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**DMS 188:2021**

Third edition

**DRAFT MALAWI STANDARD  
(COMESA/SADC HARMONISED)**

**Edible salt – Specification**

**Note: This is a draft Malawi standard and shall neither be used nor regarded as a Malawi Standard**

# Edible salt – Specification

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## FOREWORD

This draft Malawi standard is a third edition of MS 188:1988, Specification for salt which covers the requirements for all types of salt including table salt. and this is the second revision of the Malawi Standard..

This standard is exactly the same as COMESA/SADC harmonised standards on food grade salt in all respects except for iodine content, alkalinity and limits for contaminants. The COMESA/SADC Harmonised Standard is an adoption of CODEX STAN 150, Adopted in 1985; Revised in 1997; 2012; Amended in 1999; 2001; 2006 – *Food Grade Salt*.

Acknowledgement is made for the use of the information.

## TECHNICAL COMMITTEE

The following institutions, companies and organisations were represented on the Technical Committee MBS/TC 8 *Spices, condiments and culinary herbs*:

Blantyre City Council;

Consumers Association of Malawi;

Lilongwe University of Natural Resources;

Malawi Bureau of Standards;

Malawi University of Business and Applied Science;

Ministry of Health – Blantyre District Health Office;

Nali Limited;

Peoples Trading Center;  
Rab Processors Limited;  
Rambo Packaging;  
Shoprite Trading; and  
Tajo Products.

**NOTICE**

*This standard shall be reviewed every five years, or earlier when it is necessary, in order to keep abreast of progress. Comments are welcome and shall be considered when the standard is being reviewed.*

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**DRAFT MALAWI STANDARD****Edible salt – Specification**

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**1 SCOPE**

This draft Malawi 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. It does not apply to salt from origins other than those mentioned in this draft Malawi standard, notably the salt which is a by-product of chemical industries.

**2 NORMATIVE REFERENCES**

The following standard contains provisions, which through reference in this text, constitute provisions of this draft Malawi standard. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this Malawi standard are encouraged to take steps to ensure the use of the most recent edition of the standard indicated below. Information on current valid national and international standards can be obtained from the Malawi Bureau of Standards.

MS 19: *Labeling of prepacked foods – General standard;*

MS 21: *Food and food processing units – Code of hygienic conditions;*

MS 237: *Food additives– General standard;*

MS 302: *Contaminants and toxins in food; and*

ISO 2479: *Sodium chloride for industrial use – Determination of matter insoluble in water or in acid and preparation of principal solutions for other determinations.*

**3 TERMS AND DEFINITIONS**

For the purposes of this draft Malawi standard the following terms and definitions shall apply:

**3.1****iodised coarse salt**

shall mean coarse salt product consisting predominantly of sodium chloride to which iodine has been added for human and livestock consumption. It is obtained from sea, underground rock salt deposits or natural brine

**3.2****edible salt**

shall mean iodised common salt that is meant for human and livestock consumption. It is used as an ingredient of food, both for the direct sale to the consumer and for the manufacture of food. Edible salt is synonymous to food grade salt

**3.3****anti-caking agents**

shall mean substances added to the salt in finely powdered form to prevent caking, lumping or agglomeration to impart a free flowing property and retard moisture absorption. Anti-caking agents include magnesium carbonate, calcium carbonate and tricalcium phosphate

**3.4****Iodine**

shall mean a substance added to salt as a fortifier in the form of iodate or iodide

### **3.5**

#### **iodised table salt**

shall mean crushed and dried coarse salt to which iodine has been added. Ninety-nine percent (99 % m/m) of the iodised table salt shall pass through 1.00 mm sieve

### **3.6**

#### **free flowing iodised salt**

shall mean iodised table salt to which anti-caking agents have been added. Ninety-nine percent (99 % m/m) of the free flowing iodised salt shall pass through 1.00 mm sieve

### **3.7**

#### **special purpose salt:**

shall mean non-iodised salt intended for the food industry and/or medical use for which addition of iodine can cause adverse reaction to health or deteriorate the quality of the product

## **4 DESCRIPTION**

**4.1** 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.

### **4.2 Classification**

Edible salt shall be of three types namely:

**4.2.1** Iodised coarse salt;

**4.2.2** Iodised table salt; and

**4.2.3** Free flowing iodised table salt.

## **5 ESSENTIAL COMPOSITION AND QUALITY FACTORS**

### **5.1 Colour**

Edible salt shall be white, crystalline and free from grit and any other foreign matter.

### **5.2 Particle size**

Ninety-nine percent (99 % m/m) of the iodised table salt and free flowing iodised table salt shall pass through 1.00 mm sieve.

### **5.3 Specific requirements**

Edible salt shall have comply with the specific requirements as stipulated in **Table 1**.

### **5.4 Microbiological requirements**

The salt shall not contain red halophilic organisms when tested according to Annex D.

## **6 FOOD ADDITIVES**

Only those food additives listed under this product in MS 237 shall be used and only within the limits specified.

## **7 CONTAMINANTS**

**7.1** The products covered by this draft Malawi standard shall comply with the maximum levels for heavy metals as stated in MS 302.

**7.2** 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. Copper shall not exceed 2 mg/kg (expressed as Cu).

**Table 1 – Specific requirements for edible salt**

Characteristic	Requirement			Method of test
	Iodised coarse salt	Iodised table salt	Free flowing iodised table salt	
Moisture, % (m/m), max.	5.0	3.0	0.5	Annex M
Water insoluble matter % (m/m) max.	1.0	0.5	1.0	Annex N
Acid insoluble matter, % (m/m), max.	-	0.5	0.5	ISO 2479
Chloride content (as NaCl), % (m/m), min.	96	97	97	Annex C
Alkalinity (as CO <sub>3</sub> ), % (m/m), max.	1.0	1.0	1.0	Annex E
Iodine (as KIO <sub>3</sub> ) ppm, (Port of entry, iodisation salt plant and prepacking factory)	80 - 100	80 - 100	80 - 100	Annex B
Iodine (as KIO <sub>3</sub> ) ppm, min. (Whole sale and retail)	50	50	50	Annex B

## **8 HYGIENE**

It is recommended that the products covered by the provisions of this draft Malawi standard shall be prepared and handled in accordance with the appropriate sections of MS 21, and other relevant Codex texts

## **9 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:

**9.1** Edible salt shall be packed in, air tight, clean and dry moisture proof containers made of material which does not affect the quality of the salt and which ensures the ventilation of the appropriate Iodine level at the time of consumption.

**9.2** Suitable packing material shall include 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) or woven plastic bags.

**9.3** Edible salt shall be packed in 20 kg consumer packages at point of entry into Malawi and wholesale outlets. The packages shall be securely closed or sealed'.

**9.4** Iodized table salt and free flowing iodised table salt shall be packed in a suitable moisture proof consumer packages which do not affect the quality of the salt and which ensures the retention of the appropriate iodine level at the time of consumption. The product shall be packed in 1 kg, 0.5 kg, 0.25 kg or other suitable small consumer packages at retail outlets. The package shall be securely closed and sealed.

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

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

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

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

**9.9** 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.

## **10 LABELING**

In addition to the requirements of MS 19, the following specific provisions shall apply;

### **10.1 Name of the product**

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

**10.1.2** The name "salt" shall have in its close proximity a declaration of either "Edible salt" or "Cooking salt" or "Table salt".

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

**10.2** 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 "*iodated salt*," "*iodised salt*", "*salt fortified with iron*" "*salt fortified with vitamins*" and so on, as appropriate.

### **10.3 Date marking and storage instructions**

The expiry date shall be indicated and in addition conditions of storage shall be declared.

**10.4** 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.

### **10.5 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 product, lot identification and name and address of the manufacturer or a packer shall appear on the container. However, lot identification and the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

## **11 METHODS OF SAMPLING AND TEST**

**11.1** The methods of sampling shall be done as outlined in Annex A.

**11.2** Test methods for edible salt have been outlined in Annexes B to G.

## Annex A

### METHOD OF SAMPLING EDIBLE SALT

#### A1 General requirements

In drawing, stirring, preparing and handling test samples, the following precautions shall be observed:

**A1.1** Samples shall not be taken at a place exposed to weather;

**A1.2** Precautions shall be taken to protect the samples, the sampling instrument and the containers for samples from adventitious contamination;

**A1.3** To draw a representative sample, the contents of each container selected for sampling shall be mixed thoroughly by suitable means;

**A1.4** The sample shall be placed in clean, dry and air-tight glass or plastic containers which are suitable;

**A1.5** Each sample container shall be sealed air-tight after filling and marked with full details of sampling and the date of sampling and year of manufacture;

**A1.6** The number of packages (n) to be selected from a lot shall depend upon the size of the lot (N) and shall be in accordance with the Table A.

**Table A – Number of packages to be selected for sample**

Lot* size (N)	Number of packages to be selected (n)
5 to 100	4
101 to 500	5
501 to 1000	7
1001 to above	10

\*A lot is a collection of packages of the same size, type and style, which have been manufactured and packaged under essentially the same conditions. If the consignment is declared to consist of different batches, the batches shall be marked separately and the group of containers in each batch shall constitute separate lots.

**A1.7** All samples shall be randomly taken.

#### A2 Preparation of test samples

The contents of the packages selected as per **A1** shall be thoroughly mixed and by a process of quartering the sample shall be reduced to about 500 g for testing. The test sample shall be immediately transferred to a sample container for testing.

## Annex B

### DETERMINATION OF IODINE IN EDIBLE SALT

**B1 Reagents.** Sodium thiosulphate, conc. sulphuric acid ( $\text{H}_2\text{SO}_4$ ), potassium iodide, soluble chemical starch, and boiled double-distilled water (BDDW).

#### Preparation of reagents

**Sodium thiosulphate solutions:** Add 1.24 g in 1 l BDDW. Store in cool dark place.

**Sulphuric acid, 1M solution:** To 90 ml of BDDW add 5.56 ml concentrated sulphuric acid slowly. Add further water to the volume to 100 ml. Store in a cool, dark place.

**Potassium iodide (KI) solution:** Dissolve 10 g KI in 100 ml BDDW.

**Saturated sodium chloride:** Take 100 ml BDDW in a beaker and go on adding crystalline sodium chloride with continuous stirring until no more salt is soluble. Heat the contents of the beaker until the excess salt dissolves, then cool ( $\text{NaCl}$  crystals will appear on the sides of the beaker). When completely cool, decant the supernatant into a clean bottle. This can be stored for 3 to 4 weeks.

**Soluble chemical starch solution:** To be prepared freshly each day as follows: Add 1 g to 10 ml of boiling double distilled water, continue to boil until the starch completely dissolves. Add saturated  $\text{NaCl}$  solution to make up to 100 ml.

**B2 Apparatus.** Analytical balance, hot plate or gas burner, 50 ml measuring cylinder with stopper, 500 ml wash bottle, glass stirring rod, conical flask, 100 ml with stopper, glass or plastic funnel, 1 ml pipette, 5 ml pipette, 10 ml burette and stand, stop watch or clock, and closed box, cupboard or drawer to keep the conical flask.

**B3 Procedure.** Carefully weigh 10.0 g of the salt sample on a clean piece of paper boat. Transfer completely into the 50 ml measuring cylinder. Slowly add BDDW from a wash bottle and shake to dissolve completely. Add more of the water to make up to the 50 ml mark. Transfer completely the 50 ml salt solution into a conical flask with stopper. Pipette out 1 ml of the sulphuric acid solution and add it to the salt solution pipette out 5 ml of the KI solution and to the conical flask. The solution will turn yellow. Stopper the flask and place in the closed box or in the dark for 10 minutes. Pour the sodium thiosulphate into the burette and adjust the level to the "0" mark. After the 10 minutes, take the flask out of the dark and while shaking it, titrate with sodium thiosulphate a top titration as soon as the solution turns pale (becomes very light yellow). Add a few drops (1 to 5 ml of the fresh starch solution. The colour turns to deep purple. Continue titration until the purple coloration disappears as the solution becomes colourless. Note the burette reading.

**B4 Calculations.** Calculate the content of iodine using the following equivalence:

1 ml of sodium thiosulphate = 10.6 mg/kg (ppm)

Report the date of testing, sample number, source of iodine in mg/kg (ppm).

To obtain value of potassium iodate ( $\text{KIO}_3$ ) multiply the 1 mg/kg by 1.6864.

## Annex C

### DETERMINATION OF CHLORIDE CONTENT IN EDIBLE SALT

#### C1 Reagents

##### C1.1 Potassium chromate solution.

**Preparation:** Dissolve 5 g of potassium chromate ( $K_2CrO_4$ ) in 10 ml of water.

##### C1.2 Standard 0.1 N silver nitrate solution.

**Preparation:** Dissolve 17 g of silver nitrate ( $AgNO_3$ ) in 100 ml of water. Store the solution in the dark.

**C1.3 Standardization:** Weigh accurately 5.8g of analytical reagent grade sodium chloride ( $NaCl$ ), previously dried at  $200\text{ }^\circ\text{C} \pm 50\text{ }^\circ\text{C}$ , into a 1 l volumetric flask and dissolve it in approximately 200 ml of water. Adjust the temperature of this solution to  $20\text{ }^\circ\text{C}$  and dilute it to 1000 ml with water at the same temperature.

Pipette 25 ml of the sodium chloride solution at  $20\text{ }^\circ\text{C}$  into 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. Carry out a blank titration using the same procedure and replacing the 25 ml of sodium chloride solution with 25 ml of water.

Calculate the Normality of silver nitrate solution:

$$= \frac{A \times 0.42277}{(b - c)}$$

where

A = weight of sodium chloride in 1000 ml solutions in grams;

b = volume of silver nitrate solution required to titrate 25 ml of sodium chloride solution, in millilitres; and

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

#### C1.4 Procedure

**C1.4.1** Carry out the determination in triplicate on each of the test samples.

**C1.4.2** Pipette 50 ml of the filtrate at  $20\text{ }^\circ\text{C}$ , reserved in accordance with 7.5.1(b), 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  $20\text{ }^\circ\text{C}$  into a 250 ml conical flask. If the solution is acid to litmus, neutralize with sodium bicarbonate; 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. Add 1 ml potassium chromate solution and titrate with the standard 0.1 silver nitrate solution until a faint reddish-brown colour persist after brisk shaking.

#### C1.5 Calculation

(a) Chloride content calculated as  $NaCl$  on a moisture free (and drier-free) basis,

$$\text{per cent} = \frac{a \times N \times 11169}{B}$$

where

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

$B =$  weight of sample in 1000 ml solution, corrected for moisture content and where relevant, the drier content, in grams; and

$N =$  Normality of the silver nitrate solution.

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

## Annex D

### DETERMINATION OF ALKALINITY IN EDIBLE SALT

#### D1 Reagents

##### D1.1 Screened methyl orange indicator

Dissolve 0.2 g of methyl orange and 0.28 g of xylene cyanol FF in 100 ml of ethyl alcohol (50 per cent).

##### D1.2 Standard 0.1 N hydrochloric acid solution

###### D1.2.1 Preparation

Dilute 10 ml of concentrated hydrochloric acid (sp.gr.1.16) to 1000 ml with water.

###### D1.2.2 Standardization

Dry about 0.25 g of anhydrous sodium carbonate in a weighing bottle at 260 to 270 °C for 30 minutes. Allow to cool in a desiccator and weigh accurately, transfer the contents into a 250 ml conical flask, and re-weigh the empty of sodium carbonate. Add 50 ml of water to the flask, and swirl the flask until the sodium carbonate is completely dissolved. Add two drops of screened methyl orange indicator and titrate with the 0.1 N hydrochloric acid solution until the colour changes from green to grey.

$$\text{Normality of hydrochloric acid solution} = \frac{A \times 18.87}{b}$$

where

A = weight of anhydrous sodium carbonate taken, in grams, and

b = volume of the hydrochloric acid solution used in the titration, in millilitres.

#### D2 Procedure

Pipette 200 ml of the filtrate into a 500 ml conical flask, add two drops of screened methyl orange indicator and titrate with the standard 0.1 N hydrochloric acid solution until the colour changes from green to grey.

#### D3 Calculation

$$\text{Alkalinity, calculated as CO}_3^{2-} \text{ on a moisture free basis, per cent} = \frac{a \times N \times 15}{B}$$

where

a = volume of hydrochloric acid solution used in the titration, in millilitres

B = weight of sample in 1000 ml solution corrected for moisture content and where relevant, in grams, and normally or the hydrochloric acid solution

## Annex E

### EXAMINATION FOR THE PRESENCE OF RED HALOPHILIC ORGANISMS

#### E1 Glassware

Sterilize all glassware used in the microbiological examination of the salt by application of dry heat at 170 °C for 1 hour.

#### E2 Preparation of Modified Nutrient Brine Medium (Dussault and Lachance)

Dissolve 5 g of magnesium sulphate, 1 g of magnesium nitrate, 0.025 g of ferric chloride, 5 g of proteose peptone, 10 g of glycerol and 200 g of the test sample in 100 ml of distilled water, warming to dissolve if necessary. Adjust the pH value of the solution to 7.5. Sterilize this nutrient brine by autoclaving at 121 °C for 15 minutes and then divide it into two equal portions. To one portion, A, add 10 % skim milk, and to the other, B, add 3 % of plain agar.

Immediately before using the medium, melt portion B and warm portion A (which must be well mixed to ensure uniform suspension). Then mix the two portions together in a flask and dispense between 15 and 20 ml of the medium into each of two Petri dishes.

#### E3 Inoculation and Incubation

Sprinkle 1 g of the test sample on the medium in each dish and incubate the Petri dishes at 37 °C for 14 days.

#### E4 Examination

After incubation examine the Petri dishes for red colonies; such colonies indicate the presence of red halophilic organisms.

## Annex F

### DETERMINATION OF MOISTURE CONTENT IN EDIBLE SALT

#### F1 Procedure

**F1.1** Carry out the determination in triplicates on each of the test sample.

**F1.2** Weigh out accurately about 10 g of the test sample into a weighing bottle approximately 3 cm high and 6 cm in diameter. Dry at 140 °C for at least 12 hours and until constant weight is attained.

#### F2 Calculation

**F2.1** Moisture content, per cent =  $\frac{(A - B) \times 100}{A}$

where

$A$  = weight of sample taken, in grams, and

$B$  = weight of sample after drying in grams.

**F2.2** Report the moisture content of each test sample as the mean of its triplicate determinations.

## Annex G

### DETERMINATION FOR INSOLUBLE MATTER AND DRIER CONTENT IN EDIBLE SALT

#### G1 Procedure

**G1.1** Carry out the determination in triplicates on each of the test samples.

**G1.2** Weigh out accurately about 50 g of the test sample into a one litre beaker. Add 500 to 700 ml of water and mix well until all the soluble matter has dissolved. Filter the solution through a Gooch crucible containing a medium asbestos pad; wash the beaker and the residue five times with 20 ml portions of boiling water. And add these portions to the filtrate.

Where relevant, examine the residue for visible impurities. Transfer the filtrate to a one-litre volumetric flask; adjust the temperature of the filtrate to 20 °C and dilute to 1000 ml with water at the same temperature. Retain the filtrate for the determination of alkalinity and the contents of chloride, calcium, magnesium, sulphate, and fluorine. Dry the residue at 100 °C until constant weight is attained

**G1.3** If the salt contains a drier, wash the residue in the Gooch crucible five times with 20 ml portions of boiling hydrochloric acid (1.1) and then five times with 20 ml portions of boiling water. Dry the residue at 100 °C until constant weight is attained.

#### G2 Calculation

**G2.1 Drier content.** Calculated on a moisture-free basis, percent =  $\frac{A - B \times 100}{C}$

**G2.2 Free-flow table salt.** Insoluble matter, calculated on a moisture-free (and drier-free) basis,

$$\text{percent} = \frac{B \times 100}{D}$$

**G2.3 Other salts.** Insoluble matter, calculated on moisture-free basis, per cent =  $\frac{A \times 100}{C}$

where

*A* = weight of total residue before extraction with acid, in grams;

*B* = weight of residue after extraction with acid, in grams;

*C* = weight of sample taken, corrected for moisture content, in grams; and

*D* = weight of sample taken, corrected for moisture and drier contents, in grams

**G2.4** Report the insoluble matter and where relevant, the drier content of each test sample as the mean of its triplicate determinations

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**THE MALAWI BUREAU OF STANDARDS**

The Malawi Bureau of Standards is the standardizing body in Malawi under the aegis of the Ministry of Industry and Trade. Set up in 1972 by the Malawi Bureau of Standards Act (Cap: 51:02), the Bureau is a parastatal body whose activities aim at formulating and promoting the general adoption of standards relating to structures, commodities, materials, practices, operations and from time to time revise, alter and amend the same to incorporate advanced technology.

**CERTIFICATION MARK SCHEME**

To bring the advantages of standardization within the reach of the common consumer, the Bureau operates a Certification Mark Scheme. Under this scheme, manufacturers who produce goods that conform to national standards are granted permits to use the Bureau's "Mark of Quality" depicted below on their products. This Mark gives confidence to the consumer of the commodity's reliability.

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