

# Digital Blending Solution Profile

Technology and experience focused on solving your blending challenges

## Issues

- Making sure raw material volume matches formula requirements
- Formula adjustments to allow alternative raw material
- Variations in raw material characteristics (color, acidity, moisture, etc)
- Impact of offline lab testing processes on production
- Rework or scrap in production
- Throughput and capital required
- Production data to monitor and improve quality

## Results

- Increase recipe changeover speed
- Dynamic ingredient control to provide product consistency
- Reduce lab test waiting time
- Reduce quarantined, reworked or scrapped product
- Reduce capital equipment
- Enable 6-sigma or other quality improvement efforts



## Overview

Blending two or more materials is a common operation in manufacturing facilities. But this does not mean you're not looking for ways to improve this process.

Consumer demand, raw material supply, and government regulations are driving the need for flexibility in blending operations. New products are added and existing products need to be modified to meet the changing demands of consumers. Raw material supply can change, or cost pressure may require different ingredients. Systems that can quickly respond to these challenges and support continuous improvement, while maintaining quality requirements, will give you an advantage.

## Challenges

Manufacturing and production facilities that handle blending operations need to meet quality standards and tighten quality limits by reducing product variability. The final product must contain a defined ratio of raw materials, and when they are not blended to the correct finished product specification, the product must be reworked or disposed of as waste.

LISTEN.  
THINK.  
SOLVE.™

An automated blending system will allow you to consistently execute recipes or formulations for each product. The automation system provides the capability to easily change the recipes to reflect changes in the production of one product, or the quick introduction of a new product. The system will also handle variability in the raw material by adaptive technology that dynamically modifies recipe set-points based upon raw material quality characteristics.

*Example: Blending beer to final alcohol content requires recognition of the alcohol percentage in the feed, a calculation and adjustment of the water volume to achieve target alcohol percent, and feedback to make sure the percentage was achieved.*

Plants have taken many approaches to solve their challenges. The traditional approach has been to blend the material in large tanks. But there is a cost for the tanks and floor space is needed. The resulting

cycle time for production can be long, and achieving “first time right” manufacturing is difficult. Automated blending technologies leverage a special digital blending algorithm that is based on monitoring and controlling the quantity or mass of material being blended and correlating back with the quality characteristics of both the raw material and finished product. This allows blending operations to utilize their capital equipment more efficiently and reduce or eliminate the need for intermediary vessels.

## Solutions

Rockwell Automation has a digital blending solution based on modular pre-engineered components and a proven digital blending algorithm. The solutions are scalable from a simple blend with few feeds, to mixing over 20 different feed lines.

These modular solutions are delivered on the Rockwell Automation Integrated Architecture. This provides control of operations and

connectivity to field devices for measuring flow and in-line analysis, along with seamless interconnectivity into critical business systems like MRP, LIMS, etc. The design of the solution algorithm and pre-engineered components is based on our experience and expertise in solving blending problems.

Key elements of the solution are:

- *Master controller*
- *Ratio*
- *Pacing*
- *Blend shutdown*
- *Analyzer/optimizer feedback*

This solution has been developed using the Rockwell Automation library of pre-developed modules and solution specifications. This approach reduces risk in project implementation and provides enhanced capability over custom systems. It can then be easily replicated across multiple sites allowing for quicker start up consistency in systems and common training and support.

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