

Frozen Confections

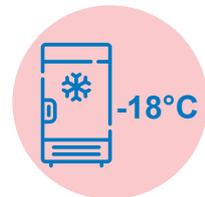
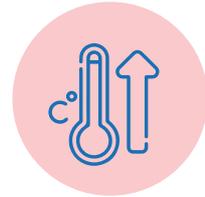
Manufactured at Wholesale Level

Food Safety Guidelines for Food Businesses



In a nutshell

- Frozen confections are high-risk food as there is no extra heat treatment to kill pathogens before consumption. They also provide a favourable environment for the growth of microorganisms.
- Pasteurisation is a Critical Control Point (CCP) that reduces the number of microorganisms in frozen confections through heat treatment.
- Storage of frozen confections at -18°C is also a CCP. Improper storage temperature could lead to unsatisfactory microbiological quality of the frozen confections.
- Contaminated ingredients, such as nuts, fruits, juices, and flavoring materials contaminated with microorganisms, added after the pasteurisation of frozen confection, may introduce microorganisms into the product. This can be addressed by the use of pre-heat treated ingredients or additional heat treatment of the frozen confection.
- All equipment and utensils should be properly and regularly cleaned and disinfected. Food handlers should maintain good personal and environmental hygiene at all times.



Introduction and scope

According to the Frozen Confections Regulation (Cap. 132AC), frozen confection means any confection commonly sold for human consumption in a frozen or chilled state. Ice cream, gelato, sorbet, and frozen yogurt are among examples. These products might be prepared in factories and served with scoops at retail locations, or they could be pre-packaged in their original cups and wrappers.

Frozen confections are high-risk food as they are ready to consume without no further cooking or reheating to kill disease-causing microorganisms. They also provide a good growth medium for microbes because of its rich nutrient constituents and nearly neutral pH. Microbial contamination can be introduced at various stages of the production line from different human and environmental sources. Inadequate heat treatment, improper storage temperature, and contaminated ingredients added after heat treatment can result in excessive bacterial levels in the product. The sale of frozen confections with microbial counts above the legal limit may result in foodborne diseases and prosecution.

Under the Frozen Confections Regulation (Cap. 132 AC),

No person shall sell, or offer or expose for sale, any frozen confection which contains more than 50 000 bacteria per gram or more than 100 coliform bacteria per gram.

This set of guidelines is intended for food business operators (FBO) that manufacture ice-cream and other similar frozen confections at wholesale level. It seeks to assist FBOs in implementing food safety measures in their operations in order to provide safe frozen confections to retailers.

While this guidance is not a legal document and its use is voluntary, it reviews some essential parameters related to Good Hygiene Practices and recommends best practices that any FBO should consider in providing safe foods to the consumers. The guidance specifically incorporates the concepts of a Hazard Analysis and Critical Control Point (HACCP) system, pinpointing different Critical Control Points (CCPs) for food businesses to prevent and correct possible food safety hazards, rather than relying mainly on end-product testing.

Frozen confections prepared at points of sale for immediate consumption



The Centre for Food Safety (CFS) considers food safety hazards differ between wholesale and point-of-sale frozen confection manufacture, with the latter focusing on mishandling of semi-finished and final products by hand. Retailers who prepare and sell frozen confections should refer to the *Food Safety Guidelines for Food Businesses on Frozen Confections Prepared at Points of Sale for Immediate Consumption*.

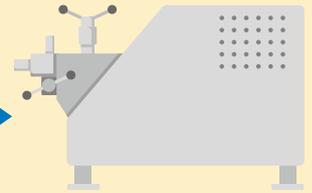
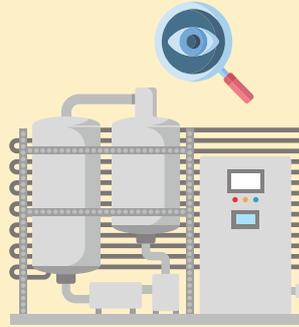
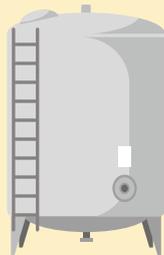


General production of ice-cream and other frozen confections

Depending on the type and recipe of frozen confection to be produced as well as the scale of production, the overall production of frozen confections consists of the following steps:



Milk
Cream
Milk Powder
Whey Protein
Liquid Sugar
Stabilizers



1 Receiving of raw materials

Raw materials include dairy products (e.g. milk, cream), sugars, flavouring matters and water. Fruits, nuts, sweets and syrups are optionally added for flavour enrichment.

2 Mixing of ingredients

In preparing ice-cream mix, liquid ingredients are combined and mildly heated. Sugar and other dry ingredients, except nuts and fruits, are added to the mix.

3 Pasteurisation

The mixture is pasteurised by a heating process, either in batch or continuous modes, depending on the production size.

4 Homogenisation

The pasteurised mixture is homogenised, put under high pressures to break down fat globules. This makes fat globules distribute more evenly and ice-cream smoother. The homogenised mix is then cooled down to 4°C.



5 Ageing

The mix is held in sterilised vats for hours at temperature of around 4°C or lower to achieve the desired overrun.



6 Freezing

During freezing, air is incorporated in the mix and cooled down to around -5°C.

Sometimes ingredients, such as fruits, juices, nuts, chocolate chips and syrup, may be added at this stage after pasteurisation.



(+/- Adding ingredients after pasteurisation)



Steps 2-6 are concerned with the general processing of frozen confections. Some frozen confection machines can accommodate more than one of these steps in their operation.

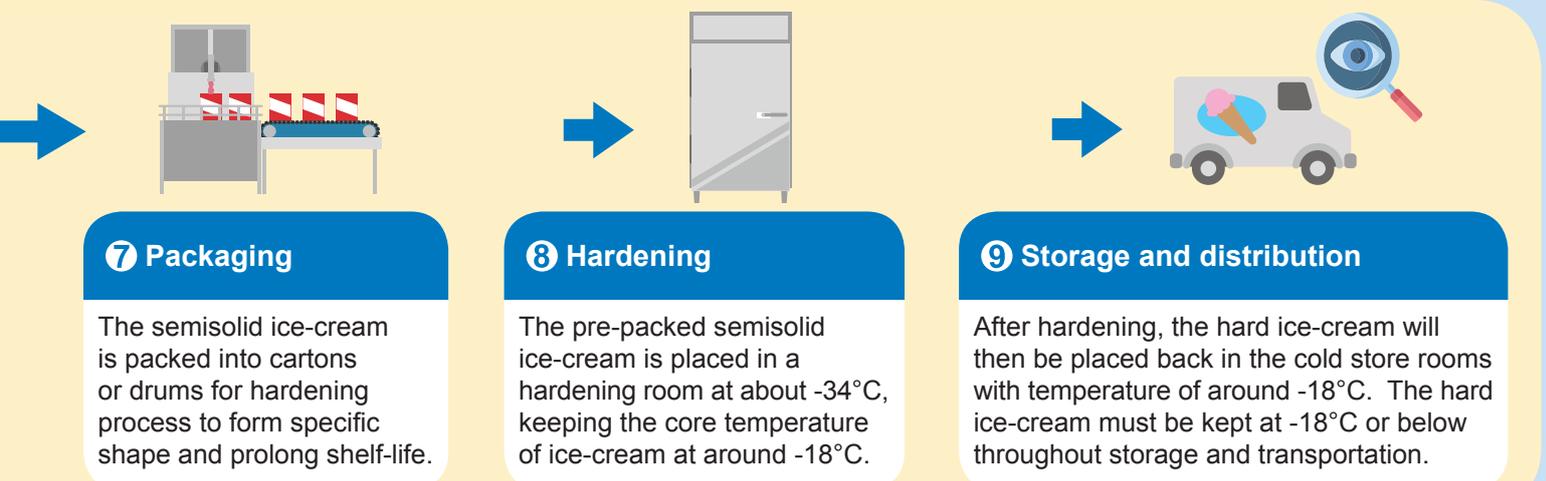
A **Critical Control Point (CCP)** refers to a step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level. There are at least two CCPs in the production of frozen confections:



- **Heat treatment**, usually **pasteurisation**, is used to reduce microbiological hazards in frozen confection. Heat treatment involves heating ingredients for a prescribed period of time and temperature to kill disease-causing and spoilage microorganisms.
- The finished products **should be kept at -18°C** to prevent microbial growth. This is especially important during storage, transport and distribution of frozen confections.
- Extra ingredients may occasionally be added to the frozen confection after heat treatment, resulting in contamination. These ingredients should be **commercially pasteurised** (for example, juices) or **heated in-house** before use. Wash fresh produce thoroughly before juicing.

The CCPs and their control measures can be summarised as follows in chronological order:

CCP	Hazards	Control measures	Monitoring process	Corrective measures	Verification
1 Pasteurisation	Survival of disease-causing microorganisms	Heat treatment of the frozen confection mixture for a period of time <i>(see Page 7 for suggested critical limits)</i>	Check temperature / time	If the mixture does not fulfill the critical limits listed in Page 7, it must be re-pasteurised	Review records
2 Adding ingredients after pasteurisation (if applicable)	Recontamination	Using commercially pasteurised ingredients; OR Heat treatment of the ingredients before application <i>(see Page 7 for suggested critical limits)</i>	Check temperature / time	Discarding or re-pasteurisation	Review records
3 Storage	Growth of microorganisms	Storing finished frozen confections at -18°C or below	Check temperature	Discard the defrosted products	Review records



Food safety measures for manufacturing frozen confections at factory

Purchasing and receiving of raw materials

1

Purchase

- Source raw materials from approved and reliable suppliers.
- If applicable, choose commercially pasteurised products if they will be added to the frozen confection after pasteurisation, such as juices.



Receiving

- Before accepting raw materials and documents, inspect them and the relevant documents to make sure that:
 - all raw materials are with intact packaging and within their “use by” or “best before” dates;
 - there is no sign of contamination or damage;
 - chilled and frozen ingredients arrive at **4°C or below** and **-18°C or below** respectively;
 - they are free from observable evidence of temperature abuse (e.g. the presence of an abnormal amount of large ice crystals); and
 - there is no excessive caking (formation of lumps) in powdery raw materials.
- Keep documentation (e.g. supplier details, date of receipt, quantity etc.) of raw materials for food traceability.





Storage

- Store ingredients at proper temperature:
 - Frozen item: **-18°C or below**
 - Chilled item: **4°C or below**
 - Food that can be stored at room temperature (e.g. nuts, powdery items): cool and dry places, preferably 10-21°C at 50%-60% relative humidity
- Measure and keep record of the temperatures in the refrigerator and freezer using a thermometer twice a day.



Please refer to the **Guidance for Trade on the Prevention and Reduction of Aflatoxin Contamination in Peanuts** for measures to reduce aflatoxin contamination in peanuts and other nuts.



2

Processing



Mixing of raw materials

- Use raw materials before their expiry dates and adhere to the first-in-first-out principle.
- Use dry and clean equipment and utensils for mixing the raw materials.
- Do not leave the mixture out of refrigeration for more than one hour; discard otherwise.
- Maintain personal hygiene at all times, especially if mixing is done by hand.

Food safety measures

Pasteurisation

- By law, all frozen confections must be pasteurised, which should be done with a heat treatment device approved by the Food and Environmental Hygiene Department.
- Only trained personnel can use heat treatment devices.
- The temperature and time of the pasteurisation process should be recorded in a monitoring system.



The law requires that the mixture should be heated (pasteurised) to and maintained at:

 Temperature	 Time
66°C or above	30 minutes or above
OR	
71°C or above	10 minutes or above
OR	
79°C or above	15 seconds or above

- The mixture should be **cooled to 4°C within 1.5 hours** after heat treatment.

Adding ingredients after pasteurisation (if applicable)

- For ingredients like nuts, fruits, juices, syrups, colourings and flavorings that are added to the mixture after pasteurisation:
 - use **commercially pasteurised** products if applicable; OR
 - **heat treat** the ingredients before use.



Should you wish to add juices extracted from fresh produces into the mixture, especially after pasteurisation, you should:

- wash, and peel if applicable, the produces thoroughly before juicing.
- remove pulp, if desired, by adding a pectic enzyme.
- apply sufficient heat treatment for the juice. For example, heat up to 70°C for 1 minute, or 85°C for about 16 seconds.
- cool the juice to 20°C in 2 hours or less and completely cool to 4°C or below in 4 hours or less.
- keep the cooled juice in a refrigerator at 4°C before use.

CCP 1



CCP 2



3

Packaging



- Single-use containers for frozen confections and other utensils that may come into direct contact with frozen confections should be stored in lidded containers or sealed plastic bags and disinfected, if necessary, before use.
- Reusable containers for bulk sale should be thoroughly cleaned and sanitised each time before use.
- Ensure that all required product information is legibly displayed on the food label of all prepackaged frozen confections.

CCP ③



4

Storage and distribution



- Keep the final products at the proper temperatures in clean containers with covers:
 - Frozen items: **-18°C or below**
 - Chilled items: **0-4°C**
- Check and keep record of the temperature of refrigerators, freezers, and cold-holding equipment on delivery vehicles twice a day.
- Maintain a first-in-first-out principle to avoid storing frozen confections for an extended period of time, which compromises their freshness and safety.

Food safety measures

Environmental hygiene

5

- Defrost the refrigerator and freezer regularly to maintain the correct temperature.
- Use food-grade disinfectants to clean and sanitise the refrigerator and freezer regularly according to the manufacturer instruction, and maintain a documented cleaning schedule.
- All utensils and equipment that come in contact with food (e.g. strainers, mixing bowls and stirrers) should be cleaned and disinfected thoroughly before and after use, in accordance with manufacturers' recommendation.
- Replace damaged, cracked utensils and machine parts.
- All work surfaces should be waterproof. All utensils should be easy to clean and kept away from the ground.
- Clean overhead structures as often as necessary and prevent condensation dripping on the product.
- Use covered rubbish bins, and empty and disinfect them regularly.



For certain frozen confections, air is incorporated into the product to create desirable overrun during the freezing process. Air must be of high quality and filtered, particularly, in this case.

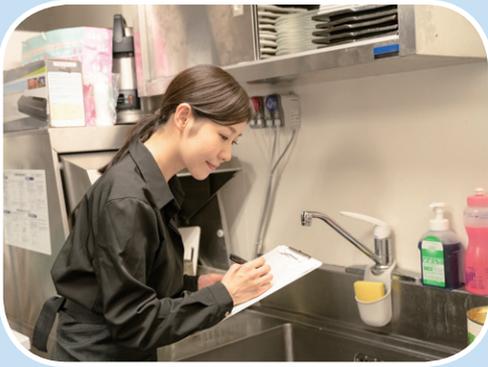
Personal hygiene

6

- Always follow good personal hygiene practices. Wash hands thoroughly by rubbing with warm soapy water for 20 seconds before each manual handling procedure.
- Wear gloves and use clean and disinfected utensils when handling food. Change gloves frequently, discard gloves after use and never reuse gloves.
- Open wounds should be covered by waterproof bandages or gloves.
- Wear clean uniforms and aprons before work. Do a hair restraint, such as a hat and a hairnet, as appropriate.
- Food handlers should stop working if they have or suspect to be suffering from an infectious disease with symptoms such as diarrhoea, vomiting, fever, sore throat or abdominal pain.



HACCP plan



- Establish and maintain a HACCP food safety plan to ensure that effective control measures are in place.
 - Keep records when monitoring the critical limits of CCPs as well as any corrective actions taken, and review the monitoring data to ensure that all CCPs are under control.
 - Provide regular training to food handlers on the operation of equipment and hygienic practices.
 - Carefully plan the preparation schedule and do not entertain orders beyond the production capacity of the manufacturing factory.
- Traders are reminded to comply with the requirements in manufacturing of frozen confections as stipulated in the Frozen Confections Regulation (Cap. 132AC).
 - The development of the HACCP plan is an ongoing process. Any changes to the product formula or manufacturing process may introduce new hazards. HACCP plans should be reviewed and updated as needed.

Providing allergen information



- Food businesses are required by law to provide accurate information about the allergenic ingredients in the prepackaged food they prepare.
- Several food allergens are commonly found in the production of frozen confection, including but not limited to milk, soybean, peanuts, nuts, gluten and eggs.
- If prepackaged frozen confections are produced, food businesses can provide allergen information on the packaging in a number of ways.



Our labelling guidelines provides a detailed account of the labelling requirements for allergen information. Scan the QR code to find out more.



