APPLICATION SUMMARY:

Formulated for a wide variety of coating, molding and screen printing applications, plastisols are dispersions of polyvinyl chloride (PVC) resin in a liquid plasticizer. Fillers, additives and colorants are also typical components of plastisols.

Shelf life, appearance, hardness/flexibility, chemical/electrical resistance, weatherability and other characteristics are dependent upon the specific plastisol formulation. However, the method of dispersion and homogenization plays a critical role in the optimization of product quality. Mixer selection is based on a number of factors but primarily viscosity profile and shear input.

Ross Multi-Shaft Mixers and Planetary Mixers

Ross Multi-Shaft Mixers are well-proven equipment in the manufacture of plastisols. Equipped with two or more independently-driven agitators working in tandem, Multi-Shaft Mixers deliver a robust combination of high shear agitation and laminar bulk flow over a wide viscosity range: from water-like to several hundred thousand centipoise. The agitators can be engaged in any combination and at any speed for any interval during the mixing cycle.

The most economical design is the Dual-Shaft Mixer which features a low-speed anchor and a high-speed saw-tooth disperser blade. A basic batching procedure starts with charging of the plasticizer and other liquid ingredients. Ideally, the liquid level must be high enough to submerge the disperser blade. Both agitators are then started as the PVC resin, fillers and additives are added through a port on the mixer cover. The operator makes necessary speed adjustments as the batch continues to thicken. Scrapers attached to the anchor agitator help promote uniform product temperature by enhancing heat transfer across the jacketed sidewalls and bottom of the mix can. Once the solid components are wetted out, the mixer is stopped for a quick manual scrape down of surfaces above the product level. Vacuum may be established prior to restarting the agitators and the batch is mixed until a smooth dispersion is obtained. Finished product is either discharged by gravity or pressed out of the vessel by a platen-style Discharge System. The latter method allows for fast and efficient transfer of viscous or sticky materials while reducing waste and clean-up.
Plastisol recipes that undergo very high viscosity peaks (above 1 million cP) are better prepared in Planetary Dispersers and Double Planetary Mixers. These machines consist of two or more blades which rotate on their respective axes as they revolve around the mix vessel. Unlike the agitators in a Multi-Shaft Mixer which rotate from a fixed axis, the blades in a planetary-style mixer continually advance into the batch and are thus able to contact fresh product all the time.

Combining slow-speed planetary agitation with an orbiting high-speed disperser, the Ross PowerMix Planetary Disperser quickly incorporates solids into a thick liquid base. Each agitator is independently controlled so flow patterns and shear rates are easily fine-tuned with every change in product rheology. The classic Double Planetary Mixer, on the other hand, is ideal for melting semi-solids and kneading highly viscous putty-like materials. Moving at relatively low speeds, the identical planetary stirrers impart increasing levels of shear as the batch gains considerable viscosity. A typical processing method in the Double Planetary Mixer is mostly high viscosity mixing, which can be as high as 6 million cP, followed by a let-down step towards the end of the cycle. Testing is normally recommended to confirm the best mixing strategy and equipment for a particular plastisol formulation.

For more information on Ross Mixers
visit www.mixers.com or click here to download a brochure.