

3.3 Receiving handling and testing of milk

The receiving, handling, testing, and storage of milk are critical steps in the dairy industry to ensure the quality and safety of the raw milk supply. These processes are typically carried out at milk collection centers or dairy processing plants. Here's an overview of each stage:

Receiving:

Collection from Farms: Raw milk is collected from various dairy farms by tanker trucks equipped with sanitary containers. Proper handling and transportation are crucial to prevent contamination and maintain the freshness of the milk.

Initial Inspection: Upon arrival at the processing plant, the milk undergoes an initial inspection. Visual checks, temperature monitoring, and documentation of the source are conducted to ensure compliance with quality standards.

Handling:

Filtration and Clarification: The raw milk is typically filtered to remove any foreign particles, such as dirt or debris, that may have been introduced during collection. Clarification processes, such as centrifugation, may be employed to separate solid impurities.

Cooling: The milk is rapidly cooled to slow down bacterial growth and maintain its freshness. Cooling is particularly crucial in preventing the multiplication of bacteria that could affect the quality of the milk.

Testing:

Quality Analysis: Various tests are conducted to assess the quality of the raw milk. Common parameters include fat content, protein content, lactose levels,

bacterial count, somatic cell count, and temperature. These tests help determine the milk's composition and identify any potential issues related to hygiene or contamination.

Pathogen Testing: Rigorous testing for pathogens such as bacteria (e.g., Salmonella, E. coli) and antibiotics is crucial to ensure the safety of the milk supply. Any milk found to be contaminated may be rejected or separated for further processing.

Storage:

Silos and Tanks: After testing, the accepted raw milk is transferred to storage silos or tanks. These vessels are designed to maintain the milk at a controlled temperature and prevent bacterial growth. Stainless steel is commonly used for these storage containers due to its hygienic properties.

Bulk Storage: Large quantities of milk are often stored in bulk before processing. Proper agitation and temperature control help maintain the homogeneity of the milk and prevent cream separation.

Inventory Management: Effective inventory management is crucial to ensure that the oldest milk is used first (first in, first out) and to prevent spoilage. Automated systems may be employed to monitor inventory levels and facilitate efficient handling.

Considerations for Quality Assurance:

Traceability: Detailed records of the source, testing results, and handling procedures are maintained for traceability. This is important for quality control, regulatory compliance, and addressing any issues that may arise.

Hygiene Practices: Strict hygiene practices, including equipment sanitation, personal hygiene of workers, and facility cleanliness, are maintained throughout the receiving, handling, and storage processes to prevent contamination.

Effective management of these stages is essential to ensure the quality, safety, and freshness of the raw milk supply. Advanced technology and automation are often employed to enhance efficiency and accuracy in testing and monitoring processes, contributing to the overall success of dairy operations.

Storage tanks

Storage tanks play a crucial role in the dairy industry for storing raw milk, intermediate dairy products, and finished goods before distribution. These tanks are designed to meet strict hygiene and safety standards, ensuring the quality and integrity of the stored dairy products. Here are key aspects related to storage tanks in the dairy industry:

Materials and Construction:

Stainless Steel: Stainless steel is the preferred material for constructing dairy storage tanks. It offers corrosion resistance, durability, and ease of cleaning, making it suitable for maintaining the hygiene and quality of dairy products.

Food-Grade Construction: Tanks are designed with a focus on food-grade standards, ensuring that the materials used do not impart any unwanted flavors, odors, or contaminants to the stored milk.

Types of Dairy Storage Tanks:

Bulk Milk Cooling Tanks: These tanks are specifically designed for rapidly cooling and storing raw milk after collection from farms. They help maintain the freshness and quality of the milk before further processing.

Silos: Large silos are used for bulk storage of raw milk or intermediate dairy products. They are equipped with temperature control systems to preserve the quality of the stored goods.

Finished Product Storage Tanks: Tanks for storing processed and finished dairy products, such as pasteurized milk, cream, or yogurt, before packaging and distribution.

Design Features:

Agitation Systems: Many storage tanks are equipped with agitation systems to prevent cream separation and ensure uniform distribution of fat throughout the milk.

Insulation: Insulated tanks help regulate and maintain the temperature of the stored products, preventing temperature fluctuations that could affect product quality.

CIP (Clean-in-Place) Systems: Tanks are designed to facilitate easy and thorough cleaning through CIP systems, ensuring sanitation and preventing bacterial contamination.

Temperature Control:

Refrigeration Systems: For tanks storing raw milk or perishable dairy products, refrigeration systems are integrated to maintain a constant and controlled

temperature. This helps inhibit bacterial growth and preserve the freshness of the products.

Heat Tracing: In some cases, heat tracing systems may be used to prevent the freezing of stored products in colder climates.

Regulatory Compliance:

Compliance with Standards: Storage tanks must comply with industry and regulatory standards, ensuring that they meet specific criteria for hygiene, safety, and quality.

Regular Inspection: Tanks are subject to regular inspections to ensure that they remain in compliance with relevant standards and regulations.

Automation and Monitoring:

Automated Level and Temperature Control: Many modern storage tanks are equipped with automated systems for monitoring and controlling the level and temperature of stored products.

Remote Monitoring: Remote monitoring systems allow operators to track tank conditions and receive alerts, facilitating timely responses to potential issues.

Installation and Maintenance:

Professional Installation: Tanks are installed by professionals to ensure proper setup and compliance with safety standards.

Regular Maintenance: Routine maintenance, including inspections, cleaning, and calibration of monitoring systems, is essential to prevent malfunctions and ensure the longevity of the storage tanks.

Storage tanks are an integral part of the dairy processing infrastructure, contributing to the efficiency, quality, and safety of dairy operations. Their proper design, construction, and maintenance are essential for meeting regulatory requirements and delivering high-quality dairy products to consumers.