

# DRAFT EAST AFRICAN STANDARD

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## Baking powder — 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 005 *Food additives*

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## **Introduction**

Baking powder finds widespread use as a chemical leavener of dough for baked products. The constituents of baking powder are sodium bicarbonate, edible starch and acid reacting component(s). On wetting, the powder produces carbon dioxide by the action of the acid reacting component on sodium bicarbonate. The released carbon dioxide is entrapped in the batter or dough mix resulting in volume increase and lightened texture of baked goods.

The starch in baking powder improves the product's consistency and stability by absorbing moisture and thus prolonging its shelf life. By keeping the product dry, the starch prevents the powder's alkaline and acidic components from reacting with each other prematurely.

This standard has been developed to ensure that the baking powder traded and/or used in food products delivers the required production qualities and is safe for human consumption.

# Baking powder — Specification

## 1 Scope

This Draft East African Standard specifies requirements, sampling and test methods for baking powder.

## 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, *Determination of Lead, Cadmium, Copper, Iron, and Zinc in Foods, Atomic Absorption Spectrophotometry after Dry Ashing*

ISO 760, *Determination of water — Karl Fischer Method (General method)*

CODEX STAN 107, *General standard for labelling of food additives when sold as such*

CODEX STAN 193, *General standard for contaminants and toxins in food and feed*

EAS 39, *Hygiene in the food and drink manufacturing industry — Code of practice*

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

### **food grade material**

material, made of substances that 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 Ingredients

Baking powder shall contain the following ingredients:

- a) refined food grade sodium bicarbonate

- b) edible starches such as maize starch and cassava starch or other neutral material such as calcium lactate, anhydrous calcium sulphate and sodium or potassium sulphate; and
- c) one or a combination of the following acid reacting components or any other in compliance with Codex Stan 192:
  - (i) sodium acid pyrophosphate with or without mono acid calcium phosphate;
  - (ii) mono acid calcium phosphate with or without dicalcium orthophosphate;
  - (iii) potassium hydrogen tartrate or tartaric acid or a mixture of both;
  - (iv) acid compounds of aluminium; and
  - (v) glucono delta lactone.

## **5 Requirements**

### **5.1 General requirements**

Baking powder shall be:

- a. free-flowing white powder;
- b. free from off odours;
- c. free from dirt;
- d. free from insect infestations;
- e. free from fungal infections;
- f. free from foreign matter and
- g. free from adulterants.

### **5.2 Specific requirements**

Baking powder shall comply with the physicochemical requirements given in Table 1 when tested in accordance with the test methods specified therein.

**Table 1 — Physicochemical requirements for baking powder**

<b>S/N</b>	<b>Characteristic</b>	<b>Requirement</b>	<b>Test method</b>
i.	Available carbon dioxide, % (m/m), min.	12	Annex A
ii.	Moisture % (m/m), max.	2	ISO 760

## **6 Contaminants**

Baking powder shall comply with the maximum levels for the contaminants given in Table 2 when tested in accordance with the test methods specified therein.

## 7 Hygiene

Baking powder shall be manufactured and handled in accordance with EAS 39.

**Table 2 — Permitted maximum levels of contaminants in baking powder**

S/N	Heavy metal	Maximum level mg/kg	Test method
i.	Lead (Pb)	1	AOAC 999.11
ii.	Copper (Cu)	2	AOAC 999.11
iii.	Arsenic (As)	0.05	AOAC 920.46 (B)

## 8 Packaging

Baking powder shall be packaged in clean, sound and airtight food grade materials. The packages shall preserve the quality and safety of the product and preclude contamination from the external environment.

## 9 Weights and measures

The products shall comply with the Weights and Measures Regulations in the respective Partner States.

## 10 Labelling

In addition to the labelling requirements of CODEX STAN 107, the packages shall be legibly and indelibly marked with the following information:

- a) name of the product. for example, "baking powder
- b) name and physical address of the processor/packer/importer;
- c) date of manufacture;
- d) expiry date;
- e) net weight of the product in metric units;
- f) list of ingredients in descending order by quantity when used; and
- g) declaration 'Contains edible starch', when edible starch is added.

## 11 Sampling

Representative samples of the product shall be drawn in accordance with the method given in Annex B.

## Annex A (normative)

### Determination of available carbon dioxide

Two methods have been described. Any can be used depending on the available facilities.

#### A.1 Method One

##### A.1.1 Apparatus

Schroedter's alkalimeter, as shown in Figure 1

##### A.1.2 Reagent

Sulphuric acid

##### A.1.3 Procedure

Fill bulb (A) with distilled water and bulb (B) with sulphuric acid to a height of 25 mm above port (C) through which carbon dioxide escapes into the acid. Weigh the alkalimeter ( $M$ ). Introduce 1 g of sample through side opening (D) into the decomposition flask (E). Weigh the alkalimeter again ( $M_2$ ). Open the stopcock (F) and allow about 25 ml of water to flow into (E). Allow the initial vigorous reaction to subside. Place the apparatus over a flame and boil the solution for about 3 min. Aspirate carbon dioxide free air through the solution by applying suction at G, the air first passing through soda lime. Weigh the alkalimeter again ( $M_1$ ).

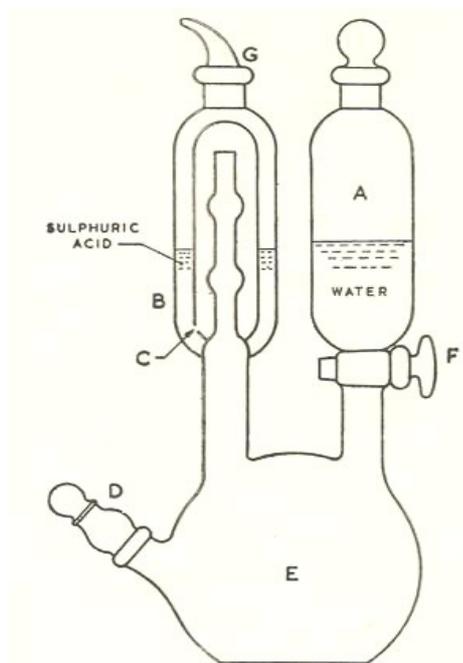


Figure 1 — Schroedter's alkalimeter

##### A.1.4 Calculation

The available carbon dioxide, expressed as percent by mass, shall be calculated as follows:

$$\frac{100(M_2 - M_1)}{M_2 - M}$$

where

$M_2$  is the mass, in grams, of alkalimeter with sample, before decomposition;

$M_1$  is the mass, in grams, of alkalimeter with sample, after decomposition; and

$M$  is the mass, in grams, of alkalimeter before introducing the sample.

## A.2 Method Two

### A.2.1 Apparatus

**Gasometric assembly**, as shown in Figure 2. The apparatus consists of a 250-ml, wide mouthed extraction flask (A) made of heat resistant glass connected by a short bent glass tube to a rubber tube (B). B is connected by a two-way stopcock (C) to a gas measuring tube (D) graduated in millilitres; the zero mark at the point just below the top and graduated up to 500 ml. Additionally connected to flask A is a 40-ml burette (H) graduated in millimetres. The gas measuring tube is connected to a levelling tube (F) through a rubber tube (E) having a pinchcock (P) to control the flow of the solution.

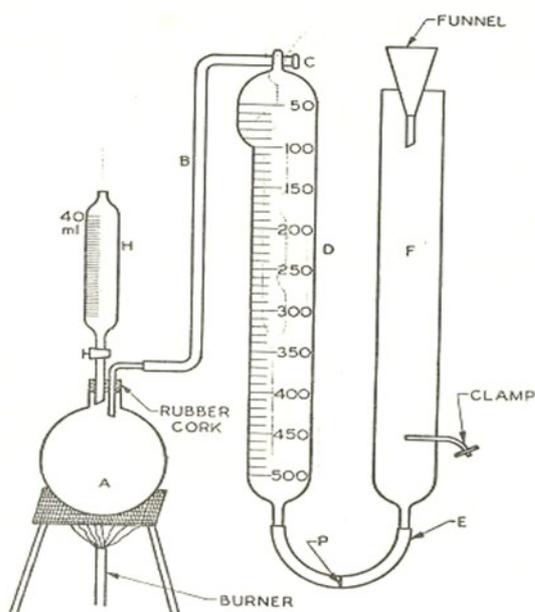


Figure 2 — Gasometric assembly

### A.2.2 Reagents

Displacement solution. Dissolve 100 g of sodium chloride or sodium sulphate in 350 ml of distilled water. Accurately add 1 g of sodium bicarbonate (conforming to US 572) and 2 ml methyl orange (0.5 % aqueous solution) and then enough sulphuric acid or hydrochloric acid to turn the solution acid (solution turns to pale pink). Stir until all the released carbon dioxide is removed.

This solution is used in the gas measuring tube and the levelling bulb and seldom needs correction.

### A.2.3 Procedure

### DEAS 993: 2019

Accurately weigh 2.5 g of the sample into flask (A). Using the two-way stopcock (C), connect the gas measuring tube (D) and levelling tube (F) to the atmosphere and through a funnel on the open end of tube F, fill both tubes with displacement solution up to the zero mark of tube D. Connect the decomposition flask A with rubber tube B and turn the stopcock so that the gas measuring tube is connected to flask A and disconnected from the atmosphere. Fill burette (H) with distilled water up to the 40-ml mark and let the apparatus stand for 1 min to 2 min so that the temperature and pressure within the apparatus comes to room conditions. Open pinchcock (P) and bring down the solution level in tube F to reduce pressure within the apparatus. Collect the displaced solution in a glass beaker and reserve for re-use later. Slowly add 35 ml of distilled water to decomposition flask, from burette H.

To allow uniform mixing of contents and complete evolution of CO<sub>2</sub>, occasionally rotate the decomposition flask by swirling and boil the flask and its contents over a tripod stand using a Bunsen burner. To prevent overflowing of displacement solution in levelling tube, fill to a level lower than the overflow capacity. When the mixture in flask A foams up and the foam reaches the neck of the flask, stop heating and quickly immerse the decomposition flask in cold tap water kept in a tray below. Also pour water over the decomposition flask while rotating it to bring the contents to the temperature of water in the tray. When this happens wait for 5 min to secure equilibrium. Equalize pressure in the measuring tube by pouring solution in levelling tube, using the pinchcock P if necessary and read the volume *V* in the measuring tube.

#### A.2.4 Calculation

Deduct from this volume *V*, the volume of distilled water added (35 ml) to get the correct volume of CO<sub>2</sub> evolved after decomposition at atmospheric temperature and pressure.

The volume of CO<sub>2</sub> evolved, in millilitres, at normal temperature and pressure shall be calculated as follows:

$$V_2 = \frac{T_2}{P_2} \times \frac{P_1 V_1}{P_2 T_1}$$

where

*V*<sub>2</sub> is the volume of carbon dioxide (CO<sub>2</sub>), calculated at normal temperature and pressure;

*T*<sub>2</sub> is the normal temperature (273 °K or 0 °C);

*P*<sub>2</sub> is the normal pressure (760 mm);

*P*<sub>1</sub> is the corrected barometric pressure at temperature *T*<sub>1</sub>;

*V*<sub>1</sub> is the *V* - 35 ml = corrected volume of carbon dioxide (CO<sub>2</sub>) evolved after decomposition; and

*T*<sub>1</sub> is the observed temperature of displacement solution.

One gram mole (44 g) of carbon dioxide, at NTP will occupy 22 400 ml, that is, 22 400 ml of CO<sub>2</sub> at NTP, weigh 44 g.

*V*<sub>2</sub> ml carbon dioxide (CO<sub>2</sub>) as obtained from 2.5 g of baking powder NTP will weigh, in grams:

$$\frac{V_2}{22400} \times \frac{44}{1}$$

Therefore, available carbon dioxide, percent by mass =  $\frac{100}{2.5} \times \frac{V_2}{22400} \times 44 = \frac{40 \times V_2 \times 44}{22400}$

## Annex B (normative)

### Sampling of baking soda

#### B.1 General requirements for sampling

In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed:

- a) the product shall be kept in a protected place not exposed to damp air, dust or soot;
- b) the sampling instrument shall be clean and dry when used;
- c) precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from contamination;
- d) the samples shall be placed in clean, odourless and dry glass containers. The sample containers shall be of such size that they are almost completely filled by the sample;
- e) batch containers shall be sealed airtight after filling and marked with full details of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment;
- f) samples shall be stored following the product storage conditions prescribed by the manufacturer; and
- g) sampling shall be done by a qualified and authorized person.

#### B.2 Scale of sampling

The number of containers to be tested from a lot shall depend on the size of the lot and shall be in accordance with Table B.1.

**Table B.1 — Number of containers to be selected for sampling**

Total Number of containers in the lot <i>N</i>	Number of containers to be selected <i>n</i>
Up to 50	3
51 to 100	4
101 to 300	5
301 to 500	6
501 and above	7

#### B.3 Random sampling

Sampling shall be done randomly from the lot and random number tables shall be used. In case such tables are not available, the following procedure may be adopted:

Starting from any container, count them as 1, 2, 3, .....*r* and so on, in one order. Every *r*th container counted shall be chosen, *r* being the integral part of  $N/n$ , where *N* is the total number of containers in the lot and *n* the number of samples to be selected as shown in Table B.1.

## **B.4 Test samples and referee samples**

### **B.4.1 Preparation of individual samples**

Empty the container on a clean sheet of paper and mix thoroughly. Cone and quarter as often as necessary till about 75 g of the material is left. From this, take about 15 g of the material and divide it into three equal parts. Each part so obtained shall constitute an individual sample representing the container and shall be transferred immediately with particulars given in B.1 (e). The individual samples obtained shall be divided into three sets in such a way that each set has a sample representing each selected container. One of these sets shall be marked for the purchaser, the other for the vendor and the third being the referee sample.

### **B.4.2 Preparation of a composite sample**

Equal quantities of the product shall be taken from the containers where the individual samples were obtained and mixed together to obtain a composite sample weighing not less than 160 g. This composite sample shall be divided into three equal parts and transferred to clean dry glass containers and labelled with the particulars given in B.1 (e). One of these composite samples shall be marked for the purchaser, the other for the vendor and the third being a referee sample.

### **B.4.3 Referee samples**

Referee samples shall consist of a set of individual samples (B.4.1) and a composite sample (B.4.2) marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place agreed to between the two.

## **B.5 Number of tests**

Tests for requirements given in 5.1 and 5.2 (Table 1) shall be conducted on each set of individual samples.

Tests for contaminants (Table 2) shall be conducted on the composite sample (B.4.2).

## Bibliography

- [1] IS 1159 (1981) (Reaffirmed in 2010), *Specification for baking powder* (First Revision)
- [2] US 571: 2006, *Baking powder — Specification*
- [3] KS 346: 2000, *Specification for baking powder* (First Revision)