

REAL-TIME TEMPERATURE MONITORING IN FLOUR SILOS

MILLING COMPANY KEEPS PRODUCT & TEMPERATURES STABLE



CAS DataLoggers provided a real-time wireless data logging solution for the [Bay State Milling Company](#). Located in Indiantown, Florida, Bay State is a food processing company serving Central and South Florida, producing baking flour in bulk and packaged products. The flour mill's stringent [Integrated Pest Management Program](#) (IPM) ensured that the plant's wholesome products were not contaminated with insects.

As part of its IPM program, the mill regularly used a powerful industrial-strength fumigant to eliminate pests in its flour storage silos and processing buildings. The fumigant was extremely effective but very temperature sensitive. During deployment, the fumigant needed to be kept at temperatures greater than 85°F (29°C) for a period of twenty-four hours to be effective. However, with the plant's equipment shut off during the fumigation process, the flour silos and processing buildings cooled down rapidly and the temperature fluctuated based on the ambient weather conditions.

To combat the loss of heat, the mill contracted personnel suited in protective gear to enter the buildings, manually measure the interior temperatures, and then adjust the unit heaters as necessary. Due to this time and cost prohibitive process, the mill began searching for an efficient, real-time temperature monitoring system for the flour bins and interior building spaces to eliminate the need to go inside.

What made this application especially difficult was the potential impact of the reinforced concrete construction of the five-story flour silos and processing building on the wireless signal.

INSTALLATION:

After investigation, TandD's wireless [RTR500B Series](#) was selected for this application owing to its operation at 900MHz, which offers superior radio performance compared to other wireless solutions on the market. [RTR-501B](#) wireless data loggers were strategically placed in the processing and storage areas to measure and record temperature using their built-in sensors. They provide an optimal solution in a water-resistant and dustproof package with a measuring range of -40 to 176°F (-40 to 80°C) and an accuracy of $\pm 0.5^{\circ}\text{C}$.



These compact data loggers, with a built-in LCD display, could record up to 16,000 points in internal memory, allowing them to capture a complete record of the process. Additionally, the loggers were fitted with wall mount brackets, allowing easy installation at the desired monitoring locations. With a low-energy consumption design, each logger was powered by a lithium battery with a life of about 10 months

which could be upgraded with a larger capacity battery to provide up to 4 years of operation.

Two [RTR-500BC](#) wireless base station/repeaters were employed in a daisy chain configuration to extend the communication range to the RTR-501B loggers located deep inside the facility so that the radio signals could penetrate the heavy walls. The data was collected far outside of the concrete silos and processing buildings using a T&D [RTR-500DC](#) wireless handheld data collector, that allowed a technician to check the real-time temperature readings as he made his rounds throughout the facility. Even from

outside the reinforced concrete silo walls and processing buildings, the handheld data collector was able to pick up the loggers' real-time data from about 200 feet away, all the way across the mill's parking lot.

UTILIZATION

The RTR500B system allowed data to be accessed via the RTR-500DC handheld data collector, which proved to be the most convenient method for the mill. The wireless base units could download one RTR-501 remote unit at full logging capacity (16,000 readings) in about two minutes. Software for automated download and real-time monitoring as well as email alarms was included with the base stations. The data collector monitored, managed, started and stopped recording, graphing all the data from the remote units for immediate on-the-spot checking of the building's temperature data without the need for a computer.

The ability to monitor current readings and status on demand from each of the remote units inside the silos without anyone having to go in and manually gather them, saving a great deal of time and removing the safety risk presented by the still-active fumigant. The collector was able to simultaneously manage a large number of remote units, storing up to 15 full units of data from the RTR-501B data loggers. The RTR-500DC also eliminated the need for any troublesome preparation such as having to create a network environment or to carry out wiring. The collector's LCD backlit display let the engineer easily read the data even in the dark. The simple dial made operation easy, with a quick menu structure enabling intuitive operation onsite.

BENEFITS:

Bay State Milling Company benefited in several key ways following installing the T&D RTR500B wireless real-time monitoring system. Most importantly, personnel were able to check the temperatures in the flour silos and the interior spaces within the process buildings with the handheld data collector instead of having to rely on

manual means. Together these sophisticated devices formed a practical and cost-effective solution for the mill's temperature monitoring application, and the data loggers' compact and lightweight design meant they could fit easily in the bags or be placed just about anywhere in the plant. The remote data allowed mill personnel to efficiently manage the fumigant's deployment's efficacy. Bay State Milling Company's Plant Manager, Mr. Bill Raiola, commented on the convenience of the T&D wireless system: "We were all very pleased to have the real-time data, especially considering where the devices were located inside the flour silos. Our engineer was even able to collect the temperature readings from as far as 200 feet away from the silos and buildings."

This application note has been adapted from an article written by TandD. TandD is the manufacturer of the RTR-500B Series, the real-time temperature monitoring solution ideal for agricultural applications.

For more information on [TandD's RTR500B Series](#), or to find the ideal solution for your application-specific needs, contact a CAS DataLogger Application Specialist at **(800) 956-4437** or www.DataLoggerInc.com.