

## The VacuShear® Liquid Processor: An Effective and Ergonomic Approach to Mixing

The VacuShear® liquid processor is an excellent candidate for use in mixing and blending processes involving powders and liquids. This mixing technology is made available to the processing industries through the partnership between A&B Process Systems (Stratford, Wisconsin) and Admix Inc. (Manchester, New Hampshire).

Mixing in enclosed vessels and in-line is an important activity in the chemical, pharmaceutical, bioresearch and food industries. With powdered materials being used extensively in these processing industries, their rapid, sanitary transport to the mixing tanks is essential for efficient operation. Early methods of charging the mixing stations led to significant dust formation, with the potential for an explosion as well as seriously contaminating the surrounding environment. Furthermore, numerous safety issues resulted from the manual lifting and carrying of the bags and drums.

A&B Process Systems and Admix Inc. have developed mixing technology and equipment which is clean, ergonomic and efficient, providing an effective approach to the charging and blending of mixtures of liquids and powders to form slurries, dispersions or emulsions. This liquid processor, the VacuShear® processor, is capable of conveying powders, under vacuum, directly into the sealed mixing tank at rates as high as 500 pounds per minute. The powder is introduced into the tank directly at the mixing head and below the surface of the liquid. In this way aeration, foaming and dust formation are minimized. Isolation valves may be closed once the charging operation has been completed and the RotoShear® mixer slowed or stopped as required. Vacuum may be maintained to allow de-aeration and de-foaming to continue throughout the blending process. The processor is versatile, since it may be used for the high speed emulsification of powders and immiscible liquids or for the simple blending of Newtonian fluids.

The processor is a combination of the mixing tank, vacuum pumps, powder feeders, hoppers and dumping stations, which provides an ergonomic and efficient link between the conveying and mixing operations. A mixing station may be custom designed to include options such as multiple tanks, clean-in-place (CIP) sprayball assemblies, sweep and scrape surface agitators, fixed or removable baffles & access platforms. Automated systems are provided to control liquid metering, bulk solid dosing by weight change, mixing, deaeration and liquid levels. The tank(s) can be jacketed or insulated to ensure efficient heat transfer during the mixing and blending processes. If required the tank(s) can be fabricated to meet ASME pressure ratings. The engineers and fabricators at A&B Process Systems will assist the customer in selecting the design of the station to ensure the maximum efficiency for the particular mixing process.

The fabrication of the VacuShear® liquid processor requires expertise in forming, cutting and welding of stainless steels, particularly the 304 and 316 stainless steels that are frequently

demanding for pharmaceutical, bioresearch and food processes. The unit is a complex vessel with in-flow and out-flow ports for piping to add or remove powders and/or liquids, together with openings for vacuum and mixing devices. A large number of TIG welds are required in the fabrication and each weld, completed in accordance with industry standards, must blend seamlessly with the main tank, without cracks, ripples or arc marks.

A&B Process Systems are recognized throughout North America for the design, fabrication and installation of stainless steel tanks, vessels, auxiliary equipment and stainless steel piping, including the high purity and hygienic piping required by the pharmaceutical, bio-pharmaceutical and food industries. The company's reputation has been built upon the capability to produce high quality products to meet the performance requirements in a timely manner. A&B's success is a direct result of the in-house resources, the design engineers, fabrication engineers, welders and QA/QC professionals. The company has four plants in Stratford, Wisconsin, with approximately 80,000 square feet of manufacturing capability and plasma cutting, automated seam welding, GMAW, GTAW and orbital welding capability are available when needed. An extensive range of process equipment may be fabricated in these facilities to meet customer requirements. The Automation and Controls Group at A&B Process Systems designs user-friendly controls in concert with the design and fabrication of the process system, to include the electrical engineering and design, electrical schematics, software development, panel component mounting and wiring. The company also offers an experienced management team, capable of coordinating all aspects of a particular project, e.g., site preparation, selection and scheduling of general contractors, cost estimation, delivery and installation of the new equipment.

It is this expertise that A&B Process Systems brings to the partnership with Admix Inc. The Vacushear® liquid processor is the result of that partnership.