

Dairy Foods Symposium: Innovations in Dairy Processing Unit Operations

492 Plate heat exchangers. J. C. Bohn*, *AGC Heat Transfer Inc., Bristow, VA.*

The role of the plate heat exchanger in pasteurization makes it arguably one of the most essential pieces of equipment in modern dairy operations. Plates designed specifically for sanitary applications have emerged with flow patterns that improve clean-in-place response, with pressing depths that cater to viscous flows, with surface finishes that enhance clean-ability, and with material thicknesses that yield improved mechanical strengths to withstand the process stresses as well as frequent opening and closing cycles. These plate characteristics have improved the overall operational efficiency of plate heat exchangers. The use of rheological data to characterize formulated dairy products, along with improved computational algorithms, has increased design accuracies of plate heat exchangers. The demand for increased production has forced plate manufacturers to utilize various methods in designing units to accommodate extended run times as well as achieving good clean-in-place response. Ice pigging, using pump-able slurry, has been introduced as a new method of reducing product losses, improving cleaning times and reducing biological oxygen demand loads. Modern dairy operations have benefited from easily opened and closed hydraulically driven twin screw frames that improve worker safety while easing the burden of field inspecting the internal product contact surfaces at an appropriate frequency. Third party field inspection of plate heat exchangers has become a standard practice in most all dairy operations, is recommended by 3-A standard 11-09, and has proven to be a valuable tool in ensuring the operational readiness of dairy pasteurizers.

Key words: pasteurization, rheology, pasteurize

493 Dairy processing efficiency and safety gains from double-seat valve technology. L. W. Clem*, *Electrol Specialties Company, South Beloit, IL.*

Double-Seat or Mixproof valve technology has undergone design changes within the last few years that allow the US dairy processor to significantly benefit from their application. The valve design allows separation of 2 product streams or a product and cleaning solution stream in the space of a single hygienic valve all while under automatic control and position monitoring. The design improvements include technologies to further enhance the separation of liquid streams through specialized seat contours and/or the use of deflector discs to assure safety and complete separation of fluid streams. These new valve types are allowed specialized process operational consideration and are recognized by the Pasteurized Milk Ordinance as acceptable

means to provide for separation of pipelines. The double seat valve can be applied without reservation in product receiving and storage, fluid batching and blending operations, thermal process systems, and everywhere there is a need to segregate products or cleaning solutions. Elimination of process openings or connection points reduce or eliminate potential product contamination and/or personnel exposure to fluids including hot or streams potentially containing chemical solutions for cleaning.

Key words: dairy processing, equipment, valves

494 Innovations in homogenizer and separator technology for the modern dairy plant. W. Rowlands*, *Rowlands Sales Co. Inc.*

Demand for improved shelf life, higher flow rates, and lower operating costs are affecting design and integration of homogenizers and separators in today's efficient dairy operation. Modern innovations must incorporate energy reduction and natural resource sustainability. Machinery longevity, possible negative product attributes, and additional maintenance burdens all need to be considered. Evolving trends in homogenizer design include noise and vibration reducing drives, energy conserving low pressure homogenizing valves, cylinder blocks with improved CIP path, water reclamation systems and hands free automation. Emerging separator technology includes enhanced cleanability, hermetic machine design, longer bowl shoot intervals and additional machine automation. All improve product quality, while some minimally increase certain product yields. Water saving technology increases natural resource sustainability. Energy efficient drivetrains lower electric consumption while reducing surrounding workplace noise and vibration.

Key words: homogenizer, separator

495 Filtration systems. D. Weber*, *Parker Hannifin Process Advanced Filtration, Oxnard, CA.*

This symposium presentation will provide updated information important to efficient operation of membrane filtration systems. An overview of filtration technology including new developments in dairy applications and membrane products will be provided. Element configuration including material limiting factors, trends in system configurations, and cost versus configuration options will also be discussed.

Key words: membrane, filtration