Applications for High Shear Mixers

Dispersion of Polyvinyl Alcohol

Coramix LLC
+1 (910) 225 4080
Sales@coramix.com

Applications for Polyvinyl Alcohol

Polyvinyl Alcohol (PVA or PVOH) is a synthetic, bio-compatible, water soluble polymer used widely in adhesives, plastics, textiles, medical equipment, etc. PVA is typically supplied as a powder, which may be dissolved into a solution.

Mixing Process

PVA is soluble in either hot or cold water, though viscosity increases with a rise in temperature. The general process using a traditional agitator is as follows:

- Powder is slowly added to cold water to avoid the formation of agglomerates.
- Once fully dispersed, the water is heated until the powder becomes solubilized. Required temperature depends on the grade of PVA.
- Mixing continues until fully solubilized.

Mixing Issues

- Some grades of PVA take a considerable amount of time to become fully solubilized.
- Traditional agitators struggle to deagglomerate the powder, increasing mixing times.
- Dispersion of the powder becomes difficult for low shear agitators as viscosity increases.
- Vigorous mixing for a considerable amount of time is required to wet out the powder, leading to aeration issues.
- Heating and cooling stages take time and are energy inefficient.
- Long mixing times may over-shear the polymer, resulting in an undesired viscosity.

Our Solution

Dispersion: Instead of slowly stirring the mixture until it is homogeneous, Coramix mixers use high-shear and mechanical design to disperse the PVA, greatly reducing each batch's cycle time while eliminating any agglomerates.

Phase 1: The Coramix inline mixer is connected with the eductor assembly, as well as pipes from the tank outlet to the mixer inlet and from the mixer outlet to the top of the tank. Base fluid is added to the tank, and the mixer is started to recirculate the fluid.

Phase 2: The powder feed valve is opened, and PVA is added directly into the hopper. The inline mixer pulls in the powder and deagglomerates the PVA as it passes through the high shear mixing zone.

Phase 3: After all of the powder is added, the valve is shut and mixing continues while additional ingredients are added.

Advantages

- Rapid mixing prevents aeration and over-shearing by drastically reducing mixing times.
- Agglomerate-free mix.
- Reduced particle sizes create a stable solution.
- PVA can be dispersed into hot water, eliminating the need for a heating stage.
- Coramix high shear mixers are capable of handling substantially higher viscosities than traditional low shear agitators.
- Operator error is virtually eliminated during powder addition.