Alfa Laval Vortex Shear-Mixer BBS

Advanced slurry mixing system for bulk material

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 However, the perceived simplicity of the process often leads to poor, unsafe slurry mixing practices and the use of outdated or improper equipment.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

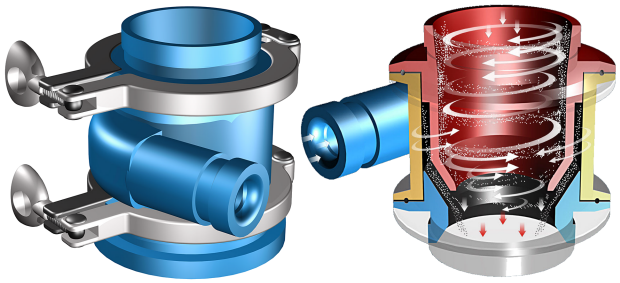
Standard Design

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. The Alfa Laval Vortex Shear-Mixer BBS is a 6" (152mm) Shear-Mixer connected to a 45 cubic ft stainless steel bulk bag hopper via the Vortex V-Slide® bulk flow promoter. Models SM6222 and SM6223 each include a dual suction port Shear-Mixer with Radial Premixer "pre-wetting"/ wash down accessory, and these models are recommended for applications where both bulk material mixing and small sack material mixing by hand may be required. Model SM6121 is a single suction Shear-Mixer that has no Radial Premixer and is recommended for applications where mixing will be conducted strictly from bulk bags. The Shear-Mixer consists of a stainless steel body, Lobestar Mixing Nozzle® insert, and venturi/diffuser tube insert mounted on a stainless steel base plate. Its primary suction port is connected directly to the bulk bag hopper via a butterfly valve and the V-Slide bulk flow promoter. The secondary suction ports on models SM6222 and SM6223 are connected to a frame mounted, stainless steel hopper table with butterfly valve and Radial Premixer accessory. The standard connection style of the Shear-Mixer BBS is 6" grooved end pipe couplings. The standard range of Alfa Laval Vortex Shear-Mixer BBS can accommodate many different applications, but if necessary, a custom engineered system can be designed to meet specific demands.

Working Principle

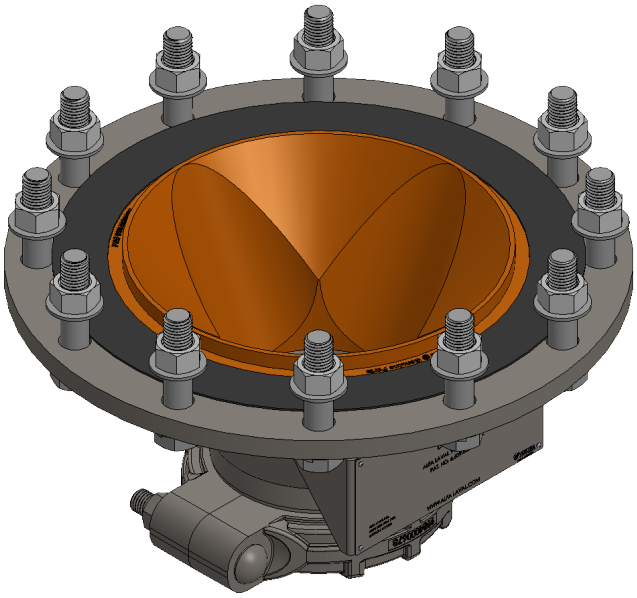
Fluid is pumped at a high rate into the inlet of the Shear-Mixer where pressure builds behind the Lobestar Mixing Nozzle insert. The fluid's velocity spikes as it passes through the nozzle, and the resulting pressure drop creates a near perfect vacuum for maximum additive loading. The Lobestar Mixing 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.

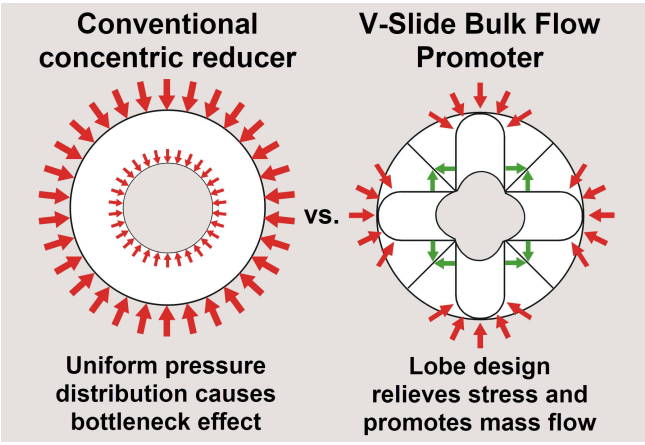


Radial Premixer "pre-wetter" and washdown accessory

The Vortex V-Slide bulk flow promoter promotes continuous, uniform mass flow of powders and granular materials. Bridging, plugging and "rat-holing" occur when bulk material uniformly compacts in the divergent section of concentric reducers, surge tanks, silos and bulk hoppers. The Vortex V-Slide's elliptical lobe design eliminates the circumferential stress point found in typical cone shaped hoppers, allowing bulk material to flow freely without outside assistance.



Alfa Laval Vortex V-Slide® bulk flow promoter

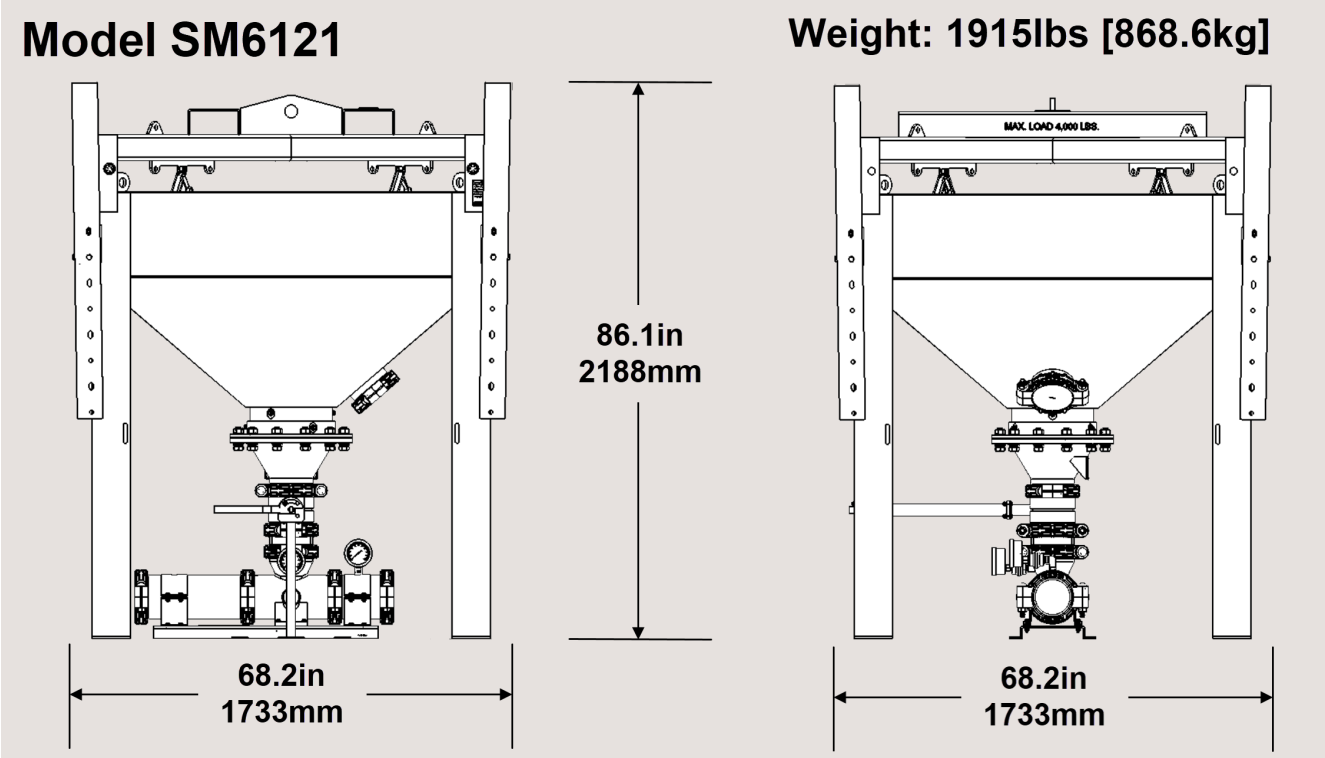


Technical Data

Physical Attributes						
Model	**Inlet & Discharge Connections**	**Suction Connection(s)**	**Body Material**	**Premixer Body Material**	**Insert Material**	**Gaskets**
SM6121	6" (152mm) grooved pipe	45ft^3 bulk bag hopper	304 stainless steel	None	Molded Polyurethane	Buna
SM6222 SM6223	6" (152mm) grooved pipe	45ft^3 bulk bag hopper & 24" Conical hopper table	304 stainless steel	Molded Polyurethane	Molded Polyurethane	Buna

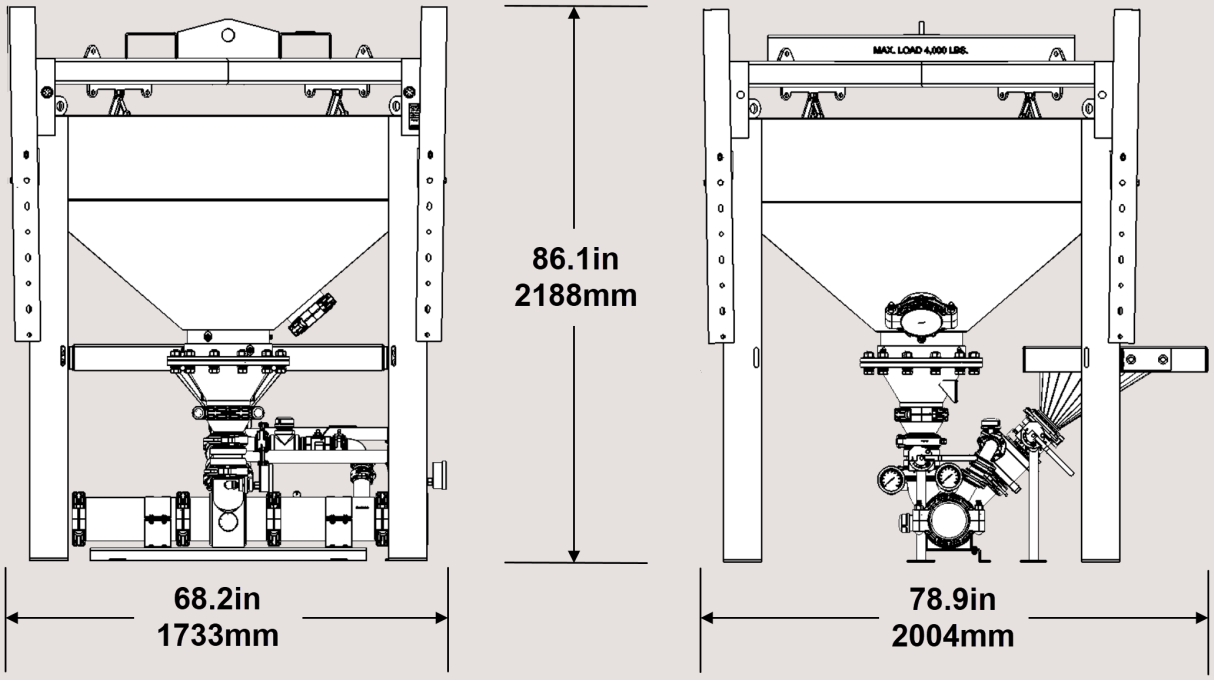
Performance Attributes			
Model	**Optimum Motive Flow Range**	**Optimum Differential Head**	**Design Temp.**
SM6121 SM6222 SM6223	475–625gpm (108–142m^3/hr)	115–185ft of head (35–56m of head)	–20°F to 135°F (–28.8°C to 57°C)

Dimensional Drawings



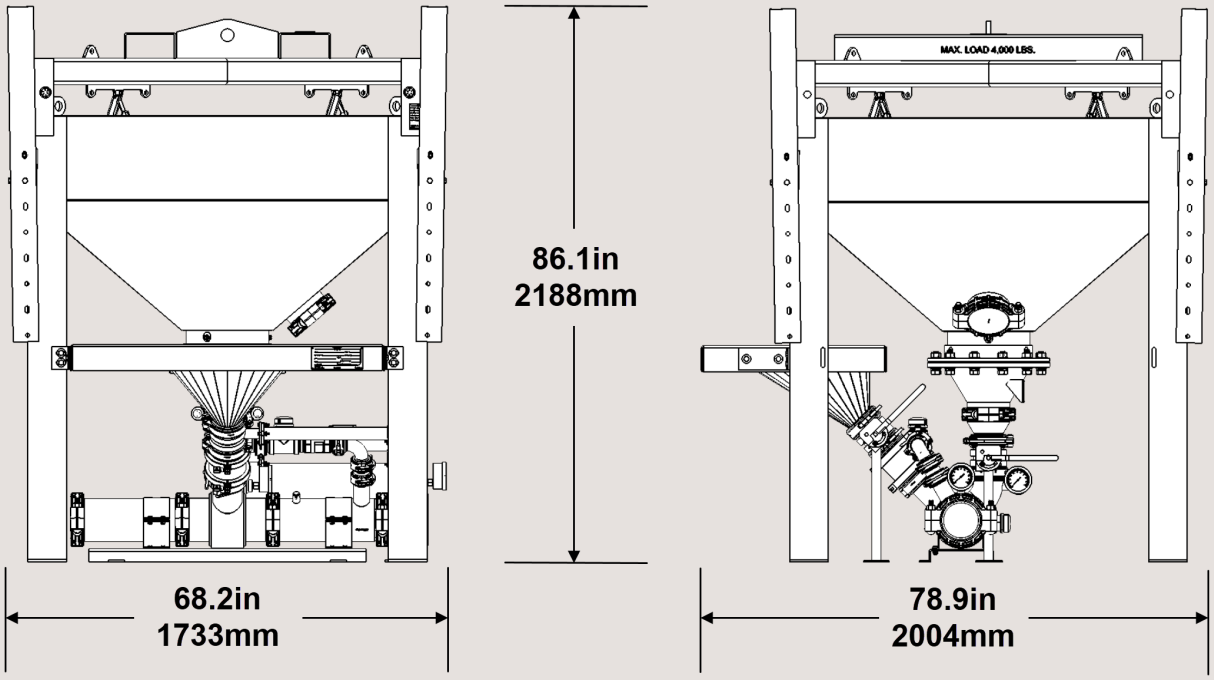
Model SM6222

Weight: 2093lbs [949.3kg]



Model SM6223

Weight: 2093lbs [949.3kg]



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