

APPLICATION SUMMARY:

Film coatings applied to tablets and capsules make them easier to swallow by imparting a smoother surface and masking unpleasant taste or odor. Coatings also help retain the tablet's shape, enhance shelf-life and even control the location and timing of drug release.

Most tablet coatings are solid suspensions or solutions which may contain various ingredients such as natural or synthetic resins, polymers, gums, plasticizers, fillers, pigments and flavors. Proper mixing is critical in achieving the desired film properties, clarity, color, particle size distribution and viscosity.

This bulletin discusses two efficient techniques for processing tablet coating formulations: high-speed sub-surface powder injection and ultra-high shear mixing.

RECOMMENDED MIXING EQUIPMENT FOR Tablet Coatings



Ross SLIM Technology and Ultra-High Shear Mixers

Designed for high-speed powder dispersion, the Ross Solids/Liquid Injection Manifold (SLIM) Mixer is well proven in the preparation of tablet coatings. This technology features a unique rotor/stator assembly that draws solids into a high shear zone for rapid mixing with the liquid vehicle.

Dry ingredients like hydroxypropyl methylcellulose (HPMC), sodium carboxymethyl cellulose (CMC), hydroxyethyl cellulose (HEC), alginates, gums, talc, titanium dioxide and fine powdered colorants are wetted out more efficiently in a SLIM Mixer compared to conventional batch systems where powders are added to the top of vigorously agitated liquid. The SLIM rotor not only turns at high speeds but also generates a powerful vacuum that combines solids and liquids *sub-surface* – at precisely the point where intense agitation takes place. A very uniform consistency is achieved in just a few turnovers so that viscosity loss due to over-mixing is easily avoided. In addition to the short cycle time, issues like floating powders, foaming and excessive dusting are also eliminated.

Particle size distribution is an important mixing parameter because large agglomerates can clog spray nozzles in the coating operation. Ross offers Ultra-High Shear Mixers for tablet coatings requiring aggressive size reduction. Turning at tip speeds over 11,000 ft/min, these new generation rotor/stator devices feature complex geometries and extremely close tolerances, subjecting the product to thousands of intense shearing events in each pass. The level of dispersion achieved is superior to most multi-stage rotor/stators and colloid mills. In certain applications, Ultra-High Shear Mixers are considered to be ideal alternatives to high pressure homogenizers because they deliver comparable size reduction at much higher flowrates and require simpler maintenance.

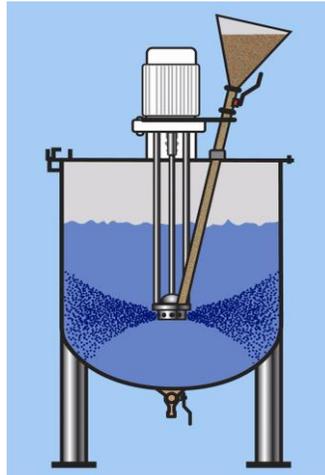


The Ross SLIM is proven technology for fast and efficient dispersion of various solids including:

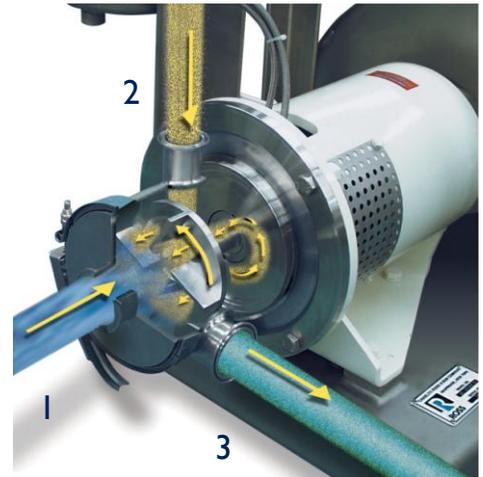
- Alginates
- Alumina
- Bentonite Clay
- Boric Acid
- Calcium Carbonate
- Carbomers
- Carbon Black
- Carrageenan
- Citric Acid
- CMC
- Dye Powders
- Ground Rubber
- Guar
- Gum Arabic
- Pectin
- Polymers
- Rosin Ester Resin
- Starch
- Sugar
- Talc
- Titanium Dioxide
- Whey
- Xanthan Gum

For more information on the Ross SLIM Technology

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



Batch SLIM. As the rotor reaches operating speed, the SLIM valve is opened and powders are quickly drawn into the batch by virtue of the powerful vacuum generated by the ported rotor.



Inline SLIM. The liquid stream (1) enters the mixer and immediately encounters the powder injection (2) at the high shear zone of the rotor/stator assembly. The resulting dispersion (3) is expelled centrifugally through the stator openings at high velocity.

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 impellers and agitators reduce their overall cycle time 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 all solid raw materials.
- **Improved operator safety.** The inline SLIM is usually installed at floor level so operators need not climb up a mezzanine carrying bags of powder. A “hose & wand” attachment may be used to induct lightweight powders straight from the container without creating a dusty environment.
- **Cleaner mixing.** SLIM Mixers are easy to clean in place and support fast changeover. Several inline models are 3A-approved.
- **Flexibility.** The portable inline SLIM unit can service multiple process lines virtually regardless of vessel size or shape.

