

Canned beans— Specification

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DKS 1311:2021

Foreword

This Kenya Standard was developed by the Technical Committee on Processed Fruits and Vegetables under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

This Kenya Standard specifies the safety and quality requirements for the canned beans prepared from dried cooked beans packed in different types of mediums.

This standard cancels and replaces KS 1311:2017, Specification for canned beans in tomato sauce (baked beans).

During the preparation of this standard, reference was made to the following documents:

- a. MS 997, Specification for Canned beans in Tomato Sauce
- b. Practical canning, by Arthur Lock, Third Edition, 1969.

Acknowledgement is hereby made for the assistance derived from these sources.

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Canned beans— Specification

1 Scope

This Kenya Standard prescribes the requirements and methods of test for canned beans

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.

KS 229, Edible salt — *Specification*

KS 2455, *General standard — Food safety*

KS CAC/RCP 1, *recommended international code of practice general principles of food hygiene*

KS CODEX STAN 192, *General standard for food additives*

KS CODEX STAN 193, *Codex general standard for the contaminants and toxins in foods*

KS EAS 12, *Potable water — Specification*

KS EAS 38, *Labelling of prepackaged foods — Specification*

KS EAS 46, *Dry beans — Specification*

ISO 4833-1, *Microbiology of the food chain — Horizontal method for the enumeration of microorganisms — Part 1: Colony count at 30 degrees C by the pour plate technique*

KS ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli - Most probable number technique*

AOAC 999.10, *Lead, Cadmium, Zinc, Copper and iron in foods*

CAC/RCP 23, *Code of hygienic practice for low and acidified low-acid canned foods*

ISO 6579-1, *Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp.*

ISO 7954, *Microbiology General Guidance for enumeration of yeasts and moulds Colony count technique at 25 °C*

3 Definitions

For purposes of this document, the following definition shall apply.

3.1

Canned beans

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The product prepared from dried mature beans used for canning. The product is prepared by washing, soaking and removing foreign matter before being packed in the medium with or without other ingredients in hermetically sealed containers and sufficiently processed by heat to ensure preservation.

3.2

Can

A container made of suitable retortable material which can be hermetically sealed

3.3

Drained weight

The weight of the contents in the container after draining the sauce

3.4

Contrasting varieties

Dried beans of the same type or of other types that are of a noticeably different colour, size, or shape from the dried beans of the predominating variety (such as red beans with white beans)

3.5

Varieties that blend

Dried beans of same type or of other types that are similar in colour, size or shape to the dried beans of the predominating variety (such as pea beans with small white beans)

3.6

Practically similar varietal characteristics

Means that the beans are practically alike in size, shape, colour, general characteristics, and that there may be present not more than 0.5 %, by weight, of contrasting varieties; and not more than 5 percent, by weight, of varieties that blend

3.7

Reasonably similar varietal characteristics

Means that the beans are reasonably alike in size, shape, colour, general characteristics, and that there may be present not more than 1 %, by weight, of contrasting varieties; and not more than 10 %, by weight, of varieties that blend

4 Requirements

Canned baked beans shall be the product made from the following basic ingredients.

4.1 Basic ingredients

All ingredients shall be clean, sound and fit for human consumption.

- a) Beans complying with the requirements of KS EAS 46.
- b) Media such as Tomato Sauce, brine, vegetable oils, chilli sauce oils, vegetable sauces etc., complying with the relevant standards
- c) Potable water complying with KS EAS 12.

4.2 Other permitted ingredients

- a) Sweetening agents - sucrose, invert sugar, dextrose, glucose syrup.
- b) Salt complying with the requirements of KS 229.
- c) Aromatic plants, spices or extracts thereof.
- d) Other ingredients as appropriate.

4.3 General Requirements

- a) It may contain permitted food conditioners - starches, modified starches, flour, acetic acid, citric acid, hardening agent, anti-caking agent.
- b) It may contain permitted nutrient supplements.
- c) It shall be free from any foreign matter.
- d) It shall not contain any non-nutritive sweetening substance and any other additives.
- e) Aroma and taste shall be characteristic of the product.

4.4 Process requirement

The filled containers shall be exhausted, sealed and sufficiently processed by heat to a specified temperature and time to ensure commercial sterility.

Canned baked beans shall comply with the requirements in Table 1.

Table 1 — Requirements for finished product

S/N	Parameter	Requirement	Test method
i)	Total soluble solid in medium, % °Brix, minimum	2	Annex A
ii)	pH, maximum	6	Annex C
iii)	Salt content (as sodium chloride), % w/v, maximum	1.2	Annex D
iv)	Minimum drained weight, % of net weight	55	Annex B

Note 1 Total soluble solid is only applicable to canned beans in tomato sauce

4.4 Defects and allowances

The product shall be reasonably free from defects and within the limit set forth herein for common defects as given in Table 2.

4.4.1 Defects

4.4.1.1 General

The factor of absence of defects refers to the degree of freedom from extraneous vegetable material, loose skin, broken and mashed beans, and blemished beans; or any other defects that may affect the appearance or eating quality of the product.

- a) Loose skin means skin or portions of a skin which have become separated wholly from the cotyledons;
- b) Broken means a cotyledon or portions of a cotyledon which have become separated; or a bean or portions of a bean with the skin or portions of the skin missing;

- c) Mashed means a bean that is crushed or flattened to the extent that the appearance is seriously affected;
- d) Blemished means a bean that is affected or damaged by any means to the extent that its appearance or eating quality is adversely affected;
- e) Extraneous vegetable material means vegetable material common to the bean plant or other plants that is harmless upon eating and includes, but is not limited to, peas, lentils, cereal grains and corn.

4.4.1.2 Classification of 'defectives'

A container or product shall be considered as 'defective' when it fails to meet one or more of the applicable quality requirements in colour, flavour and texture.

Table 2 — Defects and allowances

S/N	Defects maximum limits (based on weight of)	Maximum defects limits (based on weight of drained beans) (% w/w)
i)	Blemished beans (beans which are slightly stained or spotted)	2
ii)	Seriously blemished beans (beans which are spotted, discoloured or otherwise blemished to an extent that the appearance or eating quality is seriously affected; these shall include worm eaten beans)	2
iii)	Bean fragments portions of beans: separated or individual cotyledons; mashed, partial or broken cotyledons; and loose skins)	10
iv)	Extraneous plant material (any vine or leaf or pod material from the bean plant, or other plant material)	0.5
	Total of the foregoing defects i), ii), iii), iv)	12

4.5 Minimum fill of container

The container shall be well-filled with beans and the product (including packing medium) shall occupy not less than 90% of the water capacity of the container. The water capacity of the container is the volume of water at room temperature which the sealed container will hold when completely filled (see Annex D). A container that fails to meet the requirement for minimum fill (90 % container capacity) of 3.3 shall be considered as defective.

4.6 Quality criteria

4.6.1 Colour

The drained beans shall have normal colour characteristics for canned baked beans. Canned baked beans shall be considered to be of characteristic colour when there is no abnormal discolouration for the respective ingredients used.

Canned baked beans containing permitted ingredients and additives shall be considered to be of characteristic colour when there is no abnormal discolouration for the respective substances used.

4.6.2 Flavour

Canned baked beans shall have a normal flavour and odour free from flavours or odours foreign to the product and canned baked beans with special ingredients shall have a flavor characteristic of that imparted by the beans and the other ingredients used. Canned baked beans shall have a normal flavour and odour free from

flavours or odours foreign to the product and canned baked beans with special ingredients shall have a flavour characteristic of that imparted by the beans and other substances used.

4.6.3 Texture

The beans shall have a good typical texture, that may be slightly soft or slightly firm; and that the skins are tender and should be practically free from hard beans, mushy beans, beans with tough skins

5 Food additives

Food additives shall be used in accordance with General Standard of Food Additives established by the Codex Alimentarius Commission in KS CODEX STAN 192.

6 Contaminants

The products covered by this Standard shall comply with those limits established by the Codex Alimentarius Commission in KS CODEX STAN 193.

6.1 Pesticide residues

The products covered by this Standard shall comply with the maximum residue limits for pesticides established by the Codex Alimentarius Commission.

6.2 Heavy metal contaminants

The products covered by the provisions of this standard shall conform to those maximum limits for Heavy metals established by the Codex Alimentarius Commission in KS CODEX STAN 193.

Canned beans shall not contain metal contaminants exceeding the levels indicated in Table 3 when tested in accordance with test methods prescribed therein.

Table 3 — Heavy metal limits for canned baked beans

S/N	Metal contaminant	Maximum limit in Mg/kg	Test method
i)	Cadmium	0.1	AOAC 999.10
ii)	Lead	1.5	AOAC 999.10
iii)	Tin	250	AOAC 999.10

6.3 Other contaminants

The products covered by the provisions of this standard shall conform to those maximum levels for contaminants established by the Codex Alimentarius Commission for these products.

7 Hygiene

7.1 It is recommended that the products covered by the provisions of this Standard be prepared and handled in accordance with the appropriate KS EAS 39

7.2 The products shall conform to microbiological criteria in Table 4 and other microorganisms of food safety concern.

- a) Shall be free from microorganisms in amounts which may represent a hazard to health;

- b) Shall be free from parasites which may represent a hazard to health;
- c) Shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health.
- d) The product shall have received a processing treatment sufficient to destroy all spores of *Clostridium botulinum*; and
- e) Howard count — canned beans shall not contain mould filaments in excess of 40 % positive fields.

Table 4 — Microbiological limits for canned beans

S/N	Type of micro-organism	Requirement	Test method
i)	Total viable counts, per g	10	KS ISO 4833-1
ii)	Yeasts and moulds, per g	Shall be absent	KS ISO 7954
iii)	<i>Escherichia coli</i> , per 10 g	Shall be absent	KS ISO 7251
iv)	<i>Salmonella</i> , per 50 g	Shall be absent	KS ISO 6579-1
v)	<i>Clostridium botulinum</i> , per 25 g	Shall be absent	KS ISO 4833-1

8 Packaging and labelling

8.1 Packaging

Canned beans shall be packed in cans that shall not affect the quality of the product.

8.2 Labelling

Labelling of canned beans shall be done in accordance with the requirements stipulated in KS EAS 38 and shall include the following:

- (i) Name of the product.
- (ii) Name and physical address of the manufacturer.
- (iii) Minimum net weight in grams or kilograms.
- (iv) List of ingredients and variety of beans – a complete list of ingredients shall be declared on the label in descending order of proportion.
- (v) Canned Beans containing spices and/or aromatic herbs shall be declared.
- (vi) Date of manufacture.
- (vii) Name or business name and address of the manufacturer, packager, distributor, importer, exporter or vendor of the product, whichever may apply, shall be declared.
- (viii) Instructions for use shall be declared.
- (ix) Storage conditions or conditions for use.

- (x) Lot Identification — each container shall be embossed or otherwise permanently marked in code or in clear identity the producing factory and the lot.
- (xi) Place/country of origin.
- (xii) Date of expiry.
- (xiii) Irradiation status, where applicable.
- (xiv) GMO status, where applicable.

9 Sampling and test methods

The products covered by the provisions of this standard shall be tested using appropriate standard methods declared in this standard. Other test may be performed as per the methods given in the latest AOAC/ Codex/ ISO and other internationally recognized methods.

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Annex A (Normative)

Determination of soluble solids (Brix)

A.1 Definition

Determination of Total Soluble Solids (Brix)

A.2 Scope

All range of products with aqueous solution.

A.3 Apparatus

A.3.1 Atago Hand Refractometer:

A.3.1.1 No. N1: 0-32 °Brix

A.3.1.2 No. N2: 28-62 °Brix

A.3.1.3 No. N3: 60-90 °Brix

A.4 Procedure

A.4.1 Adjust the temperature of the sample to room temperature.

A.4.2 Open the cover (day light plate) at the refracting prism of the refractometer.

A.4.3 Stir the samples thoroughly and wet the surface of the prism.

A.4.4 Cover the prism with the day light plate.

A.4.5 Look through the eyepiece at the opposite end of the refracting prism directly under the light source.

A.4.6 Focus the eyepiece by turning the adjustment knob until a clear reading and a boundary line is seen.

A.4.7 Record the reading.

A.4.8 Flush the prism surface with distilled water.

A.4.9 Dry the surface with soft tissue.

A.5 Reference

A.5.1 Atago Hand Refractometer N Types Series Instruction Manual.

A.5.2 AOAC 932.12.

Annex B (Normative)

Determination of net weight and drained weight

B.1 Definition

Net weight is the weight of the contents in the can. Drained weight is the percentage of solid contents as determined by the procedure described below.

B.2 Scope

Liquid and solid component mixture.

B.3 Apparatus

B.3.1 Sieve No. 8, (model: BS410) 2.36 mm in diameter.

B.3.2 Analytical balance, capable of weighing to the nearest 0.001 g.

B.3.3 Tin opener

B.3.4 Stainless steel tray

B.3.5 Spoon

B.4 Procedure

B.4.1 Weigh the clean, dry sieve; m_1

B.4.2 Weigh the unopened can and contents; m_2

B.4.3 Incline the sieve at ca 17-20 °angle to facilitate drainage. Empty the contents into the sieve and spread evenly.

B.4.4 Drain contents for 2 min.

B.4.5 Weigh the sieve and contents; m_3

B.4.6 Wash the empty can and lid and dry them thoroughly.

B.4.7 Weigh the empty can and lid; m_4

B.5 Calculation

B.5.1 The net weight (W_1) expressed in grammes, is equal to

$$W_1 = m_2 - m_4$$

B.5.2 The drained weight (W_2) expressed in grams, is equal to

$$W_2 = m_3 - m_1$$

B.6 Reference

MS 997:1986 *Specification for Canned beans in Tomato Sauce*

AOAC 968.30: Canned Vegetables, Drained Weight Procedure 1968.

Annex C (Normative)

Determination of pH

C.1 Definition

pH is the measurement of the acidity or alkalinity of a solution.

C.2 Scope

Food product, cordial, syrup, fruit and fruit products.

C.3 Principle

pH is the unit of measurement of the acidity or alkalinity of a solution; and is expressed as the negative logarithm of the hydrogen ion concentration.

$$\text{pH} = -\log [\text{H}^+]$$

The pH value may be defined as the common logarithm of the number of litres of solution that

1 gram - equivalent of hydrogen ions.

C.4 Reagents

C.4.1 Standard buffer pH 4.0.

C.4.2 Standard buffer pH 7.0.

C.5 Apparatus

C.5.1 Mettler Toledo 320 pH meter

C.5.2 Erlenmeyer flask (150 mL)

C.5.3 Beaker (150 mL)

C.6 Procedure

C.6.1 Standardization on pH meter and electrodes

C.6.1.1 Switch on pH meter and allow the electronic components to warm up and stabilize before proceeding.

C.6.1.2 Immerse the electrodes in the buffer pH 4.0 and take the pH reading, allowing about 1 min for the meter to stabilize.

C.6.1.3 Adjust the standardization control so that the meter reading corresponds to buffer pH 4.0.

C.6.1.4 Rinse the electrodes with distilled water and blot with soft tissue.

C.6.1.5 Repeat the procedure with another standard buffer pH 7.0 and adjust the standardization so that the meter reads exactly 7.0.

C.6.2 Determination of pH on sample

C.6.2.1 Adjust the temperature of the sample to room temperature and set the temperature compensator control to the observed temperature.

C.6.2.2 Rinse with distilled water and blot the electrodes.

C.6.2.3 Immerse the electrodes in the sample and take the pH reading, 1 min for the meter to stabilize.

C.7 Reference

Mettler Toledo 320 PH meter Instruction Manual

AOAC 2000, 17th Edition, Chapter 42, pg. 3, 42.1.04

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Annex D
(Normative)

Determination of salt content

D.1 Definition

"Salt" as used in this instruction and in most food standards means "common salt" or sodium Chloride (NaCl). The salt content can be estimated from the sodium content in the sample.

D.2 Scope

All range of products.

D.3 Apparatus

D.3.1 Mettler Toledo DL5x V2.3

D.3.2 Analytical balance, capable of weighing to the nearest 0.001 g.

D.3.3 Plastic cup (60 mL)

D.4 Procedure

D.4.1 Weigh approximately 0.2 g sample, transfer quantitatively into 60 mL plastic cup and make up to 50 mL mark with distilled water.

D.4.2 Rinse glass electrode with water several times.

D.4.3 Start Autotitrator.

D.4.5 Immerse electrodes and alkali tubing into samples contained in the plastic cup.

D.4.6 Record the result from database.

D.5 Reference

Mettler Toledo DL5x V2.3 Instruction Manual.