

CODEX STANDARD FOR FOOD GRADE SALT

*CX STAN 150-1985, Rev. 1-1997
Amend. 1-1999, Amend. 2-2001¹*

1. SCOPE

This standard applies to salt used as an ingredient of food, both for direct sale to the consumer and for food manufacture. It applies also to salt used as a carrier of food additives and/or nutrients. Subject to the provisions of this standard more specific requirements for special needs may be applied. It does not apply to salt from origins other than those mentioned in Section 2, notably the salt which is a by-product of chemical industries.

2. DESCRIPTION

Food grade salt is a crystalline product consisting predominantly of sodium chloride. It is obtained from the sea, from underground rock salt deposits or from natural brine.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 MINIMUM NaCl CONTENT

The content of NaCl shall not be less than 97% on a dry matter basis, exclusive of additives.

3.2 NATURALLY PRESENT SECONDARY PRODUCTS AND CONTAMINANTS

The remainder comprises natural secondary products, which are present in varying amounts depending on the origin and the method of production of the salt, and which are composed mainly of calcium, potassium, magnesium and sodium sulphates, carbonates, bromides, and of calcium, potassium, magnesium chlorides as well. Natural contaminants may also be present in amounts varying with the origin and the method of production of the salt.

3.3 USE AS A CARRIER

Food grade salt shall be used when salt is used as a carrier for food additives or nutrients for technological or public health reasons. Examples of such preparations are mixtures of salt with nitrate and/or nitrite (curing salt) and salt mixed with small amounts of fluoride, iodide or iodate, iron, vitamins, etc., and additives used to carry or stabilize such additions.

3.4 IODISATION OF FOOD GRADE SALT

In iodine-deficient areas, food grade salt shall be iodised to prevent iodine-deficiency disorders (IDD) for public health reasons.

3.4.1 *Iodine compounds*

For the fortification of food grade salt with iodine, use can be made of sodium and potassium iodides or iodates.

¹ The Codex Standard for Food Grade Salt was adopted by the Codex Alimentarius Commission at its 16th Session in 1985. A revised Standard was adopted by the 22nd Session in 1997 and amended by the 23rd Session in 1999 and the 24th Session in 2001. The Standard has been submitted to all Member Nations and Associate members of FAO and WHO for acceptance in accordance with the General Principles of the Codex Alimentarius.

3.4.2 *Maximum and minimum levels*

The maximum and minimum levels used for the iodisation of food grade salt are to be calculated as iodine (expressed as mg/kg) and shall be established by the national health authorities in the light of the local iodine deficiency situation.

3.4.3 *Quality assurance*

The production of iodised food grade salt shall only be performed by reliable manufacturers having the knowledge and the equipment requisite for the adequate production of iodised food grade salt, and specifically, for the correct dosage and even intermixing.

4. FOOD ADDITIVES

4.1 All additives used shall be of food grade quality.

4.2 ANTICAKING AGENTS

		Maximum level in finished product
341 (iii)	Tricalcium orthophosphate	20 g/kg
170 (i)	Calcium carbonate	}
504 (i)	Magnesium carbonate	}
530	Magnesium oxide	}
551	Silicon dioxide, amorphous	}
552	Calcium silicate	}
553 (i)	Magnesium silicate	} GMP
554	Sodium aluminosilicate	}
556	Calcium aluminium silicate	}
470	Salts of myristic, palmitic or stearic acids (calcium, potassium, sodium)	}
538	Calcium ferrocyanide	}
536	Potassium ferrocyanide ²	} 10 mg/kg, singly or in
535	Sodium ferrocyanide ²	} combination, as Fe (CN) ₆

4.3 EMULSIFIERS

433	Polyxyethylene (20) sorbitan monooleate	10 mg/kg
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4.4 PROCESSING AID

² The maximum level for Sodium and Potassium ferrocyanides may be 20 mg/kg when used in the preparation of "dendritic" salt.

900a Polydimethylsiloxane³ 10 mg residue/kg

5. CONTAMINANTS

Food grade salt may not contain contaminants in amounts and in such form that may be harmful to the health of the consumer. In particular the following maximum limits shall not be exceeded:

5.1 ARSENIC

- not more than 0.5 mg/kg expressed as As.

5.2 COPPER

- not more than 2 mg/kg expressed as Cu.

5.3 LEAD

- not more than 2 mg/kg expressed as Pb.

5.4 CADMIUM

- not more than 0.5 mg/kg expressed as Cd.

5.5 MERCURY

- not more than 0.1 mg/kg expressed as Hg.

6. HYGIENE

In order to ensure that proper standards of food hygiene are maintained until the product reaches the consumer, the method of production, packaging, storage and transportation of food grade salt shall be such as to avoid any risk of contamination.

7. LABELLING

In addition to the requirements of the Codex General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985, Rev. 2-1999) the following specific provisions apply:

7.1 THE NAME OF THE PRODUCT

7.1.1 The name of the product, as declared on the label shall be "salt".

7.1.2 The name "salt" shall have in its close proximity a declaration of either "Food Grade" or "Cooking Salt" or "Table Salt".

7.1.3 Only when salt contains one or more ferrocyanide salts, added to the brine during the crystallization step, the term "dendritic" could be included accompanying the name.

7.1.4 Where salt is used as a carrier for one or more nutrients, and sold as such for public health reasons, the name of the product shall be declared properly on the label, for example "salt fluoridated", "salt iodated", "salt iodized", "salt fortified with iron", "salt fortified with vitamins" and so on, as appropriate.

³ Polydimethylsiloxane is listed as an antifoam agent, lubricant, release and anti-stick agent and moulding aid (as Dimethylpolysiloxane) in the Codex Inventory of Processing Aids. Polydimethylsiloxane is listed as an antifoaming agent, anticaking agent and emulsifier in the Codex International Numbering System for Food Additives.

- 7.1.5** An indication of either the origin, according to the description on Section 2, or the method of production may be declared on the label, provided such indication does not mislead or deceive the consumer.

7.2 LABELLING OF NON-RETAIL CONTAINERS

Information for non-retail containers shall either be given on the container or in accompanying documents, except that the name of the product, lot identification and name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such mark is clearly identifiable with the accompanying documents.

8. PACKAGING, TRANSPORTATION AND STORAGE

In any salt iodisation program, it is important to ensure that salt contains the recommended amount of iodine at the time of consumption. The retention of iodine in salt depends on the iodine compound used, the type of packaging, the exposure of the package to prevailing climatic conditions and the period of time between iodisation and consumption. To ensure that iodized salt ultimately reaches the consumer with the specified level of iodine, the following precautions may be taken into consideration by countries where climatic and storage conditions could result in a large amount of iodine loss:

8.1 If necessary in order to avoid the loss of iodine, iodised salt should be packed in air tight bags of either high density polyethylene (HDPE) or polypropylene (PP) (laminated or non-laminated) or LDPE-lined jute bags (Grade 1803 DW jute bags lined with 150 gauge polyethylene sheet). In many countries, this may require a major switch from conventional packaging materials made of straw or jute. The cost of adding extra iodine to compensate for its loss from cheaper packaging (i.e., straw or jute) must be weighed against the cost of switching to the above expensive packing material.

8.2 Bulk packing units should not exceed 50 kg (in accordance with International Labour Organization (ILO) Conventions) to avoid the use of hooks for lifting the bags.

8.3 Bags that have already been used for packing other articles such as fertilizers, cement, chemicals, etc. Should not be reused for packing iodised salt.

8.4 The distribution network should be streamlined so as to reduce the interval between iodisation and consumption of salt.

8.5 Iodised salt should not be exposed to rain, excessive humidity or direct sunlight at any stage of storage, transportation or sale.

8.6 Bags of iodised salt shall be stored only in covered rooms or "godowns" that have adequate ventilation.

8.7 The consumer should be similarly advised to store iodised salt in such a manner as to protect it from direct exposure to moisture, heat and sunlight.

9. METHODS OF ANALYSIS AND SAMPLING

9.1 SAMPLING (SEE APPENDIX)

9.2 DETERMINATION OF SODIUM CHLORIDE CONTENT

This method allows the calculation of sodium chloride content, as provided for in Section 3.1, on the basis of the results of the determinations of sulphate (Method 8.4), halogens (Method 8.5), calcium and magnesium (Method 8.6), potassium (Method 8.7) and loss on drying (Method 8.8). Convert sulphate to CaSO_4 and unused calcium to CaCl_2 , unless sulphate in sample exceeds the amount necessary to combine with calcium, in which case convert calcium to CaSO_4 and unused sulphate first to MgSO_4 and any remaining sulphate to Na_2SO_4 . Convert unused magnesium to MgCl_2 . Convert potassium to KCl . Convert unused halogens to NaCl . Report the NaCl content on a dry matter basis, multiplying the percentage NaCl by $100/100-P$, where P is the percentage loss on drying.

9.3 DETERMINATION OF INSOLUBLE MATTER

According to ISO 2479-1972 "Determination of matter insoluble in water or in acid and preparation of principal solutions for other determinations".

9.4 DETERMINATION OF SULPHATE CONTENT

According to ISO 2480-1972 "Determination of sulphate content - barium sulphate gravimetric method".

9.5 DETERMINATION OF HALOGENS⁴

According to ISO 2481-1973 "Determination of halogens, expressed as chlorine - mercurimetric method" (for the recovery of mercury from the laboratory waste, see Annex of ECSS/SC 183-1979).

9.6 DETERMINATION OF CALCIUM AND MAGNESIUM CONTENTS

According to ISO 2482-1973 "Determination of calcium and magnesium contents - EDTA complexometric methods".

9.7 DETERMINATION OF POTASSIUM CONTENT

According to ECSS/SC 183-1979 "Determination of potassium content by sodium tetraphenylborate volumetric method" or alternatively according to ECSS/SC 184-1979 "by flame atomic absorption spectrophotometric method".

9.8 DETERMINATION OF THE LOSS ON DRYING (CONVENTIONAL MOISTURE)

According to ISO 2483-1973 "Determination of the loss of mass at 110°C ".

9.9 DETERMINATION OF COPPER CONTENT

According to ECSS/SC 144-1977 "Determination of copper content - zinc dibenzylthiocarbamate photometric method".

9.10 DETERMINATION OF ARSENIC CONTENT

According to method ECSS/SC 311-1982 "Determination of arsenic content - silver diethyldithiocarbamate photometric method".

9.11 DETERMINATION OF MERCURY CONTENT

⁴ An alternative method for the determination of halogens by using silver nitrate is being studied.

According to method ECSS/SC 312-1982 "Determination of total mercury content - cold vapour atomic absorption spectrometric method".

9.12 DETERMINATION OF LEAD CONTENT

According to method ECSS/SC 313-1982 "Determination of total lead content - flame atomic absorption spectrometric method".

9.13 DETERMINATION OF CADMIUM CONTENT

According to method ECSS/SC 314-1982 "Determination of total cadmium content - flame atomic absorption spectrometric method".

9.14 DETERMINATION OF IODINE CONTENT

According to method ESPA/CN 109/84 "Determination of total iodine content - titrimetric method using sodium thiosulfate".

APPENDIX**METHOD FOR SAMPLING OF FOOD GRADE SALT FOR DETERMINATION OF SODIUM CHLORIDE****1. SCOPE**

This method specifies the sampling procedure to be applied when determining the main component in order to assess the food grade quality of sodium chloride (salt) as provided for in the Codex Standard for Food Grade Salt, Section 3: "Essential Composition and Quality Factors".

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

2. FIELD OF APPLICATION

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

3. PRINCIPLE

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 analyzed.

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.

4. DEFINITIONS

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

5. EQUIPMENT

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

6. PROCEDURE**6.1 PREPACKED 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).

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.

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.

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.

6.3 CONSTITUTION OF THE SAMPLE

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:

- 250 g of salt in bulk or prepacked in more than 1 kg packages;
- one package for prepacked salt in 500 g or 1 kg packages.

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).

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.

7. ACCEPTANCE CRITERION

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

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

$$\bar{x} = \frac{\sum x}{n} \quad (n \geq 2)$$

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:

$$\bar{x} \geq \text{minimum level specified}$$

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);
- k)* names and signature of people who have carried out the sampling.

9. BASIC REFERENCE

Document CX/MAS 1-1987.

10. REMARK

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