Paperless Process Recorder (PPR)

Addressing Chart Gaps in Dairy Pasteurization Plants with the PPR

Prepared by Anderson-Negele

Summary

Paper chart recorders are significant legal tools utilized in pasteurization as they document the process and offer evidence of adherence. Despite their significance for record-keeping, they can be susceptible to problems leading to what is referred to as Chart Gaps in the Dairy Industry. These Chart Gaps occur when issues with the recorder prevent it from accurately capturing the intended data.

This whitepaper explores the advantages of the Paperless Process Recorder and how this technology eradicates the potential for traditional chart gaps.

Introduction

Pasteurization is of utmost importance in the dairy industry as it ensures the safety and quality of dairy products for consumers.

The process involves heating milk or other dairy products to a specific temperature and holding it there for a predetermined period to eliminate harmful bacteria, viruses, and other microorganisms that can cause foodborne illnesses. By doing so, pasteurization significantly reduces the risk of pathogens such as Salmonella, Listeria, and E. coli, making dairy products safer to consume.

Chart recorders have historically played a crucial role in the pasteurization process, ensuring food safety and quality. In the pasteurization process, chart recorders are employed to monitor and record critical parameters, such as temperature and time, during the pasteurization of milk and other products. These recorders create graphical representations or charts of the temperature variations over time, allowing operators to verify that the pasteurization conditions meet the necessary standards for pathogen destruction while preserving product characteristics.

Traditional Paper Chart Recorder
AV9000 & AV9900

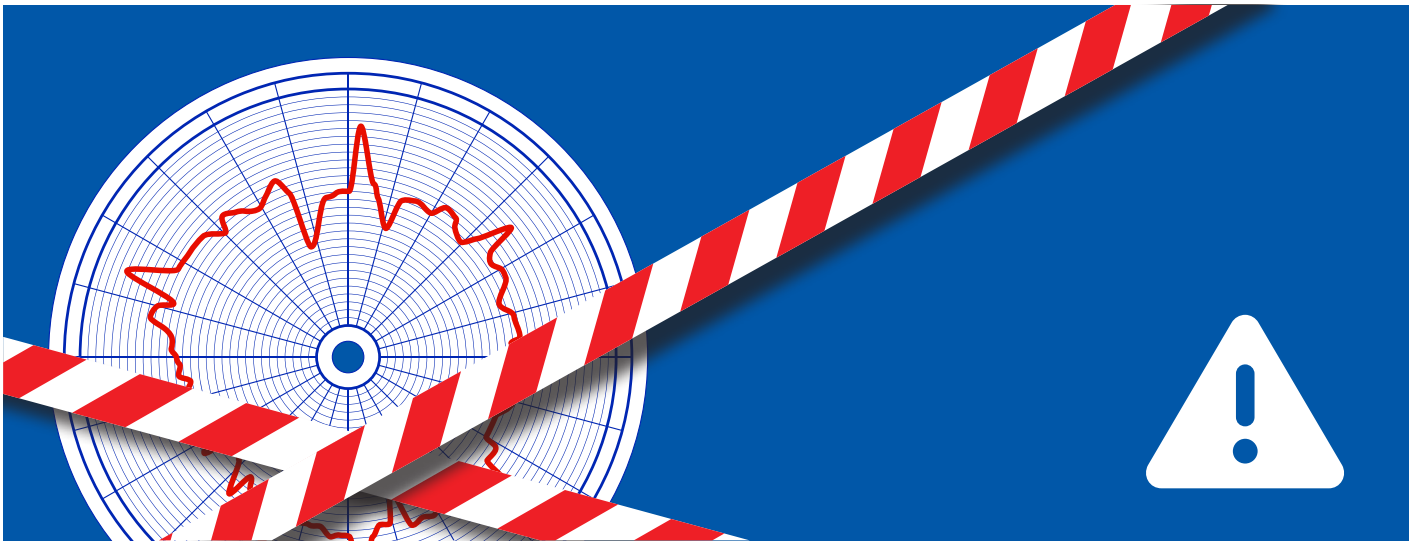
The chart produced by a recorder displays a graphical representation of the time and temperature of the processed liquid. This visual representation allows operators to quickly assess whether the pasteurization process complied with the required temperature and time conditions. Deviations from the required pasteurization control point could indicate potential issues with the process, alerting operators to take corrective actions, such as adjusting the heat treatment or extending the holding time, to ensure food safety and quality.

Although the Dairy industry has been heavily reliant on paper chart recorders, they are known to be prone to various issues. Malfunctions with paper chart recorders often referred to as chart gaps can cause production downtime and loss of product altogether.

Paper Chart Recorder Malfunctions

Traditional chart recorders rely heavily on multiple mechanical components that work in tandem to deliver precise and dependable information.

Due to the complexity of these devices and the presence of numerous moving parts, they are vulnerable to various degrees of malfunction that cause chart gaps. When such malfunctions occur, the product undergoing pasteurization may require reprocessing or even be rendered unusable. The range of issues that can impact the process and cause gaps in data include



1. **Chart Drive Malfunction: I**f the chart drive mechanism fails or experiences irregularities, it may result in inaccuracies in the recorded data.
2. **Pen Jamming or Drying:** Chart recorders use pens to mark data on the paper chart. If a pen jams or dries up, it can lead to interruptions in data recording.
3. **Chart Alignment Problems:** If the chart is not correctly aligned on the recorder, the data may not be recorded accurately, leading to gaps, or overlapping data.
4. **Temperature and Humidity Issues:** Extreme temp or humidity conditions in the environment where the chart recorder is placed can affect the proper functioning of the device.
5. **Power Interruptions:** Power outages or fluctuations can cause the chart recorder to stop recording temporarily.
6. **Mechanical Wear and Tear:** Over time, the components of the chart recorder can wear out, affecting its performance.
7. **Sensor Problems:** If the sensors responsible for measuring and transmitting data to the chart recorder malfunction or provide inaccurate readings.
8. **Paper Jams or Supply Issues:** Issues with the paper supply or jams in the paper feed can interrupt the recording process.
9. **Vibration and Shock:** Vibrations or sudden shocks can disrupt the delicate mechanisms of the chart recorder.
10. **Writing on the Chart:** Positioning the operator's palm on the chart triggers the gear chart motor assembly to move forward, leading to gaps in the data.
11. **Shift Change:** If the operator fails to change the record within the 12-hour window of the complete chart, trends captured after 12 hours may overlap with the initial chart trends, leading to difficulties in continuous trend interpretation

Advancements in technology like the Paperless Process Recorder have led to the adoption of digital data logging and automation in many modern pasteurization systems. With reliable data storage and highly accurate digital charts the Paperless Process Recorder eliminates the opportunity for both mechanical failures and human errors, reducing the likelihood of additional implications caused by chart gaps.

Implications of Chart Gaps

Chart gaps from chart recorders can have significant implications for dairy pasteurization processes.

Because chart recorders provide "legal" data about the dairy pasteurization process when chart gaps occur it can have a rippling effect within a pasteurization plant. Time, money, and energy can all be affected by chart gaps for the following reasons:

Inaccurate Monitoring

Chart gaps can lead to inaccurate temperature and time readings during pasteurization. If there are interruptions in the chart recording, it becomes difficult to track the exact temperature changes over time. This can result in an incomplete and unreliable record of the pasteurization process, making it challenging to verify whether the dairy product has been properly treated to kill pathogens.

Compliance with Regulations

Pasteurization is regulated, and dairy processors must adhere to specific temperature and time requirements to ensure food safety. Chart gaps could raise concerns during audits and inspections since there might not be sufficient evidence to demonstrate that the pasteurization process met the required standards consistently.

Food Safety Risks

If chart gaps occur during critical phases of the pasteurization process, such as the heating or cooling stages, it could create potential food safety risks. Insufficient or inconsistent heating may not contaminate and potentially lead to foodborne illnesses.

Quality Control

The data collected from chart recorders is crucial for quality control purposes. It allows dairy processors to monitor and fine-tune their pasteurization processes to ensure consistent product quality. Chart gaps hinder the ability to analyze and improve pasteurization procedures effectively.

Traceability

Accurate and continuous chart records are vital for traceability and recall purposes. In the event of a product recall due to contamination, having complete and reliable chart records helps identify affected batches, assess the extent of the issue, and take appropriate corrective actions.

> *“PPR has solved all chart trend and annotation related data issues we have experienced with paper chart recorders.”*
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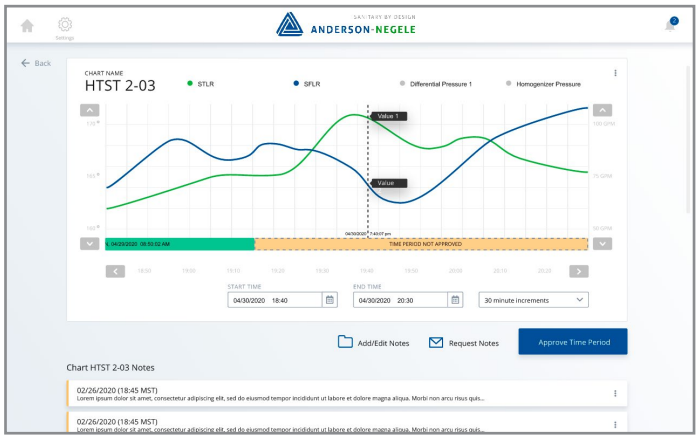
> — Avneet Sonna, QA Director at Dairy State Cheese, Wisconsin

Chart Gap Solution

Digital chart recorders play a significant role in mitigating the possibility of chart gaps through their automated and continuous data recording capabilities.



Digital chart recorders play a significant role in mitigating the possibility of chart gaps through their automated and continuous data recording capabilities. Unlike traditional paper chart recorders, which could experience the various gaps mentioned, digital chart recorders like the Paperless Process Recorder (PPR) operate electronically and provide several features to prevent chart gaps.

The PPR ensures continuous data recording without the need for paper charts. This uninterrupted data collection process eliminates the chances of gaps in data, as the system runs continuously as long as it remains powered on. The transition from one data recording period to the next is seamless, leaving no room for interruptions. The PPR stores the digital charts as static PNG images, to further protect the authenticity of the recorded
legal data.

The legal data recorded is stored both on site and in the cloud. With ample data storage capacity of digital recorders removes the frequent need to change charts that can lead to gaps in data. By electronically storing a significant volume of data, these recorders ensure that the recording process remains consistent over extended periods without requiring frequent maintenance.

> ***“Our customers are thrilled to move away to everyday problems associated with paper recorders, they are immediately experiencing improved confidence in complete trend data.”***
>
> — Seth Hanson, PPR Implementation Manager, Anderson-Negele

Another crucial feature is the automatic data backup capability present in the PPR. This functionality securely stores recorded data in an internal memory card as well as the cloud. In case of any unforeseen interruption, such as power loss, the recorder can resume data collection from the exact point it left off. This intelligent backup mechanism prevents gaps by maintaining a continuous stream of data.

Real-time monitoring is also a noteworthy attribute of the Paperless Process Recorder. Operators can monitor the data acquisition process in real time, ensuring that any potential issues are detected and addressed promptly. This active monitoring contributes to preventing gaps in data by allowing for immediate intervention in case of disruptions.

Furthermore, advanced digital recorders such as Anderson-Negele’s Paperless Process Recorder often offer remote access through network connections. This remote accessibility enables operators to keep tabs on the recorder's status and collect data from a distance.

Digital chart recorders reduce the likelihood of errors commonly associated with gaps in traditional charts by offering continuous data capture, automatic backup features, real-time tracking, and the ability to access data remotely. These combined attributes improve the overall integrity, precision, and dependability of data, factors that are particularly important in sectors where meticulous data monitoring is vital.

Additional Notes

The Paperless Process Recorder by Anderson-Negele has been evaluated and reviewed by both the FDA and AMDERC and found to be compliant with the 2019 Pasteurization Milk Ordinance (PMO), offering a unique value to dairy pasteurization plants. The Memorandum-b was issued April 21st 2023 and the only paperless process recorder to obtain the Memorandum-b at the time this article was written.

For additional information regarding the Paperless Process Recorder please visit:
Contact Us for PPR Paperless Recorder | Anderson-Negele USA

Pasteurized Milk Ordinance: Grade "A" Pasteurized Milk Ordinance (fda.gov)
Paperless Process Recorder Memorandum B: Grade A Milk Search (GAMS) (fda.gov)

For additional informations on the
Paperless Process Recorder (PPR)

PPR-Quote

anderson-negele.com/ppr-quote

40011 / 1.0 / 2025-07-23 / KK / EN-NA

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