**APPLICATION SUMMARY:**

Dental composites are synthetic polymers filled with reinforcing glass and/or ceramic particles.

A typical mixing procedure starts with blending two or more monomers often of significantly different viscosities. Various particle size fillers are then added to the liquid binder and mixed under vacuum until a homogenous paste is obtained. High amounts of fillers render most dental composites very abrasive. Initiators, inhibitors and pigments may also be added to the hardenable paste.

The ideal mixing equipment for this application must be capable of handling a wide range of viscosities and highly abrasive formulations.

**Ross Double Planetary Mixers**

Double Planetary Mixers are well-proven equipment for the preparation of dental composites. Traditional designs move materials by rotating two rectangular-shaped paddles on their respective axes as they orbit on a common axis. The blades contact virtually every point of the batch in just 36 revolutions, imparting a very thorough but gentle mixing action. The typical viscosity range of these stirrers goes up to around 2 million centipoise.

Newer design helical blades offer improved mixing and easier handling of viscosity peaks as high as 6 million centipoise. The first of its kind, Ross High Viscosity “HV” Blades (US Patent No. 6,652,137) feature a precisely angled contour which generates a unique mixing action: the sweeping curve firmly pushes batch material forward and *downward*, keeping it within the mixing zone at all times. The helical flights pass each other in a slicing motion, enabling them to move through a viscous batch without substantial spikes in power draw and amperage.

Mixing abrasive composites in a conventional stainless steel mixer leads to discoloration of the paste (stainless steel particles are incorporated into the formulation). The slightest contamination is not acceptable in dental composites wherein precise optical characteristics are critical. Ross Double Planetary Mixers are used worldwide for various abrasive materials and these are commonly either hard-chrome plated or coated with Kynar (polyvinylidene fluoride) or aluminum oxide.
Some Advantages of Ross Double Planetary Mixers with High Viscosity “HV” Blades

- **Enhanced mixing at higher viscosities.** Dental composite manufacturers have the ability to produce extremely viscous resins in a Ross Double Planetary Mixer. The helical High Viscosity Blades prevent thick or sticky batch materials from ‘climbing’ up into the mixer cover and gearbox area, an issue experienced with conventional rectangular planetary stirrers.

- **Cleanability.** There are no shaft seals, bearings, packing glands and stuffing boxes submerged in the product zone of the Double Planetary Mixer. Agitators are raised and lowered by a hydraulic lift allowing easy access for cleaning between batches.

- **Long service life.** Ross Double Planetary Mixers, built to a high-torque heavy-duty design, are offered with several wear-resistant coatings and surface treatment options. When dealing with highly-filled, viscous and abrasive composites, some users would simply re-coat the mixer blades and vessel after a certain number of years.

- **Fast and easy discharge.** With the mix can positioned beneath a Ross Discharge System, a platen is lowered into the vessel and displaces viscous product that would otherwise not flow by gravity. A specially-fitted O-ring rides against the vessel, virtually wiping the sidewall surfaces clean as product is forced out by the platen. The discharge outlet on the vessel can be designed to accept cartridge filling tubes for even faster packaging and less exposure to the environment.

Other Sanitary Applications of Ross Double Planetary Mixers:

- Bone Graft Substitutes
- Collagen Solutions
- Filled Polymers
- Hydrogel Adhesives
- Implant Materials
- Medical-grade Silicones
- Ointments
- Pharmaceutical Cakes (Mixing and Vacuum Drying)
- Pharmaceutical Gels
- Soft-gel Encapsulation Materials
- Tissue Substrates
- Toothpaste
- Viscous Foods (candies, fillings, cheese products)
- Wet Granulations

For more information on Ross Planetary Mixers

Visit [www.planetarmixers.com](http://www.planetarmixers.com) or click here to download a brochure.