

# DAIRY PRODUCT PROCESSING

## LEVEL-II



**Based on November 2021, Version- 3 Occupational  
standard**

**Module Title: Working with Temperature  
Controlled Stock**

**LG Code: IND DPP2 M04 LO (1-3) LG (18-  
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## Introduction to the Module

This module covers the knowledge, skills and attitude required to store and retrieve temperature controlled stock from appropriate storage facilities. In detail the module covers the type of dairy product and its storage method, the stock control system, document recording as well as temperature and storage requirements of dairy products.

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<b>LG #18</b>	<b>LO#1- Store stock to meet temperature control requirements</b>
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**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying goods requiring temperature control
- Locating goods in correct storage areas
- Recording stores information

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Identify goods requiring temperature control
- Locate goods in correct storage areas
- Record stores information

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

## Information Sheet 1

### 1.1. Identifying goods requiring temperature control

Most of the dairy operations are temperature dependent. Heating, cooling or holding at certain temperature are required to obtain product with good microbiological quality, flavour and texture. For this steam supply unit, refrigeration unit and temperature recording, monitoring and controlling mechanism are provided.

#### 1.1.1 Definition of terms

The following are storage definitions for recommended conditions commonly specified on product labels.

- **Freezer**

A place in which the temperature is maintained thermostatically between -20°C and -10°C (-4°F to 14°F).

- **Cold**

Any temperature not exceeding 8°C (46°F). A refrigerator is a cold place in which the temperature is maintained thermostatically between 2°C and 8°C (36°C to 46°C).

- **Room Temperature**

The temperature prevailing in the workplace.

- **Controlled Room Temperature**

A temperature maintained thermostatically that encompasses the usual and customary working environment of 20°C to 25°C (68°F to 77°F) that allows for brief deviations between 15°C and 30°C (59°F to 86°F) that are experienced in warehouses.

- **Temperature Danger Zone (TDZ)**

The range temperature that is 5°C - 60°C where bacteria grows the fastest

- **Time/Temperature Control for Safety**

A food that requires strict control of time and temperature to limit bacterial growth and/or toxin formation

- **Temperature controlled stock**

Mean stock to be stored at a constant temperature and at different temperatures for given durations

- **Warm**

Any temperature between 30°C and 40°C (86°F to 104°F).

- **Excessive Heat**

Any temperature above 40°C (104°F).

- **Protection from Freezing**

Where, in addition to the risk of breakage of the container, freezing subjects an article to loss of strength or potency, or to destructive alteration of its characteristics, the container label must bear an appropriate instruction to protect the article from freezing.

### 1.1.2 Temperature control

The food safety standards specify that potentially hazardous foods must be stored, displayed and transported at safe temperatures and, where possible, prepared at safe temperatures. Safe temperatures are 5°C or colder, or 60°C or hotter. Potentially hazardous food needs to be kept at these temperatures to prevent food-poisoning bacteria, which may be present in the food, from multiplying to dangerous levels. These bacteria can grow at temperatures between 5°C and 60°C, which is known as the temperature danger zone. The fastest rate of growth is at around 37°C, the temperature of the human body.


A thermometer is a device that measures temperature or temperature gradient, using a variety of different principles. It has two important elements, the temperature sensor (e.g. the bulb on a mercury thermometer) in which some physical change occurs with temperature, plus some means of converting this physical change into a value (e.g. the scale on a mercury thermometer). Industrial thermometers commonly use electronic means to provide a digital display or input to a computer.




- **Classification of temperature controlling devices**

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- ✓ Expansion Thermometers
  - ✓ Change of State Thermometers
  - ✓ Electrical Thermometers
  - ✓ Radiation and Optical pyrometers
- **Temperature checks can be recorded on any of the following record forms**
    - ✓ Delivery Record
    - ✓ Off Site Temperature Record
    - ✓ Cold Food Record
    - ✓ All-In-One Record (used as an
    - ✓ Hot Temperature Record
    - ✓ Weekly Record
    - ✓ Hot Holding Record
    - ✓ alternative to records

**Table 1.1 types of thermometer based on its design and working performance**

Types of thermometer	speed	placement	Usage Considerations
Thermocouple 	2–5 seconds	1 cm or deeper in the food, as needed	<ul style="list-style-type: none"> <li>✓ Gives fastest reading</li> <li>✓ Good for measuring temperatures of thick &amp; thin foods</li> <li>✓ Not designed to remain in food while it's cooking</li> <li>✓ Check internal temperature of food near the end of cooking time</li> <li>✓ Can be calibrated</li> <li>✓ More costly; may be difficult for consumers to find in stores</li> </ul>

<p>Thermistor</p> 	<p>10 seconds</p>	<p>At least 1.5 cm deep in the food</p>	<ul style="list-style-type: none"> <li>✓ Gives a fast reading</li> <li>✓ Can measure temperature in thick &amp; thin foods</li> <li>✓ Not designed to remain in food while it's cooking</li> <li>✓ Check internal temperature of food near the end of cooking time</li> <li>✓ Some models can be calibrated; check manufacturer's instructions</li> <li>✓ Available in "kitchen" stores</li> </ul>
<p>Thermometer Fork Combination</p> 	<p>2–10 seconds</p>	<p>5–7 cm deep in the thickest part of the food</p>	<ul style="list-style-type: none"> <li>✓ Can be used in most foods</li> <li>✓ Not designed to remain in food while it's cooking</li> <li>✓ Sensor in tine of fork must be fully inserted</li> <li>✓ Check internal temperature of food near the end of cooking time</li> <li>✓ Cannot be calibrated</li> <li>✓ Convenient for grilling</li> </ul>
<p>Oven-Safe, Bimetal</p> 	<p>1–2 minutes</p>	<p>5–7 cm deep in the thickest part of the food</p>	<ul style="list-style-type: none"> <li>✓ Can be used in roasts, casseroles, and soups</li> <li>✓ Not appropriate for thin foods</li> <li>✓ Can remain in food while it's cooking</li> <li>✓ Heat conduction of metal stem can cause false high reading</li> <li>✓ Some models can be calibrated;</li> </ul>



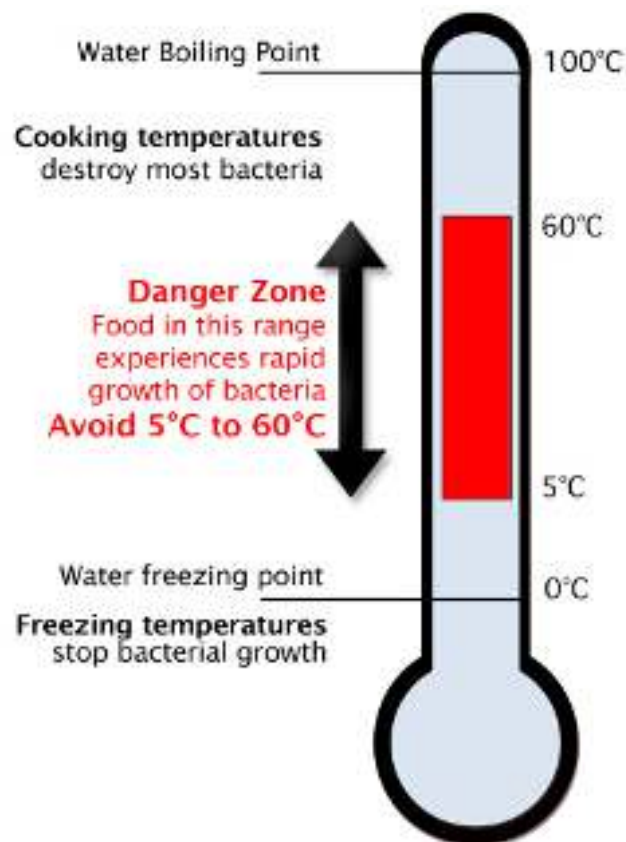
			check manufacturer's instructions
<p>Instant-Read, Bimetal</p> 	15–20 seconds	5–7 cm deep in the thickest part of the food	<ul style="list-style-type: none"> <li>✓ Can be used in roasts, casseroles, and soups</li> <li>✓ Temperature is averaged along probe, from tip to 5-8 cm up the stem</li> <li>✓ Cannot measure thin foods unless inserted sideways</li> <li>✓ Not designed to remain in food while it's cooking</li> <li>✓ Use to check the internal temperature of a food at the end of cooking time</li> <li>✓ Some models can be calibrated; check manufacturer's instructions</li> <li>✓ Readily available in stores</li> </ul>

### 1.1.3 Goods require temperature control

Temperature controlled goods are items that require a controlled temperature environment during its transportation e.g. frozen or chilled goods. The temperature-sensitive products usually have to be kept at a specific temperature to avoid growing bacteria, perishing or going bad. These items may include dairy products, meat, fish and seafood, plants, medicines and fruit and vegetables. The products must be perfect/sellable condition, so it is vital for the temperature to remain as required throughout the entire journey. Freight forwarders may have to think about how they load products, as well as if there are multimodal forms of transport needed for a journey from the place of produce, to the market.

**There are four food temperature zones that are important to know:**

- 60°C / 140°F and above is known as the hot food zone. As a general rule, food should always be cooked to 74°C / 165°F (or more) but must not drop below 60°C / 140°F when being displayed or served.
- 0°C to 4°C / 32°F to 40°F is the cold food zone and is the normal temperature for most refrigerators.
- Frozen food is normally held at -18°C / 0°F or lower.
- This means that the Temperature Danger Zone for food is between 4°C and 60°C / 40°F to 140°F.



**Figure 1.1. Temperature zone of food**

<https://www.youtube.com/watch?v=W8hZNvtrens0> (access date 11/30/2022)

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### Potentially hazardous foods

Potentially hazardous foods are foods that need to be kept at certain temperatures to minimize the risk of dangerous microorganisms or toxins. They include:

- raw and cooked meat or poultry
- foods containing eggs (cooked or raw)
- dairy products like milk, cream and fresh custard
- seafood
- sprouted seeds (like beans and alfalfa)
- cut fruit and vegetables
- cooked rice, and fresh or cooked pasta
- Sandwiches, pizzas and sushi.

The dairy industry uses various means and technologies aimed at achieving an extension in product shelf-life.

Some commonly used methods include:

- Heat treatment of fluid milk products for a pre-determined time and temperature
- Acidification by addition of starter culture in the case of cultured dairy products such as yogurt, buttermilk
- Drying of milk concentrate to produce milk or skim milk powder
- Addition of preserving agents such emulsifying salts e.g., phosphates and citrates in shelf-stable processed cheeses

Shelf-life of fluid milk products, for instance, is dependent on various factors, namely:

- Heat treatment (also known as pasteurization), quality of the incoming raw milk
- Additional processes such as micro-filtration

- Filling conditions
- Temperature control
- Packaging technologies.

However, heat treatment remains the primary factor that determines the span of the shelf-life of dairy products.

#### a) Raw milk

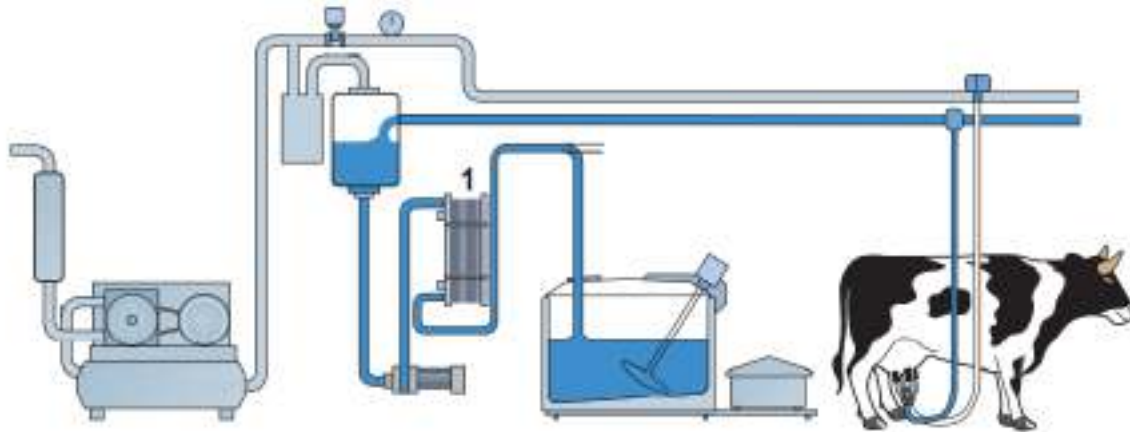
Ideally, microbial contamination of raw milk and milk products should be addressed primarily through preventive measures on the farm and throughout processing. However, far too many contamination sources exist to prevent entry of all bacteria. Therefore, milk handling and processing strategies are designed to reduce and control bacterial numbers in processed products to protect milk quality and milk safety. The first of these measures involves efficient cooling of milk to 4°C immediately following milking. Reduced temperatures inhibit growth of *mesophylls* and *thermophiles* and reduce the activity of derivative enzymes. Modern dairy farms use refrigerated bulk storage tanks which maintain milk at 4°C or below. As bulk tank milk pick-up typically occurs daily or every other day, product from multiple milking is frequently mixed and stored in the same tank.

#### b) Chill raw milk within an hour of milking

Raw milk is approximately 37-38.5°C as it comes from the cow, and needs to be chilled to 4°C as fast as possible, preferably within an hour of milking since bacteria count doubles every 20 minutes at body temperature. Chilling the milk fast ensures a longer shelf life and it just tastes better (will have less off flavors) if it is chilled quickly and stays cool. If milk does not stay cool, it will sour and separate.

Rapid cooling inhibits the good lactic-acid bacteria which causes milk to sour and will inhibit the growth of bad bacteria faster. For optimal preservation of milk quality, it should be stirred as it is rapidly chilling, and it should be kept cool during transportation and storage until use. Fluid milk processors should make every effort to maintain temperatures below 40°F (4°C) and to move product out of storage within 24 hours whenever possible. Storage tanks used for storage longer than 24 hours must be equipped with a 72-hour temperature recording chart.

Maintaining proper temperatures may be done with insulated tanks for storage periods of 24 hours or less; however, longer storage periods will require cold wall tanks using either direct expansion or circulation of a refrigerated fluid such as ice water or glycol. Because of the natural separation (creaming) of raw milk, storage tanks must be equipped with agitation capabilities.



**Figure 1.2. Raw milk rapid cooling from 37 to 4 °C.**

**c) Fermented dairy products (yoghurt, cheese, buttermilk, sour cream, etc)**

Freezing and storing fermented products needs extra attention. The mother culture or any amount of bulk starters could be kept frozen in sterile containers varying in size from one-half pint to a quart size. Identification and date of freezing on the containers filled with cultures helps the operator to locate the proper type organisms he needs, and also reduces the chance to use wrong bacteria.

On the average the frozen cultures are good about 8 months if kept below -23°C. Frozen cultures are used in the manufacturing as a number of dairy products such as cultured buttermilk, sour cream, and many types of cheeses.

**d) Ice cream and similar products**

Ice cream, reduced fat ice cream, ice confection and ice cream and ice confection products are particularly heat sensitive and at risk of quality defects due to fluctuating or elevated storage temperatures above -18°C, and should preferably be stored between -22°C and -30°C.

The smooth texture of ice cream comes about in part due to the presence of tiny ice crystals formed when the product is whipped and quickly frozen, and in part due to a mixture (called an emulsion) made up of milk solids, sugar, water and dairy fats.

If the ice cream temperature rises above  $-18^{\circ}\text{C}$ , two things happen:

- The ice crystal size increases
- The emulsion breaks down, separating in two layers of fat and water.

The smoothness of the product is lost, creating an icy, grainy, layered texture instead of a smooth one. These changes are called “heat shock” and are permanent: bringing the temperature back down to  $-18^{\circ}\text{C}$  or below does not undo the damage. This is why ice cream must be handled and stored in strict accordance with these Guidelines and the manufacturer’s specifications.

Temperature-dependent storage of dairy foods has two major roles:

- To prevent quality defects
- To control pathogen growth.

#### e) **Dry dairy product**

Low moisture dairy products are defined as those goods that result from water removal in milk processing that are able to be stored and transported under ambient environmental conditions. This includes milk powder, lactose, casein, whey powder, infant formula powder, milk protein concentrate powder, whey protein concentrate powder, dairy powder blends, and anhydrous milk fat.

Temperature controls such as refrigerated container shipments are only appropriate to be applied where there is proven and justified product quality benefit. For the majority of dry dairy products, ambient transportation alone is sufficient to ensure that product arrives at the intended destination without any deterioration.

**Table 1.2 Recommended storage times and temperatures for milk and other milk products**

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<b>Product</b>	<b>How to Store</b>	<b>Refrigerator (35-40 °F)</b>	<b>Freezer (0 °F)</b>
Pasteurized Fresh Whole or Skimmed Milk	Refrigerate immediately in original container. Keep container closed.	1 to 5 days beyond “sell-by” date	3 months. Freezing may result in change in texture. Thaw in refrigerator.
Sweetened Condensed Milk(Opened)	Refrigerate tightly covered.	1 week	Do not freeze.
Evaporated Milk (Opened)	Refrigerate tightly covered.	1 week	Do not freeze.
Cultured Buttermilk	Refrigerate immediately in original container. Keep container closed.	2 weeks	Do not freeze.
Homogenized, Reconstituted Dry Nonfat and Skimmed Milk	Keep containers tightly closed. Don’t return unused milk to original containers.	1 week	Do not freeze.
Sweet and Regular Cream	Refrigerate immediately in original container. Keep container closed.	1 to 5 days beyond “sell-by” date	Do not freeze. (Change of texture, body appearance. Separation of fat emulsion.)
Non-Dairy Whipped Topping	Keep covered.	3 months in aerosol can.	Do not freeze aerosol cans; others may be

		3 days if prepared from mix. 2 weeks if bought frozen and then thawed.	stored in freezer up to one year.
Butter	Refrigerate immediately in original container. Keep container closed.	2 weeks	Butter made from pasteurized cream: 6 to 9 months.
Sour Cream	Refrigerate immediately in original container. Keep container closed.	2 weeks	Do not freeze.
Ice Cream	Store in original container in freezer.	Do not store here.	2-3 weeks (Opened) 2 months (Unopened)
Yogurt	Keep covered.	7-10 days	Do not freeze.
Soft Custards, Milk Puddings, Cream and Custard Fillings for Cakes and Pies	Cool cooked dishes quickly and refrigerate within 2 hours. Refrigerate cold dishes immediately after preparation.	5-6 days	Do not freeze.

## 1.2. Locating goods in correct storage areas

Good receiving, transportation and storage practices help ensure that food reaches its destination in a safe condition without compromising quality. By providing an environment that reduces the risk of contamination and protects food from physical damage and temperature abuse, these practices control the safety and quality of your product until it is delivered to the customer.



### 1.2.1 perishable commodities

Perishable commodities are those commodities which deteriorate quickly when not stored properly. Perishable commodities usually require some sort of refrigerated storage.

#### a. Dairy products and eggs

Dairy products are those commodities, which are derived from or based upon milk, and include creams, yoghurts, butter, cheese and ice cream. Milk needs to be stored in the refrigerator at a temperature between 3 to 4°C. If stored this way fresh milk will last about 10 days. Cream, yoghurts, butter, cheese and eggs should also be stored at between 3 to 4°C. The shelf life of these products will vary depending on their method of manufacturing, and you should check individual use by dates on the packaging. Ice cream needs to be kept frozen at a temperature of -18°C or below. All dairy products need to be kept well sealed when in storage; otherwise they will absorb flavors from strong smelling foods around them.

#### b. Meat and poultry

Meat and poultry should be stored between 1 and 3°C. All meat and poultry should be stored on clean trays and covered with plastic wrap. You should never store raw and cooked foods on the same tray. Meat can be stored in the cool room for 4-6 days, or if vacuum-sealed up to 12 weeks. Poultry can be kept for 3-4 days. If frozen, meat and poultry can be kept for up to six months.

#### c. Seafood

Seafood has a very short shelf life and must be stored with extra care. It should be stored at 1°C. Unfortunately most cool rooms are not set for temperatures as low as this, so seafood should be wrapped in plastic film and stored in the coldest part of the cool room on a bed of crushed ice. If kept in these conditions seafood should last for 5 to 6 days. Live seafood such as crabs and yabbies' should be kept at temperatures between 1 to 3°C in sealed containers. Frozen seafood can be kept in the freezer for up to 3 months.

#### d. Cooked foods and leftovers

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These are also considered perishable and should be stored in the cool room at between 3 to 4°C. Cooked foods should be covered before storage and need to be stored separate from raw foods and never on the same tray. Always allow hot foods to completely cool prior to refrigeration.

#### **e. Fruit and vegetables**

Fruit and vegetables vary in their storage requirements, but as a general rule most fruit and vegetables should be stored between 5 and 9°C. There are a couple of exceptions such as broccoli, which usually arrives packed on ice, and should be stored at 1°C, and tropical fruits such as bananas and pineapples which should be stored at around 18°C. Because fruit and vegetables require higher temperature storage (between 7 and 10°C) they are best kept in a separate cool room. Lettuce should be stored in the cool room, where the temperature is below 5°C. Root vegetables, such as carrots, potatoes and onions are classed as semi-perishable and do not require refrigeration. Frozen vegetables and fruit are stored in a deep freezer where the temperature is set at - 18°C or less.

#### **1.2.2 Semi-perishable commodities**

Semi-perishable commodities are those that do not require refrigeration, but still have a limited shelf life. They include things like potatoes, onions, pumpkins and salamis. These items are usually kept on shelves in the storeroom complex, where they get plenty of air circulation around them. Potatoes need to be kept away from light as they will start sprouting.

#### **1.2.3 Non-perishable commodities**

Technically speaking there is no such thing as non-perishable commodities, as all goods deteriorate overtime. But some commodities deteriorate so slowly that they are called non-perishable. Examples of non-perishable goods are:

- flour
- spices
- canned foods
- jars and bottles
- nuts

- dried packet goods, for example noodles and pasta

These items are usually kept in the dry store where they are kept cool and are protected from moisture contamination. Dry goods like flour, grains and pasta often come in bags or sacks, and are not safe from vermin or weevils and should be transferred to clean storage bins with tightly fitting lids. Some jars, such as caviar, are actually perishable and should be stored appropriately.

#### 1.2.4 Receiving and storage

Good receiving, transportation and storage practices help ensure that food reaches its destination in a safe condition without compromising quality. By providing an environment that reduces the risk of contamination and protects food from physical damage and temperature abuse, these practices control the safety and quality of your product until it is delivered to the customer.

- **Raw milk**

Make a record of each shipment received including information such as:

- ✓ volume
- ✓ temperature
- ✓ date and time of receipt
- ✓ person responsible for receiving
- ✓ where the product was stored
- ✓ any unusual activity you observed
- ✓ To minimize the growth of micro-organisms, empty, clean and sanitize the raw milk silos and storage tanks at least once every 48 hours.
- ✓ Have a written cleaning program for making sure the cleaning and sanitizing was done properly.
- ✓ Use storage tanks or silos that are easy to clean. This means:
  - ✚ they should be made of stainless steel
  - ✚ they should be designed so they can be cleaned either by hand (for smaller tanks) or using a CIP system (for larger tanks or silos)

- ✓ While the milk is in the storage tanks or silos, monitor the temperature and make sure it stays between 1°C and 4°C.

- **Bulk liquid pasteurized dairy ingredients**

Receive pasteurized dairy products in bulk tank-trucks; you will have to re-pasteurize them in your plant. This is because the tank-truck and the loading and unloading equipment (pipelines, hoses and pumps) are commonly shared with raw milk and cannot be guaranteed to have been properly cleaned to prevent cross-contamination from raw milk.

- ✓ Store bulk pasteurized dairy products in dedicated tanks or silos. Never store them in a tank or silo that was previously used for raw milk.
- ✓ While the pasteurized product is in storage tanks or silos monitor the temperature and make sure it stays between 1°C and 4°C.
- ✓ If you receive pasteurized dairy products in containers (such as cartons, bags or totes), store these containers in a refrigerated area, monitor the temperature and make sure it stays between 1°C and 4°C.
- ✓ Have a written procedure and keep records to make sure the refrigerated area is cleaned and sanitized regularly to minimize the risk of contamination from spills.
- ✓ Rotate inventory so that oldest product is used first.
- ✓ Controlling the storage time and temperature of pasteurized dairy products helps to minimize the growth of micro-organisms.

- **Packaged ingredients**

When you receive ingredients, visually inspect them to make sure:

- ✓ there are no signs of tampering such as broken seals on the packaging materials
- ✓ the ingredients or packaging you have received are what you ordered
- ✓ there is no opened packaging
- ✓ there is no physical damage to the ingredients
- ✓ there is no dust, debris or signs of pest activities on the ingredients
- ✓ there is no sign of any water damage

- ✓ there is no sign of any contamination from other materials that may be in the vehicle
- ✓ The ingredients have been transported at the temperature recommended by the manufacturer.
- ✓ **All packaging materials should be stored:**
  - ✚ in a way that protects their integrity
  - ✚ in a way that minimizes the risk of contamination
  - ✚ in a way that minimizes the risk of contamination
  - ✚ protected from direct sun
  - ✚ free from excessive heating
  - ✚ protected from moisture
  - ✚ free from external contaminants
  - ✚ protected from rapid temperature changes that could affect their safety or quality

- **Non-food Chemicals**

Non-food chemicals include:

- ✓ water-treatment chemicals
- ✓ boiler-treatment chemicals
- ✓ chemicals for cleaning and sanitizing
- ✓ Materials used for maintenance (such as oils, lubricants, Freon, oxygen and acetylene gases for welding, etc.)
- ✓ other materials used for food contact surfaces

### Storage

- ✓ Store chemicals in a dry, well-ventilated area where there is no possibility that they will contaminate food or food contact surfaces.

- ✓ If chemicals are regularly used in food-handling areas, label them clearly and store them in a way that will not lead to contamination of food, food contact surfaces or packaging materials.
- ✓ Clearly label all bulk chemicals and any containers you use to dispense smaller portions of these chemicals. Only allow authorized and properly trained employees to handle chemicals.
- ✓ Make sure chemical spill kits are available to clean up spills.
- ✓ Take steps to contain spills that may occur to bulk chemical containers (such as installing a curb on the floor of the bulk chemical storage area).
- ✓ Make sure proper safety equipment is available, functioning and clean.

- **Finished product storage**

### **Storing finished product**

- ✓ Identify the hazards associated with storing your finished product.
- ✓ Make sure finished products are stored and handled under the proper conditions to prevent deterioration (such as spoilage) and damage (such as crushing or forklift damage).
- ✓ If the finished products need refrigeration, store them between 1°C and 4°C. Store frozen products at -18°C or less. Monitor storage room temperatures regularly.
- ✓ If products that need refrigeration were not packaged between 1°C and 4°C, arrange them on skids or shelving when placing them in the refrigeration unit in a way that lets enough air flow around the products to cool them to storage temperature as quickly as possible.
- ✓ Store materials that are sensitive to humidity under humidity-controlled conditions.
- ✓ Rotate stock to ensure oldest products are shipped first to maximize their retail shelf life.
- ✓ Pay special attention to the temperature when your refrigeration units are defrosting. Don't overload their cold storage capacity.
- ✓ Make sure condensate pipes empty into a drain to reduce contamination.

- ✓ Keep refrigeration units including their condensate collection trays and drain lines clean and maintained on a regular schedule to prevent the growth of mold, spoilage bacteria and pathogens.
- ✓ Treat condensate trays with sanitizer to prevent the growth of harmful bacteria that could cross-contaminate employees' clothing or skin or other areas of your plant and eventually food products.
- ✓ If products can be stored at room temperature, protect them against contamination and conditions that could affect their safety or quality. This includes:
  - ✚ direct sun
  - ✚ excessive heating
  - ✚ moisture
  - ✚ external contaminants
  - ✚ rapid temperature changes that could affect the integrity of the product container or the safety or quality of the product
- ✓ Be careful about stacking dairy products. Clearly identify each container, and make sure the stack of containers won't fall over. Make sure they are protected from pests, moisture and too much weight.
- ✓ To make cleaning easy and to control pests, store items a suitable distance from the walls and off the floor. If you are storing products for more than one month, put them on pallets approximately 45 cm (18 in.) from the wall.
- ✓ If you are storing other food products in a finished product storage room, make sure they will not contaminate the dairy products or ingredients. Stack food products on pallets or shelves in a neat and well-organized way.
- ✓ Do not store eggs in finished product storage rooms. Eggs may contain pathogens that could cross-contaminate your products
- ✓ Do not store any other products in finished product storage rooms that may transmit odours or flavour.

## 1.2.5 Stock control and rotation

Stock means goods or merchandise kept on the premises of shop or warehouse and available for sales or distribution as well as for processing input. Stock control is a term used to describe the measures taken to ensure that food is not kept beyond its shelf life. It also refers to measures taken to prevent certain types of contamination especially during storage, defrosting, hot holding, service and transportation.

### 1.2.5.1 Types of stock

- raw materials and components (used in production)
- work in progress (unfinished goods in production)
- finished goods (ready for sale)



### 1.2.5.2 The need of stock control

- Stock control is important because if high risk food is kept too long, even under favorable
- Conditions, harmful bacteria may multiply.
- Additionally, even foods with a longer shelf life, whether dried, canned or frozen, may deteriorate if they are kept for too long.
- Food which is being stored may also become contaminated by food handlers, pests and the catering environment.
- Replacement stock needs ordering before existing supplies run out.
- Carrying too much stock is merely tying up capital.
- Having to throw away ‘perishables’ is a waste of money.

### 1.2.5.3 Rotate stock

- Rotating stock means moving older stock to the front of the shelf in the cost or profit centers.
- Using this system means that the older stock is sold or used before the new stock and there is not a buildup of out of date stock.
- Rotating the stock also means that the stock will always be fresh.

### 1.2.5.4 Types of stock rotation

- **FIFO (First-IN, First-OUT)**

Is a basic rule of product rotation that protects product quality and freshness. Rotate foods so the first products displayed (IN) are the first products sold (OUT) to minimize spoilage and waste. Every product has a code date. Do NOT use products past their code or “use-by” dates.

- **LIFO The last in, first out (LIFO)**

Method assumes the reverse of the FIFO method: The products most recently purchased are used first. The value of inventory is represented by the unit cost of items in inventory the longest.

- **Just In Time (JIT)**

This aims to reduce costs by cutting stock to a minimum. Items are delivered when they are needed for immediate use. This means that less storage is needed however there is a risk of running out of stock, so you need to be confident that your suppliers can deliver on demand.

### 1.3. Recording stores information

Firstly, the reason is that record keeping is an essential part of the mandatory food safety plan requirements for dairy food businesses. Failure to keep proper records to demonstrate adherence to a food safety plan can be a criminal offence.

Secondly, records are used by independent food auditors to assess whether food safety and/or food quality standards are being met. Failing an audit has significant consequences for customer contracts.

Thirdly, proper records and logs help deal with situations where things have gone wrong. It is vital to know the times and temperatures to which foods have been subjected in order to make appropriate decisions as to what to do next.

Finally, records are the quickest way to ensure that cold chain conditions for a product remain intact. This is important because some spoilage due to heat stress can take place even at very low temperatures.

- **Requisition form**

Sometimes, large establishments use requisition forms to keep a track of stock movement. Under a requisition system, a form is filled out before the stock is removed from the storage areas. This provides an excellent method of keeping track of stock levels.

- **Preferred suppliers list**

Most dairy factory has a list of the suppliers that they use frequently for all their stock requirements, such as raw milk suppliers, packaging pouch and stabilizer, flavourant suppliers. It's a good idea to include two or more of each type of supplier on the list, that way you'll have someone to contact if one supplier is out of stock. You can also compare prices between the different suppliers.

- **Order forms**

Most order books record pages in duplicate or triplicate so that a copy of each order can be retained. Usually, one copy is sent to the supplier, a copy is kept as a record and another copy is forwarded to the person who looks after the accounts. Sometimes, these books are pre-printed with the factory name, address and phone number on them. If not, you will need to write this information on each order before you send it to the supplier.

- **Delivery note**

This document is sent with a delivery. It includes a list of all the items supplied, their quantities, weights or sizes and sometimes the cost per item. Once a delivery has been checked and accepted, you sign the delivery note. The driver or delivery person may also need to sign the note. There will usually be two copies - one for your own records and one for the delivery driver to return to the supplier.

- **Invoice**

An invoice is a bill for the goods that have been ordered and received. Invoices generally contain the same information as delivery notes but with more detailed price information and payment information. Sometimes, suppliers send the invoice with the goods instead of a delivery note, in which case you may be required to sign the invoice once you have checked that it is correct. Invoices should always be checked against the delivery or the delivery note before forwarding to the person who deals with the accounts.

- **Credit note**

A credit note is sent by your supplier if, for any reason, an amount needs to be credited to your account. For example, if some damaged goods were returned, their value would be credited to your account.

- **Goods received book**

A goods received book is used to record the quantity and cost of goods that are delivered. This book provides an accurate method of keeping track of stock levels and any changes in prices from week to week

- Standard Operating Procedures (sops)
- Specifications
- Production schedules and instructions
- Manufacturers' advice
- Standard forms and reports

<b>Self-check 1</b>	<b>Written test</b>
---------------------	---------------------

Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

**Test I: Choose the best answer (3pts)**

1. Which one of the following is not correct?
  - A. Products must be kept at temperatures never warmer than the manufacturer's or producer's recommended maximum temperature.
  - B. In most cases, keep chilled foods at a temperature between 10°C and +15°C to ensure the product temperature is never warmer than +5°C.
  - C. In most cases, keep frozen foods and ice cream never warmer than +18°C.
2. Which of the equipment is used for chilling of milk?
  - A. Refrigerator
  - B. Freezer
  - C. Pasteurizer
  - D. Homogenizer
  - E. all
3. What is the temperature danger zone?
  - A. 5°C to 60°C
  - B. 2°C to 4°C
  - C. -23C to - 30°C
  - D. 5°C to 150°C
4. What do you to control cold store temperatures effectively?
  - A. Maximize air temperature variation to avoid reduction in quality and reduction in useable shelf life of product
  - B. Maximize door openings and/ or traffic movement in and out of the cold store;
  - C. Take prompt steps to increase the product temperature should any increase occur
  - D. Ensure defrost cycle systems are adequately designed and that alarms are in place

**Test 1: Give short answer for the following questions (3pts).**

1. What will happen if the goods/products/ are not properly handled in the warehouse or storage rooms?
2. Why need to store product?
3. List the classification of thermometers?

Note: Satisfactory rating 18 points

Unsatisfactory – below 18 points

## Operation Sheet 1

### 1.1 Temperature control and calibration operation

#### A. PPE, Tools and equipments

- Safety glasses
- Safety shoes
- Gloves
- Distilled water
- Goggles
- Thermometer
- Thermal insulated gloves
- Hard hats
- Face shield

#### B. Procedures of temperature control

Step 1: check the type

Step 2: clean and sanitize the probe

Step 3: insert the thermometer

Step 4: check the temperature

Step 5: record the temperature

Step 6: clean and sanitize again

#### C. Techniques of thermometer calibration (cold)

Step 1: Mix equal parts of crushed iced and cold water in a container.

Step 1: Stir the water and let it sit long enough for the heat to distribute evenly (usually around 3 minutes).

Step 3: Insert the thermometer into the container, taking care not to touch the sides.

Step 4: Check that the temperature is between  $-1^{\circ}\text{C}$  and  $1^{\circ}\text{C}$  ( $30^{\circ}\text{F}$  to  $34^{\circ}\text{F}$ ).

Step 5: If the temperature is not within that range, adjust your thermometer to the correct temperature while it is still in the water. Boil tap water and pour into a suitable container (e.g. a mug or beaker)





### [CFS Thermometer Calibration \(Cold\)](#)

#### **D. Techniques of thermometer calibration (hot)**

Step 1: Boil tap water and pour into a suitable container (e.g. a mug or beaker).

Step 2: Place the probe into the container.

Step 3: Check that the temperature is between 99°C and 101°C (210°F to 214°F).

Step 4: If the temperature is not correct, adjust your thermometer to the correct temperature while it is still in the water.



### [CFS Thermometer Calibration \(Hot\)](#)

## 1.2 Procedures of Stock recording

**Steps 1:** Divide the products into 2 main groups - those with a short shelf life (of less than 1 month) and those with a shelf life of over 1 month.

**Step 2:** Write down the short shelf life items on the **Daily Stock Control Checklist** and the remainder on the monthly Stock Control Checklist.

**Step 3:** Ensure that staff carrying out the checks knows what they are looking for and understand **best before** and **use-by** dates.

**Step 4:** Daily checks: The foods listed on the Daily Stock Control Checklist should be examined and where they have reached their use-by-date they should be sold immediately or removed from sale. Remember: It is an offence to sell food after its use-by date has expired.

**Step 5:** Monthly checks: Again the person carrying out the stock check should be trained in what to look for.

**Step 6:** Record on the **Monthly Stock Control Record** the date the check was made and who by.

**Step 7:** In the “Product” column list all the foods where the best before date will expire before the next stock check is due. Then note the best before date in the next column. Where no best before dates expire still record the fact that a stock check has been carried out.

**Step 8:** Record what action is being taken as a result?

**Step 9:** next notes down the results of that action.

**Step 10:** The person with responsibility for the stock should only initial the final column **once the food has been Sold/destroyed etc.** and is satisfied that no further action is necessary.

**LAP Test 1**

Name..... ID.....

Date.....

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within **3** hours. The project is expected from each student to do it.

**Task 1:** perform temperature control and thermometer calibration operation

**Task 2:** perform of stock recording system

<b>LG #19</b>	<b>LO#2- Monitor and maintain temperature of stock within specifications</b>
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**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Monitoring temperature control stock
- Monitoring storage areas
- Monitoring residence time
- Identifying out-of-specification storage temperatures and taking corrective action

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Monitoring temperature control stock
- Monitoring storage areas
- Monitoring residence time
- Identifying out-of-specification storage temperatures and taking corrective action

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

## Information Sheet 2

### 2.1 Monitoring temperature control stock

Potentially hazardous food needs to be kept at these temperatures to prevent food-poisoning bacteria, which may be present in the food, from multiplying to dangerous levels. These bacteria can grow at temperatures between 5°C and 60°C, which is known as the temperature danger zone. The fastest rate of growth is at around 37°C, the temperature of the human body.

The food safety standards also require you to have a thermometer if you prepare, handle or sell potentially hazardous food. This will enable you to check that safe temperatures are being maintained.

#### 2.1.1 Hot temperature treatment

- **Thermisation**

It is the most commonly used method used for milk preservation by heating the milk at a mild temperature at 57 – 68 °C for 15 – 20 seconds and rapidly cooling at <6 °C. This method is effective against spoilage-causing bacteria however it doesn't eliminate the pathogens such as L. monocytogenes. The main objective of thermisation is to reduce the growth of psychrotrophic bacteria and extend the shelf-life of milk.

- **Pasteurization**

Pasteurization is a method of food preservation that involves the application of heat, usually below 100° at a certain time. It aims to reduce the number of viable pathogens and spoilage-causing microorganisms to extend the shelf-life of milk without harming the milk quality. In milk, thermophilic species killed by the process of pasteurization.

Four common types of milk pasteurization vary with temperature and time the milk is held at that temperature.

- ✓ **Vat Pasteurization/Low temperature**, long-time pasteurization in which the milk is heated at 63°C for 30 min.
- ✓ **High Temperature/Short Time (HTST)** in which, the milk is heated at 72°C for 15 s.

- ✓ **Ultra-pasteurization (UP)** in which the milk is heated at 138° to 150° C for one or two seconds
- ✓ **Ultra-High-Temperature (UHT)** in which the milk is heated at 280° F for only two seconds.

**The objectives of pasteurization are**

- ✓ To destroy pathogenic organisms present in milk.
- ✓ To ensure the quality of milk and milk products.
- ✓ To destroy the unwanted organisms present in milk and milk products.

Milk pasteurization <https://youtu.be/MCzCHJDR2kl> Access date 11/25/2022)

- **Sterilization or UHT**

Sterilization is a method of food preservation that involves the application of heat, usually more than 100° at a certain time to kill almost all bacteria followed by packaging in air-tight containers either before or after heat treatment. The sterilized milk can be stored at room temperature for a longer period.

There are two methods of sterilization.

- ✓ Conventional method / In-bottle sterilization method in which the product is packed before heat treatment and the packed product is heated at 105-110°C for 30-45 min.
- ✓ UHT method / Aseptic method in which the product is heated at 135-150°C for 1-20 seconds followed by instant aseptic filling into sterile containers.

**The objectives of sterilization are:**

- ✓ To ensure the quality of milk and milk products at room temperature without refrigerated storage making it safe for human consumption.
- ✓ To ensure the destruction of microorganisms (pathogenic and spoilage-causing microorganisms, vegetative and spore forms, viruses).

### 2.1.2 Low-temperature treatment

- The foods are stored at temperatures 0–5 °C.
- It causes minimal changes to the nutritional properties of food.
- The main objective of chilling is to reduce the rate of microbial growth and its enzymatic activities which extends the shelf life of milk and milk products.
- It has been used in combination with other methods of food preservations such as irradiation, pasteurization to extend the shelf life of milk and milk products.
- Milk, cheese, yogurt, butter, etc. are stored in chilled storage.

## 2.2 Monitoring storage areas

Storage means placing the products in the proper storage area. The purpose of proper storage is to ensure the security and quality of products stored until they are needed. Storage areas should always must be maintained at the proper temperature to ensure product quality, and locked to ensure product security. As a result the products in storage areas have been stored according to store policies such as,

- Store items using FIFO (First In, First Out).
- To do this, store new supplies behind old supplies so that the old supplies are used first.
- Store food and chemicals in separate areas.
- Date foods and place new foods behind current stock.
- Keep food in clean, sturdy containers to prevent pest and rodent infestation.
- Keep food off the floor and away from the walls.
- Keep the shelving and floor clean.

### 2.1.1 Definition of terms

- **Component:** Any major piece, part or assembly of the main equipment or sub-equipment that does not have its own power supply and could not operate as a standalone unit (valves, switches, etc.).
- **Controller:** A device that interprets a mechanical, digital or analogue signal, generated by a sensor, to control an equipment or component.
- **Deviation:** Any discrepancy between the protocol and the actual performed test, test function methodology, testing equipment, testing material etc.
- **Instrument:** A device that interprets a mechanical, digital or analogue signal generated by a sensor, and converts it into engineering units ( $^{\circ}\text{C}$ , % RH, mA, etc.) through scaling.
- **Key Operating Parameters:** parameters that must be maintained in order to process or produce products with consistent quality attributes and those that may have an impact on the proper operation of the equipment.
- **Refrigeration equipment:** The term ‘refrigeration’ or ‘refrigeration equipment’ means any equipment whose purpose is to lower air and product temperatures and/or to control relative humidity.

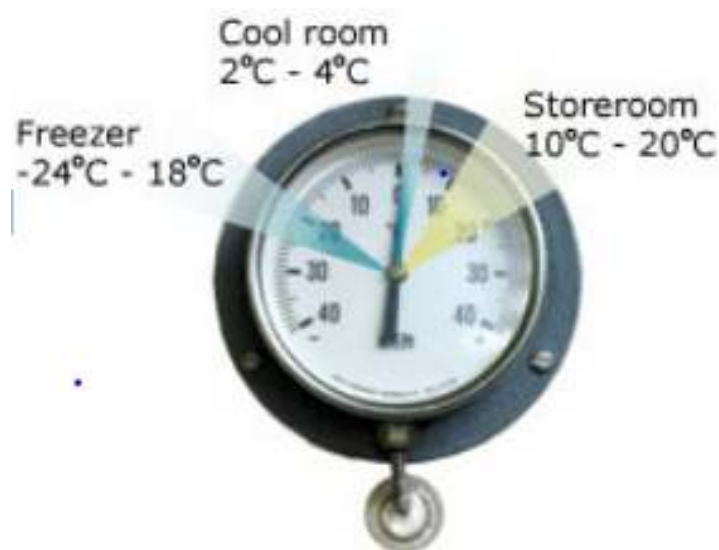


- **Sensor:** A mechanical device (pressure switch, bimetal temperature switch, etc.), or a digital or analogue transducer (limit switch, pressure sensor, temperature sensor, etc.)

### 2.1.2 Parameters monitored in the storage area

- **Temperature**

Temperature is very important when it comes to food storage, and you will often find lots of thermometers around the storerooms. The ideal storeroom temperature is between 10 and 20°C. This applies to both non-perishable and semi-perishable storage areas. The cool room and freezer are of course different. Most cool rooms operate at between 2 and 4°C, and most freezers at between -18° to -24°C.



**Figure 2.1 Temperature control**

- **Humidity**

Humidity is another thing that needs to be considered in the storeroom. The humidity in the dry store areas should be between 50% and 60%. If the humidity gets too high, when the air cools it will release this excess moisture in the form of water droplets, which end up covering the walls and floor of dry store rooms. This can then lead to moisture damage.

- **Rotation**

Stock rotation is another important storage principle. Stock rotation is where you put all new stock to the rear or underneath already stored stock, so that existing stock is used first. This prevents stockpiling older

supplies which may then deteriorate or exceed their used by date. This process is also known as the F.I.F.O 'First In, First Out' method.

- **Position**

Position is also important when storing stock, particularly when storing stock on shelves. Heavy items should be placed on the bottom shelves. Not only does this mean less lifting, but it also prevents the top shelves from becoming top heavy and unstable. Raw and cooked ingredients should be stored separately, and never on the same tray. Do not place raw meats above raw or cooked foods or desserts as the meat juices may drip and contaminate food on the shelf below.

- **Labeling**

This may not sound too important, but it is. You need a good system of labeling for many of your stock items, particularly frozen items as many of these look the same. You should also label the shelves. Labels not only allow you to identify what the commodity is but they also allow you to record information such as use by dates and supplier details.

### 2.3 Monitoring residence time

Consolidated orders are stored in chillers and freezers before being transferred to Load Out. The dispatch operator must ensure that the product is at the required temperature before it is transferred to the delivery agent. Transporters are designed to maintain the temperature of the product. They are designed to chill or freeze a product that is above the required temperature. Orders must not be loaded uncooled into a transport. The product should already be at the correct storage temperature before being transferred to the transporter for delivery.

- **Maximum out of refrigeration rule**

- ✓ The maximum out of refrigeration time limit is a time rule:
- ✓ It states the maximum period a cold chain food can be outside a temperature controlled environment (e.g. an open loading dock) without breaking the cold chain conditions.
- ✓ Like the never warmer than rule, the maximum out of refrigeration time limit is established by the manufacturer or producer in consultation with its customers. Maximum out of refrigeration time limit times must be specified in all documents that accompany the food and be communicated from each link in the cold chain to the next link. While the actual time limit is set by manufacturers or producers, these guidelines recommend some time periods as being appropriate.

- **Maximum out of refrigeration time limit guides:**

- ✓ Maximum of 20 minutes for all chilled foods if no refrigeration controls exist at receipt docks
- ✓ Maximum of 20 minutes for ice cream, ice confection and similar products, whether received into air-conditioned (+5 OC to +15 OC) and chilled anterooms (0OC to +5OC) - do not store at room temperature even temporarily
- ✓ Maximum of 60 minutes in +5 OC to +15 OC air-conditioned anterooms for frozen foods other than ice cream, ice confection and similar products; or
- ✓ Maximum of 90 minutes in 0°C to +5°C chilled anterooms for frozen foods other than ice cream, ice confection and similar products.

✓ **For chilled foods**

- ✚ Where chilled foods are being un-loaded or dispatched in either ambient (room temperature) or in +5°C to +15°C air conditioned ante-room conditions, the maximum out of refrigeration time limit is 20 minutes.
- ✚ chilled foods unloaded or dispatched in 0°C to +5°C refrigerated ante-rooms are usually still meeting their never warmer than cold chain condition and so no time limit is necessary.

✓ **For frozen foods**

- ✚ Where frozen foods are being un-loaded or dispatched in ambient (room temperature) conditions, the maximum “out of refrigeration” time limit is 20 minutes;
- ✚ Where frozen foods other than ice cream are being un-loaded or dispatched in +5°C to +15°C air conditioned ante-room (air conditioned temperature zone) conditions, maximum “out of refrigeration” time limit is 60 minutes;
- ✚ Here frozen foods other than ice cream are being un-loaded or dispatched in 0°C to +5°C refrigerated ante-room (chilled temperature zone) conditions, the maximum “out of refrigeration” time limit is 90 minutes;
- ✚ Ice cream and ice confection and similar products respond more rapidly than other frozen food to temperatures above -18°C, and should be loaded last and unloaded first direct from/to storage freezers whenever possible. The maximum “out of refrigeration” time limit for ice cream is 20 minutes, irrespective of the unloading or dispatch environment.

## 2.4 Identifying out-of-specification storage temperatures and taking corrective action

Documentation and recording are crucial elements when dispatching products. Recording product dispatch enables the company to check stock leaving the plant, and monitor delivery of the product. The dispatch operator is responsible for monitoring stock levels as goods are dispatched. In a manual system stock levels are calculated using information supplied on the dispatch dockets. If the dispatch system is computerized then stock levels will be automatically calculated out when dispatch documents are produced. This process is activated by the dispatch control clerk. Accurate records and documentation must be kept to assist:

- product recall
- monitoring product costs
- ordering
- monitoring and controlling product movement
- stock rotation
- meeting government regulatory requirements
- quality assurance
- checking correct weight of product
  
- **Expired use-by dates**

Expired use-by dates may be due to incorrect stock rotation. Products with expired use-by dates must be reported to the appropriate personnel according to workplace procedures. Product with expired use-by dates must not be dispatched.

- **Incorrect temperature of product**

This may be caused by incorrect refrigeration settings, breakdown of refrigeration, the chiller door being left open or poor air circulation due to poor stacking/packing of product. Correct temperature control of product and chillers in the dispatch area must be maintained to ensure that the product is stored in a safe and hygienic manner before dispatch to the consumer. Checks and recording of chiller temperatures in the dispatch area must be monitored according

to workplace procedures. Any variance from temperature tolerance limits given in government regulations must be reported to the responsible person immediately. All products to be dispatched are to be stored below the maximum allowed temperature for that product.

- **Off product**

Moulds, discolouration and odours may be caused by unhygienic production, handling, storage or packaging procedures. Any defect should be rectified and/or reported to the responsible person as per workplace procedure. The product may be redirected, reworked or discarded depending on the nature of the defect as per workplace procedures

- **Product Returns**

Finished products may be returned to your plant for several reasons. These include:

- ✓ expired shelf life
- ✓ customer complaints
- ✓ company product withdrawals
- ✓ recalls

These products may contaminate your plant environment, your equipment or other dairy products in your plant. Finished products that have left your direct control must not be salvaged and may not be used for processing or rework.

- **Rejection of materials & exceptions**

Have a documented policy that describes when incoming material should be rejected and how to do it. It should also describe when to make exceptions and how to handle those situations. For example, if the delivery vehicle was dirty but the ingredients or packaging was sufficiently protected and intact, you can still receive the material if you:

- ✓ send a report to the supplier and the transporter documenting the conditions under which the materials were received
- ✓ document what you had to do to make sure it would not contaminate other materials or your product (for example, cleaning dust and debris off the outer wrap or the containers)

- **Reporting out-of-specification product/process outcomes**

Reporting is providing information about serious wrong doing that you have become aware of at your workplace/ place of study. Some common elements of written reports include headings to indicate topics and help the reader locate relevant information quickly, and visual elements such as charts, tables and figures, which are useful for breaking up large sections of text and making complex issues more accessible. Lengthy written reports will almost always contain a table of contents, appendices, footnotes, and references.

**The significance of the reports includes:**

- A rule and balanced report also helps in problem solving.
- Reports communicate the planning, policies and other matters regarding an organization to the masses.
- Reports present adequate information on various aspects of the business.
- All the skills and the knowledge of the professionals are communicated through reports.
- Reports help the top line in decision making

<b>Self-check 2</b>	<b>Written test</b>
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Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

**Part 1. Choose the best answer**

- 1 Which one of the following is not true?
  - A. Products must be kept at recommended maximum temperature.
  - B. keep chilled foods at a temperature between 10°C and +15°C to
  - C. Keep frozen foods and ice cream never warmer than +18°C
  - D. All
  
- 2 What do you do to control cold store temperatures effectively?
  - A. Maximize air temperature variation to avoid reduction in quality and reduction in useable shelf life of product
  - B. Maximize door openings and/ or traffic movement in and out of the cold store
  - C. Take prompt steps to increase the product temperature should any increase occur
  - D. Ensure defrost cycle systems are adequately designed and that alarms are in place

**Part 2: Give short answer**

1. Define out-of specifications and some of out of specification items?
2. List the controlling parameters in the storage area?
3. Write the importance of controlling and monitoring residence time?



**LG #20**

**LO#3- Transfer temperature controlled  
stock**

**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Handling and transferring goods
- Recording stores transfer information
- Conducting work

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Handle and transfer goods
- Record stores transfer information
- Conduct work

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

## Information Sheet 3

### 3.1. Handling and transferring goods

Consolidating orders requires the operator to select products from separate areas of the product store according to a dispatch order and schedule. The consolidated order must be recorded and stored according to government regulations and workplace procedures before it is loaded and transported to the distributor or consumer.

The dispatch area includes storage facilities for maintaining consolidated orders before they are loaded out for delivery to the customer. Refrigerated storage facilities ensure that chilled products are maintained at the required temperature. When handling and transferring products, lifting equipment is provided to assist the operator in the movement of stock. Trolleys, forklifts and other equipment are provided to prevent accidents occurring through the use of incorrect manual handling techniques. The dispatch operator is required to follow all manual handling procedures when products for each order are being collected and stored prior to dispatch.

#### 3.1.1 Handling of milk & dairy products

Milk Handling equipment used for the movement, storage, control and protection of materials, goods and products throughout the process of manufacturing, distribution, consumption and disposal. The different types of handling equipment can be classified into four major categories: transport equipment, positioning equipment, unit load formation equipment, and storage equipment.

**A variety of milk handling equipment ranging from transportation, to storage equipment.**

- Milk Reception Units
- Milk Transport Tanks
- Milk Cans
- Pasteurization Units
- Milk Coolers
- Lacto scan
- Measuring Cups
- Milk Sampler
- Cream Separators
- Alcohol Gun
- Sample Tray
- Bottle with stand

- **Milk Reception** Unit acts as a raw milk receiving machine with sieves



**Figure 3.1 Milk Reception**

- **Pasteurization units** are the basic equipment for processing milk. They are also an important component in most processing lines for drinks and liquids in the foods industry



**Figure 3.2 pasteurization unit**

- **Milk Cans** The heavy duty international standardized milk cans for 10 -50litres or more in stainless and Alloy Aluminum. Handles are properly bent with ends chamfered, which ensures firm grip. Can lids are spot welded at five places and brazed all around with sanitary finish, which ensures hygiene.



**Figure 3.3 Milk can**

### **Milk transport tankers**

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**Figure 3.4 Milk transport tankers**



**Figure3.5. milk cooler tank**



**Figure3.5 Strainer**





**Figure 3.6 Alcohol gun**



**Figure3.7. Milk sampler**

### 3.1.2 Dairy product transferring method

- **Bulk milk transport**

Milk cooled on the farm or cooling center may be transported in milk cans or in bulk tankers. Bulk tankers are insulated, so the milk will remain cold until it reaches the plant (provided the transport is fast, i.e. short distance or good roads enabling milk to be delivered before the temperature of milk rises above 10° C).

Bulk milk cooling <https://www.youtube.com/watch?v=ehop-spxygo> (access date 11 /25/2022)

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- **In-can milk transportation**

Alternatively, such milk may be filled in cans and transported in milk cans. This has the advantage that a farmer's can of poor quality milk will not be mixed with other farmers' good quality milk and spoil the lot. Since the cans are not insulated, the transport to the factory must be efficient enough to enable milk reach the factory in acceptable condition.

- **Storage requirements**

When products are stored in the dispatch area government regulatory standards must be followed at all times. The layout of the storage areas will include areas for hanging products, chillers for storage of chilled products and storage freezers if frozen product is dispatched from the site.

- **Stock rotation**

Stock rotation procedures are necessary when consolidating orders. The operator selects the products according to workplace procedures. Stored product will then be rotated as the stock moves along the hanging rails or off the packing shelves. Stock rotation systems may use coloured tags or labels to identify the product that is to be used for each dispatch order. Effective stock rotation will ensure that no stock is left on the shelves past its use-by date. The dispatch operator must notify appropriate workplace personnel when stored products are close to the use-by date or if the stock levels of a product line are low.

- **Weighing of packaged stock**

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Stock may be ordered by weight, rather than by quantity. The weighing of products must be accurate to ensure customer requirements are met. When bulk items are to be weighed in the dispatch area the workplace procedures for use of scales are to be followed. Scales are checked prior to each shift to ensure a correct zero reading. Government regulations require that the scales be calibrated by a recognized authority.

**Milk product cold chain** <https://www.youtube.com/watch?v=UTjy2YBbmco> (Access date, 11 /25/2022),  
<https://www.youtube.com/watch?v=-FHll993x9A> (Access date, 11 /25/2022)

- **Shipping finished product**

Finished products must be properly protected during shipping. The type of vehicle or containers required depends on the type of product and the conditions under which it has to be transported. Unless you take effective control measures, finished products may become contaminated during shipping or may not reach their destination in a suitable condition for consumption. This can happen even when proper hygiene control measures were taken when you made the product.

**Shipping control measures should include:**

- ✓ protecting product from potential sources of contamination
- ✓ separating product from non-compatible products on the same load
- ✓ protecting product from damage that could make it unsuitable for consumption
- ✓ keeping the product at the right temperature to prevent the growth of spoilage micro-organisms that may shorten the shelf life of the product

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- **Transport Vehicles**

The vehicles and containers used to transport food should be kept clean and in good condition. If you use the same vehicle or container for transporting different foods or for transporting non-food products, it must be effectively cleaned and disinfected (if necessary) between loads.

- **Transport vehicles within your plant**

This section covers equipment such as carts and forklifts used to move ingredients, packaging and finished product within your plant.

- ✓ Maintain this equipment carefully. Carts, motorized forklifts and hand trucks take a lot of abuse.
- ✓ Forklifts and hand trucks often have painted surfaces. Make sure the paint isn't flaking off, since this could contaminate the products.
- ✓ Wash transportation equipment frequently. Carts should be easily cleaned and designed to prevent water from collecting in them. Regularly clean and sanitize equipment wheels.
- ✓ Not all motorized forklifts can be used in all areas of the plant. Because propane may contaminate some stored food, use electric forklifts in food-processing areas.
- ✓ Create a monitoring program to make sure that any transport vehicles restricted to specific areas of the plant are used only in those areas. For example, a hand truck used to deliver ingredients into a raw batching area should not be used to deliver packaging materials into a finished product area.

### 3.2. Recording stores transfer information

A legal requirement is that food businesses maintain records relating to the manufacture, processing, packing, distribution, receipt, holding, or importation of food products. The purpose is to assist in determining whether anything has happened to the food or been done to the food that would render it unsafe. Accordingly, firms must maintain records and government authorities may access the records. The food industry also is demanding that food businesses retain records which buyers can access or rely on to assure that the seller has taken reasonable steps to reduce the risk of a food borne problem.

#### 3.2.1 Key terms and concepts in a stock

- **Damaged stock:** Stock that has been broken damaged or soiled (spoilt) during delivery or while in the store.
- **Electronic Data Interchange (EDI):** An electronic stock recording system where a computer which is linked to Point Of Sale (POS) equipment records all sales and automatically recalculates stock levels.
- **First In First out (FIFO):** A stock rotation system which requires the stock bought first by the business is to be issued first. Incoming stock is placed behind existing stock.
- **Incoming goods:** Those goods (stock or inventory) which have been ordered and are delivered to the business.
- **LIFO: The last in, first out (LIFO)** The products most recently purchased are used first
- FIFO ensures proper rotation of foods in storage. When foods are received, put the oldest in the front and the newest in the back. Past-dated foods will lose their quality and sometimes become unsafe Inventory cycle.
- **Lead time:** The period of time between when goods (stock or inventory) are ordered, and when they are delivered to the warehouse.

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- **Minimum stock levels:** A predetermined minimum number of stocked items which, when reached, will trigger (or prompt) the generation of new orders. This can be programmed into the computerized stock management program.
- **Obsolete lines:** Old stock which is out of date (use-by-date has expired) or is no longer featured on the menu.
- **Replenishment:** The replacement of stock as goods is sold.
- **Seasonality:** A concept relating to stock/dishes on the menu whose customer demand is governed by the seasons, e.g. fruit and vegetables in summer.
- **Shelf life:** The time a product will remain safe before consumption or use.
- **Shrinkage:** The difference between the value of stock a store actually has, and the value of stock it should have. Shrinkage is also referred to as the act of theft.
- **Stock or inventory:** All the goods by unit, and their cost value, a retailer has in the business. This includes all the items in cost and profit centers for sale, and in storage for future use.
- **Stock rotation:** A stock control system where older stock is sold before newer stock.
- **Physical Inventory system:** as system in which, managers count and record the amounts of each product in storage by physically found in the place.
- **Perpetual inventory system:** is a continuous count of the number of items in inventory. The amounts of product in a perpetual inventory system are not continually determined by a physical count, but by keeping a running total of purchases, or deposits, and usage, or withdrawals. Actual physical inventory counts are, however, taken periodically to ensure the accuracy of the perpetual inventory system. The key advantage of a perpetual inventory system is that the managers always know the quantity of products that should be available.

### 3.2.2 The Reason for Records

Food businesses maintain detailed records for several reasons, such as, document how the food was handled and labeled to establish that the food was not adulterated or misbranded while under the control of the food business. Food businesses also maintain records of who they received the food from (previous source) and who received the food from the business (immediate subsequent recipient). This second purpose of records is to facilitate traceability.

Quality assurance procedures require a system of monitoring, checking and recording of processes, which could include cleaning schedules, cleaning plans, personal hygiene rules, identifying hazards, sales records, and maintenance schedules. Quality management systems should also be developed to monitor the types and amounts of products, ingredients and packaging materials that are in the storeroom and the time that they remain in storage. Records should be kept by storekeepers to show which materials are transferred into and out of the storeroom and when they were used. Similarly, the control of product quality does not finish when the product leaves the processing unit and manufacturers should monitor and control the distribution methods to retailers and discuss with them the best ways of storing and displaying the products

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### 3.2.3 Records to be maintained in the stores

- **Dead Stock or Non-Consumable Register:**

This is maintained by store-keeper, in which entries of non-consumable articles such as all machinery, equipment, furniture etc. are made. The register shows complete details of articles together with accessories. The different items are entered on different pages. All transactions about a particular item are entered in one page.

- **Consumable Register**

In this, store-keeper maintains record of consumable stores received, such as coke, diesel oil, kerosene, petrol, lubricants, cotton waste, paints etc. The different items are entered on different pages. All the transactions about a particular item are entered in one page.

- **Daily Receipt Register**

This may be in a register or loose leaf form. Whenever any material comes in the store, it is entered date wise in daily receipt register. Material is then inspected and if found suitable, is entered in Stock Register. If the material is found defective, it will be rejected and either the material or its reports will be sent to the supplier. The incidental charges that are incurred will also be noted in daily receipt register.

- **Issue Register**

This may be in register or loose leaf form. All stores issued are entered date wise in it by store-keeper. From the Receipt and issue register, store ledger is prepared by accounts section.

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- **Surplus Stock Register**

Sometimes such purchases are made, which do not come in use for long time, Such materials are then declared surplus and are recorded in a separate register called Surplus Stock Register.

Thus unnecessary material is removed from the Stock Register to facilitate easy handling.

- **Suspense Register**

The defective item or items received in excess should not be placed in the bins but kept in “Suspense cell”, A separate register is maintained by store-keeper for all such items placed in suspense and is known as Suspense Register.

- **Condemned Article Register**

Unserviceable material after use or obsolete material which is authorised to be condemned by authorized person is entered in this register and will be shown as stock until disposed off. The balance of condemned articles will be taken out from store ledger and will be shown condemned.

- **Empty Containers and Packages Register:**

The record of empty containers and packages is kept in this register by store keeper. These should be disposed-off at convenient intervals by auction or otherwise to the best advantage.

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### 3.3. Conducting work

#### 3.3.1 Workplace information

Each workplace relies on the exchange of information to carry out its daily business. Information is passed from employee to employee, customer to employee, supervisor to team member, supplier to customer, and so on. Dealing effectively with information and records is necessary and important for all organizations. The quantity and variety of information kept by an organization can be huge. Information needs to be sorted into related groups so that it can be stored easily and found when needed. An organization success depends largely on how well it manages its information. You need to be familiar with the type of information used in your job and the way records are organized so you can collect, file, store and find information quickly and easily. Finding and using information is a large part of many jobs, so knowing how to deal with it is an important workplace skill. Being confident and efficient in this skill helps you and your organization succeed.

#### 3.3.2 Workplace safety procedures

The most important concept to remember is that you are responsible for your own safety and the safety of others. Most safety practices are common sense. Unfortunately, they can be forgotten or overlooked unless you make safe practices a habit or an instinct. General Safety By doing things right, you and your co-workers will commit yourselves to safety on the job and everyone will benefit. Accidents occur in many ways but most often can be traced back to one of two basic factors: ignorance or carelessness. You must always be concerned with your own safety and with the safety of others around you.

#### 3.3.3 Specification

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A specification often refers to a set of documented requirements to be satisfied by a material, design, product, or service. A specification is often a type of technical standard. There are different types of technical or engineering specifications and the term is used differently in different technical contexts. They often refer to particular documents, and/or particular information within them. The word specification is broadly defined as "to state explicitly or in detail" or "to be specific."

<b>Self-check 3</b>	<b>Written test</b>
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Name..... ID..... Date..... **Directions:** Answer all the questions listed below.

**Part 1. Give short answer (5pts)**

1. Write the records maintained in the store?
2. Describe the reasons for recording stock in the store?
3. List some of the key terms related with stock?
4. List handling and transferring equipments?

**Note: Satisfactory rating 12 points      Unsatisfactory – below 12 points**

You can ask you teacher for the copy of the correct answers

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