



EAS 66-6:2010  
ICS 67.080.20

## EAST AFRICAN STANDARD

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Tomato products — Specification — Part 6: Tomato sauce



EAST AFRICAN COMMUNITY

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HS 2103.20.4000

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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 East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. 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 procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

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.

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## Introduction

In the preparation of this East African Standard, the following sources were consulted extensively:

*United States Standards for Grades of Tomato Sauce*, Effective date November 17, 1994

CODEX STAN 228:2001 (Rev.1:2004), *General methods of analysis for contaminants*

CODEX STAN 230:2001 (Rev.1:2003), *Maximum levels for lead*

CODEX STAN 193:1995 (Rev.5:2009), *General Standard for Contaminants and Toxins in Foods*

Codex Alimentarius website: [http://www.codexalimentarius.net/mrls/pestdes/jsp/pest\\_q-e.jsp](http://www.codexalimentarius.net/mrls/pestdes/jsp/pest_q-e.jsp)

USDA Foreign Agricultural Service website: <http://www.mrldatabase.com>

USDA Agricultural Marketing Service website: <http://www.ams.usda.gov/AMSV1.0/Standards>

USDA Plant Inspectorate Service website: [http://www.aphis.usda.gov/import\\_export/plants](http://www.aphis.usda.gov/import_export/plants)

European Union: [http://ec.europa.eu/sanco\\_pesticides/public](http://ec.europa.eu/sanco_pesticides/public)

Assistance derived from these sources and others inadvertently not mentioned is hereby acknowledged.

This standard has been developed to take into account:

- the needs of the market for the product;
- the need to gain market access locally, regionally and internationally;
- the structure of the CODEX, UNECE, USA, ISO and other internationally recognized standards;
- the needs of the producers in gaining knowledge of market standards and conformity assessment; and
- the need to promote good manufacturing practices that will enhance wider market access, involvement of small-scale traders and hence making production of fruit and vegetable products a viable means of wealth creation.

## Tomato products — Specification — Part 6: Tomato sauce

### 1 Scope

This Part 6 of EAS 66 specifies the requirements for tomato sauce as described in Clause 3.

### 2 Normative references

The following referenced documents are indispensable for the application 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.

CAC/GL 21, *Principles for the Establishment and Application of Microbiological Criteria for Foods*

CAC/RCP 1, *Recommended International Code of Practice — General Principles of Food Hygiene*

CAC/RCP 53, *Code of Hygienic Practice for Fresh Fruits and Vegetables*

EAS 35, *Edible salts — Specification*

EAS 38, *Labelling of prepackaged foods — Specification*

EAS 41, *Fresh fruit and vegetable products – Sampling and method of test*

EAS 76, *Methods of test for tomato products*

EAS 217, *Methods for microbiological examination of foods*

CD/K/370:2010 [CAC/GL 21], *Principles for the establishment and application of microbiological criteria for foods*

CD/K/371:2010 [CAC/GL 30], *Principles and guidelines for the conduct of microbiological risk*

CD/K/344:2010 [CODEX STAN 234], *Recommended methods of analysis and sampling*

CD/K/372:2010 [CAC/GL 33], *Sampling for pesticide residues for the determination of compliance with MRLs — Recommended methods*

CD/K/375:2010 [CAC/GL 50], *General guidelines on sampling*

### 3 Description and definitions

#### 3.1 Product description

Tomato sauce is the concentrated product prepared from the liquid extracted from mature, sound, whole tomatoes; the sound residue from preparing such tomatoes for canning; the residue from partial extraction of juice, reconstituted or remanufactured tomato paste; or any combination of these ingredients to which is added salt and spices. One or more nutritive sweetening ingredients, a vinegar or vinegars, onion, garlic, or other vegetable flavoring ingredients may be added. The food is preserved by heat sterilization (canning), refrigeration, or freezing. When sealed in a container to be held at ambient temperatures, it is so processed by heat, before or after sealing, as to prevent spoilage. The refractive index of the tomato sauce at 20 degrees Celsius is not less than 1.3455. The product contains not less than 25 % total solids and not less than 8.5 % natural tomato soluble solids by weight.

#### 3.2 Definitions

For the purpose of this standard the following definitions shall apply:

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### 3.2.1

#### color

the amount of red in the tomato sauce as determined by comparing the color of the product with that produced by spinning a combination of the following Munsell color discs:

- Disc 1-Red (5R 2.6/13) (glossy finish);
- Disc 2-Yellow (2.5YR 5/12) (glossy finish);
- Disc 3-Black (N1) (glossy finish); and
- Disc 4-Gray (N4) (mat finish).

Any other method or device which gives equivalent results may be used.

- (1) **Good color** means the color typical of tomato sauce that contains as much or more red than that produced by spinning the specified Munsell color discs in the following combinations or an equivalent of such composite color:

- 65 percent of the area of Disc 1;
- 21 percent of the area of Disc 2; and
- 14 percent of the area of Disc 3 or Disc 4, or 7 percent of the area of Disc 3 and 7 percent of the area of Disc 4, whichever most nearly matches the reflectance of the tomato sauce.

- (2) **Reasonably good color** means the color typical of tomato sauce that contains as much or more red than that produced by spinning the specified Munsell color discs in the following combinations or an equivalent of such composite color:

- 53 percent of the area of Disc 1;
- 28 percent of the area of Disc 2; and
- 19 percent of the area of either Disc 3 or 4, or 9½ percent of the area of Disc 3 and 9½ percent of the area of Disc 4, whichever most nearly matches the reflectance of the tomato sauce.

### 3.2.2

#### consistency

the resistance of the tomato sauce to deformation or resistance to flow i.e., apparent viscosity and the tendency to hold its liquid portion in suspension

- (1) **Good consistency** — the tomato sauce is not excessively stiff, and flows not less than 4.0 cm nor more than 12.0 cm in 30 seconds at 20 degrees Celsius in the Bostwick consistometer. After placing a tablespoon of tomato sauce on a shallow tray and observing the separation of free liquid for 2 minutes, there shall be no more than 5 mm (3/16 in) separation. The higher consistency tomato sauce will receive the higher score points.
- (2) **Reasonably good consistency** — the tomato sauce is not excessively stiff, flows less than 4.0 cm but not less than 3.0 cm or flows more than 12.0 cm but not more than 15.0 cm in 30 seconds at 20 degrees Celsius in the Bostwick consistometer. After placing a tablespoon of tomato sauce on a shallow tray and observing the separation of free liquid for 2 minutes, there shall be no more than 10 mm (3/8 in) separation. Within these two ranges, tomato sauce approaching "good consistency" will receive the higher score points.

### 3.2.3

#### defects

the degree of freedom from defects such as dark brown or black specks, whole seeds, tomato peel, core material or other similar substances.

### 3.2.4

#### finish

- (1) **Good finish** means that the product is evenly comminuted, has uniform, smooth texture, and is free from lumps.

- (2) **Poor finish** means that the product fails to meet the definition of "good finish."

### 3.2.5

#### **flavour and odour**

the flavour and odour characteristic of tomato sauce produced from good quality ingredients that have been properly processed.

- (1) **Good flavour and odour** means a good distinct flavour and odour characteristic of good quality ingredients. Such flavour and odour is free from scorching or any other objectionable flavour or odour.
- (2) **Reasonably good flavour and odour** — a flavour and odour characteristic of the ingredients in which there may be slight traces of undesirable flavour, such as scorched, bitter, or astringent flavour, but is free from objectionable off-flavours and odours.

## 4 Essential compositional and quality requirements

### 4.1 Essential characteristics

The essential characteristics and quality requirements of the product shall be as follows:

#### 4.1.1 Colour

The product shall have a characteristic reddish colour of highly seasoned tomato products derived from ripe and sound tomatoes.

#### 4.1.2 Flavour

The product shall have a characteristic tomato flavour of tomatoes with added ingredients and shall be free from foreign flavours.

#### 4.1.3 Texture

Tomato sauce or Ketchup products shall have a good body with an evenly divided texture.

#### 4.1.4 Ingredients

**4.1.4.1** Where the provisions of the relevant national legislation (see foreword) set limits for the use of ingredients, those limits shall be adhered to. Relevant regulations under the relevant national legislation shall be complied with.

**4.1.4.2** In the event of doubt regarding the compliance of the product with requirements of this standard that rely wholly or partially for their interpretation on the experience or judgment of the person carrying out the assessment, the decision of the authority administering this standard shall be final.

**4.1.4.3** One or any combination of two or more of the following safe and suitable ingredients in each of the following categories is added to the tomato ingredients:

- (i) Vinegars.
- (ii) Nutritive carbohydrate sweeteners such as sucrose, invert sugar, dextrose, dried glucose syrup, glucose syrup.
- (iii) Spices, flavouring, onions, or garlic.

#### 4.1.5 Optional ingredients

Permitted thickening agents as may be allowed in the food safety legislation.

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## 4.2 Definition of defects

Tomato ketchup shall be prepared in accordance with good manufacturing practices (GMP), from such materials and under such practices that the product is substantially free of extraneous plant materials, this including other objectionable material and shall be practically free of mineral impurities.

Consistent with its intended use, these conditions are fulfilled when:

- (a) the product is practically free of objectionable tomato peel;
- (b) the product is practically free of seeds or particles of seeds;
- (c) the presence of any extraneous plant material other than seed and peel and other than those used as seasonings cannot be detected by the naked eye, and can only be seen under microscope; and
- (d) the product is practically free of dark specks or scale-like particles.

## 4.3 Compositional requirements

Tomato sauce and ketchup shall comply with the compositional requirements indicated in Table 1.

**Table 1 — Compositional requirements for tomato sauce**

| Characteristic   | Limit       | Test method |
|--|-------------|-------------|
| Total dissolved solids content, % by mass                          | 26 - 29     | EAS 76      |
| Natural tomato soluble solids content, % by mass, min.             | 8.5         | EAS 41-10   |
| Edible salt, % m/m, max.   | 6           | EAS 35      |
| Benzoic acid content, max.   | 650 ppm     | ISO 6560    |
| pH   | 3.3 to 4.2  | ISO 1842    |
| Negative air pressure below normal air pressure, min at 30 °C, kPa | 15          |             |
| Total acidity, % as acetic acid                                    | 1.5 to 2.0  |             |
| Volatile acidity, % as acetic acid                                 | 0.60 to 1.2 |             |
| Refractive index at 20 °C  | 1.37        |             |
| Colorants, preservatives, thickeners, % mass, max                  | 5           |             |

## 4.4 Lot acceptance

**4.4.1** A container that fails to meet the natural total soluble solids requirements, as set out in 3.1.2, and/or one or more of the applicable quality requirements, as set out in 4.2 and 4.3, should be considered as a “defective”.

**4.4.2** A lot should be considered as meeting the applicable quality requirements when:

- (a) the number of “defectives”, as defined in 4.2, does not exceed the acceptance number (c) of the appropriate sampling plan with an AQL of 6.5 established in Annex B; and
- (b) the maximum allowance for mould count is not exceeded (see Section 7.3.2).

These acceptance criteria do not apply to non-retail containers.

## 4.5 Quality of consistency

**4.5.1** The consistency of the finished food is such that its flow is not more than 14 centimeters in 30 seconds at 20 °C when tested in a Bostwick Consistometer in the following manner: Check temperature of mixture and adjust to 20±1 °C. The trough must also be at a temperature close to 20

°C. Adjust end-to-end level of Bostwick Consistometer by means of the spirit level placed in trough of instrument. Side-to-side level may be adjusted by means of the built-in spirit level. Transfer sample to the dry sample chamber of the Bostwick Consistometer. Fill the chamber slightly more than level full, avoiding air bubbles as far as possible. Pass a straight edge across top of chamber starting from the gate end to remove excess product. Release gate of instrument by gradual pressure on lever, holding the instrument down at the same time to prevent its movement as the gate is released. Immediately start the stop watch or interval timer, and after 30 seconds read the maximum distance of flow to the nearest 0.1 centimeter. Clean and dry the instrument and repeat the reading on another portion of sample. Do not wash instrument with hot water if it is to be used immediately for the next determination, as this may result in an increase in temperature of the sample. For highest accuracy, the instrument should be maintained at a temperature of  $20 \pm 1$  °C. If readings vary more than 0.2 centimeter, repeat a third time or until satisfactory agreement is obtained. Report the average of two or more readings, excluding any that appear to be abnormal.

**4.5.2** Determine compliance as specified in Annex B.

**4.5.3** If the quality of catsup falls below the standard prescribed in 4.5.1 and 4.5.2, the label may bear the alternative statement, "Below Standard in Quality—Low Consistency."

## 5 Food additives

### 5.1 Acidity regulators

| INS No.  | Name of the Food Additive    | Maximum Level |
|----------|------------------------------|---------------|
| 330      | Citric Acid                  | GMP           |
| 331(i)   | Sodium dihydrogen citrate    |               |
| 331(iii) | Trisodium citrate            |               |
| 332(i)   | Potassium dihydrogen citrate |               |
| 332(iii) | Tripotassium citrate         |               |
| 333      | Calcium citrates             |               |

## 6 Contaminants

### 6.1 Pesticide residues

**6.1.1** The product covered by the provisions of this Standard shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this product.

**6.1.2** In order to consider the concentration of the product, the determination of the maximum pesticide residue limits shall take into account the natural total soluble solids, the reference value being 4.5 for fresh fruit. Table 2 gives the current Codex MRLs.

**Table 2 — Maximum pesticide residue limits and extraneous maximum residue limits in tomato catsup (current as at 2009-06-09)**

| Type           | Unit symbol     | Limit | Method of test | Notes |
|----------------|-----------------|-------|----------------|-------|
| 2-PHENYLPHENOL | MRL (mg/kg) PoP | 0.5   |                |       |
| PROPARGITE     | MRL (mg/kg)     | 0.3   |                |       |

### 6.2 Heavy metal limits

Tomato sauce and ketchup products shall not exceed the limits for heavy metal indicated in Table 3.

Table 3 — Limits for heavy metal in tomato sauce and ketchup

| SL NO | Heavy metal  | Maximum limits, (ppm) | Test method |
|-------|--------------|-----------------------|-------------|
| i)    | Arsenic (As) | 0.5                   | EAS 41      |
| ii)   | Lead (Pb)    | 1.0                   | "           |
| iii)  | Copper (Cu)  | 5                     | "           |
| iv)   | Zinc (Zn)    | 5                     | "           |
| v)    | Tin (Sn)     | 250                   | "           |

## 7 Hygiene

**7.1** Tomato ketchup shall be prepared and handled in accordance with the appropriate provisions of EAS 39, and relevant Codex texts such as codes of hygienic practice and codes of practice.

**7.2** The products should comply with any microbiological criteria established in accordance CAC/GL 21.

### 7.3 Microbiological limits

**7.3.1** Tomato ketchup shall be free from pathogenic organisms and shall comply with the microbiological limits indicated in Table 4.

Table 4 — Microbiological limits for tomato sauce and ketchup

| Type of micro-organism | Limits (number of counts), maximum | Test method |
|------------------------|------------------------------------|-------------|
| Total viable counts    | 10 per g (cfu)                     | EAS 217     |
| Yeast                  | Nil/g                              | "           |
| Escherichia coli       | Nil/g                              | "           |
| Salmonella sp.         | Nil/ 25 g                          | "           |
| Mould                  | Nil/g                              | "           |

#### 7.3.2 Howard count

The product shall not contain any mould filaments in a quantity indicative of unsuitable raw materials or unsanitary processing lines. A guide for determining compliance with these requirements would be a mould count, as determined by the Howard method see AOAC (1970) 40.085 = moulds (25); official final action and 40.002 (m), not in excess of 30 % positive fields.

## 8 Weights and measures

### 8.1 Fill of container

#### 8.1.1 Minimum fill

The container should be well filled with the product which should occupy not less than 90% (minus any necessary head space according to good manufacturing practices) of the water capacity of the container. The water capacity of the container is the volume of distilled water at 20 °C which the sealed container will hold when completely filled. Determination of fill of container shall be in accordance with Annex A.

#### 8.1.2 Classification of "Defectives"

A container that fails to meet the requirement for minimum fill of 8.1.1 should be considered as a "defective".

### 8.1.3 Lot acceptance

A lot should be considered as meeting the requirement of 8.1.1 when the number of “defectives”, as defined in 8.1.2, does not exceed the acceptance number (c) of the appropriate sampling plan with an AQL of 6.5 specified in Annex B.

## 9 Packaging and labelling

### 9.1 Packaging

Highly seasoned tomato juice shall be packaged in appropriate containers made up of glass, plastic, and cans with food grade acid-resistant lacquering materials that shall not affect the quality of the product. The interior of the can shall not show any black discolouration, rusting or pitting.

### 9.2 General

The product covered by the provisions of this Standard shall be labelled in accordance with EAS 38. In addition, the following specific provisions apply:

### 9.3 Name of the product

- (i) The name of the product shall be: “Catsup,” “Ketchup,” or “Catchup.”
- (ii) The following shall be included as part of the name or in close proximity to the name of the food:
  - (a) The statement “Made from” or “Made in part from,” as the case may be, “residual tomato material from canning” if the optional tomato ingredient specified in 3.1.1(iii) or tomato concentrate containing the ingredient specified in 3.1 (b) of EAS 66-1 is present.
  - (b) The statement “Made from” or “Made in part from,” as the case may be, “residual tomato material from partial extraction of juice” if the optional tomato ingredient specified in 3.1.1(iv) or tomato concentrate containing the ingredient specified in 3.1 (c) of EAS 66-1 is present.
  - (d) If an added ingredient, as defined in 4.1.4, alters the flavour characteristic of the product, the name of the food shall be accompanied by the term “flavoured with X” or “X flavoured” as appropriate.

### 9.4 Labelling of non-retail containers

Information for non-retail containers shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name and address of the manufacturer, packer, distributor or importer, as well as storage instructions, shall appear on the container. However, lot identification, and the name and address of the manufacturer, packer, distributor or importer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

### 9.5 Other labelling details

- i) Name and address of the manufacturer;
- ii) List of ingredients;
- iii) Net weight in grams or minimum volume in millilitres or litres;
- iv) Date of manufacture;
- v) 'Sell by .....' date.

## **10 Methods of analysis and sampling**

### **10.1 General**

**10.1.1** The factors of quality and analysis may be determined based on the following sample unit sizes:

- (a) The entire contents of a container;
- (b) A representative portion of the contents of a container;
- (c) A combination of the contents of two or more containers; or
- (d) A representative portion of processed product stored or held in bulk containers.

**10.1.2** The methods of analysis referred to hereunder apply, as appropriate, to the East African Standards for Fruit Juices, Concentrated Fruit Juices and Fruit Nectars preserved exclusively by Physical Means.

### **10.2 Test of mineral impurities**

According ISO 762:2003, *Fruit and vegetable products — Determination of mineral impurities content*

### **10.3 Determination of cadmium**

According to the following standards:

- ISO 6561-1:2005, *Fruits, vegetables and derived products — Determination of cadmium content — Part 1: Method using graphite furnace atomic absorption spectrometry*
- ISO 6561-2:2005, *Fruits, vegetables and derived products — Determination of cadmium content — Part 2: Method using flame atomic absorption spectrometry*

### **10.4 Determination of benzoic acid**

According to ISO 6560:1983, *Fruit and vegetable products — Determination of benzoic acid content (benzoic acid contents greater than 200 mg per litre or per kilogram) — Molecular absorption spectrometric method*

### **10.5 Determination of moulds and yeasts**

According to ISO 7954:1987, *Microbiology — General guidance for enumeration of yeasts and moulds — Colony count technique at 25 degrees C*

### **10.6 Determination of lactic acid**

According to EN 2631:1999, *Lactic acid — Enzymatic determination*

### **10.7 Determination of ethanol**

According to ISO 2448:1998, *Fruit and vegetable products — Determination of ethanol content.*

### **10.8 Determination of added salt**

According to ISO 3634:1979, *Vegetable products — Determination of chloride content.* The determination of sodium is not necessary. Results are expressed as % m/m NaCl.

**10.9 Determination of soluble solids and sugars**

According to the following standards:

- ISO 2172:1983, *Fruit juice — Determination of soluble solids content — Pycnometric method*
- EAS 41-10 [ISO 2173:2003], *Fruit and vegetable products — Determination of soluble solids — Refractometric method*

**10.10 Determination of pH**

According to ISO 1842:1991, *Fruit and vegetable products — Determination of pH*

**10.11 Determination of total titrable acidity**

According to EAS 41-2 [ISO 750:1998], *Fruit and vegetable products — Determination of titrable acidity*

**10.12 Determination of volatile acidity**

According to ISO 6632:1981, *Fruits, vegetables and derived products — Determination of volatile acidity*

**10.13 Determination of insoluble content**

According:

ISO 751:1998, *Fruit and vegetable products — Determination of water-insoluble solids*

ISO 763:2003, *Fruit and vegetable products — Determination of ash insoluble in hydrochloric acid*

**10.14 Determination of arsenic**

According to following standards:

- ISO 6634:1982, *Fruits, vegetables and derived products — Determination of arsenic content — Silver diethyldithiocarbamate spectrophotometric method.*
- ISO 17239:2004, *Fruits, vegetables and derived products — Determination of arsenic content — Method using hydride generation atomic absorption spectrometry.*

**10.15 Determination of copper**

According to ISO 7952:1994, *Fruits, vegetables and derived products — Determination of copper content — Method using flame atomic absorption spectrometry.* Results are expressed as mg copper/kg

**10.16 Determination of iron**

According to following standards:

- EAS 41-7 [ISO 5517:1978], *Fruits, vegetables and derived products -- Determination of iron content — 1,10- Phenanthroline photometric method*
- ISO 9526:1990, *Fruits, vegetables and derived products — Determination of iron content by flame atomic absorption spectrometry.* Results are expressed as mg iron/kg.

**10.17 Determination of lead**

According to ISO 6633:1984, *Fruits, vegetables and derived products — Determination of lead content — Flameless atomic absorption spectrometric method.* Results are expressed as mg lead/kg.

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### 10.18 Determination of sulphur dioxide

According to EAS 41-11 [ISO 5523:1981], *Liquid fruit and vegetable products — Determination of sulphur dioxide content (Routine method)*. Results are expressed as mg SO<sub>2</sub>/kg.

### 10.19 Determination of tin

According to EAS 41-6 [ISO 2447:1998], *Fruit and vegetable products — Determination of tin content*

### 10.20 Determination of zinc

According to the following standards:

- ISO 6636-1:1986, *Fruits, vegetables and derived products — Determination of zinc content — Part 1: Polarographic method*
- ISO 6636-2:1981, *Fruits, vegetables and derived products — Determination of zinc content — Part 2: Atomic absorption spectrometric method*
- ISO 6636-3:1983, *Fruit and vegetable products — Determination of zinc content — Part 3: Dithizone spectrometric method*

**Annex A**  
(normative)**Determination of water capacity of containers****A.1 Scope**

This method applies to glass containers.<sup>1</sup>

**A.2 Definition**

The water capacity of a container is the volume of distilled water at 20 °C which the sealed container will hold when completely filled.

**A.3 Procedure**

**A.3.1** Select a container which is undamaged in all respects.

**A.3.2** Wash, dry and weigh the empty container.

**A.3.3** Fill the container with distilled water at 20 °C to the level of the top thereof, and weigh the container thus filled.

**A.4 Calculation and expression of results**

Subtract the weight found in A.3.2 from the weight found in A.3.3. The difference shall be considered to be the weight of water required to fill the container. Results are expressed as ml of water.

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<sup>1</sup> For determination of water capacity in metal containers the reference method is ISO 90.1:1986.

**Annex B**  
(normative)

**Sampling and compliance**

**B.1 Compliance**

Unless otherwise provided in a standard, a lot of canned vegetables shall be deemed in compliance for the following factors, to be determined by the sampling and acceptance procedure as provided in B.2, namely:

**B.1.1 Quality**

The quality of a lot shall be considered acceptable when the number of defectives does not exceed the acceptance number (c) in the sampling plans.

**B.1.2 Fill of container**

A lot shall be deemed to be in compliance for fill of container (packing medium and vegetable ingredient) when the number of defectives does not exceed the acceptance number (c) in the sampling plans.

**B.1.3 Drained weight**

A lot shall be deemed to be in compliance for drained weight based on the average value of all samples analyzed according to the sampling plans.

**B.2 Sampling and acceptance procedure**

**B.2.1 Definitions**

**(i) Lot**

A collection of primary containers or units of the same size, type, and style manufactured or packed under similar conditions and handled as a single unit of trade.

**(ii) Lot size**

The number of primary containers or units in the lot.

**(iii) Sample size**

The total number of sample units drawn for examination from a lot.

**(iv) Sample unit**

A container, a portion of the contents of a container, or a composite mixture of product from small containers that is sufficient for the examination or testing as a single unit. For fill of container, the sample unit shall be the entire contents of the container.

**(v) Defective**

Any sample unit shall be regarded as defective when the sample unit does not meet the criteria set forth in the standards.

**(vi) Acceptance number (c)**

The maximum number of defective sample units permitted in the sample in order to consider the lot as meeting the specified requirements.

**(vii) Acceptable quality level (AQL)**

The maximum percent of defective sample units permitted in a lot that will be accepted approximately 95 percent of the time.

## B.2.2 Sampling plans

| Lot size (primary containers)   | Size of container |       |
|---|-------------------|-------|
|   | $n^1$             | $c^2$ |
| <b>net weight equal to or less than 1 kg (2.2 lb)</b>   |                   |       |
| 4,800 or less   | 13                | 2     |
| 4,801 to 24,000   | 21                | 3     |
| 24,001 to 48,000  | 29                | 4     |
| 48,001 to 84,000  | 48                | 6     |
| 84,001 to 144,000   | 84                | 9     |
| 144,001 to 240,000  | 126               | 13    |
| Over 240,000  | 200               | 19    |
| <b>net weight greater than 1 kg (2.2 lb) but not more than 4.5 kg (10 lb)</b>                       |                   |       |
| 2,400 or less   | 13                | 2     |
| 2,401 to 15,000   | 21                | 3     |
| 15,001 to 24,000  | 29                | 4     |
| 24,001 to 42,000  | 48                | 6     |
| 42,001 to 72,000  | 84                | 9     |
| 72,001 to 120,000   | 126               | 13    |
| Over 120,000  | 200               | 19    |
| <b>net weight greater than 4.5 kg (10 lb)</b>   |                   |       |
| 600 or less   | 13                | 2     |
| 601 to 2,000  | 21                | 3     |
| 2,001 to 7,200  | 29                | 4     |
| 7,201 to 15,000   | 48                | 6     |
| 15,001 to 24,000  | 84                | 9     |
| 24,001 to 42,000  | 126               | 13    |
| Over 42,000   | 200               | 19    |
| <sup>1</sup> $n$ = number of primary containers in sample.<br><sup>2</sup> $c$ = acceptance number. |                   |       |

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