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DRAFT EAST AFRICAN STANDARD

Hygienic requirement for the production of packaged meat products

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Community established an East African Standards Committee mandated to develop and issue East African Standards.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

Hygienic requirement for the production of packaged meat products

1 Scope

This Draft East African Standard specifies requirements for the production of packaged meat products processed or manufactured in an established meat processing factory.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EAS 39, *Hygiene in the food and drink manufacturing industry — Code of practice*

EAS 12, *Potable water — Specification*

CAC/RCP 58, *Code of hygienic practice for meat*

3 Terms and definitions

For the purposes of this standard, the following definitions apply:

3.1

acceptable

acceptable to the authority administering this standard, or to the parties concluding the purchase contract, as relevant

3.2

address

address in the East African Community, that includes the street or road and plot number (if a number has been allocated), the name of the street or road and the name of the town, village or suburb, or in the case of a farm or a smallholding, includes the name of the farm or smallholding and of the magisterial district in which it is situated. In the case of imported foodstuffs, "address" means the address of the manufacturer or supplier or importer and includes the Post Office box number, telephone and email

3.3

adequate

with regard to quality, of quality such as to ensure performance of the projected activity or function; with 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

3.4

edible offal

- a) in the case of food animals other than poultry: blood, blood plasma, brain, cow-heels, diaphragm, gut (casings), washed head, kidneys, omentum, pancreas, pluck (oesophagus, trachea, lungs, heart, pericardium, associated lymph nodes, pillars of the diaphragm and liver or part thereof (without the

gall bladder)), rind and skin, spleen, tail, thymus, tongue, cleaned tripe, trotters and udder (in the case of a heifer)

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

3.5
effective material
material that is capable of performing the required function(s) and that contains no substance known to be toxic to humans or capable of imparting any taste or odour to the product or of staining it, and that, in the case of an elastomeric or a plastics material, is based on a polymer of a grade recommended by the polymer manufacturer as being suitable for the specific purpose(s)

3.6
extraneous matter
objectionable matter or any material in the product that has not been derived from meat, edible offal or other edible ingredients used

3.7
inedible offal
a) in the case of food animals other than poultry, with the exception of bone, all parts of the animal not covered by the definitions of meat (see 3.8) and edible offal (see 3.4)
b) in the case of poultry, the head, trachea, lungs, crop, intestines, gall bladder, oviducts, oil glands, shanks and feet

3.8
meat
sound skeletal musculature, excluding the musculature of the lips, snout, scalp and ears, of healthy food animals, with or without connective tissue, blood vessels, lymphatic and nerve tissue, bone, fat, cartilage, scraped skin (pigs), and de-feathered skin (poultry) that are naturally associated with such musculature *in situ* in the dressed carcass and head

3.9
packaged meat product
article of food prepared for human consumption from meat, with or without the addition of other ingredients, and which has not been canned or quick-frozen but has been so processed or manufactured and so enclosed in wrapping material or packed in suitable containers or both, as to ensure freedom from contamination

3.10
product
particular meat product, indicated by the context, either prepared or in the process of preparation

3.11
suitable
suitably complying with the requirements of the intended purpose

3.12
suitably prepared
prepared for the intended purpose

3.13
factory
any meat processing facility which may be small, medium and large

4 Raw materials

The meat used in processing or manufacturing of packaged meat and meat products shall be produced in accordance with CAC/RCP 58.

5 Management system

Processors shall establish, implement and maintain an acceptable food safety management system.

6 Factory construction, layout and conditions

6.1 Location

The factory shall be located in a well-drained and accessible environment.

6.2 Design

The factory and equipment shall be so designed and arranged as to permit:

- a) an orderly, uninterrupted flow of production without any cross flows that could have an adverse effect on the quality of the product;
- b) the processing of raw materials without undue delay;
- c) proper maintenance of hygiene; and
- d) facilities to carry out functions such as quality control and process control.

The factory buildings shall

- a) be designed and constructed as to prevent the entry and harbouring of insects, birds, rodents and other vermin.
- b) be of sound construction, in good repair and large enough to prevent crowding of equipment and employees.
- c) have adequate working space provided to facilitate acceptable operations.

The factory grounds shall be;

- a) graded to ensure proper drainage, and
- b) maintained in a clean and hygienic state and shall be effectively fenced.

6.3 Roofs and ceilings

The roof shall be weatherproof. The roof and ceilings shall be at least 300 mm above any overhead equipment and in no case less than 3 m from the floor.

Ceilings, and roofs where no ceilings are fitted, shall be faced with a smooth material that is light in colour, impervious to water and dust, capable of being cleaned without damage, and so constructed and finished as to minimize condensation, mould development, flaking of paint and the lodgement of dirt.

A ceiling shall be provided where the packing media or unprotected cooked product are handled. A ceiling is not required where a canopy covers the entire open product.

6.4 Walls and doors

Outer walls shall be weatherproof and impermeable to water. Interior wall surfaces shall be faced with a smooth, hard, water-impermeable, light-coloured material, to a height of at least 2 m from the floor. Where the product might come into contact with the walls above this height, the facing shall be continued to that higher level. Walls above 2 m shall have a smooth, water-impermeable, washable, light-coloured surface.

All ledges that occur in the wall construction shall be sloped at an angle of at least 45°. The walls shall be free from unnecessary projections. Window sills shall be at least 1 m above floor level.

In the production areas and in freezer storage rooms, the wall-to-wall and wall-to-floor junctions shall be coved, the radii of the coving being at least 25 mm and 40 mm, respectively.

Doors, excluding freezer storage room doors, through which the products are moved between processing areas shall be of adequate width. Doors and door frames shall be sheathed with, or made from, a suitable corrosion-resistant material that has high impact resistance and, unless they are provided with effective air-screens, they shall, as far as is practicable, be of a self-closing type. Doors and door frames shall have smooth, seamless, water-impermeable, light coloured and readily cleanable surfaces. Chill room, freezer and freezer storage room doors shall be tight-fitting.

6.5 Floors

Floors shall be constructed of concrete or other material that is suitably water-impermeable, corrosion resistant and easy to clean, and that has an even surface that is smooth but not slippery, and is free from cracks and open joints.

Floors and drainage channels shall be graded to have a fall of at least 1 in 60 and shall be drained to internal drainage channels that are connected to external sewers via a suitable drain trap.

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. Where necessary, duckboards of easily cleaned water-impermeable material shall be provided for workers.

Installations that obstruct flow and cleaning shall not be present in drainage channels. The capacity of drainage channels shall be sufficient to cope with peak loads.

6.6 Lift cages and staircases

Lift cages shall have a smooth, water-impermeable, corrosion-resistant inside surface and lift shafts shall be properly drained and shall be accessible for cleaning. Staircases in rooms where food is processed or handled shall have solid risers, and shall be provided with solid balustrades of height at least 1 m above the nosing of each tread.

6.7 Cables and pipes

Cables and pipes shall, where applicable, be

- a) fixed above ceilings, or
- b) chased or built 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.

Overhead cables 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.

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.

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

6.8 Lighting

General lighting shall permit efficient operations during the manufacture, production, processing or treatment of the product. Artificial lighting, if used, shall be such that the perceived colour of the product is not significantly altered. Lights suspended over the work areas where the product is handled at any stage during preparation shall be of the safety type or otherwise be so protected as to prevent contamination of the product in the event of breakage of a lights or lamp.

6.9 Ventilation

The ventilation shall keep the air fresh and remove excess water vapour, and prevent the build-up of excessive heat, the formation of condensate and the growth of mould on overhead structures. The air shall be free from noxious fumes, vapours, dust and contaminating aerosols. The air-flow shall be from the more hygienic to the less hygienic areas. Natural ventilation shall be augmented, where necessary, by mechanical means.

Windows that open for ventilation purposes shall be insect-screened. The screens shall be easily removable for cleaning, and shall be made of suitable corrosion-resistant material.

6.10 Production areas

Production areas shall be so designed, equipped and staffed as to allow free movement of workers and to facilitate the free movement and cleaning of movable equipment. Except where other statutory regulations apply, the deboning of red meat carcasses and the cutting up and preparation of meat shall, except where the nature of the process makes it impossible, be performed in work areas the temperature of which does not exceed 15 °C. The temperature of meat being deboned shall at no time exceed 7 °C except when hot deboning is performed. These areas shall be physically separated from the heat processing areas of the factory.

Areas where raw food is being handled shall be separated from areas where cooked food is being handled.

Smoke units shall be maintained in a hygienic condition and they shall not be fired from the inside of the processing area of the factory. In the case of prefabricated smoke kilns where the smoke-generating equipment forms part of the kiln, the smoke generator shall not emit any smoke into the processing area, and the area adjacent to such a generator shall be so partitioned off from the processing area as to prevent contamination of the area with sawdust.

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, trays and equipment used in smoke units shall be corrosion-resistant and of hygienic design and shall be regularly cleaned.

Smoke units and waste management procedures for meat processing factory shall comply with the regulations of the Environmental Management Authority of respective partner states.

7 Facilities for personal hygiene

7.1 Hand-washing facilities

The following shall be provided at those entrances to the preparation and processing areas of the factory that are used by the employees, at the exits from the toilets, and at other conveniently situated places in the preparation and processing areas of the factory, within easy reach of the employees:

- a) an acceptable number of wash-hand basins, with an abundant supply of cold and hot or warm running potable water in the temperature range 40 °C to 50 °C;
- b) an ample supply of unscented liquid soap or acceptable detergent in active condition;
- c) disposable paper towels;
- d) receptacles for used towels; and
- e) taps operated by means other than the hands or elbows, for example knee-operated or foot-operated taps, or push-button taps with pre-set volume control. Disinfectant hand dips, where provided, shall be of such a design that they can be adequately cleaned.

Access to hand-washing facilities shall at all times be unobstructed.

7.2 Footbaths

Unless their absence in particular circumstances is acceptable, or unless alternative acceptable cleaning and disinfecting facilities are provided, footbaths that contain a suitable disinfectant solution shall be provided at each entrance to the preparation, processing and packaging areas that is used by employees, and shall be so located that employees cannot obtain access to those areas without disinfecting their footwear. Footbaths shall be so constructed that they can be adequately drained and cleaned. The design of the surfaces of the footbaths and surrounding surfaces shall be non-slippery and hygienic.

7.3 Comfort facilities

An acceptable number of suitable change-rooms, shower baths, wash-hand basins, toilets (separate for each sex) and, where appropriate, urinals, shall be provided within practical distance from the factory processing areas. Shower baths shall connect direct to the change-rooms. Comfort facilities shall not open direct into a preparation, processing, packaging or storage area unless it is provided with a vestibule. The doors of such a vestibule shall be close-fitting and self-closing. The entry from such a vestibule into the preparation, processing, packing or storage areas shall be equipped with a footbath. Where the comfort facilities are connected with food handling or storage areas by means of a vestibule only, the fall of the floor surfaces of the comfort facilities shall be such that no water from the floor surfaces can enter the food handling or storage areas.

Toilets shall be completely separate from change-rooms, the only permissible access being through a vestibule with close-fitting, self-closing doors. Toilet blocks shall have their own hand-washing facilities, separated from those provided in change-rooms. An ample supply of toilet paper, hot and cold running water, nailbrushes, unscented liquid soap or an acceptable detergent solution and disposable paper towels shall be available to employees. Receptacles shall be provided for used towels. Refuse bins of hygienic construction shall be provided. Notices shall be posted that require employees to wash their hands with soap or detergent after they have used the toilet.

Lockers or controlled clothes baskets shall be provided, and the layout and equipment shall be such as to permit proper cleaning and maintenance. The comfort facilities shall be kept clean and tidy and shall be adequately ventilated. Provision shall be made for proper drainage of the floor surfaces of the comfort facilities. Change-rooms and dressing-rooms shall not be used as living quarters or for the preparation or consumption of meals. Staff dining-rooms shall be separate from the change-rooms or dressing-rooms.

7.4 Notices

Notices shall be strategically displayed in the preparation, processing, packaging and storage areas, in the change-rooms and in the toilet facilities. The notices shall require that hands be washed with soap or detergent and shall indicate that spitting, the use of chewing gum and the use of tobacco in any form, and the taking of refreshments or food are prohibited in these areas. Any other notices shall be provided appropriately (for example, during cleaning).

8 Storage facilities

8.1 Chill, freezer and freezer storage facilities

Chill, freezer and freezer storage facilities shall operate efficiently and shall be hygienically maintained. Freezer storage rooms shall, as far as possible, be equipped with automatic temperature recording systems. Products shall not be stacked direct on the floors, against walls or against wall panels. Walls and floors shall have a smooth finish and shall be water-impermeable, and measures shall be taken to prevent the flaking off of surface material from ceilings and walls. Brick walls shall be plastered.

8.2 Storage facilities for meat and red meat offal

Edible red meat offal for human consumption shall be stored only in chill rooms or freezer storage rooms that are used for the storage of carcasses. No uncleaned edible offal shall be stored in any room that contains carcasses or cleaned edible offal. Inedible offal, unless scalded and cleaned, and boxed and frozen, may not be stored in any chill room or freezer storage room that contains meat or edible offal.

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

8.3 Storage facilities for edible ingredients

Storage facilities for edible ingredients that are used in the preparation of the frozen product shall be dry, free from dust and any other source of contamination, and vermin proof. Edible ingredients shall be stored in closed containers and away from the floor and the walls.

8.4 Storage facilities for non-edible materials

Non-edible materials shall be stored in a room separate from other storage rooms and from the production area of the factory.

8.5 Storage facilities for packing and packaging materials

Materials for the packing and packaging of the product shall be stored on racks/shelves at a distance of at least 250 mm from the floor or on pallets, and away from the walls, in clean, dustproof, vermin proof and dry storage rooms reserved for the purpose.

8.6 Storage facilities for poisonous and other harmful materials

8.6.1 Storage facilities for pesticides or other poisonous and harmful materials

Pesticides or other poisonous and harmful materials and the equipment for their application shall be stored in a well-ventilated room in which no foodstuff, food-handling equipment, packaging material or containers are stored and that is kept locked when not in use. All dangerous materials shall be prominently and distinctly

labelled and shall at no time come into contact with containers, packaging materials, raw materials or the product or product-contact surfaces.

8.6.2 Storage facilities for cleaning and disinfecting materials

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

8.6.3 Storage facilities for utensils and spare parts

Utensils and spare parts that, when in use, come into contact with the product shall, when not in use, be kept in a disinfectant solution or stored in a hygienic manner in a dry area that is free from dust and any other source of contamination, and that is vermin-proof. Spare parts for machinery that could cause contamination of the product shall be kept in a separate storage area away from the processing areas.

8.6.4 Fuel storage area

Any storage area or tanks for the storage of fuels such as coal or hydrocarbons shall be designed, protected, controlled and maintained in such a manner as to prevent the product from being polluted during the storage and manipulation of these fuels.

8.6.5 Storage facilities for lubricants

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

8.6.6 Storage facilities for finished products

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

Finished products found not to comply with the requirements of this standard shall be stacked apart from finished products that do comply with the requirements, and shall be clearly identified.

8.7 By-products

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

8.8 Refuse

A separate, suitable refuse facility shall be provided on the premises.

9 Equipment for production

9.1 Design and installation

9.1.1 Processing areas shall be so designed, equipped and staffed as to allow free movement of workers, to facilitate cleaning and the maintenance of both hygiene and product quality.

9.1.2 All plant, equipment and utensils that come into contact with the product shall be smooth-surfaced, light-coloured and of a suitable corrosion-resistant material (other than wood or other absorbent or porous material), which may have an acceptable plastics-coated surface suitable for use with food, but should preferably be stainless steel. They shall be of hygienic design with no open joints or crevices and shall be so constructed as to facilitate their cleaning and disinfecting. Plant and equipment shall be so designed as to facilitate the cleaning and disinfecting of the areas under them. Open ends and curled edges shall be satisfactorily sealed to prevent the accumulation of organic material and dirt. Where necessary, as in the case of equipment that cannot be cleaned in situ, it shall be possible to dismantle the equipment for cleaning and disinfecting. Surfaces with which the product comes into contact shall not be painted.

9.1.3 All parts of stationary equipment or of equipment that is not readily movable shall be installed away from the walls and ceilings at distances sufficient to allow access for cleaning and inspection. All permanently mounted equipment shall be either installed high enough above the floor to allow access for cleaning and inspection, or shall be completely sealed to the floor.

9.1.4 Equipment shall preferably not be sunk into the floor but, if this is unavoidable, the installation of the equipment shall be such that the equipment is accessible for proper cleaning. Sunken areas shall be well drained.

9.1.5 Food grade Lubricants shall be used to any moving parts that may come in contact with meat during processing.

9.1.6 Copper, lead and their alloys, and other metals or materials detrimental to health, shall not be used in the construction of equipment that comes into contact with raw materials or the unprotected product at any stage of its processing. Equipment and utensils used for inedible materials or for waste shall be identified as such and shall not be used for edible products. Equipment used in areas outside the food handling areas, such as in the toilet or ablution facilities, shall not be used in the areas for the processing of food for human consumption.

9.2 Equipment for the packing medium

Pipes, valves, joints, pumps or any equipment that comes 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. 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 permanently fixed water pipes. Water hoses shall not be used to supply water as an ingredient for the product.

9.3 Tables

Wooden tables shall not be used in processing areas. Table frames shall be of a design and construction that will not allow the development of unhygienic conditions and bacterial build-up. The frames shall be made of smooth, corrosion-resistant metal or shall have been so coated as to protect them from corrosion. Table tops shall be of seamless stainless metal or other seamless, corrosion-resistant, smooth material that is impermeable to water and dust and that possesses similar surface characteristics. They shall be of hygienic construction and shall be either removable for cleaning, or so secured to their frames as to allow cleaning and disinfecting. Where metal tops are folded at the edges, the folds shall be so soldered or welded, or sealed with an acceptable mastic sealant as to prevent the accumulation of organic matter and dirt. All table tops shall allow rapid and effective drainage, and shall be free from cracks and crevices. All joints in tables shall have been made watertight.

9.4 Cutting boards

If cutting boards are used, they shall be of hygienic construction and shall be made of acceptable light-coloured material (other than wood or other absorbent or porous material), suitable for use with food. Cutting boards shall be easily removable. Treated and seasoned wood cutting boards may be used provided that they are kept under good maintenance conditions.

9.5 Utensils

Utensils shall be made of stainless metal or of rigid plastics material and shall be of hygienic design. They shall be provided with acceptable handles. Knives and other utensils shall not have handles of wood or other porous or absorbent material.

9.6 Containers

All containers that contain food materials, other than those that contain the finished product, shall at all times be kept on shelves or stands of corrosion-resistant water-impermeable material at a height of at least 250 mm above floor level. Containers that contain food materials shall not be stacked one upon the other in such a way that the contents of one container can be contaminated by the bottom of another container. Containers shall be made of food grade material and hygienically designed.

9.7 Compressed air, gases and steam

Compressed air, gases and steam used in direct or indirect contact with food or with food-contact surfaces shall contain no substances that could be hazardous to health or that could contaminate the food.

10 Water and ice supply

10.1 Potable water

Every factory shall have an adequate supply of clean potable water that complies with the chemical and microbiological requirements of EAS 12.

10.2 Ice

The purity of ice shall be such that the water derived from it (by melting the ice under aseptic conditions at a temperature not higher than 10 °C) immediately after the ice has been manufactured, complies with the requirements of 9.1.

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

10.3 Non-potable water

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

11 Hygienic operating requirements

11.1 General

No operation or condition that could be detrimental to the manufacture, processing, treatment or storage of the product shall be permitted in the factory or in its grounds. The factory and its grounds shall convey an orderly, neat and hygienic image. Uncooked meat or meat products shall not, in the course of handling, processing and storage, be unnecessarily exposed to conditions that affect them adversely. Care shall be taken to ensure that there is no contact between raw materials and finished products.

Raw food shall not be handled or stored in areas where cooked food is handled or stored. Effective measures shall be taken to inhibit mould growth and to prevent dust, dirt, flaking paint, and other loose or extraneous material from being present in the processing areas or in the storage, freezer storage and refrigeration rooms.

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

11.2 Cleaning and disinfecting

11.2.1 Facilities for cleaning and disinfecting portable equipment

Facilities with proper drainage shall be provided for the cleaning and disinfecting of portable equipment. Such facilities shall be located in a separate room or in a designated area in the preparation, processing and packaging areas where there is an ample supply of cold potable water under adequate pressure that complies with the requirements of 9.1 and, where necessary, hot water or saturated steam under adequate pressure. The room or area to be used shall be such that there will be no risk of contamination of the product or product-contact surfaces. The floor of the room or area shall be smooth-surfaced and graded to facilitate proper disposal of waste liquids from the cleaning process. The direction of drainage flow shall be away from the handling areas.

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

11.2.2 Cleaning equipment, utensils and materials

An adequate supply of cleaning and disinfecting materials, saturated steam, hot and cold running water (that complies with the requirements of 9.1), hosepipes, spray nozzles, brushes, scrapers and other equipment necessary for the proper cleaning of the plant, equipment and utensils shall be available and shall be used regularly.

Wire, steel wool or metal scouring wool shall not be used for cleaning surfaces that come into contact with the product. Steam used in direct contact with the product and with product-contact surfaces shall not contain any substances that could be hazardous to health or that could contaminate the product.

Cleaning and disinfecting materials and equipment shall not be stored in a room where food-handling equipment is stored and shall at no time come into contact with raw materials, the products or their containers or packages.

Cleaning equipment, utensils and materials used in a particular area shall be identified.

Cleaning equipment, utensils and materials used in areas other than areas where food for human consumption is handled, such as toilets and ablution facilities or by-product plants, shall not be used in areas where food for human consumption is processed.

11.3 Physical facilities

The factory and grounds shall be maintained in a clean and hygienic state. All plant, equipment and utensils shall be maintained in a state of good repair and shall be kept clean.

The entire manufacturing and processing or treatment system, including utensils, shall be cleaned at each change of operations. At the end of operations, the entire system shall be both cleaned and disinfected. Immediately before the start of manufacturing operations, plant and utensils shall be rinsed with potable water that complies with the requirements of 9.1 and, if necessary, a detergent or disinfectant shall be used.

Adequate precautions shall be taken to prevent the product from being contaminated during the cleaning or disinfection of the processing areas and equipment. Detergents and disinfectants used shall be suitable for the purposes intended.

11.3.1 Floors and drainage channels

During production periods, the floor and the drainage channels shall be kept clean. Thorough cleaning of floors and drainage channels shall take place at the end of each day's operations and as often as is necessary during the working day to maintain hygienic conditions. The product shall be protected from being splashed with water during the cleaning, rinsing, sweeping and flushing of the floors and equipment.

11.3.2 Walls of preparation, processing and packaging areas

The inside surfaces of walls shall be thoroughly washed immediately after each day's operations and as often as is necessary during the working day to maintain hygienic conditions.

11.3.3 Preparation and processing systems

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

Equipment used for preparation, filling and closing shall be properly cleaned to prevent soiling and contamination of the product.

Saws, deboning knives, steels and cutting boards shall be of hygienic design and shall, after use, be immediately cleaned, disinfected and stored in a hygienic way. Saws, knives and other utensils that are kept in disinfectant solution shall be thoroughly rinsed with potable water before being re-used. The hot water disinfectors shall be kept in a clean, hygienic condition.

When the factory is in operation, equipment and utensils shall not be removed from the work area, except for repair, cleaning or replacement.

11.3.4 Removal of refuse and disposal of effluent and waste

Litter, waste and overflow shall not be allowed to accumulate or give rise to unhygienic conditions and shall be removed promptly from the processing area and disposed of in an efficient and sanitary way.

Containers of waste that are awaiting removal from the factory premises shall be physically separated from the processing areas. The separate refuse room or other refuse facility shall be cleaned and disinfected at least once a day.

Establishments shall have an efficient effluent 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. Hazardous substances shall be disposed of in an environmentally acceptable way.

11.3.5 Vermin control

All buildings in which raw materials, packaging materials, and ingredients are stored, or in which the product is manufactured or stored, shall be kept free from insects, birds, rodents and other vermin and shall be rodent-proof. Potential breeding sites for vermin shall be eliminated.

11.3.6 Use of pesticides

Pesticides shall not be used in work areas while preparation, processing and packaging are in operation. Before pesticides are applied, precautionary measures shall be taken to prevent contamination of the product. Work surfaces shall be kept free from pesticide residues. Pesticides shall at no time come into contact with containers, raw materials or the product or with product-contact surfaces.

Pesticides shall only be handled by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Containers with pesticide bait or open bait shall not be present in any area or room where the exposed product or ingredients are present or are handled.

11.3.7 Animals

Animals, including birds, shall not be allowed in any part of the factory.

12 Requirements for personnel

12.1 Health

12.1.1 Before being engaged, employees shall pass an appropriate medical examination to ensure that they are free from communicable diseases, and thereafter they shall pass an annual medical examination. In the case of any absence owing to illness for more than one day, the employee shall, before resuming duty, report the nature of the illness 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. An appropriate medical record of each employee shall be kept.

12.1.2 Any medical certificate submitted by a factory employee shall be available for inspection by the authority administering this standard.

12.1.3 No employee who is a carrier of, or is suffering from, any communicable disease, especially a carrier of *Salmonella* or *Shigella* organisms, or one who shows symptoms of, or is suffering from, gastro-enteritis or an enterobacterial infection or a disorder or condition that causes discharge of fluid from any part of the skin or body, shall be allowed to come into contact with the product. Any such employee shall immediately report to the factory management.

12.1.4 No employee who is known to be infected with a disease that is 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 likelihood of the employee's contaminating the product with pathogenic organisms.

12.1.5 No employee who is suffering from any cut or injury shall be allowed to come into contact with the product 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 of employees and contamination of the product are no longer possible.

12.2 Protective clothing

12.2.1 All employees that are engaged in the handling, preparation and processing of the product up to and including the packaging stage (but excluding employees that operate within freezer storage rooms and chill rooms), shall wear clean, light-coloured, protective clothing, waterproof aprons, waterproof slipovers or boots, and clean, washable or disposable headgear that completely covers their hair. Woollen caps and thermal protective clothing (where applicable) may be worn in freezer storage rooms and chill rooms only.

12.2.2 Overalls shall completely cover the personal clothing of the employees. Sleeves shall not extend below the elbows, except when covered by plastics sleevelets or when worn in freezer storage rooms and chill rooms. Waterproof protective clothing shall be of a plastics or rubber material or a similar acceptable material. All protective clothing shall be of hygienic design, shall have no external pockets, shall be in good repair and shall not constitute a source of contamination to the product.

12.2.3 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 this purpose.

12.2.4 Waterproof aprons, sleevelets and gloves shall be cleaned at each time of removal and as frequently as necessary, and shall be hung on hooks or pegs at exits from production areas during intervals between work and during visits to the toilet. Gloves shall be thoroughly cleaned and then disinfected by the use of chlorinated water or other acceptable solution or procedure. Waterproof aprons, sleevelets and gloves shall not be removed from the work areas except for repairs and for cleaning under hygienic conditions.

12.3 Personal hygiene

12.3.1 Before starting work, after each absence from the factory production area, at regular intervals during production, and at any time when necessary, employees shall wash their hands with warm water and acceptable unscented liquid soap or detergent and rinse them in clean, running water (see 6.1, 6.2 and 9.1). They may then dip their hands in an acceptable disinfectant solution, after which they shall rinse their hands in clean running water, if so required by the usage directions of the hand dip. Neither varnish nor lacquer shall be used on fingernails, and fingernails shall be kept short and clean. Jewellery shall not be worn by employees who handle raw material and the unprotected product.

12.3.2 Neither employees' personal effects nor their food shall be present in any area where the product and its ingredients and packaging materials are handled and stored. Containers used in the preparation, processing or packaging of the product shall not be used for any other purpose.

12.3.3 The use of chewing gum and the use of tobacco in any form shall not be permitted within areas where the product and its ingredients and packaging materials are handled or stored. Spitting shall not be allowed anywhere within the factory premises. Notices to this effect shall be posted strategically (see 6.2).

12.4 Visitors

Any person, including employees, who visit or enter the production areas of the factory during the hours of operation, shall, when in those areas, comply with all hygiene requirements and shall wear clean, protective clothing that shall be provided by the factory.

Bibliography

ISO 22000:2005, *Food safety management systems – Requirements for any organization in the food chain*

