

NEW BETE Hydraulic Nozzles

Since 1950, over 30,000,000 BETE nozzles have sprayed in deep sea, deep space, and everywhere in between.

What Makes BETE an Industry Leader in Spray Technology?

A pioneer and innovator in all areas of spray nozzle engineering, manufacturing, and application solutions, BETE improves spray processes worldwide for numerous markets, including food and beverage, petrochemical, chemical, waste management and pollution control. We manufacture tens of thousands of different products, including misting and fogging nozzles, tank cleaning nozzles, chemical injection nozzles, custom spray lances, fabrications and spraying systems. BETE integrates decades of experience in spray design and applications engineering with a CNC machine shop, foundry, and spray lab that enables in-house product design, manufacturing and testing to ensure the highest quality spray technology.

Why is Selecting the Correct Spray Nozzle Important?

Spray nozzles may be relatively small components of large industrial processes, but incorporating the proper nozzles is critical to achieving peak system performance and efficiency. BETE's extensive catalog of hydraulic nozzles includes full cone, hollow cone, fan, misting, fogging, tank cleaning and automatic spray nozzles. These nozzles come in various sizes, connection types, flow rates, spray angles and materials. Whatever your spraying challenge, BETE has an efficient and effective solution to help optimize your process.

Applications

- Cleaning & Washing
- Dust Suppression
- Humidification
- Tank Cleaning
- Cooling
- Gas Conditioning
- Foam Control
- Vacuum Distillation
- Odor Control
- Chemical Injection
- Fire Protection
- Coating & Lubricating
- Moistening
- Flue Gas Desulfurization (FGD)

Advantages

- Expertly Engineered
- Durable Construction
- High Efficiency
- Reliable Performance
- Save Resources
- Innovative Technology
- Optimize Processes
- Ready for Immediate Shipment

All weights and dimensions are approximate. Spray angle performance varies with pressure. Please contact EXAIR for specific data on critical applications.

Hydraulic Misting & Fogging Nozzles

MicroWhirl® (MW) Misting & Fogging Nozzles



Series: MicroWhirl MW
Connection: 1/8 Male NPT
Spray Angle: 70°
Material: 316 Stainless Steel

MW Models

BETE MicroWhirl† nozzles offer outstanding fine mist or fog with a rugged, pinless design that ensures drip-free performance. They include a 70-micron polypropylene filter. A 200-mesh 316 Stainless Steel filter option is available as an alternative. A safety wire hole is also available for added security. The nozzle operates with a minimum pressure of 100 PSI (7 BAR) and delivers versatile spray performance, producing mist at lower pressures and fog at higher pressures. Droplets are typically small enough that buoyancy is significant compared to gravity, allowing drops to appear to float. In actuality, particles fall very slowly in the absence of upward airflow.

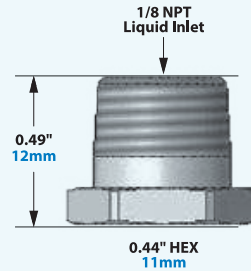
† Patent #7198201

Customers trust BETE's MicroWhirl misting nozzles for the finest hydraulic atomization, especially under critical conditions.

Ideal for cooling, humidification and complete evaporation.

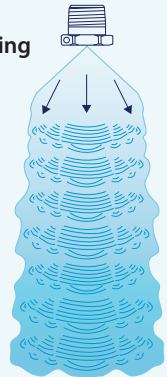


Dimensions



How Swirl Misting Nozzles Work

BETE engineers patented the whirl fine misting nozzle in 2002. Misting and fogging spray nozzles traditionally use either an impingement or air-atomizing design to produce small droplets. Alternatively, whirl misting nozzles convert the fluid's head pressure into kinetic energy within a swirl chamber. The discharged fluid breaks up the droplets from the centrifugal force. MicroWhirl nozzles utilize a vortex to create a fine mist, increasing reliability and performance compared with traditional methods.



BETE
Nozzles

MicroWhirl misting nozzles produce outstanding atomization for humidification, air inlet cooling, dust suppression and more.

MicroWhirl Flow Rates and Dimensions

Pattern: Misting/ Fogging		Spray Angle: 70°		Connection: 1/8 Male NPT		Material: 316 SS					
Male Inlet Connection	Model	K Factor	Flow Rate (GPM @ PSI)								Wt (oz)
			100 PSI	300 PSI	600 PSI	1000 PSI	1500 PSI	2000 PSI	2500 PSI	3000 PSI	
1/8 NPT	6094622	0.00085	0.009	0.015	0.021	0.027	0.033	0.038	0.043	0.047	0.25
	6109975	0.00275	0.028	0.048	0.067	0.087	0.107	0.123	0.138	0.151	
	6149734	0.00693	0.069	0.120	0.170	0.219	0.268	0.310	0.347	0.380	

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

MicroWhirl Flow Rates and Dimensions

Pattern: Misting/ Fogging		Spray Angle: 70°		Connection: 1/8 Male NPT		Material: 316 SS					
Male Inlet Connection	Model	K Factor	Flow Rate (L/min @ BAR)								Wt (g)
			7 BAR	20 BAR	40 BAR	70 BAR	100 BAR	140 BAR	170 BAR	200 BAR	
1/8 NPT	6094622	0.01220	0.032	0.055	0.077	0.102	0.122	0.145	0.160	0.173	7.09
	6109975	0.03960	0.105	0.177	0.251	0.332	0.396	0.469	0.517	0.560	
	6149734	0.09988	0.264	0.447	0.632	0.836	0.999	1.182	1.302	1.413	

Flow Rate L/min = $K \sqrt{BAR}$



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Flat Fan Nozzles

NF Standard Fan Nozzles



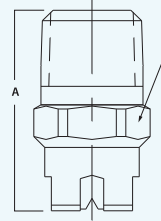
Series: NF
Connections: 1/8 - 3/8 Male NPT
Spray Angles: 30°, 65°, 80°, 120°
Material: Brass

NF Models

The NF fan spray nozzle provides high-impact spray with evenly tapered edges, enabling effective overlapping of sprays for complete coverage. With a durable, one-piece construction and no internal parts, this nozzle is reliable and easy to maintain. Available in various male connection sizes, flow rates, and spray angles, the NF nozzle is the ideal solution for numerous industrial applications including coating, conveyor cleaning, and parts washing. NF flat spray nozzles produce medium to large-sized droplets that form a thin, sheet-like spray pattern.

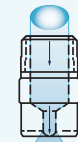
The flat spray pattern optimizes a wide range of applications including surface cleaning, coating, high-impact washing and foam control.

Dimensions and Spray Pattern



How Flat Fan Nozzles Work

As the fluid exits the nozzle's elliptical orifice, it is forced into a thin, flat sheet of fluid, producing a fan-like spray pattern.



NF Flow Rates															Dimensions for Metal Only (in)				
Pattern: Fan		Spray Angles: 30°, 65°, 80° and 120°			Connection: 1/8-3/8 Male NPT		Material: Brass												
Male Inlet Connection	Spray angle				K Factor	Flow Rates (GPM @ PSI)										Equiv Orifice Dia (in)"			
	30°	65°	80°	120°		5 PSI	10 PSI	15 PSI	20 PSI	30 PSI	40 PSI	60 PSI	80 PSI	100 PSI					
1/8 NPT Model	6011359	6017030	6003573	6013268	0.0791	0.18	0.25	0.31	0.35	0.43	0.50	0.61	0.71	0.79	0.057	1/8"	0.88	0.44	1.00
	6011652	6011842	6006147	6013456	0.158	0.35	0.50	0.61	0.71	0.87	1.00	1.22	1.41	1.58	0.080				
	6013109	6011261	6007832	6003609	0.316	0.71	1.00	1.22	1.41	1.73	2.00	2.45	2.83	3.16	0.109				
	6013470	6011672	6008463	6003944	0.474	1.06	1.50	1.84	2.12	2.60	3.00	3.67	4.24	4.74	0.141				
1/4 NPT Model	6039856	6044390	6020398	6027632	0.0791	0.18	0.25	0.31	0.35	0.43	0.50	0.61	0.71	0.79	0.057	1/4"	1.06	0.56	1.50
	6003572	6005653	6009320	6006482	0.158	0.35	0.50	0.61	0.71	0.87	1.00	1.22	1.41	1.58	0.080				
	6020542	6003868	6009566	6005313	0.316	0.71	1.00	1.22	1.41	1.73	2.00	2.45	2.83	3.16	0.109				
	6013112	6008836	6005921	6003113	0.474	1.06	1.50	1.84	2.12	2.60	3.00	3.67	4.24	4.74	0.141				
	6004735	6010893	6009858	6014763	0.632	1.41	2.00	2.45	2.83	3.46	4.00	4.90	5.66	6.32	0.156				
	6013265	6014774	6004072	6010699	0.791	1.77	2.50	3.06	3.54	4.33	5.00	6.12	7.07	7.91	0.172				
	6008562	6007564	6008688	6011539	0.316	0.71	1.00	1.22	1.41	1.73	2.00	2.45	2.83	3.16	0.109				
3/8 NPT Model	6008312	6008326	6008706	6011280	0.474	1.06	1.50	1.84	2.12	2.60	3.00	3.67	4.24	4.74	0.141	3/8"	1.25	0.69	2.00
	6008702	6002612	6003828	6011675	0.632	1.41	2.00	2.45	2.83	3.46	4.00	4.90	5.66	6.32	0.156				
	6004093	6010885	6015429	6008709	0.791	1.77	2.50	3.06	3.54	4.33	5.00	6.12	7.07	7.91	0.172				

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

NF Flow Rates															Dimensions for Metal Only (mm)			
Pattern: Fan Spray Angles: 30°, 65°, 80° and 120° Connection: 1/8-3/8 Male NPT Material: Brass															Pipe Size	A	B	Wt (g) Metal
Male Inlet Connection	Spray angle				K Factor	Flow Rates (L/min @ BAR)												
	30°	65°	80°	120°		0.5 BAR	0.7 BAR	1 BAR	2 BAR	3 BAR	5 BAR	Equiv Orifice Dia (mm)						
1/8 NPT Model	6011359	6017030	6003573	6013268	1.14	0.81	0.95	1.14	1.61	1.97	2.55	1.45	1/8"	22.2	11.1	28.4		
	6011652	6011842	6006147	6013456	2.28	1.61	1.91	2.28	3.22	3.95	5.10	2.03						
	6013109	6011261	6007832	6003609	4.56	3.22	3.81	4.56	6.45	7.89	10.2	2.78						
	6013470	6011672	6008463	6003944	6.84	4.83	5.72	6.84	9.67	11.8	15.3	3.57						
1/4 NPT Model	6039856	6044390	6020398	6027632	1.14	0.81	0.95	1.14	1.61	1.97	2.55	1.45	1/4"	27.0	14.3	42.5		
	6003572	6005653	6009320	6006482	2.28	1.61	1.91	2.28	3.22	3.95	5.10	2.03						
	6020542	6003868	6009566	6005313	4.56	3.22	3.81	4.56	6.45	7.89	10.2	2.78						
	6013112	6008836	6005921	6003113	6.84	4.83	5.72	6.84	9.67	11.8	15.3	3.57						
	6004735	6010893	6009858	6014763	9.12	6.45	7.63	9.12	12.9	15.8	20.4	3.97						
	6013265	6014774	6004072	6010699	11.4	8.06	9.53	11.4	16.1	19.7	25.5	4.37						
	6008562	6007564	6008688	6011539	4.56	3.22	3.81	4.56	6.45	7.89	10.2	2.78						
3/8 NPT Model	6008312	6008326	6008706	6011280	6.84	4.83	5.72	6.84	9.67	11.8	15.3	3.57	3/8"	31.8	17.5	56.7		
	6008702	6002612	6003828	6011675	9.12	6.45	7.63	9.12	12.9	15.8	20.4	3.97						
	6004093	6010885	6015429	6008709	11.4	8.06	9.53	11.4	16.1	19.7	25.5	4.37						

Flow Rate L/min = $K \sqrt{\text{BAR}}$

Full Cone Spiral Nozzles

TF Full Cone Spray Nozzles

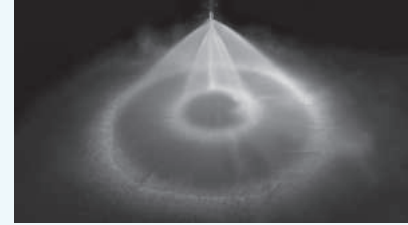
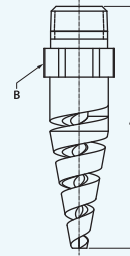


Series: TF
Connections: 1/4 - 1 Male NPT
Spray Angles: 60°, 90°, 120°
Material: Brass

TF Models

BETE is the original inventor of the spiral, also known as a pigtail, corkscrew, or helix nozzle. Its durable, one-piece design with no internal parts delivers clog-resistant performance and high energy efficiency. When compared to whirl-type nozzles of the same flow rate, pressure drop, and angle, TF spirals produce considerably smaller droplet sizes for fine atomization.

Dimensions and Spray Pattern



90°, 120°, 60° nozzles are slightly longer. For dimensions, contact EXAIR.

How Full Cone Spirals Work

The spiral nozzle pattern is created by fluid shearing along the spiral's turns, creating multiple concentric hollow cones. This design produces two to three bands of coarser droplets, each surrounded by wider bands of finer droplets, resulting in full coverage.



BETE
Nozzles

Numerous industries rely on BETE TF full cone spray nozzles for their gas cooling, quenching or chemical injection applications.

Its durable, one-piece design is clog resistant and requires minimal maintenance.

TF Full Cone Flow Rates and Dimensions

Pattern: Full Cone Spray Angles: 60°, 90°, 120° Connection: 1/4 - 1 Male NPT Material: Brass																			
Male Inlet Connection	Available Spray Angles			K Factor	Flow Rate (GPM @ PSI)										Approx Orifice Dia (in)	Approx Free Passage Dia (in)	A	B	Wt (oz) Metal
	60°	90°	120°		5 PSI	10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI						
1/4 NPT Model	6015283	6013583	6013407	0.221	0.495	0.70	0.99	1.21	1.40	1.57	1.71	1.98	2.21	0.09	0.09	1.88	0.56	1.25	
	6009295	6003058	6016084	0.411	0.919	1.30	1.84	2.25	2.60	2.91	3.18	3.68	4.11	0.13	0.13				
	6005350	6013392	6010125	0.632	1.41	2.00	2.83	3.46	4.00	4.47	4.90	5.66	6.32	0.16	0.13				
3/8 NPT Model	6011546	6012770	6012736	0.949	2.12	3.00	4.24	5.20	6.00	6.71	7.35	8.49	9.49	0.19	0.13	1.88	0.69	1.63	
	6015134	6010116	6012832	1.28	2.86	4.05	5.73	7.01	8.10	9.06	9.92	11.5	12.8	0.22					
	6006217	6012073	6005617	1.68	3.75	5.30	7.50	9.18	10.6	11.9	13.0	15.0	16.8	0.25					
	6009079	6011877	6003941	2.61	5.83	8.25	11.7	14.3	16.5	18.4	20.2	23.3	26.1	0.31					
1/2 NPT Model	6007586	6013307	6007059	3.81	8.52	12.1	17	20.9	24.1	26.9	29.5	34.1	38.1	0.38	0.19	2.5	0.88	3.00	
	6002504	6005485	6016180	5.22	11.7	16.5	23.3	28.6	33.0	36.9	40.4	46.7	52.2	0.44					
3/4 NPT Model	6003090	6010373	6013110	6.64	14.8	21.0	29.7	36.4	42.0	47.0	51.4	59.4	66.4	0.50	0.19	2.75	1.13	5.50	
1 NPT Model	6012340	6016360	6016286	10.6	23.7	33.5	47.4	58.0	67.0	74.9	82.1	94.8	106	0.63	0.25	3.63	1.38	8.50	

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

TF Full Cone Flow Rates and Dimensions

Pattern: Full Cone Spray Angles: 60°, 90°, 120° Connection: 1/4 - 1 Male NPT Material: Brass																
Male Inlet Connection	Available Spray Angles			K Factor	Flow Rate (L/min @ BAR)						Approx Orifice Dia (mm)	Approx Free Passage Dia (mm)	A	B	Wt (g) Metal	
	60°	90°	120°		0.5 BAR	0.7 BAR	1 BAR	2 BAR	3 BAR	5 BAR						
1/4 NPT Model	6015283	6013583	6013407	3.19	2.26	2.67	3.19	4.50	5.50	7.10	2.38	2.38	47.6	14.3	35.0	
	6009295	6003058	6016084	5.93	4.19	4.96	5.93	8.4	10.3	13.2	3.18	3.18				
	6005350	6013392	6010125	9.12	6.45	7.63	9.12	12.9	15.8	20.4	3.97	3.18				
3/8 NPT Model	6011546	6012770	6012736	13.7	9.67	11.4	13.7	19.3	23.7	30.6	4.76	3.18	47.6	17.5	46.0	
	6015134	6010116	6012832	18.5	13.1	15.4	18.5	26.1	32.0	41.3	5.66					
	6006217	6012073	6005617	24.2	17.1	20.2	24.2	34.2	41.8	54.0	6.35					
	6009079	6011877	6003941	37.6	26.6	31.5	37.6	53.2	65.1	84.1	7.94					
1/2 NPT Model	6007586	6013307	6007059	54.9	38.8	46.0	54.9	77.7	95.1	123	9.53	4.76	63.5	22.2	85.0	
	6002504	6005485	6016180	75.2	53.2	62.9	75.2	106	130	168	11.1					
3/4 NPT Model	6003090	6010373	6013110	95.7	67.7	80.1	95.7	135	166	214	12.7	4.76	69.9	28.6	156	
1 NPT Model	6012340	6016360	6016286	153	108	128	153	216	264	341	15.9	6.35	92.1	34.9	241	

Flow Rate L/min = $K \sqrt{\text{BAR}}$



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109

Full Cone Nozzles

MaxiPass® (MP) Maximum Free Passage Nozzles



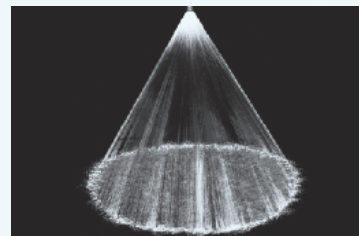
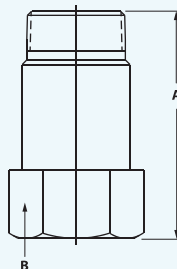
Series: MaxiPass (MP)
Connections: 3/8 - 3/4 Male NPT
Spray Angles: 60°, 90°, 120°
Materials: 316 Stainless Steel
 Polypropylene available
 for specific models
 (90°, 120° Only)

MP Models

The patented† MaxiPass design features maximum free passage for ultimate clog resistance compared to other whirl-type nozzles. This ensures high energy efficiency and reliable performance, even with dirty or lumpy liquids. Unlike conventional X-vane nozzles, the MP is engineered with two unique S-shaped internal vanes to maximize free passage, making this nozzle highly dependable under even the most challenging conditions. MP nozzles achieve atomization by swirling the water internally through its vanes before exiting through the orifice, producing medium to coarse droplet sizes. Its spray pattern is more uniform than that of spiral nozzles, providing consistent coverage across applications.

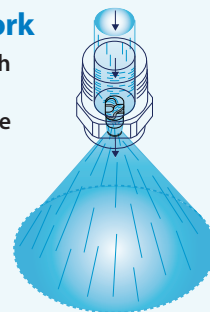
† Patent #4014470

Dimensions and Spray Pattern



How Full Cone Nozzles Work

The full cone axial spray nozzle with internal vanes produces a uniform conical spray pattern with complete coverage. As the liquid passes through the vanes, it is stabilized and evenly distributed before exiting the nozzle's orifice.



The MP is the leading spray solution for process critical applications such as gas scrubbing, cooling, foam control and vacuum distillation.

Alloy MP nozzles are cast in BETE's U.S. foundry, ensuring high-quality, durable construction.

MaxiPass Flow Rates and Dimensions

Pattern: Full Cone		Spray Angles: 60°, 90°, 120°			Connection: 3/8, 1/2, 3/4 NPT		Material: 316 SS, Polypropylene (Specific 90°, 120° Models Only)														
Male Inlet Connection	Material	Available Spray Angles			K Factor	Flow Rate (GPM @ PSI)								Approx Free Passage Dia (in)	Approx Dim (in) Overall Length (Max)			B	Wt (lbs) Metal	Wt (lbs) Polypro	
		60°	90°	120°		3 PSI	5 PSI	7 PSI	10 PSI	15 PSI	20 PSI	30 PSI	40 PSI		A (60°)	A (90°)	A (120°)				
3/8 NPT Model	Polypropylene	--	6182995	6186144	0.416	0.70	0.89	1.04	1.23	1.49	1.70	2.06	2.35	0.125	1.50	1.50	1.50	0.88	0.19	.017	
	316SS	6003212	6002739	6011935	0.661	1.11	1.41	1.65	1.95	2.36	2.70	3.27	3.74	0.156							
3/8 NPT Model	Polypropylene	--	6174330	6181241	0.954	1.60	2.03	2.38	2.82	3.41	3.90	4.72	5.40	0.188	1.88	1.88	1.88	1.00	0.28	.023	
	316SS	6008635	6011682	6016565	1.71	2.87	3.65	4.27	5.05	6.11	7.00	8.47	9.70	0.250							
3/4 NPT Model	316SS	6009757	6008929	6016672	2.54	4.26	5.42	6.35	7.51	9.08	10.4	12.6	14.4	0.312	2.50	2.50	2.50	1.25	0.50	.246	
		6014786	6008945	6010643	3.67	6.15	7.82	9.16	10.8	13.1	15.0	18.1	20.8	0.375							

Flow Rate GPM = K (PSI) 0.47

MaxiPass Flow Rates and Dimensions

Pattern: Full Cone		Spray Angles: 60°, 90°, 120°			Connection: 3/8, 1/2, 3/4 NPT		Material: 316 SS, Polypropylene (Specific 90°, 120° Models Only)											
Male Inlet Connection	Material	Available Spray Angles			K Factor	Flow Rate (L/min @BAR)						Approx Free Passage Dia (mm)	Approx Dim (mm) Overall Length (Max)			B	Wt (kg) Metal	Wt (kg) Polypro
		60°	90°	120°		0.2 BAR	0.3 BAR	0.5 BAR	0.7 BAR	1 BAR	2 BAR		A (60°)	A (90°)	A (120°)			
3/8 NPT Model	Polypropylene	--	6182995	6186144	5.53	2.6	3.14	3.99	4.68	5.53	7.66	3.18	38.1	38.1	38.1	22.2	0.09	.008
	316SS	6003212	6002739	6011935	8.79	4.13	4.99	6.35	7.43	8.79	12.2	3.97						
3/8 NPT Model	Polypropylene	--	6174330	6181241	12.7	5.96	7.21	9.17	10.7	12.7	17.6	4.76	47.6	47.6	47.6	25.4	0.13	.010
	316SS	6008635	6011682	6016565	22.7	10.7	12.9	16.4	19.2	22.7	31.4	6.35						
3/4 NPT Model	316SS	6009757	6008929	6016672	33.8	15.9	19.2	24.4	28.6	33.8	46.8	7.94	63.5	60.3	63.5	31.8	0.23	.112
		6014786	6008945	6010643	48.8	22.9	27.7	35.2	41.3	48.8	67.6	9.53						

Flow Rate L/min = K (BAR) 0.47

Full Cone Nozzles

WL Full Cone Nozzle

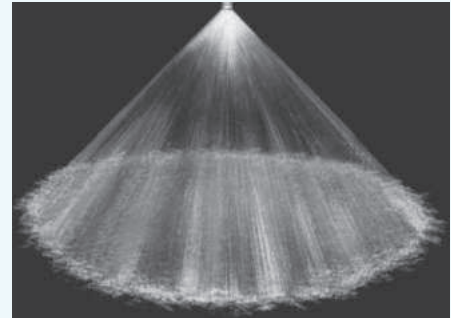
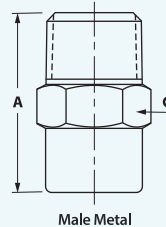


Series: WL
Connections: 1/8 - 3/8 Male NPT
Spray Angles: 60° (3/8 NPT only), 90°, 120°
Material: Brass

WL Models

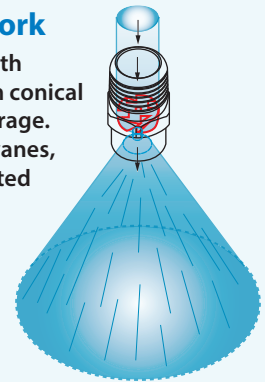
BETE's WL spray nozzle uses a whirl plate design to ensure uniform coverage at a low flow rate. Atomization occurs as water is spun within the nozzle before exiting through the orifice, producing medium to coarse droplets. This design produces a more uniform spray pattern compared to spiral nozzles, making it ideal for applications that demand consistent and precise coverage. These applications include washing, cooling, distribution and foam control.

Dimensions and Spray Pattern



How Full Cone Nozzles Work

The full cone axial spray nozzle with internal vanes produces a uniform conical spray pattern with complete coverage. As the liquid passes through the vanes, it is stabilized and evenly distributed before exiting the nozzle's orifice.



BETE
Nozzles

Great for lower flow applications requiring medium to coarse spray atomization and uniform coverage.

For higher flow rates, please see the MaxiPass® full cone nozzle on page 110.

WL Flow Rates and Dimensions											Dimensions for Metal Only (in)				
Pattern: Full Cone	Spray Angles: 60°, 90°, 120°			Connection: 1/8- 3/8 Male NPT		Material: Brass									
Male Inlet Connection	Available Spray Angles			K Factor	Flow Rate (GPM @ PSI)							Approx Orifice Dia (in)	A	C	Wt (oz) Metal
	60°	90°	120°		10 PSI	20 PSI	30 PSI	40 PSI	60 PSI	80 PSI	100 PSI				
1/8 NPT Model	--	6006349	6002104	0.044	0.13	0.18	0.22	0.25	0.30	0.35	0.38	0.043	0.88	0.44	1.00
	--	6004759	6005880	0.088	0.26	0.36	0.44	0.50	0.60	0.69	0.77	0.055			
	--	6014113	6006821	0.132	0.39	0.54	0.66	0.75	0.91	1.04	1.15	0.072			
1/4 NPT Model	--	6000279	6009470	0.177	0.52	0.72	0.87	1.00	1.21	1.39	1.54	0.082	1.06	0.56	1.50
	--	6000516	6004357	0.265	0.78	1.08	1.31	1.50	1.81	2.08	2.31	0.109			
3/8 NPT Model	--	6016721	6014032	0.353	1.04	1.44	1.75	2.00	2.42	2.77	3.08	0.125	1.25	0.69	2.00
	6019124	6012173	6008750	0.530	1.56	2.17	2.62	3.00	3.63	4.16	4.61	0.156			
	6036152	6011559	6001862	0.706	2.08	2.89	3.49	4.00	4.84	5.54	6.15	0.188			

Flow Rate GPM = K (PSI) 0.47

WL Flow Rates and Dimensions											Dimensions for Metal Only (mm)			
Pattern: Full Cone Spray Angles: 60°, 90°, 120° Connection: 1/8- 3/8 Male NPT Material: Brass														
Male Inlet Connection	Available Angles			K Factor	Flow Rate (L/min @ BAR)						Approx Orifice Dia (mm)	A	C	Wt (g) Metal
	60°	90°	120°		0.7 BAR	1 BAR	2 BAR	3 BAR	5 BAR	10 BAR				
1/8 NPT Model	--	6006349	6002104	0.587	0.497	0.587	0.814	0.984	1.25	1.73	1.09	22.2	11.1	28.4
	--	6004759	6005880	1.17	0.993	1.17	1.63	1.97	2.50	3.47	1.40			
	--	6014113	6006821	1.76	1.49	1.76	2.44	2.95	3.75	5.20	1.83			
1/4 NPT Model	--	6000279	6009470	2.35	1.99	2.35	3.25	3.94	5.01	6.93	2.08	27.0	14.2	45.5
	--	6000516	6004357	3.52	2.98	3.52	4.88	5.91	7.51	10.4	2.77			
	--	6016721	6014032	4.70	3.97	4.70	6.51	7.87	10.0	13.9	3.18			
3/8 NPT Model	6019124	6012173	6008750	7.05	5.96	7.05	9.76	11.8	15.0	20.8	3.96	31.8	17.5	56.7
	6036152	6011559	6001862	9.40	7.95	9.40	13.0	15.7	20.0	27.7	4.78			

Flow Rate L/min = K (BAR) 0.47



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Full Cone Nozzles

MaxiPass® (MP) Maximum Free Passage Nozzles



Series: MaxiPass (MP)

Connections: 3/8 - 3/4 Male NPT

Spray Angles: 60°, 90°, 120°

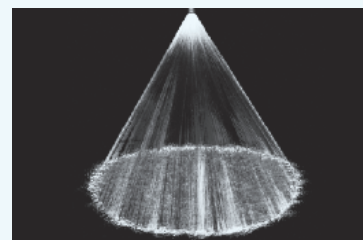
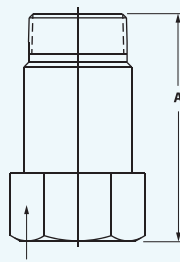
Materials: 316 Stainless Steel
Polypropylene available for specific models (90°, 120° Only)

MP Models

The patented† MaxiPass design features maximum free passage for ultimate clog resistance compared to other whirl-type nozzles. This ensures high energy efficiency and reliable performance, even with dirty or lumpy liquids. Unlike conventional X-vane nozzles, the MP is engineered with two unique S-shaped internal vanes to maximize free passage, making this nozzle highly dependable under even the most challenging conditions. MP nozzles achieve atomization by swirling the water internally through its vanes before exiting through the orifice, producing medium to coarse droplet sizes. Its spray pattern is more uniform than that of spiral nozzles, providing consistent coverage across applications.

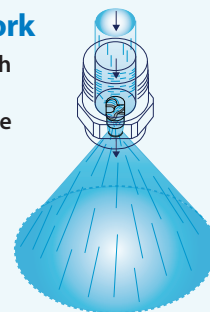
† Patent #4014470

Dimensions and Spray Pattern



How Full Cone Nozzles Work

The full cone axial spray nozzle with internal vanes produces a uniform conical spray pattern with complete coverage. As the liquid passes through the vanes, it is stabilized and evenly distributed before exiting the nozzle's orifice.



The MP is the leading spray solution for process critical applications such as gas scrubbing, cooling, foam control and vacuum distillation.

Alloy MP nozzles are cast in BETE's U.S. foundry, ensuring high-quality, durable construction.

MaxiPass Flow Rates and Dimensions

Pattern: Full Cone		Spray Angles: 60°, 90°, 120°			Connection: 3/8, 1/2, 3/4 NPT		Material: 316 SS, Polypropylene (Specific 90°, 120° Models Only)												Approx Dim (in) Overall Length (Max)			B	Wt (lbs) Metal	Wt (lbs) Polypropylene
Male Inlet Connection	Material	Available Spray Angles			K Factor	Flow Rate (GPM @ PSI)										Approx Free Passage Dia (in)	A			B	Wt (lbs) Metal	Wt (lbs) Polypropylene		
		60°	90°	120°		3 PSI	5 PSI	7 PSI	10 PSI	15 PSI	20 PSI	30 PSI	40 PSI	A (60°)	A (90°)		A (120°)							
3/8 NPT Model	Polypropylene	--	6182995	6186144	0.416	0.70	0.89	1.04	1.23	1.49	1.70	2.06	2.35	0.125	1.50	1.50	1.50	0.88	0.19	.017				
	316SS	6003212	6002739	6011935	0.661	1.11	1.41	1.65	1.95	2.36	2.70	3.27	3.74	0.156										
1/2 NPT Model	Polypropylene	--	6164563	6185953	0.954	1.60	2.03	2.38	2.82	3.41	3.90	4.72	5.40	0.188	1.88	1.88	1.88	1.00	0.28	.023				
	316SS	6006652	6014543	6015833	1.71	2.87	3.65	4.27	5.05	6.11	7.00	8.47	9.70	0.250										
3/4 NPT Model	316SS	6009757	6008929	6016672	2.54	4.26	5.42	6.35	7.51	9.08	10.4	12.6	14.4	0.312	2.50	2.50	2.50	1.25	0.50	.246				
		6014786	6008945	6010643	3.67	6.15	7.82	9.16	10.8	13.1	15.0	18.1	20.8	0.375										

Flow Rate GPM = K (PSI) 0.47

MaxiPass Flow Rates and Dimensions

Pattern: Full Cone		Spray Angles: 60°, 90°, 120°			Connection: 3/8, 1/2, 3/4 NPT		Material: 316 SS, Polypropylene (Specific 90°, 120° Models Only)											
Male Inlet Connection	Material	Available Spray Angles			K Factor	Flow Rate (L/min @BAR)						Approx Free Passage Dia (mm)	Approx Dim (mm) Overall Length (Max)			B	Wt (kg) Metal	Wt (kg) Polypropylene
		60°	90°	120°		0.2 BAR	0.3 BAR	0.5 BAR	0.7 BAR	1 BAR	2 BAR		A (60°)	A (90°)	A (120°)			
3/8 NPT Model	Polypropylene	--	6182995	6186144	5.53	2.6	3.14	3.99	4.68	5.53	7.66	3.18	38.1	38.1	38.1	22.2	0.09	.008
	316SS	6003212	6002739	6011935	8.79	4.13	4.99	6.35	7.43	8.79	12.2	3.97						
1/2 NPT Model	Polypropylene	--	6164563	6185953	12.7	5.96	7.21	9.17	10.7	12.7	17.6	4.76	47.6	47.6	47.6	25.4	0.13	.010
	316SS	6006652	6014543	6015833	22.7	10.7	12.9	16.4	19.2	22.7	31.4	6.35						
3/4 NPT Model	316SS	6009757	6008929	6016672	33.8	15.9	19.2	24.4	28.6	33.8	46.8	7.94	63.5	60.3	63.5	31.8	0.23	.112
		6014786	6008945	6010643	48.8	22.9	27.7	35.2	41.3	48.8	67.6	9.53						

Flow Rate L/min = K (BAR) 0.47

Rotating Tank Cleaning Nozzles

HydroWhirl® Stinger (HWS2) & HydroWhirl® Mini (HWM)



Series: HydroWhirl Stinger (HWS)
Materials: 316L Stainless Steel,
Ceramic Bearings



Series: HydroWhirl Mini (HWM)
Materials: 316L Stainless Steel,
PEEK Slide-Bearing

BETE's rotating tank washing nozzles deliver up to 40% water savings compared to traditional static spray balls.

Rotational tank cleaning devices offer precise and reliable cleaning to prevent batch contamination.

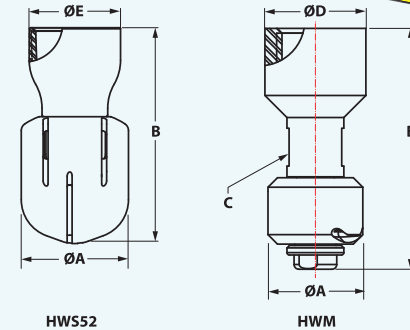
HWS Models

This compact, rotating tank cleaning nozzle is made from FDA-compliant 316L Stainless Steel and has a 32 Ra surface finish, making it ideal for many sanitary applications. The HWS2's patent-pending, no-weld design features Zirconia ceramic bearings for extended service life and extreme chemical resistance. Suitable for small to medium-sized tanks, it produces vigorous spray action with complete 360° spray coverage.

HWM Models

A fluid-driven, self-flushing compact rotary tank cleaning nozzle made from FDA-compliant 316L Stainless Steel with PEEK slide bearings for greater longevity and minimal maintenance. Suitable for small tanks up to 6.5 ft (2 m) in diameter, this compact nozzle creates vigorous spray action with complete 360° spray coverage.

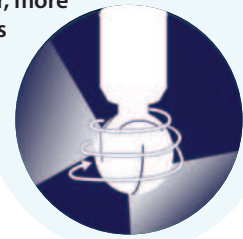
Dimensions



DOWNLOAD drawings at EXAIR.com

What are the Benefits of Reactionary Force Tank Cleaning Nozzles?

Rotating tank cleaning nozzles generate rotation using the force of the cleaning fluid. They provide more mechanical force than traditional static spray balls, resulting in faster, more effective cleaning. This leads to significant resource savings and increased production.



BETE
Nozzles

HydroWhirl® Stinger (HWS) Flow Rates and Coverage

Pattern: Tank Washing		Spray Angle: 360°		Material: 316L Stainless Steel Body, Ceramic Bearings					
Female Inlet Connection	Model	Spray Angle	Flow Rate (GPM) @ Differential Pressure (PSI)						Coverage Dia @ 40 PSI (ft)
			10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	
1/8 FNPT Model	6212052	360°	1.09	1.51	1.83	2.10	2.33	2.54	2
	6212051		2.05	2.86	3.48	4.00	4.46	4.87	7
3/8 FNPT Model	6211903		4.94	7.03	8.64	10.0	11.2	12.3	8
	6211905		8.59	12.1	14.8	17.0	19.0	20.8	10
1/2 FNPT Model	6211907		10.2	14.3	17.4	20.0	22.3	24.3	10
	6211902		12.9	18.3	22.5	26.0	29.1	31.9	10

HydroWhirl® Stinger (HWS) Flow Rates and Coverage

Pattern: Tank Washing		Spray Angle: 360°		Material: 316L Stainless Steel Body, Ceramic Bearings					
Female Inlet Connection	Model	Spray Angle	Flow Rate (L/min) @ Differential Pressure (BAR)						Coverage Dia @ 2 BAR (m)
			0.7 BAR	1 BAR	2 BAR	3 BAR	4 BAR	Max Free Passage (mm)	
1/8 FNPT Model	6212052	360°	4.15	4.92	6.83	8.27	9.48	0.64	0.6
	6212051		7.80	9.27	13.0	15.8	18.1	0.99	2
3/8 FNPT Model	6211903		18.8	22.6	32.1	39.5	45.7	0.61	2
	6211905		32.8	39.1	54.9	67.1	77.3	2.00	3
1/2 FNPT Model	6211907		39.0	46.3	64.8	78.9	90.6	0.99	3
	6211902		49.0	58.8	83.6	103	119	1.63	3

Flow Rate L/min = $K \sqrt{\text{BAR}}$

HydroWhirl® Mini (HWM) Flow Rates and Coverage

Pattern: Tank Washing		Spray Angle: 360°		Material: 316L Stainless Steel Body, PEEK Slide-Bearings					
Female Inlet Connection	Model	Spray Angle	Flow Rate (GPM) @ Differential Pressure (PSI)						Coverage Dia @ 40 PSI (in)
			10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	
3/8 FNPT Model	6208384	360°	3.64	5.22	6.45	7.50	8.43	9.27	6

HydroWhirl® Mini (HWM) Flow Rates and Coverage

Pattern: Tank Washing		Spray Angle: 360°		Material: 316L Stainless Steel Body, PEEK Slide-Bearings					
Female Inlet Connection	Model	Spray Angle	Flow Rate (L/min) @ Differential Pressure (BAR)						Coverage Dia @ 3 BAR (m)
			0.7 BAR	1 BAR	2 BAR	3 BAR	4 BAR	Max Free Passage (mm)	
3/8 FNPT Model	6208384	360°	13.9	16.7	24.0	29.7	34.5	1.52	2

Flow Rate L/min = $K \sqrt{\text{BAR}}$

Dimensions for Metal Only (in)

Pipe Size	A	B	E	Wt (oz)	Min Tank Entry Dia
1/8 FNPT	0.60	1.25	0.50	1.00	0.60
3/8 FNPT	0.85	1.81	0.75	1.41	0.85
1/2 FNPT	1.35	2.38	0.95	4.73	1.35

Dimensions for Metal Only (mm)

Pipe Size	A	B	E	Wt (g)	Min Tank Entry Dia
1/8 FNPT	15.2	31.7	12.8	28.3	15.2
3/8 FNPT	21.6	45.2	19.1	40.0	21.6
1/2 FNPT	34.3	60.3	24.1	134	34.3

Dimensions for Metal Only (in)

Pipe Size	A	B	C	D	Wt (oz)
3/8 FNPT	0.81	2.00	0.44	0.70	2.60

Dimensions for Metal Only (mm)

Pipe Size	A	B	C	D	Wt (g)
3/8 FNPT	20.3	50.8	12.7	17.8	73.7

Rotating Tank Cleaning Nozzles

HydroWhirl® Poseidon (HWP) & HydroWhirl® Disc (HWD)



Series: HydroWhirl Poseidon (HWP)
Material: PTFE, 316L Stainless Steel Retaining Clip



Series: HydroWhirl Disc (HWD)
Materials: 316L Stainless Steel, PTFE Slide Bearing

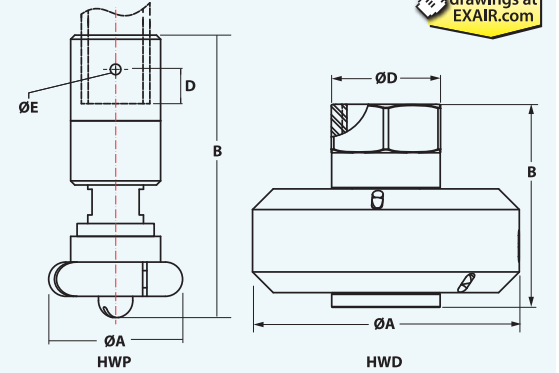
HWP Models

Manufactured from FDA-compliant, corrosion-resistant PTFE, the HWP rotating spray nozzle is highly versatile, making it ideal for Clean-In-Place (CIP) applications in the food and beverage industry and for use in harsh chemical processing environments. Its slow-spinning design delivers longer spray dwell times on target surfaces, resulting in greater cleaning impact.

HWD Models

BETE's HWD spray nozzle is a powerful, fully submersible rotating tank cleaner designed for cleaning small to medium-sized tanks. This rotary head is fluid-driven and self-flushing for minimal maintenance. Its 360° spray pattern produces high-impact washing with consistent repetition to clean the tank effectively and efficiently.

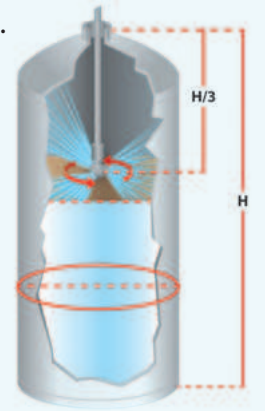
Dimensions



Guideline for nozzle placement:

(H/3) Nozzle =
1/3 Overall Tank Height (H).

Ideal nozzle placement is approximately 1/3 the height from the top of the tank.



The HWP stands out as one of the only rotary tank cleaners on the market constructed of 100% PTFE. PTFE is extremely corrosion-resistant and has one of the lowest friction coefficients of any material.

The unique HWD can be completely submerged in the tank and effectively cleans small to medium-sized tanks.

HydroWhirl Poseidon (HWP) Flow Rates and Dimensions

Pattern: Tank Washing		Spray Angle: 360°	Material: PTFE Nozzle, 316L Stainless Steel Retaining Clip						Dimensions (in)				Wt (oz)	Coverage Dia (ft) @ 40 PSI
Connection Type	Model	Spray Angle	Flow Rate (GPM @ PSI)						A	B	D MAX	E		
1/2 FNPT	6174366	360°	10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	1.68	3.94	0.50	0.09	3	9
1 Tube Clip-On	6182138	360°	10.7	15.2	18.6	21.5	24.0	26.3	1.95	4.12	0.50	0.16	4	14

HydroWhirl Poseidon (HWP) Flow Rates and Dimensions

Pattern: Tank Washing		Spray Angle: 360°	Material: PTFE Nozzle, 316L Stainless Steel Retaining Clip						Dimensions (mm)				Wt (g)	Coverage Dia (m) @ 2.8 BAR
Connection Type	Model	Spray Angle	Flow Rate (L/min @ BAR)						A	B	D MAX	E		
1/2 FNPT	6174366	360°	0.5 BAR	1 BAR	1.5 BAR	2 BAR	3 BAR	4 BAR	42.7	100.1	12.7	2.4	85.0	2.7
1 Tube Clip-On	6182138	360°	34.6	49.0	60.0	69.3	84.9	98.0	49.5	104.6	12.7	4.1	113	4.3

NOTE: Flow rates represent threaded connections with a 360° spray angle. Flow rates may vary slightly for clip-on connections.

HydroWhirl® Disk (HWD) Flow Rates and Coverage

Pattern: Tank Washing Spray Angle: 360° Material: 316L Stainless Steel Body, PEEK Slide-Bearing											Dimensions (in)				
Female Inlet Connection	Model	Spray Angle	Flow Rate (GPM) @ Differential Pressure (PSI)						Max Free Passage (in)	Coverage Dia @ 40 PSI (ft)	Pipe Size	A	B	D	Wt (oz)
			10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI							
1 FNPT	6211162	360°	25.3	35.5	43.4	50.0	55.8	61.1	0.13	11	1 FNPT	3.88	2.94	1.56	41

HydroWhirl® Disk (HWD) Flow Rates and Coverage

Pattern: Tank Washing Spray Angle: 360° Material: 316L Stainless Steel Body, PEEK Slide-Bearing										Dimensions (mm)				
Female Inlet Connection	Model	Spray Angle	Flow Rate (L/min) @ Differential Pressure (BAR)					Max Free Passage (mm)	Coverage Dia @ 2 BAR (m)	Pipe Size	A	B	D	Wt (g)
			0.7 BAR	1 BAR	2 BAR	3 BAR	4 BAR							
1 FNPT	6211162	360°	96.3	115	162	198	227	3.30	3	1 FNPT	98.4	74.8	40.6	1162