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Rock salt (Halite) — Specification

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 473 was prepared by Technical Committee RSB/TC 019, *Spices, condiments and food additives*

In the preparation of this standard, reference was made to the following standard (s):

1) TAS 6401: Good manufacturing practices for common salt

2) US 163: Standard of hygienic practise for milk and milk products

3) RS 293: Milk collection centre (MCC)

The assistance derived from the above source is hereby acknowledged with thanks.

Committee membership

The following organizations were represented on the Technical Committee on *Spices, condiments and food additives* (RSB/TC 019) in the preparation of this standard.

Agrotech Ltd

Cheeter Group Ltd

Gasabo District

Gorilla Feeds Ltd

Intertek Morocco

Nyabihu TVET School

Nyarutarama Business Incubation Centre

Prodev Ltd

Rwanda Agriculture and Animal Resources Development Board (RAB)

Rwanda Best Farm

Rwanda Food and Drug Authority (RFDA)

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Introduction

Rock salt (Halite) was first discovered in Winsford in Cheshire in 1844, which is the mine used by Online Rock salt (Halite). Local prospectors were originally searching for coal – which, ironically, would be used to heat the brine-filled pans that made salt. The value of their find did not go unnoticed, however, and during the nineteenth century mining methods led to one million tonnes of Rock salt (Halite) being mined between 1844 and 1892.

Rock salt (Halite) is found in old ocean sea beds that have long ago dried up. The compound originates from a body of sea water that undergoes an intense evaporation process, leaving behind large rings of sea salt. Then through the long process of geologic aging, the salt layers are covered with marine sediments. Rock salt (Halite) is the least processed form of salt. It is salt that's taken directly from a salt mine; directly from the underground mineral deposit. Rock salt (Halite) is used just in the form is found underground. The only processing done to it is that we crush it and screen it to get a size range of crystals that's convenient to put down on the road. Because of this, it's also the lowest cost form of salt, and therefore, it's what's most commonly used in de-icing. Underground salt deposits are extracted by means of drilling, blasting or cutting the rock with the following techniques: Continuous mining, drilling, blasting and solution mining.

Rock salt (Halite) (NaCl) is an ionic compound that occurs naturally as white crystals. It is extracted from the mineral form halite or evaporation of seawater. The structure of NaCl is formed by repeating the face centered cubic unit cell. It has 1:1 stoichiometry ratio of NaCl with a molar mass of 58.4 g/mol. Compounds with the sodium chloride structure include alkali halides and metal oxides and transition-metal compounds. An important role to many important applications is structure and dynamics of water. Some applications include crystallization of proteins and conformational behavior of peptides and nucleic acids.

Rock salt (Halite) has been used to cure and preserve meat and fish for thousands of years, this simple yet effective method of preserving food was a way of life for humans across the globe. The industry that consumes the largest amount of Rock salt (Halite) is by far the chemical industry. Obtaining chlorine and caustic soda is needed before using it in multiple applications or industrial products.

It is normally known that Rwanda imports a lot of amount of Rock salt (Halite)s, concerns about the quality and safety of importing products. This Rwanda Standard has been developed to establish requirements minimum for Rock salt (Halite)s 9halite). It also exposes the domains application of Rock salt (Halite)s, with the results of supporting scientific research.

Rock salt (Halite)— Requirements

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for Rock salt (Halite) used as an ingredient for further processing in food industry.

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.

AOAC 920.46, *Metals and other constituents in baking powder*

AOAC 999.11, *Lead, Cadmium, Copper, Iron and zinc in foods. Atomic absorption spectrophotometry after dry ashing*

ISO 13164-3, *Water quality — Radon-222 — Part 3: Test method using emanometry*

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)*

ISO 9696, *Water quality — Gross alpha activity — Test method using thick source*

ISO 9697, *Water quality — Gross beta activity — Test method using thick source*

RS CAC/RCP 1, *General principles for food hygiene — Code of practice*

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

RS ISO 649, *Animal feeding stuffs — Sampling*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply

3.1

mineral

naturally occurring homogenous inorganic solid substance having a definite chemical composition and characteristic of crystalline structure, colour and hardness.

3.2

rock salt (Halite)

coarsely crystalline, sedimentary rock containing massive, fibrous and/or granular aggregates

3.3

food grade packaging material

packaging material, made of substances which are safe and suitable for their intended use and which will not impart any toxic substance or undesirable odour or flavour to the product

4 Requirements

4.1 General requirements

Rock salt (Halite) in its natural form shall be:

a) in the form of a crystalline solid; white or pale pink or light grey in colour;

b) free from any synthetic organic compounds;

c) free from any harmful constituents; and

d) free from visible contaminants such as clay, grit or extraneous adulterants and impurities.

4.2 Specific requirements

Rock salt (Halite) shall comply with the specific requirements in Table 1 when tested in accordance with test methods specified therein.

Table 1 — Specific requirements for Rock salt (Halite)

S/N	Composition	Requirement	Test method
i.	Moisture content mass, Max	0.2	ISO 2483
ii.	Sodium chloride content (as NaCl) per cent by mass, min.	95	Annex A
iii.	Calcium (as Ca) water soluble, % on dry matter basis, max.	0.5	ISO 2482

iv.	Magnesium (Mg) water-soluble, % on dry matter basis, max.	0.5	ISO 2482
v.	Sulphate (as SO4), % on dry matter basis, max	0.2	ISO 2480
vi.	Water insoluble matter, per cent by mass, max.	0.2	ISO 2479
NOTE: These requirements are on moisture-free basis			

5 Radioactive characteristics

Rock salt (Halite) shall not exceed limits for radioactive materials stipulated in Table 2 when tested in accordance with test methods specified therein.

Table 2 — Limits for radioactive materials in Rock salt (Halite)

S/N	Radioactive material	Maximum Limits in Bq/L	Test method
i.	Gross alpha activity	0.5	ISO 9696
ii.	Gross beta activity	1	ISO 9697
iii.	Radon (Rn) concentration, Max Bq/m^3	400	ISO 13164-3

6 Hygiene

Rock salt (Halite) shall be produced, prepared and handled in accordance with RS CAC/RCP 1.

7 Heavy metals

Rock salt (Halite) shall not exceed maximum limits for heavy metals in table 3 when tested in accordance with test methods specified therein.

Table 3 — Maximum limits for heavy metals

S/N	Heavy metal	Maximum limits mg/kg	Test method
i.	Arsenic	0.2	AOAC 920.46
ii.	Copper	2.0	AOAC 999.11
iii.	Lead	0.1	
iv.	Cadmium	0.05	

8 Packaging

Rock salt (Halite) (halite) shall be packaged and supplied in food grade packaging materials and suitable weather-resistant material complying with relevant standards.

9 Labelling

In addition to the requirements of RS EAS 38, the following specific labelling requirements shall apply and shall be legibly and indelibly labelled on each container:

a) name of product;

b) guaranteed percentage (by weight) of major nutrients reported as sodium (as Na), chloride (as Cl), calcium (as Ca), magnesium (as Mg), potassium (as K), and sulphate (as SO4);

c) net weight of the product;

d) batch number;

e) name and physical address of the manufacturer/importer/packer;

f) manufacture date;

g) instructions for use and storage conditions; and

h) declaration for unique attributes for custom made products shall be declared on packaging.

10 Sampling

Sampling of Rock salt (Halite) (halite) shall be in accordance RS ISO 6497.

Annex A
(normative)

Determination of the chloride content calculated as sodium chloride

A.1 Apparatus

Normally available laboratory glassware.

A.2 Reagents

A.2.1 Potassium chromate solution.

Dissolve 5 g of potassium chromate (K2CrO4) in 100 mL of water.

A.2.2 Standard 0.1 N silver nitrate solution

A.2.2.1 Preparation

Dissolve 17.0 g of silver nitrate (AgNO3) in 1 000 mL of water. Store the solution in the dark.

A.2.2.2 Standardization

A.2.2.2.1 Carry out the standardization in triplicate.

A.2.2.2.2 Weigh out accurately 5.8 g of analytical reagent grade sodium chloride (NaCl) (previously dried at 200 °C ± 50 °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 °C and dilute it to 1 000 mL with water at the same temperature. Pipette 25 mL of the sodium chloride solution at 20 °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.

A.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.

A.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.

A.3 Procedure

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

A.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.

A.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.

A.5 Report

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

Bibliography

[1] IS 7005-1973, Standard for Hygienic Conditions for Production, Processing, Transportation and distribution of Milk. Indian Standards Institution.

[2] IS. 3219:1990, Standard of practice for hygiene for Hygiene in the Food and Drink Manufacturing Industry. National Standards Authority of Ireland.

[3] CAC/DL 22-1997, Guidelines for the design control measures for street vended foods in Africa. Standards Alimentarius commission

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