



## Wiggenhauser Multimix Solid Liquid Injection System – SLIS

- Many powders used in the process industries are hard to wet and mix, they will float for hours of the surface of the liquid phase. Once submerged they form agglomerates that continue to resist being separated and dispersed. Every process engineer who is working with powders such as CMC, Carbopol, Carbomel, Guar, Xanthan, Caregeenan, Alginates and other thickeners has experienced this hard challenges in mixing.
- Inline mixing systems were designed to break down agglomerates more intensely however many systems designed for powder induction do create often more problems than they solve. Due to clogging and maintenance problems this hard to disperse powders do create enormous extra cost to various process industries.
- The new Multimix SLIS (Solid Liquid Injection System) solves numerous production problems at once and accelerates the mixing process greatly without the need of additional lines. An overall gain in production and profitability and in almost all cases and improved end product are some of gained advantages.

### The new Multimix SLIS system

In the SLIS system solids are combined exactly at the point where mixing takes place inside the rotor/stator of the Inline machine. As you can see on the photo the liquid phase is in a closed vessel which has a Anchor stirrer inside. The whole systems operates under vacuum and when the powder is introduced into the hopper and the valve is opened the powder phase is instantly sucked into the chamber of the slotted 3 stage rotor/stator and is circulated within the closed system several times.

The whole SLIS comes mounted on a stainless steel trolley which gives it great flexibility and is fitted with 25 liter stainless steel vacuum hopper and a 5 liter stainless steel powder hopper, SMS Fittings and sanitary valves, CIP Discharge System, vacuum gauges, a vacuum inlet and outlet and a sight/light glass. The machines has a flow through capacity of 60,000 liters per hour.

Optional accessories are a panel frequency inverter controller, a vacuum pump and a Endo Lifting system.

The SLIS is specially designed to disperse solid powders mainly gum such as CMC, Carbopol & Carbomel as well as to emulsify oil and water phases.

The main advantages are:

- Dispersions of gums in seconds without "Fish Eyes"
- Achievement of fine emulsions of 1-2 microns within 5 minutes
- Elimination of bubbles within 5-15 minutes
- Flexible mixing capacities from 10-2000 liters
- Higher production batches
- Outstanding stability and homogeneity
- Improvement of product quality

Another advantage of the SLIS system is that it can handle liquids at much higher viscosities than the eductor based system can handle through.

For pseudoplastic materials the viscosity limit is even higher. This is because the viscosity of pseudoplastic materials falls when it is subject to shear which is the moment the when the powder is inducted into the fast moving stream via vacuum. With the viscosity artificially lowered in the mixing chamber the fluid can work with high solids loading and the viscosity which can be processed can reach viscosities of 80,000 cps.

Further there is practically no opportunity for the powder to escape into the air as the powder is mixed directly into the liquid in a closed system thus eliminating a significant respiratory hazard for the employees.



### There are several methods for powder induction:

#### • Propeller or turbine stirrer in an open tank

The simplest way to add powders into a liquid batch is to pour them into a open vessel. This is still a popular method as it is simple and inexpensive however this requires very long mixing cycles. However the far larger problem is the dusting problem which is created by adding light weight powders into open vessels. These particles in the air create an airborne hazard for the employees and also draws air into the mixture which in many applications makes another step necessary to remove the air again.

#### • High Speed Disperser

The agitation with a high speed disperser is much more intense than a propeller or turbine stirrer and applies much higher level of shear to the product. However there is much more air introduced into the product itself and dust into the environment. In addition many thickeners have a tendency to foam when they are agitated violently.

#### • A classic Rotor/Stator disperser

A classic Rotor/Stator disperser breaks down agglomerates much faster than a high speed disperser. With the small tolerances between the rotor and stator more intense shear is applied to the product. Material is drawn directly into the rotor/stator system and it is more efficient and finer result than a high speed disperser. However its efficiency is limited by the flow pattern and viscosity of the liquid and the wetting process is slow especially when working with lightweight powders such as fumed silica.

#### • Inline Powder induction systems

These are used since several decades and basically work on the following principle; a pump accelerates liquid into an eductor creating a vacuum, the powder is introduced from the top by a feeder through a overhead tube into the liquid stream and eventually a rotor/stator mixer applies high shear and mixing action, which breaks down the agglomerates, mixes the powder and liquid and propels the flow downstream. With three separate devices such a system requires a lot of maintenance. The balancing of the pump, the eductor and the inline mixer is often difficult and often the downtime is high.

Furthermore the problem is that solids are combined with the liquid in the eductor and then only mixed farther up the line. This creates the problem that the material is combined but not mixed yet which can still form clogging.



## Combination of the SLIS with the Vacuum Inline VM series

This machine combines ideally the batch mixer and the inline mixers together with the SLIS system and is available with double walled vessel, vacuum possibilities, tiltable vessels and a hydraulic lifting device. All necessary peripheral equipment such as vacuum pumps, heating units, lifting devices and controls are arranged on this single unit.

Vessel volumes from 50 to 2000 liters are available covering all requirements from the R&D department to mass production. Suitable for all kind of cosmetic products, tooth paste, pharmaceutical products, color pastes, body care products, mayonnaise, ketchups etc.

It is an ideal combination with the SLIS system and the Vacuum mixer is equipped with an anchor paddle mixer and a high speed disperser. The solid/liquid premix which was mixed inside the SLIS is transferred via vacuum directly into the vessel and mixes there very well with the liquid batch. Viscosities of up to 80,000 cps can be mixed without creation of bubbles due to the fact that the rotor/stator system is outside of the main mixing vessel.

### Optional Attachments

Inline High Shear Mixer / SLIS

Complete Oil & Water Jacketed Heated Vessel with Agitator /  
Stainless Steel Platform



For further inquiries please contact [tayfunk@wiggenhauser.biz](mailto:tayfunk@wiggenhauser.biz)

[www.wiggenhauser.biz](http://www.wiggenhauser.biz)