Ministry for Primary Industries
Manatū Ahu Matua

Operational Code

Red meat post slaughter activity

Code of Practice Chapter 9

12 April 2024

Issued by the Ministry for Primary Industries

New Zealand Government

TITLE

Operational Code: Red meat post slaughter activity

COMMENCEMENT

This Operational Code is effective from 12 April 2024.

ISSUING BODY

This Operational Code is issued by the Ministry for Primary Industries.

Dated at Wellington, 12th day of April 2024

Susanna Barris
Manager, Regulatory Development
New Zealand Food Safety
Ministry for Primary Industries

Contact for further information
Ministry for Primary Industries (MPI)
New Zealand Food Safety
PO Box 2526
Wellington 6140

Email: animal.products@mpi.govt.nz

Contents

Introduction

This introduction is not part of the Operational Code, but is intended to indicate its general effect.

Scope

(1) The scope of Operational Code: Red meat post slaughter activity (the Code) applies to:

a) farmed animals including sheep, lambs, cattle, bobby calves, deer, goats, pigs, horses, camelids, ostriches and emus;
b) killed wild animals, game estate animals and farmed gone feral animals of these species where relevant; and
c) other species as relevant (e.g. wallabies and chamois).

(2) The scope of the Code applies to the process activities after slaughter and dressing through to meat in its final preservation state (e.g. boning/cutting, cooling, packaging and labelling).

(3) Requirements and guidance for the following processes are not included in the Code:

a) thermal processing (e.g. pasteurisation, sterilisation);
b) reduced water activity (e.g. drying, salting, curing); and
c) acidification (e.g. fermentation and acidulation).

(4) Requirements and guidance for these processes can be found in other documents issued by MPI:

a) Guidance document: Further processing;
b) Processed Meats Code of Practice; and
c) Guidance document: Complying with the Uncooked Comminuted Fermented Meat (UCFM) Standard

(5) The Code covers the New Zealand standards and requirements only. Export requirements are not cover in the Code. Exporters must ensure they meet all export requirements, include any Overseas Market Access Requirements (OMARs) relevant to their product and intended market.

Purpose

(1) The purpose of the Code is to set out requirements for red meat post slaughter activities and provide guidance on how to meet them. These requirements are set out in Regulations and Notices issued under the Animal Products Act 1999 (APA) to ensure red meat continues to be fit for its intended purpose following slaughter and dressing.

(2) Operators will need to manage the following aspects of post slaughter activities:

a) potential microbiological growth (mesophilic bacteria) including pathogens;
b) chemical and physical hazards;
c) process control for food safety and wholesomeness defects; and
d) meeting performance criteria set by MPI.

Background

(1) The Red Meat Code of Practice is based on the Codex Code of Hygienic Practice for Meat. This is an international standard that includes principles and Good Hygienic Practice (GHP) considered essential for meat processing.

(2) Requirements and guidance relating to other aspects of red meat processing can be found in the other Chapters of the Red Meat Code of Practice. All of these requirements should be referred to in order to produce red meat and meat products fit for their intended purpose.

(3) Requirements in the form of Regulations and Notices issued under the APA set outcome-based requirements to ensure flexibility and allow for innovation in red meat processing operations. These requirements must be met and the Code provides guidance on how these requirements can be achieved.

Who should read this Operational Code?

(1) The Code applies to operators under a risk management programme (RMP) responsible for post slaughter activities of the red meat species listed within the Scope.

Why is this important?

(1) Operators who further process red meat under an RMP must meet all relevant requirements under the APA. This includes requirements in the form of Regulations and Notices issued under the APA. Failure to do so is an offence under Part 10 of the APA.

(2) Following the Code assists operators in meeting these requirements.

Document History

Version Date	Section Changed	Change(s) Description
26 March 2018	All	This Code Industry Standard 6/Industry Agreed Standard 6 (IS6/IAS6) issued in May 2004.
12 April 2024	All	• Schedule 2 has been updated to reflect changes to PHI including the performance criteria and on-line tool for PHI calculations. • References have been updated to reflect the redesigned Animal Products legislation. • Other minor edits.

How to interpret this Code

(1) A regulatory requirement is identified by having a citation to the specific legislation from which the requirement is derived from, at the end of the relevant sentence or clause. The word "must" is often used to indicate its mandatory status.

(2) It is an operator's responsibility to be aware of and ensure all relevant regulatory requirements are met.

(3) Guidance on how to meet these requirements is presented in a box. They elaborate on relevant requirements ("must") or recommended procedures ("should") and provide options or examples for achieving a particular outcome or requirement.

(4) Supplementary guidance is provided in italics to provide useful information or examples that may assist operators further, however, supplementary guidance does not have to be followed.

(5) One way of meeting requirements is by operators following the guidance (including performance criteria) in the Code as part of their registered RMP.

(6) Once any guidance ("should") is incorporated by reference or included in the operator's RMP, they will be read as requirements ("musts").

(7) Alternative approaches used to meet regulatory outcomes or requirements may be used providing the alternative approach has been included in the operator's RMP and validated.

(8) When any change (including alternatives to the guidance in the Code) is made to a process included in an operator's RMP it requires validation. Consideration also needs to be given as to whether the change is minor or significant. Refer to MPI's Risk Management Programme Manual.

Related requirements

(1) This document should be read in conjunction with:

a) The Animal Products Act 1999 (APA);
b) The Animal Products Regulations 2021 (AP Regs); and
c) The Animal Products Notice: Production, Supply and Processing (PSP Notice).

Definitions

(1) In this Code, unless the context otherwise requires:

active refrigeration means to reduce or maintain the temperature of the meat

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

a) carcasses, means holding at temperatures greater than +7°C;
b) packaged meat, means holding at an appropriate chilled temperature

boning means breaking down carcasses, sides and quarters into their constituent parts. This process occurs in the boning or cutting room; and **cutting** when used in the Code has a corresponding meaning

boning room means an area that is maintained at a certain temperature to manage microbiological growth, where meat is boned, cut or size reduction occurs

chilling means

a) initial cooling of meat following slaughter and dressing; and
b) cooling to a temperature not less than the freezing point of meat (-2°C) for longer term preservation

cold weight means the weight of the meat at the end of the cooling process (exit from a freezer prior to storage); or the entry to a boning room prior to pre-trimming

cold boning means the boning of carcasses after the temperature of the carcass has been reduced to +7°C or less

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

deep meat temperature means the temperature of a carcass measured at the thermal centre of the largest muscular mass (this will vary depending on class of animal)

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

design capacity means the theoretical maximum input of a refrigerated room based on its design, as declared by a competent person

food contact packaging means any material that is intended to protect and that comes into immediate contact with meat; and includes

a) rigid materials such as cartons and containers where meat is filled directly into the carton or container; and
b) any other material contained with, in, or attached to, meat (e.g. labels, satay sticks and heat sensors)

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

freezing point of meat is generally considered to be -2°C

good operating practice (GOP), including good agricultural practice (GAP), good hygienic practice (GHP) and good manufacturing practice (GMP) means documented procedures relating to practices that:

a) are required to ensure meat is fit for intended purpose; and
b) are appropriate to the operating circumstances

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

hot boning means boning carcasses as they come off the slaughter floor, before active refrigeration. As a process, hot boning includes cooling the meat until the surfaces of concern have been reduced to +7°C or cooler

hot weight means the weight of the meat at the end of the slaughter process, before cooling

hygiene procedures means appropriate cleaning of hands and protective equipment (including knives, boots etc.). Refer to IS3/IAS3

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 meat and the quantity of the finished meat produced

large carcasses includes cattle, horses, large deer (e.g. Wapiti) and large pigs (e.g. chopper). Operators can set defined weights for classification of large and small carcasses

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

meat means all parts of an animal that are intended for, or have been judged as safe and suitable for human consumption. This includes offal, meat intended for further processing and co-products

As a category of meat, the following is defined:

a) **offal**, sometimes called **red offal**, means a type of meat including internal organs, but excludes the main skeletal muscle groups (e.g. kidneys, tongue, cheek meat and skirt)

b) **green offal** means a type of offal derived from any part of the alimentary tract, not including green runners, and excluding the head, which are inherently contaminated with ingesta and/or faecal material

   i) **empty** (in relation to green offal) means to remove the gross ingesta and/or faecal material from the lumen of green offal

c) **green runners** means any intestine which has had the luminal contents stripped or partially stripped but not further processed
d) **casing** means the cleaned intestines, of any slaughtered animals, intended for use as containers for meat (e.g. casings are used to contain sausage meat following further processing)
e) **co-products** means meat other than skeletal muscle and offal (e.g. pizzles, tails)
f) **fat** means a natural oily substance occurring in animal bodies, as a layer under the skin or around certain organs

non-food packaging means any material that is intended to protect meat but does not come in direct contact (e.g. cartons, bubble wrap)

operating capability means maximum capacity as defined and validated for a refrigerated room by the operator or suitably skilled person

petfood means meat intended for consumption by pets and for sale or trade

preservation means the way meat is stored for a longer term, to ensure it remains fit for purpose (e.g. salted casings, frozen meat, vacuum packed chilled meat)

process hygiene index (PHI) means a modelled numerical value for microbiological growth potential in a process derived from:

a) a temperature history of meat in process; and
b) a mathematical model of predicted microbiological growth

process lot means, with regards to spray chilling, a group of whole, halved or quartered carcasses subjected to a common spray chilling regime, including relative drying time. A process lot may be produced within an individual chiller or group of chillers or be derived from a continuous chilling process

refrigerated room means an enclosed area designed to reduce and/or maintain the temperature of the meat (e.g. chillers)

small carcasses includes sheep, goats, bobby calves, deer (most considered small), pigs (e.g. baconers, porker, sucklers), emus, ostriches, and camelids. Operators can set defined weights for classification of large and small carcasses

spray chilling is a process that reduces evaporative moisture loss from the carcass when chilling by the controlled addition (applied intermittently) of potable water

suitably skilled person means a person who in the opinion of the operator has the training, knowledge, skills and ability to perform an assigned task or a particular activity

surface of concern is a surface of meat that may have been contaminated during processing (e.g. evisceration) or subsequently re-contaminated

stripping means removal of the intestinal contents and may include crushing of the intestinal mucosa during the processing of green runners and preparation of casings

tempering means, in the case of frozen meat, this is the elevation to any point which is less than the freezing point of meat

thawing means the elevation of the temperature of frozen meat to temperatures that are higher than the freezing point of meat, but less than +7°C

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 surfaces of concern have been reduced to +7˚C or cooler

unit means, with regards to spray chilling, a carcass, whole, halved or quartered

Abbreviations

APA means Animal Products Act 1999

AP Regs means Animal Products Regulations 2021

FSC means Australia New Zealand Food Standards Code

HACCP means Hazard Analysis Critical Control Point

PSP Notice means Animal Products Notice: Production, Supply and Processing

RMP means risk management programme

Part 1: General requirements

(1) The guiding principles of meat hygiene (adapted from the Codex Code of Hygienic Practice for Meat) should be applied when interpreting legislative requirements under the APA. These principles have been agreed between MPI and the meat industry.

1.1 Guiding principles for processing

(1) Production of meat that is safe and suitable requires detailed attention be paid to the design, implementation, monitoring and review of process control to achieve relevant performance criteria.

(2) The operator has the primary responsibility for implementing and maintaining systems for process control. Where such systems are applied, independent evaluation should verify that they achieve all requirements.

(3) Process control should limit microbiological contamination to levels set following a risk–based approach as appropriate.

(4) HACCP principles should be applied wherever practicable to process control and should be supported by prerequisite Good Operating Practices.

(5) Process control should reflect an integrated strategy for control of hazards and/or risk as appropriate, throughout the food chain, with information available from primary production (farming) and pre-slaughter being taken into account wherever possible and practicable.

(6) Performance criteria for the outcome of some process control activities should be established by MPI as a part of defining food safety and suitability outcomes, and the achievement of these criteria should be subject to verification.

(7) Statistically based process control systems capable of change detection should be applied by the operator as appropriate to show compliance with performance criteria.

1.2 Suitability for processing requirements

(1) Meat must be processed so that contamination or deterioration is managed [AP Regs].

(2) Meat must be suitable for processing having met slaughter and dressing requirements [AP Regs].

1.3 Documentation and record keeping requirements

(1) Procedures for post slaughter activities must be documented by the operator [AP Regs].

(2) Operators must implement processes and procedures in the relevant RMP and retain records to demonstrate that the requirements of relevant animal product regulations have been met [PSP Notice].

(3) Records must be:

a) accessible to the recognised verifier, recognised verifying agency, animal product officers and the Director-General and any other person authorised by the Director-General;
b) retained for a period of at least 4 years; and
c) retrievable within 2 working days [AP Regs].

(4) An inventory control programme must be documented for all meat and records maintained [PSP Notice].

Guidance

(5) All documentation and records, including validation data need to be available for all procedures and processes relating to post slaughter activities. These records of validation should be kept for as long as

the process is in use or is intended to be in use. This may be longer than four years (as required by the PSP Notice).

1.4 Corrective actions

(1) If operating parameters have not been met (loss of control), this is considered a process failure.

(2) A process failure has not occurred where it can be demonstrated that regulatory requirements have been met and the meat remains fit for purpose.

Guidance

(3) Failure to meet operating parameters could include:

a) contamination of the meat by chemical substances;
b) contamination of the meat by physical substances;
c) loss of active refrigeration;
d) operating outside of validated parameters that may have affected the meat's fitness for purpose; and
e) any other event that could have a detrimental effect on the meat.

(4) A suitably skilled person should undertake an assessment to determine the cause(s) and extent of the loss of control, and address:

a) immediate restoration of control;
b) identification and/or separation of any meat involved;
c) assessment around meat disposition; and
d) notify the recognised verifier without unnecessary delay.

Guidance

(5) If the meat is intended to be exported with official assurances, MPI Verification Services should be contacted and supplied with all relevant data, including an operator's assessment in accordance with process failure procedures. Each incident should be considered on a case-by-case basis.

(6) The root cause(s) of the loss of control should be identified and addressed by the preventative actions.

(7) There should be an escalation of response if on-going or repeated process failure occurs.

(8) A report of the assessment and all corrective and preventative actions taken must be documented [PSP Notice].

Part 2: Refrigeration

(1) The requirements in Part 2.1 Refrigeration requirements apply to all of Part 2: Refrigeration.

(2) Temperature control during chilling, freezing, thawing or tempering is to be appropriate for the type of meat that temperature control is applied to.

2.1 Refrigeration requirements

(1) Any cooling process must minimise any potential microbiological growth and contamination of the meat to ensure fitness for purpose [AP Regs].

(2) Meat that is preserved primarily by refrigeration, unless excluded by clause 2.1(3), must be reduced to the maximum chilled or frozen temperature and validated at the thermal centre of the meat as specified in Table 1 prior to release from any primary processing premises [PSP Notice]. Also refer to Part 2.2.6 Boning.

Table 1: Maximum critical preservation temperatures

Product type	Chilling/freezing temperature
Chilled meat and meat products	+7°C
Frozen meat and meat products	−12°C

(3) Maximum Critical Preservation Temperature (Table 1) does not apply where Schedule 4 in the PSP Notice is met, and the meat is:

a) received by a premises registered under the Food Act 2014; or
b) transferred between two premises with registered RMPs, where they contain the requirements for transfer of chilled meat within the scope; or
c) transferred between a premises with a registered RMP and a premises registered under the Food Act, provided the premises' plan or programme contains the controls for the transfer of chilled meat.

Guidance

2.2 Post slaughter cooling

2.2.1 Scope

(1) This part applies to the cooling of carcasses and meat immediately after slaughter, dressing and/or boning until the temperature for chilling (+7°C) has been reached.

Holding meat under aerobic conditions at refrigeration temperatures less than +7°C should be regarded as temporary storage and not preservation, unless an additional form of preservation has been used. Where meat is stored at these temperatures the operators should consider the impact on shelf life.

(2) Green offal that has undergone a hot wash can use PHI or another suitable cooling standard. Refer to Part 4.3 Green offal.

2.2.2 Performance criteria

(1) Meat should be cooled to +7°C or cooler and at a rate that manages mesophilic microbiological growth in line with PHI.

(2) Cooling performance criteria should be validated in accordance with:

a) Schedule 1 Validation for Refrigeration; and
b) Performance Criteria Options for Processing in Table 2.

Guidance

Table 2: Performance criteria options for processing

Performance criteria options	Process		
	Hot boning	Warm boning, Cold boning, Carcasses	Offal
1. PHI (refer to Schedule 2)Schedule2	Yes	Yes	Yes
2. PHI Recipe (Time-Temperature) (refer to Schedule 3)Schedule3	No	Yes	No
3. PHI Plus (refer to Schedule 4)Schedule4	Yes	Yes	Yes
4. Customised (refer to Schedule 5)	Yes	Yes	Yes

(3) Options 1 or 2 should be considered in the first instance.

(4) Option 3 is available to validate cooling processes that are not covered by Options 1 and 2.

(5) Option 4 is intended for processes that are not covered by 1, 2 or 3 (e.g. operators utilising new refrigeration technology).

2.2.3 Design capacity

(1) Refrigerated rooms cannot be used beyond the maximum design capacity, unless assessed by a competent person that the room can operate at a higher design capacity.

(2) The refrigerated room cannot be used beyond the maximum operating parameters they have been validated for, with a practical tolerance of 10%, unless revalidated.

a) For example, if a room is validated to 65% of design capacity the room will require revalidation if loaded with more than 75% of design capacity.

2.2.4 Monitoring

(1) Routinely monitor the performance of refrigerated rooms and processes.

(2) Monitor at least daily (for each day the refrigerated room is in operation) and include:

a) checking operating parameters for chiller or freezer air temperature (e.g. number of fans on/off, fan speed, temperature set point);
b) other operating parameters that are critical to achieving the cooling performance criteria in accordance with validation; and
c) checking that the amount of meat in the refrigerated room does not exceed the validated weight (including the 10% tolerance). Refer to Schedule 1 Validation for Refrigeration.Schedule1

Monitor relevant operating parameters including; unit type, species, class, whole carcass, side, quarter, packaging materials (unit and dimensions), initial meat temperature. There may be additional operating parameters depending on the processes. Refer to Schedule 1 Validation for Refrigeration. Schedule1

(3) Measure the refrigerated room air temperature using a calibrated automatic temperature recorder (CATR).

(4) Small, refrigerated rooms, (e.g. chest freezer), may be exempt from CATR requirements where there is suitable process control.

An example of suitable process control for small, refrigerated rooms could be the use of data loggers or manual checks/records of the temperature, at a suitable frequency. Consideration needs to be given to

Guidance

how checks will be performed outside of processing hours where small rooms are used for storage of meat.

In some circumstances, it may be reasonable to complete an end of processing and pre-start-up check of temperature and assume temperatures have been maintained for the intervening period while no production is occurring.

(5) If operating parameters have not been met, refer to Part 1.4 Corrective actions.

2.2.5 Operator verification

(1) The operator should verify that any changes to the process have not had a detrimental effect on the meat (e.g. process drift).

Process drift is a non-random shift in normal process parameters that can result from an accumulation of minor process changes over a period of time such as changes to packaging and refrigeration upgrades.

(2) At least every 5 years, or when the operator suspects process drift, the operator should check that no process drift has occurred, for each process used.

Hot, warm or cold boning is considered a process.

(3) There should be a documented plan as to how the operator intends to verify, within a 5-year period;

a) each process used; and
b) all refrigerated rooms used in each process.

(4) Select 5 random samples for each process to verify that cooling performance criteria continues to be met.

a) This verification should be done at a time that gives a representative loading of the cooling process for that year.

2.2.5.1 Corrective actions

(1) If any verified units do not meet the PHI requirements, then the operator should undertake corrective actions.

(2) A suitably skilled person should undertake an assessment to determine the cause and document the findings, including an assessment the effect on other refrigerated rooms.

(3) Revalidate the refrigerated room(s) and document the findings.

(4) Notify the recognised verifier of the findings.

2.2.5.2 Additional actions

(1) Where a process hasn't been used for 5 years or more, and the operator recommences using the process, the operator should revalidate the process.

(2) PHI Plus verification will be done on a case-by-case basis and should include the review of microbiological data at the time of the validation with current data. This may include National Microbiological Database (NMD) and/or companies own data. Refer to Schedule 4 PHI Plus. Schedule4

2.2.6 Boning

(1) Carcasses, sides, or quarters can only be boned after post-mortem examination has been completed.

(2) Refrigeration of carcasses, including sides and quarters, should be maintained until they are transferred to the boning room (Refer to Part 3: Boning and cutting requirements).

When carcasses are hot boned, clause 2.2.6(2) is not applicable.

Guidance

(3) Meat above +7°C can be held in areas that are not refrigerated during quartering and transfer operations, however these areas are to be included in the validated process.

The general rule for holding time in a non-refrigerated area should be no more than 30 minutes.

2.3 Spray chilling

2.3.1 Scope

(1) This part covers spray chilling processes for a unit (e.g. carcass, side). Refer to Schedule 6 Process Options for Spray Chilling for details. Schedule6

2.3.2 Performance criteria

(1) Spray chilling should not result in the final weight of the unit/lots being heavier than the weight at which they entered the refrigerated room.

a) Where several refrigerated rooms are used in the process, the final weight is determined when the unit/lot exits the final refrigerated room.

(2) Trimming should not be used to compensate for the addition of excess water.

2.3.3 Monitoring

(1) Spray chilled meat requires measurement of unit/lot weight before and after spray chilling. The measured weight can be obtained for one of the following:

a) individual units;
b) refrigerated room; or
c) part of a statistically valid sampling process as per Schedule 6 Process Options for Spray Chilling. Schedule6

2.4 Thawing

(1) Parts 2.4.1 to 2.4.6 are recipes for thawing. Validation of alternative procedures are required.

Microbiological growth during and after the thawing or tempering process is a significant concern. It is important to understand that while the centre of a block of meat is still frozen, the surface may be soft and thawed. The bacteria on the surface of this product can begin to multiply while the centre is still thawing out.

2.4.1 In air – carcasses

(1) Remove any packaging on carcasses prior to placement in the thawing room.

(2) Maintain an air velocity of at least 0.25 m/s and relative humidity less than 85% in the thawing room.

(3) The following are the maximum time-temperature criteria for thawing carcasses in air:

a) air temperature of 10°C and thawing time of 48 hours; or
b) air temperature of 7°C and thawing time of 72 hours.

(4) Take time-temperature measurements from the time carcasses are placed in the thawing room until carcasses are transferred to the boning room.

(5) Verify process control by microbiological evaluation of thawed carcasses.

2.4.2 In air – meat in cartons

(1) Thawing of frozen cartoned meat may take place with cartons intact or with the cartons removed. The requirements outlined in clauses 2.4.2(2), (3)(a) and (3)(b) apply to both cartoned and uncartoned meat.

(2) Meat packed in cartons can be thawed in air, however no part of the meat should exceed +7°C.

(3) The following are the maximum time-temperature criteria that can be used for thawing cartons in air:

a) air temperature of +7°C and thawing time of 96 hours; or
b) air temperature of +10°C and thawing time of 72 hours; or
c) air temperature not exceeding +15°C and the following conditions are to be met:

i) the carton packing material should not be removed; and
ii) monitor the meat temperature during the thawing process and adjust air temperature as necessary (e.g. the use of temperature probes to adjust the thawing temperature); and
iii) the temperature of the meat 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 should be used as the reference point to monitor and control the temperature.

(4) When thawing in cartons, drip from cartons should not contaminate other meat.

(5) If the above conditions are not followed, validation of the alternative thawing process is required.

2.4.3 In water

Heat transfer in water is greater than in air. Providing there is sufficient heat energy in the water, thawing can be expected to be faster in water than in air.

(1) The following criteria apply when thawing in water:

a) water needs to be potable and non-static;
b) the meat should not reach temperatures warmer than +7°C; and
c) check water uptake (where wrappings have been removed).

(2) The amount of water gained as a result of thawing should be determined quantitatively.

(3) If thawing in water results in water uptake, the operator should consider whether water should be treated as an ingredient.

The FSC requires more than 5% water to be declared as an ingredient.

(4) Calculation of declared weights from hot weights can take into account any allowance for evaporation losses, provided these can be verified.

A tolerance less than 0.5% from declared weights is considered acceptable practice.

2.4.4 Microwave and other technology for thawing

(1) Microwaves and other technology can be used to thaw meat, provided it is validated. Refer to Schedule 1 Validation for Refrigeration. Schedule1

2.4.5 Blood and related products

(1) Blood can be frozen after collection from slaughtered animals and prior to processing.

(2) Frozen blood may be mixed with freshly collected blood (not-frozen previously) provided microbiological risks are managed.

(3) The thawing time-temperature criteria used for meat should be followed.

Guidance

2.4.6 Process control

(1) There are risks associated with microbiological changes in meat during thawing. This means thawing processes need to be closely monitored using time-temperature measurements. Refer to Schedule 1 Validation for Refrigeration.Schedule1

If any part of the meat exceeds +10°C during thawing, the temperature of the meat should be reduced to less than +7°C. This needs to be within a period of time calculated using the following formula (Lowry et al. 1988):

$y = 0.00185\ x^2 - 0.136x + 2.8416$
Where x = temperature of the meat in °C (< +40°C) and y = log lag time in hours

(2) After thawing, meat should be processed as soon as possible using the time-temperature criteria in Schedule 3 Time-temperature.Schedule3

(3) Thawed meat not processed immediately after thawing should be reduced to and held for not more than 4 days at ≤ +4°C.

(4) If freezing is likely to be delayed for more than 4 days, the deep meat temperature should be reduced to +4°C or less within 2.5 days post thawing.

2.5 Tempering

(1) Part 2.4 Thawing also applies to tempering.

(2) The end point temperature of the meat should also remain colder than the freezing point of meat (−2°C). Microbiological validation is not required.

Tempered meat should be processed to prevent thawing.

2.6 Preservation

2.6.1 Scope

(1) This part covers preservation of meat by chilling or freezing.

2.6.2 Preservation temperatures

(1) Preservation temperature is the temperature that will manage deterioration of the meat during its expected shelf life (e.g. −12°C or colder for frozen meat).

(2) Determine the preservation temperature for the type of meat being processed.

(3) The type of packing or stacking configuration in a refrigerated room (chiller/freezer) should not prevent the preservation temperature being reached.

2.6.3 Preservation times

(1) Meat should achieve the final preservation temperature within 8 days post slaughter.

(2) Neither the ageing time or the preservation time can take more than 6 of the 8 days:

a) example 1 - Animals slaughtered Tuesday, boned the following Monday (6 days) and frozen, (thermal centre −12°C or colder) completed Wednesday (2 days), total of 8 days;
b) example 2 - Animals slaughtered Wednesday, boned Friday (2 days), put into blast freezer Monday (3 days), frozen (−12°C) by Thursday (3 days), total 8 days.

Guidance

(3) Clause 2.6.3(1) and (2) does not apply to:

a) vacuum packaged, chilled meat that is frozen before the end of its validated shelf life; or
b) aged product that is frozen, or chilled, at the end of the validated aging period.

(4) If freezing is likely to be delayed for more than 4 days, the deep meat temperature should be reduced to +4°C or less within 2.5 days post slaughter and dressing.

(5) The above does not apply to killed wild mammals, killed game estate mammals and farmed mammals that have become feral and then killed. These must comply with the requirements of the PSP Notice.

2.6.4 Monitoring

(1) Operating parameters of any refrigerated room should be monitored at least daily when the room is in use.

2.6.5 Chilling

(1) This part applies to meat which is intended to be held, transported, and traded as chilled meat.

(2) The principle of equilibration can be applied to chilled meat. Refer to Part 2.6.6.2 Equilibration.

2.6.5.1 Shelf life

(1) Validate the shelf life of:

a) chilled meat; and
b) aged meat.

(2) Freeze meat within the validated shelf life.

Chilled meat should not be released when remaining shelf life is less than the transport time.

To extend shelf life for as long as possible, the temperature of chilled meat should be close to the freezing point (-2°C).

2.6.6 Freezing

2.6.6.1 Storage temperature

(1) All meat should be reduced to −12°C, or colder, before being transferred to storage.

(2) The exception to clause 2.6.6.1(1) is meat in cartons that is equilibrated (refer to Part 2.6.6.2 Equilibration) or slow frozen (refer to Part 2.6.6.4 Slow freezing).

2.6.6.2 Equilibration

Equilibration is a process where the average temperature within the carton is −12°C or colder. The temperature of the thermal centre of the carton may be warmer than −12°C and the external surface of the carton colder than −12°C, so that the average temperature of the carton is −12°C or colder. This meat can be transferred into storage to equilibrate to a temperature of −12°C throughout the carton.

(1) Equilibration applies to bulk packed manufacturing meat and cuts.

(2) Any meat out of the freezer for more than 1 hour cannot be transferred into a cold store for the purpose of equilibration.

(3) The following time-temperature criteria apply after meat is removed from the freezer:

a) the temperature at the thermal centre of the carton should be colder than the latent heat phase of raw meat (i.e. below −2°C);
b) the equilibrated temperature should be the arithmetic mean of the thermal centre of the carton and

Guidance

the surface temperature of the carton; and

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

Worked example:

Meat packed in a carton where the thermal centre of the carton is −4°C and the external surface of the carton is −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. This is calculated by the following:

1. Subtract the thermal centre temperature from surface temperature, −26 − (−4) = −22.
2. Then divide that answer by 2 to obtain the average temperature, −22 / 2 = −11.
3. Then add the thermal centre temperature, −11 + (−4) = −15.
(e.g. (−26 − (−4)) / 2 + −4 = −15)

2.6.6.3 Shelf life

(1) The generally accepted shelf life of frozen meat at or below −12°C is 2 years.

(2) Validate any shelf life longer than 2 years.

2.6.6.4 Slow freezing

(1) It is possible to transfer cartons of meat directly into storage if:

a) the meat is below +7°C; and
b) Schedule 1 Validation for Refrigeration is followed; and
c) Table 2 Performance Criteria Options for Processing are met.

(2) For the initial validation obtaining a certificate of performance is not an option. Instead follow Table 2 Performance Criteria Options for Processing. Also refer to Schedule 1 Validation for Refrigeration. Schedule1

(3) The effect of temperature on other meat already in the cold store should be considered (i.e. no adverse effect).

(4) Other aspects to consider when intending to use slow freezing are:

a) type of freezer (e.g. standalone, part of a cold store);
b) packaging (e.g. materials, dimensions);
c) type of meat (e.g. bones compared to bulk packed meat);
d) spoilage potential (e.g. bone taint); and
e) fitness for purpose and intended use.

The dangers of excessive slow freezing is the growth of yeasts and moulds. Black spots may develop on frozen meat stored at -5°C for long periods, and this has been associated with a number of yeasts and moulds. These organisms penetrate into the meat surface.

Part 3: Boning and cutting requirements

(1) Operators must ensure that meat is processed in a manner that manages contamination or deterioration [AP Regs].

(2) The operator is responsible for managing the boning and cutting process to ensure the meat is fit for purpose [AP Regs].

Guidance

3.1 Boning and cutting

3.1.1 Scope

(1) This part applies to the physical process of breaking down carcasses and the primary separation of cuts into smaller components for further processing or preservation.

(2) This includes mechanically separated meat (MSM), de-sinewed minced meat, mince, meat cuts, sliced or diced meats.

(3) Boning and cutting can occur at any time within 6 days post-slaughter (Refer Part 2.6.3 Preservation times).

(4) Boning and cutting can also occur on frozen, thawed or tempered meat.

3.1.2 Performance criteria

(1) A boning and cutting operation should have a sampling programme in place to demonstrate the process is being appropriately managed. This is to ensure that defects have been identified and removed prior to sampling.

3.1.3 Rate of processing

(1) The rate of processing should be managed so that the validated post-slaughter process is followed for hot or warm boning and performance criteria are met.

a) Manage the rate of processing so that processing delays and stock-piling of meat does not occur.

(2) Significant warming of the meat's surface should not occur.

a) When cold boning, the surface (of microbiological concern) should not rise above +7°C.
b) If the meat becomes warmer than +7°C then the meat's surface temperature should be reduced to < +7°C as soon as possible.
c) There may be processes that result in a temporary surface temperature rise that are not considered significant in terms of meeting performance criteria (e.g. shrink tunnels).
d) Boning room temperatures should be +12°C or less.

(3) Meat produced from cutting frozen carcasses and/or frozen meat should be returned to storage before significant rewarming occurs.

a) Meat that is warmer than −10°C should not be processed.

(4) If the core temperature of frozen meat becomes warmer than −12°C then the meat should be reduced to the preservation temperature (i.e. placed in a refrigerated room until equilibrated), before being placed into a storage.

3.1.4 Refrigeration

(1) After boning or cutting, meat should be subject to appropriate refrigeration to ensure it is reduced to +7°C or colder (i.e. placed at preservation temperature).

Guidance

3.1.5 Microbiological evaluation

(1) Microbiological evaluation of meat is undertaken by:

a) national programme (i.e. National Microbiological Database (NMD)); and
b) commercial monitoring at specific locations during processing; and
c) mathematical modelling, i.e. PHI (including time-temperature recipes).

(2) It is recommended that operators conducting commercial microbiological programmes apply sampling plans and techniques published in:

a) MPI's Recognised Laboratory Programme;
b) Animal Products (National Microbiological Database Specifications) Notice; and
c) Meat Industry Microbiological Methods (MIMM) Manual; and
d) 'What is Validation? guidance document';

such that data from commercial programmes can be compared with, and/or contribute to national surveys.

(3) Operators can use other methodologies for commercial and their own use, however the results may not be able to be used for industry comparisons.

3.1.6 Pre-trim

(1) A pre-trim inspection and removal of defects should be performed on all carcasses before any cutting or boning occurs.

(2) The pre-trim inspection should remove any defects that may have arisen subsequent to post-mortem examination, and any defects not detected and removed prior to or at post-mortem examination. Refer to Table 10 Defect Critical Classification from Schedule 7 Boning and Cutting Sampling Requirements. Schedule7

(3) Defects that are removed from the carcass should not accumulate on the floor.

3.1.7 Retained meat

(1) Retained meat must be securely stored, identified and included in the operator's inventory records [PSP Notice].

a) The inventory records should include date, quantity, cause of retention, location, status and any other relevant details.

(2) If retained meat is to be processed, this should be processed separately from other meat.

Guidance

3.1.8 Separation of types of meat

(1) Different species of meat should be processed separately.

Where separation by time is used, meat with lower microbiological counts should be processed first, unless the meat contact surfaces are cleaned and sanitised after processing meat with relatively high microbiological counts. For example, beef should be processed before bobby veal.

(2) Where the finished meat includes a mixture of species, different species can be mixed according to the specification details of the finished meat.

(3) Meat from the same species but of different microbiological status should be processed separately.

(4) Once the meat from different species is protected (e.g. in packaging), clause 3.1.8(1) no longer applies. For example, meat from different species can be sent through the same weigh/label unit or strapping (binding or gluing) machine.

Trimmings and small cuts are likely to have higher microbiological counts than larger cuts of meat. This is because trimmings and smaller cuts often involve more physical handling. Some trimmings may be selected from the external surfaces of carcasses which may have higher microbiological counts.

Trimmings and small cuts should be conveyed from the processing room in appropriately identified containers or conveyors.

Keeping these trimmings and higher microbial count meat separate from other meat can assist in managing microbiological risk.

3.1.8.1 Personnel

(1) Personnel can be involved in processing different species of meat under the following conditions:

a) hygiene procedures are followed between species; and
b) each operation is separated by distance.

3.1.8.2 Equipment

(1) All processing equipment should be cleaned when processing of one species has been completed and before starting on another species (e.g. between beef and mutton). This is to ensure no cross contamination occurs.

(2) The use of automatic equipment and processing aids should comply with the requirements of IS2 – Design and Construction and IS3 – Hygiene and Sanitation (e.g. potable water for french-racking).

Refer to Industry Standard 2 - Design and Construction and Industry Standard 3/Industry Agreed Standard 3 - Hygiene and Sanitation.

3.1.9 Removal of defects

(1) Manage all visible defects, including removal, during cutting and boning. Refer to Schedule 7 Boning and Cutting Sampling Requirements.

(2) Manage defects using process control before the meat undergoes any size reduction (e.g. mechanical separation, mincing or dicing). Refer to Schedule 7 Boning and Cutting Sampling Requirements.Schedule7

(3) Contaminated meat and fat trimmings resulting from the removal of defects, without further processing, should be regarded as not suitable for human consumption.

3.2 Mechanically separated meat (MSM)/Desinewed minced meat (DMM) requirements

(1) The temperatures of bones, carcasses or parts of carcasses that are intended to be processed using mechanical separation methods must be:

a) chilled or maintained below +10°C and mechanically separated within 5 hours of boning; or
b) chilled to +4°C and mechanically separated within 72 hours of boning; or
c) chilled to -2°C and mechanically separated within 120 hours of boning; or
d) processed immediately after boning [PSP Notice].

(2) The calcium content of mechanically separated meat, calculated and stated on a dry matter basis, must not exceed 1.5% [PSP Notice].

(3) Mechanically separated meat must be:

a) used as an ingredient directly after the separation process, or
b) immediately cooled to a maximum temperature of 4°C and used for further processing within 48 hours; or
c) immediately frozen [PSP Notice].

Guidance

(4) Hot or warm boned meat that is to be mechanically separated is to be processed immediately after deboning. The resulting meat is to be chilled or frozen in accordance with PHI requirements.

3.3 Mincing

3.3.1 Scope

(1) This part relates to boneless meat that is further reduced in size, specifically mincing.

3.3.1.1 Food safety

(1) During mincing and handling by staff, the operator should consider management of microbiological risk.

a) Some factors that may impact the microbiological risk:

i) the use of trimmings which are subject to high levels of handling and possibly temperature fluctuation;
ii) the increase in meat temperature as a result of the energy required for mincing;
iii) mixing frozen and fresh mince to control/manage temperature.

b) Some factors to consider as a result of mincing:

i) mincing can result in the dispersion of any contamination throughout the minced meat (internally and on external surfaces). Minced meat has a homogeneous distribution of contamination;
ii) during mincing cellular components are released (e.g. water), the surface area increases, temperature increases. This contributes to the distribution of microorganisms throughout the meat not just on surfaces.

Part 4: Other processing requirements

4.1 General requirements

(1) The operator should have their own defect monitoring programme, where appropriate, for processes other than boning and cutting.

(2) The programme should include operator defined performance criteria.

(3) Records from these programmes should be analysed for trends.

4.2 Green offal requirements

(1) Green offal from farmed mammals, must be kept separate from any other meat intended for human consumption during its handling, processing and transportation until it:

a) has been cleaned so that there are no visible contaminants; and
b) is acceptably free of parasites, parasitic lesions and foreign bodies [PSP Notice].

Guidance

4.3 Green offal

4.3.1 Scope

(1) This part applies to the processing of green offal.

4.3.2 Separation of clean and dirty activities

(1) There should be no possibility of splash affecting or contaminating adjacent operations.

(2) Staff should not move from green to clean, or raw to refined operations until they have completed hygiene procedures.

(3) Green offal where inherent contamination is present should be kept separate from other edible meat. This is to avoid cross contamination until it has been cleaned.

Separation of contaminated green offal can be achieved by physical separation, distance or time.

4.3.3 Processing

(1) Green offal should be separated and emptied in facilities that are appropriate for this purpose.

(2) When partial processing occurs to the extent that the green offal may be packed before they have been cleaned, the packed green offal should be labelled in a way that clearly identifies their partially processed status.

(3) Green offal should be preserved by chilling or freezing in a way that the Operator can ensure it is still fit for purpose at the end of processing. Where green offal is subject to additional processing controls such as cooking refer to Processed Meats Code of Practice.

4.3.4 Cleaning

(1) Green offal should be cleaned by washing and/or trimming. Staining that remains after the cleaning process can be considered acceptable subject to fitness for purpose.

a) Any water used for final flushing and any water expressed after cleaning should run clear.

Guidance

(2) Ingesta or faecal material should not be visible on any surface.

(3) Ingesta can be identified based on colour and texture. Ingesta is green, brown or black in colour and has a fibrous or plant like texture. Particles should be considered ingesta only when able to be identified by both colour and texture. While size is not a defining criteria, experience has shown that it is difficult to identify the texture of extraneous material approximately 1.5 mm diameter or smaller.

The occasional finding of 1 or 2 small particles of extraneous material is considered acceptable.

(4) Rumens and reticula should have all parasites, parasitic lesions and foreign bodies removed.

4.3.5 Refining

(1) Refining may include scudding, scalding, bleaching and trimming of cleaned meat. The operation may involve hot water and chemicals to achieve the desired technical effect but will not necessarily result in the preservation of meat.

(2) Refining should only be performed on meat which has been emptied and cleaned, except where mechanical cleaning and refining occurs within the same vessel. In these cases there should be an initial cleaning step before refining starts.

The operator should be able to demonstrate the cycles within the vessel.

4.3.6 Packing

(1) Green offal should be packed in areas that are appropriate to their hygienic status.

(2) Green offal should be packed in areas where contamination from lesser hygienic status is avoided.

(3) Green offal which are emptied, but not cleaned (i.e. flushed), may be packed in the same room they are emptied. They should not be packed in the same room where other green offal are processed or packed. The exceptions are where other meat is of an equivalent green status, or the further treated green offal satisfies a finished meat standard which is acceptable to the Director-General.

(4) Clean green offal 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 meat.

(5) Green offal which is 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 meat.

(6) Green offal which is cooked may be packed in the area in which they were cooked or in a separate facility used for the packing of cooked meat.

4.4 Casings requirements

(1) Casings that are preserved primarily by dry salting must have visible salt present on the product [PSP Notice].

a) Salt must be food grade salt [FSC].

(2) Casings that are preserved primarily by salting must have a water activity (a_w) of no greater than 0.83 [PSP Notice].

Guidance

(3) 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 of about 26% salt.

(4) The salt content for the final product should be established. Process control procedures should be implemented to verify salt content.

(5) Potable water used in tanks to condition and clean green offal used for casings must be either:

a) continuously replenished throughout the process; or
b) emptied and replaced between processing batches [PSP Notice].

(6) The separation (pulling) and stripping of intestines must be adequately separated to prevent cross contamination from other processes, including classing, salting and packing of finished casings [PSP Notice].

Guidance

4.5 Processing runners into casings

4.5.1 Scope

(1) This part applies to runners that are processed into casings.

4.5.2 Transport

(1) If green runners are being transported (e.g. slaughter board to casings shed) for completion of processing into casings, they are to be transported in a suitable vessel to prevent contamination.

4.5.3 Cleaning

(1) Intestines should be emptied and stripped as soon as practicable after slaughter.

Up to 5 hours before the commencement of pulling and stripping has little or no detrimental effect on the quality of finished casings.

(2) The cleaning process may be interrupted at any time after intestines have been stripped.

(3) The cleaning process is complete when all layers apart from the sub-mucosal layer is removed.

4.5.4 Preservation and refrigeration

(1) Salt and its various forms and other food additives can be added to casings and runners. Refer to the relevant requirements in the FSC.

(2) Green runners should also be refrigerated if not otherwise preserved and/or are likely to deteriorate during the storage period.

(3) Casings and green runners can be refrigerated.

4.5.5 Packing

(1) The principles of separation outlined in Part 4.3.2 Separation of clean and dirty activities apply during the packing of casings.

(2) Casings may be wrapped and packed into cartons.

(3) Casings may be packed into reusable containers (e.g. casks).

(4) In addition, Part 5: Packaging is applicable to the packing of casings.

4.6 Rendering

(1) Rendering is a process that stabilises, sterilises, and separates the carcass of an animal or parts of a carcass in order to extract proteins, fats, and other usable parts.

(2) Examples of rendered products include meat and bone meal (MBM) and tallow.

Note that dried blood is normally processed as part of rendering operations.

(3) Refer to MPI's Code of Practice: Rendering for other rendering processes.

4.7 Tallow for human consumption (edible tallow) requirements

(1) Tallow for human consumption must be produced only from fat that has passed examination as fit for human consumption [PSP Notice].

a) Tallow for human consumption is produced from fat, however the occasional piece of meat associated with the fat is acceptable.

(2) Rancid or decomposed fats must not be used to produce tallow for human consumption [PSP Notice].

(3) Fat referred to in clause 4.7(1) that is subsequently contaminated must be subjected to a process such as refining, which addresses hazards and other risk factors and ensures that the resulting tallow is fit for intended purpose [PSP Notice].

Guidance

4.8 Tallow

4.8.1 Scope

(1) This part applies to processing tallow for human consumption.

4.8.2 Raw materials

(1) Edible tallow for human consumption can be produced in one of two ways:

a) from edible fat; or
b) from contaminated/inedible fat that can be further processed into edible tallow by further processing (e.g. refining) at a registered refinery.

Tallow is a form of fat produced by rendering. Tallow can be produced for animal or human consumption and non-food purposes (e.g. Biodiesel).

4.8.2.1 Edible tallow from edible fat

(1) The processing, handling and transfer of all raw materials should meet edible standards.

(2) Green offal that has been emptied and cleaned may be used.

4.8.2.2 Edible tallow from contaminated/inedible meat

(1) Fats or tissues contaminated with ingesta and faecal material should not be used unless washed in the first instance and the resulting tallow is refined.

(2) Edible fats subsequently contaminated by contact with surfaces or objects, other than drains or pathological material, can be used to process into tallow for human consumption subject to refining. For example:

a) boning room floor sweepings;
b) gut hashing.

Guidance

4.8.3 Processing standards

(1) Tallow for human consumption can be extracted by thermal processing at a temperature appropriate for the purpose.

(2) Tallow for human consumption should be kept separate from tallow that is not for human consumption (e.g. separation by closed, fixed equipment within an inedible room, separate pipelines for each).

(3) During processing, tallow for human consumption should be clearly marked to indicate it is suitable for human consumption.

4.9 Petfood

(1) Meat fit for human consumption can be downgraded to petfood and the resulting meat must be kept separate [AP Regs].

a) Meat that has been downgraded from human consumption to petfood, can be subsequently 'upgraded' if the operator can demonstrate that fitness for purpose was maintained.

(2) Where petfood processing is not in accordance with requirements for human consumption, the meat must be kept separate from meat for human consumption. Refer to MPI's Operational Code: Petfood Processing for more information.

Guidance

4.10 Co-Products

4.10.1 Scope

(1) This part applies to co-products other than skeletal muscle and offal intended for human consumption (e.g. pizzles, tails, tendons and sinews).

4.10.2 Performance criteria

(1) Manage microbiological contamination, taking into consideration the intended use of the co-products.

4.10.3 Cleaning

(1) Co-products should be visibly clean from faecal material.

a) It is, however, reasonable that some minor contamination (e.g. hair on tails) may remain.

(2) Operators are expected to follow good hygienic practices for cleaning co-products.

4.10.4 Separation of clean and dirty activities

(1) Handle and pack co-products separately from:

a) meat with lower microbiological contamination for different intended use; and
b) meat with potentially higher microbiological contamination (e.g. green offal).

Part 5: Packaging

5.1 Scope

(1) This part applies to all activities relating to:

a) the safety and quality of packaging materials (including direct, indirect packaging, active and intelligent packaging and reused/recycled packaging);
b) the handling and protection of those materials; and
c) the handling and protection of meat during wrapping and packing operations.

5.2 Packaging requirements

(1) Part 5.2 Packaging requirements apply to packaging that comes into contact with meat intended for human consumption.

(2) Operators must have procedures to ensure that:

a) the integrity, cleanliness, and freedom from contamination from packaging
b) that the packaging is not a source of contamination [PSP Notice].

Guidance
The composition and, where appropriate, the conditions of use of packaging should not be a source of contamination.

Operators may refer to the following standards as examples of packaging requirements. Evidence that the packaging meets 1 of the following standards would be sufficient to demonstrate that the packaging is suitable for use:

- US Code of Federal Regulations, Title 21, Parts 170-199, which applies equally to coatings and linings and cartons where these are the direct product contact surface; and
- Australian Standard: Plastics materials for food contact use, AS2070-1999.
- Operators could carry out their own assessment based on Codex HACCP principles to determine the packaging is not a hazard to the animal material or product.

(3) The type and composition of the packaging must be appropriate for its intended use [AP Regs].

(4) If the packaging is damaged such that the suitability for processing or the fitness for intended purpose of meat may be affected, the meat must be:

a) handled in a manner that minimises contamination and the damage to the packaging rectified; or
b) appropriately disposed of [PSP Notice].

(5) Reused and recycled packaging must not be a source of contamination to the meat [AP Regs].

(6) Any packaging and article or material in packaging or in contact with meat, if taken into the mouth must not be capable of causing bodily harm, distress or discomfort. Packaging articles or materials include absorbent pads, string, netting, oxygen absorbent sachets etc.

(7) Maximum levels for chemicals associated with migration from packaging must be met [FSC].

Chemicals from packaging may pose a risk to human health and safety. The guidance above is one way of meeting this requirement.

Guidance

5.2.1 Performance criteria for packaging

(1) Packaging material should effectively protect meat from contamination during handling, transportation and storage.

(2) Packaging material should be dispensed, during the packing of meat, in a manner that protects meat from contamination.

5.2.2 Food contact packaging

(1) Food contact packaging includes:

a) all materials (e.g. plastics, unlined waxed cartons, muslin and hessian) used for wrapping and in direct contact with meat;
b) insert labels and tags in direct contact with meat and which form part of the packaging system;
c) string and netting in direct contact with meat for binding or holding;
d) packing trays, absorbent pads and insert sachets used as adjuncts in the packing of meat where direct meat contact occurs;
e) reusable packing materials where direct meat contact occurs; and
f) active and intelligent packaging.

5.2.2.1 Demonstrating compliance for food contact packaging

(1) Compliance of food contact packaging is determined by the composition of each individual substance/component of the food contact material.

(2) The identity, specifications and limitations on conditions of use of each substance in the food contact material are considered by the manufacturer.

(3) The manufacturer should determine whether requirements for food contact materials have been met and whether it is suitable for direct contact with meat.

(4) The responsibility of compliance for food contact materials requirements is with the manufacturer.

(5) The operator is responsible to obtain a manufacturer's statement/declaration containing the following information:

a) the contact details and location of the packaging manufacturer;
b) identity of the food contact material (i.e. the distinguishing brand name or code designation appearing on the packing materials or shipping container);
c) confirmation that the direct contact material meets relevant US Code of Federal Regulations requirements (21 CFR Parts 174-199 or EC1935/2004 (including EC450/2009);
d) suitability for direct-contact with meat and any specific conditions of use, such as temperature limits or any other relevant limits; and
e) the current specifications and safety data for the food contact material (these need to be updated if composition changes).

(6) The operator is responsible to hold a statement/declaration for all food contact materials that are used on site.

Food contact materials that are not part of the packaging system (e.g. disease and defect tickets, legging paper, oesophageal rings etc.) and used only for short term food contact need to be appropriate quality for their intended use. It is recommended that product specifications and material safety data sheets (or similar documents) are held to demonstrate their suitability for use as short term contact materials. It is optional to hold a statement/declaration for these types of food contact materials.

Guidance

5.2.2.2 Active and intelligent packaging

Active food packaging absorb or release substances to preserve or improve the condition of packaged food or extend its shelf life.

Intelligent food contact materials monitor the condition of packaged food or the surrounding environment providing information on the freshness of the food.

(1) The operator should hold a manufacturer's statement/declaration as described in Part 5.2.2.1 Demonstrating compliance for food contact packaging.

(2) Non-edible parts of packaging such as oxygen absorbent sachets are to be clearly labelled 'not for human consumption' unless already provided by the manufacturer.

5.2.2.3 Muslin and vegetable fibre material

(1) This applies to materials made from cotton and vegetable fibre to which there have been no dyes added to the material, with the exception of labels (e.g. muslin, stockinette, calico, hessian).

(2) There should be a testing regime in place for muslin and vegetable fibre material that includes the following controls:

a) all samples shall be free from faecal coliforms; or
b) materials that are contaminated or that have not been tested for faecal coliforms shall be treated.

Safe processes which are considered to be appropriate for treating include autoclaving or washing with a bleach solution containing 20-40 ppm of free available chlorine.

(3) Muslin and vegetable fibre packing material that is used as non-food contact packaging should not be used in areas where there is unwrapped meat, unless:

a) the material meets clause 5.2.2.3(2) above; or
b) there is adequate separation. This is to ensure no cross contamination between the packaging and meat, and that separation can be maintained.

Dust from the packaging material should not contaminate unprotected meat.

5.2.3 Protection of packaging

(1) Packaging materials should be protected from contamination after manufacture until the point of use.

(2) Outer protective covering materials should not be removed until immediately before the packing and wrapping material is taken into food support facilities (e.g. ante-rooms) or, where applicable, food areas.

5.2.4 Damaged packaged meat

(1) Repackage the meat in a hygienic manner when the package is damaged.

5.2.4.1 Inventory

(1) Keep an inventory of all damaged packaged meat and subsequent actions.

(2) No inventory is required for damaged packaged meat that is repackaged within 24 hours.

5.2.4.2 Storage

(1) Store damaged packaged meat separately on racks or pallets.

Care should be taken to ensure that any meat exposed is not further contaminated, and exposed meat should be protected.

Guidance

5.2.4.3 Repackaging cartoned meat

(1) Rework and repackage cartoned meat that is exposed (i.e. inspect and trim, or downgrade) in a food processing area under appropriate supervision.

(2) The cartons and seals of the premises carrying out the reworking should be used.

(3) If only the carton is damaged with no exposure of meat, repacking may be carried out in areas such as:

i) cold stores;
ii) chillers; and
iii) suitably constructed and sealed environment areas (i.e. areas with all outside doors and openings closed).

(4) Destroy damaged cartons to ensure they cannot be reused.

5.2.4.4 Re-wrapping of carcasses

(1) Re-wrapping of carcasses can take place in appropriate areas such as cold stores, chillers and sealed environment areas that are equipped with suitable facilities.

(2) The carcasses should be re-bagged in suitable processing areas under appropriate supervision and the bags of the originating premises should be used in all re-wrapping activities. Where this is not possible, plain bags should be used with appropriate labelling.

(3) Where meat is exposed (e.g. damaged), the reworking should be undertaken in a food processing area under appropriate supervision.

Part 6: Labelling requirements

6.1 General requirements

(1) Meat must not be associated with false or misleading representation concerning:

a) fitness for intended purpose (e.g. shelf life);
b) nature (e.g. name and species);
c) origin;
d) composition;
e) ingredients or food additives;
f) proportion of ingredients or food additives [AP Regs].

(2) Labelling includes composition requirements for meat and meat products in the FSC (e.g. ingredients, permitted food additives (some limits) and processing aids). Refer to relevant requirements in the FSC.

6.2 Transportation outers

(1) This part applies to transportation outers, but does not apply to the labelling of bulk transportation units [PSP Notice].

(2) This part applies to meat that has been received by a primary processor. It does not apply to meat that is transferred within New Zealand, prior to the completion of processing, between:

a) sites of a single company or subsidiaries of a parent company; or
b) subsidiaries of a parent company and the parent company; and
c) provided the operator has documented systems to ensure that traceability is maintained [PSP Notice].

(3) Labelling must be provided on transportation outers and must state:

a) the name or description; and
b) storage directions where necessary to maintain suitability for processing or meat fit for intended purpose; and
c) lot identification.

i) Where lot identification is on retail packs inside a transportation outer, the transportation outer does not need lot identification [PSP Notice].

(4) The label of the transportation outer, or the accompanying documentation, of meat that is not intended for human consumption but has the appearance of, or could be mistaken for, meat that is intended for human consumption, must clearly indicate that it is not intended for human consumption [PSP Notice].

6.2.1 Identification of meat in bulk transportation units

(1) Transport units used for the transportation of unpackaged bulk meat that cannot practicably be labelled, must have the information specified in clause 6.2(3) provided with the meat or on the accompanying documentation [PSP Notice].

6.2.2 Labelling and accompanying documentation changes

(1) If the status of meat's suitability for processing or fitness for intended purpose changes, all affected labelling or the accompanying documentation (where there is no label) must be amended to reflect its new status prior to its release for trade, or the packaging (including labelling) must be replaced [PSP Notice].

(2) If meat is downgraded and is no longer intended to be traded for human consumption, any labelling on the transportation outer, accompanying documentation, inspection legends and any other identification of the

product as being suitable for processing for human consumption (or as being fit for human consumption) must be removed or defaced at the consigning premises [PSP Notice].

(3) Any false or misleading labelling on reused or recycled packaging resulting from previous uses must be removed or defaced at the consigning premises [PSP Notice].

Part 7: Traceability requirements

(1) RMP operators must have a tracking system that:

a) allows for the identification of meat; and
b) enables traceability of the meat [AP Regs].

(2) There are requirements for identification in the FSC.

Guidance

(3) It is recommended that traceability is maintained back to the supplier(s) of animals or meat and forward to the next step in the supply chain (i.e. one up one down).

(4) Maintain procedures and records to demonstrate traceability requirements are met.

Schedule 1: Validation for refrigeration

S1 1.1 Scope

(1) Initial post slaughter cooling of meat should be validated in accordance with this schedule.

All refrigeration of meat above +7°C should be validated in accordance with this schedule.

Consideration needs to be given to the usual process followed and processes used occasionally. For example, a premises that routinely warm bones meat but on occasion also cold bones will need to validate both processes.

S1 1.2 General validation process for refrigeration

(1) Validate all refrigeration processes.

(2) Refrigerated rooms should be managed within their design capacity.

(3) The validation protocol should be documented before the refrigerated room is in use and include:

a) disposition of meat during validation; and
b) when validation will be completed by.

(4) Validation can be completed in one of three ways:

a) obtain a Certificate of Performance and Attestation from a suitably skilled person and complete initial verification (minimum of 5 data points) within 2 years or when use exceeds 80% capacity, whichever occurs first; or
b) obtain a Certificate of Performance from a suitably skilled person and complete initial validation (20 data points) within 2 years or when use exceeds 80% capacity, whichever occurs first; or
c) complete a full validation using 20 (single room) or 30 (multiple identical rooms) data points demonstrating the acceptable criteria of the options in Table 2 Performance Criteria Options for Processing.

(5) The process of refrigerating meat to below +7°C can be achieved by:

a) the use of a single refrigerated room; or
b) the use of two or more refrigerated rooms in sequence.

The cooling process might involve the use of a refrigerated room (e.g. cooling floor) which operates at +10°C. The cooling floor would never achieve the requirements of meat temperature below +7°C. However, used in a sequence with a refrigerated room or a number of refrigerated rooms it will achieve the cooling requirements.

S1 1.3 General validation parameters

(1) The following operating parameters for each refrigerated room as part of the validation protocol should be specified:

a) air temperature setting (air on/off);
b) the setting which influences air velocity (fan on/off, number of fans on/off or percentage fan speed etc.);
c) meat weight; and
d) any other parameters that are critical to achieving the cooling performance criteria.

(2) Validation of the process may be carried out where several refrigerated rooms are routinely used in a defined sequence to achieve the process outcome. Include the following validated process parameters:

a) specific operating parameters applicable for each room;
b) room sequence; and
c) time the meat is held in each room.

Each room does not need to be individually validated, however if occasionally an individual room is used for cooling, that room will require validation.

(3) For validation, select meat that is representative of:

a) the range of meat produced (natural fall); and/or
b) the worst case scenario for cooling.

(4) Due to the nature of offal, cooling rates are likely to be variable. Similar offal (on the basis of cooling profiles) may be grouped and relative production volumes considered. Production based (natural fall) sampling is acceptable.

For example where 30% of offal production is livers, then it would be reasonable for 30% of offal sampled to be livers.

(5) Ideally, validation should be undertaken at 100% of design capacity. However, for practical reasons, during the validation process refrigerated rooms can be loaded to between 90-100% of the design capacity.

a) This means when validating, an additional '10%' can be added if the resulting number is less than the design capacity.

For example if the design capacity is 100 tonne, for validation the room needs to be loaded to at least 90 tonne.

(6) Refrigerated rooms may be validated at less than 90% of the design capacity.

a) The refrigerated room can only be used at its validated capacity.

(7) Refrigerated rooms and cooling processes should be revalidated when there is any alteration that is likely to negatively affect the operating parameters and/or changes to the maximum heat load.

For example, energy saving software installed, new packaging requirements, air flow changes etc.

S1 1.4 Certificate of performance and attestation

(1) A Certificate of Performance and Attestation can be presented as 2 separate documents or combined in the same document.

(2) A Certificate of Performance should contain the following operating parameters:

a) design air velocity (e.g. number of fans on and speed setting);
b) air temperature regime (air on/off);
c) maximum weight;
d) initial meat temperature;
e) if the meat is packaged, then the packaging type should be included;
f) date, name and signature of the suitably skilled person; and
g) relevant qualifications or experience of the suitably skilled person.

(3) An Attestation should include:

a) confirmation that the room has been designed to perform according to one of the options in Part 2.2.2 Performance criteria; and
b) date, name and signature of the suitably skilled person; and
c) relevant qualifications or experience of the suitably skilled person.

(4) If a refrigerated room is initially validated with a Certificate of Performance and Attestation issued by a suitably skilled person, it should be verified in accordance with Table 2 Performance Criteria Options for Processing:

a) within the first 2 years of operation, or when being used at more than 80% of capacity, whichever occurs first; and
b) using a minimum of 5 data points.

(5) If a refrigerated room is initially validated with a Certificate of Performance issued by a suitably skilled person, it should be validated in accordance with Table 2 Performance Criteria Options for Processing:

a) within the first 2 years of operation, or when being used at more than 80% of capacity, whichever occurs first; and
b) using 20 data points.

S1 1.5 Single refrigerated rooms using batch operations

(1) Validation data can be obtained in the following ways:

a) during a single cooling cycle using not less than 20 meat units; or
b) up to 4 production days sampling at least 5 meat units per day.

(2) The meat units (e.g. carcasses, cartons) should be randomly selected.

(3) The sample sites need to cover the whole refrigerated room. The refrigerated room should be operated under similar loading conditions for each of the validation days.

(4) The refrigerated room should follow the intended operating parameters (refer to Schedule 1 clause 1.3(1)) and the meat weight of between 90-100% of intended validation weight on each day.

(5) The following exceptions to Schedule 1 clause 1.5(1) apply when validating small or very small rooms:

a) for small rooms (e.g. 100 cartons or less (maximum weight 27.2 kg)):

i) 10 data points are acceptable, rather than 20; and
ii) Schedule 1 clauses 1.5(2) to (4) are to be met.

b) very small rooms (e.g. detain chillers holding less than 6 carcasses):

i) Develop a documented plan for collecting data, including estimated time frames, intended process and disposition of the meat.
ii) Collect data over an extended period using less than 5 data points if the room holds less than 5 units.
iii) 5 data points are sufficient to validate very small rooms.
iv) Schedule 1 clauses 1.5(2) to (4) are to be met.

S1 1.6 Groups of refrigerated rooms using batch operations

(1) Where there is more than one refrigerated room with the same design, they do not need to be individually validated.

(2) The refrigerated rooms should have been constructed and fitted with refrigeration equipment (and all other fittings) to the same design specification.

(3) A suitably skilled person needs to survey the refrigerated rooms and certify, for the named group of refrigerated rooms, they have been constructed and fitted in accordance with the common specification.

(4) Validation data should be obtained from 30 randomly selected meat units across the group of rooms.

a) Randomly select two or more of the refrigerated rooms.
b) From the selected rooms the location within each sampled unit should be randomly selected.
c) The number of meat units sampled during a cooling cycle should be no less than 5 (e.g. 6 days of 5 product units per day).

(5) Each refrigerated room of the group should be operated under similar conditions for each of the validation days. Refer to Schedule 1 1.3. General Validation Parameters.

(6) Ideally, validation should be undertaken at 100% of design capacity. However, for practical reasons, during the validation process refrigerated rooms can be loaded to between 90-100% of the design capacity.

a) This means when validating, an additional '10%' can be added if the resulting number is less than the design capacity.

For example if the design capacity is 100 tonne, for validation the room needs to be loaded to at least 90 tonne.

(7) Refrigerated rooms may be validated at less than 90% of the design capacity.

a) The refrigerated room can only be used at its validated capacity.

(8) The operating parameters that have been determined from the group validation should apply for each individual refrigerated room in the group.

S1 1.7 Validating continuous operations for meat through multiple refrigerated rooms

(1) The process of refrigerating meat to below +7°C can be achieved by the use of two or more refrigerated rooms in sequence.

(2) Validation data should be obtained from 20 randomly selected meat units for the process.

(3) The number of meat units sampled during a cooling cycle should be no less than 5.

If each room has been individually validated and continues to be operated at the validated parameters, this data can be combined to show compliance with PHI requirements.

Schedule 2: Process Hygiene Index (PHI)

S2 1.1 Scope

(1) PHI is a numerical value for microbiological growth potential in a red meat cooling process. The PHI value is modelled on:

a) a temperature history of meat during cooling; and
b) a mathematical model of predicted microbiological growth.

S2 1.2 Performance criteria

(1) When post slaughter cooling processes are validated, they should meet the following PHI criteria:

a) 80% of values ≤ 0.72
b) maximum value 1

Guidance

PHI was reviewed in 2017. While it remains fit for purpose, it was identified that the units for PHI (generations) would be more appropriately expressed as an index value as this emphasises the concept of PHI as a validation tool. In contrast, the PHI V1.0 performance criteria was based on the potential growth of bacterial cells expressed as generations of cell growth.

The enhancements to the PHI model introduced in 2023 use a web-based PHI toolbox that tests data against an index value PHI V2.0 performance criteria. Previous chiller and freezer validations meeting PHI (V1.0) will comply with PHI (V2.0) and do not need to be repeated. Periodic verification checks for these refrigerated rooms (refer to Part 2.2.5 Operator verification) will use PHI (V2.0).

PHI Performance criteria for V1.0 and V2.0

	PHI V1.0	**PHI V2.0**
80% of values	≤ 10	≤ 0.72
Maximum value	14	1

S2 1.3 Taking measurements and calculations

(1) The PHI should be calculated immediately after the post-mortem examination point, until the surfaces of concern have been reduced to +7°C.

(2) Any elapsed time between the post-mortem examination point and the start of temperature recording should be included in the calculations.

The elapsed time should be an average time. The grading ticket time can be used with the addition of the average time between post-mortem examination and grading.

(3) The temperature used for the elapsed time calculation should be either:

a) worst case (+37°C); or
b) some other justifiable value in consideration of the temperature of the meat during the period prior to measurement of temperature using data loggers.

(4) For a hot boning operation, or for offal, data loggers are usually placed in cartons at the time of packing.

S2 1.4 Methodology

(1) The web-based tool for applying PHI is available here: PHI Tool Box.

Guidance

The PHI Toolbox includes instructions for use together with background information. The PHI Toolbox is accessed by a secure log in system once users are set up by The Institute of Environmental Science and Research (ESR).

- For industry users, apply for access by contacting the Meat Industry Association (info@mia.co.nz).
- MPI users apply for access via the MPI activate portal, software applications, search on PHI toolbox.

(2) PHI data can be extrapolated to validate different processes providing the extrapolation considers the worst case scenario.

Data from the worst case scenario can be used for "cooler" case scenarios. Justification of processes can be obtained by using other validated data. For example, a carton chiller with PHI data for hot boned meat could be used to validate a warm boning carton cooling process. This is done by considering the portion of PHI accumulated for the hot boned meat in the temperature range of the warmed boned cartons.

Worst case scenario can also be used dependent on size and weight. For example, mutton for lamb, prime for cull, mutton for bobby calves.

(3) Using PHI data from warm boned meat to validate a hot boned carton cooling process would not be acceptable as the data does not cover the full temperature range for hot boning.

S2 1.4.1 Data logger placement

(1) Data logger probes should be placed at the slowest cooling point that may be contaminated by microorganisms.

Guidance

- Refer to the Meat Industry Association (MIA) website for a video resource *demonstrating placement of dataloggers and an AgResearch publication PHI (Process Hygiene Index) User Manual November 2009 Client Report 1295. Both resources were developed prior to the web-based PHI Toolbox and are not current in all aspects but continue to provide useful information.*
- *The resources are available to MPI users in a course on refrigeration in Tiritiri, search PHI.*

S2 1.4.2 Carcasses

(1) Surfaces of microbiological concern:

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.

Guidance

The surfaces are provisional for horses and pigs.

S2 1.4.3 Cartons

(1) Data logger probes should be placed at the slowest cooling point that may be contaminated by micro-organisms.

(2) Examples of sites for temperature measurement for meat/packaging types can be found in Table 3 below.

The thermal centre and the geometric centre of an outer package (e.g. carton), may not be the same. For practical purposes it may be sufficient to use the geometric centre of the carton. Operators should consider however, that 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 phenomena as it acts as a significant insulation barrier to heat transfer.

Table 3: Example temperature measurement sites for different meat/packaging types

Meat/packaging type	Temperature measurement sites
Meat packed into cartons	At the thermal centre of the carton
Packaged whole intact cuts packed into cartons	At a point nearest the thermal centre of the carton, between adjacent surfaces of the cuts
Packaged whole intact cuts not in cartons	On the outer surface of the meat
Packaged non-intact cuts (cuts of meat where new surfaces exist as a result of de-boning, such as boned rolled shoulders or tunnel boned legs) not in cartons	At the thermal centre of the cut

S2 1.5 Personnel

(1) Key personnel involved in validating processes using PHI need to be suitably skilled.

(2) The operator should ensure key staff complete appropriate training before starting PHI validation.

Schedule 3: Time-temperature

S3 1.1 Scope

(1) Time-temperature is a recipe to deliver PHI outcomes. The time-temperature performance criteria are based on accepted criteria that have been in use for many years. Following these time-temperature criteria produces meat that is acceptable and in line with PHI.

(2) Time-temperature recipes are available for:

a) large carcasses; and
b) small carcasses.

S3 1.2 Performance criteria for large carcasses

(1) This part apply to whole, sided or quartered carcasses.

(2) Large carcasses should be chilled so the time-temperature criteria in **Table 4: Time-temperature performance criteria for standard reference times in chiller**.

Table 4: Time-temperature performance criteria for standard reference times in chiller

Temperature reference points	Time in chiller (standard reference times)
Deep shoulder temperature n = 20, c = 4, m = +15°C, M = +18°C	16 hours
Deep shoulder temperature N = 20, c = 4, m = +10°C, M = +11°C	24 hours
Deep meat temperature (e.g. leg) N = 20, M ≤ +7°C	48 hours

n are the number of carcasses, **c** are the number of carcasses that are allowed to exceed **m**, **m** is the expected value for a given percentile, **M** is the maximum allowable temperature.

(3) Measurements can be taken earlier than the standard reference time.

(4) The time in chiller is considered to start from the grading time for practical purposes.

S3 1.3 Warm boning of large carcasses (boning on the curve)

(1) Carcasses may be warm boned at any time after initial chilling in a refrigerated room that is validated for carcass chilling according to the above criteria.

(2) The time between leaving the carcass chiller and meat entering the carton chiller or freezer should be less than 60 minutes.

(3) If meat is held in a non-validated chiller this should be limited to 30 minutes, provided the delay is not detrimental to carcass cooling. This is in addition to the less than 60 minutes between carcass chiller and meat entering subsequent chillers/freezers.

(4) After warm boning:

a) when boning occurs within 12 hours from grading, the meat surfaces of microbiological concern should be reduced to +7°C within 13 hours of meat leaving the boning room; or
b) when boning occurs after 12 or more hours from grading, the meat surfaces of microbiological concern should be reduced to +7°C within 10 hours of meat leaving the boning room.

(5) For practical purposes, the time of meat leaving the boning room is taken as the time printed on the carton label.

S3 1.4 Performance criteria for small carcasses

(1) Small carcasses should be chilled so the time-temperature criteria in Schedule 3 1.5 Carcass Chilling can be met.

S3 1.5 Carcass chilling

(1) After the immediate post-slaughter period (as defined in Table 4: Time-temperature performance criteria for standard reference times in chiller), carcasses should be refrigerated in a refrigerated room where the air temperature is no warmer than +7°C.

(2) Chillers should reduce the deep meat temperature to +7°C within 24 hours of the carcass leaving the slaughter floor.

(3) 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 part.

(4) After boning, meat should be placed under refrigeration appropriate to the preservation temperature less than or within 60 minutes of the carcass leaving the chiller operating to the carcass chilling standard.

(5) Immediate post-slaughter period

a) Immediately after grading, 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 Table 5b and Table 5b below.
b) The time-temperature exposures are not cumulative.
c) Where operations are non-continuous the maximum holding period should be calculated from the first carcass.
d) The maximum holding period is considered to start from the grading time for practical purposes.
e) The occasional carcass exceeding the specified weights is permissible.

Table 5a: Time-temperature holding periods for carcasses ≤ 25 kg

Room temperature (°C)	Maximum holding period (hours)	Maximum holding period (hours)
	Refrigerated Room airflow ≤ 0.5m/s	Refrigerated Room airflow > 0.5m/s
25	3.5	4.5
20	4	7
18	6.5	9
15	10	15

Table 5b: Time-temperature holding periods for carcasses > 25 kg

Room temperature (°C)	Maximum holding period (hours)	Maximum holding period (hours)
	Refrigerated Room airflow ≤ 0.5m/s	Refrigerated Room airflow > 0.5m/s
25	2	3
20	3	4.5
18	4	6
15	5	8

S3 1.6 Continuous operations

(1) Continuous operations are when hot carcasses from the slaughter floor are fed into a refrigerated room at the same time as chilled meat is present in the same room.

a) There should be a separation between hot and cold (below +7°C) carcasses equivalent to at least one clear rail.
b) The temperature throughout the room should be controlled such that no part of any chilled carcass is significantly warmed.
c) Significant warming of carcasses is defined as:

i) part of the carcass rises above +7°C, or
ii) an increase of at least 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 and should be avoided.

S3 1.7 Polythene wrapping of carcasses

(1) This part applies in all cases where a temperature differential occurs between the chiller or cooling floor environment and the deep meat temperature of the carcass. This will result in condensation/frosting occurring on the inside of the polythene wrapping.

(2) Manage condensation or frosting of wrapped carcasses to maintain fitness for purpose.

Table 6: Carcass wrapping time

Deep leg temperature of the carcasses	Carcass is subject to freezing within the following times of wrapping being applied
+10°C or warmer	within 2 hours (when carcass surface is wet at time of wrapping)
	within 4 hours (when carcass surface has dried before wrapping)
+7°C to +10°C	within 10 hours
Less than +7°C	within 24 hours

Schedule 4: PHI Plus

S4 1.1 Scope

(1) PHI Plus provides operators with the opportunity to develop customised cooling processes that result in meeting *E.coli* performance criteria detailed in this Schedule.

(2) Operators are responsible for the development of PHI Plus for their process.

(3) PHI Plus is generally used for cattle, sheep and offal.

(4) Contact MPI's VS specialist adviser to discuss further.

S4 1.2 General outline of PHI Plus

(1) PHI Plus links the 'dressing score' and 'cooling score' to determine whether a cooling process is acceptable or not.

(2) The dressing score can be obtained from the prevalence of *E.coli* post slaughter.

(3) The cooling score can be obtained from parameters of PHI distribution measured for the individual operator's cooling process.

(4) PHI Plus provides flexibility for those with a low dressing score (i.e. low prevalence of *E. coli* from operators/staff following good dressing hygiene) to have alternative PHI values.

S4 1.3 Performance criteria

(1) Customised cooling processes need to meet 95% confidence that the cooling process achieves a final *E.coli* density at the 99th percentile for:

a) cattle ≤ $\log_{10}$ 2.76 cfu/cm^2 or 575 cfu/cm^2;
b) sheep ≤ $\log_{10}$ 4.71 cfu/cm^2 or 51,286 cfu/cm^2.

S4 1.4 Validation protocol

(1) Develop a documented validation protocol that:

a) describes how the PHI data from the cooling process for customisation will be collected; and
b) is developed in accordance with this schedule and AgResearch publication PHI User Manual November 2009 Client Report 1295; and
c) is agreed upon with an MPI VS specialist adviser before the validation protocol begins (i.e. data collection).

S4 1.5 Data collection

(1) ***E.coli* prevalence data (dressing score)**

a) Obtain post slaughter premises specific *E.coli* NMD data from the NMD database.
b) The data required (for use in the PHI Plus spreadsheets) is the number of detected *E.coli* cases from the NMD data. This can be determined from *E.coli* prevalence data in the quarterly reports from the NMD database.
c) Existing operators/processes for ovine meat can use historic *E. coli* data form the NMD if the process shows aerobic plate count (APC) data is consistent or better than before NMD moved to single Y-Cut sampling.
d) Collect samples in accordance with the validation protocol when there is no NMD data (e.g. offal).
e) For new operators or new processes or where there is no NMD data:

i) collect data for at least a year or for a worst case scenario;

ii) for carcasses collect at least 900 data points for carcass cooling (300 for each of the 3 carcass sites); and
iii) for offal collect at least 300 data points.

If data is consistent enough to give 95% confidence, consideration may be given to collecting fewer data points.

(2) **PHI data (cooling score)**

a) PHI data is obtained in accordance with Schedule 2 Process Hygiene Index (PHI). For example:

i) loading refrigerated rooms/freezers to 90% of maximum design capacity;
ii) maximum delay times in processing rooms;
iii) maximum holding times before chilling/freezing.

(3) **Combining dressing and cooling scores**

a) The dressing and cooling scores are to be added to the PHI Plus spreadsheets.
b) The PHI Plus spreadsheets are available on request from the MPI VS specialist adviser.
c) Input NMD data into the PHI Plus spreadsheets as per the instructions on the PHI Plus spreadsheets.
d) Review the results from the PHI Plus spreadsheets to see whether the customised cooling process meets the performance criteria listed in Schedule 4 clause 1.3 (1).
e) If the results meet the performance criteria, submit the PHI Plus spreadsheet to the MPI VS specialist adviser for final sign off.
f) If the results do not meet the performance criteria listed in Schedule 4 clause 1.3 (1), the operator needs to decide whether to either:

i) redesign the process and repeat the data collection and validation process; or
ii) consider other options (e.g. upgrading the chiller).

S4 1.6 Documentation

(1) Document the following:

a) the validation protocol with cooling curves to obtain PHI values (i.e. PHI Plus spreadsheets completed with premises specific NMD and PHI data); and
b) information about the process being followed including details about the process steps, control limits, responsibility, records and corrective actions. An example is available on request from the MPI VS specialist adviser.

Schedule 5: Customised processes

(1) For operators seeking to develop a customised post-slaughter preservation process, MPI will assess these on a case by case basis. MPI can work with the operator from the beginning to agree on performance criteria to confirm that meat produced is fit for its intended purpose.

(2) Submit a written protocol including:

a) a description of the intended process;
b) proposed performance criteria for assessing performance;
c) relevant background information (e.g. literature references, manufacturer's information etc.); and
d) details of the RMP(s) to which the intended process relates.

(3) The protocol should be submitted to MPI for consideration to animal.products@mpi.govt.nz.

Schedule 6: Process options for spray chilling

S6 1.1 Scope

(1) This schedule outlines the different options for managing the performance of spray chilling processes.

S6 1.2 Performance criteria for spray chilling type 1

(1) Where a new spray chilling facility is constructed, use Type 1, Option 1 or 2 initially to validate spray chill facilities over a period of no less than 20 consecutive spray chilling cycles.

(2) Type 1 involves all units being weighed.

(3) **Option 1**

a) The average or total cold weight of a process lot must not exceed the average or total hot weight of that lot. All units should be weighed to confirm compliance.
b) For each process, the operator needs to document:

i) where cold weight is measured;
ii) the process lot description;
iii) monitoring procedures; and
iv) corrective action procedures.

c) Stop spray chilling when monitoring shows a non-compliance process lot until corrective action has been taken.
d) Non-compliant lots are to be treated as process failures.

(4) **Option 2**

a) The cold weight of each unit should not exceed the hot weight of that unit.
b) If the cold weight of any unit is greater than the hot weight, the unit should be held in a chiller until the cold weight is at or below the hot weight.

S6 1.3 Performance criteria for spray chilling type 2

(1) Type 2 can only be used after meeting requirements of Schedule 6 clause 1.2 (4)(a).

(2) Type 2 involves sampling of the units being weighed. Weighing all units is not needed for Type 2 spray chilling.

(3) The total cold weight of the sample carcasses post spray chill should not exceed the total of sampled carcass hot weight.

(4) There needs to be a weight verification programme to monitor performance using process control procedures.

S6 1.4 Type 2 process control procedures and sampling plans

(1) Identify and document the factors affecting the chilling process(es), particularly the critical spray chilling parameters, that achieve the outcome of this schedule.

(2) Given a process lot, the critical spray chilling parameters for monitoring purposes are considered to be:

a) unit type (e.g. species/class/whole carcass/side/quarter);
b) number of units of that type;
c) interval between sprays within the spray chill cycle;
d) spray duration;
e) number of sprays per cycle;
f) chiller temperature regimes;
g) fan speed setting; and

h) time from last spray to point of weighing (drying time).

(3) A record of these critical spray chilling parameters should be kept to check that the correct process is being used.

Table 7: Checklist for spray chilling

Activity	Frequency
Record the spray chilling cycle used	Each spray chilling cycle
Check spray chill nozzle pressure (or flow checks for nozzles) and water temperature is in the normal range Check for blocked or leaking nozzles Check minimum drying time being followed as per programme	Weekly
Review of spray chilling programme including confirmation that spray chilling control parameters are consistent with those at validation. Flow checks on a sample of nozzles in each chiller.	Annually
Record any changes made and carry out revalidation as appropriate (e.g. new pump, nozzles, alter spray times or intervals etc.)	As required

(4) Sampling plan

The sampling plan can be altered if the operator can consistently show the spray chilling process is under control in accordance with Table 8.

Table 8: Performance Based Verification (PBV) frequency for operation of a Type 2 spray chill programme

Level	Number of samples	Frequency of sampling	Number of days/ total samples	Actions
1	60 samples	Daily	5 days (300 samples)	Compliant move to Level 2 Non-compliant move to Type 1
2	32 samples	Daily	5 days (160 samples)	4 weeks compliant move to Level 3 Non-compliant move to Level 1
3	32 samples	Weekly	5 days (160 samples)	3 months compliant move to Level 4 Non-compliant move to Level 2
4	32 samples	Monthly	5 days (160 samples)	Ceiling frequency Non-compliant move to Level 3

(5) Spray chill performance steps

The time frame for moving between steps in the operation of the spray chill programme are shown in Table 9.

Table 9: Time frames moving between steps in the operation

Step	Frequency	Sample size	Duration	Acceptable
1	Daily	All	20 days	Average each day
2	Daily	60	5 days	Average each day
3	Daily	32	5 days	Average each day
4	Weekly	32	10 weeks	Average each week
5	Monthly	32	10 months	Average each month
6	Quarterly	32	On going	Average each quarter

a) At the end of each duration period, operators can go up a step which means less frequent monitoring (e.g. from step 3 to step 4).
b) For each failure, operators go down a step which means more frequent monitoring (e.g. from step 3 to step 2).

It will take at least 14 months to go from Step 1 to Step 6.

S6 1.5 Meat that is spray chilled, then frozen

(1) The operator can make an allowance for evaporation losses during the initial freezing of the carcass.

(2) Nominate whether cold weight measurement is pre-freeze or post-freeze.

(3) If cold weight measurement is pre-freeze, an allowance can be made for freezing weight loss. Determine the allowance for the freezing weight loss (refer to Schedule 6 clause 1.5(5)).

(4) Where the process includes freezing of units (i.e. carcass, side or quarter):

a) weigh the frozen unit bare; or
b) weigh the frozen unit with a tare allowance for packaging; or
c) weigh the non-frozen unit bare and apply the allowance for the freezing weight loss (e.g. prior to bagging); or
d) weigh the non-frozen unit with a tare allowance for packaging and apply the allowance for the freezing weight loss (e.g. post-bagging).

(5) The allowance for freezing weight loss is determined as follows:

a) weigh 300 units pre-freezing for each type of freezer operating;
b) weigh the 300 units post-freezing for each type of freezer operating at the shortest freezing time typically used for the freezer(s);
c) determine the percentage weight loss for each unit during freezing;
d) determine the freezing allowance at the 2.5 percentile of the data set.

(6) The packaging allowance is determined as follows:

a) randomly select 30 wrappings or packaging and determine the average weight to be used for the tare allowance;
b) check the average weight of the wrapping or packaging:

i) at least every 12 months; and
ii) after any change to wrapping or packaging specifications; and
iii) after changes to wrapping or packaging suppliers; and
iv) at any time where the operator believes the weight of wrapping or packaging may have changed.

Schedule 7: Boning and cutting sampling requirements

S7 1.1 Scope

(1) All cartoned meat from a boning and cutting operation should be sampled to demonstrate the process is being appropriately managed. This is to ensure that defects have been identified and removed prior to sampling.

In the future, it is intended to review the sampling programme to align with a statistical process control methodology.

(2) Cartoned meat should have minimal processing defects after cutting and boning.

(3) Small domestic only operators, (generally called Very Low Throughput, VLT), are exempt from the specified requirements outlined in the following clauses, however:

a) a defect sampling programme should be in place;
b) the defect sampling programme is to be documented; and
c) records are to be kept (refer Schedule 7 clause 1.2(6)).

S7 1.2 General principles

(1) All meat with surfaces of concern is to be available for sampling at least once during post-slaughter processing by a quality control (QC) inspection programme, in accordance with one of the sampling plans provided for in this schedule.

a) Exclusion of meat from sampling:

i) where the surface of concern is removed from the meat (e.g. silver skinning), that meat does not need to be sampled; and
ii) the operator is to demonstrate recontamination will not occur (e.g. immediate bagging of meat after silver skinning).

(2) Any person appointed as a QC inspector is to remain independent of production during the inspection, and is:

a) suitably trained;
b) equipped; and
c) competent in:

i) the operation of the sampling plans;
ii) procedures for random selection; and
iii) the identification, classification and removal of defects.

The person carrying out QC inspections should not at any time (during the inspection) be involved in the management or operation of the boning room. This person is to have the freedom to carry out the QC function and not be bound by the constraints of production.

The job description of the person undertaking QC inspections should be independent of any production related activities and should report to senior management on a separate reporting line from production.

(3) Perform a QC inspection for each of the following processes:

a) meat intended for manufacturing purposes (e.g. further processing (individually wrapped and bulk pack));
b) meat marketed as primal cuts and intended for sale to the consumer through retail outlets, hotels, restaurants or institutions;
c) different species; and
d) different types within a species (e.g. mutton, lamb, beef, bobby veal).

(4) Select meat according to the requirements of the sampling plan and inspect for defects. Refer to Table 10 below.

a) Perform QC inspections on unwrapped meat.
b) Where the number of defects exceed the tolerance provided in the sampling plan, the lot of meat (as defined in the plan), should be reworked.

Guidance

(5) If exporting, any lot that is not re-worked immediately is not eligible for export to Canada, Mexico or USA.

(6) Keep a daily record for every inspection plan carried out. Include the:

a) date;
b) species or class, if relevant;
c) weight of sampled meat;
d) type, classification, and number of defects; and
e) name of the inspector.

(7) Analyse the daily records for trends over time.

S7 1.3 Identification and classification of defects

Table 10: Defect criteria classifications

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 usability	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

Type	Insignificant	Minor	Major	Critical
Extraneous material	Specks or dust < 3 mm in GD and > 12 mm apart not affecting product usability. 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 usability	Circle > 40 mm, or > 5 stains not affecting product usability. Any that affects usability	Minors or majors of a number seriously affecting use Any that seriously affects usability

S7 1.4 Lot sampling plans

(1) Use lot sampling plans in all QC inspection programmes until routine processing of the type of meat consistently achieves a process average of 5.5 (or fewer) defects per 100 kg of meat inspected.

a) This only applies to any new process.
b) This does not apply to a process that has been in place for some considerable time.
c) An operator can choose to continue lot sampling if it suits their operation.

(2) Select the lot size and sampling plan before processing commences.

a) When samples are selected after packing:

i) take only one sample from each carton; and
ii) select the cartons using random methods.

b) When sampling occurs throughout the production of the lot, select samples on a random time basis.

S7 1.5 Meat intended for manufacturing purposes

Table 11: Product intended for manufacturing purposes[1,2,3]

				Accept/Reject Criteria					
Lot size	**Plan**	**No. of sample**		**Major**		**Critical**		**Total**	
(kilograms)	**No.**	**Step no.**	**Units**	**Accept**	**Reject**	**Accept**	**Reject**	**Accept**	**Reject**
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**

[1] Bulk packed boneless manufacturing meat shall have a sample unit of 5.5 kg.

[2] Bulk packed cuts wrapped or unwrapped intended for manufacturing shall have a sample unit of 11 kg.

[3] 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, is to be based on the accumulation of all lower-class defects throughout the inspection of the lot.

S7 1.6 Meat intended for marketing as primal cuts and intended for sale to the consumer through retail outlets, hotels, restaurants or institutions

Table 12: Meat intended for marketing as primal cuts and intended for sale to the consumer through retail outlets, hotels, restaurants or institutions[1,2]

Accept/Reject Criteria								
Lot size (kilograms)	Plan no.	No. of samples units	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

[1] One sample unit is not less than 5.5 kg.
[2] When any single minor or major defect comprises 5-10 defects of a lower-class, the calculation of major or total defects is to be based on the accumulation of all lower-class defects throughout the inspection of the lot.

S7 1.7 On-line sampling plans and CUSUM Plans

CUSUM is the activity of inspecting meat, every 30 minutes for defects, with defined accept and reject criteria.

S7 1.7.1 General procedures

(1) All QC inspection programmes can use on-line sampling plans when, using lot sampling plans, routine processing of the type of meat consistently achieves a process average of 5.5 (or fewer) defects per 100 kg of meat inspected.

(2) Select sample units not less than 14 kg on a random time basis every 30 minutes throughout production.

a) A process for random selection of the first sample of the day is to be documented.
b) Once the first sampling time has been determined all other samples will be collected at 30-minute intervals following this starting point.
c) A tolerance of ±5 minutes is permitted from the determined sampling times.

(3) At the start of each shift use a new inspection form.

(4) If a sample is missed:

a) during the first 6 scheduled samples, treat the production as a lot. Lot sampling procedures apply; and
b) subsequent to the first 6 scheduled samples, provided the results of the 6 samples show that the process is in control, then the missed sample is to be taken. This is to occur before the next scheduled sample.

The missed sample is to be taken before the next scheduled sample. However if this is impractical, the missed sample is to be taken after the next scheduled sample.

c) if two or more consecutive missed samples occur, treat the production as a lot. Lot sampling procedures apply.

S7 1.7.2 CUSUM plans

(1) There are two plans available, one for primal cuts (Plan A) and one for boneless manufacturing meat (Plan B).

a) Inspect primal cuts and boneless manufacturing meat under separate plans, with a separate form for each plan.
b) Primal cuts will include bulk packed cuts intended for manufacturing.
c) If only small quantities of manufacturing meat are being produced from the same carcasses and process as the primal cuts:

i) then these can be included in the more stringent CUSUM plan for primal cuts;
ii) primal cuts cannot be included in the boneless manufacturing meat CUSUM plan;
iii) alternatively small production lots can be inspected under Lot provisions.

(2) The characteristics of CUSUM are described below:

a) The acceptance limit “L” is the maximum accumulation of defects allowed to exceed the sample tolerance “T” in any sample.
b) The CUSUM value is the accumulated number of defects that exceed the sample tolerance “T”.
c) The sample tolerance “T” is the allowable number of defects in any sample.
d) The starting value “S” is the initial CUSUM value used to begin a CUSUM sampling plan
e) The defect score “D” is the factor by which the sum of the defects is multiplied by.
f) Each CUSUM plan includes two stages, one for major defects and one for total defects. Enter all required information on to the form.

(3) Determining CUSUM values:

a) At the start of a plan, the CUSUM value is to be set at the starting value “S”.
b) For each consecutive sample, the new CUSUM is calculated using the following formula:

New CUSUM = old CUSUM + (number of defects x D) - T

c) If the calculated CUSUM is less than 0, then reset the new CUSUM to 0.
d) If the calculated CUSUM exceeded the acceptance limit “L”, and meat had been reworked and re inspected, then reset the new CUSUM to the acceptance limit “L”.

(4) Primal cuts including bulk packed cuts intended for manufacturing

a) Use the inspection recording form Plan A.
b) <u>For total defects</u>:

i) acceptance limit “L” = 9,
ii) sample tolerance “T” = 1,
iii) 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.

(5) Boneless manufacturing meat

a) Use the inspection recording form Plan B.
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.

(6) 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.

(7) Re-working and re-inspection following a CUSUM rejection:

a) All meat in the room associated with the type of production, including carcasses and cartoned and uncartoned meat, is to be re-worked and re-inspected. Wrapped cuts are to be unwrapped.
b) After re-working, two 27.5 kg cartons or carton equivalents are to be selected at random from the re-worked meat and inspected according to Table 13.
c) If product is rejected based on the inspection criteria in Table 13, product must be re-worked and re-inspected again.

Table 13: Inspection criteria for re-worked meat

	Accept	Reject
Minors	3	4
Majors	0	1
Critical	0	1

S7 1.8 On-line boneless manufacturing meat

(1) This is not applicable to bulk-packed wrapped or unwrapped cuts intended for manufacturing or for boneless manufacturing pork.

a) Use the on-line inspection plan in Table 14.
b) No single 14 kg sample is to have more than one major or one critical defect or more than four total defects. No major defect is to occur in the first four samples and no critical defect is to occur in the first 26 samples.
c) If a rejection occurs then all meat in the room associated with the type of production, including carcasses and cartoned and uncartoned meat, is to be re-worked and re-inspected. Wrapped cuts are to be unwrapped.
d) After a rejection, subsequent inspections for the type of meat are to revert to lot inspection, until 27 000 kg or 2 full days production has been inspected, under the lot system without rejection.

Add individual sample totals to the previous cumulative total and record in the cumulative column. Compare with allowable limits. No single 14 kg sample can 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 is to be inspected by lot sampling plan.

Table 14: On-line inspection plan for boneless manufacturing meat

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	No 6		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 QC Inspector									

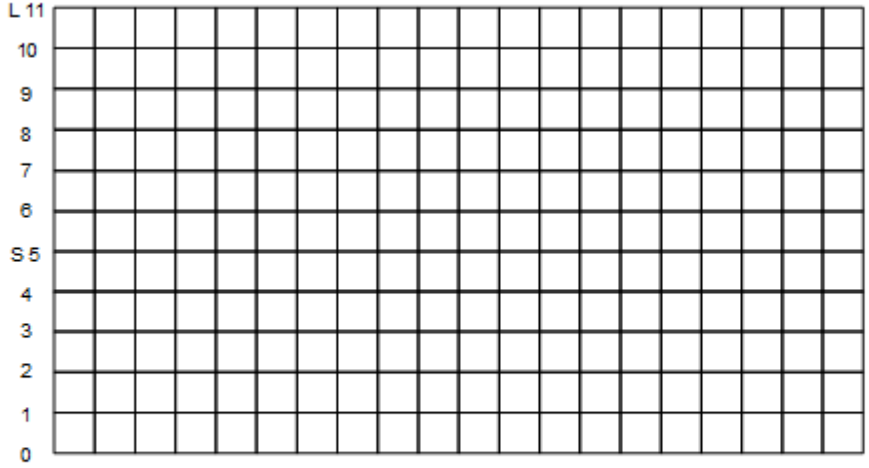
* One is allowed if none in the previous 3 samples from the same production line.

+ One is allowed if none in the previous 26 samples from the same production line.

S7 1.9 CUSUM plans

Table Plan A and Table Plan B are to be used for CUSUM recording (see next 2 pages).

MAJOR DEFECTS
Defect score = defects x 7



TOTAL DEFECTS
Defect score = defects x 3

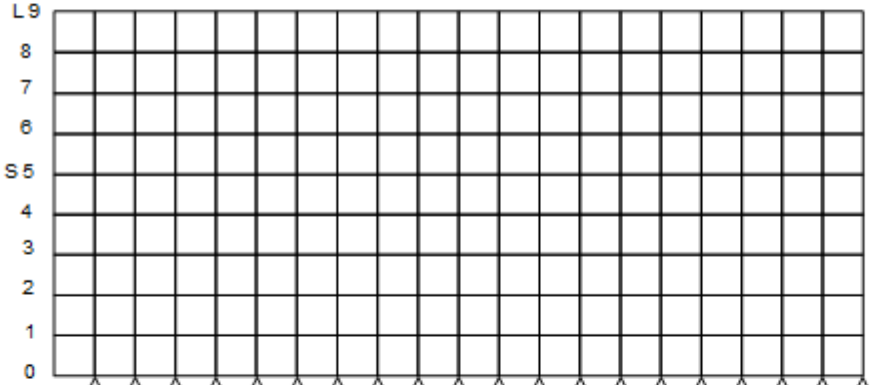


TABLE PLAN A – CUSUM CHART FOR PRIMAL CUTS INCLUDING BULK PACK CUTS ITENDED FOR MANUFACTURE

Premises Number
Date
Product description
Signature: QC Inspector
Comments

Sample number	
Minors	
Majors	
Criticals	
Total defects	
Defect type	
Time of sampling	

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 PLAN B – CUSUM CHART FOR BONELESS MANUFACTURING MEAT

MAJOR DEFECTS
Defect score = defects x 8

L10
9
8
7
6
5
S 4
3
2
1
0

TOTAL DEFECTS
Defect score = defects x 1

SL 4
3
2
1
0

Premises Number
Date
Product description
Signature: QC Inspector
Comments

Sample number	
Minors	
Majors	
Criticals	
Total defects	
Defect type	
Time of sampling	

	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