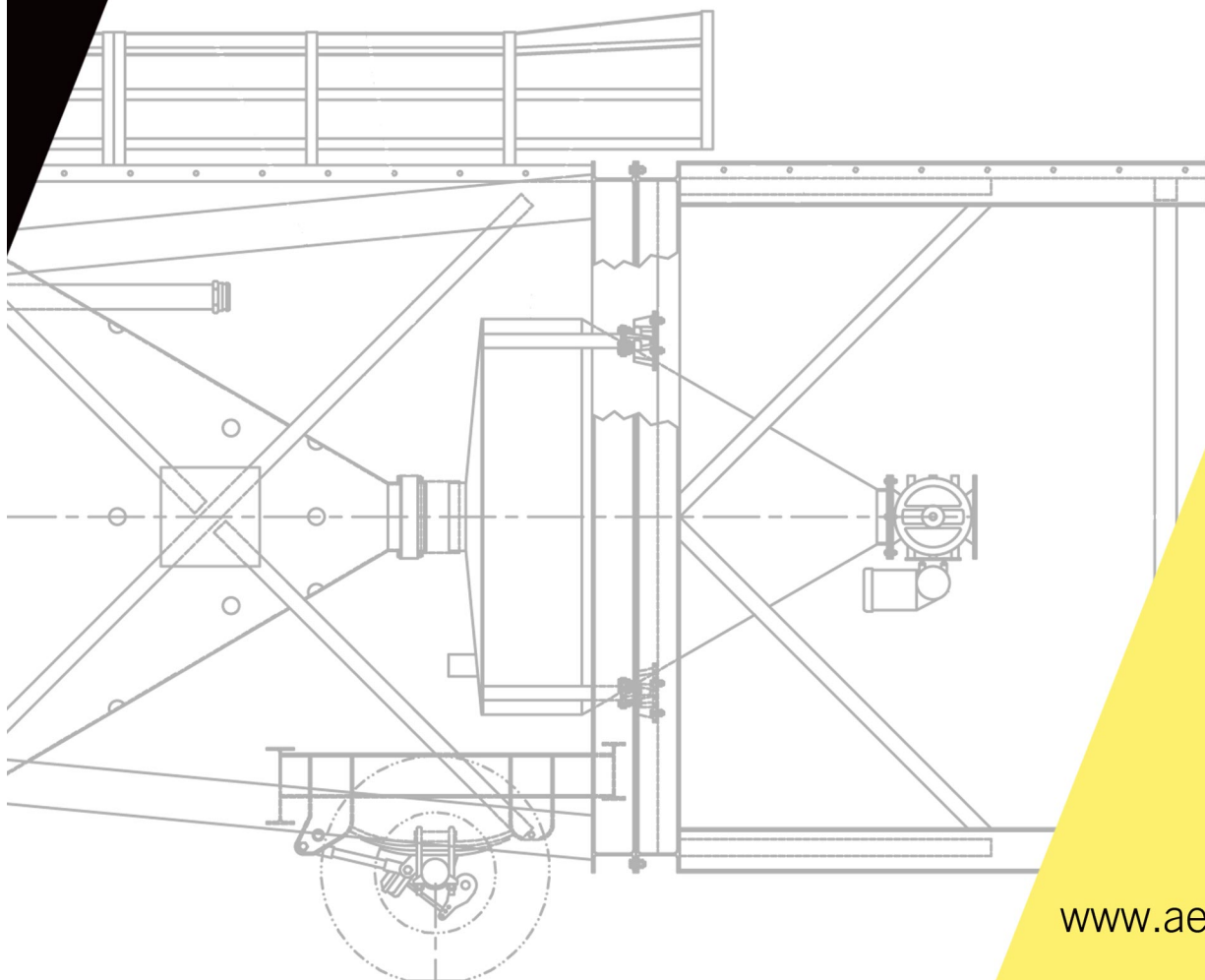




ADDITIVE SYSTEMS



www.aescomadsen.com

AESCO MADSEN

Additive Systems

To meet the ever increasing requirements regarding asphalt longevity, overall quality, and environmental impact; a growing number of natural and synthetic additives are being utilized within the asphalt industry to enhance the final product.

Should your set-up benefit from a warm mix system to lower both your operating costs and environmental footprint, lime storage / distribution silo in order to minimize stripping of asphalt cement from aggregates, or a latex pumping system for increased pavement durability; Aesco Madsen offers many custom additive system options for your operation requirements.

For additional information on how Aesco Madsen additive systems can improve your plant operations, reach out to a knowledgeable sales representative today.

Lime / Slurry Mixing Skid



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Warm Mix Technology

Eco-Foam II

Growing rapidly in popularity over recent years has been a practice known as warm mix, which involves the injecting of water into hot asphalt cement (A/C) just before it reaches the aggregate with which it is to coat. When the A/C and water mix, a unique foam is produced which can effectively bind with aggregate material that has been heated to temperatures notably lower than the aggregate temperatures required for traditional hot mix asphalt. The many benefits of this process include saving on fuel consumption as well as reducing greenhouse gas emissions. It is hence no surprise that one of Aesco Madsen's most popular additive systems is their **Eco-Foam II** warm mix system equipped with its **static inline vortex mixer**.

**Static Inline
Vortex Mixer**



As its name suggests, the static inline vortex mixer is placed inline with the asphalt cement piping so that the A/C flows through the mixer. This stationary component is considered static because it is able to effectively mix the asphalt cement and water without the use of moving parts.

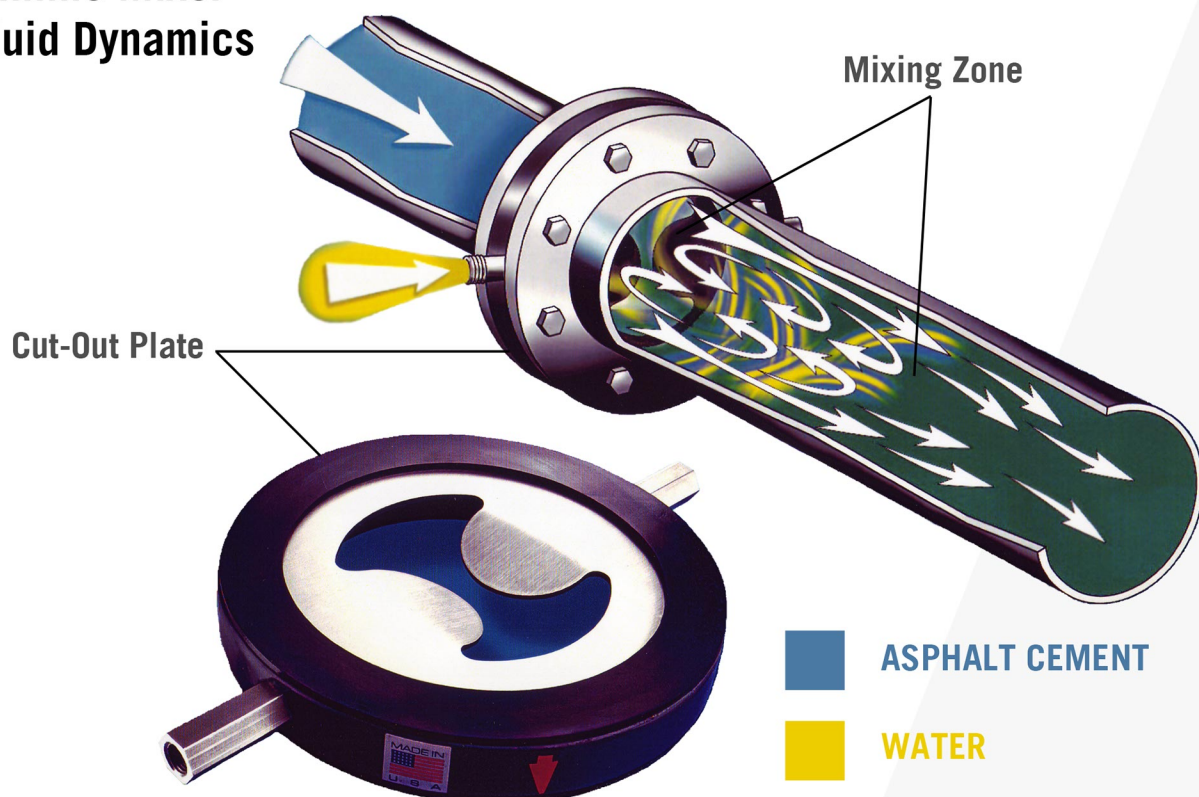
Warm Mix Technology

How it Works

As the asphalt cement reaches the inline vortex mixer it is forced through openings in the cut-out plate of the mixer (depicted below). The A/C that is being pushed through the restricted openings accelerates to a velocity that is five times that of the slower downstream flow. Once the accelerated A/C encounters the slower moving A/C ahead of it, it is not able to maintain its velocity and as a result is forced to circle back, generating an ideal mixing zone where the water is injected.

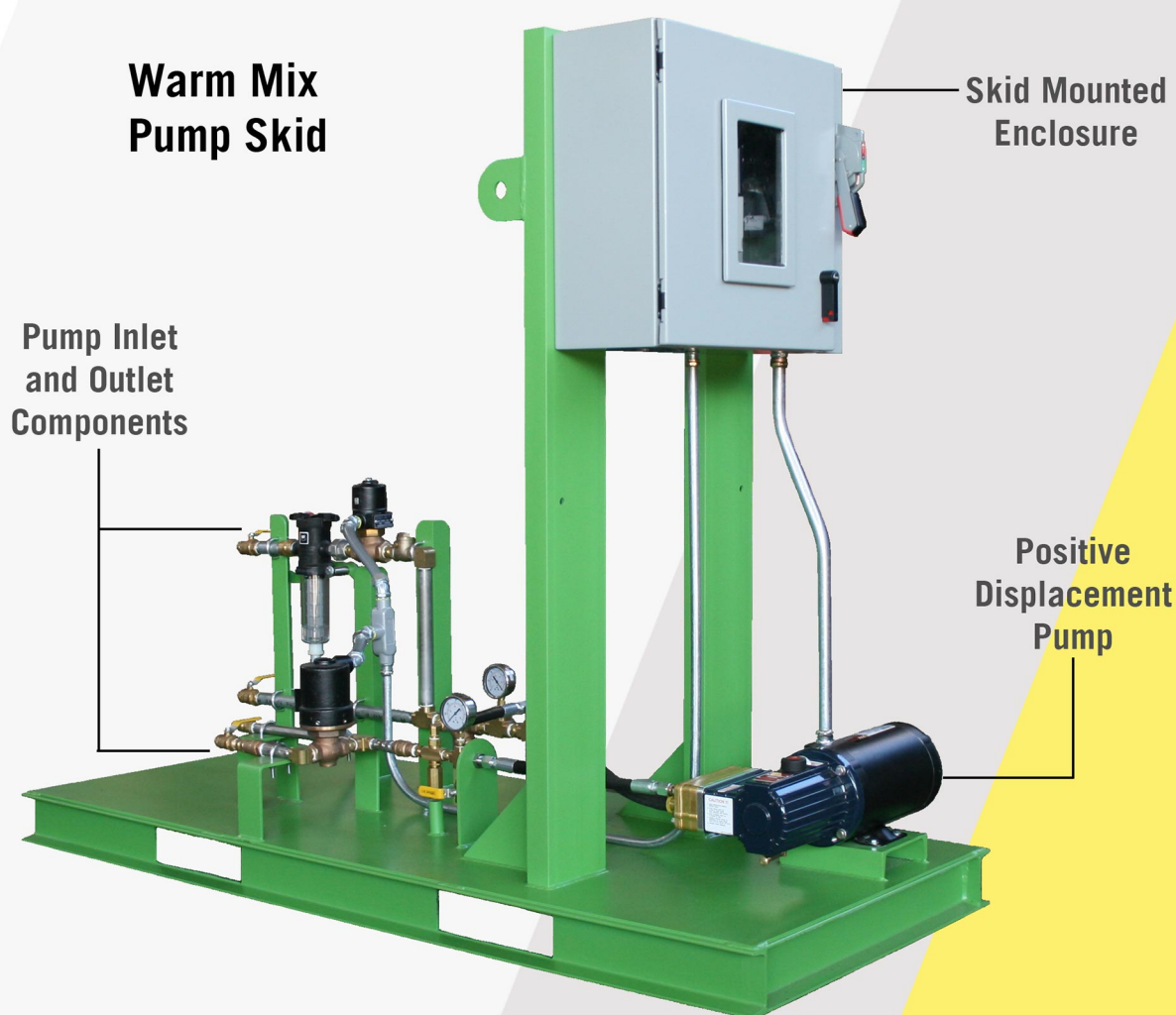
At this point in the mixing zone there is a great deal of what is known as shear zone turbulence, which is caused by separate streams of asphalt cement flowing opposite to one another within the vortex mixer. As water is injected into this zone it is thoroughly mixed by the unique movement of the asphalt cement. Additionally, the water converts into steam when it encounters the extremely hot asphalt cement. The resulting mixture of A/C and steam is a foam that can coat aggregate material much more efficiently than traditional hot-mix asphalt cement.

Inline Mixer Fluid Dynamics



Warm Mix Technology

Included in Aesco Madsen's eco-foam II warm mix system is a compact, self-contained pump skid. On the inlet side of the high pressure positive displacement pump is a manual shut off valve, water particle filter, pressure gauge, and in-line strainer. On the pump outlet side is a manual shut off valve, injection solenoid, pressure regulator, pressure gauge, and quick disconnect fittings to connect the pump skid to the static in-line vortex mixer via hose attachment. A skid mounted enclosure which houses the variable frequency drive used for the system is interfaced to a hand-built control system by way of custom communication cables.



For those looking to bolster their additive capabilities even further without expanding their footprint, an additional liquid additive pump system and variable frequency drive enclosure can be conveniently mounted on the same pump skid as the warm mix system.

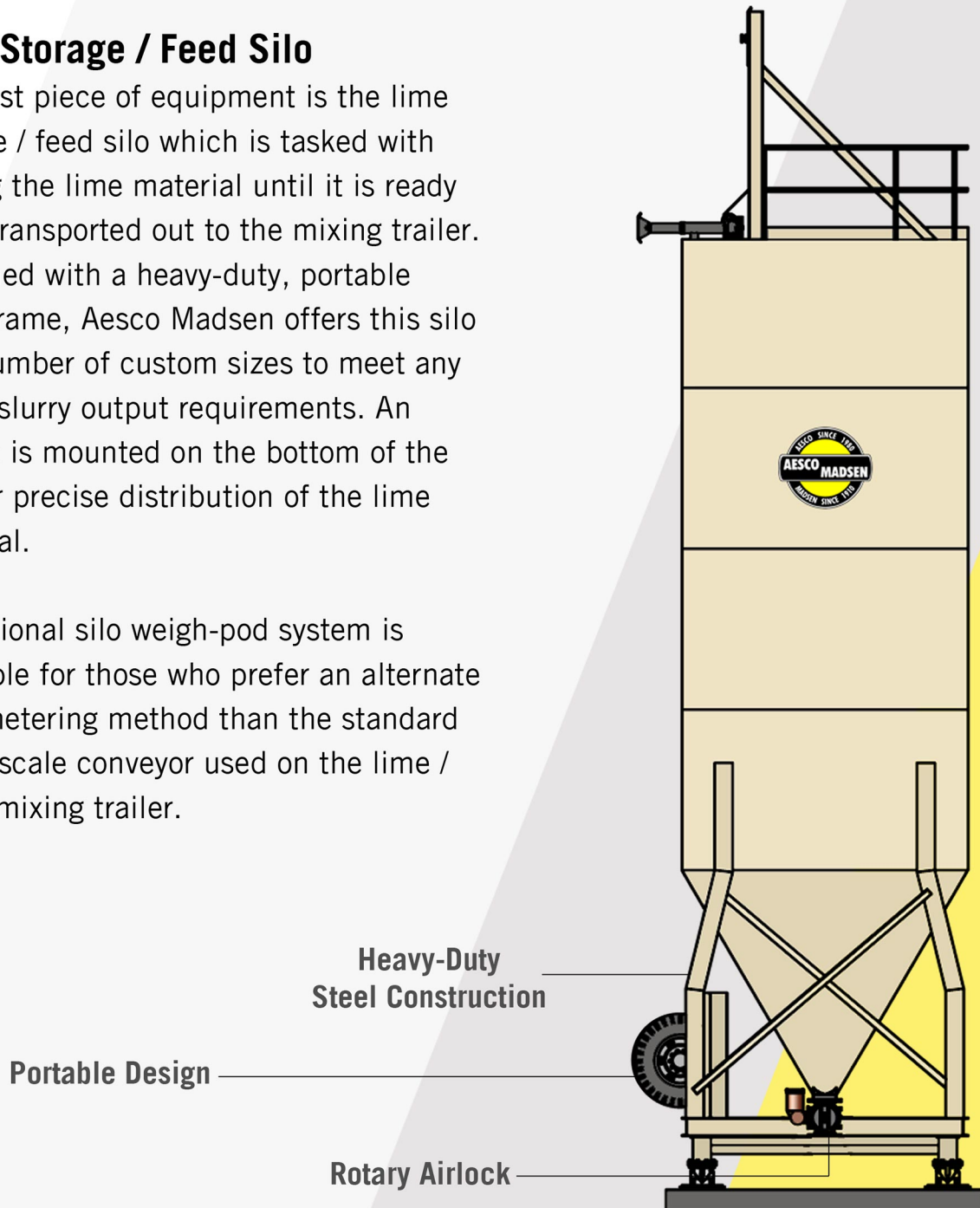
Lime / Slurry System

Aesco Madsen's "LS series" lime / slurry processing plant not only manufactures water / slurry mixtures to meet industry standards, but also combines that mixture with appropriate aggregates for either on-site marination or instant use in the asphalt production process. Three main pieces of standard equipment comprise this system and are as follows:

Lime Storage / Feed Silo

The first piece of equipment is the lime storage / feed silo which is tasked with storing the lime material until it is ready to be transported out to the mixing trailer. Designed with a heavy-duty, portable steel frame, Aesco Madsen offers this silo in a number of custom sizes to meet any lime / slurry output requirements. An airlock is mounted on the bottom of the silo for precise distribution of the lime material.

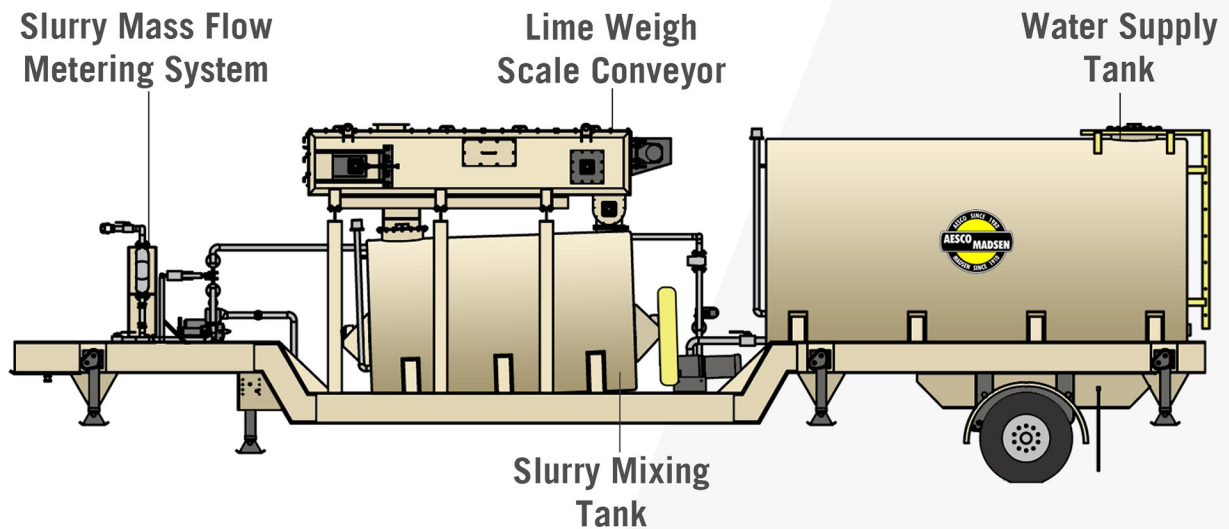
An optional silo weigh-pod system is available for those who prefer an alternate lime metering method than the standard weigh scale conveyor used on the lime / slurry mixing trailer.



Lime / Slurry System

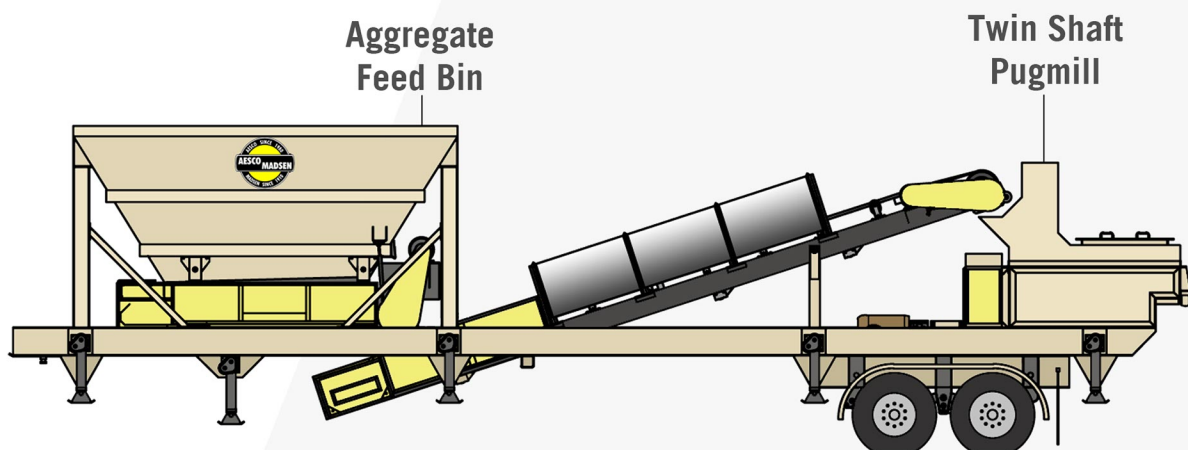
Lime / Slurry Mixing Trailer

After the lime material leaves the silo it is transported via auger to the lime / slurry mixing trailer. It is here where the lime will be thoroughly mixed with water to create a slurry. Supported on the trailer is a water supply tank, slurry mixing tank, lime and water metering devices, and a slurry mass flow metering system.



Aggregate Feed / Pugmill Trailer

Once the lime / slurry product has been manufactured by the mixing trailer it is sent to the aggregate feed / pugmill trailer where it will be combined with the virgin aggregate. The pugmill trailer is equipped with an aggregate feed bin, conveyor, and twin shaft pugmill which mixes the lime / slurry and aggregate material to produce an asphalt plant ready product.

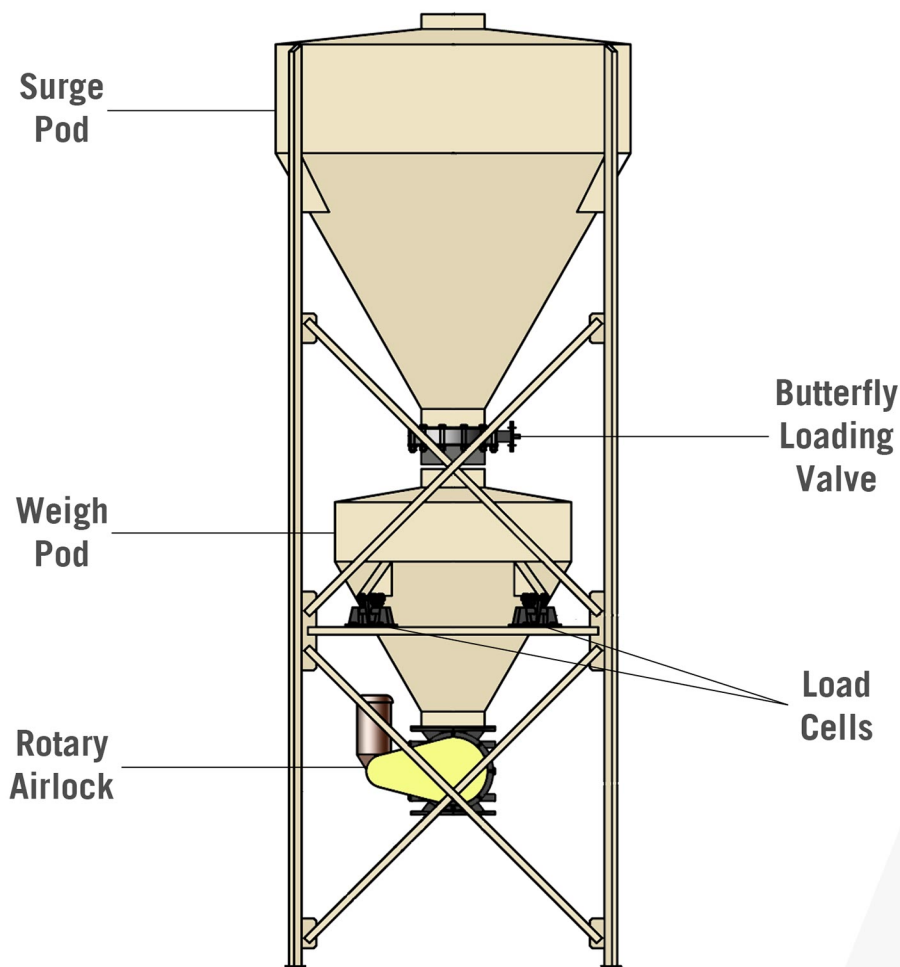


Weigh Pod System

Weigh Pod

For the integration of solid additives such as lime, fly ash, cement, and fiber; Aesco Madsen offers their weigh pod system. The weigh pod is either mounted below a large additive silo or smaller surge pod depending on both budget and output requirements. Both of these storage options will introduce the solid additive material into the weigh pod below them by way of an air operated butterfly valve.

Weigh Pod Additive System



The weigh pod itself is mounted upon load cells which provide a running total of the material coming in and being metered out. A rotary airlock on the bottom of the weigh pod is used to determine the rate at which the additive material is transported out into the mix. This airlock is controlled by a variable frequency drive, allowing the plant operator to match their mix design requirements with precision.

Liquid Additive Systems

Latex / Water

Many of today's asphalt production operations utilize additive latex for its increased resistance to pavement deformation over time and stability in extreme temperatures. The **"PC series" latex / water pump skid** and control system by Aesco Madsen offers precision control of your plant's additive latex in a convenient, compact design. A custom control enclosure houses an ADP (asphalt drum mix process) computer system which automatically adjusts the latex / water additive rates to be introduced. Manual controls are also provided on the enclosure in order to bypass the ADP automation if needed.

The compact 2' 6" x 4' 0" channel frame pump skid supports two separate positive displacement, progressive cavity pumps for the latex and water. Also mounted on the pump skid is a junction box housing the variable frequency drives responsible for the mix design precision offered by the system. The outlet piping of the latex and water pumps converge, mixing the two liquids as they flow down to a spray bar installed above the aggregate belt where the additive mixture is to be introduced.

Liquid Anti-Strip

To ensure a high quality and durable asphalt product, many mix design formulas now require the use of some form of liquid anti-strip. Anti-strip can be any chemical additive that helps prevent asphalt cement from separating (or "strip-ping") from the aggregate material. For these set-ups, Aesco Madsen works with each customer to individually design a system that meets their specific requirements. By utilizing positive displacement pumps on custom built skids and interfacing them to hand-built control systems, every liquid anti-strip system produced by Aesco Madsen is uniquely tailored to the customer's individual needs.