

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

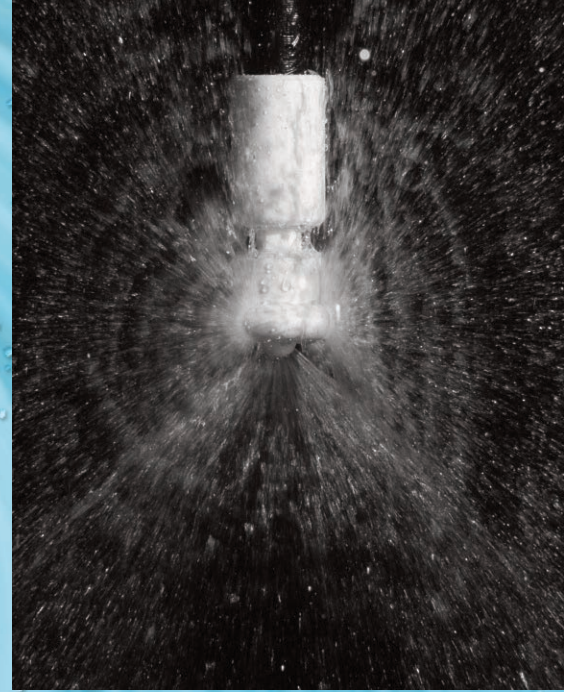
Stationary nozzles, also known as static nozzles, have no moving parts. These specialized BETE products include the innovative HydroClaw[®], and spiral TW. The low-maintenance designs provide sizeable free passage superior to other products on the market. The versatile size range and narrow form of the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

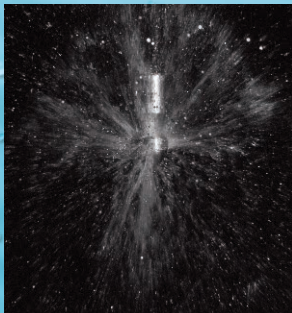
Tank cleaning machines, such as the HydroWhirl[®] Orbitor and Orbitor 100 models, use the spray media flowing through internal gears on the body to rotate sets of high impact jet nozzles through an efficient 2-axis orbital pattern, providing complete 360° coverage. The jet pattern nozzles utilized on 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 more chemical 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 Nozzles	Tank Diameter (Coverage)											
	5'	10'	15'	20'	25'	30'	40'	50'	60'	70'	80+	
Feet	5'	10'	15'	20'	25'	30'	40'	50'	60'	70'	80+	
Meters	2	3	4	5	7	9	12	15	18	21	24+	
HydroClaw		10'/3.0m										
TW			12'/3.6m									
HydroWhirl S				18'/5.5m								
HydroWhirl Poseidon					25'/7.6m							
HydroWhirl Orbitor 100								55'/17m				
HydroWhirl Orbitor												130'/40m



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 spray media or fluid 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, spray media or fluid 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 spray media or fluid flow to clear away particles

High-precision machining and finish

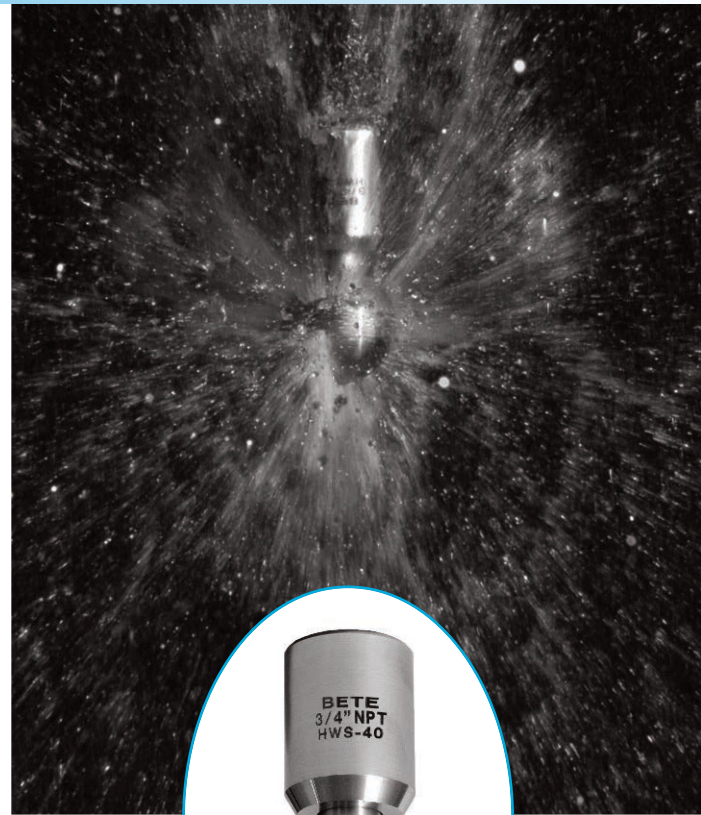
- Stainless steel construction – corrosion resistant
- Laser-welded design for durable assembly
- External surface finish of 0.8 μm (microns) R_a or better
- Made from FDA compliant materials for use in Clean-in-Place (CIP) applications

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, spray media or fluid and lower pressure than static tank washers
- Surface finish of 0.8 µm (microns) R_a 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

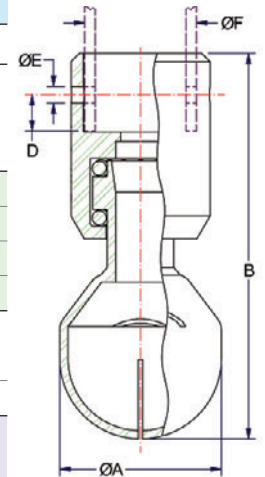
Flow rates: 1.26 to 90.9 gpm

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"	-	1/2"	-	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"	1"	1"	1"	2"	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"	1/2"	3/4"	1"	3/4"	1"	1"	1"	1"	1-1/4"	1-1/2"	2"	
Dim F (in)	0.38	0.50	0.38	0.5	0.75	0.75	1.00	0.75	1.00	1.00	1.00	1.25	1.5	2.00	
DIN Clip On**	DN8	-	DN15	-	DN15	DN20	DN25	-	DN20	DN25	DN40	DN50	-	-	
DIN Weld**	DN10	DN10	DN15	DN15	DN20	DN25	DN25	DN15	DN20	DN25	DN40	DN50	-	-	
Dim F (mm)	10	13	13	19	19	23	29	19	23	29	41	53	-	-	

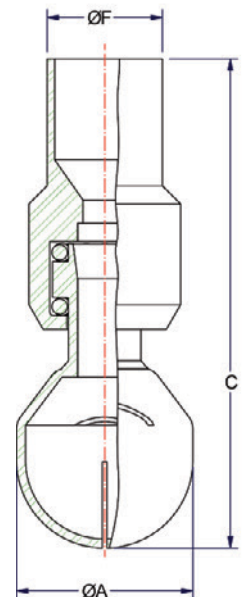
Optimal cleaning performance achieved between 30-50 PSI; maximum operating pressure is 150 PSI.



Threaded and Clip-On Connections

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					8
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	-	-	-	-	-	-	-
HWS-40HF-11	12.2	17.1	20.8	24.1	26.9	29.4	1.53	3.65	4.25	0.35	.156	10.6	13
HWS-40HF	15.0	21.3	26.0	29.7	32.6	35.4		3.94					
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					



Weld-On Connections

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

HydroWhirl® Poseidon® Spray Nozzles for Quick, Efficient Tank Cleaning

The HydroWhirl Poseidon tank washing nozzle directs the cleaning spray media or fluid 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
- 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

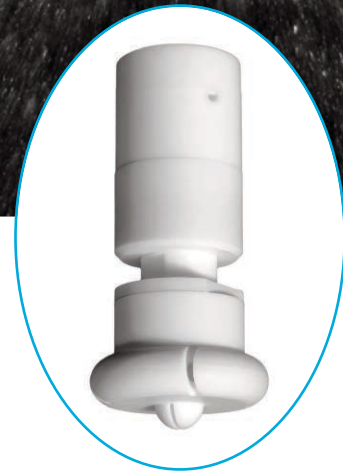
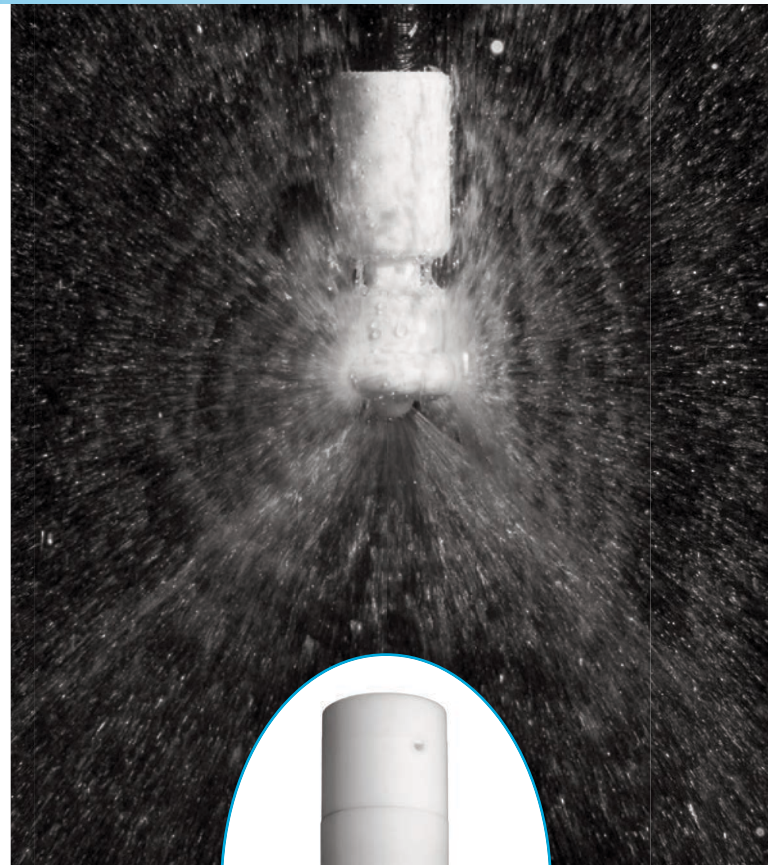
The HydroWhirl® Poseidon® tank washing nozzle has been carefully designed for long service life

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 or, pipe, tube, and 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

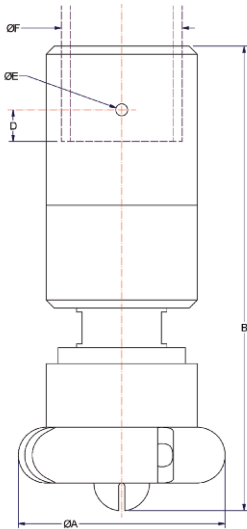
DESIGN FEATURES

- Cleans more quickly and uses less water, spray media or fluid 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"	1-1/4"	1-1/2"	1-3/4"			
Dim F (in)	0.50	0.75	0.75	1.00	1.00	1.00	1.25	1.50	1.75			
DIN Clip On**	DN10	DN15	DN15	DN20	DN20	DN20	DN25	DN25	DN40			
Dim F (mm)	13	19	19	23	23	23	29	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						
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						25

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

HydroWhirl® Orbitors

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_a 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 configurations



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
- Male or female connections

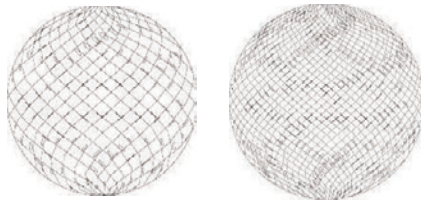
SPRAY CHARACTERISTICS

- 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



Orbitor 2 nozzle spray pattern

Orbitor 4 nozzle spray pattern



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

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

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		
	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)
Pressure (PSI)	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
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		
	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)
Pressure (PSI)	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
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

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

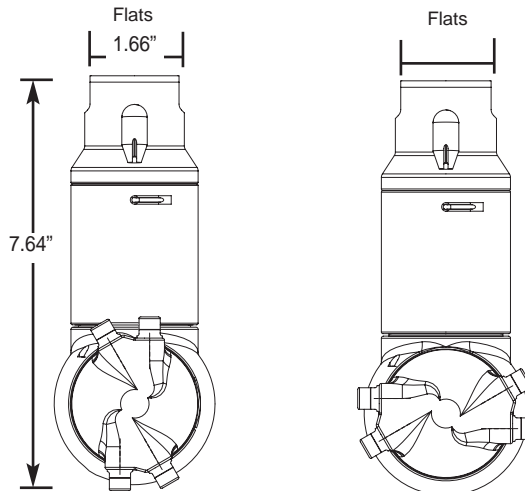
Materials:

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



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		
	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	3.3	6.0	17.8	6.6	5.4	23.7	8.2	4.4	30.6	9.8	3.9
60	13.9	4.9	5.4	20.3	8.2	4.7	26.7	9.8	3.9	34.0	11.5	3.4
75	15.8	6.6	4.8	22.7	9.8	4.1	29.6	11.5	3.4	37.3	13.1	3.0
90	17.6	6.6	4.3	25.1	9.8	3.6	32.3	11.5	3.0	40.6	13.1	2.6
100	18.8	8.2	4.0	26.6	11.5	3.3	34.1	13.1	2.8	42.8	14.8	2.4
115	20.5	8.2	3.6	28.9	11.5	2.9	36.7	13.1	2.4	46.0	14.8	2.1
130	22.2	9.8	3.2	31.2	13.1	2.7	39.1	14.8	2.2	49.2	16.4	1.9
145	23.9	11.5	2.9	33.4	13.1	2.5	41.4	14.8	2.0	52.4	16.4	1.7

TW

Tank Washing

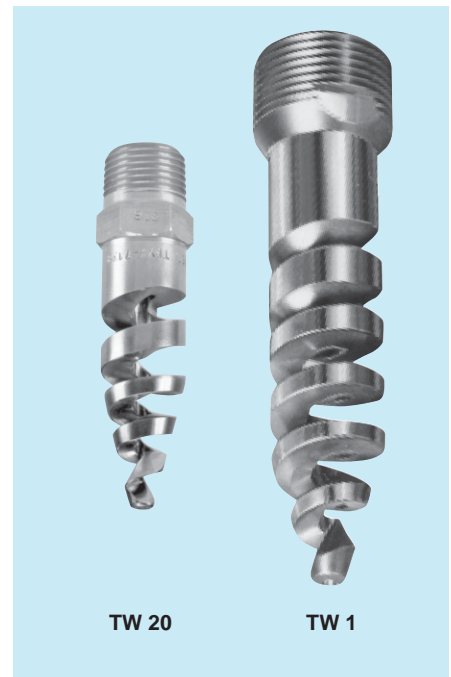
DESIGN FEATURES

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

SPRAY CHARACTERISTICS

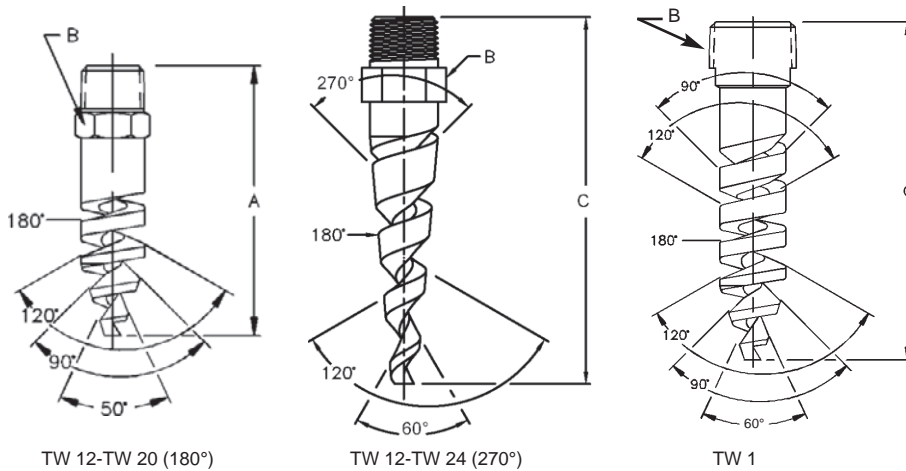
- Easy to maintain
- Unique patterns that spray in opposing directions

Flow rates: 3.0 to 163 gpm



TW 20

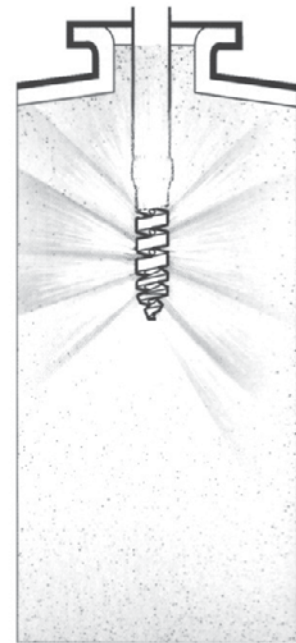
TW 1



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.	A	B	C	
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	

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

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

High-precision machining

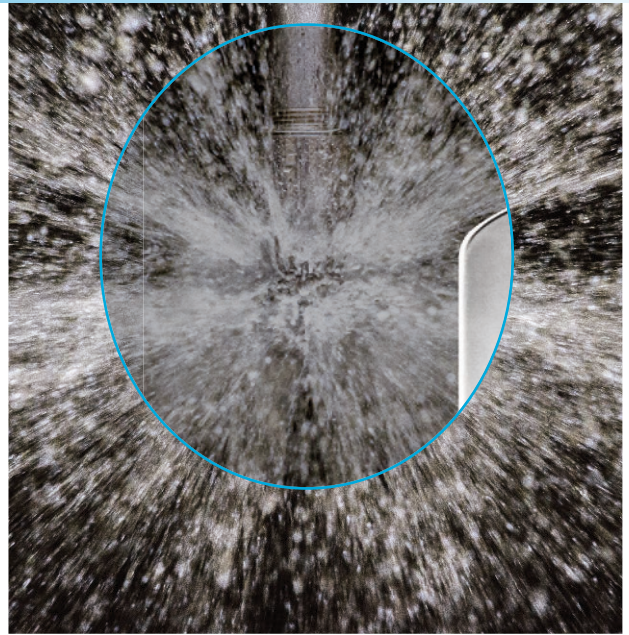
- 316L stainless steel construction for food-grade and sanitary applications
- Laser-welded for durability

Designed with your tank in mind

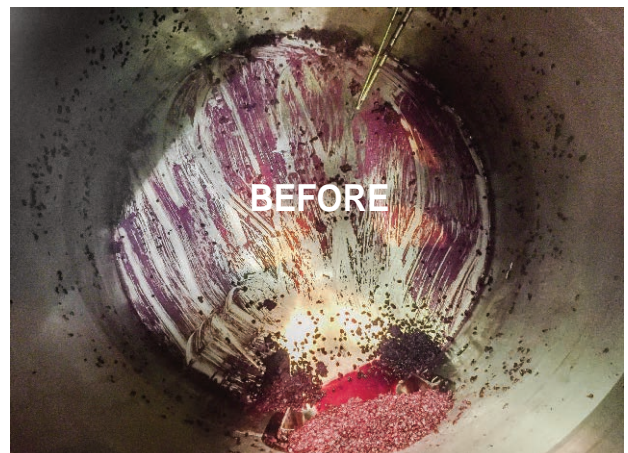
- Available in a variety of connection sizes and types, including threaded, clip-on and welded
- Fits through compact openings: either 2 1/2" (HC-42) or 3" (HC-100) diameter
- Spray Angle: complete 360° coverage for tanks up to 10' in diameter
- Free Passage: allows passage of particles 1/4" in diameter;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

- **Recommended Operating Pressure:** 30 psi
- Low pressure, high flow for a quick, energy-efficient rinse

Visit 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.
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Greenfield, MA 01301

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HydroClaw[®]

Tank Washing - Superior Clog Resistance

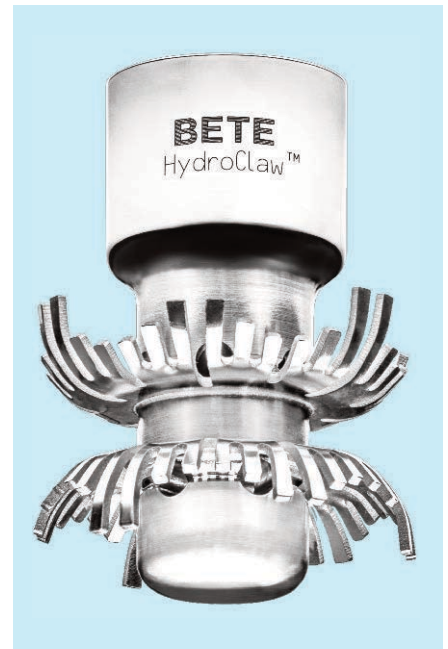
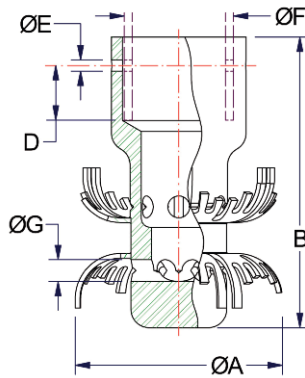
DESIGN FEATURES

- 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-42) 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	
1-1/2" Tube Clip-On	HC-42	35.7	38.9	42.0	44.8	2.38	3.59	0.75	0.16	1.50	0.25	18	8
1" Tube Clip-On												14	
DN20 Tube Clip-On*												15	
3/4" Pipe Clip-On												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





BETE[®]

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