Food Safety Workbook for Farmhouse Cheesemakers







This workbook is a joint project between
the **Food Safety Authority of Ireland** and **Teagasc**

In cooperation with

Food Safety Authority of Ireland

Teagasc
Agriculture and Food Development Authority

CÁIS

An Roinn Gnóthaí Pobail, Comhionannais agus Gaeltachta
Department of Community, Equality and Gaeltacht Affairs

HACCP/Food Safety Workbook for Farmhouse Cheesemakers

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01 Introduction

This workbook has been produced to assist farmhouse cheesemakers meet their legal obligation to develop and implement a food safety management system based on the principles of HACCP (Hazard Analysis and Critical Control Point), also referred to as HACCP-based procedures. It recognises that such an approach must be underpinned by good hygiene practices. The workbook takes a step by step approach to describing and recording individual operations in cheesemaking, from raw material production/purchasing through to the storage and dispatch of cheese. It will help you to identify and control hazards associated with your operations and to verify that you are controlling these hazards.

OBJECTIVE

To enable farmhouse cheesemakers to use this workbook to develop and implement their own HACCP-based procedures for the manufacture of cheese in compliance with food law.

HACCP-BASED PROCEDURES

The majority of food safety hazards are controlled by adhering to good cheese making practices and by ensuring good structural, operational and personal hygiene. Structural, operational and personal hygiene are referred to as prerequisite hygiene requirements, e.g. condition and upkeep of premises, pest control, cleaning and maintenance etc.
(For more details, see Section 4. Prerequisites Hygiene Requirements).

A food safety hazard is a:

- Biological agent, e.g. *Salmonella* species
- Chemical agent, e.g. antibiotic residue
- Physical agent, e.g. piece of metal
  (with the potential to cause adverse health effects)

HACCP is used to identify food safety hazards and the steps in your process which are critical to control and monitor so as to ensure safe food. These steps in your process are referred to as Critical Control Points (CCPs). In simple terms, HACCP involves:

- Identifying what can go wrong
- Planning to prevent/control it
- Checking that you are doing what you planned to do

02 How to Complete and Implement this Workbook

1. Fill in the management commitment box below
2. Give details of your business in **Section 3**
3. Ensure that you are implementing the prerequisite hygiene requirements in **Section 4**
4. In **Section 5:**
   - *Identify the steps in your business*
   - *Identify the hazards and suggested controls relevant to each of these steps*
   - *Identify the CCPs by answering the questions on page 52 and completing the table on page 54*
5. Fill in the Declaration of Completion on page 59.
6. Implement the controls and keep the records you have identified.
7. Regularly check that control is being maintained.
8. Review workbook annually or whenever there is a change in your business, e.g. new recipe, new equipment, extension/alterations etc, that is likely to affect food safety.

MANAGEMENT COMMITMENT

The following personnel are responsible for developing, implementing and maintaining the HACCP-based procedures:

Business owner(s) and those having management or supervisory responsibilities
Name
Position
Name
Position
Name
Position
Others: (if appropriate)

03 Business Details

Identification Mark	

Manufacturing Address	
Tel	Email

Milk and cheese premises	Cheese made **using own** milk Tick as relevant	**Cheese made using bought in milk** Tick as relevant
Milking animals on same site as cheese production		Not Relevant
Milk cooling, e.g. plate cooler, bulk tank, in-churn cooler. **Please specify:**		
Milk transport system, e.g. mobile tank, piped, churn **Please specify:**		
Cheese making - near/in the vicinity of farm facilities, e.g. animal buildings, slurry store, dungsted, silage pit etc. **Indicate Yes or No:**		
Cheese storage - near/in the vicinity of farm facilities, e.g. animal buildings, slurry store, dungsted, silage pit etc. **Indicate Yes or No:**		

Staff *	
Total number of staff involved	
Cheese activities only	
Milking only	
Joint livestock and cheese activities	

*** Note**
A sample staff responsibilities/ duties record is given on page 56.

Water Tick as relevant	
Type of supply	Mains supply ☐ Public group scheme ☐ Private group scheme ☐ Private supply, e.g. well or borehole ☐
On site system protection	Ultraviolet ☐ Chlorination ☐ Filter ☐ No on-site treatment ☐ Storage facilities adequately protected ☐

Livestock Details

For completion only where own milk is used to make cheese

Animals	Cow	Goat	Sheep	Guidance
Herd or flock size				i.e. approx. average (excluding young stock)
Herd/flock mainly self contained				i.e. replacements normally on-farm reared
Bought in stock known source				i.e. replacements from known source
or Bought in stock open market				i.e. replacements from dealer or market
Other livestock on site, e.g. poultry, horses etc				

Animal Health and Animal Remedies

Only milk from animals meeting the legislative health, treatment and processing requirements set out in Appendix 1 is used for cheese production.
Indicate Yes or No: _____

Note
The following is a recommendation from a Food Safety Authority of Ireland report on tuberculosis –
["Milk intended to be consumed, or to be further processed, without prior heat treatment, i.e. pasteurisation or equivalent heat treatment, should come from registered herds or flocks that are subject to an official tuberculosis control plan. In the case of cattle, the control plan should include herd inspection and herd testing for tuberculosis every six months to minimise the risk of delay in detecting infected animals. Likewise, goat herds and sheep flocks kept for milk production should be subject to an official tuberculosis control plan that addresses public health concerns in terms of food safety."]

Other non-statutory policies/controls (if appropriate) e.g. testing for pathogens, vaccination etc

Product(s) Description and Other Information

Cheese name				
Generic type of production, e.g. fresh, soft, mould-ripened, smear-ripened, hard, animal species, i.e. cows, goats or sheep				
Raw/lower heat treatment than pasteurisation (please specify time and temp_____)/pasteurised milk				
Own or bought in milk or both				
Age at maturity				
pH				
Moisture content and/ or available water (a_w), where available				
Salt content				
Added ingredients, e.g. herbs, seaweed, fruit etc. or process, e.g. smoking				
Shelf-life				
Production level, i.e. approx % of overall production				
List the intended use(s), e.g. (a) ready for consumption; (b) further maturation; (c) for cheese processing; (d) as an ingredient; (e) and/or other (please specify)				

Supplier List

Supplies	Name and address of supplier(s)
Bought in milk or curd	
Starter	
Rennet	
Other cultures, e.g. mould, smear etc	
Herbs/spices	
Salt/brine	
Packaging and processing materials in contact with the cheese, e.g. wax, cloth, moulds, smoke, ink labels, bags, boxes etc. Note: All materials, including packaging, should be in compliance with food law.	
Cleaning products, sterilisers and disinfectants Note: All products should be suitable for use in food premises.	
Other, e.g. acid for altering pH of brine Acidity regulators should be compliant with EU legislation	

Note: The product specifications should be maintained for all ingredients purchased and all materials used should be in compliance with EU legislation

04 Introduction

Hygienic premises and staff practices form the foundation of your HACCP-based procedures. These are known as prerequisite hygiene requirements and will control the majority of hazards that you encounter in your business.

The following tables detail the typical structural, operational, and personal hygiene controls which should be in place in a cheesemaking premises. In Section 5 (HACCP), you will identify hazards specific to each step in the cheesemaking process.

HOW TO COMPLETE THIS SECTION

Work through each table in this section and tick the controls that you have in place. If you identify something you aren't doing or should be doing differently or better, list it in the table on page 22 and set a deadline for introducing it into your premises/operations.

Premises, Equipment, Facilities, Services, and Maintenance

What can go wrong	Control Measure	Tick if measure is in place
Inadequate or poorly designed, sited, constructed or maintained **premises, equipment, facilities, maintenance and services** can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination	**Premises** • The premises are sited and designed in a manner which prevents contamination from the surrounding environment • The space is big enough and suitably laid out to allow hygienic operations *(Note: it is recommended that you draw a floor plan of the work flow in your premises. See sample floor plan on page 23)* • The walls, floors and ceilings are maintained in a sound condition and are easy to clean and where necessary, to disinfect • Rooms have suitable ventilation to prevent moisture build-up • The premises are maintained in good repair • If the farm facilities, e.g. animal buildings, slurry store, dungsted, silage pit etc, are adjacent to the cheese room, there are controls in place to prevent contamination, e.g. via drains	☐ ☐ ☐ ☐ ☐ ☐
	Equipment and utensils • Constructed of smooth, corrosion resistant and non-toxic materials • Installed in a manner that allows adequate cleaning including surrounding areas • Capable of being effectively cleaned, disinfected (as appropriate) and maintained • Arrangements exist for the correct storage and protection of equipment and utensils between use • Equipment which requires calibration is regularly calibrated, e.g. pH meter, thermometer, temperature control of the pasteuriser etc	☐ ☐ ☐ ☐ ☐

What can go wrong	Control Measure	Tick if measure is in place
Inadequate or poorly designed, sited, constructed or maintained **premises, equipment, facilities, maintenance and services** can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination	**Facilities** • Adequately ventilated hygienic facilities, i.e. toilets, wash-hand basin supplied with hot and cold water, materials for cleaning hands, hygienic hand drying facilities and an area to change and store clothes, are available and properly maintained • Adequate facilities for storage of cleaning agents and disinfectants	☐ ☐
	Services • An adequate and protected water supply of potable quality is available • Clean air circulation unit, e.g. humidifier	☐ ☐
	Maintenance • The premises, equipment, facilities and services are maintained in good repair	☐

Personal Hygiene

What can go wrong	Control Measure	Tick if measure is in place
Poor **personal hygiene** can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination	**Ensure that staff:** • Do not move between external areas (especially livestock areas) and production areas without changing protective clothing, footwear and washing hands	☐
	• Wash hands when entering any production area and before handling milk or cheese	☐
	• Wash hands after visiting the toilet, eating/drinking or handling waste or dirty items	☐
	• Ensure that gloves (if used), are used appropriately and do not become a source of contamination	☐
	• Wear clean protective clothing and hair coverings	☐
	• Leave personal items, e.g. phones, keys, music players etc, outside the processing area	☐
	• Do not wear jewellery	☐
	• Ensure that fingernails are cut short and clean	☐
	• Report illness such as food poisoning, gastric problems, coughs/colds etc.	☐
	• Do not handle food if they have vomiting and/or diarrhoea or if they are in doubt about personal illness	☐
	• Cover cuts and sores	☐
	• Refrain from unhygienic habits which could contaminate milk or cheese, such as:	
	- Coughing, sneezing over or near products	☐
	- Touching your mouth, nose, ears or hair whilst working	☐
	- Eating, drinking	☐
	• Ensure that only authorised visitors enter the premises, wear suitable protective clothing and are not left unattended	☐

Staff Training and Supervision

What can go wrong	Control Measure	Tick if measure is in place
Insufficiently **trained or supervised staff** can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination	• Receive training and/or instruction to ensure that they have sufficient understanding of food safety/food hygiene to enable them to carry out their duties in a hygienic manner • Who are responsible for the development of this workbook understand the principles of HACCP • Are regularly supervised to ensure that they implement hygienic practices • Keep records of formal, e.g. external course, and informal, e.g. in-house or on the job, training are kept *(see example of staff training record on page 25)* **Note** Details of the skills food handlers should have are outlined in the FSAI Training Guides – Level 1 Induction Skills; Level 2 Additional Skills and Level 3 Food Safety Skills for Management	☐ ☐ ☐ ☐

Cleaning and Disinfection

What can go wrong	Control Measure	Tick if measure is in place
Poor quality water, inadequate **cleaning and/ or disinfection** can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination	• Operate a clean as you go policy • Use a cleaning schedule to identify the items that should be cleaned: - Throughout the day/daily/weekly/monthly (see page 24 for an example of a cleaning schedule) **Premises** Ensure that: • Any soiling, debris or waste is cleared away promptly • Floors are regularly brushed and washed down • Drains are kept clean and free from blockage and disinfected at intervals • Soiling of walls or fittings are cleaned promptly • At the end of each work period, the interior is left thoroughly clean • Waste disposal areas are kept tidy and brushed clean each day • Approaches to the premises are kept clean and washed down daily /as required • All storage and ripening areas to be kept dry and clean	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Cleaning and Disinfection (continued)

What can go wrong	Control Measure	Tick if measure is in place
Poor **cleaning and/or disinfection** can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination	**Equipment** • Clean any surface that has had contact with milk, ingredients or cheese and disinfect as appropriate • Rinse with potable water immediately after use to avoid dried residues • Wash all equipment as soon as possible, using the correct cleaning chemicals ensuring that: - Chemicals are used at the required strength - Adequate water is used at the required temperature - Sufficient chemical or heat contact time is allowed to ensure disinfection - Equipment is sufficiently rinsed • Position equipment after washing to allow natural drainage • Protect equipment from contamination, e.g. dust or flying insects • Inspect equipment before use for residues or scale and treat accordingly • Keep all cleaning equipment and chemical containers clean and tidy **Note 1** See Appendix 3 (page 67) regarding sampling of processing areas and equipment for *L. monocytogenes*. **Note 2** Phenolic chemicals should not be used in the dairy, milking or housing areas, as these can react with chlorine based chemicals to produce chlorophenols. These can produce a strong taint in milk even at low concentrations.	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Pest and Waste Control

What can go wrong	Control Measure	Tick if measure is in place
Inadequate **pest control or waste control** can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination	**On the farm:** • Protect animal feed, especially straights or compound feeds, from pest infestation including birds • Keep the parlour, dairy and surrounding areas clean and tidy and protect from pests as required • Keep accumulations of slurry and farm yard manure to a minimum • Act to reduce fly populations • Make a formal inspection each month for signs of rodents and act if found **Cheesemaking:** • Promptly remove any rubbish, debris or cheese waste (in particular curds and whey) to containers protected from pests • Store any cheese ingredients and packaging materials in a pest-free environment • Keep doors closed and ensure other openings are protected from pests, e.g. flies, birds, rats etc • Keep the premises clean and tidy, adopting a 'clean as you go' policy • Clean drains and channels daily to remove cheese waste and avoid standing water • Ensure that insect traps work correctly and that the location of the insectocutor will not lead to contamination of the cheesemaking process • Inspect all incoming raw materials/ingredients for signs of pests • Store cheese or ingredients away from walls, to allow cleaning and inspections • Make formal inspections each week for signs of rodents or cheese mites • Be aware of any indication of pest infestation and know what to do	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

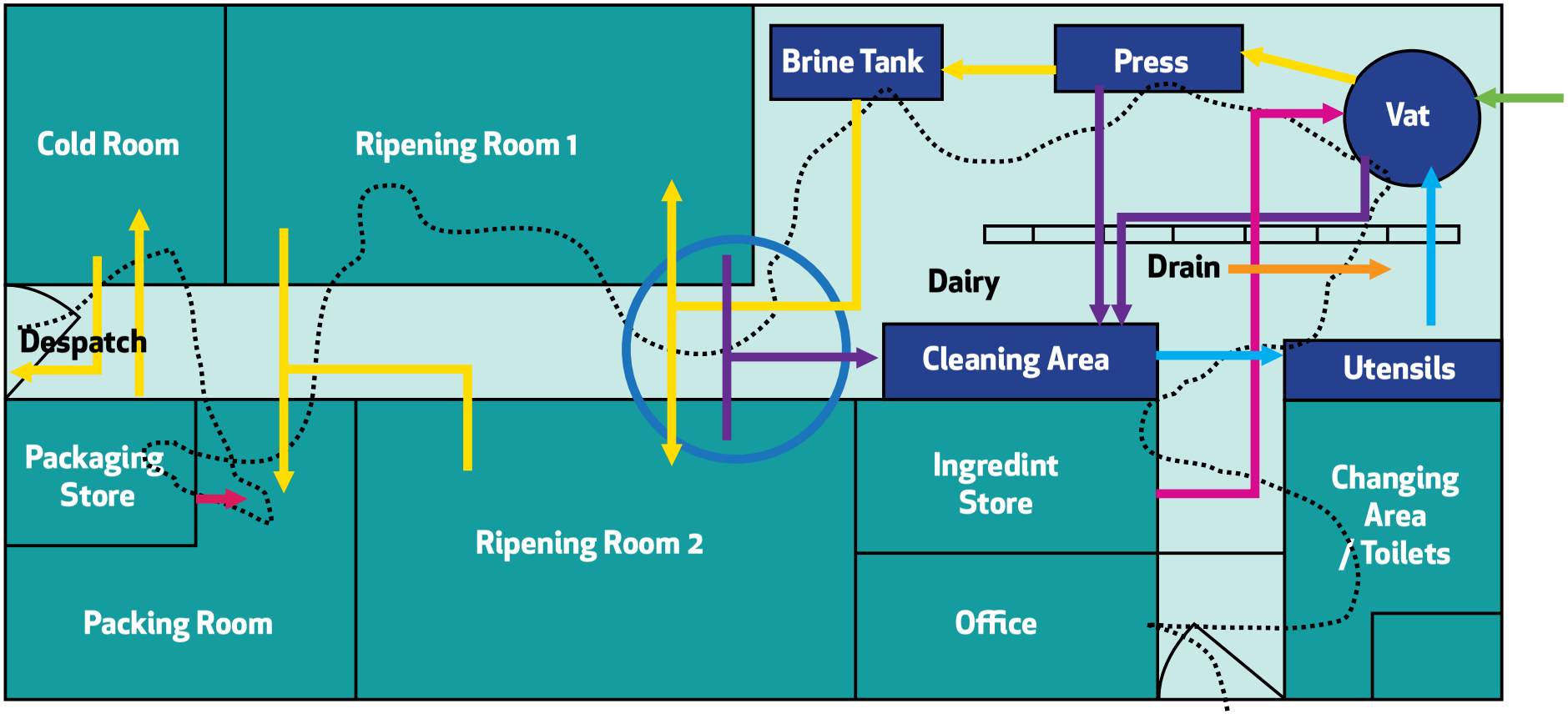
Traceability and Recall Procedures

What can go wrong	Control Measure	Tick if measure is in place
Unsafe cheese may reach the consumer if these procedures are not in place	Have traceability and recall procedures in place which permit identification of and withdrawal/recall of contaminated batches of cheese **Supplier traceability:** Keep a record of the ingredients and packaging you receive from your suppliers. Specifically keep a record of the: - Supplier's contact details - Ingredient and packaging description including quantity and batch number (if available) - Date of transaction **Customer traceability:** Keep a record of the customers to whom you have sold your produce (excluding sales to the final consumer). Specifically keep a record of the: - Customer's contact details - Product description including quantity and batch number(s) - Date of transaction **Withdrawal/recall:** - Immediate withdrawal of affected cheese from the market and, if necessary, recall from consumers - Immediately inform your dairy produce inspector (DPI) of the incident **Note** See FSAI *Guidance Note No. 10- Product Recall and Traceability* for further details.	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Summary of Improvements or Changes Required

Prerequisite Area	Control Measure to be Introduced/Change	Deadline

Example of Work Flow/Floor Plan in a Cheesemaking Operation



Example of a Cleaning Schedule

Item to be cleaned	**Frequency of cleaning** e.g. after use/daily, weekly etc	**Method of cleaning**	**Chemical(s) to be used** (including dilution required)	**Person responsible**
e.g. vat	e.g. daily	e.g. hand brushing	e.g. iodine solution at manufacturers recommended rate	e.g. Joe Bloggs

Example of a Staff Training Record

Name
Position
Date of Employment

Nature of training	Date	In-house trainer or course provider	Employee signature

Copies of any certificates should be kept with this form

05 Introduction

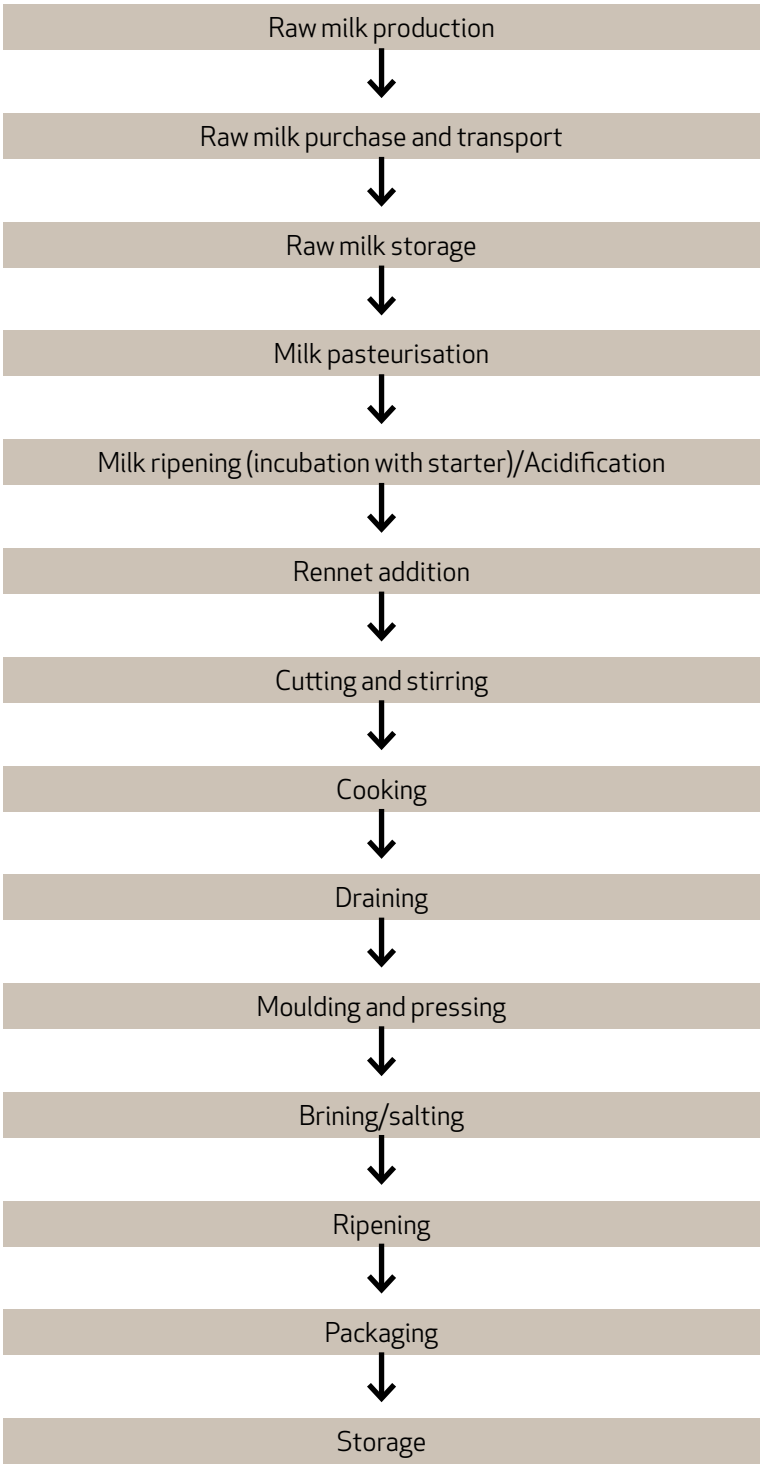
Hygienic premises and staff practices form the foundation of your HACCP-based procedures. These are called Prerequisite Hygiene Requirements and were identified in Section 4. In this section you will identify hazards specific to steps in the cheesemaking process and identify how to control these hazards. You will specifically identify the steps which are critical to ensuring the safety of your cheese, i.e. CCPs, and how you will monitor and verify that control is maintained.

HOW TO COMPLETE THIS SECTION

1. Tick the steps relevant to your business in the table below. To ensure that you do not forget any steps, you should draw a detailed flow diagram of the steps for each of the cheeses you produce. (See example of a flow chart in a cheesemaking operation on **page 28**).
2. Go to the hazard analysis section (**pages 30 to 51**) and identify the hazards in each of these steps in your business and the appropriate controls.
3. Go to **page 52** and identify the CCPs in your business by answering the three questions.
4. Complete the summary CCP table on **page 54**.

No.	Step	Tick where relevant to your cheese(s)
1	Raw milk production	
2	Milk purchase and transport	
3	Milk storage in bulk tank and transfer to pasteuriser/cheese vat	
4	Milk pasteurisation	
5	Non-milk ingredients	
6	Acidification	
7	Curds, salting, moulding and pressing	
8	Ripening or maturation	
9	Cutting, packaging and storage	
10	Additional step(s), **i.e. not covered in this workbook for which you will have to conduct your own hazard analysis**. Please specify below	

Example of a Flow Chart of Cheese Manufacturing Steps



Flow chart

Draw a flow chart for each of your cheese(s)

Hazard Analysis

This section presents: **(1) Typical hazards in cheesemaking**
(2) Identification and control of hazards in your business

(1) TYPICAL HAZARDS IN CHEESEMAKING (Note: this list is not exhaustive)

Number	Step

Biological hazards i.e. pathogenic microorganisms	**Notable pathogens for cheese are:**
	- *Salmonella* species
	- *Listeria monocytogenes*
	- Pathogenic *E. coli*, e.g. *E. coli* O157
	- Coagulase positive staphylococci, e.g. *Staphylococcus aureus*
	- *Mycobacterium bovis* which causes tuberculosis (TB)
	- Additional pathogens relevant to your cheese (please specify):
	_____
	Key pathogen sources include:
	- Milking livestock
	- Other livestock, especially calves, pigs or poultry
	- Staff
	- Pests and domestic pets
	- Environment
	- Water
	Pathogens may be introduced by:
	- Cross-contamination from any livestock
	- Contamination of raw or pasteurised milk either during milking or during processing
	- Inadequate pasteurisation of milk (if applied)
	- Contamination during manufacture from:
	  - Inadequately cleaned and/or disinfected equipment
	  - Poor hygiene practices or operator illness
	  - Pest infestation
	  - The environment
	- Growth or survival of pathogens due to:
	  - Incorrect cheese acidification
	  - Inadequate temperature controls at any stage
	  - Incorrect stock management
	  - Intrinsic nature of the cheese

Chemical hazards	In particular: antibiotic or veterinary drug residues, cleaning chemicals, agro chemicals, oils and lubricants, refrigerants, packaging residues, **other** (please specify): _____
Physical hazards	In particular: metal and non-metal foreign bodies including paper, wrapping materials, packaging, glass fragments, clothing, hair, bristles, flying insects, dressing, personal belongings, e.g. mobile phones, **other** (please specify): _____

(2) IDENTIFICATION AND CONTROL OF HAZARDS IN MILK PRODUCTION AND CHEESEMAKING STEPS

Note 1: The following tables enable you to **identify and control hazards** in your business

Note 2: A number of different records are listed in the 'Documentation' column in these tables. In practice, much of what you need to record can be stored in your **cheesemaking /production log or diary** (see sample log on page 55).

Step 1. Raw milk production

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)
Contamination by harmful bacteria Animal husbandry: - Animal disease - Soiled milking animals - Udder infections - Contaminated animal feed	**To prevent, eliminate or reduce hazards ensure:** • Good animal health and disease control ☐ • Good animal housing management ☐ • Mastitis control ☐ • Clean loafing/grazing conditions ☐ • Clean source and protection of animal feed ☐	**Examples of control evidence:** • Animal remedies record book and herd register ☐ • Herd health and veterinary records ☐ • Mastitis records ☐ • Milking machine test reports ☐ • Feed supplier assurances ☐
Milking methods: - Unhygienic milking practices - Unclean udders - Unclean milking equipment - Cross-contamination from: • Other animals/ environment	• Clean milking techniques ☐ • Good teat hygiene ☐ • Detection and rejection of abnormal milk ☐ • Prompt and effective cleaning of milking equipment and regular maintenance ☐ • Observe all animal remedy withdrawal periods ☐ • Identify treated animals and withdraw antibiotic milk ☐ • Observe withdrawal period for other animal treatments ☐	• Raw milk test results: – Plate counts and bovine somatic cell counts (SCC), and CMT (California Mastitis Test) or similar. Legal requirement of at least 2 samples per month for Plate Count for at least ☐ – A) 1 SCC sample for bovines ☐ – B) 2 samples per month for plate count for all other species ☐ – Periodic pathogen testing (in particular after colostrum). *Note: This is a control raw milk cheesemakers may consider* ☐
Chemical contamination - Antibiotics - Animal treatments - Teat disinfectants - Cleaning chemicals - General farm disinfectants	• Use teat dips according to manufacturer's instructions ☐ • Ensure equipment, utensils and surfaces are rinsed adequately ☐ • Do not use phenolic compounds near dairy, milking facilities or dairy animal housing ☐	• Animal remedies records ☐ • Periodic raw milk antibiotic test results ☐ • Evidence of cleaning procedures ☐
Foreign body contamination - Inadequate milk filtration	• Effective milk filtration in place: - Change milk socks after each milking and/or clean and disinfect re-usable milk filters ☐	

Variations from or additions to stated hazards and controls listed on previous page for step 1

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 1. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 2. Milk purchase and transport [Raw] [Pasteurised]

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)
Contamination by harmful bacteria, chemicals and foreign bodies Hazards same as raw milk production (Step 1) and raw milk storage (Step 3)' **Additional hazards** - Contamination during milk transport - Multiplication of harmful bacteria or toxin production during transport **Pasteurised milk** - Inadequate pasteurisation	**To prevent, eliminate or reduce hazards:** • Ensure supplier knows the standards that are required ☐ • Ensure supplier is aware of what the milk will be used for ☐ • Periodic inspection of the production premises (Step 1 and 3 controls) ☐ • Periodic microbiological results of the milk at receipt ☐ • Sealed transport tanks/containers/pipes ☐ • Reject any liquid milk consignment, which: - Has an abnormal smell and appearance ☐ - Is delivered in a vessel which is visually soiled ☐ - Has been not been adequately protected ☐ - Has an excessive storage time ☐ • Reject any milk which is delivered at a temperature above 10°C (legal limit is 10°C but storage below 6°C is best practice) unless it will be used within 2 hours of milking ☐ • Reject consignments of frozen raw milk, which: - Is delivered at a temperature above -18° C (for goat milk) ☐ - Is not marked with a traceable batch code ☐ - Shows any signs of damaged packaging ☐ • Assurances of correct heat treatment ☐	**Examples of control evidence** • Supplier assurances of compliance with 'raw milk production (Step 1) and draw milk storage (Step 3)' ☐ • Record of visits and inspections made ☐ • Copies of milk test results: – Plate counts and bovine somatic cell counts and CMT (California Mastitis Test) or similar ☐ – Periodic pathogen testing (in particular after colostrum). *Note: This is a control raw milk cheesemakers may consider* ☐ • Supplier assurances of compliance with transport requirements ☐ • Delivery record (or delivery docket) to include: – Condition of milk upon receipt ☐ – Temperature, date and volume ☐ – Consignment rejection ☐ • Phosphatase test results or certificate of assurance ☐

Variations from or additives to stated hazards and controls listed on previous page for step 2

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 2. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 3. Milk storage in bulk tank and transfer to pasteuriser/cheese vat [Raw] [Pasteurised]

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)

Contamination by harmful bacteria
- Contamination from the environment
- Contaminated milk storage vessels
- Contaminated pipe work used to transport milk to pasteuriser/cheese vat
 	
Growth of harmful bacteria and/or production of toxins
- Stored warm milk
- Prolonged storage
- Inadequate milk freezing:
  - Delayed freezing
  - Temperature rise
 	
Foreign body contamination
- Insects, dust or debris
	To prevent, eliminate or reduce hazards ensure:
	• Milk storage vessels are covered ☐
	• Prompt and effective cleaning of storage vessels and pipe work ☐
	• Use disposable churn liners ☐
	• Protect and drain equipment between use and clean milk pumps ☐
	• For on-farm cheese production, un-cooled milk is used within 2 hrs of milking ☐
	• For milk sourced from another holding (ex-farm milk), uncooled milk is delivered to cheese facility and used for cheese making immediately after milking ☐
	• Ex-farm refrigerated (< 8°C-daily collection, < 6°C-if not daily) milk, delivered at not more than 10°C, is used for cheese making within 4 hrs of delivery if stored < 10°C ☐
	• Ex-farm refrigerated (< 8°C-daily collection, < 6°C –if not daily) milk, delivered at not more than 6°C upon acceptance at cheese facility (<_____°C) & kept at that temperature until cheese making ☐
	In the case of cheese produced from heat treated cows' milk:
	• If storage period of raw cows' milk from acceptance to commencement of cheese making exceeds that determined by HACCP-based procedures (____hrs), then the TBC must be < 300,000 ☐
	(If TBC limit is exceeded, then corrective action required and DPI must be notified)
	• If storage period from time of heat treatment to commencement of cheese making exceeds that as determined by HACCP based procedures (____hrs), then the TBC must be <100,000 ☐
	(If TBC limit is exceeded, then corrective action required and DPI must be notified)
	• Vessel(s) protected when containing milk and after cleaning ☐
		Control evidence is assisted by
		• Cleaning schedule and record ☐
		• Cheesemaking/production log ☐
		• Cheesemaking/production log ☐
		• Daily temperature log ☐
		• Cheesemaking/production log ☐
		• Cheesemaking/production log ☐
		• Daily temperature log ☐

Variations from or additions to stated hazards and controls listed on previous page for step 3

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 3. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 4. Milk pasteurisation
(see Appendix 2 for criteria for cows' milk immediately before pasteurisation)

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)
Survival of harmful bacteria Insufficient heat treatment: - Inadequate temperature - Inadequate holding time **Contamination by harmful bacteria** Post pasteurisation contamination: - HTST plate leaks (raw milk) - Inadequate plant cleaning **Growth of harmful bacteria and/or production of toxins** - Warm stored pasteurised milk (>5°C)	**To prevent, eliminate or reduce hazards** *HTST systems (minimum of 72° C for 15 secs) **Actual** time/temperature_____°C _____secs **Adequate temperature is obtained by** • Daily test of flow diversion valve (FDV) ☐ • Daily check of hot indicating pen ☐ • Regular calibration of all temperature control and monitoring devices ☐ • Regular plant servicing ☐ **Adequate holding time is obtained by** • Correct design and installation ☐ • Milk flow rate tests ☐ Batch systems (63° C for 30 mins) **Actual** time/temperature_____°C _____secs **Adequate temperature and time are assured by:** • Visual monitor of the thermograph/temperature gauge ☐ • Correct heater thermostat setting ☐ • Supervision to ensure minimum heating time ☐ • Regular calibration of all temperature control and monitoring devices ☐ • Good plant and equipment condition ☐ • Correct cleaning routines in place ☐ • Immediately use for cheesemaking ☐	**Control evidence is assisted by** • Confirmation of temp/time ☐ • Thermograph chart – record FDV test ☐ • Operating procedures and training ☐ • Phosphatase test results ☐ • Calibration/service record ☐ • Invoice/commission report ☐ • Record of milk flow rate tests ☐ • Confirmation of time/temp ☐ • Thermograph chart ☐ • Calibration record ☐ • Manual record (temperature/time) ☐ • Phosphatase test results ☐ • Calibration/service record ☐ • Microbiological and phosphatase results ☐ • Thermograph chart ☐ • Cheese/production log or diary record ☐

*** High Temperature Short Time**

Variations from or additions to stated hazards and controls listed on previous page for step 4

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 4. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 5. Non-milk ingredients

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)
Contamination by harmful bacteria or toxins may occur: • In any ingredient used in the cheesemaking process or added to the cheese, e.g. - Starter - Rennet - Salt - Additives, e.g. nitrates - Herbs, spices, fruit - Mould, smear cultures - Water - Other • During storage, after receipt **Growth of harmful bacteria due to** - Incorrect starter storage - Expired 'use-by' date **Chemical contamination**	**To prevent, eliminate or reduce hazards** • Use reputable suppliers for all ingredients ☐ • Obtain supplier assurances of: - Ingredient performance and quality ☐ - Product specification ☐ • Ensure plant-based ingredients are washed and if necessary, treated, e.g. boiling ☐ • Periodic testing of water supplies ☐ • Store and use according to manufacturer's instructions ☐ • Check starter cultures for signs of clumping (which may indicate that thawing took place) ☐ • Goods in procedures - rejection of any consignment which: - Is delivered above any required temperature ☐ - Cannot be used within any stated 'use-by' date ☐ - Is not marked with a traceable batch code ☐ - Shows any signs of damaged packaging ☐ - Is not accompanied with a consignment note ☐ • Good stock control ☐ • Ensure additives, e.g. nitrates, are added at the correct concentration ☐	**Examples of control evidence:** • Supplier sales/product literature ☐ • Supplier assurances ☐ • Ingredient specifications ☐ • Cheese recipes indicating the need for washing/other treatments of ingredients ☐ • Water analysis results ☐ • Manufacturers' instructions ☐ • Delivery record (or delivery docket) to include: - Batch codes and dates ☐ - Consignment rejection ☐ • Cheese/production log or diary record ☐

Variations from or additions to stated hazards and controls listed on previous page for step 5

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 5. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 6. Acidification (very important step, especially for raw milk cheese)

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)
Growth/survival of harmful bacteria Inadequate/slow acid development due to: - Slow activity of starter organisms - Incorrect incubation conditions - Low addition rate - Incorrect bacterial starter strains - Inhibitory substances - Contamination by bacteriophage Contamination of unused starter culture during vat inoculation **Contamination in vat by harmful bacteria or foreign bodies from** - Operatives - Equipment - Environment	**To prevent, eliminate or reduce hazards** • Correct acid development: - Use reputable starter supplier (Step 5) ☐ - Correct storage of starter ☐ - Ensure milk is at the correct temperature when adding starter ☐ - Define starter type ☐ - Use milk free of antibiotics and other veterinary drugs (Steps 1 and 2) ☐ - Rotate starter ☐ • Corrective action in the event of slow acid development, e.g. - Check pH meter is working ☐ - Test cheese batch to ensure safety ☐ - Other; please specify ☐ _____ • Use sterile techniques when opening and resealing bulk bags of starter culture ☐ • Particular emphasis is given to the adherence to the prerequisite hygiene requirements ☐	**Control evidence is assisted by** • Record* of developed acidity: - Titration ☐ - pH measurement (using a pH meter or pH strips) ☐ - Curd tests or inspection ☐ • Record* of starter batch information ☐ • Record* what you did in response to the slow vat ☐ ***Note:** Many cheesemakers keep these records in the cheesemaking/production log or diary

Variations from or additions to stated hazards and controls listed on previous page for step 6
e.g. back sloping

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 6. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 7. Curds, salting, moulding and pressing

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)
Growth/survival of harmful bacteria	**To prevent, eliminate or reduce hazards**	**Control evidence**
Inadequate/slow acid development before salting	• Ensure correct pH is reached before salting ☐	• Record titratable acidity/pH ☐
	• Produce and follow recipe defining: - Salt levels ☐ - Method of addition ☐	• Written recipe outlining: - Dry salt levels ☐ - Salting procedures ☐
Incorrect salting: - Dry salting - Dry salt levels - Uneven salt distribution		• Brine tank management instructions ☐
	• Produce and follow instructions for managing brine tank including: - Defined immersion times ☐ - Replenishment of brine tank ☐ - pH control ☐	• Record emersion times in cheesemaking log ☐ • Record salt replenishment ☐
Brine: - Immersion time too short - Low brine salt concentration - Incorrect pH	• Particular emphasis is given to adherence to prerequisite hygiene requirements ☐	• Brine test results (strength/pH/ hygiene tests) ☐ • Record brine heat treatment or replacement dates ☐
Contamination by harmful bacteria from - Equipment and operators during handling - Contaminated salt or brine - Wash water	• Protect dry salt ☐ • Brine: - Heat-treat ☐ - Make fresh brine if required ☐ - Maintain tank in a clean condition ☐ • Use drinking quality (potable) water ☐	• Water analysis results ☐
Foreign body contamination - From brine tanks	• Visually inspect and remove residual curds or other particles when needed ☐	

Variations from or additions to stated hazards and controls listed on previous page for step 7

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 7. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 8. Ripening or Maturing

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)

Growth/survival of harmful bacteria
- Uneven moisture/salt distribution
- Incorrect ripening conditions (relative humidity/temperature)
- Incorrect ripening period
- Environmental contamination:
  - During cheese handling (including rind washing)
  - During cheese storage
 	
Contamination by harmful bacteria and foreign bodies from:
- Operators
- Equipment
- Environment
	To prevent, eliminate or reduce hazards:
	• Cheeses are turned to ensure even moisture and salt distribution ☐
	• Shelving/rack surfaces permit adequate drainage ☐
	• Visual inspections to prompt corrective action ☐
	• Maintain required temperature _____ °C and relative humidity _____ ☐
	• Remove cheese showing unacceptable faults ☐
	• Correct stock control, cheese inspections (as cheese batches may not mature in chronological order) ☐
	• Maintenance of clean premises/environment and pest control with effective "barriers" preventing contamination from other areas ☐
	• Particular emphasis given to adherence to prerequisite hygiene requirements ☐
	• Conduct tasks such as spiking/piercing; brushing/washing, or waxing according to specified schedule and in a hygienic manner; cheese wrapping, bandaging or coating ☐
	• Careful handling to avoid cheese rind/coat damage ☐
		Examples of control evidence
		• Cheese recipe ☐
		• Corrective action records ☐
		• Record temperature and relative humidity ☐
		• Record cheese faults and actions taken ☐
		• Batch records ☐

Variations from or additions to stated hazards and controls listed on previous page for step 8
(e.g. washed rind/smearing)

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 8. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 9. Cutting, packaging and storage

Hazard What can go wrong	**Control Measure** (Tick where measure is in place)	**Documentation** (Tick where measure is in place)
Growth/survival of harmful bacteria due to: Cheese handling operations: - Packaging soft cheese - Cutting cheese portions - Dressing cheese "coats" Environmental contamination: - During cheese handling - During cheese storage Equipment: - All dressing, cutting, potting or packaging equipment - Packaging materials **Growth of harmful bacteria** - High storage temperature - Prolonged storage periods	**To prevent, eliminate or reduce hazards:** **Cutting/packaging** Strict adherence to the prerequisites hygiene requirements: • Good personal hygiene ☐ • Staff training ☐ • Maintenance of clean premises/environment and pest control with effective "barriers" preventing contamination from other areas ☐ • Scheduled cleaning of all related equipment ☐ • Storage of all equipment in a clean environment ☐ • Correct storage and handling of packaging materials ☐ **Cheese storage after cutting/packing** • Packaged cheese is stored at <_____°C ☐ • Tolerance periods are defined ☐ • Good stock control ☐	**Control evidence is assisted by:** • Evidence of adequate supervision and/or training ☐ • Record daily chill temperatures ☐ • Batch and stock records ☐

Variations from or additions to stated hazards and controls listed on previous page for step 9
e.g. washed rind/smearing

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control

Step 9. Required improvements

Step	Control measure to be introduced/changed	Deadline

Step 10. Additional step

e.g. distribution, farmers markets etc.

Hazard What can go wrong	**Control Measure** Method of prevention	**Documentation** Evidence of control
	To prevent, eliminate or reduce hazards	**Control evidence is assisted by**

Step 10. Required improvements

Step	Control measure to be introduced/changed	Deadline

Summary of Improvements or Changes Required

Step	Control measure to be introduced/changed	Deadline

Identification of CCPs

In the tables on pages 32-51 you identified control measures to control hazards in all the steps in your business. Now you should identify the steps which are considered to be Critical Control Points (CCPs) which will need extra monitoring to ensure that control is being maintained.

HOW TO IDENTIFY CCPs

1. For each step in your business work through the following three questions:

Questions	Answers
Does the step involve a control measure or measures to prevent, eliminate, or reduce one or more hazards to an acceptable level?	Yes/No
For each control measure is it the last chance to control the hazard or is it essential for the success of a later CCP?	Yes/No
Can the control measure(s) be monitored at this step (either visually or by taking a measurement)?	Yes/No

2. If you answer '**Yes**' to all three questions then the control measure is a CCP. Once you have identified the CCPs, complete the summary table on page 54 by setting the critical limits, the approach to monitoring, corrective action (should there be a deviation from the limit) and the record used for monitoring. See text below for further details.

Note: When you answer these questions, you will typically find that you have a small number of CCPs in your business.

CRITICAL LIMITS FOR CCPs

Each CCP should have a specific critical limit. Critical limits separate acceptability from unacceptability in terms of product safety.

They are set for observable or measurable parameters which can demonstrate that the critical point is under control, e.g. temperature, time, pH, moisture content, additive, preservative or salt level, sensory parameters such as visual appearance or texture, etc.

Critical limits may be derived from a variety of sources. When not taken from legislation, international standards, this workbook, or guides to good hygiene practices, you should be able to present evidence that they are valid.

MONITORING OF CCPs

Monitoring is done to demonstrate that the critical limit at a CCP has not been exceeded.

You should decide the following in relation to monitoring:

- When? - i.e. frequency of monitoring
- How? - i.e. method of monitoring
- Who? - i.e. allocate responsibility for the monitoring and recording

The results of monitoring should be recorded (see documentation and records below).

Identification of CCPs (continued)

CORRECTIVE ACTION WHEN THERE'S A DEVIATION FROM A CRITICAL LIMIT

The purpose of corrective action is to prevent unsafe food reaching the customer. For each CCP, corrective actions should be planned in advance so that they can be taken without hesitation when monitoring indicates a deviation from a critical limit.

You should decide the following in relation to corrective action:

- Who? - i.e. allocate responsibility for implementation and recording of the corrective action
- How? - i.e. (i) description of means and action required to correct the observed deviation and (ii) action to be taken with regard to products that have been manufactured during the period when the process was out of control

Note: If there is nothing you can do to make the cheese safe after a critical limit has been exceeded then the cheese should be discarded.
Corrective actions taken should be recorded.

DOCUMENTATION AND RECORDS

A completed version of this workbook plus any additional related procedures you might develop can be considered to be your 'HACCP documentation'.

Monitoring results, corrective actions taken and verification activities should always be recorded. A cheesemaking/ production log book (see sample on page 55) is a useful way to keep these records.

Legally, you must keep your records for at least three years and make them available to your dairy produce inspector (DPI) upon request.

VERIFICATION OF HACCP-BASED PROCEDURES

The purpose of verification is to demonstrate that your food safety management system has been implemented as planned and that hazards are being controlled

Regularly, you should:

- Review the records to ensure that:
  - Monitoring is taking place
  - Corrective actions are being taken where deviation from the critical limits occur
- Inspect operations to ensure that the prerequisite hygiene requirements are being implemented
- Test against the process hygiene and food safety microbiological criteria as per Article 4 of Reg. 2073/2005 (see Appendix 3)

Annually and whenever there is a change in the operation that could influence food safety you should:

- Review this workbook to ensure that all steps in your operation are included and that your controls are valid.

You should record the date of scheduled reviews on page 59 in Section 6.

Summary of CCPs in your Business

(Use the 3 questions on page 52 to help you identify the CCPs)

Step	Hazard (source)	Control Measure	Critical limit(s)	Monitoring	Corrective Action	Record name	Verification
e.g. - Batch pasteurisation*	e.g. - Survival of pathogenic bacteria (Inadequate temperature/in-adequate holding time)*	e.g. - Adequate heat treatment for sufficient time period*	e.g. - ≥ 63°C for 30 mins*	e.g. - Visual monitor of the thermograph/ temperature gauge Correct heater thermostat setting Supervision to ensure minimum heating time*	e.g. - If temperature drops below 63°C, adjust heater thermostat and heat for corresponding time Ensure thermostat is operating correctly*	e.g. - Thermograph record Cheesemaking log*	e.g. - Phosphatase test, reviewing monitoring records of critical limit, microbiological analysis.

***Note: This CCP is an example only and the parameters may not apply to your process in particular or at all**

Sample Cheesemaking/ Production Log

Date	Quantity of Starter
Quantity of Milk	Quantity of Rennet

	Time	Temperature	Acidity or pH	Comments
Milk				
Starter added				
Rennet added				
Cutting				
Washing				
Resting				
Draining				
Pressing				
Turned				
Turned				
Into brine				
Out of brine				

Number of cheeses made	Batch Code
Notes	

Sample Staff Responsibilities/ Duties Record

The following people are familiar with the contents of this workbook relevant to their assigned duties as listed in the table below

Staff name	Main duties	Staff signature	Date

Sample Event Record

This incident record may be used to prompt or support a review of this workbook

(a) Event or incident Key event or incident, e.g. new staff, recipes, quality issues, TB outbreak in herd etc	**(b) Date**

06 Declaration of Completion of this Workbook

I hereby certify that I:

(name) _____

(position) _____

of (business name) _____

have completed this workbook and produced HACCP based procedures for this business at (address):

_____

The following person(s) is / are responsible for ensuring that the HACCP based procedures are implemented:

_____ (position)

_____ (position)

_____ (position)

_____ (position)

I will review the HACCP based procedures at least once a year and also if my operations change.

Signed _____ **Date** _____

Scheduled Reviews

Review date	Date review completed	Signature

Appendix 1
Health Requirements for Raw Milk and Colostrum Production

Regulation (EC) No. 853/2004 contains health requirements for raw milk and colostrums. Below is an extract from extract from Annex III, Section IX, Chapter I, part I (1)-(5).

Note: To ensure compliance with the legal requirements you are advised to read the relevant legislation and not rely solely on the extract below.

For the purpose of this Section:

1. 'Colostrum' means the fluid secreted by the mammary glands of milk producing animals up to three to five days post parturition that is rich in antibodies and minerals, and precedes the production of raw milk
2. 'Colostrum-based products' means processed products resulting from the processing of colostrums or from the further processing of such processed products

CHAPTER I. RAW MILK AND COLOSTRUM – PRIMARY PRODUCTION

Food business operators producing or, as appropriate, collecting raw milk and colostrum must ensure compliance with the requirements laid down in this Chapter.

I. HEALTH REQUIREMENTS FOR RAW MILK AND COLOSTRUM PRODUCTION

1. Raw milk and colostrum must come from animals:
   (a) that do not show any symptoms of infectious diseases communicable to humans through milk and colostrum
   (b) that are in a good general state of health, present no sign of disease that might result in the contamination of milk and colostrum and, in particular are not suffering from any infection of the genital tract with discharge, enteritis with diarrhoea and fever, or a recognisable inflammation of the udder
   (c) that do not have any udder wound likely to affect the milk and colostrum
   (d) to which no unauthorised substances or products have been administered and that have not undergone illegal treatment within the meaning of Directive 96/23/EC
   (e) in respect of which, where authorised products of substances have been administered, the withdrawal periods prescribed for these products or substances have been observed.

Appendix 1
Health Requirements for Raw Milk and Colostrum Production (continued)

2. (a) in particular, as regards brucellosis, raw milk and colostrum must come from:
   (i) cows or buffaloes belonging to a herd which, within the meaning of Directive 64/432/EEC([1]), is free or officially free of brucellosis:
   (ii) sheep or goats belonging to a holding officially free or free of brucellosis within the meaning of Directive 91/68/EEC([2]); or
   (iii) females of other species belonging, for species susceptible to brucellosis, to herds regularly checked for that disease under a control plan that the competent authority has approved
   (b) as regards tuberculosis, raw milk and colostrum must come from:
   (i) cows or buffaloes belonging to a herd which, within the meaning of Directive 64/432/EEC, is officially free of tuberculosis; or
   (ii) females of other species belonging, for species susceptible to tuberculosis, to herds regularly checked for this disease under a control plan that the competent authority has approved
   (c) If goats are kept together with cows, such goats must be inspected and tested for tuberculosis.

3. However, raw milk from animals that does not meet the requirements of point 2 may be used with the authorisation of the competent authority.
   (a) in the case of cows or buffaloes that do not show a positive reaction to tests for tuberculosis or brucellosis, nor any symptoms of these diseases, after having undergone a heat treatment such as to show a negative reaction to the alkaline phosphatase test;
   (b) in the case of sheep or goats that do not show a positive reaction to tests for brucellosis, or which have been vaccinated against brucellosis as part of an approved eradication programme, and which do not show any symptom of that disease, either:
   (i) for the manufacture of cheese with a maturation period of at least two months: or
   (ii) after having undergone heat treatment such as to show a negative reaction to the alkaline phosphatase test; and
   (c) in the case of females of other species that do not show a positive reaction to tests for tuberculosis or brucellosis, nor any symptoms of these diseases, but belong to a herd where brucellosis or tuberculosis has been detected after the checks referred to in point 2(a)(iii) or 2(b)(ii), if treated to ensure its safety.

4. Raw milk and colostrum from any animal not complying with the appropriate requirements of points 1 to 3, and in particular, any animal showing individually a positive reaction to the prophylactic tests vis-á-vis-tuberculosis or brucellosis as laid down in Directive 64/432/EEC and Directive 91/68/EEC, must not be used for human consumption.

5. The isolation of animals that are infected, or suspected of being infected, with any of the diseases referred to in point 1 or 2 must be effective to avoid any adverse effect on other animals milk and colostrum.

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1 Council Directive 64/432/EEC of 26 June 1964 on animal health problems affecting intra-Community trade in bovine animals and swine (OJ 121, 29.7.1964, p. 1977/64) Directive as last amended by Regulation (EC) No 21/2004 (OJ L 5, 9.1.2004, p. 8).

2 Council Directive 91/68/EEC of 28 January 1991 on animal health conditions governing intra-Community trade in ovine and caprine animals (OJ L 46, 19.2.1991, p. 19). Directive as last amended by Commission Decision 2005/932/EC.

Appendix 2
Requirements Concerning Dairy and Colostrum-Based Products

Note: To ensure compliance with the legal requirements you are advised to read the relevant legislation and not rely solely on the extract below.

Regulation (EC) No. 853/2004 contains requirements for milk and colostrums. The following are extracts from **Annex III, Section IX Chapter I (part III) and Chapter II (parts I-III):**

CRITERIA FOR RAW MILK

Extract from Regulation EC No. 1662/2006 amending Regulation (EC) No. 853/2004.

Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.

Note: It is possible to produce milk of a better quality, i.e. lower somatic cell counts and lower plate counts at 30°C, than the legal limits. Whether you are producing your own raw milk or purchasing it, you should aim for it to have a plate count at 30°C of < 20,000 per ml and a somatic cell count of < 250,000 per ml.

Appendix 2
Requirements Concerning Dairy and Colostrum-Based Products (continued)

Extract from Annex III, Section IX, Chapter I, part III:

III. CRITERIA FOR RAW MILK AND COLOSTRUM

1. (a) The following criteria for raw milk apply pending the establishment of standards in the context of more specific legislation on the quality of milk and dairy products.
   (b) National criteria for colostrum, as regards plate count, somatic cell count or antibiotic residues, apply pending the establishment of specific Community legislation.

2. A representative number of samples of raw milk and colostrum collected from milk production holdings taken by random sampling must be checked for compliance with points 3 and 4 in case of raw milk and with the existing national criteria referred to in point 1(b) in case of colostrum. The checks may be carried out by, or on behalf of:
   (a) the food business operator producing the milk;
   (b) the food business operator collecting or processing the milk;
   (c) a group of food business operators, or
   (d) in the context of a national or regional control scheme.

3. (a) Food business operators must initiate procedures to ensure that raw milk meets the following criteria:-

   (i) for raw cows' milk:

• Plate count at 30°C (per ml) • Somatic cell count (per ml)	• ⩽ 100,000 (*) • ⩽ 400,000 (**)
• (*) Rolling geometric average over a two-month period, with at least two samples per month. • (**) Rolling geometric average over a three-month period, with at least one sample per month, unless the competent authority specifies another methodology to take account of seasonal variations in production levels	

   (ii) for raw milk from other species:

• Plate count at 30°C (per ml)	• ⩽ 1,500,000 (*)
• (*) Rolling geometric average over a two-month period, with at least two samples per month	

   (b) However, if raw milk from species other than cows is intended for the manufacture of products made with raw milk by a process that does not involve any heat treatment, food business operators must take steps to ensure that the raw milk used meets the following criterion:

• Plate count at 30°C (per ml)	• ⩽ 500,000 (*)
• (*) Rolling geometric average over a two-month period, with at least two samples per month	

4. Without prejudice to Directive 96/23/EC, food business operators must initiate procedures to ensure that raw milk is not placed on the market if either.
   (a) it contains antibiotic residues in a quantity that, in respect of any one of the substances referred to in Annexes I and III to Regulation (EEC) No. 2377/90 (1), exceeds the levels authorised under that Regulation; or
   (b) the combined total of residues of antibiotic substances exceeds any maximum permitted value.

5. When raw milk fails to comply with point 3 or 4, the food business operator must inform the competent authority and take measures to correct the situation.

Appendix 2
Requirements Concerning Dairy and Colostrum-Based Products (continued)

Extract from Annex III, Section IX, Chapter I, part III:

CHAPTER II: REQUIREMENTS CONCERNING DAIRY AND COLOSTRUM-BASED PRODUCTS

I. Temperature Requirements

1. Food business operators must ensure that, upon acceptance at a processing establishment,
   (a) milk is quickly cooled to not more than 6°C;
   (b) colostrum is quickly cooled to not more than 6°C or maintained frozen, and kept at that temperature until processed.
2. However, food business operators may keep milk and colostrum at a higher temperature if:
   (a) processing begins immediately after milking, or within four hours of acceptance at the processing establishment; or
   (b) the competent authority authorises a higher temperature for technological reasons concerning the manufacture of certain dairy or colostrum-based products.

II. Requirements for Heat Treatment

1. When raw milk, colostrum, dry or colostrum-based products undergo heat treatment, food business operators must ensure that this satisfies the requirements laid down in Chapter XI of Annex II to Regulation (EC) No. 852/2004. In particular, they shall ensure, when using the following processes that they comply with the specifications mentioned:
   (a) Pasteurisation is achieved by a treatment involving:
      (i) a high temperature for a short time (at least 72°C for 15 seconds);
      (ii) a low temperature for a long time (at least 63°C for 30 minutes); or
      (iii) any other combination of time-temperature conditions to obtain an equivalent effect, such that the products show, where applicable, a negative reaction to an alkaline phosphatase test immediately after such treatment.
   (b) Ultra high temperature (UHT) treatment is achieved by a treatment:
      (i) involving a continuous flow of heat at a high temperature for a short time (not less than 135°C in combination with a suitable holding time) such that there are no viable micro-organisms or spores capable of growing in the treated product when kept in an aseptic closed container at ambient temperature, and
      (ii) sufficient to ensure that the products remain microbiologically stable after incubating for 15 days at 30°C in closed containers or for seven days at 55°C in closed containers or after any other method demonstrating that the appropriate heat treatment has been applied.

Appendix 2
Requirements Concerning Dairy and Colostrum-Based Products (continued)

2. When considering whether to subject raw milk and colostrum to heat treatment, food business operators must:
   (a) have regard to the procedures developed in accordance with the HACCP principles pursuant to Regulation (EC) No 852/2004; and
   (b) comply with any requirements that the competent authority may impose in this regard when approving establishments or carrying out checks in accordance with Regulation (EC) No 854/2004.

III Criteria for Raw Cows Milk

1. Food business operators manufacturing dairy products must initiate procedures to ensure that, immediately before being heat treated and if its period of acceptance specified in the HACCP-based procedures is exceeded:
   (a) raw cows' milk used to prepare dairy products has a plate count at 30°C of less than 300,000 per ml; and
   (b) heat treated cows milk used to prepare dairy products has a plate count at 30°C of less than 100,000 per ml.
2. When milk fails to meet the criteria laid down in paragraph 1, the food business operator must inform the competent authority and take measures to correct the situation.

Appendix 3
Microbiological Criteria, Environmental Sampling for *Listeria monocytogenes* and Shelf-life Studies

Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.

Food safety and process hygiene criteria for cheese

Regulation EC No. 2073 of 2005 outlines two types of microbiological criteria:

Food safety criterion (see page 70)

A criterion defining the acceptability of a product or a batch of foodstuff applicable to products placed on the market.

Process hygiene criterion (see page 72)

A criterion indicating the acceptable functioning of the production process. Such a criterion is not applicable to products placed on the market. It sets an indicative contamination value above which corrective actions are required in order to maintain the hygiene of the process in compliance with food law.

Article 4 of the Regulation requires cheesemakers to test against the cheese specific process hygiene and food safety criteria when they are validating and verifying their HACCP based procedures.

Note: Regulation EC No. 2073 of 2005 does not include criteria for all pathogens relevant for cheese, e.g. *E. coli* O157. However, the Regulation governing food law in general, i.e. Regulation (EC) No. 178 of 2002, requires that unsafe food is not placed on the market. This means that ready-to-eat food should not contain pathogens or their toxins at unsafe levels.

Sampling frequency

For cheese, Regulation EC No. 2073 of 2005 does not stipulate the frequency of testing; this is a decision for the cheesemaker. In making the decision, cheesemakers should bear in mind the purpose of these legal microbiological criteria, i.e. to validate or verify the correct functioning of the HACCP based procedures, and the prerequisite hygiene requirements.

Appendix 3
Microbiological Criteria, Environmental Sampling for *Listeria monocytogenes* and Shelf-life Studies (continued)

Environmental sampling for *Listeria monocytogenes*

Regulation EC No. 2073 of 2005 requires cheesemakers producing cheese which may pose a *Listeria monocytogenes* risk for public health, to sample the processing areas and equipment for *Listeria monocytogenes* as part of their routine sampling programme.

Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.

Shelf-life studies

Regulation EC No. 2073 of 2005 requires cheesemakers to conduct shelf-life studies on their products as necessary. In particular, this applies to cheese able to support the growth of *Listeria monocytogenes* and that may pose a *Listeria monocytogenes* risk for public health. The Regulation outlines the following requirements for shelf-life in general:

Extract from Regulation EC No. 2073 of 2005 in relation to shelf-life studies

The studies referred to in Article 3(2) shall include:

- Specifications for physico-chemical characteristics of the product, such as pH, aw, salt content, concentration of preservatives and the type of packaging system, taking into account the storage and processing conditions, the possibilities for contamination and the foreseen shelf-life and
- Consultation of available scientific literature and research data regarding the growth and survival characteristics of the micro-organisms of concern

When necessary on the basis of the abovementioned studies, the food business operator shall conduct additional studies, which may include:

- Predictive mathematical modelling established for the food in question, using critical growth or survival factors for the micro-organisms of concern in the product
- Tests to investigate the ability of the appropriately inoculated micro-organism of concern to grow or survive in the product under different reasonably foreseeable storage conditions
- Studies to evaluate the growth or survival of the micro-organisms of concern that may be present in the product during the shelf-life under reasonably foreseeable conditions of distribution, storage, and use

The above mentioned studies shall take into account the inherent variability linked to the product, the micro-organisms in question and the processing and storage conditions.

Appendix 3
Microbiological Criteria, Environmental Sampling for *Listeria monocytogenes* and Shelf-life Studies (continued)

Listeria monocytogenes

The Commission has prepared two guidance documents on shelf-life studies in relation to *Listeria monocytogenes*. The first is for food businesses and the second for laboratories.

1. **European Commission (2008) Guidance Document on *Listeria monocytogenes* shelf-life studies for ready-to-eat foods under Regulation (EC) No. 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs**

   http://www.fsai.ie/uploadedFiles/EU_Guidance_listeria_monocytogenes/pdf

   The aim of this document is to guide food business operators producing ready-to-eat foods to:

   - Demonstrate to the satisfaction of the competent authority, that the products will comply with the Community Regulation until the end of the shelf-life
   - Understand the range of different approaches available to help establish a safe product shelf-life in relation to *Listeria monocytogenes* and to decide the appropriate approach for their products
   - Classify their products into ready-to-eat foods in which growth of *Listeria monocytogenes* can occur or in ready-to-eat foods in which growth of *Listeria monocytogenes* will not occur during their shelf-life

2. **European Commission (2008) Technical Guidance Document on shelf-life laboratory durability and challenge studies for *Listeria monocytogenes* in ready-to-eat foods**

   http://www.fsai.ie/uploadedFiles/EU_Guidance_shelflife_listeria_monocytogenes_en.pdf

   This document was prepared by the EU Community Reference Laboratory (CRL) for *Listeria monocytogenes* in collaboration with a working group consisting of ten laboratories.

   The document is aimed at laboratories conducting shelf-life studies for *Listeria monocytogenes* in ready-to-eat foods on behalf of food business operators, and it provides recommendations on how to select, implement, and perform the tests required. It describes the microbiological procedures for determining growth of *Listeria monocytogenes* using challenge tests and durability studies in the frame of the application of the application of Regulation (EC) No. 2073/2005.

FOOD SAFETY CRITERIA FOR CHEESES

Extract from Regulation EC No. 2073 of 2005 as amended

Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.

Food category	Micro-organisms/ their toxins, metabolites	Sampling plan [1]		Limits [2]		Analytical reference method [3]	Stage where the criterion applies
		n	c	m	M		
1.2 Ready-to-eat foods able to support the growth of *L. monocytogenes*, other than those intended for infants and for special medical purposes	*Listeria monocytogenes*	5	0	100 cfu/g[5]		EN/ISO 11290-2 [6]	Products placed on the market during their shelf-life
		5	0				
1.3 Ready-to-eat foods unable to support the growth of *L. monocytogenes*, other than those intended for infants and for special medical purposes [4] [5]	*Listeria monocytogenes*	5	0	Absence in 25 g [7]		EN/ISO 11290-2[6]	Before the food has left the immediate control of the food business operator, who has produced it
1.11 Cheeses, butter and cream made from raw milk or milk that has undergone a lower heat treatment than pasteurisation [10]	*Salmonella*	5	0	Absence in 25g		EN/ISO 6579	Products placed on the market during their shelf-life
1.21 Cheeses, milk powder and whey powder, as referred to in the coagulase-positive staphylococci criteria in Chapter 2.2 of this Annex	*Staphylococcal enterotoxins*	5	0	Not detected in 25 g		European screening method of the CRL for coagulase-positive staphylococci criteria [13]	Products placed on the market during their shelf-life

[1] n = number of units comprising the sample; c = number of sample units giving values between m and M

[2] For points 1.1 – 1.25 m = M

[3] The most recent edition of the standard shall be used

[4] Regular testing against the criterion is not required in normal circumstances for the following ready-to-eat foods: those which have received heat treatment or other processing effective to eliminate *Listeria monocytogenes*, when recontamination is not possible after this treatment (for example, products heat treated in their final package),

- fresh, uncut and unprocessed vegetables and fruits, excluding sprouted seeds,
- bread, biscuits and similar products,
- bottled or packed waters, soft drinks, beer, cider, wine, spirits and similar products,
- sugar, honey and confectionary, including cocoa and chocolate products,
- live biovalve molluscs.

[5] This criterion shall apply if the manufacturer is able to demonstrate, to the satisfaction of the competent authority, that the product will not exceed the limit 100 cfu/g throughout the shelf-life. The operator may fix intermediate limits during the process that must be low enough to guarantee that the limit of 100 cfa/g is not exceeded at the end of shelf-life.

[6] 1 ml of inoculum is plated on a Petri dish of 140 mm diameter or on three Petri dishes of 90 mm diameter.

[7] This criterion shall apply to products before they have left the immediate control of the producing food business operator, when he is not able to demonstrate, to the satisfaction of the competent authority, that the product will not exceed the limit of 100 cfu/g throughout the shelf-life.

[8] Products with pH ≤ 4,4 or aw ≤ 0,92, products with pH ≤ 5.0 and aw ≤ 0,94, products with a shelf-life of less than five days shall be automatically considered to belong to this category. Other categories of products can also belong to this category, subject to scientific justification.

[10] Excluding products when the manufacturer can demonstrate to the satisfaction of the competent authorities that, due to the ripening time and aw of the product where appropriate, there is no *salmonella* risk.

[13] Reference: Community reference laboratory for coagulase positive staphylococci. European screening method for the detection of Staphylococcal enterotoxins in milk and milk products

FPROCESS HYGIENE CRITERIA FOR CHEESE

Extract from Regulation EC No. 2073 of 2005 as amended

Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.

Food category	Micro-organisms	Sampling plan (1)		Limits (2)		Analytical reference method (3)	Stage where the criterion applies	Action in case of unsatisfactory results
		n	c	m	M			
2.2.2 Cheeses made from milk or whey that has undergone heat treatment	*E. coli* (5)	5	2	100 cfu/g	1 000 cfu/g	ISO 16649 -1 or 2	At the time during the manufacturing process when the *E.coli* count is expected to be highest (6)	Improvements in production hygiene and selection of raw materials
2.2.3 Cheeses made from raw milk	*Coagulase-positive staphylococci*	5	2	10^4 cfu/g	10^5 cfu/g	EN/ISO 6888-2	At the time during the manufacturing process when the number of staphylococci is expected to be highest	Improvements in production hygiene and selection of raw materials. If values >105 cfu/g are detected, the cheese batch has to be tested for staphylococcal enterotoxins
2.2.4 Cheeses made from milk that has undergone a lower heat treatment than pasteurisation (7) and ripened cheeses made from milk or whey that has undergone pasteurisation or a stronger heat treatment (7)	*Coagulase-positive staphylococci*	5	2	100 cfu/g	1 000 cfu/g	EN/ISO 6888-1 or 2		
2.2.5 Unripened soft cheeses (fresh cheeses) made from milk or whey that has undergone pasteurisation or a stronger heat treatment (7)	*Coagulase-positive staphylococci*	5	2	10 cfu/g	100 cfu/g	EN/ISO 6888-1 or 2	End of the manufacturing process	Improvements in production hygiene. If values > 10^5 cfu/g are detected, the cheese batch has to be tested for staphylococcal enterotoxins

(1) n = number of units comprising the sample; c = number of sample units giving values between m and M
(2) For points 2.2.7, 2.2.9 and 2.2.10 m = M
(3) The most recent edition of the standard shall be used
(4) The criterion shall not apply to products intended for further processing in the food industry
(5) *E. coli* is used here as an indicator for the level of hygiene
(6) For cheeses which are not able to support the growth of *E. coli*, the *E. coli* count is usually the highest at the beginning of the ripening period, and for cheeses which are able to support the growth of *E. coli*, it is normally at the end of the ripening period
(7) Excluding cheeses where the manufacturer can demonstrate, to the satisfaction of the competent authorities, that the product does not pose a risk of staphylococcal enterotoxins

Appendix 4
Reference Material

KEY LEGISLATION

Note: The following lists the main pieces of legislation which are subject to amendment. For a comprehensive and up to date list of all relevant legislation, see the FSAI website www.fsai.ie or contact the FSAI Advice Line 1890 33 66 77.

General food law: Regulation (EC) No. 178 of 2002 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, as amended

Hygiene of food and feed: Regulation (EC) No. 853/2004 (OJ L226, p22, 25/06/2004) of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin, as amended.

Microbiological criteria for foodstuffs: Commission Regulation (EC) No. 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs as amended

Guidance Material

Food Safety Authority of Ireland (2008) Guidance Note No. 10: Product Recall and Traceability (Revision 1) www.fsai.ie

Food Safety Authority of Ireland (2007) Guidance Note No. 11: Assessment of HACCP Compliance (Revision 2)

Food Safety Authority of Ireland (2006) Guidance Note No. 16: Food Stalls (Revision 1)

Food Safety Authority of Ireland (2005) Guidance Note No. 18: Determination of Product Shelf-Life

Food Safety Authority of Ireland (2007) Labelling of Food in Ireland

Food Safety Authority of Ireland (2005) The Control and Management of *Listeria monocytogenes* Contamination of Food

Food Safety Authority of Ireland (1999) The Prevention of *E. coli* O157:H7 Infection

Food Safety Authority of Ireland (2008) Zoonotic Tuberculosis and Food Safety

Food Safety Authority of Ireland (2009) Guide to Food Safety Training Level 1 & 2

Food Safety Authority of Ireland (2003) Guide to Food Safety Training Level 3

European Commission (2005) Guidance document on implementation of procedures based on the HACCP principles, and facilitation of the implementation of the HACCP principles in certain food businesses

European Commission (2008) Guidance document on *Listeria monocytogenes* shelf-life studies for ready-to-eat foods under Regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs

European Commission (2008) Technical guidance document on shelf-life laboratory durability and challenge studies for *Listeria monocytogenes* in ready-to-eat foods

Health Protection Surveillance Centre (2004) Preventing Foodborne Disease: A Focus on the Infected Food Handler www.hpsc.ie

Appendix 5
Acknowledgements

The FSAI and Teagasc wish to thank the Food Standards Agency UK for making its HACCP workbook *(Specialist Cheesemakers – Food Safety Workbook)* available to this project. This workbook is based on the UK workbook and the experience of people involved in its development and implementation. In particular, we wish to thank Chris Pratt (Food Standards Agency); Randolph Hodgson (Neal's Yard Dairy); Alan Lyne (ADAS); Jamie Montgomery (Montgomery's Cheddar) and; Sandy and Andy Rose (Two Hoots Cheese).

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The FSAI and Teagasc would especially like to thank the farmhouse cheesemakers who participated on the working group for this project. We would also like to thank those who received and commented on drafts of the workbook including the Department of Agriculture, Fisheries and Food.

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