

Guidelines

**for the development
of a**

**Food Safety Programme
(*Food Act 1981*)**

or a

**Risk Management
Programme
(*Animal Products Act 1999*)**

for

Ice Cream

These Guidelines are owned by The New Zealand Ice Cream Manufacturers' Association (Inc) (NZICMA).

The templates and other information in these Guidelines may be used for the purposes of designing, implementing, operating, and maintaining a Food Safety Programme (FSP) or Risk Management Programme (RMP).

The New Zealand Ice Cream Manufacturers' Association (Inc)
PO Box 9364
WELLINGTON

Contents

Contents	i
1.0 About these Guidelines	1
1.1 Owner/Sponsor of the Guidelines for Ice Cream	1
1.2 Maintenance and Review of the Guidelines for Ice Cream	1
1.3 Purpose of the Guidelines for Ice Cream	2
1.4 Scope of the Guidelines for Ice Cream	3
1.5 HACCP Principles	4
1.6 Instructions for Use of Guidelines for Ice Cream for the Development of a Programme	5
2.0 Components of a Food Safety Programme/Risk Management Programme	7
2.1 Scope of your Programme	7
2.2 Authorities and Responsibilities	8
2.3 Product Name and Intended Purpose (intended use/intended consumer)	8
2.4 Limits – From a Food Safety Perspective	10
2.5 Process Flow Description	14
2.6 HACCP identification and analysis	17
3.0 Supporting Systems – Process-Related Activities	35
3.1 Purchasing and Acceptance of Incoming Goods	35
3.2 Food Contact Materials – Equipment and Packaging	39
3.3 Raw Dairy Ingredients	40
3.4 Hygienic Processing	42
3.5 Processing of Inclusions	46
3.6 Control of Foreign Matter by Filtration	47
3.7 Cleaning and Sanitation	48
3.8 Process Monitoring	53
4.0 Supporting Systems - Premises, Facilities, Equipment, People & Services	58
4.1 Design of Premises and Equipment	58
4.2 Repairs and Maintenance of Premises and Equipment	60
4.3 Calibration	62
4.4 Personal Hygiene	64
4.5 Potable Water	66
4.6 Product Contact Air	68
4.7 Pest Control	70
4.8 Waste Disposal	72
4.9 Handling and Storage of Raw Materials and Finished Products	73
4.10 Refrigeration Management (chiller/freezer, processing rooms)	78

5.0	Supporting Systems – Other Programme Activities	80
5.1	Laboratory Facilities, Equipment and Methodology	80
5.2	Traceability and Labelling	82
5.3	Corrective Action (including non-conformances, complaints, recalls)	84
5.4	Training	89
5.5	Documentation and Record Keeping	91
5.6	Validation	93
5.7	Operator Verification	96
5.8	Programme Approval or Registration (regulator roles, auditor roles)	98
	Appendix 1: Definitions	101
	Appendix 2: Background Information on Food Safety Hazards	104
	Appendix 3: Information on New Zealand Food Legislation for Specialist Ice Cream Makers	117
	Attachments (examples of forms)	123
	Attachment 1: Internal Audit Checklist	123
	Attachment 2: Delivery Record – Ambient Deliveries	130
	Attachment 3: Delivery Record – Chilled/Frozen Deliveries	131
	Attachment 4: Storage Temperature Record	132
	Attachment 5: Batch Production Record	133
	Attachment 6: Supplier Assessment – Questionnaire	134
	Attachment 7: Supplier Assessment – Audit	140
	Attachment 8: Thermometer Check	143
	Attachment 9: Procedure for Corrective Action	144
	Attachment 10: Cleaning Schedule	145
	Attachment 11: Training Record	146
	Attachment 12: Pest Control Inspection Sheet	147
	Attachment 13: Staff Sickness Record	150
	Attachment 14: Customer Complaint Record	151
	Attachment 15: Check Sheet to Review Label Requirements of the ANZ Food Standards Code	152

1.0 About these Guidelines

1.1 Owner/Sponsor of the Guidelines for Ice Cream

The owner and sponsor of these Guidelines is:

The New Zealand Ice Cream Manufacturers' Association (Inc).
PO Box 9364
WELLINGTON.

1.2 Maintenance and Review of the Guidelines for Ice Cream

The maintenance and review of the success of the Guidelines for Ice Cream will be a permanent agenda item at the Annual General Meeting of The New Zealand Ice Cream Manufacturers' Association (Inc).

The Guidelines will be reviewed with input from the stakeholders. The stakeholders are identified as:

- the general public who consume ice cream;
- all ice cream manufacturers;
- New Zealand regulators;
- third party auditors.

The review shall consider the impact of:

- any legislative changes that affect the Guidelines;
- the review of any Ministry for Primary Industries (MPI) Dairy Standards;
- review of public health data on foodborne outbreaks for the past year;
- review of any international audits conducted;
- any major changes to the ice cream industry (e.g. new technologies or science, new equipment, new ingredients);
- any third party agency concerns or recommendations;
- audit standards and the application of audits by third party auditors;
- review of information gained from the implementation of Programmes.

Important:

The above information is to be requested from the regulators one month prior to the Annual General Meeting by the chairperson of The New Zealand Ice Cream Manufacturers' Association (Inc.) or by a designated person.

The review will be chaired by the chair of the Technical Committee of the above association. The session will be open to all parties having an interest in the Guidelines for Ice Cream, and will be advertised on the Ice Cream Manufacturers' Association (Inc.) website prior to the Association's meeting.

1.3 Purpose of the Guidelines for Ice Cream

The Guidelines contain requirements for the safe production of ice cream.

- The Guidelines form a basis from which businesses can develop a **Food Safety Programme (FSP)** for the production of ice cream in New Zealand and for its sale in New Zealand and Australia if manufacturing under the *Food Act 1981*.
- The Guidelines and additional requirements under the *Animal Products Act 1999* and any Overseas Market Access requirements (OMARs) form a basis from which businesses can develop a **Risk Management Programme (RMP)** for the export of ice cream from New Zealand to any country.

The requirements are ways which industry and the regulators have agreed are suitable for achieving effective control of food safety hazards.

A purpose of the Guidelines is to make the implementation of a programme easier. It does this by:

- providing a format and information for hazard analysis and critical control point identification that can be edited and used directly;
- providing information about supporting systems that state the **criteria** that need to be met, and where possible, providing **examples of procedures** that can be edited and used directly;
- providing information that needs to be included and used directly;
- providing forms for record keeping that can be edited and used directly.

Note: In this document the terms **Food Safety Programme (under the *Food Act 1981*)** and **Risk Management Programme (under the *Animal Products Act 1999*)** are used. For export production some additional requirements may be required; these are known as Overseas Market Access Requirements (OMARs). These may be accessed at www.foodsafety.govt.nz.

Hereafter in these Guidelines, a Food Safety Programme and a Risk Management Programme will be referred to as a Programme.

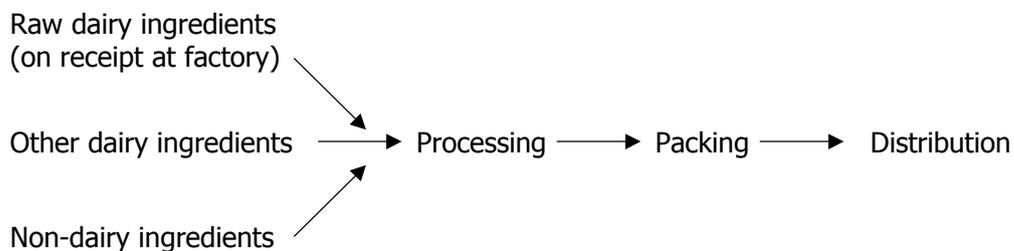
Food Safety Programmes must comply with the requirements of the *Food Act 1981*, the *Food (Safety) Regulations 2002* and the joint Australia New Zealand Food Standards Code.

In addition, Risk Management Programmes must also comply with the requirements of the *Animal Products Act 1999*, *Animal Products (Dairy) Regulations 2005*, *Animal Products (Risk Management Programme Specifications) Notice 2008* and the *Animal Products (Dairy Processing Specifications) Notice 2006*.

1.4 Scope of the Guidelines for Ice Cream

The scope of the Guidelines is from receipt of raw dairy ingredients through to distribution and the primary aim is to manage food safety.

The following diagram illustrates the scope:



The Guidelines include typical processes for:

- ice cream, as defined by the Australia New Zealand Food Standards Code (FSC); and
- frozen dessert systems, which include:
 - gelato and sorbet
 - water ices
 - frozen yoghurts
 - milk ices
 - ice confections
 - soft serve wet mixes with frozen step.

References throughout the Guidelines to “ice cream” or “finished product” should be interpreted (as appropriate) as references to any of the above processes and their associated products.

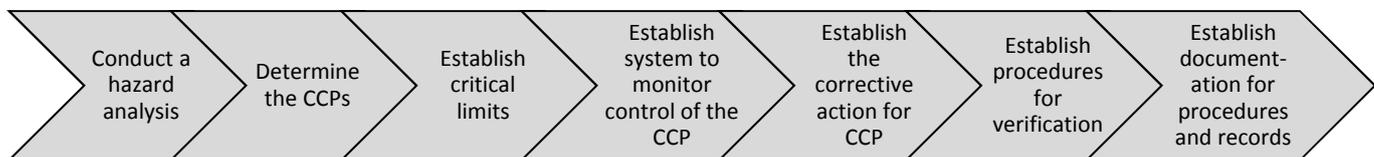
For individual users of the Guidelines, this is a guide to developing a Programme. Users will need to put in their own information for the scope of their programme (see later).

1.5 HACCP Principles

Hazard Analysis and Critical Control Point (HACCP) is defined by the Codex Alimentarius Commission as “*the process for collecting and evaluating information on hazards and conditions leading to their presence to decide which are significant for food safety and therefore should be addressed in the HACCP Plan*”.

The Codex definition of hazard is “*a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect*”.

HACCP is a management tool to assess food safety hazards (either biological, chemical or physical) and to identify Critical Control Points (CCPs) to eliminate or control these hazards to acceptable levels.



The following outlines the principles of HACCP and stages in the implementation of HACCP.

- Principle 1** *Conduct a hazard analysis.* Hazard analysis is the process of collecting and evaluating information on hazards and conditions leading to their presence in order to decide which are significant for food safety and therefore should be addressed in the HACCP Plan.
- Principle 2** *Determine the Critical Control Points (CCPs).* A “Critical Control Point” is a step at which control can be applied and is essential (CCP) to prevent or eliminate a food safety hazard or reduce it to an acceptable level.
- Principle 3** *Establish critical limits.* A critical limit is a criterion that separates acceptability from unacceptability.
- Principle 4** *Establish a system to monitor control of the CCP.* Monitor is the act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control.
- Principle 5** *Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control.* Corrective action is any action to be taken when the results of monitoring at the CCP indicate a loss of control.
- Principle 6** *Establish procedures for verification to confirm that the HACCP system is working effectively.* Verification is the application of methods, procedures, tests and other evaluations, in addition to monitoring to determine compliance with the HACCP Plan.
- Principle 7** *Establish documentation concerning all procedures and records appropriate to these principles and their application.*

Information about the HACCP principles

Further information about the HACCP principles and guidelines for their use is available on the Web at www.codexalimentarius.net. Other information is available from MPI at www.foodsafety.govt.nz.

1.6 Instructions for Use of Guidelines for Ice Cream for the Development of a Programme

The New Zealand Guidelines for Ice Cream is a reference and support document for the development of a Programme for an ice cream manufacturer.

The purpose of the Guidelines is to provide advice and guidance for the manufacture and storage of ice cream in order to provide products that are safe to consume.

The Guidelines have been designed to facilitate the development of a Programme. To develop a Programme, start at section 2.0, “Components of a Food Safety Programme/Risk Management Programme” and work through each sub section. Continue working through sections 3.0, 4.0 and 5.0 on supporting systems.

Throughout the Guidelines the words “may”, “must”, “shall” and “should” are used.

- Where the words “must” or “shall” are used, these items are essential to your Programme. They are mandatory.
- Where the words “may” or “should” are used, these are matters that need to be considered, and a decision made as to whether or not to include as part of your Programme. In other words, they are recommendations.

If you are not familiar with the requirements of a Programme, the relevant legislation, or the HACCP principles, it is strongly recommended that you attend a training course or consult someone with the necessary competency.

It is important to note that you will need to complete your own hazard analysis based on your manufacturing process flow diagram. You may use the information in section 2.6, “HACCP Worksheets” as a template and edit it accordingly.

Where information in these Guidelines is directly applicable to your Programme, you may refer to, or insert a copy of it, in your Programme. Where information in these Guidelines is relevant, but has omissions or needs amendment, you should take the electronic version of the appropriate section and edit it accordingly.

Important Notes:

1. The hazard analysis offered in the Guidelines relies heavily on the supporting systems being effective, and controlling the hazards for which they were designed.

If hazards, which are meant to be controlled by a supporting system, are not effectively controlled at levels of acceptability, then you must make changes to achieve effective control.

If, for some reason, this is not possible, you may need to examine the assumptions made in the hazard analysis in these Guidelines, and reconsider the nature of the supporting systems and/or the Critical Control Points.
2. It is essential to include corrective actions when developing your Programme. Identify what corrective actions must be taken in the event of a critical control point failure.
3. Monitoring is an important part of your Programme.

2.0 Components of a Food Safety Programme/Risk Management Programme

2.1 Scope of your Programme

Your programme will require	Yes/No	Action
Procedures?	Yes	A scope statement shall be prepared.
Records?	No	

Outcomes

Your programme must state:

- the location of the premises used, and where necessary, a unique identifier for the location;
- the scope of the operations, including physical boundaries, to be covered by the programme;
- the products made (e.g. categories, brands);
- the processes used.

Example

ABC Ice Cream Company Ltd Scope Statement	
Prepared by J Wilson	Date: 1 February 2003
The following are the details of the scope of the Programme for the manufacture of ice cream at ABC Ice Cream Ltd.	
Products:	5 l, 2 l, 500 ml, novelty lines
Brands:	Brent's Best ABC Super Cool
Processes:	Treated cream purchased All processes are mix and freeze Chocolate coating Range of fruit and nuts added pre-freezing
Legal owners:	ABC Ice Cream Limited
Contact details:	123 Main Road, Masterton Phone (06) 123-4567 Email: jack@abccream.co.nz

Personnel:	J Wilson is the manager. T Thomas co-ordinates the Programme, OSH procedures, and reports directly to J Wilson.
Product recall:	T Thomas is responsible for co-ordinating any complaint or product recall.
Authorities and responsibilities:	S Smith is responsible for staff training

2.2 Authorities and Responsibilities

Your programme will require	Yes/No	Action
Procedures?	Yes	Statements of management responsibility and authority shall be documented.
Records?	No	

Outcomes

Your programme must state:

- the name of the manager of the business;
- the person(s) responsible for the operation of your programme;
- the person who is legal owner of the business;
- responsibilities and authorities in relation to Critical Control Points, supporting systems, and verification, where appropriate.

Example

See information in the example given in section 2.1, “Scope of your Programme”.

Other responsibilities and authorities

Statements, responsibilities and authorities in relation to verification activities, Critical Control Points and supporting systems should be included in the procedures that make up this programme.

More detailed comments are made in the various sections of this document.

2.3 Product Name and Intended Purpose (intended use/intended consumer)

Your programme will require	Yes/No	Action
Procedures?	Yes	Include information about the intended use and at risk customers.
Records?	No	

Outcomes

The product description programme shall include:

- products, names and brands (see scope statement);
- product use (e.g. consumer sale, further processing);
- intended customer (e.g. general human consumption or specific groups of the population (e.g. high-risk groups)).

The product description may also include the following (you may wish to include this information on product description at this stage in your programme):

- ingredients;
- specifications;
- product storage requirements;
- preparation and serving procedures;
- packaging used;
- transport and distribution;
- label warnings.

Example: product information and intended use

	Details
Product use(s)	For sale to consumers, directly or in trade.
Intended customers	General population including high-risk groups.
Ingredients	Cream, sugar, milk powder, stabilisers, emulsifiers, flavourings
Product composition (specifications, formulations)	See specification tables (confidential).
Product Storage Requirements	Storage life is 2 years. Storage and transport must be below minus 25°C.
Preparation and Serving Procedures	All products are sold in consumer packs.
Packaging	Tubs and foil wraps.
Transport and distribution	Product is delivered by freezer truck.
Label Warnings	Labelling in accordance with ANZ Food Standards Code

2.4 Limits – From a Food Safety Perspective

Your programme will require	Yes/No	Action
Procedures?	Yes	A business shall establish in its Programme.
Records?	No	

Linkages

Section 3.8, “Process Monitoring”.

Section 5.6, “Validation”.

Section 5.7, “Verification”.

Outcomes

The limits in your programme must be measurable criteria, where possible, for biological, chemical, and physical hazards.

A regulatory limit is a measurable regulatory requirement that is critical to the fitness for intended purpose e.g. pasteurisation parameters for milk. Regulatory limits must be documented in your programme and must be met. You must consider all relevant legislation.

Operator-defined limits are measurable limits that are established by you to manage the fitness for intended purpose of your products. These are limits that are essential for food safety but have not been set in legislation for the specific product or risk factor of concern.

Examples of possible operator-defined limits are:

- intrinsic parameters of the final product (e.g. moisture content or water activity)
- microbiological criteria defining the maximum acceptable level of a hazard in a product for food safety.
- maximum levels of physical hazards (e.g. foreign material such as rubber, fibres, metal); and
- maximum levels of chemical hazards.

You must demonstrate that the operator-defined limits are appropriate to your product, considering its intended use, intended consumer and expected handling after leaving your control.

A business may also prepare specifications for other biological, chemical, physical, sensory and functional characteristics that the business is targeting for quality control and customer purposes. These are not addressed in these Guidelines.

Testing requirements are matters are addressed under section 3.8, “Process Monitoring”, section 5.7, “Verification” and section 5.8, “Validation”.

Limits – for biological hazards

The finished product shall be **safe to consume**. It shall not contain pathogens at levels that can lead to food-borne illness.

The following are suggested standards for businesses operating in accordance with these Guidelines.

Aerobic Plate Count @ 30°C less than 100,000 cfu/g

(Note: The above Aerobic Plate Count standard will not be applicable to frozen yoghurt. Manufacturers of frozen yoghurt have to set their own limits).

Coliforms or *enterobacteriaceae* less than 100 cfu/g

Term	Meaning
Aerobic Plate Count @ 30°C, for 3 days	This gives a general indication of the hygienic quality. Large numbers of mesophilic aerobic bacteria, irrespective of their origin, exceeding the above standard may be considered as an indication of unsatisfactory hygienic conditions or highly contaminated raw materials.
Coliforms	Coliforms are heat-sensitive bacteria and are easily destroyed by pasteurisation. Their presence in the product after pasteurisation indicates post-pasteurisation contamination or inadequate heat treatment. Coliforms may be pathogenic and their presence is an indicator of non-hygienic conditions.

Testing for indicator bacteria is generally quicker than testing for specific pathogens. Indicator bacteria are not normally harmful to health but can be regularly isolated from test samples in sufficient numbers to provide useful information on the microbiological quality of the ingredients, the processing environment and how these change over time. Since most laboratory tests will return a numerical result, indicator numbers can be plotted on a graph showing microbiological trends.

Enterobacteriaceae

These are a large and diverse collection of more than 30 different species of bacteria. The numbers of *Enterobacteriaceae* present in a test sample can be thought of as a general indicator of the degree of contamination acquired from faecal material, contaminated water, insects, wildlife, soil, etc. The testing of ice cream product for *Enterobacteriaceae* should provide important information on the hygienic status of the processing lines. High levels of *Enterobacteriaceae* may then trigger investigative sampling for pathogens.

Coliforms and faecal coliforms

Coliforms are a subgroup of the *Enterobacteriaceae*. Some members of the coliform group can also be isolated from the environment although they are a better indicator of contamination from faeces than the true *Enterobacteriaceae*. Faecal coliforms are a sub group of the coliforms and they are isolated using a higher incubation temperature. The use of a higher incubation temperature selects for bacteria that have been recently deposited or shed. A very high percentage (more than 80%) of a faecal coliform count is typically made up of *E. coli*.

A positive product test for faecal coliforms or *enterobacteriaceae* indicates pathogenic bacteria may be present. Procedures should be in place to trigger further testing and investigation if a positive test result is obtained. At this point, testing for Salmonella should also be undertaken.

E. coli

E. coli is an indicator for the faecal contamination of water or milk as *E. coli* is found in the faeces of all warm-blooded animals. Most *E. coli* do not cause illness in humans however *E. coli* O157 is one individual sub group of *E. coli* that may cause foodborne illness.

The hygiene of the plant and equipment should be monitored using a documented environmental sampling programme, including Listeria. The environmental sampling programme should outline the action taken if a positive test result is obtained.

Trend analysis of product and environmental microbiological test results is a useful tool to indicate when action needs to be taken eg to initiate additional hygiene measures in specific areas of the plant. See section 3.8.

Product safety limits (PSLs) for Pathogenic Bacteria (Human Consumption)

Pathogen	General PSLs ^{1,3}	Specific PSLs ^{2,3}	Explanatory Notes / Comments
<i>Salmonella</i> spp.	ND/25g	ND/250g	ND = not detected in the volume tested Composite of samples collected throughout the production run as defined by the manufacturer's RMP
<i>L.monocytogenes</i>	ND/25g ⁴	ND/25g	ND= not detected in the volume tested Composite of samples collected throughout the production run as defined by the manufacturer's RMP
Coagulase Positive Staphylococci (<i>S. aureus</i>)	1000/g	100/g	It is critical that sampling and testing are performed in a way that correctly estimates the maximum number of <i>S. aureus</i> reached in a product. This is important because the risk posed by released enterotoxin is 'estimated' by the bacterial load
<i>B.cereus</i>	1000/g	100/g ⁵	
<i>E.coli</i>	100/g	10/g	

¹ General PSLs: For product to be consumed by the general population.

² Specific PSLs: For products that are specifically designated for, and are likely to form, a substantial part of the dietary intake of more susceptible members of the population (i.e. infants and young children, the old, pregnant and immunocompromised).

³ Sampling Rates: If testing is required, the rate of sampling for each organism/product combination should be decided as part of a HACCP analysis performed on the manufacturing process

⁴ Listeria monocytogenes: A figure of 100/g has been proposed by the Joint FAO/WHO Food Standards Programme, Codex Committee on Food Hygiene in the "Draft Guidelines for the Control of Listeria monocytogenes in Foods" and is obtaining increasingly wide acceptance. In the future, it may be appropriate to adopt a PSL of 100/g in circumstances where it can be shown that growth is extremely unlikely to occur during the life of the product. However, before this occurs, MPI and the dairy industry will need to be convinced that the 100/g figure has become accepted by reputable food safety authorities worldwide.

⁵ Bacillus cereus: This limit only applies to product designated as infant formula

This information is from the document DPC 1: Animal Products (Dairy): Approved Criteria for General Dairy Processing. The document can be found on the MPI website.

Various methods, including rapid test methods, are available for process monitoring, validation, and verification. Refer to the section 3.8, “**Process Monitoring**”, section 5.6, “**Validation**” and section 5.7, “**Verification**” for further details.

A business may establish specific limits for biological hazards.

Limits – for physical hazards

The finished product shall be **safe to consume**. It shall not contain foreign objects (e.g. glass, plastic, wood, walnut shell), which may cause injury or distress to the consumer.

A business may establish specific limits for physical hazards. These may be expressed in terms of a product specification as in the example given below for walnut ice cream.

Parameter e.g. additive	Specification (ANZ Food Standards Code example)
Walnut shell	May contain small fragments

Limits – for chemical hazards

The finished product shall be **safe to consume**. It shall not contain food additives, chemicals or processing aids (e.g. emulsifiers, stabilisers, flavours, colours) in excess of the levels stated in the ANZ Food Standards Code).

A business may establish specific limits for chemical hazards.

It shall not contain chemicals from water supply and treatment, and from cleaning practices at levels that might be unsafe.

If label claims are made which assert the absence of particular substances (e.g. the absence of peanut protein, lactose, gluten) that may cause an allergic reaction, your programme must identify these hazards and the controls that are used to assure absence.

The levels of toxic trace metals in dairy product shall not exceed the limits specified in the ANZ Food Standards Code (Standard 1.4.1 Contaminants and Natural Toxicants). Maximum residue limits (MRLs) and extraneous residue limits (ERLs) are published by Codex and the New Zealand (Maximum Residue Limits of Agricultural Compounds) Food Standards 2002.

2.5 Process Flow Description

Your programme will require	Yes/No	Action
Procedures?	Yes	A flow description must be prepared for the manufacturing processes used by the business.
Records?	No	

The following flow chart is a broad description of the process for making ice cream. It may not be applicable for some products e.g. frozen yoghurt, where hazards associated with additional steps such as fermentation will need to be addressed.

In the process illustrated in this section, raw milk (milk that is not filtered or heat treated) or other raw dairy ingredients used as an ingredient in the ice cream manufacturing process will need to meet the requirements for raw milk harvesting, collection and supply (harvesting of milk must be covered by a risk management programme.)

At the product/programme level, a detailed process description is needed. This may be expressed as a flow chart or a written description. All steps need to be identified so that hazard analysis identifies all likely hazards and their causes.

An ice cream business should adapt this flow chart for its own business by appropriate editing and, as necessary, adding, deleting or amending information. Add additional details such as temperatures and times specific to your process.

It is suggested that the team developing your programme “walks the floor” to ensure that the flow chart is representative of what happens and to check for hazards that may not be apparent in the meeting room.

Generic Ice Cream Process Overview

Process flow step	CCP or Control Measure (CM)? (see note below)	Objective of step	Inputs
1. Design product	CM	Food safety objectives met while meeting new product brief	
2. Purchase ingredients (including milk) and packaging	CM	Ensure supplier can meet FSP/ RMP requirements Ingredients supplied meet the requirements of the ANZ Food Standards Code Ingredients selected for functionality	
3. Receive ingredients and packaging	CM	Ensure ingredients receipted in, meet raw material specification	
4. Store ingredients and packaging	CM	Ensure ingredients stored correctly to protect from degradation and deterioration of ingredient quality	

Process flow step	CCP or Control Measure (CM)? (see note below)	Objective of step	Inputs
5. Measure ingredients	CM	Correct quantity of ingredient added Current date-marked ingredient used	Food ingredients which meet the requirements of the ANZ Food Standards Code Raw dairy ingredients
6. Mix tank	CM	To ensure a uniform distribution of all the ingredients for subsequent efficient treatment Proteins and stabilising agents begin to hydrate Opportunity for microbiological amplification	
7. Filter	CCP (optional) CM	Removes foreign matter Removes clumped ingredients e.g. stabiliser	
8. Heat treatment	CCP (raw milk) CM (ingredients previously pasteurised)	Heat treatment to ensure pasteurisation	
	CM	Degree of hydration of the water binding substances is increased Whey proteins partially destabilised Protein substances and the milk reactive stabilising agents form complexes Activate the emulsifier (5 to 10°C higher than the dropping point)	
9. Homogenisation		Basis of the ice cream structure is formed Aim is to make a stable and uniform suspension of the fat	
10. Cooling	CM	Rapidly reduce temperature after heat treatment to below 4°C Reduces opportunity for microbiological amplification	
11. Ageing vat	CM	Opportunity for microbiological amplification as average minimum ageing time required is between two to 20 hours Can check for the presence of heat sensitive organisms e.g. coliforms prior release of product batches Allows the proteins and the stabilising agents to obtain complete water hydration Adsorption of proteins and emulsifiers continues Subcooled fat is allowed the opportunity to crystallise	

Process flow step	CCP or Control Measure (CM)? (see note below)	Objective of step	Inputs
12. Colour and flavour Addition of inclusions	CM	Limit holding time to reduce opportunity for microbiological amplification Can check for the presence of heat sensitive organisms e.g. coliforms prior to release of product batches	Food ingredients not heat treated added after this point e.g. colour/flavour/fruit/water
13. Churn	CM	Reduce temperature of ice cream base mix to below 0°C Preservation step Introduction of inclusions into the ice cream Final formation of the structure takes place Approximately 50% of the water content of the mix is frozen to ice Air is incorporated and distributed through the ice cream as small air cells Fat globules agglomerate and coalesce Formation of ice crystal nuclei	Food ingredients not heat treated added at this point e.g. inclusions such as confectionery, ripples Air
14. Package	CM	Protects finished product	Packaging
15. Harden	CM	Further freezing of water takes place (10–15 percent of water remains unfrozen)	Note: Guidelines for soft serve base mix process ends at this point
16. Store in freezer	CM	Protects finished product Heat shock commences	
17. Distribution	CM	Maintain finished product as cold as possible, preferably -18°C or colder, with minimum temperature fluctuation. It is intended that the product shall be consumed frozen.	

Note:

1. The choice of Critical Control Points must be based on the “decision tree” described in the Codex HACCP guidelines.
2. Where a Critical Control Point is described as optional in the table, each business must determine whether hazards are likely to occur in accordance with the Critical Control Point determination process.

2.6 HACCP identification and analysis

Your programme will require	Yes / No	Action
Procedures?	Yes	This section must either be adapted or a new section developed which is equivalent.
Records?	No	

Preparation of HACCP worksheets

This section details the information about the way in which the hazard analysis can be applied to an ice cream operation, and Critical Control Points established.

The subsequent pages provide a detailed analysis of the hazards and control measures that may apply to a typical ice cream process.

This analysis of hazards models a typical ice cream process, and care is required if a business has other steps that introduce other hazards, or the analysis applies to other products and processes.

Sometimes hazards are identified that are particular to a business, or to a certain type of product e.g. frozen yoghurt, and care is required to identify these and to apply the appropriate controls.

The analysis is based on the assumption that the supporting systems are in place and are effective. This analysis therefore includes only the hazards arising from process inputs and the process steps themselves.

In this presentation, Hazards and Control Measures (Principle 1) are identified at each step. Critical Control Points (Principle 2) are also recommended where appropriate. Critical Limits (Principle 3), Monitoring (Principle 4) and Corrective Action (Principle 5) are included only if a Critical Control Point is present. Information about Verification (Principle 7) and Procedures and Records (Principle 6) is covered where appropriate, but otherwise addressed in the various sections on supporting systems.

A hazard analysis will need to be conducted for each individual process.

An ice cream business may adapt the HACCP information on the following pages for its own business by adding, deleting or amending information in this section. This can be included directly in a Programme.

There are alternative ways of presenting hazard analysis information (such as the use of tables and charts); a business may do this but should comment on the source of the methodology used in its programme.

Step 1, 2 – Purchase and receipt of ingredients**Principle 1 (conduct a hazard analysis)**

An ice cream business should list all the ingredients that it uses. List these here or on an attached sheet. Identify all suppliers likely to be used. Include treated dairy ingredients. See also the list of ingredients and hazards in section (13).

e.g. egg pulp, supplied by ABC Egg Company.

(i) Hazard – Something biological, chemical or physical that can cause an adverse health effect.

(a) Potential for pathogens to be present.

e.g. egg pulp may contain pathogens such as *Salmonella*

Note – Toxin production must also be considered eg Aflotoxins.

(b) Foreign matter may be present if the product is contaminated by the manufacturer.

e.g. sugar may contain foreign matter such as stones, packaging debris.

(c) Chemical contamination may be present if the product is contaminated by the manufacturer.

e.g. egg pulp may contain pesticide residues.

An ice cream business should provide further examples of hazards that are likely to be associated with each ingredient. Ingredients with common hazards may be grouped.

(ii) Control – any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.

Either:

- require any supplier to have an approved programme; and/or
- require any supplier to be registered by the local council and be working towards a programme (to be completed in one year); and/or
- issue supplier specifications and inspect each product; and/or
- if the ingredient is likely to be contaminated with pathogens, heat treatment on-site is necessary (see step 4); and/or
- visually inspect ingredients at receipt.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.1, “Purchasing and Acceptance of Inwards Goods”.

Principle 2 (determine the critical control points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended where hazards are effectively controlled by the supplier or a later control measure in the ice cream process (either by a Critical Control Point or a supporting system). This should be reconsidered by a business if there are ingredients that contain high levels of hazards.

Note:

1. It is assumed that the controls agreed and established with the supplier allow ingredients to be received with hazards at or below acceptable levels, recognising the control that may occur at subsequent process steps and through supporting systems. Control is implemented through procedures for purchasing and inwards inspection. If this assumption is not correct, the suitability of the controls must be revisited.
2. It is noted that subsequent steps involve heat treatment and filtration. Where there is no subsequent step for heat treatment, such as for some inclusions, controls must be more stringent.

Step 2, 3 – Purchase and receipt of packaging**Principle 1 (conduct a hazard analysis)**

An ice cream business should list all packaging items that it uses. List these here or on an attached sheet. Identify all suppliers likely to be used.

e.g. plastic tubs supplied by XYZ Extruders.

- (i) **Hazard** – Something biological, chemical or physical that can cause an adverse health effect.
 - (a) Potential for pathogens to be present.

e.g. pathogens that can contaminate items during handling, transport and storage, such as *Salmonella* from bird droppings.
 - (b) Foreign matter contamination may be present if the packaging is contaminated by the manufacturer.

e.g. glass, plastic from the process environment.
 - (c) Chemical contamination may be present if the ingredient is contaminated by the manufacturer.

e.g. pesticides from incorrect fumigation practices, chemical hazards from manufacturing process or chemical residues from packaging

An ice cream business should provide further examples of hazards that are likely to be associated with each package.

(ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.

Either:

- require any supplier to have an approved programme; and/or
- require any supplier to be registered by the local council and be working towards a programme (to be completed in one year); and/or
- issue supplier specifications; and/or
- visually inspect packages at receipt for evidence of spoilage or contamination by foreign matter.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.1, “Purchasing and Acceptance of Inwards Goods”.

Section 3.2, “Food Contact Materials – Equipment and Packaging”.

Principle 2 (determine the critical control points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended where hazards are controlled by the supplier. This should be reconsidered by a business if there are package types that contain high levels of hazards, and which are not effectively controlled by the supplier or a control measure in the ice cream process (either by a Critical Control Point or a supporting system).

Note:

It is assumed that the controls agreed and established with the supplier allow packaging to be received with hazards at or below acceptable levels, recognising the control that may occur at subsequent process steps and through supporting systems. Control is implemented through procedures for purchasing and inwards inspection. If this assumption is not correct, the suitability of the controls must be revisited.

Step 2, 3 – Purchase and receipt of raw dairy ingredients

Principle 1 (conduct a hazard analysis)

An ice cream business should list all suppliers of raw dairy ingredients that it uses. List these here or on an attached sheet. Include other ingredients under Step 1,2 – Purchase and receipt of ingredients.

e.g. raw cream supplied by Independent Dairy Company.

(i) **Hazard** – something biological, chemical or physical that can cause an adverse health effect.

(a) Pathogens which may have originated from the cow, dairy shed or transport may be present in the raw milk.

e.g. raw cream may contain *Salmonella*, *Listeria*, *Mycobacterium bovis* (TB), *Clostridium perfringens*, *Bacillus cereus*.

High somatic cell count may also be present, but this is more likely to indicate quality defects. High somatic cell counts may also be indicative of pathogens present in the udder.

(b) Physical hazards may occur with extraneous matter from the farm dairy shed or from the transport vehicle entering the product.

e.g. raw cream may contain dirt, rubber, glass, plastic, metal.

(c) Chemical residues from the cow, dairy shed or transport maybe present.

e.g. raw cream may contain antibiotics, pesticides.

An ice cream business should provide further examples of hazards that are likely to be associated with raw milk or cream.

(ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.

(a) Risk Management Programme for farm, including farm dairy and transport (mandatory).

(b) Heat treatment during processing (see Step 4 in this section).

(c) Filtration during processing (see Step 4 in this section).

(d) Chemical residue testing (e.g. pesticides, etc.) programme (within the Product Safety Programme)

(e) Contractual arrangements for supply (with farmer or with supplying company).

(f) Inhibitory substances (e.g. antibiotics) and other testing at receipt to factory.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.1, “Purchasing and Acceptance of Incoming Goods”.

Section 4.9, “Handling and storage of raw materials and finished products”.

Principle 2 (determine the Critical Control Points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended if hazards are controlled by the supplier. This should be reconsidered by a business if the raw dairy ingredients contain hazards that are not effectively controlled by the supplier or a control measure later in the ice cream process.

Note:

It is noted that the controls agreed and established with the supplier allow raw dairy ingredients to be received with biological and physical hazards **at unacceptable levels**, recognising that heat treatment and filtration will occur at subsequent process steps.

Step 4 – Storage of raw dairy ingredients, ingredients, and packaging

Principle 1 (conduct a hazard analysis)

- (i) **Hazard** – something biological, chemical or physical that can cause an adverse health effect.
- (a) Pathogens may increase if liquid ingredients are stored for excessive time and temperature.
e.g. pathogens in raw dairy ingredients if not kept chilled, such as *Listeria* and *Salmonella*.
e.g. aflotoxins during storage (nuts etc).
 - (b) Foreign matter from the environment and storage containers.
e.g. foreign matter such as wood and stones if outer packaging of ingredients is damaged.
 - (c) Chemical residues from cleaning or the storage environment.
e.g. cleaning residues following cleaning.

An ice cream business should provide further examples of hazards that are likely to be associated with the storage of raw dairy ingredients, ingredients and packaging.

- (ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.
- (a) Check “best before” dates, and ensure that packaging is intact.
 - (b) Ensure ingredients and raw dairy ingredients are kept at correct temperatures and for correct times.
 - (c) Ensure materials are stored and protected from contamination.
 - (d) Retest raw material prior to use.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.7, “Cleaning and Sanitation”.

Section 4.9, “Handling and Storage of Raw Materials Finished Product”.

Principle 2 (determine the Critical Control Points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended if effective control measures are implemented through procedures identified above.

This should be reconsidered by a business if there are activities that cause high levels of hazards to be present, and which are not effectively controlled by the control measures in the ice cream process (either by a Critical Control Point or a supporting system).

Note:

It is assumed that the controls agreed and established allow storage of raw dairy ingredients, ingredients and packaging so hazards are at acceptable levels, recognising the control that may occur at subsequent process steps or through supporting systems. If this assumption is not correct, the suitability of the controls must be revisited.

Step 5, 6 – Preparation of ice cream mix**Principle 1**

- (i) **Hazard** – Something biological, chemical or physical that can cause an adverse health effect.
- (a) Pathogens may increase if time and temperature are not controlled e.g. pathogens from:
- **ingredient sources such as *Salmonella*, *Listeria*, *Mycobacterium bovis* (TB), *Clostridium perfringens*, *Bacillus cereus*;**
 - **environmental sources or from unclean equipment, such as *Salmonella*, *Listeria*, *E. coli*, *Staphylococcus*.**
- (b) Foreign matter from the environment and from ineffective cleaning.
e.g. foreign matter such as wood, stones.
- (c) Chemical residues from cleaning.
e.g. cleaning residues such as nitrates and nitrite following acid cleaning.

An ice cream business should provide further examples of hazards that are likely to be associated with the preparation of ice cream mix.

- (ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.
- (a) Ensure ice cream mix is kept at correct temperatures and extended storage is avoided.
 - (b) Ensure cleaning is effective.
 - (c) Ensure mix vessels are appropriately protected.
 - (d) Eliminate potential foreign matter from the process environment (e.g. by using glass free processing environment).
 - (e) Keep records of batching activities.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.4, “Hygienic Processing”.

Section 3.7, “Cleaning and Sanitation”.

Section 4.9, “Handling and Storage of Raw Materials and Finished Products”.

Principle 2 (determine the Critical Control Points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended if effective control measures are implemented through procedures identified above.

This should be reconsidered by a business if there are activities that cause high levels of hazards to be present, and which are not effectively controlled by the control measures in the ice cream process (either by a Critical Control Point or a supporting system).

Note:

It is assumed that the controls agreed and established allow the preparation of the ice cream mix so hazards are at acceptable levels, recognising the control that may occur at subsequent process steps and through supporting systems. If this assumption is not correct the suitability of the controls must be revisited.

Step 7, 8, 9 – Heat treatment (pasteurisation), filtration and homogenisation**Notes:**

- 1) Heat treatment may not be required if pasteurised milk, cream or eggs are used (i.e. biological hazards are controlled through processes operated by the supplier, say, a dairy factory). If this is the case, the flow chart and hazard analysis should be adapted accordingly.
- 2) Heat treatment (pasteurisation), as considered in this section, is a step specifically designed to destroy vegetative pathogens (but not necessarily spores or microbial toxins).
- 3) Heat treatment may also be used to activate stabilisers and for other technological reasons, although the times and temperatures required are not considered in this analysis.

An ice cream business should amend the flow chart to properly represent the steps in its own process.

Principle 1 (conduct a hazard analysis)

- (i) **Hazard** – Something biological, chemical or physical that can cause an adverse health effect.
 - (a) Pathogens present in raw materials prior to heat treatment may survive if the heat treatment is inadequate.
 - e.g. pathogens from ingredient sources such as *Salmonella*, *Listeria*, *Mycobacterium bovis* (TB), *Clostridium perfringens*, *Bacillus cereus*;**
 - e.g. pathogens from environmental sources or from unclean equipment, such as *Salmonella*, *Listeria*, *E. coli*, *Staphylococcus*.**
 - (b) Foreign matter from ingredients, the environment and from ineffective cleaning.
 - e.g. foreign matter such as wood, stones, metal parts.**
 - (c) Chemical residues from cleaning.
 - e.g. cleaning residues such as nitrates and nitrite following acid cleaning.**

An ice cream business should provide further examples of hazards that are likely to be associated with heat treatment, homogenisation and filtration.

- (ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.
 - (a) Ensure effective heat treatment.
 - (b) Ensure effective filtration of the ice cream base mix.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.4, “Hygienic Processing”.

Section 3.6, “Control of Foreign Matter by Filtration”.

Section 3.7, “Cleaning and Sanitation”.

Principle 2 (determine the Critical Control Points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

- (a) **Optional – heat treatment – a CCP will exist at this point if “raw” dairy ingredients or raw egg products are used or if there are other sources used that cause the base mix to have unacceptable levels of biological hazards.**

This is the last point in the process where an effective heat treatment can be applied to change hazards from unacceptable to acceptable levels.

- (b) **Optional – filtration – a CCP will exist at this point if the hazard analysis identifies unacceptable levels of hazard in the ice cream mix.**

This is the last point in the process where effective filtration can be applied and is able to eliminate or reduce physical hazards from unacceptable to acceptable levels.

Principle 3 (establish critical limits)

Critical limits – accept or reject criteria (applies to CCPs).

- (a) **Heat treatment** – refer to the critical limits in section 3.4, “Hygienic Processing”.
- (b) **Filtration** - minimum practical mesh size.

The business should refer to the detailed information about critical limits in section 3.4, “Hygienic Processing” and section 3.6, “Control of Foreign Matter”.

An ice cream business should state the specific limits that apply at the CCP.

Principle 4 (establish a system to monitor control of the CCP)

Establish the method of monitoring each CCP.

- (a) **Heat treatment** – use temperature measurement, automatic divert and other fail safe devices, as appropriate to the installation and the performance criteria in section 3.4, “Hygienic Processing”.
- (b) **Filtration** – inspection of filter at end of each day for integrity.

The business should refer to the detailed information covering monitoring in section 3.4, “Hygienic Processing” and section 3.6, “Control of Foreign Matter by Filtration”.

An ice cream business should state the specific monitoring actions it uses.

Principle 5 (establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control)

- (a) **Heat treatment** – reject the batch, investigate the reason for loss of control, re-establish control and reprocess the mix.
- (b) **Filtration** – reject the batch, investigate the reason for loss of control, replace the filter medium and reprocess all material at risk.

The business should refer to the detailed information about corrective action in section 3.4, “Hygienic Processing” and section 3.6, “Control of Foreign Matter by Filtration”.

An ice cream business should state the specific corrective actions it takes.

Principle 6 (establish procedures for verification to confirm that the HACCP system is working effectively)

Refer to section 5.6, “Validation” and section 5.7, “Verification”.

An ice cream business should prepare procedures for validation and verification.

Principle 7 (establish documentation concerning all procedures and records appropriate to these principles and their application)

Establish procedures for each Critical Control Point, and keep simple, clear records of all monitoring and corrective action.

e.g. temperature chart, operations log sheet.

An ice cream business should prepare procedures and state any records it uses.

Step 10 – Cooling**Principle 1 (conduct a hazard analysis)**

- (i) **Hazard** – Something biological, chemical or physical that can cause an adverse health effect.
 - (a) Spores may become vegetative and grow if time and temperature are abused.
e.g. *Clostridium* and *Bacillus* spores from raw milk, if mix is cooled too slowly.
 - (b) Pathogens may contaminate if product is cooled in unclean equipment.
e.g. pathogens, such as *E. coli*, *Listeria*, from unclean equipment.
 - (c) Pathogens from cross contamination from “raw” ingredients.
e.g. pathogens, such as *Salmonella*, *E. coli*, from raw cream.
 - (d) Foreign matter from the environment and from ineffective cleaning.
e.g. foreign matter such as wood, stones, metal parts.

(e) Chemical residues from cleaning.

e.g. cleaning residues such as nitrates and nitrite following acid cleaning.

An ice cream business should provide further examples of hazards that are likely to be associated with cooling.

(ii) Control – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.

(a) Ensure ice cream mix is kept at correct temperatures and slow cooling is avoided.

(b) Ensure cleaning is effective.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.4, “Hygienic Processing”.

Section 3.7, “Cleaning and Sanitation”.

Section 4.10, “Refrigeration Management (chiller/freezer, processing rooms).”

Principle 2 (determine the critical control points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended if hazards are effectively controlled through procedures identified above.

This should be reconsidered by a business if there are activities that cause high levels of hazards to be present, and which are not effectively controlled by the control measures in the ice cream process (either by a Critical Control Point or a supporting system).

Note:

It is assumed that the controls for cooling are such that hazards are at acceptable levels, recognising the control that may occur at subsequent process steps and through supporting systems. If this assumption is not correct, the suitability of the controls must be revisited.

Step 11, 12 – Ageing, ingredient addition (pre-churn)

Principle 1 (conduct a hazard analysis)

(i) Hazard – Something biological, chemical or physical that can cause an adverse health effect.

- (a) Spores may become vegetative and grow if time and temperature are abused. Pathogens may grow if the mix is not sufficiently chilled.
e.g. *Clostridium* and *Bacillus* spores from milk, if mix is held warm.
e.g. the slow growth of *Listeria* under chilled conditions and/or extended storage conditions.
- (b) Pathogens may contaminate if product is held in unclean equipment.
e.g. pathogens, such as *E. coli*, *Listeria*, from unclean equipment.
- (c) Pathogens from added ingredients.
e.g. pathogens, such as *Salmonella*, *E. coli*, in the ingredient.
- (d) Pathogens from cross contamination from “raw” ingredients.
e.g. pathogens, such as *Salmonella*, *E. coli*, from raw cream.
- (e) Foreign matter from added ingredients, the environment and from ineffective cleaning.
e.g. foreign matter such as wood, stones, metal parts.
- (f) Chemical residues from cleaning.
e.g. cleaning residues such as nitrates and nitrite following acid cleaning.

An ice cream business should provide further examples of hazards that are likely to be associated with the storage of base mix and the addition of ingredients.

- (ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.
 - (a) Ensure ice cream mix is kept for correct time and at correct temperatures.
 - (b) Ensure cleaning is effective.
 - (c) Ensure ingredients are free of pathogens, foreign matter and chemical contamination.
 - (d) Pre-treat ingredients according to the likelihood of hazards being present.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.1, “Purchasing and Acceptance of Incoming Goods”.

Section 3.4, “Hygienic Processing”.

Section 3.5, “Processing of Inclusions”.

Section 3.7, “Cleaning and Sanitation”.

Principle 2 (determine the Critical Control Points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended if hazards are effectively controlled through procedures identified above.

This should be reconsidered by a business if there are ingredients added at this point that cause high levels of hazards to be present, and which are not effectively controlled by the control measures in the ice cream process (either by a Critical Control Point or a supporting system).

Note:

1. It is assumed that the controls agreed and established are suitable for managing hazards at acceptable levels, recognising the control that may occur at subsequent process steps and through supporting systems. If this assumption is not correct, the suitability of the controls must be revisited.
2. It is suggest that, where possible, flavour and colour is added as late as possible in the process to minimise the opportunity for micro-organisms to grow during storage steps.

Step 13 – Initial freeze in ice cream churn; addition of ingredients (post-churn)**Principle 1 (conduct a hazard analysis)**

- (i) **Hazard** – Something biological, chemical or physical that can cause an adverse health effect.
 - (a) Spores may become vegetative and grow if time and temperature are abused.
e.g. *Clostridium* and *Bacillus* spores from raw milk, if mix is held warm.
 - (b) Pathogens may contaminate if product is held in unclean equipment.
e.g. pathogens, such as *E. coli*, *Listeria*, from unclean equipment.
 - (c) Pathogens from added ingredients.
e.g. pathogens, such as *Salmonella*, *E. coli*, in the ingredient.
 - (d) Pathogens from cross-contamination from “raw” ingredients.
e.g. pathogens, such as *Salmonella*, *E. coli*, from raw cream.
 - (e) Foreign matter from added ingredients, the environment and from ineffective cleaning.
e.g. foreign matter such as wood, stones, metal parts.
 - (f) Chemical residues from cleaning.
e.g. cleaning residues such as nitrates and nitrite following acid cleaning.

An ice cream business should provide further examples of hazards that are likely to be associated with churning and ingredient addition.

- (ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.
- (a) Ensure ice cream mix is kept at correct temperatures and time.
 - (b) Ensure cleaning is effective.
 - (c) Ensure ingredients are free of pathogens, foreign matter and chemical contamination.
 - (d) Pre-treat ingredients according to the likelihood of hazards being present.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.1, “Purchasing and Acceptance of Incoming Goods”.

Section 3.4, “Hygienic Processing”.

Section 3.5, “Processing of Inclusions”.

Section 3.7, “Cleaning and Sanitation”.

Principle 2 (determine the Critical Control Points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended if hazards are effectively controlled through procedures identified above.

This should be reconsidered by a business if there are ingredients added at this point that cause high levels of hazards to be present, and which are not effectively controlled by the control measures in the ice cream process (either by a Critical Control Point or a supporting system).

Note:

It is assumed that the controls agreed and established are suitable for managing hazards at acceptable levels, recognising the control that may occur at subsequent process steps. Control is implemented through procedures in various supporting systems. If this assumption is not correct, the suitability of the controls must be revisited.

Step 14 – Package**Principle 1 (conduct a hazard analysis)**

- (i) **Hazard** – Something biological, chemical or physical that can cause an adverse health effect.
- (a) Pathogens may contaminate if product is held in unclean equipment. It is unlikely that microbes will grow once the ice cream temperature is below 0°C.
e.g. pathogens, such as *E. coli*, *Listeria*, from unclean equipment.
 - (b) Pathogens from cross-contamination from “raw” ingredients.
e.g. pathogens, such as *Salmonella*, *E. coli*, from raw cream.
 - (c) Pathogens from human sources.
e.g. pathogens such as *Staphylococcus*, *Salmonella* from food handler.
 - (d) Chemical residues from cleaning.
e.g. cleaning residues such as nitrates and nitrite following acid cleaning.
 - (e) Foreign matter from packaging and the environment.
e.g. foreign matter such as wood, stones, metal parts.

An ice cream business should provide further examples of hazards that are likely to be associated with freezing and packaging.

- (ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.
- (a) Ensure equipment is clean and staff use hygienic techniques.
 - (b) Ensure cleaning is effective.
 - (c) Ensure hygienic handling when ice cream is packed.
 - (d) Ensure the frozen state is maintained.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 3.4, “Hygienic Processing”.

Section 3.7, “Cleaning and Sanitation”.

Section 4.9, “Handling and Storage of Raw Materials and Finished Products”.

Section 4.10, “Refrigeration Management (chiller/freezer, processing rooms)”.

Principle 2 (determine the critical control points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended if hazards are effectively controlled through procedures identified above.

This should be reconsidered by a business if there are ingredients added at this point that cause high levels of hazards to be present, and which are not effectively controlled by the control measures in the ice cream process (either by a Critical Control Point or a supporting system).

Note:

It is assumed that the controls agreed and established are suitable for managing hazards at acceptable levels, recognising the control that may occur at subsequent process steps and through supporting systems. If this assumption is not correct, the suitability of the controls must be revisited.

Steps 15, 16, 17 – Hardening, storage, distribution

Principle 1 (conduct a hazard analysis)

- (i) **Hazard** – Something biological, chemical or physical that can cause an adverse health effect.
 - (a) Contamination by pathogens if product is damaged and packaging compromised (unlikely under normal conditions).
e.g. pathogens such as *Salmonella*.
 - (b) Contamination by foreign matter if product is damaged and packaging compromised (unlikely under normal conditions).
e.g. foreign matter such as wood, stones.
 - (c) Contamination by chemicals if product is damaged and packaging compromised (unlikely under normal conditions).
e.g. chemicals such as sanitisers and fumigants.

An ice cream business should provide further examples of hazards that are likely to be associated with storage and despatch.

- (ii) **Control** – Any action that can prevent, eliminate or reduce a food safety hazard to an acceptable level.
 - (a) Ensure the frozen state is maintained.
 - (b) Ensure product handling takes place with care.

An ice cream business should identify other control measures that it uses. Include them here and reference the supporting system used.

Links to supporting systems

Section 4.9, “Handling and Storage of Raw Materials and Finished Products”.

Section 4.10, “Refrigeration Management (chiller/freezer, processing rooms)”.

Principle 2 (determine the Critical Control Points)

Critical Control Points (CCPs) – A step at which control can be applied, and which is essential to prevent, eliminate or reduce a food safety hazard to an acceptable level.

A Critical Control Point is not recommended if hazards are effectively controlled through procedures identified above.

This should be reconsidered by a business if there are ingredients added at this point that cause high levels of hazards to be present, and which are not effectively controlled by the control measures in the ice cream process (either by a Critical Control Point or a supporting system).

Note:

It is assumed that the controls agreed and established are suitable for managing hazards at acceptable levels, recognising the control that may occur at subsequent process steps and through supporting systems. If this assumption is not correct, the suitability of the controls must be revisited.

Helpful hint:

You must have adequate controls to prevent cross-contamination.

3.0 Supporting Systems – Process-Related Activities

The following sections provide information about supporting systems that you may use in your programme.

3.1 Purchasing and Acceptance of Incoming Goods

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare procedures for the purchasing and acceptance of incoming goods.
Records?	Yes	Records shall be kept of supplier approval and acceptance of incoming goods.

Linkages

Food Standards Australia New Zealand User Guide, “Overview of Food Labelling”.
<http://www.foodstandards.gov.au/foodstandards/userguides/overviewoffoodlabell1267.cfm>

Outcome

The business shall have effective and documented procedures for purchasing and acceptance of incoming goods (**raw materials, ingredients, packaging**), which ensure they are suitable for the intended purpose.

Criteria for supplier quality assurance

It is important to be satisfied that all materials purchased are of adequate quality and safety.

A system of supplier quality assurance is required to ensure this. Any supplier, including new suppliers, must be chosen and approved on a systematic basis, and only suppliers approved on this basis should be used. The system of approval should relate both to the supplier and the product supplied.

Any change to a product formulation or specification should result in a review of the approval. Approvals should also be reviewed following incidents such as rejected incoming goods or complaints.

The system of approval can be based on a number of criteria. Such criteria include:

- reputation and previous history;
- evidence of registration with statutory authorities, i.e. MPI, local council;
- the supplier having an approved Food Safety Programme or Risk Management Programme;
- certification or accreditation through third party auditing e.g. ISO 9002;
- completion of a questionnaire;
- periodic external auditing.

For examples of forms that could be used, see **Attachment 6: Supplier Assessment - Questionnaire** and **Attachment 7: Supplier Assessment - Audit**.

A specification may be available for incoming ingredients and packaging, in which case, this should be reviewed to ensure that it is appropriate. If a specification is not available, or it is not appropriate, a specification should be discussed with the supplier and agreed. Incoming ingredients and packaging can then be checked against the specification and rejected if unsatisfactory.

Criteria for acceptance of incoming goods

A written procedure shall be followed for receipt of goods. For an example of forms that can be used, see **Attachment 2: Delivery Record - Ambient Deliveries** and **Attachment 3: Delivery Record – Chilled/Frozen Deliveries**.

A Certificate of Conformance with a unique identifier allowing traceability may also be available from suppliers, or if not, this can be discussed with the supplier. Having a Certificate of Conformance for each delivery assures the quality and safety of that delivery and ensures the safety of ingredients and packaging. It will also contribute to establishing that all due diligence was undertaken, and should a problem occur, it can be traced back to incoming ingredients or packaging.

Other raw materials e.g. flavours and colourings may be required to have a statement to comply with the *Hazardous Substances and New Organisms Act 1996*.

See the next two sections for specific requirements for packaging and raw dairy ingredients.

Specific ingredient hazards and control measures

The following table provides information about particular hazards that are known to be present in various ingredients i.e. biological (B), physical (P) or chemical (C). Comments are made about any particular control measures that might be applied where they are not included in the process hazard analysis.

Ingredient	Class	Examples of hazards	Additional control measures (if available)
Sweeteners	...	...	...
Dairy ingredients	...	...	...
Tankered liquid raw materials	...	Contamination from previous loads	Apply a HACCP analysis for transport of ingredients Consider need for further heat treatment
Bulking agents	...	...	...
Stabilisers	C	Addition at excess levels	Pre-weighing of materials Reconciliation of stocks
Emulsifiers	C	Addition at excess levels	Pre-weighing of materials Reconciliation of stocks
Non-dairy fats	...	...	...
Flavours	C	Addition at excess levels	Pre-weighing of materials Reconciliation of stocks
Colours	C	Addition at excess levels	Pre-weighing of materials Reconciliation of stocks
Functional ingredients	C	Addition at excess levels Addition of permitted functional ingredients (see ANZ Food Standards Code)	Pre-weighing of materials Reconciliation of stocks
Fruited ripples	P	Presence of foreign matter such as seeds	Test certification of raw materials
	B	Presence of excess fungi	
Non-fruit ripples	CPB	Dependent on ingredients	Test certification of raw materials
Confectionery	CPB	Dependent on ingredients	Test certification of raw materials
Dried fruit	P	Presence of foreign matter e.g. seeds, sticks	Test certification of raw materials Inspection before use
	B	Presence of pathogens such as <i>Salmonella</i> , <i>E. coli</i>	
Bakery	CPB	Dependent on ingredients	Test certification of raw materials
Peanuts/nuts	C	Presence of aflatoxins	Test certification of raw materials Inspection before use
	P	Shells	

Ingredient	Class	Examples of hazards	Additional control measures (if available)
Water	C	Presence of chemicals above drinking water standards	Consider negotiating a contract with your water supplier and/or treat water
	P	Presence of foreign matter such as grit	
	B	Presence of pathogens such as <i>Salmonella</i> , <i>E. coli</i>	

Note :

- 1 The process flow chart (section 2.5, "Process Flow Description") and hazard analysis (section 2.6, "HACCP worksheets") should be adapted to include details of ingredient specific hazards.
- 2 Hazards may be biological, chemical or physical.
- 3 One of the control measures above is "reconciliation of stocks". In this method, a stock take is done at the end of each day that reconciles the change in stock of ingredients on hand against the amount of ingredients that should theoretically be in product.

Genetically modified ingredients

The ANZ Food Standards Code requires the use of any genetically modified ingredient to be approved, and requires the business to follow particular labelling requirements.

Refer **ANZ Food Standards Code, Standard 1.5.2, "Food produced using gene technology"**.

Irradiated ingredients

The ANZ Food Standards Code prohibits the use of irradiated ingredients unless a specific permission is given. Criteria are provided for acceptable uses.

Refer **ANZ Food Standards Code, Standard 1.5.3, "Food Irradiation"**.

Ingredients (not of New Zealand Origin)

The ANZ Food Standards Code contains requirements for country of origin labelling (Australia only). These do not apply to food for sale in New Zealand.

For ice cream products that are exported, there may be requirements to:

- demonstrate traceability between products and the sources of ingredients;
- provide declarations of ingredient origin for export certification purposes; and
- provide sanitary certification statements from the country where the ingredient has been sourced.

Procedures for non-conforming product

Procedures for purchasing and acceptance of ingredients and packaging shall include the means for handling non-conforming product.

A business may include non-conformance procedures within a supporting system or use a generic procedure (refer to section 5.3, “Corrective Action (including non-conformances, complaints, recalls”).

3.2 Food Contact Materials – Equipment and Packaging

Your programme will require	Yes/No	Action
Procedures?	Yes	Refer purchasing and acceptance of incoming goods.
Records?	Yes	Records shall be kept for purchasing activities.

Linkages

Section 3.1, “Purchasing and Acceptance of Incoming Goods”.

Outcome

The business shall ensure that food contact materials and packaging materials are suitable for the intended purpose.

Equipment

The risk of product contamination can be minimised by preventing contact with unsuitable materials. Food contact materials must not impart any hazardous chemicals or taints into the ingredients or finished product.

For processing equipment, where possible, mixing vessels, pipework, etc. should be made using appropriate specification stainless steel e.g. pipes and pasteurisers – use 304 and vats and silos – use 306.

Other materials, such as copper or aluminium, may be suitable. However, care must be taken to ensure that reactive metals do not come into contact with acidic or alkaline materials such as caustic cleaners or acidic fruits as the metal could be dissolved and taken into solution. Care must also be taken to ensure that dissimilar reactive metals, such as aluminium and copper, are not joined as electrolytic corrosion may also dissolve metals into the product. Soldering of materials is unacceptable as these materials contain lead and are not suitable for food use.

Materials such as glass, china, foil, and wood are not acceptable in the processing environment.

Any plastics used for food contact materials must be food grade to avoid leaching of toxic materials into the product (plastics should comply with a suitable standard e.g. AS 2070 – 1999 Plastics materials for food contact use).

Packaging materials

When choosing a packaging material, the life of the material and conditions of use should be considered. All materials in contact with food must also be smooth, non-absorbent and easily cleaned.

Note: Extra care should be taken because some food packaging manufacturers do not have premises or systems designed for the production of food grade packaging. Some sensible checks on the hygienic nature of the production environment should be made.

3.3 Raw Dairy Ingredients

Your FSP/PSP will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for the processing of raw dairy ingredients.
Records?	Yes	Records shall be kept of key activities.

Linkages

Section 3.1, “Purchasing and Acceptance of Incoming Goods”.

Section 3.4, “Hygienic Processing”.

Section 4.9, “Handling and Storage of Raw Materials and Finished Product”.

Section 4.10, “Refrigeration Management”.

Outcome for raw dairy ingredients

The business shall have effective and documented procedures which ensure **raw** dairy ingredients received by a processor are suitable for processing.

Raw dairy ingredients shall be accepted from a supplier only with an appropriate Risk Management Programme approved by and registered with MPI.

Outcome for processing

The business shall have effective and documented procedures for the separation, holding, and treatment of raw dairy ingredients.

General

The removal of cream or skim milk from the parent stream may be required prior to being re-blended with more or less of either into a single stream destined for further processing. Subsequent steps may involve the addition of ingredients, heat treatment, pasteurisation, homogenisation, cooling and churning.

Separation

This may be either cold or hot.

Normally milk is separated at about 50°C. The warmer the product the more effective the cream/fat removal from the whole milk stream.

After separation and formulation, it is important to cool the mix to below 7°C to minimise the growth of pathogens and regeneration of spores.

Fat levels are determined by the specification for the particular product required (quality matter).

Monitoring of product for both temperature and product specification is essential for quality and label requirements of the completed final product.

Standardisation

Standardisation involves the blending of the cream and the skim milk stream (or other variants) as well as some dry goods such as milk powder and fortifiers, as determined by specification.

Heat treatment

See also section 3.4, “Hygienic Processing”.

Pasteurisation may be used for the destruction of pathogenic organisms in raw materials and to eliminate other biological hazards that arise from ingredients and the processing environment.

Heat treatment may be required to activate stabilisers and emulsifiers.

Heat treatment may also be used on fruits and other ingredients to inactivate enzymes and pathogens that may be present to ensure these products are safe to add later in the process.

Ingredients

Due to the potential for ingredients to carry pathogens and other undesirable contaminants, all raw materials shall be considered suspect.

This requires controls on the suppliers to supply products within specification, and appropriate control measures on receiving, handling and storage.

Such controls may include the receiving and storage of these products in a separate facility to that of partially or finished product. There might be specific handling and processing instructions on the best method of using these products to prevent cross-contamination.

The treatment of raw materials can be anything from screening to filtering and visual inspection to heat treatment in order to eliminate or minimise the extent of undesirable hazards. Each raw material should be assessed to determine its potential risk and to determine the control measures necessary to prevent undesirable inclusion.

3.4 Hygienic Processing

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall establish control measures for hygienic processing that ensure a safe food outcome.
Records?	Yes	Records shall be kept of key activities.

Linkages

Section 2.4, “Product Limits – From a Food Safety Perspective”.

Section 3.7, “Cleaning and Sanitation”.

Section 4.9, “Handling and Storage of Raw Materials and Finished Products”.

Section 5.6, “Validation”.

Section, 5.7, “Verification”.

Outcome

The business shall have effective and documented procedures for the hygienic processing of ice cream products.

General

Base mix ingredients shall be hygienically processed to ensure a safe wholesome food outcome.

Ingredients **may** be heat treated to ensure biological hazards are at acceptable levels – see below for specific requirements.

If a manufacturer uses pasteurised dairy or egg ingredients, further heat treatment may not be required. However, it is important that all other sources of biological hazards are considered when determining the overall nature of sanitary measures. Hygiene controls will be required. The combination of control measures chosen must be relevant to the hygiene status of the ice cream product and raw materials used, with consideration given to the relevant pathogens of concern.

An essential requirement for hygienic processing is the cleanliness of all plant and equipment – refer **section 3.7, “Cleaning and Sanitation”**.

Production records

Production records shall be kept of monitoring and corrective action information, as detailed elsewhere in the Guidelines.

An example of a form for production activities is provided (see **Attachment 5: Batch production Record**).

Dairy heat treatments – pasteurisation

If a business uses dairy ingredients or egg products that have not previously received a heat treatment at pasteurising temperatures, then such a treatment shall be provided in the manufacturing process.

If a business treats its raw materials using HTST or batch systems, or uses equivalent treatments, it shall ensure that:

- equipment is of appropriate design;
- equipment is installed and operated;
- critical limits are established for the ice cream product mix, and for any particles it may contain.

Pasteurising heat treatments shall be established as a Critical Control Point.

Pasteurisation equipment shall not be used unless it meets the performance outcomes.

Dairy heat treatments – activation of functional ingredients

If a business uses a heat treatment for the purpose of activating functional ingredients, this step need not be considered as a Critical Control Point. Such heat treatment is not otherwise considered in these Guidelines as it relates to the achievement of quality characteristics.

Critical limits – pasteurisation

The process must be capable of achieving a 100,000-fold reduction in the numbers of *Mycobacterium tuberculosis*, *Mycobacterium bovis*, and *Coxiella burnetii*.

This equates to the follow temperature and time conditions for ice cream mixes with particles <1000µm diameter:

Process	Temperature (minimum)	Holding Time (minimum)
High temperature short time (HTST)	85.5°C	10 seconds
	79.5°C	15 seconds
Batch	74.0°C	10 minutes
	69.0°C	20 minutes

This data is obtained from *DPC 3: Animal Products (Dairy): Approved Criteria for the Manufacturing of Dairy Material and Product*, see table A4.3 and Appendix One: Dairy Heat Treatments. This document is available on the MPI website.

Design and operational criteria – pasteurisers

The heat treatment equipment shall be designed, installed, and operated in a manner that ensures that:

- no untreated or partially treated dairy produce passes forward;
- contamination is not possible by coolant, heating media, cleaning solutions or untreated produce.

The following table specifies the causes of contamination and failure modes inherent in the operation of pasteurisers, and the performance outcomes that must be achieved in the control measures used to allow reliable operation.

Cause of biological hazard	Performance outcome
Product does not achieve the specified time and temperature	The pasteurisation temperature is measured and achieved. The minimum holding time is achieved. Particle size is controlled. Temperature, flow, and holding time are monitored as appropriate and the data collected and recorded.
Raw ingredients, heating media, cooling media and cleaning solutions are able to contaminate heat treated ingredients	The corrective action system prevents untreated produce from feeding forward in the event of a failure. Pasteurised produce does not come in contact with untreated produce or services.
Contamination from unclean equipment	Product contact surfaces are clean and sanitary before initial start up.
Regeneration of pathogenic sporeformers after heating	The cooling system rapidly reduces the ingredients or mix to the temperature specified in your programme.
System controls can be adjusted without authorisation	Management and control systems cannot be modified without authorisation.

Design and operational criteria for heat treatment for functional purposes

The following table specifies the causes of the hazards inherent in the operation of plate heat exchangers and batch heaters, and the performance outcomes that must be achieved in the control measures used to allow reliable operation. Criteria are less stringent because some failure modes do not have the same consequences.

Cause of biological hazard	Performance outcome
Raw ingredients, heating media, cooling media and cleaning solutions are able to contaminate heat treated ingredients	Heat treated ingredients or mix do not come in contact with untreated produce or services.
Contamination from unclean equipment	Product contact surfaces are clean and sanitary before initial start up.
Regeneration of pathogenic sporeformers after heating	The cooling system rapidly reduces the produce to the temperature specified in your programme.

Note: For helpful advice on cooling temperatures, refer to "Introduction to Food Engineering" by R. Paul Singh, Dennis R. Heldman (ISBN 0-12-646381-6, Academic Press, Second Edition 1993).

Requirements for validation and evaluation

Refer section 5.6

3.5 Processing of Inclusions

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare procedures for the processing of inclusions.
Records?	Yes	Records shall be kept of the processing of inclusions, as detailed in this section.

Linkages

Section 3.1, “Purchasing and Acceptance of Incoming Goods”.

Section 3.4, “Hygienic Processing”.

Section 5.6, “Validation”.

Section 5.7, “Verification”.

Outcome

The business shall have effective and documented procedures for the processing of inclusions as appropriate to ensure there are no hazards at unacceptable levels in the finished product.

Treatment of added ingredients and inclusions

Each ingredient or inclusion must be subject to hazard analysis to determine the likelihood of hazards being present and to establish appropriate control measures.

Some examples are provided in the table below:

Inclusion or component	Example of hazards	Control option (example)
Liquid sugar, milk or similar base	Pathogens such as <i>E. coli</i> , <i>Salmonella</i>	Heating of the liquid to suitable temperatures.
Nuts	Pathogens such as <i>E. coli</i> , <i>Salmonella</i>	Dry heat in oven. Heating in a fryer.
Lemon rind	Pathogens such as <i>E. coli</i> , <i>Salmonella</i>	Washing in an appropriate sanitiser.
Raisins	Foreign matter such as stones and sticks	Visually inspect.

If products are unable to be heat treated or inspected, they should be subject to appropriate control measures at purchase, or subject to testing before use.

Temperature and times for heat treatment will require validation, as appropriate to the method used.

3.6 Control of Foreign Matter by Filtration

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare procedures for the control of foreign matter.
Records?	Yes	Records shall be kept of any monitoring or corrective actions.

Linkages

Section 2.4, “Product Limits – From a Food Safety Perspective”.

Section 2.6, “HACCP Worksheets” (see steps 7, 8 and 9 on heat treatment, filtration, and homogenisation).

Section 3.1, “Purchasing and Acceptance of Incoming Goods”.

Section 3.7, “Cleaning and Sanitation”.

Section 5.6, “Validation”.

Section 5.7, “Verification”.

Outcome

The business shall use effective measures to prevent or minimise the presence of foreign matter in the finished product.

General

Foreign matter hazards have been identified in many of the supporting systems in these Guidelines. Control measures appropriate for those hazards have also been identified, e.g. purchasing, processing. A business may also control physical hazards by the use of procedures, e.g. requiring a glass-free zone.

This supporting system addresses the need for filtration.

Filtration

The manufacturing process may have a filter at some point prior to churning.

The need for a filter should be determined from hazard analysis and be based on the likelihood of there being physical hazards in product at unacceptable levels.

The filter shall be checked at the end of each run to see that it is in place and is undamaged and capable of retaining particulate matter. Depending on the filter design, there may be sense in checking filter condition just prior to the start of a processing run.

The mesh size is not specified in these Guidelines because the viscosity of the product mix will often create flow restrictions if the mesh size is too small.

In larger installations the filter arrangement may be duplex to allow checking during a processing run and to allow changes to occur if fouling of the filter does occur. In some cases, it may be useful to monitor the pressure drop across the filter medium.

It is recommended that filters are established as a Critical Control Point.

Records of checks of filter condition should be made at appropriate intervals.

It is good practice for the operator to inspect the material retained on the filter at the inspection interval. Corrective action should be taken if the material is not expected to be present; the retained material may give clues as to the suitability of ingredients or issues arising with equipment condition.

If the filter has failed, then corrective action must be carried out. The cause of the filter failure should be investigated. Appropriate preventive measures should be taken.

Validation

Records of visual inspection of filter after sufficient uses to show the filter is working.

3.7 Cleaning and Sanitation

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a cleaning schedule as appropriate to the business.
Records?	Yes	Records of cleaning shall be kept.

Linkages

Section 3.4, “Hygienic Processing”.

Outcome

The business shall have an effective and documented cleaning and sanitation programme to minimise the chance of contaminants from the processing environment and food contact surfaces making their way into the finished product. This should include methods (inspection, swabbing) to assess cleaning effectiveness.

Effective cleaning

To be effective, cleaning requires careful planning. A schedule for cleaning and sanitising of the building (housekeeping), and of all associated equipment should be documented and implemented.

An example of a cleaning plan is shown in **Attachment 10: Cleaning Schedule**.

Consider:

- what to clean;
- how to clean;
- when to clean;
- who will clean;
- cleaning records required.

Staff must be trained to ensure correct cleaning and sanitation steps are used and adhered to. It is important that they always have regard to health and safety. Suitable protective clothing may have to be supplied and worn by staff who clean.

Effective cleaning and sanitising cannot be undertaken on damaged surfaces of equipment. Any surface or equipment of this nature identified in your workplace requires repair or replacement.

Five cleaning stages

Cleaning and sanitising normally consists of five basic but important stages	Example of hazards
Physically remove food particles, soil, dust by sweeping, wiping or pre-rinsing in water.	Biological such as <i>Listeria</i> , <i>Salmonella</i> , <i>E. coli</i>
Rinse any equipment that has been in contact with high-protein product with water (hot water will cause proteins to be baked onto surfaces).	As above
Wash equipment in water with appropriate cleaners (as per manufacturer's instructions) to remove grease and dirt.	Chemical residues such as nitrates or caustic
Rinse well to remove dirt and detergent, and air dry where possible.	Chemical residues
Sanitise equipment and work surfaces, e.g. by using a chemical sanitiser (as per manufacturer's instructions), or by immersing in hot water at 82°C.	Chemical residues such as sanitisers

Note: Use food grade cleaning and sanitising chemicals and take care if you are using high pressure hoses – these can cause cross-contamination by creating aerosols.

Methods of cleaning

(a) Soak tanks

- These are useful for small, easily damaged items, especially when items are dismantled for cleaning.

(b) Mists/foam/gel

- Mists for sanitising surfaces and fumigating surface environments.
- Foams form layers of bubbles above the surface. The outer film holds the chemical and as the bubble collapses the surface is “wetted” with fresh chemical solution. Ideal for vertical and ceiling surfaces.
- Gels will bind to the surface almost indefinitely, but need specialist applicators.

(c) Specialised equipment

- There is a wide range of cleaning equipment available on the market designed to make the job easier, such as foam applications and mechanical scrubbers. Scrubbers may also vacuum up residues.

(d) Cleaning-in-place (CIP)

- Multi-use system – combine recovery and single use of cleaning solutions for cleaning of vessels and pipes with automated programmes for dispensing combinations of water, caustic soda, acid and acidified rinses plus sterilising functions. Temperatures and contact times are also controlled.
- Cleaning equipment should be dedicated to specific areas and used with care, so as not to incur the risk of product contamination. It may be colour coded for use in specific areas.

Note: Where vacuum cleaning methods are used, it is preferable to have a portable vacuum cleaner dedicated to one area to ensure contaminants are not carried from one room to another. A vacuum with a central collecting system is ideal.

Cleaning equipment care

To avoid cleaning equipment becoming ineffective and/or contributing to surface contamination, ensure that:	Examples of hazards
Mops, brooms, scrubbing brushes and cloths are stored clean in a designated, well-ventilated area. Cleaning equipment should be allowed to drain, or to dry overnight. It should be regularly disinfected. Wooden handles on equipment should be avoided.	Biological e.g. <i>Listeria</i> , <i>Salmonella</i> Physical e.g. bristles Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Replace equipment that shows signs of wear, e.g. bristles missing, bristles ‘turned up’, fraying cloths or hoses, etc.	Physical e.g. bristles, foreign matter

Note: The use of abrasive pads may be a source of physical contamination.

Cleaning evaluation

The best time to conduct a visual inspection of cleaning efficiency is immediately after the cleaning but before the sanitising step. This allows time to reclean any areas that are obviously still dirty, before work next resumes.

Aids to visual inspection

- Scrape the cleaned surface with your fingernail or wipe with a white tissue. Look for scrape marks on the cleaned surface or residues on the tissue.
- Do the surfaces feel greasy or gritty?
- Remove side panels or partially dismantle equipment to check inside.
- Use a torch (where appropriate).
- Check hard-to-get-at places (underneath workbenches).
- Does water runoff the surface evenly? Water forms a continuous flow over properly cleaned surfaces.
- Have all food residues been removed?
- Use your nose – smell for product or offensive odours.
- Do the surfaces look dull or shiny?

A two-step process

Clean first, sanitise second is more effective than a combined one-step operation.

Sanitiser effectiveness

Many sanitisers lose their efficiency if organic matter (food particles) is present. Therefore, it is critical to clean equipment before applying a sanitiser.

Cleaning equipment condition

Bacterial contamination may be spread by inappropriate cleaning tools (ragged brushes, frayed hoses, disintegrating 'pot mitts', wooden handles).

Cleaning chemicals

Training is recommended for all staff using cleaning chemicals and is often available from your cleaning chemical supplier.

You must ensure that all maintenance compounds (eg detergents, sanitisers) are suitable for their intended use.

A list of chemicals approved for the food industry is available on the MPI website. See Register of Approved & Recognised Dairy Maintenance compounds.

Hygiene testing

For critical hygiene areas swabbing, use of contact slides and other rapid methods on cleaned and sanitised surfaces or “first off” the line product tests (very effective for monitoring and trace-back) provides an indication that cleaning and sanitising are effective at removing bacterial contaminants. Swabbing can be used to detect:

- TPC (Total Plate Count) or APC (Aerobic Plate Count) – broad test for a large group of biological contaminants;
- Coliform test or *enterobacteriaceae* test – good indicator of the presence of potentially dangerous pathogenic bacteria. The testing of *enterobacteriaceae* rather than coliforms would present a wider and better indication on the effectiveness of the cleaning within the processing environment particularly in processing areas that are kept dry;
- yeast and moulds – these can cause serious spoilage and are an indication of the control of environmental factors such as air quality;
- ATP (adenosine-5'-triphosphate) levels (using specialised testing equipment). ATP, a chemical compound, indicates the presence of biological contamination.

Note: This is a guide only, and not an exhaustive list.

Cleaning sanitation checks

To maintain effective sanitation, ensure that:	Examples of hazards
Plant and equipment are cleaned and serviced immediately after use.	Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Any faults (including wear) are reported.	
Missing parts such as nuts, springs, clips, etc. are reported immediately to management.	Physical e.g. foreign matter
Plant and equipment are checked for cleanliness and integrity before use.	Biological, <i>Listeria</i> , <i>Salmonella</i> , <i>Staphylococcus</i> Chemical e.g. cleaning chemicals
All premises, including processing areas, laboratories, stores, passage ways, air filtration equipment and external surroundings are maintained in a clean and tidy condition, and cleaned before and after extended shutdown.	Microbiological e.g. <i>Listeria</i> , <i>Salmonella</i>

Helpful hints

Good housekeeping

General good housekeeping should be practised i.e. prompt removal of waste material, precautions to minimise spillage or leakage, prompt removal and clean-up of any articles that might enter the product as foreign matter.

Simply...

... if it looks dirty CLEAN IT!

Prevention of chemical contamination

All cleaning chemicals shall be stored securely so that there is no risk of accidental contamination of ingredients and product.

All chemical containers shall be of a shape and size, and clearly labelled, so that there is no risk of there being confusion with ingredient or product containers.

Cleaning shall occur in such a way that the risk of contamination of product is minimised.

3.8 Process Monitoring

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare procedures for the monitoring of product.
Records?	Yes	Records shall be kept of all test results.

Linkages

Section 2.4, “Product Limits – From a Food Safety Perspective”.

Section 5.6, “Validation”.

Section 5.7, “Verification”.

Outcome

The business shall have effective and documented procedures to monitor product and processes, as may be appropriate, for the purposes of:

- detecting deviations from standard procedures;
- confirming the effectiveness of Critical Control Points and supporting systems;
- assuring conformance to microbiological and compositional standards (your own standards and your customers' standards), and regulatory standards;
- detecting other hazards (as appropriate).

Testing of product (Aerobic Plate Count, coliforms)

A business operating in accordance with these Guidelines should monitor finished product on an ongoing basis for **Aerobic Plate Count** and **coliforms**.

Control limits are established on the basis of recent historical performance.

If a business moves outside the control limits that are established, then corrective action shall take place. This may involve product testing and/or appropriate investigation.

A business shall define the monitoring process used and the corrective action that takes place if the hygiene results are above the control limit.

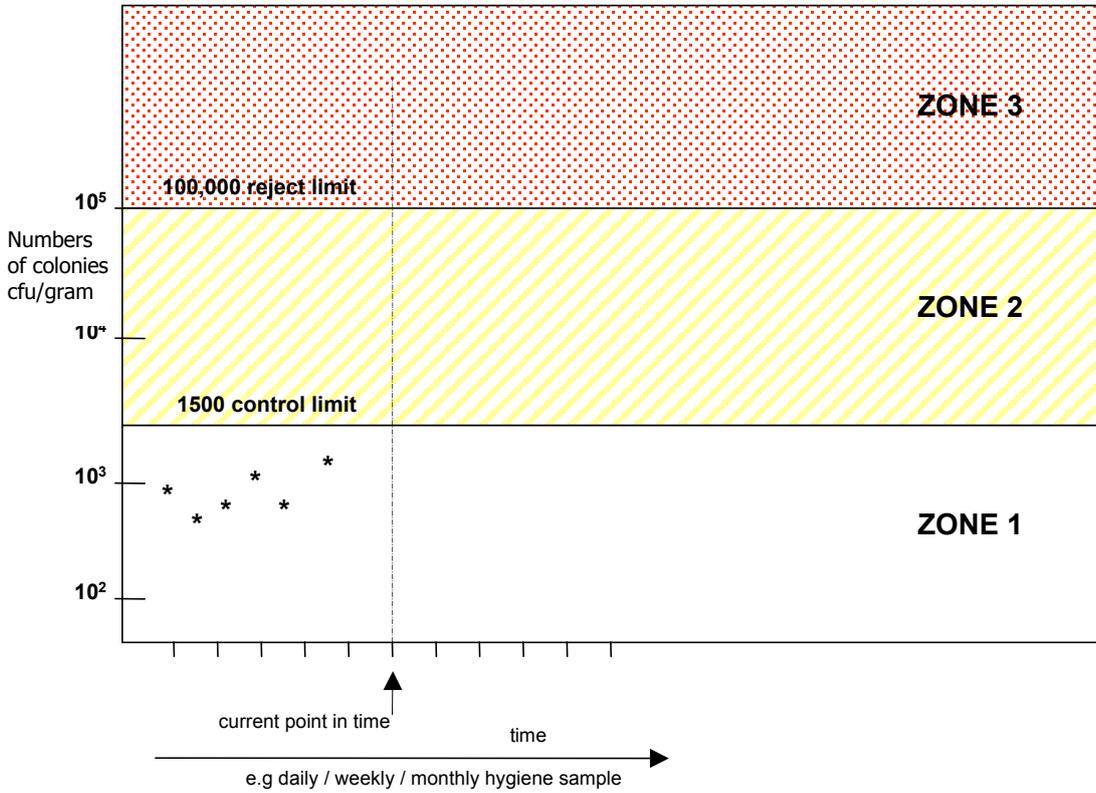
The frequency of testing needs to be justified based on:

- other monitoring tools used;
- history of results;
- the effectiveness of the supporting systems in place;
- batch versus continuous processing;
- size of the run or batch.

Control limits for finished product

This note illustrates a method for establishing control limits using historical performance data.

This example is for Aerobic Plate Count (APC) at 30°C.



Notes:

The value 100,000 is the limit agreed by the industry group as a maximum acceptable level for safe food. Above this limit, ZONE 3, product must be reprocessed or dumped, or, if in the market, recalled.

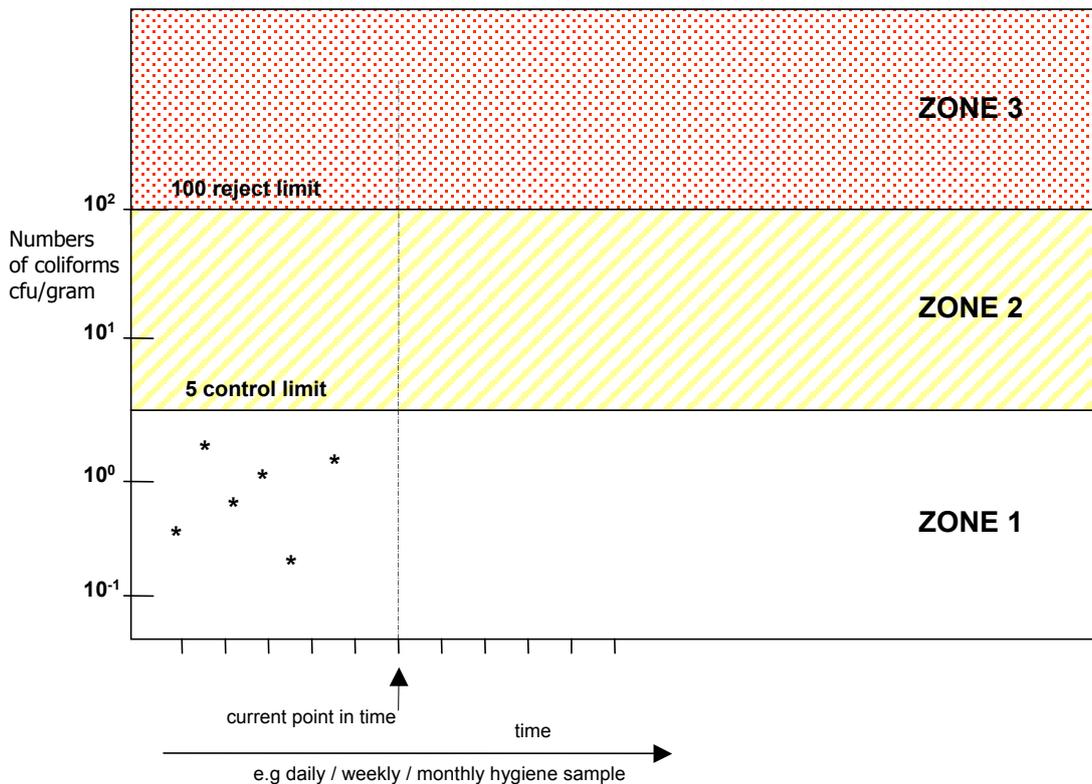
The control limit between ZONES 1 and 2 is a limit based on historical performance. Here it is set at 1500. It can be calculated statistically, but it is acceptable for a business to set this limit based on visual estimation from trends.

If the business exceeds this limit (ZONE 2), it reacts as if something is not right, and investigates the reasons. Product rejection is not contemplated unless performance is in ZONE 3. Typically, a review of hygienic practices should occur.

If performance is in ZONE 1, then the situation is acceptable and business occurs as normal.

Note that a log scale should be used for the vertical axis in this graph.

This example is for coliforms tested using a quantitative method.



Notes:

The value 100 for coliforms is the limit agreed by the industry group as a maximum acceptable level for safe food. Above this limit, ZONE 3, product must be reprocessed or dumped, or, if in the market, recalled.

The control limit between ZONES 1 and 2 is a limit based on historical performance. Here it is set at 5. It can be calculated statistically, but it is acceptable for a business to set this limit based on visual estimation from trends.

If the business exceeds this limit (ZONE 2), it reacts as if something is not right, and investigates the reasons. Product rejection is not contemplated unless performance is in ZONE 3. Typically, a review of hygienic practices should occur.

If performance is in ZONE 1, then the situation is acceptable and business occurs as normal.

Note that a log scale should be used for the vertical axis in this graph.

Testing of product (other tests)

A business may carry out other microbial tests in accordance with other product or process outcomes that may be established.

It may establish control limits and determine corrective action, as appropriate.

In-process tests

A business may decide to carry out other tests to confirm the hygienic status of its process and products. The nature and amount of testing should be guided by the hazard analysis (see section 2.6, “HACCP Worksheets”, and the results of any product testing.

Examples of tests that might occur are:

- samples of ingredients to confirm the levels provided by suppliers, or to gather a profile of levels for new suppliers;
- samples after heat treatment, such as tests for coliforms in the base mix;
- samples of ice cream mix, if say, the storage time has been longer than usual or there has been a problem with cleaning; *Listeria* or coliforms might be tested;
- samples of first product off the line to check cleaning effectiveness;
- swabs to determine the hygiene condition of equipment surfaces, and points with a history of being, say, difficult to clean; coliforms can be a useful indicator; rapid test kits may also be suitable for this application;
- samples of rinse water at the end of cleaning cycles;
- swabs of critical items after cleaning to check cleaning effectiveness; e.g. the homogenisation valve after cleaning;
- swabs of floors in cool rooms to check the build-up of organisms such as *Listeria*. If the process is not a closed system, include swabs from eg door handles, switches mixing vats, product contact surfaces (see MPI website for more information on developing a *Listeria* management plan)

Note: Sampling and testing should be used wisely by the business, and as appropriate to provide evidence that the process operates in a hygienic manner. Staff should be encouraged to highlight events where there is a likelihood of pathogens being present in product; it is sensible to focus testing actions at these times.

4.0 Supporting Systems - Premises, Facilities, Equipment, People & Services

4.1 Design of Premises and Equipment

Your programme will require	Yes/No	Action
Procedures?	No	
Records?	No	

Linkages

Section 4.2, “Repairs and Maintenance of Premises and Equipment”.
Section 4.7, “Pest Control”.

Outcome

The business shall have physical facilities and/or systems that minimise/control contamination or deterioration of the product, and which comply with any criteria in this section. The suitability of premises and equipment will be assessed by inspection.

A good premises

Building integrity should be maintained. All facilities must also be maintained in a good state of repair and hygiene. This requires regular assessments to be undertaken, documentation of deficiencies and subsequent corrective action.

To control the hazards premises should:

- control contamination (rubbish disposal, dust, odours, etc.) from surrounding activities such as heavy industry, chemical manufacturers, etc.;
- allow for separation of products as necessary to control cross-contamination;
- provide adequate space to allow workflow and supervision;
- be maintained in good repair and clean state to prevent contamination of food;
- provide protection from entry of foreign matter;
- control potentially pathogenic organisms.

Advice for inside a good premises

To control the hazards premises should provide for:	Examples of hazards
Ceilings of easily cleaned materials	Biological e.g. yeast and mould, <i>Listeria</i> , <i>Salmonella</i>
Walls of smooth impervious materials to facilitate cleaning	
Floors of impervious materials free from cracks and open joints covered to walls in critical hygiene areas	Biological e.g. <i>Listeria</i> , (coving may eliminate pathogen growth in corners), <i>Salmonella</i>
Sufficient lighting (e.g. >1000 lux for inspection areas)	Physical e.g. plastic
All entry points for building services (pipes, ducting, cable trunking) through walls, ceilings and floors should be sealed and flashed off	Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Drains to be fit for purpose and be trapped to prevent pest access, inhibit waste odours and prevent large food particles entering waste flow	Physical e.g. feathers Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Change and locker areas should be segregated from manufacturing areas	Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
No toilet to open directly into food handling areas	Biological (human hazards) e.g. <i>Shigella</i> , <i>E. coli</i>
Protection of despatch/load out and receipt of goods areas	Biological e.g. <i>Listeria</i> , <i>Salmonella</i> from birds
Waste to be effectively contained in covered containers and regularly disposed of	Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Adequate air ventilation fit for purpose	Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Correct placing of insect control devices and air vents to ensure they are away from open product	Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Handwashing facilities	Biological e.g. <i>Staphylococcus</i>
Cleaning facilities for both equipment and premises	Chemical e.g. cleaning materials Physical e.g. bristles Biological e.g. <i>Listeria</i> , <i>Salmonella</i> , <i>Staphylococcus</i>
Environmental controls	Physical e.g. insects, objectionable matter

Equipment

Equipment must also be maintained in a good state of repair and hygiene. This will require regular assessments, documentation of deficiencies, and subsequent corrective action; refer section 4.2, “Repairs and Maintenance of Premises and Equipment”.

Equipment to control the hazards should:	Examples of hazards
Be constructed of suitable materials and be easily cleaned	Physical e.g. rust, metal, wood Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Be able to be inspected for cleanliness and cracks, fractures and failures	Physical e.g. metal Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Ideally, be self-draining	Chemical e.g. cleaning material Biological e.g. <i>Listeria</i> , <i>Salmonella</i>
Be designed to prevent product build-up or contamination from leaking glands, lubricants or through unauthorised modifications to the equipment	Biological e.g. <i>Listeria</i> , <i>Salmonella</i> , <i>Staphylococcus</i>
Where desirable, be able to be cleaned without disassembly by a suitable cleaning-in-place (CIP) system	Chemical e.g. cleaning material Biological e.g. <i>Listeria</i> , <i>Salmonella</i>

4.2 Repairs and Maintenance of Premises and Equipment

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for preventive maintenance and repairs.
Records?	Yes	Records shall be kept of all maintenance activities.

Linkages

Section 4.1, “Design of Premises and Equipment”.

Outcome

The business shall have effective and documented procedures for regular repairs and maintenance, including preventive maintenance, which ensure the efficient operation of plant and equipment, and which minimise risks of product contamination.

Major repairs and maintenance (in product contact areas)

“Major repairs and maintenance” refers to an engineering process where product quality can or will be affected by or during the maintenance of production equipment, particularly when working on internal parts or surfaces of equipment.

To ensure the production of safe food:	Examples of hazards
Ensure all tools are clean. It may be necessary to include an intrusive maintenance step.	Chemical e.g. oil and grease Biological e.g. <i>Listeria</i> , <i>Salmonella</i> , <i>E. coli</i> Physical e.g. metal, nuts and bolts
When working on the item requiring repair, ensure that no possible contamination can occur in other production areas, e.g. if using a grinder, either remove the item to a workshop or provide sufficient screening.	Physical hazards, such as metallic debris
If installing repaired and/or new parts into product contact areas, have these parts cleaned prior to assembly.	Chemical Biological
When assembling any machinery, ensure no tools or extra parts remain inside	Physical
Ensure only food grade production materials are used, including food grade lubricant	Chemical
Following repair, plant should be checked and adequately cleaned. This should include areas around the plant, and the exterior of the plant.	Chemical Biological Physical

Preventive maintenance

All operators should design a regular preventive maintenance programme to suit their plant.

A schedule should be prepared identifying the maintenance required, when it is to be done, and who is to do it.

The cleaning regime after maintenance should be specified.

Items that might be included in a maintenance schedule are:

- liquid filters;
- dry powder sifters or screens;
- magnets;
- chillers and freezers;
- pressure vessels;
- bearings;
- compressors for air, water and their filters;
- heat treatment equipment.

Alternatively, an inspection checklist can be developed to include buildings, equipment, etc.

All contractors should be made aware of hygienic requirements or otherwise be appropriately supervised.

4.3 Calibration

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for the calibration of process instruments.
Records?	Yes	Records of calibrations shall be kept.

Linkages

Section 3.4, “Hygienic Processing”.

Section 3.8, “Process Monitoring”.

Section 5.1, “Laboratory Facilities, Equipment and Methodology”.

Outcome

The business shall have an effective and documented procedure for calibration.

Calibration of process instruments

Any instrument that is used to monitor process or product characteristics, and where the measurement will have direct impact on product safety requirements, shall be calibrated and be traceable to a recognised national standard.

A reference thermometer may be available through your auditor.

Instruments requiring calibration could include:

- temperature gauges;
- temperature recorders;
- weigh scales.

Calibration should be covered by procedures or as a separate supporting system, appropriate to the food business. These may include the use of technical experts to carry out calibration activities.

Where high levels of accuracy are required, calibration must occur according to recognised methods, be traceable to national standards and generally be in facilities that are IANZ accredited (see note below).

Checks should be performed between calibrations to confirm that the calibration is maintained.

Ice point checks

An ice point is made with clean water frozen in clean trays in a freezer. It is preferable for the ice to be shaved in a food processor or purpose-built shaver. Alternatively, the ice is crushed in a clean cloth with a mallet or a hammer and put into a thermos flask deep enough to immerse the thermometer to the correct level. Water is then added until the whitish ice colour disappears and clear ice remains. Excess water should then be drained off but the whitish colour should not return.

Once the thermometer has stabilised record the reading. Repeat the measurement at least twice. An ice point used for extended periods should have the excess water drained off occasionally. Record results and retain within the record-keeping system.

Records

An example of a record for calibration using ice point and boiling point checks is shown in **Attachment 8: Thermometer Check**.

Note:

1. If temperature measurement is required accurate to $\pm 0.2^{\circ}\text{C}$, then the thermometer can be calibrated only in a specialist laboratory that has IANZ registration for this purpose. Calibration should occur using comparative measurements near to any critical limits that are used in the process.
2. If temperature measurement is required accurate to $\pm 1.0^{\circ}\text{C}$, then calibration using ice point and boiling point is acceptable. The thermometer must be of a quality design and sensible checks should be completed to confirm repeatability.
3. IANZ is the acronym for International Accreditation New Zealand; it is the only agency in New Zealand that has government recognition for the accreditation of laboratories. It may accredit laboratories for chemical, biological, physical, sensory and function testing; and may accredit calibration laboratories. It operates in accordance with various international standards.

4.4 Personal Hygiene

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare procedures covering dress, personal hygiene, and infectious disease control.
Records?	Yes	Records shall be kept of notifiable diseases and other staff illness.

Linkages

Section 3.4, “Hygienic Processing”.

Outcome

The business shall have effective and documented procedures for personal hygiene to minimise/control/prevent, as appropriate, contamination of the finished product.

Personal hygiene

High standards of personal hygiene must be observed throughout all manufacturing processes. Rules covering the movement of personnel between work areas should be in place where appropriate, e.g. in moving from raw to cooked areas. It is the responsibility of managers and supervisors to ensure all persons are aware of, and comply with, these requirements, e.g. personnel involved with maintenance, research and development, quality assurance and visitors.

A training programme should cover the general requirements for personal hygiene within the manufacturing plant and any specific critical requirements.

Procedures should cover the way in which hazards in the table below are controlled.

An example of a record sheet for staff health is shown in **Attachment 13: Staff Sickness Record**.

Personal hygiene requirements	Example of hazards
The provision of clean protective clothing which must only be worn within food premises and should be stored to prevent contamination when not in use.	Biological e.g. dirt from street clothes Physical e.g. objects in pockets
The wearing of protective aprons and hair and beard coverings where necessary.	Biological e.g. <i>Staphylococcus</i> on clothes and hair
Thoroughly wash and dry hands before commencing or resuming work or after using the toilet.	Biological e.g. <i>Staphylococcus</i> , <i>Shigella</i> , <i>E. coli</i>
Keep hands, body and clothing clean.	Biological e.g. <i>Staphylococcus aureus</i> from skin
Do not eat introduced foods in critical hygiene areas. Drinking water should be in suitable containers.	Biological
Do not smoke within food manufacturing areas.	Biological e.g. <i>Staphylococcus aureus</i> from skin
An employee, who has a notifiable infectious disease shall not work in a food premises until that person provides a medical certificate indicating he/she is free from that infection. An employee who has visible illness, such as vomiting or diarrhoea, discharge or pus from head, neck, hands or arms, shall not work in a food premises.	Biological e.g. <i>Staphylococcus aureus</i> from skin, food poisoning organism
If a manager believes or suspects that an employee is likely to have any of the symptoms in the previous paragraph, and is likely to handle food, then that person should not work in the food premise, and should be referred to their medical practitioner.	Biological e.g. <i>Staphylococcus aureus</i> from skin, food poisoning organism
All cuts or abrasions must be covered by a waterproof dressing. Precautions shall be taken to ensure first aid dressings are not lost in food (e.g. coloured and/or with a metal strip for detection).	Biological e.g. <i>Staphylococcus aureus</i> from pus Physical e.g. presented by band aid
Provide readily accessible first aid materials.	Biological e.g. cross-contamination by blood borne disease-causing organisms (e.g. Hepatitis)

Note:

The employer is responsible for providing and maintaining the facilities and equipment required for employees to comply with these requirements. These may include washing facilities (adequate in number, design and location), storage facilities for street clothing, work clothing and protective clothing.

The employee is responsible for taking all reasonable precautions to ensure safe food, and to minimise the risk of cross-contamination of infections to the product.

The above should be viewed as minimum requirements. Managers should institute more stringent controls where there are risks of compromising food safety.

4.5 Potable Water

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare procedures for the maintenance of the water supply and any quality control activities.
Records?	Yes	Records must be kept of maintenance and quality control tests, and any correspondence with the supplier.

Linkages

Section 3.4, “Hygienic Processing”.

Outcome

The business shall have an effective and documented procedure for the supply of water. All water used for food, or in contact with food contact surfaces, shall be of potable water quality as defined in the “Drinking-Water Standards for New Zealand 2000” (available from the Ministry of Health).

Water supply and assessment of quality

For premises on town supply the water quality will be officially graded. One grade is given for the source/treatment; another grade is given for the distribution zone. Grades range from A (good) to E (totally unsatisfactory). You can check your grading by looking in the “Register of Community Drinking Water Supplies” at your local library, or by contacting your water supplier, local Council or your local Health Protection Officer (HPO). The Food business can then assess what the risk to food safety is (if any) and put additional control measures in place if required.

Note: Water quality and treatment is a specialised area. It is appropriate to seek help from an expert in this field.

It is poor practice to use storage or header tanks in your cold water system, as these can be susceptible to contamination. Tanks, and pipework with dead ends, should be avoided. Backflow prevention devices may be needed.

For properties on a private water supply, the supply may be graded, and may be classified as a “Community Drinking Water Supply” (CDWS). In this case, the supply should be subject to a “Public Health Risk Management Plan” (PHRMP), which is a type of HACCP assessment. Further information is available from your local Health Protection Officer.

Where the private supply is not classified as a CDWS, an assessment of the quality of the water should be undertaken. This is the same procedure as undertaking a PHRMP. Further information on undertaking an assessment is available from your local HPO. Useful information, including PHRMP guides to various supplier situations is also available on the Ministry of Health website (www.moh.govt.nz).

Treatment of water supply

In the case of roof-collected water, this assessment will involve consideration of the potential for both microbiological contamination (such as from birds, opossums and nearby trees) and chemical contamination (such as from the roof material or covering).

In the case of surface water or ground water, again an assessment must be made of microbiological contamination (such as from animals or septic tanks) and chemical contamination (such as from pesticides, naturally occurring dissolved metals, etc).

Where assessment shows that contamination is possible, a system must be installed to ensure that the water is adequately treated. This may involve the installation of mesh filters (course), cartridge filters (fine), back-washable media filters (extra fine), and disinfection, e.g. UV light or hypochlorite. Additional treatment may be necessary, e.g. adjustment of the pH for water that is too acidic or too alkaline. A regular maintenance programme is necessary to identify potential hazards. Random sampling may also be undertaken.

An example is given below.

A maintenance programme to control hazards in a treated water supply should consider:	Examples of hazards
Checking condition and security of the source	Biological e.g. <i>E. coli</i> , coliforms Chemical e.g. heavy metals, pesticides
Cleaning of collection surfaces, pipework, tanks etc	As above
Cleaning, backwashing or replacement of filters	As above
Cleaning of UV tube covers	As above
Periodic replacement of UV tubes	As above
Maintenance and calibration of chemical dosing systems	As above
Sampling and testing of the water	As above
Checking of UV safety cut out	As above

Criteria for water supplies

The following criteria apply to water supplies:

- Water that comes into direct or indirect contact with dairy produce and dairy products is suitable if it is potable water.

- An alternative water quality standard may be used by the manufacturer provided that the water quality standard is determined by an analysis of hazards and other risk factors; the water is safe for its intended use at the point of use; the water will not compromise the safety of the dairy produce or dairy product being manufactured.
- Non-potable water is permitted in exceptional cases for steam production, fire control, refrigeration equipment and other similar purposes, provided that the pipes installed for this purpose preclude the use of this water for other purposes and present no direct or indirect risk of contamination of the product.
- Lines containing water that is not potable water are clearly labelled as such and are not connected to lines or tanks containing potable water.
- Records are kept for as long as necessary for traceback purposes and for inspection.

The person accountable for the programme must implement a water management plan that includes:

- the water quality standard and criteria as determined through an analysis of hazards and other risk factors;
- any additional treatments to the water;
- a water sampling and testing programme for compliance monitoring and process control monitoring;
- record keeping;
- an action plan in the event of non-compliance with the water management plan;
- the procedures covering water reticulation.

4.6 Product Contact Air

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for the treatment of product contact air.
Records?	Yes	Records shall be kept of maintenance activities.

Linkages

Section 3.4, “Hygienic Processing”.

Outcome

The business shall have effective and documented procedures to ensure that air is free from contamination (safety) and allows the finished product to be of correct sensory and functional characteristics (quality).

General

To be most enjoyable on eating, most frozen dessert must contain air that is whipped in as minute bubbles. The air content of frozen dessert or the increase in volume of product over the volume of mix due to incorporation of air is termed “overrun”.

Some churns operate at atmospheric pressure, so air that is incorporated exists at the same pressure both inside and outside the churn and it can be generated by whipping/rapid agitation.

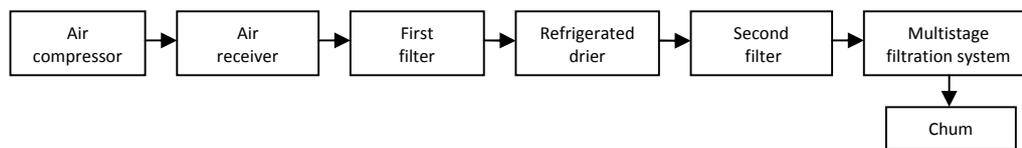
However, the freezing cylinder of a continuous churn is held under pressures up to about 100 psi and therefore requires continuous flow of compressed air generated by an air compressor.

Air that is incorporated into the product may be a source of microbial and foreign matter contamination. It must therefore be of good quality and should preferably be filtered.

The good quality of air generated by an air compressor can be achieved only by the use and routine maintenance programme of the compressor, refrigeration compressed air drier and multistage filtration.

Example of an air supply system

The following diagram is an example of a modern multi-stage air filtration system.



The air compressor should be checked, oil changed and serviced every six months or as per manufacturer’s recommendation.

The refrigeration compressed air drier removes moisture from compressed air by cooling the air to increase the relative humidity of the air, and causes water and oil to condense. The condensate is automatically drained. The air drier is serviced by changing the filters (first filter is placed prior to the drier and second filter is placed after the drier) every 12 months or if flow gauge moves to indicate restricted air flow, or in accordance with manufacturer’s instructions.

The multistage filtration system is usually placed directly prior to the churn and it consists of:

- **prefilter:** removes bulk liquid and particles down to three microns. This filter should be replaced every six months or as per manufacturer’s recommendation.
- **coalescer:** removes liquid and particles down to 0.01 microns; residual oil content 0.01 mg/m³. This filter should be replaced every six months or as per manufacturer’s recommendation.
- **activated carbon coalescer:** removes odours, oil vapours liquid and particles below 0.01 microns; residual oil content 0.003 mg/m³. This filter should be replaced every six months or as per manufacturer’s recommendation.

4.7 Pest Control

Your programme will require	Yes/No	Action
Procedures	Yes	The business shall prepare a plan for pest control.
Records	Yes	Records of checks of traps and maintenance shall be kept.

Linkages

Section 4.1, “Design of Premises and Equipment”.

Section 4.2, “Repairs and Maintenance of Equipment and Premises”.

Outcome

The business shall have effective and documented records to ensure that pests (e.g. rats, mice, birds, cats, dogs, and flying and crawling insects) and their residues do not contaminate product. The procedure shall specify the competency required of people using chemicals (e.g. rodent baits, insecticides).

Pest control

Pests should be kept to an absolute minimum in food manufacturing premises. Pests consist of:

- crickets;
- rats and mice;
- insects – flies, moths, cockroaches etc.;
- cats and dogs;
- birds;
- opossums.

Pests present physical hazards (such as faeces, insect parts and rodent hairs) and biological hazards (such as *E. coli* and *Salmonella*).

Barrier control (enclosed building design, etc.) is an essential preventive step.

Poisons are the normal control measure used for rodents. It is essential to keep records of poisons used, and any activity should be noted.

Each poison station should be attached to its location, numbered and recorded on a log. Each station should be regularly checked by a responsible person, and a record kept. It is usual for this to take place at least once a month.

Where sprays are used to control insects, an accurate record of the chemical strength, location sprayed and date of spraying should be kept. If insect traps are used, it is preferable to use the “sticky trap”. The “electro-blitz” type of trap should be kept well clear of any product areas to ensure that “exploding” insects do not enter the product. Sprays should not be used as a substitute for good housekeeping and cleaning.

Cats and dogs should not be able to access processing or storage areas.

Bird control is vital, as they have been known in recent times (around year 2000) to be responsible for the spread of *Salmonella*. Birds should not be able to enter the premises.

All chemicals shall be stored securely so that there is no risk of accidental contamination of ingredients and product.

All chemical containers shall be clearly labelled and of such shape and size that there is no risk of confusion with ingredient or product containers.

Application of chemicals shall occur in such a way that the risk of contamination is minimised. Particular care is required with the application of fumigants in processing and storage areas.

Note: It is recommended that bait is rotated regularly.

Helpful hint:

You must ensure that all maintenance compounds (eg pesticides) are suitable for their intended use.

A list of chemicals approved for the food industry is available on the MPI website. See Register of Approved & Recognised Dairy Maintenance compounds. You may also check the Approved Maintenance Compounds (Non-Dairy) Manual on the MPI website, or the Assessed Products list on the AsureQuality website.

An example of an inspection sheet is shown in **Attachment 12: Pest control inspection record**.

4.8 Waste Disposal

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for waste disposal.
Records?	No	

Linkages

Section 3.7, “Cleaning and Sanitation”.

Section 4.1, “Design of Premises and Equipment”.

Section 4.7, “Pest Control”.

Outcome

The business shall have effective and documented procedures to control waste, including storage and regular disposal, and prevent contamination of product.

Waste management

Containers for refuse should be marked as such, and be made of a material that is easily cleanable. They should be designed so as to prevent access by pests.

The containers should be placed in an area that is easily washable and away from foods in order to prevent cross-contamination. If possible the containers should be located out of direct sunlight so as to eliminate odour and prevent the growth of micro-organisms.

Waste should be removed on a regular basis.

At all times common sense should prevail.

Note:

It is advisable to contact your local authority to identify specific requirements or regulations imposed for waste disposal.

In addition, it may be necessary to comply with provisions of the *Resource Management Act 1991* or those imposed by the Department of Conservation.

4.9 Handling and Storage of Raw Materials and Finished Products

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare procedures for handling and storage.
Records?	Yes	Records shall be kept of materials received, and stock dispatched.

Linkages

Section 3.1, “Purchasing and Acceptance of Incoming Goods”.

Section 4.7, “Pest Control”.

Section 4.10, “Refrigeration Management (chiller/freezer, processing rooms)”.

Section 5.2, “Traceability and Labelling”.

Outcome

The business shall have effective and documented procedures for the handling and storage of raw materials, products-in-process requiring storage and finished product. The procedures shall prevent or otherwise minimise the chance of contamination.

General

All raw materials and packaging must be handled and stored appropriately. This will ensure that quality of the finished product is not compromised.

When considering handling and storage of raw materials and finished product any outcome will need to be based on the principles of HACCP. This programme actually covers the handling and storage of raw materials *after* receipt as well as the handling and storage of finished product from the end of the manufacturing cycle to despatch.

Raw materials

Once raw materials have been accepted into the factory or workplace according to product specifications, and an examination and acceptance system is in place, a standard procedure may be followed that ensures that the raw materials are rapidly and safely taken to the appropriate storage areas and stored correctly.

Liquid products in bulk

Large volume liquid raw materials can arrive on site by tanker transport and be transferred to on-site storage units, e.g. ice cream mix, cream, skimmed milk, milk.

In the case of tanker transport all systems, including valves, pipe work and vats dispensing and accepting the raw material, are to be washed, sanitised and rinsed following written in-house procedures. Point of transfer should be under sterile conditions and actual transfer to holding vessels should be filtered. Once deposited in storage vessels control of temperature is essential and records should be kept of temperatures during the storage period.

It is likely that the incoming raw material, once in holding vessels, will be evaluated for taint, bacteriological quality and other aspects outlined in the product specification. Frequency and manner of testing will be according to HACCP and in-house requirements to manage risk.

Chilled holding temperatures should be maintained until the raw material is required by production.

Dry products

A wide and diverse range of raw materials are packed in multi-wall bags, cartons, sacks and similar materials e.g. bulk bags (milk powders, sugar), cartons, confectionery inclusions. After receipt and acceptance such raw materials need to be transferred to a preferably cool, dark and dry covered storage area free of dust, rodents, pests and taint. The storage area should be allocated for that specific purpose and should not also house other support activities such as engineering. Each product type should be stored on pallets off the floor or on shelving, being clearly marked with identification particulars and, in particular, details of receipt and “use by” date if appropriate. Incoming products could best be stored using a first in, first out principle ensuring the shortest shelf life product is used first. Stock rotation is important. It is advised that a system to implement this be part of the stock handling policy. The policy should also include steps to be taken to handle incoming goods not meeting expectations.

Opened product containers should not be returned to store unless in a clean sealed container.

Products should not be despatched to production contained in the original outer pack but taken out of the outer, usually in a plastic inner, and carefully transferred. There are instances where this cannot be done and great care should be exercised to prevent contamination.

Goods packed in glass should not be taken into production areas but transferred into more suitable containers such as sanitised plastic bottles. Glass is to be avoided at all costs.

Chilled products

Chilled products are of two types. The first is the group delivered to site e.g. fruit juice, dairy products such as milk and cream and accepted by way of a raw material acceptance system; the second is a group manufactured in-house as intermediate products e.g. ripples, yoghurt. Both groups need to be treated in the same way.

As soon as chilled products are accepted they should be transferred to a correctly operating chiller with minimal delay. Manufactured intermediate products should likewise be transferred to a chiller or freezer as appropriate.

It is presumed that the chiller is maintained, regularly checked for temperature and clean. Chiller temperatures are to be monitored and recorded regularly, at least daily.

Chilled products will normally have a short shelf life. A sound system of recording and monitoring of date of receipt, and “use by” dates should be in place. An in-house system of labelling products with such information is necessary.

Stock rotation is most important in a chiller and any out-of-date product will be rejected and a record probably kept of such action. A similar record would be kept of the action taken as a result of any compressor or equipment failure and subsequent rise in temperature.

Always store chilled products off the floor, preferably on wire or slat shelves for air circulation.

Never store unprocessed raw materials, such as raw egg pulp, alongside or above processed or pre-packed products. The unprocessed raw materials must be stored apart from processed raw materials in a clearly segregated area.

Note: Good manufacturing practice requires raw products to be stored below pasteurised products.

Frozen products

It is presumed that the freezer is maintained, regularly checked for temperature and clean. Storage freezer temperatures are to be monitored and recorded regularly, at least daily.

Frozen products e.g. bulk fruit, egg products, ice cream mix, should be transferred to the freezer as soon as possible after acceptance. Raw materials would be best stored in a dedicated freezer used only for raw materials or in a separated and dedicated segment of a freezer containing packed finished goods only. Raw materials are not to be stored in a freezer in which unpacked or part processed manufactured product is hardening or stored.

All raw materials are to be stored on pallets, or shelving off the floor.

Whilst stock rotation in freezers is not as much of a problem as in chillers, rotation should be carried out and a monitoring system should be in place.

A system of recording action is necessary to record the action taken as a result of a compressor or equipment failure and subsequent rise in temperature.

Helpful hint:

When intermediate products are stored in a freezer the use of an **adhesive** label detailing batch number and product details is recommended.

Packaging

This is material that is used to contain product and it is therefore critical that it be handled and stored to minimise the chance of contamination. Packaging does not normally undergo any further cleaning or sanitation process and it is obvious that such materials have to be stored correctly. Correct storage means clean and dry enclosed storage areas where the possibility of contamination is excluded.

Primary packaging (contains product) is not to be used for any purpose other than that for which it was intended (refer to note below).

Pallets and packaging outers or cartons should not be allowed into the process or manufacturing area. Any packaging received with the MAF AFE (Approved For Export) mark should be destroyed, not reused.

The introduction of wood into a critical hygiene area must be managed by a HACCP Plan.

Finished products

Finished products may be classified as those products in final packaging ready for distribution to end users or retailers.

It is important to transfer the packaged product from the packing station to the holding or distribution freezer in the minimum time. In some instances packaged products may pass into an intermediate freezer room for palletisation prior to passing into the final holding freezer.

The holding temperature of the final freezer is a decision for each manufacturer. It should be held at a temperature suited to the product. Storage freezer temperatures are to be monitored and recorded regularly, at least daily.

Finished product must be stored off the floor on pallets or shelving. The freezer must be clean and tidy and nothing should be placed directly on the floor.

Finished stock should ideally be stored in a dedicated freezer or in a clearly defined segregated part of a freezer. Uncooked raw material should be stored apart and be clearly identified.

A stock rotation and monitoring system will probably be in place to control stock on a first in, first out principle.

Note: Reusable bulk containers such as pallecons (usually painted or galvanised) need to be properly cleaned then checked for paint flakes or other forms of contamination e.g. biological (pathogens), physical (wood).

It would be a good in-house practice not to re-use primary packaging.

When contracting out holding and storage of either raw materials or finished product off-site, or when transporting the finished product by contractor to a supplier, a manufacturer must ensure that storage (including temperature control) is appropriate for the product.

Product transport

Transport of finished and packed product has to be done in such a way as to protect the product from in-transport damage. Delivery vehicles must be maintained in a clean and hygienic condition and the cooling equipment well maintained.

In the case where transport is being carried out by a third party transport arrangements should be covered in your programme. In particular, it would be sensible to include in any contract with a third party transport operator a requirement to sight the programme of that contractor, which should include actions that prevent risks associated with transport of products.

Temperature control has a major bearing on product quality and should be a major consideration in the maintenance of the cold chain delivery cycle.

Hazards associated with transport

Integrity of packaging – damage to packaging during transport could lead to contamination of the product, i.e. bacterial and physical.

Cross contamination – it is possible that mixed cargoes will contaminate product. This is particularly a problem in third party subcontracting of product transport.

Taint and bacterial contamination – products must be transported in clean and hygienic vehicles offering no risk of taint or bacterial contamination. A regular vehicle cleaning schedule should be available for staff and results recorded (signature to confirm action). In third party cases, check FSP of the carrier.

Transport of the product is often out of the control of the manufacturer, and most problems associated with transporting product are not hazards, but temperature related. It is recommended that product temperatures are checked on a regular basis by use of inexpensive data and temperature loggers.

Typical problems experienced in ice cream product transport include carriage with chilled goods or with large quantities of high temperature meat or other products (minus 8°C to minus 12°C) and delays in transshipping and consequent re-freezing in carriers' freezers. Care must be taken to prevent such problems occurring. Be sure to check insurance liability accepted by the carrier.

Appropriate care should be taken in handling raw materials and finished products to avoid:	Examples of hazards
Incorrect handling of material	Chemical e.g. cleaning materials Biological e.g. cross-contamination between raw and cooked foods Physical e.g. wood and cardboard
Cross-contamination of incorrectly stored materials	Chemical e.g. cleaning materials Biological e.g. raw and cooked foods Physical e.g. plastic

4.10 Refrigeration Management (chiller/freezer, processing rooms)

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for refrigeration maintenance.
Records?	Yes	Records of chiller and freezer temperatures and maintenance activities shall be kept.

Linkages

Section 4.2, “Repairs and Maintenance of Equipment and Premises”.

Section 4.3, “Calibration”.

Section 5.3, “Corrective Action”.

Outcome

The business shall have effective and documented procedures to ensure that microbiological growth in raw materials, product-in-process and finished product is minimised (safety), and that the sensory and function characteristics desired in finished product are achieved (quality).

Overview

The efficiency of the cold chain cannot be emphasised enough, as it is the cold chain that protects the integrity of the product and that of the manufacturer/supplier.

Frozen foods should be maintained at a temperature of minus 18°C or below.

In the age of Quality Assurance it is the “Cold Environment” that is given the overall consideration when assessing the cold chain principles.

The processor’s responsibilities:

- should have a facility that has the capacity to cool and maintain product at cooler than minus 18°C;
- shall have a temperature logging system in place to provide monitoring and verification;
- should have a preventive maintenance programme in place, which includes the use and maintenance of calibration equipment;
- should have systems within the freezers to readily identify product batches to facilitate freezer management i.e. newest product in, oldest product out. Should also have systems for segregation and identification of “on-hold” product.

A documented housekeeping programme shall include cleaning and routine maintenance of freezer systems.

The distribution environment is critical to maintaining the integrity of the product. Dispatch and transport specifications should be documented.

Modern technology enables the temperature integrity to be logged virtually continuously from store to customer. In fact some customers will insist on that requirement for verification of the delivery environment.

The use of HACCP analysis of the cool chain will determine the critical control points necessary to protect the product.

Equipment

The process of manufacturing ice cream products requires the use of equipment that chills the product during its final working stage.

The following can be used to manage product safety –

- cleaning: cleaning schedules
- maintenance: routine and preventative
- monitoring: temperature, glycol levels, microbiological.

Record keeping

This will assist in the verification process.

An example of a record for checks of chiller/freezer temperatures is shown in **Attachment 4: Storage Temperature Record**.

5.0 Supporting Systems – Other Programme Activities

5.1 Laboratory Facilities, Equipment and Methodology

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare procedures for laboratory sampling and testing.
Records?	Yes	Laboratory monitoring and calibration records. Product and process test records.

Linkages

Section 2.4, “Product Limits – From a Food Safety Perspective”.

Section 3.8, “Process Monitoring”.

Section 5.6, “Validation”.

Section 5.7, “Verification”.

Outcome

The business shall have effective and documented procedures to monitor, validate and verify processes (including Critical Control Points and supporting systems) and products.

Laboratory methods for sampling and testing shall afford the levels of precision or accuracy that are appropriate.

For process monitoring:

- The establishment should be equipped with or have access to laboratory facilities which are sufficiently resourced to carry out all testing required to monitor all products and processes in a reliable manner.
- An in-house laboratory requires a competent person to undertake laboratory testing.
- Sampling methods and laboratory analytical methods should follow manufacturer instructions or be based on reputable and published methodologies.
- Rapid methods are acceptable to monitor process control.

- The laboratory quality assurance programme needs to take into account equipment management, control, calibration and maintenance.

Note: Where there is a need to provide test information to support export certification and/or test for specific pathogenic organisms, the laboratory shall operate a quality assurance programme that meets NZS/ISO/IEC 17025: 1999 *General requirements for the competence of testing and calibration laboratories* and be accredited by IANZ.

Accredited laboratories shall participate in an inter-laboratory comparison programme.

Care needs to be taken to avoid contamination from the laboratory to the production area. Laboratories should be separated from production rooms.

Microbiological analyses should be carried out separate from chemical, physical and sensory analyses. Microbiological laboratories should be designed and operated in accordance with good laboratory practice.

Testing for pathogenic organisms must be carried out by an appropriately qualified person and only in a laboratory suitable for that purpose.

Process and product checks

There should be a written schedule of sampling and testing procedures, prepared on the basis of a review of the HACCP analysis for each process incorporating:

- what;
- where;
- how often;
- responsible person.

The frequency of testing will need to be justified based on:

- monitoring in place;
- history of results to prove confidence of processing;
- supporting programmes in place;
- batch versus continuous processing;
- size of run or batch.

Quality standards or specifications should be defined for each input and finished product. In-process product may also be defined. These will include the four features following:

- **Sampling points**

To be specified as a result of the hazard analysis and, in particular, the application of control measures, and in accordance with legal requirements and where appropriate, overseas market access requirements.

- **Quality control**

An overall parameter in every specification could be: “meets the requirements of the ANZ Food Standards Code or equivalent”. Specifications can be used for all inputs (e.g. dairy ingredients, packaging, air, cleaning chemicals), in-process product and finished products. Specifications can include microbiological, physical (including functional aspects) and chemical limits.

- **Frequency of sampling and testing**

To be established for each item separately depending on frequency of use, possibility of deterioration, shelf life, etc.

- **Analytical methods**

Where accuracy of measurement is required validated test methods must be used. Legally established or (inter)nationally standardised methods should be used. A number of publications are available: AOAC (Association of Analytical Chemists), USFDA BAM (United States Food and Drug Administration Bacteriological Analysis Manual). MPI also publishes validated methods.

If rapid methods are used they may need to be calibrated against a standard method.

Note:

A validated test method is one where scientific studies have shown that the accuracy and repeatability of the method is equivalent to an already established method or with some primary standard of measurement.

A rapid method is one where studies have shown that there is a good association between the rapid method and a validated method, but the two are not equivalent. However, for the purposes of providing a quick result or a trend, a rapid method provides useful information. Rapid methods are often used for hygiene monitoring.

5.2 Traceability and Labelling

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for the labelling of its products in accordance with the ANZ Food Standards Code.
Records?	Yes	Records shall be kept of all product released to the market place.

Linkages

Section 5.3, “Corrective Action (including non-conformance, complaints, recalls)”.

Section 5.5, “Documentation and Record Keeping”.

Outcome

The business shall have effective and documented procedures so product is labelled in accordance with the ANZ Food Standards Code.

Labelling

Standard 1.2.5, “Date Marking of Packaged Foods” says that the label on a package of food must include:

- its “use by” date where the food should be consumed before a certain date because of health or safety reasons;
- or where this does not apply, a “best before” date, unless:
- the “best before” date of the food is two years or more; or
- the food is:
 - an individual portion of ice cream or ice confection; or
 - in a small package, except where the food should be consumed before a certain date because of food or safety reasons.

Each product shall contain an accurate list of ingredients, in descending order of ingoing weight according to the ANZ Food Standards Code. This list needs to be reviewed if the product specification or the ingredients added have been changed.

Every other statement on the label shall be accurate and truthful and shall not deceive (*Fair Trading Act 1986*).

Each label must comply with the requirements of the ANZ Food Standards Code (refer to www.foodstandards.gov.au).

An example of a check list for labelling is shown in **Attachment 15: Check Sheet to Review Label Requirements of the ANZ Food Standards Code**.

Traceability

Correct labelling and traceability are key steps that allow product to be identified, and which allow efficient corrective action in the case of non-conformance, complaints or recall.

An important part of any non-conformance, complaint investigation or recall procedure, is for the business to have the ability accurately to identify individual products and link these to manufacturing records. It is vital that either each item, or each outer, or each carton (i.e. each bulk pack, or minimum level as required by regulation) is marked or recorded in such a manner that identification is simple and absolutely accurate. The Julian numbering system is commonly used. Each finished product must be linked to a production sheet that clearly identifies the batches of ingredients used.

Note: The extent of traceability is the decision of the business. But some businesses may find it useful to record the identification of ingredients, people, times, production lines, batches of packaging, etc., so that the source of problems can be identified in detail.

5.3 Corrective Action (including non-conformances, complaints, recalls)

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for corrective action and procedures for recall.
Records?	Yes	Records shall be prepared in accordance with the procedures.

Linkages

Section 5.2, “Traceability and Labelling”.

Outcomes

The business shall have an effective and documented procedure for corrective action to put right product and system failures. The procedure shall include procedures, where appropriate, for the restoration of control, the control of non-conforming product and preventive action. It shall include procedures for handling **complaints** and conducting **recalls**.

General

Corrective action shall be stated for situations where monitoring indicates ingredients, product or process is outside critical limits or when operations are not in compliance with some aspect of a supporting system.

Corrective action may be used as a tool to correct or improve your Programme.

Corrective action may be included as a part of supporting systems. Specific corrective actions need to be identified for each of the Critical Control Points. However, it is important for your Programme to include a procedure that deals with product and process problems in a more general sense.

Programme requirement

The purpose of corrective action is to ensure that safe product results, that any deficiencies in your Programme are put right and that, where possible, the systems are improved.

All programmes shall have a corrective action procedure including a recall procedure.

The procedure needs to be stated in a way that can be adapted to deal with any form of product or process failure and to take on board ideas for improvement.

The following issues need to be included in corrective action processes:

- Who is responsible for corrective action? There are no strict rules here but generally people should have appropriate experience if they are to undertake investigations and devise solutions. In small businesses the manager should be involved in the decisions made.
- How is control to be restored? There needs to be some comment about the need to identify the cause of the problem and the action needed to put things right, particularly to ensure that the process is stable and in control.
- What happens to any risk product? This is an essential element. Is there any ingredient, product-in-process at risk? What happens to that product? Can it be accepted as is or does it need to be reprocessed in some way?
- What happens to prevent such problems recurring? This looks at the long-term solution; production may recommence but investigations continue to find solutions that stop similar problems happening again.
- What records are kept? Generally, notes in a diary or on a log sheet are sufficient. However, in some cases, such as pathogen contamination incidents and recalls, more detail may be required.

A short procedure should be developed by the business to capture the above outcomes.

Corrective action at Critical Control Points

Corrective action at Critical Control Points shall be stated in the requirements for each Critical Control Point. This may be in a CCP table or in a procedure linked to the CCP table. It is highly recommended you refer to the *Risk Management Programme Manual* on the MPI website for examples and guidance on how to develop a CCP table.

Corrective action in supporting systems

Corrective action for supporting systems may be stated in the procedure for the supporting system or in a generic corrective action procedure.

Generic corrective action procedure

An example of a procedure is shown in **Attachment 9: Procedure for Corrective Action**.

This procedure should be reviewed and adapted as appropriate to include all elements that apply to the activities of the business.

You must document corrective action procedures and ensure they are implemented when a critical limit is not met. Corrective action procedures should include:

- the identity of the person or position responsible for taking corrective action
- procedures for restoration of control
- procedures for control and disposition of non-complying product, including checking of product back to the last good result, where possible
- action to prevent a reoccurrence
- escalating response if preventative action fails; and
- records to be kept.

Non-conforming product

The business shall ensure non-conforming product is identified, food safety hazards are assessed and the product is reworked, repacked, or disposed of in such a way that product is always fit for human consumption.

Identification of non-conforming product

- Non-conforming product must be properly and clearly marked e.g. reject stickers.
- Non-conforming product must be securely quarantined.
- Records of all reworking/repacking/rejection activities to ensure traceability through to ultimate disposal or disposition of the product must be kept.

Options for non-conforming product

Options for disposal of non-conforming product:	Reference	Notes
Can the product be reworked or repacked? What is the nature of the hazard identified?	See section 2.4, "Product Limits – From a Food Safety Perspective"	See section below on reworking and repacking.
Can the product be sold for inclusion in animal feed?	Check the <i>Agricultural Compounds and Veterinary Medicines Act 1997</i> .	
Destruction.	Check local council bylaws. If your programme is a RMP, check " <i>Animal Products (Disposal of non-conforming dairy material or dairy product) Notice 2012</i> "	In most cases dumping or destruction will need to be supervised so that product is not salvaged by others.

Repacking or rework systems

Procedures should be in place that clearly define what product can be reworked/repacked. It can be possible to rework/repack and produce a product safe to consume.

Options for reworking of non-conforming product (examples)	Examples of hazards
Metal detection, screening, sieving may satisfactorily intercept and remove foreign matter.	Physical, such as metal particles
Further heat treatments may be appropriate for some micro-organisms. Care is required if the contamination is by spore formers or by microbial toxins; these may not be rectified by further heat treatment.	Microbiological, such as coliforms

Note: It is important when reworking non-conforming product that the allergen status of the finished product is considered.

Identification of reworked or repacked product

When relabelling packs, any identifying marks carried by the original labels should be carried by the new labels. Where the pack carries a “best before” date (or equivalent) on the label, the new label must carry an appropriate date mark.

Records of all reworking/repacking activities to ensure traceability through to ultimate disposal or disposition of the product must be kept.

Recall

Adequate records and procedures will ensure that a defective product is quickly and efficiently recalled, and that customers are not put at risk. Information on developing a recall procedure can be found on the MPI website www.mpi.govt.nz

In exceptional circumstances, a fault may have occurred that has resulted in finished product being distributed and posing a risk to health.

In these circumstances, a recall is necessary in order to retrieve affected product, and/or to ensure that it is not consumed.

On becoming aware of a problem it is essential to act quickly and urgently. The following actions must be undertaken:

- identify the affected product;
- establish the nature and extent of the problem;
- establish the location of affected product;
- commence the recall by notifying customers, wholesalers, retailers, etc. (this must be done by the quickest possible means, e.g. phone or fax);
- notify your local Food Act Officer, Verifier and/or appropriate authority, and keep them informed of your actions;

- if the problem has arisen through a supplier, notify that supplier;
- isolate and quarantine affected stock;
- where you have product liability insurance, notify your insurer.

If product has been sold through retailers, then a public recall may be necessary. This will involve placing advertisements in the media. Further information and advice must be sought from your local Food Act Officer and/or appropriate authority.

A strategy should be in place at all times just in case a recall becomes necessary. This will involve identifying responsibilities for decision making, notifying customers, liaising with other parties, etc. An up-to-date list of 24-hour contacts should be maintained.

Where a recall is undertaken it is important to document events should you need to justify your actions at a later date. This will involve keeping a log of events, contacts, telephone calls, mailing lists, letters sent, etc. Keeping a chronological summary of events and phone calls throughout the recall would be useful.

Complaints

It is useful if all complaints and feedback about product quality are recorded by sales and other staff who are in contact with wholesalers, distributors and retailers. A register should be kept.

Often the “signals” from complaints provide the triggers for recall and other issues relating to product quality.

When comments are received from the market, the following information should be recorded:

- name and contact details of the person providing the feedback;
- batch code, and date information;
- information about the product;
- any details about sickness or injury.

The person should be requested to hold any product or packaging as this may be required in subsequent follow-up.

If there is evidence of sickness or injury the person should be urged to contact their doctor. The business should notify their Health Protection Officer.

There should always be prompt investigation of the reasons for the issue.

Records are an important part of complaint handling.

An example is shown in **Attachment 14: Customer Complaint Record**.

Useful hint

In the case of re-work from churn start-up, if this cannot be re-worked within 24 hours, then it should be frozen and re-worked later.

5.4 Training

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a training plan for each task (or group of tasks), detailing the skills required to achieve each task, and the way a person will be trained.
Records?	Yes	Records shall be maintained of a person's training.

Linkages

New Zealand Industry Training Organisation (see www.nzito.co.nz).

Outcome

The business shall have effective and documented procedures for training.

General

Appropriate staff facilities and procedures are needed to ensure adequate personal hygiene and safe food handling. Staff need the appropriate knowledge of food safety for the operation and type of product handled. Staff have a responsibility to conduct themselves so as not to compromise food safety.

Training procedures

Training procedures shall have the following elements:

- an analysis of tasks;
- a training-needs analysis against each task;
- a method to provide training;
- a record of a person's competence;
- provision for ongoing review and implementation.

An example of a training record sheet is shown in **Attachment 11: Training Record**.

Recruitment and induction

All staff should have job descriptions or access to appropriate procedures. Recruitment and selection should be made on a person's ability to do the job at the time unless training is to be provided. A person should not be placed in the job unless capable of doing the job described. This is crucial for health and safety and food safety reasons.

If the position to be filled is complex and detailed recording is required, relevant competencies or qualifications should be considered. These may be:

- a tertiary or New Zealand Qualifications (NZQA) qualification;
- demonstrated level of reading and writing ability;
- demonstrated ability of visual competence and/or colour blindness where a high level of inspection skills are required;
- demonstrated ability of sensory capability where flavour, odour and textures are evaluated in food.

The induction process should initially prepare new personnel for the business culture.

The induction process should progressively initiate the new entrant through the business's quality system, responsibilities, reporting, supervision, disciplinary process, the task skills and expectations and the use of documented work instructions.

Competence

All personnel should receive basic training and be able to demonstrate competence in hygiene practices and quality management. Personnel should also receive detailed training relating to their job and should have an understanding of the operating principles of the process. Contractors should also receive appropriate training.

At no time should staff compromise food safety. Staff need to be able to demonstrate an understanding of the food process they are responsible for such as monitoring, corrective action and verification requirements.

No person who falls below the minimum level of competence required should be allowed to perform that task without supervision.

Competence is the demonstrated ability of a person to perform a task correctly the first time without assistance.

Training and competence should be regularly audited and reviewed to identify training needs.

Personal hygiene

Personal hygiene is important to training (refer to section 4.4, “Personal Hygiene”).

The training programme should cover the general requirements for personal hygiene within the manufacturing plant and any specific critical requirements.

HACCP

It is highly recommended that at least one member of the business has received HACCP training to enable the skilled development of a Risk Management/Food Safety Programme. When the necessary skill is not available the HACCP skill can be contracted in.

Note: The Hospitality Industry Training Organisation (HIS), COMPETNZ (New Zealand Engineering and Food Manufacturing Industry Training Organisation) and NZITO (New Zealand Industry Training Organisation – for meat and dairy) will be able to assist in establishing work-site training programmes and linking these to nationally accepted NZQA qualifications.

5.5 Documentation and Record Keeping

Your programme will require	Yes/No	Action
Procedures?	Yes	Your programme must be written down in accordance with the various requirements in these Guidelines.
Records?	Yes	Records are required, as detailed elsewhere.

Linkages

Section 1.6, “Instructions for use of the Ice Cream Guidelines for the Development of a Programme”.

New Zealand Industry Training Organisation (see www.nzito.co.nz).

Outcome

Documenting your Risk Management Programme/Food Safety Plan and keeping records are essential for the following reasons:

- ensuring that your product is made, stored and handled correctly at all times;
- providing evidence that your product has been made, stored and handled correctly should you ever need to, say, when investigating complaints or recalls. Having documentation will help you to establish a “good defence” under Section 30 Strict liability of the Food Act 1981 to prove that you took all reasonable steps should a complaint or food poisoning incident arise;

- to demonstrate your system of food safety to your customers;
- as a tool to assist training.

General

If approval of your programme is required, then the programme must be documented. This will involve documenting the hazard analysis carried out, together with supporting systems and identification of the Critical Control Points (CCPs), and other components as detailed in these Guidelines.

The document, as well as records, can be managed electronically. If this approach is taken, it must be available for operators and be backed up.

Process records must be kept for all monitoring activities. These must detail the results/values etc. obtained, together with any corrective actions taken when the product or process moves outside the limits stated in your programme.

The range of documentation and records needed, and the detail required, will depend on the types of hazards present and the control measures used.

Requirements for procedures and records are highlighted in a note at the beginning of many of the sections in these Guidelines.

Document control

Your programme should state the system of document control used by the ice cream business. The procedure might cover:

- format of documents, including the use of document numbers, versions, and issue dates;
- authority for issue;
- routines for issue and retrieval of old versions;
- rules for hand alterations;
- rules for making copies;
- routines for review.

Record keeping

Records shall be kept for at least **the product life plus the audit interval**.

For practical purposes it is recommended that all records be kept for four years (requirement under the APA).

There may be other needs for record keeping that are established in other legislation. A business needs to be aware of the need to provide evidence supporting its diligence if it is subject to a customer claim or an action by a regulatory body.

5.6 Validation

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure for validation and revalidation activities.
Records?	Yes	Records of validation must be kept.

Linkages

Section 2.4, “Product Limits – From a Food Safety Perspective”.

Section 3.4, “Hygienic Processing”.

It is recommended you read this section in conjunction with the document *Risk Management Programme Manual for Animal Product Processing*. This document is available on the MPI website www.foodsafety.govt.nz.

Outcome

The business shall have effective and documented procedures for validation activities.

Purpose of validation

Validation is the activity of ensuring that control measures are suitable and effective, and that they will control the hazard at levels required to meet the Product Limits.

Validation is a one-time process that is repeated only when changes are made to your programme.

Validation needs to be applied to Critical Limits (regulatory and operator defined), to Critical Control Points and to supporting systems, as these represent the operational control measures used by the business.

Requirements for validation

The business needs to provide information that shows that the control measures are suitable and effective.

It must provide this information at the time your programme is first evaluated, and whenever significant changes are made to the programme. If this information is not available at the evaluation stage, include a validation protocol outlining how this information will be obtained.

More details on validation can be found in the Risk Management Programme Manual for Animal Product Processing. This document is available on the MPI website www.foodsafety.govt.nz.

Critical limits

If a business selects Critical Limits that are stated in these Guidelines and in the context that applies, then those limits may be used in a Programme by reference, without further justification.

If a business selects Critical Limits that are different to those stated in these Guidelines, the business must provide references that demonstrate that those limits are scientifically based. It may use references from the literature or conduct its own studies.

Pasteurisation/heat treatment

If a business uses dairy ingredients or egg products that have not previously been pasteurised, then such a treatment must be provided in the manufacturing process (see **section 3.4, “Hygienic Processing”**).

If a business treats its raw materials using HTST, or batch systems, or by using equivalent treatments, it must provide information about the design criteria and operation characteristics of the system. Criteria have been established in **section 3.4, “Hygienic Processing”**.

The business may present this information itself or use a suitably competent person to examine the pasteuriser design and operation and prepare a report.

A report shall be prepared about the design, installation and performance capability of the pasteuriser to achieve the product limits. Following this, it is necessary to run the pasteuriser under normal processing conditions to confirm the pasteuriser is achieving the correct time/temperature combination. Validation is a one-time process that is repeated only when significant changes are made to the design, installation and operational parameters of the pasteuriser.

Validation of pasteurisers can be carried out by suitably competent people in the business **or** the business may engage a suitably competent person **or** a suitably qualified auditor to perform this task.

For heat treatment for functional purposes, the normal assessment at time of audit by a competent auditor is sufficient.

Product and process testing

A manufacturing business may use results of tests of in-process samples, product samples and environmental samples to confirm the suitability of the control measures.

Due to the cost implications, sampling and testing should be used wisely, and as appropriate by the business to provide evidence that the control measures are suitable and effective.

Responsibilities of regulators

Regulators have responsibilities to assess the information provided by a business about the suitability, effectiveness and performance of control measures.

If a business does not provide sufficient information to a regulator, the business will be required to provide additional supporting information.

Revalidation

The business must revalidate its Critical Control Points and supporting systems if it makes any changes to those stated in the Programme that would affect the suitability and effectiveness of those control measures.

The Conditions of Approval of your Programme may state special conditions as may be appropriate to an individual business.

If a business introduces new products, uses new ingredients or operates new processes, it must revise its programme and revalidate it. **Such significant amendments usually require application for registration of your amended programme.** Check with your regulator or verifier.

It must identify any new hazards and control measures and ensure that the Programme is amended in such a way that the programme remains suitable and effective.

If a business makes product and process changes as a matter of routine, it is recommended that the business has a specific “design and development” procedure so that hazard analysis is established as a routine prior to commercial production.

5.7 Operator Verification

Your programme will require	Yes/No	Action
Procedures?	Yes	The business shall prepare a procedure detailing the verification methods it uses, noting the mandatory and optional elements below.
Records?	Yes	Records shall be prepared in accordance with the procedures.

Linkages

Section 2.4, “Product Limits – From a Food Safety Perspective”.

Section 3.8, “Process Monitoring”.

Section 5.6, “Validation”.

Section 5.4, “Training”.

It is recommended you read this section in conjunction with the document *Risk Management Programme Manual for Animal Product Processing*. This document is available on the MPI website www.foodsafety.govt.nz.

Outcome

The business shall have effective and documented procedures for verification.

Purpose of verification

Verification is an ongoing management responsibility of the business.

Verification requires the business to provide evidence that all the Critical Control Points and supporting systems are implemented and operational on an ongoing basis.

Requirements for verification

1. Perform supervisor checks

The manager or a senior staff member shall check all records of Critical Control Points and supporting systems either on a daily basis or prior to the release of batches of products.

This check shall confirm that all monitoring and corrective actions have occurred in accordance with the documented procedures. All records checked in this way shall be signed and dated.

2. Conduct a formal review of your programme

At least annually, and whenever necessary, the manager shall conduct a review to see that all procedures remain suitable and effective and all records are maintained.

The business shall keep a record stating:

- the time of the review;
- the people who participated in the review;
- the procedures that are reviewed;
- the records that are examined;
- any corrective action that is taken.

This review shall also check that:

- job descriptions are used and/or procedures are followed;
- training records are maintained;
- maintenance and repairs are planned and taking place;
- information from customer feedback or complaints has been acted upon;
- findings from product recalls are acted upon;
- information from regulatory assessments and external audits has been acted upon.

Note that it is expected that information about product or manufacturing issues will be dealt with at the time. The purpose of the review is for the manager and the “team” to consider again whether all necessary actions have taken place.

3. Process and product tests

A business may use tests of in-process samples, product samples and environmental samples, to confirm the suitability of the control measures.

Examples of product and process tests have been detailed in **section 3.8, “Process Monitoring”**. These may also be used for the purposes of verification.

Due to the cost implications, sampling and testing should be used wisely and as appropriate by the business to provide evidence that the control measures are suitable and effective.

A business may carry out other process and product tests in accordance with other product or process outcomes that may be established.

4. Internal audits

A business may carry out internal audits.

If this is done, audits should be programmed on a periodic basis, as well as taking place after changes to the process or Programme, or where problems have arisen.

An audit plan for internal audits should be drawn up showing the timetable for the audits, what activities will be audited, and by whom.

A procedure for auditing should also be established. A checklist may be used as the basis for the procedure. Records must be kept of all audit activities.

An audit checklist is shown in **Attachment 1: Internal Audit checklist**.

5. Supplier audits

Second party audits of suppliers may be undertaken as part of a Supplier Quality Assurance Programme section of your Programme. A procedure for this activity should be developed.

5.8 Programme Approval or Registration (regulator roles, auditor roles)

Your programme will require	Yes/No	Action
Procedures?	No	
Records?	Yes	Keep a record of all correspondence and reports from regulators and auditors.

Linkages

Animal Products Act 1999

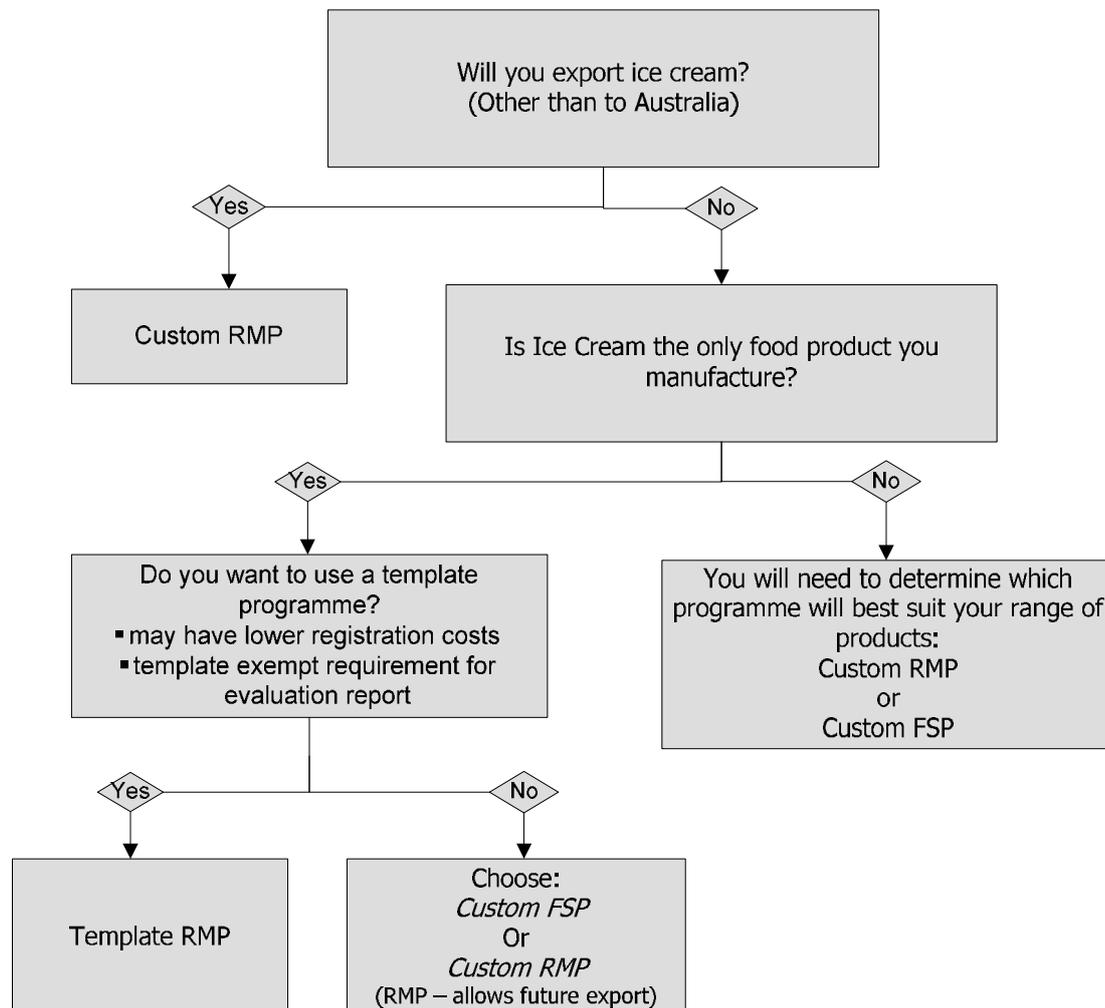
Food Act 1981

Outcome

Your programme will need to be approved by the regulator in accordance with the legislation which applies (A Food Safety Programme under *Food Act 1981* or A Risk Management Programme under *Animal Products Act 1999*).

Choosing your programme

This flowchart is to assist you decide if a FSP or RMP will best suit your ice cream business:



Approval of Food Safety Programmes under the *Food Act 1981*

A number of pathways for approval are allowed under the *Food Act 1981*. More details are available on the MPI website www.foodsafety.govt.nz.

The following is a brief summary of the steps an operator may take to register and operate a Food Safety Programme:

- Operator develops Food Safety Programme
- Operator engages an approved auditor to prepare audit report
- Operator completes MPI application form and submits Food Safety Programme with audit report
- MPI reviews information and registers programme if all requirements are met
- Operator runs business according to the programme, and keeps all required records
- Approved Auditor carries out annual audit

Registration of Risk Management Programmes under the Animal Products Act

A Risk Management Programme may be a template programme, or one the operator has developed. More details on developing and registering a Risk Management Programme are available on the MPI website www.foodsafety.govt.nz.

The following is a brief summary of the steps an operator may take to register and operate a Risk Management Programme:

- Operator develops Risk Management Programme or completes template
- Operator carries out validation (or develops a validation protocol)
- Operator contracts the services of a recognised evaluator to complete the evaluation report. (Evaluation is not required if a template programme is used)
- Operator completes MPI application form and submits Risk Management Programme and evaluation report
- MPI reviews information and registers programme if all requirements are met
- Operator runs business according to the programme, including any conditions (eg validation protocol), and keeps all required records
- Recognised verifier carries out verification at the frequency required for the particular programme (can depend on export requirements etc).

Appendix 1: Definitions

Term	Definition
Batch	A quantity of production with unique characteristics (process or ingredients) covering a period of time not in excess of 24 hours.
Control (noun)	The state wherein correct procedures are being followed and criteria are being met (Codex definition).
Control (verb)	To take all necessary actions to ensure and maintain compliance with criteria established in the HACCP Plan (Codex definition).
Control measure	Any action and activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level (Codex definition).
Corrective action	Any action to be taken when the results of monitoring at the Critical Control Point (CCP) indicate a loss of control (Codex definition).
Critical Control Point	A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level (Codex definition).
Critical Limit (CL)	A criterion that separates acceptability from unacceptability (Codex definition).
Deviation	Failure to meet a Critical Limit (Codex definition).
Evaluation	Assessment of an individual plan, programme or system to determine compliance with regulatory requirements. This will involve review of documentation and, in some cases, review of operations or observation of practice (MPI definition).
Finished product	Product as presented to the consumer or user, and as defined by individual product manufacturers.
Flow diagram	A systematic representation of the sequence of steps or operations used in the production or manufacture of a particular food item (Codex definition).
Food for Retail sale	Food for sale to the public and includes food prior to retail sale which is - (a) manufactured or otherwise prepared, or distributed, transported or stored; and (b) not intended for further processing, packaging or labelling (ANZ Food Standards Code)
Food for catering purposes	Those foods for use in restaurants, canteens, schools, caterers or self-catering institutions, where food is offered for immediate consumption (FSANZ (formerly ANZFA) definition).
Food Safety Programme (FSP)	A programme designed to identify and control food safety risk factors in order to establish and maintain food safety (<i>Food Act 1981</i>)
HACCP	Hazard Analysis and Critical Control Point (HACCP) is a system which identifies, evaluates and controls hazards which are significant for food safety (Codex definition).
Hazard	A biological, chemical or physical agent in, or condition, of food with the potential to cause an adverse health effect (Codex definition).
Hazard analysis	The process of collecting and evaluating information on hazards and conditions leading to their presence in order to decide which are significant for food safety and therefore should be addressed in the HACCP Plan (Codex definition).

Term	Definition
Ice cream	Ice cream means a sweet frozen food made from cream or other milk products or both, and other foods, and is generally aerated. It must contain no less than (a) 100g/kg of milk fat; and (b) 168g/litre of food solids (ANZ Food Standards Code).
Intra company transfer	A transfer of food between elements of a single company, between subsidiaries of a parent company, or between subsidiaries of a parent company and the parent company (ANZ Food Standards Code).
Monitor	The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control (Codex definition).
Operator-defined limit	A measurable limit established by a risk management programme operator to manage the fitness for purpose of animal material or animal product.
Pasteurisation	(a) Heating milk to a temperature of no less than 72°C, and retaining at such temperature for no less than 15 seconds, then immediately and rapidly cooling to either a temperature that is appropriate for further processing, or a storage temperature that maintains the milk in a wholesome condition during its shelf life. (b) Heating milk or dairy produce using any other time and temperature combination of equal or greater lethal effect on pathogenic micro-organisms. Pasteurisation conditions, as defined heat treatments, are designed to reduce the number of <i>Mycobacterium tuberculosis</i> , <i>M. bovis</i> and <i>Coxiella burnetii</i> by at least a factor of 10 ⁵ (log 5). In addition, it results in prolonging the keeping quality of the dairy produce under refrigerated conditions resulting in only minimal chemical, physical and organoleptic changes.
Programme	A documented programme complying with the principles of HACCP designed to identify and control food safety risk factors in order to establish and maintain food safety.
Regulatory Limit	A measurable regulatory requirement that is critical to fitness for intended purpose of animal material or animal product.
Risk Management Programme (RMP)	A risk management programme is a programme designed to both - (a) identify; and (b) control, manage and eliminate or minimise - Hazards and other risk factors in relation to the production and processing of animal material and animal products in order to ensure that the resulting animal product is fit for intended purpose.
Ready-to-eat-food	Ready-to-eat-food is food that is ordinarily consumed in the same state as that in which it is sold or distributed. (Food Standards Australia New Zealand (formerly ANZFA) definition)
Small package	A package with a surface area of less than 100 cm ² (ANZ Food Standards Code).
Step	A point, procedure, operation, or stage in the food chain including raw materials, from primary production to final consumption (Codex definition).
Transportation outer	A container or wrapper which encases packaged or unpackaged foods for the purpose of transportation and distribution, and which is removed before the food is used or offered for retail sale, or which is not taken away by the purchaser of the food (ANZ Food Standards Code).
Validation	The process by which evidence is obtained to demonstrate that animal material or animal product will be fit for intended purpose, through the achievement of any regulatory limit or operator defined limit.

Term	Definition
Verification (external)	<p>Includes the ongoing checks carried out by recognised persons to determine whether -</p> <ul style="list-style-type: none"> (a) Operations that are subject to a risk management programme or a regulated control scheme are in compliance with the requirements of the programme or the scheme or of the Act (b) Animal materials or products for whose export on official assurance is required have been produced or processed in a way that meets the requirements for the official assurance
Verification (internal/operator)	<p>Application of methods, procedures, tests and other checks by the operator to:</p> <ul style="list-style-type: none"> ▪ validate the risk-based programme; ▪ determine the ongoing compliance and applicability of the risk-based programme; ▪ revalidate the risk-based programme when changes occur that may have a significant impact on the outcome of the product.

Appendix 2: Background Information on Food Safety Hazards

1 Introduction

The purpose of this technical annex is to provide background information on food safety hazards to provide guidance in identifying potential hazards within the specialist manufacture of ice cream. The products included in the scope of this annex are ice cream, frozen dessert systems, gelato, sorbet, water ices, frozen yoghurts, milk ices, ice confections and soft serve wet mixes with frozen step.

Foodborne outbreaks associated with ice cream have been minimal in the past century. In the United States the majority of foodborne outbreaks were contributed to the use of raw milk and eggs (Bryan, 1983). Ice cream is inherently a safe food when good manufacturing practice is used. These preventive practices include:

- in-plant process control such as pasteurisation;
- use of pasteurised milk;
- rapid cooling and freezing, which minimises microbial growth;
- cleaning and sanitisation;
- final product testing for pathogens and indicator organisms such as Standard Plate Counts and coliform testing (Vought and Tatini, 1998).

Data from the United States of America show that the key etiological sources of ice cream associated foodborne outbreaks from 1993 to 1997 were *Salmonella*, and one-off cases sourced from heavy metals and *Giardia lamblia*. Two outbreaks had unknown etiological sources (CDC, 2000). The majority of ice cream complaints in New Zealand were physical hazards. Complaints since 1997 have included glass, metal, plastic, paper, hair, fingernail, muslin cloth and insects. There have been no reports of foodborne outbreaks associated with ice cream in New Zealand, except for two cases since 1997 derived from “snow freeze” (MoH, 2000b). “Snow freeze” sold at retail stores is, however, outside the scope of these Guidelines.

2 Ice cream manufacturing process

2.1 Heat processed food ingredients

Milk

Milkfat sources used in ice cream making can include fresh cream, butter oil, sweet butter, whole milk and other dairy products. Non-fat milk solids are derived from whole milk, skim milk, condensed milk, dried whey, buttermilk and non-fat dry milk (ICMSF, 1998). The pre-pasteurisation microflora of the ice cream is the microflora of the individual mix ingredients.

Raw milk is a vehicle for milkborne outbreaks. Campylobacteriosis and salmonellosis are well established as illnesses that may be contracted from milk and milk products. Salmonellae may contaminate the milk during the milking process via hands, equipment or direct contamination of the milk by faecal material (Todd, 1989). Listeriosis and hemorrhagic colitis outbreaks have also been traced to milk (Jay, 1996).

Raw milk held at refrigerator temperatures for several days invariably shows the presence of several or all bacteria of the following genera: *Enterococcus*, *Lactococcus*, *Streptococcus*, *Leuconostoc*, *Lactobacillus*, *Microbacterium*, *Oerskovia*, *Propionibacterium*, *Micrococcus*, *Proteus*, *Pseudomonas*, *Bacillus*, and *Listeria* and members of at least one of the coliform genera (ICMSF, 1998).

Stabilisers/emulsifiers

Small amounts of emulsifier(s) improve whipping properties, while stabilisers improve body and texture and prevent ice crystal formation. Mix ingredients are combined and may be held for a short time to allow the stabiliser to hydrate. Time–temperature regulations vary from country to country (ICMSF, 1998).

Water

Water (including ice and steam) that comes into direct or indirect contact with animal material or animal product must be potable water or clean seawater at the point of use. An alternative water quality standard determined by the operator can be used provided that the water quality standard is determined by an analysis of hazards and other risk factors, and that the suitability for processing of animal material or fitness for intended purpose of animal product is not adversely affected. Supporting systems should be in place to manage the water quality standard. Such systems may include a water sampling and testing programme.

Pasteurisation and homogenisation

Heat treatments applied to ice cream mixes extensively destroys microbial growth, yet survivors are generally spores. Lack of pasteurisation will enable the survival of pathogens. Post-pasteurisation aerobic plate counts are usually a few hundred cfu/ml or lower.

In the United States parameters for pasteurisation are based on, but are higher than, time–temperature combinations used for milk. Heat treatments must be 3°C higher than those used for milk for each minimum holding time (ICMSF, 1998). The following table gives the pasteurisation requirements of ice cream mix for different countries.

Table A2.1: Some pasteurisation requirements for ice cream

Country	Pasteurisation requirement
UK	65.5°C (150°F) for at least 30 minutes 71°C (160°C) for at least 10 minutes 79.5°C (175°F) for at least 15 seconds 148.8°C for two seconds

USA	68°C (155°F) for 30 minutes 79°C (175°C) for 25 seconds
Japan	68°C for 30 minutes or by a method having equal or better effect
Denmark	At least 65°C for 30 minutes within one hour of mixing ingredients
France	60-65°C for at least 30 minutes
Singapore	66°C for 30 minutes 72°C for 10 minutes

Source: ICMSF, 1998.

Ice cream mixes are homogenised to improve body and texture of the product. The homogeniser often functions as the metering pump for the HTST pasteuriser.

2.2 Post-heat treatment

Additional ingredients

Flavours may be added before or after pasteurisation and homogenisation. Other ingredients may be added post-pasteurisation, such as fruit, nuts, confectionery and flavours. These ingredients may contribute to contamination through the presence of pathogens and toxins (ICMSF, 1998).

Spices sometimes contain bacteria that can cause foodborne infections, but are not a major source of foodborne disease (ICMSF, 1998). Spices contain spore-forming organisms and are capable of producing gastroenteritis when ingested in large populations. *Bacillus cereus* was tested for prevalence and levels in 110 variety of spices. The organism was found in 53 percent of these samples (Powers *et al.*, 1976). Te Giffel *et al.* (1996) found in a recent survey *B. cereus* levels of 1×10^2 to 1×10^6 in samples tested. Other pathogens found in some spices included *Clostridium perfringens* (Powers *et al.*, 1975) and there were several outbreaks of salmonellosis (ICMSF, 1998).

The New Zealand Microbiological Reference Criteria for Salmonella in herbs and spices (Ministry of Health, 1995a) is zero in 25 g. New Zealand commercial suppliers of treated spices usually guarantee that their products meet the set criteria. Bacterial spores may survive cooking temperatures and temperatures between 3°C and 50°C. Spices containing these spores should be considered as a potential hazard if the production of, or final product to which the spices are added, are not properly prepared and handled (ICMSF, 1998). Supporting systems may include fumigation or irradiation, or treatment parameters to enable proper handling of spices and the addition of spices into products. The use of spices that have been treated to reduce the microbial loading is advisable along with sourcing spices from preferred suppliers, setting quality specifications and managing the procurement of spices under an effective Supplier Quality Assurance (SQA) programme.

Cooling/freezing

The pasteurised mix is cooled and aged to allow physical changes. After ageing, ice cream mix is promptly frozen, unless it is to be used for soft serve ice cream. Hardened ice cream is frozen in a two-step process.

The ice cream is firstly partially frozen to minus 5°C to minus 8°C during which air is beaten into the mix. Partially frozen mix is packaged and placed in a hardening room or freezing tunnel where complete freezing to minus 25°C to minus 30°C occurs. Microbial spoilage does not occur if ice cream mix is promptly frozen. The low temperature of frozen ice cream completely prevents microbial growth. Microbial growth and spoilage can take place when uncontrolled storage delay between pasteurisation and storage arises (ICMSF, 1998).

Packaging

The following excerpt is extracted from the Animal Products (Specifications for Products Intended for Human Consumption) Notice 2004 detailing packaging requirements for products intended for human consumption. (The Notice can be accessed from the MPI website):

1. The composition and where appropriate, the conditions of use of packaging must:
 - (a) comply with the requirements specified in the current US Code of Federal Regulations, Title 21, Parts 170–199 (21 CFR 170–199), which apply equally to coatings and linings of containers and cartons where these are the direct product contact surface; or
 - (b) comply with the requirements specified in the current Australian Standard AS2070–1999 *Plastics materials for food contact use*; or
 - (c) be determined by the operator to be suitable for use, based on an analysis of hazards and other risk factors from the packaging.
2. If compliance with this specification is achieved through meeting the requirements of subclause (1)(a) or (b), the risk management programme must state the full reference to the regulation, part, section or standard with which the packaging complies.

Soft serve wet mix

Soft serve ice cream is usually drawn from the freezer at about minus 6°C to minus 7°C. The wet mix is packed off after the initial freeze of the ice cream making process. Contamination and temperature abuse of soft serve ice cream mix could occur. Facilities for cleaning and sanitising freezers and associated equipment are required to prevent contamination. Prevention of both contamination and temperature abuse of the mix is required. Improper refrigeration may permit bacterial growth to high levels causing spoilage (ICMSF, 1998). The use of HACCP (Hazard Analysis Critical Control Point) may be required to control and monitor temperatures of equipment and product.

3 Hazards

There have been no reports in New Zealand of foodborne illness outbreaks associated with products covered in these Guidelines. In the United States there have been cases of foodborne outbreaks transmitted through ice cream from 1993-1997 (see Table A3.1).

Table A2.2: Number of reported foodborne disease outbreaks, cases and deaths by contributing factor transmitted through ice cream in the United States from 1993–97

Year	Outbreaks		Cases		Deaths		Etiology	
	n	%	n	%	n	%	Etiologic agent	n
1993	3	0.6	32	0.2	0	0.0	<i>Salmonella</i>	3
1994	5	0.8	919	5.7	0	0.0	<i>Salmonella</i> Heavy metals Unknown	3 1 1
1995	1	0.2	60	0.3	0	0.0	Unknown	1
1996	6	1.3	183	0.8	0	0.0	<i>Salmonella</i> <i>Giardia lamblia</i>	5 1
1997	0	–	–	–	–	–	–	–

The outbreaks of foodborne disease transmitted through ice cream between 1993 and 1997 in the United States have ranged from zero to six outbreaks, up to 919 cases in 1994 and as low as 32 cases in 1993 with no deaths. The percentage of foodborne disease derived from ice cream range from 0.2 to 1.3 percent of outbreaks over the period and between 0.2 and 5.7 percent of reported cases. The majority of outbreaks have been contributed to by *Salmonella*, one from heavy metals, one from *Giardia lamblia*, and two outbreaks had unknown etiological sources.

3.1 Biological hazards

Salmonella

Ice cream made from raw milk and cream is susceptible to similar inherent dangers as the consumption of raw milk. The ability for *Salmonella* to survive prolonged periods of time in frozen foods has been established. *S. enteritidis* and *S. typhimurium* were isolated from ice cream held at –23°C for seven years (D'Aoust, 1989).

Raw or improperly pasteurised eggs containing *Salmonella* were involved in a number of outbreaks in the United States.

An outbreak of *Salmonella enteritidis* in 1994 associated with ice cream products reported 80 confirmed cases (CDC 1994). However the final number of reported cases after the CDC report was issued was up to 225 000 cases. An investigation found that particular production codes of the ice cream samples of collected had *Salmonella enteritidis*. The isolates from the stools and from the ice cream were of the same bacteriophage type. This served to confirm the ingestion of *S. enteritidis* was a direct result of eating these ice creams.

The results of this foodborne outbreak investigation found the 95 percent confidence interval for *S. enteritidis* among the samples was <0.001 to 2.4 cells/g. The 95 percent upper limit of *S. enteritidis* per gram was 0.38 for five of six consumer samples. Based on this the number of *S. enteritidis* cells per serving (65g) was 25. Based on the consumption of a single sundae cone (73g, prepackaged), the infective dose would appear to be no more than 28 cells/serving (Vought and Tatini, 1998).

The cause of the contamination was thought to have originated during transportation of pasteurised ice cream mix in tankers that had previously been used to transport unpasteurised raw egg. The ice cream mix was not subsequently pasteurised (Hennessy *et al.*, 1996, see ICMSF, 1998).

Transportation procedures should be reviewed and verified so that tanker trucks or transport vehicles are either dedicated to receiving only pasteurised mix or, if used to transport raw materials, assurances given that the transport vehicle is adequately cleaned and sanitised to prevent any contamination.

A number of *Salmonella enteritidis* outbreaks have been associated with home-made ice cream in the United States using raw eggs (CDC 1994). In one case the ice cream was properly chilled, no food-handling errors were identified, and the source was therefore linked to the raw eggs utilised in the ice cream.

Listeria

Listeria monocytogenes does not survive pasteurisation, so if *Listeria* is present post pasteurisation there has been contamination post pasteurisation. The inability to grow at freezing temperatures minimises the risk associated with this and other pathogens (Kovak *et al.*, 1996, Ryser and Marth, 1991). The notable foodborne Listeriosis cases traced to dairy products have mainly been in raw and pasteurised milk and soft cheeses (Jay, 1996). Ice cream and specialty dairy products have been found to contain *Listeria* spp, but at a lower frequency and more sporadically compared to other dairy products (Lovett, 1989).

Overall, standard pasteurisation protocols for milk are adequate for destroying *L. monocytogenes* at levels of 10^5 and 10^6 /ml. The D values for raw milk pasteurised at 71.7°C/15secs (high-temperature, short time-HTST) was adequate to reduce the normally existing levels of this organism to below detectable levels. The low-temperature, long-time (LTLT) was found to be even more destructive (Jay, 1996).

This pathogenic micro-organism has the ability to survive at refrigeration temperatures. Scott A strain has been found to be the most heat resistant strains of *Listeria monocytogenes*. However, pasteurisation guidelines for ice cream mixes achieve adequate destruction of the species. Major ingredients in ice cream, ice milk and milk shake mixes such as some stabilisers, e.g. some starches, increases the thermal resistance of *Listeria monocytogenes* (Holsinger *et al.*, 1992).

A study was carried out by members of Environmental Health Departments or Public Health Laboratories in England and Wales. Of the 150 samples of ice cream that were sampled and isolated for *L. monocytogenes*, only three samples contained *Listeria* species. Products such as cheese contained a higher frequency of *Listeria*. Recommendations to use pasteurised milk in

the production of cheese and strict attention to hygiene in the dairy premises are required to prevent contamination of products. These Guidelines can similarly be applied to other dairy products such as ice cream. The *Listeria* strains found in the samples were serogroups 4 (one sample) and 4b (two cases). Most cases of human infection (80 percent) are caused by serogroup four strains. The levels of *Listeria* in this study were generally low, but precaution is required due to the ability of this organism to multiply at refrigeration temperatures.

Bacillus cereus

No foodborne outbreaks associated with ice cream due to *Bacillus cereus* have been reported. However *B. cereus* can be found in milk, causing a “bitty” cream or sweet curdling. Milk contaminated with *B. cereus* has been traced to canned milk that was allowed to stand after emptying and to mastitic cows. *Bacillus* spores have been found to survive in UHT-processed milk (Johnson, 1984). Enterotoxigenic strains of **B. cereus** have been found to contain 85 percent of 83 strains from raw milk being positive for the diarrheagenic toxin (Jay, 1996).

Campylobacter

A number of *Campylobacter* outbreaks reported in the United States have resulted from the consumption of raw milk. *Campylobacter jejuni* was found in the stools of nine out of 12 persons. *Campylobacter* is present in the intestinal tracts of about 40 percent of dairy cattle (American Medical Association, 1984). *C. jejuni* is a heat sensitive bacterium that can be destroyed by milk pasteurisation temperatures (Jay, 1996).

Campylobacter spp can be found in the faeces of all animals; on many occasions the animals do not show signs of clinical disease (Johnston, 1990). Since healthy animals may be carriers of *Campylobacter* spp., faecal contamination of milk represents a potential route leading to human infection.

Campylobacteriosis in New Zealand has significantly been associated with the consumption of raw and undercooked foods (notably poultry and unpasteurised dairy products) and the consumption of untreated drinking water (ESR, 1996).

Staphylococci

As *Staphylococci* should be destroyed by heat treatment of the milk, the occasional presence of enterotoxigenic *S. aureus* may be due to post-processing contamination either through cleanliness and sanitation of equipment, handling or storage (Batish and Chander, 1987).

Staphylococcal enterotoxin in ice cream was discovered in several outbreaks reported in the 1930s and 1940s. It was usually found that ice cream mix was contaminated at the time of preparation, and temperature abuse allowed the *Staphylococci* to multiply before and during the long period of cooling before the mix froze (Bryan, 1983). Butter has also been implicated as a vehicle (Bryan, 1983).

Raw milk, and that sourced from cows with clinical or subclinical mastitis, can frequently contain *Staphylococcus aureus* (ICMSF, 1998). It will grow in milk that is not quickly cooled and kept chilled. High *S. aureus* populations of greater than 10^6 CFU /ml are considered necessary for detectable enterotoxin to form. *S. aureus* and enterotoxin formation could be minimised through good animal health and milking practices followed by rapid chilling of the

milk and subsequent pasteurisation. Animal strains of *S. aureus* have rarely been associated with outbreaks of staphylococcal food poisoning in humans in New Zealand (Wilks and Humble, 1997).

Mycobacterium bovis (TB)

The following table is recent data on the presence of *Mycobacterium bovis* (TB) presented on the basis of region (Regional Council Boundary) and TB vector area (a risk area where infection is present in and transmitted to, cattle from wildlife). The results indicate that *Mycobacterium bovis* (TB) may be present in some dairy herds in New Zealand, and that the presence of *Mycobacterium bovis* (TB) varies from region to region (see Table A2.2).

Table A2.3: *Mycobacterium bovis* (TB) infected cattle herds in New Zealand at 30 June 2000

Region	Area class	Herd type	Herds	Number infected herds
Northland	Free	Dairy	1574	0
Auckland	Free	Dairy	941	0
Auckland	Risk	Dairy	49	0
Waikato	Free	Dairy	5653	9
Waikato	Risk	Dairy	461	8
Bay of Plenty	Free	Dairy	1032	1
Gisborne	Free	Dairy	11	0
Hawkes Bay	Free	Dairy	75	1
Hawkes Bay	Risk	Dairy	4	0
Taranaki	Free	Dairy	2462	1
Manawatu/Wanganui	Free	Dairy	912	1
Manawatu/Wanganui	Risk	Dairy	207	4
Wellington	Risk	Dairy	268	15
Nelson/Marlborough	Free	Dairy	297	2
Nelson/Marlborough	Risk	Dairy	40	1
West Coast	Free	Dairy	18	1
West Coast	Risk	Dairy	429	59
Canterbury	Free	Dairy	606	1
Canterbury	Risk	Dairy	191	7
Otago	Free	Dairy	223	5
Otago	Risk	Dairy	155	12
Southland	Free	Dairy	614	3
Southland	Risk	Dairy	64	0

Escherichia coli

E. coli 0157:H7 infection was first identified in New Zealand in 1993. Between that time to the end of December 1998, there have been a total of 79 cases of infection by the pathogen, 48 of which were reported in 1998. Consumption of unpasteurised milk and insufficiently treated water should be avoided.

3.2 Chemical hazards

Chemical hazards are likely to arise through raw materials, for example milk, agricultural chemicals, environmental contaminants (e.g. heavy metals, organochlorines), and possibly through ice cream production.

Raw milk

Raw milk is likely to be contaminated directly or indirectly from hazards such as chemical residues and contaminants. Direct contamination occurs where the contaminant is in direct contact with milk either through misuse or accidental contamination. The farm dairy's Risk Management Programme (RMP) must contain procedures that prevent contamination from the surroundings, equipment, detergents, sanitisers, extraneous substances, toxic substances, pesticides or similar substances.

Indirect contamination occurs where the chemical enters the milk from the animal. This usually occurs through the grazing and feeding of the milking animal and her treatment with animal remedies. Examples of indirect contamination include:

- environmental contaminants that are ingested with the grass, feed or water (environmental contaminants include DDE, dieldrin and chemical elements such as heavy metals);
- pesticides on grass or feed or in water;
- animal remedies such as antibiotics and other antibacterial drugs, endoparasiticides, ectoparasiticides, etc.;
- illegal drugs (some drugs are not registered for use in New Zealand, e.g. bovine somatotrophin).

A farm dairy's RMP must also include procedures to ensure that the milk of animals treated with an animal remedy within the withholding period is not sold for human consumption. Procedures must also include the exclusion of contaminated milk from sale.

Manufacturers and raw milk safety

All manufacturers are required to have a RMP that contains provisions that ensure the milk used for the manufacture of dairy products is safe. All manufacturers are required to test raw milk from each farm at least three times a month for inhibitory substances, which include antibiotics. Farms found supplying milk contaminated with inhibitory substances are subject to penalties and follow-up testing to demonstrate that the contamination has ceased.

To ensure milk safety, some manufacturers also monitor milk for other substances such as DDE, and take action if milk is found to be contaminated.

National Milk Residues Programme

The National Milk Residues Programme is run by MPI with the provision of sampling and testing services contracted to AsureQuality. This programme is designed to provide information on the occurrence of residues and contaminants in raw milk and to investigate and control the movement of potentially contaminated milk.

This programme currently examines raw milk and colostrum at the farm silo, and encompasses all farm dairies including those supplying milk for domestic consumption and export, and covers milk and dairy product eligible for export, from cows, goats and sheep.

The National Milk Residues Programme consists of two parts: the monitoring programme and the surveillance programme.

Each season, the monitoring programme selects a minimum of 300 farms at random from all the farm dairies supplying export aligned companies, plus additional samples to capture other species, domestic supply only, and colostrum. Samples of milk are collected from these farms and analysed for approximately 75 residues and contaminants.

The surveillance programme specifically investigates situations of potential contamination. Surveillance may be based on particular residues and contaminants, regions, times of the season or groups of farm dairies. The surveillance plan is agreed annually, based on a review of the situations of greatest risk. The plan may change during the season if areas of concern emerge.

Where the programme finds that residues and contaminants exceed safe levels (e.g. the maximum residues limit (MRL) is breached) or unusual results are found, an investigation supervised by MPI is undertaken.

Where necessary, MPI takes further action to prevent contamination of the food supply. These actions vary depending on the specific situation and may include disposal of contaminated product, restriction on supply from specific farms, and changing the registration conditions on a particular animal remedy or pesticide.

Chemical residues

Chemical residues of pesticides, herbicides and fumigants may be present in herbs and spices. Of particular concern are residues of methyl bromide, a fumigant used to control insect infestation in spices, and ethylene oxide, a chemical used for reducing microbial contamination. The Supplier Quality Assurance (SQA) programme should ensure that chemical residue levels are below the maximum permissible levels specified in New Zealand and importing country regulations (where applicable).

The chemical residue status of fresh fruit added to ice cream should be considered as a potential hazard during the production of, and to, the end product. The *New Zealand (Maximum residue limits of agricultural compounds) Food Standards 2011* states that the MRL of any agricultural compound present in a food consisting of one or more of the foods listed in Column 4 of Schedule 1 is calculated as the sum of the MRL specified in Column 5 of Schedule 1 for each food multiplied by the proportion of that food in the food product.

A person may only sell a food listed in Column 4 of Schedule 1 that contains residues of an agricultural compound listed in the corresponding row of Column 1 of Schedule 1 (as measured against the residue listed in the corresponding row in Column 3 of Schedule 1) if the residue does not exceed the MRL specified in the corresponding row of Column 5 of Schedule 1.

A person may sell a food containing residues of an agricultural compound not exceeding 0.1mg/kg if –

- (a) that agricultural compound is not specified in Column 1 of Schedule 1; or
- (b) Column 5 of Schedule 1 does not specify an MRL for that agricultural compound in relation to a food of that type, kind, or class.

This could be monitored, or assurances of residue levels could be provided, through an effective SQA programme.

3.3 Physical hazards

New Zealand's complaints (Ministry of Health, 2000) indicate that foreign matter is the major source of hazard in ice cream. The foreign matter complaints include three cases of glass, metal and plastic respectively, paper, hair, steel bolt, steel rivet, fingernail, muslin cloth and insects. Complaints associated with ice cream service in New Zealand since 1997 have also been recorded. Complaints sourced from physical hazards include a bug found in ice cream, blood on cone/serviette, metal in ice cream and hair on ice cream.

The *New Zealand Food Regulations 1984* require that spices shall not contain foreign organic and inorganic matter, or any other unsuitable or inferior material. Specifications for commercially available spices normally include a requirement that they be free from foreign objects. Powdered spices are generally sieved and sometimes undergo metal detection to remove foreign objects. The SQA programme should ensure that these ingredients are free from foreign objects that may pose a food safety hazard.

Metal detection

When installing a metal detection system, it is important to take into consideration the types of metal likely to occur in the product, the capability of the machine, and the characteristics of the product. The limitations of the detector should be clearly understood and reflected in the food safety objective set for metal objects. The detection capability of metal detectors is generally influenced by the type, size, shape and orientation of the metal, and the characteristics of the product (e.g. moisture content, temperature). Some processors set their critical limits for metal based on the limit of detection of the machine.

A detailed method for checking the performance of the metal detail is required of the processor. The procedures should include how the test piece is mounted and passed through the search head with or without product being present, examination procedure for reject material, frequency and interval of calibration and testing.

4 Hazard control

Hazards associated with raw materials and processes should be identified and controlled to acceptable levels to make safe products. Some elements of an effective SQA programme are the inclusion of agreed customer-supplier specifications, audited suppliers and certificates of analysis (Mortimer and Wallace, 1994). Manufacturing plants should also have procedures in place for verification of compliance to agreed specifications, physical inspection and microbiological testing of incoming raw materials.

The key causes of common foodborne outbreaks associated with ice cream were isolated mainly to raw milk and eggs. Pathogens that are incorporated into ice cream can survive in the frozen product for many months (Bryan, 1983).

Minimising pathogens causing foodborne illness can be achieved by the use of pasteurised milk in ice mixes, either omission of eggs or use of pasteurised egg products in these mixes, and rapid freezing of these mixes.

References

- American Medical Association. 1984. *Campylobacter* outbreak associated with certified raw milk products – California. *JAMA* 252: 2386.
- Baker M, Eyles R, Bennett J, Nicol, C, Wong W, Garrett N. 1999. Emergence of verotoxigenic *Escherichia coli* (VTEC) in New Zealand. *New Zealand Public Health Report* 6: 1–4.
- Batish VK, Chander H. 1987. Occurrence of *Staphylococcus aureus* and their preformed enterotoxins in frozen dairy products. *Australian Journal of Dairy Technology* Mar/Jun, 22–4.
- Bryan FL. 1983. Epidemiology of milk-borne diseases. *Journal of Food Protection* 46: 637–49.
- Centres for Disease Control and Prevention. 2000. Surveillance for foodborne-disease outbreaks – United States, 1993–1997. *Morbidity and Mortality Weekly Report* 49: 27–42.
- Centres for Disease Control and Prevention. 1994. Outbreak of *Salmonella enteritidis* associated with homemade ice cream – Florida, 1993. *Morbidity and Mortality Weekly Report* 43: 669–71.
- Centres for Disease Control and Prevention. 1994. Emerging infectious diseases outbreak of *Salmonella enteritidis* associated with nationally distributed ice cream products – Minnesota, South Dakota and Wisconsin, 1994. *Morbidity and Mortality Weekly Report* 43: 740–1.
- D’oust J. 1989. Chapter 9: *Salmonella*. In: *Foodborne Bacterial Pathogens*. Doyle MP (ed). New York: Marcel Dekker, Inc.
- ESR [Institute of Environmental Science and Research Ltd., Health]. 1996. Surveillance and control notes: risk factors for campylobacteriosis identified in the study. *New Zealand Public Health Report* 3: 20.
- Holsinger VH, Smith PW, Smith JL, Palumbo SA. 1992. Thermal destruction of *Listeria monocytogenes* in ice cream mix. *Journal of Food Protection* 55: 234–7.
- ICMSF. 1998. Chapter 16: Milk and dairy products. In: *Microorganisms in Foods* 6. International Commission on Microbiological Specifications for Foods of the International Union of Biological Societies. London: Blackie Academic and Professional.
- Jay JM. 1996. Chapter 7: Fermentation and fermented dairy products; Chapter 22: Foodborne listeriosis. In: *Modern Food Microbiology*. New York: Chapman & Hall.
- Johnson KM. 1984. *Bacillus cereus* foodborne illness – an update. *Journal of Food Protection*. 47: 145–53.
- Johnston AM. 1990. Foodborne illness: veterinary sources of foodborne illness. *Lancet* 336: 856–8.

- Kozak J, Balmer T, Byrne R, Fisher K. 1996. Prevalence of *Listeria monocytogenes* in foods: incidence in dairy products. *Food Control* 7: 215–21.
- Lovett J. 1989. Chapter 8: Listeria. In: Foodborne bacterial pathogens. Doyle MP (ed). New York: Marcel Dekker, Inc.
- Martin JH, Blackwood PW. 1971. Effect of pasteurization conditions, type of bacteria, and storage temperature on the keeping quality of UHT-processed soft-serve frozen dessert mixes. *Journal of Milk and Food Technology* 34: 256–9.
- Ministry of Agriculture and Forestry. 2000a. *A Guide to HACCP Systems in the Meat Industry*. Vol. 2 (Appendix X 4: 27).
- Ministry of Agriculture and Forestry. 2000b. *Animal Products (Specifications for Products Intended for Human Consumption) Notice*. Wellington, pp 14, 15, 19.
- Ministry of Health. 1995a *Microbiological Reference Criteria for Food*. Wellington: Ministry of Health.
- Ministry of Health. 2000b. *Communication: Foodborne illnesses associated with ice cream*. Wellington: Ministry of Health.
- Mortimer S, Wallace C. 1994. Chapter 5: Designing safety into products and processes. In: *HACCP: A practical approach*. London: Chapman and Hall.
- New Zealand Food Regulations*. 1984. Wellington.
- New Zealand (Maximum Residue Limits of Agricultural Compounds) Mandatory Food Standard*. 1999. Wellington.
- Powers EM, Lawyer R, Masouka Y. 1975. Microbiology of processed spices. *Journal of Milk and Food Technology* 38: 683–7.
- Powers EM, Latt TG, Brown T. 1976. Incidence and levels of *Bacillus cereus* in processed spices. *Journal of Milk and Food Technology* .36: 668–70.
- Ryser ET, Marth EH. 1991. *Listeria, Listeriosis and Food Safety*. New York: Marcel Dekker, Inc.
- Smeltz RA, Barnard SE. 1992. Bacterial quality of vanilla ice creams purchased at stores in Pennsylvania. *Dairy, Food and Environment Sanitation* 12: 510–11.
- Te Giffel MC, Beumer RR, Bonestroo MM, Rombouts FM. 1996. Incidence of *Bacillus cereus* and *Bacillus subtilis* in foods in the Netherlands.
- Todd ECD. 1989. Foodborne and Waterborne disease in Canada: 1984 annual summary. *Journal of Food Protection* 52: 503–11.
- Vought KJ, Tatini SR. 1998. *Salmonella enteritidis* contamination of ice cream associated with a 1994 multistate outbreak. *Journal of Food Protection* 61: 5–10.
- Wilks CR, Humble MW. 1997. *Zoonoses in New Zealand: A combined veterinary and medical perspective*. Publication No. 178. Palmerston North: Veterinary Continuing Education, Massey University.

Appendix 3: Information on New Zealand Food Legislation for Specialist Ice Cream Makers

Legislation administered by the Ministry for Primary Industries (MPI)

MPI's responsibility for regulating food safety extends to both the domestic and export sectors – that is, from 'farm to fork'. It covers:

- harvesting, manufacturing, processing, packaging, labelling and composition, storage, transport and sale of wine, animal and plant products intended as food
- food imported into New Zealand
- official assurances and other certification for export of wine, animal and plant products intended as food
- controls for registration of agricultural compounds and the use of veterinary medicines.

Food legislation

Food-related legislation in New Zealand has 2 main purposes:

- to protect public health and safety
- to facilitate access to domestic and export markets.

The main food legislation, which MPI is responsible for are the following Acts:

- Food Act 1981
- Animal Products Act 1999
- Agricultural Compounds and Veterinary Medicines Act 1997
- Wine Act 2003.

Understanding the legislative framework

Legislation falls into 3 main categories:

- primary legislation – Acts, which become legislation through a majority vote in parliament
- secondary legislation – Regulations, which are made under Acts and are introduced by the Minister, approved by Cabinet and issued by the Governor-General

- tertiary instruments – Notices, Orders, Specifications and Standards, which, under the Acts and Regulations, can be issued by the Director General of MPI. Some of these may be issued by the Minister and may also be classed as ‘Deemed Regulations’, for example Food Standards.

You can find out more about how this legislation is made by visiting the New Zealand Parliament website.

Food Act 1981

The Food Act regulates domestic food produced or sold in New Zealand.

[New Zealand Legislation: Food Act 1981](#) (External website)

Under the Act, there are regulations and standards which industry needs to comply with.

Regulations and standards under the Food Act 1981

There are 3 Regulations under the Food Act, which apply to food businesses in New Zealand.

Food Hygiene Regulations (FHR) 1974

The FHR are enforced by local councils (territorial authorities). They set food-handling requirements and describe registration and inspection of food businesses. Food businesses that come under the Food Act meet food standards by operating under the Food Hygiene Regulations or by implementing a Food Safety Programme (FSP). In most cases, the Food Hygiene Regulations 1974 do not apply to ice cream manufacturers, where there is a requirement to operate under a Food Safety Programme or a Risk Management Programme.

Food (Safety) Regulations 2002

These regulations include provisions relating to food containers, infected people working with food, the manufacture of low-acid canned food and provisions relating to particular foods including muttonbirds, wine labels, fluoridated water and hemp seed oil.

Food (Fees and Charges) Regulations 1997

These Regulations describe the charges which MPI and other authorities may make for services they undertake for food businesses.

[New Zealand Legislation: Food \(Fees and Charges\) Regulations 1997](#) (External website)

Standards under the Food Act

Below is a list of Standards that have been developed under the Food Act:

Standards for chemical contaminants and residues

The following Standard defines the maximum residue limits (MRLs) allowable in food products.

- New Zealand (Maximum Residue Limits of Agricultural Compounds) Food Standards 2011

Standards for additives or other substances

There are several Standards, which control additives or other substances in food products.

- New Zealand Food (Supplemented Food) Standard 2010
- New Zealand (Mandatory Fortification of Bread with Folic Acid) Food Standard 2007 and its 2009 amendment
- New Zealand (Bee Product Warning Statements – Dietary Supplements) Food Standards 2002
- Food (Tutin in Honey) Standard 2010 and its amendments.

Standards for processing and manufacturing

- Food (Uncooked Comminuted Fermented Meat) Standard 2008.

Standards for imported food

The Standards for imported food ensure that the food meets New Zealand food safety requirements.

- Food (Prescribed Foods) Standard 2007 and its amendments
- Food (Importer general-requirements) Standard
- Food (Importer listing) Standards
- Food (Imported Milk and Milk Products) Standards 2009.

Australia New Zealand Food Standards Code

The Australia New Zealand Food Standards Code (the Code) also describes requirements that New Zealand food businesses need to meet eg composition and labelling.

The New Zealand (Australia New Zealand Food Standards Code) Food Standards 2002 gives effect to the agreement between the governments for a joint food standards system.

Reform of the Food Act

A new Food Bill is being developed. It is currently before parliament (2012).

Animal Products Act (APA) 1999

The purpose of the APA is to protect human and animal health and facilitate access to overseas markets. The risk management system under the APA potentially covers operations for all animal materials and products from production and harvesting to processing, transport, storage and export.

[New Zealand Legislation: Animal Products Act 1999](#) (External website)

The APA establishes a regulatory regime that requires all animal products traded and used to be 'fit for intended purpose'. Food businesses do this by meeting standards for animal products. The regime comprises the following types of controls:

- Standards** – these are issued under the Act as Regulations or Notices
- Risk Management Programmes (RMPs)**, which are implemented by businesses processing animal material to manage food safety hazards and ensure that resulting animal products meet relevant standards
- Regulated Control Schemes (RCSs)** – these are imposed and managed by MPI in circumstances where it is more efficient to control food-related risks, such as contaminants and residues, through a national programme
- Export controls**, which are issued by MPI and include Overseas Market Access Requirements (OMARs), General Requirements for Export (GREX) and official assurances.

Regulations under the APA

Regulations under the APA include a number of Regulated Control Schemes (RCSs) and regulations which cover processing, food safety hazards and levies. You can find more about the RCSs on the page, Regulated Control Schemes in the left-hand menu, including links to the schemes themselves. Other APA regulations are as follows:

[New Zealand Legislation: Animal Products \(Dairy Industry Fees and Charges\) Regulations 2007](#) (External website)

[New Zealand Legislation: Animal Products \(Dairy\) Regulations 2005](#) (External website)

[New Zealand Legislation: Animal Products \(Exemptions and Inclusions\) Order 2000](#) (External website)

[New Zealand Legislation: Animal Products Regulations 2000](#) (External website)

[New Zealand Legislation: Animal Products \(Fees, Charges and Levies\) Regulations 2007](#) (External website)

[New Zealand Legislation: Animal Products \(Definition of Primary Processor\) Notice 2000](#)(External website)

Notices and Specifications under the APA

Under the APA, MPI issues Notices and Specifications to give effect to the Act and to Regulations issued under the Act. These cover a wide range of requirements for businesses producing, processing, selling, storing, transporting, importing and exporting animal and dairy products. You can find a list of the Notices and Specifications issued by MPI by searching in the elibrary on the MPI foodsafety website.

Of particular importance is the *Animal Products (Risk Management Programme Specifications) Notice 2008*.

Overseas Market Access Requirements (OMARs)

Notices are also issued to define the OMARs that MPI has negotiated with destination countries to facilitate the export of animal and dairy products from New Zealand. Because they are market-sensitive, you can only view them if you are involved with exporting. You can find out more about OMARs for animal products and how to get access to them in the Exporting section of the MPI Foodsafety website.

Agricultural Compounds and Veterinary Medicines (ACVM) Act 1997

The ACVM Act controls the agricultural compounds and veterinary medicines used in association with animals and plants.

[New Zealand Legislation: Agricultural Compounds and Veterinary Medicines Act 1997](#)
(External website)

There are standards under the ACVM Act, which food produced or imported into New Zealand must meet.

Regulations under the ACVM Act

There are 2 Regulations under the ACVM Act which:

- describe the conditions under which agricultural compounds and veterinary medicines are exempt from registration and those prohibited from use
- define the fees and charges paid under the Act for setting standards, applying to have compounds and medicines registered, and compliance and monitoring activities.

[Agricultural Compounds and Veterinary Medicines \(Exemptions and Prohibited Substances\) Regulations 2011](#) (External website)

[New Zealand Legislation: Agricultural Compounds and Veterinary Medicines \(Fees and Charges\) Regulations 2002](#) (External website)

Standards under the ACVM Act

Standards under the ACVM Act apply to animal feed or petfood. They range from detailing the authorisation process for veterinary medicines to standards for fertilisers and good manufacturing practice.

Other legislation relevant to food for sale

The Fair Trading Act 1986

The Fair Trading Act 1986 prohibits false or misleading representation of goods or services. This covers some truth of labelling issues and weights and measures. The Commerce Commission publishes a guide on food labelling. Copies are available from the Wellington Office (04 498 0929) (website: www.comcom.govt.nz).

Medicines Act 1981

The Medicines Act 1981 sets requirements for medicines and related products. This *Act*, and regulations made under it, includes a definition for therapeutic purpose which requires that a product cannot be distributed for a therapeutic purpose without the consent of the Minister of Health (this prevents false therapeutic claims being made on food products).

Hazardous Substances and New Organisms (HSNO) Act 1996

Administered by Environmental Protection Authority (EPA) [website: www.epa.govt.nz]

Attachments (examples of forms)

The following are examples of forms which may be used for record keeping.

Attachment 1: Internal Audit Checklist

Audit date	
Auditor	

Reason for audit:

- Routine audit
- Customer complaint
- Alteration of process
- Alteration of Programme
- Other

Scope and objectives of audit

This checklist is focused on operational compliance; it does not consider matters that should be addressed in initial Programme approval by regulators or third party auditors.

In the 'Comment' column, record any relevant detail such as records sampled, person interviewed, product concerned, value obtained, date, etc.

Programme details

Programme details	Compliance	Comment
Have any significant changes been made to the scope of the Programme?		
Changes to products?		
Changes to intended purpose?		
Changes to processes?		
Changes to key personnel?		
Changes to responsibilities and authorities?		

Process related activities

Product limits	Compliance	Comment
Are outcomes established?		
Biological hazards?		
Physical hazards?		
Chemical hazards?		

Hazard analysis	Compliance	Comment
Does the flow chart still represent the process?		
Are there new or changed process steps?		
Have any new hazards been identified?		
Are there any new sources of hazard?		
Have any control measures been implemented?		
Are the Critical control points still appropriate?		

Purchasing and acceptance	Compliance	Comment
Are purchasing procedures followed?		
Are records being kept?		
Are there any new ingredients being used?		
Are criteria for raw dairy ingredients, ingredients, and packaging specified?		

Hygienic processing	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Are pasteurisation heat treatments correctly monitored and records kept?		
Have corrective actions been addressed appropriately, and records kept?		
Is equipment operated in accordance with its specified criteria?		
Are inclusions added in accordance with the procedures?		

Filtration	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Are filters correctly monitored and records kept?		
Have corrective actions been addressed appropriately, and records kept?		

Cleaning	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Is there monitoring (visual checks, swabs) of cleaning effectiveness?		

Process monitoring	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Review APC monitoring results		
Review coliform monitoring results		
Review pathogen testing results		
Review in-process test results		
Is corrective action in accordance with procedures?		

Supporting systems – premises, facilities, equipment, people, and services

Premises, equipment, maintenance	Compliance	Comment
Conduct an inspection of the building and equipment		
Are buildings and equipment in good condition?		
Are repairs and maintenance identified?		
Are records of maintenance kept?		

Calibration	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Does the calibration recognise the working measurement needs?		
Are operational checks performed?		

Personal hygiene	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Is clothing appropriate for the processing task?		
Are staff aware of the sickness policy?		
Are there any uncontrolled people-to-product hazards?		

Water, air	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Is there any likelihood of water or air leading to contaminated product?		
Review all hygiene checks		

Pests	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Is there any evidence of rodent or insect presence in the processing areas?		
Is waste removed so that insects are not attracted to the area?		

Handling and storage	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Is product protected from contamination and damage?		
Are records kept of storage (chilled, frozen) temperatures?		
Are records of maintenance kept?		

Supporting systems – other programme activities

Laboratory facilities	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Are test methods suitable?		
Do unacceptable results lead to corrective action?		

Traceability and labelling	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Examine product labels for conformance with requirements		
Can product be linked to ingredients, times, processes, people, equipment?		

Corrective action	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Examine all product dispositions		
Examine all complaints and recalls		

Training	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Examine competence of a sample of staff		
Review records of training plans and training completed		

Documentation	Compliance	Comment
Are procedures in place and followed for all processes and supporting systems detailed in the Ice Cream Guidelines?		
Are records kept?		
Examine a sample of historical records		
Is record keeping secure?		

Validation	Compliance	Comment
Are critical limits justified?		
Is equipment able to achieve the critical outcomes?		
Are all Programme components in place?		
Are there any needs to revalidate Programme components?		

Verification	Compliance	Comment
Are procedures in place and followed?		
Are records kept?		
Examine supervisor checks		
Examine Programme reviews		
Examine process and product tests		
Examine internal audit reports		
Examine external audit reports		

Notes:

Attachment 2: Delivery Record – Ambient Deliveries

Date	Supplier	Product	Invoice no.	Quantity	Date/ batch code	Condition	Comment	Sign

Reject deliveries if:

- product is out of date;
- packaging is damaged;
- product is wet or dirty.

You may wish to inspect product against a specification and request a 'Certificate of Conformance', particularly for large deliveries.

Attachment 3: Delivery Record – Chilled/Frozen Deliveries

Date	Supplier	Product	Invoice no.	Quantity	Date/ batch code	Temp- erature	Condition	Comment	Sign

Reject deliveries if:

- product is out of date;
- packaging is damaged;
- product is wet or dirty;
- product is above specified temperature.

You may wish to inspect product against a specification and request a 'Certificate of Conformance', particularly for large deliveries.

Attachment 4: Storage Temperature Record

Week commencing:.....

	Time	Temperature (°C)						Action	Sign
		1	2	3	4	5	6		
Monday AM PM									
Tuesday AM PM									
Wednesday AM PM									
Thursday AM PM									
Friday AM PM									
Saturday AM PM									
Sunday AM PM									

Freezers should operate at colder than minus 18°C.

Fridges should operate at colder than 4°C.

Immediate action is required if fridges/freezers cannot maintain this temperature (ignoring defrost cycles).

Attachment 5: Batch Production Record

Batch number	
Date	
Flavour	
Operator	

Ingredients

Ingredient	Supplier code	Amount
SMP		
AMF		
Sugar		
Milk		
Emulsifier		
Stabiliser		
Colour		
Flavour		

Filtration

Filter condition Satisfactory (if not satisfactory – stop)

Ingredients filtered Yes No (if not, which ones)

.....

Heat treatment

Pasteurisation start time		Temperature (°C)	
Pasteurisation finish time		Temperature (°C)	

Production volume kilograms/litres

Pack size	Number produced
1 litre	
5 litre	
10 litre	

Batch code

Best before

Attachment 6: Supplier Assessment – Questionnaire

Supplier	
Address	
Contact	
Telephone/email	
Product supplied	
Date	

As part of (company name) food safety procedures, we require certain information from our suppliers. Completing this form will allow us to be confident about the safety of our product.

Where your answer to a question is yes, please provide details.

If a question is not applicable, please state 'N/A'.

Management

Do you have a written food safety/quality policy?

Yes No

.....

Has a food safety risk assessment been undertaken?

Yes No

.....

Do you have a food safety plan, product safety programme, risk management plan, HACCP, or other food safety system?

Yes No

.....

Are you externally certificated/accredited? e.g. ISO 9002, ISO 17025

Yes No

.....
.....
.....

Raw materials

Do you have a system of supplier approval?

Yes No

.....
.....
.....

Are raw material specifications available?

Yes No

.....
.....
.....

Are checks made on raw materials (including packaging)?

Yes No

.....
.....
.....

Please describe your water supply (source, treatment, and storage).

.....
.....
.....

Production

Are manufacturing instructions documented?

Yes No

.....
.....
.....

Is sorting, separation or detection carried out to remove foreign objects?

Yes No

.....
.....
.....

For suppliers of perishable product

Is processing to remove micro-organisms carried out?

Yes No

.....
.....
.....

Is potential growth of micro-organisms controlled?

Yes No

.....
.....
.....

Are cross-contamination risks controlled?

Yes No

.....
.....
.....

Finished product

Do you have a recall system?

Yes No

.....
.....
.....

Are product specifications available?

Yes No

.....
.....
.....

Do you have a system for handling customer complaints?

Yes No

.....
.....
.....

Supporting programmes

Do you have full traceability?

Yes No

.....
.....
.....

Do you have a system to ensure stock control/stock rotation?

Yes No

.....
.....
.....

Are personnel trained in food hygiene?

Yes No

.....
.....
.....

Do you have a cleaning schedule?

Yes No

.....
.....
.....

Do you have a glass and hard plastics policy, and breakage instructions?

Yes No

.....
.....
.....

Do you have a pest control contract?

Yes No

.....
.....
.....

Is measuring equipment checked and calibrated?

Yes No

.....
.....
.....

Is any laboratory testing carried out?

Yes No

.....
.....
.....

Do you have an illness exclusion policy?

Yes No

.....
.....
.....

Do you carry out any auditing, either internal or external?

Yes No

.....
.....
.....

Do you have foods on site that could be the cause of food intolerance – cereals containing gluten, nuts, peanuts, soybeans, eggs, fish, shellfish, foods containing sulphites (220)?

Yes No

.....
.....
.....

Are any products you supply derived from genetically modified foodstuffs or ingredients?

Yes No

.....
.....
.....

Are any products you supply derived from foodstuffs or ingredients that have been subject to irradiation?

Yes No

.....
.....
.....

Please detail any other matters relevant to food safety which have not been covered above.

.....
.....
.....
.....
.....
.....

Thank you for completing this form.

Attachment 7: Supplier Assessment – Audit

Supplier	
Address	
Contact	
Tel/email	
Product supplied	
Audit date	
Auditor	

Management	Compliance	Comment
Is there a management commitment to food safety, such as a written policy?		
Has food safety risk assessment been undertaken? Does it cover physical, chemical and microbiological risks?		
Is a food safety system in operation e.g. FSP, PSP, RMP, HACCP, etc?		
Is the company certificated/accredited externally e.g. ISO 9002, ISO 17025?		

Raw materials	Compliance	Comment
Is there a system of supplier approval?		
Are raw material specifications available?		
Are raw materials checked?		
Water supply?		

Production	Compliance	Comment
Are manufacturing instructions documented?		
Is sorting, separation or detection carried out to remove foreign bodies?		

Perishable products	Compliance	Comment
Is processing sufficient to inactivate pathogenic micro-organisms?		
Is growth of micro-organisms controlled?		
Are cross-contamination risks controlled?		

Finished product	Compliance	Comment
Is there a recall system?		
Are product specifications available?		
Is there a customer complaints system?		

Supporting systems	Compliance	Comment
Is there a system of traceability?		
Is there a system of stock control/stock rotation?		
Are personnel trained in food hygiene?		
Is there a cleaning schedule?		
Is there a glass and hard plastics policy? Are there breakage instructions?		
Are there pest monitoring activities? Is there a pest control contract?		
Is measuring equipment checked and calibrated?		
Is any laboratory testing carried out?		
Is there an illness exclusion policy?		
Is any auditing carried out, either internal or external?		
Are allergenic foods handled on site?		

Physical	Compliance	Comment
Is equipment clean?		
Is equipment well maintained?		
Are premises clean?		
Are premises well maintained?		
Are adequate cleaning facilities provided?		
Is staff personal hygiene and protective clothing satisfactory?		
Are staff amenities, i.e. toilets and wash hand basins, clean and well maintained?		
Are premises proofed against pest activity?		
Are waste products adequately separated before disposal?		

Notes:

Supplier approved?

- Yes
- Yes, subject to corrective actions
- No

Corrective actions

Details	Action agreed	Completion date	Date confirmed

Attachment 8: Thermometer Check

Month Year

Day	Upper temp (°C)	Lower temp (°C)	Record action if out of range	Sign
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				

Upper temperature – check the temperature in boiling water (99°C to 101°C is acceptable).

Lower temperature – Check the temperature of water in melting ice (minus 1°C to 1°C is acceptable).

Attachment 9: Procedure for Corrective Action

ABC Ice Cream Ltd Corrective Action	
Prepared by J Wilson	Date: 1 February 2001
[Note: for those businesses operating a quality system, corrective action under the Codex HACCP definitions includes non-conformance of product, corrective and preventive action.]	
<p>Procedure:</p> <ol style="list-style-type: none"> 1 It is the absolute policy of this ice cream business that nothing shall compromise the safety, quality, integrity and image of our ice cream. 2 This is a general procedure for corrective action. More specific actions may be stated elsewhere for corrective action at Critical Control Points and supporting systems. 3 Any additives, ingredients, ice cream mix, ice cream, or packaging materials that are identified as being not up to the expected standard shall cause action to halt the process where appropriate and seek the view of the manager. 4 Action shall be considered to rectify any fault in the product so there is no effect on the safety, quality or integrity of our ice cream. 5 Whenever a problem occurs it should be noted on the appropriate log sheet, even if it is quickly resolved. We need to keep track of all these incidents so we can review them at management level. 6 Whenever a problem occurs we need to understand the likely causes. If these are immediately apparent they should be noted on the log sheet or discussed with the manager. 7 Again, records of any changes, repairs, maintenance etc. should be made on the log sheet. 8 We must ensure that we fix the problem and that the process is returned to a state of control. 9 We must ensure that any risk product is dealt with in a timely manner. 10 Careful recording is an important part of corrective action and our Programme. In the unlikely event that a fault escapes our quality control and reaches a customer, good record keeping demonstrates that we have exercised due diligence. This is also important in relation to our exports if we are challenged by a regulatory authority. <p>Records must be kept on a log sheet or in the office diary.</p>	

Attachment 10: Cleaning Schedule

Frequency	Item	Product	Dilution	Method
After each batch	Mixing vessel			Rinse out with water from hose. Use cleaning bucket with brush. Leave to drain and dry.
	Components Homogeniser Scraper Bowl chopper			Dismantle. Rinse components in sink with water. Clean in sink with cloth. Place on rack to drain and leave to dry.
	Homogeniser body			Wipe with wrung cloth at sink. Do not immerse body in water. Place on rack to dry.
	Body Scraper Bowl chopper			Use cleaning bucket with cloth. Leave to drain and dry.
	Scraper – barrel			Rinse out with water from hose. Use cleaning bucket with cloth. Leave to drain and dry.
	Ingredient buckets			Clean in sink with cloth. Invert, and place on rack. Leave to drain and dry.
	Equipment – Paddles, thermometer etc			Rinse in sink with water. Clean in sink with cloth. Place on rack to drain and leave to dry.
	Hand contact surfaces, e.g. door handles, tap handles, etc.			Use cleaning bucket with cloth. Leave to dry.
	Cleaning sink, drainer and racks			Fill sink and use cloth. Leave to dry.
	Floors			Mop with designated mop and bucket.
Twice weekly	Toilet			Use designated toilet bucket and disposable cloth.
Weekly	Fridges, freezers			Use cleaning bucket with cloth. Leave to dry.
	Bins			Use designated bin bucket and disposable cloth. Invert and leave to drain dry.
Monthly	Walls, ceilings, doors, etc.			Use cleaning bucket with cloth. Leave to dry.
After each use	Cleaning equipment			Launder cloths and scourers. Rinse mops and buckets – invert and leave to air dry.

Note: Always follow health and safety instructions regarding electrical safety, blade safety and chemical safety.

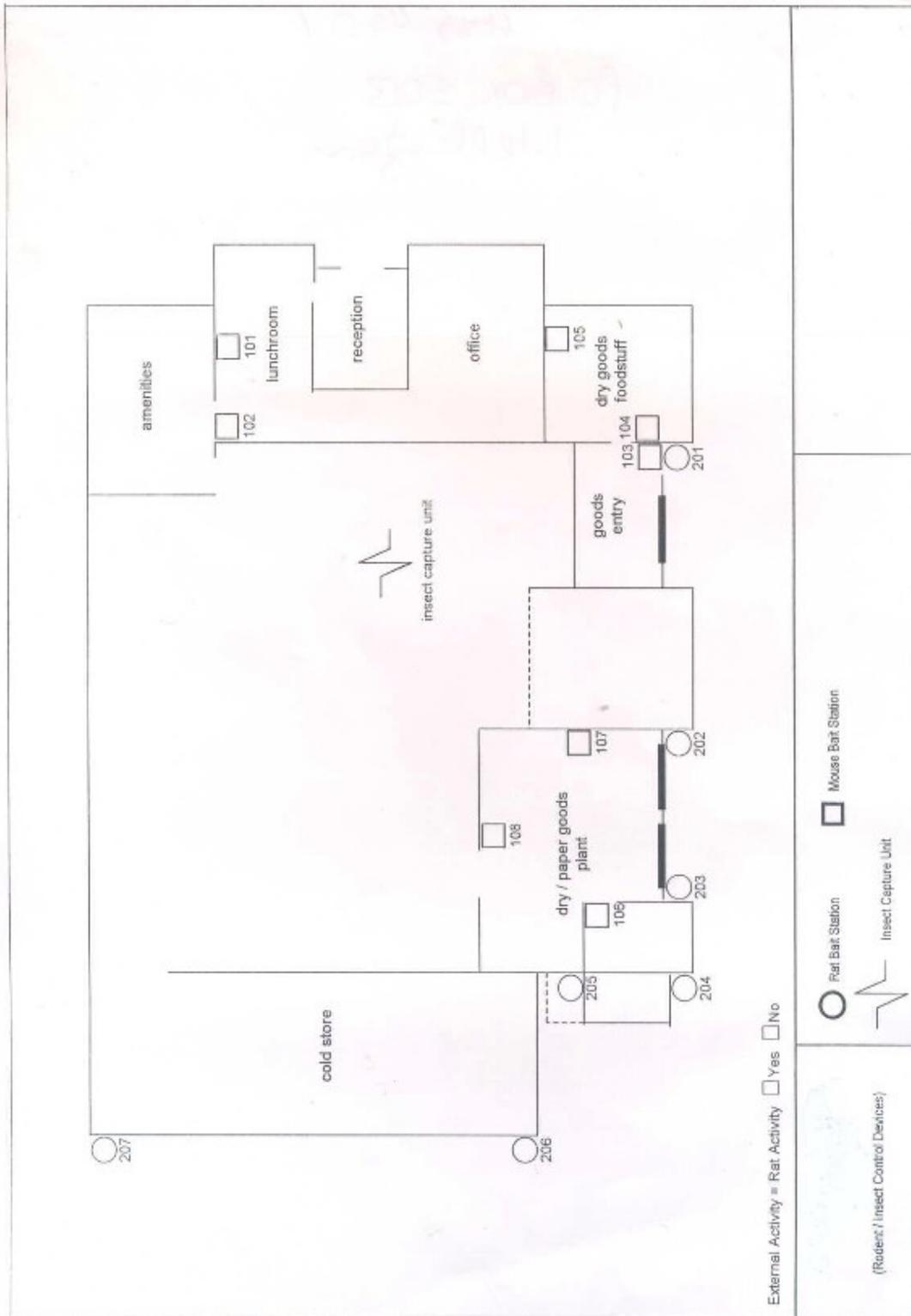
Attachment 11: Training Record

Name	
Date employment commenced	
Job position	

Date	Training received	Documents received	Signature of trainee
	Induction training Personal hygiene Illness exclusion Jewellery Glass/hard plastic		
	Company training Food safety policy Food safety plan Company HACCP		
	On the job training Delivery checks Manufacturing instructions Pasteurisation Refrigeration Stock control Cleaning		
	Supporting systems training Pest monitoring Glass and hard plastics monitoring Glass breakage Auditing		
	External food hygiene training course A formal course accredited to NZQA Unit Standards 167 – Practise food safety methods in a food business 15274 – Work in a food business under a Food Safety Programme 168 – demonstrate knowledge of food contamination hazards, and control methods used in a food business 15276 – Develop, implement, and verify the operation of a programme for a food business 15275 – Supervise a food business under a Food Safety Programme		

Attachment 12: Pest Control Inspection Sheet

INSECTS ACTIVITY: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> ROUTINE TREATMENT <input type="checkbox"/> FOLLOW UP / ADDITIONAL TREATMENT <input type="checkbox"/> EXTRA TREATMENT AREA or SITUATION: _____ _____ _____ TREATMENT METHOD(S): <input type="checkbox"/> WET SPRAY <input type="checkbox"/> DUST <input type="checkbox"/> ULV MIST <input type="checkbox"/> OTHER..... INSECTICIDE(S) & RATE(S) UTILISED: _____ _____ _____ COMMENTS / RECOMMENDATIONS: _____ _____ _____	BIRDS ACTIVITY: <input type="checkbox"/> YES <input type="checkbox"/> NO AREA or SITUATION: _____ _____ _____ TREATMENT ENACTED: _____ _____ _____ PRODUCT(S) UTILISED: _____ _____ _____ COMMENTS / RECOMMENDATIONS: _____ _____ _____	MAMMALS / OTHER ACTIVITY: <input type="checkbox"/> YES <input type="checkbox"/> NO AREA or SITUATION: _____ _____ _____ TREATMENT ENACTED: _____ _____ _____ PRODUCT(S) UTILISED: _____ _____ _____ COMMENTS / RECOMMENDATIONS: _____ _____ _____
SERVICE REPORT SHEET (All Other Vermin)	DATE: TECHNICIAN: SIGNATURE: REGISTRATION No:	



You will also need to maintain a record of the results of your visual inspection and the corrective action taken, as shown in the table below:

Visual inspection	Corrective action	Action taken
Flies in pest eliminators		
Moths in pest eliminators		
Cat, dog, rat, mouse, bird and insect faeces		
Obvious signs of any other vermin		
Dead vermin		
Signed:		

Attachment 13: Staff Sickness Record

Date	Name	Illness	Dates ill	Date returned

Before commencing work, staff must report to their supervisor any symptoms of:

- sickness;
- diarrhoea;
- boils, infected cuts and other skin problems;
- coughs, colds and sore throats;
- sickness and diarrhoea while away on holiday;
- sickness and diarrhoea affecting anyone in their household.

Attachment 14: Customer Complaint Record

Customer name	
Address	
Telephone	
Date	

Product

Flavour

Size

Batch code

Nature of complaint:

Action taken:

Information taken by.....

Attachment 15: Check Sheet to Review Label Requirements of the ANZ Food Standards Code

Note: This check sheet can be used for both retail and catering packs (ANZ Food Standards Code Standard 1.2.1, “Application of Labelling and Other Information Requirements”).

Product FSANZ (formerly ANZFA) Standard	Notes	Date Required:
1.2.2 Food identification requirements	Name of food Lot identification Name and address of supplier	Yes
1.2.3 Mandatory advisory statements and declarations	Mandatory advisory statements and declarations Mandatory warning statements and declarations Mandatory declaration of certain substances in food Advisory statement in relation to foods containing polyols or polydextrose	Yes/No
1.2.4 Labelling of Ingredients	Requirement for statement of ingredients All ingredients to be listed in a statement of ingredients Ingredients to be listed by common, descriptive or generic name Ingredients to be listed in descending order of ingoing weight Declaration of compound ingredients Declaration of alternative ingredients Declaration of food additives Declaration of vitamins and minerals	Yes
1.2.5 Date Marking of Packaged Food	Food must be date marked Prohibition on sale of food after the use-by date Prescribed form of date mark Prescribed form of date Statement of storage conditions Exclusive date marking system to be used	Yes
1.2.6 Directions for Use and Storage	Directions for use and/or directions for storage of food to be included on the label, where, for reasons of health and safety, the consumer should be informed of specific use or storage requirements	Yes/No

Product FSANZ (formerly ANZFA) Standard	Notes	Date Required:
1.2.8 Nutrition Information Requirements	Nutrition information requirements and exemptions Requirements for nutrition information panels where nutrition claims are made in relation to food Prescribed declarations in a nutrition information panel Expression of average energy content and quantities of nutrients and biologically active substances Percentage daily intake information Food in small packages Food in dehydrated or concentrated form Food that must be drained before consumption Food to be prepared or consumed with other food	Yes See attached for minimum mandatory nutritional statement in prescribed format
1.2.9 Legibility Requirements	General requirements Legibility requirements for warning statements	Yes
1.2.10 Characterising Ingredients and Components of Food	Declaration of characterising ingredients and characterising components Method of calculating the proportion of characterising ingredients by ingoing weight Method of calculating the proportion of characterising ingredients where moisture loss occurs Method of declaration of characterising ingredients Method of calculating the proportion of characterising components Method of declaration of characterising components	Yes
1.5.2 Food Produced using Gene Technology	General prohibition on the sale and use of food produced using gene technology Exemption to general prohibition on sale and use	Yes/No
2.5.6 Ice Cream	Composition Processing of milk and milk products in New Zealand	No BUT compositional requirements must be met if the name "ice cream" is to be used

Nutrition information Servings per package: (insert number of servings) Serving size in grams	Average quantity per serving	Average quantity per 100 g
Energy	kJ	kJ
Protein	g	g
Fat, total – saturated	g g	g g
Carbohydrate, total – sugars	g g	g g
Sodium	mg (mmol)	mg (mmol)