Littleford Technifax

#6

PLASTISOLS

Plastisol Mix Uniformity In Short Cycle Time

Plastisols are dispersions of very fine particles of PVC resin in a plasticizer which produce a fluid system containing no volatile components. Fillers, stabilizers, colorants, and foaming agents may be added to modify the physical properties of the end product. Plastisols are made in hundreds of different formulations that have one important property in common: they are *liquids* that become *solid* upon the addition of moderate heat, with essentially no volume or weight change.

Plastisols have been responsible for the evolution of a variety of inexpensive processing techniques, e.g. slush, rotational and dip molding, knife coating and spraying. These techniques are used to produce such items as toys, boots, gloves, sheeting, coated fabrics and recently, as a rust preventive coating for automobiles.

In order to achieve optimum product performance and batch to batch reproducibility, all of the ingredients must be uniformly mixed, dispersed, and deaerated. Special emphasis must be placed on these steps to avoid poor homogeneity and erratic viscosities. For years the plastisol industry has used vertical cone-shaped mixers and agitated kettles to prepare the plastisol paste. Many problems were encountered with these mixers: inability to handle high viscosities, long mix cycles (30 + min.), poor dispersions, separate equipment required for deaeration, as well as difficulty in cleaning.

Littleford's process technology and mixer design combine to provide a totally new concept of plastisol preparation. The unique mix action developed in the Littleford intermediate intensity mixer insures a rapid and complete dispersion of the resin (dispersion or suspension grades), fillers, pigments, (high loading of TiO_2), stabilizers, etc. into the liquid plasticizer. This is all accomplished *without* the need for any special mixing techniques, i.e. "pulling," which is withholding plasticizer to create artificial shear.

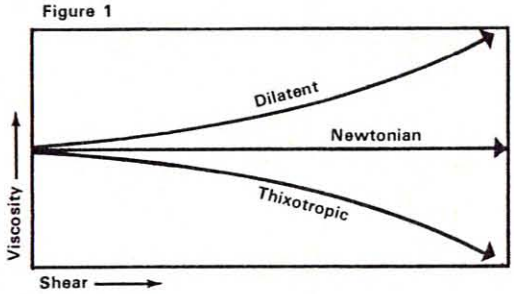
The product agitation is developed by plow-shaped mixing elements rotating within a horizontal cylinder at a sufficient peripheral speed to force the materials into a three dimensional motion.

Four bladed, high shear chopping devices can be added to further complement the excellent mix action of the plows. Located in the lower half of the drum, between the travel paths of neighboring plows, the choppers quickly disperse the powders into the liquid plasticizer by deagglomerating and reducing the powders to their primary grain size.

This unique mixing combination permits the Littleford mixer to effectively mix a wide range of viscosities. For materials of low viscosity the choppers assist the plows to create the necessary shear, while with high viscosities the plows alone are sufficient to create the necessary shear forces to wet out and disperse the powders into the plasticizers.

The Littleford mixer has also demonstrated its ability to mix materials that exhibit varying viscosity characteristics, i.e. Newtonian, Thixotropic, and Dilatent. (Figure 1)

Figure 1



Mix temperatures can be easily kept near ambient conditions by equipping the mixer with a labyrinth flow cooling jacket. Through utilization of the jacket combined with the excellent heat transfer characteristics of the mixer, there is no tendency to form gels caused by localized hot areas.

Since most plastisols are required to be air free, the Littleford mixer can be equipped for vacuum operation. This permits the product to be simultaneously mixed and deaerated.

With the Littleford mixer it is possible to complete an entire mix, including vacuum deaeration, in as little as 15 minutes. Larger mixers may require a slightly longer cycle due to the loading of larger quantities of materials.

Littleford mixers are not only versatile in their application, but also rugged in their construction. The mixers are available in a wide range of capacities to meet all process requirements. Let us put our engineering and design experience to work for you.