Industry Standard 6 / Industry Agreed Standard 6 (IS6/IAS6)

Processing of Edible Product

Prelims

Amendment 5

May 2004

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Notice of Copyright

Preface

Industry Standard / Industry Agreed Standard 6 (IS6/IAS6) has been developed jointly by Industry, MAF Verification Agency and NZFSA and is endorsed by the Meat Industry Standards Council.

It is the New Zealand standard for quality assurance for premises licensed, in terms of the Meat Act 1981, and premises approved by NZFSA.

It is an official circular issued by the NZFSA of the Ministry of Agriculture and Forestry, pursuant to the Meat Act 1981.

Review of Industry Standard / Industry Agreed Standard 6 (IS6/IAS6)

This Industry Standard / Industry Agreed Standard (IS6/IAS6) shall be regularly reviewed according to a schedule held by NZFSA.

The co-ordinator welcomes suggestions for alterations, deletions or additions to this standard, to improve it or make it more suited to Industry needs. Suggestions should be sent to the co-ordinator on the form on Page P.8, together with reasons for the change and any relevant data.

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Suggestions for Changes

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Industry Standard / Industry Agreed Standard 6 (IS6/IAS6): Processing of Edible Product

Section	Suggested Improvements

Signature	Date
Please post to: Judy Barker Assistant Director (Animal Product Standards) NZFSA P.O. Box 2835 **Wellington**	Acknowledgment of receipt: Signature: Date:

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Amendment Record

It is important that this publication is kept up-to-date by the prompt incorporation of amendments.

To update this publication when you receive an amendment, remove the appropriate outdated pages, destroy them, and replace them with the pages from the new issue. Complete instructions will be given on the covering letter accompanying the amendment. File the covering letter at the back of the publication and sign off and date this page.

If you have any queries, please ask your local Technical Supervisor.

Amendment No.	Date	Initials	Amendment No.	Date	Initials
1	August 2000		21		
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1 Introduction

Amendment 5

May 2004

Scope

Processing includes any intervention that is applied to product which results directly or indirectly in a state of preservation. The production criteria that are used to achieve the desired commercial and/or technical outcomes need to take into account the biological, chemical or physical interventions that will result in preservation.

In relation to biological interventions, preservation depends on eliminating pests and killing or preventing the growth of micro-organisms in the food. Preventing chemical and physical deterioration of perishable foods may be accomplished by excluding air, oxygen, light or deleterious contaminants.

In conjunction with the preservation of food, other production controls are necessary in order to restrict the release of products to markets if they present a potential food safety hazard or fail to satisfy the regulatory requirements of a particular market.

This Industry Standard / Industry Agreed Standard outlines the major microbiological hurdles which have become established as principles of good manufacturing practice in the preservation of food and other production controls that are necessary to restrict the release of non-complying products. The incorporation of one or several of the microbiological hurdles in the processing of products should result in the effective preservation of the product for the duration of the shelf life.

1.1 Outcome

Processing shall result in the preservation of food and minimal deterioration of products during their processing.

1.2 Definitions

All definitions contained in Section 2 of the Meat Act 1981 and consequent regulations shall apply.

Aging means temporarily arresting, or deliberately slowing, the cooling rate of products to avoid cold shortening and to improve the tenderness of meat. Aging, in relation to:

- carcasses, means holding at temperatures greater than 7°C;
- packaged products, means holding at an appropriate chilled temperature.

Canning means commercial sterilisation of food in a hermetically sealed container.

Casings are products derived from the intestines, including caeca, of any slaughtered animal, and are intended for use as containers for any other product.

Container means any metal can, glass jar, or semi-rigid or flexible packaging material.

Chilling means reduction of the product temperature to a temperature that is not less than the freezing point of meat.

Commercial sterilisation, in relation to canned food, means the application of heat treatment to food such that no viable organisms can be detected by usual cultural methods, or that the number of surviving micro-organisms is so low as to be of no significance. Some organisms may survive the heat treatment, but do not grow, produce toxins or result in spoilage because of the conditions such as the pH or water activity (a_w), the presence of growth inhibiting substances or absence of essential growth substances which prevail in the container during storage.

Competent person is a person with any specific competency as defined in any standard, specification or requirement, who may provide expert technical advice within the scope of the particular standard, specification or requirement.

Competent person/processing authority in relation to thermal processing is a person or organisation having expert knowledge of thermal processing requirements and having adequate facilities to make process determinations.

Cooling medium means any solid, liquid or gaseous medium that comes in contact with wrapped or unwrapped food with the objective of removing heat.

Deep meat temperature means the temperature of a carcass measured at the thermal centre of the largest muscular mass.

Deep shoulder temperature means the temperature of a carcass measured at the mid point in front of the 1st rib to a depth that will reach the medial side of the scapula.

Dehydration means removal of water from products to the extent that the growth of pathogenic and spoilage micro-organisms is retarded or eliminated.

Deterioration includes any biological, chemical or physical contamination, or any degradation or process failure to the extent that the nature and intended quality of the product is affected.

Director-General means the Director-General of Agriculture and Forestry.

Empty in relation to green offals means to remove the gross ingesta and/or faecal material from the lumen of green offals.

Food is any substance, including additives, whether processed, semi-processed or raw, which is intended for human consumption. The definition of food includes "product" as defined in the Meat Act 1981.

Food Standards Code means the code incorporated into New Zealand law by the New Zealand (Australia New Zealand Food Standards Code) Food Standards 2002 and issued by the Minister under section 11C of the Food Act 1981.

Freezing means the reduction of product temperature to temperatures that are less than the freezing point of the product. Freezing points will vary depending on the physical characteristics of the product, e.g. salt and water soluble constituents normally present in product will depress the freezing point to a temperature sometimes considerably less than the freezing point of water.

Good manufacturing practice (GMP) means the provision and maintenance of a sanitary environment and manufacturing practices for the production of food, including the application of quality systems and production criteria to ensure food is safe and of a nature and quality intended.

Green runners means any intestine intended to be used as a casing which has had the lumenal contents stripped but not further processed.

Green offal means products which are derived from any part of the alimentary tract, not including green runners, which are inherently contaminated with ingesta or faecal material.

Halophiles are micro-organisms that can grow in the presence of high concentrations of salt.

HACCP (Hazard Analysis Critical Control Point) is a system which identifies, evaluates and controls hazards which are significant for food safety.

Handling means the movement, holding and conveying of food during processing until the food is preserved. Handling will have an equivalent meaning in respect of packaging, chemicals, protective clothing and processing equipment used for or during the production of food.

Hazard means a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.

High risk zone is an area where a food hazard could exist if not otherwise controlled. A high risk zone is designed to maintain strict hygiene, in the management of personnel, processing operations, equipment and environmental hygiene, and products and food ingredients to prevent food hazards.

Hot boning means the boning of carcasses in the absence of any active prior carcass chilling. As a process, hot boning includes cooling the meat until the surfaces of concern have been reduced to 7°C or cooler.

Industry standard means a processing standard or collection of standards that have been issued jointly by the New Zealand Food Safety Authority on behalf of the Director-General and the council or body recognised by the Director-General as representing the interests of the appropriate industry sector.

MAF Verification Agency means a body charged with the responsibility of ensuring that the requirements of New Zealand acts, regulations, NZFSA specifications, and importing country requirements are implemented and adhered to by Licensees and other persons/activities to which the legislation applies.

Inventory means a detailed list of any goods which includes purchases, stocks held and the distribution of the goods. In the case of food additives, the distribution of the goods shall include reconciliation with the formulation of products and the quantity of the finished product produced.

Low acid canned food supervisor (LACF) means a person who has attended a school approved by the Director-General for giving instruction appropriate to the preservation technology involved and who has been identified by that school as having satisfactorily completed the prescribed course of instruction.

Lot is a quantity of food that has been produced and handled under uniform conditions and usually includes the production of the food within a limited period of time.

Minimise means to have taken all practical steps to substantially reduce the potential hazard of concern.

Non-meat ingredient means any substance other than product, including a food additive, that is used in the manufacture or preparation of a food; and present, whether in a modified form or not, in the final product (Food Standards Code).

NZFSA means New Zealand Food Safety Authority.

Packing means any material that is intended to enhance the protection of products but does not come into direct contact with the product.

Pasteurisation means the application of a heat treatment to food that is intended to destroy vegetative forms of pathogenic micro-organisms, reduce or destroy vegetative forms of micro-organisms that cause spoilage or that interfere with desirable fermentations (Anon, 1980).

Pasteurising value means the length of time at a given temperature to obtain a specified level of destruction of a target micro organism whose thermal resistance characteristics are known.

Preservation temperature means frozen to -12°C in the case of frozen product, or chilled to the temperature that will minimise deterioration of the product during its expected shelf life in the case of chilled products, or chilled or frozen within the tolerances provided in any commercial specification.

Preserved food means food which has been subjected to biological, chemical or physical agents to minimise deterioration of the product during its expected shelf life.

Processing includes cutting and the use of all methods of manufacture and preservation (Meat Act 1981). Processing may include slaughter and dressing, packing and handling of food.

Process hygiene index (PHI) a unit of potential microbial growth equivalent to one generation of *Escherichia coli* as calculated using the following formulae (Reichel *et al*., 1991):

Temperature (°C)	Generations/hour[a]
Aerobic growth	
7 – 30	$((0.0513x) – 0.17)^2$
30 – 40	$((0.027x) + 0.55)^2$
40 – 47	2.66
<7 or >47	0
Anaerobic growth	
7 – 30.5	$((0.0433x) – 0.15)^2$
30.5 – 40	$((0.0163x) + 0.676)^2$
40 – 45	1.77
<7 or >45	0

a. x is the temperature in °C.

Lag duration is regarded as zero (0) in the case of aerobic growth, provided measurements commence immediately after slaughter (37°C). Lag duration is calculated according to the following table when aerobic growth shifts to anaerobic growth:

Temperature (°C)	Equivalent lag factor[a]
<7	0
7	0.95
12	3.2
15	6.6
17	12.8
19	17.6
21	28.8
22	36.8
23	47.0
24	60.0
25	76.4

a. The equivalent lag factor is a fraction of 11 hours at 8 °C (11 h/observed lag @ x °C(h)).

Production criteria includes processing methods and appropriate process control parameters. The process control parameters will include quantitative measurements and tolerances (IS8/IAS8: Section 4).

Production includes processing and any activity that results in the production and preservation food to the extent that the food is suitable to enter commerce.

Protected means sufficiently wrapped, packaged or enclosed to prevent the introduction of contaminants.

Salting/curing means the addition of solute in order to lower the water activity and aid in preservation of the food.

Shall expresses a mandatory requirement of this Industry Standard.

Should/may expresses a recommended provision which when followed may assist in achieving the required outcome.

Spray chilling means the wetting of carcasses by the intermittent spraying of potable water during the chill cycle with a resultant reduction in evaporative weight loss from the meat.

Sterilisation, in relation to food preservation, means the application of heat treatment to food to destroy all viable organisms, as may be measured by an appropriate plating or enumerating technique.

Sterilisation value F_0 ("F nought") is the time in minutes, at 121.1°C (250°F), that gives the same kill of *Clostridium botulinum* as the process under evaluation. It includes the sum of all the lethal effects within the container during the process that is equivalent to the period, in minutes, of instantaneous heating and cooling.

Stripping means removal of the faecal material and includes crushing of the intestinal mucosa during the preparation of casings.

Technical Supervisor means a person with the primary responsibility for the MAF Verification Agency at the premises level.

Tempering means the elevation of the temperature of any product within the range of temperatures normally encountered for the particular physical state of the product. In the case of frozen product, this is the elevation of temperature to any point which is less than the freezing point of product.

Thawing means the elevation of the temperature of frozen product to temperatures that are higher than the freezing point of product.

Thermal centre is the slowest cooling, or heating, point in the product mass.

Warm boning means the boning of carcasses after cooling has started but before the temperature of the carcass has been reduced to 7°C or less. As a process, warm boning includes cooling the meat until the product has been reduced to 7°C or less.

Water activity, (a_w) is the ratio of the water vapour pressure of the food (p) to that of pure water (p_o) at the same temperature: $a_w = p/p_o$.

When a solution becomes more concentrated, the vapour pressure decreases and the a_w falls from a maximum value of 1 for pure water.

Wrapping means any material that is intended to protect products and comes into immediate contact with the product. Wrapping includes rigid materials, such as cartons and containers, where products are filled directly into the container or carton.

1.3 General Principles

1.3.1 Cross references

1.3.1.1 The requirements for processing described in this Industry Standard should be applied in conjunction with the requirements for quality assurance, including documentation, described in IS8/IAS8.

While it is desirable that all documented systems are developed according to the standard in IS8/IAS8, failure to do so should not preclude the adoption of the requirements of this industry standard. The Director Animal Products will, therefore, permit a lesser standard of documentation for premises operating under this industry standard. It is recommended that the principles in IS8/IAS8 be used for documented systems.

1.3.1.2 The requirements for sanitary design and construction of premises shall be read in conjunction with IS2/IAS2.

1.3.1.3 The definition of food, including additives and ingredients, shall be read in conjunction with the relevant parts of the Food Act 1981 and consequent regulations.

1.3.1.4 The specific requirements of importing countries shall be read in conjunction with Overseas Market Access Requirements.

1.3.2 Production criteria

1.3.2.1 The generally accepted criteria for particular types of processing described in IS6/IAS6 encompass food safety concerns. These food safety concerns shall be

incorporated into the systems of control as minimum standards when using these production criteria.

1.3.2.2 Methods used in any type of processing shall identify the particular chemical, physical and/or biological effect on the product that may occur as a consequence of the process.

1.3.2.3 The processor shall incorporate the process control principles outlined in the relevant production criteria to ensure preservation.

a. Processing shall result in the preservation of products.

b. The methods of processing and the state of preservation shall be appropriate to the desired technical effect.

1.3.2.4 The descriptions of processing technologies published by MIRINZ in the Technical Report or Record Memorandum series of publications shall be regarded as generally accepted criteria, provided the process control parameters that relate to food safety outcomes are laid down and are applied as a minimum standard.

1.3.2.5 Non-standard methods shall include any description for processing that has been developed and published by research institutes other than that described above, or have been published in scientific and trade journals, or developed through trials and experimentation, or any variation to generally accepted criteria for processing that has an effect on food safety outcomes. Non-standard methods shall be approved by the Director-General.

1.3.3 Customised processes, experimentation, hazard analysis critical control point systems (HACCP) and new technology

Where any outcome required by this Industry Standard can be achieved using alternative general or specific, then the alternative principles are permitted, provided they are fully validated within the context of IS8/IAS8: Sections 3 and 5, and provided they comply with all relevant regulatory outcomes.

1.4 Layout of Industry Standard / Industry Agreed Standard

1.4.1 Scope

Each section commences with a scope which broadly describes the activity to which the requirement applies.

1.4.2 Outcome

The outcome is the principal requirement. It is a statement of what is intended to be achieved and is a fundamental component of the New Zealand system for ensuring safety of food derived from animals, excluding fish, minimising hazards associated with byproducts and compliance with importing country requirements. It provides a basis for determining equivalence of alternative general or specific principles with the New Zealand standard.

1.4.3 General principles

The general principles described in the Industry Standard are based on good manufacturing practice. Application of the general principles is intended to deliver the outcome.

1.4.4 Specific principles

1.4.4.1 The specific principles are recognised as methods of delivering the required outcome. The principles described in the Industry Standard are based on either validated data or good manufacturing practice. Alternative methods, fully validated within the context of IS8/IAS8, are permitted.

1.4.4.2 International recognition of any method may differ from country to country and specific importing country requirements should be consulted.

There are no headings which identify specific principles. A specific principle will be identified as any major heading (bold 14 point) which occurs in sequence after general principles.

1.4.5 Explanatory notes

Any description in this Industry Standard which is enclosed in a box does not form a part of the requirement. It is an explanatory note which is intended to expand the general intent of the particular requirement and may serve to clarify compliance with the requirement in some instances.

1.4.6 Director-General

Wherever it is a requirement in this Industry Standard to report to, or seek the approval of, the Director-General, then the requirement shall be addressed to the Director (Animal Products).

1.4.7 Supervision by the Technical Supervisor

Wherever it is a requirement in this Industry Standard / Industry Agreed Standard for the Technical Supervisor to carry out any action, then it may be carried out by an appropriately qualified person who is directly responsible to the Technical Supervisor. In the case of direct supervision being required, the person shall be present at the time and witness the requirement.

References

Anon (1980). Microbial Ecology of Foods. Vol I, Factors Affecting Life and Death of Microorganisms. The International Commission on Microbiological Specifications for Foods. Academic Press. p 33.

Reichel M.P., Phillips D.M., Jones R. and Gill C.O. Assessment of the hygienic adequacy of a commercial hot boning process for beef by a temperature function integration technique. Int. J. Food Micro. 14, 27-42, 1991.

2 Products Eligible for Processing

Amendment 5

May 2004

Scope

This section lays down the eligibility of product from any species and in any premises, for sale or export to any market. Product includes any carcass, offal, blood, fat or tissue which is intended for human consumption and is derived from any stock, farmed deer, game or animal. For the purposes of this Industry Standard / Industry Agreed Standard, product does not include fish.

2.1 Outcome

Products intended for processing shall have satisfied all regulatory requirements and be eligible for the intended market.

2.2 General Principles

2.2.1 All product intended to be processed in a licensed or approved premises shall conform to the requirements for procurement, and the criteria for inspection, of product that is fit for human consumption.

2.2.2 Product in any premises shall be identified by the official brand of the processing premises and shall be traceable to the originating slaughter premises.

2.2.3 The eligibility of any product to be exported to any particular market shall be identified and documented.

2.2.4 Inventory control shall be maintained for all product on any premises. The sources of the product and the market eligibility shall be included with the inventoried product.

The use of identification tags required under the National Velveting Standards Body velvet removal programme on individual sticks of deer velvet has shown to be an acceptable manner of identifying the source of velvet arriving at the packing house. This applies only to product where velvet identification tags can be used and are required such as branched velvet and not to products such as spikers, regrowth or bagged product.

2.2.5 Any product that is temporarily or permanently ineligible to be exported to any market, or is intended to be released to the domestic market, shall be held separately from product that is eligible to be exported. The degree of separation shall conform to any particular condition required by specified markets, including the domestic market. Refer also to Overseas Market Access Requirements.

2.3 Branding and Labelling

2.3.1 Branding

The supply, security and use of all brands, seals and pre-printed material containing the inspection legend shall comply with the relevant requirements in Manual 15.

2.3.2 Labelling

2.3.2.1 Carton seals are not mandatory but may be required by some markets, see Overseas Market Access Requirements.

Carton seals are a means of verifying the integrity of product and may be useful in the case of obtaining re-export certification for re-imported product, see IS6/IAS6: Section 2.8.3.

2.3.2.2 Carton seals should be avoided on production intended for the domestic market.

Cartons with seals, released to the domestic market shall be identified in a manner that makes it obvious the product is no longer intended for export. Defacing the seal or using labels that clearly show the intent may achieve this end.

2.4 Imported Product

Processing of imported product shall conform to the same conditions as New Zealand sourced product.

Imported product should be separated to the satisfaction of the Technical Supervisor. Mixing of cartons or pallets is not recommended. The requirements of any importing country

relating to the processing of imported product should be taken into account (see Overseas Market Access Requirements)

2.5 Abattoir Meat

This section relates to the processing, storing or handling of product in an export licensed premises which is derived from stock slaughtered elsewhere than at an export slaughterhouse. This does not include the use of any article derived from animals slaughtered at rural slaughterhouses, custom killing premises and non-licensed sources.

2.5.1 Application

2.5.1.1 The product shall be derived from stock slaughtered only at a premises licensed as an abattoir. The requirements of this section shall apply in respect of any export licensed premises that intend to process, store or handle any abattoir product that has been:

- obtained directly from an abattoir; or
- obtained, in a further processed form, from premises appropriately registered as domestic packing houses, i.e. registered by a territorial authority under the Health Act 1956; or
- obtained, in a further processed form, from a premises that has an approved Food Safety Programme under the Food Act 1981.
- obtained, in a further processed form, from another export licensed premises.

2.5.1.2 The Technical Supervisor shall be satisfied that any product is derived only from abattoir-slaughtered stock. The documentation which accompanies the transfer of products shall clearly identify the original source of the product. Eligibility documents may be used in respect of transfer of product derived directly from abattoirs. Refer also to Overseas Market Access Requirements.

2.5.2 Market eligibility

2.5.2.1 Except as provided for below, all product shall be produced only for the local market. Any export product mixed with this product will lose its export status.

2.5.2.2 All product shall be labelled according to the requirements of IS6/IAS6; Section 2.3.2.2.

2.5.2.3 Notwithstanding 2.5.2.1, small quantities of meat derived from abattoir-slaughtered stock may be exported as trade samples, refer to the Official Assurances Programme.

2.5.3 Documentation

2.5.3.1 The processing, storing or handling of abattoir product shall be fully documented. Documentation for handling of such product shall include control measures that will preclude any entry into the export chain.

2.5.3.2 The documentation shall provide the following minimum details:

a. how complete physical separation from all export product in processing rooms and associated chillers, unless the export product is also to be processed for the local market, is achieved;

b. how all cartons of product are immediately marked according to the requirements for any product intended for the local market;

c. how protected and labelled local product (both before and after processing) is separated by distance from export product in stores. Refer also to IS6/IAS6: Section 2.3.2.2.

2.5.4 Export meat, game and game meat not to be affected

2.5.4.1 The presence of abattoir meat on any premises shall not compromise the eligibility of the premises to export products to any country. Refer also to the Official Assurances Programme.

2.5.4.2 Where there is any doubt as to the origin of any product on premises that at times processes abattoir meat, then all product about which there is any doubt shall be:

a. retained pending further investigation, to the satisfaction of the Technical Supervisor; or

b. removed from the premises and treated as domestic only product.

2.5.5 Retail butcher shops

Retail butcher shops attached to export licensed premises may receive domestic product derived from abattoir slaughtered stock, provided the retail butcher shop is a self-contained and physically separate facility. The controls shall satisfy the general intent of requirements outlined above but do not need to be as strict.

2.6 Restricted Market Product

2.6.1 Application

a. This section applies to any product which complies with the minimum New Zealand export standard but does not comply with a more stringent standard that is required as a condition of export by a specified importing country.

b. The standard is applicable where the uncontrolled processing, storing or handling of the product would compromise the eligibility of the premises to export products to specified countries.

2.6.2 Separate processing

Restricted market product shall not be processed at the same time as the processing of products eligible for export to the specified restricted market.

2.6.3 Inventory control

The product shall be maintained under inventory control. The inventory shall identify the market restrictions and/or the market eligibility.

2.6.4 Product storage

Restricted market product shall be held in such a manner that it can be clearly identified as being restricted market product.

Some importing countries require restricted market product to be physically separated from products that comply with the requirements of that particular market, refer to Overseas Market Access Requirements.

2.7 Retained Product

2.7.1 Application

This section applies to:

a. any product that has been downgraded as a consequence of a non-hazardous process failure;

b. any product that has not been passed, at the time, as fit for human consumption.

It will include carcasses held pending results of tests or inspections and any product that has become contaminated, after initially passing an inspection, and for which additional tests or inspections are necessary. It does not include carcasses held on immediate retain rails on slaughterfloors.

2.7.2 Responsibilities of the Technical Supervisor

2.7.2.1 Retained product shall be under the direct control of the Technical Supervisor.

2.7.2.2 Carcasses held pending results of tests or inspections shall be physically separated from other carcasses in secure facilities. Some importing countries have requirements for strict security over retained carcasses, refer also to Overseas Market Access Requirements.

2.7.2.3 Product that has subsequently become contaminated after passing inspection, or for which additional tests or inspections are necessary, shall be identified using the "retained" label, AgM74, and held under controlled conditions.

a. The AgM74 shall carry a description of individual item or, in the case of a lot of product, a description of the lot that has been retained.

b. The AgM74 shall be applied and removed only by a person directly responsible to the Technical Supervisor.

c. When removing the AgM74, the person directly responsible to the Technical Supervisor shall verify the identity of the product by pairing the main label and a butt-end.

2.7.3 Inventories

2.7.3.1 The Technical Supervisor shall maintain an inventory of all retained product, i.e., dates, quantities, product type, cause for retention, location and disposition.

2.7.3.2 The inventory maintained by the Licensee shall include the status of any retained product.

2.7.4 Processing retained product

Retained carcasses may be boned or cut and held appropriately refrigerated pending test results.

2.7.4.1 The cutting or boning shall be carried out under the direct supervision of the Technical Supervisor.

2.7.4.2 Product shall be packed and further retained as in IS6/IAS6: Section 2.7.2.3 (see also IS5/IAS5).

2.7.5 Disposition

After the results of tests or further inspections the retained products shall be:

- passed by the Technical Supervisor and subsequently released for human consumption without restriction; or
- passed by the Technical Supervisor and subsequently released for export to restricted markets; or
- passed by the Technical Supervisor but released only for specified further processing with or without restrictions for exporting, refer also to IS6/IAS6: Section 2.7.6; or
- deemed unfit for human consumption or otherwise condemned.

2.7.6 Tuberculosis (including TB reactors)

2.7.6.1 After passing inspection:

a. carcasses and products derived from carcasses may be released for local consumption or may be thermally processed and exported;

b. offals from tuberculous carcasses shall be thermally processed, if intended for human consumption.

2.7.6.2 Thermal processing shall achieve the equivalent of not less than 62.5 °C for not less than 30 minutes at the thermal centre of the product. Thermal processing shall comply with the requirements of IS6/IAS6: Section 8.

2.7.6.3 Cartons of raw product intended to be transferred to premises for thermal processing shall be marked “passed for cooking” in clear legible lettering. Cartons shall be sealed with an official carton seal. Labelling shall comply with the requirements of IS6/IAS6: Section 2.3.2.2 where products are intended for sale to the domestic market.

2.7.6.4 Some importing countries may restrict some or all forms of thermally processed tuberculous products. Refer also to Overseas Market Access Requirements.

2.8 Redirected Product

2.8.1 Application

This section applies to products identified below.

2.8.1.1 Products that have been exported which are subsequently re-imported to New Zealand. This will include product rejected by any Regulatory Authority at a port of entry inspection, product rejected by purchasers and product recalled by the exporter or processor for any reason.

2.8.1.2 Products that have been produced for export which are subsequently found to be not fit for export and are directed for sale to the domestic market. This may also include re-imported products.

2.8.1.3 All re-imported product shall comply with the requirements of the import permit.

2.8.2 Fitness for human consumption

2.8.2.1 Any redirected product shall be fit for human consumption.

2.8.2.2 Product re-imported into New Zealand as a result of market rejection due to administration or documentation inaccuracies, e.g. labelling or counting inaccuracies, or rejection by purchasers or re-called by exporters or processors due to commercial reasons may be released for sale for human consumption subject to complying with IS6/IAS6: Section 2.8.3. The reasons for the re-importation shall be verifiable.

2.8.2.3 Product re-imported into New Zealand as a result of rejection at a port -of-entry inspection due to any defective condition of the product or the cartons/product containers, or re-called by exporters or processors due to process failures or refrigeration failure in transit, shall be regarded as a process failure. Refer to IS6/IAS6: Section 2.9.

2.8.3 Disposition

2.8.3.1 Products that are fit for human consumption may be re-exported:

a. As product of New Zealand origin if:

i. there is adequate documentation that can reconcile the product with the original export certificate; and

If the original certificate is not released by the competent authority then documents issued by that authority may be satisfactory.

ii. the description of the lot reconciles with the documentation or the returned original certificate; and

iii. the integrity of the product is secure, e.g. the original carton seals are intact, no carton/product container displays evidence of tampering and the product has been under the direct supervision of a competent authority in the country where the product was rejected.

A certificate of non-manipulation from the foreign government is recommended to assist re-export from New Zealand.

b. Or, as imported product, i.e. not as re-imported product, if the product has been released into commerce in the foreign country, i.e. no longer in bond storage at the border. Export health certificates from the foreign government will be required as if it were a normal export from that country; and

c. In all cases the requirements of an importing country shall be observed. Refer to IS6/IAS6: Section 2.6 and Overseas Market Access Requirements.

2.8.3.2 Products that are fit for human consumption and are directed to the domestic market shall comply with the labelling requirements in IS6/IAS6: Section 2.3.2.2.

2.8.3.3 When product that is fit for human consumption is directed for use as a byproduct, i.e. animal food, medicine or industrial use, the product, cartons/product containers shall not be released from the premises before being marked according to any requirement for labelling or over branding relating to the respective byproduct. Refer to relevant Byproduct requirements.

2.9 Process Failures

This section relates to any product where the conditions of processing failed to comply with the documented requirements for the process and the failure has an effect on any food safety or regulatory outcome of the affected lot. This will also include market-rejected product where the rejection relates to a defective condition of the product.

2.9.1 Food safety outcomes affected

2.9.1.1 *Failure in process control parameters*

a. Where there has been a failure to maintain:

- validated temperature control parameters for post-slaughter management of carcasses and offals; or
- validated process control parameters designed to achieve preservation by refrigeration, reduced water activity or acidification;

i. affected products shall be retained, refer to IS6/IAS6: Section 2.7, and preserved in a manner stipulated by the Director-General;

ii. testing, inspection and disposition of the affected lot shall be stipulated by the Director-General.

b. Information to be provided to the Director-General shall include:

i. a description of the lot (number of units of product, nature of the product, different types of product if there are more than one type affected);

ii. the intended process outcomes;

iii. a description of the control failure, including exposure data, e.g. relevant time, temperature, pH and/or water activity combinations, before the product was stabilised by freezing;

iv. any quantitative measurements, e.g. microbiology, that may have been made on the affected lot.

Evaluation of the lot will depend on the specific circumstances relevant to the type of product, the intended outcomes and the type of control failure. Where the disposition of the lot is based on the examination of samples, the Director-General will prescribe sampling plans and appropriate methods of inspection.

2.9.1.2 *Failure in heat treatment*

Where a heat treatment process is applied to a product that deviates from the approved process, the licensee shall evaluate the deviation and undertake one of the following actions:

a. Where the deviation has occurred during a commercial sterilisation process, refer to IS6/IAS6, Section 8.6.9.6.

b. Where the heat treatment parameters have been extended during the process, and the licensee can verify that the product received a safe process that is at least equivalent to the approved process, no further action need be taken. Record of the evaluation undertaken shall be held on file.

c. Where no adjustment is made during the process to make up for the deviation in the applied heat treatment, the requirements of IS6/IAS6, Section 2.9.1 shall be followed.

2.9.1.3 *Contamination by chemical substances*

This includes any cleaner, detergent, lubricant, air-borne contaminant, processing aid or food additive where the food additive has not been added to the product according to the requirements of a documented process. This does not include incidental contamination by substances permitted to be used on food contact surfaces during processing or substances described as incidental defects.

In the case of food additives, the contamination may be rectified by reformulating, provided the failure was detected at the time of processing and reformulating is done immediately.

In all other cases:

a. Affected products shall be retained (see IS6/IAS6: Section 2.7) and frozen if not otherwise preserved.

b. Testing, inspection and disposition of the affected lot shall be approved by the Director-General.

c. Information to be provided to the Director-General shall include:

i. a description of the lot (number of units of product, nature of the product and different types of product if there are more than one type affected);

ii. the name of the chemical and the circumstances by which the contamination occurred.

Evaluation of the lot will depend on the specific circumstances relevant to the type of product, the intended outcomes and the type of control failure. Where the disposition of the lot is to be based on the examination of samples, the Director-General will prescribe sampling plans and appropriate methods of inspection (see IS8/IAS8).

2.9.1.4 *Contamination by processing defects*

These are defects the presence of which affects the usability of products, refer to Appendix I.

These defects may be removed and the affected lot may be re-inspected and reworked according to the requirements of appropriate sampling plans.

a. Where a lot is not reworked at the time of processing, subsequent acceptance after reworking should be based on a sampling plan that is appropriate to the size of the shipping lot and not necessarily based on the number of units in the defective lot.

b. Market-rejected product shall be sampled and re-inspected according to a plan appropriate to the size of the rejected lot.

i. Where the defects exceed the allowable number, the lot may be reworked, re-inspected and released.

ii. Reworked market rejected product may not be eligible for export to all markets (see Overseas Market Access Requirements).

iii. Market-rejected product that is not reworked where the lot fails the reinspection criteria, shall not be released without the approval of the Director-General.

2.9.1.5 *Microbiological contamination*

This section relates to the identification of a pathogenic organism at levels that exceed an international standard for that organism in the type of product. This will include any market rejected product where the presence of a pathogenic organism resulted in the rejection of the lot.

a. Affected products shall be retained (see IS6/IAS6: Section 2.7) and frozen if not otherwise preserved.

b. Testing, inspection and disposition of the affected lot shall be approved by the Director-General.

c. Information to be provided to the Director-General shall include:

i. a description of the lot (number of units of product, nature of the product and different types of product if there are more than one type affected);

ii. the pathogen(s) and the circumstances by which the contamination occurred.

Evaluation of the lot will depend on the specific circumstances relevant to the type of product, the intended outcomes and the type of control failure. Where the disposition of the lot is to be based on the examination of samples, the Director-General will prescribe sampling plans and appropriate methods of inspection (see also IS8/IAS8).

2.9.2 Regulatory outcomes affected

2.9.2.1 Where processing results in failure to achieve any regulatory outcome, other than a food safety outcome outlined in IS6/IAS6: Section 2.9.1, then products shall be considered as restricted-market product.

2.9.2.2 A lot of restricted-market product shall be identified by any description of processing such as product item or description, production codes or dates, etc.

2.9.2.3 Products may be released to markets where the nature of the failure does not compromise the certification of the lot to that market, refer to Overseas Market Access Requirements.

3 Post-Slaughter Management

Amendment 5

May 2004

Scope

This section applies to the cooling of carcasses and product (not including offals) immediately after slaughter, dressing and/or boning until the temperature of the surface of microbiological concern has been reduced to specified levels. This section applies to all activities that occur during this cooling period resulting in the production of products from slaughtered animals.

3.1 Outcome

The management of carcasses and product after slaughter shall result in minimal proliferation of pathogenic bacteria of enteric origin.

3.2 General Principles

3.2.1 Documentation

The Licensee shall document a management plan for the post-slaughter cooling of carcasses and product.

3.2.2 Cooling criteria

3.2.2.1 Processes shall conform to accepted criteria for cooling. Criteria for which the hygienic adequacy has been justified, and accepted by the D-G, are specified in Sections 3.5–3.7.

3.2.2.2 Processes conforming to these criteria will need to be validated, as required by Section 3.3, the criteria do not have to be further justified.

3.2.2.3 The criteria in Sections 3.5-3.7 are not exclusive and alternative criteria may be equally adequate for different situations. These alternative criteria will need to be considered on their merits under the provisions for customisation, see Section 3.2.5.

3.2.3 Surfaces of microbiological concern

3.2.3.1 *Carcasses*

The surfaces of concern shall be:

a. the peritoneal surface of the aitch bone pocket in beef and horses*.

b. the peritoneal surface at a point in the abdominal cavity adjacent to the 5th lumbar vertebrae in sheep, bobby calves, deer, goats and pigs*.

* the surfaces are provisional for horses and pigs.

3.2.3.2 *Product other than carcasses*

a. If all surfaces are fully exposed to the cooling medium, the surface of microbiological concern shall be the outer surface, e.g. surfaces of primal cuts if the cuts are placed on trays or racks and are not placed into cartons.

b. If the surfaces are not fully exposed to the cooling medium, the surface of microbiological concern should be the thermal centre of the product mass, e.g. where cuts or product are placed into cartons or containers.

The thermal centre and the geometric centre of a carton may not be the same. For practical purposes it may be sufficient to use the geometric centre of the carton. However, studies indicate that these two locations may be several centimetres apart and there may be a difference of several degrees of temperature between the thermal and geometric centres. Air in a carton is responsible for this phenomenon as it acts as a significant insulation barrier to heat transfer.

3.2.4 Validated and verified cooling curves

All cooling curves shall be validated. Routine process monitoring shall verify compliance with the objective criteria. See IS8/IAS8.

3.2.5 Customised processes

3.2.5.1 Any Licensee wishing to process using criteria that are different to that described in Sections 3.5-3.7 shall follow the procedures for Customised Processes detailed in IS8/IAS8: Section 5.6.

3.2.5.2 Microbiological data may be considered in the validation of a customised process. Refer also to IS8/IAS8, Appendix A.

With regard to warm boning, the criteria has two variables which are critical to safe processing, the pre-boning cooling of carcasses and the post-boning cooling of product. Different combinations of these variables can achieve similar hygienic performances.

3.3 Validation of Refrigeration Performance

3.3.1 Application

The performance of any refrigeration room that acts as the source of post-slaughter temperature reduction of the carcass or product shall be validated against:

a. either the objective PHI target, refer to IS6/IAS6: Section 3.5; or

b. equivalent time/temperature parameters, refer to IS6/IAS6: Sections 3.6, 3.7; or

c. the criteria for customised processes which have been agreed to by the DG.

3.3.2 Measurements

The measuring device used for the purpose of validation shall be calibrated. Refer to IS8/IAS8. The measurements shall commence within 30 minutes of the carcass leaving the slaughter floor and, where appropriate, within 15 minutes of the standard reference times.

3.3.3 Carcass chillers

3.3.3.1 *Application*

a. This section relates to the validation of chillers, or combinations of chillers, that hold carcasses or part carcasses in order to comply with requirements for aging, warm boning or similar operations.

b. Validation of the process may be carried out where several chillers or rooms are routinely used in a defined sequence to achieve the process outcome. The validated process parameters will include the specific operating parameters applicable for each room, the room sequence and the time carcasses spend in the room.

3.3.3.2

a. During the initial validation, chillers, or chiller combinations, shall be loaded to at least 90% of the capacity at which it is intended that they will be fully utilised. Chillers may also be validated at lesser capacities, provided the subsequent operating parameters include the carcass weight or number appropriate at the time of validation.

b. In the case of new chillers, they shall be initially operated within the capability for which they were designed and constructed. Validation of the refrigeration capability of the chiller, or chiller combination, shall be performed when operations require the room to be used at a capacity of 90%, or greater, of the design capacity.

3.3.3.3 The operating parameters for each chiller, applicable at the time of validation, shall be determined from the air temperature setting, the setting which influences air velocity (may be fan speed or % fan speed etc.) and carcass mass (total weight or number/grade of carcasses) in the chiller.

Note: When carcass mass is specified in numbers of carcasses then the validation studies shall have been based on that class of stock. When the validation is being extrapolated to other classes of stock, as provided in Section 3.3.3.4 (d), then the operating parameters shall specify a total weight of carcasses.

3.3.3.4 Validation of chiller performance

Chiller performance may be validated for each chiller or for groups of chillers and for batch operations or continuous operations.

a. For single chillers using batch operations:

i. data may be obtained during a single chilling cycle using not less than 20 carcasses selected using random selection procedures; or

ii. data may be obtained over 4 production days using 5 carcasses per day provided the 20 sample sites are pre-selected, using random selection procedures, and the chiller is operated in a similar manner for each of the validation days, i.e. temperature and air velocity (may be fan speed or % fan speed etc.) settings are to be the same and the carcass mass shall not be less than 90% of capacity, on each day. The validation is to be carried out within a reasonable period of time.

b. For groups of chillers using batch operations:

i. the chillers shall have been constructed to an identical design and shall have been fitted with rails, refrigeration equipment and all other fittings that have been constructed to the same respective specification. A competent person shall survey the chillers and shall certify, for the named group of chillers, that they have been constructed and fitted in accordance with the common respective specification.

ii. performance data may be obtained over 5 production days from not less than 30 carcasses. The validation is to be carried out within a reasonable period of time.

iii. the group shall be divided into sampling locations and the 30 carcass sampling sites shall be pre-selected using random selection procedures.

iv. each chiller of the group is to be operated in an similar manner for each of the validation days, i.e. temperature and air velocity(may be fan speed or % fan speed etc) settings are to be the same and the carcass mass shall not be less than 90% of capacity, on each day.

v. the operating parameters that have been determined from the group validation shall apply in respect of every chiller in the group.

vi. revalidation of chiller performance may be performed as a group of chillers or as individual chillers.

c. For validating continuous operations (processes):

i. where several rooms are used sequentially, performance data may be obtained over 5 production days from not less than 30 carcasses. The validation is to be carried out within a reasonable period of time.

ii. where a single room is used at variable temperatures, performance data may be obtained over 5 production days from not less than 20 carcasses. The validation is to be carried out within a reasonable period of time.

iii. the operating parameters which have been determined for the continuous operation shall include the air temperature settings, the air velocity settings, the carcass dwell time at each temperature setting and an estimate of heat load, e.g. number or weight of carcasses or process rate.

d. Species variations:

i. for horses and beef, chillers may be validated using one species or a representative grade of carcasses in the case of beef. Refer also IS6/IAS6: 3.3.3.3.

ii. for bobby calves, goats, lambs and sheep, chillers may be validated using one class of stock. Refer also IS6/IAS6: 3.3.3.3.

iii. for deer and pigs, chillers may be validated using one species of animal. Refer also to IS6/IAS6: 3.3.3.3.

3.3.3.5 Validation may be made against the objective PHI criteria (see IS6/IAS6: Section 3.5) or the time/temperature parameters detailed for the respective classes of stock.

3.3.3.6 The chiller performance shall be revalidated when any alteration to the chiller is carried out that is likely to affect the chiller operating parameters and/or changes to the maximum heat load.

3.3.4 Carton chillers and freezers

This section applies to the validation of carton chillers/freezers to comply with the requirements of hot or warm boning, or similar processes. The outcome of cooling for any room, for which certificates of performance are to be issued, are expected to comply with the relevant requirements of the processes outlined in this standard.

3.3.4.1 New chillers, shall be initially operated within the capability for which they were designed and constructed. Validation of the refrigeration capability of the chiller shall be performed when operations require the room to be used at a capacity of 90%, or greater, of the design capacity.

3.3.4.2 If a carton chiller or freezer has a certificate of performance issued by a competent person, it does not have to be initially validated or revalidated, provided that the competent person shall have

a. listed in the certificate of performance the design air velocity, air temperature regime, carton weight, carton depth, cardboard type, carton holding capacity and initial product temperature;

b. attested in the certificate of performance that the room has been designed to perform according to specifications.

3.3.4.3 If the carton chiller or freezer does not have a certificate of performance, then validation shall be carried out in accordance with the following criteria:

a. Carton chillers or freezers shall be loaded with products packaged in the usual form and to the usual capacity.

b. The operating parameters for any chiller or freezer shall be determined from the air temperature setting, the air velocity setting (may be fan speed or % fan speed etc) and maximum heat load in the chiller that were applicable at the time of validation.

c. Product temperature measurements shall be obtained from the surfaces of microbiological concern (see IS6/IAS6: Sections 3.2.3.2).

3.3.4.4 *Validation of carton chiller and freezer performance*

a. For single chillers or freezers:

i. Validation should be carried out during a single refrigeration cycle and shall use either:

- not less than 20 data points, in the case of chillers or freezers that have a capacity of more than 100 cartons; or
- not less than 10 data points, in the case of chillers or freezers that have a capacity of less than 100 cartons.

ii. Data may be obtained from production days where not less than 5 data points are measured per day provided the required number of sample sites are pre-selected, using random selection procedures, and the chiller is operated in a similar manner for each of the validation days, i.e. temperature and air velocity (may be fan speed or % fan speed etc) settings are to be the same and the product mass shall not be less than 90% of capacity, on each day. The validation is to be carried out within a reasonable timeframe.

iii. The parameters of the distribution shall be calculated and compared to the PHI target, or the time/temperature parameters detailed in IS6/IAS6: 3.6 or 3.7.

b. For groups of chillers or freezers:

i. the chillers or freezers shall have been constructed to an identical design and shall have been fitted with refrigeration equipment and all other fittings that have been constructed to the same respective specification. A competent person shall survey the chillers or freezers and shall certify, for the named group of chillers or freezers, that they have been constructed and fitted in accordance with the common respective specification.

ii. performance data may be obtained over 5 production days from not less than 30 cartons, and the validation is to be carried out within a reasonable period of time.

iii. the group shall be divided into sampling locations and the 30 cartons sampling sites shall be pre-selected using random selection procedures.

iv. each chiller or freezer of the group is to be operated in a similar manner for each of the validation days, i.e. temperature and air velocity (may be fan speed or % fan speed etc) settings are to be the same and the carcass mass shall not be less than 90% of capacity, on each day.

v. the operating parameters that have been determined from the group validation shall apply in respect of every chiller or freezer in the group.

vi. revalidation of chiller or freezer performance may be performed as a group of chillers or freezers or as individual chillers or freezers.

3.3.4.5 The chiller or freezer performance shall be revalidated when any alteration to the chiller or freezer is carried out that is likely to affect the chiller or freezer operating parameters and/or changes to the maximum heat load.

3.4 Verification of Refrigeration Performance

3.4.1 Application

The refrigeration performance of any room that is used to reduce the post slaughter temperature of the carcass or product shall be verified.

3.4.2 Carcass chillers

3.4.2.1 Carcass chiller performance shall be verified routinely, and not less than daily for each day the chiller is in operation.

3.4.2.2 Verification shall include:

a. monitoring the settings for chiller air temperature and air velocity; and

b. measuring chiller air temperature (calibrated air temperature recordings CATR); and

c. calculating the mass (total weight or number/grade) of carcasses within the chiller to ensure the mass does not exceed the validation test mass.

3.4.3 Carton chillers and freezers

3.4.3.1 Carton chiller and freezer performance shall be verified routinely, and not less than daily for each day the chiller or freezer is in operation.

3.4.3.2 Verification shall include:

a. monitoring the settings for chiller or freezer air temperature and air velocity; and

b. measuring the chiller or freezer air temperature (CATR); and

c. monitoring that the amount of product in the chiller or freezer does not exceed the validation test weight.

3.5 Process Hygiene Index (PHI)

3.5.1 Application

The PHI criteria specified in this section may be applied to cooling processes for all types of product. These criteria are to be applied in the case of cooling of hot boned product.

3.5.2 Criteria

When applied, the cooling of carcasses or product shall not exceed the following cumulative PHI criteria at the surfaces of microbiological concern (Reichel *et al*., 1991; Gill and Jones, 1991):

- 80% of values 10;
- maximum 14.

The cumulative process hygiene index shall be measured immediately after slaughter and dressing, and shall include all activities during cooling until the surfaces of concern have been reduced to 7°C or less. The calculation of PHI shall include an allowance for any elapsed time between the end of slaughter and dressing (37°C) and the start of temperature recording.

3.6 Aging and Chilling of Carcasses

3.6.1 Small carcasses

3.6.1.1 *Application*

This section applies to bobby calves, deer, goats, lambs, adult sheep.

3.6.1.2 *Assembly of carcasses*

a. Immediately after slaughter, carcasses may be held in rooms (cooling floors, chillers and other rooms of a suitable construction for holding carcasses) for periods of time not exceeding those stated in the following table:

Room temperature (°C)	Maximum holding period (hours)
25	4
20	6
18	8
15	12

These time/temperature exposures are not cumulative. Where operations are non-continuous the maximum holding period shall be calculated from the time the first carcass entered the room.

b. Where it can be demonstrated that the air flow over carcasses is equal to or greater than 0.5 metres per second, then the assembly time may be increased by a factor of 1.5. When carcasses are transferred to rooms where it can be demonstrated that the air flow is equal to or greater that 0.5 m/s, then any residual assembly time may be increased by a factor of 1.5.

3.6.1.3 *Polythene wrapping of carcasses*

a. The requirements of this section shall apply in all cases where a temperature differential occurs between the chiller or cooling floor environment and the deep temperature of the carcass and is such that condensation occurs on the inside of the polythene wrapping.

b. If the deep leg temperature of the carcasses is 10°C or warmer at the time of wrapping, carcasses shall be subjected to refrigeration appropriate to the storage temperature of the carcasses, within the following times of the wrappings being applied:

i. 2 hours, when the carcass surface is wet at the time of wrapping, or

ii. 4 hours, when the carcass surface has dried before wrapping.

c. If the deep leg temperature of the carcass is less than 10°C, carcasses shall be subjected to a freezing process within 6 hours of wrappings being applied.

3.6.1.4 *Continuous operations*

a. The requirements of this section shall apply whenever hot carcasses from the slaughter floor are fed into a chilled room at the same time as chilled product from the previous day's production is being removed.

b. Management of the hygiene requirements of the process and the facilities shall comply with IS3/IAS3.

c. There shall be a separation between hot and cold carcasses equivalent to at least one clear rail. The temperature throughout the room shall be controlled such that no part of any chilled carcass is significantly warmed as a result of the presence of hot carcasses. A significant warming of carcasses shall be an increase of 1°C for longer than 1 hour at any surface on the carcass.

The mixing of hot and cold carcasses can result in condensation on the surfaces of cold carcasses. In these situations, re-hydration and warming of the surface can result in marked microbial growth.

3.6.1.5 *Carcass chilling*

a. After the immediate post-slaughter period, carcasses shall be refrigerated.

Carcasses may be transferred to chillers or may be held in the same room as that used for assembly. The critical factor is the application of refrigeration to achieve the cooling performance standard described in this section.

b. Unless otherwise approved, the air temperature shall be no warmer than 10°C and chillers shall reduce the deep meat temperature to:

i. 7°C within 24 hours of the carcass leaving the slaughter floor, or

ii. 10°C within 24 hours of the carcass leaving the slaughter floor when all the carcasses are going to be frozen in carcass form.

3.6.1.6 *Post-chilling processing*

a. After being reduced to the required temperatures (Section: 3.6.1.5), the carcasses shall be processed as rapidly as possible and the product shall be reduced to the preservation temperature without undue delay.

b. If processing, which includes freezing, is likely to be delayed for greater than 96 hours, then the deep meat temperature shall be reduced to 4°C or less after 60 hours. The carcasses or processed products shall be subjected to refrigeration, capable of achieving the preservation temperature within 144 hours of carcasses leaving the slaughterfloor.

3.6.2 Beef and horse carcasses

3.6.2.1 *Application*

This section applies to aging of beef and horses in carcass form.

Nothing in this section applies to the aging after the temperature of the meat has been reduced to less than 7°C.

3.6.2.2 *Process parameters*

Immediately after slaughter carcasses or sides may be held in chillers for 14 hours with the off evaporator air not exceeding 10°C. After 14 hours the air temperature shall not exceed 4°C. When the loading of chillers exceeds 2 hours, then microbiological validation shall include sampling of carcasses that have been held in the chiller for the longest time.

Due to normal chiller loading operations, some individual carcasses may be subjected to these conditions for longer periods.

3.6.2.3 *Microbiological validation*

The premises shall have established a post slaughter database for Aerobic Plate Counts @ 30°C (APC30) according to the requirements of the National Microbiological Database, in the case of beef and to equivalent requirements in the case of horses, and the process shall not result in a numerical increase in the mean APC30 greater than 40%.

- the parameters of the post slaughter microbiological database must be within the parameters of the appropriate national microbiological database.
- a post-chilling microbiological database is to be established within 7 working days of the commencement of processing.
- the data must be obtained from chillers that are loaded to at least 90% of their usual holding capacity.
- a data point will consist of the arithmetic average of the 3 NMD carcass sites. Alternatively, an aggregate of samples from the 3 carcass sites may be tested to provide the data point. NB: this will not comply with the requirements of the NMD.
- the database must consist of not less than 30 datapoints.
- the data may be obtained from one or more chillers. The data can relate to more than one chiller provided all chillers have the same characteristics, i.e. they are of the same dimension, the same number of rails and carcass capacity, the same evaporator size, fan speed and air flow arrangement.
- the data must include carcasses that are held for longer than 16 hours at 10°C.

3.6.2.4 If the data suggests that the mean value of the post-chilling database is likely to exceed 40% of the mean post-slaughter data, the process parameters are to be revised and the process revalidated.

Maintaining an adequate air flow over the whole carcass or side is a critical factor in retarding microbiological growth. Carcasses are to be spaced to ensure that air can flow over the carcass and, where air flows are known to be poor, the spacing shall be such that the hygiene outcome can be achieved.

3.6.2.5 Validation shall also include demonstrating that the deep meat temperature can be reduced to 7°C or colder within 48 hours of the carcasses leaving the slaughter floor.

3.6.2.6 *Post-chilling processing*

a. After being reduced to 7°C, carcasses shall be held under conditions of temperature and time which do not result in microbial spoilage of the carcass.

The requirements outlined in IS6/IAS6: Section 3.6.1(c) may be used as a guide.

b. Where the chill temperatures result in hard meat and fat, holding of carcasses for short periods at temperatures warmer than the preservation temperature shall not result in proliferation of mesophilic bacteria.

3.7 Boning During Cooling

3.7.1 Application

This section applies to the cooling of carcasses and/or boned product when warm or hot boning sheep, goat, deer, horse, pigs and beef, including bobby calf carcasses.

3.7.2 Product temperature measurements

Product temperatures shall be measured at the following locations by the methods outlined:

- unwrapped meat packed into cartons: at the thermal centre of the carton;
- wrapped cuts packed into cartons: at a point nearest the thermal centre of the carton, between adjacent wrapped surfaces of the cuts which are closest to the thermal centre;
- wrapped whole intact cuts not in cartons: on the outer surface of the meat;
- wrapped dissected cuts (cuts of meat where new surfaces exist as a result of de-boning, such as boned rolled shoulders or tunnel legs) not in cartons: at the thermal centre of the cut.

3.7.3 Hot boning

3.7.3.1 This section applies to all classes of stock that are transferred directly to the boning room, and boned, at the completion of slaughter and dressing.

3.7.3.2 Product shall be cooled according to the requirements for refrigeration in IS6/IAS6: Section 3.5.

No intermediate cooling point has been established for hot boning and a single time temperature end point is not adequate to assure hygiene.

3.7.3.3 The temperature of products shall be further reduced to the preservation temperature to comply with any regulatory or commercial requirement or according to good manufacturing practice.

3.7.4 Warm boning

3.7.4.1 This section applies to all classes of stock.

3.7.4.2 Carcass chillers shall achieve the following cooling performance standards:

a. In the case of sheep, goat, pigs, deer or bobby calves, the deep temperature of carcasses shall be reduced to 7°C within 20 hours of the carcass leaving the slaughter floor.

b. In the case of beef and horses, the carcasses shall be chilled so that deep meat temperature is reduced to 7°C or less within 48 hours of the carcass leaving the slaughterfloor. In addition the shoulder temperature shall be reduced according to the following schedule:

Deep shoulder temperature	Time in chiller
n=20, c=4, m=15°C, M=18°C	16 hours
n=20, c=4, m=10°C, M=11°C	24 hours

Where: n is the number of carcasses,

c are the number of carcasses that are allowed to exceed m,

M is the maximum allowable temperature.

These criteria shall also apply to quartered carcasses. Where both hind and fore quarters are held in the same chiller, the fore quarters in the case of beef and the hind quarters in the case of horses should be used as the deep temperature reference site. Where hind quarters are held in a separate chiller the criteria shall apply to the deep meat temperature.

Note: warm boning of some or any species of animal may not be permitted for some markets, refer to Overseas Market Access Requirements.

3.7.4.3 *General requirements*

a. Carcasses may be boned at any time after having been placed in a chiller where the refrigeration performance has been validated.

b. Refrigeration of carcasses, including quarters, shall be maintained at, or equivalent to, the carcass chilling standard until they are transferred to the boning room.

It is acceptable to hold carcasses in refrigerated areas that have not been fully validated for short periods of time during quartering and transfer operations. This is provided that the holding time does not exceed 30 minutes and the delay does not negatively influence carcass cooling.

c. After boning, products shall be placed under refrigeration appropriate to their preservation temperature within 60 minutes of the carcass leaving the chiller operating to the carcass chilling standard.

3.7.4.4 *Post-boning cooling*

After boning, the product surfaces of microbiological concern shall be reduced to 7°C according to the following schedules:

a. for beef and horse carcasses:

i. when boning occurs within 12 hours of slaughter, within 13 hours of products leaving the boning room,

ii. when boning occurs after 12 hours of slaughter, within 10 hours of products leaving the boning room.

b. for sheep, goat, pig, deer or bobby calf carcasses, within 20 hours of carcasses leaving the slaughterfloor.

3.7.4.5 *Certification*

The certification requirements of some markets for warm boned products may differ from those set out in this section, refer to Overseas Market Access Requirements.

3.8 Spray Chilling

3.8.1 Compliance with chilling requirements

The chilling of carcasses shall conform to the objective PHI target, refer to IS6/IAS6: Section 3.5, or appropriate equivalent time/temperature parameters, IS6/IAS6: Section 3.6 and 3.7.

3.8.2 Water quality

Water shall be potable and shall not contain any sanitising agents other than chlorine. Chlorine shall not be present at levels in excess of those normally used for the maintenance of potable water.

3.8.3 Water pickup

Spray chilling shall not result in water being absorbed by the carcass. The exit weight of the carcass shall not be heavier than the weight at which it entered the chiller.

Spray chilling is designed to control weight loss. Water is sprayed intermittently onto the carcass surface and evaporates. The evaporation of sprayed water is intended to replace the evaporation of moisture from within the meat, hence reducing weight loss. Excessive volumes of sprayed water can result in the carcass picking up sufficient water to cause a weight increase. Water sprayed towards the end of the chilling cycle will also tend to cause weight increases.

3.9 New Refrigeration Technologies

Alternative refrigeration technologies such as plate contact freezing (or chilling), dense spray cooling, cryogenic cooling and liquid immersion chilling (or freezing) are permitted provided they are approved according to the requirements of IS8/IAS8; Section 5. Procedures for validating and verifying refrigeration performance shall be appropriate to the refrigeration technology used.

3.10 Microbiological Monitoring

3.10.1 Application

Routine process monitoring shall include microbiological evaluation of carcasses and products for the purposes of verifying the effectiveness of the established process parameters and control parameters for any processes described in this section.

3.10.2 Monitoring

3.10.2.1 Process monitoring shall be carried out according to principles of microbiological monitoring described in IS8/IAS8. Verification shall comply with the requirements outlined in IS8/IAS8: Appendices A and E.

3.10.2.2 The frequency of routine quantitative microbiological monitoring may be reduced after initial microbiological verification has been carried out, provided refrigeration performance is routinely verified and routine monitoring using PHI is substituted.

3.10.3 Sampling

Samples for microbiological analysis shall be taken from the surfaces of concern after the temperature at the surface has been reduced to 7°C or less. In the case of products that are intended for freezing, sampling may occur after product has been frozen.

3.10.3.1 For any carcass, sampling shall occur at the same sites that are used for microbiological evaluation of slaughter and dressing.

3.10.3.2 For hot and warm boned cartoned products, sampling shall occur at or near the thermal centre of the carton.

3.10.3.3 For hot and warm boned products that are whole cuts without any dissecting cuts, and that are wrapped but are not placed into a carton, sampling shall occur at the surface of the cut.

3.10.4 Databases

Microbiological databases shall be created for products and processes according to the requirements of IS8/IAS8: Appendix A.

Where no current data is available, regular analyses shall be performed until the minimum amount of data necessary to create the database has been accumulated.

References

Gill C.O. and Jones S.D.M. Evaluation of a commercial process for collection and cooling of beef offals by a temperature function integration technique. Int. J. Food Micro. 15, 131-143, 1992.

Reichel M.P., Phillips D.M., Jones R. and Gill C.O. Assessment of the hygienic adequacy of a commercial hot boning process for beef by a temperature function integration technique. Int. J. Food Micro. 14, 27-42, 1991.

4 Offals

Amendment 5

May 2004

Scope

This section contains the requirements for the post-slaughter cooling of offals, the handling of offals and runners that are inherently contaminated, and the processing of casings.

4.1 Outcome

The management of offals after slaughter shall result in minimal proliferation of pathogenic bacteria of enteric origin, and the control of contamination from green offals.

4.2 General Principles

4.2.1 Documentation

The cooling of offals, including cleaning of green offals, shall be documented.

4.2.2 Refrigeration

Note: this section does not apply to intestines complying with section 4.8.

The cooling of offals shall not exceed the following process hygiene index (PHI) criteria at the surfaces of microbiological concern (see IS6/IAS6: Section 3.2.2):

- 80% of values 10
- maximum 14

The cumulative process hygiene index shall be measured immediately after slaughter and dressing, and shall include all activities during cooling until the surfaces of concern have been reduced to 7°C or less. The calculation of PHI shall include an allowance for any elapsed time between the end of slaughter and dressing (37°C) and the start of temperature recording.

Where it is technically justifiable offals may be grouped together into like offals for sampling purposes. Factors which will influence grouping of offals will include offal size, packaging, initial temperature and the like.

4.2.3 Surfaces of microbiological concern

4.2.3.1 If all surfaces are fully exposed to the cooling medium, the surface of microbiological concern shall be the outer surface, e.g. the outer surfaces when the offals are placed on trays, racks or packed in ice, and are not immediately placed into cartons.

4.2.3.2 If the surfaces are not fully exposed to the cooling medium, the surface of microbiological concern shall be the thermal centre of the product mass, e.g. when offals are placed into cartons or containers.

The thermal centre and the geometric centre of a carton are not the same. For practical purposes it may be sufficient to use the geometric centre of the carton. However, studies indicate that these two locations may be several centimeters apart and there may be a difference of several degrees of temperature between the thermal and geometric centres. Air in a carton is responsible for this phenomenon as it acts as a significant insulation barrier to heat transfer.

4.2.4 Immersion cooling

When the cooling involves the use of immersion in ice or water, the immersion medium shall be potable.

4.2.5 Validated and verified cooling curves

All cooling curves shall be validated. Routine process monitoring shall verify compliance with the objective criteria. See IS8/IAS8.

4.2.6 Certified rooms

If a refrigeration room has a certificate of performance issued by a competent person, it does not have to be initially validated, provided that the competent person shall have:

a. listed in the certificate of performance the design air velocity, air temperature regime, carton weight, carton depth, cardboard type, carton holding capacity and initial product temperature;

b. attested in the certificate of performance that the room has been designed to perform according to specifications.

4.2.7 Customised processes

4.2.7.1 Any Licensee wishing to validate refrigeration performance in a manner different to that described in this section shall submit a proposal to the Director General (DG) according to the requirements for Customised Processes, see IS8/IAS8: Section 5.6.

4.2.7.2 Microbiological data may be considered in the validation of a customised process. Refer also to IS8/IAS8: Appendix A.

4.2.8 Contamination

Except where permitted, all offals shall be free from contamination before being saved for edible use.

4.2.8.1 Green offals and casings may contain inherent contamination.

4.2.8.2 Some offals may contain contamination as a result of the special nature of the organ or tissue, e.g. tissues of the urogenital tract.

4.2.9 Separation of green offals

Green offals, casings or other offals that are saved when inherent contamination is present shall be maintained physically separate (see IS2/IAS2) from any other edible product during their handling, processing and transporting, until they have been cleaned.

4.2.10 Market access

Some importing countries may prohibit the saving of certain offals. In these instances, the Licensee shall ensure the prohibited offals are kept separate from the handling and processing of all other offals.

4.3 Validation of Refrigeration Performance

4.3.1 Application

The refrigeration performance of any room or facility in which offals are reduced in temperature after slaughter shall be validated against:

a. either the objective PHI target, refer IS6/IAS6: Section 4.2.2; or

b. the objective targets for customised processes which have been agreed to by the DG.

4.3.2 Calibrated measurements

The measuring device used for the purpose of validation shall be calibrated. Refer to IS8/IAS8.

4.3.3 Validated capacities

a. During the initial validation, chillers and freezers shall be loaded to at least 90% of the capacity at which it is intended that they will be fully utilised. Chillers and freezers may also be validated at lesser capacities, provided the subsequent operating parameters include the carton weight and number or total weight applicable at the time of validation.

b. In the case of new chillers, they shall be initially operated within the capability for which they were designed and constructed. Validation of the refrigeration capability of the chiller, or chiller combination, shall be performed when operations require the room to be used at a capacity of 90%, or greater, of the design capacity.

4.3.4 Operating parameters

The operating parameters for a chiller or freezer, applicable at the time of validation, shall be determined from the air temperature setting, the setting which influences air velocity (may be fan speed or % fan speed etc.) and the product mass (number and weight of cartons, or total carton mass).

4.3.5 Validation procedures for Offal chiller and freezer

a. For single chillers and freezers:

   i. Validation should be carried out during a single refrigeration cycle and shall use either:

   - not less than 20 data points, in the case of chillers and freezers that have a capacity of more than 100 cartons; or
   - not less than 10 data points, in the case of chillers and freezers that have a capacity of less than 100 cartons.

ii. Data may be obtained from production days where not less than 5 data points are measured per day provided the required number of sample sites are pre-selected, using random selection procedures, and the chiller is operated in a similar manner for each of the validation days, i.e. temperature and air velocity (may be fan speed or % fan speed etc) settings are to be the same and the product mass shall not be less than 90% of capacity, on each day, and validation is carried out within a reasonable timeframe.

b. For groups of chillers or freezers:

i. the chillers or freezers shall have been constructed to an identical design and shall have been fitted with refrigeration equipment and all other fittings that have been constructed to the same respective specification. A competent person shall survey the chillers or freezers and shall certify, for the named group of chillers or freezers, that they have been constructed and fitted in accordance with the common respective specification.

ii. performance data may be obtained over 5 production days from not less than 30 cartons, and the validation is carried out within a reasonable period of time.

iii. the group shall be divided into sampling locations and the 30 cartons sampling sites shall be pre-selected using random selection procedures.

iv. each chiller or freezer of the group is to be operated in a similar manner for each of the validation days, i.e. temperature and air velocity (may be fan speed or % fan speed etc) settings are to be the same and the carton mass shall not be less than 90% of capacity, on each day.

v. the operating parameters that have been determined from the group validation shall apply in respect of every chiller or freezer in the group.

vi. revalidation of chiller or freezer performance may be performed as a group of chillers or freezers or as individual chillers or freezers.

4.3.6 Revalidation

Chiller or freezer performance shall be revalidated when any alteration to the chiller or freezer is carried out that is likely to affect the chiller or freezer operating parameters and/or changes to the maximum heat load.

4.4 Verification of Refrigeration Performance

4.4.1 Application

The refrigeration performance of any room that is used to reduce the post harvest temperature of offals to < 7°C shall be verified.

4.4.2 Offal chillers and freezers

4.4.2.1 Offal chiller and freezer performance shall be verified routinely, and not less than daily for each day the chiller or freezer is in operation.

4.4.2.2 Verification shall include:

a. monitoring the settings for chiller or freezer air temperature and air velocity; and

b. measuring the chiller or freezer air temperature (CATR); and

c. monitoring that the amount of product in the chiller or freezer does not exceed the validation test weight.

4.5 New Refrigeration Technologies

Alternative refrigeration technologies such as plate contact freezing (or chilling), dense spray cooling, cryogenic cooling and liquid immersion chilling (or freezing) are permitted provided they are approved according to the requirements of IS8/IAS8; Section 5. Procedures for validating and verifying refrigeration performance shall be appropriate to the refrigeration technology used.

4.6 Green Offals

4.6.1 Separation

4.6.1.1 Where physical separation is required by this standard, the separation shall be achieved by walls and the facilities shall be dedicated to the type of activity. Refer also to IS2/IAS2.

4.6.1.2 Where separation by distance is permitted by this standard, there shall be an adequate space between operations and personnel.

An adequate space between operations will depend on the facilities and the type of practices carried out. Refer also to IS2/IAS2.

4.6.1.3 The planning of operations shall ensure that:

a. there is no possibility of any splash which might occur at one location affecting or contaminating adjacent operations;

b. personnel do not move from green to clean, or raw to cooked, operations until they have completed a sanitary routine. Refer also to IS3/IAS3.

4.6.2 Processing

4.6.2.1 Processing may be interrupted at any time after green offals have been emptied.

a. When partial processing occurs to the extent that the green offals may be packed before they have been cleaned, the packed green offals shall be labelled “green unprocessed <product name>”. Eligibility documents accompanying the transfer of products shall include the term “green unprocessed”.

b. Further processing of partially processed green offals shall take place in areas appropriate to the status of the partially processed green offals. Refer also to IS2/IAS2.

4.6.2.2 Green offals shall be separated and emptied at the originating slaughter premises in facilities that are appropriate for this purpose. Refer also to IS2/IAS2.

4.6.2.3 Green offals shall be refrigerated according to the requirements of IS6/IAS6: Section 6 unless they are preserved by other means.

4.6.3 Cleaning

4.6.3.1 Cleaned green offals shall conform to the following standard:

a. There shall be no visible ingesta or faecal material on any surface.

b. The water used for final flushing, and any water expressed from the finished product, shall run clear.

c. Rumens and reticula shall have all parasites, parasitic lesions and foreign bodies removed.

d. Any contamination which can not be washed off during cleaning shall be trimmed.

4.6.3.2 The cleaning of green offals and all other subsequent operations may be performed at any licensed premise that has facilities for this purpose. Packed frozen green offals may be thawed and cleaned in appropriate facilities at any licensed premises.

4.6.4 Refining

Refining is a pre-treatment to affect the visual appearance of product. It includes scudding, scalding, bleaching and trimming of cleaned product. The operation may involve hot water and chemicals to achieve the desired technical effect but will not necessarily result in the preservation of products.

4.6.4.1 Refining shall only be performed on product which has been emptied and cleaned, except where mechanical cleaning and refining occurs within the same vessel. In these cases there shall be an initial cleaning step before refining starts. The cleaning step shall achieve the standard described in IS6/IAS6: Section 4.6.3.

4.6.4.2 Clean offals shall be refined in facilities, and under such conditions, that are appropriate for this purpose. Refer also to IS2/IAS2.

4.6.5 Cooking

Cooking may include the use of chemicals to achieve the desired technical effect. Refer also to IS6/IAS6: Section 7.

4.6.5.1 The principles of preservation using thermal processing shall be observed. Refer to IS6/IAS6: Section 8.

4.6.5.2 The principles of complete separation between raw and cooked products shall be observed. Refer also to IS2/IAS2 and IS3/IAS3.

4.6.6 Other processing

4.6.6.1 The production systems shall achieve a state of preservation to the extent that the products are shelf-stable at ambient temperatures.

4.6.6.2 *Salting*

Salting may include the use of sodium chloride, sodium metabisulphite and other approved food additives. Importing countries may have specific requirements in this regard, refer to Overseas Market Access Requirements.

a. Salting shall take place in an area set aside for the purpose, refer to IS2/IAS2.

b. The supplier of salt shall provide evidence that the salt conforms to the minimum standards required by the Food Standards Code.

4.6.6.3 *Drying*

Drying, including freeze drying, shall take place in facilities appropriate for this purpose, refer to IS2/IAS2. The principles of preservation using reduced water activity shall be observed, refer to IS6/IAS6: Section 9.

4.6.7 Packing of green offals

The principles of separation of clean and dirty activities apply.

4.6.7.1 *Separation during packing*

Products shall be packed in areas that are appropriate to their hygienic status:

a. Products which are emptied may be packed in the same room as where they are emptied. They shall not be packed in the same room where any other product is processed or packed unless the other product is of an equivalent green status.

b. Products which are emptied, but which do not comply with the criteria for being clean prior to being further treated, may be packed in the same room in which they were further treated. They shall not be packed in the same room where any other product is processed or packed, unless the other product is of an equivalent green status, or the further treated product satisfies a finished product standard which is acceptable to the Director-General.

c. Products which have been checked after cleaning and comply with the criteria for being clean may be packed in the same room in which they are cleaned or in a separate area in a room used for the packing of other edible products.

d. Products which are refined may be packed in the same room in which they are refined or in a separate area in a room used for the packing of other edible products.

e. Products which are cooked may be packed in the area in which they were cooked or in a separate facility set aside for the packing of cooked products.

4.6.7.2 *Market access*

The packing and handling requirements set out in IS6/IAS6: Section 4.6.7.1 may not be acceptable to the regulatory authorities in some importing countries. See Overseas Market Access Requirements for specific EU and other country requirements.

4.7 Microbiological Monitoring

4.7.1 Application

Routine process monitoring shall include the microbiological evaluation of offals for the purposes of verifying the effectiveness of the established process parameters and the control parameters for processes described in this section.

The purpose of microbiological monitoring should be to evaluate the hygiene of removing offals from the carcass including evisceration, the effectiveness of refrigeration in the case of offals subjected to refrigeration and the effectiveness of cleaning and/or refining green offals.

4.7.2 Monitoring

Process monitoring shall be carried out according to the principles of microbiological monitoring described in IS8/IAS8 and verification shall comply with the requirements of IS8/IAS8: Appendices A and E.

4.7.3 Sampling

Samples for analysis shall be taken from the surfaces of microbiological concern (see IS6/IAS6: Section 4.2.3).

4.7.4 Databases

4.7.4.1 Microbiological databases shall be created for products and processes according to the requirements of IS8/IAS8: Appendix A.

4.7.4.2 Where no current data is available, regular analyses shall be performed until the minimum amount of data necessary to create the database has been accumulated. The frequency of routine quantitative microbiological monitoring may be reduced after initial microbiological verification has been carried out, provided the process control parameters are routinely monitored.

Routine monitoring may also involve temperature dataloggers and predictive microbiology techniques.

4.8 Casings

The principles of separation of clean and dirty activities apply. Refer also to IS6/IAS6: Section 4.6.1.

4.8.1 The separation (pulling) and stripping of intestines shall be physically separate from the classing, salting and packing of finished casings. Refer also to IS2/IAS2.

4.8.2 Cleaning

4.8.2.1

a. Intestines shall be emptied and stripped at the slaughter premises as soon as practicable after slaughter.

Experience suggests unintentional delays of up to 5 hours before the commencement of pulling and stripping have no detrimental effect to finished casings.

b. The cleaning process may be interrupted at any time after intestines have been stripped.

The cleaning process is complete when all layers of the intestine are removed and only the sub-mucosal layer is left.

4.8.2.2

a. Intestines shall not be held in static water during processing except when processing chemical aids have been added to achieve a particular technical effect.

b. The flow rate of water used throughout the cleaning of intestines shall be adequate to ensure the constant removal of faecal and mucosal content.

4.8.2.3 When processing of intestines is interrupted after stripping they shall be labelled “GREEN RUNNERS”. Green runners may be shipped for completion of processing into casings

4.8.3 Preservation

4.8.3.1 *Salting*

Salting includes the use of sodium chloride, sodium metabisulphite and other approved food additives. Saturated salting of casings and green runners will have an effective anti-microbial

and preservation function. Some markets may only accept salted casings, refer to Overseas Market Access Requirements.

a. Casings shall be preserved.

b. Salt shall be kept clean at all times. The supplier of salt shall provide evidence that the salt conforms to the minimum standards required by the Food Standards Code.

c. Other additives that may be used to prevent bacterial spoilage or to improve the handling characteristics of casings shall conform to the requirements of the intended market. Refer to Overseas Market Access Requirements and IS6/IAS6: Section 7.

d. Preservatives, such as sodium metabisulphite, may be used for partial preservation during the transportation of green runners.

4.8.3.2 Casings and green runners may be refrigerated, refer to IS6/IAS6: Section 6. Green runners shall be refrigerated if not otherwise preserved and/or are likely to deteriorate during the storage period.

4.8.4 Packing and storage of casings

The principles of separation outlined in IS6/IAS6: Section 4.6.7.1 apply during the packing of casings.

4.8.4.1 *Packing*

a. Casings may be wrapped and packed into cartons.

b. Casings may be packed into reusable containers such as casks provided the containers have been thoroughly cleaned before entering any packing area or edible support area.

4.8.4.2 *Storage*

a. Frozen packaged casings may be stored in licensed cold stores provided they are stacked separately from other edible product.

b. Salted casings in sealed casks shall be stored in a licensed dry store.

5 Boning and Cutting

Amendment 5

May 2004

Scope

This section contains the requirements for the breaking down of carcasses and the primary separation of cuts into smaller components by manual or mechanical means to provide raw products ready for further processing or preservation. This section applies to mincing, the addition of ingredients, mixing and reforming, etc., but does not include methods of preservation.

5.1 Outcome

Processing of any product into raw foods intended for preservation by refrigeration or other means, with or without other ingredients, shall result in minimal microbial contamination and deterioration.

5.2 General Principles

5.2.1 Documentation

The Licensee shall document all processes for boning, cutting and size reduction of raw meat.

5.2.2 Application

Boning and cutting may occur during the period of post-slaughter management, or after the carcass has been cooled to 7°C or less, or on frozen carcasses, or on thawed or tempered meat.

5.2.3 Food safety outcomes

The food safety outcomes of concern relate to the control of contamination of the product and the product environment. Control of contamination shall include:

a. the control of visible defects by implementation of:

   i. re-boning inspections and corrective action plans,

ii. bone-in and boneless meat re-inspections and corrective action plans;

b. the control of the chemical composition of product contact surfaces and wrapping and packing materials;

c. maintaining the appropriate temperature of the product and the product environment according to the requirements of IS3/IAS3; and

d. maintaining the hygiene of food contact surfaces according to the requirements of IS3/IAS3.

5.2.4 Expeditious processing

5.2.4.1 Carcasses and product intended for boning and cutting shall be processed without unnecessary delay:

a. The rate of processing shall be managed so that processing delays and stock-piling of meat do not occur.

b. Carcasses, cuts and cut products shall not be left without refrigeration for periods that:

i. are in excess of that required by any standard (see IS6/IAS6: Section 3), or

ii. have not been validated within the objective PHI target, and

iii. do not result in significant warming of the product surface, see also IS3/IAS3: Section 3.6.3.3.

c. Product resulting from the cutting of frozen carcasses and/or frozen product shall be returned to the cold store before the core temperature of the frozen cut becomes warmer than -12 °C. If the core temperature becomes warmer than -12 °C then product shall be reduced to the preservation temperature, i.e. placed in a freezer, before being placed into store.

5.2.4.2 A processing standard or an importing country requirement may specify a maximum permissible period for refrigerated storage or the return of products to refrigeration. If these standards or requirements are more stringent than set out in this Industry Standard, and the processor requires eligibility for this market, then processing shall comply with these requirements. Refer to Overseas Market Access Requirements for importing country requirements.

5.2.5 Refrigeration

After boning or cutting, products shall be subjected to refrigeration at temperatures appropriate to their preservation, unless they are to be used immediately as an ingredient in another process and subjected to preservation by an appropriate method.

The holding of any product under aerobic conditions at refrigeration temperatures between 1°C and 7°C should be regarded as temporary storage and not preservation.

5.2.6 Microbiological evaluation

A microbiological evaluation of processed products shall be carried out according to the requirements of IS8/IAS8.

5.2.6.1 The evaluation shall be made on products that are intended for preservation by chilling.

The microbiological evaluation of products that are intended for further processing, and preservation by other means, should be appropriate to any requirements relating to the nature of the preservation and the type of finished product.

5.2.6.2 The sampling plan shall take into account the effect of processing on the distribution of micro-organisms.

a. On carcasses and cuts the distribution of micro-organisms is non-random, and cuts should be sampled on surfaces that represent the outer surfaces of the carcass.

b. Processing which involves a substantial reduction in the size of meat (e.g. mincing) will randomise the distribution of micro-organisms inherent in the raw product, including those acquired from the processing environment and any ingredients added to the product. In these cases, the sampling techniques should involve taking volume or weight samples rather than surface swabs.

5.3 Pre-Trim

5.3.1 Application

A pre-boning inspection and removal of defects (pre-trim) shall be performed on all carcasses prior to the start of any cutting or boning.

5.3.2 Criteria

All carcasses, sides and quarters shall be free of visible defects and clean prior to the commencement of cutting.

5.3.2.1 The pre-trim inspection shall:

a. remove any defects that were not detected and removed prior to or at post-mortem inspection;

b. remove any defects that may have arisen subsequent to post-mortem inspection.

5.3.2.2 Defects shall include, but are not restricted to, any pathology, parasitic lesions in excess of those permitted in the post-mortem criteria, bruises, blood clots, clusters of hair or wool, hide, rail dust, dirt, stains, grease or extraneous material. The hock shall be included in pre-trim procedures, as defects on hocks can be spread to other areas by contact or hands.

5.3.3 Retained carcasses

Carcasses or meat carrying the MAF AgM74 retain label which have come from MAF retain areas shall only be pre-trimmed, boned and cut under the direct supervision of the Technical Supervisor.

5.4 Separation of Types of Meat

5.4.1 Application

Different species of meat shall be processed separately unless the finished product includes a mixture of species. In this case, products of different species shall be mixed according to the formulation details of the food.

Products of the same species but of different microbiological status should be processed separately. Where separation by time is practised, products with relatively low microbial counts should be processed first, unless the product contact surfaces are cleaned and sanitised after processing product with relatively high microbial counts.

5.4.2 Personnel

Different species of meat may be processed at the same time, provided different personnel attend to each species and each operation is separated by distance. Filled closed cartons may be handled by one person through the same weigh/label unit or strapping (binding or gluing) machine.

5.4.3 Equipment

Boning and packing tables and processing equipment shall be cleaned when boning of one species has been completed and before starting on another species, e.g. between beef and mutton (see IS3/IAS3 also).

5.5 Preparation for Packing

5.5.1 Expeditious handling

All products shall be handled as rapidly as possible and in a hygienic manner.

Trimmings and small cuts are likely to have higher microbial counts than larger cuts due to the greater degree of physical handling that occurs and because trimmings may be selected from the external surfaces of carcasses and contaminated cuts.

5.5.1.1 Uncontaminated meat and fat trimmings intended for edible purposes shall be packed or handled in a manner appropriate to edible handling.

5.5.1.2 Contaminated meat and fat trimmings resulting from the removal of hygiene defects shall be regarded as inedible. They shall be conveyed from the edible room in appropriately marked containers or conveyors. They shall not accumulate on the floor. Refer also to IS3/IAS3.

5.5.2 Removal of defects

5.5.2.1 All products derived from the primary breaking down of carcasses shall be checked for defects before packing or undergoing any size reduction (e.g. mechanical separation, mincing or dicing) preparatory to any further processing.

5.5.2.2 All visible defects shall be removed during cutting and boning. Packed products intended for export shall conform to the defect criteria set out in IS6/IAS6: Appendix I.

5.5.2.3 Some importing countries have specific requirements for the re-inspection of products derived from cutting and boning. All products intended for those markets shall comply with the specified requirements.

5.5.3 Mixing cuts of different origins

Cuts for export derived from different slaughterhouses shall not be mixed in the same carton unless the Licensee has developed and implemented a programme which can identify the premises of origin, and trace the dispersion, of all products.

5.5.4 Packing

5.5.4.1 Packing activities shall not compromise cutting and boning hygiene or provide a source of contamination for products.

5.5.4.2 Packing areas of boning rooms shall not be used for carton storage or assembly.

Small quantities of erected carton or unassembled “pop-up” cartons and inner cartons are acceptable.

5.5.4.3 Some importing countries have specific requirements for the separation of cutting and boning activities and the management and handling of packing and exposed products. These shall be observed as an essential regulatory outcome for premises exporting to these markets (see Overseas Market Access Requirements).

Personnel handling cartons and packing material should be separate from those personnel directly involved with the handling of exposed products. Separation may take the form of a hygiene routine (see IS3/IAS3 also) where this does not offend an importing country requirement.

5.6 Mechanically Separated Meat (MSM)

5.6.1 Application

This section relates to the mechanical separation of meat from bones using compression or abrasion methods.

5.6.2 Compliance with standards

Bones, carcasses or parts of carcasses that are intended to be processed using mechanical separation methods, and products derived from the process of separation, shall comply with all requirements for edible products, including expeditious processing, species separation and defect inspection.

5.6.3 Pre-separation temperature requirements

The temperature of bones, carcasses or parts of carcasses that are intended to be processed using mechanical separation methods shall comply with the following criteria:

- in the case of hot or warm boning, bones shall be mechanically separated immediately after deboning.
- chilled to or maintained below 10°C and mechanically separated within 5 hours of boning; or
- chilled to 4°C and mechanically separated within 72 hours of boning; or
- chilled to -2°C and mechanically separated within 120 hours of boning; or
- immediately placed in a freezer and frozen within 48 hours of boning.

5.6.4 Post-separation requirements

5.6.4.1 Mechanically separated meat shall conform to the following criteria:

- used as an ingredient of a meat product directly after the separation process; or
- immediately cooled down to, and maintained at, a maximum temperature of 4°C and used for further processing within 48 hours; or
- immediately frozen.

5.6.4.2 The calcium content of mechanically separated meat, expressed on a dry matter basis, shall not exceed 1.5%. Bones should not be crushed during the recovery process.

As a measure of the crushing of bones, the bone content, including the size of bone particles, should be minimal.

5.6.5 Importing country requirements

Mechanically separated meat shall conform to any requirement specified by an importing country, see Overseas Market Access Requirements.

Importing countries may have restrictions on the use of MSM and/or specify different criteria for the composition of MSM. These different criteria may include calcium content that differs from the Codex limit, restrictions on bone particle size and limitations on protein:calcium ratios.

5.7 Mincing

Minced product has a greater distribution of contamination by pathogenic micro-organisms and is generally of poorer overall microbial quality than whole meat.

5.7.1 Food safety

5.7.1.1 The Licensee shall take into account the following aspects relating to food safety outcomes when considering products intended for mincing, the process of mincing and the handling of minced product:

a. the use of trimmings which are subject to high levels of handling and possibly temperature fluctuation (see IS6/IAS6: Section 5.5.1);

b. the increase in product temperature as a result of the energy required for mincing;

Temperature increases, often as high as 10°C, have been observed.

c. the effect that mincing has on the mixing of ingredients and defects;

Mincing results in the dispersion of all ingredients, including any contamination, throughout the minced product.

d. the components of tissue cells released during mincing that provide a readily available source of nutrients for microbial growth.

Released cellular components, together with an expanded surface area created during mincing and the distribution of micro-organisms throughout the meat, increases the potential microbial hazard.

5.7.1.2 Cleaning and sanitising of the mincer shall comply with the requirements of IS3/IAS3. The frequency of cleaning shall be determined using a microbiological evaluation.

5.7.2 Market access

Importing countries may have restrictions on the trade in mince, on acceptable types of raw materials and may specify composition and/or microbiological standards. The requirements of an importing country shall be observed as an essential regulatory outcome for products exported to these markets (see Overseas Market Access Requirements).

5.8 Addition of Ingredients

5.8.1 Where ingredients are added to any compounded meat product, the conditions for their acceptable use and level of inclusion specified in the appropriate food regulations of the country to which the products are intended to be sold shall be observed. Licensees are reminded of their obligations under the Food Standards Code in this regard.

5.8.2 The storage and handling of non-meat ingredients in licensed premises shall conform to the requirements of IS6/IAS6: Section 7.

6 Refrigeration

Amendment 5

May 2004

Scope

This section contains the requirements for preservation by controlling the temperature of products through chilling or freezing, and also applies to tempering and thawing.

6.1 Outcome

Refrigeration and storage of products shall result in minimal biological deterioration for the duration of their shelf life.

6.2 General Principles

6.2.1 Documentation

The Licensee shall document procedures for managing the operation of chillers and freezers.

6.2.2 Initial cooling

The initial cooling of carcasses and products, including offals, during the immediate post-slaughter period shall conform to the requirements outlined in IS6/IAS6: Sections 3 and 4.

6.2.3 Refrigeration capacity

The refrigeration capacity of all chillers and freezers shall be adequate for the intended purpose. The chiller or freezer shall be operated according to the designed parameters unless alternative operating parameters have been validated for the particular refrigerated room. Refer to IS2/IAS2 for design and construction requirements for refrigeration facilities.

6.2.4 Preservation temperatures

The preservation temperature shall be defined in the processing standard for the type of product. The type of packing used, and the method of stacking product in a chiller or freezer, shall not hinder the capability of the refrigeration system to reduce the temperature of product according to the requirements of the processing standard.

6.2.5 Conformance to processing standards

The control of environmental temperature during chilling, freezing, thawing or tempering shall conform to the processing standards appropriate to the type of product.

6.2.6 Monitoring

The operating parameters of any chiller or freezer shall be regularly monitored. The monitoring of room temperatures shall comply with the requirements in IS2/IAS2.

6.3 Chilling

6.3.1 Application

This section applies to products which comply with the requirements for post-slaughter management of carcasses, or the refrigeration of offals, and are intended to be held, transported and marketed as chilled products.

6.3.2 Relevant processing standards

Products intended to be stored, transported and marketed in a chilled state shall conform to the processing standards for the type of product.

The procedures should lay down how to minimise microbial growth before refrigeration and include the suitability of the raw meat (e.g. pH), and packaging systems relative to the processing standards for the type of product.

6.3.3 Licensee to determine shelf life

The chilled shelf life of the product shall be determined when the process is validated. Chilled products shall not be released to any market when the residual shelf life of the product is less than the transport time.

6.3.4 Heat-processed products

Heat-processed products that are intended for chilled despatch or further processing shall be chilled according to the requirements set out in IS6/IAS6: Section 8.

6.4 Freezing

6.4.1 Freezer capacity

Freezers shall have sufficient capacity to receive and reduce all product processed by the establishment to the storage temperature before it is transferred to any cold stores.

6.4.2 Storage temperature

All parts of carcasses and product shall be reduced to a temperature of -12°C or colder prior to transfer to cold stores.

6.4.2.1 Cartoned product which conforms to the requirements for equilibration, refer to Section 6.4.3, may be transferred to a cold store before the thermal centre has been reduced to the storage temperature.

6.4.2.2 Some markets require products to be reduced to storage temperatures that are colder than -12°C, refer to Overseas Market Access Requirements.

6.4.3 Equilibration

6.4.3.1 These criteria apply only to bulk packed manufacturing meat and cartoned cuts.

6.4.3.2 The measurements shall be made shortly after product is removed from the freezer. Any product that is out of the freezer for ≥ 1 hour is not eligible for entry into cold store on the basis of equilibration.

Equilibration is theoretical and assumes uniform freezing temperatures.

6.4.3.3 *Criteria*

a. The temperature at the thermal centre of the carton shall be colder than the latent heat phase of raw meat, i.e. below -2°C.

b. The equilibrated temperature shall be the arithmetic mean of the temperature of product at the thermal centre and product at the surface of the carton.

c. The equilibration temperature shall be reached in less than 3 hours of the cartons being removed from the freezer.

If the thermal centre is -4°C and the surface -26°C on leaving the freezer, the equilibrated temperature will be close to the mean of: -4°C and -26°C, i.e. -15°C.

6.5 Thawing

6.5.1 Thawing in air

6.5.1.1 *Carcasses*

a. All wrappings shall be removed just before the carcasses are placed in the thawing room. Thawing shall not exceed the following time/temperature parameters, which shall be measured from the time product is placed in the room and apply until it is removed to boning room:

i. 10°C for a maximum thawing time of 48 hours; or

ii. 7°C for a maximum thawing time of 72 hours.

b. The room shall have an air velocity of not less than 0.25 metres per second and the humidity should not exceed 85%.

c. Alternative process parameters may be adopted, provided they are properly validated. Refer also to IS6/IAS6: Section 1.3.3.

d. Microbiological evaluation of thawed carcasses shall be carried out to verify process control, refer to IS8/IAS8: Appendix A.

6.5.1.2 *Cartons*

a. Thawing shall not result in contamination of other product associated with thaw drip.

Routine thawing of frozen cartoned meat may take place with cartons intact or with the cartons removed.

b. Routine thawing of cartons in air shall conform to one of the following temperature/time parameters:

i. a maximum air temperature of 10°C for 72 hours, or

ii. a maximum air temperature of 7°C for 96 hours.

c. Controlled thawing of cartoned meat may take place in air temperatures not exceeding 15°C under the following conditions:

i. the carton packing material shall not be removed;

ii. no part of any product shall exceed a temperature of 7°C;

iii. the temperature of product shall be constantly monitored and the whole thawing process shall be under an automatic control system;

iv. the temperature of product at the top leading corner of the carton, i.e. the corner that first intercepts the air flow, at the warmest location in the chiller shall be used as the reference to monitor and control the temperature.

6.5.2 Thawing in water

The heat transfer between product and water is greater than between product and air. Provided there is sufficient heat energy in the water, thawing can be expected to be faster in water than in air.

6.5.2.1 The water shall be potable and non-static.

6.5.2.2 No part of any product shall be warmer than a temperature of 7°C.

6.5.2.3 *Water uptake* (where wrappings have been removed)

a. The amount of water picked up as a result of thawing shall be determined quantitatively.

b. If the water uptake results in the product exceeding the declared net weight, then water shall be treated as an ingredient in the final product and shall be declared as an ingredient where required by any regulation.

Calculating hot weights from declared weights can take into account any allowance for evaporation losses, provided these can be verified.

6.5.3 Microwaves and other technology

The use of microwaves and other forms of high energy to thaw meat is permitted. The equipment shall be operated according to the manufacturer's instructions.

6.5.4 Process control

6.5.4.1 If the temperature of any part of the product during thawing exceeds 10°C, then the temperature shall be reduced to less than 7°C within a period of time calculated as the thawing lag time at the warmest temperature recorded for the process according to the following formula (Lowry *et al*., 1988):

$y = 0.00185\ x^2 - 0.136\ x + 2.8416$

x = the temperature of the product in °C and y = log lag time in hours

6.5.4.2 After thawing, product shall be processed expeditiously and shall comply with all temperature and handling requirements of IS6/IAS6; Section 6.

6.5.4.3 Thawed meat which is not processed directly after thawing shall be reduced to and held at < 4°C. The maximum holding period shall be determined using microbiological evaluation. Refer to IS8/IAS8.

6.5.5 Customised processes

Processes for the thawing of products in air or water, including the handling and holding of thawed products, that differ from any parameter set out in this section may be customised. Validation of the intended process shall conform to the requirements for customised processes (see IS8/IAS8: Section 5).

6.5.6 Export of thawed meat

6.5.6.1 Meat may be thawed only once before export.

6.5.6.2 Cartoned re-frozen meat from thawed carcasses may be re-thawed for canning in New Zealand before export.

6.5.6.3 Thawed product shall not be exported chilled.

6.5.6.4 All thawed product shall be identified and separately inventoried.

6.6 Tempering

All of the principles of thawing cartoned product shall apply to tempering, with the restriction that the end point temperature remains colder than the freezing point of product and microbiological validation is not required. Tempered meat shall be further processed as rapidly as possible.

Reference

Lowry P.D., Gill C.O., Pham Q.T. A quantitative method of determining the hygienic efficiency of meat thawing processes. Proceedings, 34th International Congress of Meat Science and Technology, Brisbane, 1988.

7 Non-Meat Ingredients

Amendment 5

May 2004

Scope

This section contains the requirements for the quality control and handling of non meat ingredients incorporated into products.

7.1 Outcome

Storing, handling and preparing non-meat ingredients, of an appropriate quality, shall result in minimal contamination and/or deterioration of food.

7.2 General Principles

7.2.1 Documentation

The Licensee shall document procedures for storing, handling and preparing non-meat ingredients, including the inventory control of food additives.

7.2.2 Specific requirements for products

The specific formulation requirements of any product for non-meat ingredient shall be included in the documented processing procedures specific to that product.

7.2.3 Compliance with regulations

The formulation of a product, and the quality of non-meat ingredients used, shall conform to the food standards and other regulatory requirements of the intended markets. The product shall conform to the food standards applicable to New Zealand if the product is to be sold in New Zealand.

7.2.4 Handling

Procedures for the handling of non-meat ingredients shall incorporate the use of sanitary facilities, equipment and personnel practices for processing, accepted industry practices for processing, use of suitable quality raw ingredients and appropriate pre- and post-preparation storage conditions.

a. Non-meat ingredients shall be stored in areas that are appropriate to the nature of the substance and in a manner that will not have any effect on the storage of products. Refer also to IS2/IAS2.

b. Non-meat ingredients shall be handled and prepared in a manner that will not result in contamination of products. Refer also to IS6/IAS6: Section 7.7.

c. The combination of non-meat ingredients with products shall be consistent with the technical requirements of the particular processing standard. Refer also to IS8/IAS8.

7.3 Food Standards

7.3.1 All food shall comply with the food-labelling and composition regulations of the intended market.

7.3.2 The use of any food additive shall comply with the specific regulations of the intended market.

7.3.3 Food additives shall conform to quality standards specified in regulations.

The inclusion of any additive should serve an essential technical need and should be used at the lowest level possible to provide the technological effect.

7.4 Labelling

7.4.1 Non-meat ingredients shall be labelled unless the identity of the ingredient is traceable to a supply/purchase specification.

7.4.2 Food additives shall be labelled. The label shall comply with the requirements of the food standards of the intended market and as a minimum state:

- the name of the substance, or substance description (using an accepted common name);
- the name and address of the manufacturer or distributor.

7.4.3 Information relating to the chemical name(s) and percentages of additives which have maximum levels set by regulation shall be available if this is not included on the label.

Where an ingredient is a proprietary mix containing several additives, the label or accompanying product information shall state the proportion of additives when there is a maximum level permitted by regulation for the meat product in which it is used.

Licensees are reminded of their obligations under the Food Standards Code with regard to labelling of non-meat ingredients.

7.5 Supplier Quality Control Programmes

7.5.1 All non-meat ingredients shall be of a quality appropriate to their intended use.

The use and final preparation of the finished product should be taken into account when determining the appropriate quality of non-meat ingredients.

7.5.2 Incoming ingredients shall be subjected to quality control procedures.

Acceptance of any ingredient should be based on appropriate checks against the supplier-stated specifications of microbiological, physical or chemical qualities. The criteria for such checks need to reflect the intended use and method of incorporation of the ingredient into the finished product and the history of supply.

7.5.3 No raw material or ingredient shall be accepted by the establishment if it is known to contain parasites, micro-organisms or toxic, decomposed or extraneous substances which cannot be reduced to acceptable levels by normal in-house procedures of sorting and/or preparation or processing.

7.5.4 Non-meat ingredients shall not be used if the identity of the substance and compliance with appropriate regulations can not be verified.

7.6 Storage

Foods vary widely in their degree of perishability and, hence, the requirements for their storage and preparation in order to achieve the desired outcome may be quite different.

7.6.1 Premises

7.6.1.1 Storage facilities in a licensed premises shall comply with the requirements set out in IS2/IAS2.

7.6.1.2 When non-meat ingredients are obtained from domestic premises:

a. the premises shall comply with the requirements of the Food Hygiene Regulations 1974 if registered under the Health Act 1956, or

b. have an approved Food Safety Programme under the Food Act 1981.

Some importing countries require additives to be stored securely (see Overseas Market Access Requirements).

7.6.2 Protection in store

All ingredients shall be protected while being held in storage.

7.6.2.1 Non-meat ingredients shall be stored according to any instructions on the label or any instructions provided by the supplier.

7.6.2.2 The integrity of ingredient containers shall not be broken.

7.6.2.3 In the event of container damage, spilled material shall be removed immediately and the affected area cleaned and, where appropriate, sanitised.

Containers of ingredients may be opened for use provided the contents do not become contaminated. After use the container may be closed, resealed and the contents adequately protected.

7.6.3 Shelf-life

Ingredients shall be used within their “use by” date or shelf-life.

It is considered good manufacturing practice to use ingredients on a first in/first out basis.

7.6.4 Perishable ingredients

7.6.4.1 Ingredients that require chilled or frozen storage shall remain under appropriate controlled temperature conditions until they are required in production.

7.6.4.2 Non-meat ingredients shall not affect any product that is stored in the same refrigerated room.

a. Products and non-meat ingredients shall both be protected.

b. Products shall not be stored in the same room as any fruit or vegetable that produces a strong natural odour or respiratory gas that could have any detrimental effect on products.

The restriction would not necessarily apply in the case of non-meat ingredients that could effect products as a result of being stored in the same room but are ultimately combined with the stored product during manufacture and therefore would not have a detrimental effect on the finished product.

7.6.4.3 The licensee shall determine the maximum storage period for chilled ingredients prior to use in production, if a use-by date has not been recommended by the supplier.

7.6.4.4 Refrigerated non-meat ingredients shall be used as rapidly as possible after being removed from cold/chilled storage.

a. The suitability of any unused ingredient shall be determined using appropriate validation procedures (see IS8/IAS8).

b. The shelf-life of any thawed frozen ingredient shall be determined using appropriate validation procedures, if the ingredient is not incorporated into a product directly after thawing (see IS8/IAS8).

It is part of good manufacturing practice that only enough ingredient should be taken from the cold/cool store to be used in a single batch of final product. Returning any unused ingredient to the refrigerated store after extended periods of non-refrigeration should be avoided.

7.6.5 Shelf-stable products

7.6.5.1 Shelf-stable products shall be stored in a suitably controlled environment which will avoid temperature abuse, vermin and pest contamination and the build up of dust or other foreign matter. Refer also to IS2/IAS2.

7.6.5.2 Dry ingredients shall be stored under environmental conditions that are suitable to maintain their dry product status.

7.7 Preparation of Ingredients

7.7.1 Expeditious processing

All steps in the preparation of ingredients shall be performed without unnecessary delay and under conditions that minimise the possibility of contamination or deterioration of ingredients.

7.7.2 Hygiene of personnel

Personnel responsible for handling raw materials or semi-processed products capable of adding contaminants to the end-product shall not enter high risk zones (e.g. in-process production, exposed finished product, packaging, etc.) without first having completed an appropriate hygiene routine. Refer also to IS3/IAS3.

7.7.3 Vegetables

7.7.3.1 Raw unprocessed vegetables shall be prepared in physically separate areas or facilities outside the high risk zone areas (e.g. away from processing and storage areas of in-process production, exposed finished product, packing, etc.).

7.7.3.2 Washed, peeled and/or cut, blanched or sautéed vegetables received on the premises in a form suitable for direct incorporation into the product mix do not need a separate preparation area or facility.

7.7.4 Dry ingredients

The pre-mixing and weighing out of dry ingredients ready for incorporation into the product mix shall be performed in a dry ingredient room or facility specifically designated for dry product preparation and/or storage. In the absence of dedicated facilities, the outer packing shall be discarded prior to entry into food areas and food support facilities unless separation is maintained by distance or time so as to minimise contamination, see also IS2/IAS2.

7.7.5 Low moisture ingredients

7.7.5.1 Non-meat ingredients that are prepared moist then dried prior to incorporation with the meat component shall be processed by a method, and in a facility, according to the accepted practices of the trade for that particular product.

7.7.5.2 The microbiological hazard associated with residual moisture shall be determined if subsequent processing is delayed and/or the finished product does not include a pasteurisation step.

7.7.6 Eggs

7.7.6.1 Liquid eggs or egg components, e.g. egg albumin or egg yolk, used as an ingredient of a product, or in the preparation of a compounded ingredient such as pasta, should be pasteurised.

7.7.6.2 When any unpasteurised eggs, or egg components, are used as ingredients they shall be of an acceptable microbiologically quality.

7.7.6.3 When unpasteurised eggs, or egg components, are used as ingredients the finished product shall be subjected to pasteurisation before consumption.

7.7.7 Dairy products

Any dairy product (whole milk, milk powders, butter, cheese, yoghurt, etc.) used as an ingredient of a product, or in the preparation of a compounded ingredient, shall comply with the regulatory requirements for dairy products. The regulatory requirements of an importing country shall be taken into consideration where products that incorporate dairy ingredients have not been fully pasteurised after fabrication.

While dairy products may be ingredients in different foods they will still remain as controlled products under laws relating to dairy products. This may lead to additional certification requirements.

7.7.8 Bakery products

7.7.8.1 Doughs and fresh pasta shall be made using ingredients of appropriate quality.

7.7.8.2 Bread and pizza doughs should be used fresh. If it is intended to store leavened dough, the shelf-life shall be appropriately validated.

Yeast-activated doughs will continue to leaven at chill temperatures.

7.7.8.3 Pastry that is not intended to be used fresh shall be refrigerated.

7.7.8.4 Pasta that is not intended to be used fresh shall be dried promptly after mixing and shall be stored and handled so to avoid cross contamination with finished moist food products.

8 Thermal Processing

Amendment 5

May 2004

Scope

This section contains the requirements for the heating of products that will result in complete or partial preservation. Thermal processing does not include "flash" heat treatments, e.g. flash frying, that are designed to achieve a technical outcome but do not contribute to the preservation of the product.

8.1 Outcome

The application of heat and additional controls, when necessary, shall result in minimal biological deterioration of products for the duration of their shelf life.

8.2 General Principles

8.2.1 Documentation

The Licensee shall fully document all thermal processes. Documentation shall include the thermal processing parameters, post-heat treatment handling and additional preservation control where the heat treatment is only partial.

8.2.2 Process outcomes

The degree of heat required shall be appropriate to the intended process outcome in respect of achieving:

- low heat treatment; or
- pasteurisation; or
- commercial sterilisation.

8.2.2.1 *Low heat treatments*

Where a low heat treatment is used to achieve sensory, palatability or ease of further handling characteristics, then additional forms of preservation shall be employed in conjunction with the formulation, e.g. acidity, salting or curing salts, low temperature storage, reduced water activity (concentration or drying).

8.2.2.2 *High heat treatments*

Where high temperature pasteurisation and commercial sterilisation are used, then the lethality of the heat treatment required shall be calculated against an appropriate reference micro-organism.

8.2.3 Adequacy of heat treatments

A heat treatment process (excluding low heat treatment), shall:

- be sufficient to render the product microbiologically safe for its intended method and period of storage; and
- be calculated for the coldest point of the product during heat treatment; and
- based on a worst-case scenario with regard to transfer of heat to the product.

8.2.4 Schedule of heat treatment

8.2.4.1 The degree of heat treatment required and the scheduled heat treatment shall be established and documented by a competent person or processing authority for all pasteurising and commercial sterilising processes.

8.2.4.2 The scheduled heat treatment shall take into account the following factors and requirements, as applicable to the type of product:

a. the expected micro-flora and microbial load of raw materials and ingredients;

b. the desired log reduction of target organism(s);

c. the degree of cooking required to achieve the desired level of safety and any additional preservation controls necessary;

d. adequate temperature distribution in the heat treatment vessel;

e. the initial temperature of the product before heat treatment commences;

f. the composition and consistency of the product affecting the rate of heat penetration;

g. the size of pack, type of packing material and individual portion weight for filling;

h. the need for cooking by the end-user before consumption.

8.3 Pasteurisation

8.3.1 Food safety outcome

The degree of heat treatment shall ensure the destruction of vegetative forms of pathogenic bacteria, particularly *Salmonella spp*., staphylococci and *Clostridium perfringens*.

8.3.2 Adequacy of heat treatment

Pasteurisation values shall be established for all cooked chilled products with extended shelf-life to ensure that product safety is maintained to the end of the expected shelf-life. These values shall take into consideration additional preservation factors that may be present, e.g. the degree of heat treatment may be less severe if it is combined with one or more additional controls such as pH reduction, preservatives, reduced water activity, etc. (CODEX).

Some importing countries may require processes to achieve a minimum decimal reduction of *E. coli* (D-value) for certain pasteurised meat products.

8.3.3 Degree of cooking

8.3.3.1 Meat or meat products shall be cooked according to accepted industry practices for the particular type of product and consistent with codes of hygienic practice.

8.3.3.2 Cooking parameters shall be established and documented. These shall include, but are not restricted to, the following criteria:

a. the temperature of the process medium;

b. the temperature achieved at the coldest heating point of the product; and

c. the time of heat treatment at the specified cook temperature.

8.4 Additional Controls

8.4.1 Cooking areas are high risk zones

a. During cooking operations, access of personnel to the cooking area from other processing areas shall be restricted.

b. Personnel moving into the high risk zone shall complete an appropriate hygiene routine. Refer also to IS3/IAS3.

8.4.2 Handling and additional preservation

After cooking, products will require additional forms of control to minimise microbial contamination or growth and deterioration. These shall include one or more of the following methods:

- cooling; and/or
- hot holding and post process handling procedures; and/or
- acidification; and/or
- reduced water activity; and/or
- specialised wrapping systems.

8.4.3 Cooling

8.4.3.1 Cooked product shall be cooled rapidly after cooking to prevent germination of any surviving spores.

8.4.3.2 Cooling parameters shall be established and documented. These shall include, but are not restricted to:

- the rate of cooling;
- the method of cooling; and
- chilled storage conditions.

8.4.3.3 Cooling shall be carried out in a manner that minimises the risk of post-process contamination. Cooling methods shall take into account the following factors:

a. the temperature of the product before cooling begins;

b. the temperature of cooling medium and the adequacy of the circulation;

c. the time of cooling, especially for products or packaged products conveyed through chilling equipment;

d. the adequacy of temperature distribution in the cooling vessel;

e. the composition (solid to liquid ratio) and consistency affecting rate of cooling;

f. the size of packing, type of material, weight of individual portion and maximum weight for filling; and

g. the market (some importing countries have specific regulatory requirements for the cooling of some types of products, refer to Overseas Market Access Requirements).

Cooling should be carried out so that the centre of the product reaches 4°C in less than 6 hours. Products should be cooled quickly so that their temperature remains for a minimum of time between 60°C and 10°C. This means bringing the temperature at the centre of the product to under 10°C in less than 2 hours when feasible (CODEX).

8.4.3.4 The cooling system shall ensure an even temperature distribution within the batch or product when it is cooled. The cooling method should also specify tolerable limits for time and temperature variations.

8.4.3.5 Water used in the cooling of heat treated product shall be potable.

Some importing countries require cooling water to contain detectable levels of chlorine after cooling (see Overseas Market Access Requirements).

8.4.3.6 After cooling, cooked products intended for chilled despatch shall be maintained at refrigeration temperatures that will protect the product against deterioration and spoilage.

8.4.3.7 The storage temperature of cooked chilled products shall comply with the requirements, if any, of the intended market.

8.4.4 Hot holding and post-process handling

8.4.4.1 Post-process handling of the cooked product shall be performed so that recontamination is minimised.

8.4.4.2 Mixing or formulating cooked meat with other ingredients shall be carried out as soon as possible to limit the time during which the temperature of the meat product is held between 60°C and 10°C. If mixing or formulating with other ingredients is not carried out soon after cooking and/or the product cannot be held at 60°C or hotter, then the temperature of the product shall be reduced to 10°C or cooler before mixing.

8.4.4.3 Cooked products shall be cooled to 10°C or cooler before carrying out any handling procedures such as removing casings, cutting, slicing, dicing, mincing and/or reforming.

8.4.4.4 Notwithstanding 8.4.4.3 (above), if there is a technical need demonstrated that requires the cooked product to be handled at higher temperatures, and it can be demonstrated there is no increased microbiological risk, then products may be handled at temperatures higher than 10°C.

8.4.5 Reduced water activity

Product that is intended to be shelf-stable cooked and dried shall, immediately after cooking, be further processed to reduce the water activity to 0.85 or less by means of dehydration (drying or salting). Refer also to IS6/IAS6: Section 9.

8.4.6 Acidification

Product that is intended to be shelf-stable cooked and acidified shall be uniformly acidified to a pH of 4.6 or less. Refer also to IS6/IAS6: Section 10.

8.4.7 Other methods of preservation

Additional controls using preservatives, modified atmosphere, competitive microflora, etc. are to be applied according to best industry practice and in conformity with any applicable requirement set out elsewhere in this Industry Standard (see IS6/IAS6: Section 11 also).

8.5 Shelf-Life

8.5.1 The expected shelf-life of pasteurised products shall be determined as part of the documented process parameters.

8.5.2 The processor shall demonstrate adequate verification of the shelf-life expectancy.

8.5.3 The product shall be labelled to identify the storage requirements and storage life prior to consumer consumption. In the case of chilled products, the processor shall maintain chilled transit conditions and deliver in a timely fashion to the intended market.

8.6 Commercial Sterilisation

Processes for the sterilisation of food are based on the heat resistance of *Clostridium botulinum* spores, as they are the most heat-resistant pathogenic organisms known. The sterilisation value, F_o, relates to instantaneous heating and cooling. It varies considerably between different foods and the same food in different can sizes. Instantaneous heating and cooling does not occur in a can of food and the calculation of F_o requires accurate knowledge of the temperature history of the slowest heating point in the can as well as data on the heat resistance of *Clostridium botulinum*. The F_o value for a "safe" process may prove to be inadequate if high standards of plant hygiene and product preparation are not maintained. This is because the severity of the heat process to produce the required kill of organisms must increase as the numbers of heat resistant organisms increases.

8.6.1 Principles of thermal processing

8.6.1.1 The production, processing and packing of low acid canned food shall conform to the principles detailed in a course of instruction approved by the Director-General.

8.6.1.2 The Director-General has approved the course on: "Principles of thermal process control, acidification and container closure evaluation", (Anon, 1995), as presented by Massey University for low acid canned food supervisors (LACF). Courses providing an equivalent instruction may be approved by the Director-General.

8.6.2 Qualified personnel

8.6.2.1 Personnel operating processing systems, retorts, product formulating systems and performing container closure inspections shall be under the direct supervision of a low acid canned food supervisor (LACF).

8.6.2.2 The competent person/processing authority designing and determining thermal processes shall have one of the following qualifications:

a. having passed the course for the qualified cannery persons (thermal processes) course, University of Western Sydney;

b. having passed the course for the introduction to the fundamentals of thermal process evaluation, Massey University (no longer available);

c. a university course of instruction of not less than 3 years, including the fundamentals of thermal processing, which leads to a degree in Food Technology or similar. The person shall have relevant practical experience in thermal processing.

8.6.2.3 The qualifications of any person recognised as a competent person/processing authority must be verified by the licensee.

8.6.3 Process schedule

8.6.3.1 A process schedule shall be prepared and documented by a competent person/processing authority.

8.6.3.2 The process schedule shall include thermal process parameters such as:

a. product initial temperature;

b. process temperature;

c. process time; and

d. critical factors that may affect the attainment of commercial sterility.

8.6.3.3 Critical factors shall include any characteristic, condition or aspect of a product, container, preparation procedure or processing system that affects the scheduled process such as:

a. the formulation details (e.g. food particle size, percent solids, pH, viscosity, type of ingredients);

b. method of preparation (e.g. hot fill, cold fill, head space, pre-cook);

c. size of container;

d. retort system (e.g. vent schedule, amount of agitation, rotational speed, water levels, come-up time);

e. time/temperature processing parameters including the minimum initial temperature; and

f. cooling procedures (e.g. medium, time, required product temperature, chlorine levels).

8.6.3.4 The scheduled process shall result in a commercially sterile product. Heat penetration tests shall be performed to validate the adequacy of the process parameters in achieving commercial sterility.

Provisional process schedules that are derived from F_o calculation are still required to be validated using heat penetration tests. This includes calculations derived using data from similar process and data from reference material.

8.6.3.5 The process schedule shall be:

a. specific for a given product, its formulation, method of preparation, container size and type of retort system; and

b. available to all personnel who have responsibilities for processing and for quality control.

8.6.4 Container cooling

8.6.4.1 Cooling water shall contain a minimum of 5 ppm free residual chlorine at the time of delivery to the retort or the can cooling tank. Chlorine shall have had a contact time of at least 20 minutes.

8.6.4.2 Not withstanding IS6/IAS6: Section 8.6.4.1, cooling water shall be permitted to contain a detectable amount of free residual chlorine after the retorting process, provided that:

a. the premises has obtained an exemption from Regulation 173 of the Meat Regulations 1969, as provided for in Section 50 (4) of the Meat Act 1981. The Licensee shall supply a copy of the company's quality control procedures for canning when applying to the Director Animal Products for an exemption.

b. the detectable chlorine level shall be measured after each processing batch at the point where the cooling water exits from the retort. Records of the chlorine measurements shall be retained with the records of processing the respective batch.

c. if the cooling water fails to show a detectable amount of free residual chlorine then the production batch shall be completely reprocessed or condemned.

8.6.4.3 Further, not withstanding IS6/IAS6: Section 8.6.4.1, retorts that operate using a closed system of re-circulating the same water used for both heating and cooling, e.g. “Steriflow”, may be exempt from the chlorine requirement provided the premises has obtained an exemption from Regulation 173 of the Meat Regulations 1969, as provided for in Section 50 (4) of the Meat Act 1981.

8.6.4.4 Importing countries may have different requirements for container cooling water (e.g. the UK, see Overseas Market Access Requirements).

8.6.4.5 Containers shall be rapidly cooled to a temperature of 41°C or less after heat sterilisation and be dried before handling.

a. Containers may be removed from retorts at temperatures warmer than 41°C, provided there are validated quality control procedures in place that ensure the cooling, drying of cans and the hygiene of the can environment shall not result in the growth of any thermophilic bacteria in the can.

b. Containers shall not be removed from any retort at a temperature that is likely to result in distortion of the container as a result of any physical stress, e.g. can races.

8.6.5 Incubation of containers

8.6.5.1 Containers shall be visually inspected after they have been cooled to atmospheric temperature and defective cans shall be rejected.

8.6.5.2 A minimum of one, and preferably two containers, shall be set aside from each and every retort load, or batch in aseptic systems, and incubated for 10 days at 37°C. In the case of continuous retorts (chain, carrier, rotational mechanism) one can shall be set aside per elapsed “heat processing time”.

8.6.5.3 The retort load from which the can was taken, or the lot from which cans were taken, shall be held in store until satisfactory incubation tests have been completed. Product may be released from the premises under the following conditions.

a. If the Technical Supervisor is satisfied that control of product can be maintained elsewhere, the Technical Supervisor may permit storage elsewhere than in the cannery, e.g. a store notified to the Technical Supervisor.

b. Product may be released for export under the following circumstances:

i. The incubation tests shall have been completed before the product leaves New Zealand.

ii. The product shall be recalled if the incubation tests are unsatisfactory.

iii. Export certificates shall not be signed until satisfactory results of the incubation tests are available to the Technical Supervisor.

8.6.5.4 *Unsatisfactory incubation test*

If an incubation test is unsatisfactory, the retort load/lot from which the can(s) came shall be disposed of as directed by the Technical Supervisor or a competent person/processing authority.

"Unsatisfactory" refers to any organoleptic change, pH changes, gas formation or lack of vacuum, which leads to retention of product, tightened sampling and microbiological tests.

8.6.6 Rigid containers

8.6.6.1 Containers shall be strong enough to withstand mechanical and heat stresses encountered during the retorting process and to resist physical damage during distribution.

8.6.6.2 Containers shall have inner surfaces which will not react with the contents in any way that would adversely affect the product or the containers. They shall have outer surfaces resistant to corrosion under the expected conditions of storage.

8.6.6.3 The process and the intended use of the container shall comply with the manufacturer's specifications for the container.

8.6.6.4 Metal cans and glass jars shall be treated, prior to filling, to ensure the cans are free from foreign matter and contamination that could cause food safety concerns in the final product.

8.6.6.5 Can and glass closures shall conform to the principles of good manufacturing practice for low acid canned foods.

8.6.6.6 Where necessary, containers shall be cleaned after closure using water sprays or a continuous flow water bath at a temperature that is adequate to ensure the removal of any food scraps. This water may contain an approved detergent (see Manual 15).

8.6.7 Semi-rigid and flexible packaging

8.6.7.1 In addition to the principles of thermal processing stated in IS6/IAS6, Section 8.6.1.1, processing shall be in accordance with good manufacturing practice for this type of processing (Evans *et al*., 1978).

8.6.7.2 Semi-rigid and flexible packages used in processes shall be compatible with the manufacturer's specifications relating to use of the packaging.

8.6.7.3 Retort racks shall be capable of holding pouches so that they do not move during the heat process cycle and so that uniform heating and cooling of all pouches shall be achieved at the required temperatures.

8.6.7.4 Any pouch that has overlapped or is found to be out of its process position after the process cycle shall be discarded or, if appropriate, reprocessed.

8.6.7.5 After heat processing, the pouch shall be protected by an outer wrap as soon as possible after drying.

Some pouch materials may not need additional protection if they are specifically designed to withstand substantial physical abuse, inhibit microbiological contamination, be tamper-proof, and are capable of carrying identification.

8.6.7.6 Transit packing materials shall be additional to any outer wrapping and shall be sufficiently robust that pouch seals are not subjected to undue strain.

8.6.8 Aseptic packaging

Aseptic packaging involves producing a commercially sterile product in a sealed package by heating and holding the product to achieve sterilisation, followed by cooling and filling aseptically into pre-sterilised containers which are then sealed under aseptic conditions.

Personnel operating aseptic processing and packaging systems, including product formulation and container closure inspectors, shall be under the direct operating supervision of a LACF.

8.6.9 Quality control

8.6.9.1 The process schedule for each product intended for commercial sterilisation shall be available to personnel with the responsibility for quality control.

8.6.9.2 Retort operations shall be supervised by a LACF during all operating hours.

8.6.9.3 Quality control staff shall ensure that no changes are made in product formulation, container size or retorting unless the proposed changes have been fully validated by a competent person or processing authority.

8.6.9.4 Quality control procedures shall ensure:

a. that the product, container size, and retorts correspond to the processing schedule;

b. that standard operating procedures for measurement, weighing, mixing and blending (and rehydration) of ingredients are maintained;

c. where appropriate, that product consistency is measured before filling begins and is further checked during filling to ensure that the consistency is uniform and within specification;

d. that the scheduled heat treatment is applied and records of that treatment are kept; and

e. that every container is identified for the purposes of trace back by providing a date of manufacture either in clear or code.

The company may identify a single batch size such as one retort load, or a whole day's production. If rejection occurs, it will involve the recall of the entire batch.

8.6.9.5 No products shall be released if the manner in which they were formulated or processed differs from the documented processing schedule, where this may negatively impact on process lethality.

If the formulation or any type of ingredient is changed, the sterilising value of the new formulation or the new type of ingredient shall be verified by a competent person or processing authority.

8.6.9.6 *Non scheduled process*

Where there has been a failure to maintain the scheduled heat treatment of a thermal process, the operator shall undertake one of the following:

a. Adjustment during processing:

When a non-scheduled process is detected while the process is being applied it may be feasible to adjust the time and/or temperature of the heat process to ensure the product is made commercially sterile. The adjustment shall be based on detailed information on the conditions prevailing during the non-scheduled process, and on the heat transfer characteristics of the product, and shall be determined by a competent person/processing authority.

The adjustment will depend on the nature of the non-scheduled process which could, for example, involve low processing temperature, low initial temperature, short processing time, or interruptions to the steam supply, at any time during the process.

In these cases the affected lot(s) shall be held pending verification of the recalculated process by a competent person or processing authority.

b. Assessment after processing

If the process is not adjusted during processing, the product lot(s) involved shall be held and a detailed evaluation of the processing records made by a competent person/processing authority.

The lot(s) shall be:

i. Fully reprocessed to render the product commercially sterile. In these cases the time and/or temperature of the process shall be adjusted where necessary, to take into consideration the new IT and heat transfer characteristics of the processed product. After processing, the lot(s) shall be held pending verification of the recalculated process by a competent person or processing authority. The licensee shall ensure that the product has not deteriorated between processes;

In practice, where product is to be reprocessed, this should occur within hours of the initial process, or the product should be immediately cooled to 0°C and held for a maximum of 2-3 days prior to reprocessing.

ii. Released if it is determined that the applied process was sufficient to render the product lot(s) stable and free of microorganisms of public health significance;

iii. Condemned and suitably disposed of.

Recalculating process times in the case of rotary and continuous agitating retorts may be limited by the extent of the drop in temperature and the ability to effectively extend the processing time. A scheduled heat treatment to enable reprocessing affected product in a static retort shall be established by a competent person or processing authority.

c. Records

Records of the evaluation procedure and the corrective actions taken in the event of a non-complying process must be fully documented, and any associated reprocessing records shall be retained. The records shall include a complete description of the deviation along with all necessary supporting documentation, the evaluation report and a description of any product disposition actions taken.

References

Anon. Principles of Thermal Process Control, Acidification and Container Closure Evaluation. National Food Processors Association, The Food Processors Institute, Washington D.C., 1995.

CODEX. Hygienic Practice for Refrigerated Packaged Foods with Extended Shelf Life. Alinorm 93/13.

Evans K.W., Thorpe R.H. and Atherton D. Guidelines on Good Manufacturing Practice for Sterilisable Flexible Packaging Operations for Low Acid Foods. Technical Manual No. 4, Campden Food and Drink Research Association, 1978.

9 Reduced Water Activity

Amendment 5

May 2004

Scope

This section contains the requirements for the preservation of products by reducing water activity.

Reduced water inhibits microbial growth but is not necessarily a lethal intervention. Microbial growth can re-commence after rehydration of products.

9.1 Outcome

Reducing water activity and applying additional controls, when necessary, shall result in minimal biological deterioration of products for the duration of their shelf life.

9.2 General Principles

9.2.1 Documentation

The Licensee shall document all processes where preservation of products is achieved by reducing water activity. The documentation shall include the appropriate control parameters for drying, salting or curing and additional interventions that shall result in the intended state of preservation.

9.2.2 Criteria

Finished products with water activities higher than a_w 0.85 shall be processed in conjunction with one or several other methods of preservation such as chilling, acidification or reduced oxygen.

Water activity of products should be reduced to values of a_w 0.85 or less to control the growth of pathogens, including *Staphylococcus aureus*.

9.2.3. Raw materials

9.2.3.1 The raw materials shall be of an appropriate microbiological status. The Licensee shall determine the microbiological acceptance criteria for raw materials (see IS6/IAS6: Section 7.5).

Some products may be consumed after drying without any intervention that will result in a microbial reduction. The end use of products and methods used for preparation prior to consumption shall be taken into account when determining the acceptable microbiological status of the raw materials.

9.2.3.2 Raw materials may be preserved or partially preserved by other methods before being subjected to processing to reduce water activity.

a. Raw materials of differing hygienic status shall be stored and handled separately until they become formulated into a final product.

b. Raw materials shall be prevented from further microbial contamination during handling and storage.

9.2.3.3 *Deer sinews, tails, testicles, pizzles and velvet*

Deer sinews, tails, testicles, pizzles and velvet shall be stored, handled and processed separately from any other product or food unless they are fully preserved and protected.

9.2.4 Processing

9.2.4.1 The method of reducing water activity shall be consistent with the desired technical outcome and shall conform with good manufacturing practice.

9.2.4.2 *Process standards*

a. The water activity of ready to eat intermediate moisture products shall be validated by calculation or direct measurement during the process design phase.

Low moisture foods, i.e. those that generally do not contain more than 25% moisture and have an a_w between 0.0 and 0.6, can be validated by moisture content.

b. Routine verification of process control may use quantitative indicators, such as moisture or salt content, or measurements of total solids, provided the final a_w has been validated.

9.3 Drying

The objective in drying is to ensure that the vapour pressure of the process medium (normally air) is lower than the vapour pressure of the food. The control of the drying process depends on controlling the differential between the two pressures. The size of the particles is also important — they should be of a similar size. If they are not, the moisture content of the finished product may not meet the specified level throughout a product batch.

9.3.1 Food safety outcome

The controlled drying of product shall take place under conditions which prevent microbial growth and contamination. The resulting product shall be uniform in moisture content, with a final moisture level low enough to prevent microbial growth.

Note: the drying process may not reduce initial microbial numbers.

9.3.2 Process parameters

Process parameters shall be established which include, but are not restricted to, the following criteria:

a. the method of drying;

b. physical characteristics of the process medium, refer to IS6/IAS6: Sections 9.3.6, 9.3.7 and 9.3.8;

c. the length of time of the drying treatment;

d. the size of particle; and

e. the moisture content at the end of the process.

9.3.3 Intended use of the product

The process design shall take into account the method of reconstitution of dried product. Reconstitution of the dried product should not result in bacterial multiplication before consumption or subsequent use of the product.

9.3.4 Personnel hygiene

The movements of personnel shall be controlled and hygienic practices shall be consistent with preventing contamination entering the drying/filling areas (see IS3/IAS3).

9.3.5 Post-process handling

Post-process handling, packaging and storage of the dried product shall ensure that moisture is not reabsorbed and the product is not contaminated.

a. The product shall be kept dry, and packing damage shall be prevented.

b. Finished products shall not be stored in the same area as ingredients unless protected.

9.3.6 Mechanical drying

This generally relates to drying in an oven with or without vacuum. The vapour pressure of the medium is controlled by temperature and/or by creating a vacuum in the space immediately adjacent to the food.

The process parameters shall include, in addition to those required in IS6/IAS6: Section 9.3.2, the following factors:

a. air temperature and, when applicable, vacuum; and

b. dryer loading, to ensure even drying within the specified time and to avoid overloading which could cause slow drying and promote rapid microbial growth in warm, wet product.

9.3.7 Air drying

This relates to drying in rooms where the vapour pressure differential is maintained by controlling the humidity of the air before it enters the room.

9.3.7.1 The process parameters shall include, in addition to those required in IS6/IAS6: Section 9.3.2, the following factors:

a. humidity of the air; and

b. velocity of the air.

9.3.7.2 The incoming air shall be filtered.

a. The filtration system shall be adequate to handle the necessary volume of air.

b. Filters shall be cleaned regularly.

9.3.8 Freeze drying

The objective in freeze drying is, as with other forms of drying, to reduce the water activity of the product. The mechanism involves sublimation of water vapour directly from ice. The vacuum system removes the vapours, thus maintaining the vapour pressure differential. This process preserves micro-organisms.

Process parameters shall include, in addition to those required in IS6/IAS6: Section 9.3.2, the following factors:

a. the initial temperature of frozen product; and

b. the temperature and vacuum pressure of the drier.

9.4 Salting and Curing

Salting includes dry salting, brining and curing using sodium chloride.

Nearly all micro-organisms survive in media containing less than 3% salt, however most pathogenic micro-organisms do not tolerate 5-10% salt. *Staphylococcus* species can survive and grow in substrates having more than 15% salt. Halophiles can survive for some time at levels about 26% salt.

9.4.1 Validation

The salt content for the final product shall be established. Process control procedures shall be implemented to verify salt content.

9.4.2 Process parameters

Process parameters shall be established and include:

- the percentage of salt in the formulation where salt is directly added to the product;
- the salt concentration in cover brines and pumping brines; and
- the soaking time or pump levels that are necessary to achieve the required salt content in the final meat product.

9.4.3 Other factors

Additives such as curing salts and processing aids such as sugars will have an effect on lowering the water activity of a product. The net effect of these other substances shall be taken into account when validating the water activity of shelf-stable reduced water activity products.

9.4.4 Market access

Requirements relating to methods of brining, levels of salt and other substances may be included in foreign food standards. The requirements of the market shall be determined when formulating products and designing processes (see Overseas Market Access Requirements).

9.4.5 Additional controls

Salted or cured meat products which are not shelf-stable shall incorporate an additional preservation control such as acidification, refrigeration and/or drying.

10 Acidification

Amendment 5

May 2004

Scope

This section applies to any process that results in products with a reduced pH. This includes fermentation and the use of acidulants.

10.1 Outcome

Acidifying products and applying additional controls, when necessary, shall result in minimal biological deterioration of products for the duration of their shelf life.

10.2 General Principles

Acids will have an inhibitory and/or a lethal effect on micro-organisms depending on the level of acid achieved in the product.

10.2.1 Documentation

The Licensee shall document the process parameters that are required to achieve acidification of products. The parameters shall include, but are not restricted, to:

- the method of acidification;
- the raw materials specifications;
- the temperature controls;
- the pH;
- the water content; and
- the salt content.

10.2.2 Processing standards

Processing standards shall be in accordance with good manufacturing practice relevant to the type of product. The criteria shall:

10.2.2.1 ensure the final product contains a uniform pH of the desired level;

10.2.2.2 be validated by direct measurement of the ultimate pH of products; and

10.2.2.3 include monitoring the microbiological outcome.

Some importing countries require process validation studies to demonstrate that acidification achieves a specified log reduction (D value) in *E. coli* bacteria.

10.2.3 Additional controls

Acidified products which are not shelf stable shall incorporate an additional preservation control such as refrigeration, thermal processing or reduced water activity.

A pH of ≤ 4.6 is regarded as the limit for survival of *Clostridia* spp. and is the lower boundary of low acid foods for the purposes of commercial sterilisation. Other pathogens such as *Escherichia coli* O157:H7 and *Listeria monocytogenes* are able to survive in acid conditions more severe than pH ≤ 4.

10.3 Fermentation

10.3.1 Processing standards

Meat shall be fermented according to good manufacturing practice and according to the accepted practices for the intended product.

10.3.2 Starter cultures

10.3.2.1 The fermentation of meat products shall be initiated through the use of harmless cultures of lactobacilli, harmless lactic acid starters or similar starters.

a. Starter cultures shall be stored, prepared and inoculated according to the manufacturer's specifications.

b. Previously fermented product shall not be used in lieu of starter cultures.

10.3.2.2 Starter cultures shall conform to the following requirements:

a. they shall result in fermentation of meat;

b. they shall successfully compete for the nutrients in the meat medium, and shall produce microbial inhibitors;

c. they shall be microbiologically safe;

d. they shall produce a controlled reduction of the pH within the meat mix; and

e. they shall be included in the supplier's quality control programme, refer to IS6/IAS6: Section 7.5.

10.3.3 Temperature

The temperature of the fermentation process shall be controlled to comply with the specification provided by the supplier of the starter culture.

10.3.4 Acidity

The pH shall be monitored regularly during fermentation and shall comply with any manufacturer's specifications related to the use of the starter culture.

10.3.5 Competing microflora

10.3.5.1 The growth of pathogenic bacteria shall be prevented during the fermentation process.

10.3.5.2 The processing parameters shall include monitoring and verifying microbiological outcomes and any regulatory requirements relative to microbiological performance.

10.3.6 Further processing

10.3.6.1 The use of previously fermented food as an ingredient in the meat product shall not adversely affect the microbiological safety of the food. See also IS6/IAS6, Section 10.3.2.1(b).

10.3.6.2 The microbiological status, including relevant pathogens, shall be determined prior to reuse unless the previously fermented food is intended to be cooked.

10.3.7 Post-process handling

Post-process handling, packaging and storage of the fermented product shall not add contamination to the product.

10.4 Acidulation

Acidulants include the use of any food acid designed to directly or indirectly reduce the pH of a product to the ultimate pH.

10.4.1 Direct acidulation

10.4.1.1 When food acids are added directly to a product to effect the desired pH (e.g. sauces and acidified canned foods), the pH level shall be strictly monitored and controlled.

10.4.1.2 Additional preservation methods shall be employed as appropriate.

10.4.1.3 The use of any acidulant shall conform with importing country requirements.

10.4.2 Indirect acidulation

10.4.2.1 The principles outlined for fermentation shall apply when food acids, such as glucono-delta-lactone, are added to products to encourage the growth of natural *Lactobacillus* spp.

10.4.2.2 The designed process parameters shall be strictly monitored to avoid the possibility of unacceptable growth of pathogens.

The rate of acidification and ultimate pH will depend on the microbiological condition of the raw materials, including the meat.

10.4.2.3 The production of uncooked fermented products using acidulants to facilitate fermentation by natural *Lactobacillus* spp. is prohibited in many countries. The use of indirect acidulation shall conform with importing country requirements.

11 Controlled Oxidative States

Amendment 5

May 2004

Scope

This section contains the requirements for the control of oxygen, and aerobic bacterial growth, in order to enhance the shelf life of products and to minimise oxidative deterioration of products.

11.1 Outcome

Reduced aerobic conditions and oxidative reactions shall result in enhancing preservation of products for the duration of their shelf life.

11.2 General Principles

11.2.1 Documentation

The Licensee shall establish, where appropriate, specifications for controlling the aerobic or oxidative state of products. The process parameters derived from the specifications shall be included in documentation relating to the principle method of preservation.

11.2.2 Processing Standards

11.2.2.1 The oxygen permeability characteristics of wrapping systems shall satisfy the technical requirements for the type of processing.

11.2.2.2 When the wrapping system is intended to be a functional oxygen barrier, and the shelf life has been validated under the intended conditions of storage, the type and specification of the barrier film shall be regarded as a critical process parameter.

11.2.2.3 When the wrapping system uses methods of modifying the storage atmosphere, and the shelf life has been validated under the intended conditions of storage, then the following shall be regarded as a critical process parameters:

a. the type of gas and method of application; and

b. the type and specification of the barrier film.

11.2.3 Packaging gases

Gases used to modify the storage atmosphere of products, shall be of a suitable food grade quality.

11.2.4 Chemical systems

Sachets of chemicals, e.g. carbon dioxide generators and oxygen absorbers, that are included with the wrapping system to modify the immediate storage atmosphere of products, shall comply with the requirement for food contact packing materials, when used in direct contact with food, and any New Zealand or importing country requirements (see Overseas Market Access Requirements).

11.2.5 Antioxidants

Antioxidants may be used according to good industry practice to control oxidative deterioration of products. When used, they shall conform to any limitations of use prescribed in domestic and foreign food regulations.

12 Edible Tallow

Amendment 5

May 2004

Scope

This section applies to the processing of edible tallow.

12.1 Outcome

Edible tallow shall have been produced from acceptable raw materials using appropriate production methods.

12.2 General Principles

12.2.1 Raw materials

Edible tallow (including lard and dripping) shall be derived from fat that is clean and fit for human consumption (see IS5/IAS5).

12.2.1.1 Fats or tissues contaminated with ingesta and faecal material shall not be used. Green offals that have been emptied and cleaned may be used.

12.2.1.2 Rancid or decomposed fats shall not be used.

12.2.1.3 The processing, handling and transfer of all raw materials shall comply with all edible standards.

12.2.1.4 Edible fats subsequently contaminated by contact with surfaces or objects other than drains or pathological material, e.g. boning room floor sweepings, or edible product contaminated by ingesta or faeces, and then washed, e.g. gut hashing, can be used for edible tallow subject to deodorisation at a licensed refinery.

12.2.2 Processing standards

12.2.2.1 Edible tallow may be extracted by a thermal process operating at a temperature sufficient for the purpose.

12.2.2.2 Equipment and facilities processing edible tallow shall be dedicated for the purpose. They shall be separated from those processing manufacturing tallows, which are inedible.

a. Storage tanks and conveyances for edible tallow shall be clearly marked as containing an edible product, e.g. “Edible” in letters at least 50 mm high.

b. There shall not be any interconnection between edible tallow and manufacturing tallow pipelines.

Closed fixed equipment can be considered to be a room in itself and therefore situated within inedibles rooms.

12.2.2.3 Tallows may contain antioxidants, synergists, bleaching agents and other additives subject to complying with New Zealand and foreign requirements relating to non-meat ingredients (see Overseas Market Access Requirements also).

13 Packaging

Amendment 5

May 2004

Scope

This section applies to all activities relating to the quality of packing and wrapping materials, the handling and protection of those materials and the handling and protection of products during wrapping and packing operations.

13.1 Outcome

Wrapping and packing of products shall result in minimal contamination from the materials as a consequence of their composition, use, handling or storing.

13.2 General Principles

13.2.1 Documentation

The Licensee shall develop and document a system that includes:

- inventories of all food contact wrapping materials and all wrapping and packing materials bearing the inspection legend held on the premises;
- standards for the storage and handling of materials; and
- the management of materials during the wrapping and packing of products.

13.2.2 Criteria for wrapping and packing materials

13.2.2.1 Wrapping and packing materials shall be free from substances capable of contaminating product.

a. Any wrapping or packing material that comes in direct contact with food shall comply with the requirements for food contact materials.

b. Wrapping and packing material shall be protected from contamination during handling, transporting and storage.

13.2.2.2 Wrapping and packing shall effectively protect the product from contamination during the handling, transporting and storing of the food.

13.2.2.3 Wrapping and packing material shall be dispensed, during the packing of products, in a manner that protects the materials and the food from contamination. Reusable containers shall comply with the requirements for hygiene and sanitation outlined in IS3/IAS3.

13.2.3 Labelling information

Wrapping and packing materials that contain any labelling information shall comply with the:

- general requirements for labelling of export product outlined in General Requirements for Export and Overseas Market Access Requirements;
- specific country requirements with respect to labelling outlined in Overseas Market Access Requirements;
- requirements for the supply of material which contains the inspection legend (see Manual 15);
- requirements for the security of inspection legend packing material; and
- label warnings required by the Food Standards Code in the case of insert sachets (e.g. desiccants, oxygen absorbers and moisture absorbers).

13.3 Food Contact Packaging Materials

13.3.1 Food contact materials include:

- all materials (plastics, muslin and hessian) used for wrapping product;
- insert labels and tags in direct contact with product and which form part of the packaging system;
- string and netting used in direct contact with product for binding or holding product shape;
- packing trays, absorbent pads and insert sachets used as adjuncts in the packing of products where direct product contact occurs; and
- reusable packing materials.

It is not intended that guarantees be supplied for food contact materials that do not form part of the packaging system. Food contact materials such as disease and defect tickets, legging paper, oesophageal rings and the like with short term product contact should be of appropriate quality for their intended use. However, due to the short term exposure of these materials to the product the risk of migration of unwanted chemical compounds is considered to be low.

13.3.2 Composition

13.3.2.1 The composition of food contact materials shall conform to the requirements specified in the US Code of Federal Regulations Title 21, Parts 170-199, (21 CFR 170-199). These requirements will also apply to coatings and linings of containers and cartons where these form the direct food contact surface of the wrapping material.

13.3.2.2 The responsibility for compliance with the specifications for composition rests with the manufacturers of the food contact materials. The Licensee shall obtain a written guarantee from the manufacturer or supplier that the material complies with the above requirements. The guarantee shall contain the following information:

a. the identity of material, i.e. the distinguishing brand name or code designation appearing on the packing materials or shipping container; and

b. the specific part(s) of 21 CFR 170-199 that are applicable to the material; and

c. the specific conditions of use, such as temperature limits or any other pertinent limits, particularly those which are stipulated by the US regulation; and

d. the signature of an authorised official, for example the manager of the supplying firm; and

e. whether the guarantee is limited to a specific shipment of an article, in which case it may be part of or attached to the invoice covering such a shipment; or

f. whether the guarantee is generic and continuing, in which case, in its application to an article or other shipment of an article, it shall be considered to have been given at the date the article was shipped by the person who gave the guarantee.

13.3.2.3 The Licensee shall hold a guarantee in respect of all food contact materials that are used on the premises. A copy of all guarantees shall be provided to the Technical Supervisor.

13.3.2.4 Products shall not be wrapped in any material for which there is no guarantee.

a. Products that have been wrapped contrary to this requirement shall be retained.

b. The disposition of such products shall be at the discretion of the Director-General.

13.3.3 Meat exudate absorbent pads

This relates to sodium polyacrylate polymers where they are used to absorb moisture in conjunction with the packing of product.

13.3.3.1 Except for the sodium polyacrylate polymer absorbent layer, all films and other components of the sachets shall conform to the composition requirements specified in the US Code of Federal Regulations, Title 21 Parts 170-199.

13.3.3.2 The sodium polyacrylate polymer shall conform to the following specifications:

a. The absorbent layer shall be fully contained within the sachet and any adhesives used in the sachet shall not come into direct contact with the product.

b. The absorbent layer shall not contain any free acrylic acid or acrylate monomer in excess of 1g/kg.

13.3.3.3 All requirements described in IS6/IAS6: Sections 13.3.2 – 13.3.4 relating to the manufacturer's guarantee of compliance with composition specifications shall apply to sodium polyacrylate polymer absorbing materials.

13.3.3.4 The requirements for sodium polyacrylate polymer specified in this section may not be accepted by some importing countries. Where it is intended to use sodium polyacrylate polymer absorbent pads in any premises, the following requirements shall be implemented:

a. All stocks of the material shall be kept under the same security arrangements as inspection legend wrapping material.

b. All products using absorbent pads shall be packed separately from other products.

c. Packed products shall be clearly identified and maintained under inventory control.

d. The export of products is restricted to those countries who accept the New Zealand standard.

e. Products that have been packaged using absorbent pads conforming to this standard shall not be repackaged for any market which does not accept the New Zealand standard.

13.3.4 Muslin and vegetable fibre material

This section applies to all materials manufactured completely from cotton and vegetable fibre, and to which there have been no dyes added to the material, with the exception of labels.

13.3.4.1 Muslin or other vegetable fibre material used as a wrapping material, i.e. in direct contact with product, shall not contain any faecal coliforms.

a. Materials shall be tested for faecal coliforms using the MPN method described in Chapter 5 of the Microbiology Manual for the Meat Industry in a laboratory approved by the Director-General.

i. Samples shall be selected from 5% of a lot.

ii. A lot shall be any group of bags known to have been made from the same roll of imported muslin, or from a single bundle of bags purchased from a commercial supplier (with a maximum of 100).

iii. Suppliers intending to test rolls of material shall extensively sample localised areas along the roll to determine the prevalence and distribution of organisms and to develop a valid sampling programme.

iv. All samples shall be free from faecal coliforms.

b. Materials that are contaminated or that have not been tested for faecal coliforms shall be sterilised or subjected to a treatment which has an effect equivalent to water at the sterilising temperature of 82°C.

Safe processes which are considered to have an equivalent treatment value include autoclaving and washing with a bleach solution containing 20 – 40 ppm of free available chlorine.

13.3.4.2 Muslin and vegetable fibre packing material that is not used in direct contact with product shall not be used in areas where there is unwrapped product, unless:

a. the material conforms to the faecal coliform standard described in IS6/IAS6: Section 13.3.5.1; or

b. adequate separation can be maintained such that dust from the packing material does not contaminate unprotected product.

13.4 Protection of Wrapping and Packing Material

13.4.1 Packing materials shall be protected from contamination after manufacture until the point of use.

13.4.2 Outer protective covering materials shall not be removed until immediately before the packing and wrapping material is taken into food support facilities or, where applicable, food areas.

13.5 Damaged Packaged Product

This section relates to the control of product contamination where the packing of packaged product becomes damaged.

13.5.1 Application

Damaged packaged product shall be repackaged according to the requirements of this section.

13.5.2 Inventory

The Licensee shall keep an inventory of all damaged packaged product unless the affected product is repackaged on the original packing day.

13.5.3 Storage

13.5.3.1 Damaged packaged product shall be stored separately, in an area and a manner which is satisfactory to the Technical Supervisor.

13.5.3.2 Damaged packaged product shall be stored on racks or pallets.

13.5.3.3 Any product exposed as a consequence of the damaged packing shall not come in contact with any non-product surface (see IS3/IAS3).

13.5.4 Repackaging cartoned product

13.5.4.1 If product is exposed, it shall be reworked and repackaged in a food processing area under company supervision and inventory control, and audited by the Technical Supervisor. The cartons and seals of the premises carrying out the reworking shall be used.

13.5.4.2 If outer packing only is damaged with no exposure of product, repacking may be carried out in areas such as cold stores, chillers and suitably constructed and sealed environment areas, i.e. areas with all outside doors and openings closed. See Manual 15 for operational control of packaging and seals.

13.5.4.3 Damaged cartons shall be destroyed to the satisfaction of the Technical Supervisor.

13.5.5 Re-wrapping of carcasses

13.5.5.1 Re-wrapping of carcasses can take place in areas such as cold stores, chillers and environmental areas equipped with suitable facilities.

13.5.5.2 Where carcasses are damaged:

a. exposed damaged areas of the carcass shall be trimmed; and

b. the carcasses shall be rebagged in food processing areas under company supervision and inventory control, and audited by the Technical Supervisor.

13.5.5.3 The bags of the originating premises shall be used in all re-wrapping activities.

14 Deer Velvet Processing

Amendment 5

May 2004

Scope

This section applies to the processing of dried stick deer velvet and sliced deer velvet that will undergo further preparation (eg into a tonic or broth) by the consumer prior to consumption. This section does not cover the processing of deer velvet for direct human consumption, eg deer velvet capsules.

14.1 Outcome

Deer velvet shall be processed in such a manner that the reduced water activity and drying process results in a shelf stable product.

14.2 General Principles

14.2.1 Where velvet is imported into NZ for further processing the conditions relating to the processing of imported materials apply (refer Overseas Market Access Requirements 01/172 Import of Foreign Animal Material and Animal Products and Return to New Zealand of New Zealand Animal Material and Animal Products for Domestic Use or Export, Official Assurances Programme Section 13 and IS6/IAS 6 Section 2.4).

14.2.2 Upon arrival at the premises green velvet is to be subjected to incoming product checks to ensure fitness for purpose.

Checks should include that the product is frozen with no evidence of temperature abuse or spoilage.

14.2.3 Green velvet received is to be held in refrigerated rooms operating at -12°C or colder.

14.2.4 Velvet may be cooked from frozen or thawed prior to cooking. Thawing of velvet is to be carried out in a manner which minimises the potential for the proliferation of pathogens and spoilage organisms.

Where velvet is air thawed in temperature controlled rooms the thawing process is to be operated in accordance with the following parameters:

10°C for a maximum of 48 hours,

7°C for a maximum of 72 hours.

Where thawing is conducted at warmer temperatures eg: ambient, it is to be managed such that the surface temperature of the velvet is maintained at 10°C or colder during thawing.

Thawed velvet is to be further processed without unnecessary delay or it may be reduced to 4°C or colder and held for a period that does not result in deterioration of the velvet prior to further processing.

14.3 Colour Preservation and Distribution Treatments

a. Green velvet may be hot water dipped prior to cooking. The dip tank is to be maintained at a temperature that does not facilitate the growth of micro-organisms; or

A temperature of greater than 59°C has been found to be acceptable in terms of limiting growth of micro-organisms.

b. Velvet may be preheated in ovens prior to cooking. Where velvet is cooled prior to further processing, cooling shall be as rapid as practicable to minimise the outgrowth of spore-forming organisms.

14.3.1 Materials used for sealing the ends of velvet are to be an appropriate quality for use in food applications. They are to be managed in a manner that minimises the risk of contamination during storage.

Food grade flour, eg: that used for baking, is usually used for this purpose.

14.4 Cooking of Velvet

14.4.1 Velvet is to be cooked prior to drying in a manner consistent with best industry practice.

A minimum of 60°C for 3 hours for D grade velvet and smaller, and 60°C for 5 hours for SA-D grade has been found to be acceptable for thawed velvet.

14.4.2 Velvet may be cooled following cooking and prior to drying. Cooling shall be as rapid as practicable to minimise the outgrowth of spore-forming organisms.

14.4.3 Cross contamination between green (raw) and cooked velvet shall be minimised. Where a common facility is used for the cooling of cooked and the storage of green velvet –

a. cooked and green velvet is to be separated by distance; and

b. the refrigeration is to be of sufficient capacity that the cooling of cooked velvet is rapid and does not cause a significant increase in temperature of green velvet; and

c. operators involved in handling green velvet are to undergo appropriate hygiene routines prior to handling cooked velvet.

Where possible velvet should be cooled in a chiller or freezer specifically reserved for the cooling of cooked velvet and with sufficient capacity to cool the velvet quickly.

Where cooked velvet is cooled at ambient temperature measures should be employed to improve the cooling rate, eg: fans. Velvet products should be dried as soon as practicable following cooking if they are not subject to some other means of preservation.

14.5 Drying of Velvet

14.5.1 Velvet shall be air dried or vacuum dried in a manner that minimises the potential for micro-organism growth during the drying process.

Control of the temperature of the dryer and relative humidity in the drying room or vacuum dryer whilst the product is wet enough to support growth has been found to be important in this regard.

14.5.2 Velvet is to be dried until it is shelf stable, unless it is subject to additional forms of preservation.

Velvet that is nearly dry may be removed from the dryer to complete drying at ambient temperatures providing it does not result in deterioration of the product. Where velvet is removed from the dryer prior to being fully dry the processor must demonstrate that the moisture content or water activity is below levels that will facilitate bacterial growth.

14.5.3 The effective drying of velvet has been validated by laboratory tests of water activity or moisture content (for standards in this regard refer IS6/IAS6, Section 9) and may be routinely verified using the "tap test".

The tap test is a traditional and qualitative test designed to demonstrate that the velvet has reached a stage of dryness that equates with shelf stability. The tap test is undertaken by tapping the velvet with a piece of stainless steel or by tapping velvet pieces together. Velvet that is adequately dried gives a medium knock sound with a slight vibration.

14.5.4 Where the qualitative tap test is used, the test is to include testing of the velvet by skilled people, at the slowest drying point in the stick.

The slowest drying point on the stick depends on the placement during drying and usually relates to the thickest point in the stick. A skilled person needs to carry out the test to ensure accuracy and repeatability.

14.5.5 All sticks in a dryer load are to be subjected to the tap test or where sampling is undertaken this is to relate to the worse case ie: the largest sticks in the slowest drying point in the dryer.

14.5.6 Dried velvet is to be stored and handled in a manner which minimises moisture re-absorption and contamination.

14.6 Slicing of Velvet

14.6.1 Velvet dried in accordance with the conditions above may be sliced.

14.6.2 Velvet for slicing is to be brushed or de-haired prior to slicing.

14.6.3 To facilitate the slicing process the velvet may be pre-soaked in an ethyl alcohol/water mix.

14.6.4 The ethyl alcohol is to be food grade and the water is to be potable.

A ratio of 50:50 alcohol to water is commonly used for the pre-soaking process. The solutions should be changed regularly to ensure there is no build up of bacteria, a minimum

of once per week would be considered acceptable unless a longer time period was fully validated.

14.6.5 Equipment used for slicing of cooked velvet shall not provide for the transfer of contaminants to the cooked velvet.

Separate bandsaws and cutting equipment should be used for cutting of cooked and green velvet. Where common equipment is used appropriate measures are to be undertaken to minimise the risk of cross contamination. For example, cooked velvet processing prior to green velvet or alternatively clean and sanitise equipment when moving from green to cooked velvet.

14.6.6 Sliced velvet is to be re-dried to achieve a shelf stable product.

Some processors may return the sliced product to driers for active drying whilst others dry it passively in processing rooms, either option is considered acceptable. The very thin and consistent nature of sliced velvet means it is possible to assess dryness by tactile means alone.

14.6.7 Sliced and dried velvet is to be stored and handled in a manner which minimises moisture re-absorption and contamination.

14.7 Documentation

14.7.1 Operators are to document their premises specific procedures in accordance with the processing standard above.

14.7.2 The documented procedures are to provide for the generation of sufficient records to enable verification that they are operating in accordance with this standard.

14.7.3 The scope of verification is to include an assessment of conformance with this standard.

14.8 Certification

14.8.1 Velvet produced in accordance with this standard may be certified on the AgM 107 certificate. Electronic documents supporting the signing of such certificates are to have the "co-products" only box ticked together with any other appropriate boxes. For the avoidance of doubt, the box relating to human consumption should not be ticked. For velvet destined for sale on the domestic market processors are reminded of their obligations in terms of the NZ Food Act 1981.

15 Appendix I. Carton Sampling Plans

Amendment 5

May 2004

15.1 Outcome

Cartoned products shall have minimal processing defects after cutting and boning.

15.2 General Principles

15.2.1 All product which is processed in boning or cutting rooms shall be subjected to a quality control (QC) inspection programme operated by the Licensee in accordance with one of the sampling plans provided for in this Appendix.

15.2.2 The Licensee shall ensure that any person appointed as a QC inspector can remain independent of production during the inspection, and is suitably trained, equipped and proficient in:

- the operation of the sampling plans;
- procedures for random selection; and
- the identification and classification of defects.

15.2.3 A QC inspection shall be performed for each process. A process shall include:

- product intended for further manufacturing;
- product marketed as primal cuts and intended for sale to the consumer through retail outlets, hotels, restaurants or institutions;
- different species; and
- different types within a species, e.g. mutton, lamb, beef, bobby veal.

15.2.4 Products shall be selected according to the requirements of the sampling plan and inspected for defects as outlined in IS8/IAS8: Appendix A Section 3.

a. Inspections shall be performed on unwrapped products.

b. Where the number of defects exceed the tolerance provided in the sampling plan, the lot of product as defined in the plan, shall be reworked.

Note: Any lot that is not re-worked immediately is not eligible for export to Canada, Mexico or USA.

15.2.5 A record of the type, classification and number of defects shall be kept for every inspection plan carried out. The records are to made available to the Technical Supervisor.

15.3 Defect Criteria

Type	Insignificant	Minor	Major	Critical
Blood clot	Less than 40 mm in greatest dimension (GD)	40- 150 mm in GD	More than 150 mm, or >5 minors in a sample not affecting product use	One or more of a number or size seriously affecting product use
Bruises	Less than 25 mm in GD and <12 mm deep	25- 65 mm in GD or 12- 25 mm deep	More than 65 mm, or >25 mm deep, or >5 minors in a sample not affecting useability	One or more of a number or size seriously affecting product use
Bone fragments	Scrapings <1 mm thick x 3 mm wide x 75 mm long, muscle attached. Slivers <6 mm wide x 20 mm long. Chips less than 20 mm in GD	Less than 40 mm in GD	More than 40 mm GD or >5 minors in a sample not affecting product use	One or more of a number or size seriously affecting product use
Bone sliver (from rib)		Less than 75 mm long x <6 mm wide, or chips >20 mm GD		
Detached cartilage or ligament	Less than 25 mm long	More than 25 mm long	More than 5 minors in sample not affecting product use	Numerous defects seriously affecting product use
Faeces and ingesta				Any positively identified amount
Extraneous material	Specks or dust <3 mm in GD and >12 mm apart not affecting product useability. Paper, plastic or soft material <12 mm	Specks or dust >3 mm in GD or < 3 mm in GD and <12 mm apart. Paper or plastic 3- 45 cm^2 or covering a 3-12 mm circle. Grass seeds >10 mm long or >3 seeds 3-10 mm long without inflammation	More than 8 specks or dust in 20 mm circle. Paint <12 mm circle. Wood >25 mm long. Paper or plastic >45 cm^2. Single material >12 mm circle. >5 minors in a sample not affecting product use. Anything causing irritation, e.g. chemicals, hard objects	Continuous specks or dust seriously affecting product use. Paint >12 mm. Anything causing injury or illness, e.g. poisons, chemicals, sharp metal, glass hard plastic. Large insects, insanitation Any material of a number or size seriously affecting product use

Hair, hide wool		Hide or wool <12 mm in GD. 5-10 strands of hair or wool (each 5-10 = one defect). One single cluster of hair.	Hide or wool >12 mm in GD. >25 strands of hair or wool. > 5 clusters of hair in one sample not affecting product use	Hair, hide or wool seriously affecting product use
Off condition				Any
Parasitic lesions		Any single lesion, not transmissible to man (1-3 lesions ovine only)	Each succeeding lesion in the sample	
Pathologic lesions			Any lesion not affecting product use	Any lesion affecting product use
Stains, discoloured areas other	Light stains any size or stains <12 mm circle	12-40 mm circle Any that affects appearance but not useability	Circle >40 mm, or >5 stains not affecting product useability. Any that affects useability	Minors or majors of a number seriously affecting use Any that seriously affects useability

15.4 Lot Sampling Plans

15.4.1 All QC inspection programmes shall use lot sampling plans until routine processing of the type of product consistently achieves a process average of 5.5 (or fewer) defects per 100 kg of product inspected.

15.4.2 The selection of the lot size and sampling plan shall be made before processing commences.

a. When samples are selected after packing, only one sample shall be taken from each carton and the cartons shall be selected using random methods.

b. When sampling occurs throughout the production of the lot, samples shall be selected on a random time basis.

15.4.3 **Product intended for manufacturing purposes**

				Accept / Reject Criteria					
Lot size	**Plan**		**No. of sample**	**Major**		**Critical**		**Total**	
(kilograms)	**no.**	**Step no.**	**units**	**Acc**	**Rej**	**Acc**	**Rej**	**Acc**	**Rej**

Up to	15	1	9	0	2	0	1	4	8
10 999		2	3	-	-	-	-	-	-
		Total	12	1	2	0	1	8	9
11 000 -	20	1	15	0	3	0	1	6	12
26 999		2	15	-	-	-	-	-	-
		Total	30	2	3	0	1	18	19
27 000 -	25	1	22	0	4	0	1	9	16
109 999		2	25	-	-	-	-	-	-
		Total	47	3	4	0	1	26	27
110 000 -	30	1	27	0	4	0	1	10	19
224 999		2	40	-	-	-	-	-	-
		Total	**67**	**4**	**5**	**0**	**1**	**35**	**36**

Note:

- Bulk packed boneless manufacturing product shall have a sample unit of 5.5 kg.
- Bulk packed cuts wrapped or unwrapped intended for manufacturing shall have a sample unit of 11 kg.
- Canadian port of entry inspections may use up to 27 kg sample units.
- When any single minor or major defect comprises 5-10 defects of a lower class, the calculation of total defects, or defects at any step, shall be based on the accumulation of all lower class defects throughout the inspection of the lot.

15.4.4 **Product intended for marketing as primal cuts and intended for sale to the consumer through retail outlets, hotels, restaurants or institutions**

Lot size (kilograms)	Plan no.	No. of sample units	Accept / Reject Criteria					
			Major		Critical		Total	
			Acc	Rej	Acc	Rej	Acc	Rej
Up to 439	A1	3	0	1	0	1	1	2
440 - 1799	A2	5	0	1	0	1	2	3
1800 - 4499	A3	7	0	1	0	1	3	4
4500 - 8999	A4	9	0	1	0	1	4	5
9000 - 10 999	A5	12	1	2	0	1	5	6
11 000 - 27 299	A6	30	2	3	0	1	8	9
27 300 - 109 999	A7	47	3	4	0	1	18	19
110 000 - 227 999	A8	67	4	5	0	1	26	27
228 000 - 452 000	A9	89	5	6	1	2	35	36
Over 452 000	A10	120	6	7	1	2	56	57

Note:

- One sample unit is not less than 5.5 kg.
- When any single minor or major defect comprises 5-10 defects of a lower class, the calculation of major or total defects shall be based on the accumulation of all lower class defects throughout the inspection of the lot.

15.5 On-line Sampling Plans and Cusum Plans

15.5.1 QC inspection programmes may use on-line sampling plans when, using lot sampling plans, routine processing of the type of product consistently achieves a process average of 5.5 (or fewer) defects per 100 kg of product inspected.

Historical evidence from processes that were operating prior to 1 January 1998 may be used in lieu of lot sampling plans.

15.5.2 The sample unit in all instances shall not be less than 14 kg. Samples shall be selected on a random time basis not less than once every 30 minutes throughout production.

15.5.3 A new inspection form shall be started with the start of each new shift. No defects shall be carried over from one shift to the following shift.

15.5.4 On-line boneless manufacturing product

This is not applicable to bulk-packed wrapped or unwrapped cuts intended for manufacturing or for boneless manufacturing pork.

a. Use the inspection recording form Table 1.

b. No single 14 kg sample shall have more than one major or one critical defect or more than four total defects. Furthermore, no major defect can be allowed in the first four samples and no critical defect can be allowed in the first 26 samples.

c. If a rejection occurs then all product in the room associated with the type of production, including carcasses and cartoned and uncartoned product, shall be re-worked and re-inspected. Wrapped cuts shall be unwrapped.

d. After a rejection, subsequent inspections for the type of product shall revert to lot inspection until 27 000 kg or 2 full days production has been inspected under the lot system without rejection.

15.5.5 CUSUM Plans

15.5.5.1 *General rules*

a. Plans are available for primal cuts (see Appendix 15.5.5.2) and boneless manufacturing product (see Appendix 15.5.5.3). Primal cuts will include bulk packed cuts intended for manufacturing.

i. The acceptance limit "L" is the maximum accumulation of defects allowed to exceed the sample tolerance "T" in any sample.

ii. The CUSUM value is the accumulated number of defects that exceed the sample tolerance "T".

iii. The sample tolerance "T" is the allowable number of defects in any sample.

iv. The starting value "S" is the initial CUSUM value used to begin a CUSUM sampling plan (see Appendix I: 15.5.3).

v. The defect score "D" is the factor by which the sum of the defects is multiplied by.

b. Each CUSUM plan includes two stages, one for major defects and one for total defects. All required information shall be entered on to the form.

c. Rejection will occur when the new CUSUM is greater than the acceptance limit ("L") for either total defects or major defects, or for any sample which has a single critical defect.

d. Determining CUSUM values

i. At the start of a plan, the CUSUM value shall be set at the starting value "S".

ii. For each consecutive sample, the new CUSUM is calculated using the following formula:

New CUSUM = old CUSUM + (number of defects x D) - T

iii. If the calculated CUSUM is less than 0, then reset the new CUSUM to 0.

iv. If the calculated CUSUM exceeded the acceptance limit "L", and product had been reworked and re inspected, then reset the new CUSUM to the acceptance limit "L".

e. Re-working and re-inspection

i. All product in the room associated with the type of production, including carcasses and cartoned and uncartoned product, shall be re-worked and re-inspected. Wrapped cuts shall be unwrapped.

ii. After re-working, two 27.5 kg cartons or carton equivalents shall be selected at random from the re-worked product and inspected according to the following criteria:

	Acc	Rej
Minors	3	4
Majors	0	1
Critical	0	1

15.5.5.2 *Primal cuts including bulk packed cuts intended for manufacturing*

a. Use the inspection recording form Plan A, Table 2.

b. For total defects:

a. acceptance limit "L" = 9,

b. sample tolerance "T" = 1,

c. starting value "S" = 5,

iv. defect score "D' = 3.

c. For major defects:

i. acceptance limit "L" = 11,

ii. sample tolerance "T" = 1,

iii. starting value "S" = 5,

iv. defect score "D" = 7.

15.5.5.3 *Boneless manufacturing product*

a. Use the inspection recording form Plan B, Table 3.

b. For total defects:

i. acceptance limit "L" = 4,

ii. sample tolerance "T" = 1,

iii. starting value "S" = 4,

iv. defect score "D" = 1.

c. For major defects:

i. acceptance limit “L” = 10,

ii. sample tolerance “T” = 1

iii. starting value “S” = 4

iv. defect score “D” = 8

15.6 Tables

TABLE 1: ON-LINE INSPECTION PLAN FOR BONELESS MANUFACTURING MEAT

Add individual sample totals to the previous cumulative total and record in the cumulative column. Compare with allowable limits. No single 14 Kg sample may have more than 1 critical or major defect or more than 4 total defects. If a sample or the cumulative limit is exceeded then the next 27,000 Kg of production shall be inspected by lot a sampling plan.

Premises Number			Date			Product Description			
Classes of defects	In sample	Cumulative samples	Limit	In sample	Cumulative samples	Limit	In sample	Cumulative samples	Limit
minor	No 1		2	No 2		4	No 3		6
major			0*			0*			0*
critical			0+			0+			0+
total			2			4			6
minor	No 4		7	No 5		9	No6		10
major			1			1			1
critical			0+			0+			0+
total			7			9			10
minor	No 7		11	No 8		13	No 9		14
major			1			2			2
critical			0+			0+			0+
total			11			13			14
minor	No 10		15	No 11		16	No 12		18
major			2			2			3
critical			0+			0+			0+
total			15			16			18
minor	No 13		19	No 14		20	No 15		21
major			3			3			3
critical			0+			0+			0+
total			19			20			21
minor	No 16		23	No 17		24	No 18		25
major			3			3			3
critical			0+			0+			0+
total			23			24			25
minor	No 19		26	No 20		27	No 21		29
major			3			4			4
critical			0+			0+			0+
total			26			27			29

Signature Premises Quality Controller

Signature
[Technical Supervisor (Inspector in Charge)]

* One is allowed if none in the previous 3 samples from the same production line.
\+ One is allowed if none in the previous 26 samples from the same production line.

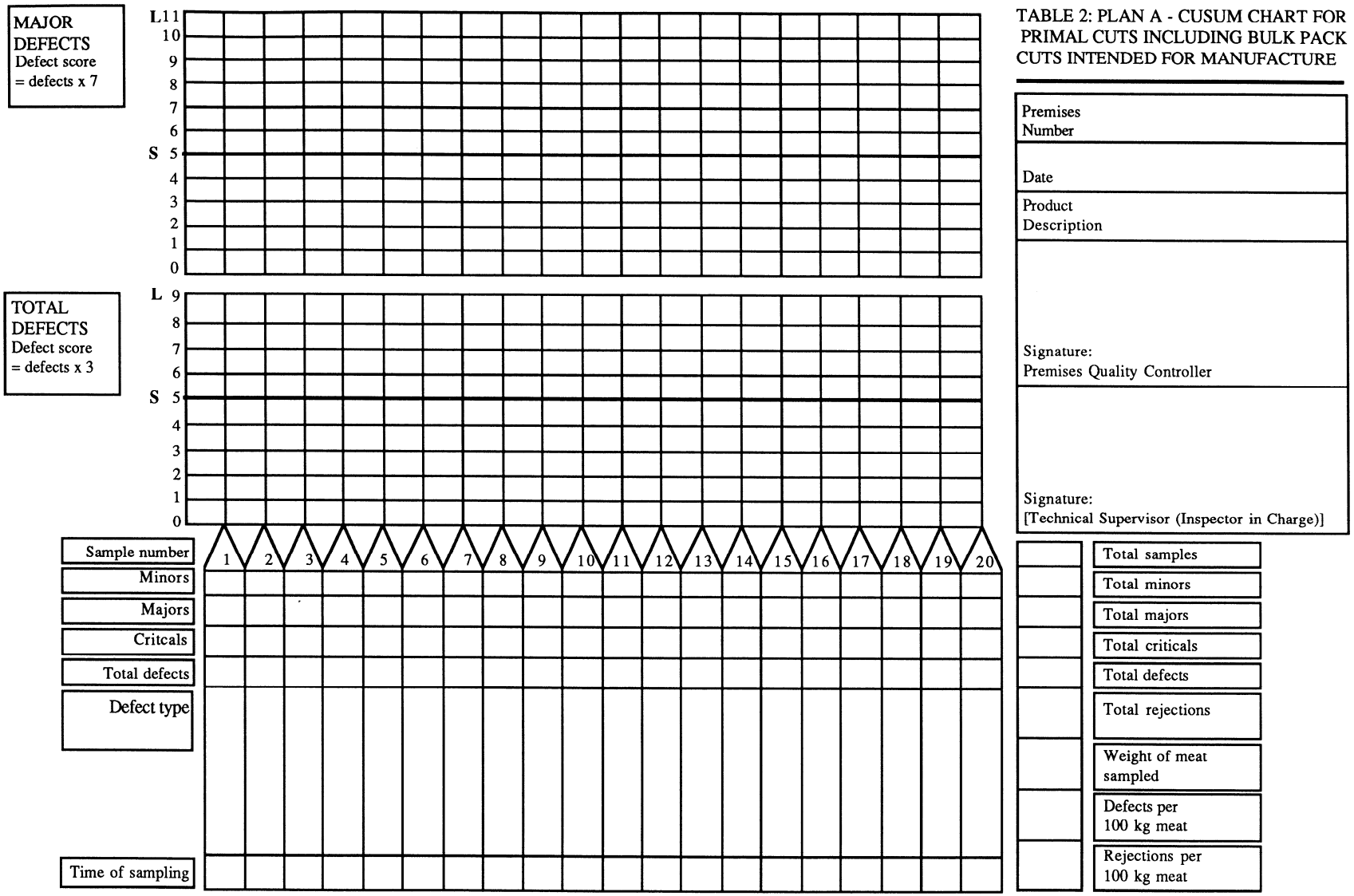

TABLE 2: PLAN A - CUSUM CHART FOR PRIMAL CUTS INCLUDING BULK PACK CUTS INTENDED FOR MANUFACTURE

Premises Number	
Date	
Product Description	
Signature: Premises Quality Controller	
Signature: [Technical Supervisor (Inspector in Charge)]	
	Total samples
	Total minors
	Total majors
	Total criticals
	Total defects
	Total rejections
	Weight of meat sampled
	Defects per 100 kg meat
	Rejections per 100 kg meat

TABLE 3: PLAN B - CUSUM CHART FOR BONELESS MANUFACTURING MEAT