# all mixed up

## Conductivity sensor helps rubber producers control tacking

**Without a properly mixed** antitack additive, rubber production can indeed be a sticky situation. Too little calcium stearate powder — the main ingredient of the liquid additive — and rubber sheets could adhere to each other; creating costly rework to bring them back into spec. Too much calcium stearate and sheets could slide off of palettes and end up in the scrap pile.

Despite the fact that variations in the mixture have tremendous implications for labor, material costs, and product quality, rubber producers have had to rely on human judgment to determine which mix was optimal for their production. Recently, however, Calzin, a producer of chemical components for antitack additives, has produced a measuring system that enables its customers to determine the exact proportions of calcium stearate concentrate and water for their application.

Founded in 1952, Calzin, Inc., is an international supplier of coatings for the rubber industry. One of the company's original products is calcium stearate which, when mixed with water, produces a soap-like slurry release agent that inhibits rubber from sticking to itself when folded and stacked.

Calzin ships the calcium stearate to customers as a concentrated dispersion, and they in turn dilute it with water for use as needed. Through what has largely been trial and error, customer technicians adjust the flow of water into the premix concentrate until they feel it has the right consistency.

"This is far from an exact science. There's a fine line between hitting or missing the proper ratio," says Jeff Blanchard, vice president at Calzin, Inc. "For instance, if your target is a mixture of three percent solids, a two percent mixture will result in the rubber sticking to itself and may require rework. A four percent ratio can cause rubber sheets to slide off of pallets and possibly result in scrap. Worse yet, the excess can become airborne resulting in severe dust problems that endanger workers."

Release agents are used for a wide variety of applications throughout the natural and synthetic rubber industry, and it is the application that dictates the proper mix ratio.

"Users must determine what works best for them, and even then it's a moving target, since environmental conditions, such as temperature can affect the density of the mixture," says Blanchard.

Seeking to help customers make more effective use of his product, Blanchard set out to develop an automated mixing system to remove the guess work and help his customers achieve consistent and repeatable release agent mixes.

"There were mixing systems that are programmed to pump out predetermined quantities of concentrate and water, but they are strictly mechanical and do not account for process variations, such as temperature and humidity that can change the make up of the mixture," says Blanchard.

Figuring that determining the exact percent of solids ratio in the solution would provide a much more accurate and consistent solution, he hypothesized that conductivity sensing could deliver that information. His search for authorities on the subject led him to the Foxboro Measurement & Instrument Division of Invensys.

## Foxboro solution

After preliminary discussions about his application, Blanchard met with Foxboro process measurement experts, who demonstrated an electrodeless conductivity system with which he could measure and maintain percent solids ratios with high accuracy.

"The Foxboro solution measures and maintains a predetermined percent solids ratio based on conductivity, which assures accurate batch composition every time," says Blanchard.

The Foxboro system consists of a conductivity analyzer with a tailored custom curve set and electrodeless conductivity sensor. The sensor measures the conductivity and sends a reading to the analyzer. From there, the software triggers alarms when conductivity setpoints are reached, which control a series of valves and pumps that supply the Calzin concentrate and water in proportion to maintaining a predetermined target conductivity setting.

Before Blanchard offered the premix system to customers, he performed his own research, calibration, and testing. He correlated the conductivity readings to percent of solids in the solution and experimented with the valves and pumps to determine the levels that would meet the customers' mixing target.

"The key was converting conductivity measurements into discernable information that technicians could understand. Through trial and error I developed a percent ratio chart as a guide for determining percent solids at different temperatures," says Blanchard. "Conductivity is not the easiest thing to work with. It can be very temperamental."

Foxboro provided technical support to decipher the meter's codes and showed Blanchard where and how to link his equipment to the meter, and how to work the data for programming the software.

"I was impressed with their availability and level of technical expertise," says Blanchard.

## Results

By automating the release agent mixing process, Calzin has improved the use of its additives, while assisting customers in reducing labor and material costs.

"The most significant benefit for our customers is ease of use of our agents," says Blanchard. "They love it because we give them a quality concentrate and the capability to automate mixing specifically for their applications."

The automated system also reduces labor and material costs for Calzin customers.

"In some cases there have been as many as six people checking and adding to the release agent mixtures. Our system totally eliminates the 'too-many-cooks' problem through automation. It eliminates human error while enabling customers to use just the right amount of concentrate, which also reduces waste. The Foxboro-based system enables us to better serve our customers and gives us a competitive edge in the market place," says Blanchard.