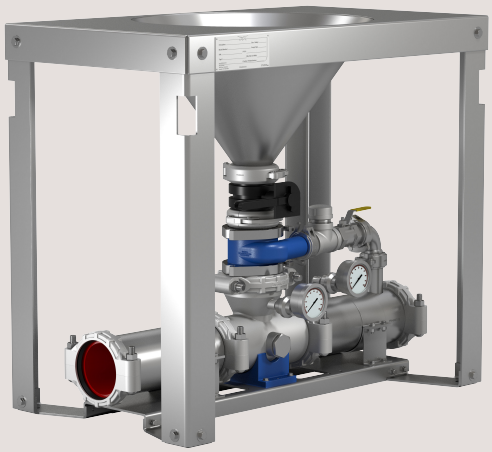
Alfa Laval Vortex Shear-Mixer Tier 3

Advanced Slurry Mixing Eductor



Introduction

Mixing of liquid and powder, or slurry mixing, is a necessary process for many applications. Effective slurry mixing significantly impacts operational safety, speed, and overall cost. However, the perceived simplicity of the process often leads to poor, unsafe slurry mixing practices and the use of outdated or improper equipment. Venturi eductors, or slurry eductors as they are commonly referred to, are relatively simple devices that are installed directly into motive liquid flow lines. They have been employed in numerous applications over the years as an extremely cost effective means of mixing slurries. They have no moving parts or motors, and passively convert motive flow pressure into vacuum, inducing powdered additives directly into the motive fluid. However, they are not free from issues such as plugging, sensitivity to recirculation of solid containing slurries, and inadequate powder dispersion which disqualifies them for use in applications where continuous powder flow, batch recirculation, and slurry homogeneity are critical. The Alfa Laval Vortex Shear-Mixer is an advanced style of venturi eductor that provides all of the functional simplicity of its predecessor, but overcomes multiple issues that inhibit the traditional venturi eductor.

Applications

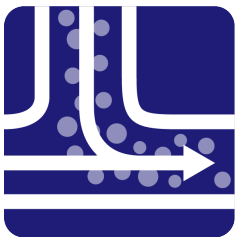
The Alfa Laval Vortex Shear-Mixer is a high-performance venturi slurry eductor uniquely designed to operate in demanding slurry mixing jobs. Handling high flow rate requirements, high solids content, and difficult to mix additives are major criteria for meeting demanding slurry mixing conditions in applications such as oil and gas drilling fluid mixing, construction material production, chemical production, mining, liquid sugar mixing, brine mixing, cosmetics, paint pigment mixing, metal processing, and plastic production.

Benefits

Lobestar

Accelerated Mixing with dynamic shearing

Unique nozzle design creates high vacuum, dynamic shearing and reduces plugging



MaxiFlow

Maximized mixture and flow-through rates

Open mixing chamber significantly reduces clogging

LiquidLock

Minimized air entrainment

Vortex action creates a liquid buffer, inhibiting air entrainment

MaxiMix

Swirling mixing effect reduces clumps

Vortex action washes down and pre-mixes product

- Robust design, no moving parts, easy to replace inserts
- Handles hard to mix additives such as clays or polymers
- Highly customizable to fit specific site applications

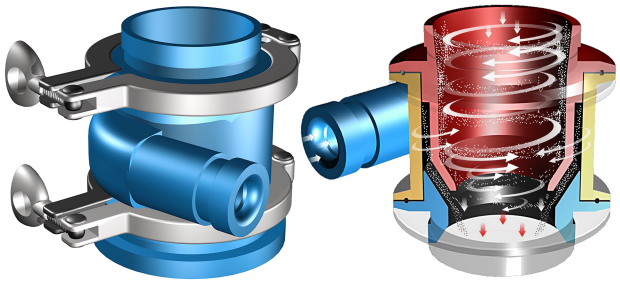
Standard Design

Much like traditional slurry eductors, The Alfa Laval Vortex Shear-Mixer has no motorized or rotating components. It relies on low pressure vacuum and dynamic, hydraulic shear to easily mix additives into fluid. It outperforms traditional venturi eductors; providing higher additive loading rates and more complete additive mixing. However, unlike traditional venturi eductors, it is exceedingly resistant to plugging and downtime. Alfa Laval Vortex Shear Mixers Tier 3 are offered in four standard sizes: 2" (51mm,) 3" (76mm,) 4" (102mm,) and 6" (152mm.) The 3", 4", and 6" sizes are available in dual suction port options for added versatility and connection to secondary additive feed devices or accessories, such as bulk bag hoppers or bulk surge tanks. Each 3", 4", and 6" Shear-Mixer Tier 3, except for model SM6103, consists of a stainless steel body, Lobestar Mixing Nozzle® insert, venturi/diffuser tube insert, Radial Premixer "pre-wetting"/wash down accessory, and a stainless steel work table hopper. SM6103 does not include a Radial Premixer. 2" Shear-Mixers Tier 3 consist of molded polyurethane bodies with Lobestar Mixing Nozzle® inserts assembled with a ball valve and a stainless steel conical hopper on a stainless steel base plate. 3", 4", and 6" Dual suction Shear-Mixers Tier 3 can be equipped with an optional, V-Slide® bulk flow promoter, bulk bag station, or dustless surge tank accessory. The standard connection style for all Shear-Mixer Tier 3 sizes except the 2" is grooved end pipe couplings. The 2" size has male pipe threaded connections. There are multiple Shear-Mixer Tier 3 models which can accommodate many different applications, but if a standard model does not suit the application, a custom engineered Shear-Mixer can be designed to meet specific application demands.

Working Principle

Fluid is pumped at a high rate into the inlet of the Shear-Mixer where pressure builds behind the Lobestar Mixing Nozzle insert. The fluid's velocity spikes as it passes through the nozzle, and the resulting pressure drop creates a near perfect vacuum for maximum additive loading. The Lobestar Mixing Nozzle produces a unique jet stream that has a dual impact. First, it dynamically shears fluid, rapidly hydrating and uniformly dispersing additives. Secondly, it promotes a highly-energized fluid boundary layer, which when combined with the effect of the Shear-Mixer's specialized venturi/diffuser tube, minimizes the impact of pressure loss in the downstream piping and increases the distance and elevation which the mixed slurry can be delivered through the discharge piping. Generally, the Shear-Mixer can be utilized in any application where the motive fluid can be handled by a centrifugal pump.

The Radial Premixer accessory "pre-wets" chemical additive particles, preventing them from forming clumps, fish eyes, or microgels in the mixed slurry. The Radial Premixer wash down effect also helps to inhibit foaming in slurries by partially flooding the Shear-Mixer suction with motive fluid and preventing entrainment of free air into the slurry. During mixing start up or shut down, motive fluid can be recirculated through the Radial Premixer to clear the Shear-Mixer mixing chamber of any accumulated or settled additives.



Radial Premixer "pre-wetter" and washdown accessory

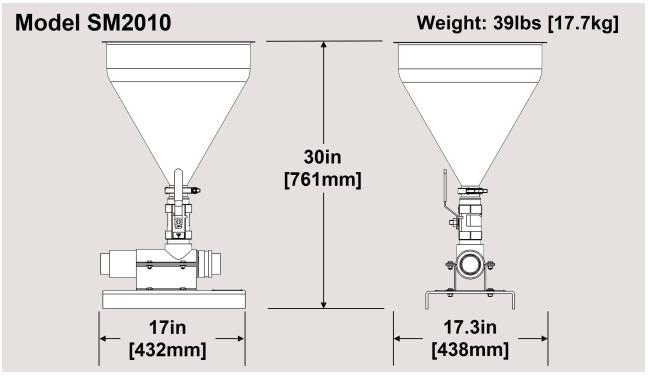
Technical Data

Physical Attributes						
Model	**Inlet & Discharge Connections**	**Suction Connection(s)**	**Body Material**	**Premixer Body Material**	**Insert Material**	**Gaskets**
SM2010	2" (51mm) MNPT	16" Conical hopper	Molded Polyurethane	None	Molded Polyurethane	None
SM3102	3" (76mm) grooved pipe	24" Conical hopper table	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna
SM4102	4" (102mm) grooved pipe	24" Conical hopper table	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna
SM4201 SM4202	4" (102mm) grooved pipe	24" Conical hopper table & 4" (102mm) grooved pipe	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna
SM6103	6" (152mm) grooved pipe	24" Conical hopper table	304 stainless steel	None	Molded Polyurethane	Buna
SM6104 SM6105 SM6106	6" (152mm) grooved pipe	24" Conical hopper table	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna
SM6201 SM6202	6" (152mm) grooved pipe	24" Conical hopper table & 4" (102mm) grooved pipe	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna

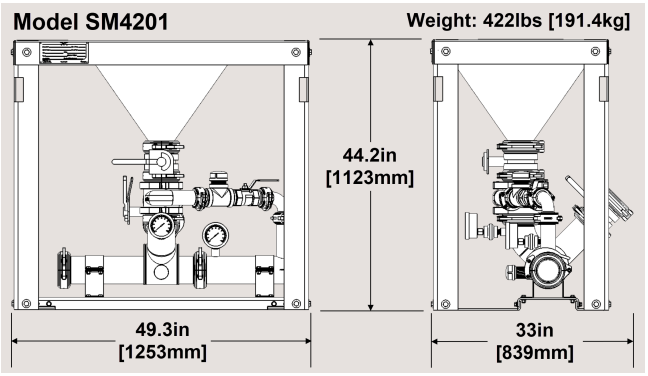
Performance Attributes			
Model	Optimum Motive Flow Range	Optimum Differential Head	Design Temp.
SM2010	65–85gpm 914.7–19.3m^3/hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)
SM3102	118–150gpm (28–38m^3/hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)
SM4102			
SM4201	260–350gpm (59–79.5m^3/hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)
SM4202			
SM6103			
SM6104			
SM6105	475–625gpm (108–142m^3/hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)
SM6201			
SM6202			
SM6106	590–780gpm (134–177m^3/hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)

Dimensional Drawings

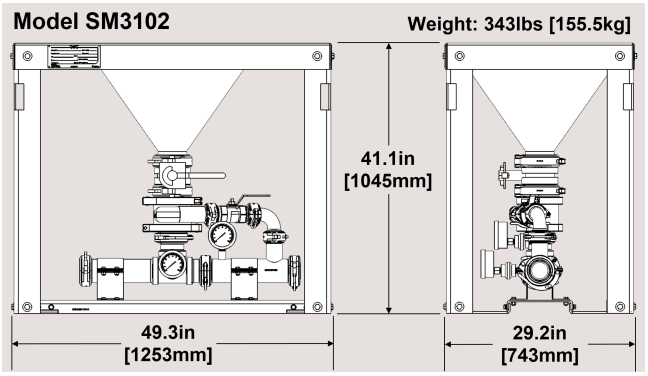
Model SM2010 — Weight: 39lbs [17.7kg]



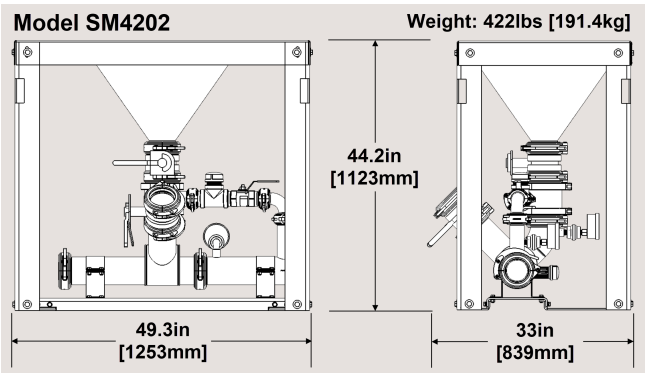
Model SM4201 — Weight: 422lbs [191.4kg]



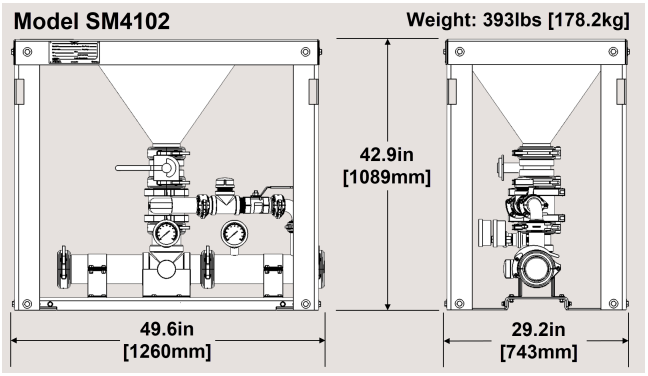
Model SM3102 — Weight: 343lbs [155.5kg]



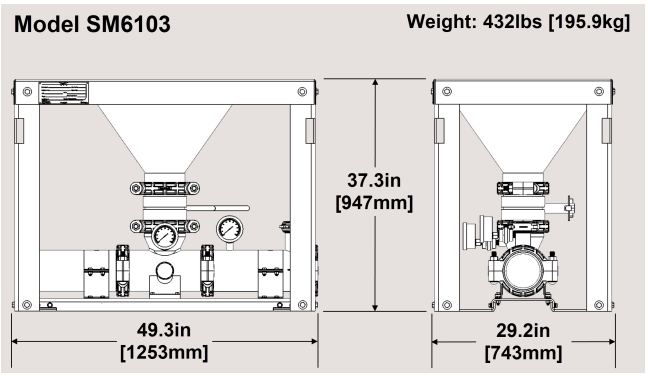
Model SM4202 — Weight: 422lbs [191.4kg]

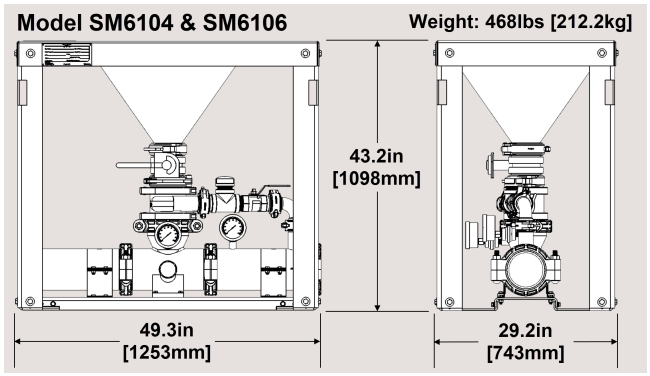


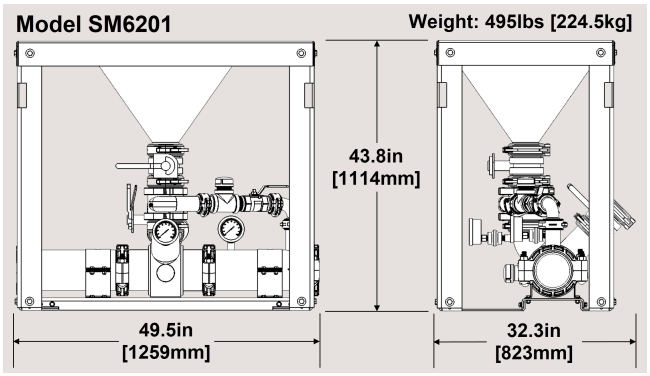
Model SM4102 — Weight: 393lbs [178.2kg]

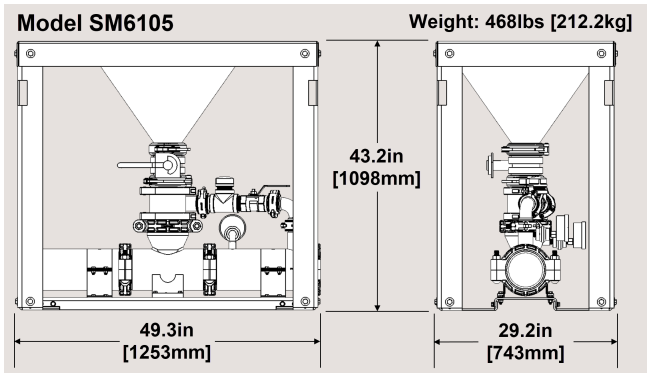


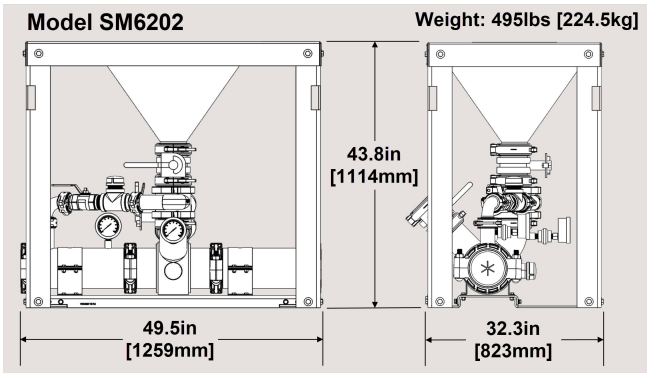
Model SM6103 — Weight: 432lbs [195.9kg]











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How to contact Alfa Laval

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