428 Process Description

The process we will automate uses a steam jacketed reactor fed by two ingredient tanks. (See the diagram on the following page.) Ingredient A is always used in the process in varying amounts. Ingredient B is optional depending on the final product. The reactor has a two-speed agitator which runs on low as the ingredients are charging. It switches to high during the reaction, which takes place when the charging is complete.

The reaction phase of the process consists of a temperature ramp to a specified set point and a ramp down immediately after. The reactor agitator is set to high speed during the ramp up and down.

When the temperature cools to a specified level, the agitator switches to low and reactor draining begins. Draining continues until the reactor is empty. The agitator is switched off as the reactor nears empty to prevent the motor from burning out.

Both ingredient tanks as well as the reactor have two-state bottom valves and two-state pumps in-line. In addition, the A fill line has a regulatory control valve since flow rate of ingredient A into the reactor is process critical. Totals of ingredients A and B, and product, are monitored and recorded after each batch.

Process and safety interlocks are incorporated to: 1) prevent reactor over flow; 2) prevent fill valves opening during draining; 3) prevent the pumps being turned on when their corresponding bottom valves are closed; 4) prevent the agitator being turned on when the reactor is empty; and 5) prevent the drain valve opening during ingredient charging.

The process can be run manually and we will also set it up to run automatically.

428 Process Diagram