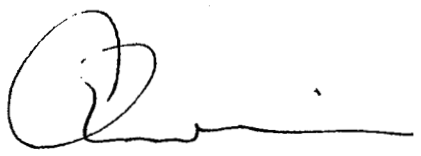
No. R. 1076 **1 August 2003**

STANDARDS ACT, 1993

PROPOSED REPLACEMENT OF THE COMPULSORY SPECIFICATION FOR THE MANUFACTURE, PRODUCTION, PROCESSING AND TREATMENT OF CANNED FISH, CANNED MARINE MOLLUSCS AND CANNED CRUSTACEANS

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 crustaceans, as amended, published by Government Notice No 357 of 10 March 1972 and the manufacture, production, processing and treatment of canned fish, canned fish products and canned marine molluscs, as amended, published by Government Notice No R357 of 10 March 1972 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 FISH, CANNED MARINE MOLLUSCS AND CANNED CRUSTACEANS

1 Scope

This specification covers the manufacture, production, processing, and treatment of canned fish, canned fish products, canned marine molluscs, canned marine mollusc products, canned crustaceans and canned crustacean products.

2 Definitions

For purposes of this specification the following definitions shall apply:

2.1
acceptable
acceptable to the authority administering this specification

2.2
address
an 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 small holding and of the magisterial district where it is situated. In the case of imported foodstuffs, "address" means the address of the manufacturer or supplier or importer

2.3
adequate
sufficient to accomplish the intended purpose of this specification:

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.

2.4
appropriate
acceptable to, or required by the authority administering this specification

2.5
batch-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, which may indicate a line of production or a particular catch or harvest or delivery of the raw material

2.6
bleeders
small orifices on a retort through which steam and other gases are emitted from throughout the entire thermal process

2.7
canned crustacean
article of food for human consumption obtained by packing clean, sound crustaceans or the edible meat of crustaceans with or without the addition of seasoning and flavouring materials, water, edible oil, and other wholesome ingredients allowed by this specification, in hermetically sealed containers and obtained and maintaining it in sound edible condition by a process of preservation

2.8
canned crustacean product
article of food for human consumption prepared from clean, sound crustaceans or the edible meat of crustaceans with or without the addition of seasoning, and flavouring materials, water, fat, edible oil, farinaceous material, vegetables (including mushrooms), fruit and other wholesome ingredients allowed by this specification, packed in hermetically sealed containers and obtained and maintained in sound edible condition by a process of preservation

2.9
canned fish
article of food for human consumption obtained by packing clean, sound, edible fish or cuts of such fish or the flesh of such fish or parts of such fish with or without the addition of seasoning and flavouring materials, water, edible oil, and other wholesome ingredients allowed by this specification, in hermetically sealed containers and obtained and maintaining it in sound edible condition by a process of preservation

2.10
canned fish product
article of food for human consumption prepared from clean, sound, edible fish or parts of such fish with or without the addition of seasoning, and flavouring materials, water, fat, edible oil, farinaceous material, vegetables, including mushrooms, fruit and other wholesome ingredients allowed by this specification, packed in hermetically sealed containers and obtained and maintained in sound edible condition by a process of preservation

2.11
canned marine mollusc
article of food for human consumption obtained by packing clean, sound, edible mollusc or meat of mollusc with or without the addition of seasoning and flavouring materials, water, fat, edible oil, and other wholesome ingredients allowed by this specification, in hermetically sealed containers and obtained and maintaining it in good edible condition by a process of preservation

2.12
canned marine mollusc product
article of food for human consumption prepared from clean, sound, edible mollusc or meat of molluscs with or without the addition of seasoning, and flavouring materials, water, fat, edible oil, farinaceous material, vegetables, including mushrooms, fruit and other wholesome ingredients allowed by this specification, packed in hermetically sealed containers and obtained and maintained in sound edible condition by a process of preservation

2.13
cleaning
removal of soil, food and fat residues, dirt, grease or other objectionable matter from surfaces

2.14
clean area worker
worker who operates in an area that is required to be maintained in a hygienic condition

2.15
code
number(s), letters or markings or any combination of these, indelibly affixed to containers representing the factory identity, batch code and sub-code where applicable

2.16
coming-up time
time, including venting time, that elapses between the introduction of the heating medium into a closed retort and the time when the temperature throughout the retort reaches the required sterilization temperature

2.17
commercially sterilized product
product:

a) that is processed in such a way as to reduce the number or activity or both of viable micro-organisms or their spores to such an extent that no growth is detectable by the methods given in 12.1 or 12.2

b) in which no spoilage or toxicity of microbial origin is detectable under normal, non-refrigerated conditions of storage, distribution and handling using the method in 12.1

2.18
container
rigid or semi-rigid container including collapsible tubes and retort pouches made of tinplate or, glass or other acceptable material or mixture or layers of different materials that excludes the permeation of gas and that is capable of being hermetically sealed

2.19
contamination
occurrence of any undesirable matter in the product

2.20
count
number of units of fish, molluscs or crustaceans or cuts of fish or units prepared from fish, molluscs or crustaceans present in the container

2.21
crustacean
any invertebrate animal breathing by gills and having jointed limbs and a hard segmented exoskeleton or outer shell

2.22
dirty area worker
worker who operates in an area that cannot be maintained in a completely hygienic condition as required for the product processing areas

2.23
disinfection
application of hygienically satisfactory chemical or physical agents and processes to reduce or eliminate micro-organisms

2.24
distinct
capable of being readily perceived by vision, odour, touch, mouth feel, taste or flavour through an objective impression, not blurred, obscured or indefinite

2.25
d.n.m
net mass of the contents declared on the container

2.26
drained mass
washed mass
mass of the contents, without the packing medium, of a container in that equilibrium has been reached, determined in accordance with 11.5

2.27
extraneous matter
any material readily recognized without magnification in the product which has not been derived from the fish or molluscs or crustacean used, or from the ingredients added or is present at a level determined by any method, including magnification that indicates non-compliance with good manufacturing practices and sanitation practices

2.28
fish
any vertebrate cold-blooded marine or fresh water animal having gills throughout life, and limbs, if any, modified into fins

2.29
flesh pack
pack consisting of the musculature tissues of raw material covered by this specification

2.30
headspace and net headspace
headspace means the volume in a container not occupied by the food and net headspace is the mean vertical distance between the upper level of the product in an upright rigid container and the inside surface of the lid

2.31
hermetically sealed containers
containers that are designed and intended to protect the contents against the entry of micro-organisms and air during and after heat processing and prevent leakage of the contents

2.32
honeycombing
formation of alveolaires
a condition characterized by decomposition of the flesh resulting in formation of voids in the meat, occurring sometimes on the surface of the cut of the meat, but more often in between the layers of fish flesh

2.33
initial temperature
temperature at the coldest spot of the contents in the coldest container to be processed at the onset of the sterilization/pasteurisation process

2.34
name of the product
product name
name and true description of the contents of the can as is required on the main panel of the container or the main panel of the label on the container

2.35
non-fish proteinaceous materials
any nitrogen protein obtained from sources other than from fish, molluscs and crustaceans

2.36
MIG thermometer
Mercury-in-Glass thermometer

2.37
off-odour
persistent and distinct objectionable odour abnormal for the type of product

2.38
off-flavour
persistent and distinct objectionable flavour abnormal for the type of product

2.39
packed/canned in the round
packed (canned) "whole" i.e. head on, untrimmed, and guts in (or guts may be removed in the case of finfish)

2.40
packing medium
any medium in which solid foods are packed in a container

2.41
per cent (%)
percentage
per cent (percentage) as a mass fraction, by mass, unless otherwise indicated or as is consistent with the text

2.42
persistent
existing without significant change; not fleeting

2.43
plain pack
fish packed either in its own exuded oil or liquid without any additional ingredient other than salt, or in brine

2.44
potable water
water that complies with the requirements of SANS 241 (SABS 241), *Drinking water*

2.45
preserve
maintain in sound edible condition by the prevention of deterioration, decomposition, or putrefaction

2.46
process
course of operations during production of the product

2.47
product
either fish, marine molluscs or crustaceans or products of these or any combination of these, canned or in the course of transporting, handling, preparation, packing, processing for canning as indicated by the context

2.48
production lot
containers of the same product and container size produced on the same day under the same conditions by the same factory and identified by the same code

2.49
retort
vessel that may be pressurized and is designed for thermal processing of product packed in hermetically sealed containers

2.50
retort process
the entire process that starts with the loading of the retort, where relevant, the closing of doors, introduction of the heating medium and continuous heating through the coming-up time, sterilization time, and ends at the end of the cooling process when the retort door is opened

2.51
semi-preserved product
product requiring refrigeration for continued preservation

2.52
shallow container
container with the height shorter than the diameter of the container

2.53
slack filling
excessive lateral free space, whether between individual units or cuts of fish or between units or cuts of fish and the walls of the container, or between both

2.54
sterilization schedule
time and temperature process scientifically determined for a given product and container type and size established at a specific initial temperature to achieve at least the intended condition of either a commercially sterilized product or a semi-preserved product

2.55
sterilization temperature
minimum temperature to be maintained throughout the sterilization time as specified in the sterilization schedule

2.56
sterilization time
time between the moment the sterilization temperature is achieved and the moment the heating medium is turned off. If the sterilization temperature is achieved prior to the completion of the venting cycle, sterilization time means the time between the completion of the venting cycle and the moment the steam is turned off

2.57
sub-code
number(s), letter(s), or marking(s) or any combination of these, in addition to the batch code, representing a particular time on the date of canning which may indicate a line of production or a particular catch or harvest or delivery of the raw material

2.58
suitable
suitably
complying with the requirements of the intended purpose

2.59
suitably prepared
prepared for the intended purpose

2.60
thermal process
heat treatment to achieve the intended condition of either a commercially sterilized product or a semi-preserved product that is quantified in terms of time and temperature

2.61
time-and-temperature process
continuous heat treatment, expressed in terms of time and temperature, applied in the processing of heat-preserved products after the container has been sealed

2.62
uniformity in unit size
situation where the mass of a unit in any one container is within 20 % of the average mass of all units in the container

NOTE 1 In most instances one smaller filler piece may be added to the contents to adjust the net mass.

NOTE 2 Where unit size is within tolerances described in a product description on a label, this requirement is irrelevant.

2.63
venting
process of flushing air out of steam or steam-air retorts during coming-up time before the start of the timing of the sterilization schedule

2.64
vents
relatively large, controlled ports in retorts used for purging or eliminating air from the retorts

3 Requirements for the factory and for employees

3.1 General

Management shall implement documented methods and procedures that can testify that an acceptable product safety management system has been incorporated.

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 3.1 to 3.6 inclusive.

All the statutory requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) and the Health Act, 1977 (Act 63 of 1977) (as amended from time to time) shall be complied with.

3.2 Factory construction, layout and conditions

3.2.1 Location, size, hygienic design, conditions and maintenance

3.2.1.1 The factory shall be situated in an environment deemed by the authority administering this standard to be suitable for the canning of the product.

The location of the factory and the designed construction of the factory 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 of the Health Act, 1977.

3.2.1.2 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) adequate food safety management procedures.

The factory shall have the necessary fittings, equipment, utensils, the technical supervision and skilled labour to carry out the production process as required and in accordance with its design.

3.2.1.3 The factory grounds shall be graded to ensure proper drainage, eliminate stagnant water and shall not be subject to flooding. There shall be no inadequately drained areas that may contribute to contamination of the product through seepage of food-borne filth and by providing breeding places for insects or micro-organisms. 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. Outside surfaces shall be constructed as to prevent the entry of rain or waste water.

3.2.1.4 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 may constitute an attraction, breeding place or harbourage for rodents, insects or other pests.

3.2.1.5 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.

3.2.1.6 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.

3.2.2 Roofs and ceilings

3.2.2.1 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.

3.2.2.2 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.

3.2.2.3 Roofs where no ceilings are fitted, and ceilings in other cases, shall be faced with a smooth water-impermeable material that is 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.

3.2.2.4 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. The structures should be insulated where appropriate.

3.2.2.5 Areas where the sauce is prepared, cooked product is handled or ingredients are stored, shall have overhead ceilings. A ceiling is not required where a canopy covers the entire open product.

3.2.2.6 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.

3.2.3 Walls and doors

3.2.3.1 Outer walls shall be weatherproof and impermeable to water.

3.2.3.2 Interior wall surfaces shall be faced with a smooth, without crevices, (an unplastered brick surface is unacceptable), hard, water-impermeable, light-coloured material 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, water-impermeable, impact-resistant, non-toxic material 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.

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

3.2.3.4 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.

3.2.3.5 Windowsills shall be sloped to the inside at an angle of at least 45° and shall be at least 1 m above floor level.

3.2.3.6 Windows and other openings shall be so constructed as to avoid accumulation of dirt. Windows shall be tight fitting into their frames. Joints on panelled walls and junctions of the panels and floor surface shall be adequately sealed. Where appropriate, walls shall be protected from damage by moving equipment and fork trucks. Galvanized guardrails or the equivalent shall be used for this purpose.

3.2.3.7 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.

3.2.3.8 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, water-impermeable, light-coloured, readily cleanable surface. Doors that open directly from the outside into the preparation, processing and packaging areas shall be tight fitting and be of a self-closing type.

3.2.3.9 Direct entrance(s) from the outside that is (are) used by the employees shall be provided with an entrance hall furnished with wash hand basins, boot cleaning apparatus and/or proper foot baths into the factory building.

3.2.4 Floors and drainage in processing and food handling areas

3.2.4.1 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.

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

3.2.4.3 Floors and drainage channels shall be evenly sloped 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.

3.2.4.4 Outlets shall have a suitable drain trap to prevent vermin entering the factory from the sewer system. Floors and drainage channels shall be in good condition and repair, and gully traps shall have strainers in place. Internal drainage channels shall be of the open type with, where necessary, removable covers.

3.2.4.5 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.

3.2.4.6 Where necessary, stands or duckboards made from material that is washable and water-impermeable shall be provided for workers.

3.2.5 Lift cages and staircases

3.2.5.1 Lift cages shall have a corrosion resistant inside surface that is smooth, easy to clean, and water-impermeable, and the floor shall be properly drained.

3.2.5.2 Staircases in rooms where food is processed or handled shall have solid risers, and shall be provided with closed balustrades of a height that will prevent contamination of products underneath the stairs.

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

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

3.2.5.5 Chutes shall be constructed where appropriate with inspection and cleaning hatches.

3.2.6 Cables and pipes

3.2.6.1 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.

3.2.6.2 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.

3.2.6.3 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.

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

3.2.7 Illumination

3.2.7.1 General illumination shall be such as to permit efficient operation during manufacture of the product.

3.2.7.2 An illumination of at least 220 lux is required for general operations in the manufacture, production, processing or treatment of the product, while at least 540 lux is required at points where close examination of the product or containers is carried out.

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

3.2.7.4 Luminaires suspended over production areas, container storage areas and ingredient storage areas, shall be of the safety type or otherwise protected to prevent contamination of the product in case of breakage. Suspended fixtures shall be so constructed and so situated to facilitate easy cleaning and maintenance.

3.2.8 Ventilation

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

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

3.2.8.3 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. The screens shall be easily removable for cleaning and shall be regularly cleaned.

3.2.8.4 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.

3.2.8.5 Mechanical 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.

3.2.9 Hand-washing facilities

3.2.9.1 The following shall be provided at the entrances to the preparation and processing areas of the factory used by the employees, and at other strategic and convenient places wherever the process demands it:

a) an adequate number of wash-hand basins, with an abundant supply of hot and cold running potable water from taps operated by means other than hands or elbows, or warm potable 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 for used disposable towels at each hand-washing facility. These receptacles shall be regularly emptied; and

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

   1) after using the toilet,

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

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

3.2.9.2 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 (e.g. guided by a rail).

3.2.9.3 The hand-washing facilities at the entrances to the processing areas and inside the processing area shall be located in such a position that employee practices can be supervised.

3.2.9.4 Access to hand-washing facilities shall, at all times, be unobstructed by equipment and operating activities. Wash-hand basins shall be of a suitable corrosion-resistant impermeable material, shall have a smooth finish, be easy to clean and shall drain directly into the waste water system.

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

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.

3.2.10 Footbaths and boot-wash basins

3.2.10.1 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.

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

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

3.2.11 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, and 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 on the ingredients, packing, materials, handling and processing from the arrival of raw materials, 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 and designated cleaning areas. Workshops and comfort areas shall be completely separated from preparation, processing and storage areas,

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

h) an orderly and undelayed flow of production,

i) prevention of cross flows of operations that may have an adverse effect or reduction in the quality of the product or separation of those operations that may cause cross contamination, and

j) minimizing the risk of the product being contaminated.

3.2.12 Storage facilities for edible raw materials

3.2.12.1 Holding tanks for fish, molluscs and crustaceans shall be constructed of material that is durable, water-impermeable, resistant to flaking or poverising and capable of withstanding repeated cleaning and disinfection.

Water or ice water used for storage of the raw product shall not be re-circulated for the purpose of repeated use without adequate treatment to maintain its purity. Provision shall be made for drainage of the tanks without contaminating the product.

3.2.12.2 Edible materials shall be stored in a 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. Materials not used in contact with the product shall not be stored in the same rooms where edible or packing materials are stored.

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

3.2.12.4 Edible material 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 and shall be properly identified.

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

3.2.13 Storage facilities for items not used in contact with the product

Materials capable of contaminating the product and spare parts for machinery shall be stored separately from the processing area.

3.2.14 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 store-rooms reserved for the purpose. Precautions shall be exercised that containers and closures are not exposed to dust and other 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.

3.2.15 Storage facilities for poisonous and harmful materials

3.2.15.1 Storage facilities for pesticides and other poisonous materials

Poisonous or other harmful materials, pesticides and equipment for their application, shall be stored in an enclosed 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.

3.2.15.2 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.

3.2.15.3 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 so as to not present a risk of the product being polluted during the storage and manipulation of these fuels.

3.2.15.4 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.

3.2.16 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 an hygienic manner in an area that is dry, free from dust and any other source of contamination by vermin. 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 not stored with operational utensils and equipment parts used in contact with the product.

3.2.17 Storage facilities for finished products

Finished products awaiting dispatch shall be stacked away from the floors and walls in ventilated, dust-free, dry and clean rooms. The storage area for finished products shall be physically separated from areas where steam is generated. The storage area shall be such that the finished products are protected against environmental elements or any other condition that may adversely affect the product.

3.2.18 Labelling

The construction and layout of the labelling area shall be such that orderly, neat and tidy conditions can be maintained and the possibility of confusion between different production lots will be precluded. Illumination shall be in accordance with the requirements in 3.2.7.

3.2.19 Smoke units

Where used, smoke units shall be maintained in an 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 may not emit any smoke into the processing area and the area adjacent to such a generator is to be partitioned off from the processing area so as to prevent contamination of the area with sawdust. Open sawdust shall be not 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.

3.2.20 By-products

Processing plants for the manufacture of by-products such as fish meal, fish oil, stick-water concentrates, and similar products from fish, fish residues, and fish waste shall be effectively separated from the cannery in such a way that there is no risk of contamination of the product. There shall be no direct access from such a by-product plant to the preparation and processing areas of the cannery. Utensil and equipment used in by-product plants may not be used in areas where food for human consumption is handled.

3.2.21 Refuse

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

3.2.22 Effluent sewage and waste disposal

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 or ingredients and shall not create an unsanitary condition or nuisance. Drainage and sewer pipes shall not be installed directly 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.

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 as per requirements of local authorities but in such a manner that health risks are eliminated.

Offal and rubbish shall be so conveyed, disposed, or stored as to minimize the development of bad odours and to prevent the harbouring and breeding of vermin and prevent contamination of the product or product contact surfaces, ground surfaces or water supplies. Manholes shall not be present in preparation and processing areas.

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

3.2.23 Comfort facilities

3.2.23.1 An adequate number of suitable dining rooms, change rooms, shower baths, wash-hand basins with taps, toilets (separate for each sex) and, where appropriate, urinals, shall be provided. The design, layout, construction and location of the comfort features shall be such as not to create a health hazard. Each shower shall have fresh (potable) hot and cold water supply and soap shall be supplied. Comfort facilities shall be separated and not open directly 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 to enable workers to dress with the required protective clothes before entering the preparation and processing areas. Change rooms may not open directly into the factory. They should be connected to processing areas in such a manner that protective clothing can be exchanged before leaving the factory of before visiting the toilets.

3.2.23.2 Toilets shall be conveniently located and be provided at a suitable distance from the production areas, shall not open direct onto production areas and shall be completely separated from change rooms. If toilets do not open into 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. The layout and equipment shall be such as to permit proper cleaning, maintenance and enable proper vermin control. The comfort features shall be designed to ensure hygienic removal of waste matter. A proper footbath is to be erected at the entrance lobby to the factory. An adequate supply of toilet paper shall be provided at the toilets.

3.2.23.3 Proper facilities such as clothes-baskets or well ventilated lockers shall be provided for the storage of the daily change of clothes at or near change room facilities. Where lock-up facilities are required for personal effects of workers, such facilities are to be provided in a separate room (e.g. rest rooms or dining rooms). 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 personal items attracting vermin. The lockers or baskets shall be maintained in a clean and good condition and repaired or shall be replaced when necessary.

3.2.23.4 The comfort facilities shall be adequately ventilated and illuminated. Toilets shall be ventilated to external air and 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.

3.2.24 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.

3.2.25 Facilities for washing and laundering of protective clothing

Plastic brushes on corrosion-resistant chains, disinfecting soap or powder such as hypochlorite, and spray nozzles shall be provided near the hand-washing facilities for the cleaning of waterproof protective clothing and gloves. The washing or laundering of other types of protective clothing shall be performed by the factory or a firm contracted by the factory. Workers shall not be allowed to remove work clothing from the premises in order to launder this clothing. Laundering facilities at the factory shall not be connected to processing or storage areas.

3.2.26 Facilities for cleaning and disinfecting portable equipment

The washing and disinfecting of portable or movable equipment such as trolleys, bins and other utensils shall be conducted in allocated areas furnished with proper floor drainage and the necessary water points. Such facilities shall either be located in a separate room or in a designated area that may be partitioned off from the preparation, processing and packaging areas where there is any 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, at adequate pressure, that complies with the requirements for potable water shall be provided. High pressure or high frequency oscillating water or detergent equipment shall be available where possible. The drainage shall be in a direction away from the food handling areas.

3.2.27 Freezers, chill rooms and freezer storage rooms

These facilities shall comply with the current compulsory specification for frozen fish and frozen fish products as published in Government Notice R1229 (Government Gazette No. 23903) of 11 October 2002.

3.2.28 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 fish shall be performed in a separate, 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 fish from shelves above shall be prevented. If the thawed product cannot be processed immediately, the product shall be kept under refrigerated conditions.

3.2.29 Ice-making plant and ice storage and transportation

Suitable and adequate facilities shall be provided for the production, storage and transportation of ice.

All surfaces of ice-making equipment that come into contact with ice shall be of suitable non-absorbent corrosion resistant material that shall not peel or flake. The ice-making plant shall be of such a design and construction to protect the ice against contamination and undue exposure to heat and to facilitate cleaning and the drainage of melted water. Ice shall be effectively protected against contamination and heat when transferred or transported.

3.2.30 Specific requirements for fishing vessels

3.2.30.1 Compliance with compulsory specification

Fishing vessels for freezing and chilling of fish shall comply with the requirements prescribed in the current compulsory specification for frozen fish and frozen fish products.

3.2.30.2 Good Manufacturing Practice (GMP) checks and documentation

The approach required is similar to that for fishing vessels for freezing and chilling prescribed in the said compulsory specification.

3.2.30.3 Construction and maintenance of production facilities and equipment

3.2.30.3.1 Water and ice used to chill the product shall comply with the requirements of SANS 241 (SABS 241), *Drinking water.* Seawater shall be clean and no seawater may be taken in near the shoreline unless it is cleaned beforehand. Establishments providing ice shall be inspected for conformance with the same requirements for fish processing areas in clause 3.

3.2.30.3.2 Sea water shall be taken in at the deepest possible point on the vessel. The water may not be used for engine cooling and the sea water supply lines may not have any cross-connections with engine cooling lines or waste water lines.

3.2.30.3.3 Water refrigeration lines shall be equipped with coarse screen filters and there may be no possibility that the refrigerated water may be cross-contaminated in the heat exchanging equipment.

3.2.30.3.4 The inside surfaces of the holds, tanks or containers shall be smooth, impermeable, corrosion and flake resistant and easy to clean and disinfect. They shall not transmit to fish products, substances harmful to human health.

3.2.30.3.5 Refrigeration tanks or holds shall be designed and equipped to

a) render satisfactory insulation,

b) enable adequate sea water filling and drainage,

c) enable effective circulation of sea water in tanks while incorporating coarse screen filters to allow a constant and unobstructed flow of refrigerated water,

d) enable the fish-water mix to reach a temperature of 3 °C or lower within 6 h after loading and 0 °C within 16 h of loading,

e) enable the temperature at the warmest spot in the tank to be recorded, and

f) prevent drainage water on deck from running into the tank.

3.2.30.3.6 If the catch comes into contact with the deck, the deck surfaces shall be smooth, easy to clean and disinfect and permit free and complete drainage of water. Deck surfaces constructed of wood, shall be made of hardwoods. The reception area for the fish on deck shall be arranged into pounds and pens of adequate size that are easy to clean.

3.2.30.3.7 The catch shall be kept out of the sun and protected from drying out by sprays of clean sea water.

3.2.30.3.8 Deck surfaces that come into contact with the fish shall be clean and shall not be liable to be contaminated by fuel or other petrochemical substances.

3.2.30.3.9 Where any fish is handled by crew, at least one wash hand facility shall be erected in the fish handling area. Taps shall not be operated by hands or elbows and liquid wash hand soap shall be provided.

3.2.30.3.10 Where gutting or heading and gutting are to be performed, the requirements are the same as for freezer vessels as detailed in the said compulsory specification for frozen fish and frozen fish products.

3.2.30.3.11 Chutes, pipes, conveyors and movable parts shall be water-impermeable, easy to clean and disinfect and shall be designed in such a way so as to not be a source of dirt and contamination.

3.2.30.3.12 Toilet facilities or the crew quarters may not open directly into the processing area/fish handling area unless doors are fitted with self-closing devices (where applicable).

3.2.30.4 Operation and sanitation

3.2.30.4.1 An adequate number of flushing toilets shall be provided.

3.2.30.4.2 Crews quarters, cloakrooms, dining rooms and galley shall be suitably isolated from the processing/fish handling area where applicable. Facilities shall be kept clean and tidy and the floors and other surfaces are to be cleaned regularly.

3.2.30.4.3 Bathing or showering facilities are to be provided if vessels stay out for more than 3 days (especially where any fish is to be hand handled).

3.2.30.4.4 Protective clothing shall be stored as follows:

a) clean overalls and coats shall be stored in clean cupboards or wardrobes; and

b) a suitable ventilated facility shall be provided for cleaned plastic protective clothing (oilskins).

3.2.30.4.5 The requirements for staff handling or processing fish on board are the same as those described for freezer vessels, as detailed in the said compulsory specification for frozen fish and frozen fish products (as amended from time to time). For other types of operations, the following is required:

a) clean protective clothing or oilskins are to be worn;

b) smoking, spitting, eating or drinking shall be prohibited on deck or in storage areas of the vessel;

c) staff shall wash their hands after visits to the toilet; and

d) staff shall maintain a high standard of cleanliness for themselves and their clothes.

3.2.30.4.6 The requirements for the keeping of medical and health records are the same as those for freezer vessels and ice vessels as detailed in the said compulsory specification for frozen fish and frozen fish products.

3.2.30.4.7 The following requirements for sanitation of processing and storage areas apply:

a) work surfaces shall be cleaned and disinfected as per prescribed cleaning schedules;

b) where applicable, the processing/fish handling and storage areas shall be monitored for the requirements that were set out in 6.3.8.5 to 6.3.8.12 for freezer vessels as detailed in the said compulsory specification for frozen fish and frozen fish products;

c) after each discharge of fish, the fish hold, tanks and circulation system shall be completely emptied and thoroughly cleaned with clean seawater or fresh water and disinfected where required. All cleaning chemicals and disinfectants shall be rinsed off before the vessel sails; and

d) if tanks are filled with water after cleaning and rinsing, only clean water complying with SANS 241 (SABS 241), *Drinking water*, may be used.

3.3 Equipment

3.3.1 Layout, installation, design, construction and usage

3.3.1.1 Layout

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. 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 a 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.

3.3.1.2 Installation

Equipment shall be so constructed and installed so as to prevent hygienic hazards and to minimise the build-up of contamination with organic material and dirt, and to facilitate their cleaning and disinfection.

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.

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.

3.3.1.3 Design

Equipment, implements and utensils shall be designed and of a workmanship that is suitable for their intended use and facilitate rapid and efficient handling of the product. The design of equipment and where applicable, utensils, shall be such to prevent hygienic hazards and shall preclude contamination of the product with lubricants, fuel, metal fragments, soiling, contaminated water or any other contaminants. 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. 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. 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.

3.3.1.4 Construction

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 that does not transmit toxic substances, odour, taste, staining or cause colour changes and soiling of the product and shall be inert to the product, detergents and disinfectants under normal operating conditions. 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.

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.

3.3.1.5 Usage

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

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.

3.3.2 Equipment for the packing medium

Pipes, valves, joints, pumps, homogenizers, cyclones or any equipment coming into contact with the packing medium shall be of an hygienic design with no dead-ends, sharp bends or uneven joints. Pipelines shall be easily dismantled for cleaning. Branches occurring in pipelines shall be fitted with suitable stopcocks in such position to avoid dead ends and the development of stagnant packing medium. Any bend occurring in the pipeline, shall allow for dismantling at both sides of it. Mixing equipment, stirrers mesh screens and storage tanks shall be of stainless steel. Storage tanks shall 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.

3.3.3 Tables

Wooden tables shall be not 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. Frames shall be made of suitable smooth, corrosion-resistant metal or steel with no openings in the construction. The tops of preparation and packaging tables shall be of a suitable water-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. 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. 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.

3.3.4 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.

3.3.5 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.

3.3.6 Heat processing equipment

Retorts shall have an adequate supply of heating medium such as steam and where applicable, water or air. The capacity of heat processing equipment shall be sufficient to avoid any delays in processing. Steam shall be made from potable water and shall be free from condensate and air.

Steam, water and compressed air used in the operation of retorts shall not contain any substances that may be hazardous to health or that may contaminate the product. All heat-processing equipment, temperature control devices and other process measuring devices shall be maintained in good order. All temperature measuring bulbs or probes shall be installed in such a way and in such a location so as to accurately measure the actual temperature within the retort. A constant flow of the heating medium shall pass the sensitive part of the probe or bulb of the temperature indicating or recording device. A bleeder of a diameter of at least 3 mm is to be provided at or near such probes or bulbs.

Retorts shall comply with the requirements laid down for the efficient operation of the particular retort type.

In the case of steam retorts the following is required:

All heat-processing equipment shall be maintained in good order and shall be fitted with temperature control mechanisms and thermometers that shall be calibrated regularly (at least annually) and the calibration certificates shall be available to the authority administering this specification. Steam retorts shall be equipped with the following fittings:

a) a controller, either manually or automatically operated, to maintain the processing temperature accurately;

b) at least one indicating mercury-in-glass thermometer;

c) a recording thermometer and time-temperature charts;

d) a pressure gauge;

e) a vent or vents with taps have to be placed at appropriate distances from each other on horizontal retorts or in the top of the retort in case of vertical retorts. The sizes of vents, venting lines connecting individual vent openings and vent manifolds shall be acceptable to ensure efficient venting and there may be no obstructions in the venting system;

f) a bleeder in each thermometer pocket;

g) at least one bleeder in the top of vertical retorts and on horizontal retorts bleeders are to be placed within 300 mm from each side and not more than 2,5 m from one another. Each of these bleeders shall have a diameter of at least 6 mm;

NOTE The bleeders referred to in (f) and (g) should remain open during the heat-processing period.

h) where an automatic controller is used, a steam by-pass around the controller to make a rapid rise to the processing temperature possible;

i) an effective pressure safety valve;

j) 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;

k) a recording thermometer device (thermograph) producing a time vs 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 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 value at sterilizing temperature. Means of preventing unauthorized changes or 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;

l) 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;

m) water retorts:

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

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

n) 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 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 be not used for retort timing. A clock not indicating seconds shall be not 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 has been achieved;

o) any supplies of compressed air and/or water shall allow for adequate shutting-off to prevent any leakage into the retort in order to prevent adverse effects on the retort process;

p) retort identification:

each retort shall be conspicuously identified with a number; and

q) retort basket identification:

retort baskets containing unprocessed products shall be so identified as to obviate confusion between such retort baskets and those containing processed products.

3.3.7 Measuring instrumentation, devices and equipment

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

A system of in-house monitoring and verification of accuracy against known accurate standards of the measuring instruments shall be employed on a routine basis or at any time 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.

3.3.8 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 water-impermeable 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 offal products and waste shall be leakproof and constructed of suitable 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 and bins for offal and waste shall be appropriately identified. Waste bins shall be fitted with lids.

3.3.9 Conveyors, elevators, runways and flumes

Conveyors, elevators, runways and flumes for transferring the product shall be so designed as to allow 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 be not 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.

3.3.10 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. Compressed air lines used to blow out 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 or over an area where the open product can be contaminated.

3.3.11 Seamers or sealing equipment

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

Seamers or sealing equipment shall be identified indelibly by means of a coding device.

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

3.4 Water

3.4.1 General

The water used shall comply with the requirements for potable water as defined.

Subject to the provisions of 3.4.2, every cannery shall have an adequate supply of clean potable water under adequate pressure and capable of coping with peak demand. The water supply shall be free from suspended matter and substances that are deleterious to the product or injurious to health.

In addition, all water coming in contact with the product, product contact surfaces or being in the processing areas at the factory shall have been so treated, by flocculation, filtration, chlorination or other acceptable process, as to ensure compliance with the requirements in 3.4.2 to 3.4.4.

3.4.2 Treatment 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 as defined. 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 available chlorine content measured at the retort inlet. Clean potable water that is not recirculated may be treated by other acceptable means than chlorination that will ensure compliance with requirements for clean water and in addition a total count of viable micro-organisms less than a 100 mL.

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 available chlorine content of 2 mg/L at the retort inlet. In all cases the free residual chlorine concentration shall be determined by the N,N-diethyl-1,4-phenylenediamine test or other test of equivalent sensitivity.

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 cooling water shall be protected against contamination.

3.4.3 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 (by melting the ice under aseptic conditions at a temperature not exceeding 10 °C) immediately after the ice has been manufactured, complies with the microbiological requirements for potable water.

3.4.4 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 may be hazardous to health or that risks contamination of the product. Boilers shall be properly operated and maintained.

3.4.5 Non-potable water other than sea water

Non-potable water shall be carried in completely separate lines from potable water with no cross-connection with, or back-siphonage into, the system carrying potable water, to prevent contamination. 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 or in food handling areas or for hand washing purposes.

3.5 Hygienic operating requirements

3.5.1 General

The factory shall implement procedures that will ensure good operation and sanitation practices as described in SANS 10049 (SABS 049), *Food hygiene management.*

3.5.2 Cleaning and disinfecting

3.5.2.1 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.

3.5.2.2 Cleaning and disinfecting materials

Only cleaning agents, sanitizers and disinfectants that have been officially approved for use in food establishments shall be used.

An adequate supply of cleaning materials, steam, hot and cold water, complying with 3.4, 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. 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. Cleaning equipment and utensils shall be identified to the areas of use and equipment used to clean toilets, ablution facilities or other uncleaned areas shall not be used in processing areas.

3.5.2.3 Cleaning of facilities

3.5.2.3.1 Buildings, 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 during production stoppages and 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, sauces or other packaging medium. Couplings and other fittings of pipelines used for transporting packing medium shall be cleaned and kept in a disinfectant solution or stored dry under hygienic conditions when they are dismantled.

3.5.2.3.2 The entire plant, equipment and utensils shall be thoroughly cleaned with a detergent or other cleaning agent and disinfected at each change of operations and at least once during a twenty four hour cycle or at the end of operations. 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 at a predetermined schedule. Immediately before the commencement of operations, equipment shall be thoroughly rinsed with potable water to remove any residues from the sanitation process and dust. Cleaning of the facility shall commence immediately after processes have stopped and machinery and products have been protected and safe guarded against contamination. Dirt, waste and organic materials such as blood and scales shall not be allowed to react in such a manner that cleaning is impeded.