



# Sous Vide and Food Safety

## Purpose

This factsheet is intended as a guide for restaurants and catering establishments to highlight the food safety risks associated with sous vide cooking and to provide best practice recommendations for managing these risks. This information should help to address sous vide procedures in food safety management systems based on the principles of HACCP (Hazard Analysis and Critical Control Points).

## What is Sous Vide?

Sous vide is a method of cooking where food is vacuum packaged in a plastic pouch and heated in a temperature controlled water bath for a defined length of time. This cooking method can present a number of food safety risks which should be recognised and controlled. These risks include the potential for survival and growth of bacteria that can grow under the anaerobic (absence of oxygen) conditions created by the vacuum packaging, e.g. *Clostridium botulinum*.

## Equipment for Sous Vide Cooking

The following should be considered in relation to equipment used for sous vide cooking:

- Water baths and temperature probes should be maintained and calibrated as recommended by the manufacturer
- Separate vacuum packing equipment must be used for raw food and cooked/ready-to-eat food to prevent cross-contamination
- Plastic pouches should be food grade and certified as suitable for cooking at high temperatures. More information can be found in the Food Safety Authority of Ireland (FSAI) factsheet on [Food Contact Materials](#)

## Cooking

The following is recommended for sous vide cooking:

- Set the water bath 2.5°C above the target temperature of the food to achieve the correct core temperature
- Preheat the water bath to the desired temperature before submerging sealed pouches
- Fully immerse pouches in the water bath
- Allow space between pouches for water circulation and even heat distribution
- Monitor water bath and product cooking temperatures, and maintain records for verification purposes
- Cooking times should be determined when the bath is loaded with pouches to its maximum capacity, and the internal temperature of the food is at its lowest prior to immersion in the bath. This is to ensure that the food reaches the desired temperature at the centre
- Time, temperature and product size combinations for each food item should be recorded
- At the end of cooking, remove the pouches and serve immediately or cool quickly

Remember, some foods may not be suitable for sous vide cooking. These include whole birds (the cavity inside the birds prevents even cooking) and minced meats.

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## Cooking temperatures and times

- The FSAI recommends a cooking process adequate to kill harmful bacteria, i.e. pasteurisation which is achieved by cooking to 70°C for 2 minutes at the centre of the thickest part of the food.
- Pasteurisation can also be achieved at lower temperatures but longer cooking times are required. See Table 1 for equivalent cooking times and temperatures to 70°C for 2 minutes.
- You must be able to validate that the cooking process will enable food to reach the target core temperature for the recommended time during cooking to ensure it is safe to consume.

**Table 1: Example of equivalent core temperature/time combinations for pasteurisation<sup>1</sup>**

TEMPERATURE (°C)	TIME	TEMPERATURE (°C)	TIME
64	12 min 37sec	70	2 min
65	9 min 17 sec	71	1 min 28 sec
66	6 min 50 sec	72	1 min 5 sec
67	5 min	73	48 sec
68	3 min 42 sec	74	35 sec
69	2 min 43 sec	75	26 sec

## Temperature measurement

- Calibrate temperature probes as recommended by the manufacturer.
- Clean and sanitise the probe between uses to prevent cross-contamination. This can be done using boiling water, sanitisers or alcohol swabs.
- **Suggestions for measuring temperature of vacuum packaged food:**
  - Cut the pouch open at the top, measure the core temperature of the food. Reseal for further cooking if necessary
  - During recipe development, foam tape could be applied to the pouch and a digital thermometer probe inserted through it into the thickest part of the food. As this method punctures the pouch through which microorganisms can enter, **it is not considered safe** and should **only be used for recipe development** and not for food being consumed
- Additional information on temperature measurement can be found in [FSAI Guidance Note No. 20](#).

<sup>1</sup> FSAI (2006) Guidance Note 20: Industrial Processing of Heat-Chill Foods. p21.

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## Cooling

- The reduced oxygen atmosphere created by vacuum packaging can increase the risk of growth of anaerobic bacteria.
- If food is cooled too slowly, the growth of surviving anaerobic spore-formers such as *Clostridium perfringens* may occur.

### Recommendations for cooling:

- Cooling time will depend on the thickness and shape of the food
- Use a designated sink or container consisting of a 50/50 mixture of ice and water. Ensure potable water is used for ice-making and cooling
- Do not put hot or warm pouches in the fridge or freezer
- Cool pasteurised food to  $\leq 5^{\circ}\text{C}$  within a total time of 150 minutes following completion of cooking, i.e. total time: a maximum of 30 minutes following completion of cooking plus a maximum of 120 minutes for chilling to  $\leq 5^{\circ}\text{C}$ . Best practice recommends a target temperature of  $\leq 3^{\circ}\text{C}$  for chilling, if achievable
- Monitor cooling time to make sure the method is adequate for the food product
- More details on cooling and chilling cooked food can be found in [FSAI Guidance Note 15](#)

## Storing

- Food that has been vacuum packaged, pasteurised by sous vide cooking and properly chilled should be stored in the fridge ( $\leq 5^{\circ}\text{C}$  but preferably  $\leq 3^{\circ}\text{C}$ ) or freezer ( $\leq -18^{\circ}\text{C}$ ).

## Reheating

- If cooked food is to be reheated before consumption, it should achieve a core temperature of at least  $70^{\circ}\text{C}$  (see [FSAI Guidance Note No.15](#)).
- Time/temperature/size of product combinations for each product should be documented.