



EDITORIAL

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Meeting Modern Demands for Solids/Liquid Mixing

Market expectations continually develop and change, and the food and beverage market is no exception. The demand for new and varied products is rising with consumers being more aware of the health benefits and qualities of foods. In the dairy industry, for example, there is an increasing use of milk derivatives and vitamin and mineral fortification is an important feature of products offered. Producers need to deliver more in a competitive market place where cost, quality and variety are all important factors. Technology has to provide a way for manufacturers to meet the need for increased efficiencies, process flexibility and reliability but with consistent, high quality results.

Mixing is an important part of food processing on all scales. Whether at home in the kitchen making a party cake or in a large factory producing tons of ice cream, the quality of the mixing has a huge impact on the quality of the end product. Mixing may require the combination of multiple liquids or pastes or can be the method for introducing dry powders to liquids. It is a vital process in the production of foods including dairy products, soups and sauces, baby foods, fruit preparation, syrups and jams, to name but a few.

Solid/liquid mixing

Where the mixing of solids and liquids is required the need for good dispersion is a common factor in all batch or continuous production applications. The consistency produced will impact the final taste, texture and color of the food or beverage and the

final product quality depends on continually achieving the correct consistency with homogenized and stable emulsions.

The shear a mixer generates also has an important role to play in the characteristics of the food produced. Shear is necessary to puree solid ingredients, homogenize and produce cohesive emulsions. A high shear forces even difficult soluble ingredients into a solution or dispersion and avoids undesirable qualities such as foaming, clogging, lumps or “fish eyes.”

Traditionally atmospheric mixing has been widely used in the food and beverage markets, but this technique presents some challenges to the process and modern demands are increasingly requiring more sophisticated recombination technology. Atmospheric mixers typically have an open, gravity fed powder transport system, which has hygienic risks and creates a way for vapors to enter into the dry parts of the machinery. Such effects reduce the running time for the mixer and increase cleaning and maintenance requirements.

A top, gravity fed system also allows air into the mixture and makes the mixing process less efficient. In areas such as dairy production, the introduction of air leads to the need for a longer resting period before pasteurization can take place, extending the overall process time. Air can also affect color, flavor, oxidation, nutritional stability and ultimately the shelf life of the product.

A mixing system with a vacuum powder transport has a number of advantages with increased solids capacity and insensitivity to free vortex formation improving mixing efficiency. Unlike traditional gravity fed systems, the vacuum provides a bottom-fed powder input in a closed environment. This arrangement improves hygienic factors and the vacuum efficiently removes air from the mixture, leading to longer running times and, in turn, increased capacity and reduced maintenance costs.

As the powder is sucked in beneath the circulating liquid in the mixer tank, increased solid content can be used even with higher viscosities. The high shear created by a vacuum mixer gives good dispersion and tighter emulsions with narrow particle size distribution – a desirable characteristic for production of premium food and beverage

products. Integrated de-aeration adds to product quality and improves the reliability of the process. The low-level powder feed mechanism also requires less height for installation than a gravity fed system and provides easier access for maintenance and inspection.

Keeping the wet side and dry side of a mixing process separate is important as powder entering the wet production area creates hygiene risks. A closed vacuum mixer prevents contamination by keeping the powder contained but back flush of liquid into the powder within the machine will also create production issues. Wet powder will stick to inlet valve seals, reduce their effectiveness and lead to blockages. SPX APV has resolved this issue on its Flex-Mix Instant vacuum mixer with a patent pending system incorporating three valves at the powder inlet. The valves have delay setpoints and an open and close sequence, which ensures seats and seals are kept clean and dry for a long period of time – providing extended lifetime, fewer blockages and less downtime. The arrangement has the added benefit of easy maintenance with access for inspection and cleaning without the need to empty the process tank.

A high performance vacuum mixer such as the APV Flex-Mix Instant provides better economy with higher capacity for liquid/powder mixing. Excellent de-aeration efficiency and the high shear with a controlled vortex ensure fine emulsions, improved product quality and shorter mixing times. The closed system assists with the necessarily high sanitary requirements for the food and beverage industry. The Flex-Mix Instant also reduces maintenance costs with its unique valve arrangement designed to keep the process running for longer.

Through its APV brand, SPX offers a wide range of mixing solutions to meet an extensive variety of applications. Alongside the Flex-Mix Instant is the Flex-Mix Processor, which offers the high-speed dispersion of powders with the added ability to gently blend delicate particulates into the solution. The unit can provide a capacity of up to 20,000 liters per hour and utilizes an aggressive bottom-mixing unit with an efficient and gentle agitator above.

Mixing is a vital part of food processing and, as such, reliability and running time of this process has a big impact on the capacity of an overall production line. The quality of the mixing has a major influence on the quality and characteristics of the final product. SPX works closely with its customers to advice on the best solution for an individual application and, through listening to their requirements and issues, continues to develop innovative and effective solutions for the food and beverage industry.

About SPX Flow Technology:

The SPX Flow Technology segment designs, manufactures and installs highly engineered solutions used to process, blend, meter and transport fluids, in addition to solutions for air and gas filtration and dehydration. The segment supports global food and beverage, dairy, pharmaceutical, oil and gas, energy, and industrial markets. SPX (NYSE: SPW) is a global Fortune 500 multi-industry manufacturing leader with over \$5 billion in annual revenue, operations in more than 35 countries and over 18,000 employees. For more information, please visit www.spx.com.

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Based in Charlotte, North Carolina, SPX Corporation (NYSE: SPW) is a global Fortune 500 multi-industry manufacturing leader with over \$5 billion in annual revenue, operations in more than 35 countries and over 18,000 employees. The company's highly-specialized, engineered products and technologies are concentrated in three areas: Flow Technology, infrastructure, and vehicle service solutions. Many of SPX's innovative solutions are playing a role in helping to meet rising global demand for electricity, processed foods and beverages and vehicle services, particularly in emerging markets. The company's products include food processing systems for the food and beverage industry, power transformers for utility companies, cooling systems for power plants; and diagnostic tools and equipment for the automotive industry. This description of SPX does not contemplate the pending sale of the Service Solutions business. For more information, please visit www.spx.com.



This editorial has been featured in the September issue of Powder/Bulk Solids magazine.

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