

## What can I do to break up lumps that form in my mixer?

The short answer is that it depends on what type of mixer you have and what material you're processing. There are several options to break up or minimize lumping in a mixer: Increasing the rotor speed increases the mixing energy and breaks up soft lumps. If the mixer has adjustable mixing elements, adjusting the pitch or orientation can help break up lumps. If you're adding liquid in the mixer, try changing how or where the liquid is added. For example, adding the liquid from multiple points instead of just a single point, or atomizing the liquid stream, will help prevent lumps. In some mixers, adding choppers (small, high-speed blades) will help.

Start by contacting your mixer manufacturer because it has the most expertise with your particular unit. If you can't improve your existing mixer performance to your satisfaction, another option is to add a finisher after the mixer. A finisher applies dispersive shear to the material as it discharges, breaking up and dispersing lumps and resulting in a uniform finished product.

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The most common factors of lump formation in a mixer are lack of mechanical energy or use of the wrong mixer type for your application. Every product requires a specific energy input that creates the shear forces necessary to achieve a homogenous mix. Slow-moving mixing tools with insufficient horsepower will result in an unmixed product. If the mixer you're using isn't capable of introducing additional speed or shear forces, odds are you won't eliminate the problem.

Also, if you're adding liquid binders, take a look how they're introduced into the mixer. Liquid slugging will create wet spots or lumps that need to be dispersed and broken up. Opening and exposing the material surfaces will enable uniform particle coating. If the mixer can't break up the lumps, try spraying in the liquids because smaller droplets are easier to break up.

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The first thing to do is find out what's causing the lumps, which will allow you to determine what the best solution is. Take a look at the lumps' hardness — can they be broken up with your hand or do you need special tools? This will help you decide how to proceed. Lumps may not be a problem as long as your mix is still meeting all the requirements. If it is, then you can delump the material as it exits the mixer. However, if the lumps are causing a blending problem, you need to deal with them during the blending process. Try modifying the agitator or blender elements to prevent agglomeration from occurring. Or try adding secondary elements in strategic locations that are specifically designed to break up agglomerates.

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The right answer to everything in the powder and bulk solids industry is: It depends. First, you have to find the cause of the material lumping. A lump forming in a mixer is an agglomeration, which is when particles are held together by a bridge where the bridge strength is stronger than the particle weight and all other forces. You need to eliminate the bridging somehow. For example, if you're adding liquid, reduce the spray droplets or make the liquid less viscous.

If the material is building up on the side where the rotor leaves the wall, a simple fix may be to put some self-adhesive UHMW at that spot to reduce friction. If you're using a new mixer, try wrapping the walls around the rotor more or use milled UHMW for the same effect.

Another option is to retrofit your rotor with a paddle system, which increases particle movement. This allows you to add external devices to add high shear into a pathway cut in the rotor. Or, if a particular ingredient is sticky, try changing the ingredient form.

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