

Temperature: Cooking & Storage

As a food producer or business owner, it is essential to know about safe methods and cooking temperatures to ensure that the food you are serving will be free of any bacteria that can cause illness as a result of under-cooking.

Cooking temperatures

The Food Standards Agency states: 'Bacteria usually grows in the 'Danger Zone' between 5°C and 63°C. Below 5°C, growth is stopped or significantly slowed down. Above 63°C the bacteria start to die. Time and temperature are both important because proteins need to be heated up for a long enough time for them all to be broken down.'

Food.gov.uk offers a number of resources around cooking temperatures and safe methods. There may also be special advice around cooking with meats and pates. Food Hygiene courses also cover cooking temperatures.

Food.gov.uk says that: 'Standard advice is to cook food until it has reached a core temperature of 70°C for 2 minutes. The other time and temperature combinations are:

- 60°C for 45 minutes
- 65°C for 10 minutes
- 70°C for 2 minutes
- 75°C for 30 seconds
- 80°C for 6 seconds

These provide equivalence of destruction for defined pathogens to include Salmonella and Listeria and are validated by industry experts. Cooking food at the right temperature and for the correct length of time will ensure that any harmful bacteria are killed. You can check the temperature of a food, using a clean thermometer probe. Insert the probe so that the tip is in the centre of the food or the thickest part.' There may be benefit to cooking foods at lower temperatures, but for a longer time, in terms of flavour and texture and these techniques are commonly employed in sous vide preparation systems used in catering and by some manufacturers.

Thermometers, probes and calibration

A thermometer probe that is able to give an accurate reading is an essential piece of kit in food production. A probe is used by placing the metal probe section into for example the centre of a pan of soup, or the thickest part of a piece of meat to get a reading of the inside temperature of the food item during cooking. Infra-red thermometers are also available for use in kitchens, however they only measure the surface temperature of items and therefore are not suitable for us use to determine if items are cooked through.

Calibration

When your thermometers are not accurate you risk the chance of causing food borne illness through inaccurate readings. You can calibrate your thermometers in-house using iced water and boiling water to do this - see instructions on the links below.

Ensuring your thermometers are working correctly is vital and it is an idea to obtain a calibrated and certificated thermometer to ensure accuracy. There are no definite rules on how often to verify the accuracy of a thermometer but when deciding, take into account how often you use the thermometer and assess how risky the product is to health if there was a false reading. Best practice would be to do a boiling / iced water verification on a regular basis such as weekly. If your thermometer does not read 100 degrees celsius for a boiling water calibration, or zero for an iced water calibration you will need to adjust or recalibrate the thermometer.

If you have a thermometer that cannot be adjusted or calibrated and it is wrong, you should remove the thermometer from the production area and replace immediately. When buying a thermometer probe, check on the label to see if it can be adjusted, or is supplied with a calibration certificate. An annual external calibration of thermometers by a professional company would also be advised to know that your own methods are working and you are working with accurate readings. Larger companies often have a single 'reference thermometer' that is calibrated annually and other units are checked against this.



Temperature: Cooking & Storage

Record your readings

Recording your verification readings will show any external auditors, EHO officers or potential customers that you are taking food safety seriously.

Temperatures and HACCP

In food manufacturing, recording temperature during certain steps of the process would act as a one of your critical limits at control points in your HACCP plan. (Also see HACCP information sheet 1.12)

Links

<https://www.food.gov.uk/business-guidance/cooking-safely-in-your-business#cooking-temperatures>

<https://www.foodsafety.com.au/blog/calibrating-probe-thermometers-in-a-commercial-kitchen>

Thermometer Calibration - Hot Cold method Video: <https://www.youtube.com/watch?v=VpJULQICiGM>

Temperature: Cooling & Freezing

Cooling, refrigerating and freezing cooked food products carries food safety risks as much as a cooking process. As a food producer it is your responsibility to maintain the safety of your food at all stages of preparation. Cooling food product down quickly along with correct storage methods reduces the chance of harmful bacteria forming. This sheet gives a brief overview of the guidelines for chilling and freezing, but should not be a replacement for formal food hygiene and HACCP training.

Whilst cooking will destroy pathogenic bacteria in their vegetative form, even if cooked food is carefully handled, spores that survive the original cooking process may survive and if cooling is insufficient they may be able to germinate and cause food safety problems. Heat tolerant yeasts and moulds and food spoilage bacteria can also survive the standard cooking process. For this reason, fast and effective cooling will be an important control and can also give products a longer shelf life. The most effective method (albeit additional expense) is blast chilling, but other methods can include use of iced water or water baths for containers, running through cold water, stirring and transfer to smaller or shallow containers. In catering, a best practice point is to not cool food at ambient temperatures for longer than 90 minutes before transfer to refrigeration. That said, it is poor practice to put hot food in standard refrigeration, although larger chillers may have suitable refrigeration design capacity.

Temperature Danger Zones

The Food Standards Agency states: 'Bacteria usually grows in the 'Danger Zone' between 8°C and 60°C. Below 8°C, growth is stopped or significantly slowed down. Above 60°C the bacteria start to die. Time and temperature are both important because proteins need to be heated up for a long enough time for them all to be broken down.'

Cooling

It is important to cool food as quickly as possible prior to storage in order to prevent the growth of bacteria. Ideally this should be cooled to less than 8 degrees celcius within 90 minutes. Food can be cooled quickly by a variety of methods:

- Cover pans of hot food and move to a colder area (e.g. store room or larder).
- Stand them in cold water.
- Add ice to the water you stand the food in.
- Stir regularly while it is chilling.
- Divide food into smaller portions.
- With larger food items such as joints of meat, cut them in half or break them down.
- Spread foods such as pasta or rice flat out on a tray.



Temperature: Cooling & Freezing

Never put hot food in the fridge or freezer otherwise it will potentially heat up your appliance and warm up other foods that are stored adjacently. Efficient cooling can provide a product with a longer shelf life than a product that is not effectively controlled during cooling.

Freezing

If you are freezing cooled foods, it is important to ensure that your freezer is working effectively by checking its temperature. Freezers should be operating at temperatures at -18°C or below. Freezing straight after cooling can help ensure freshness and maintain the nutritional content of the foods.

Remember to:

- Suitably package and cover your foods
- Label everything with date of production, date of freezing and use-by date, the product name, ingredients list and allergens to avoid any cross contamination.
- Never guess what a product may be if it is unlabelled in case it contains allergens. Remove it from storage and dispose.

Similar protocols apply to fast freezing. In particular, inefficient freezing through prolonged freezing can give rise to ice crystals in products and is detrimental to product quality, although once below freezing, microbial growth is likely to be insignificant.

Defrosting

The best way to defrost foods is overnight in a fridge. Ensure that defrosting foods are not touching any raw foods to avoid cross-contamination. You can also use a microwave on defrost setting for smaller items. Never leave items out on the side to defrost in case they enter the danger zone temperatures.

Why is it important to chill and defrost your food properly?

The Food Standards Agency states: Some foods need to be kept in the fridge to help slow down bacterial growth and keep them fresh and safe for longer. Generally, the colder the temperature the slower bacteria will grow, but cold temperatures don't stop bacteria growing altogether (for example, *Listeria monocytogenes* can grow at temperatures below freezing).

Re-heating & hot holding

When re-heating food to serve, it is important to remember, that re-heating isn't just warming up a food product, it should be treated as re-cooking and be heated to a high enough temperature so that all of the food is steaming hot through. **The core temperature should be a minimum of 75°C for 30 seconds.** Once food has reached the correct temperature it should be served immediately or put into hot holding e.g. a bain marie to avoid the temperature reducing and falling back into the temperature danger zone. **Temperatures for safe hot holding are required to be above 63°C .**

Links

<https://www.highspeedtraining.co.uk/hub/safe-temperatures-for-food-storage/>

<https://www.food.gov.uk/sites/default/files/media/document/chilling-down-hot-food.pdf>

<https://www.food.gov.uk/sites/default/files/media/document/reheating.pdf>

