

**RECOMMENDED INTERNATIONAL CODE  
OF PRACTICE FOR THE PROCESSING  
AND HANDLING OF QUICK FROZEN FOODS**

**CAC/RCP 8-1976**

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## INTRODUCTION

At its Eleventh Session, held in March/April 1976, the Commission adopted as a Recommended Code of Practice to be sent to all Member Nations and Associate Members of FAO and/or WHO a Code of Practice for the Processing and Handling of Quick Frozen Foods.

In adopting the Code, the Commission recognized that certain matters, notably the fact that the quality of quick frozen foods depended not only on product temperature and temperature fluctuation but also on length of storage which merited further study. Accordingly, the Commission agreed that these matters should continue to be studied by the Joint ECE/Codex Alimentarius Group of Experts on Standardization of Quick Frozen Foods in the light of further information, and that this Code of Practice should be reviewed at a future date.

At its Twelfth Session, held in April 1978, the Commission adopted a Method of Checking Product Temperature to be included as Annex I to the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976).

At its Fifteenth Session held in July 1993, the Commission adopted the Code of Practice for the Handling of Quick Frozen Foods during transport as a Recommended International Code of Practice and suggested that this should be published as Annex II to CAC/RCP 8-1976.

All Codes of Practice are to be regarded as being advisory in nature and it is for individual governments to decide what use they wish to make of the Code. The Commission has expressed the view that codes of practice dealing with specific categories of foods might provide useful checklists of requirements for national enforcement authorities.

Like the Code of Practice, the method of checking product temperature is to be regarded as being advisory in nature. It is for individual governments when deciding what use they wish to make of the Code, to consider at the same time the method which has been included as Annex I to CAC/RCP 8-1976.

## RECOMMENDED INTERNATIONAL CODE OF PRACTICE FOR THE PROCESSING AND HANDLING OF QUICK FROZEN FOODS

### CAC/RCP 8-1976

#### 1. SECTION I - SCOPE AND PURPOSE

1.1 This Code is intended to provide guidelines for the elaboration of codes of practice or standards for specific quick frozen products or groups of products.<sup>1</sup>

1.2 This Code of Practice is intended to apply to quick frozen foods of all types which have been subjected to the process of quick freezing set out in Section 3 of this Code and which are offered for sale in the quick frozen state.

1.3 The provisions of this Code of Practice should be interpreted as recommendations and are intended as a guide to assist in the production and handling of quick frozen foods in order to maintain their quality up to the time of final sale.

#### 2. SECTION II - RAW MATERIALS AND PREPARATION

2.1 Only sound and wholesome raw materials should be used for the quick freezing process. Since quick freezing cannot improve the original quality of the foods being treated, only products at an optimum level of freshness and maturity should be quick frozen.

2.2 The selected raw materials should be in prime condition when processing begins. In order to minimize the rate of natural deterioration, when storage prior to processing is a necessary stage in stock holding, all raw materials should be stored for a period dictated by actual trade and material needs, in conditions capable of maintaining a temperature range and degree of relative humidity appropriate to the raw materials concerned.

2.3 To minimize microbiological activity, pre-cooked foods intended for quick freezing should not be held in the temperature range of +10°C to 60°C. They should be cooled as rapidly as possible in suitable pre-cooling equipment consistent with requirements of hygienic processing. Whilst it is desirable that cooling and quick freezing should be carried out immediately, where this is not possible the food should be held at a temperature above 60°C (140°F) until cooling and subsequent quick freezing can take place.

#### 3. SECTION III - QUICK FREEZING

3.1 After preparation the product should be quick frozen without delay. The quick freezing process should be carried out in appropriate equipment in such a way as to minimize physical, biochemical and microbiological changes.

3.2 To achieve this the freezing operation should be carried out in such a way that the range of temperature of maximum crystallization (for most products -1°C to -5°C (+30°F to +23°F) is passed quickly.

3.3 The process should not be regarded as complete unless and until the product temperature has reached -18°C (0°F) at the thermal centre after thermal stabilization.

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<sup>1</sup> Detailed technical information may be found in a publication of the International Institute of Refrigeration, "Recommendations for the Processing and Handling of Frozen Foods".

3.4 Specific limits for freezing times and speeds are not given, as the requirements of both differ for various foodstuffs. Where necessary, specific indication should be made in individual food standards or Codes of Practice.

3.5 Effective measures should be taken to keep temperature rise to a minimum, after the quick freezing process and during handling and transport to cold storage.

3.6 The recognized practice of repackaging quick frozen products should be carried out only under controlled conditions.

#### 4. **SECTION IV - STORAGE**

4.1 Cold stores should be operated so as to maintain a product temperature of  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) or lower with a minimum of fluctuation.

4.2 Excessive product temperature fluctuations either in range or frequency are undesirable. They may lead to serious dehydration in susceptible products and to other forms of quality deterioration. Although temperature fluctuations are generally less harmful at lower storage temperatures, variations greater than 2 Centigrade degrees (4 Fahrenheit degrees) in the air temperature should, so far as possible, be avoided.

4.3 Frequent temperature checks should be carried out, preferably with recording thermometers or devices that will continually monitor storage temperatures.

4.4 The air velocity in cold stores should be moderate and no higher than necessary to achieve sufficiently uniform temperatures within the store.

4.5 Products should be stacked so that air circulation is not impaired. No direct contacts with the walls - except in jacketed rooms - ceiling or floor should be allowed. The distance between the stored products and the walls, ceiling or floor should be at least 10 cm (4 in.).

4.6 A system of control stock rotation should be employed in cold stores.

#### 5. **SECTION V - TRANSPORT AND DISTRIBUTION**

5.1 The transport of quick frozen foods from warehouse cold store to warehouse cold store should be carried out in equipment capable of maintaining and so operated as to maintain a product temperature of  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) or lower. Vehicles should be pre-cooled to  $+10^{\circ}\text{C}$  ( $50^{\circ}\text{F}$ ) or lower prior to loading and should be equipped with devices to record temperatures during transport.

5.2 A temperature rise of the product during such transport from warehouse cold store to  $-15^{\circ}\text{C}$  may be tolerated but any product temperature higher than  $-18^{\circ}\text{C}$  should be reduced as soon as possible either during transport or immediately after delivery to  $-18^{\circ}\text{C}$ .

5.3 Loading into and unloading from vehicles and into and unloading from vehicles and into and from stores should be as fast as practicable and the methods used should minimize product temperature rise.

5.4 During the transport from warehouse cold store to warehouse cold store as indicated in 5.1, frequent temperature checks should be carried out using methods of recording temperatures of the load visible outside of the vehicle.

5.5 Before loading the vehicle as indicated in 5.1 and before entering the cold store the

product temperature should be checked.

5.6 Transport of quick frozen foods for local distribution to retailers should be carried out in such a way that any rise in product temperature above  $-18^{\circ}\text{C}$  is kept to a minimum and should not, in any case, rise above  $-12^{\circ}\text{C}$  ( $10.4^{\circ}\text{F}$ ) in the warmest pack.

5.7 A temperature rise of the product occurring during local transport as indicated in 5.6 should be reduced to  $-18^{\circ}\text{C}$  where, and as soon as possible, after delivering. When this is not possible, the product should be offered for sale as soon as possible.

## 6. SECTION VI - RETAIL SALE

6.1 Quick frozen foods should be offered for sale from refrigerated cabinets designed for the purpose.

6.2 The cabinets should be capable of maintaining and be so operated as to maintain a product temperature of  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) and should be equipped with a thermometer.

6.3 A rise in product temperature may be tolerated for short periods but the product temperature of the warmest pack should not be allowed to become higher than  $-12^{\circ}\text{C}$  ( $10.4^{\circ}\text{F}$ ).

6.4 Warm air currents from the outside should not blow directly into the refrigerated space. Cabinets should be located so that the open display area is not subjected to a normal radiant heat (e.g., not in direct sunlight, under strong artificial light or in direct line with heaters). Cabinets should be covered at night and over the weekend. Defrosting cycles should be programmed in such a way that, as much as possible, defrosting takes place outside the normal shopping hours.

6.5 The contents of the cabinet should never be stocked outside the load line. Stocks should not be removed from and returned to the cabinet except when absolutely necessary.

6.6 Unpacked products are subject to risks of contamination and dehydration and should be stored and displayed in compartments separate from those used for packaged quick frozen foods.

6.7 Foods which are not quick frozen should not be placed in a cabinet which contains quick frozen foods. Prepackaged edible ices may, however, be kept in cabinets containing quick frozen foods.

6.8 Stocks should be carefully rotated to ensure that the products are sold on a "First in First Out" basis.

## 7. SECTION VII - PACKAGING AND LABELLING

7.1 The packaging should be designed to:

- (a) protect the organoleptic and other quality characteristics of the product;
- (b) protect the product against microbiological and other contamination;
- (c) protect, as far as practicable, against dehydration, heat accumulation by radiation, and, where appropriate, leakage;
- (d) not pass on to the product any odour, taste, colour or other foreign characteristics, throughout the processing (where applicable) and distribution of the product up to

the time of final sale.

7.2 Retail packages should be preserved intact up to the time of final sale.

7.3 Quick frozen foods should always comply with the requirements of the General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985 (Rev. 1-1991), Codex Alimentarius Volume 1).

In addition, the packages of quick frozen foods should bear clear indications as to the way to keep them from the time they are bought at the retailer to that of their use.

## 8. **SECTION VIII - HYGIENE**

8.1 The maintenance of good hygiene is important throughout the preparation, freezing process, transport and distribution right up to and including the time of final sale.

8.2 Quick frozen foods should always comply with the provisions of the General Principles of Food Hygiene and, where appropriate, with Codes of Hygienic Practice relevant to a particular food.

**ANNEX I- 1978  
to CAC/RCP 8-1976****METHOD FOR CHECKING PRODUCT TEMPERATURE****1. PURPOSE**

1.1 The procedures outlined herein provide methods for the measurement of temperature of quick frozen foods. Temperature measurement involves two aspects:

- (a) to obtain an accurate temperature at point of measurement, using proper equipment; and
- (b) to select a representative number of locations for measurement to provide information regarding average temperature of the lot as well as variations within the lot.

1.2 Two methods are recommended for temperature measurement, namely for:

- (a) measuring internal "product temperature"; and
- (b) measuring surface package temperature

Unless otherwise agreed, the "product temperature" mentioned in the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976) refers to internal product temperature as indicated in paragraph 6 of this method.

**2. DEFINITION OF TEMPERATURE**

"Temperature" for the purpose of this document, is the temperature measured at the point of placement of the sensitive part of the temperature measuring instrument or device.

**3. GENERAL SPECIFICATIONS FOR TEMPERATURE MEASURING INSTRUMENTS**

Only equipment that meets the following requirements should be used for measuring and control purposes:

- (a) the half-value period <sup>1</sup> should not exceed 0.5 minutes;
- (b) the instrument should be accurate to within  $\pm 0.5^{\circ}\text{C}$  over the range  $-30^{\circ}\text{C}$  to  $30^{\circ}\text{C}$ ;
- (c) the instrument should be sensitive to changes of  $0.5^{\circ}\text{C}$ ;
- (d) the accuracy of the measurement should not be affected by the temperature of the surroundings;
- (e) markings on the scale should be in divisions of  $1^{\circ}\text{C}$  or less and readable to  $0.5^{\circ}\text{C}$ ;

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<sup>1</sup> Half-value period means the time in minutes needed to change a thermometer reading from the initial temperature to that halfway to the final temperature.

- (f) for measuring equipment, other than glass-stem thermometers, a setting device to allow adjustment of the indicating needle during recalibration should be provided;
- (g) the sensitive part of the measuring device should be so constructed as to ensure good thermal contact with the product;
- (h) electrical equipment should be protected from undesirable influence resulting from condensation of moisture.

#### 4. EQUIPMENT FOR MEASURING TEMPERATURE

##### 4.1 Glass-stem Thermometer

Glass-stem thermometers are not recommended for routine testing, but where used they should be used with great care in proximity of food. The glass-stem thermometer should have the following characteristics:

- (a) an overall length of about 25 cm;
- (b) a sharp pointed round stem for product measurement and an elliptical stem for surface measurement; and
- (c) alcohol filling is preferred to mercury.

##### 4.2 Dial Thermometer

Equipment may be based on the principle of liquid expansion, vapour pressure change, spring deformation, or metal expansion. The dial thermometer should have the following characteristics:

- (a) an overall length of the sensitive part of about 15 cm;
- (b) a sharp pointed stainless steel stem for product measurement and preferably a flat stem (not over 5 mm thick) for surface measurement; and
- (c) a dial, hermetically sealed with plastic and not with glass.

##### 4.3 Electrical Thermometer

A portable instrument powered by a dry cell battery is recommended in preference to an instrument using a "mains" voltage supply. The instrument should incorporate a device for checking the battery voltage, to indicate when replacement or recharging is necessary. Electrical resistance or thermocouple is used as the sensing element. The overall length of the probe or blade should be about 15 cm. The sensing element of the electrical thermometer should have the following characteristics:

- (a) a stainless steel sensitive part - either probe or blade type; and
- (b) leads of known resistance or, preferably, leads with built-in compensation resistance.

##### 4.4 Instruments for Making Holes in the Product

A sharp pointed metal instrument such as an ice pick or hand drill, which can easily be cleaned, should be used. The hole in the packet and product should be only marginally larger in diameter than the sensitive part of the sensing element to be used.

## 5. CALIBRATION OF THERMOMETERS

5.1 Thermometers should be checked at regular intervals depending on how consistent they are for accuracy. Instruments handled from one load to another should be checked weekly. Instruments used during transport should be checked before a new load is to be carried.

5.2 The test can be made by immersing the thermometer sensing element in an ice water bath. A litre container (vacuum flask) should be filled with chipped ice and then filled entirely with cold water. It should be stirred for at least two minutes, before the sensing element is inserted into the centre of the mixture. The sensing element should not be allowed to touch the container. The temperature indicated by the thermometer should be observed after pausing for at least three minutes to allow stabilization to take place. The immersed thermometer should read within  $0.5^{\circ}\text{C}$ , plus or minus, of  $0^{\circ}\text{C}$ . The  $0^{\circ}\text{C}$  point on the scale of a glass stemmed thermometer should emerge just above the top of the flask. The sensing element of all other types should be entirely immersed in the ice bath.

5.3 For checking the thermometer at temperatures in the range of  $-18^{\circ}\text{C}$  to  $-21^{\circ}\text{C}$ , a brine mixture consisting of one part by weight of table salt and three parts by weight of chipped ice should be used. The reading of the thermometer being tested should be compared with that of a thermometer known to be accurate. Both temperature sensors should be inserted into the brine mixture with the stems next to each other, and they should not touch the container. The temperatures indicated by the thermometers should be observed after pausing for at least three minutes to allow stabilization to take place.

5.4 Thermometers can also be checked by comparing the reading from the thermometer being tested with a thermometer which is known to be accurate; both are held alongside each other in the same ambient environment and the readings compared.

5.5 If no reference thermometer is available, an eutectic mixture of analytical grade sodium chloride and ice gives a temperature of  $-21.4^{\circ}\text{C}$ .

5.6 If an error greater than  $0.5^{\circ}\text{C}$  ( $1^{\circ}\text{F}$ ) is indicated, the calibration of the thermometer should be corrected by means of its standard adjustment mechanism. After adjustment, the thermometer should be rechecked for accuracy.

5.7 Glass thermometers having an error greater than  $0.5^{\circ}\text{C}$  ( $1^{\circ}\text{F}$ ) should not be used for the checking of product temperature.

## 6. METHOD FOR MEASURING INTERNAL PRODUCT TEMPERATURE

6.1 Reliable information on the internal product temperature can be obtained only by measuring the temperature in the product.

6.2 The internal product temperature shall be measured at a point in the product which is 2.5 cm below the centre of the largest surface. In the case of products (or products in packages) with one dimension less than 5 cm, the point of measurement should be halfway through the dimension.

6.3 **Making a Hole** - Sensing elements are in general not structurally designed to penetrate a frozen food. A hole should be made in the product (packages) concerned using a probe or hand

drill which has been previously pre-cooled. The hole should be at least 5 cm deep.

#### 6.4 Pre-cooling

- (a) A package should be selected at random for use in pre-cooling the probe or hand drill and the sensing element. This will be referred to hereafter as the "pre-cool package". A warm probe, hand drill or sensing element should never be placed in the test package.
- (b) The sensing element should be inserted into the centre of the "pre-cool package" and it should be left there for at least three minutes. It should not be removed from the "pre-cool package" until it is ready to be inserted in the test package.
- (c) Pre-cooling may also be accomplished by inserting the sensing element between packages of frozen foods, provided good thermal contact can be attained. If readings are being taken in cold storage facilities, pre-cooling can be accomplished by allowing the equipment to equalize with the ambient temperature of the cold stores.

#### 6.5 Measuring Internal Product Temperature

For an accurate temperature measurement it is essential that the formation of the hole and subsequent temperature readings in the product with the sensing element are carried out with the product in the refrigerated environment from which it was selected or in ambient conditions as close as possible to that environment, as follows:

- (a) The sensing element should be removed from the "pre-cool package" and immediately inserted into the test package so that the point of measurement is approximately 2.5 cm below the surface of the product.
- (b) It is preferable to reach this point by inserting the sensing element so that as much of it as is practicable is in the product.
- (c) In the case of packages less than 5 cm in one dimension, insert the sensing element so it is close to the mid point of the package.
- (d) Record the temperature after it has reached a steady value.
- (e) After recording the temperature of the test package, allow the sensing device to remain in that package until ready to take readings on subsequent packages. This will eliminate the need to again pre-cool the device.

### 7. METHOD FOR MEASURING PACKAGE SURFACE TEMPERATURE

7.1 The package surface temperature can be obtained in a non-destructive way and is sufficiently accurate for routine temperature checks, provided good contact is achieved by the sensing device between the packages or cases and adequate pressure is applied. A reasonable approximation to internal product temperature can be obtained by measuring the temperature at the package surface.

#### 7.2 Measuring Package Surface Temperature

- (a) Pre-cool the sensing device as specified in paragraph 6.4.
- (b) If the product is in shipping cases, cut the sidewall of the case with a sharp knife

and bend the cut tab outward.

- (c) Insert the sensing element between the first and second layers of packages so that all of the sensing element is in firm contact with the package walls.
- (d) Stack additional cases of the frozen product obtained from the same general location on top of the test case in order to ensure good thermal contact with the sensing element.
- (e) Record the temperature after it has reached a steady value.
- (f) If several test cases are being checked, do not remove the sensing instrument from the test case until the succeeding case is ready for testing.
- (g) If the product is not cased, as in a retail cabinet, observe the same steps (a) through (f). Stack sufficient packages on top of the test package in order to obtain good thermal contact.

## 8. SAMPLING

### 8.1 Selection of Test Packages

The selection of location from which to take test packages for temperature measurement is difficult to specify precisely and must be a matter of judgement, taking into account any previous history of the load or lot being examined and also the results obtained as the sampling proceeds. The correct interpretation of the results depends, to a very large extent, on informed sampling. Test packages should be selected in such a way and in such manner that their temperatures will be representative of the stock being examined.

### 8.2 Cold Stores

If cases are stacked closely together, e.g., on a pallet or in a stack, temperature readings should be taken from packages on the outer face of outer cases, and from packages from cases in the centre of the lot. These temperatures are known as "outer temperatures" and "centre temperatures", respectively. A significant difference between the two readings will indicate a temperature gradient in the lot and is an indication that more temperature readings should be taken in order to establish more reliable data on the temperature condition of the product.

### 8.3 Vehicles or Transport Container Unit

Product temperatures should be measured in the following locations:

- (a) if required during transport:
  - top and bottom of the load adjacent to the opening edge of each door or pair of doors;
- (b) when unloading:
  - top and bottom of the load adjacent to the opening edge of each door or pair of doors;
  - top of the load at the rear corners (furthest from the refrigeration unit if applicable);

- centre of the load;
- centre of the face of the load (nearest to the refrigeration unit if applicable);
- top corners of the face of the load (nearest to the refrigeration unit if applicable).

Other locations for temperature measurement may be selected at the discretion of the inspecting officer.

#### **8.4 Retail Display Cabinets**

In all cases check a package from at least the front top layer, the centre area of the cabinet and the bottom portion of the cabinet. If the cabinet is on a defrost cycle it should so be noted on the report.

## ANNEX II-1983 to CAC/RCP 8-1976

**RECOMMENDED INTERNATIONAL CODE OF PRACTICE FOR THE HANDLING  
OF QUICK FROZEN FOODS DURING TRANSPORT****1. SCOPE**

1.1 This Code is intended to provide guidelines for the loading, transport<sup>1</sup> and unloading of quick frozen foods, other than for retail purposes.<sup>2</sup>

1.2 This Code of Practice is intended to be applied to quick frozen foods of all types which have been subjected to the process of quick freezing described in Section 3 of the *Recommended International Code of Practice for the Processing and handling of Quick Frozen Foods* (Ref. No. CAC/RCP 8-1976) and which are offered for sale in the quick frozen state.

1.3 This Code of Practice is based on the knowledge that a product with an acceptable quality, offered by a shipper<sup>3</sup> will have to be delivered by carrier at the final point of destination to a receiver in almost an unchanged condition. To achieve the transportation, the carrier provides adequate transport facilities, capable of maintaining the recommended temperature from the point of shipping to the point of receiving.

1.4 The provisions of this Code of Practice should be interpreted as recommendations and are intended as a guide to assist in the handling and transport of quick frozen foods in order to maintain their quality up to the time of final sale.

1.5 This Code relates to any type of transport of quick frozen foods and therefore applies also to transport of quick frozen foods in containers suitable for the purpose.

**2. PRODUCT QUALITY**

2.1 Quick frozen foods, when offered for transportation, have a quality which is determined by the quality of the raw material and by the processing before freezing, the quick-freezing process itself, by the packaging and the packaging material and the storage temperature-time history and handling up to that time.

2.2 No material change in quality will result from the loading, transportation and unloading operations provided that the recommended temperature provisions have been maintained. However, because quality is dependent on many factors other than temperature (see 2.1) maintaining the temperature according to this Code provides no guarantee that the quality of the product will be at an acceptable quality level at the end of a transportation journey.

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<sup>1</sup> Transportation in the sense of this Code means conveyance of quick frozen foods from one warehouse cold-store to another. The transportation process starts with the removal of the products from the initial cold-store and ends with the storage of the products at the destination cold-store.

Transport by land of frozen foodstuffs to countries having ratified the UN/ATP agreement must be carried out in equipment approved according to the said agreement and under conditions laid down in the agreement.

<sup>2</sup> Detailed technical information may be found in the following publications of the International Institute for Refrigeration (IIR): (i) Recommendations for the Processing and Handling of Frozen Foods; (ii) Recommended Conditions for Land Transport of Perishable Foodstuffs.

<sup>3</sup> In this document the shipper, carrier and receiver are considered as identical to the responsible person who offers, respectively transports and receives the load or the person who works under his responsibility.

2.3 In cases where the temperature of a product at the time of arrival is warmer than that recommended, the product should not be refused but placed in such conditions so as to reduce the temperature to the desired level as quickly as possible. Such product will not necessarily be of bad quality although its product life may have been reduced. Further handling of the affected product should be determined in consultation with the appropriate control authority.

### 3. **LOADING, UNLOADING AND TRANSPORTATION**

3.1 Any handling of quick frozen foods in air temperatures warmer than the product temperature will result in an increase of the product temperature and may also result in condensation of water on the product. Handling at such temperatures should, therefore, be minimized or avoided if possible. Under all circumstances, handling of quick frozen foods during loading and unloading of the transport equipment should be done as quickly as practicable. Fans in the transport equipment should be stopped during the loading process.

3.2 The use of standardized load units is strongly recommended as well as the use of mechanical loading and unloading equipment, to minimize the time-temperature-surface exposure of cargo to uncontrolled environmental conditions.

3.3 The quick frozen food should not reside longer than is necessary in an environment with warmer temperatures.

3.4 The selection and grouping of quick frozen foods for various destinations should be done well in advance before leaving the cold store. The order of loading should be prepared well in advance in cases where the transport equipment will not be completely unloading at one destination.

3.5 Quick frozen foods shall be loaded within transport equipment so as to provide for free circulation of refrigerated air at the front, rear, top, bottom and both sides of the load, except for transport equipment wherein refrigerated air or refrigerant circulates within the walls of such equipment.

### 4. **PRODUCT TEMPERATURE**

4.1 Transport equipments generally designed to keep the temperature in a load as it is offered and not to remove any heat gained by the food during loading, because the refrigeration capacity provided is in most cases not sufficient to lower the core temperature of the cargo in a reasonable time. A superficial temperature rise, however, can be redressed within a reasonable time, provided that the external heat load is not excessive, refrigeration power and air circulation is not restricted and refrigerated air is properly distributed.

4.2 When handling of quick frozen foods is expected to increase the product temperature (see especially paragraphs 3.1 and 3.3), it is recommended to decrease the product temperature prior to loading in order to ensure that nowhere in the cargo the product temperature on completion of loading becomes warmer than the recommended carriage temperature.

4.3 Shipper and carrier should agree upon the stabilized product temperature at the time of preparing the load in the warehouse cold-store for delivery to the transport equipment and on the time and procedure of loading, taking into account the temperature recommended for the product and the time needed for the loading process, the ambient air temperature during the loading process, the characteristics of the refrigerated transport equipment and the time needed for transportation.

4.4 Carrier and receiver should agree upon the product temperature at the time of receiving the load at entry to the warehouse cold-store and on the time and procedure of unloading, taking into account the temperature recommended for the product and the ambient air temperature during the unloading process and the time needed for unloading.

4.5 On arrival at the final destination, the warehouse cold-store should keep the product at the recommended temperature.

4.6 Temperature measurement at the time of loading and unloading should preferably be made in packages situated in approximately the same relative position in the cargo, taking into consideration the recommendations laid down in para. 8.3 of Addendum 1 to CAC/RCP 8-1976, and para. 5.2 of this Code.

4.7 Temperatures measured should be written in a transport document accompanying the load for the benefit of the receiver, with a copy to all parties concerned which may also include insurance organizations.

## 5. MEASURING PRODUCT TEMPERATURE

5.1 Temperature should be checked in the product according to the recommendations as presented in Addendum 1 to the Code of Practice for the Processing and handling of Quick Frozen Foods (CAC/RCP 8-1976).

5.2 If agreed by the parties concerned, package surface temperatures may be measured instead of product temperatures, but in cases of dispute only the product temperature should be valid.

5.3 Checking temperature in the situations mentioned in 4.6 should always be done by the shipper and the carrier or carrier and receiver, at the same time, on the same samples, and in the environmental conditions of the warehouse cold-store where the product will be stored or was stored (Ref. No. CAC/RCP 8-1976, para. 5.4).

5.4 Checking product temperature should not delay the loading or unloading process. In case of dispute the measuring procedure should follow the directions presented in para. 5.3 above, meanwhile keeping the transport equipment closed.

## 6. TRANSPORT EQUIPMENT

6.1 Transport equipment should be compatible with the requirement of the quick frozen food to be transported, taking into account the conditions during loading and unloading and the ambient air temperature during transportation and the duration of the journey. The transport equipment should be insulated and should be equipped in such a way that the recommended temperatures can be maintained during the time of transportation.

6.2 The transport equipment should be free from foreign smell or odour and in good hygienic condition.

6.3 The transport equipment should be precooled before loading as far as appropriate with regard to the time and energy consumption as well as temperature and humidity at the loading area. Before loading a defrost cycle should be observed. Any frost accumulated inside the vehicle should be removed prior to precooling.

6.4 In the event of a refrigeration system being supplied that may have repercussions on the health of people entering the refrigerated space, warning notices and safety procedures or

devices must be provided to protect the workers; where no such equipment is used the manufacturer's instructions should be strictly adhered to.

6.5 During transportation a limited rise of 3°C (see para. 5.2, CAC/RCP 8-1976) for the load may be tolerated, but the temperature should be reduced as soon as possible, either during transport or immediately after delivery, to the recommended temperature (see para. 2.3).

6.6 It is recommended that the transport vehicle be equipped with an appropriate temperature measurement device to record air temperature inside the vehicle. The dial or reading element of the device should be mounted in a readily visible position outside the vehicle.

6.7 The carrier should keep records of:

- (where the refrigeration during transport is carried out by mechanical equipment) the temperature of the return air flow;
- (where a thermograph is fitted) the air temperature inside the equipment as indicated by the dial mounted on the equipment body;
- (where the refrigeration during transport is carried out by mechanical equipment) the running time of the refrigeration unit;
- the length of time for which the doors are left open during the loading and unloading of the goods.

6.8 Transport of quick frozen foods should be carried out within the shortest practicable time.

## 7. FACILITIES AT LOADING AND UNLOADING PLACE

7.1 The warehouse cold-store should provide adequate connections, e.g., port doors, dock shelters, etc., to the refrigerated transport equipment, so that this equipment and the cargo transferred are subject to the minimum of heat load, and that thereby any increase in product temperature is restricted as much as possible.

7.2 When no port door or dock shelter is provided for loading or unloading the use of plastic strip door curtains or similar protection is recommended to prevent inlet of warmer and humidified air (ambient air).

7.3 Shipper, carrier, receiver and Inspection Services should contribute to accelerate the loading and unloading procedure so as to avoid any unnecessary delay.

7.4 Door(s) of the transport equipment should always be closed when loading or unloading is interrupted for any reason.

## 8. INSPECTION

8.1 Inspection of the temperature of the product, other than by reading the recording instruments outside the vehicle, as provided for in CAC/RCP 8-1976 (para. 5.4), between the time of loading and unloading by opening the transport equipments should be strongly dissuaded and should be done as recommended in 5.3 above.

8.2 It is strongly recommended that inspection by governmental authorities for other purposes be organized at the point of loading and unloading and should be carried out under environmentally controlled conditions.

8.3 In case of accidental damage to essential parts of the transport equipment during transport, it is important to arrange a damage survey of the load and the transport equipment as quickly as possible, preferably before unloading the vehicle. If it is not possible to arrange a damage survey within a very few hours, depending on the ambient temperature, the load should be unloaded and placed under suitable conditions. During unloading temperature measurement should be taken according to para. 4.6 above.