CPG Industry Solution
Dairy Dryer/Evaporator Balance Application

Features and Benefits
Realize faster time-to-value benefits, lower life cycle costs and higher lifetime business value

- Increase throughput up to 15%
- Increase outlet air relative humidity up to 16%
- Reduce energy use up to 12%
- Reduce off-spec product up to 75%
- Increase moisture yield up to 1%
- Reduce moisture variability up to 60%
- Improve the consistency of dryer feed milk solids

The Challenge
Manufacturers of milk and other food ingredient powders recognize the constant need to operate their processes more efficiently. The goal is to increase throughput while simultaneously reducing costs in order to be competitive globally. Many manufacturers are also shifting more production towards higher value specialty products that require higher quality standards (such as low-fat, no-fat, protein-enhanced, etc.) In order to produce these different products, plant operations must perform within narrower, more consistent, product specifications.

In the dairy industry, a variety of dryers and evaporators are common in the production of powdered products to achieve cost-effective moisture removal from concentrated liquids. Dryers and evaporators are the most energy intensive units used in the dairy processing industries. Optimal operation of this process is essential to reduce costs and help meet final product quality specifications.

Rockwell Automation recognizes these challenges and offers an application focused on delivering valuable dryer and evaporator balance control for optimization and performance.
**Dairy Dryer/Evaporator Balance Application**

This Rockwell Automation Model Predictive Control (MPC) and Optimization Application assists in controlling and optimizing the drying process during the production of powdered dairy products. Powered by our patented technology, this application is tailored to the individual configuration of each unit and specific site objectives. It combines Rockwell Automation Dryer and Evaporator Balance Control Applications for a complete solution which incorporates full thermal control and optimization.

**Application Scope**

This application works with single and multi-stage spray drying processes as well as flash dryers and processes with fluidized beds. It controls product average moisture to a desired target, while reducing overall moisture variability, and manages relative humidity and capacity to achieve optimal performance.

**Moisture Management**

The MPC controller compensates for variations in the milk solids concentrate as well as inlet air relative humidity and other disturbances that affect drying efficiency. By reducing moisture variability, the average moisture target can be increased without compromising product quality. This increase in moisture target can also produce higher yields from the same milk solids. Dryer capacity can be increased and product re-works and energy use per ton of finished product can be reduced.

**Energy Balancing**

Implementing this dual application solution offers a unique thermal energy balancing opportunity between the evaporator and the dryer. Optimal energy use and cost control can be achieved.

**Early Engagement and Capacity Management**

This application also includes early engagement control, which sees the dryer under MPC and optimization. This helps in achieving optimal quality and thermal efficiency within minutes of the dryer commencing powder production.

Capacity management is achieved by improving the thermal efficiency of the dryer and controlling chamber temperatures and airflows to achieve the capacity target. At the same time, the absolute chamber relative humidity constraint and product quality are optimized.

**Performance Metrics and Visualization**

Real-time visualization in a browser based interface presents metrics that allow operators and management to monitor the performance measures of production, quality and energy. These dashboards allow current and predicted plant performances to be viewed and managed to realize and sustain the lifetime business value of MPC investment.