

# BETE®

## EQUIPMENT AND TANK WASHING SOLUTIONS



TW 0618



## EQUIPMENT & TANK WASHING

When choosing a suitable equipment and tank cleaning solution, three different CIP designs are available:

- Stationary Tank Cleaning Nozzles
- Rotating Tank Cleaning nozzles
- Tank Cleaning Machines

### Stationary Tank Washing Nozzles

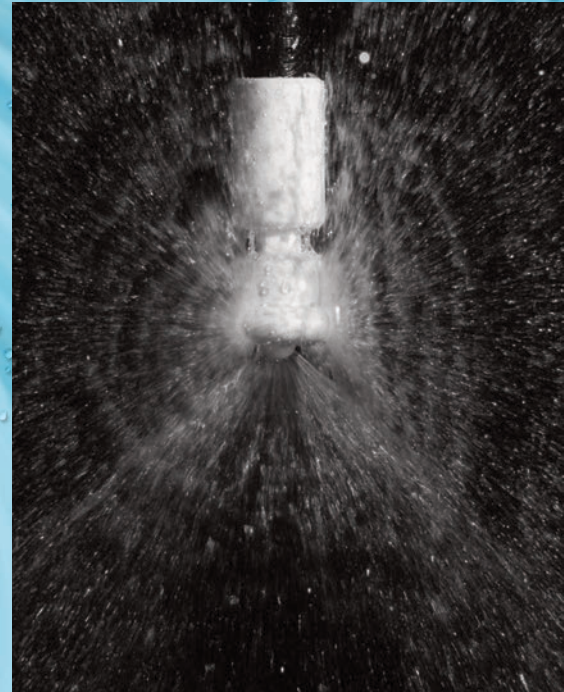
Stationary nozzles, also known as static nozzles, have no moving parts. These specialized BETE products include the innovative HydroClaw®, and spiral TW. The low-maintenance designs provide sizeable free passage superior to other products on the market. The versatile size range and narrow form of the TW series ensure compatibility with small vessel openings.

### Rotating Tank Cleaning Nozzles

Rotating tank wash nozzles, like BETE's slotted HydroWhirl® S and PTFE HydroWhirl® Poseidon® series, use the reaction force of the spray media to drive the rotation of the nozzle head. These provide complete 360° coverage and efficient cleaning through impact and repetition. Rotating nozzles ensure a significant increase in tank washing efficiency over static spray balls, saving time and money by reducing water and cleaning agent consumption while decreasing downtime.

### Tank Cleaning Machines

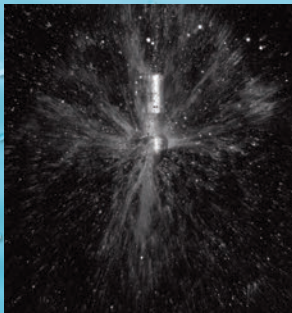
Tank cleaning machines, such as the HydroWhirl® Orbitor and Orbitor100 models, use the spray media flowing through internal gears on the body to rotate sets of high impact jet nozzles through an efficient 2-axis orbital pattern, providing complete 360° coverage. The jet pattern nozzles utilized on these assemblies provide significantly more impact and impingement force than other styles of tank washing nozzles, making them ideal for hard to clean residues and larger vessels.



At BETE Fog Nozzle, Inc., our success has always focused on understanding our customers' business. We provide effective engineered solutions for the most challenging fluid process needs.

BETE's mission goes beyond just selling spray nozzles. It is to provide engineered spraying solutions that exceed customer expectations in every detail. Our in-house capabilities include integrated 3D CAD/CAM design, rapid prototyping, investment casting, CNC machining, welded fabrication, and advanced spray testing. We offer the highest level of quality through every phase of production.

The BETE difference is our ability to respond quickly and efficiently to each spraying challenge, with personal customer service every step of the way. Our team draws on over 65 years of experience in the design and manufacturing of spray nozzles and fluid process fabrications. Engineering expertise you can count on from the premier spray nozzle experts.





# CHOOSING A TANK WASHING NOZZLE

Adequate coverage and effective scrubbing are of prime importance in equipment and tank washing. When selecting BETE nozzles, you should consider the following vessel characteristics and nozzle design criteria: size and shape of the vessel, internals, vessel opening, type of residue to remove, and spray coverage.

## Size and Shape of the Vessel to Clean

BETE's tank washing nozzles can be used to clean, wash, and rinse every size vessel from small bottles to a wide variety of process tanks and railroad tankers.

The HydroWhirl® S and TW series offer the best options for cleaning small bottles, kegs, and barrels due to their compact design.

The free passage of the HydroClaw® is an ideal solution for small tanks up to 10 ft where clogging can lead to downtime. Medium-sized tanks up to 20 ft are best cleaned using the HydroWhirl® S, or the residue-resistant HydroWhirl® Poseidon® up to 25 ft.

Where higher impact for hard to clean residues or coverage distance for large tanks is needed, BETE's tank washing machines, the HydroWhirl® Orbitor 100 and HydroWhirl® Orbitor, are an excellent choice.

Tank Washing Nozzle	up to	Coverage Distance in Feet (Diameter)											
		5	10	15	20	25	30	40	50	60	70	80+	
HydroClaw	10'												
TW	12'												
HydroWhirl S	20'												
HydroWhirl Poseidon	25'												
HydroWhirl Orbitor 100	55'												
HydroWhirl Orbitor	130'												up to 130'



### What is ATEX (Ex)?

ATEX is an acronym that stands for 'ATmosphere EXplosible'. BETE products are reviewed and approved under ATEX Directive 2014/34/EU concerning equipment and protective systems intended for use in potentially explosive atmospheres.

**All HydroWhirl Orbitor, HydroWhirl Orbitor 100, and HydroWhirl S nozzles are available with ATEX approval.**

# HydroWhirl® S

## Slotted, Rotating Spray Nozzle for Quick, Efficient Tank Cleaning

The HydroWhirl S nozzle directs the cleaning water through a rotating head at the tip of the spray assembly. This produces a vigorous moving spray action against all areas of the walls of a tank. The spray pattern from the HydroWhirl S head uses impact and repetition to quickly wash the tank. This spray pattern is especially effective at breaking up and removing contaminants.

### Advantages of the HydroWhirl® S rotary spray nozzle.

- Cleans more quickly, and uses less water, and lower pressure than static tank washers
- Lower flow and pressure mean smaller pump size resulting in lower operating costs

### The HydroWhirl® S nozzle has been carefully designed for long service life.

#### Low-maintenance bearing design

- Self-cleaning bearings are lubricated by water flow to clear away particles

#### High-precision machining and finish

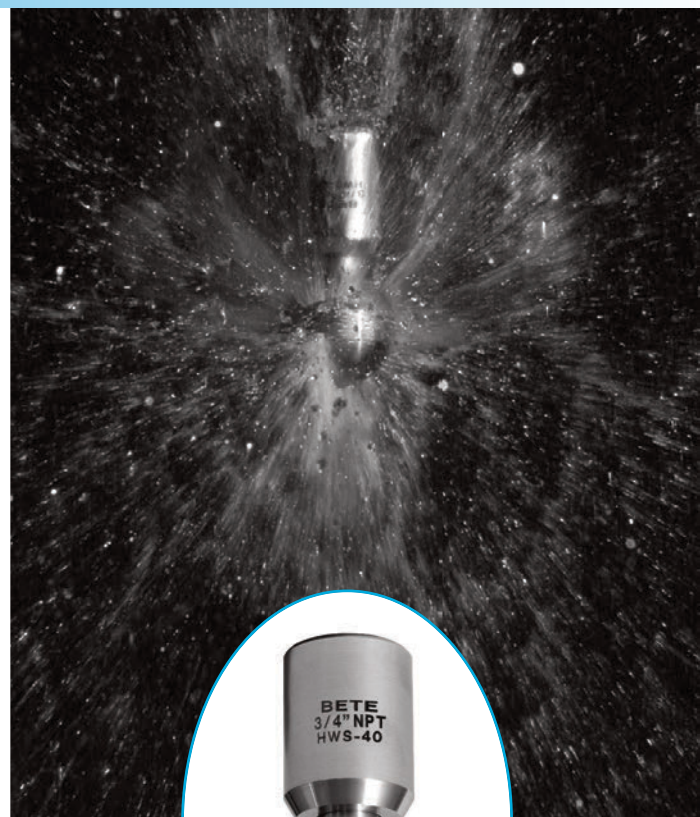
- Stainless steel construction – corrosion resistant
- Laser-welded design for durable assembly
- Surface finish of 0.8 µm (microns) R<sub>a</sub> or better
- Made from FDA compliant materials for use in Clean-in-Place (CIP) applications

#### Comprehensive quality control

- Material traceability controlled throughout production
- Quality components carefully designed for long service life
- All HydroWhirl S nozzle are available with ATEX approval for Zone 0

#### Design flexibility

- Available in many different sizes and connections: threaded, clip-on, or welded
- Spray Angles:  
360°, 90° Up, 90° Down, 180° Up, 180° Down, 270° Up, 270° Down
- Flow Range: 1.26 – 90.9 gpm
- Dual bearing design – nozzle operates effectively in any orientation



*Surface finish ideal for sanitary applications*

**The HydroWhirl S nozzle is an outstanding combination of design, quality, and engineering. The HydroWhirl S nozzle is ideal for anyone who needs reliable, efficient cleaning of tanks and other interior spaces.**

All HydroWhirl S nozzles are available with ATEX approval.



# HydroWhirl® S

## Tank Washing - Slotted Spray Nozzle

### DESIGN FEATURES

- Cleans more quickly, and uses less water and lower pressure than static tank washers
- Surface finish of 0.8 µm (microns) R<sub>a</sub> or better: ideal for sanitary applications
- Laser-welded design for durability
- Stainless steel construction – corrosion-resistant material
- Connections: threaded, clip-on, and welded
- Made from FDA compliant materials for use in Clean-In-Place (CIP) applications

### SPRAY CHARACTERISTICS

- Self-cleaning bearings
- Vigorous moving spray action
- Spray Angles: 360°, 90° Down\*, 180° Up\*, 180° Down, 270° Up, 270° Down,  
\*Not available in all flow rates

**Flow rates:** 1.26 to 90.9 gpm

All HydroWhirl S nozzles are available with ATEX approval



### STANDARD CONNECTION SIZES

Additional connection sizes available on request

Connection Type	Nozzle Number														
	HWS-20-3 HWS-20-4 HWS-20		HWS-30-5 HWS-30-6 HWS-30		HWS-40-7.5 HWS-40-8 HWS-40-9 HWS-40			HWS-40HF-11 HWS-40HF			HWS-50-16 HWS-50				
FNPT/G		-	1/4"		-	1/2"		-	1/2"		-	1"			-
Pipe Clip On	1/8"	-	-	3/8"	-	-	3/4"	-	-	3/4"	-	-	1-1/4"	1-1/2"	-
Pipe Weld		1/4"	1/4"		1/2"	1/2"		1"	1/2"		1"	1"			2"
Dim F (in)	0.41	0.54	0.54	0.68	0.84	0.84	1.05	1.32	0.84	1.05	1.32	1.32	1.66	1.90	2.38
Tube Clip On	-	-	-	1/2"	3/4"	-	1"		-	1"		-	1-1/4"	1-1/2"	2"
Tube Weld	3/8"	1/2"	3/8"			3/4"			3/4"			1"			
Dim F (in)	0.38	0.50	0.38	0.5	0.75	0.75	1.00		0.75	1.00		1.00	1.25	1.5	2.00
DIN Clip On**	DN8	-	-	DN15		-	DN20	DN25	-	DN20	DN25	DN40		DN50	
DIN Weld**		DN10	DN10			DN15									
Dim F (mm)	10	13	13	19		19	23	29	19	23	29	41		53	

Optimal cleaning performance achieved between 30-50 PSI; maximum operating pressure is 150 PSI.

### HydroWhirl S Flow Rates\* and Dimensions

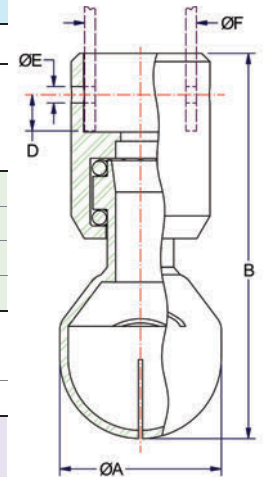
Nozzle Number	GALLONS PER MINUTE @PSI						Dimensions (in)					Wt (oz)	Coverage Diameter (ft) @40 PSI
	10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	A	B (NPT) B (G)	C	D (MAX)	E		
HWS-20-3	1.26	1.63	1.89	2.10	2.28	2.44	0.66	1.68	2.72	0.15	.086	0.88	4.9
HWS-20-4	2.14	2.79	3.26	3.64	3.97	4.26		1.96					6
HWS-20	3.16	4.31	5.45	6.41	7.16	7.83		-					-
HWS-30-5	2.31	3.29	4.12	4.80	5.37	5.88	1.1	2.38	3.28	0.21	.086	3.28	8
HWS-30-6	5.54	6.97	7.98	8.78	9.46	10.1		2.62					
HWS-30	5.70	8.10	9.96	11.5	12.9	14.3		-					
HWS-40-7.5	5.60	7.87	9.60	11.1	12.4	13.6	1.53	3.65	4.25	0.35	.156	10.8	11
HWS-40-8	6.39	8.96	10.9	12.6	14.1	15.4		3.94					
HWS-40-9	7.94	11.3	13.9	16.0	17.8	19.6		-					
HWS-40	9.08	13.1	16.1	18.3	20.3	22.2	1.53	3.65	4.25	0.35	.156	10.6	13
HWS-40HF-11	12.2	17.1	20.8	24.1	26.9	29.4		3.94					
HWS-40HF	15.0	21.3	26.0	29.7	32.6	35.4		-					
HWS-50-16	24.2	33.8	41.4	47.8	53.4	58.5	2.72	6.21	7.09	0.35	.219	53.8	18
HWS-50	37.2	52.4	64.1	74.2	82.9	90.9		6.47					

Standard Materials: Nozzle: 316L Stainless Steel; Ball Bearings: 316 Stainless Steel

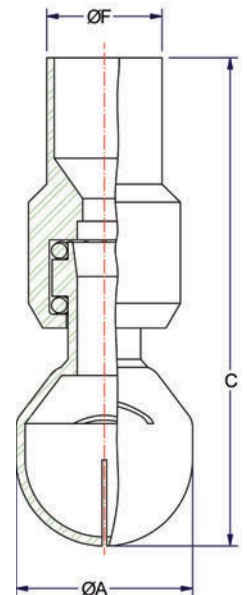
\*Flow rates represent threaded connections with a 360° spray angle. Flow rates may vary for other connection types and spray angles, please contact BETE for more information.

\*\*Per DIN 11866 Part A / DIN 11850 Part B

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



**Threaded and Clip On Connections**



**Weld On Connections**



# HydroWhirl® Poseidon®

## Spray Nozzles for Quick, Efficient Tank Cleaning

The HydroWhirl Poseidon tank washing nozzle directs the cleaning water through a rotating head at the tip of the spray assembly. This produces a slow-moving, high-impact spray action against internal surfaces of the tank. The HydroWhirl Poseidon nozzle head uses impact and repetition to quickly break up and wash away contamination. The combination of the spray pattern and slow rotation of the HydroWhirl Poseidon tank washing nozzle is especially effective at removing scum rings or tougher, viscous material.

### Advantages of the HydroWhirl® Poseidon® rotary tank washing nozzle

- Cleans more quickly and uses less water and lower pressure than static tank washers
- Complete 360° omnidirectional coverage
- Slow rotation speed provides higher impact and more efficient cleaning
- Durable PTFE nozzle construction withstands extreme chemical and elevated temperature environments
- Simple internal design allows reliable flow-through operation
- Design validated by lab testing to 200 °F (93 °C)
- Maintenance-friendly design allows disassembly, inspection, and reassembly with basic hand tools
- Made from FDA compliant materials for use in Clean-in-Place (CIP) applications

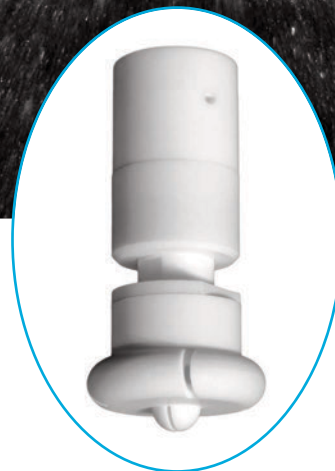
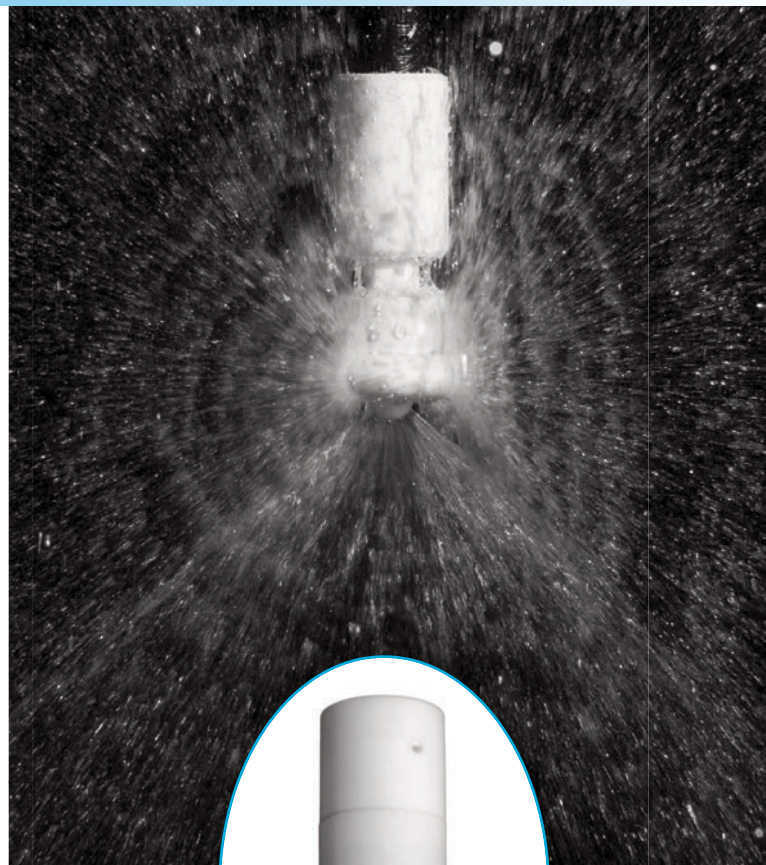
### The HydroWhirl® Poseidon® tank washing nozzle has been carefully designed for long service life

#### Comprehensive Quality Control:

- Material traceability controlled throughout production
- BETE product quality is maintained using a quality system registered to ISO 9001-2015

#### Design Flexibility:

- Threaded, pipe, tube, or DIN clip-on connections are available
- Flow Range: 4.45 to 82.4 gpm



*Corrosion resistant PTFE is ideal for harsh chemical environments*

**The HydroWhirl Poseidon tank washing nozzle is an outstanding combination of design, quality, and performance.**

**The HydroWhirl Poseidon tank washing nozzle is ideal for anyone who needs a polymer nozzle for reliable, efficient cleaning of tanks and other interior spaces.**

# HydroWhirl® Poseidon®

## Tank Washing - PTFE Spray Nozzle

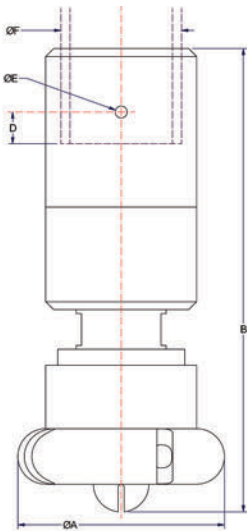
### DESIGN FEATURES

- Cleans more quickly and uses less water and lower pressure than static tank washers
- PTFE construction:
  - Ideal for harsh chemical environments
  - Corrosion resistant
- Available in threaded, pipe, tube, or DIN clip-on connections
- Made from FDA compliant materials for use in Clean-In-Place (CIP) applications

### SPRAY CHARACTERISTICS

- Slow spinning produces longer spray dwell time on the target surface, increasing impact over conventional rotating designs
- Complete 360° omnidirectional spray pattern, other spray angles available upon request

**Flow rates:** 4.45 to 82.4 gpm



### STANDARD CONNECTION SIZES

Connection Type	Nozzle Number											
	HWP-10			HWP-23 HWP-28			HWP-32 HWP-37			HWP-48 HWP-55 HWP-65 HWP-73		
FNPT/BSP	1/4"	3/8"	1/2"	3/8"	1/2"	3/4"	1/2"	3/4"	1"	1"	1-1/4"	1-1/2"
Pipe Clip-On							X					
Dim F (in)	0.54	0.68	0.84	0.68	0.84	1.05	0.84	1.05	1.32	1.32	1.66	1.90
Tube Clip-On	1/2"	3/4"		3/4"	1"		1"	1-1/4"		1-1/2"	1-3/4"	
Dim F (in)	0.50	0.75		0.75	1.00		1.00	1.25		1.50	1.75	
DIN Clip On**	DN10	DN15		DN15	DN20		DN20	DN25		DN40		
Dim F (mm)	13	19		19	23		23	29		41		

### HydroWhirl Poseidon Nozzle Flow Rates\* and Dimensions

Nozzle Number	Spray Angle	GALLONS PER MINUTE @PSI						Dimensions (in)				Wt (oz)	Coverage Diameter (ft) @40PSI
		10 psi	20 psi	30 psi	40 psi	50 psi	60 psi	A	B	D MAX	E		
HWP-10	360°	4.45	6.31	7.75	8.96	10.0	11.0	1.68	3.94	0.50	0.09	3	9
HWP-23		9.42	13.4	16.5	19.0	21.3	23.4	1.95	4.12	0.50	0.16	4	11
HWP-28		10.7	15.2	18.6	21.5	24.0	26.3						14
HWP-32		11.7	16.8	20.8	24.1	27.1	29.8	3.00	6.40	0.50	0.19	21	14
HWP-37		15.1	21.6	26.5	30.8	34.5	37.9						16
HWP-48		20.6	29.3	36.0	41.7	46.8	51.3	3.30	7.30	0.50	0.19	29	24
HWP-55		23.5	33.4	41.1	47.6	53.3	58.5						25
HWP-65		30.7	43.4	53.3	61.6	68.9	75.5						
HWP-73		33.4	47.4	58.2	67.2	75.2	82.4						

Standard Materials: Nozzle: PTFE; Retaining Clip: 316 stainless steel

\*Flow rates represent threaded connections with a 360° spray angle. Flow rates may vary for other connection types and spray angles, please contact BETE for more information.

\*\*Per DIN 11866 Part A / DIN 11850 Part B

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

# HydroWhirl® Orbitor

## Tank Cleaning Machines Ideal for High Impact Cleaning

The HydroWhirl Orbitor and HydroWhirl Orbitor 100 are versatile tank cleaning machines designed to meet the high standards required in the food, brewing, beverage, dairy, and chemical industries combining high performance cleaning efficiency with extended operating life and reduced life cycle costs.

### Advantages of the HydroWhirl® Orbitor tank cleaning machines

- The HydroWhirl Orbitor and Orbitor 100 can be stripped, maintained, and rebuilt in less than 15 minutes
- The HydroWhirl Orbitors are self cleaning and self lubricated
- Enhanced external cleaning with dedicated nozzles that clean the external surfaces of the machine and its mounting pipe
- Designed for use where high impact cleaning is required
- The HydroWhirl Orbitors are ideal for use in larger tanks and where the product is difficult to clean
- Designed with minimum moving parts to ensure extended operating life and reduced down time

#### AVAILABLE VERSIONS

- 2 or 4 nozzle machines
- Variable cycle times
- Male or female connections
- 360° wash pattern
- 180° down wash pattern
- 180° up wash pattern

### Typical HydroWhirl® Orbitor Applications

Typically used where high impingement cleaning is required and where the most efficient use of utilities is necessary.

#### BREWERIES AND WINERIES

Bright beer tanks, coppers, maltings brew kettles, fermentors, storage tanks

#### COATINGS AND PAINTS

Storage silos, process vessels, mixers

#### FOOD AND DAIRY

Raw milk storage, spray driers, process vessels, storage silos

#### CHEMICAL

Process vessels, mixers, storage silos

#### BEVERAGE

Process vessels, storage silos



### Key Features and Benefits:

- Designed to meet hygienic standards; external surface finish of 0.5 µm (microns) R<sub>a</sub> or better
- Optimum consumption of water, chemicals, and time = reduced operating costs
- Minimum moving parts = reduced lifecycle costs
- Self cleaning; self lubricating = no process contamination
- High impact jets; orbital wash pattern = high efficiency cleaning process
- Compact design will fit through small access flanges and vessel openings
- 2 or 4 nozzle configuration = wash pattern variable up to super intense



All HydroWhirl Orbitor and HydroWhirl Orbitor 100 tank cleaning machines are available with ATEX approval.

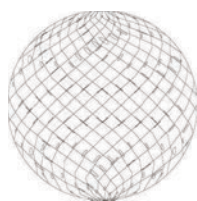


# HydroWhirl® Orbitor

## High Impact Rotary Tank Cleaning Machine

### DESIGN FEATURES

- Easily field-serviced to reduce maintenance costs
- Minimum moving parts to extend operating life
- Self cleaning; self lubricating
- High-impact jets; orbital wash pattern = high efficiency cleaning process
- Compact design
- 2 or 4 nozzle configurations = wash pattern variable up to super intense
- Male or female connections



Orbitor 2 nozzle  
spray pattern



Orbitor 4 nozzle  
spray pattern

### SPRAY CHARACTERISTICS

- 360° wash pattern.  
180° patterns available on request

- Variable cycle times

- High impact cleaning

**Flow rates:** 21.5 - 160 gpm

**Working Pressure:** 45 - 145 psi

### Materials:

Housing and Nozzle Head: 316L

Gears: PEEK + 316 SS

Bushings/Seals: Carbon Filled PTFE

**Max. Working Temp.:** 200 °F (95 °C)

**Max. Ambient Temp.:** 285 °F (140 °C)

**Weight:** 16.5 Lbs

Minimum opening size is 5" for either 2-nozzle or 4-nozzle standard-capacity model with jets vertically aligned.



All HydroWhirl Orbitor tank cleaning machines are available with ATEX approval.

### Jet lengths are effective cleaning lengths

# Nozzles X Orifice Size	4 x 4.2 mm			4 x 5 mm			4 x 6 mm			4 x 7 mm			4 x 8 mm		
Connection Size	1" and 1-1/2"			1" and 1-1/2"			1-1/2"			1-1/2"			1-1/2"		
Pressure (PSI)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)
45	22.6	9.5	11	31.4	13.1	13	38.6	17.4	15.5	59.1	21.3	11.4	68.3	23.6	15.5
60	26.5	9.8	9.3	36.4	13.8	10.8	45.7	18.7	12.9	67.7	23.3	9.8	79.0	26.2	12.9
75	30.0	11.5	7.9	40.8	15.4	9.4	52.1	20.3	11	75.2	25.3	8.7	88.4	29.5	11
90	33.3	13.1	6.9	44.8	17.1	8	58.0	23.0	9.5	81.9	27.9	8.1	96.9	32.5	9.5
100	35.3	16.4	6.3	47.2	20.7	7.3	61.8	26.2	8.4	86.0	30.8	7.5	102	34.8	8.5
115	38.1	20.3	5.8	50.8	24.6	6.8	67.0	30.8	7.6	91.9	33.8	7.1	110	36.7	7.8
130	40.8	23.3	5.6	54.0	27.9	6.5	72.1	33.8	7	97.3	36.7	6.9	117	40.0	7
145	43.4	25.6	5.5	57.2	29.5	6.4	76.8	36.7	6.9	102	39.4	6.6	123	42.6	6.9
# Nozzles X Orifice Size	2 x 6 mm			2 x 7 mm			2 x 8 mm			*2 x 10 mm			*2 x 12.5 mm		
Connection Size	1-1/2"			1-1/2"			1-1/2"			1-1/2"			1-1/2"		
Pressure (PSI)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)
45	21.5	18.0	33	26.1	21.3	37.5	33.5	23.6	25.7	59.1	32.1	41	89.4	33.1	26.8
60	25.4	19.7	27.2	31.3	23.6	31.6	39.3	26.2	22.9	68.7	34.4	34.2	103	36.7	24
75	28.8	20.7	24.7	36.0	25.9	28.2	44.4	29.5	20.5	77.2	37.7	30.5	115	39.7	21.7
90	31.9	23.0	22.6	40.4	27.9	25.8	49.1	32.5	18.9	84.9	41.7	28	126	44.0	19.8
100	33.9	26.2	21	43.2	29.2	24	52.0	34.8	17.5	89.8	45.6	26	133	48.5	18.4
115	36.7	29.5	19.5	47.2	30.2	22.3	56.2	36.7	16.4	96.6	49.9	24.5	143	53.8	17.2
130	39.4	33.5	18.4	51.1	37.0	21	60.1	40.0	15.6	103	55.8	23.2	152	60.0	16.3
145	41.9	37.7	17.4	54.7	40.4	20	63.8	42.6	14.9	109	61.7	22	160	65.9	15.5

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

\*High Capacity Jet Machine

# HydroWhirl® Orbitor 100

## High Impact Rotary Tank Cleaning Machine

### DESIGN FEATURES

- Easily field-serviced to reduce maintenance costs
- Minimum moving parts to extend operating life
- Self cleaning; self lubricating
- High-impact jets; orbital wash pattern = high efficiency cleaning process
- Ideal for small to medium tanks, easily fits through Ø4" (100 mm) openings or Ø3.35" (85 mm) when nozzle head vertically aligned
- 4 nozzle configurations
- Female connections

### SPRAY CHARACTERISTICS

- 360° wash pattern
- Variable cycle times
- High impact cleaning

**Flow rates:** 12 - 52.4 gpm

**Working Pressure:** 45 - 145 psi

### Materials:

Housing and Nozzle Head: 316L

Gears: PEEK + 316 SS

Bushings/Seals: Carbon Filled PTFE

**Max. Working Temp.:** 200 °F (95 °C)

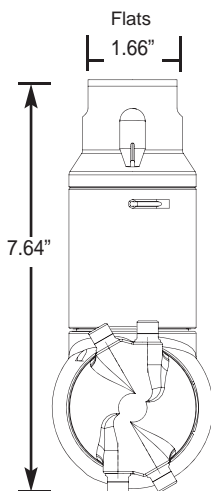
**Max. Ambient Temp.:** 285 °F (140 °C)

**Weight:** 5.5 Lbs

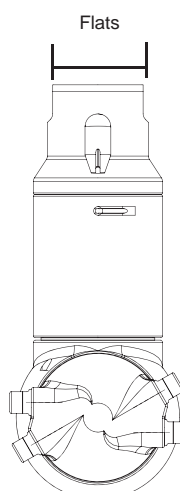


Orbitor 100

HydroWhirl Orbitor



Vertical Nozzle Head Alignment  
Clearance Diameter: 3.35"

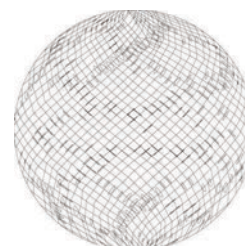


Horizontal Nozzle Head Alignment  
Clearance Diameter: 3.94"



All HydroWhirl  
Orbitor 100 tank  
cleaning machines  
are available with  
ATEX approval

*Performance may vary with  
ATEX models.*



4 nozzle  
spray pattern

**Jet lengths are effective cleaning lengths**

# Nozzles X Orifice Size	4 x 3mm			4 x 4mm			4 x 5mm			4 x 6mm		
Connection Size	3/4" and 1"			3/4" and 1"			3/4" and 1"			3/4" and 1"		
Pressure (PSI)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)	Flow (gpm)	Jet Length (ft)	Cycle Time (min)
45	12.0	12.5	6.0	17.8	14.4	5.4	23.7	16.4	4.4	30.6	18.0	3.9
60	13.9	14.9	5.4	20.3	17.1	4.7	26.7	19.1	3.9	34.0	20.6	3.4
75	15.8	17.0	4.8	22.7	19.4	4.1	29.6	21.4	3.4	37.3	22.9	3.0
90	17.6	18.8	4.3	25.1	21.3	3.6	32.3	23.2	3.0	40.6	24.7	2.6
100	18.8	19.8	4.0	26.6	22.3	3.3	34.1	24.3	2.8	42.8	25.7	2.4
115	20.5	21.0	3.6	28.9	23.6	2.9	36.7	25.4	2.4	46.0	26.9	2.1
130	22.2	22.0	3.2	31.2	24.5	2.7	39.1	26.2	2.2	49.2	27.8	1.9
145	23.9	22.6	2.9	33.4	25.0	2.5	41.4	26.6	2.0	52.4	28.2	1.7



# TW

## Tank Washing

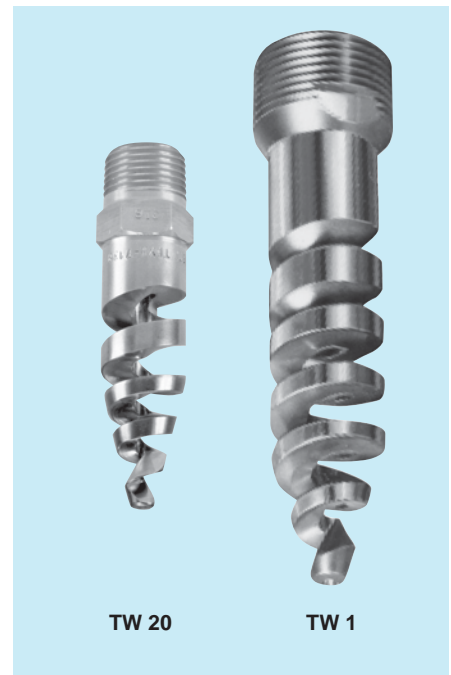
### DESIGN FEATURES

- Clog-resistant spiral design
- Energy efficient
- Compact design; fits small openings

### SPRAY CHARACTERISTICS

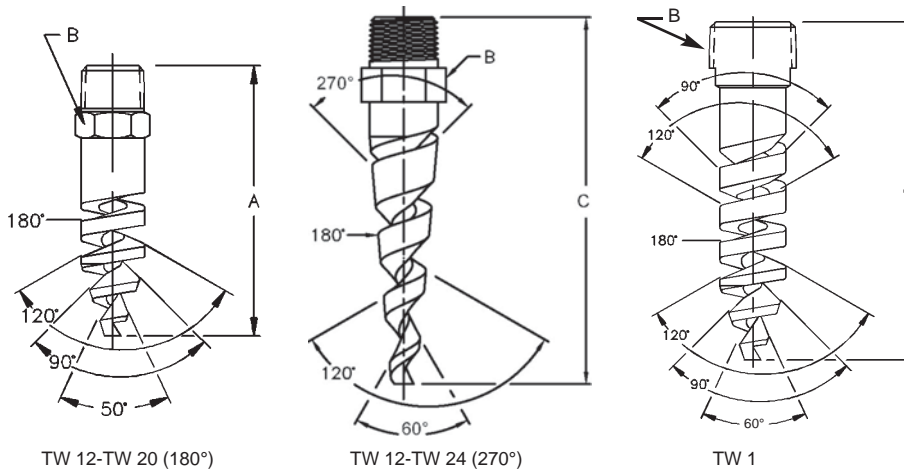
- Easy to maintain
- Unique patterns that spray in opposing directions

**Flow rates:** 3.0 to 163 gpm



TW 20

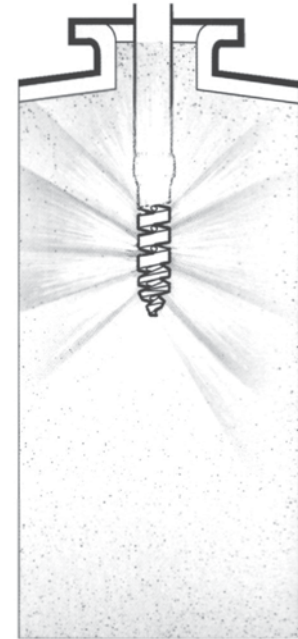
TW 1



TW 12-TW 20 (180°)

TW 12-TW 24 (270°)

TW 1



### Tank Washing TW Coverage Chart When spraying at 30-40 PSI

Pipe Size	Nozzle Number	Scrubbing Diameter (ft)	Rinsing Diameter (ft)
3/8	TW12	1.3	2.5
	TW14	1.5	4.0
	TW16	2.0	5.0
	TW20	3.0	7.0
1/2	TW24	4.0	9.0
1	TW1	8.0	20

Dimensions are approximate. Check with BETE for critical dimension applications.

### Tank Washing Flow Rates and Dimensions TW 180° and 270°, 3/8", 1/2", and 1" Pipe Sizes

Male Pipe Size	Nozzle Number	Available Spray Angle	K Factor	GALLONS PER MINUTE @ PSI										Approx. (in.)		Dimensions (in.)			Wt. (oz.)
				10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI	Orifice Dia	Free Pass. Dia.				
3/8	TW12	180° 270°	0.949	3.00	4.24	5.20	6.00	6.71	7.35	8.49	9.49	13.4	19.0	0.19	0.13	2.88	0.75	3.63	1.75
	TW14	180° 270°	1.28	4.05	5.73	7.01	8.10	9.06	9.92	11.5	12.8	18.1	25.6	0.22	0.13				
	TW16	180° 270°	1.68	5.30	7.50	9.18	10.6	11.9	13.0	15.0	16.8	23.7	33.5	0.25	0.13				
	TW20	180° 270°	2.61	8.25	11.7	14.3	16.5	18.4	20.2	23.3	26.1	36.9	52.2	0.31	0.13				
1/2	TW24	270°	3.81	12.1	17.0	20.9	24.1	26.9	29.5	34.1	38.1	53.9	76.2	0.41	0.17		0.88	4.25	6.4
1	TW1	270°	8.06	26.0	36.0	45.0	51.0	57.0	63.0	72.0	80.6	115	163	0.56	0.20		1.13	5.75	10.5

$$\text{Flow Rate (GPM)} = K \sqrt{\text{PSI}}$$

Standard Materials: Brass, 316 Stainless Steel

# HydroClaw®

## Superior Clog-Resistant Nozzle for Ferocious Tank Cleaning

- Triple the free passage of spray balls
- Unique, patent-pending, clog-resistant design with no moving parts
- Complete 360° coverage
- Vigorous rinsing action quickly flushes solids and contamination from vessel.

### Who needs the HydroClaw®?

- Wineries: spray balls get clogged with stems, skins, and seeds
- Breweries: spray balls get clogged with grains and hops
- Juice Processing Plants: tank washing nozzles get clogged with fruit seeds and pulp
- Sugar Processing Plants: rotary nozzles jam up with sticky residue
- Tomato Processing Plants: tank washing nozzles get clogged with seeds and skins

### Advantages of the HydroClaw®

#### Low-maintenance design

- Self-draining and self-flushing design
- No moving parts = low maintenance

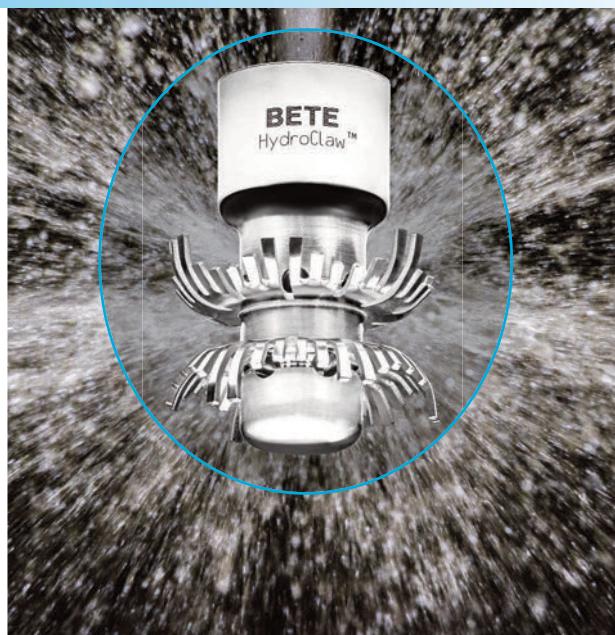
#### High-precision machining

- 316L stainless steel construction for food-grade and sanitary applications
- Laser-welded for durability

#### Designed with your tank in mind

- Available in a variety of connection sizes and types, including threaded, clip-on and welded
- Fits through compact openings: either 2 1/2" (HC-42) or 3" (HC-100) diameter
- Spray Angle: complete 360° coverage for tanks up to 10' in diameter
- Free Passage: allows passage of particles 1/4" in diameter; three times the free passage of a comparable spray ball
- **Recommended Operating Pressure:** 30 psi
- Low pressure, high flow for quick, energy-efficient rinse

Visit [www.BETE.com](http://www.BETE.com) for comprehensive spray nozzle tools, case studies and literature.



Wine Fermentation Tank Cleaned with the HydroClaw



**BETE®**  
PERFORMANCE THROUGH ENGINEERING

BETE Fog Nozzle, Inc.  
50 Greenfield St.  
Greenfield, MA 01301

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# HydroClaw®

## Tank Washing - Superior Clog Resistance

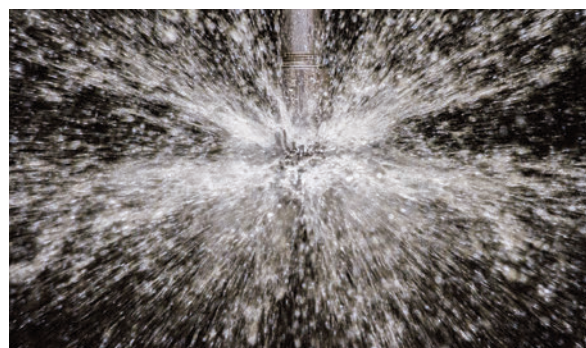
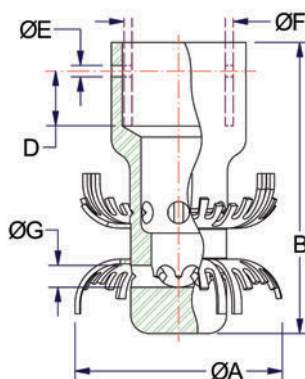
### DESIGN FEATURES

- Patent-pending, clog-resistant design with no moving parts
- Allows passage of particles 1/4" in diameter, three times the free passage of a comparable spray ball
- Made from FDA compliant 316L stainless steel for use in food-grade and sanitary Clean-In-Place (CIP) applications
- Low pressure/high flow operation quickly cleans tank walls to reduce overall water consumption compared to a static spray ball
- Self-draining and self-flushing
- Laser-welded for durability
- Available in a variety of connection sizes and types, including threaded, clip-on and welded
- Clip-on nozzles include low-profile retaining pin for secure connection
- Fits through compact openings: either 2-1/2" (HC-142) or 3" (HC-100) diameter

### SPRAY CHARACTERISTICS

- Vigorous rinsing action quickly flushes solids and contamination from vessels
- Complete 360° omnidirectional coverage
- Optimum cleaning performance at 30 psi
- Recommended installation 2' - 3' vertically below top of tank

**Flow rates:** 33 - 112 gpm



### HydroClaw Flow Rates and Dimensions

Connection Type	Nozzle Number	GALLONS PER MINUTE @PSI				Dimensions (in)						Wt (oz)	Coverage Diameter (ft) @30 PSI
		25 PSI	30 PSI	35 PSI	40 PSI	A	B	D	E	F	Free Pass. G		
3/4" NPT	HC-42	33.4	36.6	39.5	42.0	2.38	3.59	—	—	—	0.25	15	8
G3/4												15	
1" Tube Weld-On												12	
1" Tube Clip-On	HC-42	35.7	38.9	42.0	44.8	2.38	3.59	0.75	0.16	1.00	0.25	14	8
DN20 Tube Clip-On*										0.91		15	
3/4" Pipe Clip-On										1.05		14	
1" NPT	HC-100	79.0	86.5	93.5	100	2.88	4.00	—	—	—	0.30	23	10
G1												23	
1-1/2" Tube Weld-On												15	
1-1/2" Tube Clip-On	HC-100	88.5	96.9	105	112	2.88	4.00	0.75	0.16	1.50	0.30	19	10
DN40 Tube Clip-On*										1.57		15	
1" Pipe Clip-On										1.32		21	

### Standard Material: 316L Stainless Steel

Clip-on flow rates may vary depending on actual O.D. of installation tube or pipe

\*Per DIN 11866 Part A / DIN 11850 Part B

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



# Case Study

SOLVING CLOGGING FROM  
SEEDS & SKINS

## TOMATO PROCESSING TANK WASHING SOLUTION

Seeds, skins, pulp, stems, and grains in a recirculated water system can cause blockage in many tank washing nozzle designs, inhibiting their ability to work correctly. Cleaning tanks and maintaining a sanitary environment is essential to success in food processing and beverage industries. Problems within these systems lead to loss of time, money, and resources – an unacceptable situation.

### ► PROBLEM: CLOGGING WITH RECIRCULATED WATER

A tomato processing plant system designer contacted BETE to help troubleshoot issues with their tank washing system.

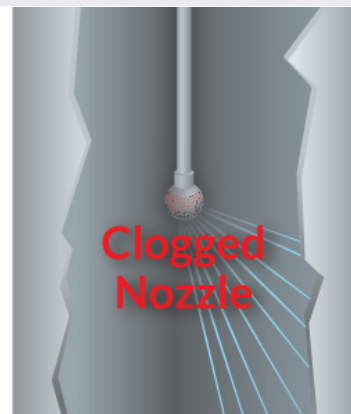
After installing six total competitor disc cleaning nozzles into two tanks, 100" diameter by 80" high, they observed clogging caused by seeds and skins that were in their recirculated water system. Displeased with constant blockage and too much time wasted on nozzle maintenance, they worked with BETE Applications Engineers to solve the problem and improve efficiencies in keeping their tomato processing tanks clean.

### ► SOLUTION: THE BETE HYDROCLAW®

The systems designer had done their research and wanted more information as to whether the innovative HydroClaw was the right solution for their tank washing requirements.

After assessing the dimensions of their vessels, BETE engineers recommended six HydroClaw 100 nozzles, three for each tank. The ¼" free passage makes them an ideal solution for flushing through tomato seeds and skins with the recirculated water.

The low-maintenance HydroClaw self-flushes as it cleans tanks without any rotating parts or gears to jam up.







## WHY CHOOSE BETE FOR YOUR FOOD INDUSTRY NOZZLE NEEDS?

- The ability to solve unique and complex process challenges
- ISO 9001:2015 Certified
- Custom nozzle design and manufacturing with consistent quality assurance

With BETE you get our world-class customer support from a nozzle industry pioneer who has been creatively solving problems for over 65 years.

**BETE®**

PERFORMANCE THROUGH ENGINEERING

50 Greenfield Street,  
Greenfield, MA 01301 USA

800-235-0049  
413-772-0846

[www.BETE.com](http://www.BETE.com)  
[sales@BETE.com](mailto:sales@BETE.com)

## Results

After testing the six new HydroClaw 100s in their tank washing system, the tomato processing plant circled back to BETE to express their enthusiasm. Pleased with the performance of the HydroClaw, they requested a quote for twenty three more nozzles to improve tank washing efficiencies at their other locations.

### CHALLENGES WITH OTHER TANK WASHING NOZZLES

- Small holes and moving parts lead to clogging
- Nozzle blockage leads to unclean tanks, and more maintenance downtime becomes costly
- The expense of high water consumption from extra wash cycles and the inability to use recycled water effectively

The HydroClaw was explicitly designed to offer a tank washing innovation for wineries – allowing grape seeds and skins to pass through the nozzle. This design feature makes it the perfect nozzle for food processing applications.

Whether used in a tomato processing factory or any other food processing plant, the HydroClaw saves time and money with tanks glistening and ready for the next cycle.

### ADVANTAGES OF THE BETE HYDROCLAW®

- Nozzle designed to let particulates and sediment flow through with no clogging
- Clog resistance and low maintenance = reduced downtime and more economical water usage
- 316L stainless steel construction means it is perfect for clean-in-place (CIP) and food grade applications
- Complete 360-degree coverage





# BETE<sup>®</sup>

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