.	Material	Connection	Flow Rate (Gallons Per Minute)			
				20 psi	40 psi	60 psi	litres per minute 2 bar
180° up 	<b>500. 191. 5E. 02</b>	PVDF	1/2" Female BSPP	2.9	4.0	4.9	13
180° down 	<b>500. 191. 5E. 01</b>	PVDF	1/2" Female BSPP	2.9	4.0	4.9	13
300° down 	<b>500. 186. 56. AH</b> <b>500. 186. 5D. AH</b>	POM PVDF	1/2" Female BSPP	4.0	5.6	6.8	18
360° 	<b>500. 191. 5E. 00</b>	PVDF	1/2" Female BSPP	4.4	6.2	7.6	20

**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 200 mesh size. For further information, please contact Lechler.



# Miniature stainless steel nozzles – for kegs, drums, barrels, totes, and carboys Series 500 and 566

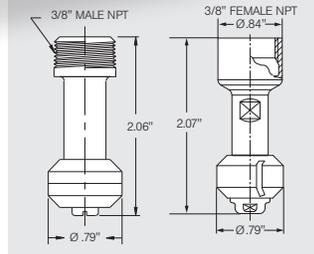


Also available  
with ATEX approval

### Mini Whirly series 566



- Only .79" diameter to insert in small openings
- Excellent cleaning power
- 316L stainless steel
- PEEK Bearing inserts
- Materials used are FDA Compliant (see page 105)



**Max. spray diameter:**  
3 – 5 ft.

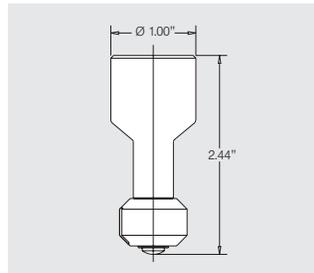
**Operating pressure:**  
15 – 30 psi, max. 70 psi

**Max. fluid temperature\*:**  
200°F

**Weight:**  
.1 lb.

### Slip-on connection Mini Whirly

- Same cleaning flows and coverage
- Slip-on pin mounting for 3/4" diameter tubing
- Maximum diameter: 1"
- Materials used are FDA Compliant (see page 105)



**Max. spray diameter:**  
3 – 5 ft.

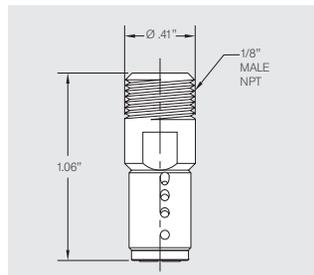
**Operating pressure:**  
15 – 30 psi, max. 70 psi

**Max. fluid temperature\*:**  
200°F

**Weight:**  
.2 lb.

### Precision Whirly series 500.234

- Unique extremely small nozzle design
- All stainless steel Kolsterised
- Slide bearing
- Materials used are FDA Compliant (see page 105)



**Max. spray diameter:**  
3 ft.

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

**Max. fluid temperature\*:**  
200°F

**Weight:**  
.15 lb.

### Common features of these series

- Very compact design
- Free spinning, self-lubricating and self-flushing
- Operates in every position

### Applications

- Kegs
- Cans
- Bottles
- Autoclaves
- Barrels
- Machines

For additional spray angles and nozzle sizes, please request our "Tank Cleaning Nozzles" brochure.



Spray Angle	Ordering no.					Flow Rate (Gallons Per Minute)			
	Type	Connection				20 psi	40 psi	60 psi	litres per minute 2 bar
		1/8" Male NPT	3/8" Male NPT	3/8" Female NPT	3/4" Slip-on				
300° down 	<b>500. 234. G9</b>	<b>BA</b>	-	-	-	1.8	2.5	3.0	8
180° up 	<b>566. 933. 1Y</b>	-	<b>BE</b>	<b>BF</b>	<b>TF07</b>	4.6	6.5	8.0	21
180° down 	<b>566. 934. 1Y</b>	-	<b>BE</b>	<b>BF</b>	<b>TF07</b>	4.6	6.5	8.0	21
360° 	<b>566. 939. 1Y</b>	-	<b>BE</b>	<b>BF</b>	<b>TF07</b>	4.6	6.5	8.0	21

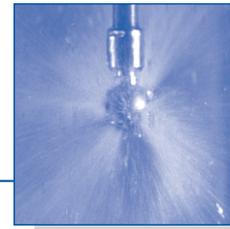
**Please note:** We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 200 mesh size. For further information, please contact Lechler.

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

\* Contact Lechler for maximum ambient temperature.



# Whirling Nozzle – the versatile standard solution Series 569



Also available  
with ATEX approval

## Stainless steel whirly

The time-tested design of the Lechler Whirling Nozzle now has been made even better:

- 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 thread connection (adapter)
- Free spinning, self-lubricating, and self-flushing
- All materials used are FDA Compliant (see page 105)

### Applications

For small and medium-sized tanks, e.g., in Chemical, Beverage, Food industries

There are four standard inlets available:

- For general industrial use: 3/4" NPT female
- For sanitary CIP use: Slip-on 3/4" and 1" OD tubing
- For manual insertion: 1" Tri-Clamp

### Max. tank diameter:

Rinsing: 15 ft.  
Cleaning: 10 ft.

### Operating pressure:

15 – 40 psi, max. 80 psi

### Max. fluid temperature\*:

200°F

### Weight:

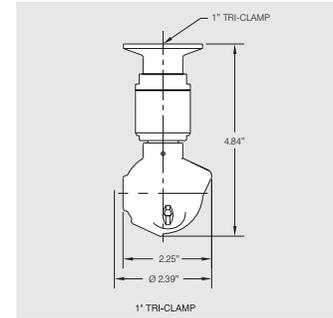
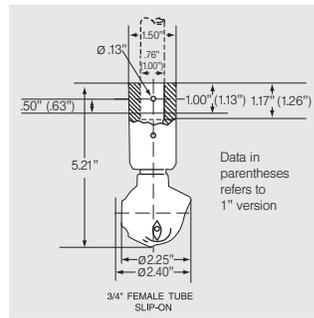
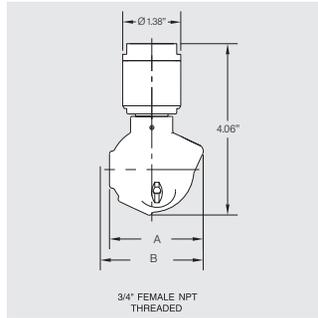
(Threaded) 1 lb.

### Material:

- 316L stainless steel

### Bearing:

Double row, angular contact ball bearing in 316L stainless steel with PEEK cage and Rulon bushing.



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

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 200 mesh size. For further information, please contact Lechler.

**Example**    **Type**    +    **Conn.**    =    **Ordering no.**  
**for ordering:** 569. 055. 1Y. + BL = 569. 055. 1Y. BL

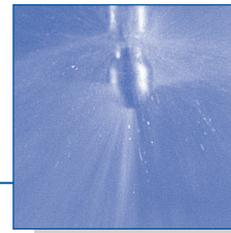
\* Contact Lechler for maximum ambient temperature.



Tank cleaning



## Spinners – thin profile for small openings Series 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.**

- Three size groups
- 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

### Applications

For small and medium-sized tanks, e.g., chemical processing, food and beverage manufacturing, CNC machining centers

### Max. tank diameter:

Micro rinsing: 6 ft.  
Micro cleaning: 4 ft.

Mini rinsing: 12 ft.  
Mini cleaning: 9 ft.

Maxi rinsing: 20 ft.  
Maxi cleaning: 12 ft.

### Operating pressure:

15 – 40 psi, max. 60 psi

### Max. fluid temperature\*:

200°F

### Weight:

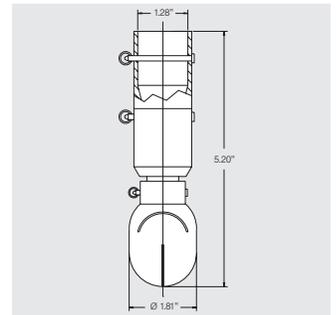
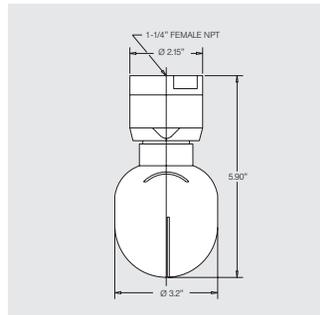
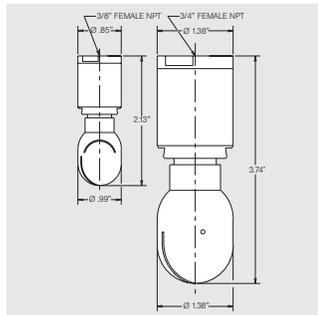
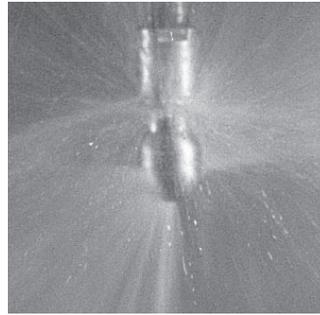
Micro .15 lb.  
Mini .68 lb.  
Maxi 2.3 lb.

### Materials:

- 316 stainless steel

### Bearing:

Double row square contact ball bearing, 304 stainless steel



Spray Angle	Ordering no.					Flow Rate (Gallons Per Minute)			
	Type	Connection				20 psi	40 psi	60 psi	litres per minute 2 bar
		Micro 3/8" Female NPT	Mini 3/4" Female NPT	Maxi 1-1/4" Female NPT	1-1/4" Slip-on				
360°	<b>5MI. 049. 17</b>	<b>BF</b>	-	-	-	8.6	12	15	39
	<b>5MC. 999. 17</b>	-	<b>BL</b>	-	-	6.6	9.3	11	30
	<b>5MI. 089. 17</b>	-	<b>BL</b>	-	-	11	15	19	49
	<b>5MI. 139. 17</b>	-	<b>BL</b>	-	-	15	21	26	69
	<b>5MI. 209. 17</b>	-	-	-	<b>TF12</b>	22	31	38	99
	<b>5MI. 369. 17</b>	-	-	<b>BQ</b>	-	55	78	95	250

**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 200 mesh size. For further information, please contact Lechler.

**Example for ordering:** Type **5MI. 089. 17.** + Conn. **BL** = Ordering no. **5MI. 089. 17. BL**

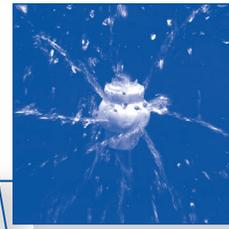
**For additional spray angles and nozzle sizes, please request our "Tank Cleaning Nozzles" brochure.**



\* Contact Lechler for maximum ambient temperature.



# PTFE Whirling Nozzle – especially for CIP applications Series 583 / 573



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

### Whirling nozzles in PTFE offer these advantages:

- Corrosion resistance
- Lightweight
- Balanced rotating action
- Operates in every position
- 3/4" size fits through a 2" opening
- All materials used are FDA Compliant (see page 105)

### Three standard inlets are available:

- For general use: 3/4" or 1" NPT female
- For sanitary CIP use: Slip-on 1" OD tubing
- For manual insertion: 1.5" Tri-Clamp

### For environments with special sanitary requirements, use the sanitary slip-on pin connection:

- Design meets 3A standards
- Smooth surface finish
- Free spinning, self-lubricating, and self-flushing

### Applications

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

- Excellent for corrosive environments
- Recommended for glass-lined tanks

### Max. tank diameter:

Rinsing: 18 ft.  
Cleaning: 10 ft.

### Operating pressure:

20 – 30 psi, max. 90 psi

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

200°F

### Weight:

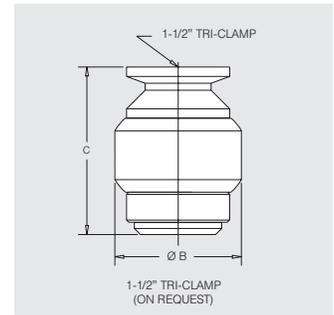
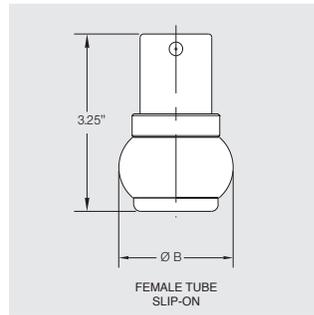
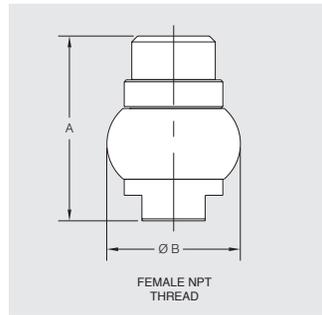
3/4" .32 lb.  
1" .68 lb.

### Materials:

- PTFE
- R-pin: 316L stainless steel

### Bearing:

PTFE slide bearing



Spray Angle	Ordering no.					Flow Rate (Gallons Per Minute)				Dim. A (in.)	Dim. B (in.)	Dim. C (in.)
	Type	Connection				20 psi	40 psi	60 psi	litres per minute			
		3/4" Female NPT	1" Female NPT	Sanitary Pin 3/4" Tube	1" Tube							
270° up	583. 266. 55	BL	-	TF07	-	32	45	55	145	2.9	1.95	2.94
270° down	573. 266. 55	BL	-	TF07	-	32	45	55	145	2.9	1.95	2.94
360°	583. 119. 55	BL	-	TF07	-	13	18	22	58	2.9	1.95	2.94
	583. 209. 55	BL	-	TF07	-	22	31	38	100	2.9	1.95	2.94
	583. 269. 55	BL	-	TF07	-	32	45	55	145	2.9	1.95	2.94
	583. 279. 55	-	BN	-	TF10	33	47	58	150	3.9	3.1	3.22
	583. 349. 55	-	BN	-	TF10	50	70	86	226	3.9	3.1	3.22

**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 200 mesh size. For further information, please contact Lechler.



### NEW! Retractable Lance

Lance retracts to pull spray nozzle from tank interior

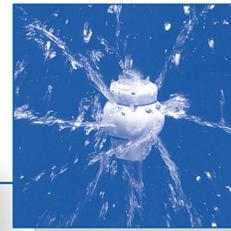
\* This product has been authorized to use the 3-A® Symbol by the 3-A® Sanitary Symbol Council Administrative Council for Spray Cleaning Devices (78-00). See page 105.

\*\* Contact Lechler for maximum ambient temperature.

<b>Example</b>	<b>Type</b>	<b>+</b>	<b>Conn.</b>	<b>=</b>	<b>Ordering no.</b>
<b>for ordering:</b>	<b>583. 266. 55.</b>	<b>+</b>	<b>BL</b>	<b>=</b>	<b>583. 266. 55. BL</b>



# PTFE Whirling Nozzle – for high temperature applications Series 599



**NEW!** Dimension stability at high temperatures.

While PTFE can withstand high temperatures, its dimensional stability limits its range as a tank cleaning device. Lechler's new 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 range is actually extended, since it can perform equally well under normal conditions. The spray characteristics are the same as the standard units.

- Balanced rotating action
- Operates in every position
- Free spinning, self-lubricating, and self-flushing
- Materials used are FDA Compliant (see page 105)

### Applications

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

- Excellent for corrosive environments
- Withstands repeated high temperature cycles
- Suitable for low pressure steam; clip-on sanitary model has been tested with steam up to 30 psig @ 274°F.

### Max. tank diameter:

Rinsing: 18 ft.  
Cleaning: 10 ft.

### Operating pressure:

15 – 30 psi, max. 90 psi

### Max. temperature:

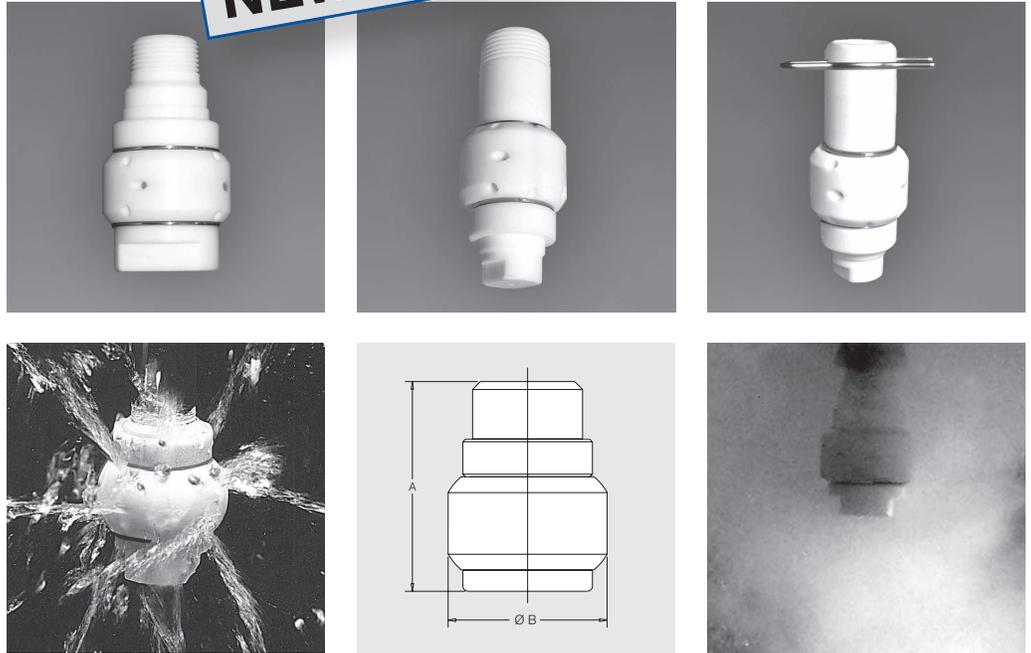
274°F

### Weight:

3/4" .36 lb.

### Materials:

- PTFE
- Rings: Hastelloy®



Spray Angle	Ordering no.		Flow Rate (Gallons Per Minute)				Length A (in.)	Width B (in.)	Weight (lb.)	
	Type	Connection				litres per minute				
			3/4" Male NPT	3/4" Female Tube	20 psi					40 psi
360°	599. 133. 55	BK	-	22	31	38	100	3.5	2.0	.35
	599. 170. 55	BK	-	19	26	32	84	3.6	1.5	.25
	599. 174. J7	-	TF07	19	26	32	84	3.6	1.5	.25

### Nozzle for cleaning 4"-6" vent pipes when inserted lengthwise into pipe

Spray Angle	Type	Connection	20 psi	40 psi	60 psi	litres per minute	Length A (in.)	Width B (in.)	Weight (lb.)	
360°	599. 156. 55	BK	-	20	28	34	90	3.5	2.0	.35

**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 200 mesh size. For further information, please contact Lechler.



### Pharmaceutical or chemical grade tank cleaning lances

Lechler can fabricate custom CIP lances for use with sanitary tank cleaning nozzles that are suited to the most demanding environments:

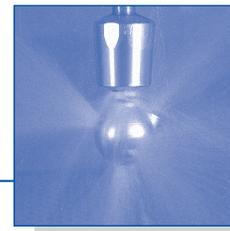
- Designed for your specific tank configuration
- Accepts spray balls or sanitary rotating heads (see pages 111 and 116)
- Configured for tri-clamp or welded mounting
- Stainless steel, PTFE, or special alloy materials

<b>Example</b>	<b>Type</b>	<b>+</b>	<b>Conn.</b>	<b>=</b>	<b>Ordering no.</b>
for ordering:	599. 170. 55.	+	BK	=	599. 170. 55. BK

Hastelloy® is a registered trademark of Haynes International Inc.

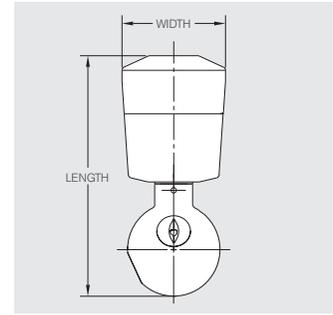
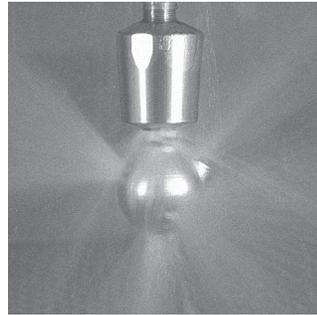


**ACCUClean –**  
**The efficient way to clean your tank**  
**Series 515 / 519**



**The redesign of the successful ACCUClean concept combines now even more efficient cleaning technology in an economical package:**

- 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
- Wide flow and pressure range



**Applications**

- For use in all applications where a high cleaning performance is required
- We recommend the use of a line strainer 0.3"/50 mesh

Spray Angle	Ordering no.				Flow Rate (Gallons Per Minute)				Length (in.)	Maximum Width (in.)
	Type	Connection			20 psi	40 psi	60 psi	litres per minute 2 Bar		
		3/4" Female NPT	1" Female NPT	1-1/2" Female NPT						
360° 	<b>515. 219. 7T</b>	<b>BL</b>	-	-	21	30	37	97	6.7	3.4
	<b>515. 289. 7T</b>	<b>BL</b>	-	-	32	45	55	145	6.7	3.4
	<b>515. 339. 7T</b>	-	<b>BN</b>	-	42	60	73	193	10.5	5.5
	<b>519. 379. 7T</b>	-	-	<b>BS</b>	53	75	92	242	10.5	5.5
	<b>519. 429. 7T</b>	-	-	<b>BS</b>	71	100	122	322	10.5	5.5
	<b>519. 469. 7T</b>	-	-	<b>BS</b>	92	130	159	419	10.5	5.5

**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.
1-1/2"	Rinsing	24 ft.
1-1/2"	Cleaning	20 ft.

**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 200 mesh size. For further information, please contact Lechler.

**Operating pressure:**

20 – 75 psi

**Max. fluid temperature\*:**

200°F

**Weight:**

3/4"	3.1 lb.
1"	3.1 lb.
1-1/2"	10.5 lb.

**Materials:**

- Body: Stainless steel 316L
- Gear parts: PEEK

**Bearing:**

Ball bearing made of 316L stainless steel

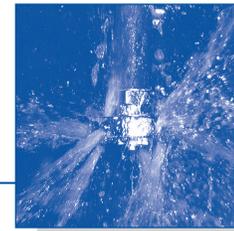
**For additional spray angles and nozzle sizes, please request our "Tank Cleaning Nozzles" brochure.**



\* Contact Lechler for maximum ambient temperature.



# Heavy duty, high capacity Gyro – Simple design for hard work Series 577



**The largest capacity free spinning designs, the Gyro family is the high capacity work horse of tank cleaning nozzles.**

- Our highest flow rates of all our tank cleaning nozzles
- High cleaning performance at low pressures
- Simple design works in difficult situations
- PTFE bearings easily replaced to extend the service life
- Free spinning, self-lubricating, and self-flushing
- All materials used are FDA Compliant (see page 105)

### Applications

For medium to large tanks, e.g., grain processing, ethanol fermenters, paper machine headboxes, chemical storage, breweries

### Max. tank diameter:

Inlet Size	Activity	Tank Diam.
1"	Rinsing	25 ft.
1"	Cleaning	12 ft.
2"	Rinsing	30 ft.
2"	Cleaning	15 ft.
3"	Rinsing	40 ft.
3"	Cleaning	20 ft.

### Operating pressure:

20 – 50 psi, max. 65 psi

### Max. fluid temperature\*:

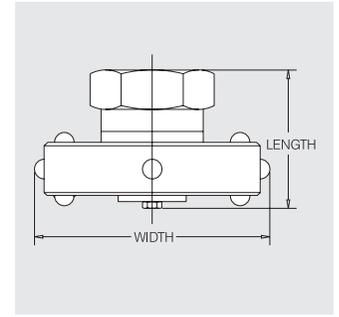
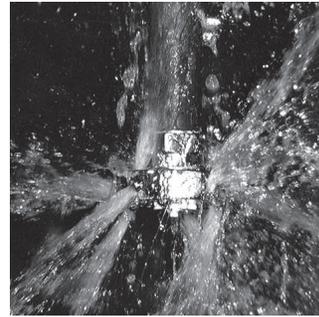
200°F

### Weight:

1"	1.65 lb.
2"	4 lb.
3"	8 lb.

### Materials:

- Body: 316 stainless steel



Spray Angle	Ordering no.				Flow Rate (Gallons Per Minute)				Length (in.)	Maximum Width (in.)
	Type	Connection			20 psi	40 psi	60 psi	litres per minute 2 Bar		
		1" Female NPT	2" Female NPT	3" Female NPT						
360° 	<b>577. 289. 17</b>	<b>BN</b>	-	-	35	50	61	161	2.7	4.6
	<b>577. 369. 17</b>	<b>BN</b>	-	-	57	80	98	258	2.7	4.6
	<b>577. 439. 17</b>	-	<b>BW</b>	-	85	120	147	387	4.0	5.9
	<b>577. 499. 17</b>	-	<b>BW</b>	-	120	170	208	548	4.0	5.9
	<b>577. 569. 17</b>	-	-	<b>MB</b>	177	250	306	806	4.6	7.4

**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 200 mesh size. For further information, please contact Lechler.

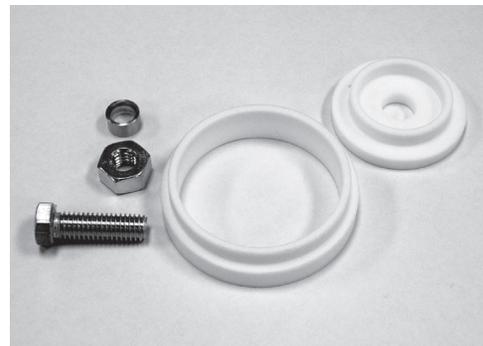
- Bearing: PTFE

### Rebuild kit:

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"	057.701.55.000
2"	057.702.55.000
3"	057.703.55.000

### Contents of Gyro rebuild kit



**For additional spray angles and nozzle sizes, please request our "Tank Cleaning Nozzles" brochure.**

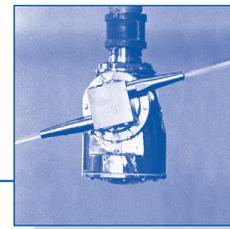


\* Contact Lechler for maximum ambient temperature.



# High impact tank cleaning machine

## Series M20



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

- 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

The standard machine configuration uses two or four nozzles to blast the tank walls and rinse all surfaces. In operation, this indexed orbiting machine has to run for the cycle time indicated on the chart for the specific pressure. This ensures full cleaning. For extremely difficult applications, the time may need to be extended.

### Applications

For large tanks and tough cleaning tasks, e.g., wine and beer fermenters, tank trucks, rail cars, chemical processing

### Max. tank diameter:

Cleaning: 50 ft.

### Operating pressure:

35 – 100 psi, max 150 psi

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

200°F

### Opening requirement:

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

### Weight:

Approx. 17 lb.

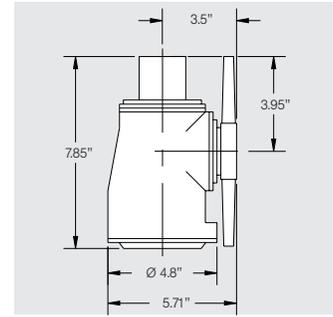
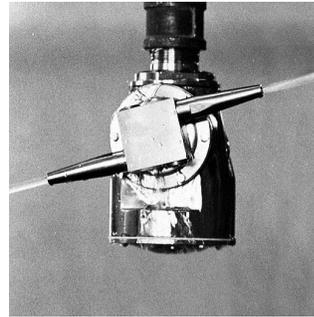
### Materials:

- 316L stainless steel
- Gear components made of PTFE and carbon fiber

### Connection:

- 1-1/2" Male NPT
- 1-1/2" Female NPT
- Flange

\*\* Contact Lechler for maximum ambient temperature.



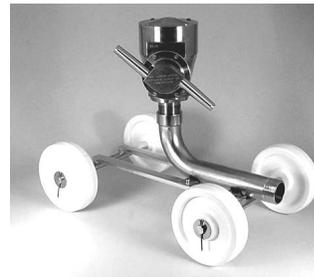
Type	Ordering no.				No. of Nozzles x Diameter (mm)	Operating Pressure				
	Connection					40 psi	60 psi	80 psi	100 psi	
	1-1/2" Male NPT	1-1/2" Female NPT	Flange	Inverted Operation						
<b>M20. 208. 17</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	<b>BRDRV</b>	2x8mm	Flow Rate Cycle Time	40 gpm 31 min	49 gpm 24 min	56 gpm 20 min	59 gpm 17 min
<b>M20. 209. 17</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	<b>BRDRV</b>	2x9mm	Flow Rate Cycle Time	45 gpm 27 min	54 gpm 21 min	60 gpm 19 min	65 gpm 15 min
<b>M20. 210. 17</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	<b>BRDRV</b>	2x10mm	Flow Rate Cycle Time	50 gpm 22 min	62 gpm 19 min	69 gpm 17 min	72 gpm 14 min
<b>M20. 211. 17</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	<b>BRDRV</b>	2x11mm	Flow Rate Cycle Time	57 gpm 21 min	68 gpm 17 min	78 gpm 14 min	<b>80</b> gpm 13 min
<b>M20. 407. 17</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	<b>BRDRV</b>	4x7mm	Flow Rate Cycle Time	* 12 min	70 gpm 10 min	78 gpm 10 min	<b>82</b> gpm 9 min
<b>M20. 408. 17</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	<b>BRDRV</b>	4x8mm	Flow Rate Cycle Time	62 gpm 14 min	74 gpm 11 min	<b>84</b> gpm 10 min	<b>92</b> gpm 8 min
<b>M20. 410. 17</b>	<b>BR</b>	<b>BS</b>	<b>015</b>	<b>BRDRV</b>	4x10mm	Flow Rate Cycle Time	<b>80</b> gpm 12 min	<b>95</b> gpm 10 min	<b>107</b> gpm 8 min	<b>110</b> gpm 7 min

\* Not recommended for operation below 50 psi

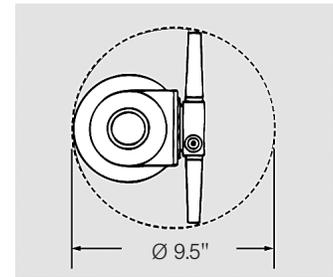
Notes: **Bold type** indicates flows in excess of 80 gpm, which exceeds the normal maximum flow through the machine. Operating beyond this point can cause excessive speed and premature wear to the internal gear train. If you require this high a flow rate, contact us to discuss modifications to your unit. 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.



Lechler offers a special mounting attachment which allows the M20 BRDRV version to double the spray effectiveness on the end bulkheads of long, horizontal tanks or tankers. The mounting part number is **099.164.17.00**.



A BRDRV version of the M20 is available for inverted operation on an optional moveable cart. The cart part number is **M20.000.17.BR**.



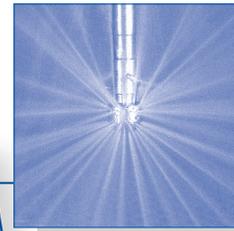
**Top view** (maximum rotation diameter required by nozzles)

**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 200 mesh size. For further information, please contact Lechler.

**Example for ordering:** Type **M20. 208. 17** + Conn. **BR** = Ordering no. **M20. 208. 17. BR**



## Static Spray Balls – for sanitary CIP applications Series 527



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

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

- Meet the requirements of 3A standards
- Very fine surface finish inside and outside
- All mount using slip-on fittings and pins
- Material is FDA Compliant (see page 105)

There are no threaded inlets available.

### Applications

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

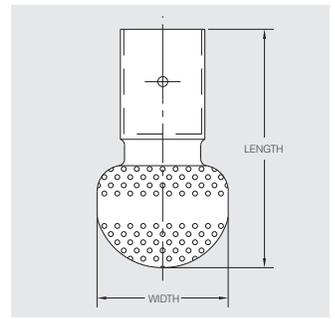
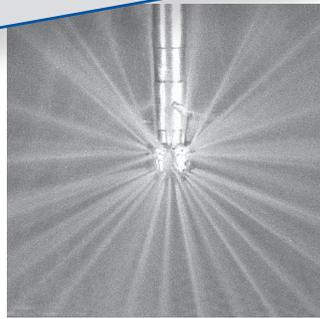
**Max. tank diameter:**  
12 – 25 ft.

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

**Operating pressure:**  
15 – 45 psi, max. 75 psi

**Max. temperature:**  
400°F

**Material:**  
■ 316L stainless steel



Spray Angle	Ordering no.	Connection	Flow Rate (Gallons Per Minute)				Length (in.)	Maximum Width (in.)
			20 psi	40 psi	60 psi	litres per minute 2 bar		
360° 	<b>527. 209. 1Y. 00. 75</b>	3/4"	14	19	23	60	2.5	1.3
	<b>527. 289. 1Y. 01. 50</b>	1-1/2"	36	50	62	170	4.5	2.6
	<b>527. 449. 1Y. 02. 00</b>	2"	89	127	155	420	6.0	4.0

Higher pressure generally means higher wear and smaller droplets. This might have adverse effects on the cleaning result.

**Please note:** To protect the products' inner workings, we suggest use of a line strainer with a 200 mesh size.

For further information, please contact Lechler.

\* This product has been authorized to use the 3-A\* Symbol by the 3-A\* Sanitary Symbol Council Administrative Council for Spray Cleaning Devices (78-00). See page 105.

### Pharmaceutical or chemical grade tank cleaning lances

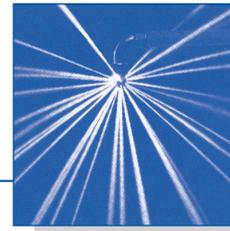
Lechler can fabricate custom CIP lances for use with sanitary tank cleaning nozzles that are suited to the most demanding environments:

- Designed for your specific tank configuration
- Accepts spray balls or sanitary rotating heads (see page 111)
- Configured for tri-clamp or welded mounting
- Stainless steel, PTFE, or special alloy materials





## Static Spray Balls – for kegs, drums, barrels, totes, and carboys Series 540



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

- Also can be used for air or saturated steam (see page 100)
- Partial coverage (120°/ 240°)

### Applications

For small kegs, drums, barrels, totes, and carboys

### Max. tank diameter:

Rinsing: 10 ft.

Cleaning: 5 ft.

### Weight:

.20 lb.

### Operating pressure:

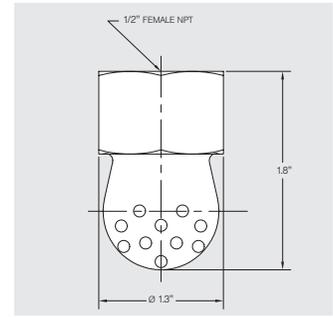
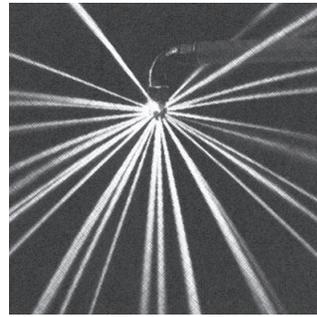
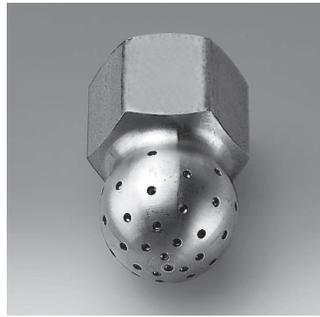
15 – 45 psi, max. 150 psi

### Max. temperature:

400°F

### Materials:

- 303 stainless steel



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

**Please note:** To protect the products' inner workings, we suggest use of a line strainer with a 200 mesh size. For further information, please contact Lechler.

Spray balls are useful for certain types of applications, although they are not as effective for most cleaning tasks as a comparable rotating nozzle. They do have specific advantages:

- No moving parts
- Self draining
- Easy mounting for inspection
- Traditionally used in sanitary environments

Since rotating nozzles depend on their turning action for full cleaning, if the unit stops for some reason, parts of the tank may not be cleaned. There is no such concern with a static head. However, they can develop cleaning voids if debris collects in the head and blocks individual orifices. Spray balls require higher flow rates than rotating nozzles, usually at least 2 to 3 times the amount of liquid.

For additional spray angles and nozzle sizes, please request our "Tank Cleaning Nozzles" brochure.





## Special tank cleaning configurations and accessories

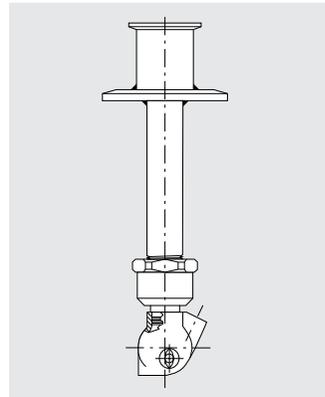
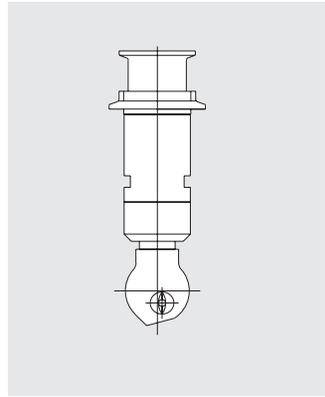
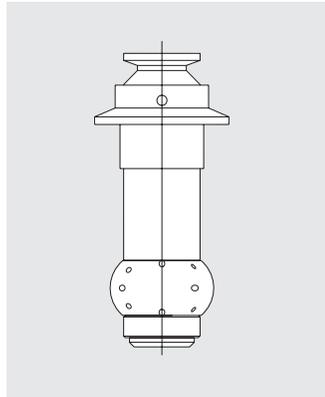
Lechler has manufactured many tank cleaning nozzle lances over the years for all manner of applications:

- Food processing
- Pharmaceutical manufacturing
- Chemical processing
- Radioactive contamination cleanup
- Equipment fabricators

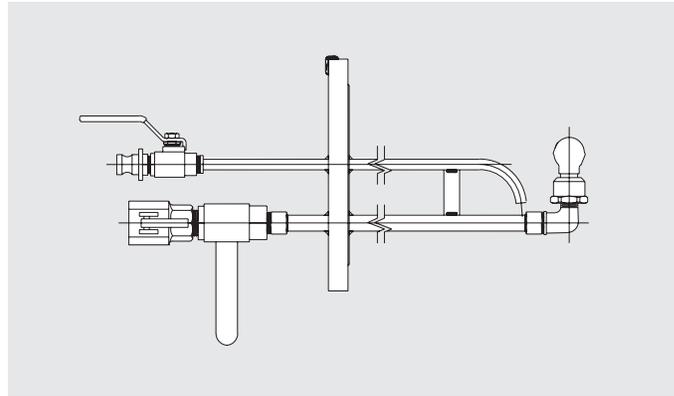
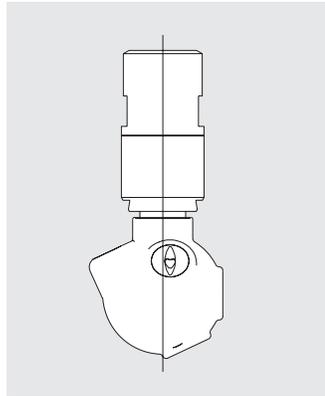
While Lechler's offering of tank cleaning nozzles is as large and varied as anyone's, special applications sometimes demand special products. Over the years we have built countless custom nozzles and accessories for specific cleaning tasks when a standard unit doesn't quite fit the bill.

A special unit can be something as simple as an alternate inlet or particular coverage pattern. Or, it might involve a lance or support to place the tank cleaner in a critical position since nozzle placement in a tank influences the ability of the spray to contact all important surfaces, as illustrated on page 103.

These diagrams illustrate various examples of such special nozzles and accessories. While they may not be what you need for your situation, one may give you an idea that will solve a problem. Your Lechler representative can help you sort through your situation and give helpful suggestions to succeed in your cleaning task.

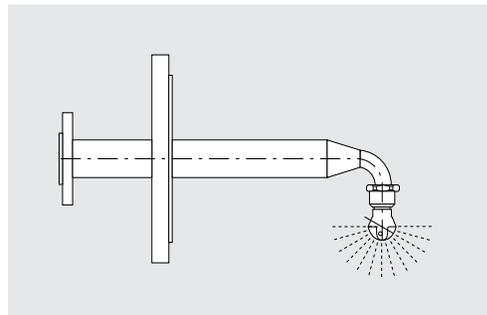
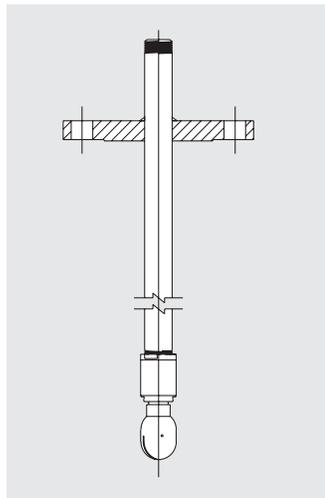


*Applications using tri-clamp nozzle connections and tank spuds are very common in pharmaceutical as well as food and beverage manufacturing. Lechler has produced many variations of this approach.*



*Sometimes all that is required is a special inlet configuration. This example uses a direct butt-welded connection in a critical reactor mounting.*

*Some applications are more complicated than others. This lance was used to clean radioactively contaminated soil from a tank. The second pipe delivered a neutralizing chemical into the residue.*



*Bolt-on flanges are also common forms of tank entry. These can be from the top or any other position on the vessel wall, so the length and angle of the inserting pipe can be different in every application.*