No. R. 1080 **1 August 2003**

STANDARDS ACT, 1993

PROPOSED REPLACEMENT OF THE COMPULSORY SPECIFICATION FOR THE MANUFACTURE, PRODUCTION, PROCESSING AND TREATMENT OF CANNED MEAT PRODUCTS

It is hereby made known under section 22(3) of the Standards Act, 1993 (Act No. 29 of 1993) that the Minister of Trade and Industry intends to withdraw the compulsory specification for the manufacture, production, processing and treatment of canned meat products, as amended, published by Government Notice No 406 of 7 March 1980 and to replace it with the specification contained in the Schedule.

Any person who wishes to object to the intention of the Minister to thus replace the compulsory specification concerned, shall lodge his objection in writing with the President, South African Bureau of Standards, Private Bag X191, Pretoria, 0001, on or before the date two (2) months after publication of this notice.

A ERWIN
Minister of Trade and Industry

SCHEDULE

PROPOSED COMPULSORY SPECIFICATION FOR THE MANUFACTURE, PRODUCTION, PROCESSING AND TREATMENT OF CANNED MEAT PRODUCTS

1 Scope

This specification specifies requirements for the manufacture, production, processing and treatment of canned meat products intended for human consumption.

2 Definitions

For the purposes of this specification, unless the context indicates otherwise, the following definitions apply:

2.1
acceptable
acceptable to the authority administering this specification

2.2
actual lean meat content, per cent
result after the mass percentage of nitrogen, represented by the non-meat proteinaceous material present in the product, multiplied by a factor of 30, has been deducted from the lean meat content, per cent

2.3
actual total meat content, per cent
actual lean meat content, per cent (see 2.2) plus the total fat content, per cent

2.4
address
address in the Republic of South Africa, that includes the street or road number (if a number has been allotted), the name of the street or road and the name of the town, village or suburb or that, in the case of a farm or a smallholding, includes the name of the farm or smallholding and of the magisterial district in which it is situated .

NOTE In the case of imported foodstuffs, "address" means the address of the manufacturer or supplier or importer.

2.5
adequate
sufficient to accomplish the intended purpose of this specification, and

a) **in regard to quality:** of quality such as to ensure performance of the projected activity or function

b) **in regard to quantity (or size):** of such magnitude as will comfortably accommodate the maximum number of persons or operations (or size of unit) envisaged as being involved

2.6
appropriate
acceptable to, or required by the authority administering this specification

2.7
batch-code
sub-code
numbers(s), letter(s) or marking(s) or any combination of these in addition to the code representing a particular time on the date of canning and may also include identification of the production line or particular lot of raw material

2.8
bleeders
small orifices on a retort through which steam and other gases are emitted from the retort throughout the entire thermal process

2.9
canned meat product
article of food that is manufactured from meat or from edible offal or from both, including, when specifically permitted, bone, and with or without vegetables, including mushrooms, fruit or cereal or any combination of the three, or sauces or gravies and other appropriate ingredients, such as vegetable protein, edible fats, seasoning ingredients, spices, thickening agents, sweeteners and caramel, and packed and preserved or semi-preserved in hermetically sealed containers

NOTE This definition does not include packaged meat products (open pack meat products), or products containing vegetables, fruit or cereals or any combination of the three, with meat or edible offal or both, where the content of meat or edible offal or both in the end product, or the meat content of prepared units containing meat or edible offal or both in the end product is less than 10 % by mass

2.10
cereal
wheat, maize, rice or other edible grain, or flour or starch made therefrom

2.11
"clean area worker"
worker who operates in an area that is required to be maintained in a hygienic condition

2.12
cleaning
removal of soil, food and fat residues, dirt, grease or other objectionable matter from surfaces

2.13
code
number(s), letters or markings or any combination of these indelibly affixed to containers representing the factory identity, type of product and date of canning as required by 12.1.1(g)

2.14
commercially sterilized product
product

a) that is processed in such a manner as to reduce the number or activity (or both) of viable micro-organisms to such an extent that none are detectable by the methods given in clause 11, and

b) in which no spoilage or toxicity of microbial origin is detectable under normal, non-refrigerated conditions of storage, distribution and handling

2.15
container
bin
container that is made of suitable metal, glass, semi-rigid plastics (or any combination of these), a plastics retort pouch, a collapsible tube or other acceptable material or combinations of materials that excludes permeation of gas, and that is capable of being hermetically sealed

2.16
contamination
occurrence of any undesirable matter in the product

2.17
count
number of units of preformed meat present in the container

2.18
critical control point
step at which control can be applied and that is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level

2.19
curing salts
sodium or potassium nitrates and nitrites that are listed as preservatives under the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act 54 of 1972), with or without the addition of common salt

2.20
declared net mass (d.n.m.)
net mass of the contents that is declared on the container

2.21
"dirty area worker"
worker who operates in an area that cannot be maintained in a completely hygienic condition

2.22
disinfection
application of hygienically satisfactory chemical or physical agents and processes to clean surfaces with the intention of eliminating micro-organisms

2.23
distinct
capable of being readily perceived by sight, smell, touch or taste, through a sharp, clear, unmistaken impression, not blurred, obscured or indefinite

2.24
drained mass
mass of the contents without packing medium, of a container in which equilibrium has been reached and determined in accordance with 10.5

2.25
edible offal
a) in the case of food animals other than poultry: blood, blood plasma, brain, cow-heels, diaphragm, gut (casings), washed head, kidneys, omentum, pancreas, pluck [oesophagus, trachea, lungs, heart, pericardium, associated lymph nodes, pillars of the diaphragm and liver or part thereof (without the gall bladder)], rind and skin, spleen, tail, thymus, tongue, cleaned tripe, trotters and udder (in the case of a heifer)

b) in the case of poultry: giblets (the heart, the clean and stripped gizzard and the liver without the gall bladder)

2.26
exhaust
to remove air from a container and its contents

2.27
extraneous matter
any objectionable matter or any material in the product which has not been derived from meat, edible

offal or other ingredients used

2.28
fat
edible vegetable fat or edible animal fat

2.29
food animal
any animal used as food

2.30
hazard
biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect

2.31
hazard analysis critical control point (HACCP)
system that identifies, evaluates and controls hazards that are significant for food safety

2.32
inedible offal
a) in the case of food animals other than poultry: with the exception of bone, all parts of the animal not covered by the definitions of meat (see 2.34) and edible offal (see 2.25)

b) in the case of poultry: the head, trachea, lungs, crop, intestines, gall bladder, oviducts, oil glands, shanks, and feet

2.33
lean meat content, per cent
mass percentage of protein nitrogen, multiplied by a factor of 30

2.34
meat
sound skeletal musculature, excluding the musculature of the lips, snout, scalp and ears, of healthy food animals, with or without connective tissue, blood vessels, lymphatic and nerve tissue, bone, fat, cartilage, scraped skin (pigs), and defeathered skin (poultry) that are naturally associated with such musculature *in situ* in the dressed carcass and head

2.35
mechanically recovered meat
pulped material that consists predominantly of musculature tissue, collagen, marrow and fat, and that has been recovered by a process of mechanical separation from bone

2.36
MIG thermometer
mercury-in-glass thermometer

2.37
name of the product
product name
name and true description of the contents that appear on the main panel of the container or label on the container as required by 12.1.1(b)

2.38
non-meat proteinaceous materials
any nitrogen protein obtained from sources other than from meat

2.39
off-flavour
persistent and distinct objectionable flavour abnormal for the type of product

2.40
off-odour
persistent and distinct objectionable odour abnormal for the type of product

2.41
packing medium
any medium in which solid foods are packed in a container

2.42
pasteurized products
products heat-treated in the container to a minimum centre temperature of 66 °C for a specified time

2.43
per cent
percentage
per cent (percentage) by mass, unless otherwise indicated or inconsistent with the text

2.44
preserve
to maintain in sound edible condition by the prevention of deterioration

2.45
process
course of operations during production of the product

2.46
product
particular canned meat product indicated by the context, either prepared or in the course of preparation

2.47
retort
pressure vessel designed for thermal processing of product packed in hermetically sealed containers

2.48
retort process
entire process which starts when the steam is admitted after the containers are loaded in the retort and the door(s) are closed, continuing through the coming-up time, sterilization time, and ends at the end of the cooling process when the retort door is opened

2.49
semi-preserved products
products that, for purposes of continuous preservation during storage, have to be kept under refrigeration

2.50
suitable
suitably
complying with the requirements of the intended purpose

2.51
suitably prepared
prepared for the intended purpose

2.52
time-temperature process
continuous heat treatment, expressed in terms of time and temperature, that is applied in the processing of heat-preserved products after the container has been sealed

2.53
total meat content, per cent
lean meat content, per cent (determined in accordance with 11.3), plus the fat content, per cent (determined by analysis in accordance with 11.4)

2.54
tripe
scraped and scalded rumen or the scraped and scalded reticulum of ruminant food animals

2.55
uniformity of size
except where a filler piece is allowed, the mass, size, length or thickness of no individual unit shall deviate more than 20 % from the average mass of units in a container

2.56
vents
relatively large, controlled ports in retorts used for purging or eliminating air from the retorts

3 Management system

Producers shall implement and maintain an acceptable quality management system such as the HACCP system (see 2.31).

4 Requirements for the factory and for employees

4.1 General

Where a part of the preparation of a product for canning is done at a factory other than the canning factory, the other factory concerned and its employees shall comply with the requirements of 4.1 to 4.6 inclusive.

All the statutory requirements contained in the Occupational Health and Safety Act, 1993 (Act 85 of 1993), in the Health Act, 1977 (Act 63 of 1977), in the Perishable Products Export Control Act, 1983 (Act 9 of 1983), or in any other relevant act shall be complied with. (All Acts as amended from time to time.)

The factory, equipment and the water used in the preparation of the product shall comply with the requirements given in 4.2 to 4.5 inclusive.

4.2 Factory construction, layout and conditions

4.2.1 Location, size, hygienic design, conditions and maintenance

4.2.1.1 The factory shall be situated in an environment suitable for the canning of the product.

The location of the premises and the designed construction of the factory buildings shall be such that it can be kept acceptably free from objectionable odours, smoke, dust and other contamination in order to comply with the relevant requirements for hygiene and sanitation.

4.2.1.2 The factory buildings and structures shall be of suitable size, construction design, and location to facilitate

a) maintenance and operation for their intended purpose,

b) large enough to prevent crowding of equipment and employees,

c) sufficient space for orderly arrangement of equipment and storage of raw materials and utensils used in any of the operations,

d) an orderly uninterrupted flow of production without any cross flows that could have an adverse effect on the quality of the product,

e) adequate cleaning and the maintenance of hygiene,

f) processing of raw materials without undue delay,

g) product quality and safety, and

h) functions such as quality management, quality control and process control.

4.2.1.3 The factory shall have the necessary fittings, equipment, utensils, technical supervision, skilled labour and workers to carry out the production in progress at any time for which it is designed (see 4.3.1).

4.2.1.4 The factory grounds shall be graded to ensure proper drainage, elimination of stagnant water and shall not be subject to flooding. There shall be no inadequately drained areas that might contribute to contamination of the product through seepage of food-borne filth and by providing breeding places for insects or micro-organisms.

4.2.1.5 The factory and grounds shall be of sound construction and well maintained in a clean and hygienic state and shall be effectively fenced to keep out large animals (see 4.5.9 and 4.5.11).

4.2.1.6 There shall be no accumulation of unused equipment, litter, waste, refuse, and uncut weeds or grass within the immediate vicinity of the product processing plant buildings or structures that might constitute an attraction, breeding place or harbourage for rodents, insects or other pests.

4.2.1.7 A system of control without risking contamination of the product shall be maintained to keep the factory free from birds, rodents, insects and other vermin (see 4.5.9).

4.2.1.8 Outdoor working areas and roads and pathways on the premises shall have a permanent surface of concrete, brick, bitumen or other durable material suitable for wheeled traffic. Areas outside buildings and not in actual use shall be covered by lawn or any other suitable surface that is not liable to produce dust or any toxic substances. Precautions shall be taken to ensure that contamination is not brought into the processing areas by foot or by vehicles such as fork trucks.

4.2.1.9 A schedule and routine inspection system of the condition and maintenance of the factory construction and facilities shall be implemented and maintained. Procedures for corrective actions in the event of non-compliance shall be instituted. Findings of such inspections and correction of non-conformance or the time limit to correct such non-conformance shall be documented and kept (see also 4.2.17).

4.2.2 Roofs and ceilings

4.2.2.1 The roofs, valleys and gutters shall be weatherproof and well maintained to prevent contamination of the product, ingredients and empty containers, and to keep the walls, floor and other structures from becoming damp. Roofs, valleys and gutters shall be kept clear of debris including insects, dead birds and rodents and their droppings.

4.2.2.2 The roofs and ceilings shall be at least 300 mm above any overhead equipment and in no case, less than 3 m from the floor. Ceilings, and roofs where no ceilings are fitted, shall be faced with a smooth material that is impermeable to water, light in colour and capable of being easily cleaned without damage, and so designed, constructed, installed and finished as to be dust-proof and minimize condensation, mould development, flaking paint and the lodgement and accumulation of dirt (see 4.5.2.4). Effective measures shall be taken to avoid contamination and to prevent loose or detachable material and drips from falling on the product from overhead structures in processing and storage rooms. They should be insulated where appropriate.

4.2.2.3 Areas where the sauce is prepared, cooked product is handled or ingredients are stored, must be provided with overhead ceilings. A ceiling is not required where a canopy covers the entire open product.

In areas where the open product is handled, all overhead structures and fittings shall be installed in such a manner as to avoid direct or indirect contamination of the product by condensation, drip or other falling matter and shall not hamper cleaning operations.

4.2.3 Walls and doors

4.2.3.1 Outer walls shall be weatherproof and impermeable to water. Interior wall surfaces shall be faced with a smooth surface, without crevices, (unplastered brick surface is unacceptable), hard, light-coloured, material that is impermeable to water, to a height of not less than 2 m above the floor. In addition, the walls in the preparation, processing and packing areas shall be faced with a suitable corrosion-resistant, light-coloured washable and impact-resistant non-toxic material that is impermeable to water, to a height of at least 2 m above the floor, except that when soiling of the walls might occur above this height this facing shall be continued to a higher level appropriate to the operation (see 4.5.2.6). All ledges occurring in wall construction shall be sloped at an angle of at least 45°. The walls shall be free from unnecessary projections and ledges.

4.2.3.2 Openings for conveyors, services, vents, etc. shall be smooth and shall be sealed.

4.2.3.3 Fixtures, signboards, switch boxes, etc. shall be avoided on internal wall surfaces in the processing areas and where necessarily present, shall be adequately sealed to prevent harbourage of pests and accumulation of dirt.

4.2.3.4 Windowsills shall be sloped to the inside at an angle of at least 45° and shall be at least 1 m above floor level. Windows and other openings shall be so constructed as to avoid accumulation of dirt. Windows shall be tight fitting into their frames (see 4.2.8). Joints on panelled walls and junctions of the panels and floor surface shall be adequately sealed. Where appropriate the walls shall be protected from damage by moving equipment and fork trucks such as galvanized guardrails.

4.2.3.5 Wall-to-wall and wall-to-floor junctions in production areas shall be closed and coved. The minimum radius of the coving shall be 25 mm and 40 mm respectively. Junctions between walls and ceilings shall be closed and coved. Wall surfaces shall be easy to clean and disinfect.

4.2.3.6 Doors, through which products are moved between processing areas shall be of adequate width. Doors and door-frames shall be made from corrosion-resistant material that has high impact resistance. Doors and door-frames shall have a smooth, seamless, light-coloured, readily cleanable surface that is impermeable to water. Doors that open direct from the outside into the preparation, processing and packaging areas shall be tight fitting unless provided with effective air-curtains, and shall, as far as is practicable, be of a self-closing type.

4.2.3.7 Direct entrance(s) from the outside that is (are) used by the employees shall be provided with an entrance hall. External doors shall be constructed as to prevent the entry of rainwater into the factory building. Plastic curtains, if not properly maintained and clean, can be a serious source of contamination. Where used, plastic curtains shall not be located after the use of hand washing facilities upon entering the processing area.

4.2.4 Floors and drainage in processing and food handling areas

4.2.4.1 Floors shall be constructed of concrete or other suitable material that is impermeable to water, non-toxic, resistant to wear and corrosion, easy to clean and maintain and laid to an even surface that is smooth but not slippery, free from cracks, crevices and open joints (see 4.5.2.5).

4.2.4.2 Floor surfaces shall be resistant to attack by product spillages, cleaning agents and cleaning solutions of normal dilution. In the case of floor tiles, the grouting between the tiles must be of a non-absorbent and durable material that is resistant to erosion and corrosion.

4.2.4.3 Floors and drainage channels shall be graded to have a fall of at least 1 in 60 and be drained to internal drainage channels connected to accessible gullies, sumps and external sewers. Outlets shall have a suitable drain trap immediately outside the factory.

4.2.4.4 Floors and drainage channels shall be in good condition and repair, and have strainers in place. Internal drainage channels shall be of the open type with, where necessary, removable covers.

4.2.4.5 Installations obstructing flow and cleaning shall not be present in drainage channels. The capacity of drainage channels shall be sufficient to cope with the maximum flow of liquid during peak demand without overflowing and causing flooding.

4.2.4.6 Where necessary, duckboards of easily cleaned material that is impermeable to water shall be provided for workers.

4.2.5 Lift cages and staircases

4.2.5.1 Lift cages shall have a smooth, corrosion-resistant inside surface that is impermeable to water, and lift shafts shall be properly drained and shall be accessible for cleaning.

4.2.5.2 Staircases in rooms where food is processed or handled shall have solid risers, and shall be provided with closed balustrades that have a height of at least 1,3 m as to prevent contamination of products underneath the stairs.

4.2.5.3 Stairs, lift cages and auxiliary structures such as platforms, ladders, chutes, catwalks shall be so situated and constructed as not to cause contamination of the products.

4.2.5.4 Walkways, catwalks, bridges and mezzanine floors over the open product, product contact surfaces, empty containers, conveyors for empty containers or the open product or handwash facilities shall be completely sealed underneath and shall have side walls.

4.2.5.5 Chutes shall be constructed where appropriate with inspection and cleaning hatches. Equipment or lifts for conveying the product shall be mechanically operated.

4.2.6 Cables and pipes

4.2.6.1 Cables and pipes shall be

a) fixed above ceilings, or

b) chased into walls, or

c) carried under floors, or

d) fixed away from walls or ceilings and above the floor, and spaced in such a manner that the ceilings, walls, floor, cables and pipes can be easily cleaned and maintained in a hygienic condition.

4.2.6.2 Overhead cable and pipework and girders and other structures shall be kept to a minimum to aid cleaning and if present shall be free from dust, rust, mould, flaking paint, cobwebs and other extraneous material.

4.2.6.3 Cladding around steam pipes shall be suitable for use in a food factory and shall not be ragged and shall be covered with a suitable metal sheet.

4.2.6.4 Pipes in which the product is conveyed, shall have no dead ends or sharp corners.

4.2.7 Illumination

4.2.7.1 General illumination shall be such as to permit efficient operations during manufacture of the product.

4.2.7.2 An illuminance of at least 220 lux for general operations in the manufacture, production, processing or treatment of the product, and at least 540 lux at points where close examination of the product is carried out shall be provided, situated in such a way to cause the minimum stress to the workers who carry out these examinations.

4.2.7.3 The area where container seam examination other than seam projections are performed shall have close-up illuminance of at least 540 lux with minimum reflections. In other areas the illuminance shall be at least 110 lux.

4.2.7.4 Artificial illumination, if used, shall be such that the colours of products are not significantly altered.

4.2.7.5 Luminaires suspended over the product at any stage of preparation, packaging and processing areas or where the open product ingredients or empty cans are handled, shall be of the safety type or otherwise protected to prevent contamination of the product in case of breakage of luminaire or lamp.

4.2.7.6 Suspended fixtures shall be so constructed and so situated to facilitate easy cleaning and maintenance.

4.2.8 Ventilation

4.2.8.1 The ventilation shall keep the air fresh, prevent the build-up of excessive heat, remove excess steam, vapour and shall prevent the formation of condensate and growth of mould. Natural ventilation shall be augmented, if necessary, by mechanical means.

4.2.8.2 Airflow shall be from the more hygienic to the less hygienic areas of the factory.

4.2.8.3 Windows that open for ventilation purposes or ventilation openings shall be insect screened and made out of corrosion-resistant material and kept in good repair (see 4.2.3). The screens shall be easily removable for cleaning and shall be regularly cleaned.

4.2.8.4 Fork truck or other vehicles emitting exhaust gasses shall not be operated in the preparation and processing areas. The air shall be free from noxious fumes, smoke, vapour, dust, chemicals and contaminating aerosols.

4.2.8.5 Air intake points for ventilation shall be fitted with dust filters and shall be located so as to avoid the intake of air contaminated by micro-organisms and other contaminants.

4.2.9 Hand washing facilities

4.2.9.1 The following shall be provided at the entrances to the preparation and processing areas of the factory that are used by the employees, and at other strategic and conveniently situated places in the preparation and processing areas or where their absence would present a food safety risk and within easy reach of the employees and at the toilets in such a position that the employee must pass them when returning to the processing area:

a) an adequate number of wash-hand basins, with an abundant supply of hot and cold running potable water complying with 4.4.1 and from taps operated by means other than hands or elbows, or warm water in the temperature range of 40 °C to 50 °C under adequate pressure;

b) abundant unscented liquid soap or suitable hand cleaning preparation, nail brushes and single-use disposable towels;

c) receptacles shall be provided for used disposable towels at each hand-washing facility. These receptacles shall be regularly emptied; and

d) notices shall be conspicuously posted requiring employees or where applicable, visitors, to wash their hands with soap or detergent; (see 4.6.6)

1) after using the toilet,

2) when entering the preparation; processing areas or product handling areas,

3) when their hands become dirty or whenever necessary before handling the product.

4.2.9.2 Hand-washing facilities at the entrance to the processing and food handling areas shall be under protection against environmental contamination inside the building and shall be preferably located in a lobby or entrance hall. They shall be placed in such a position that employees are forced to pass them upon entering and if necessary to be guided by a rail.

4.2.9.3 The hand-washing facilities at the entrances to the processing areas and inside the processing area shall be located in a position where employee practices can be supervised (see 4.6.6).

4.2.9.4 Access to hand-washing facilities shall, at all times, be unobstructed by equipment and operating activities. Hand-washing basins shall be of a suitable corrosion-resistant impermeable material, they shall have a smooth finish, be easy to clean and shall drain direct into drainage channels.

4.2.9.5 Hand-washing facilities shall not be used for other purposes than the washing of hands.

4.2.9.6 Disinfectant hand dips, where provided shall be of such design that they can be adequately cleaned. Hand dips shall not be allowed to become a source of contamination. Disinfectant solutions shall be monitored and replaced regularly.

4.2.10 Foot-baths and boot-wash basins

4.2.10.1 Unless their absence in particular circumstances is acceptable, or unless alternative acceptable cleaning and disinfecting facilities are provided, footbaths or boot-wash basins that contain a suitable active disinfectant solution shall be provided at each entrance to the preparation, processing and packaging areas that is used by employees and be so located that employees cannot obtain access to those areas without disinfecting their footwear.

4.2.10.2 There shall be adequate provision for the drainage and cleaning of footbaths.

4.2.10.3 Footbaths or boot-wash basins shall be positioned before the hand-washing facility upon entering the processing area and shall be located inside the factory, protected against environmental contamination.

4.2.10.4 Boot-wash basins shall be provided with suitable brushes consisting out of non-absorbent material of hygienic design, water sprays under suitable pressure and boot scrubbing powder and a disinfectant dip.

4.2.11 Production areas

Product handling areas shall not be used during production for any other purposes than that for which they have been designed. The production areas shall be designed, constructed, staffed and the equipment shall be arranged in a manner to permit

a) control of access,

b) proper supervision,

c) adequate working space to allow free movement of workers for the satisfactory performance of all operations,

d) functions such as quality and process control from arrival of raw materials, ingredients and packaging materials, the handling, processing to the finished product,

e) easy and adequate cleaning and proper maintenance of hygiene and hygienic operations and facilitate free movement and cleaning of movable equipment,

f) physical separation of the preparation and processing areas from any storage, designated cleaning, workshop, and comfort areas,

g) rapid and efficient handling and processing without mechanical or other damage of the product,

h) an orderly undelayed flow of production,

i) prevention of crossflows of operations that might have an adverse effect or reduction in the quality of the product or separation between those operations that might cause cross contamination,

j) where necessary, temperature control areas,

k) effective separation of those operations or areas with potential adverse effects on the product such as the separation of areas where the uncleaned ingredients are handled from areas where cleaned ingredients are handled, or where raw materials are being handled from areas where cooked food is being handled, or separation of low temperature control areas from heat control areas, and

l) minimization of product contamination risk.

4.2.12 Chill rooms, freezers and freezer storage rooms

4.2.12.1 Chill rooms, freezers and freezer storage facilities shall operate efficiently and shall be hygienically maintained.

4.2.12.2 Refrigeration and freezing units, such as compressors, shall not be installed in an area where the product is handled, with the exception of equipment that is an integral part of a production unit. Where freezers, chill rooms and freezer storage rooms are located in processing areas, their floors shall either be an integral part of the floor of the processing area or adequately sealed to that floor. Any storage units shall be installed high enough above the floor to permit easy and adequate cleaning of the area under them.

4.2.12.3 The walls and floors shall be in good condition. The surfaces of ceilings, walls and floors shall be of suitable corrosion-resistant material, be impermeable to water and shall be smooth, free from cracks, crevices and flaking of surface material. The floors shall be drainable, and the floors of chill rooms shall be sloped to effect complete draining.

4.2.12.4 Freezer storage rooms in factories other than factory ships shall be equipped with automatic temperature recorders that have enough suitably placed sensing elements to monitor the overall air temperature. The temperature in freezer storage rooms shall be automatically and continuously monitored and a record of the temperature shall be kept and shall be available for inspection. Temperature charts shall be so graduated that each division represents not more than 2 °C within the storage range, and shall be easily readable, to the nearest 1 °C, within the storage range. Batch freezers, other than plate freezers, shall be fitted with external gauges or other temperature indicators.

4.2.12.5 The entrances to chill rooms, freezers and freezer storage rooms shall be protected from the inflow of warm air by the provision of an ante-room or a mechanical air curtain or self-closing shutters.

4.2.13 Thawing areas

Thawing devices shall have sufficient capacity to avoid delay, shall be designed and constructed for ease of cleaning and disinfecting and shall allow adequate evacuation of water. The thawing of frozen meat shall be performed in a separated, well-drained and cool area where the air temperature can be maintained below 20 °C. The design of thawing shelves shall ensure adequate drainage. Dripping onto meat from shelves above shall be prevented.

4.2.14 Storage facilities for meat and red meat offal

4.2.14.1 Edible red meat offal for human consumption (cleaned where applicable), if not stored separately, shall be stored only in chill rooms or freezer storage rooms that are used for the storage of carcasses. No uncleaned edible offal shall be stored in any room that contains carcasses or cleaned edible offal.

4.2.14.2 Inedible offal, unless scalded and cleaned, and boxed and frozen, shall not be stored in any chill room or freezer storage room containing meat or edible offal.

4.2.14.3 In storage, unprotected meat shall be kept separate from boxed or protected meat. Raw materials other than meat and edible offal that require cold storage or freezer storage shall only be stored in the same room as meat and edible offal if held in a prepared and neatly packaged form in hygienic containers. No carcass or edible offal, whether wrapped or not, shall rest immediately on the floor or against the walls.

4.2.15 Storage facilities for edible ingredients other than meat or edible offal

4.2.15.1 Edible materials shall be stored in clean, tidy, dust free, insect, vermin and bird proof areas, away from the wall and floor surfaces and protected against any source of contamination and separated from the processing areas. Non-edible materials shall not be stored in the same rooms where edible or packing materials are stored.

4.2.15.2 Edible raw materials requiring storage under cool, chilled or frozen conditions shall be stored under such conditions.

4.2.15.3 Edible materials supplied by the manufacturer in containers or in packages shall be stored in closed containers or packages. Opened containers or packages with partly used ingredients shall be re-sealed or transferred to closed containers for further storage.

4.2.15.4 Edible dry ingredients and other ingredients in containers or packages such as tomato paste shall be stored under dry conditions.

4.2.16 Storage facilities for non-edible material

Stores capable of contaminating the product and spare parts for machinery (see 4.2.18, 4.2.19 and 4.2.20) shall be kept away from the processing area.

4.2.17 Storage facilities for packing and packaging materials

Containers, closures, cartons, and labels for the packing and packaging of the product shall be stored in clean, dustproof, vermin-proof, dry storerooms reserved for the purpose. Precautions shall be exercised that containers and closures are not exposed to environmental elements or excessive steam or moisture during storage. Packing and packaging materials shall be stored at a height of at least 250 mm above floor level and away from the walls.

4.2.18 Storage facilities for poisonous and harmful materials

4.2.18.1 Storage facilities for pesticides and other poisonous materials

Poisonous or other harmful materials, pesticides and equipment for their application, shall be stored in a well-ventilated room in which no foodstuff or food-handling equipment or packing material or containers are stored and shall be kept locked. These poisonous or harmful substances shall at all times be segregated from edible materials. All these materials shall be prominently and distinctly labelled with the warning about their toxicity and use, and shall be registered for the purpose of use. Their containers shall be kept closed during storage.

4.2.18.2 Storage facilities for cleaning and disinfecting materials

Cleaning and disinfecting materials and equipment for their application, shall be stored in a lockable room where no foodstuff or food-handling equipment or packaging materials or containers or lids are stored and shall, at no time, come into contact with containers, raw materials or the product. All materials shall be prominently and distinctly labelled.

4.2.19 Fuel storage area

Any storage area or tank, for the storing of fuels such as coal or hydrocarbons shall be located, designed, protected, controlled and maintained in such a manner as not to present a risk of the product being polluted during the storage and manipulation of these fuels.

4.2.20 Storage of lubricants

Lubricants shall be stored away from the production areas in such a manner that they shall not be a cause of contamination to the product.

4.2.21 Storage facilities for utensils and spare parts

Utensils and equipment parts that, when in use, come in contact with the product shall, when not in use, be kept in a disinfectant solution or be stored in a hygienic manner in an area that is dry, free from dust and any other source of contamination and is vermin proof. Suitable stands and/or shelves shall be provided for the storage of loose equipment and utensils. Spare parts for equipment and tools that can contaminate the product shall be kept in a separate storage area away from the processing areas and not stored with utensils and equipment parts that come in contact with the product when in use.

4.2.22 Storage facilities for end products

End products awaiting dispatch shall be stacked in well ventilated, acceptably dust-free, dry and clean rooms. The storage area for end products shall be physically separated from areas where steam is generated. The design and location of the storage area shall be such that the end product shall be protected against elements of the environment or any other condition that could adversely affect the product.

4.2.23 Smoke units

Smoke units shall be maintained in a hygienic condition and they shall not be fired from the inside of the processing area of the factory. In the case of prefabricated smoke kilns where the smoke generating equipment forms part of the kiln, the smoke generator shall not emit any smoke into the processing area, and the area adjacent to such a generator shall be partitioned off from the processing area to prevent contamination of the area with sawdust. Exposed sawdust shall not be transported through the processing areas. Sawdust shall be contained in bins with lids on. Doors of smoke rooms and kilns shall be tight fitting. The inner surfaces of smoke units shall be finished with a smooth lining such as stainless metal, to facilitate the cleaning of the walls with steam and water. Trolleys or trays used in smoke units shall be of hygienic design and shall be regularly cleaned.

4.2.24 By-products

Any processing of by-products and non-meat products that are not intended for human consumption shall be conducted in buildings that are physically separated from the factory in such a way that there is no possibility of contamination of the product. There shall be no direct access from a by-product plant to the preparation and processing areas of the cannery. Equipment and utensils used in by-product plants shall be identified and shall not be used in areas where food for human consumption is processed.

4.2.25 Refuse

A separate room or other equal adequate and suitable refuse facility shall be provided on the premises and shall be cleaned daily. The design and construction shall be such as to prevent harbourage of pests and contamination of the product, the equipment or buildings used for the production of the product.

4.2.26 Effluent sewage and waste disposal

4.2.26.1 Establishments shall have an efficient effluent sewage and waste disposal system that shall, at all times, be maintained in good order and repair. All effluent lines (including sewer systems) shall be large enough to carry peak loads and shall be so constructed as to avoid contamination of potable water supplies or the environment and not constitute a source of contamination to the product, product contact surfaces, ingredients or create an unsanitary condition or nuisance. Drainage and sewer pipes shall not be installed direct over the preparation, processing or packaging areas, or the product or product contact surfaces or empty container storage areas or in any manner that accidental leakages could contaminate the product. Sewer pipes shall have an inside diameter of at least 100 mm and shall be properly vented to the outside atmosphere.

4.2.26.2 Effluent sewage and waste water lines shall be identified as such and the disposal shall be made into a public sewerage system or in the absence thereof, into an adequate private sewerage system in a manner which will not cause a health hazard.

4.2.26.3 Offal and rubbish shall be so conveyed, disposed, or stored as to minimize the development of bad odours, prevent waste from becoming an attractant and harbourage or breeding place for vermin and prevent contamination of the product or product contact surfaces, ground surfaces or water supplies.

4.2.26.4 Manholes shall be not present in preparation and processing areas.

4.2.26.5 Combustible waste, if incinerated, shall be burned in an incinerator of an approved design and located at an adequate distance from the factory to avoid contamination of air supplies. Effluent shall not be treated on the premises or close to the factory premises in such a position as to risk air contamination. Hazardous substances shall be disposed of in an environmentally acceptable manner.

4.2.27 Comfort facilities

4.2.27.1 An adequate number of suitable dining rooms, change-rooms, shower baths, hand-wash basins whose taps operate as described in 4.2.9, toilets (separate for each sex) and, where appropriate, urinals, shall be provided. The design, layout, construction and location of the comfort facilities shall be such as not to create a health hazard. Each shower shall have a fresh (potable) hot and cold water supply and soap shall be supplied. Comfort facilities shall be separated and not open direct into a preparation, processing, packaging or storage area but be connected with these areas by means of a vestibule or lobby. The location of the change-rooms shall be such as to enable workers to dress with the required protective clothes (see 4.6.3) before entering the preparation and processing areas.

4.2.27.2 Toilets shall be conveniently located and be provided at a suitable distance from the production areas and shall be completely separated from change-rooms. If toilets do not open in a vestibule or a lobby, they shall be fitted with close-fitting self-closing doors. Doors of toilets rooms shall not open direct into areas where the product could be exposed to airborne contamination. The comfort facilities shall be kept neat and clean and maintained in a sanitary condition and in good repair and free from bad odours.

4.2.27.3 The layout and equipment shall be such as to permit proper cleaning and maintenance and prevent harbourage and breeding of pests. The toilets shall be so designed as to ensure hygienic removal of waste matter. Exit from a vestibule or lobby to the processing, food handling or storage area shall be equipped with a footbath located inside the vestibule or lobby. Provision shall be made for proper drainage of the floor surfaces. Where comfort facilities by means of a vestibule or lobby are connected with the food handling or storage areas, the fall of the floor shall be such that no water from the floor surface of the comfort facilities can enter the food handling or storage areas. An adequate supply of toilet paper shall be provided at the toilets.

4.2.27.4 Lockers shall be provided or alternatively an effective controlled basket system for the storage of personal clothes shall be used. Personal effects of workers shall not be allowed to accumulate in the lockers or baskets. The lockers or baskets shall be not used for the storage of food or items attracting vermin and shall be emptied at the end of each working shift. The lockers or baskets shall be maintained in a clean and good condition and repaired or shall be replaced when necessary. Lockers or facilities to be used for the storage of any personal effects may preferably be provided, and if provided these shall not be located inside the complex accommodating the comfort facilities. The comfort facilities shall be adequately ventilated and illuminated. Toilets shall be separately ventilated to external air in such a way as not to contaminate the air in the processing areas. Change-rooms and dressing rooms shall not be used as living quarters or for the preparation of food or as dining rooms. Staff dining rooms shall be separate from the change-rooms or dressing rooms. Separate comfort facilities shall be provided for "clean area" and "dirty area" workers. The comfort facilities shall not be used as storage areas.

4.2.28 Living quarters

Living quarters shall not be located on the same premises that accommodate the areas where the product is prepared, processed, packaged or stored.

4.2.29 Facilities for washing and laundering of protective clothing

For the cleaning of waterproof protective clothing, plastic brushes on corrosion-resistant chains, disinfecting soap or powder such as hypochlorite, and a spray nozzle shall be provided at the wash-hand basins (see 4.2.9). If cloth types of protective clothing other than waterproof protective clothing are to be washed at the factory, laundering facilities shall be supplied in an area away from the product handling area or stores for ingredients (see 4.6.3).

4.2.30 Facilities for cleaning and disinfecting portable equipment

Facilities with proper drainage shall be provided for the washing and disinfecting of portable or movable equipment such as trolleys and bins and utensils or food contact parts capable of being separated from stationary equipment. Such facilities shall be located in a separate room or in a designated area which should, where necessary, be partitioned off in the preparation, processing and packaging areas where there will be no possibility of contaminating the product or product contact surfaces. Suitable drying stands or shelves shall be provided to keep equipment and utensils off the floor. An ample supply of cold potable water, and hot water if required, or saturated steam, or clean seawater, at adequate pressure, that complies with the requirements of 4.4.1 shall be provided. High pressure or high frequency oscillating water or detergent equipment shall be available where possible. The floor of the room or area shall be smooth-surfaced and graded, to facilitate proper disposal of waste liquids from the cleaning process. The drainage shall be in a direction away from the food handling areas.

4.3 Equipment

4.3.1 General

4.3.1.1 Layout

4.3.1.1.1 Processing areas shall be so designed, equipped and staffed as to allow free movement of employees to facilitate cleaning and maintenance of hygiene and product quality.

4.3.1.1.2 Equipment such as tables shall be installed or placed away from the walls. Aisles and working spaces between equipment and between equipment and walls shall be unobstructed and of sufficient width to permit employees to perform their duties without contamination of the product or food contact surfaces with clothing or personal contact.

The position of stationary equipment shall not impede drainage of water towards the drainage canals.

4.3.1.2 Installation

4.3.1.2.1 Equipment shall be so constructed and installed as to prevent hygienic hazards and to minimise the build-up of contamination with organic material and dirt, and to facilitate its cleaning and disinfecting, and adjacent areas and those areas beneath it.

4.3.1.2.2 All permanently mounted or readily movable equipment shall be installed away from the walls or ceiling and be either installed high enough above the floor at distances sufficient to provide access for cleaning and inspection, or completely sealed to the floor.

4.3.1.2.3 Equipment shall preferably not be sunk into the floor but, if this is unavoidable, the equipment shall be installed in an acceptable manner. Sunken areas shall be well drained.

4.3.1.3 Design

4.3.1.3.1 Equipment, implements and utensils shall be designed and of a workmanship that is suitable for their intended use and shall facilitate rapid and efficient handling of the product.

4.3.1.3.2 The design, construction, installation and use of equipment and where applicable, utensils, shall be such as to prevent hygienic hazards and shall preclude contamination of the product with lubricants, fuel, metal fragments, soiling, contaminated water or any other contaminants.

4.3.1.3.3 All equipment used in the production of the product shall be in a well-maintained and sound condition, durable and easy to maintain, inspect or monitor, movable or easy to dismantle or able to be disassembled or to be opened for cleaning. They shall be of hygienic design with no open joints or pits or crevices or dirt traps.

4.3.1.3.4 All parts that come into contact with the product shall be easily accessible for cleaning and disinfecting. Where necessary, as in the case of equipment that cannot be cleaned *in situ*, it shall be possible for easy dismantling to expose the food contact surfaces for effective cleaning and disinfection.

4.3.1.3.5 Surfaces with which the product comes into contact shall not be painted and shall be constructed to reduce projections, sharp corners or other features that could cause damage to the product. Bearings in equipment or revolving of equipment within reach of the product contact surfaces shall be of a sealed type and shall not cause any soiling of the product through seepages.

4.3.1.4 Construction

4.3.1.4.1 All plant, equipment, implements and utensils or surfaces that come into contact with the product shall be smooth and of a suitable corrosion-resistant, non-absorbent material which does not transmit toxic substances, odour, taste or staining or cause colour changes and soiling of the product and shall be inert to the product, detergents and disinfectants under normal operating conditions.

4.3.1.4.2 The equipment, implements and utensils may have an acceptable plastics-coated surface capable of withstanding repeated cleaning and disinfection or shall preferably be made of stainless steel suitable for use with food. Dissimilar metal material shall not be used where electrolytic corrosion can occur. Wooden equipment or utensils are unacceptable.

4.3.1.4.3 Copper, lead and their alloys other than solder, and other metals or materials detrimental to health, shall not be used in the construction of equipment that comes into contact with the raw materials or with the unprotected product at any stage of its processing. The use of solder in equipment shall be minimized.

4.3.1.4.4 Equipment and utensils shall not be removed from the processing areas except for repairs.

4.3.1.4.5 Equipment and utensils used for inedible materials or waste shall be identified as such and shall not be used for edible products. Equipment and utensils used in areas outside the food for human consumption areas such as the toilets and ablution facilities shall not be used in food for human consumption handling areas. Such equipment and utensils shall be identified as such.

4.3.2 Equipment for the packing medium

4.3.2.1 Pipes, valves, joints, pumps, homogenizers, cyclones or any equipment coming into contact with the packing medium shall be of a hygienic design with no dead ends, sharp bends or uneven joints.

4.3.2.2 Pipelines shall be easily dismantled for cleaning.

4.3.2.3 Branches occurring in pipelines shall be fitted with suitable stopcocks in such position as to avoid dead ends and the development of a stagnant packing medium. Any bend occurring in the pipeline, shall permit dismantling at both sides of the bend.

4.3.2.4 Mixing equipment, stirrers mesh screens and storage tanks shall be of stainless steel. Storage tanks must be provided with suitable covers.

Water used in the mixing tanks shall only be supplied by means of a permanently fixed water pipe. Water hoses shall not be used to supply water as an ingredient in the product.

4.3.3 Tables

4.3.3.1 Wooden tables shall not be used in preparation, processing and packaging areas.

Tables shall be of a design and construction that will not allow the development of unhygienic conditions and microbial build-up.

4.3.3.2 Frames shall be made of suitable smooth, corrosion-resistant metal or steel with no openings in the construction.

4.3.3.3 The tops of preparation and packaging tables shall be of a suitable impermeable, smooth, seamless, corrosion-resistant metal (preferably stainless steel) or other material with similar surface characteristics. The tops shall either be removable for cleaning, or so secured to their frames as to allow cleaning and disinfection.

4.3.3.4 Tables shall, as far as possible, allow rapid and effective draining and shall be easy to clean and be free from cracks, crevices or openings in the framework.

4.3.3.5 Where metal tops are folded at the edges, the fold shall be effectively soldered, welded or sealed with an acceptable mastic sealant in such a way as to prevent organic matter and dirt from entering the folded section. All joints shall be watertight.

4.3.4 Cutting boards

If cutting boards are used they shall be easily removable cutting boards or blocks of hygienic construction, made of acceptable light-coloured solid and smooth material (other than wood or other absorbent or porous material) and suitable for use with food. The shape and size shall be such as to facilitate cleaning and disinfecting.

4.3.5 Utensils and implements

Knives, shovels, brooms and other utensils or implements shall not have handles of wood or other absorbent or porous material. Utensils used for the topping-up of cans shall be made of stainless metal or of rigid plastics and of hygienic design.

4.3.6 Heat processing equipment

4.3.6.1 Retorts shall have an adequate supply of energy, steam and where applicable, water or air. Their capacities shall be sufficient for production flow to avoid undue delays.

4.3.6.2 Steam, water and compressed air used in the operation of retorts shall not contain any substances that might be hazardous to health or that might contaminate the product. Steam shall be made from potable water. The steam quality for steam retorts shall be pure saturated and free from air. All heat-processing equipment, temperature control and measuring devices shall be maintained in good order. All temperature-indicating devices shall be installed in such a way and location and maintained to accurately measure the actual temperature within the retort. The installation shall be such to ensure a constant flow of the heating medium past the length of the probe or bulb of the temperature-indicating device.

4.3.6.3 Retorts shall comply with the following:

a) An **automatic steam controller**, to maintain the processing temperature accurately (see 4.3.6.3(c)). Steam controllers may be combined with the temperature and time recording device (see 4.3.6.3(e)) to function as recording-controlling instruments.

b) The **construction of the retort**, the steam supply and steam distribution in the retort shall be such so as to ensure a rapid and even rise of temperature, provide uniform heat distribution throughout the retort and ensure an adequate heat process. The steam supply shall be sufficiently provided for the greatest number of retorts that might be brought to sterilization temperature simultaneously.

   The steam pressure and size of steam inlet shall be large enough and shall enter at points and be distributed to facilitate adequate flushing of air out of the retort and to provide steam for proper operation of the retort.

   Steam shall be evenly distributed by means of steam spreaders and shall flow unobstructively throughout the retort load without any air pockets remaining in the retort.

   Steam spreaders are perforated continuations of the steam inlet inside the retort. Horizontal retorts shall be equipped with steam spreaders extending the entire bottom length of the retort occupied by the retort trolleys. In retorts of at least 6 m in length, the steam shall enter the spreader near the centre of the retort. In retorts of length less than 6 m, the steam may enter either at the ends or at the centre. When the steam inlet enters the spreader at the end, the cross sectional area of the latter shall not be less than the inlet pipe, when the inlet enters at the centre, the cross sectional area of each arm of the spreader shall not be less than two-thirds of the inlet pipe. Retorts over 9 m length shall have two steam inlets connected to the spreader at approximately equal divisions of its length.

   In vertical retorts, bottom spreaders when present, shall be in the form of a cross pipe.

   Spreaders shall be perforated over its entire length along the top 90° of this pipe, that is, within 45° on either side of the top centre. The ends of the spreader shall be closed. The number and size of perforations in the steam spreader shall be such that the total cross sectional area of the perforations is equal to 1½ to 2 times the cross sectional area of the smallest restriction in the steam inlet pipe.

c) If the **controller** is smaller than the steam inlet pipe, a steam by-pass around the controller is necessary for a rapid, even rise during the coming-up time.

d) At least one indicating **mercury-in-glass (MIG) thermometer**, easily readable to 0,5 °C. The divisions shall not exceed 10 °C for each 20 mm of graduated scale. The temperature range shall adequately encompass scheduled retort temperatures to be used. Bulbs of MIG thermometers shall be installed within the retort shell or in external wells attached to the retort body. Thermometers with separable wells or sleeves for the bulb shall not be used. Thermometers shall not be installed in the lid or door of a retort. Thermometers with a divided mercury column shall be replaced immediately for repair.

e) A **recording thermometer device (thermograph)** with time and temperature chart (thermogram) to provide a permanent record of thermal processing, installed in such a way that their proper operation is not affected by steam or vibration.

The correct time and temperature chart shall be used. The time and temperature charts shall have a temperature scale of not less than 1,0 mm/°C and a time scale of not less than 20 mm/h over a range of ± 5 °C of the processing temperature. The recording accuracy shall be equal to or better than ± 0,5 °C at the sterilizing temperature. The temperature recorded shall never be higher than and not more than 0,5 °C lower than the MIG thermometer at sterilizing temperature. Means of preventing unauthorized changes in adjustment shall be provided.

The heat processes of not more than one retort shall be recorded on a particular time-temperature chart. Where multi-point plotting chart-type devices are used, temperature recordings shall be printed at intervals not exceeding 30 s. Records of the retort process shall be kept and shall be available for control reference for at least the expected shelf life of the products.

f) A **pressure gauge**, with the diameter of the dial at least 100 mm, connected to the retort by means of a gauge siphon or gooseneck.

g) **Vents:**

1) **Location:** Vents shall be located in that portion of the retort opposite to the steam inlet. Vents shall be of a size and be designed, installed, arranged on the retort and operated in such a way that air is rapidly flushed out of the retort during the coming-up time before the start of the sterilization timing.

Vents on horizontal retorts shall not be located more than 750 mm from the ends of the retort. The spacing of vents on horizontal retorts depends on the size of each vent, such as one 25 mm vent for every 1,5 m of retort length or one 20 mm vent for every 1 m retort length.

2) **Size:** The total cross sectional area of the vents on horizontal retorts shall be at least one vent size larger than the cross sectional area of the steam inlet.

Where vents from a single horizontal still steam retort are connected with a manifold, the cross sectional area of the manifold shall be larger than the total cross sectional area of the connecting vents. Where a manifold header connecting vents or manifolds from several retorts, the cross sectional area of the header-manifold shall be at least equal to the total cross sectional area of all connecting manifold pipes or vents from the maximum number of retorts to be vented simultaneously. If the manifold header is of excessive length, it shall be at least one manifold pipe size larger.

Vents or where applicable the manifold, shall be controlled with a suitable gate or plug-type valve(s) with at least the same opening of the vent or manifold in which they are installed.

The manifold header connecting manifolds from several retorts shall not be equipped with a valve.

3) **Discharge:** Vents and manifolds shall be of a size and layout to allow unobstructive discharge of the retort without any condition which could retard the discharge or without the production of back pressure.

Vents, manifolds or manifold headers on horizontal retorts shall discharge direct into the atmosphere. They shall not be connected direct to a drainage system or discharged under water.

Vents on vertical retorts which also serve as overflows, shall have a break in the pipe before their connections to a drainage system.

4) Means of indicating the functioning of the vents shall be provided.

h) **Bleeders:**

Bleeders on retorts shall be installed in such a way and in such a position as to facilitate proper removal of air and a flow of steam throughout the retort load after the vents have been closed.

The following are required:

1) a bleeder of at least 3 mm at each thermometer pocket or external well accommodating bulbs or probes of temperature devices located to provide a full flow of steam past the entire length of these bulbs or probes especially of the MIG thermometer;

2) a 6 mm bleeder on a vertical retort located in that portion of the retort opposite the steam inlet;

3) 6 mm bleeders along the top of horizontal retorts spaced not more than 2,5 m apart and one approximately 300 mm of each end of the retort.

All bleeders shall discharge direct into the atmosphere and shall be arranged so that the retort operator can observe that they are functioning properly.

Where vents or bleeders are installed in positions other than those indicated above, the establishment shall provide evidence in form of heat distribution data or other scientific proof that the arrangement accomplishes the purpose set above.

i) **Water retorts:**

Whether still, agitating, or rotating retorts, the bulbs, or probes of temperature-indicating devices and controllers shall be located in such a position that they are beneath the surface of the water so that steam does not strike them direct or that there is no opportunity for steam impingement on the control bulb or probe. The temperature-indicating device bulb or probe shall extend direct into the water without a separate well or sleeve.

There shall be a means of determining the water level in the retort during operation.

In retorts for processing products packed in glass jars, the incoming cooling water shall not impinge direct on the jars in order to minimize glass breakage by thermal shock.

When a water recirculation system is used for heat distribution, the water shall be drawn from the bottom of the retort through a suction manifold and discharged through a spreader that extends the length/circumference of the top of the retort. The holes in the water spreader shall be uniformly distributed. Suction outlets shall be protected with non-clogging screens to keep debris from entering the recirculation system. The pump shall be equipped with a signal device to warn the operator when it is not running, and with a bleeder to remove air when starting operations. Alternative methods for recirculation of water in the retort may be used, provided there is documentation proof of effectiveness in the form of heat distribution test data that shall be maintained on file at the factory.

j) **Stacking equipment, divider plates and baffle plates:**

Retort baskets, trolleys, crates or other devices for holding product containers and divider plates shall be fabricated to ensure that steam or water or whatever applicable, can freely circulate around the containers during the entire retort process, and in still steam retorts ensure adequate purging or eliminating of air and adequate distribution of steam and prevention of air pockets.

In the case of still steam retorts, the retort baskets, trolleys or crates and in particular their bottoms, shall not obstruct steam circulation. When perforated sheet metal is used, perforations shall be approximately 25 mm holes on 50 mm centres or their equivalent in percent open area.

Divider plates, if used, shall have at least the same perforations (25 mm holes on 50 mm centres) or their equivalent in percent open area as required for retort trolleys above. A divider plate shall not be placed on bottoms of trolleys, etc. before container loading. Not more than one divider plate shall be used to separate any two layers of product.

Baffle plates shall not be used in the bottom of vertical or horizontal still steam retorts due to their tendency to direct steam flow around container lots rather than through container lots.

k) **Agitating or rotary retorts:**

The rotational speed of the retort or reel is critical if specified in the sterilization schedule. A recording tachometer or other acceptable device shall be used to provide a continuous record of the speed.

l) **Safety valve:**

There shall be an effective safety valve.

m) **Process timing devices:**

A large, easily read fixed wall clock in at least one minute divisions or an accurate timing device shall be used for recording the retort process and to monitor the recording of the timing of the time and temperature controlling device. The wall clock shall, in the case of a power failure, be independent of the main electricity supply. The wall clock shall be located in such a position that it can be readily observed by the retort operator while controlling the retort process. A wristwatch or pocket watch shall not be used for retort timing. A clock not indicating seconds shall not be used unless the specified operating process including the venting and sterilization schedules have an added one-minute or greater safety factor over the schedule process.

The wall clock and the timing controlling devices used to measure the retort process shall ensure that the specified venting time and the sterilization schedule time have been achieved.

n) **Compressed air:**

Any supplies of compressed air and/or water shall be capable of being shut-off adequately to prevent any leakage into the retort in order to prevent adverse effects on the retort process.

o) **Positioning of operating controls and instrumentation:**

All manually controlled devices necessary for retort operating shall be easily accessible and in a position convenient for the operator. MIG thermometers and other temperature, pressure and timing devices with adequate available light shall be located where they can be easily and accurately read to enable the retort operator to operate the retort from virtually one spot.

p) **Retort identification:**

Each retort shall be conspicuously identified with a number.

q) **Calibration pocket:**

A calibration pocket shall be installed in a position where steam freely circulates alongside the bulb of the MIG thermometer (see 4.3.6.2(d)) and the probe of the recording thermometer or thermograph (see 4.3.6.2(e)) with a bleeder (see 4.3.6.2(h)(i) next to them. This arrangement should be preferable in an extension well on the retort body. The calibration pocket shall be approximately 125 mm in length and 13 mm in diameter and be kept nearly filled with a high boiling point oil such as cylinder-head oil. The opening of this pocket shall be fitted with a screw-in plug for the purpose, to be kept closed when not used.

4.3.7 Measuring instrumentation, devices and equipment

4.3.7.1 The calibration of measuring instrumentation devices and equipment shall ultimately be traceable to national specifications. The following shall at least be annually calibrated by an accredited body or institution and the calibration certificates shall be available to the authority administering this specification:

a) all thermometers and temperature controlling and recording devices on retorts and other processing equipment;

b) pressure gauges on retorts;

c) timing controlling devices on the thermal processing equipment and wall clock at retorts;

d) in case of a rotary or agitating retorts, the retort or reel speed timing device;

e) micrometers, callipers and other measuring devices used for container closure examination;

f) massmeters and any masses used; and

g) in general, all pieces of equipment that are used to confirm that the product is in compliance with specifications shall be calibrated.

4.3.7.2 The thermometers, temperature recording devices and pressure gauges shall, after calibration, be certified *in situ* on the retort, at sterilization temperature(s) used for processing(s). A calibrated specification MIG thermometer shall be inserted in the calibration pocket (see 4.3.6.2(q)) and then packed into the mouth of the pocket with thermal insulated material. After 10 min of sterilization the temperature readings of the MIG thermometer (see 4.3.6.3(d)) and recording thermometer (see 4.3.6.3(e)) shall be taken against the reading of the inserted thermometer in the calibration pocket. The reading of the pressure gauge shall be correlated against the above three readings of the thermometers. These certifications shall be available to the authority administering this specification.

4.3.7.3 All measuring equipment, devices or instruments shall carry a unique identification number throughout their working lives. An acceptable system of identifying if the instrument is still in calibration shall be employed. Action on equipment found to be out of calibration shall be prescribed.

4.3.7.4 A system of in-house monitoring and verification of accuracy against known accurate specifications of the measuring pieces, equipment and instruments shall be employed on a routine basis or at any time that their accuracy is questioned between calibrations. In case of temperature measuring devices the routine verification of accuracy shall only be done against a calibrated and certified MIG thermometer.

4.3.7.5 Records of each measuring instrument shall be kept covering the following details:

a) the type of instrument and measurement scale;

b) instrument identification;

c) location of instrument usage;

d) date of calibrations;

e) accuracy and results of calibration;

f) traceability of accuracy against calibrated specifications used;

g) method of calibration;

h) status of calibration; and

i) maintenance and repairs.

4.3.8 Containers, bins and trays

All containers that contain foodstuffs, other than those containing the finished product and sealed cans in retort baskets, shall at all times be kept on shelves or dunnage stands of corrosion-resistant material at a minimum height of 250 mm above the floor level. Containers shall be of hygienic design and light-coloured or have a bright metal finish.

Containers used for inedible products and waste shall be leakproof and constructed of suitable water-impermeable material that is easy to clean and shall be identifiable. The same type of containers used for the product shall not be used for collecting offal and waste. Containers, bins or trays shall be identified so that containers that are used for the unprepared product shall not be used for the unpacked processed product.

4.3.9 Conveyors, elevators, runways and flumes

Conveyors, elevators, runways and flumes for transferring the product shall be so designed to allow for effective cleaning and, when necessary, disinfection and to prevent damage to the product such as by sharp corners, projections, long drops, crushing or contamination of the product. Electrical motors and transmissions driving the conveyors shall not be installed above the open product or in such a position that the product is exposed to soiling. Conveyor systems and runways to transport empty containers shall be designed and constructed to prevent contamination and damaging of the containers.

4.3.10 Compressed air and gases

Compressed air and gases used in direct or indirect contact with food or with food contact surfaces shall not contain substances that could be hazardous to health or that could contaminate the food with particles of oil. Pipes of compressed air used to clean empty containers/cans shall be fitted with effective oil traps or filters just before the point where cans are blown out. The compressed air supply at the point of cleaning on a conveyor line for empty containers shall be fitted with a mechanism to activate the outlet of compressed air into the container when passing that point.

The point where empty containers are blown out with compressed air shall not be located in such a position where the open product can be contaminated. Compressed air shall not be used for other cleaning purposes in the preparation and processing areas due to the risk of spreading contaminants.

4.3.11 Seamers or sealing equipment

Every seamer or sealing equipment shall be clearly and indelibly numbered where a processing plant is equipped with more than one seamer or sealing equipment.

Every seamer or sealing equipment shall be equipped with a coding device to indelibly mark, emboss or project symbols, letters or numbers on containers.

Seamers or sealing equipment shall be equipped with an effective, automatically operated device for counting the number of containers processed.

4.3.12 Maintenance and condition of production facilities, equipment and utensils

The equipment and utensils shall be maintained in an acceptable condition of maintenance.

A schedule and routine inspection system of the condition and maintenance of the production facilities, equipment and utensils shall be implemented and maintained. Procedures for corrective action in the event of non-compliance shall be instituted. Findings of such inspection and correction of non-conformance or the time limit to correct the non-conformance shall be documented and kept.

Procedures for the inspection, maintenance, repair, adjustment of apparatus and equipment, in particular the sealing machines and retorts shall be established. Procedures shall specify, for each piece of equipment, the methods to be used, the person in charge of the application, and the frequency. Lubrication of machines shall be such to avoid risks of soiling the product. Only lubricants that have been officially approved for use in food establishments shall be used. Sealed bearings shall be used where possible, in places where the risk of lubrication seepage to the product could occur. Regular inspection for leaking oil seals for replacement shall be conducted.

4.3.13 Facilities for storage, treatment and distribution of water supplies

Facilities for storage, treatment and distribution of potable water and container cooling water shall be adequately protected against contamination. Air vents on storage tanks and reservoirs shall be insect and rodent proof. Each supply and pipeline carrying potable water, treated retort cooling water, treated sea water and non-treated sea water shall be completely separate from each other and identified as such. There shall be no cross connection between each of them, above or with non-potable water or with waste water lines and without any back siphonage.

The pipe system and the installation of sea water supplies shall be capable of being adequately drained to prevent any stagnant sea water in the system when the plant is not in operation. The intake for sea water shall be located in such a position to avoid contamination.

4.3.14 Disinfecting and cleaning facilities

Disinfecting facilities for gloves and knives shall be available at convenient and acceptable points.

4.3.15 Ice-making equipment

All surfaces of ice-making equipment that come into contact with the ice shall be of suitable corrosion-resistant material. The ice-making equipment shall be of hygienic construction throughout. Whenever ice is transferred, stored or transported, it shall be effectively protected from contamination.

4.4 Water

4.4.1 Potable water

4.4.1.1 Every cannery shall have an adequate supply of clean potable water under adequate pressure and shall be capable of coping with peak demand. The water supply shall be free from suspended matter and from substances that could be deleterious to the product or harmful to health. In addition, the water shall have been so treated, by flocculation, filtration, chlorination or other acceptable process, as to ensure compliance with the following requirements:

a) **total count:** when tested in accordance with 11.19, the total count of viable micro-organisms shall not exceed 100 per mL;

b) **coliform organisms:** the count of coliform organisms shall not exceed five organisms per 100 mL of the water (see 11.20); and

c) **faecal coliform bacteria:** faecal coliform bacteria shall not be detectable in 100 mL of the water (see 11.21).

4.4.1.2 For the purposes of the water examination, the coliform group shall include all Gram-negative, non-spore-forming rods that are capable of fermenting lactose with the production of acid and gas at 37 °C in less than 48 h. Faecal coliform bacteria shall be regarded as Gram-negative, non-spore-forming rods that are capable of fermenting lactose with the production of acid and gas at both 37 °C and 44 °C in less than 48 h, and of producing indole in tryptone water.

4.4.1.3 Chlorinated water that could have any deleterious effect on the product shall be dechlorinated immediately before use. In all cases, the free residual chlorine concentration shall be determined by the *N,N*-diethyl-1,4-L-phenylene diamine test or other acceptable test that has equivalent sensitivity.

4.4.2 Chlorination of water for container cooling in the retorts

Water used for container cooling after the retort process shall comply with the microbiological requirements of potable water set out in section 4.4.1. Water that is used for container cooling but is not circulated for re-use shall be continuously chlorinated to contain a minimum of 2 mg/L of free available chlorine content measured at the retort inlet. Where water for container cooling is circulated for re-use it

shall, before recirculation, be treated to remove solids and chlorinated after the circulated water has been cooled, to ensure, after a contact period of at least 20 min, a minimum free available chlorine content of 2 mg/L at the retort inlet. In all cases the free resicual chlorine concentration shall be determined by the N,N-diethhyl-1.4-L-phenylene diamine test or other test of equivalent sensitivity.

The free available chlorine content shall also be measured immediately after the can cooling process. (The presence of free chlorine is an indication that the level of chlorine available during cooling was sufficient.) After being used for container cooling, the water shall not be drained onto the floor surface and then be circulated for re-use. All pipelines, reservoirs, tanks, cooling towers, treatment facilities and equipment employed in the handling of re-circulated water for container cooling shall be kept clean and so constructed and installed to facilitate cleaning and inspection. The pipelines, tanks and reservoirs shall be a closed system. Recirculated container cooling water shall be protected against contamination.

4.4.3 Steam

Steam used in direct contact with the open product or food contact surfaces such as, but not limited to hot exhaust boxes, or indirect contact with the product such as in retorts, shall be made from potable water and shall not contain substances that might be hazardous to health or that risk contamination of the product. Boilers shall be properly operated and maintained.

4.4.4 Ice

Ice shall be manufactured, handled and stored in a manner that protects it from contamination. The purity of ice shall be such that the water derived from it immediately after the ice has been manufactured (by melting the ice under aseptic conditions at a temperature not exceeding 10 °C) shall comply with the microbiological requirements of 4.4.1.

4.4.5 Water for processing

In addition to complying with the requirements of 4.4.1, water used in the manufacture of the product and water (other than container cooling water) used to wash equipment and plant, with which the product comes into contact during processing and manufacture shall, unless it already contains at least two parts per million of free available chlorine, be continuously chlorinated to contain a minimum of two parts per million of free available chlorine at the point of use.

Where water thus treated affects the product deleteriously in any way, the water shall be dechlorinated immediately before use. In the case of brine solutions held continuously prior to filling at a temperature not below 75 °C, the use of chlorinated water in the preparation of the brine is not essential.

4.4.6 Water for cleaning

Water used for the cleaning of plant and equipment shall comply with 4.4.1 or 4.4.2 as relevant and shall be continuously chlorinated to contain a minimum of two parts per million of free available chlorine or, alternatively, it shall contain such germicidal substances as will ensure sanitation of plant and equipment. Flexible hoses used to supply water for cleaning purposes shall be stored on a reel or an equivalent.

4.4.7 Non-potable water

Non-potable water shall be carried in completely separate lines with no cross-connection with, or back siphonage into, the system that carries potable water. Non-potable water lines shall be identified as such and the water shall be considered unsafe and shall not be used for drinking or for use in food handling areas or allowed to come into contact with food-contact surfaces or for hand washing purposes.

4.5 Hygienic operating requirements

4.5.1 General

4.5.1.1 An orderly, neat and hygienic image of the factory and its grounds shall be conveyed.

In relation to the handling, transportation, processing, packaging, and storage of the product, no operation shall be performed, or conditions exist, that are detrimental to the product.

4.5.1.2 Smoke from factory chimneys and smoke rooms shall not be allowed to enter the factory building in a quantity or manner that is offensive, injurious or dangerous to health, or causes contamination at any stage during the processing of the product. Vehicles that emit exhaust fumes shall not be used in any area where the unprotected product is exposed.

4.5.1.3 Uncooked meat or meat products shall, in the course of handling, processing and storage, not be unnecessarily exposed to conditions that affect them adversely.

4.5.1.4 Care shall be taken that there is no contact between raw materials and finished products, uncleaned and unprepared vegetables shall not be prepared or stored in areas where unprotected meat is handled or stored. Raw food shall not be handled or stored in areas where the cooked product is handled or stored.

4.5.1.5 Effective measures shall be taken to inhibit mould growth and to prevent dust, dirt, flaking paint and other loose or extraneous material being present in the processing or in the product storage areas, cold storage and refrigeration rooms, change-rooms and toilets. Processing areas shall be kept free from surplus water.

4.5.2 Cleaning and disinfecting

4.5.2.1 Cleaning and disinfecting system

A permanent cleaning and disinfection system shall be established to ensure that the processing areas, equipment and material, including vessels used for transportation, are cleaned and disinfected appropriately and regularly. This program shall state precisely the methods for cleaning and disinfecting to be used, as well as methods for monitoring the cleaning schedule, the kind of detergents and disinfectants, instructions for cleaning and the results of cleaning (see 4.5.6).

The programme shall be regularly reviewed and regular examination of its effectiveness and cleaning methods should be done.

The cleaning schedule shall be designated to critical areas and equipment for special attention.

The cleaning and disinfecting of the preparation, processing and packaging areas of the factory and of all auxiliary equipment and utensils shall be organised on a regularly scheduled basis and carried out by trained employees. A permanent member of the factory shall be designated to be responsible for the cleanliness of the plant. He shall have an understanding of the significance of contamination and the hazards involved. He should preferably be independent of production. All persons responsible for handling of the product shall be trained and informed continuously on the hygiene rules to be respected. All employees shall be sensitised to their responsibilities for the quality and safety of the canned product produced.

4.5.2.2 Cleaning materials

Only cleaning agents, sanitizers and disinfectants that have been officially approved for use in food establishments shall be used. Detergents and disinfectants shall be suitable for the purpose intended, safe and effective under conditions of use. A combined detergent disinfectant may be used.

An adequate supply of cleaning materials, steam, hot and cold water, complying with 4.4.6, hose-piping, brushes and other requisites for proper cleaning shall be available. Brooms and brushes shall be made of impermeable material and shall have nylon bristles and shall be maintained in a clean and good condition. Bristles shall be conspicuously coloured to enable easy detection in case of detached bristles. When not in use, brooms and brushes shall be hung up with bristles facing downwards to aid drying. Brooms and brushes used on floors shall not be used on product contact surfaces. Wire wool or metal scouring wool shall not be used for cleaning surfaces that come in contact with the product. Steam used in direct contact with the product and product contact surfaces shall comply with 4.4.3. Cleaning equipment and utensils shall be identified. Cleaning equipment or utensils used in areas other than where food for human consumption are handled, such as the toilets and ablution facilities or by-product plants shall not be used in areas where food for human consumption is handled.

4.5.2.3 Physical facilities

The building, premises, plant, equipment, utensils and all other physical facilities of the factory shall be kept clean and in good repair and shall be maintained in an orderly, clean and hygienic condition. The plant shall be cleaned and/or disinfected and rinsed as frequently as necessary whenever circumstances demand. Where necessary, provision shall be made for cleaning-in-place (CIP) of pipes and tanks used for the product. Couplings and other fittings of pipelines used for transporting packing medium, shall, when dismantled, not be left on floor surfaces but be kept in a disinfectant solution or stored dry under hygienic conditions (see 4.3.1).

The entire plant, equipment and utensils shall be thoroughly cleaned with a detergent or other cleaning agent and disinfected at each change of operations. Immediately at the end of operations, the entire system shall be both cleaned and disinfected. Where equipment and utensils are used in a continuous production line basis, the product contact surfaces of such equipment or utensils shall be cleaned and disinfected on a predetermined schedule. Immediately before the commencement of operations, equipment shall be thoroughly rinsed with water (see 4.4.) to remove any dust and any disinfectant residues, and if necessary, a detergent and disinfectant shall be used.

Cleaning operations shall be conducted and adequate precautions shall be taken to prevent the product or product contact surfaces from being contaminated during cleaning or disinfection of the processing areas and equipment. Cleaning operations shall be carried out while waste and organic materials are still wet, before these become dry.

All utensils and product contact surfaces of equipment shall be maintained in a sanitary condition through cleaning as frequently as necessary to prevent contamination of the product. Non-product contact surfaces of equipment used in the processing plant shall be cleaned as frequently as necessary to be kept free of accumulated dust, dirt, food particles and other debris.

4.5.2.4 Ceilings (see 4.2.2)

Ceilings shall be regularly cleaned. Accumulation of dust above the ceiling shall not be allowed.

4.5.2.5 Floors, drainage channels and foot-baths (see 4.2.4 and 4.2.10)

During periods of operation, the floors and the drainage channels in the preparation, processing and packaging areas shall be kept clean and if necessary, by regular sweeping and flushing with water. The product shall be protected from being splashed with water. Refuse shall not be permitted to accumulate in drainage channels. Thorough cleaning of floors and drainage channels shall take place as often as is necessary and at the end of each day's operations in order to maintain hygienic conditions. Foot-baths shall be drained and cleaned regularly and the disinfectant kept in active condition.

4.5.2.6 Walls of preparation, packaging and processing areas (see 4.2.3)

The inside surfaces of walls of preparation, packaging and processing areas shall be thoroughly washed immediately after each day's operations and as often as necessary during the production periods. The rooms shall be kept as free from dust as possible.

4.5.2.7 Preparation, processing and packaging systems

The product shall be prepared, packed and processed under strictly hygienic conditions.

The filling and closing equipment shall be cleaned regularly to prevent soiling and contamination of the product.

The preparation, processing and packaging systems shall be rinsed during each break in production that lasts for more than 1 h, or whenever it is deemed necessary, and effectively cleaned at the end of each shift and at the end of each day's operations. They shall be clean at the time of further use. Knives, saws and other loose items of equipment shall, during breaks in production, immediately after use, or at any time when disinfecting is necessary, be thoroughly cleaned and then disinfected by the use of either saturated steam, chlorinated water or other acceptable disinfectant solution or procedure (see 4.3.8). Loose parts or pieces of equipment that come in contact with the product shall be cleaned and disinfected immediately at the end of operations and shall be stored in a hygienic manner when not in use. When the factory is in operation, equipment and utensils shall not be removed from the work area except for repair, cleaning or replacement.

Any discharge system and conveyance system of the factory, including elevators and holding tanks, shall be cleaned both before and after use.

4.5.2.8 Installations for the treatment of water (see 4.3.13 and 4.4.1)

Factory installations for the treatment of water shall be thoroughly cleaned once a week by an acceptable method.

4.5.3 Emergency repair

Maintenance or repairs shall be conducted without the risk of affecting the product adversely. Whenever maintenance or repairs have been carried out in production areas, tools and replaced equipment shall be immediately removed from these areas and the affected equipment thoroughly cleaned and disinfected.

Welding repairs or other repairs involving a high risk of contamination in the areas where (and when) the product is handled, prepared, processed or packaged, shall be performed as an emergency during breakdown only, and in such a way that the product is not exposed to welding fumes, splatter or slag particles.

4.5.4 Cleaning and disinfecting portable equipment (see 4.2.30)

If a separate room is not provided, the area to be used and the method of cleaning shall be of such a nature that there will be no possibility of contamination of the product.

4.5.5 Containers, bins and crates for handling the product (see 4.3.8)

Containers holding food materials shall not be stacked one upon the other in such a manner that the contents of one container can be contaminated by the bottom of another container. Containers shall not be stacked immediately on the floor or against the wall. Whenever containers are moved, they shall be effectively protected from contamination.

4.5.6 Efficacy of cleaning

Daily routine inspections and scheduled in depth inspections shall be conducted. Suitable records shall be kept of the findings. Corrective action procedures shall be stipulated.

The efficacy of the cleaning and disinfecting process specified in 4.5.2 shall be such that, in samples taken in accordance with 11.18, the percentage efficacy of cleaning and disinfecting in the sample, determined in accordance with 11.18, is acceptable when scored by the system set out in 11.18.

4.5.7 Spare parts (see 4.2.21 and 4.5.2.7)

Spare parts for machinery, and other items capable of contaminating the product, shall be stored away from the preparation, processing, packaging and product storage areas.

4.5.8 Removal of refuse (see 4.2.25 and 4.2.26)

A permanent and effective system of waste and refuse removal shall be established, implemented and maintained.

Litter, waste and overflow shall not be allowed to accumulate or to give rise to unhygienic conditions, and shall be disposed of promptly. Offal shall be removed from the processing area on a continuous basis or as often as necessary, in an efficient and sanitary manner. Containers with offal awaiting removal from the factory area shall be well separated from the processing areas. The refuse room or other acceptable refuse facility, equipment and utensils used for waste, offal and refuse removal, collecting or storage, shall be cleaned and disinfected daily. Refuse, offal or waste shall be handled and stored without a risk of contamination to the product, potable water, equipment, utensils or the environment. Hazardous substances shall be disposed of in an environmentally acceptable manner.

4.5.9 Vermin control

All buildings in which raw materials, ingredients and the product are stored, or in which the product is handled, prepared, processed or packaged, shall be kept free from insects, rodents, birds and other vermin. The factory and its premises shall be regularly inspected by trained personnel for the evidence of infestation by insects or rodents and for the presence of birds and wild or domestic animals (see 4.2.1 and 4.5.11). All rooms in which raw materials and ingredients are stored shall, in addition, be rodent proof. Potential breeding sites shall be eliminated.

An effective and continuous programme for pest control shall be established, implemented and maintained (see 4.5.10).

A site drawing and register of all bait stations shall be kept up to date and open baits shall not be present in processing areas or ingredient, product and empty container and lid stores.

4.5.10 The use of pesticides or poisonous or other harmful materials (see 4.2.18.1)

Only pesticides that have been officially approved for use in food establishments shall be used.

Pesticides shall not be used in work areas while preparation, processing and packaging are in progress. Adequate precautionary measures shall be taken to prevent contamination of the product, product contact surfaces, equipment and utensils during and after application of pest control treatments. Precautions shall be taken to ensure that equipment, product contact surfaces and other work surfaces are free from pesticide residues before being used again. Containers with pesticides, bait or open bait shall not be present in an area or room where the exposed product or ingredients are present or handled. Pesticides shall not, at any time, be allowed to come into contact with containers intended for packing the product or ingredients, or raw materials, or the product, or product contact surfaces. Pesticides or poisonous or other harmful materials shall only be dispensed, handled or applied by authorized and properly trained personnel or by persons under strict supervision of such authorized and trained persons.

Insect electrocuters shall be fitted with catch trays of adequate size and shall not be located over areas where the unprotected product is handled, or over product contact surfaces or in such a position where there is a risk of product contamination.

4.5.11 Animals (see 4.2.1 and 4.5.9)

Animals, including birds, shall not be allowed in any part of the factory. Security dogs shall not be allowed in, or come in contact with production or product handling areas or product contact surfaces.

4.5.12 Supervision

Responsibility for ensuring observance of the requirements of this section, by all personnel, shall be given specifically to competent staff members.

4.6 Requirements for employees engaged in the handling, preparation, processing, packaging and storage of the product

4.6.1 Operating requirement

The production planning shall be such that workers will not be subjected to such exhausting long working hours that could result in a lack of their concentration with the risk of adversely affecting the product quality and safety

4.6.2 Health

4.6.2.1 Before being engaged, employees shall pass an appropriate medical examination to ensure that they are free from communicable diseases, and shall thereafter pass an annual medical examination.

4.6.2.2 No person who is suffering from any communicable disease, a carrier of pathogenic micro-organisms such as *Salmonella*, *Shigella* presumed pathogenic *Staphylococcae* and A-type haemolytic *Streptococcae*; or parasites such as any vegetative or cystic amoeba, tape-worm or any type of helminthiasis, or shows symptoms of or is suffering from gastro-enteritis or an enterobacterial infection or a disorder or condition causing discharge of fluid from any part of the skin or body, shall be allowed to come into contact with the product, containers or product contact surfaces. Any such person or worker in the factory in a capacity in which there is a possibility of the product or ingredients becoming contaminated or the disease being transmitted to other individuals, shall immediately report to the factory management.

4.6.2.3 The management shall ensure that no employee who is known or suspected to be affected with a disease capable of being transmitted through food shall be permitted to work in any part of the factory in a capacity in which there is a possibility of the employee's contaminating the product with pathogenic organisms.

4.6.2.4 In the case of any absence of more than one day due to illness, the employee shall, before resuming duty, report the nature of the illness which necessitated the absence to the factory hygiene officer who shall, should he deem it necessary, take the appropriate steps to obtain a medical opinion on the employee's fitness for work.

4.6.2.5 An appropriate medical record of each employee shall be kept. Medical records and any medical certificate submitted by a factory employee shall be available for inspection by the authority administering this specification.

4.6.2.6 The management shall ensure that no employee who is suffering from any cut, injury, infected wounds, infected skin irritations, shall be allowed to come into contact with the product, ingredients, containers, product contact surfaces, unless the cut or injury has been so treated or dressed that the discharge of body fluid has been prevented, and the wound and its dressing have been so covered as to ensure that infection or contamination of the product is no longer possible. Such dressing and its covering shall be conspicuous in colour.

4.6.2.7 Employees performing close-up inspections shall undergo an eye-sight test at least annually.

4.6.3 Protective clothing

4.6.3.1 All employees engaged in the handling, preparation and processing of the product up to and including the cooling of cans after retorting, but excluding employees operating within freezer storage rooms, shall wear clean, light-coloured, protective clothing covering the entire body except for the face, forearms and hands, suitable waterproof boots, and clean, washable or disposable headgear that completely covers their hair including beards and if necessary, hair nets.

4.6.3.2 Employees handling the open product shall wear light-coloured waterproof aprons.

4.6.3.3 Gloves if used, shall be made of impermeable material and be washable. The wearing of gloves shall not exempt workers from washing their hands.

4.6.3.4 Woollen caps may be worn in freezer rooms only.

4.6.3.5 Overalls shall completely cover the personal clothing of the employees. At the end of each working day soiled overalls and headgear shall be handed in for laundering. Employees shall not take protective clothing used in the processing area home for washing and shall not wear their protective clothing outside the factory premises.

4.6.3.6 Sleeves shall not extend below the elbows, except when covered by plastics sleevelets or when worn in freezer storage rooms.

4.6.3.7 Protective clothing, other than waterproof aprons, sleevelets and gloves, shall not be stored in work areas; when not in use it shall be kept in change-rooms and shall not be removed from the premises except for laundering under hygienic conditions. The homes of employees shall not be regarded as acceptable for laundry purposes.

4.6.3.8 Waterproof protective clothing shall be of a plastics, rubber or other acceptable material. All protective clothing shall be of hygienic design, shall not have external pockets above the waistline, shall be in good repair and shall not constitute a source of contamination to the product.

4.6.3.9 Employees shall not visit the toilets and cloakrooms with their waterproof aprons, gloves and plastic sleevelets on. Hooks and pegs shall be provided at the exit before the hand-wash facilities upon leaving the processing areas, for hanging waterproof aprons and gloves. Pegs for gloves shall not be located above other protective clothing in such a way that contamination by means of dripping water can occur. Hooks for aprons shall be adequately spaced apart to prevent contact between aprons and a consequent build-up of contaminants.

4.6.3.10 Waterproof aprons, sleevelets and gloves shall be cleaned and disinfected immediately at the end of each shift and at the end of each days' operations, at each time of undress and as frequently as necessary, and shall be hung on hooks or pegs at exits from work areas during intervals between work and during visits to the lavatory. Waterproof protective clothing such as aprons shall not be washed on the floors. Waterproof aprons, sleevelets and gloves, as well as equipment used in the preparation, processing and packaging of the product, shall be not removed from the work areas except for repairs and for cleaning under hygienic conditions.

4.6.4 Personal hygiene

4.6.4.1 Workers shall at all times be clean of person and maintain a high degree of personal cleanliness and conform to hygienic practices while on duty. Workers shall be trained and educated in personal cleanliness and hygienic practices. Adequate control shall be exercised to ensure that employees are in compliance with the hygienic requirements such as supervision at the hand-washing facilities before commencing work at the beginning of a work-shift and after breaks.

4.6.4.2 Before commencing work, and after each absence from the factory preparation, processing or packaging area, after blowing their noses, after handling unwashed vegetables, at regular intervals during production, or at any time necessary such as after handling contaminated material, and after using the toilet, employees shall wash their hands with warm running water complying with 4.4.1, and an acceptable unscented liquid soap or detergent, after which they shall rinse their hands in clean, running,

potable water complying with 4.4.1. They may then immerse their hands in an acceptable disinfectant, after which they shall rinse their hands in clean running potable water, complying with 4.4.1 if so required by the usage directions of the hand dip.

4.6.4.3 Fingernails shall be kept short and clean and free from varnish or lacquer. Jewellery shall not be worn by employees who handle raw materials or the unprotected product.

4.6.4.4 The necessary precautions and control shall be exercised to prevent contamination through the workers of the product with micro-organisms and foreign substances including but not limited to, perspiration, hair, cosmetics, chemicals and medicants, or any behaviour that could result in the contamination of the product. Workers handling the unprotected product shall keep their hands away from their noses, eyes, ears, hair, mouths or licking their fingers when handling the unprotected product.

4.6.4.5 Workers shall not cough, sneeze or blow their noses over the unprotected product. Containers used in the preparation, processing or packaging of the product shall not be used for any other purpose. The use of chewing gum and tobacco in any form shall not be allowed within the areas where the product and its ingredients and packaging materials are handled or stored. Spitting shall not be allowed anywhere within the factory premises.

4.6.5 Personal effects

Neither workers' personal effects nor their food shall be present in the preparation, production, processing and packaging areas or where the product, its ingredients or packaging materials are handled or stored. Employees' personal effects including their personal clothes shall be kept in lockers or hangers provided for this purpose in cloakrooms. No food or drink, other than that forming part of the product produced, shall be prepared and no food or drink shall be consumed in these areas.

4.6.6 Notices and supervision

Notices prohibiting eating, spitting and the use of chewing gum and tobacco in any form, shall be posted in each production area and in each area for the storage of ingredients. Notices requesting employees to wash their hands on entering the production areas shall be posted at each entrance used by employees to gain access to those areas. Notices shall be posted at the toilets directing employees to wash their hands after using the toilet (see 4.2.9.1(d)).

Adequate supervision shall at all times be practised to ensure compliance with this section.

Responsibility for ensuring observance of all personal practices, operations and requirements of this section by all people and employees shall be given specifically to competent staff members.

4.6.7 Visitors

A strict control of visitors entering the factory shall be exercised.

Any person who visits or enters the preparation, processing or packaging areas during the hours of operation shall, when in those areas, observe and adhere to all relevant hygiene requirements and shall wear clean protective clothing that shall be provided by the factory.

5 Ingredient requirements

5.1 General

All ingredients and the quantities used, whether specified or not, shall comply with the relevant provisions of the Trade Metrology Act, 1973 (Act 77 of 1973), the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act 54 of 1972) and any relevant regulations framed under that Act. (All Acts as amended from time to time.)

5.2 Condition of ingredients

All ingredients shall be clean and sound and in every way fit for human consumption. The temperature of prepared cold meat and cold product emulsions of mixtures that are awaiting processing shall not be more than 7 °C. The transportation of ingredients shall take place under hygienic conditions. The transportation of meat shall be executed in accordance with the requirements of the Abattoir Hygiene Act, 1992 (Act 121 of 1992) (as amended from time to time).

5.3 Meat and offal

Meat and edible offal shall have been inspected and passed as fit for human consumption in accordance with the statutory provisions governing animal slaughtering, meat hygiene and meat inspection. The use of frozen meat and edible offal is allowed, provided that they have been frozen and stored under acceptable conditions and show no evidence of rancidity or discolouration and have been defrosted in a way that does not adversely affect quality. Only chilled carcasses in which rigor mortis has occurred fully or carcasses that have been frozen and thawed may be deboned for processing, unless hot deboning is used.

Meat and edible offal shall be free from off-odours, off-flavours, and taint. Meat and edible offal that are bruised, meat that is from parts of the head other than the masseter muscles, and, in the case of pork, the teat line, shall not be used. Inedible offal shall not be used. Cartilage, glands, blood clots, major sinews, major tendons and major blood vessels shall be removed, except that sinews and tendons may be used in natural binder.

Except where other statutory regulations apply, the deboning of red meat carcasses and the cutting up and preparation of meat for canning shall, except where the nature of the process makes it impossible, be performed in work areas where the temperature does not exceed 15 °C. The temperature of meat being deboned shall at no time exceed 7 °C, except when hot deboning is performed. These areas shall be physically separated from the heat processing areas of the factory.

5.4 Fat

Fat shall be pure, edible and free from obvious rancidity. Anti-oxidants may be used in accordance with the provisions of the said Foodstuffs, Cosmetics and Disinfectants Act.

5.5 Salt

Salt shall be of good edible quality and shall be free from bitterness.

5.6 Seasoning ingredients

Seasoning ingredients shall be pure natural spices or herbs or their preparations, essential oils and essences, and shall be free from foreign matter and of a microbiological quality that conforms with the requirements of the current Foodstuffs, Cosmetics and Disinfectants Act.

5.7 Sodium glutamate

Sodium glutamate used in the product shall be specially prepared for use in foods.

5.8 Tomato purée and tomato paste

Tomato purée and tomato paste shall comply with the requirements for specification grade canned tomato purée and canned tomato paste prescribed by the regulations under the current Agricultural Products Specifications Act, 1990 (Act 119 of 1990) (as amended from time to time).

5.9 Fruit and vegetables

Fruit and vegetables, whether fresh, frozen, canned or dehydrated, shall be suitably prepared from fresh fruit and vegetables that are free from insect infestation and contamination and that comply with the requirements for pesticidal residues under the current Foodstuffs, Cosmetics and Disinfectants Act. Canned fruit and canned vegetables shall comply with the relevant requirements for specification grade prescribed by the regulations under the said Agricultural Product Specifications Act.

5.10 Mushrooms

Fresh, frozen, canned, or dehydrated mushrooms, free from insect infestation and contamination and that comply with the requirements for pesticidal residues under the current Foodstuffs, Cosmetics and Disinfectants Act may be used. They shall be suitably prepared. Canned mushrooms shall comply with the relevant requirements for specification grade prescribed by the regulations under the said Agricultural Product Specifications Act.

5.11 Caramel

Caramel used shall be suitably prepared for use in foodstuffs.

5.12 Sweetening ingredients

All sweetening ingredients used shall comply with the requirements prescribed by the regulations under the current Foodstuffs, Cosmetics and Disinfectants Act.

5.13 Gravy thickeners

Only edible vegetable flours, gelatine, edible gums, modified starches, and agar-agar, the last three in concentrations in the gravy of not more than 1 % by mass, may be used as thickeners in the preparation of gravy.

5.14 Curing salts

Curing salts shall be of a quality intended for use in foods.

5.15 Phosphates

Phosphates shall be suitable for use in meat products.

5.16 Citric, lactic, and ascorbic acids

Citric, lactic, and ascorbic acids shall be of British Pharmacopoeia quality. Sodium ascorbate shall be of a grade intended for use in foods.

5.17 Starchy (farinaceous) materials

Subject to the requirements of the current Foodstuffs, Cosmetics and Disinfectants Act, fillers used shall be cereal, rusk, biscuit meal, potato flour, or other edible starchy (farinaceous) material, including edible gums and modified starches.

5.18 Soya and other non-meat proteinaceous materials

Subject to the requirements of the regulations under the said Foodstuffs, Cosmetics and Disinfectants Act, and subject to the conditions in 6.12, soya and other non-meat materials may be used.

5.19 Milk powder

Milk powder shall be pure, fresh and sweet and when tested in accordance with 11.19, no sample shall have a total bacterial colony count in excess of 50 000 organisms per gram. When tested in accordance with 11.20, no sample shall contain *E. coli* in 1 g.

5.20 Eggs

Eggs (fresh, dried, or liquid) shall be sound and when tested in accordance with 11.22, shall not contain *Salmonella* organisms.

5.21 Colourants

Any colourant used (see 6.6) shall be one of those permitted by the regulations under the said Foodstuffs, Cosmetics and Disinfectants Act.

5.22 Garnish

Garnish, if used, shall consist of pimento, cured olives or other suitably prepared, sound, edible vegetable material.

5.23 Natural binder (see 6.13, 12.1.1.5 and 12.1.1.6)

Natural binder shall be finely comminuted gelatinous material derived from one of the following:

a) in the case of beef or mutton, gelatinous materials such as sinews, connective tissues and other suitable parts of the carcass including skin acceptably processed into collagen and lips and snouts acceptably cleaned and processed;

b) in the case of pork, gelatinous materials such as the skin, sinews and face pieces; or

c) in the case of poultry, the skin and connective tissues.

5.24 Stabilizers

Stabilizers shall comply with the said Foodstuffs, Cosmetics and Disinfectants Act.

5.25 Lard

Lard shall comply with the requirements of 7.10 for canned edible lard.

6 Product requirements

6.1 General

In the event of doubt regarding the compliance of the product with any requirement of this specification that relies wholly or partially for its interpretation on the experience or judgement of the person carrying out the assessment, the decision of the authority administering this specification shall be final.

6.2 Flavour, odour, colour, and appearance

The canned product shall have a flavour, an odour, a colour and an appearance that are characteristic of its type. Foreign flavours and foreign odours, and off-flavours and off-odours shall not be present.

6.3 Texture

The product shall have a texture characteristic of its type. Vegetables or fruit, if present as garnish, shall be tender but not mushy, abnormally fibrous or stringy. Cereals, if present, shall not have an abnormally mushy or soggy texture.

6.4 Freedom from defects

Bone and skin, except where one or both are specifically permitted, blood clots, and cartilage, shall not be present. Permitted bone shall not be dangerously sharp. The proportion of soft connective tissue present in the product shall be the same as that present in the carcass or meat cuts used. The product shall be free from dirt, grit, hair, loose pieces of solder and other extraneous matter.

6.5 Fill of container

Except where otherwise specified, the product shall occupy at least 90 % of the total volume capacity of the container (see 10.4).

6.6 Colourants

Except where specifically permitted, artificial colourants shall not be present (see 5.21).

6.7 Curing salts

Where the presence of curing salts is permitted the limits specified by the current Foodstuffs, Cosmetics and Disinfectants Act shall be complied with.

6.8 Phosphates

The presence of phosphates, where permitted, shall be in accordance with the requirements prescribed by the regulations under the current Foodstuffs, Cosmetics and Disinfectants Act.

6.9 Smoke preparations

Smoke preparations suitable for human consumption may be used (see 12.1.1.2.3).

6.10 Anti-oxidants

All anti-oxidants used shall be as prescribed by the current Foodstuffs, Cosmetics and Disinfectants Act.

6.11 Preservation

With the exception of products of which the label states that the product is to be kept under refrigeration (see 12.1(e)) and semi-preserved products (see below), all canned meat products shall have been commercially sterilized by heat treatment.

Canned meat products covered by this specification and packed as semi-preserved meats shall have been preserved by salting, brining, pickling or smoking, or any combination of these, and may in addition have been pasteurized (partially heat processed). The presence of preservatives shall be subject to the regulations under the current Foodstuffs, Cosmetics and Disinfectants Act. The products shall not contain inorganic acids.

6.12 Soya and other non-meat proteinaceous materials

The product may contain soya and/or other non-meat proteinaceous materials subject to the following:

6.12.1 If required to do so by the authority administering this specification or the authority administering

the regulations under the current Foodstuffs, Cosmetics and Disinfectants Act, the manufacturer of the canned meat product shall disclose to the authority the composition of the non-meat proteinaceous preparation that has been used and the concentration at which it is present in the meat product.

6.12.2 Where soya and/or other non-meat proteinaceous material is present in products that contain the meat content called for by this specification, the presence of non-meat proteinaceous material shall be declared in the ingredients panel of the label. The meat content of the product may be declared immediately below the title in type of at least half the size of that used for the words in the title and of minimum size 2 mm.

6.12.3 Where any part of the meat content of a product laid down by this specification has been replaced by soya and/or other non-meat proteinaceous material, the presence of this substituted material shall be declared conspicuously and prominently in the title of the product, in the main panel of the label, in the same colour as the rest of the title and in type of at least half the size of that of the words appearing in the rest of the title. The meat content shall be declared immediately below the title in type of at least half the size of the larger type used for the words in the title and of minimum size 2 mm.

6.12.4 Subject to the provisions of 6.12.3, up to 25 % of the lean meat content of emulsified or comminuted canned meat products may have been replaced by soya and/or other non-meat proteinaceous material. In the form of textured vegetable protein, substitution to the same extent may have taken place in canned stewed meat products.

6.12.5 Soya or other non-meat proteinaceous material or both, may be present in the following products:

a) corned meat;

b) meatballs;

c) meat pastes, potted meat, minced meat and gravy;

d) meat patties;

e) meat rolls;

f) sausages other than boerewors and raw species sausage and raw mixed-species sausage; and

g) stewed or braised meat products.

6.12.6 In the case of new products, specific approval from the authority administering this specification shall be obtained for the use of soya or other non-meat proteinaceous material.

6.12.7 Soya or other non-meat proteinaceous material shall not be present in the following products:

a) boerewors or raw species sausage or raw mixed-species sausage;

b) brawn;

c) corned beef and corned beef with cereal;

d) ham, cured shoulder and solid pressed beef;

e) infant's food; or

f) tongue.

6.13 **Natural binder** (see 5.23)

The natural binder used shall be derived only from the same type of animal(s) from which the meat used in the product is derived unless labelled in accordance with 12.1.1.5 or 12.1.1.6.