

Compulsory Specification for

The manufacture, production, processing and treatment of canned fish, canned marine molluscs and canned crustaceans

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GOVERNMENT NOTICE

DEPARTMENT OF TRADE AND INDUSTRY

No. R. 790

9 July 2004

STANDARDS ACT, 1993**WITHDRAWAL AND REPLACEMENT OF THE COMPULSORY SPECIFICATIONS FOR
THE MANUFACTURE, PRODUCTION, PROCESSING AND TREATMENT
OF CANNED FISH, CANNED MARINE MOLLUSCS AND CANNED CRUSTACEANS**

I, Mandisi Mpahlwa, Minister of Trade and Industry, hereby under Section 22(1)(a)(i) of the Standards Act, 1993 (Act No. 29 of 1993), and on the recommendation of the Council of the South African Bureau of Standards, withdraw the compulsory specifications for the Manufacture, Production, Processing and Treatment of Canned Fish, Canned Marine Molluscs and Canned Crustaceans derived therefrom and replace it with the compulsory specification as set out in the Schedule, with effect from the date 2 months after the date of publication of this notice.



M MPAHLWA

Minister of Trade and Industry

SCHEDULE

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 a 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 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 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 or 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 a 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.

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

3.5.2.3.4 Foot-baths shall be drained and cleaned regularly and the disinfectant kept in active condition.

3.5.2.3.5 The inside surfaces of walls of preparation, processing and packaging 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.

3.5.3 Control of vermin

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. All rooms where 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.

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.

NOTE SANS 10133 (SABS 0133), *The application of pesticides in food handling, food processing and catering establishments*, may be referred to.

3.5.4 Exclusion of animals

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

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

3.6.1 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.

3.6.2 Health

3.6.2.1 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.

3.6.2.2 No person who is a carrier of, or is suffering from, any communicable disease, especially a carrier of *Salmonella*, *Shigella* 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 that 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.

3.6.2.3 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.

3.6.2.4 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 that 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.

3.6.2.5 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.

3.6.2.6 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, or 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.

3.6.2.7 Employees performing close-up inspections shall undergo an eyesight test at least annually.

3.6.2.8 All the requirements of Regulation 2538 of the Health Act, 1977, shall be complied with.

3.6.3 Protective clothing

3.6.3.1 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 personal clothes down to the knee. They shall in addition wear washable or disposable headgear that completely covers their hair including beards and if necessary, hair nets. Employees handling the exposed product or other wet materials shall wear light-coloured waterproof aprons.

3.6.3.2 Gloves if used, shall be made from impermeable material and shall either be washable or be of the disposable type. The wearing of gloves shall not exempt workers from washing their hands.

Woollen caps may be worn in freezer rooms only. 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.

3.6.3.3 Employees shall not remove protective clothing from the factory premises.

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

3.6.3.5 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.

3.6.3.6 Waterproof protective clothing shall be made of plastic, 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.

3.6.3.7 Employees shall not visit the toilets and cloakrooms with their waterproof aprons, gloves and plastic sleevelets on. Hooks and pegs for hanging waterproof aprons and gloves shall be provided at the exit before the hand-wash facilities. 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.

3.6.3.8 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.

3.6.4 Personal hygiene and personal effects

3.6.4.1 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.

3.6.4.2 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 3.4.1, and an acceptable unscented liquid soap or detergent, after which they shall rinse their hands in clean, running, potable water complying with 3.4.1. They may then immerse their hands in an acceptable disinfectant, after that they shall rinse their hands in clean running potable water, complying with 3.4.1, if so required by the usage directions of the hand dip. 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.

3.6.4.3 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. Workers shall not cough, sneeze or blow their noses over the unprotected product.

3.6.4.4 Containers used in the preparation, processing or packaging of the product shall be not used for any other purpose.

3.6.4.5 The use of chewing gum and tobacco in any form shall be not allowed within the areas where the product and its ingredients and packaging materials are handled or stored. Spitting shall be not allowed anywhere within the factory premises.

3.6.4.6 Neither workers' personal effects nor their food shall be present in the preparation, production, processing, 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.

3.6.5 Notice boards 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 3.2.9.1(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.

3.6.6 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.

4 Ingredient requirements

4.1 General

All ingredients used shall fall within the scope of, and shall comply with the requirements of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act 54 of 1972) (as amended from time to time) and any regulation promulgated there-under. The limits set for the use of ingredients by the regulations in the said Food, Cosmetics and Disinfectant Act shall be adhered to. All ingredients used in the preparation of the product shall be clean, sound, of good quality, shall show no signs of decomposition or shall not be contaminated or excessively infested with parasites or be infested with insects, and shall be in every way fit for human consumption. In addition the product shall not contain any substance in amounts that may present a hazard to human health.

4.2 Condition of ingredients

All fish, marine molluscs, crustaceans and other ingredients for canning, whether fresh, chilled, frozen, canned or otherwise preserved shall be in compliance with 4.1. All fish, marine molluscs and crustaceans shall be alive on harvesting. The raw materials shall only be transported under protection.

An incoming inspection on the quality of the raw materials and ingredients shall be conducted on receipt and records shall be kept of the findings and time of reception.

Ingredients are to be inspected on arrival at the factory to ensure that they are correct as ordered, properly packaged and identified through labelling, of the correct quality or grade and uncontaminated. Ingredients are to be stored hygienically and in such a manner so as to protect quality and integrity. Where ingredients are made up for use in processing areas, they shall be protected and identified. Only ingredients made up for the daily use shall be stored in processing areas and then in such a manner that they cannot be contaminated. They shall be kept hygienically at a safe distance from the floor.

4.3 Specific requirements for certain ingredients

4.3.1 Packing oils and vegetable fats

Edible vegetable oils that shall not affect the product adversely and refined fish oil may be used in the canning of fish. The oils shall be bland, clear refined, deodorized, edible and free from rancidity, off-odour, and off-flavour. They shall be clear at a temperature of 15,5 °C and bland and, where applicable, shall comply with the requirements of the British Pharmacopoeia or the British Pharmaceutical Codex, or be in conformity with the recommended international standards adopted by the Codex Alimentarius Commission. Olive oils shall be in conformity with the Recommended International Standard for Olive Oil, Virgin and Refined and for Refined Olive Residue Oil (Ref. CAC/RS 33-1970). The use of mineral oils is not permitted.

Edible vegetable fats for use in the preparation of the product shall be bland and free from off-odours, off-flavours and rancidity.

4.3.2 Preservatives

Preservatives shall, when allowed, be specially prepared for use in foodstuffs.

4.3.3 Salt

Salt added to the product or used in the preparation of brine for canning shall be edible and free from bitterness due to calcium, magnesium, sulphur or other causes.

4.3.4 Starchy (farinaceous) materials

Subject to the provisions of the said Foodstuffs, Cosmetic 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. Starchy materials used as thickeners in the preparation of sauce shall be cereal or other wholesome edible starchy flour and shall be free from insect infestation, pesticides or other contaminants.

4.3.5 Thickeners

Thickeners specially prepared for use in food and of sound quality may be used in the preparation of the packing medium.

4.3.6 Vegetables and fruits

Vegetables may be used as such or as preparations. Vegetables or fruits, whether frozen, canned, dehydrated or dried, shall be suitably prepared from fresh vegetables or fruits that are free from insect infestation or signs of insect infestation and contamination and that comply with the requirements for pesticidal residues under the said Foodstuffs, Cosmetics and Disinfectants Act. Canned vegetables shall comply with the relevant requirements for standard grade prescribed by the regulations under the Agriculture Product Standards Act, 1990 (Act 119 of 1990) (as amended from time to time).

The cleaning and washing of fresh vegetables or fruits shall be done in a room separated from areas where fish molluscs or crustaceans are handled or prepared to avoid risks of cross contamination of the product.

4.3.7 Tomato paste

Tomato paste shall be made only from sound, clean, fully ripe, red tomatoes that have been well washed and trimmed where necessary. Tomato paste shall have the maximum tomato content and shall be well-bodied, smooth and fine in texture and free from skin, seeds and core. It shall have a colour and flavour characteristic of fresh, sound and ripe tomatoes.

Scorched paste or paste showing evidence of the use of immature tomatoes, or paste containing artificial colouring matter shall not be used. Tomato paste intended for thickening by homogenizer before using in fish canning, shall be diluted to an appropriate total soluble solids content and homogenized to render a good sauce in the end product with a consistency corresponding to a blob diameter when tested in accordance with 11.11, not greater than 59,5 mm.

4.3.8 Soya and other proteinaceous materials from non-fish products

Subject to the requirements of the regulations under the said Foodstuffs, Cosmetics and Disinfectants Act and with the approval of the authority administering this specification, soya and other non-fish, proteinaceous materials may be used subject to the following:

- a) Soya and any other non-fish proteinaceous materials shall not be used to replace the required fish, molluscs and crustacean content.
- b) If required to do so by the authorities administering this specification, the manufacturer of the canned fish, canned molluscs or canned crustacean products shall disclose to the authority the composition of the non-fish proteinaceous preparation that has been used and the concentration at which it is present in the product.
- c) Where soya and/or other non-fish proteinaceous material is present in products that contain the fish or molluscs or crustacean content called for by this specification, the presence of non-fish proteinaceous material shall be declared in the ingredients panel of the label. (See 10.2.1(c).)

4.3.9 Canned and preserved fish for paste manufacture

Canned fish that fails to comply with the requirements of this specification shall not be used in the manufacture of fish paste except under the authority administering this specification.

Preserved fish used in the manufacture of fish paste shall be clean, sound, and free from contamination.

4.3.10 Sweetening ingredients

Only the type and quantity of sweetening ingredients permitted under regulations promulgated under the Foodstuffs, Cosmetics and Disinfectants Act may be used.

5 Requirements for fish, marine molluscs and crustaceans used as raw materials for the product

5.1 General

Good hygiene and good manufacturing practices are to be incorporated during the harvesting, transport, handling, cleaning, preparation and processing of the product. Operations such as gutting, heading, skinning, boning or portioning shall be done in a clean and hygienic area and under such conditions as will ensure freedom from any contamination, deterioration, spoilage or the development of infections or toxigenic micro-organisms. Where gutting is performed, it shall be done in such a manner that split viscera do not adversely affect the quality, appearance and flavour of the product. Guts and fish offal shall be hygienically and effectively removed from cleaned fish products by mechanical means, water fluming or other acceptable means. Fish shall be thoroughly washed in clean running water before and after cleaning and preparation.

5.2 Fish

5.2.1 All fish shall be acceptably descaled unless

- a) it is sardines (*Sardina pilchardus*), or
- b) the product is described as "scales on".

Tough scales, able to hurt the palate, on Jack Mackerel (Maasbanker) shall be removed.

5.2.2 The heads, tails, and fins of all fish shall be removed unless the fish is packed as whole units or the manner of presentation is appropriately described on the label.

5.2.3 The viscera (except for roes) kidney and extremity of the anal canal, shall be removed.

5.2.4 Large bones and backbones that can hurt the palate must be removed unless

- a) it is the backbone of larger species presented as cross-cut sections or cutlets, or
- b) fish bones are softened during heat processing or in low acid preservation to such an extent that there is no health risk to the consumer.

5.2.5 Fish products and its form and presentation shall be correctly described on the label.

5.3 Marine Molluscs

5.3.1 General

Molluscs are to be obtained from sources that are officially approved by the authorities monitoring biotoxins. Molluscs shall not contain any chemical, or microbiological contaminants or marine biotoxins at levels that could be detrimental to the health of the consumer. Molluscs shall be alive until immediately before processing and may be kept alive in appropriate clean water tanks or in aerated containers under cool conditions until they can be processed.

5.3.2 Shucking

Shucking shall be performed under conditions of good hygiene and the product thoroughly washed under clean running water. Shucking shall be complete and the product shall be free from sand, dirt, silt, debris and other foreign material.

5.3.3 Cleaning of abalone

In the case of abalone, all guts, mouths, adhering mucous and epithelium between fringes and the "foot" of the abalone shall be removed.

5.4 Crustaceans

5.4.1 General

Raw material used for canning shall be of a quality suitable for human consumption and shall be collected from clean waters not polluted by industrial or sewage discharges or other sources of pollution. Crustaceans shall not contain chemical, microbiological or biological contamination that may be hazardous to health. Transport of crustaceans to the factory shall be under conditions that will protect the product from the elements and from environmental contamination. Crustaceans shall be kept alive until immediately prior to processing or canning.

5.4.2 Preparation of crustaceans

Unless crustaceans are canned in the round, all viscera including the anal canal shall be removed. In flesh packs, the flesh shall be neatly trimmed and free from pieces of shell or swimmeret.

5.5 Minced, diced or sliced fish products

Proper procedures are to be instituted to prevent contamination of product with metal and other foreign material from mincers, slicers, dicers or other cutting machinery. Raw material used for the product must be fresh and of a quality suitable for human consumption.

6 Requirements for the product

6.1 General requirements

6.1.1 Packing appearance and colour

The product in a container shall comprise fish or molluscs or crustaceans or a mixture of these, of an appearance and colour characteristic of the genus or genera processed and packed in the manner indicated. The product shall have a normal texture characteristic of the species, the type of product and the process used.

6.1.2 Absence of foreign matter posing a threat to health

The product shall be free from any foreign material that poses a threat to human health, e.g.

- a) contaminants such as but not limited to pesticide residue, fuel, mineral oil and lubricants or hazardous chemicals, or
- b) dangerous material such as, but not limited to glass, metal, stones, sharp and hard bones.

6.1.3 Absence of toxic fish, biotoxins and histamine

No fish that are naturally toxic or affected by biotoxins from the aquatic environment or have high histamine levels may be used for canning. The product shall not contain more than 10 mg/100 g histamine based on the average of samples tested, provided that no sample shall contain more than 20 mg histamine per 100 g product. The limits for other biotoxic substances are as per United States Foods and Drugs Administration regulations.

6.1.4 Objectionable extraneous matter

The product shall be free from any objectionable extraneous material such as, but not limited to insects, sand, dirt, soiling, hair, metal soiling or other foreign matter that indicates non-compliance with good manufacturing and sanitation practises. The product shall be free from sulphide stains and presence of "struvite crystals".

6.1.5 Container integrity

The final product shall be free from container integrity defects that may compromise the hermetic seal. Additional requirements are stipulated in section 9.

6.1.6 Net headspace and fill of containers

The containers shall be filled to practical capacity without being overfilled. The drained mass requirements are subject to the cans being filled to practical capacity. When examined in accordance with 11.4.2 and 11.4.3, the net headspace in cylindrical containers shall be not more than 13 mm, on condition that the product shall occupy at least 90 % of the total volume capacity of the container.

Sufficient headspace shall be allowed for expansion of the contents during the heat process and to ensure that the ends of the container or closure of jars are not convex when cooled after the retort process. Shallow containers with large flexible lids (see definition 2.54) need little or no measurable headspace on condition that the lid or lids do not remain convex.

6.1.7 Negative air pressure inside containers

The negative air pressure inside the container shall be adequate to prevent the bulging or flipping of containers at ambient temperature or lower atmospheric pressure in regions of higher altitude.

6.1.8 Sensory requirements

The product shall have an odour and flavour that is characteristic of fresh raw material and of the packing medium and processing undergone. Examine the product as stipulated in 11.9.

6.1.9 Requirements for the packing medium

The product may be packed in its own juice, potable water, brine, vegetable broth, a sauce, a gravy, fish oil, vegetable oil, or with vegetable oil added, in agar, or other suitable medium. The product may be packed dry. The packing medium shall be reasonably free from exuded proteins and fish matter indicating decomposed fish or presence of viscera or of excessive fish blood in the raw material. Parchment paper or similar lining material may be used to prevent surface discolouration or adhesion of the product to the container. Vegetables may be used in the preparation of the sauce or gravy. When tested in accordance with 13.2 the sauce or gravy without the solid ingredients shall contain not more than 6 % starch. Where the product is claimed to be in a broth, or a thick or rich sauce or gravy, the character of the packing medium shall, after equilibrium has been reached, be in accordance with the claim made. A product packed in a natural broth shall not be labelled in a sauce or gravy.

Where oil is declared as the sole packing medium, the presence of other liquid shall be not in excess of 30 % when determined in accordance with 11.6. When the packing medium contains more than 30 % exuded liquid it shall be labelled "X (name of product) with oil added".

6.1.10 Vegetables, fruits and cereals

Root vegetables shall be in the form of clean-cut dices, slices or pieces, except that, if of acceptable size, these vegetables may be packed whole. Dices shall be approximate cubes. Pieces shall appear regular in size and shape and shall be practically free from scrap pieces. The texture shall be soft but not broken up or disintegrated or abnormally tough, dry or woody. Onions, fresh or pickled, shall be sliced, diced, shredded or chopped, or, if of acceptable size, they may be used whole. Dehydrated onion may be used. Grains of rice shall separate easily. Beans and peas shall be mostly intact and not split or broken, and shall be free from loose shells. Cereals such as spaghetti and noodles shall be not disintegrated or abnormally broken up, and the texture shall be not abnormally mushy or soggy.

6.1.11 Parasites

The product shall be free from visible parasites.

6.1.12 Salt content (as sodium chloride)

Unless described as packed in salt, or salted, or heavily salted the product, when examined in accordance with 13.3, the product shall contain not more than 3 % by mass of common salt.

6.2 Canned fish

6.2.1 General

Only fish of one species shall be packed under the same batch code and sub code where applicable. Units of fish in any one container shall be reasonably uniform in size, appearance and form. Where it is necessary to adjust the fill of the container, a small cutlet or smaller unit of fish may be present. The manner of packing or the cut packed shall be in accordance with the product description on the label. In packs other than plain packs, the fish shall be pre-cooked and exuded liquids drained before the addition of the packing medium. Canned fish shall be practically free from

units of mushy and brittle texture indicating poor quality raw material or fish softened by excessive parasitical infestation.

6.2.2 Fillets

Where fish is packed as fillets, the fillets shall be reasonably uniform in size. An additional small piece may be included for mass adjustment.

6.2.3 Compliance with product description and sensory requirements

The presentation of the product and its appearance shall comply with the description of the product on the label. The appearance, colour, texture, odour and flavour shall be indicative and characteristic of fresh raw material used. The flesh colour shall be reasonably free from discolouration indicating excessive lipid oxidation or other chemical or biochemical reaction. Unless the product description indicates that fish units are de-skinned or that trawl marked raw materials were used, fish units shall be reasonably free from skin damage and excessive blemishes in the flesh. No canned fish product shall have a muddy appearance indicative of poor raw materials being used. Flesh texture shall not be excessively soft, mushy, tough or rubbery.

6.2.4 Freedom from defects indicating poor manufacturing

Canned fish shall be free from defects such as, but not limited to viscera, head parts or tails unless the presentation matches the description of the product. Canned fish shall be free from unsightly deposits of exuded fish protein curd, loose scales, scutes, fibre, sand, grit, intestines or spilled feed, loose parasites and other extraneous matter. Any residual scales shall be soft.

6.3 Canned marine molluscs (including cephalopods)

6.3.1 Preparation

When packed with shells, any growth on the external surfaces of the shells and meats shall be removed. Byssus shall be removed. In the case of abalone cleaning of the flesh shall include removal of the mouth and guts. The adhering mucous and epithelium between fringes and foot shall be brushed off. Abalone may be treated with preparations of salt and lime solutions to remove mucous. No bleaching agents shall be used.

6.3.2 Packing medium

The packing medium shall be free from excessive exuded materials indicating poor cleaning and manufacturing techniques or use of poor quality raw materials.

6.3.3 Compliance with product description and sensory requirements

The product shall comply with the size description where declared or shall be otherwise uniform in colour, appearance and size. Where male and female units of some molluscs differ in colour (e.g. black mussels) they may be packed as such but colours must be characteristic of the freshly cooked product. The texture shall be characteristic of the species and firm, succulent, but not difficult to chew and swallow. Meats shall not be disintegrated, mealy, chalky, mushy or doughy.

6.3.4 Freedom from defects indicating poor manufacturing

The product shall be free from sand, grit, byssus, obvious parasites or other extraneous contaminants that may not be of marine mollusc origin, but indicate poor cleaning and manufacturing practises. In case of marine mollusc meats, no sharp pieces of shell or other foreign matter that pose a threat to human health, may be present.

6.4 Canned crustaceans

6.4.1 Preparation

The product shall be prepared as in 5.4.2.

6.4.2 Packing medium

The colour of the packing medium shall be characteristic of good quality raw material and free from excessive protein curd or discolouration indicative of chemical breakdown or staining.

6.4.3 Compliance with the product description and sensory requirements

The product shall be free from uncharacteristic discolouration such as blue and black stains. In flesh packs the pigment of the flesh shall be bright and natural white to off-white. The flesh shall be firm, yet tender and shall not be disintegrated, soft, mushy or soggy.

6.4.4 Freedom from defects indicating poor manufacturing

Crustacean meat packs shall be free from inedible parts, shells or pieces of shell and swimmerets. The product shall be free from foreign matter not derived from shrimp and no foreign matter that may pose a health risk may be present.

7 Product-specific requirements

7.1 Canned fish (see also 5.2 and 6.2)

7.1.1 Canned pilchards, sardinella, herring, mullet, sauries and similar types of canned fish and canned sardines

7.1.1.1 Preparation

7.1.1.1.1 Pilchards

Fins need not be removed.

7.1.1.1.2 Sardines

When sardines are described as pilchards the scales shall be removed.

7.1.1.1.3 Products packed in sauce

The fish product shall be covered or partially covered with sauce upon opening of the can and the product shall comply with the description of the product. The presence of natural fish oils in the sauce is acceptable but there shall not be excessive separation of water from the sauce. Fish units shall be of uniform size and there shall not be excessive disintegration of flesh and bellies indicative of poor quality raw material or of bad manufacturing practice. In case of skin-on portions, fish skins shall be reasonably intact and not show signs of microbiological, biochemical or physical deterioration.

7.1.1.2 Drained mass

7.1.1.2.1 The average drained mass of pilchards, sardines, mullet, herring, sardinella and similar types of fish packed in sauce in vertical cans shall be not less than 70 % of the declared mass. No individual drained mass shall be less than 65 % of the d.n.m. of products under 7.1.1.

7.1.1.2.2 When pilchards are presented in a brine or water packing medium in round vertically packed cans, the minimum drained mass shall be not less than 65 % of the d.n.m.

7.1.1.2.3 When packed as fillets of pilchards, sardinella, sardines or similar types of fish in flat cans and in a thick sauce, the drained mass shall be not less than 60 % of the d.n.m.

7.1.1.2.4 Mullet and herring fillets packed in flat cans and in a thick sauce shall have a drained mass of not less than 60 %.

7.1.1.2.5 The total drained mass of fish products packed as semi-preserves, where the packing medium composition preserves the product, shall be not less than 60 %.

7.1.1.3 Absence of scales and viscera

Unless fish is labelled scales on, not more than 10 % of the units examined as per 11.14 shall be covered with scales. When determined in accordance with 11.13 the product shall contain not more than 3 % of viscera and/or loose green feed.

7.1.2 Canned sardines in oil or sauce, with oil added and including cured sild sardines, cured brisling, cured pilchards and similar types of fish canned sardine style and packed horizontally in flat cans

7.1.2.1 Preparation

Head and gills shall be completely removed. Eviscerated fish shall be practically free from visceral parts other than roe, milt and kidney. (See 7.1.1.3.) Where there are five or less units in a 106 g Dingley container, the units shall be eviscerated. Where more than five units are present in a 106 g Dingley container the units need not be eviscerated. For other sizes of container the counts calling for evisceration of units shall be proportionate to the ratio between the net mass of the container and 106 g. Ungutted fish shall be free from undigested feed or unused feed.

7.1.2.2 Packing and packing medium

Units shall be neatly finger layed so that there are not excessive void spaces between fish units and fish units and the container. Over filling causing bulging of can lids or mechanical damage to the fish, shall be avoided. Where the product is packed in an oil packing medium such as vegetable oil, the packing medium shall be reasonably free from excessive cooked out protein curds and turbidity indicating poor raw material quality or poor cleaning of fish. Where products are depicted as sardines in a particular oil, the exuded liquid in the oil shall not exceed 30 % of the packing medium.

7.1.2.3 Drained mass

When sardines are packed in an oil or a thin watery medium, the drained mass shall not be less than 75 % of the d.n.m. when determined in accordance with 11.3. When sardines are packed in a thick sauce, the average drained mass of the containers shall be not less than 70 % of the d.n.m with no individual drained mass less than 65 %.

7.1.3 Canned maasbanker (jack mackerel or horse mackerel), mackerel, canned snoek and similar types

7.1.3.1 Preparation

Fins need not be removed but in the case of Maasbanker, the tough scutes and sharp dangerous spines at the dorsal and anal fins shall be removed.

7.1.3.2 Drained mass

When determined in accordance with 11.5 the drained mass shall be as follows:

- when fish units are cut in cutlets or middle cuts, the drained mass shall be not less than 70 %,
- in the case of fish fillets packed in shallow flat cans, the drained mass shall be not less than 60 % of the d.n.m.

7.1.4 Canned tuna, albacore and bonito

7.1.4.1 Preparation and presentation

The product shall be produced from pre-cooked tuna flesh from the species listed under 10.3.2.10.

Tuna shall be presented as tuna meat preparation forms (unless it is described differently on the label) as per the following:

a) Solid:

Fish is cut into transverse segments that are placed in the can with their transverse cut ends parallel to the ends of the can. The proportion of free flakes or chunks shall not exceed 18 % of the drained mass of the container when determined in accordance with 11.5.

The structure of the solid tuna meat shall be well defined and shall turn out of the can in a basically single portion.

b) Chunks:

A mixture of pieces of fish most of that have dimensions of not less than 12 mm in each direction and in that the original muscle structure is retained. The presence of pieces of flesh of that the dimensions are less than 12 mm shall not exceed 30 % of the drained mass when determined in accordance with 11.5.

c) Flakes:

A mixture of particles and pieces of flesh that have dimensions less than 12 mm in each direction but in which the muscular structure of the flesh is retained. The proportion of pieces of flesh of which the dimensions are less than 12 mm shall exceed 30 % of the drained mass of the container as determined in accordance with 11.5.

d) Grated or shredded:

A mixture of particles of fish that have been reduced to a reasonable uniform size in that particles are discrete and do not comprise a paste.

e) Tuna with vegetables and/or fruit and/or cereals:

The tuna component shall be in the form of flakes or shredded and the colour shall be light as required in 7.1.4.2.

f) Other presentations:

Any other presentation shall be permitted provided that it is sufficiently distinctive from the forms of presentation or preparation laid down in 7.1.4.1, meets all other requirements of this specification and is adequately described on the label to avoid confusing or misleading the consumer.

7.1.4.2 Colour of white or light meat tuna

For the purpose of labelling, canned tuna shall fall within one of the following colour designations:

a) White tuna or white meat tuna:

Canned tuna of the species *Thunnus alalunga* (albacore) that has a diffuse luminous reflectance of not less than 33,7 % of that of magnesium oxide when that reflectance is measured by the method in SANS 5137 (SABS SM 137), *Daylight 45°, 0° luminous directional reflectance of surface coatings and pigments*. This is approximately equivalent to 6.3 Munsell units when examined in accordance with 11.12; and

b) Light tuna or light meat tuna:

Canned tuna that has a diffuse luminous reflectance of not less than 22,6 % of that of magnesium oxide when that reflectance is measured by the said method. This is approximately equivalent to 5,3 Munsell units when examined in accordance with 11.12.

The colour in each pack shall conform to its description and shall be reasonably uniform. There shall be no dark meat and the product shall be practically free from discoloured muscle due to bruising, blood, parasitical infestation or lipid oxidation. The flesh of different species of tuna shall not be packed together. Discolouration due to lipid oxidation, sugar caramelisation or persistent flushed pink, orange or green colours in the flesh shall not exceed 5 % of the drained contents. Metal soiling or staining shall be absent.

7.1.4.3 Dark meat tuna or dark tuna

Canned tuna that does not meet the colour requirements of light meat tuna or that is packed by using dark meats, may be described as dark meat tuna or dark tuna.

NOTE Colour of tuna is usually determined subjectively by trained and experienced inspectors. The test methods in 7.1.4.2 need only be employed in cases of dispute.

7.1.4.4 Opening appearance and packing medium

The cans shall be well filled with fish and the flesh pack shall be reasonably free from voids. In case of solid packs the structure of the solid tuna meat shall be well defined and shall turn out of the can in a basically single portion. The product shall be free from excessive exuded protein curd indicating poor quality raw material or bad manufacturing procedures. The packing medium shall comply with requirements of 6.1.10.

7.1.4.5 Drained mass

When determined in accordance with 11.5 the drained mass shall be as follows:

- the average drained mass of containers examined shall be not less than 70 % of the d.n.m. with no individual drained mass less than 65 % of the d.n.m.;
- where canned tuna is packed in a thick sauce the drained mass shall be not less than 60 % of the d.n.m.;
- where tuna is packed in a thick sauce with garnish, the drained mass shall be not less than 55 % of the d.n.m.; and
- where tuna is packed with vegetables and/or fruit and/or edible garnish and/or cereals, the total drained mass shall be not less than 55 % of the d.n.m. and the drained mass of the tuna content shall be not less than 25 % of the d.n.m.

7.1.4.6 Absence of certain particular defects

The product shall comply with the description on the label. The product shall be free from bones, fins, viscera, large blood vessels longer than 10 mm and shall be practically free from blood clots greater than 6 mm in diameter.

7.1.5 Canned kippers, bloaters and similar types

7.1.5.1 Presentation

Kippers, bloaters, and similar types of cured fish may, except when packed as fillets, be packed with heads, tails and fins.

7.1.5.2 Drained mass

When determined in accordance with 11.5 the drained mass shall be as follows:

- a) be not less than 70 % of the d.n.m; and
- b) be not less than 60 % of the d.n.m. when packed in flat shallow containers.

7.1.6 Canned salmon

7.1.6.1 Preparation and presentation

Canned salmon shall be prepared from fresh or frozen raw material of salmon species listed in 10.3.2.12. The heads including the gills, viscera including the roe, tails, fins, loose scales, milt and blood shall be removed. Damaged or discoloured flesh, bruises or wounds shall be cut away.

Canned salmon shall consist of sections of fish that are cut transversely and in equal lengths and that are filled vertically into the can. The sections shall be packed in the container so that the cut surfaces are approximately parallel with the ends of the container and the skins parallel to the walls of the container.

Any other presentation may be permitted provided that it

- a) is sufficiently distinctive from the form of presentation laid down above,
- b) meets all other requirements of the specification, and
- c) is adequately described on the label to avoid confusing or misleading the consumer.

7.1.6.2 Drained mass

When determined in accordance with 11.5 the drained mass shall be as follows:

- a) be not less than 70 % when fish units are cut into cutlets or middle cuts; and
- b) be not less than 60 % of the d.n.m. in case of fish fillets packed in shallow flat cans.

7.1.7 Canned hake, cod, kabeljou and similar types

7.1.7.1 Preparation and presentation

The product may be smoked and shall be prepared from fresh or frozen raw material from which the heads, viscera including the roe, tails, fins, loose scales, milt and blood shall be removed. All visible parasites and unsightly bruises and wounds shall be removed. The product shall consist of sections of whole fish that are cut transversely and in equal lengths and that are filled vertically into the can. Fillet or fillet portions may be packed. Any presentation that is adequately described on the label so

as to avoid confusing or misleading the consumer may be permitted. The product shall be free from hard bones that may hurt the palate and that may be an indication of insufficient heat processing. Backbones present on cross cuts shall only be present as an integral part of the cut section of the fish and shall not appear separated from the muscular structure.

7.1.7.2 Drained mass

The drained mass, when determined in accordance with 11.5, shall be not less than 70 % of the d.n.m. in the case of transversely cut sections of the whole fish packed vertically; and 60 % of the d.n.m. in the case of fillets and fillet portions packed in shallow flat cans.

7.1.8 Curried fish and pickled fish

7.1.8.1 Preparation and presentation

The product preparation and presentation shall be as discussed in 7.1.7.1. Fish portions may be dipped in flour, batter or other suitable coating and may be pre-cooked, pre-fried or pre-baked. The product is packed with curry sauce containing at least a mass fraction of 5 % onions in the case of pickled fish.

7.1.8.2 Drained mass

7.1.8.2.1 Curried fish

The washed mass of all solid components in curried fish product shall be not less than 50 % of the d.n.m. In case of a battered (or breaded) product, the fish and batter content shall be not less than 45 % of the d.n.m.

7.1.8.2.2 Pickled fish

The washed mass of all solid components shall be not less than 50 % of the d.n.m. and the mass of the fish core content shall be not less than 35 % of the d.n.m. on condition that at least 5 % of the d.n.m. consists of onions. A fish core content of 40 % is required where less than 5 % onions are used.

7.1.8.3 Absence of particular defects

Where fish units are covered in batter, the batter shall not separate excessively from fish units or crumble to form an excessive amount of sediment in the can. Where onions are present, they shall not be abnormally dark or discoloured. The surfaces of fish ends shall not be abnormally dark discoloured. There shall be no dark discoloured oil in the packing medium.

7.1.9 Canned salted or salt cured/dried anchovies or sardines

7.1.9.1 Preparation, preservation and presentation

The fish shall be salted or salt cured before canning. The product may be preserved by salt and chilled storage (below 5 °C) or by pasteurization or heat processing to render it shelf stable. When presented as fillets, the backbones shall be removed. The product may be presented as whole fish, headed and gutted fish, flat or rolled fillets or any presentation fitting the description on the label. Garnish may be used and the product may be packed dry with salt, salted in own juices, in a salt pickle or in oil. Units in flat shallow containers shall be packed to avoid void spaces between units and units and the container.

7.1.9.2 Drained mass

When the drained mass is determined in accordance with 11.5, the fish and garnish content shall be at least 70 % of the d.n.m.

7.1.9.3 Absence of particular defects

Fillets shall not have dangerous protruding bones that can hurt the palate or throat. Fish units shall be firm and not mushy, slimy, mealy or disintegrating. There shall be no indication of mould or halophilic discolouration of units. Units shall be reasonably uniform in size unless described otherwise.

7.1.10 Canned fish for bulk catering and re-manufacturing purposes

7.1.10.1 Preparation and presentation

Except for texture, uniformity of unit size, and the permissible presence of cross-filled units and turbidity in brine or in other packing medium, fish for bulk catering and re-manufacturing purposes shall comply with the requirements of this specification. Units may be packed with the tails intact; the heads and guts (viscera) however shall be removed. It may be a solid-pack or contain packing medium. It shall be labelled to disclose its true nature, with the name of the fish used being declared.

In the case of catering packs in a packing medium such as tomato, the packing medium shall be dispersed through the pack to cover almost all the fish units.

7.1.10.2 Drained mass

The drained mass, when determined in accordance with 11.5, shall be not less than 70 % of the d.n.m.

7.1.11 Canned minced fish

7.1.11.1 Preparation and presentation

The product shall not consist out of a mixture of fish species unless this is conspicuously declared in the name of the product.

Except for requirements rendered inapplicable by the nature of the pack, canned minced fish shall comply with the requirements of this specification.

Except that damaged fish units may be permitted, the raw fish used shall comply with this specification.

The product shall be prepared from the body parts of fish without the heads and viscera. The bone to flesh ratio shall practically be the same that occurs in middle cut pieces of fish. Excessive tail-end pieces and scales shall be not used. Pieces of the head, gills, gut, intestines or its contents or other unsuitable or any unsound fish parts shall not be used.

It shall be labelled to disclose its true nature, and the name of the fish used shall be declared in the name of the product and in the list of ingredients.

7.1.11.2 Absence of certain particular defects

When determined in accordance with 11.16, the product shall not contain more than 5 % starch.

The product shall have a uniform minced texture where the flesh has been reduced to a uniform size in that particles are discrete and do not comprise of a paste or an emulsified texture. The product shall not contain large pieces of fish. It shall not contain a large amount of denatured protein or honeycombing. The texture shall not be soggy or watery. It shall not have a gritty texture due to the presence of an abnormally high amount of bone pieces or a high amount of scales or any other added ingredients that cause grittiness in the product. The texture shall not be extremely closed and excessively compact or doughy.

The product shall not contain an excessive amount of exuded aqueous material. It shall be practically free from other exuded matter such as starch and protein.

Upon removal out of the container, the product shall retain essentially the shape of the container without falling apart and shall practically be free from excessive surface cavities that affect its appearance.

The product shall have an acceptable uniform colour. The colour of the product shall not be abnormally dark due to excessive amounts of skin pigment and tail-ends. It shall be practically free from discolouration on the surface due to oxidation.

The product shall be free from discolouration such as metal soiling or scorching. The product shall be free from fish eyeballs. Green feed, gut or pieces of gut shall be absent.

The odour and flavour of the product shall be characteristic of the fresh product and bitter or scorched flavours and odours shall be absent.

7.1.12 Marinated fish products with or without vegetables

7.1.12.1 Preparation and presentation

The product shall be prepared from fillets or cut pieces of specific fish types packed in brine or a suitable sour sauce with or without sweeteners, spices or herbs or other suitable ingredients.

7.1.12.2 Drained mass

When determined in accordance with 11.5, the drained mass of the fish content shall be not less than 50 % of the d.n.m.

7.1.13 Canned kedgeree and canned smoorfish

Preparation and presentation

The product shall be prepared from species of fish flesh suitable for the purpose. The product shall not contain a mixture of fish species unless this fact is conspicuously declared in the name of the product. The trimmed and cleaned fish shall be pre-cooked before flaking and only light-coloured flesh shall be used. Where possible bones shall be removed and no hard bones may remain in the final product. No dark discoloured fish or vegetables shall be present.

When determined in accordance with 13.1, the protein nitrogen content derived from the fish flesh of kedgeree shall be not less than 1,3 % by mass. Kedgeree may contain cereal, other starchy material, egg, other ingredients and garnish.

When determined in accordance with 13.1, the protein nitrogen content derived from the fish flesh of smoorfish shall be not less than a mass fraction of 1,5 %. The remainder of the contents shall be vegetables or cereals or both, or other ingredients.

7.1.14 Canned fish cakes and canned fish balls

7.1.14.1 Preparation and presentation

Fish cakes and fish balls shall be prepared from flaked, shredded, or minced fish flesh with or without the addition of seasoning ingredients, edible starchy material, egg and other ingredients. Bones shall be removed where practicable. No bones that are hazardous to the consumer shall be present. The head, gills, gut, intestines or its contents or other unsuitable or any unsound fish parts shall not be used.

The product described as fish balls shall be formed into characteristic rounded shaped units and the product described as fish cakes shall be formed in flat rounded disc-like shaped units.

The units shall not be ragged or disintegrated and shall retain their shape when normally handled.

The units shall not be soggy or mushy and shall be free from grittiness.

7.1.14.2 Fish protein nitrogen content

When determined in accordance with 13.1, the protein nitrogen content derived from the fish flesh in the fish cakes or fish balls without the packing medium shall be not less than 1,0 % by mass.

7.1.14.3 Drained mass

7.1.14.3.1 Packed in brine or sauce

The drained mass of the product when determined in accordance with 11.5, shall be not less than 60 % of the d.n.m.

7.1.14.3.2 Packed with vegetables, fruit or cereals

The drained mass of the fish content of the cakes or balls shall be at least 25 % of the d.n.m. and the total drained mass of all solid components at least 55 % of the d.n.m. when determined in accordance with 11.5.

7.1.15 Canned fish roe and caviar

7.1.15.1 Preparation and presentation

7.1.15.1.1 Fish roe

The product shall be prepared from roes in which membranes and connective tissue may be present but from which blood and adhering particles of entrails have been removed. It shall be packed in brine. The container shall be well-filled.

7.1.15.1.2 Caviar

Caviar shall be prepared from cured roe free from membrane and connective tissue. It may be packed in brine. The product shall not be mushy or tough. Artificial preparations resembling the product shall not be labelled as caviar.

7.1.15.2 Drained mass

Except when packed as a dry product the drained mass when determined in accordance with 11.5 shall be at least 70 % of the d.n.m. The drained mass of fish roe in the membrane shall be at least 60 % of the d.n.m. When packed as a dry product the containers shall be practically full.

7.1.16 Fish paste, fish pâté and fish spread

7.1.16.1 Preparation, preservation and presentation

For purposes of this specification fish paste, pâté and spread shall be deemed to include paste containing the edible flesh of crustaceans or molluscs either as major or minor ingredient.

The product shall be prepared from clean, sound fish, fresh or preserved, that has been comminuted to form a smooth, spreadable paste or in the case of a spread may contain coarse pieces. It may contain tomato, prepared vegetable material, starchy material, salt, spices, milk powder, fat, or oil of vegetable or fish origin, seasoning and flavouring substances, and other acceptable ingredients. Head or head parts of the fish, the gills, intestines or intestines contents, cartilage or other unsuitable or any unsound parts shall not be used.

Unless the salt concentration is adequate to preserve it, the product shall be processed by heat to ensure preservation.

The texture of the product shall be well bodied but readily spreadable without being watery or excessively soggy. It shall have a smooth textured appearance without being emulsified.

The product shall be free from separated fat starch, denatured protein or aqueous material. Discolouration other than slight surface discolouration due to oxidation, shall not be present.

There shall not be indications of inadequate mixing of ingredients. The texture shall be homogeneous throughout the contents of the container without separation of the components or tendency to separate the components. The contents of the container shall be reasonably free from air bubbles. Large void cavities shall be not present.

When examined in accordance with 11.10, it shall be free from sandiness, grittiness or palpable pieces of bone or shell particles.

The product shall be free from clots of materials such as clots of cereals or other inadequately mixed portions of ingredients or other abnormalities such as specks and stained areas.

7.1.16.2 Fish protein nitrogen content

When determined in accordance with 13.1, the protein nitrogen content derived from the fish flesh shall be not less than a mass fraction of 2 %. When determined in accordance with 13.2, the starch content of the product shall not be more than a mass fraction of 6 %.

Where the product is described as a spread with vegetables and/or fruit, the protein nitrogen content of the fish flesh, as determined in accordance with 13.1 shall be not less than a mass fraction of 0,7 %.

7.1.17 Fish sausages

7.1.17.1 Preparation and presentation

The product shall be prepared from clean and sound minced or finely chopped fish flesh, either fresh, frozen, cured or canned. It may contain starchy material, salt, spices, fat or oil of vegetable or fish origin, seasoning and flavouring substances and other permissible ingredients. The sausages may be smoked.

The product shall be formed either in artificial casing (that, if not edible, shall be completely stripped before the product is packed into containers), or in natural casings of animal origin.

7.1.17.2 Composition

When determined in accordance with 13.1, after draining and removal of the packing medium, the protein nitrogen percentage derived from fish flesh shall be not less than a mass fraction of 2 %. When determined in accordance with 13.2 the sausages without the packing medium shall not contain a mass fraction of more than 6 %.

7.1.17.3 Drained mass

When determined in accordance with 11.5, the drained mass of the product shall be not less than 75 % of the d.n.m.

7.1.17.4 Absence of particular defects

The sausages shall have an evenly fine to slightly coarse, smooth and a firmly stuffed texture. The sausages shall not be soggy. They shall be free from grittiness, cavities and air pockets.

The sausage units shall be acceptably uniform in size, shape and colour and shall be free from discolouration and ragged or irregularly cut ends. The units shall be not distorted or twisted. Off-cut pieces, bursts, and cut-marked units shall be not present. Pieces of fish bone shall not be present. Sausages shall completely be separated from one another. The sausages shall be free from impression marks such as caused by the expansion rings on the side walls of the container. Sausage units that are cross-filled in relation with other units in the container shall not be present. Cross-cut units shall be cleanly cut at square angles to their longitudinal axes. Spices present shall not adversely affect the appearance of the product.

7.1.18 Canned fish, including marinated products, with vegetables and/or fruit and/or cereals

7.1.18.1 Preparation and presentation

The product shall be prepared from fish or cuts of fish packed with vegetables and/or fruits, and/or cereals and/or edible garnish, together with seasoning materials, spices or other appropriate ingredients.

7.1.18.2 Drained mass

When determined in accordance with 11.5, the total drained mass of the container contents shall be not less than 55 % of the d.n.m. When fish appears first in the name of the product, the drained mass of fish shall be not less than 25 % of the d.n.m. When fish does not appear first in the name of the product, the fish content shall constitute not less than 10 % of the d.n.m. unless the fact that it constitutes less than 10 % is declared on the main panel of the label.

7.2 Canned marine molluscs and cephalopods

7.2.1 Canned abalone

7.2.1.1 Preparation and presentation

The abalone units shall be smoothly trimmed and guts and mouth pieces shall be removed. The fringes need not be removed. Flesh showing unsightly fork marks or other damage shall not be used for the packing of wholes or halves unless being trimmed and used as filler pieces.

Abalone shall be packed as wholes or as halves. Wholes and halves shall be not packed in the same container unless only one half is used as a filler piece to make up the correct mass. A small piece may be added to adjust the fill of the container. Such a filler piece shall be not less than 70 g in mass. Not more than one filler piece may be added.

Other forms of presentation may be permitted provided that they

- a) meet all regulatory requirements, and
- b) are adequately described on the label in accordance with the labelling requirements.

The container shall be well filled but not overfilled with the fish and packing medium. Distortion of the circular curve of the cans by forcing large abalone units into the cans with the consequent risk of affecting the integrity of the hermetical sealing of lids onto the cans shall be prohibited.

7.2.1.2 Drained mass

The drained mass, when determined in accordance with 11.5, shall be not less than 50 % of the d.n.m. Where the abalone content of any product is less than 50 % the product description shall be clear to indicate that it is a special type of product of which abalone is an ingredient, and the drained mass of the abalone shall be prominently declared on the label.

7.2.1.3 Absence of particular defects

Abalone units shall be free from discolouration due to oxidation or objectionable discoloured surfaces or stained marks or spots. The abalone units shall not have an abnormal dark colour. The product shall not contain abalone units with excessive dark colours due to high metal content such as iron, copper, lead or mercury.

The abalone units in any one container shall be reasonably uniform in colour.

The abalone units shall be practically free from abnormal surface cracks. Whole abalone units shall not be damaged or have unsightly cut marks or fork marks. When more than two abalone units are packed in any one container they shall be reasonably uniform in size. The product shall be free from viscera, mouth parts and black or dark pigmented parts.

When the packing medium is brine or water the packing shall be clear and free from any curd and turbidity such as milkiness and sediment.

Canned abalone shall have a firm, springy, chewy but succulent texture.

The texture shall be not abnormally soft or brittle. The internal texture of the whole abalone body shall be not mushy or disintegrated (soft heart) or mealy, or chalky, or crumbled or doughy. The texture shall be not dried or shrunken.

7.2.2 Canned mussels, oysters, clams, cockles, scallops, whelks and marine molluscs other than abalone

7.2.2.1 Presentation and presentation

Canned molluscs other than abalone may be packed from molluscs that were pre-cooked or raw, smoked or unsmoked, whole unshelled or shucked units. The molluscs units shall be culled, washed where appropriate and if necessary trimmed and packed in containers with, or in, a suitable oil, brine, own juice, a suitable sauce or another suitable grade packing medium.

Canned marine molluscs products may consist of marine molluscs packed with vegetables, fruits, cereals or other appropriate ingredients.

Other forms of presentation may be permitted provided that they

- a) meet all regulatory requirements, and
- b) are adequately described on the label and in accordance with the labelling requirements.

Shelled molluscs units presented in a shallow type container shall be neatly packed in rows close together with all units in the same upside down positions. There shall be no void spaces between the molluscs units or between the molluscs units and the walls of the container.

Cans shall not be over filled to the extent that they cause mechanical damage of the molluscs units or result in bulging lids.

Molluscs units packed without the shell shall be reasonably uniform in colour and in size. When smoked, the molluscs units in any one container shall have a uniform smoked colour.

Molluscs units shall not contain excessive amounts of green feed to the extent that it causes the discolouration of the packing oil.

Where the product is packed in an oil packing medium such as a vegetable oil, the packing medium shall be reasonably free from sediment and turbidity. Where the product is presented as a type of molluscs in "X" oil where "X" indicates the type of oil, the exuded liquid in the oil determined in accordance with 11.6 shall not exceed 30 %.

7.2.2.2 Drained mass

When determined in accordance with 11.5, the drained mass when packed in vertical containers shall be at least 60 % of the d.n.m.. When packed in flat cans the drained mass shall be at least 70 % of the d.n.m. Baby clams packed in vertical cans shall have a drained mass at least 50 % of the d.n.m.

7.2.3 Canned cephalopods (octopus, squids and cuttlefish)

7.2.3.1 Preparation and presentation

Cephalopods may be presented as whole, legs only, or cut pieces of the legs, heads or pieces of heads or a mixture of cut pieces from the cephalopods. Cephalopods may be packed with vegetables, fruit or cereals.

Cephalopods may be packed in an oil packing medium, brine or in water or in its own juice such as the ink.

7.2.3.2 Drained mass

The drained mass, when determined in accordance with 11.5, shall be not less than 60 % of the d.n.m.

7.2.4 Canned molluscs and vegetables and/or fruit and/or cereals and/or edible garnish

7.2.4.1 Preparation and presentation

The product may consist of molluscs with vegetables and/or fruits and/or cereals and/or with edible garnish together with seasoning materials, spices or other appropriate ingredients.

7.2.4.2 Drained mass

The total drained mass, when determined in accordance with 11.5, shall be not less than 55 % of the d.n.m. When molluscs appear first in the name of the product, the drained mass of the molluscs shall be not less than 25 % of the d.n.m., unless the fact that the drained mass of the molluscs is less than 25 % appears on the label. When molluscs do not appear first in the name of the product, the mass content of the molluscs shall constitute not less than 10 % of the d.n.m, unless the fact that it constitutes less than 10 % is declared on the main panel of the label.

7.3 Canned crustaceans

7.3.1 Lobster and rock lobster

7.3.1.1 Preparation and presentation

7.3.1.1.1 Lobster and rock lobster tails

In the packing of lobster and rock lobster tails, a small additional portion of tail flesh may be introduced to adjust the fill of the container. Whole or half tails shall be neatly folded or arranged with as much as possible of the red pigment of the epidermis of the flesh visible on the outside.

7.3.1.1.2 Lobster and rock lobster tails with other meat

The contents of the container shall be neatly and uniformly arranged. The tails shall be folded and packed around the other meat, the latter being centred in the container as far as possible. As much as possible of the pigment of the tails and other meat shall be visible.

7.3.1.1.3 Lobster and rock lobster limb and body meat

Where packed in pieces retaining to a large extent their original shape and size, the meat shall be neatly arranged in the container with as much as possible of the pigmented surfaces uppermost. Where the product is described only as "meat", this requirement shall not apply.

7.3.1.2 Drained mass requirements

7.3.1.2.1 Plain packs

The drained mass, when determined in accordance with 11.5, of the product shall be not less than 75 % of the d.n.m.

7.3.1.2.2 Packs in sauce medium

The drained mass, when examined in accordance with 11.5, shall be not less than 70 % of the d.n.m.

7.3.2 Lobster tomalley

The hepatopancreas, roe, meat from the limbs and body, and other edible parts of the lobster may be used. The gills, guts, stomach, shell particles, cartilage, and other unsuitable parts and any unsound parts shall be not used. Filler or other extraneous ingredients shall be not used.

7.3.3 Shrimps, prawns and langoustines

7.3.3.1 General preparation and presentation

Canned shrimps, prawns and langoustines shall be prepared from edible species of the families designated in 10.3.5(g)(h)(j) from which heads, shell and antennae have been removed.

The name of the product shall optionally be "shrimp", "shrimps" or "prawns" or where applicable "langoustines". (Both "shrimps" and "prawns" shall hereafter be denoted in the term "shrimp").

Canned shrimp may be presented as follows:

- a) **Peeled:** Shrimp that have been headed and the shell and tail fin removed but without removal of the dorsal tracts;
- b) **Peeled and de-veined or cleaned:** Peeled shrimp that the back have been cut open and the dorsal tract removed at least to the last segment of the tail.
- c) **Cocktail (picnic):** Mixture of peeled shrimp sizes that when determined in accordance with 11.8(ii) does not contain more than a mass fraction of 15 % broken shrimp in a container.
- d) **Salad:** Mixture of peeled shrimp sizes that when determined in accordance with 11.8(ii) does not contain more than a mass fraction of 50 % broken shrimp in a container.
- e) **Broken:** Pieces of peeled shrimp consisting of less than four segments. This may also denote product containing more than the percentage of broken shrimp permitted in the above categories.

7.3.3.2 Size designation of shrimp

Canned shrimp may be designated by size in accordance with (a) the actual count range adherent on the label, or (b) as per provisions stated below.

The terms "extra large", "jumbo", "large", "medium", "small", "tiny" may be used provided that the range is in accordance with table 1. The number of whole shrimp (including pieces greater than 4 segments) per 100 g of drained product are indicated in table 1.

Table 1 — Size designation of canned shrimp

1	2
Designation	Number of whole shrimp per 100 g of drained product
Extra large, jumbo	13 or less
Large	14-19
Medium	20-34
Small	35-65
Tiny or miniscule	More than 65

7.3.3.3 Drained mass

The drained mass of shrimp or langoustines when determined in accordance with 11.5, shall be not less than 60 % of the d.n.m.

7.3.3.4 Absence of particular defects

a) Criteria for broken shrimp:

When examined in accordance with 11.8, the presence of broken shrimp shall not exceed the criteria in tables 2 and 3.

Table 2 — Broken shrimp permitted per size designation

1	2
Size designation	Maximum percentage (as a mass fraction) of broken shrimp permitted
Extra large, jumbo	5
Large	5
Medium	5
Small	10
Tiny, miniscule	15
No size designation	10

Table 3 — Broken shrimp permitted per style designation

1	2
Style	Maximum percentage (as a mass fraction) of broken shrimp permitted
Picnic, cocktail	15
Salad	50
Broken	No maximum

b) Criteria for broken langoustines:

When examined in accordance with 11.8, langoustines shall contain not more than a mass fraction of 5 % of broken units.

c) Cleaned or deveined:

When examined in accordance with 11.8, not more than a mass fraction of 5 % improperly deveined or cleaned units shall be present in a product labelled as "deveined" or "cleaned".

d) Discolouration:

Except for sulphide staining (blackening) and when determined in accordance with 11.8, not more than a mass fraction of 15 % of the units shall be affected by distinct discolouration of more than 10 % of the surface area of the individual shrimp or with faded pigment or liver stain.

Black stained units due to sulphide staining developed on the inside surfaces of containers shall not be present.

7.3.4 Crab meat

7.3.4.1 Preparation and presentation

Canned crab meat shall be prepared single or in combination with the leg, claw, body and shoulder meat from which the shell has been removed from edible species designated in section 10.3.5(i).

The name of the product shall be "crab" or "crab meat" and shall be preceded or followed by the common or usual name applied to the species if the possibility exists of the consumer being confused.

In addition, the product name shall include descriptive terms which accurately reflect the contents without misleading or confusing the consumer.

Where leg meat is presented, the leg meat shall be neatly arranged on top, or may also be at the bottom of the container with as much as possible of the pigmented surfaces uppermost.

When leg meat is declared as a percentage of leg meat in the product, the composition of leg meat shall be determined as a percentage of the total drained mass of the contents.

Where a product is presented as chunk meat at least 50 % of the total drained mass of the contents shall consist of solid pieces or chunks of crab meat.

7.3.4.2 Drained mass

The drained mass, when determined in accordance with 11.5, shall be not less than 70 % of the d.n.m.

7.3.5 Canned crustaceans and vegetables and/or fruits and/or cereals and/or edible garnish

7.3.5.1 Preparation and presentation

The product may be prepared from crustaceans with vegetables and/or fruits and/or cereals with or without edible garnish, seasoning materials, spices or other appropriate ingredients.

7.3.5.2 Drained mass

The drained mass when determined in accordance with 11.5, shall be not less than 55 % of the d.n.m. When crustaceans appear first in the name of the product, the mass of crustaceans shall be not less than 25 % of the d.n.m., unless the fact that the mass is less than 25 % of the d.n.m. appears on the label. When crustaceans do not appear first in the name of the product, the crustacean content shall constitute not less than 10 % of the d.n.m, unless the fact that it constitutes less than 10 % of the d.n.m. is declared on the main panel of the label.

7.4 Canned seafood mixtures

7.4.1 General

The raw material for canned seafood of any mixture of fish, molluscs and crustaceans with or without vegetables and/or fruits and/or cereals falling within the scope of this specification, shall comply with the requirements in section 5 as applicable.

7.4.2 Drained mass

The drained mass of any mixture of fish, molluscs and crustaceans when determined in accordance with 11.5, shall be not less than 60 % of the d.n.m.

When any mixture of fish, molluscs and crustaceans are presented with vegetables and/or fruits and/or cereals the drained mass of the total solids shall be not less than 55 % of the d.n.m. When reference is made in the product name or indicating any mixture ingredient of fish, molluscs or crustaceans, the drained mass of that mixture ingredient shall be not less than 25 % of the d.n.m., unless the fact that it is less than 25 % of the d.n.m. appears on the label.

When the meat ingredient of the mixture does not appear first in the name of the product, the meat content shall constitute not less than 10 % of the d.n.m, unless the fact that it constitutes less than 10 % of the d.n.m. is declared on the main panel of the label.

7.5 Canned fish pies or puddings

When determined in accordance with 11.5, the drained mass shall be as follows:

- a) in pies or puddings containing only fish or marine molluscs or crustaceans or any mixture of these, the mass of fish or marine molluscs or crustaceans within the pie crust or pudding shall be not less than 35 % of the d.n.m.;
- b) in pies or puddings containing fish, or marine molluscs or crustaceans or any mixture of these with vegetables and/or mushrooms and/or fruit, and/or cereal, the mass of fish or marine molluscs or crustaceans shall be not less than 25 % of the d.n.m. The mass of vegetable and/or mushroom and/or fruit and/or cereal as relevant as the part of the product in the pie crust or pudding shall constitute not less than 15 % of the d.n.m.

Where the name of a minor ingredient also appears in the name of the product, the mass of that minor ingredient shall constitute not less than 5 % of the d.n.m.

7.6 Unspecified canned seafood

7.6.1 General

Any product falling within the scope of this specification shall be prepared from material complying with the requirements in section 5. The product shall be appropriately described on the label.

7.6.2 Drained mass

Subject to the container being filled to practical capacity (see 5.1.4) the drained mass when determined in accordance with 11.5 shall be as follows:

a) Fish:

- 1) Canned fish not less than 70 % of the d.n.m.
- 2) Canned fish products not less than 60 % of the d.n.m.

b) Molluscs:

- 1) Canned molluscs not less than 60 % of the d.n.m.
- 2) Canned molluscs products not less than 55 % of the d.n.m.

c) Crustaceans:

- 1) Canned crustaceans not less than 60 % of the d.n.m.
- 2) Canned crustaceans products not less than 55 % of the d.n.m.

Where the drained mass of any unspecified fishery product is less than 50 % of the d.n.m., the product description shall clearly indicate that it is a special type of product of which fish, crustaceans or molluscs are an ingredient and the fish, crustaceans or molluscs content shall be declared on the label.

7.7 Semi-preserved or pasteurized canned products

7.7.1 Product definition and methods of preservation

Canned fish, molluscs and crustaceans or their products covered by this standard, may be packed as semi-preserved. The product is preserved by any combination of salting, brining, pickling, smoking, low acid or preservatives allowed in terms of regulations under the Foodstuffs, Cosmetics and Disinfectants Act and chilled in storage below 5 °C. Products may also be rendered shelf stable by incorporating heat processing and at least a pasteurization treatment process.

7.7.2 Product requirements

Particular product descriptions shall comply with the requirements for the particular products as relevant on condition that where product is preserved by the packing medium and is labelled semi-preserved, the drained mass may be a minimum of 50 % of the d.n.m. (This requirement is not applicable to products in 7.1.9).

8 Microbiological requirements

8.1 Commercially sterilized products

8.1.1 Incubation

- a) The frequency and number of samples from a production lot to be incubated shall be determined at the discretion of the authority administering this specification. Such discretion shall be established on criteria such as, the past records and ability of the factory to produce a microbiologically safe product, the length of time the factory was idle, any delays or deviations occurring in the scheduled processing plan for the product and the use of raw materials, ingredients or packing material or production of unaccepted, defective or doubtful quality.

The capability of a factory depends on attributes such as adequate supervision, competent and technically trained personnel, a positive attitude and commitment, the use of calibrated instruments and consistent and carefully maintained and adjusted equipment, and adequate implementation of management systems based on programmes such as good manufacturing and sanitation practices, quality management and process control and the successful application of a system that identifies specific hazards and preventative measures for their control to ensure the safety of the product.

- b) The factory shall provide sufficient incubation facilities at the factory. The incubation of the samples shall be under the sole control of the authority administering this specification.

8.1.2 Microbiological spoilage

A product in its container, after incubation at 37 °C for 14 d or after it has been kept at ambient temperature, shall be considered to have undergone microbiological spoilage if the container

- a) shows a positive pressure,
b) leaks, or
c) whether having a positive pressure or not, shows evidence of bacterial proliferation indicated, when compared with sound samples by a significant change in pH value, or by disintegration or decomposition, or by significant discolouration of the product. Evidence of bacterial proliferation shall be confirmed by microscopical or cultural examination (see 12.1 and 12.2).

8.1.3 Microbiological requirements

When examined or tested (or both) in accordance with 12.1 and 12.2, products in containers shall show no evidence of microbiological spoilage or of the presence of viable pathogenic organisms or organisms liable to cause spoilage of the product under normal conditions of storage.

8.2 Pasteurized, semi-preserved and salt-preserved products

8.2.1 Microbiological spoilage

A product in its container shall be considered to have undergone microbiological spoilage if the container

- a) shows a positive pressure,
b) leaks, or

- c) whether having a positive pressure or not, shows evidence of bacterial proliferation indicated, when compared with sound samples, by a significant change in pH value, or by disintegration or decomposition, or by significant discoloration of the product.

Evidence of bacterial proliferation shall be confirmed by microscopical or cultural examination (see 12.1 and 12.2).

8.2.2 Microbiological requirements

When tested in accordance with 12.1 and 12.2, products in containers examined or tested or both shall show no presence of viable micro-organisms considered to be pathogenic nor the evidence of microbiological spoilage or of viable spoilage organisms in numbers liable to cause spoilage of the product during storage at the temperature recommended by the canner, or, in the case of pasteurized or semi-preserved products at the required storage temperature in accordance with 10.2.1(e) that is stated on the label.

9 Requirements to control the integrity of cans and other types of containers

9.1 General requirements

Containers, including lids or caps shall meet the following requirements:

- a) be capable of maintaining the preservation of their contents in a sound wholesome condition;
- b) be made of a suitable material and constructed so that they can be easily closed and sealed;
- c) be sufficiently durable to withstand mechanical and thermal stresses during the canning processes and to resist physical damage and maintain their normal appearance during normal distribution and storage;

NOTE Collapsible tubes if unsuitable for heat sterilization, should be used only for products such as fish pastes or fish roe with a high salt content where heat sterilization is not obligatory.

- d) protect the contents from contamination by micro-organisms or any other substance;
- e) be suitable for the type of product and the conditions of storage and transportation;
- f) their inner surfaces shall be adequately coated with a suitable material and shall not react with the contents in any way that would adversely affect the product or the containers;
- g) the internal surface coating such as lacquer shall be uniformly applied and shall not become loose or peel off the surface of the can or lid during processing and normal storage conditions;
- h) the outer surfaces shall be resistant to corrosion under normal storage and retail conditions;
- i) the compound sealing material on lids or caps shall be suitable for the purpose and for the type of product used;
- j) lids shall be tamper-proof, a tamper detector shall be provided in cases where lids or caps can be removed by hand, such as with screw-on caps on jars; and
- k) the containers shall be such that the contents can be easily emptied out.

9.2 Condition of containers and closures

Containers or lids with signs of poor or doubtful container integrity shall not be used. The inner surfaces of all containers and closures shall, at the time of use, be clean and in the case of cans, free from corrosion, pinholes, evidence of de-tinning, de-lacquering, damages, serious solder

splashing or excess application of solder. When lacquered cans or lids or both are used, the lacquer shall be free from drops or splashes of lacquer, significant scratches and other imperfections, and it shall have no detrimental effect on the product such as foreign flavours, foreign odours and discolouration. The seams and seals, where applicable, shall be normal in appearance with a strong leakproof structure and quality. The sealing compound on closures shall be evenly applied around the entire contour with a normal appearance and adhesion.

Can bodies and lids with scoring lines for easy opening purposes of the final product by the consumer, shall be subjected to appropriate examinations for integrity. There shall be no signs of corrosion in the scoring lines.

9.3 Transport and storage of empty containers

Containers and lids or closures from manufacturers shall be delivered covered by wrapping material or in covers and shall be transported and stored under protection against risk of contamination, damaging and the weather. The storage area shall be kept clean and shall be insect-, bird- and rodent-proof. Containers and lids or closures shall be stored in a dry store, protected against wind, rain or vapour from the sea and away from steam, humidity, condensation or sudden temperature variations. The storage area shall be used solely for the storage of empty containers and lids.

The stacking of pallets with empty cans shall be such that the cans shall be not damaged. Empty cans or pallets with empty cans shall be not stepped on.

9.4 Inspection on receipt

The can manufacturer shall, by means of applying a quality management system, ensure that consignments of containers and lids supplied to the canner are in compliance with the correct characteristics and documented parameters that were agreed upon between the can manufacturer and the canning factory. The canning factory shall on receipt of the consignments, conduct a routine inspection system that includes a visual examination and physical testing to determine the freedom of integrity defects and other defects.

Inspection results and corrective procedures where applicable shall be documented and kept on file. Consignments not in compliance with the standards set by the container manufacturer shall not be used.

Each pallet or package with containers and lids shall be provided with a means of identity of the container and lid manufacturer. A system of collecting and retaining these identities shall be exercised and be such that, should problems arise, the affected containers or lids from a particular pallet or package can be related and traced to a specific production code lot from which these containers or lids were selected.

9.5 Handling of containers in the canning operation

Containers shall be not exposed to contamination or damaging to their bodies, seams or flanges while distributed, on runways or feeding lines. Containers shall be removed from the runways or feeding lines at the end of production unless the containers are adequately covered and protected against risks of contamination and damages.

9.6 Coding and sealing of containers

9.6.1 Coding

Each container shall be indelibly and legibly marked, and visible with the naked eye, coded from which the details of manufacture (see 10.2(g)) including the seamer and/or packing line identification and where applicable any sub-coding system used, can be determined.

Sub-coding may indicate and change according to the following: intervals or periods during a work shift; personnel shift changes; batches or catches, provided that containers comprising such batches shall not extend over a period of more than one personnel shift.

When coding is done by embossing, the lids or closers shall not be damaged.

9.6.2 Seam closing machines

Lids or closures and containers shall not be damaged during handling or sealing or closing of containers. Only specially trained and adequately qualified personnel shall conduct the correct operation, careful maintenance, adjustment and frequent regular inspection of the seam closing machines. The seam closing operation shall be performed at a speed that is consistent with the speed of the production line to prevent a delay of containers before the seamer, resulting in a subsequent drop in contents temperature.

A system of identifying each retort trolley, basket or crate being filled with containers after sealing and the time of sealing shall be in place.

9.6.3 Sealing

9.6.3.1 Seam quality

All container closures shall be strongly and accurately made and well formed with the parameters and dimensions within the accepted tolerances for the particular double seam or closure attributes of the container.

9.6.3.2 Seam evaluation

Routine evaluations at regular intervals of the quality of the closures shall be conducted by competent personnel under illumination complying with 3.2.7. Such evaluations shall be a formalised programme that shall include visual inspections for the absence of defects likely to affect the hermetic seal and internal inspections of the seams in accordance with the standards, parameters, attributes and methods of evaluation provided by the container manufacturer and shall be available at the container seam inspection station.

9.7 Container washing prior to retorting

9.7.1 Water used in a detergent solution for container washing purposes or in water sprays for washing shall be clean potable water in compliance with 3.4.1.

9.7.2 All dirt, grease and organic material shall be removed from the outside surfaces of the containers.

9.7.3 The detergent solution shall be regularly replaced to ensure its effectiveness and to prevent accumulation of contaminates.

9.7.4 The temperature of the washing water or detergent solution shall be such to ensure that the product temperature remains in compliance with the initial temperature specified in the sterilization schedule.

9.8 Handling of the product between container closure and retorting

9.8.1 Damaging of containers during collection or loading in the retort baskets or trolleys shall be avoided. The stacking of containers shall be such to avoid obstruction of the flow of the heat medium in the retort.

9.8.2 The period of time between the closing of containers and retorting shall be kept to a minimum. Unnecessary delays between the closure of containers and the retort process shall be avoided.

9.8.3 If the temperature of the product before retorting dropped below the initial temperature that has been used to determine the time-and-temperature process of the product, the retort sterilization schedule shall be extended according to a pre-determined plan that shall ensure commercial sterility of the product. Just before the start of the retort process whenever a drop of the normal schedule initial temperature is suspected, the content of the coldest container to be processed shall be shaken or stirred to determine the average temperature.

9.8.4 A system for product traffic control shall be established to prevent the product from bypassing the thermal processing operation and being accidentally taken into the storage area, or being subjected to multiple processing. A method to indicate whether a retort trolley or basket has been thermally processed such as with the application of a heat sensitive tape or tag shall be employed. A container on top of a retort trolley or basket shall be conspicuously marked with a heat sensitive tape or a heat sensitive tag shall be tied to the retort trolley or basket.

9.8.5 Containers with product requiring different retort processes that are being packed at the same time shall be identified and routed to receive the specified processes.

9.8.6 Retorts containing containers not yet processed shall be identified by means such as with a distinctive marker to prevent confusion.

9.8.7 Retorts shall not be closed until ready to start the process.

9.8.8 A clean new time and temperature chart or thermogram (see 3.3.6(k)) shall be installed at the start of each day's operation and be synchronized with the time indicated on the wall clock. The recording pen shall be filled with ink and the functioning of the timing mechanism and the correct length of the recorder pen arc shall be checked. After a power failure where the thermograph was inactivated, the time and temperature chart or thermogram shall be reset to the correct time.

9.9 Thermal processing of product

9.9.1 In the case of products in containers other than semi-preserves and salt-preserved products, the filled containers shall, where appropriate, be exhausted, hermetically sealed, and fully thermally processed. The containers of semi-preserves and salt preserved products shall be hermetically sealed.

9.9.2 The thermal process shall be continuous.

9.9.3 All rigid containers shall be exhausted, sealed, and processed in a proper manner resulting in their ends remaining concave and the bodies remaining normal during normal commercial conditions of storage and distribution.

9.9.4 The time-temperature process in the case of heat-preserved products shall ensure

- a) the destruction of pathogenic organisms, and
- b) freedom from microbiological spoilage.

9.9.5 Retorts and other heat processing equipment are to be operated as per requirements for the particular type of retort or equipment by trained and qualified individuals. The processor is required to document prescribed operating procedures for each product and container size and these procedures have to be available for inspection and validation by the authority administering this specification.

9.9.6 Appropriate alternative sterilization schedules shall be provided for immediate application in case of any deviations in processing.

9.9.7 Processing data and recorded charts of all processes that deviate from the scheduled process, shall be submitted to the heat processing authority that investigated and authorised the original documented scheduled process. The heat processing authority shall submit a written report on the heat dose calculated for the particular deviation for submission to the authority administering this specification.

9.10 Handling of sealed containers after heat processing

Any container whose process status before and after the retort process is unknown shall be immediately destroyed.

After having been removed from the retort in their baskets or trolleys the containers shall not be subjected to after-sterilization contamination. Hot or wet containers or containers having a positive internal pressure after the retort process shall not be removed out of their trolleys or baskets or be handled individually or be touched by hand. Containers shall not be handled or bulk-stacked before being thoroughly dried and cooled.

A clean separated area for the sole purpose of cooling containers after retorting shall be provided. Such an area shall be

- a) enclosed with unauthorized entrance being restricted,
- b) physically separated from areas from which steam is emitted, and
- c) away from other normal factory traffic, other than the handling of trolleys or baskets with containers after retorting. There shall be no crossflow of other factory traffic along the route of the baskets or trolleys between the retorts and the cooling area.

After the containers have been cooled and dried, and only on instruction from a designated person, may the baskets or trolleys be moved out of the cooling area to a pick-up area. The process of removing the containers out of the trolleys or baskets and the stacking shall be done in such a way as to avoid rough handling or damaging of the containers or causing unnecessary stress to their seams or seals.

Containers, and in particular their seams, shall not be exposed to contamination. The equipment and conveyors used for the pick-up and stacking of containers shall be regularly sanitized.

9.11 Storage of the end product

9.11.1 General

The end product storage areas shall be used solely for the intended purpose.

All containers of the same production code or batch code or sub code, where applicable, shall be stored together and not be mixed with containers of other production days' codes. Each stack or pallet with containers shall be identified with the code appearing on the containers and with their inspection status. Any production lots in which defects or a deviation from process requirements were detected, shall be identified as such and be stored separately from other production lots. Any non-conforming production lots, shall be identified as such and stored in an area physically separated from the rest of the end product stock.

9.11.2 Products not requiring refrigeration

Canned products not requiring refrigeration shall, both before and after labelling and packaging for commercial distribution, be stored orderly in dry conditions, protected against steam, condensate, moisture, dust and the weather. Canned products shall not be stored under conditions that are conducive to corrosion of the containers or be exposed to extreme temperatures.

The final product shall be stacked in such a way that container damage shall not occur due to pressure from excessive mass of pallets with containers stacked above. Workers shall not be allowed to step on containers or on pallets with containers. Precautions shall be exercised to avoid container damaging in particular with fork-lift truck handling.

9.11.3 Products requiring refrigeration

Where products are required to be stored under refrigeration, the storage temperature shall not exceed 5 °C. Refrigeration rooms shall be clean and shall be hygienically maintained. The product shall be protected against risks of corrosion.

10 Labelling and marking

10.1 Labelling operations

10.1.1 Labelling area

Before the start of the labelling operation, the area shall be cleared of any stray cans. The labelling area shall be maintained in a clean, tidy and orderly condition.

10.1.2 Condition and handling of containers during labelling

Containers shall be in a condition complying with 9.2.

The handling of containers during the labelling process shall be done in a manner so as to avoid container abuse or damaging or their seams being subjected to undue stress or mechanical shock.

10.1.3 Labels

Labels, outer wrappers, outer cartons, lithographic markings and printing on containers, pictorial presentation and colouring shall be in accordance with the labelling requirements of 10.2.

The size of the label, outer wrapper and outer carton shall be suitable to the container size without being oversized. Printing shall be correct, proper and neat.

It is recommended that the authority administering this specification be consulted with regard to the printed lettering size, statements, pictorial presentation and colouring on newly designed labels, outer wrappers, outer cartons or lithographed cans before they are taken into use.

10.1.4 Attachment of labels

Labels, outer wrappers or outer cartons shall not be attached or applied to containers by any person other than the manufacturer or by his authorized agent.

Labels, outer wrappers or outer cartons on containers, shall be clean, neat, unspoiled, undamaged and labels or outer wrappers shall be securely attached at the time of despatch from the factory (or at the time of arrival when imported).

Misaligned labels, excess glue or lack of glue, or loose or pleated labels or outer wrappers shall not be present. Labels or outer wrappers shall not be superimposed over other labels or over outer wrappers that have been affixed on to containers or onto lithographic printed containers.

Materials such as adhesives or glues used for attaching or applying labels, outer wrappers or outer cartons or closing of packages shall not be hygroscopic, or liable to deteriorate during storage after being applied or conducive to corrosion of the can or lid.

10.1.5 Packages – outer containers

Packages in which containers are packed shall be clean, neat and undamaged. Outer containers such as boxes or cases shall be suitable for the purpose of use, be of correct size to avoid damaging of containers by squeezing or loose movement of the containers inside the outer container. Containers shall not be packed in outer containers in positions prone to cause damaging such as packing containers on their sides.

Outer containers shall be strong enough to protect the finished product during normal handling and transport.

10.1.6 Marking of packages

The following regarding the containers in the package shall be printed or stencilled on the outside of every package: The number and size or net mass of the containers and the information required by 10.2(a), 10.2(b), 10.2(g), 10.2(h), 10.2(i) (where applicable) and 10.2(f). The business address of the manufacturer need not be the full address but shall be sufficient for identification purposes.

In addition to the date code required by 10.2(h), any sub-coding indicating a time period of the production date, and/or any line or seamer number, that appeared on the containers shall also be printed or stencilled on every package. When a code system other than the conventional lettering and digital form such as a bar or edge coding system is used, sufficient information shall appear on the packages to identify the production date and any sub-coding.

10.1.7 Containers for export

Provided that the requirements of the importing country are met and subject to there being no attempt to misrepresent the product, products may be exported either unlabelled, or labelled differently from the requirements of this specification. The requirements of 10.1.6 shall, however, apply, except that a code mark may be used in lieu of the name of the manufacturer.

10.2 Details required on each container or label

The following information shall appear on each container or label, clearly visible in legible and indelible markings not affected by pictorial or other matter, printed or otherwise, in type of such size and presentation as prescribed by regulation promulgated under the said Foodstuffs, Cosmetics and Disinfectants Act and the Trade Metrology Act, 1973 (Act 77 of 1973) (as amended from time to time):

- a) the name and full physical address of the manufacturer, importer, producer, proprietor or controlling company, or in the case of containers packed on behalf of any other person or body, the name and full physical address of that person or body;
- b) taking cognisance of the provisions of the correct Merchandise Mark Act the name and true description of the contents (see 10.3), including where applicable, the nature of the packing medium in which the product is packed;
 - 1) the description "natural oil" or "natural" shall not be used for products in a "plain" or "brine" packing medium;

- 2) where the product is packed in oil, the name of the type of oil. If the term "vegetable oil" appears in the name of the product, the specific type of vegetable oil shall be declared in the list of ingredients;
 - 3) if the product has been smoked or smoked flavoured, this information shall appear on the label in close proximity to the name of the product. The qualifying word(s) e.g. "smoked" or "smoke-flavoured" whatever is appropriate shall appear in immediate conjunction to the product name in a letter size at least half that in that the product name is featured and in equal prominence and boldness;
- c) where applicable, a list of ingredients including the name(s) of the fish, molluscs or crustacean species;
 - d) where permitted by the Foodstuffs, Cosmetics and Disinfectants Act, the presence of artificial colorants;
 - e) where the product is required to be stored under refrigeration, the words "Perishable – Keep under refrigeration at a temperature not exceeding 5 °C" in a prominent position on the main panel, in plain capital letters at least half the size of that used for the product name, with a minimum of 3 mm in height, except that the word "Perishable" shall be in bold type of at least 4,0 mm in height;
 - f) the d.n.m. of the contents;
 - g) the product identification, the date of canning, the batch number (if used) and the factory identification embossed or otherwise indelibly marked on the container or, in the case of jars, on the cap or label (see 9.6.1); any mark or code used for the foregoing shall be disclosed to the authority administering this standard. Where individual containers are labelled, wrapped in an outer wrapper or packed inside an outer carton in such a way that the code on the container is not visible without removing the label, outer wrapper or outer carton, the corresponding code of the container shall be marked on the label or outer carton;
 - h) words indicating the country of origin where the product was produced; and
 - i) information required in terms of the relevant subsection(s) dealing with the specific product.

10.3 True description of the canned product

10.3.1 General

10.3.1.1 The name of canned fish, molluscs or crustaceans declared on the label shall be the common or usual name applied to the species.

10.3.1.2 The product shall be correctly described in the name of the product appearing on the label.

10.3.1.3 In addition to 10.3.1.1 and 10.3.1.2, the label shall include other descriptive terms that will avoid misleading or confusing the consumer.

10.3.1.4 Any descriptive terms used including those denoting style of presentation, shall accurately reflect the contents of the container.

10.3.1.5 No fish, molluscs or crustaceans shall be labelled under a name or designation that is misleading or no descriptive terms or statements that are misleading or confusing to the consumer shall be used.

10.3.1.6 Where the words "selected fish" or similar words are used to describe the product, the name of the fish, molluscs or crustaceans shall appear in plain type of the same letter size and colour as the product name.

10.3.1.7 The name of the product shall be qualified by a term descriptive of the representation. A product presented as solid pack or chunks or as flaked, grated, shredded, minced or similarly prepared, shall be described by the appropriate word(s) on the main panel of the label in letters of the same size and prominence as the name of the product that shall include the name of the fish. Where the name of a minor ingredient appears in the name of the product, the mass of the minor ingredient shall not constitute less than 5 % of the d.n.m.

10.3.1.8 Fish packs other than whole packs (heads and tails removed and eviscerated) such as cutlets, filets or slices shall be appropriately described on the main panel(s) of the label.

10.3.1.9 Pictorial presentations shall not be misleading or confusing to the consumer. Any fish, molluscs or crustaceans depicted on the container, label, outer wrapper or outer carton shall bear a reasonable likeness to the type of fish, molluscs or crustacean, cut of fish or colour of fish or product in the container.

10.3.1.10 Where applicable, the common or usual name of the product shall be qualified by the country, or region of origin.

10.3.1.11 The "Best before" date or expiry date shall appear legibly on the label.

10.3.2 True description of canned fish

10.3.2.1 Where stockfish is used in the preparation of products labelled "curried fish", "fried fish", or "pickled fish" the name "stockfish" need not to appear in the title; in the case of other fish used for these types of products the name of the fish shall appear in the title in conjunction with the descriptions. The type of fish used shall appear in the list of ingredients (see 10.2.1(c)).

10.3.2.2 Mullet shall be described only as "Mullet" or "Haarders" / "Harders".

10.3.2.3 *Trachurus spp.* shall be described only as "Maasbanker" or "Jack Mackerel".

10.3.2.4 *Scomber spp.* in any form shall be described only as "Mackerel"/"Makriel" or "Middlecut".

10.3.2.5 The words "middle cut"/"middelstuk" shall be used only when coupled with the name of the fish and when in fact middle cuts have been packed; the words "middle cut"/"middelstuk" shall appear in type of the same size and prominence as that of the name of the fish.

10.3.2.6 Canned sardines or sardine type products are prepared from the following species:

Sardina pilchardus

Sardinops melanostictus, S. neopilchardus, S. ocellatus, S. sagax, S. caeruleus,

Sardinella aurita, S. brasiliensis, S. maderensis, S. longiceps, S. gibbosa

Clupea harengus

Sprattus sprattus

Hyperlophus vittatus

Nematalosa vlaminghi

Etrumeus teres

Ethmidium maculatum

Engraulis anchoita, *E. mordax*, *E. ringens*

Opisthonema oglinum

Depending on the species used, the name of the product shall be

- a) "Sardines" exclusively reserved for *Sardina pilchardus* (Walbaum); or
- b) "X sardines" where "X" is the name or description of a country, the species, or the common name of the species in accordance with this specification and in a manner not confusing or misleading to the consumer (see 10.3.1) in close proximity and in a letter size at least half the size of the word sardines and in equal prominence, with the exception that the species *Sprattus sprattus* may be described as brisling sardines.
- c) The description "Pilchards/Sardyne" is exclusively reserved for the species *Sardinops ocellatus*, *S. melanostitus*, *S. neopilchardus*, *S. sagax*, *S. caeruleus* and *Sardina pilchardus*.
- d) *Sardinella spp* shall be described as "Sardinella". The descriptive terms "Pilchards" shall be not used for packs consisting of *Sardinella spp*.
- e) *Etrumeus spp* shall be described as "X herring" where "X" is the name or description of a country, a geographic area, the species, or the common name of the species in a manner not to mislead or confuse the customer. The species *Etrumeus teres* (Rooi-oog/ronde haring) qualify for labelling "South Atlantic herring"/"Suid Atlantiese Haring".
- f) *Engraulis spp* shall be described as anchovies.
- g) Canned Saury shall be prepared from *Scomberesox spp* and *Cololobis spp*.

10.3.2.7 Snoek (*Thyrsites atun*) in any form shall be described only as "Snoek", "Barracouta" or "Atun".

10.3.2.8 Subject to 10.3.2.1, South African *Merluccius spp* shall be described only as "Hake" or "Stockfish"/"Stokvis" or as Cape Whiting.

10.3.2.9 Yellow-tail (*Seriola spp*.) shall be described only as "Yellow-tail"/"Geelstert", "Halfkoord", "Amberjack".

10.3.2.10 Canned Tuna and Bonito (see 6.1.4) are the product consisting of the flesh of any of the appropriate species listed below:

Thunnus alalunga

Thunnus albacares

Thunnus atlanticus

Thunnus obesus

Thunnus maccoyii

Thunnus thynnus

Thunnus tongoe

Euthynnus affinis

Euthynnus alletteratus

Euthynnus lineatus

Katsuwonus pelamis (syn. *Euthynnus pelamis*)

Sarda chilensis

Sarda orientalis

Sarda sarda

10.3.2.10.1 The name of the product as declared on the label shall be "Tuna" or "Bonito" and may be preceded or followed by the common or usual name of the species in a manner not confusing or misleading to the consumer.

10.3.2.10.2 The name of the product labelled as "Tuna" shall be qualified or accompanied by a term descriptive of the representation in accordance with 10.3.1.7 and of the colour of the product provided that the term "white" shall be used only for the product of the meat of the tuna species *Thunnus alalunga* that shall comply with the requirements of 7.1.4.2(a). The term "light" shall be used for a tuna product that corresponds to the colour designation as set out in 7.1.4.2(b). A tuna product that corresponds to a colour designation as set out in 7.1.4.3 shall be labelled as "dark". Blends of tuna of different colour designation shall be specifically described in the title of the product. All colour designation terms qualifying "tuna" shall be in letters of at least the same size and prominence as "Tuna" or "Tunny".

The name "Albacore" when used for the labelling of tuna shall be reserved for the tuna species *Thunnus alalunga* and shall be coupled with "Tuna" or "Tunny" in letters of the same size and prominence.

10.3.2.10.3 Products consisting of the meat of *Sarda spp.* shall be labelled as "Bonito" and shall not be described as "Tuna" or any reference made to tuna.

10.3.2.11 Kabeljou shall be described only as "Kabeljou" or "Cape Cob".

10.3.2.12 Canned salmon (see 7.1.6) is the product prepared from any of the species listed below, with the proviso that the common names in brackets may only be used in conjunction with the corresponding species names as follows:

Salmo salar - (Atlantic salmon, salmon);

Oncorhynchus nerke - (Sockeye salmon, red sockeye salmon, red salmon);

Oncorhynchus kisutch - (Coho salmon, silver salmon, medium red coho salmon);

Oncorhynchus tshawytscha - (Chinook salmon, spring salmon, king salmon);

Oncorhynchus gorbuscha - (Pink salmon, humpback salmon);

Oncorhynchus keta - (Chum salmon, keta salmon, dog salmon); and

Oncorhynchus masou - (Cherry salmon, Japanese or Masou salmon).

Tips, tails, minced and similar forms of canned salmon shall be labelled to disclose their true nature, all words qualifying the word "salmon" being in type of the same size and prominence as "Salmon".

The species *Oncorhynchus gorbuscha* - (Pink salmon, humpback salmon) is the only species that may be labelled "Pink Salmon". The colour of the fish flesh in the can may deviate from the characteristic pink colour provided

- a) that the fish is from the abovementioned species,
- b) that written verification from an authority in the country where the fish is canned is provided,
- c) that there is no pictorial presentation depicting pink salmon on the label, and
- d) if white fish is depicted in the pictorial presentation on the label it may not be labelled "Pink Salmon".

The colour of the fish flesh depicted in the pictorial presentation shall be a true reflection of the fish flesh colour of the contents.

10.3.3 True description of the contents of fish paste

Any fish named in the description of a fish paste shall be used in sufficient quantity to justify the use of the name. If only one variety of fish is named, the paste (except in the case of anchovy) shall contain at least 60 % by mass of that fish. Where two or more varieties are named, except where one variety is anchovy, the total quantities of the named fish shall be not less than 60 % by mass and the quantity of any one particular variety of fish named shall be not less than 15 % by mass. In the case of fish paste labelled anchovy, the anchovy content shall be not less than 30 % by mass. Where anchovy appears in the name of the product, the anchovy content shall be not less than 10 % by mass and the total quantities of the varieties of fish indicated in the name of the product shall be not less than 50 % by mass. In the case of fish pastes made from more than one variety of fish, the names of the varieties featuring in the title shall appear in the title in decreasing order of amounts by mass present. All types of fish used in the preparation shall appear in the list of ingredients in decreasing order of amounts by mass present. For the purpose of this subsection the term "fish" shall be deemed to include molluscs and/or crustacea, provided that the presence of molluscs and/or crustacea as a fish paste ingredient shall be specifically stated on the label.

10.3.4 True description of molluscs

The common names given in table 4 may be used as indicated:

Table 4 — Common and scientific names of molluscs

1	2
Common name	Scientific name
Abalone/Perlemoen	<i>Haliotis midae</i> and other edible species of the family <i>Haliotidae</i> .
Mussel	Edible species of the family <i>Mytilidae</i> .
White mussel	<i>Donax serra</i>
Black mussel	<i>Chloromytilus meridionalis</i> , <i>mytilus gallo provincialis</i>
Brown mussel	<i>Perna perna</i>
Green mussel	<i>Perna canaliculus</i> , <i>mytilus smaragdinus</i>
Oyster	Edible species of the <i>crassostrea spp</i> and other edible species of the <i>Ostreidae</i> family.
Knysna oyster	<i>Crassostreaa margaritacea</i>
Razor shell (Razor clam)	Edible species of <i>Solenidae</i> family.
Octopus (Seacat)	Edible species of the <i>Octopus spp</i> , <i>Polypus spp</i> ; <i>Eledone spp</i> .
Cuttlefish	Edible species of the <i>Sepia spp</i> ; <i>Sepiola spp</i> .
Squid, Inkfish, Inks, Sea arrow, Calamari	Edible species of the <i>Loligmidae</i> family.
Clams	<i>Menetrix spp.</i> <i>Donax spp.</i> <i>Corbicula spp.</i> <i>Mya arenaria</i> <i>Saxidomus giganteus</i> <i>Saxidomus nuttali</i> <i>Venus mortoni</i> <i>Protothaca thaca</i> <i>Protothaca stamina</i> <i>Paphia stamina</i> <i>Austrovenus stutchburyi</i> <i>Mercenaria mercenaria</i> <i>Venus mercenaria</i> <i>Mactra sachalinensis</i> <i>Anadara subcrenata</i> <i>Tilapia cordata</i> <i>Tivela stultorum</i> <i>Spisula solidissima</i> <i>Ensis directus</i> <i>Arctic islandica</i>
Cockle	Edible species of the <i>Veneridae</i> and <i>Cordidae</i> families.
Scallop	Edible species of the <i>Pectinidae</i> family.
NOTE Where molluscs are not shucked, the presence of shells shall be reflected in the description of the product on the main panel of the label.	

10.3.5 True description of crustaceans

The common names given in table 5 may be used as indicated:

Table 5 — Common and scientific names of crustaceans

1	2
Common name	Scientific name
Rock lobster, spiny lobster	<i>Jasus spp</i>
Crawfish	<i>Palinurus spp</i> and <i>Panulirus spp</i>
West coast rock lobster, Cape rock lobster, kreef	<i>Jasus lalandii</i>
Vema rock lobster, Tristan rock lobster	<i>Jasus tristani</i>
Natal rock lobster	<i>Palinurus gilchristi</i>
Crayfish	<i>Panulirus homarus</i> . Freshwater lobsters of <i>Cambarus spp</i> and <i>Astacus spp</i> .
Port Elizabeth mud crayfish	<i>Scyllorus elizabethae</i>
Langoustine	Edible <i>Nephrops spp</i>
King prawn	<i>Nephrops andamanica</i>

Crab meat shall be prepared from any of the edible species of the sub-order *Brachyura* of the order *Decapoda* and all species of the family *Lithodidae*.

The name "Shrimp", "Shrimps" or "Prawns" shall only be used for the product prepared from species of the families *Penaeidae*, *Pandalidae*, *Crangonidae*, *Palaemonidae*.

"X Shrimp", "X Shrimps" or "X Prawns" may be used where the "X" is the name of a country or a geographic area from that the shrimps originate or the common name.

Size designations or count ranges are not required on the label, but if used, they shall be in accordance with 7.3.3.2. Where a count range is declared on the label in place of a size designation; no tolerances shall be applicable to the specified count ranges.

11 Methods of physical examination

NOTE A sample unit consists of a container of product and the entire contents thereof.

11.1 External and internal examination of containers

11.1.1 Determine whether the code digits are legible and indelible and if embossed, examine for any abnormalities such as damage of the tinplate or lacquer.

11.1.2 Examine the seams, seals or closures and outer and inner surfaces of the container for any abnormalities or integrity defects.

11.2 External and internal examination of seams

Conduct internal and external examinations of container seams, seals or closures in accordance with the method provided by the container manufacturer to determine whether the container seam, seal or closure is in compliance with the prescribed standards, parameters and attributes supplied by the container manufacturer to ensure the integrity of the hermetic sealing.

11.2.1 Leak test by applying vacuum inside the can

11.2.1.1 Preparation of the cans

a) Empty unused cans:

Immerse empty unused cans for 5 min in boiling water. Remove the cans from the boiling water and cool to 30 °C or below before testing.

b) End product:

In the case of 3-piece cans – Open the end product by cutting out one of the lids of the can without damaging the circumference of the seam. In case of 2-piece cans, remove the bottom of the can (opposite the seam) without damaging the expansion ring on the bottom end. After removal of the content, immerse the can for 60 min in boiling water. Remove from the boiling water and dry for 6 h at approximately 55 °C before testing.

11.2.1.2 Testing

Add some water to submerge the entire seam. Place a rubber seal on the open end to cover the entire top of the circumference of the seam or expansion ring. Place a perspex plate connected with a vacuum tube on top of the rubber seal. Observe the entire seal covered with water at the opposite end of the can during the removal of air out of the can. Appearance of a succession of air bubbles from the seam into the water indicates leakage through the seam at that particular point.

11.3 Determination of net mass of the contents of the container

11.3.1 Weigh unopened container.

11.3.2 Open container and remove the contents.

11.3.3 Wash, dry and weigh the container complete with lid.

11.3.4 Subtract the mass of the empty container from the mass of the unopened container. The resultant figure is the net mass.

11.4 Determination of the vacuum inside a container, the net headspace and the fill of the container

11.4.1 Vacuum

Tap the unopened container slightly on the surface of the inspection table to move the contents away from the inside surface of the lid. Impress the point of a vacuum gauge through the lid to measure the vacuum inside the container. Check for compliance with 6.1.7.

11.4.2 Net headspace

In case of

- a) a container with a lid attached by a double seam, partially cut out lid without removing or altering the height of the double seam, or
- b) another type of container, remove the lid.

Determine the average vertical distance, in mm, from the inside surface of the lid of the container to the upper level of the contents by taking measurements over the surface of the contents. The result is the net headspace.

11.4.3 Fill of container

In case of containers with lids attached by double seams, fill the container with water at room temperature to a vertical distance of 5 mm below the top level of the container. Weigh the container thus filled and determine the mass of the water by subtracting the mass of the container.

Draw off water from the filled container to the level of the contents, weigh the container with the remaining water and determine the mass of the remaining water by subtracting the mass of the container.

Divide the mass of the remaining water by the mass of the water and multiply by 100. The result is the percentage of the total volume capacity of the container occupied by the content expressed as the fill of the container.

In case of a container with a lid attached otherwise than by a double seam, remove the lid and proceed as above, but fill the container to the top or to the level of the inside surface of the lid instead of to 5 mm below the top.

11.5 Determination of drained mass

11.5.1 Maintain the container at room temperature approximately between 20 °C and 30 °C for a minimum of 12 h prior to examination.

11.5.2 Open and tilt the container to distribute the entire contents from the container on a pre-weighed sieve having a wire mesh with square openings of 2,8 mm × 2,8 mm.

11.5.3 Incline the sieve at an angle of approximately 17° to 20° and allow the contents to drain for 2 min, measured from the time the product is poured onto the sieve.

11.5.4 Immediately weigh the sieve containing the contents.

11.5.5 In case of a product with a sauce adhering to the contents or onto the sieve, wash the sauce off with a gentle spray of warm tap water (approximately 40 °C) using a wash bottle (e.g. plastic). Incline the sieve at an angle of approximately 17° to 20° and allow the contents to drain for 2 min, measured from the time the washing has finished.

11.5.6 Immediately remove adhering water from the bottom of the sieve by use of a paper towel and weigh the sieve containing the washed contents.

11.5.7 In case of products packed in a jelled medium that does not liquefy at a room temperature between 20 °C and 30 °C within 12 h, remove the jelled medium by hand and weigh the solid contents.

11.5.8 The drained or washed mass (A) is obtained by subtracting the mass of the sieve from the mass of the sieve with the drained or washed product.

11.5.9 In case of products containing optional ingredients such as vegetables, fruits, cereals or garnish, determine the total drained or washed mass (B) as described above, then separate the optional ingredients and re-weigh. The mass of the material remaining on the sieve is the drained or washed mass of the fish content (C).

11.5.10 In case of products wrapped in parchment paper such as crab meat, proceed as above but remove the parchment paper after removing any adhering meat.

11.5.11 The percentage drained or washed mass (% P_A) is expressed as:

$$\% P_A = \frac{A}{d.n.m.} \times 100$$

where

A is the drained or washed mass.

d.n.m. is the declared net mass.

11.5.12 The percentage total drained or washed mass (% P_B) is expressed as:

$$\% P_B = \frac{B}{d.n.m.} \times 100$$

where

B is the total drained or washed mass.

d.n.m. is the declared net mass.

11.5.13 The percentage drained or washed mass of the fish content (% P_C) is:

$$\% P_C = \frac{C}{d.n.m.} \times 100$$

where

C is the drained or washed mass of the fish content.

d.n.m. is the declared net mass.

11.6 Determination of percentage exuded liquid in an oil packing medium

Drain the entire liquid packing medium from a container and collect by means of a funnel directly into a graduated volumetric measuring glass cylinder of a suitable size. Record the total volume (*T*) in mL. After the oil has been separated, record the volume (*V*) in mL of the exuded watery liquid.

Express the percentage exuded liquid as (% P_{EL}):

$$\% P_{EL} = \frac{V}{T} \times 100$$

where

V is the volume of the exuded liquid in mL.

T is the total volume of packing medium in mL.

The average exuded liquid in a number of containers of the same batch code can be obtained by collecting the entire packing medium of all the samples examined into a glass measuring cylinder and proceed as above.

11.7 Determination of percentage of tuna

11.7.1 Open the can and drain the contents, following the procedures outlined in 11.5.

11.7.2 Remove and place the contents onto a tared 12 mm mesh screen equipped with a collecting pan.

11.7.3 Separate the fish with a spatula being careful not to break the configuration of the pieces. Ensure that the smaller pieces of fish are moved to the top of a mesh opening to allow them to fall through the screen onto the collecting pan.

11.7.4 Segregate the material on the pan according to flaked, grated (shredded) or paste and weigh the individual portions to establish the mass of each component.

11.7.5 If declared as a "chunk" pack, weigh the screen with the fish retained and record the mass. Subtract the mass of the sieve from this mass to establish the mass of solid and chunk fish.

11.7.6 If declared as "solid" pack remove any small pieces (chunks) from the screen and reweigh. Subtract the mass of the sieve from this mass to establish the mass of "solid" fish.

11.7.7 Express the mass of flaked, grated (shredded and paste) (F) as a percentage of the total drained mass of fish.

$$\% F = \frac{M_F}{M_T} \times 100$$

where

M_F is the mass of flaked, grated or shredded fish.

M_T is the total mass of fish.

11.7.8 Calculate the mass of solid and chunk fish (M_{SC}) retained on the screen by difference and express as a percentage of the total drained mass of fish.

$$\% SC = \frac{M_{SC}}{M_T} \times 100$$

where

M_{SC} is the mass of solid or chunk fish.

M_T is the total mass of fish.

11.7.9 Calculate the mass of solid fish (M_S) retained on the screen by difference and express as a percentage of the total mass of drained mass.

$$\% S = \frac{M_S}{M_T} \times 100$$

where

M_S is the mass of solid fish.

M_T is the total mass of fish.

11.8 Examination methods for shrimps, prawns and langoustines

11.8.1 Determination of size designation

The size designation (*SD*) if expressed as the number of shrimps or prawns of 100 g of drained product, shall be determined from the number of whole units (*N*) and the actual drained mass (*M*), using the following equation:

$$SD = \frac{N}{M} \times 100$$

where

N is the number of whole units.

M is the total number of units.

11.8.2 Determination of percentage broken units

Separate the broken pieces from the whole units and calculate the percentage of broken units (% BU) by using the following equation:

$$\% BU = \frac{M_B}{M} \times 100$$

where

M_B is the number of broken units.

M is the total number of units.

11.8.3 Determination of percentage undeveined units

Separate any units not deveined or cleaned from the product labelled as "deveined" or "cleaned" and calculate the percentage units not deveined or cleaned (*M_U*) by using the following equation:

$$\% Mu = \frac{M_U}{M} \times 100$$

where

M_U is the number of undeveined units.

M is the total number of units.

11.8.4 Determination of percentage discoloured units

Separate units with distinct discolouration of more than 10 % of their surface area and calculate the percentage discoloured units (% DU) by using the following equation:

$$\% DU = \frac{M_D}{M} \times 100$$

where

M_D is the number of discoloured units.

M is the total number of units.

11.9 Sensory and physical examination of contents

11.9.1 Open container.

11.9.2 Carefully remove the contents out of the container onto a white coloured tray for physical examination.

11.9.3 Assess immediately the odour remaining in the empty container.

11.9.4 Assess the odour, flavour and texture of the contents.

11.9.5 Assess the product in accordance with the applicable requirements stipulated for the product.

11.9.6 Where the product is cross cut, round pilchards (not filleted) or sardinella packs or sardines in round cans, determine whether scales are present by gently scratching with the finger tips, any remaining scales off from the surface of the skin.

11.9.7 Split the units length wise open from the dorsal side down to the ventral side to determine the texture of the flesh, the bones, the colour of the flesh, the flavour and the presence of any remains of intestines with feed. Check for compliance with 6.1.9.

11.10 Examination of fish paste, fish spread

Transfer the contents from the container onto a white ceramic tile. Examine the contents for discolouration, defects or any other abnormalities. Spread the contents in thin layers over the tile with a spatula, in order to detect any sandiness, grittiness or other coarse pieces or tough portions or clots and examine the product for compliance with 7.1.16.1.

11.11 Measurement of blob diameter of tomato paste

Measure the blob diameter at 25 °C by placing a cylindrical chromium-plated copper tube of height 60 mm and inside diameter 19 mm on a horizontal glass plate, and filling it to the level of the top rim with the paste under test and gently lifting the tube from the plate at a slow and even rate such that the time taken to empty the cylinder is 4 s. Then immediately measure the lengths, in mm, of two diameters (at right angles to each other) of the paste blob, including in the measurements, any exuded liquid, and record the mean of these values. Perform this determination twice and record the overall mean value as the blob diameter. Check for compliance with 4.3.7.

11.12 Determination of Munsell value of canned tuna

11.12.1 Apparatus

11.12.1.1 An apparatus for comparing the reflectance of the tuna sample and the neutral Munsell discs.

11.12.1.2 A light source suitable for illuminating the sample and the Munsell disc with the radiating light at a wavelength centered at 555 nm (540 nm to 570 nm), or a comparator device fitted with a filter (on the eyepiece) that transmits light centered at the above wavelength.

11.12.1.3 Munsell discs of values 6,3 and 5,3.

11.12.2 Preparation of sample

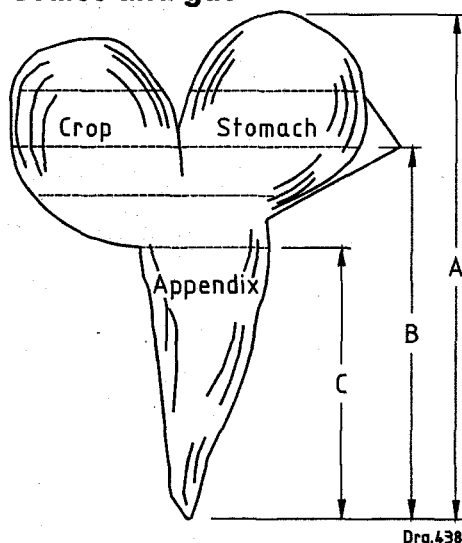
Pass the contents of the container through a sieve of nominal aperture size 6,7 mm. Mix the sieved material and place it in a 84 mm × 46 mm open-top can with a false bottom 13 mm deep, the can being painted flat black inside and out. Fill the can to within 3 mm to 6 mm of its top edge. In the case of blended tuna, separate the flesh of the two colours and proceed as indicated with each colour separately.

11.12.3 Procedure

Within 10 min of sieving the sample determine the Munsell value as follows:

Using two Munsell discs of the same value each mounted 8 mm below the top edge of a 84 mm × 46 mm open-top can (painted as in 11.12.2), regulate the source of illumination so that, when viewed, the two discs appear to be of equal brightness. Without altering the adjustment, remove one can and replace it by the prepared sample and observe whether the sample appears to be lighter or darker than the standard. For tuna designated "white" and "light" conduct the comparison using Munsell discs of value 6,3 and 5,3 respectively. Check for compliance with 7.1.4.2.

11.13 Determination of scales and gut



Symbols

- A – complete gut
- B – half gut
- C – one-third gut

Figure 1 — External gut

Determination of the seriousness of the defect caused by the presence of gut

The undermentioned symbols are used to indicate the degree to which gut is present in fish units but have no bearing on the degree to which feed is present in the gut.

The presence of the extremity of the anal canal is allowed and is therefore not considered in determining the extent of the presence of gut. Gut without feed is not considered to be a significant defect.

The degree to which the gut is full is indicated by means of the following symbols:

- D – Serious (half full to full gut)
- E – Less serious (less than half full gut)
- F – Slight (presence of feed in the gut not obvious)

From the above it follows that a complete gut which is half to totally full is considered to represent one serious defect, viz., 1 AD. The following formulae are used for the purpose of calculating the equivalent number of AD's in a production of canned fish in which gut, containing feed, is present:

$$1 \text{ AD} = 2 \text{ AE} = 2 \text{ BD} = 4 \text{ BE}$$

$$1 \text{ AD} = 3 \text{ CD} = 6 \text{ CE}$$

A unit containing spilt green or red feed with or without gut is considered to be a serious defect and constitutes 1 AD.

11.14 Interpretation and calculation of scales

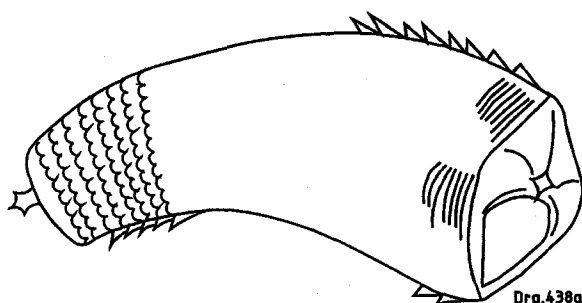


Figure — 2(a) Slight scales

Slight scales on one side = 1/8 unit full scales.
Slight scales on both sides = 1/4 unit full scales.

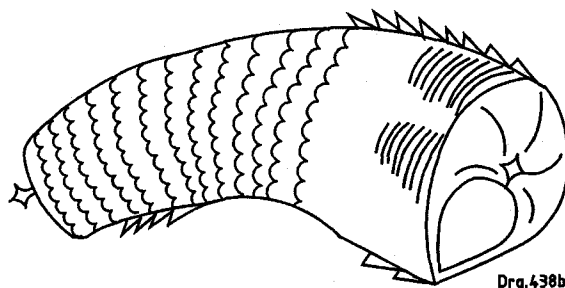


Figure — 2(b) Half scales

Half with scales on one side = 1/4 unit full scales.
Half with scales on both sides = 1/2 unit full scales.

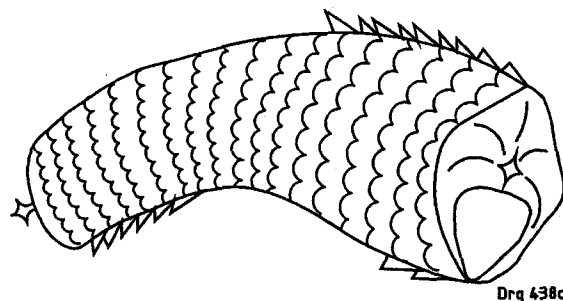


Figure — 2(c) Full scales

Full of scales on one side = 1/2 unit full scales.
Full of scales on both sides = 1 unit full scales.

Figure 2 — Interpretation and calculation of scales

12 Microbiological test methods

12.1 Microbiological spoilage

Use SANS 6257 (SABS SM 1257), *Microbiological examination of canned meat and fish products*.

12.2 Tests for pathogenic organisms

Use the following test methods:

SANS 6579/ISO 6579 (SABS ISO 6579), *Microbiology – General guidance on methods for the detection of Salmonella*.

SANS 6888-1/ISO 6888-1 (SABS ISO 6888-1), *Microbiology of food and animal feeding stuffs – Horizontal method for enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) – Part 1: Technique using Baird-Parker agar medium*.

SANS 7932/ISO 7932 (SABS ISO 7932), *Microbiology – General guidance for enumeration of Bacillus cereus – Colony count technique at 30 °C*.

SANS 7937/ISO 7937 (SABS ISO 7937), *Microbiology of food and animal feeding stuffs – Horizontal method for enumeration of Clostridium perfringens – Colony count technique*.

13 Chemical test methods

13.1 Determination of protein nitrogen

Use SANS 6317, *Methods of chemical analysis of meat and fish products*, or any other internationally recognized method that delivers equivalent results.

13.2 Determination of starch content

Use SANS 6317, *Methods of chemical analysis of meat and fish products*, or any other internationally recognized method that delivers equivalent results.

13.3 Determination of salt content (as sodium chloride)

13.3.1 Reagents

13.3.1.1 Silver nitrate solution, 0,1 N, accurately standardized.

13.3.1.2 Potassium thiocyanate solution, 0,1 N.

13.3.1.3 Ferric alum indicator – a cold saturated aqueous solution of ferric ammonium sulphate to which a few drops of 6 N nitric acid have been added.

13.3.1.4 Sodium carbonate solution – a saturated aqueous solution.

13.3.1.5 Nitrobenzene.

13.3.2 Procedure

Weigh accurately a suitable quantity of the prepared sample into an evaporating basin or crucible, moisten with the sodium carbonate solution and dry on a waterbath. Char the dried sample and ash it at a temperature not exceeding 500 °C. Extract the residue with dilute nitric acid (about 6 N) and filter into a 100 mL volumetric flask. Make up to volume with the dilute nitric acid.

To a suitable aliquot in a 250 mL Erlenmeyer flask add 25 mL of the silver nitrate solution, 5 mL nitrobenzene and 1 mL ferric alum indicator. Shake well. Titrate with 0,1 N potassium thiocyanate to the end point – colour change to reddish brown. Carry out a blank determination omitting the sample. From the difference between blank titration and the test titration determine the volume (*A*) of silver nitrate solution applicable to the sample used.

13.3.3 Calculation

Calculate the result as follows:

$$\% \text{ sodium chloride} = \frac{A \times 5,845 \times N}{W}$$

where

A is the volume of silver nitrate solution used by the aliquot, in mL;

N is the normality of silver nitrate used;

W is the mass of original sample represented by the aliquot used in the titration, in grams.