



## Alfa Laval Vortex Shear-Mixer Tier 2

### Advanced Slurry Mixing Educator

#### 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 However, the perceived simplicity of the process often leads to poor, unsafe slurry mixing practices and the use of outdated or improper equipment.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 educutors, or slurry educutors 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 educutor that provides all of the functional simplicity of its predecessor, but overcomes multiple issues that inhibit the traditional venturi educutor.

#### Applications

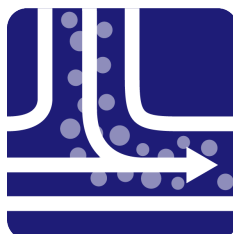
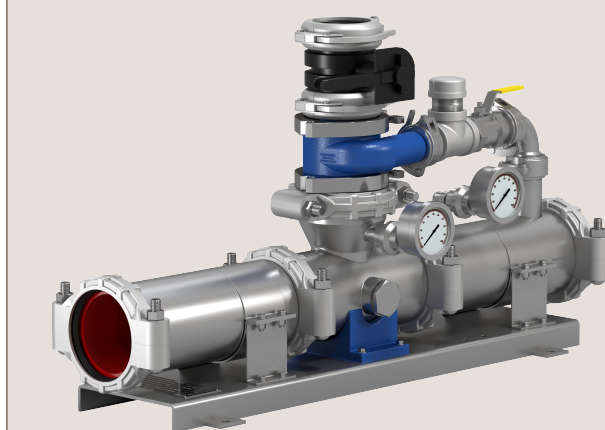
The Alfa Laval Vortex Shear-Mixer is a high-performance venturi slurry educutor uniquely designed to operate in demanding slurry mixing jobs. Handling high flow rate requirements, high solids content, and difficult to mix additives are major criteria for meeting demanding slurry mixing conditions in 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

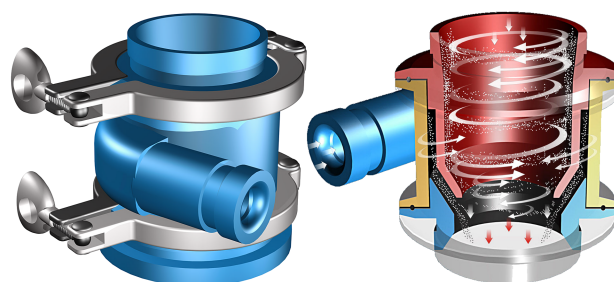
Much like traditional slurry eductors, The Alfa Laval Vortex Shear-Mixer has no motorized or rotating components. It relies on low pressure vacuum and dynamic, hydraulic shear to easily mix additives into fluid. It outperforms traditional venturi eductors; providing higher additive loading rates and more complete additive mixing. However, unlike traditional venturi eductors, it is exceedingly resistant to plugging and downtime. Alfa Laval Vortex Shear-Mixers Tier 2 are offered in three standard sizes: 3" (76mm,) 4" (102mm,) and 6" (152mm.) The 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 Shear-Mixer Tier 2 consists of a stainless steel body, Lobestar Mixing Nozzle® insert, venturi/diffuser tube insert, and a Radial Premixer "pre-wetting"/wash down accessory assembled and mounted on a stainless steel base plate. Tier 2 Shear-Mixers can be equipped with an optional hopper, V-Slide® bulk flow promoter, bulk bag station, or dustless surge tank accessory. The standard Shear-Mixer Tier 2 connection style is grooved end pipe with couplings. There are multiple Shear-Mixer Tier 2 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

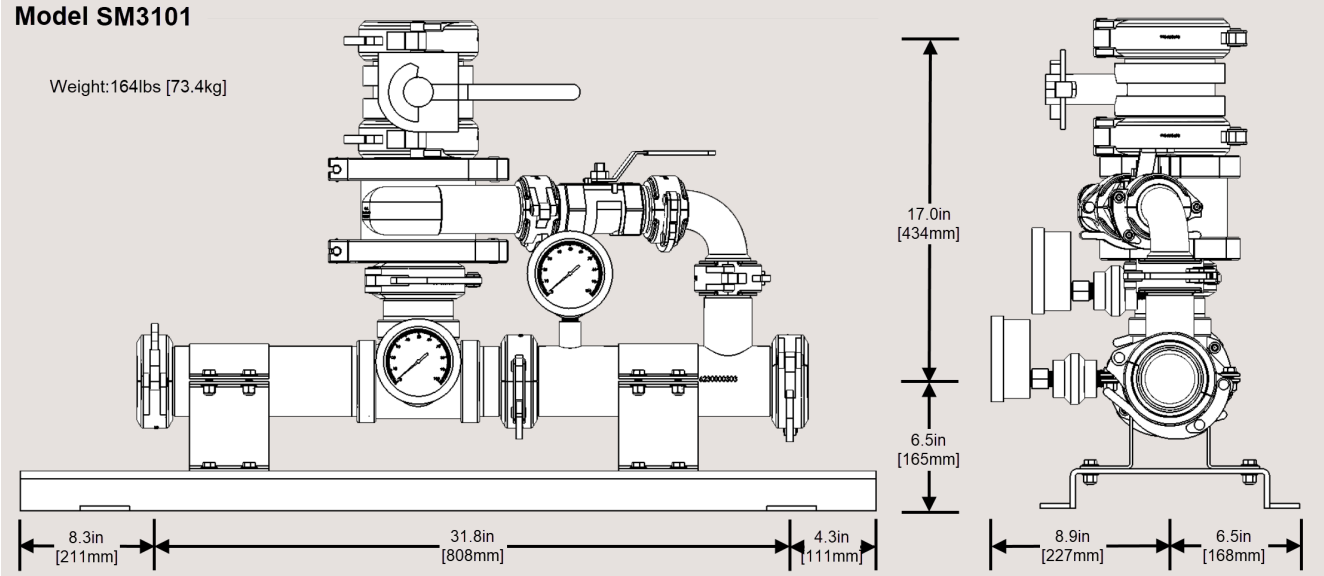
Physical Attributes						
Model	Inlet & Discharge Connections	Suction Connection	Body Material	Premixer Body Material	Insert Material	Gaskets
SM3101	3" (76mm) grooved pipe	3" (76mm) grooved pipe	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna
SM4103 SM4204	4" (102mm) grooved pipe	4" (102mm) grooved pipe	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna
SM6101 SM6102	6" (152mm) grooved pipe	6" (152mm) grooved pipe	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna
SM6203	6" (152mm) grooved pipe	4" (102mm) grooved pipe	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna

Performance Attributes			
Model	Optimum Motive Flow Range	Optimum Differential Head	Design Temp.
SM3101	118–150gpm (28–38m <sup>3</sup> /hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)
SM4103 SM4204	260–350gpm (59–79.5m <sup>3</sup> /hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)
SM6101 SM6203	475–625gpm (108–142m <sup>3</sup> /hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)
SM6102	590–780gpm (134–177m <sup>3</sup> /hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)

Dimensional Drawings

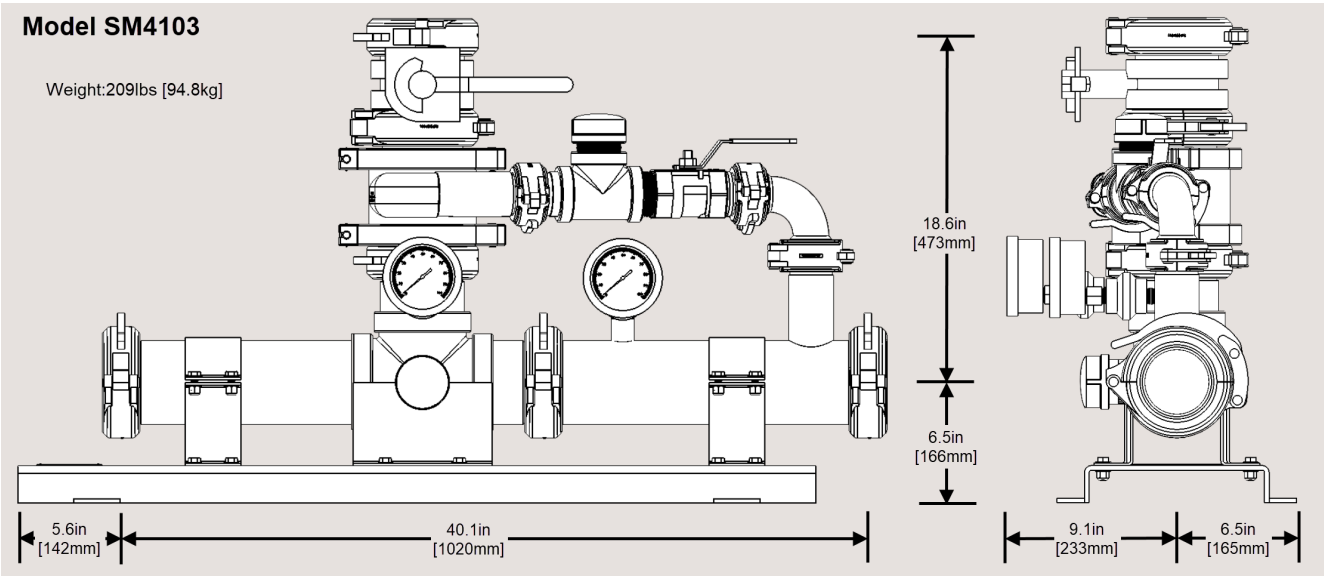
Model SM3101

Weight:164lbs [73.4kg]



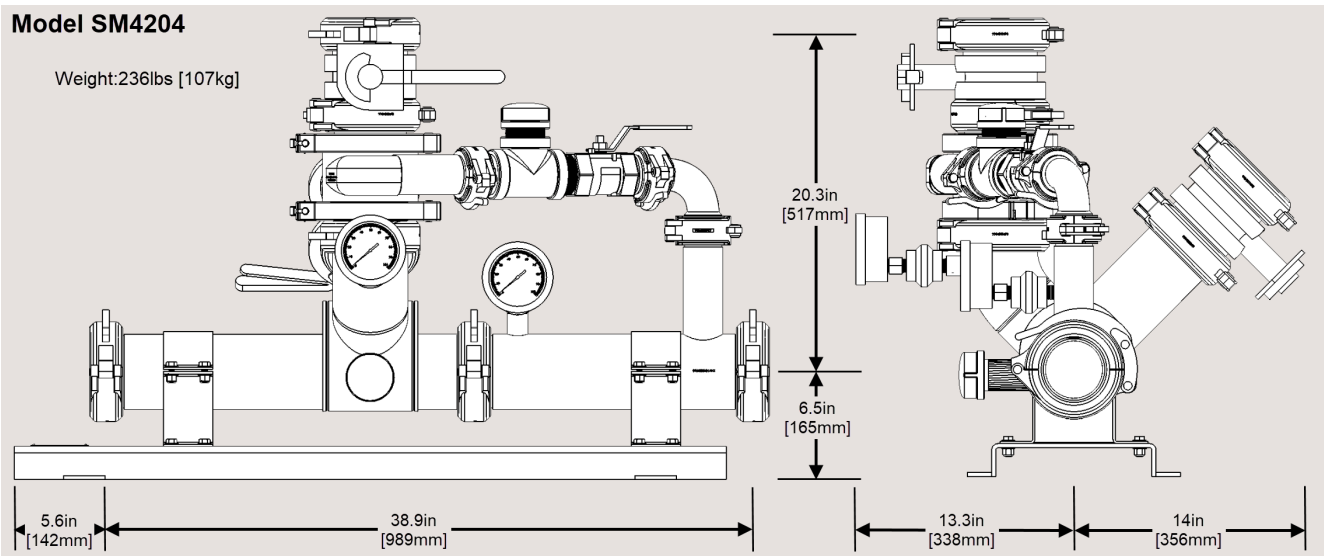
Model SM4103

Weight:209lbs [94.8kg]



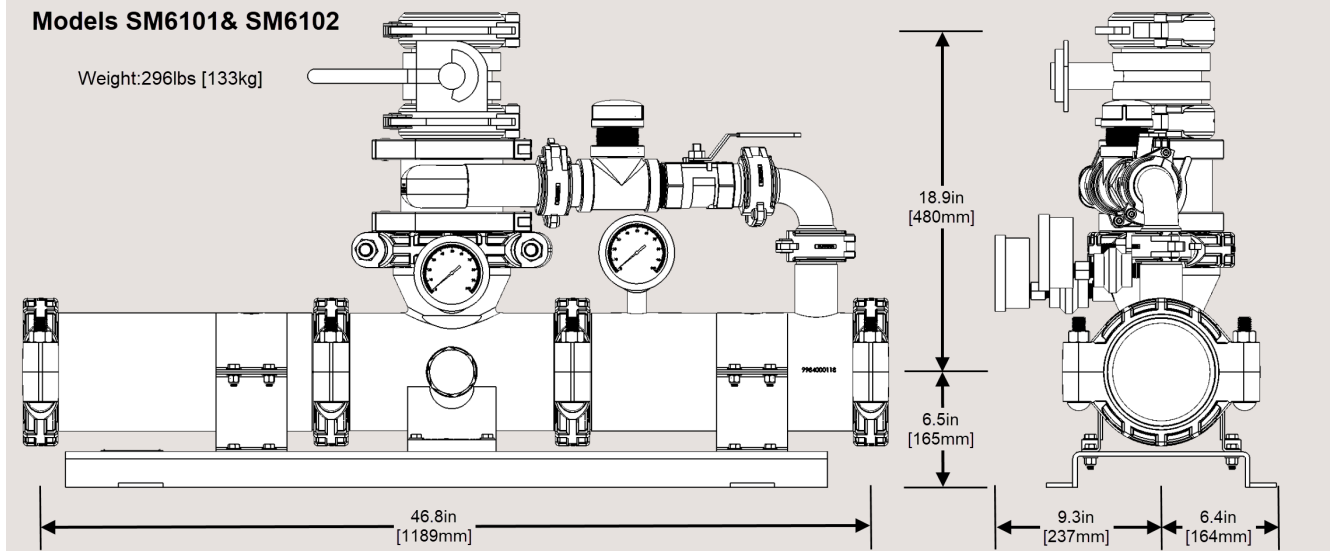
Model SM4204

Weight:236lbs [107kg]



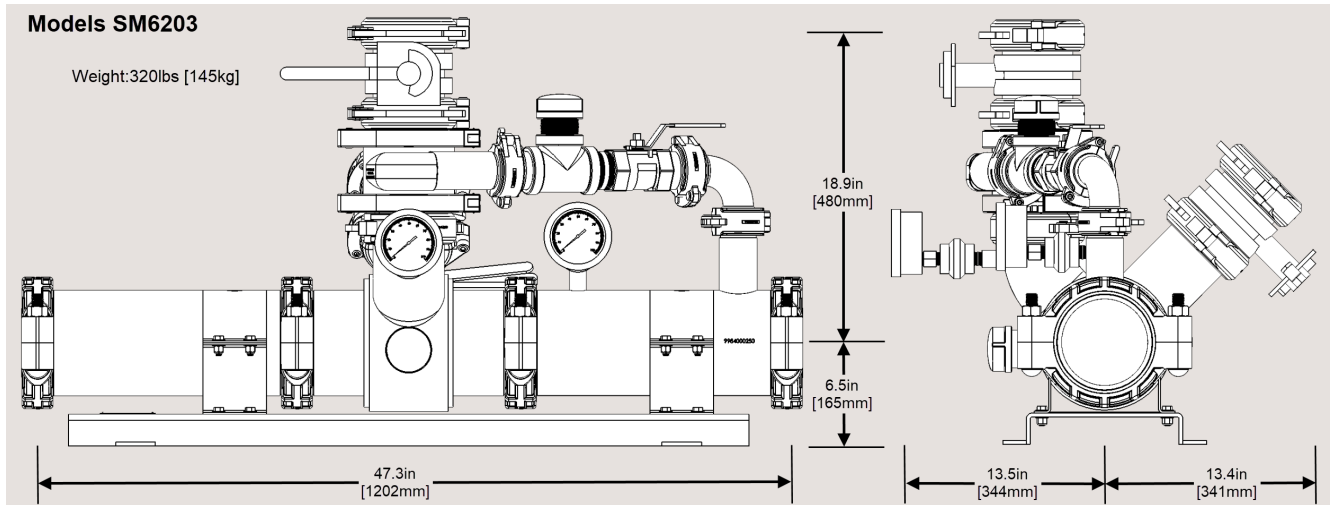
### Models SM6101& SM6102

Weight: 296lbs [133kg]



### Models SM6203

Weight: 320lbs [145kg]



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