



Temperature-controlled loading

A three-stage process

This document concerns the following refrigerated vehicles.



reefer containers



semi-trailers



refrigerated vehicles

1 The preparation of parcels

a. Distinguishing «refrigerated» and «frozen»

Refrigerated goods (from 0 to +10°C depending on the product) are mainly plant products (fruit and vegetables) and are sensitive to two sources of heat:

- external, through the walls, the floor and the roof of the container
- internal, from the goods themselves

The air must circulate around and, above all, through the goods.

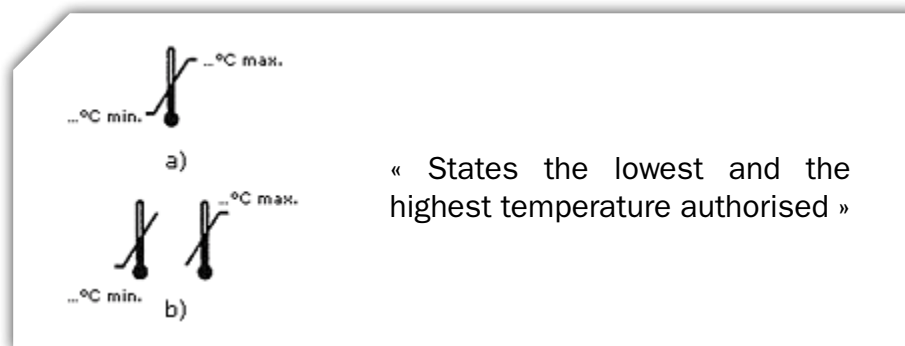
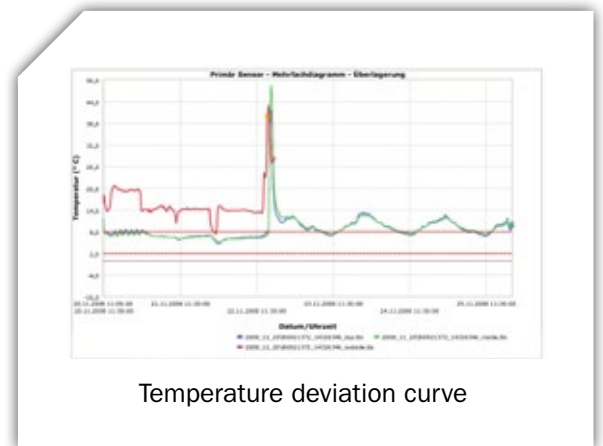
Frozen products (from -9 to -18°C), essentially animal-based (meat, fish, etc.), are maintained at negative temperatures and fastened securely in a single block. The flow of refrigerated air must travel from the floor, along the sides and the ceiling so that the heat from the walls of the box does not reach the goods.

b. Adapting the packaging

It must limit heat transfer, which must be minimised by the size and the number of perforations in the packaging

An autonomous temperature sensor must be placed as close as possible to the goods: write its serial number and exact location on the transport document

All persons involved in the cold chain must be able to interpret the instructions provided by a pictogram:



Because certain goods are irreparably damaged by freezing, add the notice «Do not freeze»

Beware of the term «Ambient temperature»: it is not a standardised term. The outside temperature varies from one country to another and from one season to the next, particularly during international transport between hot and cold countries (change of hemisphere)!

2 Loading the refrigerated box

Before loading, check:

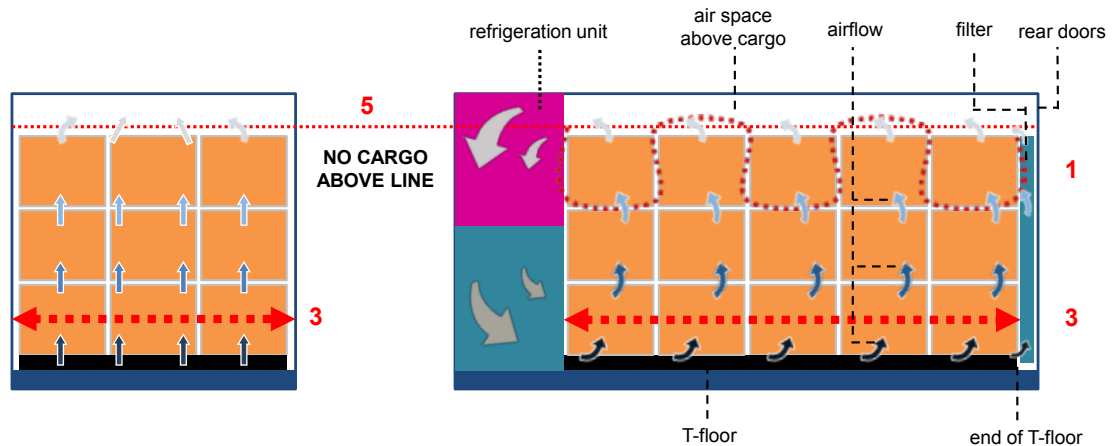
- for the absence
 - of perforations, cracks, traces of humidity, smells, dirt... and that the box is closed
 - of unsticking or tears... on the door seal to guarantee air-tightness
 - of frost on the evaporators
- if the ventilation hatch at the rear of the box closes properly for refrigerated vehicles, that the air ducts are connected to the lower air inlet and outlet vents

Comment:

Limit door openings to loading and unloading goods. The presence of strip curtains for refrigerated trucks helps to reduce heat transfer.

**3 Stuffing**

It must respect the following principles:



In the case of so-called «reefer» refrigerated containers

In a refrigerated road vehicle, cold air is blown through the upper side of the load from ducts located in the ceiling. In refrigerated maritime containers, the air is blown through the lower part and circulates through a grooved floor (T-bar flooring) then sucked through the upper part.

1. Ensure the stacking level is uniform: all stacks should be the same height
2. Partition the container if there are different temperatures
3. Use the entire floor surface: the cold air will thereby go through all the goods rather than taking the shortest route
4. Do not place the pallets or cases against the evaporators
 - **When the thermostat is set at +2°C, the air blown is at -3°C!**
5. Leave a space of approximately 80 mm (for TEU 20') to 100 mm (for TEU 40') between the goods and the ceiling to allow the blown air to return to the evaporator: this limit is sometimes shown by a red line (called a «load line») at the top of the walls

6. Remind drivers that stopping the refrigeration unit, opening the doors for an extended period of time, and certain outside climatic conditions (freezing temperatures, etc.) have an immediate impact on the temperature. This information must appear explicitly on the transport document.



→ **Carry out handling as quickly as possible in order to avoid breaking the cold chain!**

7. Before loading use a manual probe and check temperature of:
- parcels
 - vehicle (with the doors closed and the refrigeration unit on)

Do not let the vehicle leave if the temperature is not stabilized within the range set



→ **Infra-red thermometers with laser pointers must be avoided!**

A refrigerated box should not be loaded like a container...

- A refrigerated vehicle is designed to keep goods cool, not to freeze them
- The cases must be at their storage temperature before loading
- The products will be degraded if
 - the refrigerated air does not circulate around the goods (appearance of hot spots),
 - the duration of transport and storage are not planned