APPLICATION SUMMARY:

Structural adhesives are formulated from different chemistries depending on their end use and desired performance. Base resins are typically epoxy, acrylic, polyurethane or cyanoacrylate. A wide selection of curing agents, fillers and additives are employed to optimize bonding to metal, ceramic, glass, wood, plastic, rubber or other substrates. Applied in a variety of methods and environments, these adhesives range from thin pastes to heavy, putty-like consistencies.

The mixing technologies utilized in the production of structural adhesives vary from one formulation to another. Mixer selection is based on a number of factors but primarily viscosity profile and shear input.

RECOMMENDED MIXING EQUIPMENT FOR Structural Adhesives

Ross Double Planetary Mixer used for making structural adhesives at Uniseal.

Ross Multi-Shaft Mixers and Planetary Mixers

Ross Multi-Shaft Mixers are well-proven equipment in the manufacture of structural adhesives with viscosities up to several hundred thousand centipoise. 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 ideal for a wide range of non-Newtonian fluids. The agitators can be engaged in any combination and at any speed for any interval during the mixing cycle. Although this sounds complex, Multi-Shaft Mixers are actually engineered to be comparatively simple and cost-effective.

Finished product that is too slow to discharge by gravity (even with assistance from the anchor) is pressed out of the vessel by a platen-style Discharge System. This technique allows for fast and efficient product transfer with minimal waste and clean-up.

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Structural 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.

Combining slow-speed planetary agitation with an orbiting high-speed disperser, the Ross PowerMix Planetary Disperser quickly incorporates large amounts of solids into a thick liquid base resin. 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 formulations which start out with melting of a semi-solid or highly viscous paste. 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 followed by 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
- Dental Composites
- Energetics
- Filled Epoxies
- Fuel Cell Pastes
- Gum Dispersions
- Lubricants
- Medical Gels
- Metal Suspensions
- Molding Compounds
- Pharmaceutical Pastes
- Plastisols
- RTV Sealants
- Silicones
- Solder Pastes
- Syntactic Foams
- Thermal Greases
- Thick Film Inks
- Viscous Foods

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