



EAS 66-1:2010  
ICS 67.080.10

## EAST AFRICAN STANDARD

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Tomato products — Specification — Part 1: Concentrated juice



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 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:

CODEX STAN 057:1981 (rev. 2007), *Standard for Processed Tomato Concentrates*

*United States Standards for Grades of Concentrated Tomato Juice*, Effective February 25, 1970

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.mrlatabase.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 1: Concentrated juice

### 1 Scope

This Standard applies to the product as defined in Clause 3, and offered for direct consumption, including for catering purposes or for repacking if required. This Standard also applies to the product when indicated as being intended for further processing. The Standard does not include products that contain seeds and skins such as “pizza toppings” and other “homestyle” products as well as products commonly known as tomato sauce, chilli sauce, and ketchup, or similar products which are highly seasoned products of varying concentrations containing characterising ingredients such as pepper, onions, vinegar, etc., in quantity that materially alter the flavour, aroma and taste of the tomato component.

### 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 concentrates are the class of foods each of which is prepared by concentrating one or any combination of two or more of the following optional tomato ingredients:

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- (a) Prepared by concentrating the juice<sup>1</sup> or pulp obtained from substantially sound, mature red tomatoes (*Lycopersicon/Lycopersicum esculentum* P. Mill) strained or otherwise prepared to exclude the majority of skins, seeds and other coarse or hard substances in the finished product; and
- (b) The liquid obtained from the residue from preparing such tomatoes for canning, consisting of peelings and cores with or without such tomatoes or pieces thereof.
- (c) The liquid obtained from the residue from partial extraction of juice from such tomatoes.

Such liquid is obtained by so straining the tomatoes, with or without heating, as to exclude skins (peel), seeds, and other coarse or hard substances in accordance with good manufacturing practice. Prior to straining, food-grade hydrochloric acid may be added to the tomato material in an amount to obtain a pH no lower than 2.0. Such acid is then neutralized with food-grade sodium hydroxide so that the treated tomato material is restored to a pH of 4.2±0.2. Water may be added to adjust the final composition. The food contains not less than 8.0 percent tomato soluble solids<sup>2</sup>, but not dehydrated to a dry powder or flake form. 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.

### 3.2 Product designation

Tomato concentrate may be considered "Tomato Puree" or "Tomato Paste" when the concentrate meets these requirements:

**3.2.1 "Tomato Puree"** — Tomato concentrate that contains no less than 7% but less than 24% of natural total soluble solids.

**3.2.2 "Tomato Paste"** — Tomato concentrate that contains at least 24% of natural total soluble solids.

### 3.3 Definitions

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

#### 3.3.1

##### **tomato concentrates**

products prepared by concentrating the liquid obtained from sound, ripe tomatoes (*Lycopersicum esculentum* P. Mill).

The liquid shall be strained or otherwise prepared to exclude skins, seeds and other coarse or hard substances in the finished product. Permitted additives in tomato concentrates shall include edible salt, malic, citric, acetic and ascorbic acids. The product is processed by heat before or after sealing in a container to prevent spoilage.

#### 3.3.2

##### **tomato puree**

tomato concentrate containing no less than 8.5 % of natural tomato soluble solids and not more than 25 % total solids by weight

#### 3.3.3

##### **tomato paste**

tomato concentrate containing 25 % or more by weight of natural tomato soluble solids

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<sup>1</sup> In this Standard, "juice" must not be intended as the fruit juice (including tomato juice) as defined in the Codex General Standard for Fruit Juices and Nectars (CODEX STAN 247-2005).

<sup>2</sup> The concentrations are measured on the product without added salt.

**3.3.4****concentrated tomato juice**

if the food is prepared from the optional tomato ingredient described in 3.1 (a) and is of such concentration that upon diluting the food, the diluted article will contain not less than 5.0 percent by weight tomato soluble solids

**4 Essential composition and quality factors****4.1 Composition****4.1.1 Basic ingredients**

Processed tomato concentrate as defined in 3.1.

**4.1.2 Other permitted ingredients**

- (a) salt (sodium chloride) in accordance with EAS 35;
- (b) spices and aromatic herbs (such as basil leaf, etc.) and their natural extracts;
- (c) lemon juice (single strength or concentrated) used as an acidulant; and
- (d) water.

**4.2 Quality criteria****4.2.1 Colour**

The product shall have a characteristic reddish colour of tomato concentrates derived from ripe and sound tomatoes. No artificial colouring material shall be added to the product.

**4.2.2 Flavour**

Tomato concentrates shall have a good flavour and odour.

**4.2.3 Texture**

Tomato concentrates shall have a homogeneous evenly divided texture indicative of food manufacturing practice.

**4.2.4 Definition of defects**

Processed tomato concentrates 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.

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## 4.2.5 Defects and allowances

### 4.2.5.1 Mineral impurities<sup>3</sup>

The mineral impurity content does not exceed 0.1% of the natural total soluble solids content.

### 4.2.5.2 Lactic acid

The content of lactic acid (total) does not exceed 1% of the natural total soluble solids content.

### 4.2.5.3 Mould count

Mould count for processed tomato concentrates to be set according to the legislation of the country of retail sale.

### 4.2.5.4 pH

The pH must be below 4.6.

4.2.6 Benzoic acid shall be the only preservation that will be added to tomato concentrates.

Table 1 — Compositional requirements for tomato concentrates

S/N	Characteristic	Requirement	Method of test
i	Natural tomato soluble solids content per cent by mass, min.		
	Puree	8.5	EAS 76*
	Paste	25	"
ii	Edible salt content per cent by mass, max.	0.6	"
iii	pH	Not higher than 4.3	"
iv	Benzoic acid content, max.	750 ppm	"

## 4.3 Classification of "Defectives"

4.3.1 A container that fails to meet the natural total soluble solids requirements, as set out in 3.2, and/or one or more of the applicable quality requirements, as set out in 4.2, should be considered as a "defective".

4.3.2 Tomato concentrates shall be free from the following defects:

- i) Dark specks or scale-like particles of seeds.
- ii) Seeds or other objectionable particles of seeds.
- iii) Tomato peels.
- iv) Harmless plant material.

## 4.4 Lot acceptance

A lot should be considered as meeting the applicable quality requirements referred to in 4.2 when:

- (a) the number of "defectives", as defined in 4.3, 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 7.3.2).

<sup>3</sup> Sand, soil and any other impurities insoluble in hydrochloric acid.

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

## 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 concentrated tomato juice (current as at 2009-06-09)**

Type	Unit symbol	Limit	Method of test	Notes
CARBARYL	MRL (mg/kg)	3		
MALATHION	MRL (undef)	0.01		
PIPERONYL BUTOXIDE	MRL (mg/kg)	0.3		

### 6.2 Other contaminants

**6.2.1** The product covered by the provisions of this Standard shall comply with those maximum levels for contaminants established by the Codex Alimentarius Commission for this product. The current limits for contaminants are given in Table 3.

**6.2.2** In order to consider the concentration of the product, the determination of the maximum levels for contaminants shall take into account the natural total soluble solids, the reference value being 4.5 for fresh fruit.

**Table 3 — Limits for mineral impurities in tomato concentrates**

Type of impurity, max	Limits, ppm	Method of test
Arsenic (as As)	0.5	EAS 41"
Lead (as Pb)	1.0	"
Copper (as Cu)	10	"
Zinc (as Zn)	50	"
Tin (as Sn)	250	"

## 7 Hygiene

**7.1** Tomato concentrates 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.

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

## 7.3 Microbiological limits

7.3.1 Tomato concentrates shall be free from pathogenic organisms and shall comply with the microbiological limits indicated in Table 3.

Table 3 — Microbiological limits for tomato juice

Type of micro-organism	Limits (number of counts), max	Method of test
Total viable counts	10 per g	EAS 217*
Yeast and moulds	shall be absent	“
<i>Escherichia Coli</i>	shall be absent	“
Salmonella	shall be absent	“

7.3.2 **Howard count** — Tomato concentrates shall not contain mould filaments in excess of 40 % 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.

## 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

The name of the product shall be:

- (a) "Tomato Puree" if the food contains not less than 7% but less than 24% natural total soluble solids;
- (b) "Tomato Paste" if the food contains not less than 24% natural total soluble solids;
- (c) Another denomination usually employed in the country accompanied by the declaration of the percentage of the natural total soluble solids; or
- (d) If an added ingredient, as defined in 4.1.2, 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 Declaration of the percentage of natural total soluble solids

The percentage solids may be included on the label in either of the following manners:

- (a) The minimum percentage of natural total soluble solids (example: "Minimum Solids - 20%").
- (b) A range within 2% of the natural total soluble solids (example: "Solids - 20% to 22%").

#### 9.5 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.

#### 9.6 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.

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## 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.

**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*



Standard



Draft for comments

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

This method applies to glass containers.<sup>4</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>4</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</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. <sup>2</sup> $c$ = acceptance number.		

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