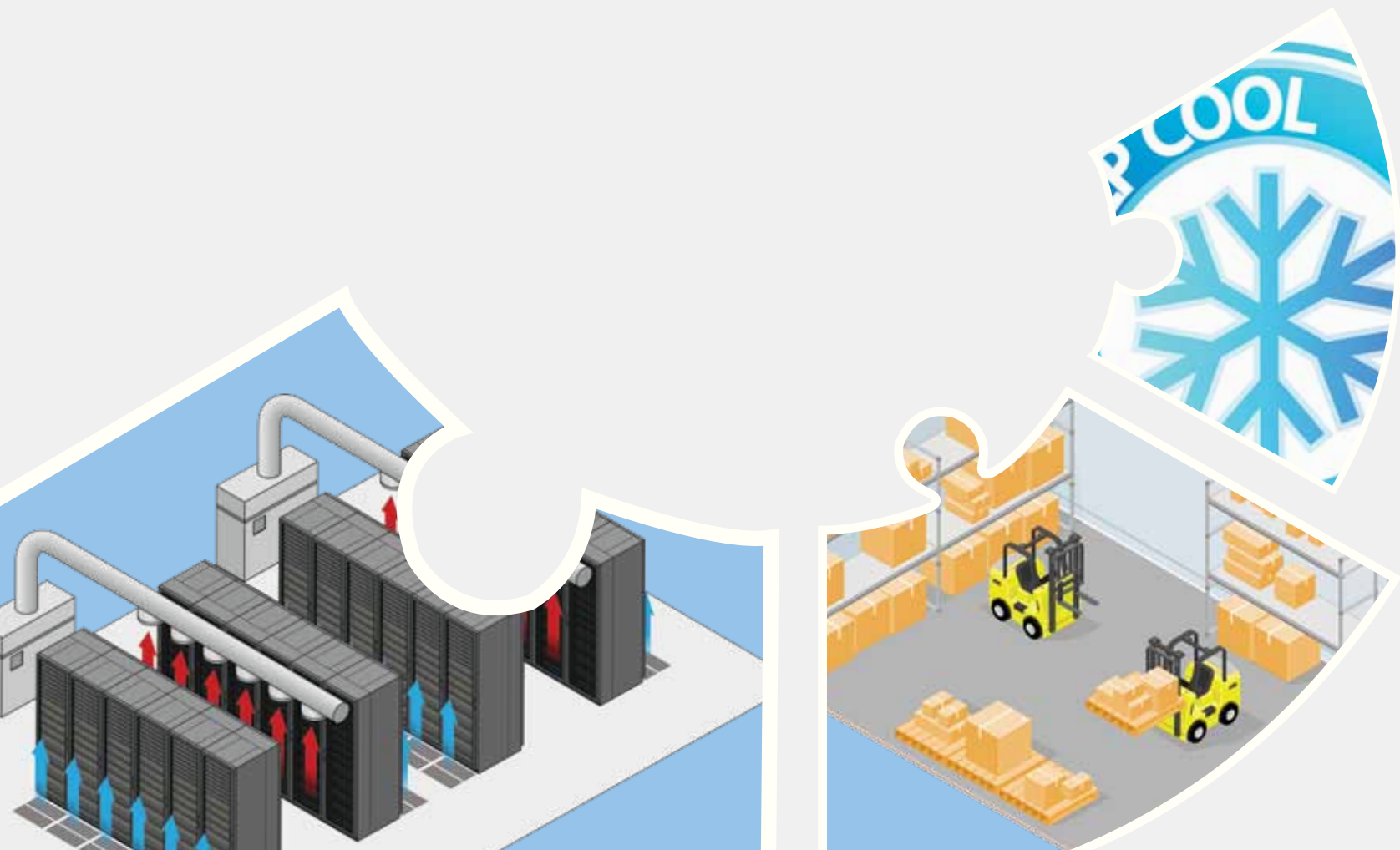




CHAPTER 5

COLD STORAGE

1.	Introduction	1
2.	Storage of perishable dairy products.....	1
3.	Management of cold storage areas	1
	3.1 Construction and layout	
	3.2 Maintaining the cold chain	
	3.3 Stock management	
4.	Reworkable stock and rejected products.....	4



Chapter 5: Cold Storage

1. Introduction

The refrigerated storage of perishable dairy products after processing is critical to ensure that the consumer receives safe and palatable products for consumption.

Dairy products that require refrigeration should be transferred into a refrigerated cold storage area as soon as possible after processing to prevent the possibility of contamination, deterioration or development of pathogenic and spoilage microorganisms.



2. Storage of perishable dairy products

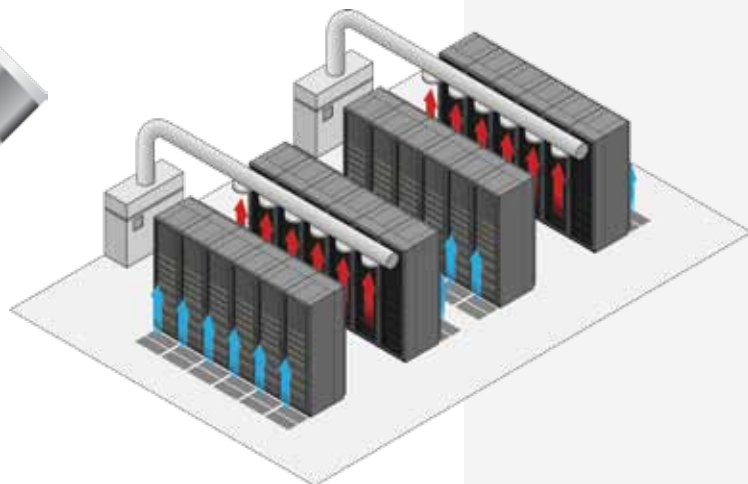
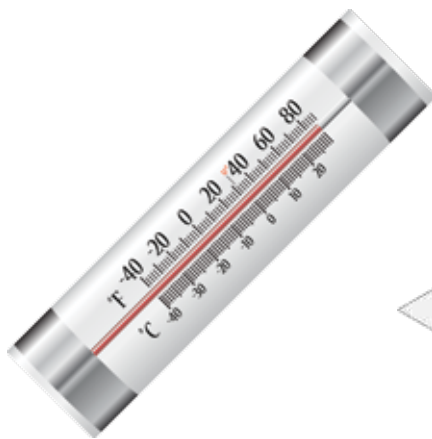
It is the responsibility of the manufacturer to provide adequate cold storage facilities to prevent damage or deterioration of the food. The finished product should be stored at a temperature between 4 and 7°C as specified by law, in a cold room. The temperatures of the facility should be monitored and recorded.

This is an important aspect as the law refers to the CORE TEMPERATURE of the product, not the cold room.

The code of practice for measuring the temperature of the product is specified in the regulation. This process will be used by any Environmental Health Practitioner during an inspection of your facility.

R 962 Annexure D
R 8(4), 6(5)
SANS 10049, 7.3.3, 7.4.4
SANS ISO TS 22002-1, 8.4
SANS 1678, 5.9
SANS 1679, 5.9

CGCSA FSI GMCP I.B,4.1-4.3, B.C 1.5



3. Management of cold storage areas

Cold storage fulfils a very important link in keeping the cold chain and ensuring that perishable product integrity is maintained as well as shelf life targets are reached.

3.1 Construction and layout

The cold storage area should be located as close as possible to the packaging area to ensure that there is no break in the cold chain after the product has been packaged.

Packaged final products should be moved into the cold storage area as soon as possible.

SANS 10049, 7.2.4
SANS ISO TS 22002-1, 5.3
SANS 1678, 5.9
SANS 1679, 5.9
CGCSA FSI GMCP I.B,4.1-4.3

The floor must have a suitable surface/covering with adequate drainage facilities and this area must be on the master cleaning schedule. Special attention should be given to the choice of floor as the cold temperature can cause deterioration of surfaces and lead to potholes, which can result in pools of standing water. This can be a cause of contamination.

Walls are usually constructed of insulated wall paneling, e.g. Iso-wall, which is easily washable. The walls should be protected from forklifts and other moving machinery.

The layout of the cold room and the positioning of the chilling unit should be done with the assistance of reputable installation experts to ensure effective cooling.



SANS 10049, 7.2.3
SANS ISO TS 22002-1, 16
SANS 1678, 5.9
SANS 1679, 5.9

R 962, 6(5), Annexure D
SANS 10049, 7.3.3, 7.4.4,
SANS ISO TS 22002-1, 8.4
CGCSA FSI GMCP I.A. 5, BC 1.5

3.2 Maintaining the cold chain

Temperature probes should be correctly located to ensure that an accurate reading is obtained for the temperature of the cold room. The temperature gauge should be calibrated on a regular basis and be accessible at all times. Verification of the temperature probes should also take place using a calibrated handheld thermometer. Complete and accurate records of temperature monitoring should be available. Temperatures should be checked at least daily.

It is recommended that automated alert measures be in place in the event of load-shedding or compressor malfunction over weekends or during the evenings.

The door of the cold room should be kept closed at all times and additional measures such as plastic strip curtains or



air curtains should be in place to minimise the loss of cold air when the doors have to be open.

Appropriate loading dock areas should be available to minimise the loss of cold air during vehicle loading activities.

Condensation from cooling units should be properly drained so as not to contaminate products. Outside drainage should be used to avoid contamination.

Stores should be proofed against rodents, insects and birds, and should be kept in a hygienic condition.

3.3 Stock management

There should be sufficient space for normal stock levels, including peak periods.

The layout of the cold rooms should allow for a passageway at least 0,5 m wide around the walls or partitions of all stores, to preclude the establishment of breeding sites for rodents, to enable cleaning and to aid hygienic inspections.

Where racks are used against walls there should be a clearance of at least 0,3 m between the floor and the bottom of the rack.

Measures should be taken in the cold room where necessary to:

- Protect food from potential sources of contamination.
- Protect food from damage likely to render the food unsuitable for consumption.
- Provide an environment that effectively controls the growth of pathogenic or spoilage microorganisms and the production of toxins in food (with special reference to *Listeria*).
- Ensure first-in, first-out (FIFO) principles or first-expired, first-out (FEFO).
- Correct stacking practices.

The height of stacking should be limited so that crushing or distortion, which is sufficient to damage the product or packaging, does not occur on the lower layers. The top layer of the stored product should not make contact with the overhead structures, as this could facilitate access by crawling insects.

It is illegal to pack food products directly onto any floor surface.

Stackable containers that are used for food, shall also not be placed directly on the floor, but on pallets, “dummy crates” or trolleys that are clearly identified for this purpose.

Rough treatment of containers should be avoided to preclude the possibility of contamination of the processed product.

Sufficient lighting is essential to ensure that production dates are visible for correcting stock rotation practices.

SANS 10049, 7.2.3
SANS 1678, 5.9
SANS 1679, 5.9
CGCSA FSI GMCP I.B,4.1-4.3

SANS 10049, 8.6
SANS ISO TS 22002-1,
5.7, 16
SANS 1678, 5.9
SANS 1679, 5.9
CGCSA FSI GMCP I.B,4.1-4.3

SANS 10049, 8.6
SANS ISO TS 22002-1, 5.7, 16

SANS 1678, 5.9
SANS 1679, 5.9
CGCSA FSI GMCP I.B,4.1-4.3

SANS 10049, 8.6,
SANS ISO TS 22002-1, 16

SANS 10049, 7.2.6,
SANS ISO TS 22002-1, 6.6

SANS 10049, 7.4.5
SANS ISO TS 22002-1,
10.2, 11

SANS 10049, 9
SANS ISO TS 22002-1, 14
CGCSA FSI GMCP B.A.4

Chapter 10

Plastic pallets and skids should be used in the production areas where products are packaged. They must be kept clean and in good condition. When pallets or other wooden surfaces are washed, they should be properly dried before use.

The area must be cleaned and sanitised regularly and the effectiveness of cleaning must be monitored. Cross-contamination can easily take place from the cold storage area to processing. Uncontrolled staff movements must be avoided to prevent possible risks of cross-contamination.

4. Reworkable stock and rejected products

A dedicated controlled area must be available for reworkable stock and rejected products. A formal documented procedure should be in place for all rejects, returns from the trade and any product to be reworked.

It is best practice to completely isolate this area from the rest of the stock for food safety and security purposes.

This area must be kept clean and hygienic to ensure that no cross-contamination with saleable product takes place.

Controls must be in place to ensure complete segregation of reworkable stock and rejects to ensure that rejects are not reworked or sold.

IMPORTANT LINKS



HACCP

Remember to refer back to Chapter 1 to recap on the hazards identified and preventive measures in the handling of raw milk and the DVD



DOCUMENTATION

Remember to refer back to Chapter 12 and the DVD for more details on the suggested documentation required for raw milk handling



TESTING

Remember to refer back to Chapter 7 for more details on sampling and testing methods



CHAPTER 6

TRANSPORTATION OF PERISHABLE DAIRY PRODUCTS

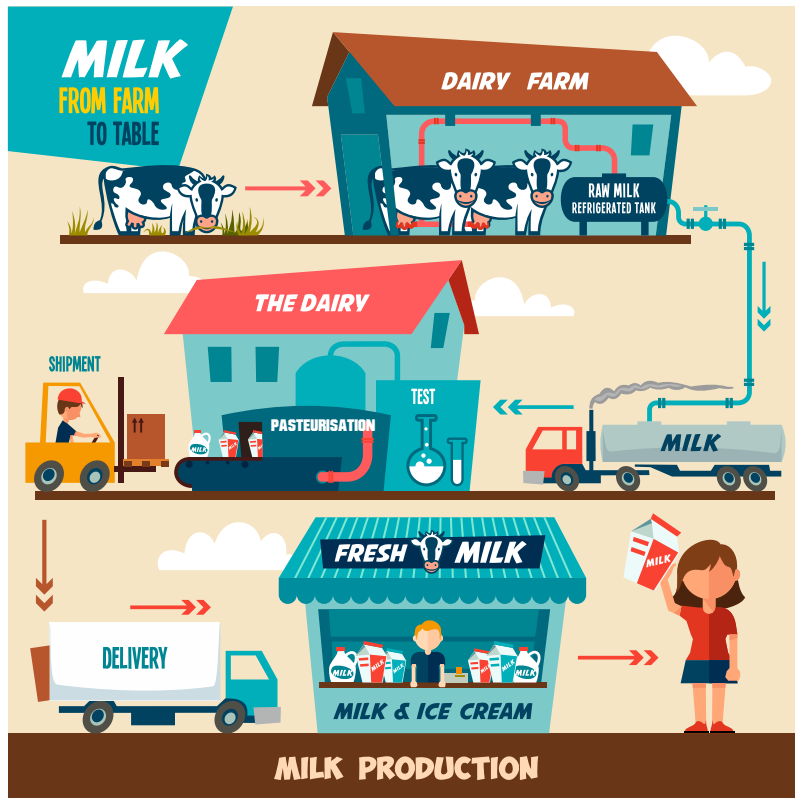
1.	Introduction	1
2.	Transport to the factory	2
	2.1 Standards and requirements for the transport of food	
	2.2 Vehicle requirements	
3.	Vehicle loading and offloading.....	3
4.	Third-party transporters	5



Chapter 6: Transportation of Perishable Dairy Products

1. Introduction

The logistics of fresh milk and other dairy products are becoming increasingly important. The shelf life of dairy products is directly influenced by the time of production, warehousing and transportation, including collecting of the raw milk, warehousing it in a dairy plant, delivering it to the retailer and selling it to the customer.



Refrigerated transportation is expensive but essential to ensure that products are adequately protected to provide maximum shelf life and safety for the consumer.

Vehicles used for the transportation or distribution of food should be clean, free from odours, weatherproof and easy to clean. In the case of vehicles with refrigeration, the refrigeration unit should be equipped to maintain the food at the required temperature. Food must be adequately protected during transportation. The type of containers required depends on the nature of the food and the conditions under which it must be transported.

Where necessary, measures must be taken to:

- Protect food from potential sources of contamination.
- Protect food from damage likely to render the food unsuitable for consumption.
- Provide an environment that effectively controls the growth of pathogenic or spoilage microorganisms and the production of toxins in food.

Food may become contaminated, or may not reach its destination in a condition suitable for consumption, unless effective control measures are

taken during transport, even where adequate hygiene control measures have been taken earlier in the food chain.

2. Transport to the factory

R 962 Annexure D, 8(4)

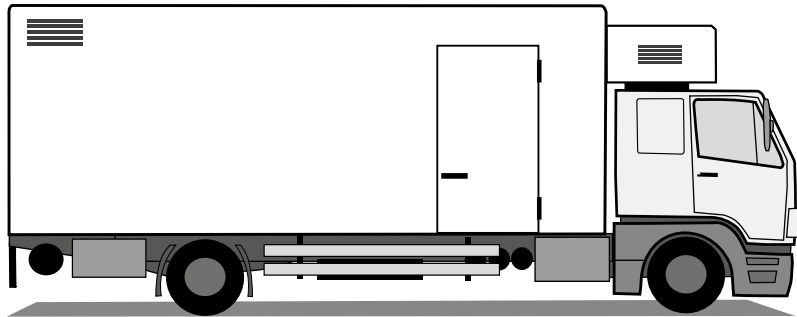
2.1 Standards and requirements for the transport of food

- There are specific legal requirements pertaining to the transportation of foodstuffs. These include the requirements for the vehicle and the temperature at which food is transported. Dairy products shall be transported to maintain a core temperature of 4 or 7°C, thus all vehicles shall be refrigerated and shall be fitted with a temperature-monitoring device.

R 962, 13

In addition, regulation states that vehicles used shall be clean. Dairy products must be transported in dedicated vehicles and should not be transported together with waste, live animals or people. The vehicle should be easy to clean and dust-proof.

Products should not be stored directly on the floor of the truck.



2.2 Vehicle requirements

The internal surfaces of the vehicle should be waterproof and sealed to prevent the ingress of pests, exhaust fumes and any other sources of contamination. The vehicle must be in a good state of repair with no cracks between the floor and insulated panels and between the panels. Door seals must be intact and the doors must seal positively with no air leakage.

The exterior cladding of the insulated body should also be weatherproof to prevent any loss of insulation.

The refrigeration unit shall also be adequate to maintain the temperature of the product. It should be maintained regularly and records of maintenance should be available.

Every refrigerated road transport vehicle used for the transportation of food must be fitted with an accurate and calibrated temperature recorder or electronic data logger. The recorder unit should be calibrated at regular intervals, given the vibration of the vehicle.



Vehicles should be clean and well maintained as they carry the reputation of the company on the road. Cleaning procedures should be documented with records. Adequate attention should be given to roadworthiness, driver training and appearance. Advertising and driver feedback numbers should be well maintained.

SANS 10049:2011, 8.11.4
SANS ISO TS 22002-1, 16.3
CGCSA FSI GMCP I.B,4.1-4.3, B.C 1.5

SANS 10049:2011, 8.11.6
SANS ISO TS 22002-1,16.3
CGCSA FSI GMCP I.A 5

SANS 10049:2011, 7.4.5.2
SANS ISO TS 22002-1, 16.3
CGCSA FSI GMCP I.B, 4.4-4.9

3. Vehicle loading and offloading

A refrigerated road transport vehicle is not a cold store and can only maintain product temperature. The product must therefore be pre-cooled to the required or specified transport temperature. The temperature of the product should be checked before loading and should be recorded.

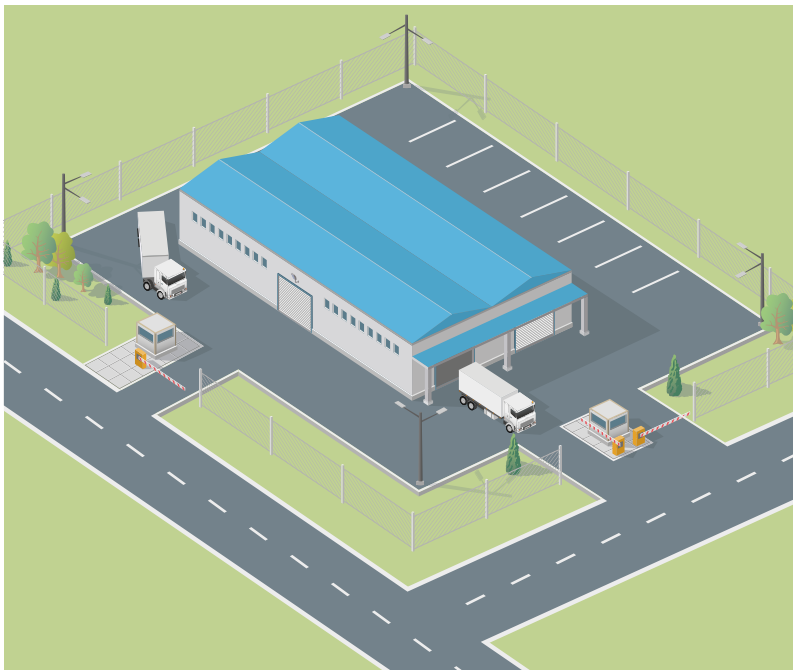
Proper and uniform pre-cooling of the truck is also an important prerequisite for effective temperature control. Pre-cooling of the vehicle is very strongly recommended because it will:

- Cool the body structure to reduce the heat load after completion of loading.
- Allow routine checks on the operation of the cooling unit.

The refrigeration unit should operate within the manufacturer's specifications with no excessive heat build-up, strange noises or oil leakage.

All vehicles should be inspected before loading to ensure that they are clean and weatherproof. The refrigeration unit and the amount of fuel in the unit's fuel tank should be inspected at least daily. The temperature should be recorded before loading.

Covered facilities should be provided for the loading and offloading of vehicles so that weather conditions do not contaminate the product or packaging.



Refrigerated products must never be exposed to ambient temperature and humidity conditions. This will result in unwanted temperature increases and condensation on the product and packing material. Insulated and temperature-controlled air locks connecting the cold store directly with the refrigerated vehicle should always be used. This applies for both loading and offloading of refrigerated vehicles and containers.

The loading of refrigerated cargo must be as quick as possible to avoid any temperature increases and condensation. Ideally, loading must

SANS 10049:2011, 8.11.8
SANS ISO TS 22002-1, 16.3
CGCSA FSI GMCP I.B,
4.4 – 4.9,

SANS 10049:2011, 8.11.2
SANS ISO TS 22002-1, 16.3
CGCSA FSI GMCP I.B,4.4-
4.9

ideally be completed within 30 minutes. The doors must be closed and cooling applied during breaks in loading.



The vehicle should not be overloaded and cargo must never be loaded above the horizontal load line (at least 80 mm from the ceiling) or beyond the vertical load line (end of the T-bar floor section) at the door end.

Cargo should not be stowed right up against the sides and an air space of at least 20 mm must be provided for the cold air to flow between the inner sides of the transport unit and the cargo.

The doors must be closed properly and door rubbers must seal all around to avoid heat leakage and the ingress of moisture into the refrigerated compartment.

Non-food items should not be transported with food unless it can be shown that there is no risk to the food products.

Where the same refrigerated transport is used for deliveries to several points, care should be taken to minimise the time of the opening of the vehicle doors to maintain the temperature of the rest of the load.

SANS 10049:2011, 8.11.5
SANS ISO TS 22002-1, 16.3
CGCSA FSI GMCP I.B,4.4-4.9

SANS 10049:2011, 8.11.6
SANS ISO TS 22002-1, 16.3
CGCSA FSI GMCP I.B,4.4-4.9



Product should be handled with care during loading and offloading to minimise any damages.

The truck should be sealed after loading to prevent any tampering of the product.

Product temperature must be maintained at a core temperature of 4 to 7°C, for the specific product as specified by regulation, throughout delivery. Records of deliveries and batch shall be maintained to ensure that traceability includes the vehicle used.

A procedure should be in place for any vehicle incidents to ensure that product safety is not compromised.

If the vehicle is required to uplift returns from the trade, there should be a defined procedure for this and measures must be taken to ensure that saleable stock is not compromised.

4. Third party transporters

Some companies choose to outsource the delivery of their products to a third party specialist haulier.

All the requirements above should be complied with. Ideally these requirements should be included in the contract with the third party. These requirements should be monitored by the dairy to ensure that compliance and records are in place. The contract should also cover any emergency procedures and breakdowns that could affect the product quality and safety.

Additional requirements for consideration include insurance for the load, should there be a vehicle accident.

IMPORTANT LINKS



HACCP

Remember to refer back to Chapter 1 to recap on the hazards identified and preventive measures in the handling of raw milk and the DVD



DOCUMENTATION

Remember to refer back to Chapter 12 and the DVD for more details on the suggested documentation required for raw milk handling

SANS 10049:2011, 8.11.7
SANS ISO TS 22002-1, 16.3
CGCSA FSI GMCP I.B,4.4-4.9, I.C.2

R 962 Annexure D, 8(4)
SANS 10049:2011, 8.11.9
SANS ISO TS 22002-1, 16.3
CGCSA FSI GMCP B.A.2.5

CGCSA FSI GMCP B.A.2.5, I.C.2

CGCSA FSI GMCP B.A.4.1

SANS 10049:2011, 8.3 SANS
ISO TS 22002-1, 16.3
CGCSA FSI GMCP I.A.7, 8