

### TECHNOLOGY BRIEF:

The typical operating viscosity range of traditional double planetary mixers is in the range of 3 million cP. Swapping the traditional rectangular stirrers with helical planetary blades can extend this range to up to 8 million cP.

## Helical blades extend the viscosity range of double planetary mixers.



### *Traditional double planetary mixers*

Double planetary mixers move material by rotating two identical blades on their own axes as they orbit on a common axis. The blades continuously advance along the periphery of the mix vessel, removing material from the walls and transporting it towards the interior.

Traditionally-used blades are of a rectangular open paddle design featuring a bottom crossbar which makes it difficult to raise or lower the blades through a highly viscous batch. The vertical flights of the rectangular stirrers also generate a power spike in high viscosity applications as a lot of blade surface area pass each other at the same time and at very close tolerances.

Even with these characteristics, double planetary mixers equipped with rectangular stirrers remain standard workhorses used for processing viscous products up to 3 million cP.

### *A simple technique for extending viscosity range*

Applications that undergo a viscosity peak or arrive at a final state above 3 million cP may demand a heavier-duty double planetary mixer or a shift to a kneader extruder (sigma blade mixer). Both options entail complete mixer

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## Double Planetary Mixer Blade Designs



**“HV” Blades**

US Patent No. 6,652,137



**Rectangular Blades**

replacement. A simpler alternative should first be explored which requires only a set of helical planetary blades.

### ***Helical planetary blades deliver versatility***

Helical planetary blades extend the operating viscosity range of double planetary mixers to up to 8 million cP. High Viscosity “HV” blades offered on Ross Double Planetary Mixers feature a precisely angled helical contour which makes the blades pass each other in a slicing motion, so that even at the same close tolerances, the spike in power experienced with rectangular blades is eliminated. The absence of horizontal crossbars also allows the agitators to be lifted very easily out of a viscous batch. Less product hangs on the blades and wipe down is easier.

“HV” blades are interchangeable with rectangular blades in Ross mixers. They offer a cost-effective means of mixing materials that are normally considered to be beyond the viscosity capabilities of double planetary mixers.

### ***More information on “HV” Blades***

Click [here](#) to see “HV” blades in action. Or view the website [www.planetarymixers.com](http://www.planetarymixers.com).



### ***Sample Application: Rubber-Based Adhesive***

This batch of adhesive starts out as blocks of rubber and transforms into a heavy dough-like mixture with each subsequent addition of liquid plasticizer.

The plasticizer is deliberately added gradually to keep viscosity high in the early stages of mixing. The higher the viscosity of the product, the greater the amount of shear energy that the “HV” blades can impart to it. This translates to enhanced mixing of the different rubbers in the batch.

When all the plasticizer has been added, the batch takes on a pasty consistency. The end product is an adhesive applied to automobile parts and frames to prevent excessive vibration.

