



COVID-19

BFFF Guidance on the freezing down of chilled and ambient product to preserve life

Purpose

This guidance is written with the intention of helping businesses manage unexpected supply problems effectively.

Key objectives

- Maintain safety including allergen information
- Not degrade consumer protection by misleading or omitting mandatory information
- Maintain traceability and transparency of the supply chain
- Encourage communication across the supply chain so that safe and appropriate use may be made of the food to avoid food waste
- Mitigate business losses

Scope limitations and legal requirements

- This guidance is provided by the BFFF to assist businesses who unexpectedly find themselves holding chilled or ambient food, with the original intended supply being unfulfilled and alternative routes unavailable sufficient for the quantity, thus food would be likely to go to waste otherwise.
- This guidance is not intended for foods destined for general retail sale to the public.
- The Food Standards Agency (FSA) has provided advice on [Bulk freezing of ambient and chilled foods](#) that this guidance complements. The FSA guidance encompasses retail supply. You are advised to read it in conjunction with this guidance.
- The food will reach the end user in its frozen state and will not be defrosted again prior to supply.
- You are reminded that it is not permitted to supply, or hold for supply, food after the use by date relating to it. You are not permitted to freeze down product bearing a use by date and subsequently change this use by date’.
- The law requires that food business operators within the businesses that they control, shall take responsibility for the safety of the food in their control, and shall not modify the information accompanying a food if it would mislead or reduce the level of consumer protection. Food business operators are responsible for any changes they make to food information accompanying the food.
- Members are recommended to discuss their plans with the BFFF and their Primary Authority and other food business operators should contact their local authority environmental health and trading standards officers (more than one local authority may be necessary). The [Notification to Primary Authority of product change](#) will assist to provide all the necessary information.



Suitability for freezing

As we know, the quality of any frozen food owes everything to the integrity of the product, its packaging and its temperature throughout the cold chain.

please note the following lists are not exhaustive

Many types of food can be frozen including:

- Meat, Poultry, Game, Fish
- Vegetables - Note: for optimal taste, colour and texture most vegetables except peppers and onions are best blanched before freezing)
- Fruits (can be preserved in ascorbic acid or syrups)
- Butter
- Milk - Note: all liquids expand as they freeze, therefore to avoid the pack (pouch, carton etc) splitting, attention should be paid to the amount of headspace available in the pack. Milk should not be frozen down in glass bottles.
- Hard Cheese
- Fruit juice
- Bread, Cakes and pastries
- Ice cream
- Stocks

However, some foods do not lend themselves well to freezing, including:

- Salad greens and crisp raw vegetables to be used in salads and sandwiches — such as celery, onions, and sweet peppers — will lose their crispness and become limp after freezing.
- Eggs in the shell will expand and crack the shell. Hard cooked egg whites will become tough and rubbery.
- Creamed cottage cheese will change texture, becoming grainy. Freeze only uncreamed or dry-curd cottage cheese.
- Sour cream will separate when frozen and thawed.
- Heavy or whipping cream will not whip high after freezing.
- Potatoes become mushy if frozen raw, and watery and tough if boiled and then frozen.

Therefore, some form of some assessment to ensure the product is intrinsically suitable for freezing should be carried out.



Blast Freezing

It is recommended that techniques such as blast freezing are always used where possible, to ensure the preservation of the original food characteristics. Blast freezing down to -18°C with sufficient promptness will ensure that the temperature of the food at its thermal centre passes quickly through the zone of maximum crystallisation - for most products this lies between -1°C and -5°C . This will minimise any chemical, biochemical or microbiological changes to the food.

However, care should be taken to ensure that blast freezing processes are not inadvertently accelerated as this could lead to product being removed prior to the temperature at the thermal centre passing through the zone of maximum crystallisation.

Freezing and thermal stabilisation processes are complete once the temperature throughout the product has reached -18°C . Once the freeze cycle is complete, the equipment can be switched into the “hold” mode to keep the food at this temperature.

Products can be frozen to -18°C within 240 minutes. This ensures quality and food safety and minimises damage to appearance, structure, or taste. However, different foods give up their heat at different rates and therefore there are certain factors which need to be considered when determining freeze time, and which programme to use. For example, density, water content, and fat content all affect the time required to achieve temperature as well as weight loadings and the thickness of the product.

Table 1. below may be used as a guide only. Freezing times listed will depend on the type, size and quantity of the food concerned as well factors such as pallet loading and density. It should be noted that products in the centre of a pallet may take up to the upper end of the stated time to freeze. Note: Previously frozen meat and fish should not be refrozen without taking technical advice from an appropriate food technologist.

Table 1 – Blast freezing times for categories of frozen food

Food type	Includes	Time required to blast freeze (mins)
Meat	Beef, pork, lamb, poultry and mince	60-240
Fish & Shellfish	Fish and shellfish – all cuts e.g. fillets and further processed e.g. coated, fried	60-240
Prepared meals	Stews and casseroles, Shepherds Pie, Lasagne etc	90-240
Vegetables and pulses	Steamed veg, roasted veg, rice, potatoes etc	60-240
Fruit	Stewed and cooked fruits	60-240
Bakery	Cakes	70-240
Bakery	Pastries	50-240
Desserts	Fruit based desserts, egg based flans	70-240
Desserts	Sponge puddings and dense desserts such as cheesecakes	70-240



Shelf life of blast frozen products

Frozen storage life is limited by quality considerations and it is not generally possible to carry out accelerated trials for shelf life determination. It is therefore accepted that it is not realistic to establish a practical storage life under frozen conditions for individual products. Much work has however been done over very many years on time-temperature tolerance relationships, and industry has also built up a wealth of practical experience.

As a result, it has become possible to establish a 'standard storage life' for different product types. These typically range from 9 to 18 months, assuming a storage temperature of -18°C (or colder). This approach has proved effective and has served the industry well. Its validity is assured, both by long historical experience and also by the continuing practice for many manufacturers/packers of retaining samples of product from production runs for assessment at end of life. Actual storage life for a product will depend on a number of factors, including:

- Quality and nature of raw material
- Handling and storage before freezing
- Effectiveness of any pre freezing treatment (blanching etc)
- Freezing process, particularly the speed of initial freezing
- Packaging, post freezing
- Storage temperature: -18° is the standard (and may be a legal requirement) but many products are held at lower temperatures in primary storage
- Storage conditions, particularly the control of storage temperature

The 'standard' storage life that is assigned to a product at the time of freezing should of necessity err on the side of caution, to allow for any uncertainty or possible variability, in later storage conditions for example. For a product that is initially of high quality and that has been handled and stored in line with best practice, it can be expected that the product will remain of acceptable quality well beyond its 'standard' storage life.

Table 2 below provides suggested shelf lives for categories of quick-frozen foods

However, note that based on detailed knowledge of a specific product –the raw materials, production process, packaging, intended storage conditions, etc – it is entirely possible for a manufacturer/ packer to assign a shelf life to a product that will be different to the 'standard' shelf life that is suggested.



Table 2 – Suggested shelf lives for certain categories of quick-frozen foods

Fish		Meat	
Prawns	12 months	Beef cuts, Chicken, Lamb	18 months
All other Crustacea	18 months	Pork Cuts	9 months
Trout	18 months	Comminuted Meats & Burgers	12 months
Salmon Whole	18 months	Breaded Comminutes	18 months
Steaks	12 months	Comminutes with Pork	9 months
Slices (vacuum)	12 months	Cured Meats (vacuum packed)	12 months
Herring, Sardines, Mackerel	12 months	All prepared Meat Meals	18 months
Fish Fillets	18 months	Pies	18 months
except:-		Vegetables	
Halibut Steaks	12 months	All Vegetables	18 months
Skate	12 months	except:-	
Lemon Sole	12 months	Mushrooms	12 months
Smoked Fillets	18 months	Cauliflower Florettes	12 months
except:-		Unblanched Vegetables	12 months
Kippers, Mackerel	9 months	Vegetable Mixes	12/18 months
unless vacuum packed	12 months	Potato Products	
Breaded Fish Products	18 months	French Fries	18 months
Fish Cakes/Croquettes	18 months	Potato Specialities	18 months
Fish in Sauce dishes	18 months	Fruit	
Fish Recipe dishes	18 months	All Fruits	18 months
Pizzas		Desserts	
All Pizzas	18 months	Cheesecakes	18 months
except:-		Gateaux and Cakes with Cream	18 months
Pizzas with Ham/Pepperoni	9 months	Pies, Puddings, etc	18 months
		Pastry	18 months
		Desserts with Meringue	12 months

Cold store freezing

In the absence of blast freezing facilities, although not preferable, products can be frozen in cold storage freezers provided it is clearly controlled.

If you are freezing down food in cold storage freezers rather than blast freezing this will take longer. Exact time to freeze will be impacted by size and age of the freezer, how full they are loaded, maintenance, storage temperature and how densely products are packed. Product in the centre of densely packed pallets will take longer to freeze.



Some packaging types may not lend themselves to freezing and thawing (e.g. they may split or get brittle or get shards). Prior to freezing, you should therefore liaise with suppliers to establish suitability. However, if the pack already states 'suitable for freezing' then it should be fine to freeze down.

Products should be frozen as soon as possible and before their best before date. Products must not be frozen after a use by date - they must be frozen by midnight of the use by date. Where possible, at least 2 days life should remain on products before freezing. Records of verification checks on use by/best before dates should be maintained.

Businesses should verify products are all frozen as soon as possible, as a guide, preferably within 12 hours to minimise microbial growth. The longer it takes to freeze, the greater the chance of microbial growth.

This form of freezing will still slow down the chemical and biochemical reactions but product quality after freezing will be dependent on product type and crystal formation. For example, high water content products may not survive and quality may be poor. It should therefore be noted that this may affect customer and consumer acceptance.

As regards product safety, once frozen, the growth of any bacteria present in the food will be inhibited. However, bacteria will remain. Therefore, it is recommended that the suppliers of the product are contacted to provide microbiological support of some description. In the absence of supplier information research institutes such as Campden BRI or Leatherhead Food Research Association may be able to assist.

Shelf life of cold store frozen products

As previously described, many factors can influence the shelf life of a frozen product and products frozen down in cold storage freezers will undoubtedly have a shorter life than if frozen down in a blast freezer, as suggested in table 2.

Samples for determination of shelf-life should be taken and testing should be repeated mid-life and end of life to ensure quality and safety are retained. Research institutes such as Campden BRI or Leatherhead Food Research Association may be able to assist when determining the shelf-life of frozen foods.

Labelling of frozen products

Once frozen, steps should be taken to ensure that product temperature is maintained and does not fluctuate significantly, with an allowance for a 3°C upward tolerance for 'brief periods'. Excessive product temperature fluctuations, either in range or frequency, are undesirable as they may lead to serious dehydration of the food and to other forms of quality deterioration. Although temperature fluctuations are generally less harmful at lower storage temperatures, significant variations around the set point in the cold store air



temperature should be avoided and the frequency of variations kept to a minimum. Cold store temperatures should be monitored and recorded at frequent and regular intervals to ensure continued product safety.

Products should be clearly labelled with a non-peelable (freeze stable) sticker. This sticker, when applied must not cover any printed information and should be located as close to the original use by/best before date.

The sticker must be applied to each item as supplied to the receiving business customer. Therefore, if supplied in bulk, the sticker can be applied to an outer carton. However, in this scenario the label must be large enough to be unavoidable and the carton be a sealed package. Labelling must be applied to individual packs if bulk is split.

Note: Article 8(4) of the Food Information to Consumers Regulation (Regulation (EU) No 1169/2011) states that Food Business Operators shall not modify the information accompanying a food if such a modification would mislead or otherwise reduce the level of consumer protection. Therefore, any shelf life extension should be made with consultation of the brand owner and confirmation sought from the customer that they accept all liability.

Table 3 below provides a suggestion of the information which should appear on the sticker and will aid in traceability. It is suggested that products be frozen and sold under a different SKU code to differentiate it from its chilled/ambient status.

Table 3 – suggested re-labelling sticker

KEEP FROZEN FOR UP TO 30 DAYS BETWEEN -18°C TO -24°C
DEFROST THOROUGHLY AND COOK/CONSUME ON SAME DAY OR WITHIN 12 HOURS
BEST BEFORE END DATE []
FROZEN ON []
THE USE BY DATE ON THE ORIGINAL LABEL MUST BE DISREGARDED EXCEPT FOR USE AS PRODUCT TRACEABILITY

Important: where a business proposes to re-label, they should, in the first instance, provide and agree details of the changes with their local food authority.