

Continuous Recording Solutions for the Pasteurization Milk Ordinance (PMO)

The Milk Must Flow and Dairy Data Recording Cannot Stop

Industry: Food & Beverage



Executive Summary

As long as cows produce, milk must continuously flow in dairy facilities. Processes such as pasteurization must continue uninterrupted to prevent waste and, of course, the related expenses. To prove that processes have been performed safely, recording of measurement data also must be continuous. The **Michigan Milk Producers Association (MMPA)**, a multi-site, farmer-owned cooperative, has found an accurate and efficient way to maintain uninterrupted recording and prove that producers meet regulations.

The **Pasteurized Milk Ordinance (PMO)** is a set of standards and requirements that regulate aspects of dairy plants producing Grade "A" products. It is the "dairy bible" that dairy producers, manufacturers, and balancing plants must follow to verify food safety.

Inspectors want to know that dairy facilities have maintained the proper process variables for pasteurization, for example, mandatory temperatures, flow rates, and flow diversion status. Inspections proceed more smoothly with much less stress when dairy organizations have the technology to record the data correctly.

The Challenges and the Solutions

1. What is really needed from technology

In the dairy industry, producers make the best of available technology, but paper and pen recorders have been cumbersome. There are many stories about batches that had to be scrapped because their safety could not be proven after a recording pen ran dry or milk spilled on the paper record.

At MMPA, their method of recording data has been, of course, to use a paper-format data recorder. The moderately thick pen cannot indicate better resolution than a tenth of a degree. Although this level of precision has been accepted for a long time, MMPA has wanted to record with higher precision. With this information, producers could make improvements to their processes and better understand any deviations.

“Our relationships with the inspectors have been good, and they recognize we are looking for better ways to document the safety of our pasteurization process. In the past, they have requested temperature precision to the hundredth of a degree and faster review of the data,” stated Ryon Shaw, Project Engineer at MMPA.

As stated previously, the trend line on a paper chart cannot document temperature values to a tenth of a degree. There is always quite a bit of interpolation that comes into play when trying to define a digital value on chart paper that offers grid lines only every two degrees Fahrenheit. MMPA knew that the quality control department would appreciate the tenth of a degree (or better) values that the paperless readings provide.

Ryon added, “we also recognized that our processes could be improved by a more user-friendly analysis method. Searching through paper records to understand the data has always been difficult and potentially could have generated errors. And each of us in dairy facilities have had to dig through paper batch records to answer inspectors’ questions about a specific batch number.”

2. Integrating digital recording to meet the PMO

Although paperless recorders address many challenges, milk facilities are often hesitant to be early adopters. The universally accepted M-b number has not been available for a digital recorder until very recently. In order to satisfy their accuracy and paperless goals, MMPA reached out to their local Yokogawa instrumentation provider for solutions. Ryon decided to place a **SMARTDAC+ GX digital recorder** in parallel with the existing paper chart recorder.

The MMPA project engineer demonstrated the solution to skeptical inspectors, showed them where the recorders would be installed in the application, and presented the digital recorder’s special firmware that meets the PMO specifications. Specifically, the recorder can be placed into a Regulatory Lockdown Mode where users are locked out of certain capabilities until the inspector releases the lock. Security settings allow users to see the recorder parameters, but they cannot perform the restricted actions that are prohibited by the PMO.

Ryon shared “During COVID, our parallel tests continued, but progress in removing the paper recorder slowed. We maintained the paper chart as the master and used the digital as a backup. Results of the side-by-side comparison of our current paper chart with a digital recorder showed more accurate digital data with no wasted paper or ink, and no ruined records through water or fire.”

3. Benefits of continuous recording and tailoring reports

The recorders enabled inspectors and the MMPA team to use the touch screen to view the configuration file and prove how the input was configured for the recording session. The configuration parameters of the recorder are always saved as an integral part of the data file. The encrypted data file contains the

instrument name, serial number, configuration with detailed input types, and scaling for each channel as well as time-stamped trend/digital values as a historical record.

“We can show inspectors a real-time web page with graphics launched on a browser. During inspections, we do not need to go out to the floor; we can sit in a remote office and see recorder data — trends, values, logs, and more,” Ryon explains. “In fact, we are planning to have multiple recorders showing real-time graphics on a large control room monitor simultaneously. The operators in the control room can view the conditions on the plant floor in real-time.”

The recorder is simply another node on the network. All its data can be used in digitally created reports and analyses.

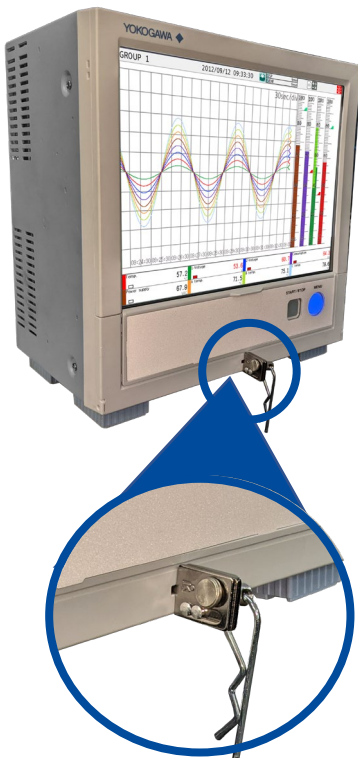


Figure 1. Recorder with Key for Lockdown Mode (PMO compliant)

Recently, the MMPA team called up data for a process area and viewed the temperature for three months starting on a specified day. During the recording sessions, notes and ideas were written on the touch screen to allow the quality department to view them and determine if improvements could be made to the process. All notes and annotations are saved as part of the secure encrypted data file.

The digital recorder helps enable PMO compliance in the pasteurization processes. But the digital recorder strengthens many other areas in dairy facilities — anywhere producers need to log process flow, temperature, valve status, and more.

4. Clean-in-place (CIP) benefits

As they perform clean in place (CIP) applications, they can use the digital recorders to record the important parameters that show the vessels and pipes have been properly cleaned — recording flow rate and chemical concentration. In fact, the recorder itself is wash-down ready as it carries a NEMA 4- IP65 rating.

About MMPA's Future Plans

According to Ryon, "our plan is to go completely digital over time. In fact, the silo temperature recording is currently paperless. For now, we are still operating the pasteurization process with both paper and digital recorders in parallel.

"You might ask what we will do after we have final approval to use the digital recorders?

"My answer: Rip out the paper recorders and have a party!"

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