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EAST AFRICAN STANDARD

**Fish industry — Operational cleanliness and layout of market —
Guidelines**

EAST AFRICAN COMMUNITY

Foreword

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

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. 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.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

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.

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East African Community

P O Box 1096

Arusha

Tanzania

Tel: 255 27 2504253/8

Fax: 255-27-2504481/2504255

E-Mail: eac@eachq.org

Web: www.each.int

Introduction

It is essential that fish, fresh and processed, offered for human consumption is free from pathogenic micro-organisms and toxic substances. Like in other food industries, cleaning is one of the most important operations in fish industry. In normal cleaning operations, scrubbing and hosing with cold water or hot water is suitable to remove the surface dirt. However, where slime is present, as is usual in fish processing establishments, hot water may not remove the slime completely while cold water, though effective in removal of slime, may not be successful in complete removal of bacteria. In such cases, additional treatments become necessary to ensure proper hygienic conditions.

Besides observing hygienic precautions by proper sanitation to avoid microbial contamination and spoilage, it is also necessary for this purpose to chill the fish as soon as it is caught and maintain a sufficiently low temperature in fish markets and stalls.

In the preparation of this East African Standard, the following sources were consulted extensively:

IS 14520:1998(2003), *Fish Industry — Operational Cleanliness and Layout of Market — Guidelines*

CAC/RCP 52:2003(Rev. 4:2008), *Code of practice for fish and fishery products*

IS 4303-1:1975, *Code of hygienic conditions for fish industry — Part 1: Pre-processing stage*

IS 4303-2:1975, *Code of hygienic conditions for fish industry — Part 2: Canning stage*

Codex Alimentarius website: http://www.codexalimentarius.net/mrls/vetdrugs/jsp/vetd_q-e.jsp

USDA Foreign Agricultural Service website: <http://www.mrldatabase.com>

USDA Agricultural Marketing Service website: <http://www.ams.usda.gov/AMSV1.0/Standards>

European Union: http://ec.europa.eu/enterprise/sectors/pharmaceuticals/veterinary-use/maximum-residue-limits/index_en.htm

Assistance derived from these sources is hereby acknowledged.

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Fish industry — Operational cleanliness and layout of market — Guidelines

1 Scope

This standard covers the guidelines for operational cleanliness and layout of market for the fish industry.

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.

CAC/GL 21, *Principles for the establishment and application of microbiological criteria for foods*

CAC/RCP 1, *Recommended international code of practice — General principles of food hygiene*

CAC/GL 30, *Principles and guidelines for the conduct of microbiological risk assessment*

CAC/GL 31, *Guidelines for the sensory evaluation of fish and shellfish in laboratories*

CAC/GL 48, *Model certificate for fish and fishery products*

CAC/RCP 52, *Code of practice for fish and fishery products*

CAC/GL 53, *Guidelines on the judgement of equivalence of sanitary measures associated with food inspection and certification systems*

EAS 38, *Labelling of prepackaged foods — Specification*

3 Definitions

For the purpose of this standard the following definitions shall apply.

3.1

fish

includes marine and fresh water fish and all other aquatic foods like shell fish and other marine invertebrates of edible nature

3.2

Cleaning Agents (Hereafter Referred to as Detergents)

Simple substance or mixture used in conjunction with water to assist cleaning.

3.3

soil

Fish and food residues, dirt, dust, grease, oil, etc, which have to be removed from the surfaces of the containers, plants and premises during cleaning.

3.4

fish market

all authorized place where fish is handled and sold for human consumption

4 Types of soil in fish industry

The soil to be removed from equipment and other surfaces may be one or a combination of the following:

- a) Wet fish, slime, blood, gut, gut-contents, scales, stain, head portions and oil:
- b) Air dried fish residues; and
- c) Cooked and hardened fish residues.

5 Surface to be cleaned

5.1 In fishing and fish-processing industries, different types of surfaces are required to be cleaned, namely, wooden decks and fish holds in small wooden trawlers; steel floors in steel trawlers; and cemented and tiled floors in processing units. A few of the wide range of articles that require regular cleaning are utensils made of aluminium, galvanized-iron sheets, stainless steel, polythene or any other suitable material; tables made of wood and lined with aluminium or stainless steel; wooden boxes; cane baskets; etc.

5.2 Selection of utensils

Desired efficiency of any cleaning operation can be achieved only if the utensils have a clean and smooth surface without any crevices. As cane/bamboo baskets and wood have a tendency to absorb slime and thereby cultivating a large number of microorganisms, they should not be used as far as possible in fish processing industry. In unavoidable cases like fish hold, boat deck, etc, the wood may be used. The metal selected for the fabrication utensils should have resistance to the action of detergents and disinfectants used in the cleaning operation. Stainless steel utensils are recommended for the purpose.

6 Detergents and detergency

6.1 Outline of the cleaning process

Wet cleaning processes in fish industry comprise:

- a) wetting of the soiled surface;
- b) removal of soil from the surface in a dissolved or dispersed form. Mechanical action assists this process, and hot detergent solution is often advantageous; and
- c) removal of the last traces of the detergent and soil by adequate rinsing with clean water.

NOTE Soil which has been allowed to dry out or has become baked, is particularly resistant to removal. If articles have to be left even for an hour before thorough cleaning it is worth leaving them to soak in water or detergent solution.

6.2 Classification of detergents

Detergents in general are of three types, namely, acidic alkaline and neutral. Synthetic detergents, increasingly used by the industry because of their neutral character and non-detrimental value towards metals should be preferred. For specific purposes such as removal of slime from the surfaces of utensils and equipment with which fish comes in direct contact, alkaline detergents may be used.

6.3 Handling and use of detergents

6.3.1 Storage

Detergents should be stored in covered containers in a cool and dry place.

6.3.2 Measurement

Detergents should be carefully measured or weighed while preparing their solutions. Careless measuring may lead to waste, ineffective cleaning or damage to the plant.

6.3.3 Instructions for use

Detailed instructions for the use of detergents and the frequency of cleaning including any necessary precautions to be observed should be given to the operators.

6.4 Handling and use of disinfectants

6.4.1 Use of disinfectants is necessary as the detergents alone may not be capable of bringing down the bacterial load on the surfaces of utensils and equipments to any appreciable extent. Chlorine disinfectants are widely used for this purpose. Chlorine is available in two forms, that is, calcium hypochlorite (solid) (bleaching powder) and sodium hypochlorite (liquid).

6.4.2 Precautions for storage

Chlorine present in both the forms — solid and liquid — is unstable and is easily lost in the presence of the light and high temperature. It should be kept in amber-coloured bottles in a cool and dry place.

NOTE Hypochlorite compounds should not be mixed with acidic compounds since dangerous fumes are produced when this is done. Prolonged contact of these substances with the skin should be avoided.

7 Cleaning operation

7.0 General

Fish residues in wet condition should be removed by hosing with cold water. If hardened, they are very difficult to clean and the use of scrapers and scrubbers may become unavoidable. Frequent cleaning and hosing should be restored to in order to avoid more prolonged and drastic methods. Wooden and other porous surfaces may readily become sodden with fish slime and may create serious problems of cleaning at later stages. The surface to be cleaned should first of all be scrubbed with a brush in order to remove solid organic matter, then flushed with potable water and subsequently scrubbed with a detergent. The excess of detergent may, then, be washed off and the disinfectant at the required concentration (wooden surfaces — 1000 mg/kg minimum, floor — 500 mg/kg, other surfaces — 1 000 mg/kg) may be applied for a contact period of 15 minutes followed by final washing with potable water.

NOTE In the case of movable utensils like basins, trays, tubes, baskets, knives, scissors, etc, it will be preferable to dip them in detergent and disinfectant solutions rather than mere cleaning with the respective solutions.

7.1 Mechanical cleaning

Mechanical cleaning makes the job easier. Depending upon the type of cleaning, vacuum cleaning, scrubbing or high pressure cleaning may be adopted.

7.1.1 Vacuum cleaners

The vacuum cleaners are of great use in fish meal plants to prevent accumulation of solid meal particles which may act as centres for insect infestation or harbouring of micro-organisms. They are also useful in cleaning roof girders and trusses.

7.1.2 Scrubbers

Scrubber may be used for cleaning floors. They consist of a rotating brush or brushes kept in contact with the floor by the weight of the machine or manually. The detergent solution may be delivered at the point where the brushes are operating.

7.1.3 Pressure cleaners

Pressure cleaners are of great use in cleaning equipment, such as filleting, grading or skinning machine so that the spray may be directed to the inaccessible parts of the equipment. They are also useful in washing ice boxes, wagons, and vans used for transporting fish.

7.1.4 Automatic chlorination

Automatic chlorinators may be fitted to the process water system to ensure perfect and uninterrupted chlorination of the water supply.

7.2 Fishing boats

The boat deck, fish hold and the utensils used in the vessel should be scrubbed with a neutral detergent, such as sodium salt of higher sulphonated fatty alcohols (0.5 percent). After washing off the excess detergent, disinfectant like sodium hypochlorite may be applied at the rate of 1000 mg/kg for wooden surfaces and 100 mg/kg for metallic surfaces with a minimum contact time of 15 minutes. A dose of 100 mg/kg may be given to the baskets which are used in some smaller type of trawlers. For fishing vessels at sea, normally sea water is used for washing the deck and fish-room after treatment with detergents and disinfectants. There is no particular objection to using sea water provided that the water is drawn from the open sea, since near shore water is often polluted with sewage and other faecal matter.

7.3 Fish harbour

Polluted water should not be used for washing purposes; only potable water approved by the local authority should be used. Cleaning procedures and the concentrations of the detergent and disinfectants should be similar to those described under 7.2. Drains and gutters may be washed off first, followed by sprinkling of bleaching powder.

7.4 Vehicles for transport

These vehicles often develop fish smell which is difficult to remove by mere hosing with water. The internal surface has to be hosed with water after removal of the solid particles laying here and there. Thereafter, the surface has to be cleaned with a detergent followed by spraying of sodium hypochlorite (100 mg/kg) and final hosing with water. In case where the wagons have to be used for carrying fruits, vegetables, butter, milk, etc, in the downward trip, spraying with 0.1 percent sodium thiosulphate solution or any other approved anti-chlorine solution followed by hosing with cold water is recommended.

7.5 Primary process centres, fish meal plants, freezing and canning factories

Washing of the utensils and equipment is similar to those described under 7.2. The floor may be washed with a higher concentration of chlorine after treatment with the detergent.

8 Fish market

8.1 Location

8.1.1 Fish markets should preferably be located at places away from vegetable, meat or other food markets. A prerequisite should be that main services, such as potable water, electricity and proper hygienic sewage disposal facilities are available.

8.1.2 It is recommended that fish markets should deal solely with the sale of fish and not with any other food or food products. The mixed shops purveying meats, marine foods and vegetables shall be discouraged.

8.2 Blocks

8.2.1 A block shall consist of a number of fish stalls and shall be enclosed in a compound wall which barricades entry of dogs, cats and other undesirable elements into the block.

8.2.2 Each block shall be provided with a potable water storage supply tank with taps to facilitate drawal of water by fish stalls.

8.2.3 Other facilities like those of toilet and arrangements for washing of hands shall also be

provided in a block.

8.2.4 Maintenance of hygienic conditions, repairs of facilities, etc, shall be the collective responsibility of the stall holders.

8.2.5 Each block should preferably be provided with a chilling room maintained around 1 °C.

8.3 Layout

8.3.1 A recommended layout of the fish markets is given in Figure 1.

8.3.2 The market shall comprise of 10 fish stalls arranged in two rows with a VERANDAH provided on three sides.

8.4 Other requirements

8.4.1 The market shall be provided with centralized services of water, fish storage and icing.

8.4.1 A fish store and an ice store each of the size 4.80 m x 3.60 m shall be provided at one end of the market.

8.4.3 A weighing machine for centralized weighing of fish shall be provided by the side of the ice store.

8.4.4 A wash tub for washing of fish before storage in the ice store shall also be provided adjacent to the latter.

8.4.5 Plastic containers for handling of fish shall be provided in the stall.

8.4.6 Two toilets shall be provided for each of the stalls. The toilets should be provided with panelled doors of dimensions 0.9 m x 2.1 m (see Figure 1).

8.4.7 Doors

The doors provided for the stores should be insulated and of dimensions 1.2 m x 2.1 m. The doors provided for the entrances to the market as well as to the stands should also be glazed and of dimensions 1 m x 2.1 m.

8.4.8 Windows

The windows provided in the market should be of dimensions (2 m x 1.5 m) glazed and with flyproof net.

8.4.9 Ceiling

The ceiling of the market should be of asbestos cement plain sheets with wooden reepers. .

8.4.10 Floors

The flooring shall be mosaic over cement concrete 1:4:8,40 mm metal, 100 mm thick.

8.4.11 Suitable provision of exhaust fans shall be made in the stalls.

9 Fresh fish stalls

9.1 Location

Fresh fish retail stalls should ensure liberal supply of water, sewage disposal facilities and power supply. They should be preferably located at places away from vegetables or other foods. It should also be away from meat and poultry since fish are more perishable and pick up infection.

9.2 Sections

9.2.1 Fish storage and receiving room (3 m × 4 m × 4m)

Fish received in boxes should be emptied immediately and chilled to a temperature around 5 °C. The boxes should be cleaned immediately for re-use, if necessary. Surplus fish as also fish left over after sales should be stored in refrigerator or ice chests. This room may also serve for storage of ice.

9.2.2 Fish dressing room (3 m × 3 m × 4 m)

9.2.2.1 Fish exhibited for sale shall be washed thoroughly in water and freed from viscera and gills, if received whole, on cutting boards of hard wood. Washing vats should be coated by linseed oil paint. After washing, the dressed fish may be sold as such or cut into steaks or fillets as required.

9.2.2.2 Cutting knives of stainless steel blades with sanitary holders shall be employed for dressing of fish. Cutlery and equipment should be sterilized by dipping in hot water (76 °C) for 15 minutes or in water containing 50 mg/kg of chlorine for 2 minutes. All equipment should be washed within 2 hours of use apart from daily washing while commencing and closing of sales.

9.1.3 Fish sales counter (2 m × 3 m × 4 m)

9.2.3.1 Fish shall be sold in closed glass cabinets and flies should be prevented by pesticides strips or other effective means unless the stall is completely screened from flies by wire gauze windows of 2 mm size.

9.2.3.2 Fish may be exhibited on benches of rust-proof material or wood lacquered white at least 50 cm above the floor level. Fish shall not be piled in heaps and bruising of fish should be avoided at all stages. Fish sold as fillets shall be covered in water-proof paper. Fish shall be chilled from the time of receipt to sale to a temperature of 5 °C with the help of ice and iced water.

9.2.4 Covered passage for customers (1.5 m wide)

Covered passage before sales counter should be protected from rain and sun.

9.3 Dimensions

It is recommended that the four sections should have the dimensions given in 9.2 for stands with medium fish handling capacity per day, that is. 300 to 500 kg.

9.4 Constructional requirements

9.4.1 In case walls do not have tiles, they should receive water impermeable, non-flaking coating, white vermin-proof oil paint finish. Non-washable ordinary distempers shall not be used. All joints with walls and other surfaces should be smooth and rounded for easy washing. Roof should be of cement or white-washed plaster.

9.4.2 Floor

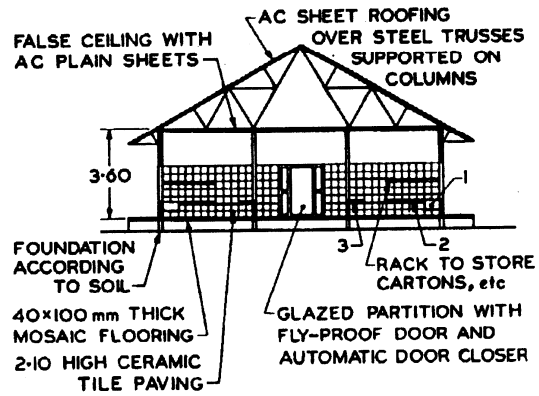
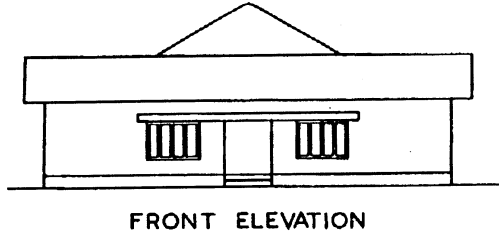
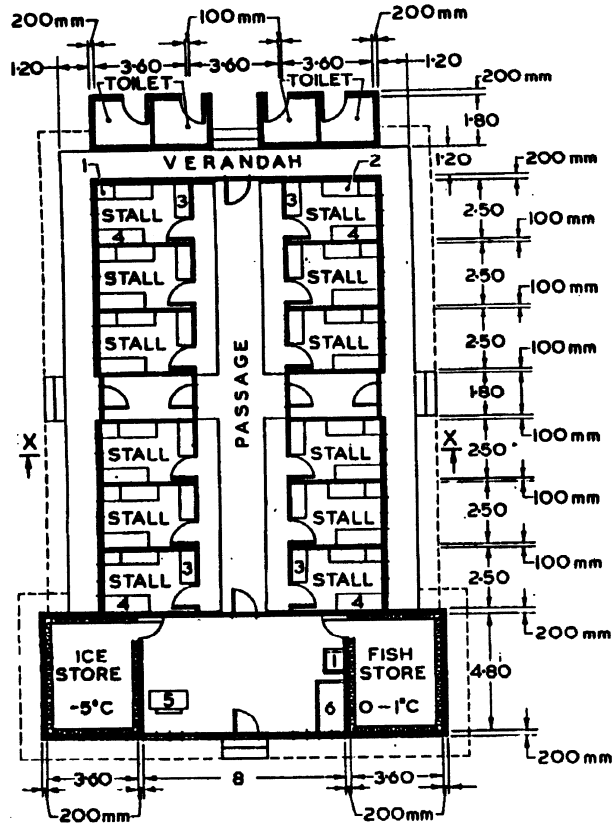
Floor should be water impermeable and capable of easy washing, built of cement, granite, asphalt or smooth hard rubber concrete and free from cracks, joints and open drains. A slope of 1:50 towards the drain is recommended. Actual contact of fish with flooring should be avoided and fish should always be placed on glass/metal/clean wooden surface.

9.4.3 Illumination of fish retail shops should be in the range of 10 to 15 lumens; fish should not be exposed to the sun.

9.5 Employee hygiene

Employees in fish retail stalls shall observe hygienic conditions as given in CAC/RCP 1 and CAC/RCP 52.

ward



- 1 = Wash Basin
- 2 = Gutting Table
- 3 = Sales Counter
- 4 = Freezer Cabinet
- 5 = Weighing Machine
- 6 = Wash Tub

All dimensions in metres excepting those expressed in millimetres.

Figure 1 — Layout of a fish market

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