



DRAFT EAST AFRICAN STANDARD

Fortified edible salt — Specification

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.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. 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 Principles and procedures for development of East African Standards.

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.

The committee responsible for this document is Technical Committee EASC/TC 018, *Nutrition and foods for special dietary uses*.

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

This second edition cancels and replaces the first edition (EAS 35: 2012), which has been technically revised.

Fortified edible salt — Specification

1 Scope

This Draft East African Standard specifies the requirements, sampling and test methods for fortified edible salt intended for direct human consumption (table use) and used as an ingredient in food manufacturing.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

CODEX STAN 150, *Standard for food grade salt*

CODEX STAN 192, *General standard for food additives*

EAS 38, *Labelling of pre-packaged foods — Specification*

EAS 39, *Code of practice for hygiene in the food and drink manufacturing industry*

ISO 2479, *Sodium chloride — Determination of matter insoluble in water or in acid and preparation of principal solutions for other determinations*

ISO 2480, *Sodium chloride for industrial use — Determination of sulphate content — Barium sulphate gravimetric method*

ISO 2482, *Sodium chloride — Determination of calcium and magnesium contents — EDTA complexometric methods*

ISO 2483, *Sodium chloride — Determination of moisture content (loss of mass at 110 °C)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

edible salt

crystalline product consisting predominantly of sodium chloride, which is obtained either from the sea, saline lakes, underground rock salt deposits or from natural brine. Salt from other origins, and notably the salt which is a by-product of chemical industries, is excluded

3.2

coarse salt

predominantly sodium chloride product which is crystalline solid mainly of white, pale pink, or light grey colour

3.3

crushed salt

salt obtained by drying and crushing coarse salt

3.4

table salt

predominantly refined white crystalline sodium chloride product

3.5

fortified edible salt

salt to which iodine has been added

3.6

fortificant

compound which contains the specified micronutrient intended to be added to a food vehicle

3.7

fortification

practice of deliberately adding essential micronutrients in a food to improve its nutritional quality and to provide a public health benefit with minimal risk to health

3.8

food grade packaging material

material which will safeguard the hygienic, nutritional, technological, safety and organoleptic qualities of the product

3.9

extraneous adulterants

stones, glass, pieces of soil and other matter other than salt

4 Forms of presentation

Fortified edible salt shall be presented in the following forms:

- a) coarse salt;
- b) crushed salt; and
- c) table salt.

5 Requirements

5.1 General requirements

Fortified food grade salt shall be practically free from grit and other extraneous adulterants, when visually examined.

5.2 Particle size for table salt

Fortified edible table salt shall be free flowing. At least 85 % of the material shall pass through a 1.00 mm (1 000 micron) sieve and not more than 20 % by mass of the material shall pass through a 0.212 mm or a 212-micron sieve.

5.3 Specific requirements

Fortified food grade salt shall also conform to the requirements in Table 1 when tested in accordance with test methods specified therein.

Table 1 — Specific requirements for fortified edible salt

S/N	Characteristics	Coarse salt	Requirements		Test
			Crushed salt	Table salt	
1.	Chloride content as NaCl, % on dry matter basis, min	96.0	96.0	97.0	An
2.	Moisture content, drying at 105 °C, % by mass, max.	4	4	1	ISO
3.	Matter insoluble in water, % on dry matter basis, max.	1	1	0.2	ISO
4.	Calcium (as Ca) water soluble, % on dry matter basis, max.	0.5	0.5	0.10	ISO
5.	Copper, (as Cu), mg/kg, on dry matter basis, max.	2.0	2.0	2.0	An
6.	Magnesium (Mg) water-soluble, % on dry matter basis, max.	0.5	0.5	0.10	ISO
7.	Sulphate (as SO ₄), % on dry matter basis, max.	0.5	0.5	0.50	ISO
8.	Total alkalinity (as Na ₂ CO ₃), %, by mass, max	0.5	0.5	0.20	AN

6 Fortification requirements

6.1 Levels of iodine

Food grade salt shall be fortified with potassium iodate to conform to the iodine levels provided in Table 2 when determined in accordance with any of the methods listed in CODEX STAN 150, AOAC 935.14 or ECSA methods.

Table 2 — Required levels of iodine in fortified edible salt

Nutrient	Requirement, mg/kg		Test method
	Minimum	Maximum	
Iodine	30	60	CODEX STAN 150/AOAC 935.14/ECSA

6.2 Fortificants

The fortificant for addition of iodine in salt shall be potassium iodate which shall conform to any of the following:

- British Pharmacopoeia (BP);
- Food Chemical Codex (FCC);
- Merck Index (MI);

- d) United States National Formulary (USNF);
- e) European Pharmacopoeia (Ph Eur);
- f) United States Pharmacopoeia (USP); and
- g) FAO/WHO Codex Alimentarius commission (CAC).

7 Food additives

Only food additives permitted for use in CODEX STAN 192 may be used within the specified limits or guidance in food grade salt.

8 Hygiene

Fortified edible salt shall be produced, prepared and handled in accordance with EAS 39.

9 Contaminants

9.1 Heavy metals

Fortified food grade salt shall conform to those maximum limits for heavy metals in table 3.

Table 2 — Maximum limits for heavy metals

S/N	Heavy metal	Maximum Limits mg/kg	Test Methods
1.	Lead	1	AOAC 999.11
2.	Arsenic	0.5	AOAC 920.46 (B)
3.	Cadmium	0.5	AOAC 999.11
4.	Mercury	0.1	AOAC 999.11

10 Weights and measures

The product shall comply with the Weights and Measures Regulations of the respective Partner States.

11 Packaging

11.1 Fortified food grade salt shall be packaged in food grade packaging materials.

11.2 Bags that have already been used for packaging other articles such as fertilizers, cement, and chemicals shall not be reused for packaging fortified edible salt.

12 Labelling

12.1 General

In addition to the requirements in EAS 38, each package shall be legibly and indelibly marked with the following:

12.2 Name of product

12.2.1 The name of the product shall be "Fortified edible salt" or fortified food grade salt, or "Iodated edible salt". The name shall have in its close proximity a declaration of either coarse salt or, crushed salt or table salt.

12.2.3 An indication of either the origin, according to the definition in Clause 3, or the method of production may be declared on the label, provided that such an indication does not mislead or deceive the consumer.

12.2.4 The following information shall be shown on the label:

- a) name and physical address of the manufacturer's/importer/ distributor/packer;
- b) net content of the package in metric units;
- c) lot or batch number in code or clear format;
- d) brand or registered trademark; if any;
- e) date of manufacture as month/year;
- f) best before date as month/year;
- g) storage instruction as "salt must be stored in a cool and dry place and away from direct sunlight"; and
- h) country of origin.

12.3 Nutrition and health claims

Fortified food grade salt may have claims on the importance of the vitamins and minerals in nutrition and health. Such claims when declared shall be consistent with EAS 803, EAS 804 and EAS 805.

13 Sampling

Sampling shall be done in accordance with Annex A.

Annex A

(normative)

Method of sampling of fortified edible salt

A.1 Scope

This method specifies the sampling procedure to be applied when determining the main component in order to assess the quality of sodium chloride (salt).

The criterion to be used for acceptance or rejection of a lot or consignment on the basis of this sample is also provided.

A.2 Field of application

This method is applicable to the sampling of any type of salt intended for use as food, either pre- packed or in bulk

A.3 Clause

This method represents a variables sampling procedure for mean quality: blended bulk sample analysis.

A blended bulk sample is produced in such a way that it is representative of the lot or consignment. It is composed of a proportion of items drawn from the lot or consignment to be analysed.

Acceptance criterion is on the basis that the mean value obtained from analyses of those blended bulk samples must comply with the provision in the Standard.

A.4 Definitions

The terms used in this sampling method refer to those in the "Instructions on Codex Sampling Procedures" (CX/MAS 1-1987).

A.5 Equipment

The sampling equipment used shall be adapted to the nature of the tests to be carried out (for example: sampling by borer and sampling equipment made of chemically inert material). The containers used for collecting the samples shall be made of a chemically inert material and should be air-tight.

A.6 Procedure

A.6.1 Pre-packed salt

Sampling may be carried out by "random sampling" or by "systematic sampling". The choice of the method to be used depends on the nature of the lot (for example: if the packages are marked with successive numbers, systematic sampling may be suitable).

A.6.1.1 Random sampling

Draw the n items from the lot in such a way that each item in the lot has the same chance of being selected.

A.6.1.2 Systematic sampling

If the N units in the lot have been classified and can be numbered from 1 to N , the 1-in- k systematic sampling of n items can be obtained as follows:

- a) Determine the k value as $k = N/n$. (If k is not an integer, then round to the nearest integer).
- b) From the first k items in the lot take one at random and then make every k th item thereafter.

A.6.2 Salt in bulk

Here, the lot is fictitiously divided into items (strata); a lot with a total mass of m kg is considered to be composed of $m/100$ items. In this case, it is necessary to draw up a "stratified sampling" plan appropriate to the lot dimension. The samples are selected from all the strata in proportion to the stratum sizes.

NOTE: Stratified sampling of a population which can be divided into different subpopulations (called strata) is carried out in such a way that specified proportions of the sample are drawn from the different strata.

A.6.3 Constitution of the sample

A.6.3.1 The size and the number of the items forming the sample depend on the type of salt and the lot magnitude. The minimum size to be taken into account should be in accordance with one of the following specifications according to the circumstances:

- a) 250 g of salt in bulk or pre-packed in more than 1 kg packages; and
- b) one package for pre-packed salt in 500 g or 1 kg packages.

NOTE Concerning the number of samples to be drawn from the lot, an example of minimum sample number that would be picked up, can be found in the document CX/MAS 1-1987, Appendix V, Table 3, taking into account the magnitude of the lot and appropriate inspection level, in this case generally level 4 (see paragraph 8.4 in the same document).

A.6.3.2 Combine and mix well the different items drawn from the lot. This blended bulk sample constitutes the laboratory sample. More than one laboratory sample may be composed in such a manner.

A.7 Acceptance criterion

A.7.1 Determine the NaCl content (%) of at least two test portions of the laboratory sample.

A.7.2 Calculate the average of the results obtained for the n test portions of the laboratory sample using:

$$= \sum x (n \geq 2) / n$$

A.7.3 In accordance with the provision for the relevant NaCl content (%), a lot or a consignment shall be considered acceptable if the following condition is verified: $x \geq$ minimum level specified

A.8 Sampling report

The sampling report should contain the following information:

- a) type and origin of the salt;
- b) alterations of state of the salt (e.g. presence of foreign matter);

- c) date of sampling;
- d) lot or consignment number;
- e) method of packing;
- f) total mass of lot or consignment;
- g) number, unit mass of packages and whether the mass is given net or gross;
- h) number of items sampled;
- i) number, nature and initial position of sampled items;
- j) number, composition and mass of the bulk sample(s) and the method used to obtain and conserve it (them); and
- k) names and signature of people who have carried out the sampling.

A.9 Basic reference

Document CX/MAS 1-1987.

A.10 Remark

"Laboratory sample" is the "blended bulk sample" described in CX/MAS 1-1987, Appendix IV, paragraph 4-B.

Annex B (normative)

Determination of the chloride content calculated as sodium chloride

B.1 Apparatus

Normally available laboratory glassware.

B.2 Reagents

B.2.1 Potassium chromate solution.

Dissolve 5 g of potassium chromate (K_2CrO_4) in 100 mL of water.

B.2.2 Standard 0.1 N silver nitrate solution

B.2.2.1 Preparation

Dissolve 17.0 g of silver nitrate ($AgNO_3$) in 1 000 mL of water. Store the solution in the dark.

B.2.2.2 Standardization

B.2.2.2.1 Carry out the standardization in triplicate.

B.2.2.2.2 Weigh out accurately 5.8 g of analytical reagent grade sodium chloride ($NaCl$) (previously dried at $200\text{ }^{\circ}C \pm 50\text{ }^{\circ}C$ for 2 h and cooled to room temperature in a desiccator) into a 1 L volumetric flask and dissolve it in approximately 200 mL of water. Adjust the temperature of this solution to $20\text{ }^{\circ}C$ and dilute it to 1 000 mL with water at the same temperature. Pipette 25 mL of the sodium chloride solution at $20\text{ }^{\circ}C$ into a 250 mL conical flask, add 1 mL of potassium chromate solution, and titrate with the 0.1 N silver nitrate solution until a faint reddish-brown colour persists after brisk shaking.

B.2.2.2.3 Carry out a blank titration using the same procedure but replacing the 25 mL sodium chloride solution with 25 mL water.

B.2.2.2.4 Calculate the mean normality of the silver nitrate solution from the triplicate determinations.

$$N = \frac{Ax0.4277}{b-c}$$

where

N is the normality of silver nitrate solution,

A is the mass of sodium chloride, in grams, in 1 000 mL solution,

b is the volume of silver nitrate solution, in millilitres, required to titrate 25 mL of sodium chloride solution, and

c is the volume of silver nitrate solution, in millilitres, required to titrate the blank.

NOTE A commercially prepared volumetric solution may be used instead.

B.3 Procedure

B.3.1 Carry out the determination in triplicate on each of the test samples.

B.3.2 Pipette 50 mL of the principal solution reserved in accordance with ISO 2479 at 20 °C, into a 250 mL volumetric flask and dilute to 250 mL with water at the same temperature. Mix well and pipette 25 mL of this solution at 20 °C into a 250 mL conical flask. If the solution is acid to litmus, neutralize with sodium bicarbonate solution; if the solution is alkaline, add dilute nitric acid (1:10) drop by drop until the solution is acid to litmus and then neutralize with sodium bicarbonate solution. Add 1 mL of potassium chromate solution and titrate with the standard 0.1 N silver nitrate solution until a faint reddish-brown colour persists after brisk shaking.

B.4 Calculation

Calculate the chloride content as NaCl, on a moisture-free basis (and free-flowing agent-free basis, where relevant), as a percentage, as follows:

$$C = \frac{a \times N \times 1169}{B}$$

where

C is the chloride content, as NaCl, expressed as a percentage (by mass),

a is the volume of silver nitrate solution, in millilitres, used in the titration,

N is the normality of the silver nitrate solution,

B is the mass of sample, in grams, in 1 000 mL principal solution, corrected for moisture content and, where relevant, the drier content.

B.5 Report

Report the chloride content of each test sample as the mean of its triplicate determinations.

Annex C (normative)

Determination of copper content

C.1 Apparatus

Nessler cylinders — 50 ml capacity

C.2 Reagents

C.2.2.1 Citric acid solution — 20 % aqueous.

C.2.2.2 Ammonium hydroxide-Sp.gr. 0.90.

C.2.2.3 Sodium diethyldithiocarbamate solution.

Dissolve 1 g of sodium diethyldithiocarbamate in 1000 ml of water. Keep in amber bottle and protect from strong light.

C.2.2.4 Standard copper solution.

Dissolve 0.392 g of copper sulphate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) in water. Make up the volume with water to 1 000 ml. When required for use, pipette 10 ml of the solution into a 1 000 ml volumetric flask and dilute up to the mark with water. One millilitre of this solution contains 0.001 mg of copper (as Cu).

C.3 Procedure

Dissolve 2 g of the dried material in 10 ml of water in a cylinder; add 5 ml of citric acid solution, 2 ml of ammonium hydroxide and 10 ml of sodium diethyldithiocarbamate solution. Dilute to the mark and mix well. In the other Nessler cylinder carry out a control test using 4 ml of standard copper solution proceeding exactly as with the sample.

The limit prescribed in Table 1 shall be taken as not having been exceeded if the intensity of the colour developed with the sample is not greater than that obtained in the control test.

Annex D

(normative)

Determination of alkalinity

D.1 Preparation of solutions

D.1.1 Preparation of raw (Coarse) Salt solution

Accurately weigh about 20 g of the dried sample, dissolve it in 200 mL of water in a beaker and heat to boiling and cool. Filter the solution through a weighed Gooch or sintered glass crucible (LG No. 4) and wash the residue till it is free from soluble salts. Collect the filtrate and washings in a one-litre graduated flask and dilute to the mark. Preserve the solution so obtained for subsequent tests. Dry the crucible along with the insoluble residue to constant mass.

D.1.2 Preparation of Table Salt solution

Transfer about 20 g of the prepared sample, accurately weighed, in a 100 ml measuring flask through a funnel. Wash the funnel in the flask with carbon dioxide-free distilled water and fill it to the mark with that water. Shake the flask well till all the salt goes into solution (undissolved magnesium carbonate will remain in suspension).

D.2 Reagents

D.2.1 Standard Hydrochloric Acid — 0.1 N.

D.2.2 Methyl orange indicator

Dissolve 0.1 g of methyl orange in 100 ml of water.

D.3 Procedure

D.3.1 Procedure for common salt

Pipette out 100 ml of the solution prepared in **D.1.1** and titrate against standard hydrochloric acid using methyl orange as indicator **D.2.2** and record the volume (V).

D.3.2 Procedure for Table salt

Shake prepared solution **D.1.2** well and filter first 10 ml to 15 ml of the solution through Whatman filter paper No. 1 and discard the filtrate. Then filter the remaining solution and titrate 50 ml of the solution so obtained against standard hydrochloric acid using methyl orange as indicator and record the volume (V).

D.4 Calculation

Alkalinity (as Na_2CO_3), per cent by mass:

For common salt = $5.3 \times \frac{V}{m}$

For table salt and food industry salt = $1.06 \times \frac{V}{m}$

where

V = volume in ml of standard hydrochloric acid used in the titration, and

m = mass in g of the prepared sample taken for the test.

Annex E (normative) Determination of acid-insoluble matter

Carry out this test for free-flowing table salt only)

E.1 Reagents

E.1.1 Dilute hydrochloric acid

E.1.2 Concentrated hydrochloric acid

E.2 Procedure

Transfer for residue obtained in D.1.2 into a beaker. Alternatively, transfer the sintered crucible itself with the residue to 100 ml beaker, and add 15 ml to 20 ml of water and 25 ml of concentrated hydrochloric acid so that the sinter base is immersed in the acid. Heat to boiling for 10 min to 15 min so that practically all the residue and drier have decomposed with the acid. Remove the sintered crucible from the beaker (if it is transferred to the beaker) and wash the crucible with water. Evaporate the extract and wash solution together to dryness and transfer the solid residue with 25 ml of dilute hydrochloric acid (1:1).

Filter on a filter paper (Whatman No. 41 or equivalent), wash the precipitate first with warm dilute hydrochloric acid (1:20) and then with hot water until washings are free from chloride. Dry the residue and ignite in a silica crucible. Heat strongly at red heat for 1 h. Cool and weigh.

NOTE: If silicate drier is not used, acid-insoluble residue will be very low for accurate weighing. In that case, repeat with 50 g of dried material.

E.3 Calculation

Acid insoluble matter, per cent by mass =

$$\frac{100 \, m_1}{m_2} \quad -$$

where

m_1 = mass in g of the residue, and

m_2 = mass in g of the dried sample taken for the test.

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