APPLICATION SUMMARY:

Aluminum hydroxide, also called alumina trihydrate, hydrated alumina or ATH, is a fire-retardant filler added to various types of polymers to provide flame resistance and smoke suppression in plastics and composites. ATH is also a functional pigment used in coatings, inks, adhesives, sealants and other applications.

A high ATH loading in the liquid resin is normally required in order for it to be effective. In addition to using chemical dispersants, selecting the right style of mixer is a key factor in reducing agglomeration, optimizing dispersion quality and maximizing functionality.

This bulletin describes two proven solutions in the processing of ATH dispersions: sub-surface powder injection and ultra-high shear mixing.

RECOMMENDED MIXING EQUIPMENT FOR Aluminum Hydroxide

Ross SLIM Technology and Ultra-High Shear Mixers

The Ross Solids/Liquid Injection Manifold (SLIM) is ideal for fast and thorough dispersion of aluminum hydroxide (ATH) powders into liquid resin. At the heart of this technology is a unique rotor/stator mixer designed to create a powerful vacuum that draws powders sub-surface and injects them into a high shear zone.

The SLIM is highly efficient at producing ATH slurries not only because it turns at high speeds but because of the way it introduces powders: solids and liquids are rapidly combined sub-surface at precisely the point where intense agitation takes place. Dispersion is virtually instantaneous; yet, the mixing action disintegrates agglomerates without changing the size and properties of primary particles. Floating powders and excessive dusting are also eliminated.

During powder injection, resin viscosity is usually a few hundred centipoise (cP), well below the SLIM’s upper limit of 10,000 cP. Unlike in eductor-based systems, solids loading is normally not a limiting factor in the SLIM – it can induct large volumes of ATH comprising up to 60% solids by weight or higher. Heavier, paste-like formulations may be processed in Multi-Shaft Mixers equipped with supplemental agitators to aid product turnover through the SLIM rotor/stator.

For formulations that require more aggressive deagglomeration, the pre-mixed slurry or paste may be pumped through a Ross Ultra-High Shear Mixer such as the MegaShear, QuadSlot or X-Series. These mixers are close-tolerance rotor/stator devices with complex geometries and extremely high design tip speeds (>11,000 ft/min). Ultra-High Shear Mixers deliver greater throughput and efficiency compared to colloid mills, media mills and other wet milling equipment.
The Ross SLIM is proven technology for fast and efficient dispersion of many other solids including:

- Alginate
- Alumina
- Bentonite Clay
- Boric Acid
- Calcium Carbonate
- Carbomers
- Carbon Black
- Carrageenan
- Citric Acid
- CMC
- Dye Powders
- Ground Rubber
- Guar
- Gum Arabic
- Pectin
- Rosin Ester Resin
- Starch
- Sugar
- Talc
- Titanium Dioxide
- Whey
- Xanthan Gum

**Processing advantages of the SLIM Technology**

- **Simple and straightforward operation.** Just turn on the mixer and start inducting powders. No eductors or vacuum pumps to deal with.
- **Shorter cycle times.** SLIM users switching from conventional mixers and stirrers reduce their overall cycle time often by as much as 80% or more.
- **Increased yield and higher quality dispersions.** By dispersing agglomerates and eliminating floating powders, the SLIM maximizes the functionality of the solids, dispersants and other raw materials.
- **Robust mixing.** Sufficient product turnover and powder injection are achieved even at very high solids content.
- **Easier material handling.** The Inline SLIM is usually installed at floor level so operators need not climb up a mezzanine carrying heavy bags of powder. Solids can also be delivered via automatic feeding devices.
- **Flexibility.** Portable SLIM Mixers supplied on a mobile cart can service virtually any size vessel located anywhere in the plant.

*For more information on the Ross SLIM Technology*

Visit [www.highshearmixers.com](http://www.highshearmixers.com) or click here to download a brochure.