WHITE PAPER

Maintaining Product Integrity at Dairy Farms

A look at how milking parlors utilize loading dock technology and compression foam seals at hatch doors to prevent product contamination

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Introduction

Have you ever wondered how milk makes it to the grocery store? From farm to fridge, milk has a fascinating and complex journey and must be thoroughly tested, regulated and inspected to ensure it is safe for human consumption or use as an ingredient in other end-products. From cow care to raw milk transport, dairy farmers must follow strict guidelines, ordinances and procedures from state and federal agencies to ensure that their product meets high standards for wholesomeness and overall quality. The milking parlor and storage areas are vulnerable to contaminant entry and pose the greatest risks to the production process.

Milking parlors are the isolated buildings where milk is collected from cows and are required to follow specific rules for sanitation and contaminant prevention. Cows are cleaned and disinfected before milking, but the process can be tainted by dust, dirt and other airborne particulates, or if insects, rodents or birds can enter the parlor and carry in bacteria from the outside environment. If a storage tank of milk, which can hold on average 8,000 gallons (30,000 liters) of milk or more, tests positive for food pathogens or disease-causing bacteria, it must be disposed of at the farmer's expense. Equally threatening to milking operations is if a facility fails to meet satisfactory standards for cleanliness during an inspection, in which case the operation's approval may be denied or suspended, further reducing profitability and risking net losses. To protect milking parlors against the entry of contaminants, like insects, birds, dust, dirt and debris, openings to the parlor must be sealed, including the hatch doors where milk transfers from the parlor storing area into tanker trucks.

In this white paper, we will examine the impact the dairy industry has on the US economy, the dangers of disease outbreaks that can occur if infected or contaminated milk reaches consumers and provide a brief overview on the various steps in place from state and federal regulatory agencies to keep milk fresh, clean and safe. Then, we'll discuss the importance of sealing gaps around the milking parlor hatch door while transferring milk into tanker trucks and how that has been made possible with a unique solution developed by a leading manufacturer of loading dock seals and shelters.

Dairy Industry Overview

Dairy products are used in virtually every type of food, from easily recognizable dairy items like cheese and ice cream to products where the dairy ingredients are lesser-known, like granola mixes made with butter or vitamins that contain whey. With so many foods relying on dairy as their primary or secondary ingredients, it is no surprise that it contributes significantly to the American economy. Reports show that the dairy industry accounts for 1 percent of the US Gross Domestic Product (GDP), generating an economic impact of $628 billion and creating nearly 3 million jobs.[1]

No matter the specific type of food, all dairy ingredients and byproducts originate from the same source: milk. According to the United States Department of Agriculture (USDA), the 24 states with the highest level of milk production yield over 223 billion pounds of milk per year.[2] Raw milk, the end-product of a dairy farm, is taken from cows at the farm's milking parlor. Milking parlors are designed to optimize milk production, efficiency and quality: all factors that significantly impact a farm's profitability. Cows are milked two to three times per day and each cow can produce over 2,000 pounds of milk per month.[2]

Each cow produces approximately 80 pounds (10 gallons) of milk per day

Milking parlors facilitate cows during the milking process, where raw milk is transferred into large storage tanks. Milk leaves the cow's body at 101 degrees Fahrenheit and must be instantly cooled to 39 degrees. To keep raw milk fresh and safe, it must remain at a constant 39 degrees and not experience temperature fluctuation or be exposed to extreme cold or heat. Depending on the size of the farm and its milk production, the milk in the holding tanks will be picked up by an insulated and refrigerated milk tanker truck every day or every other day.

Stainless steel insulated tanker trucks are sanitized upon arrival at the milking parlor and connected to the stored milk via a food-grade hose that pumps the raw milk into the

truck's tank, which can hold approximately 7,000 to 8,000 gallons. Throughout the transportation process, milk must be tested and graded to ensure its quality and that it is safe for consumption. Because raw and pasteurized milk and its byproducts are used across such a variety of foods and supplements, it is essential that each tank load of milk meets the highest standards for quality and safety. Not only is milk tested to ensure it is free of antibiotics and possesses minimal somatic cells, but the milking parlor and storage areas are regularly inspected to ensure they are clean, hygienic and free of potential contaminants.

An insulated, stainless steel tanker truck prepares for a raw milk load pickup

In the next section, we will discuss what guidelines are in place to ensure the parlor and its products remain clean and the specific challenges that dairy farms face when sealing out contaminants and vulnerable points of entry that pose serious threats to product integrity.

Milking Parlor Ordinances and Regulations

There are a variety of ordinances, regulations and procedures that milking parlors must adhere to in order to receive USDA approval and meet Food and Drug Administration (FDA) operational requirements. In this section, we will narrow our focus on a major threat to product integrity: contaminants. Keeping milk clean, cold and moving are the goals of dairy logistics, and preventing contaminants is crucial to ensuring a usable product.[3] Cleanliness not only refers to cleaning and sanitizing the cows and equipment before milking, but it also applies to the general environment in the milking parlor itself. Foodborne pathogens in milk are due to direct contact with contaminated sources within the dairy farm environment, which allow dirt and bacteria to enter the milk lines, creating a biofilm and an increase in the total bacteria count.[4]

Contamination of the milk is particularly dangerous because manure may contain a variety of harmful bacteria, including salmonella, tuberculosis, E. coli, typhoid fever and intestinal diseases, which, if ingested by consumers, can lead to sickness, hospitalizations or fatalities. According to the Centers for Disease Control and Prevention, contaminated or infected milk caused a total of 81 outbreaks across 26 states in recent years. These outbreaks resulted in 979 illnesses and 73 hospitalizations.[5] Although pasteurization kills harmful organisms and greatly reduces the risk that milk will carry illness-causing bacteria, raw milk is still used in a variety of products, such as soft cheeses and some yogurts and ice creams. It is essential that raw milk from dairy farms, regardless if it will be pasteurized, gets tested and checked thoroughly at various intervals in its transport and production processes.

In order to sufficiently prevent bacteria from contaminating milk, dairy parlors must adhere to strict hygiene ordinances and follow guidelines and regulations from the FDA and USDA. These organizations provide instructions on how to help protect milk from contamination during collection, storage and transfer and provide specifics on parlor designs that can help limit air, particle and pest infiltration. Milk can be contaminated at any point in the milk production process and some key sources of contamination include dust, insects, birds, vermin, hair and other airborne particulates that may enter from the outside environment.[6] These contaminants can raise the bacterial estimate in milk samples and force tank loads of raw milk to fail quality inspections, resulting in thousands of gallons being disposed of at the farmer's expense.

Milk is transferred from the parlor holding area to the bulk tanker through a hatch door

The FDA requires that all milking parlors take effective measures to prevent the contamination of milk, containers, utensils and equipment and that the entire parlor must remain sanitized and clean, with no evidence of birds, dust, odors, insects or rodents.[6] Not only do preventing these contaminants help protect product integrity and reduce the chance of bacterial presence in milk, but it also safeguards the dairy

operation from net losses and penalties from the USDA. A facility's licensure or approval may be denied or suspended by the USDA if it is not performing satisfactorily regarding the control of insects, rodents and other vermin.[7]

Along with sealing out the external environment, dairy farms must ensure that milk is not exposed to any extreme temperatures that could jeopardize the milk's quality or freshness. Dairy items are highly sensitive and even a short encounter with extreme cold or heat from outside can damage the product. Transporting the milk from the parlor to the bulk tanker truck must be done in such a manner as to accommodate the short shelf life and delicate conditions in which dairy products must be kept.[3] To protect against product damage while milk travels from the interior storage tanks to the tanker trucks, the FDA requires the milk hose connection to the milk tanker truck to be completely protected from the outside environment at all times.[6]

Preventing Contaminant Entry and Infiltration

In addition to protecting the milk hose and connection between the building and the tanker truck, parlors must also protect against pest entry and contaminant infiltration that can also jeopardize the safety and cleanliness of the raw milk and its storage area.[6] There are several ways in which dairy farmers ensure the milking parlor entrances and windows are protected from contaminant entry, but hatch doors must remain open for the hose to connect the interior storage tanks to the bulk tanker trucks. However, open hatch doors also create a point of entry for insects, rodents, birds, dust, dirt and debris from outside of the building to enter. In order to keep the parlor and milk hose connection to the tank protected, a positive seal must be established between the tanker truck and the parlor hatch door opening.

Compression foam seals surround hatch door openings

These types of seals are commonly used in the material handling industry at loading docks. Compression foam surrounds the loading dock door opening and creates a positive seal between semi-trailers and overhead doors at commercial and industrial buildings. By sealing all air and light gaps at the dock, foam seals eliminate points of entry for contaminants, maximize environmental control, reduce temperature fluctuation and lower energy costs. They are designed to prevent product damage and provide an effective barrier against the elements to increase overall safety and operational efficiency.

NOVA Technology, a leading manufacturer in loading dock seals and shelters, recognized the need for contaminant protection at milking parlors and developed a seal specifically to enclose parlor hatch doors. The Dairy Seal from NOVA Technology is a four-sided compression foam seal that allows milk tanker trucks to back up against and eliminates gaps between the vehicle's pump and hose cabinet and the parlor. By compressing between the truck and the back of the hatch opening, the foam pads eliminate all gaps between the internal and external environments. Just like sealing a loading dock, gaps around the hatch door opening can lead to product contamination, environmental exposure and temperature fluctuation, which can ruin thousands of gallons of milk.

Dairy Seal from NOVA Technology

The NOVA Dairy Seal has head, bottom and side pads that are all filled with high-density polyurethane foam for a tight seal and added resiliency. The pads have a standard 12-inch face for ample coverage and contact surface area and are available with up to a 24-inch projection. The foam is bonded to a pressure-treated, kiln-dried wood backing with high-strength adhesive and features top-grade cover materials for

added durability. Seals are designed to fit most 34-inch x 34-inch hatch seal doors but custom sizes and configurations are available upon request.

Key Takeaways

The dairy industry is an essential part of the American economy and relies on parlors to deliver high-quality, fresh milk. Milk undergoes a variety of tests to ensure it is safe for consumption and meets standards set by the USDA, FDA and other state agencies. In order to prevent bacteria and other contaminants from jeopardizing the milking process, dairy farmers must take extra precautions to seal open hatch doors so insects, rodents, birds, dust and dirt cannot enter the parlor while tanker trucks are being filled. Milk is also highly sensitive and must be protected from extreme temperatures and kept at a constant temperature. By utilizing loading dock technology and compression foam seals around hatch doors, milking parlors are able to establish positive seals between the hatch door opening and the tanker truck to maximize environmental control, prevent contaminant entry and maintain constant product temperatures.

In this white paper, you learned:

- The impact the dairy industry has on the US economy
- Risks of foodborne pathogens and diseases from contaminated milk
- Why cleanliness and hygiene are essential at milking parlors
- USDA and FDA ordinances, regulations and guidelines
- The key contaminants at milking parlors
- How the Dairy Seal from NOVA Technology utilizes compression foam found at loading docks to seal against the back of tanker trucks to maintain product integrity by preventing exterior infiltration and contaminants from entering the milking parlor

NOVA Dairy Seals establish tight seals between tanker trucks and milk parlor hatch doors

Bacteria and pests pose serious threats, both to consumer health and safety and a dairy farm's profitability, but by safeguarding open parlor hatch doors with a compression foam seal, dairy farms can eliminate openings between the parlor building and the tanker truck to prevent contaminant entry. The Dairy Seal from NOVA Technology encloses hatch doors and allows milk tanker trucks to back up directly to the building, compressing the foam side pads to establish a positive seal for maximized environmental control and product integrity.

About NOVA Technology

NOVA Technology is an international manufacturer and distributor of loading dock equipment and accessories. For over 30 years, NOVA has provided the innovation, reliability and resources needed for our customers to handle the continuously evolving needs of the material handling industry. We offer a variety of dock levelers, seals and shelters, vehicle restraints, light communication systems, dock lifts, safety barrier products and a selection of aftermarket parts and accessories. All of our products are designed to maximize safety, productivity, security and environmental control at loading docks and throughout commercial facilities. Call us today at 1-800-236-7325 or send an email to sales@novalocks.com for more information or to find a dealer in your area.

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