Tips & Techniques for Mixing & Blending Success, Part 2

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This is part two of a two-part piece. Part one can be found here. *[1]*

Equipment Multitasking

Consider these cost-saving techniques. Combining two or more processing functions, such as mixing and drying, or mixing in a vacuum or with pressure, may eliminate additional costly equipment. For example:

1. Microwave mixing is ideal for chemical processing. This is accomplished with a unique paddle-style agitation within the mixer vessel and a microwave system power source. The combination with a microwave has solved one of the biggest challenges of process heating with a microwave; the ability to achieve uniform heat distribution. You get cost-effective, safe mixing and heating all in one vessel. Microwave mixing is ideal for these applications: heating, dehydration, sterilization, pasteurization, tempering and cooking.
2. Vacuum de-aeration is achieved when mixing liquid slurry of paste ingredients within a vacuum. Air bubbles are extracted from the final product as the agitator mixes ingredients. Removal of voids in industrial products, such as dry-wall mud, auto body putty and silicone caulk, is important for smooth installation of the product.
3. Vacuum drying is an excellent method for removing moisture or vapor from heat-sensitive materials without fear of thermal degradation. Pulling a vacuum inside of the mixer lowers the boiling point of liquids and facilitates drying at a faster pace with lower operating temperatures. Vacuum drying may allow the use of lower temperature (lower cost) sources of heat, such as hot water or steam rather than hot oil or direct-fired blowers. Vacuum drying is used with pharmaceutical and dried dairy products where discoloration due to excessive heat is undesirable.
4. Vacuum blanketing is used when processing ingredients in the absence of air. Producers of bakery premixes with high levels of shortening or fat use CO_2 to cool the ingredients. This keeps the ingredients flowable until they are evenly mixed. Manufacturers of propellants and explosives inject inert gas into the mixer to prevent an inadvertent ignition.

The following accessories may also optimize your mixing process:

1. Liquid, gas and shortening injection systems, including: an integrally mounted injection manifold, a Vee-jet, a flood jet or atomizing nozzles, shortening presses, liquid pumping units, nitrogen blanket inlet ports, clean-in-place tank-washing nozzles, electrical controls, and electrical and safety controls wired at the factory.
2. High-intensity choppers for color standardization, dispersion of minors and particle size reduction.
3. Feeders including bag dumps, surge bins, weigh hoppers, bucket elevators and pumping units designed to reduced batch cycle time, and support continuous utilization of downstream packaging and constant agitation of staged materials.
4. Air supply manifolds mounted on the down-sweep side of the trough and piped to seals, which include low-pressure regulators and gauges for each seal and a high-pressure/regulator filter for inlets.
5. Liquid manifolds and nozzles that can be used to add liquids to the mixing process. In general, dispersing a liquid over a wide area of the mixture enhances results. While this suggests that atomizing nozzles are ideal, they may not be necessary for your application.
6. Heating/integral jacket, including ASME code-rated jackets suitable for steam, hot oil or
water, and external insulation.
7. Weigh scale equipment, including an integral load cell and digital indicator package, and single and multi-ingredient batching suitable for wash-down applications.
8. Controls like variable-speed drives, which allow you to slow the tip speed of the agitator to reduce breakage of friable (fragile) ingredients or splashing of liquids. The very same agitator can be used at high speed to aerate product for drying, cooling or coating.

In summary, mixing and blending is considered both an art and a science. The art part deals mainly with the equipment component features, crucial for product mixing success. The science part deals mainly with the techniques that are specific to your product mixing, influenced by your plant environment; i.e. your processing system, sanitation requirements, regulations, engineering requirements and Lean processing strategies. A mixer should not be viewed as merely an equipment commodity but as a system consisting of many components in which the mixing outcome is affected by a number of different attributes.

This is part two of a two-part piece. Part one can be found here. *[1]For more information, please visit www.marionmixers.com* [2].

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