Case Study: The Design, Fabrication & Installation of Skidded Systems for the Production of Chocolate

For thirty years A&B Process Systems has provided process flow systems for the dairy, food and beverage, pharmaceutical, chemical, water treatment and other sectors of the processing industries. The benchmarks of this service have been consistent, high quality workmanship and an ability to meet demanding schedules. An example of this is a project that was recently completed and required the design, fabrication and installation of two skidded systems for the production of chocolate. The new systems replaced existing installations and the particular product line was relocated.

The first system, a distribution system, was the larger of the two and was required to distribute the product, operating continuously, 24 hours per day, 7 days per week and 50 weeks per year. Clearly, the reliability of this distribution system was critically important. The second system was a rework unit, capable of reprocessing chocolate that had been rejected during a production run but which still met the purity specifications. Rework units are quite common to the confectionery industry and are also used in sections of the dairy industry.

The distribution system contained two jacketed and insulated stainless steel tanks fitted with a swept wall mixer capable of gently agitating the highly viscous product. The surfaces of these tanks were dimpled to provide good fluid distribution across the entire heat transfer surface. Three positive displacement pumps were included in this skidded system. The supporting system contained strainers, magnetic traps, static mixers and several valves, these being connected by stainless steel process piping. The piping itself was jacketed, allowing hot water to flow counter current to the chocolate. A platform and stairs were built onto the skid to provide access to the tanks, which were fitted with a manway in the top.

In designing the distribution unit, the engineers at A&B Process Systems recognized that the dimpled surfaces of the tanks, together with the low speed agitating action of the swept wall mixer, ensured even heating, an important factor in the production of chocolate. The use of static mixers for the blending of two product streams was also recommended. It was considered that not only did this type of mixer provide the required blending but it is a low cost, low maintenance component. Magnetic traps are necessary to remove metallic particles from the product, particles that are small enough to pass through the strainers in the system.

The rework unit also required two stainless steel tanks and again with dimpled surfaces to provide efficient heat transfer and fitted with a swept wall mixer. The support system included two positive displacement pumps, two strainers and several valves, again connected by jacketed, stainless steel process piping. The flow of hot water through the jackets was again counter current to that of the chocolate.

Although the customer had originally specified two different brands of mixer for the distribution and rework systems, the same "anchor" agitation design was installed in both. This change was the result of lead-time issues. In order to meet the customer's start-up schedule, the "anchor" agitators were built at A&B Process Systems' facilities, which also resulted in significant cost savings to the project.

Both skidded systems were provided with automated controls. The distribution system contained a small logic controller and an operator interface, allowing specific functions to be automatically performed, e.g., the CIP cycle. The programmable logic controller in the distribution system contained discrete and analog inputs/outputs (I/O) and an interface to a communication protocol (RIO interface). The controls for the rework skid were connected to that for the distribution system by way of a separate operator interface. The Automation and Controls Group at A&B Process Systems provided the electrical engineering and design, the electrical schematics, software and screen development, panel component mounting and wiring and complete software. Details, including all hardware documentation, were provided to the customer as a manual. In keeping with A&B's policies, these systems were fully tested prior to shipment.

A&B Process Systems has always stressed the importance of good communication between the project teams, consultants and management personnel, referring to this approach to a project as "vendor partnering." The design, fabrication and installation of the two skidded systems for the production of chocolate represents an excellent example of this type of working relationship, a relationship that ensured the successful completion of the project.