RECOMMENDED MIXING EQUIPMENT FOR

Medical Adhesives

APPLICATION SUMMARY:

The growing demand for prescription and over-the-counter transdermal products encompasses a wide range of uses and conditions, from motion sickness and smoking cessation, to hormone replacements and pain management.

At the heart of a transdermal patch manufacturing process are two important mixing steps: preparation of the pressure sensitive adhesive, and preparation of the drug-adhesive solution consisting of the active pharmaceutical ingredient, the adhesive, enhancers/excipients and solvent.

Proper mixing is critical to achieving consistent homogeneity, predictable viscosity and accurate drug content.

Ross Multi-Shaft Mixers and Planetary Mixers

Medical adhesives used in transdermal patches are typically acrylic (polyacrylate), PIB (polyisobutylene) or silicone (polydimethylsiloxane). Tackifiers and plasticizers (i.e. hydrocarbon resins, rosin esters, mineral oil, etc.) are added to provide tack, soften the adhesive mass and modify viscosity. Ross Multi-Shaft Mixers are widely used for this process and in the preparation of other types of medical adhesives. 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 within a wide viscosity range: from water-like to several hundred thousand centipoise.

The simplest design is the Dual-Shaft Mixer which features a low-speed anchor and a high-speed saw-tooth disperser blade. A Triple-Shaft Mixer extends the operating range by adding either a high shear mixer, or a second high speed disperser. The addition of a high shear rotor/stator assembly enhances the system's capability for particle or droplet size reduction.

Medical adhesives that undergo very high viscosity peaks (above 1 million cP) are better prepared in Planetary Dispersers and Double Planetary Mixers. Planetary-style mixers consist of two or more blades which rotate on their respective axes as they revolve around the mix vessel. The agitators continually advance into the batch and contact fresh product all the time.

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Combining slow-speed planetary agitation with an orbiting high-speed disperser, the Ross PowerMix Planetary Disperser quickly incorporates dry ingredients into a very thick starting liquid. Each agitator is independently controlled so flow patterns and shear rates are easily fine-tuned as changes in product rheology occur throughout the entire cycle.

The classic Double Planetary Mixer, on the other hand, is ideal for formulations which start out with the melting of solids or highly viscous fluids. The agitation mechanism is extremely thorough and does not require a minimum liquid level to properly wet-out and disperse solids. 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 with a let-down step towards the end of the cycle. Testing is recommended to confirm the best mixing strategy and equipment for a particular adhesive formulation.

Other applications of Ross Multi-Shaft Mixers and Planetary Mixers:

- Battery Slurries
- Ceramic Dispersions
- Conductive Inks
- Cosmetic Creams
- Electrode Materials
- Engineered Composites
- Fuel Cell Pastes
- Hot-Melt Adhesives
- Lubricants
- Medical Gels
- Pharmaceutical Pastes
- Plastisols
- Polyurethanes
- RTV Sealants
- Silicone Compounds
- Solder Pastes
- Specialty Coatings
- Syntactic Foams
- Thermal Greases

For more information on Ross Planetary Mixers

Visit www.planetarymixers.com or click here to download a brochure.

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