

HOUSE RULES

TEMPERATURE CONTROL

The House Rules Section contains 6 sub-sections each of which covers a particular subject of food safety management.

Every House Rule sub-section begins with guidance and then provides advice on how to write your own House Rules.

A template is then provided for use when writing the House Rules.

Your House Rules should reflect your current safe working practices on the 6 food safety subject areas covered in this manual.

WHAT YOU NEED TO DO

- Read the guidance provided at the beginning of this sub-section
- Draw up your own House Rules describing how you intend to manage temperature control in your business
- Once you have completed all your House Rules, remember to update your Action Plan

Think about the temperature control practices that you already have in place. It is possible that you will simply have to write these down to produce your Temperature Control House Rules.

THE TEMPERATURE CONTROL HOUSE RULES ARE AN ESSENTIAL COMPONENT OF YOUR HACCP BASED SYSTEM AND MUST BE KEPT UP TO DATE AT ALL TIMES

HOUSE RULES TEMPERATURE CONTROL

This sub-section will give you guidance on Temperature Control. At the end of the sub-section you will be asked to write your own House Rules to show how you manage Temperature Control in your business.

The control of food temperature during storage, cooking, cooling and re-heating is a key control in a HACCP system. In this section you will be given temperature control examples for typical processes found in a butchers' shop. By the end of the section you will be able to set your own Critical Limits and choose an appropriate method of Monitoring, establish Corrective Actions, use Verification methods and select supporting documentation.

HAZARDS (What can go wrong)

Microbiological Growth – Harmful bacteria are a hazard present in many foods handled in food businesses. If these bacteria are not controlled they may multiply to dangerous levels and cause food poisoning. In some cases, it is not the bacteria that cause food poisoning but the toxins produced by the bacteria.

Microbiological Survival – If harmful bacteria or their spores survive a cooking process they can multiply to dangerous levels during cooling and storage. It is important to be aware that even a very low number of harmful bacteria such as *E. coli* O157 can cause food poisoning.

CONTROLS (How you can prevent or eliminate the hazard)

Bacteria survive and multiply given favourable temperature conditions. The aim of temperature control is to prevent the conditions that allow this to happen and this is achieved by:

1. **Keeping food cold** – low temperatures stop or slow down the multiplication of bacteria.
2. **Cooking/hot holding food** – high temperatures destroy bacteria.
3. **Cooling food quickly** – cooling quickly minimises the time that food is held at temperatures that allow bacteria to multiply.

CRITICAL LIMITS (Specified safety limits)

You need to set Critical Limits when using Butcher**Safe**. Critical Limits will vary depending on the process, for example, during chilled storage this will be a defined temperature limit such as 5°C or the Critical Limit for cooking meat may be 75°C. A Critical Limit must never be breached otherwise food safety will be compromised.

MONITORING (Checking your Control Measures)

When using HACCP based procedures, you are required to check that your Critical Limits are being met. This checking is referred to as **Monitoring**. The most reliable method of monitoring temperatures is by using a digital probe thermometer.

What are the key temperature controls?

Process Step	Temperature Control Measure/Critical Limit
Delivery	<ul style="list-style-type: none"> Accept chilled food at your specified temperature, e.g. 5°C or below Accept frozen food at your specified temperature, e.g. -18°C or below
Storage	<ul style="list-style-type: none"> Store chilled food at your specified temperature, e.g. 5°C or below Store frozen food at your specified temperature, e.g. -18°C or below
Preparation	<ul style="list-style-type: none"> Keep ready-to-eat food within the refrigerator until required, then prepare and handle without delay Thoroughly defrost all frozen food prior to cooking or reheating (unless specified otherwise by the food manufacturer)
Cooking	<p>To cook meat and meat products safely to ensure that food poisoning bacteria such as <i>E. coli</i> O157 and <i>Salmonella</i> have been destroyed, the centre of the meat should ideally reach at least 75°C.</p> <p>There are lower temperature Critical Limits which may be applied. However, these require that food is held for a longer time at the target temperature. <i>Please refer to the Cooking Guidance which follows this table.</i></p>
Cooling	<p>Active cooling should start within 90 minutes of the end of cooking. The aim is for food to be cooled to 5°C as quickly as possible. With the exception of the cooling of small volume meat products, it may be difficult to achieve this target quickly enough unless a blast chiller is used.</p> <p>Whatever method is used, it is important that food passes through the temperature danger zone (from 63°C to 5°C) as quickly as possible. <i>Please refer to the Cooling Guidance which follows this table.</i></p>
Reheating	<p>Food being reheated or cooked for a second time as part of the production process must be thoroughly heated until the core temperature is 82°C or above. This includes the final cook of potted meat, firing of pies and roasting of meats after boiling</p>
Sale to customers	<p>Cold Display Chilled food being displayed cold should be kept under refrigeration at your specified temperature, e.g. 5°C or below, until sold</p> <p>Hot Display/Hot Holding All food held hot, prior to sale, must be kept at above 63°C. This food should be placed in appropriate equipment, for example, a preheated hot cabinet, as soon as possible after cooking or reheating</p>

These key temperatures are referred to as 'Critical Limits'. There may be alternative Critical Limits which are more suitable for you. The Critical Limits that you choose must be sufficient to ensure that the food is safe to eat. For further advice, contact your Enforcement Officer.

COOKING GUIDANCE

It is crucial that cooking is done safely, regardless of the type of food being cooked or the cooking method used. Any item of equipment used to cook food must be suitable and be capable of enabling the food temperature to reach the specified Critical Limit. Cooking equipment typically used by butchers includes ovens, steamers, boilers and pots.

Validating Cooking Temperature/Time

Ideally, all meat and meat products should be cooked to a core temperature of at least 75°C to ensure food safety.

However, you may choose to use an alternative cooking temperature which is lower than 75°C. In this case, the food must spend a longer period of time at this temperature, this is known as a "temperature/time combination". Two examples of validated alternative temperature/time combinations are:

- 65°C for 10 minutes
- 70°C for 2 minutes

Warning: These temperature/time combinations are known to be equally effective in destroying bacteria as cooking food to 75°C and have been validated by scientific research.

To use any alternative temperature/time combination, especially if your temperature is lower or time shorter, you must firstly validate the method i.e. prove it to be safe. This will require expert scientific advice from an accredited food laboratory.

Cooking temperatures/times in butcher's shops tend to exceed the combinations listed above. This information is provided as a guide to the **absolute minimum** only.

Note: Should you wish to use a Critical Limit other than those listed above, you should discuss this with your Enforcement Officer.

Monitoring where the cooking Critical Limit is below 75°C

When using a validated cooking temperature/time where the temperature is less than 75°C, it may be necessary to monitor and record the temperature twice to ensure that the food was held at the required temperature for the specified time. For example, cooking at 65°C for 10 minutes would require the actual time 65°C was reached to be recorded and also the time and temperature after a ten minute period, to confirm that 65°C was maintained for the 10 minute period.

Where meat is cooked at temperatures above 70°C, e.g. 75°C for 30 seconds, the time factor becomes less important and only requires a single temperature reading to confirm that the Critical Limit has been met.

Monitoring of Batch Cooking

Batch cooking is where several similar products are cooked together as part of the same cooking operation, for example a set number of meat joints in the same boiler for the same time period. Batch cooking monitoring involves using a digital probe thermometer to check the core temperature of the largest piece of meat, to ensure that the Critical Limit has been met.

Monitoring of Overnight Boiler Cooking

This type of cooking process should be timed so that staff are on site at the end of the cooking period to allow the final cooking temperature to be monitored. The core temperature of the largest piece of meat should be checked using a digital probe thermometer to ensure the Critical Limit has been met. If staff are **not** on site at the end of the cooking period an alternative method of monitoring the cooking temperature should be used, such as a calibrated thermograph or data logger.

Monitoring when using Cooking Bags

When cooking in a boiler many butchers place large meat joints and diced meat into sealed bags. Temperature monitoring is still vitally important to ensure that the Critical Limit has been met. Some types of bags can be opened to allow temperature monitoring to take place and then resealed for further cooking or cooling. However, if the bag cannot be resealed after opening, it should be pierced by a probe thermometer and then placed inside a second bag which is then sealed before subsequent heating or cooling.

Monitoring of Reheating and Hot Holding

Where food is reheated and sold hot, make sure that the core temperature is raised to a minimum of 82°C. If the food is not sold immediately, it may be transferred to a hot holding cabinet. The temperature of the food in the hot holding cabinet should be monitored to ensure it is being held above 63°C.

Liquid Food Checks

The temperature of food may vary throughout, especially during cooling and heating of liquid food, such as pie filling. Stir liquid food before probing, to ensure adequate distribution of heat.

Cooker Thermostats

Certain types of cooking equipment, such as ovens and boilers, rely on an integral thermostat to regulate the cooking temperature. It is important to recognise that the thermostats may lose accuracy resulting in the temperature inside the oven or boiler not matching the setting on the control panel. Regular checks using an oven thermometer should be carried out to verify the accuracy of the thermostat.

Validating and monitoring cooking without probing

The use of a probe thermometer may not be appropriate when monitoring the temperature of standard sized products cooked in their skins, such as puddings. The following procedure will enable the process to be validated and then monitored without probing and damaging products:

1. Decide upon the Critical Limit i.e. the core temperature to which the food should be cooked,
2. Follow the preferred cooking method, for example the temperature of the water and the time period that the water should be at this temperature,
3. Probe a sample of the largest item being cooked. If the Critical Limit has been met, the cooking process has been validated (If the Critical Limit has not been met, extend the cooking time and probe again),
4. Repeat the preferred cooking method for all subsequent batches, monitoring the water temperature and cooking time on each occasion.

If this cooking method is followed every time, only occasional probe monitoring of the puddings will be required to verify that the process remains effectively controlled. You should consult your Enforcement Officer for further information on this method.

Here is an example of Validation of cooking without probing

Date	Product details including Product type/weight/ batch size/ equipment used and equipment settings	Time water started boiling	Time/temperature checks to achieve critical limit	Signature
1/9/13	<p><i>Cooking standard batch of 20x3lb black puddings in a boiler containing 75 litres of cold water.</i></p> <p><i>Product placed into boiling water.</i></p> <p><i>Equipment used/settings: Talsa 150 litre electric boiler (oil jacket) set at 105°C</i></p>	8.35am	<p><i>9.15am/54°C</i></p> <p><i>9.30am/65°C</i></p> <p><i>9.41am/72°C</i></p> <p><i>9.45am/74°C</i></p>	Alex

COOLING GUIDANCE

The cooling of food is of critical importance and must be carried out safely. Most types of food poisoning bacteria multiply fastest when food is within the “Danger Zone” (from 63°C to 5°C) it is vital that food is cooled as quickly as possible. There are different methods of cooling and the overall time taken to cool depends on the food’s nature, density and size as well as the type of equipment used. Remember to protect food during cooling.

METHODS OF COOLING

Blast Chilling

It is strongly recommended that a blast chiller is used, although this may not be feasible for some businesses. This is an effective method of cooling hot food quickly and reducing the risk of bacterial growth during the cooling process. Remember to always follow the manufacturer’s instructions.

Cooling small items such as pies and potted meat

Cool for no longer than 90 minutes at ambient temperature, then place into chilled storage.

Cooling of stews and mince

Protect the cooked product within a sealed bag and immerse in a container of cold or iced water of drinking quality.

Cooling puddings

Cool by placing directly into a container of cold or iced water of drinking quality.

Cooling Joints of Meat

Due to their size and density, large joints of meat are more difficult to cool unless a blast chiller is available. However, cooling can still be carried out safely as long as specific temperatures are reached within specified time limits. Protect the cooked product in a sealed bag and immerse in a container of cold or iced water. The table below provides additional guidance on safe cooling of cooked joints of meat

UNCURED JOINTS OF MEAT e.g. Roast Pork		
Cooling Time (hours)	Good Practice	Maximum
To 50°C	1 Hour	2 ½ Hours
50°C to 12°C	6 Hours	6 Hours
12°C to 5°C	1 Hour	1½ Hours
Total Time to 5°C	8 Hours	10 Hours
CURED JOINTS OF MEAT e.g. Hams		
Cooling Time (hours)	Good Practice	Maximum
To 50°C	1¼ Hours	3¼ Hours
50°C to 12°C	7½ Hours	7 ½ Hours
12°C to 5°C	1¼ Hours	1¾ Hours
Total Time to 5°C	10 Hours	12½ Hours

Validation of Cooling

Regardless of which method of cooling is used, you must always validate the cooling process and be aware of the temperature profile of your products as they go through this process.

Validation is an exercise used to identify a repeatable safe cooling method.

1. Test your preferred cooling method by carrying it out under normal circumstances, for example placing the container directly into cold or iced water.
2. Check the core temperature of a sample item of each food to ensure that the rate of cooling complies with the time and temperatures targets you have set. For cooked joints of meat, aim to satisfy the limits in the cooling table on the previous page.
3. If the method is successful, state the method in your House Rules at the end of this sub Section. This is now your validated cooling method for this product.
4. If the method does not cool the food rapidly enough, repeat the process making changes such as reducing the size of joints or changing the cooling method.

Warning: In order to ensure that you continue to operate safely, you must adhere to the validated method exactly. This includes the quantity and weight of the product cooled for the given time.

Here is an example of Validation of a Cooling Process for a joint of meat.

Date	Product Type & weight of joint	Cooling method	Time Out of cooker	Core temperature out of cooker	Time/ temperature checks to achieve critical limit	Signature
11/9/13	Boiled beef xx Kg	Remove from the boiler, cool for 30 minutes at ambient. Place in ice/ water for 2 hours. Top up ice every 30 minutes and place in the fridge at 5°C	12 noon	75°C	1.30 pm/50°C 5 pm/12°C 6.15pm/5°C	Alex

Note: If after cooking, the joints are roasted to create a superficially “roasted” effect, the cooling time is the total time the joint spends above 5°C after the initial cook.

If there is a significant quantity of untreated herbs and spices in a product, the above cooling times may not be applicable due to the high spore count commonly found in herbs and spices. For example the product may need to be cooled to 5°C or below within as short a time as 3 hours. You should discuss this with your Enforcement Officer.

Whatever temperature control method is being used, it is essential that the Critical Limit is not breached. However, this does not mean that every item of food subject to temperature control needs to be monitored using a thermometer every time. **You must determine your methods of temperature monitoring in your House Rules.**

COLD STORAGE AND DISPLAY

Refrigerators, Chills and Display Cabinets

Refrigeration temperatures must be controlled to minimise microbiological growth. Do not over-stock refrigeration units because proper air circulation is essential for effective temperature control. Make sure the refrigerator is regularly maintained and cleaned to ensure maximum efficiency, especially during warmer weather. Don't switch off chills, refrigerators or display cabinets containing food to save on electricity costs.

Monitoring of Cold Temperatures

- It is advisable to check all refrigerator, chill and cold display cabinet temperatures twice a day, once at the start of the working day and at some other time of the day.
- Temperatures in refrigerators and display cabinets vary at different points within the unit depending on the air circulation and efficiency of the unit. Always monitor the temperature at the warmest part of the unit.
- Air temperatures fluctuate so avoid checking the temperature of refrigerators, chills and cold displays immediately after the door or lid has been open for any significant period of time or during a defrost cycle.
- When relying on an electronic display for temperature monitoring, be aware that the reading refers to the air temperature where the probe is located so may not provide an accurate indication of food temperature. You should always back this up with an actual food reading or food simulant reading e.g. bottle of water or food gel.

Thermometers

The simplest way to check food and air temperatures is by using a digital probe thermometer. This may be supplemented by additional "in-place" thermometers located in refrigerators, chills and cold display cabinets.

Thermometers and Temperature Monitoring – Good Practice

Have two separate, identifiable probe thermometers, one for raw food and the other for ready-to-eat food to reduce the risk of cross contamination.

When monitoring the core temperature of large meat products, the probe must be long enough to reach the centre of the product.

Thermometers should always be kept clean and should be disinfected before and after each use. Both the body of the unit and the probe should be kept clean.

Check that your thermometer is working correctly by taking a reading in iced water – readings should be between -1°C and +1°C. Similarly, take a reading in boiling water – readings should be between 99°C and 101°C. If your reading is outside these temperature ranges, the unit should be replaced or returned to the manufacturer to be re-calibrated.

Never use a mercury-in-glass thermometer because breakage would present a contamination risk.

WHAT YOU NEED TO DO NOW

To effectively manage the temperature control part of your HACCP based system, use the information in this sub-section for guidance, go to the end of this sub-section and write your House Rules.

How to draw up your Temperature Control House Rules

Consider the various Temperature Control procedures that are followed in your business.

Write down the Temperature Control measures applied at each process step and include a Critical Limit. Guidance on suitable Critical Limits can be found at the start of this sub-section.

- Write down how you will monitor temperature control – the procedure, frequency and the recording form you intend to use.
- Validate your cooking methods for products that will not be probed at the end of cooking.
- Validate the cooling method of products which rely on temperature/time combinations to ensure thorough cooking rather than a core temperature check.
- Validate your cooling method for large volume meat products, such as large joints of meat and bags of stew.
- You need to validate cooking and cooling methods once for each product and write the details down in the table at the end of this sub-section.

Here is an example of how you could write your House Rules

Process Step	Temperature Control Measure and Critical Limits	Monitoring Method, Frequency and Records used
Cooking items to be probed	<i>75°C or above</i>	<i>The largest item will be probed per batch, at the thickest part of the food. Recorded on the 'All in One' record.</i>
Cooking items NOT to be probed	<i>Cook for 1 hour in boiling water as per validated procedure</i>	<i>Water kept boiling throughout the cooking process - the time is monitored and recorded on the 'All in One'</i>

Monitoring and Recording

You must carry out suitable monitoring to ensure that your Temperature Control House Rules are implemented at all times. Any failure to adhere to these Rules should be considered to be a **very serious matter** and must trigger Corrective Action to prevent the supply of unsafe food.

Corrective Action (What to do if things go wrong)

Corrective Action should be predetermined and written into your House Rules. Examples include:

- Continue cooking until the Critical Limit is achieved.
- Revise your temperature/time combination for a specific product.
- Call a maintenance engineer to repair defective equipment.

Corrective Actions should be recorded in the **All-in-One** record or in the **Individual Temperature** records. This will help you to ensure that any failure is not repeated and demonstrate that no unsafe food was supplied.

Records of monitoring and any Corrective Action(s) taken should be kept for an appropriate period of time to demonstrate that your HACCP based system is working effectively.

Action Plan

Once you have completed all your House Rules, remember to update your Action Plan.

The Temperature Control House Rules are an essential component of your HACCP based system and must be reviewed and kept up to date at all times. Your House Rules need to be written to accurately reflect how you run your business.

HOUSE RULES TEMPERATURE CONTROL

Enter a statement of your House Rules in the table below. Please note: The Cooking and Cooling process steps require details of validation. The validation tables follow this House Rule.

Process Step	Temperature Control Measure and Critical Limits	Monitoring Method, Frequency and Records used
Delivery		
Refrigerated storage (refrigerators/chills)		
Frozen storage		
Preparation (Including defrosting)		
Cooking		
Cooling		
Reheating		
Sale to customers (Cold and hot display cabinets)		

My Corrective Actions

-
-
-
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Signed Date

Position in the business

The Temperature Control House Rules are an essential component of your HACCP based system and must be kept up to date at all times.

Now write your Validation COOKING procedures in the table below.

Note: This is a one-off activity

Date	Product details including product type/weight/ batch size/ equipment used and equipment settings	Time water started boiling	Time/temperature checks to achieve critical limit	Signature

Now write down your validation of COOLING procedures in the table below.

Note: This is a one-off activity

Date	Product Type & weight of joint	Cooling method	Time Out of cooker	Core temperature out of cooker	Time/ temperature checks to achieve critical limit	Signature