Food safety program template Supplementary practices section

for class 2 retail and food service businesses, No. 1, Version 3

Sous vide

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Authorised and published by the Victorian Government, 1 Treasury Place, Melbourne.

ISBN 978-0-9924829-6-1 (Print)
ISBN 978-0-9924829-7-8 (pdf)

Available at www.health.vic.gov.au/foodsafety

(1405008)

Contents

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Why do I need this template supplement?

As a food business owner, you are legally required to sell safe food. The legislation governing the sale of safe food is the *Food Act 1984*, which incorporates the Food Standards Australia New Zealand (FSANZ) Food Standards Code.

A food safety program will assist you to meet your legal responsibilities.

This supplement is for use with the Food Safety Program template for class 2 retail and food service businesses, No.1 version 3.

Where can I get more help?

Several organisations can assist you:

- Speak with an environmental health officer from your local council.
- Call the Food Safety Help Line: 1300 364 352.
- Visit the Food Safety website <www.health.vic.gov.au/foodsafety>.
- Visit *dofoodsafely*, the department's free online learning program recommended for food handlers. It covers basic knowledge of food safety and develops food-handling skills – see <http://dofoodsafely.health.vic.gov.au>.
- Business Victoria can assist you with information about setting up a business in Victoria; call 13 22 15 or visit the website <www.business.vic.gov.au>.

For further assistance, contact your local council to help you access interpreter services.

How do I use this template supplement?

You must keep a copy of your food safety program at your business. If you use this supplementary practice you must add it to your food safety program folder.

Compile records

Keep your completed records at your business to demonstrate that you are processing and handling food correctly. These must be available for review by your food safety supervisor, and at the request of an environmental health officer.

Your responsibilities

This supplement outlines the requirements for food businesses using sous vide cooking practices. If businesses wish to use sous vide practices outside the scope of this supplement then you will need to use an independent food safety program which must be audited annually by a Department of Health & Human Services-approved Food Safety Auditor. Discuss this with your local council Environmental Health Unit before commencing any sous vide cooking.

Preparing and cooking food using the sous vide method

Goal: Ensure sous vide food is safe to consume when cooked at temperatures between 55°C and 75°C.

What is Sous vide cooking?

Sous vide is French for 'under vacuum'. Sous vide foods are foods that are cooked under controlled conditions of temperature and time inside sealed packages in water baths or steam ovens. This method of cookery can produce food with different characteristics to conventional cooking methods.

Note: The term '*sous vide*' in this template refers to foods that are:

- vacuum packed or similarly sealed to expel air prior to cooking, ***and***
- are cooked by immersing in hot water or steam, ***and***
- are cooked at lower temperatures than other common cooking methods, but for a time period sufficient to produce safe food, ***and***
- cooked safely to kill potentially hazardous bacteria prior to consumption.

Why is Sous vide cooking different to conventional cooking?

Sous vide food must be cooked using a time and temperature combination that results in safe food. Whilst cooking food to a core temperature of 75°C or above kills food poisoning bacteria, cooking at lower temperatures and for a longer time can also have the same effect, but it is critical that it is done correctly to ensure safe food is produced.

This supplement is for businesses cooking high-risk food using the sous vide method, following the time and temperature parameters set out in this document. If you plan to cook food beyond these parameters, such as shortening or extending cooking time or lowering cooking temperature, this template is not suitable.

You must carefully monitor food cooked using the sous vide method to ensure it is safe to consume. **Food must not be held at 60°C or below for longer than 6 hours**, including the food heating up to cooking temperature time and cooking time, as the risk of *Clostridium perfringens* spores germinating and producing toxins is increased. These bacterial toxins are not destroyed by further cooking and can cause food poisoning.

Necessary skills and knowledge

Food handlers responsible for cooking food using this supplement must be able to demonstrate sound knowledge of:

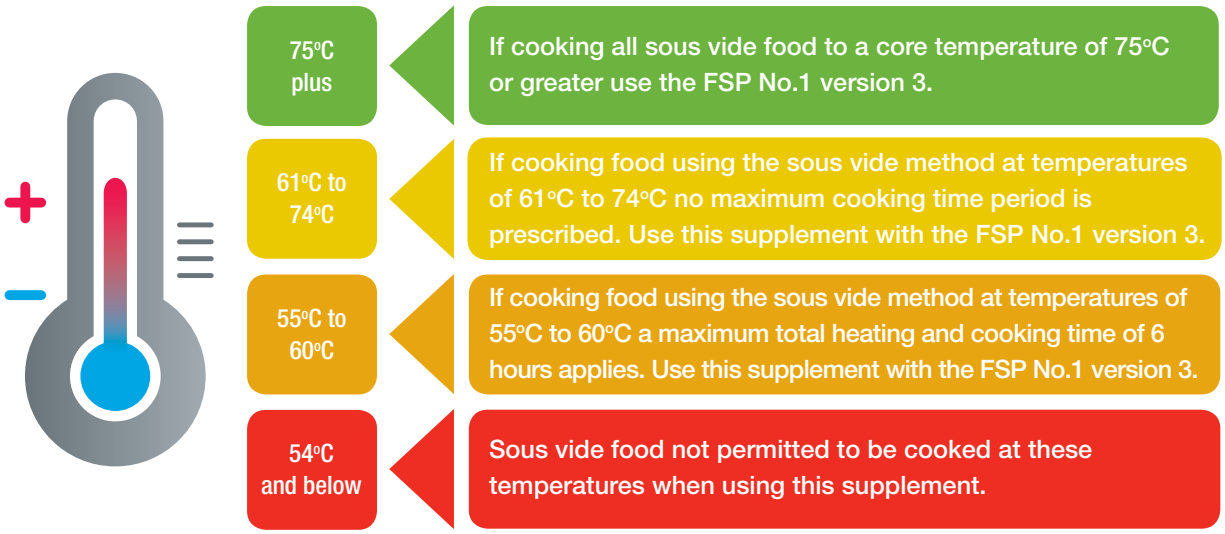
- the method used,
- how the equipment is operated,
- how risk is managed, and
- that the correct records are being completed as good practice and when requested by a local council environmental health officer.

Equipment

The equipment used must be suitable for producing safe food using the sous vide method.

You must use a calibrated probe thermometer accurate to at least +/-1°C to check the temperature of the food when required.

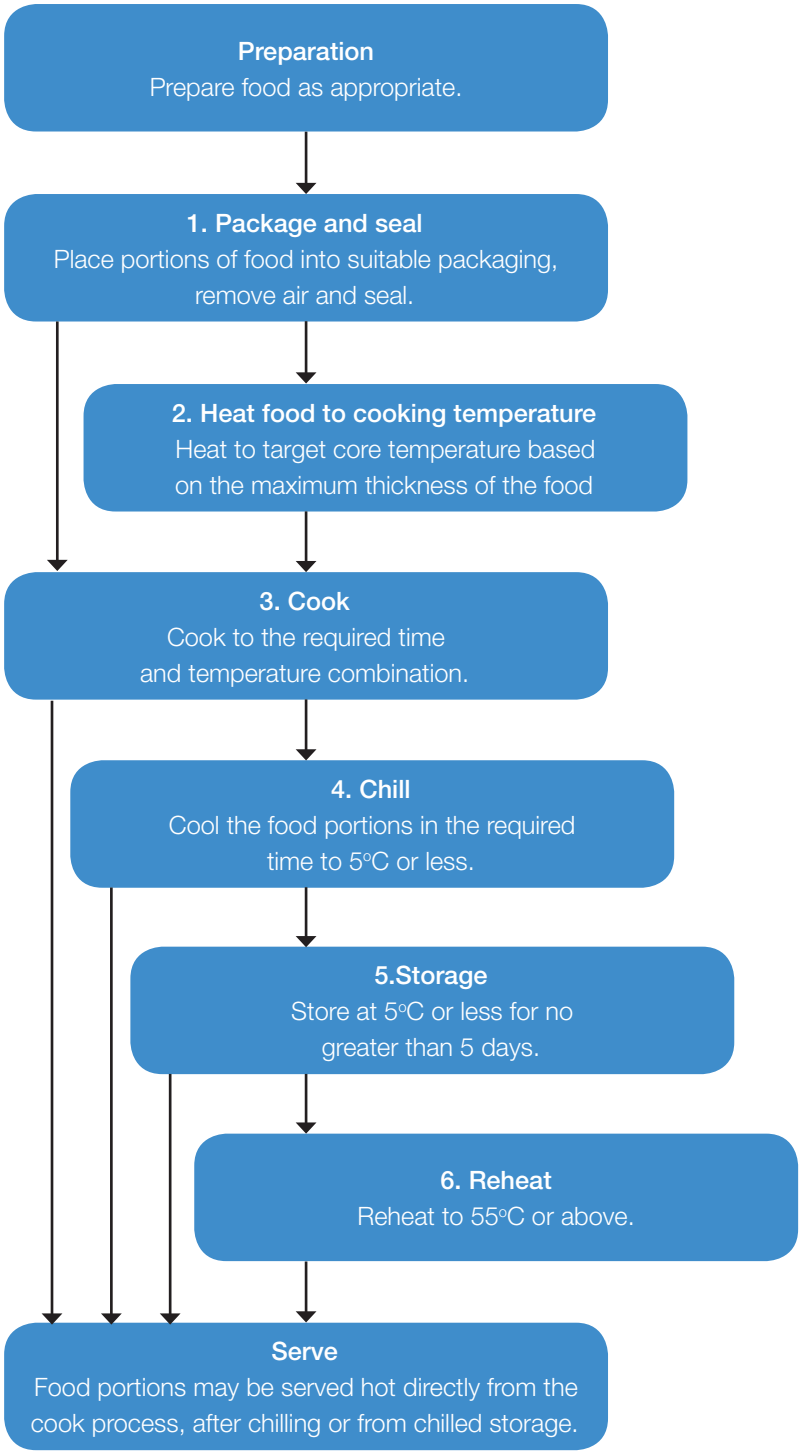
Diagram 1: Cooking temperature rules using the sous vide method



Sous vide process

The following flowchart outlines the basic sous vide process. There are several ways to produce food using the sous vide method.

Diagram 2: Sous vide process



Goal: Ensure sous vide food is safe to consume when cooked at temperatures between 55°C and 75°C.

What are the risks?

For each of the sous vide processing steps in the flowchart, the risks, actions that can be taken to reduce the risks, and what can be done if risks are detected are outlined below.

1. Package and Seal	
What can go wrong? Toxic chemicals from unsafe packaging leach into the food. The packaging or bag breaks, leaks or does not seal.	**What must I do?** • Purchase bags suitable for sous vide cooking and chilling processes from specialist packaging suppliers. • Reject any leaking / unsealed bags.
	How can I check? • Verify with your supplier that the bags are food safe and suitable for this practice. Obtain the specification from the bag supplier. • Check each bag does not leak after vacuum sealing.
	What if it is not right? • Reject bags from the supplier if they are not food-safe grade. • Reject bags that do not seal effectively. • Reject or discard food cooked in unsuitable or leaking bags. • Reseal food in suitable bags and continue the process only if safe to do so.

2. Heat to cooking temperature	
What can go wrong? Food poisoning bacteria survive and grow. *(cont. next page)*	**What must I do?** Ensure the food heats up quickly by checking: • The water is at the cooking temperature before adding the food to be cooked. • The food is no thicker than that usually cooked. • There is space between bags to allow good water or steam flow between bags. • That all air is removed from the bag and it is not floating or the heat will not penetrate the food evenly. • There is even distribution of heat in the equipment by stirring or using recirculating systems. **Do not overload the equipment.** **Do not heat up food between 5°C – 60°C for more than 6 hours.**

2. Heat to cooking temperature (cont.)	
(cont. from previous page)	**How can I check?** • Use a calibrated thermometer to check the temperature of the water. • Do not add the food until the water is at the right temperature. • Use an accurate timer or alternative method to track the heating up time. • Visually check that all bags are separate from each other and that none are floating. • Use a probe thermometer to ensure the food reaches the necessary temperature for the minimum set time to produce safe food. • Undertake scheduled maintenance and calibration to ensure equipment is operating correctly and accurately.
	What if it is not right? • Do not start cooking if the required water temperature is not reached. • Check the equipment is working correctly and replace or arrange a service if not. • Physically separate the bags with a rack or other equipment. • Ensure all packages of food are submerged and in full contact with water or steam. • Stir the water to better circulate heat. • Reject or discard food if the heating process does not reach the cooking temperature quickly enough, or if you suspect food has become unsafe.

3. Cook	
What can go wrong? Food poisoning bacteria survive and grow, and produce toxins.	**What must I do?** Cook food thoroughly by: • Ensuring the food is cooked for at least the minimum time at the correct temperature. • Visually checking there is good water flow between bags. • Ensuring there are no bags floating above the surface of the water. • Measure the core temperature of the food during the cooking process when required.
	How can I check? • Monitor the time that the food takes to heat up and cook with calibrated and sanitised probe thermometer. • Use an accurate timer or alternative method to track the cooking time.
	What if it is not right? • Dispose of food if the heating process does not reach the required time and temperature requirements. **Dispose of food held between 5°C and 60°C for longer than 6 hours.**

4. Chill	
What can go wrong? Food poisoning bacteria grow from spores that survive cooking, and form toxins if food is not cooled quickly enough.	**What must I do?** • Food must be cooled from 60°C (or less) to 21°C or less in 2 hours; and from 21°C to 5°C within a further four hours (a total of 6 hours). Cooling food within this timeframe will prevent bacterial spores from growing and potentially producing harmful toxins. • Ensure the cooling method (ice bath, coolroom, etc.) cools the food in the required time. **How can I check?** • Monitor the food temperature during cooling with a calibrated and sanitised probe thermometer. • Develop a method for how long it takes to cool the food safely in an ice bath or coolroom. Record the procedure, and monitor when required. **What if it is not right?** • Reject or discard the food, or hold the food and undertake appropriate microbial testing to determine whether it is safe if it has not been cooled quickly enough.

5. Storage	
What can go wrong? Food poisoning bacteria grow in food stored at incorrect temperatures.	**What must I do?** • Store unopened, cooked sous vide foods at 5°C or below for no longer than 5 days. • Ensure the packaging seal remains intact to prevent contamination. **How can I check?** • Monitor the fridge/coolroom temperature. • Rotate stock to ensure that oldest stock is used first. • Label food clearly with a maximum 5 days shelf life. **What if it is not right?** • Discard food that has not been stored at 5°C or below, or if it exceeds 5 days storage.

6. Reheat	
What can go wrong? Food poisoning bacteria survive and grow, and form harmful toxins.	**What must I do?** • Reheat food rapidly to at least 55°C and do not exceed 4 hours reheating between 55–60°C. **Do not reheat sous vide foods more than once.** **How can I check?** • Check the core temperature of the food with a calibrated and sanitised probe thermometer to ensure that it reaches the desired temperature. • Measure the reheating time accurately and do not exceed 4 hours at 55°C to 60°C. **What if it is not right?** • Continue to reheat. Check again and if the target temperature is not reached, stop the process and check that the equipment is working correctly. **Discard food held between 5°c and 60°C for longer than 4 hours.**

What are the risks?

Sous vide cooking requires precise time and temperature combinations to effectively manage the food safety risks.

The cooking process must heat the food to a sufficient temperature and cook it for a sufficient time to kill potentially hazardous bacteria, to prevent their growth in the food. If the cooking processes does not meet the minimum time and temperature requirements, the food may be unsafe to eat.

Food must not be cooked below 55°C as this will not kill potentially hazardous bacteria that may be present.

Remember:

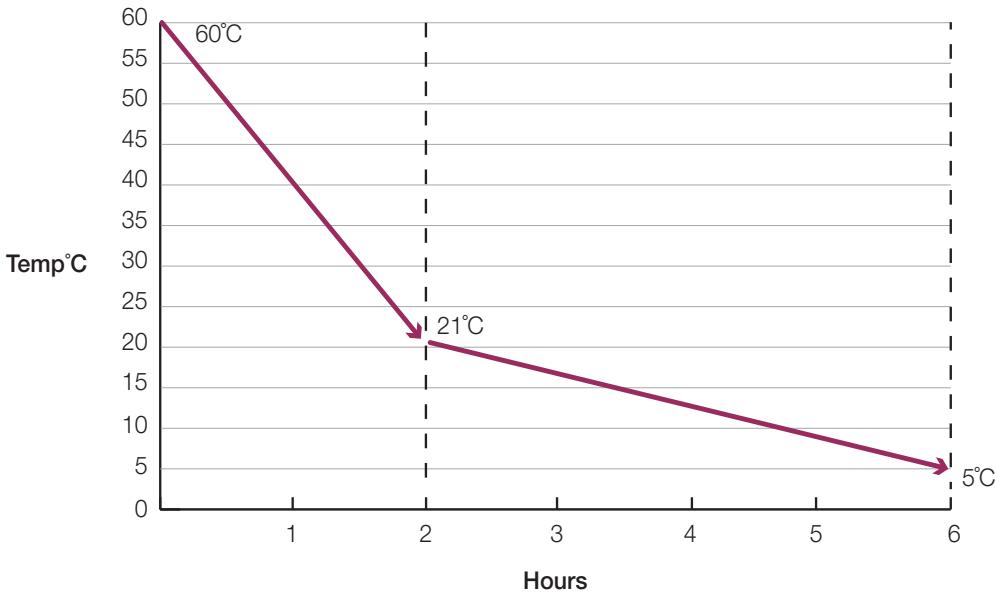
Food cooked between 55°C and 60°C must not exceed a total heating up and cooking time of longer than 6 hours.

After this period of time *Clostridium perfringens* bacterial spores are able to grow and can produce toxin that may cause food poisoning. Potentially hazardous bacterial spores can survive the sous vide cooking process. Food must be cooled quickly to minimise the time the food is spent at temperatures at which these spores can grow and potentially produce food poisoning toxins.

Remember:

All cooked food to be stored chilled must be cooled from 60°C (or less) to 21°C within 2 hours, and from 21°C to 5°C within a further four hours; a total of 6 hours.

Diagram 3: Safe cooling stages for food



Sous vide food must be stored at 5°C or below to prevent heat resistant bacterial spores in the food from growing. Do not exceed storage periods of longer than 5 days.

What records must I keep?

You must keep a record of your cooking methods, procedures followed, and monthly batch cooking information to demonstrate your sous vide cooking methods produce safe food.

Use **Record 10: Cooking method** to record the procedure for each menu item cooked using the sous vide method.

Use **Record 11: Monthly cooking record** to record a monthly check of at least two sous vide-cooked menu items. Rotate these to cover all menu items from Record 10 in a 12 month period.

You must test each recipe to make sure the correct time and temperature have been met as this is very important to produce safe food.

Further information

- ✔ Use **high quality** heat-stable **food-safe packaging materials**.
- ✔ **Vacuum seal the food**: Vacuum sealing removes air from the package allowing efficient heat transfer and prevents the pouches from floating which can lead to uneven heat penetration.
- ✔ **Clean the vacuum sealing machine after each batch of food** – it can be a source of cross contamination of food during sealing.
- ✔ **Use thin portions of food** so heating and cooling is rapid, as larger, thicker portions will take a longer time for the core of the food to reach the required temperature. Table 2 provides a guide for the time it takes different thicknesses of food to reach the required core temperature.
- ✔ The **number** and **temperature** of the **portions added** to the waterbath will initially **reduce the water temperature**.
- ✔ Ensure all sealed packages are **submerged** and receive **adequate heat**.
- ✔ **Circulating water baths** heat foods portions uniformly. **Convection steam ovens** may not heat the food portions uniformly. Make sure your equipment works properly to produce safe food.
- ✔ When measuring the temperature of the food, **use an accurate, calibrated and sanitised probe thermometer**. It can be inserted through closed cell self-sealing tape or by a pack-connected thermocouple thermometer.
- ✔ Self-sealing tape can be used to maintain the vacuum when checking the core temperature of food. This will avoid food wastage when monitoring temperatures.
- ✔ If using the temperature gauge of the equipment or the temperature of the water between cooking verification runs, **regularly check a sample of food to ensure the core of the food is reaching the required precise cooking temperature**.
- ✔ **Replace the water** in the waterbath between uses to **prevent** the risk of **cross contamination**.
- ✔ Calibrate all equipment that you use for sous vide regularly, as sous vide relies on **precise and accurate time and temperature readings**. Keep a record of the calibration results for your thermometer and timer.
- ✔ Use an **ice slurry** (half ice, half water) or a blast chiller to **chill the food rapidly**.
- ✔ When **alcohol** is used as an ingredient it **may cause the sealed pouch to balloon** and **float** which will **prevent the heat from penetrating** the food properly.
- ✔ **Ensure the temperature and processing time meets the requirements in this supplement** rather than referring to equipment manuals and other sources for recipes.
- ✔ Reheating or finishing food may include rapid processes other than sous vide, such as pan sear, grill, barbeque, braise or roast.
- ✔ **Label cooked sous vide portions with food details and shelf life dates** to ensure safe and efficient stock control.

The maximum shelf life of cooked sous vide food portions must not exceed 5 days when stored at refrigerated temperatures 5°C or less.

Table 1: The two categories of food cooked using the sous vide method in this supplement

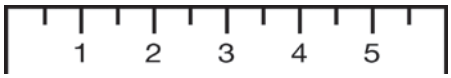
Based on the category definition, decide what category the high risk food you intend to cook belongs to. This will guide you on what method to use.

Category	1	2
Category definition	Foods other than whole muscle red meats or seafood that **must be cooked correctly to be safe to consume**.	Whole muscle red meats or seafood.
	Foods that must be cooked correctly to be safe to consume include: ✔ minced, diced or sliced meat, terrines or pates ✔ deboned, stuffed, formed or rolled meat or other processes where bacteria may be in the centre of a formed meat piece ✔ mechanically or needle-tenderised meat, or other similar processes, where potentially hazardous bacteria may have been moved or pushed into the interior of the meat by the tenderising process ✔ offal, such as tripe, kidney, liver or brains from any animal ✔ chicken, duck, quail or turkey meat. **Note:** It does not include foods that are safe to consume uncooked. Follow the safe food practices in your food safety program for foods such as diced vegetables, dairy foods and egg products.	It is an intact piece of red meat muscle from an animal, or an intact piece of seafood. For example, a T-bone or sirloin steak, kangaroo, wallaby or emu fillet, a leg of lamb, lamb shank, pork fillet or seafood such as a scallop or fillet of fish.
What tables must I use to work out the cooking time and temperatures?	**Use Table 2** in this supplement to work out the heating time required to bring the food up to cooking temperature based on the maximum thickness of the food. If you follow a procedure for this menu item, make sure the thickness of the food is consistent. Once the required time has been met for heating up, start the cooking stage. **Use Table 3** in this supplement to determine the minimum cooking time. Check that the core of the food is held at the specified cooking temperature for the required time. This is important to ensure any potentially hazardous bacteria in the food are destroyed.	**Use Table 3** in this supplement to work out the minimum cooking time the food must be cooked for. This is important to ensure any potentially hazardous bacteria on the surface of the food are destroyed. For this category only, the food does not need to cook through to the core.
Use tables:	**Table 2: Heating Time for different thicknesses of food** **+** **Table 3: Cooking Temperature and Time** **=** **Total cooking time required**	Table 3: Cooking temperature and time.

Table 2: Heating time for different thicknesses: Category 1 foods

Use this table for Category 1 foods to work out the heating time prior to starting cooking. The thickest part of the food must be used when referring to this table.

Thickness (cm)	Time (minutes)
0.5	5
1	19
2	50
3	90 (1hr 30min)
4	150 (2hr 30min)
5	210 (3hr 30min)
6	285 (4hr 45 min)



*not to scale

Table 3: Cooking temperature and time: Category 1 & 2 foods

Use this table to work out the cooking time for the food item (after the heating up time is completed from Table 2, if it is a Category 1 food).

Cook temperature °C	Minimum Time (minutes)	Notes
55	200 (3hr 20min)	**Total heating and cooking time must not exceed 6 hours (360 minutes) when these cooking temperatures are used.**
56	147 (2hr 27min)	
57	109 (1hr 49min)	
58	80 (1hr 20min)	
59	59 minutes	
60	44	
61	32	
62	24	
63	18	
64	13	
65	10	
66	7	
67	5	
68	4	
69	3	
70	2	
71	1 minute 30 seconds	
72	1 minute 05 seconds	
73	48 seconds	
74	36 seconds	
75	26 seconds	

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Supplementary records

Record 10: Cooking method

Record 11: Batch information

Record 10: Cooking method (example)

Complete this record as you add or remove items or modify procedures for food on your menu.

Menu Item	Food Category (1 or 2 – see page 12)	Cooking temperature (55–75°C)	Maximum thickness of food	Heating time to core temperature for Category 1 foods		Cooking time based on cooking temperature (Table 3)		Total time required	Cooling time to reach 5°C or below*	Food will be reheated (Yes/No) Reheat food rapidly to at least 55°C and do not exceed 4 hours reheating between 55–60°C
Rolled Chicken breast	1	64°C	3 cm	1 hr 30 mins	+	13 mins	=	1 hr 43 mins	N/A	No
Salmon fillet	2	60°C	N/A	N/A (this is a category 2 food)	+	44 mins	=	44 mins	55 mins in Coolroom 1	Yes, for up to 4 hours at 60°C then serve immediately or throw in the bin.
Beef burger	1	55°C	2cm	50 minutes	+	3 hr 20 min	=	4 hr 10 mins	45 mins in ice bath	Yes, for up to 4 hours at 55°C then serve immediately or throw in the bin.
Kangaroo fillet	2	56°C	N/A	N/A (this is a category 2 food)	+	2 hr 27 min	=	2 hr 27 min	35 mins in ice bath	Yes, for up to 4 hours at 56°C then serve immediately or throw in the bin.

*The cooling step is critical to keeping the food safe. Spores of bacteria can grow during this stage, and produce toxins that are not destroyed by reheating and may cause food poisoning.

All food must be cooled from 60°C (or less) to 21°C within 2 hours, and from 21°C to 5°C within a further four hours; a total of 6 hours.

Procedures	
Menu item	**Procedure (include any finishing off of the food such as sear in pan)**
E.g. Rolled Chicken breast **Category 1**	1. Slice uncooked rolled chicken breast portions 3 cm thick from frozen. 2. Package and vacuum seal individually. 3. Defrost overnight in fridge. 4. Check water is at 64°C. 5. Add a maximum of 10 bags per waterbath. 6. Cook in waterbath at 64°C for a minimum 1 hour and 43 minutes – remember to set timer! 7. Hold hot in the waterbath at 64°C. 8. Discard any portions left in waterbath at end of service.
E.g: salmon fillet **Category 2**	1. Single serve chilled raw salmon pieces are individually packaged with 1 tablespoon of butter and sage. 2. Seal and make sure air is removed. 3. Check water is at 60°C. 4. Cook in waterbath at 60°C for a minimum 44 minutes – remember to set timer! 5. Cool in Coolroom 1 in single layers on top shelf for at least 55 min. 6. Label with today's date. 7. Reheat in waterbath at 60°C for up to 4 hours, no more than 5 bags per waterbath. 8. Remove from package. 9. Pan sear prior to serving. 10. Discard any portions left in the waterbath after 4 hours.
E.g. beef burger **Category 1**	1. Package two burgers per pack, side by side and measure each is 2cm thick. 2. Seal and make sure air is removed. 3. Check water is at 55°C. 4. Add a maximum of 10 bags per waterbath. 5. Cook in waterbath at 55°C for 4 hours and 10 minutes – remember to set timer! 6. Cool in ice bath for at least 45 min, label with today's date and stored in Fridge 1. 7. Reheat in waterbath at 55°C for up to 4 hours, with no more than 10 bags per waterbath. 8. Remove from package. 9. Pan sear prior to serving. 10. Discard any portions left in the waterbath after 4 hours.
E.g. Kangaroo fillet **Category 2**	1. Package fillet individually with marinade. 2. Seal and make sure air is removed. 3. Check water is at 56°C. 4. Cook in waterbath at 56°C for a minimum 2 hours and 27 minutes – remember to set timer! 5. Label with today's date. 6. Cool in an icebath 1 for at least 35 min. 7. Reheat in waterbath at 56°C for up to 4 hours, no more than 5 bags per waterbath. 8. Remove from package. 9. Pan sear prior to serving. 10. Discard any portions left in the waterbath after 4 hours.

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Record 10: Cooking method

Complete this record as you add or remove items or modify procedures for food on your menu.

Menu Item	Food Category (1 or 2 – see page 6)	Cooking temperature (55–75°C)	Maximum thickness of food	Heating time to core temperature for Category 1 foods		Cooking time based on cooking temperature (Table 3)		Total time required	Cooling time to reach 5°C or below*	Food will be reheated (Yes/No) Reheat food rapidly to at least 55°C and do not exceed 4 hours reheating between 55–60°C
					+		=			
					+		=			
					+		=			
					+		=			

*The cooling step is critical to keeping the food safe. Spores of bacteria can grow during this stage, and produce toxins that are not destroyed by reheating and may cause food poisoning.

All food must be cooled from 60°C (or less) to 21°C within 2 hours, and from 21°C to 5°C within a further four hours; a total of 6 hours.

Continued on next page

Procedures	
Menu item	Procedure (include any finishing off of the food such as sear in pan)

Record 11: Batch information (example)

Use this record to check monthly the cooking method for at least two menu items to demonstrate how you keep food safe.

Date	Food item	Food thickness (Category 1 food only)	Time taken to heat up	Cook temperature and time (Category 1 food – measure the core temperature, Category 2 food – measure the water bath temperature)	Cooling – time taken to reach less than 5°C* Chill food rapidly	If any adjustments or actions are required, write down what these are. Make sure Record 1 is up to date if you make changes to the cooking method
22/10/2014	Rolled Chicken breast	3cm	1hr 30 min	**Category:** 1 **Temp:** 64°C **Cook Time:** 13 min **Time total:** 1 hr 43 min	No cooling, served after cooking	None.
24/10/2014	Beef burger	2cm	50 min	**Category:** 1 **Temp:** 55°C **Cook Time:** 3hr 20 min **Time total:** 4hr 10 min	45 min in icebath reaches 3°C	None.
05/11/2014	Salmon fillet	N/A	N/A	**Category:** 2 **Temp:** 60°C **Cook Time:** 44 min **Time total:** 44 min	55 minutes in Coolroom 1 to reach 5°C	Yes, 10 minutes added to cooling time when using Coolroom 1.
11/11/2014	Kangaroo fillet	N/A	N/A	**Category:** 2 **Temp:** 56°C **Cook Time:** 2hr 27 min **Time total:** 2hr 27 min	35 min in icebath reaches 4°C	None.

*All food must be cooled as a minimum from 60°C (or less) to 21°C within 2 hours, and from 21°C to 5°C within a further four hours; a total of 6 hours.

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Record 11: Batch information

Use this record to check monthly the cooking method for at least two menu items to demonstrate how you keep food safe.

Date	Food item	Food thickness (Category 1 food only)	Time taken to heat up	Cook temperature and time (Category 1 food – measure the core temperature, Category 2 food – measure the water bath temperature)	Cooling – time taken to reach less than 5°C* Chill food rapidly	If any adjustments or actions are required, write down what these are. Make sure Record 1 is up to date if you make changes to the cooking method
				Category: Temp: Cook Time: Time total:		
				Category: Temp: Cook Time: Time total:		
				Category: Temp: Cook Time: Time total:		
				Category: Temp: Cook Time: Time total:		

*All food must be cooled as a minimum from 60°C (or less) to 21°C within 2 hours, and from 21°C to 5°C within a further four hours; a total of 6 hours.