BETE®
PERFORMANCE SPRAY ENGINEERING

TURBOMIX® EDUCTOR NOZZLE

IMPROVE YOUR MIXING AND AGITATING PERFORMANCE WITH BETE TURBOMIX EDUCTOR NOZZLES

BETE TurboMix eductors provide a cost-effective and efficient solution for circulating and mixing liquids in closed and open tanks. With no moving parts, these eductors are inherently resistant to clogging and require minimal maintenance. Many applications that require the continuous mixing of immiscible liquids or the suspension of solids can achieve this with just a pump and submerged spray nozzles, which significantly increases system complexity, capital costs, and maintenance requirements.

TurboMix eductor nozzles are designed to reduce the settling of suspended solids, improve circulation, maintain uniform liquid characteristics, mix chemicals, and move solids along the bottom of a tank. The TurboMix offers a lightweight and inexpensive alternative to traditional mechanical mixing methods.

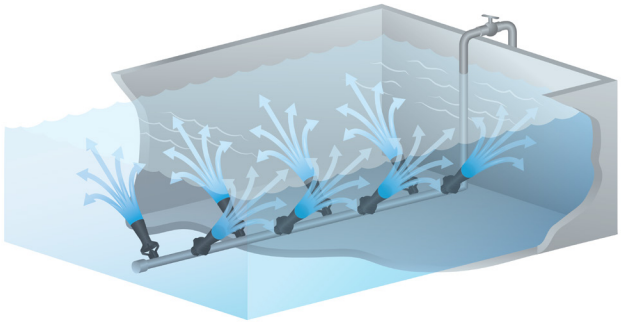
DISCOVER THE VERSATILITY OF TURBOMIX

- **Aerobic and anaerobic digesters**
- **Avoiding bacteria growth or preventing thermal stratification**
- **Sweeping sludge and sediment from tank bottoms**
- **Blending ethanol and biodiesel**
- **Particulate and solid suspension or steam and air injection**
- **Homogenizing tank contents and proper chemical/biological reactions when pumping/draining**
- **Open tank heating for cooking grains, mash, starch, heating, as well as circulating and mixing**
- **Plating, phosphating, paint, anodizing, agricultural fertilizers and chemicals, pulp, slurries, electrocoating, and pretreatment**

LIGHTWEIGHT AND INEXPENSIVE SOLUTION TO TRADITIONAL MECHANICAL MIXING METHODS

DESIGN FEATURES

- **No moving parts**
- **Clog-resistant**
- **Minimal maintenance**
- **Volume of discharge liquid is 3-5 times greater than the motive liquid pumped**



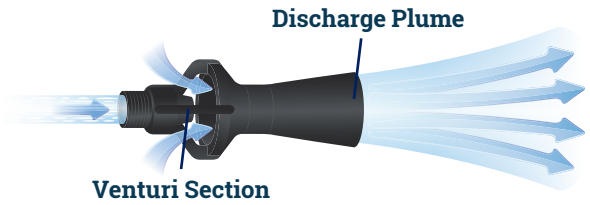
HOW THE TURBOMIX WORKS

The TurboMix eductor mixing nozzle is completely submerged below the liquid inside the tank and operates based on the simple premise that when velocity increases, pressure decreases. They are designed to take the velocity of the fluid pumped into the nozzle and convert it into a low-pressure zone that induces surrounding liquid in the tank to enter the nozzle. In this fashion, the pumped fluid is effectively mixed with the tank contents, and the amount of fluid that exits the nozzle is three to five times the amount of fluid pumped. This multiplier effect allows greater mixing efficiency while using a smaller pumping capacity.

Even after liquids are combined, mixing nozzles can agitate the combined fluid. For instance, if the mixture has many lighter or heavier solids than the liquid, agitation prevents them from floating or settling. The same is true for liquids of two different densities or oil and water-based compounds mixtures. Uniform liquids can stagnate, fostering bacteria growth and stratifying by temperature. Agitating keeps the solids suspended evenly while also preventing bacterial growth via mixing.

DISCHARGE PLUME

The plume is cone-shaped, diverging from the TurboMix at an angle of approximately 11º. To determine the approximate length of the discharge plume, multiply the pressure drop across the TurboMix in PSI (kPa/23) x 1 foot (1 meter). Reduce this estimate by 50% when sweeping solids across a tank bottom.



MATERIALS

The TurboMix is available in a wide variety of materials to suit any application. For excellent corrosion resistance choose glass-filled polypropylene. Where metal alloy material is required, choose from brass, carbon steel, and 316 stainless steel. Other materials are also available upon request.

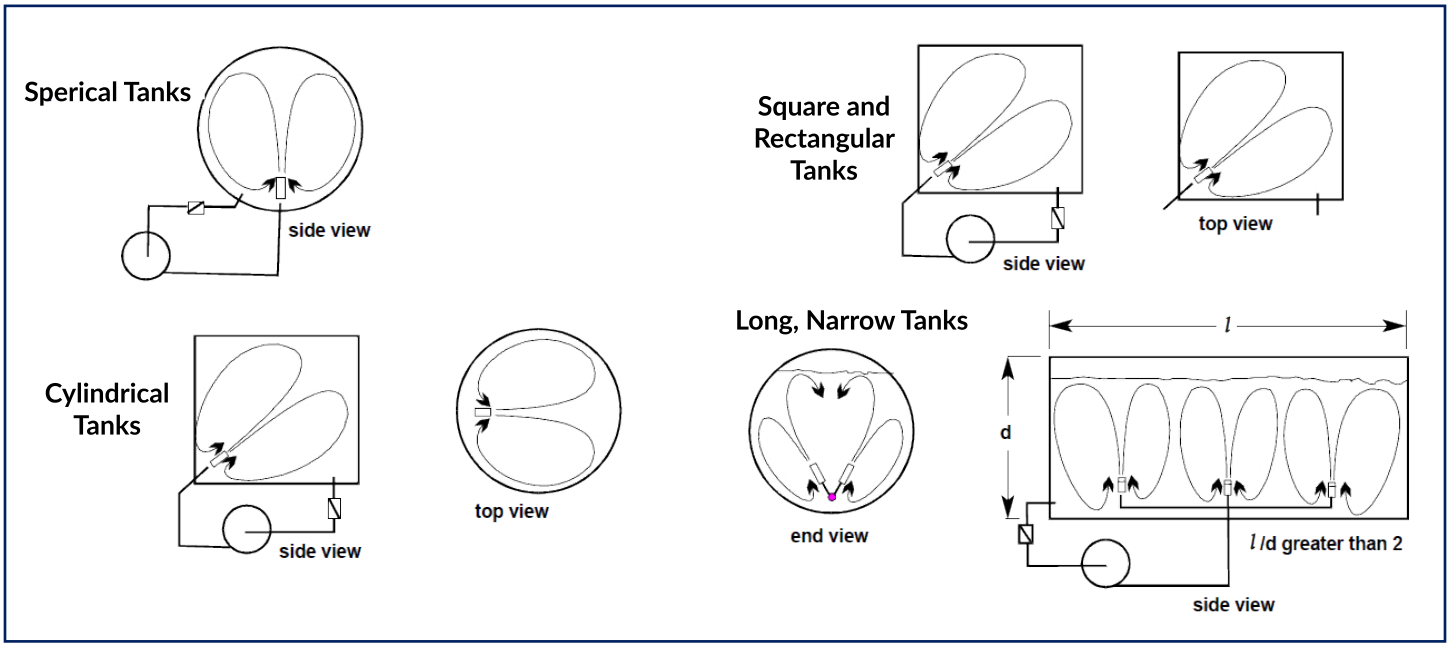
The approximate temperature limits of various materials are: glass-filled polypropylene 170°F (77°C), brass 755°F (402°C), carbon steel 450°F (232°C) and 316 stainless steel 800°F (427°C).

POSITIONING THE TURBOMIX

To agitate liquids or liquids with suspended solids, position the TurboMix at the bottom of one side of the tank and direct the plume upward toward the opposite side of the tank, aiming at the highest liquid level. To sweep solids along the tank bottom, direct the TurboMix plume downward at a 10°-20° angle, using enough units to cover the bottom surface completely. For some applications, directing the plume toward the pump inlet is useful.

BETE swivel joints may be used to aim the TurboMix more accurately. Refer to the chart below for placement suggestions in various tank shapes.

EDUCTOR PLACEMENT AND ELEVATION VIEWS FOR SPHERICAL, CYLINDRICAL, AND SQUARE TANKS



TurboMix®

TurboMix® Eductor Mixing Nozzle

Metal

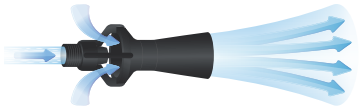
DESIGN FEATURES

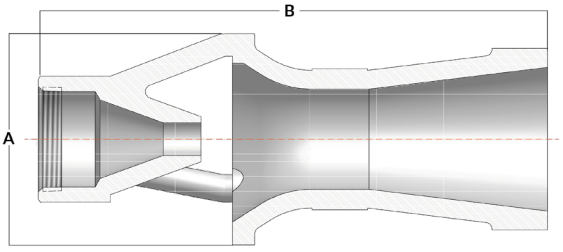
- Effective, economical way to circulate liquids in closed or open tanks
- No moving parts
- Inherently clog resistant
- Requires minimal maintenance
- Nozzle operation creates multiplying effect on fluid flow
- The volume of discharge liquid will be 3-5 times greater than the motive liquid pumped

SPRAY CHARACTERISTICS

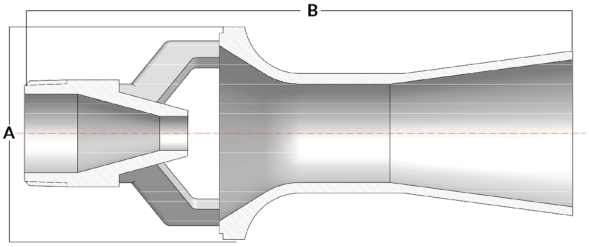
- Cone-shaped plume

Flow rates: 26.7 to 12000 LPM (motive)





Metal



Plastic

TURBOMIX® FLOW RATES & DIMENSIONS

TurboMix in Molded Plastic

NPT or BSP Connection Size		TurboMix Number	K Factor	Motive Flow Rate (LPM) @ Differential Pressure (bar)							Dimensions (mm.)		Wt. (kg.)
				0.7 bar	1 bar	1.5 bar	2 bar	2.5 bar	3 bar	3.5 bar	A	B	
Male	3/8"	TM73	33.2	27.8	33.2	40.7	47	52.5	57.6	62.2	54	114	0.03
	1/2"	TM120	48.8	40.8	48.8	59.8	69	77.2	84.5	91.3	64	165	0.04
	3/4"	TM137	62.4	52.2	62.4	76.4	88.2	98.6	108	117	73	162	0.06
	1"	TM240	109	90.8	108	133	153	172	188	203	89	241	0.15
	1 1/2"	TM340	155	130	155	190	219	245	269	290	114	248	0.21

Standard Material: Glass-filled Polypropylene. *bar = supply pressure at the TurboMix minus the pressure in the tank

TurboMix in Metal

NPT or BSP Connection Size		TurboMix Number	K Factor	Motive Flow Rate (LPM) @ Differential Pressure (bar)							Dimensions (mm.)		Wt. (kg.)
				0.7 bar	1 bar	1.5 bar	2 bar	3 bar	5 bar	7 bar	A	B	
Male	3/8"	TM70	31.9	26.7	31.9	39.1	45.1	55.3	71.4	84.4	43	108	0.23
	1/2"	TM110	50.1	41.9	50.1	61.3	70.8	87.0	112	132	55	133	0.34
	3/4"	TM150	68.4	57.2	68.4	83.7	96.7	118	153	181	67	159	0.68
	1"	TM230	105	87.7	105	128	148	182	234	277	83	200	1.25
Female	1 1/2"	TM320	146	122	146	179	206	253	326	386	97	233	2.95
	2"	TM620	282	236	282	345	399	489	631	746	121	286	5.67
	3"	TM1500	684	572	684	837	967	1180	1530	1810	146	492	18.1
150# Flange	4"	TM2510	1130	950	1130	1390	1610	1970	2540	3000	213	864	18.1
	6"	TM6010	2720	2270	2720	3330	3840	4710	6080	7190	321	1320	54.4
	8"	TM10050	4550	3800	4550	5570	6430	7870	10200	12000	416	1730	147

Standard Material: Brass, Carbon Steel, 316SS

Flow Rate (LPM) = $K\sqrt{bar}$ *bar = supply pressure at the TurboMix minus the pressure in the tank

Performance varies with pressure. Contact BETE for specific data on critical applications.