World Food Programme

Technical Specifications for

IODIZED SALT

Commodity code: **MSCSAL010**
Version: **1, adopted 2020**
Replacing: **Version 1, dated 20.12 2018**
Date of **OSCQ** issue: **16.01.2020**

The key adjustments are:
- *Removal of Alkalinity (Na2CO3) parameter*
- *Revising requirement for Lead (Pb) as per Codex Stan.*
- *Packaging as per contract requirement*
- *Updating reference test methods*

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1. SCOPE

This specification applies to edible iodized salt used as an ingredient of food, the usual synonyms are food grade salt, cooking salt, table salt. Food grade salt is a crystalline product consisting pre-dominantly of Sodium Chloride (NaCl). It is obtained from the sea, from underground rock salt deposits or from natural brine. The specification does not apply to the salt which is a by-product of chemical industries or industrial salt.

2. REFERENCES AND STANDARDS

Unless otherwise specified, the product must comply with the following guidelines or standards (latest versions):

- Codex standard for Food Grade Salt: CODEX STAN 150-1985
- WHO 2014 Guidelines on "Fortification of food-grade salt with Iodine for the prevention and control of iodine deficiency disorders[1]"
- Recommended International Code of Practice: General Principles of Food Hygiene CAC/RCP 1-1969 including Annex "Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its application".
- General standard for Contaminants and Toxins in food and feed: CODEX STAN 193- 1995
- General Standard for Food Additives (GSFA), CODEX STAN 192-1995
- Salt quality: European salt producer's association[2]
- Country specific regulations established by the relevant authorities

3. RAW MATERIALS

3.1 Main ingredient

The product covered by the provision of this specification shall be manufactured from good quality ingredients, free from foreign materials, substances hazardous to health, excessive moisture, and must comply with all relevant national food laws and standards where applicable.

- The Iodized Salt must conform to Codex STAN 150-1985.

[1] https://www.who.int/nutrition/publications/guidelines/fortification_foodgrade_saltwithiodine/en/

[2] https://eusalt.com/salt-quality

- The Iodized Salt may comprise of natural secondary products, which are present in varying amounts depending on the origin and the methods of production of the salt, which are composed of mainly calcium, potassium, magnesium and sodium sulphates, carbonates, bromides, and of calcium, potassium, magnesium chloride as well.
- Natural contaminants may also be present in amounts varying with the origin and the method of production of the salt.
- The salt rocks and evaporated/harvested salt from the sea or lake must be kept under dry, covered and hygienic conditions.

3.2 Iodine compounds

For the fortification of food grade salt with iodine, use fortificant made of sodium and/or potassium iodides or iodates. The iodine compound e.g. Potassium iodate (KIO3) added in salt shall be of food grade quality and conform to all applicable food chemical codex.

The Iodine compound should be purchased from GAIN Premix Facility or any of the GAIN approved premix suppliers, a complete list is available at the following link: http://gpf.gainhealth.org/suppliers/current-suppliers

The iodine compound must be delivered to the processor of Iodized Salt with a complete Certificate of Analysis (CoA) and a Proof of Purchase. The two documents must be presented with other documents to WFP as proof for fortification. Premix must be stored in a dry, cool and clean place or as per storage recommendation from the premix supplier.

4. PROCESSING

The production of Iodized Salt shall only be performed by reliable manufacturers having the knowledge and the equipment requisite for the adequate production of food grade salt, and especially, for the correct dosage, mixing and quality monitoring.

4.1 Methods of Salt Iodization

The most common method of iodating salt is called “wet mixing”. This involves the preparation of a fortificant (iodate) solution which is sprayed or dripped onto the salt as it moves along a conveyor belt or a screw conveyor. In a simpler set-up, which can be equally effective when carried out well, the iodate solution is sprayed onto a batch of salt that is mixed in a blender or roller mixer. The preparation and spraying of solution require the fortificant, clean filtered water and a pump with a nozzle for spraying.

When Iodized Salt is manufactured by dry mixing, the KIO3 is first blended with an anti-caking agent to serve as the standard premix, which is then mixed with the input salt in a set proportion. Commonly permitted anti-caking agents are calcium carbonate, tricalcium phosphate and magnesium carbonate.

An estimated additional variability of ±10% during iodization procedures could be considered at the production site for use in quality control and assurance procedures. This variability depends on the iodization methods used and quality assurance system in place.

4.2 Homogeneity of KIO3 mixing

Theoretical calculations indicate that a mixing system with a Coefficient of Variation of 10% using Iodine as the indicator element, will enable product to meet the above variation target on 95%, provided that all conditions of mixing are rigorously applied. The guidelines for this calculation is shown at

http://foodqualityandsafety.wfp.org/coefficient-of-variation-calculator

The iodine content of the Iodized Salt as it is being produced should be constantly controlled, preferably through "in line" product sampling and iodine content analysis at short intervals.

4.3 Food safety and risk assessment at manufacturing premises

For compliance with Codex standards the processor must be able to demonstrate by principle and practice the adoption, implementation and recording of:

- Good Manufacturing Practice
- Hazard Analysis Critical Control Point program

In this context an appointed WFP staff/WFP appointed Inspector / Quality Surveyor is entitled to visit the factory without prior notice during any period when WFP product is being manufactured to check that the GMP and HACCP systems are in place. The Inspector / Quality Surveyor may request to see:

- **Records** (i.e. names of people in charge of the process and quality control, temperatures of the process, mixing times / net contents, cleaning schedules, CCP monitoring, traceability etc.)
- **Procedures** (e.g. cleaning, personnel hygiene, HACCP, sampling and analysis)
- **Instructions** (e.g. process instructions, cleaning instructions.
- The quality manual for the process or factory.
- The manufacturer must be registered under national food law as a processor of foods for human consumption.

5. PRODUCT SPECIFICATIONS

5.1 General requirements

5.1.1 Food Additives

Food additives listed in Tables 1 and 2 of the Codex General Standard for Food Additives (CODEX STAN 192-1995) in Food Category 12.1.1 (Salt) may be used in foods subject to this standard. All additives used shall be of food grade quality.

5.1.2 Contaminants

The product covered by this specification shall comply with the maximum levels of the Codex Standard for Contaminants and Toxins in Foods and Feed (CODEX STAN 193-1995).

Additional contaminant/stringent requirement shall be followed in case of Country Specific regulatory requirements on Iodized Salt

5.1.3 Food Hygiene

It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the:

- Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to these products.
- Iodized Salt shall be free from any foreign material and substances/residues hazardous to health.
- Iodized salt shall not not contain other contaminants and toxins in amounts which may represent a hazard to health.

5.1.4 Fit for human consumption guarantee

Suppliers shall have to check the quality of iodized salt and guarantee that the product covered by the provision of this specification is 'fit for human consumption'.

5.2 Specific requirements

5.2.1 Physio-chemical

Follow shall be met in iodized salt. specification may vary with national regulations.

- Appearance: shall be homogeneous in appearance and free from agglomeration;
- Colour: shall be white and 10 g of salt in 100 ml water shall give a colourless solution having a neutral reaction;
- Particle size: Min. 85 % pass through 1.00 mm sieve and max .20 % pass through 0.212 mm sieve or follow particle size specified in the purchase contract;
- Iodine: 39.0-65.0 mg/kg (means 65 – 110 mg of potassium iodate per kg of salt);
- List of compulsory tests are described in table 2.

Note: The maximum and minimum levels used for the iodization of food grade salt are to be calculated as iodine (expressed as mg/kg) and shall established by the WHO 2014 Guidelines on Fortification of food-grade salt with iodine for the prevention and control of iodine deficiency disorders and/or by the National Health Authorities in the light of the local iodine deficiency situation where recommended. Specifications may vary with national regulations.

5.2.2 Shelf life

Shelf life as per contract requirement. Many recipient countries restrict shelf life requirement (best before end) for at least 24 months from the date of manufacture.

6. PACKAGING

6.1 General requirements

The product covered by the provision of this specification must be packed in appropriate packaging which safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product. The packaging shall be made of substances which are safe and suitable for their intended use.

Packaging materials must comply with the last amendments of national regulations in the country of production (if not existing: compliance with EU or FDA legislations requested). Packaging must be new, uniform, strong, fit for export and multiple handing,

Note: Packaging requirement can also be agreed as per contractual requirements.

6.2 Product net weight

As per contract requirement,

- Product net weight of the batch should not be less than specified net weight,
- Weight and quantity tolerance must meet The International Organization of Legal Metrology International Recommendation OIML R 87[3].

6.3 Packaging requirements

As per contract requirement.

[3] OIML R 78 Quantity of commodity in prepackages https://www.oiml.org/en/files/pdf_r/r087-e04.pdf, latest edition to be followed

6.4 Compliance Tests:

The bags of finished product must pass the drop test (after each drop, there shall be no rupture or loss of contents) following the principles of the drop test standard (EN 277, ISO 7965-2 or equivalent) with following sequence (each bag should go through the butt dropping and flat dropping):

- Butt dropping: Bag is dropped from a height of 1.20m on the bottom and the top of the bag.
- Flat dropping: Bag is dropped from a height of 1.60m twice on one flat face & twice on the opposite flat face.

Unless otherwise specified in the contract, two percent marked bags (included in the price) must be sent with the lot.
Note: Drop testing is not required in case carton is used as secondary packaging for iodized salt.

6.5 Stuffing of Containers and other transport vehicles[4]

Use of desiccant is mandatory in each container to absorb moisture and condensation during shipment to preserve the product and packaging performance. The following table provides a guideline on the quantity to be used;

Table 2: Guideline on the quantity to be used for calcium chloride-based desiccants:

Estimated days in container	20 ft container	40 ft container
15-59 days	9.00 kg	17.50 kg
60-89 days	11.25 kg	22.50 kg
90-120 days	13.50 kg	25.00 kg

Better alternative material can be used upon agreement with WFP.

In addition, and applicable to all bagged commodities, kraft paper should be laid to all sides of the container. Bags should be well maintained to avoid any movement.

Empty containers/vehicles shall be clean, pest free and free of damage, odours and previous cargo remains. Ventilation holes must remain clear and unsealed.

If pallets are used inside containers: it is highly recommended to have 3 first bottom layers placed as column stacking, the rest can be interlocked (cross-stacking) for load stability. Pallet must be wrapped in a suitable manner (locked to the pallet, enough containment force) and the cartons should be banded when necessary. The cartons must be secured to pallets in order to prevent any damage to the contents or packaging during shipment. Pallet used should be strong enough to support the charge during transportation. Pallets shall be stackable (minimum double stock) without damage to the cartons during shipment.

If no pallets are used inside container: dunnage (of strong sheets such as carton, plywood…) should be placed inside each container at every three layers of cartons to provide the required stacking strength. In addition, protecting material like air bag, carton, polystyrene, can be used. Also, kraft paper must be adhered to all internal sides, door, and floor of container. Kraft paper also need to be placed on the top of packaging.

[4] For more details, please refer to container loading procedure:

https://documents.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp254688.pdf

7. MARKING

Below information must be printed on the packaging:

- Name of the product: **Iodized Salt**
- Net weight
- Name of supplier (Name and address)
- Supplied by (name and address) – *if required*
- Country of origin
- Production date (mm/yyyy) or (dd/mm/yyyy)
- Best Before End (mm/yyyy) – *if required*
- Batch/Lot number
- Note for Sale

Additional marking may be required as per purchase contract.

8. STORING

The product covered by the provision of this specification must be stored under dry, ventilated and hygienic conditions. The bags of iodized salt shall be stored only in covered rooms or go-downs to protect from excessive humidity and direct sunlight.

9. ANALYTICAL REQUIREMENTS

The principal tests in table 2 must be performed to check if the quality of Iodized Salt meets below requirements. Suppliers should follow its own food safety and quality management plan. Additionally, WFP reserves the rights to change these plans at any time.

Table 2: List of compulsory tests and reference method

No	Parameter/Test	Requirements	Analytical method (or equivalent validated method)
1.	Organoleptic	- Normal smell - Colour: white - 10g of salt in 100ml water shall give a colourless solution having a neutral reaction	
2.	Particle size	- min 85 % pass through 1.00 mm sieve - max 20 % pass through 0.212 mm sieve Or: as per contract requirement	
3.	Sodium chloride (NaCl)	Min 97.0 % (m/m, on dry matter) Or: as per contract requirement	ISO 2481
4.	Moisture content (drying at 110 °C)	Max 3.0 % (m/m) Or: as per contract requirement	ISO 2483
5.	Water insoluble matter	Max 0.2 % (m/m)	ISO 2479
6.	Iodine	39.0 – 65.0 mg/kg (*Based on estimated salt consumption 3-5g per day, WHO 2014 Guidelines)* Or: as per contract requirement	EuSalt/AS 002 EuSalt/AS 019 WHO/UNICEF/ICCIDD method[5]
7.	Acid insoluble matter	Max 0.15 % (m/m)	ISO 2479
8.	Sulphate (as SO4)	Max 0.5 % (m/m)	ISO 2480 EuSalt/AS 015 EuSalt/AS 018
9.	Arsenic (As)	Max 0.5 mg/kg	EuSalt/AS 015
10.	Copper (Cu)	Max 2.0 mg/kg	EuSalt/AS 015
11.	Lead (Pb)	Max 1.0 mg/kg	EuSalt/AS 013 EuSalt/AS 015
12.	Cadmium (Cd)	Max 0.5 mg/kg	EuSalt/AS 014 EuSalt/AS 015
13.	Mercury (Hg)	Max 0.1 mg/kg	EuSalt/AS 012 EuSalt/AS 015

Note: Additional analysis/parameters and/or stringent requirement shall be followed in case of Country Specific regulatory requirements for Iodized Salt.

[5] https://apps.who.int/iris/bitstream/handle/10665/43781/9789241595827_eng.pdf