



CD/K/520-2:2010
ICS 67.120.30

EAST AFRICAN STANDARD

Canned fish — Part 2: Fish canned in brine — Specification



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

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Introduction

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

KS 05-522-2:1987, *Specification for canned fish — Part 2: Fish canned in brine*

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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1 Scope

This East African Standard applies to canned finfish in brine in hermetically sealed containers. It is intended to be used for the inspection of canned finfish species for which specific product standards have not been elaborated.

Canned finfish shall be prepared from sound, wholesome raw material processed using good manufacturing practices.

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*

CD/K/572:2010, *Fish and fisheries products — Methods of sampling*

CAC/RCP 52[CD/K/521:2010], *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 12, *Drinking (potable water) — Specification*

EAS 35, *Edible salt — Specification*

EAS 38, *Labelling of prepackaged foods — Specification*

EAS 41, *Fruits, vegetables and derived products — Sampling and methods of test*

EAS 103, *Schedule for permitted food additives*

EAS 123, *Distilled water — Specification*

ISO 4831, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of coliforms — Most probable number technique*

ISO 4832, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella spp.*

ISO 6887-1, *Microbiology of food and animal feeding stuffs — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 1: General rules for the preparation of the initial suspension and decimal dilutions*

ISO 6887-2, *Microbiology of food and animal feeding stuffs — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 2: Specific rules for the preparation of meat and meat products*

ISO 6887-3, *Microbiology of food and animal feeding stuffs — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 3: Specific rules for the preparation of fish and fishery products*

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

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 7937, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of Clostridium perfringens — Colony-count technique*

ISO 13720, *Meat and meat products — Enumeration of Pseudomonas spp.*

ISO 16050, *Foodstuffs — Determination of aflatoxin B₁, and the total content of aflatoxin B₁, B₂, G₁ and G₂ in cereals, nuts and derived products — High performance liquid chromatographic method*

ISO 16654, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Escherichia coli O157*

ISO 21567, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Shigella spp.*

ISO/TS 21872-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 1: Detection of Vibrio parahaemolyticus and Vibrio cholerae*

ISO/TS 21872-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 2: Detection of species other than Vibrio parahaemolyticus and Vibrio cholerae*

3 Requirements

3.1 Ingredient requirements

3.1.1 Fish — The fish to be canned under this standard shall be of sound quality, free from taint or decomposition and fit for human consumption. It shall also be free from heads, tail-tips, fins and entrails. Scales if present shall be removed before canning. The fish canning facility shall also comply with CAC/RCP 52[CD/K/521:2010].

3.1.2 Salt — Edible salt complying with EAS 35 salt shall be used for canning.

3.2 Packaging

3.2.1 Container — The fish shall be packed in suitable internally lacquered cans and the cans sealed hermetically.

The lacquer used shall be such that it does not impart any unpleasant taste and smell to the contents of the can and does not peel off during processing and storage. The lacquer shall not be soluble in brine to any extent. The can exterior shall be free from major dents, rust, perforations and seam distortions.

The interior of the can shall not show any visible rusting or pitting and the inside lacquer shall be in good condition.

3.2.2 Fish — The fish shall be neatly packed. Regular packs shall be reasonably free from cross packs and pieces of skin or sections of the vertebrae across the top of the can.

3.3 Processing

Processing temperature and time shall ensure proper cooking and adequate sterilization of the finished product. The water used for the cooling of cans shall be maintained in clean condition and chlorinated to maintain minimum free residual chlorine concentration of 2 mg/kg.

3.4 Other presentations

Any other presentation of the product may be permitted provided that it:

- a) is sufficiently distinctive from the forms of presentation set out above;
- b) meets all other Regulatory requirements; and
- c) is adequately described on the label and in accordance with all regulatory labelling requirements.

4 Requirements for the finished product

4.1 Vacuum — The can shall give a negative pressure when punctured. Canned fish packed in round cans or deeper containers shall have a minimum level of vacuum at 50 mm Hg.

4.2 Colour and appearance — The manufacturing process shall ensure that the product is attractive in appearance and uniform in colour. The colour shall be characteristic of good quality canned fish of the particular species.

4.3 Drained weight — The drained mass of the contents in each can shall be not less than 62 per cent of water holding capacity of the can as tested by the method given in Annex of CD/K/520-1:2010.

4.4 Freedom from defects — The contents of the can on opening shall not display any appreciable disintegration. Pieces from which portions have separated out would be treated as disintegrated units. The percentage of detached portions of fish, calculated on the basis of the drained mass, shall not exceed 10 per cent based on the average of 5 cans. The can shall not show leaking, paneling or swelling.

4.5 Odour and flavour — The odour and flavour of the product shall be fresh and characteristic of good quality canned fish of the particular species. The flavour shall be free from excessive saltiness. No off-odours or off-flavours of any kind shall be present.

5 Food additives

No other additives shall be used except citric acid, acetic acid or tartaric acid may be added in accordance with EAS 103.

6 Hygiene

6.1 The material shall be prepared, filled and processed under hygienic conditions and only in premises maintained in a thoroughly clean and hygienic manner complying with CAC/RCP 1, CAC/RCP 52 and duly approved or licensed by the authorities concerned for fish products. The water used for processing of fish shall conform to EAS 12.

6.1.1 The canned fish shall be subjected to a heat process which will ensure complete destruction of clostridium botulinum. The scheduled heat process shall be established only by competent and properly trained persons using acceptable scientific methods. All new productions or changes in the production process must be fully evaluated as to their effect on the adequacy of the process before commercial production is undertaken.

Table 1 — Microbiological and heavy metal limits for fish canned in brine

Type of contaminant		Requirement	Method of test
(i)	Microbiological requirements	Shall be commercially sterile	E.5
(ii)	Vacuum of the can in mm, min	100	Annex A
(iii)	Head space of the can in mm	5.0 to 7.5	---
(iv)	Drained weight of the contents of the can, as percentage by weight of the water capacity of the can, min	64	Annex B
(v)	Sodium chloride in brine, % (w/v), max	3.5	
(vi)	Acidity in brine as citric acid (anhydrous), % (w/v)	0.06 to 0.20	
(vii)	Arsenic, mg/kg, max	2.0	EAS 41
(viii)	Copper, mg/kg, max	20	EAS 41
(ix)	Tin, mg/kg, max	250.0	EAS 41
(x)	Mercury, mg/kg, max	0.5	EAS 41
(xi)	Lead, mg/kg, max	0.3	EAS 41
(xii)	Cadmium, mg/kg, max	0.3	EAS 41
(xiii)	Zinc, mg/kg, max	50.0	EAS 41
(xiv)	Histamine content, mg/100 fish meat, max	20.0	Annex B

6.1.2 The details of the scheduled processes, the heat penetration data, bacteriological and chemical tests shall be kept and be readily available for inspection for a minimum period of 3 years from the date of the last production to which they relate.

6.1.3 When processed containers are cooled in water, the water used for cooling the cans shall be maintained in clean condition and chlorinated to maintain minimum residual-free chlorine concentration of two parts per million. If cooling water is re-circulated, it shall be filtered and super chlorinated (5 ppm of residual chlorine) before use or each re-use.

6.1.4 It is essential that water used for can cooling shall be free from harmful organisms. Even though the can seams are satisfactory, small quantities of water can enter the can during this cooling period. For this reason the can cooling water shall be tested for coliform organisms at monthly intervals and coliforms shall not be detected in any samples of 100 ml. A colony count of less than 100 organisms per milliliter after incubation for 5 days at 22-26 °C is satisfactory, but any significant variation from the established limits shall be investigated immediately.

6.1.5 The water for cooling shall not contain toxic chemicals in quantities likely to cause harm to health.

6.1.6 After processing, the containers shall be handled in such a manner as to avoid contamination of the product.

6.1.7 A damaged can shall not be offered for use.

6.2 Microbiological requirements

The product shall be free from pathogenic micro-organisms and shall also satisfy the tests in accordance with the methods of Annex J in CD/K/520-1:2010.

6.3 Other requirements

The product shall also conform to the requirements specified in Table 1.

7 Marking

7.1 Each container shall be legibly and indelibly marked with the following information in addition to information required by EAS 38:

- a) Name of the material along with brand name, if any;
- b) Name and address of the manufacturer;
- c) Grade;
- d) Net mass of the contents of the can;
- e) Proportion of fish curry in the cans, if required by the purchaser;
- f) Nature of the canning medium used and ingredients;
- g) Licence number, date and authority, if any, under which the manufacturer has been permitted to can the product (optional for export);
- h) Batch or lot number and the date of manufacture;
- i) The words 'Best before (month and year to be indicated)'; and
- j) Any other requirement as given OIML R87, *Quantity of product in prepackages*.

7.2 Each container may also be marked with a Certification Mark.

8 Sampling, examination and analyses

8.1 Sampling

8.1.1 The sampling and tolerance plans in CD-K-572:2010 shall be used to determine the acceptability of the lot. The sampling plans dictate the minimum sample size to be taken. If necessary, in the opinion of the inspector, more than the minimum sample size specified may be taken.

8.1.2 Sampling of lots for the sensory examination of the product shall be in accordance with CD-K-572:2010 except that a lower acceptance number for decomposition shall be used as indicated in the sampling tables.

The tables specify the minimum number of sample units to be used for the following types of inspections:

- a) Level I — Sensory examinations of all products subject to inspection other than lots which are subject to reinspection.
- b) Level II — Sensory examinations of all products which are under reinspection.

8.1.3 The sample unit shall consist of a can of fish and the entire contents thereof.

8.2 Sensory and physical examination

Samples taken for sensory and physical examination shall be assessed by persons trained in such examination in accordance with CAC/GL 31.

8.3 Determination of the fill of the container

8.3.1 Apparatus

8.3.1.1 Top pan balance

8.3.1.2 Rotary can opener

8.3.2 Procedure

8.3.2.1 The container selected shall be undamaged in all respects. Carefully open the container and note the level of the contents by means of a pencil mark on the internal surface of the can. Wash, dry and weigh the container.

8.3.2.2 Fill the container with distilled water at 20 °C to the height of the contents. Weigh the container plus the water. Subtract the weight of the container from this weight to give the weight of the equivalent to the volume of the contents.

8.3.2.3 Fill the container with additional water at 20 °C a distance of 4.76 mm below the top level of the container if the container has a double seam. (For other container, fill up to the top of the container). Weigh the container plus the water. Subtract the weight of the container from this weight to give the weight of the equivalent to the full volume of the container.

8.3.3 Calculation

Fill of container, per cent mass of remaining water

$$= \frac{\text{mass of the equivalent full volume of the content}}{\text{mass of water equivalent to full volume of content}} \times 100$$

8.4 Physical examination

8.4.1 Complete external can examination. Open can and complete net weight determination, according to defined policies and procedures for these examinations.

8.4.2 Examine appearance of product in can. Carefully remove fish from can to examination tray. Inspect can contents for presence of foreign material or other undesirable parts, carefully separating fish as necessary.

8.4.3 Examine can interior for presence of foreign material, smut, struvite, and corrosion or other can interior defects.

8.4.4 Observe colour of flesh as an indicator of decomposition.

8.4.5 Assess odour, flavour and texture as required.

8.4.6 Record any defect for that unit on the appropriate worksheet.

9 Definition of defectives

A sample unit will be considered defective when it fails to meet any of the following final product requirements referred to in Clause 4.

9.1 Taint

A unit will be considered tainted when any of the following conditions are found:

- a) **Rancid** — The contents in the container show the following defects:
 - Odour characterized by the distinct or persistent odour of oxidized oil; or
 - Flavour characterized by that of oxidized oil which leaves a distinct bitter aftertaste.
- b) **Abnormal** — Distinct and persistent uncharacteristic odours or flavours such as burnt or acrid, metallic, or associated with feed and not defined as rancid or decomposed; or
- Flavour or odour resulting from the improper addition and/or mixing of ingredients.

9.2 Decomposition

A unit will be considered decomposed when any of the following conditions are found:

- a) **Odours and flavours** — Persistent, distinct and uncharacteristic odour or flavour including but not limited to the following: fruity, vegetable, stale, musty, yeasty, sour, faecal, ammonia, hydrogen sulphide, bilge-like and putrid.
- b) **Discolouration** — Discolouration associated with decomposition which is uncharacteristic of the species and type of pack, such as flushed pink, dark brown, green or yellowish to orange colours.
- c) **Texture** — Breakdown of muscle structure due to decomposition characterized by:
 - muscle structure which is very tough, dry, mealy or chalky; or
 - muscle structure which is very soft, mushy, or pasty.

9.3 Unwholesome

- a) **Critical foreign material** — A lot will be considered defective when any of the following conditions are found:
 - the presence of any material which has not been derived from fish (and packing media) and which poses a threat to human health (such as glass, etc.); or
 - distinct and persistent odour or flavour of any material which has not been derived from fish (and packing media) and which poses a threat to human health (such as solvents, fuel oil, etc.).
- b) **Foreign material** — A unit will be considered defective when the following condition is found:
 - the presence of any material which has not been derived from fish (and packing media) but does not pose a threat to human health (such as insect pieces, sand, etc.).
- c) **Other defects** — A unit will be considered defective when any of the following conditions are found:
 - 1) **Struvite crystals** (magnesium ammonium phosphate crystals) — Any struvite crystal greater than 5 mm in length.
 - 2) **Sulphide blackening** (smut) — Staining affecting greater than 5% of the drained contents.

- 3) **Undesirable parts** — Any combination of head parts, heads, tails, scales and viscera exceeding 2% of the drained weight.

10 Lot acceptance

A lot shall be considered as meeting the requirements of this standard when:

- (i) not any single instance of critical foreign matter occurs; or
- (ii) the total number of sample units found defective for taint, decomposition or unwholesomeness, individually or in combination, does not exceed the acceptance number for the sample size designated in the sampling plans; or
- (iii) the total number of sample units found defective for decomposition does not exceed the acceptance number (c) shown in parentheses for the sample size designated in the sampling plans in CD-K-572:2010; or
- (iv) the average net weight and the average drained weight of all sample units examined is not less than the declared weight and provided there is no unreasonable shortage in any individual container;
- (v) the Food Additives, Hygiene and Labelling requirements of Clauses 5, 6, and 7 are met.
- (vi) the total number of sample units found defective for standards of identity (style of presentation) and size designation or count range (if a size designation or count range is declared), does not exceed the acceptance number for the sample size designated in the sampling plans.



Eels canned in brine — Example only



Sardine in brine



Skip-jack flack in brine

Draft for comment

American Standard

Annex A (normative)

Determination of sodium chloride

A.1 Reagents

A.1.1 Standard Silver Solution — 0.1 N, standardized against 0.1 N sodium chloride solution.

A.1.2 Dilute Nitric Acid — 1:4.

A.1.3 Ferric ammonium indicator solution — A saturated solution of ferric alum $[\text{Fe}(\text{NH}_4)(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}]$.

A.1.4 Standard Potassium Thiocyanate Solution — 0.1N

A.2 Procedure

A.2.1 Wash the emptied can thoroughly with water and wash the residue on the sieve at least thrice with cold water. Collect the drained liquid and all the washings together in a 1 000 ml graduated flask and make up the volume. Centrifuge the made-up liquid for at least 5 min at 1 000 rev/min.

A.2.2 Take a suitable aliquot of a clear supernatant solution, add a known volume of the standard silver nitrate solution in slight excess and then add 20 ml of dilute nitric acid. Boil gently on a hotplate or a sand-bath until all solids except silver chloride dissolve (usually 15 min). Cool, add 50 ml of water and 5ml of the ferric alum indicator solution and titrate with the standard ammonium thiocyanate solution until permanent light brown colour appears.

A.3 Calculation

A.3.1 Sodium chloride in the brine, per cent by weight

$$= 5.85 \frac{(V_1 N_1 - V_2 N_2)}{W}$$

where,

V_1 = volume of the standard silver nitrate solution;

V_2 = volume of the standard potassium thiocyanate;

N_1 = normality of the standard silver nitrate solution;

N_2 = normality of the standard potassium thiocyanate; and

W = weight, in g, of the dried product taken for the test.

NOTE The total weight of brine is obtained by finding the difference between the net weight and the drained weight of the contents of the can.

Annex B
(normative)

Determination of acidity in brine

B.1 Reagents

B.1.1 Standard sodium hydroxide solution

0.1N.

B.1.2 Phenolphthalein indicator solution

Dissolve one gram of phenolphthalein in 100 ml of 95 percent (w/v) alcohol.

B.2 Procedure

B.2.1 Take a suitable aliquot of the brine solution (see A.2.1), add about 200 ml of water and titrate against the standard sodium hydroxide solution using phenolphthalein indicator solution. Calculate the percentage acidity of the brine in terms of citric acid from the relationship: 1ml of 0.1 N sodium hydroxide solution is equivalent to 0.0064 g of citric acid (anhydrous).

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