

**SRI LANKA STANDARD 945 : 1991**

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SPECIFICATION FOR  
**TOMATO CONCENTRATES**

**SRI LANKA STANDARDS INSTITUTION**



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SLS 945 : 1991

Gr. 6

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SRI LANKA STANDARDS INSTITUTION

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This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD  
SPECIFICATION FOR TOMATO CONCENTRATES

**FOREWORD**

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1991-12-31, after the draft, finalized by the Drafting Committee on Tomato Products, had been approved by the Agricultural and Food Products Divisional Committee.

During the formulation of this specification due consideration has been given to the relevant provisions made under the Sri Lanka Food Act No. 26 of 1980. Specific requirements given in this specification, wherever applicable, are in accordance with the relevant regulations. However, general provisions made under the Sri Lanka Food Act have not been included in this specification and therefore, the attention of the user of this specification is drawn to the general provisions made in the regulations framed under the Food Act.

For the purpose of deciding whether a particular requirement of this specification is complied with, the final value, observed or calculated, expressing the result of a test or an analysis, shall be rounded off in accordance with CS 102. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this specification.

In the preparation of this specification, the valuable assistance derived from the publications of the Codex Alimentarius Commission is gratefully acknowledged.

**1 SCOPE**

1.1 This specification prescribes the requirements and methods of sampling and test for processed tomato concentrates manufactured from fully ripe, red tomatoes (*Lycopersicon esculentum*. Mill.) and preserved by physical means.

1.2 This specification does not cover dehydrated tomato products in dry powder or flake form or products preserved by chemical means.

**2 REFERENCES**

- SLS 79 Edible common salt.
- CS 102 Presentation of numerical values.
- SLS 109 Edible common salt.
- SLS 209 Code of Practice for manufacture of fruit and vegetable products (processed).
- SLS 260 Tomato sauce.
- SLS 315 Determination of Tin.
- SLS 428 Random sampling methods.
- SLS 467 Labelling of prepackaged foods.
- ISO 2173 Fruit and vegetable products - Determination of soluble solids content-refractometric method.

### 3 DEFINITIONS

For the purpose of this specification, the following definitions shall apply:

3.1 **tomato juice** : Liquid extracted from wholesome, fully ripe, red tomatoes with a substantial portion of the pulp obtained with or without the application of heat.

3.2 **tomato concentrate** : Processed product prepared by concentrating tomato juice so as to exclude skins, seeds and other coarse or hard substances and containing more than 8 per cent of natural tomato soluble solids and preserved by physical means.

3.3 **tomato puree** : Processed tomato concentrate which contains not less than 8 per cent and not more than 24 per cent by mass of natural tomato soluble solids.

3.4 **tomato paste** : Tomato concentrate which contains not less than 24 per cent by mass of natural tomato soluble solids.

3.5 **triple concentrate** : Tomato concentrate which contains not less than 45 per cent by mass of natural tomato soluble solids.

3.6 **natural tomato soluble solids** : The soluble solids content, expressed as °Brix obtained on the sugar scale of a refractometer at 20°C and corrected only for added salt, based on the assumption that the natural salt content of tomatoes contributes to 1.6 per cent of the soluble solids content.

### 4 INGREDIENTS AND ADDITIVES

#### 4.1 Fruit ingredients

The fruit used shall be fully ripe, red tomatoes which are free from fungal attack and any signs of deterioration or damage.

#### 4.2 Salt

Salt used shall conform to SLS 191.

#### 4.3 Lemon juice

#### 4.4 pH regulating agents

4.4.1 Sodium hydrogen carbonate may be added to raise the pH to a level of 4.3.

4.4.2 Citric acid, malic acid, L-tartaric acid and lactic acid may be added to maintain the pH at a level of 4.3.

## 5 REQUIREMENTS

### 5.1 Hygiene

Tomato concentrates shall be processed according to the conditions described in SLS 209.

### 5.2 Natural tomato soluble solids content

The natural tomato soluble solids content shall be according to the product type declared on the label and shall be not less than the values given in Column 3 of Table 1 when tested according to the method given in Appendix A.

TABLE 1 - Natural tomato soluble solids content

Sl. No.	Product type	Natural tomato soluble solids content, per cent by mass, min.	Method of test
(1)	(2)	(3)	(4)
i)	Tomato puree	8.0	)
ii)	Concentrated tomato puree	18.0	)
iii)	Tomato paste	24.0	)
iv)	Triple concentrate	45.0	)

### 5.3 Appearance

Tomato concentrates, when diluted with water to reach 8 per cent natural tomato soluble solids, shall have a bright red colour and shall be free from browning or any other discolouration. They shall also be free from dark specks or scale like particles, seed particles, of tomato peel, and other extraneous plant material except those used as seasoning.

### 5.4 Flavour and odour

Tomato concentrates, when diluted with water to reach 8 per cent natural tomato soluble solids, shall have a flavour and odour of properly processed tomato concentrates.

### 5.5 Texture

Tomato concentrates shall be homogenous and free from lumps.

## 5.6 Mineral impurities

Tomato concentrates, when diluted with water to reach 8 per cent by mass of natural tomato soluble solids, shall contain not more than 60 mg/kg of mineral impurities calculated on a dry basis. when tested according to the method given in Appendix C.

## 5.7 Howard mould count

The Howard mould count of tomato concentrates, when diluted with water to reach to 8.0 per cent by mass of natural tomato soluble solids, shall be not more than 50 per cent positive fields, when tested according to the method given in SLS 260.

## 5.8 Tin content

The tin content of tomato concentrates placed in tin containers shall be not more than 250 mg/kg, when tested according to the method given in SLS 315.

# 6 PACKAGING

## 6.1 Packaging

Tomato concentrates shall be hygienically packed in retortable containers made of suitable food packaging material which shall not cause deterioration of the product or impart any foreign odour or flavour to the product.

## 6.2 Marking

6.2.1 Each container shall be legibly and indelibly marked or labelled with the following information:

- i) Name of the product, as "Tomato concentrate". The descriptions "Tomato puree"/"tomato paste"/"concentrated tomato puree"/"triple concentrate", may be applied where the per cent by mass of natural tomato soluble solids is in compliance with the requirements given in 5.2 as applicable;
- ii) Declaration of the percentage of natural tomato soluble solids either as the minimum percentage (example : minimum solids - 20 per cent) or as a range within 2 per cent of the natural tomato soluble solids (example : solids - 20 per cent to 22 per cent);
- iii) Brand name or trade name;
- iv) Net contents, in grams or kilograms;
- v) Name and address of the manufacturer/packer/distributor/importer (including country of origin);
- vi) Batch or code number;
- vii) Date of expiry;
- viii) A list of ingredients in descending order of proportion; and
- ix) Instructions for storage and use, where necessary.



6.2.2 Marking or labelling shall also comply with the requirements given in SLS 467.

*NOTE*

*Attention is drawn to the certification marking facilities offered by the Sri Lanka Standards Institution. See the inside back cover of this specification.*

## 7 METHODS OF TEST

Tests shall be carried out in accordance with the methods given in SLS 260, SLS 315 and Appendices A to C.

## 8 SAMPLING

### 8.1 Lot

In any consignment all containers of tomato concentrates of the same type and size belonging to one batch of manufacture or supply shall constitute a lot.

### 8.2 General requirements of sampling

When drawing samples, the following precautions shall be taken:

8.2.1 Samples for microbiological analysis shall be drawn first.

8.2.2 The samples shall be protected against adventitious contamination.

8.2.3 The sampling instruments shall be clean and dry when used. When drawing samples for microbiological examination, the sampling instruments shall be sterilized.

8.2.4 The samples shall be stored in such a manner that there will be no deterioration of the quality of the material.

### 8.3 Scale of sampling

8.3.1 Samples shall be tested from each lot for ascertaining its conformity to the requirements of this specification.

8.3.2 The number of containers to be selected from a lot shall be in accordance with Table 2.

TABLE 2 - Scale of sampling

Number of containers in the lot (1)	Number of containers to be selected (2)
Up to 150	3
151 to 500	4
501 to 1 200	6
1 201 and above	8

8.3.3 The containers shall be selected at random. In order to ensure randomness of selection, tables of random numbers as given in SLS 428 shall be used.

#### 8.4 Preparation of sample for microbiological tests

Sufficient quantities of tomato concentrates shall be drawn from each sample selected as in 8.3.2 and transferred to separate sterilized containers and sealed air tight.

#### 8.5 Preparation of composite sample

Sufficient quantities of tomato concentrates shall be drawn from each container selected as 8.3.2 and mixed together to form the composite sample.

#### 8.6 Number of tests

8.6.1 Each container selected as in 8.3.2 shall be inspected for packaging and marking requirements.

8.6.2 Individual samples prepared as in 8.4 shall be tested for the Howard mould count (see 5.7).

8.6.3 The composite sample prepared as in 8.5 shall be tested for the requirements given in 5.2, 5.3, 5.4, 5.5, 5.6 and 5.8.

### 9 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this specification if the following conditions are satisfied :

9.1 Each container inspected as in 8.6.1 satisfies the packaging and marking requirements.

9.2 Each sample tested as in 8.6.2 satisfies the relevant requirements.

9.3 The composite sample tested as in 8.6.3 satisfies the relevant requirements.

APPENDIX A  
DETERMINATION OF NATURAL TOMATO SOLUBLE SOLIDS CONTENT

**A.1 PRINCIPLE**

The natural tomato soluble solids content is determined by measuring the refractive index of the clear serum obtained from the product corrected for temperature and by converting the resultant index to per cent sucrose, in accordance with the international scale of refractive indices of sucrose at 20 °C. If no salt is added, the sucrose percentage is considered equal to the percentage of natural tomato soluble solids content.

Where added salt is present, a correction is made (see A.2.1).

**A.2 PROCEDURE**

Determine the soluble solids content as given in ISO 2173 : 1976.

**A.2.1 Correction**

Correct the reading as follows for any added salt and also when the total soluble solids content, expressed as sucrose is greater than the refractometer reading corrected for sodium chloride.

Natural soluble tomato solids content (TSS -salt content determined  
per cent by mass = as in Appendix B, per cent  
by mass) x 1.016

where,

TSS = Total soluble solids content, per cent by mass.

APPENDIX B  
DETERMINATION OF SODIUM CHLORIDE CONTENT

**B.1 APPARATUS**

**B.1.1** *Muffle furnace*, maintained between 500 ° C to 550 °C.

**B.1.2** *Platinum or silica dish*.

**B.1.3** *Gooch crucible*

**B.2 REAGENTS**

**B.2.1** *Sodium carbonate*

**B.2.2** *Nitric acid*, Prepared by diluting 1 part of concentrated nitric acid (rel. Den = 1.42) with 4 parts of water.

B.2.3 *Nitric acid*, 2 per cent (V/V).

B.2.4 *Standard silver nitrate solution*,  $c(\text{AgNO}_3) = 0.1 \text{ mol/l}$ .

B.2.5 *Ferric ammonium solution*, saturated  $\text{Fe NH}_4(\text{SO}_4)2.12 \text{ H}_2\text{O}$  in water.

B.2.6 *Standard potassium thiocyanate solution*, prepared by dissolving 9.719 g of KCNS in 1 litre of water,  $c(\text{KCNS}) = 0.1 \text{ mol/l}$ .

B.1.7 *Standard ammonium thiocyanate solution*, prepared by dissolving 7.613 g of  $\text{NH}_4\text{CNS}$  in 1 litre of water,  $c(\text{NH}_4\text{CNS}) = 0.1 \text{ mol/l}$ .

### B.3 PROCEDURE

Note the tare mass of a platinum or silica dish. Weigh to the nearest milligram, approximately 20 g of puree, or 5 g of paste or 2 g of triple concentrate. Add an excess of sodium carbonate (about 0.5 g) and ash in a muffle furnace. Dissolve the ash in dilute nitric acid (B.2.2) and make up to 100 ml in a volumetric flask.

Pipette 20 ml of the ash solution into a 250-ml conical flask. Add a known excess of about 25 ml of standard silver nitrate solution (B.1.4). Filter through a gooch crucible containing an asbestos pad previously washed with nitric acid (B.2.3). Wash the precipitate repeatedly with nitric acid (B.2.3) until the filtrate is about 150 ml. Add 2 ml of ferric ammonium solution (B.2.5) to the filtrate and titrate the excess silver nitrate with potassium thiocyanate (B.1.6) or ammonium thiocyanate (B.1.7) till a pale rose colour is formed. Carry out a blank using a similar volume of silver nitrate solution, 2 ml of ferric ammonium solution and 5 ml of dilute nitric acid solution (B.2.2).

### B.4 CALCULATION

From the volume of silver nitrate originally added, subtract the volume of silver nitrate solution equivalent to the volume of standard thiocyanate required. Calculate the percentage by mass, of sodium chloride in the sample as follows :

1 ml of standard silver nitrate solution  $\equiv$  0.0058 g of sodium chloride

## APPENDIX C DETERMINATION OF MINERAL IMPURITIES

### C.1 APPARATUS

C.1.1 *Muffle furnace*, maintained between 500 °C to 550 °C.

C.1.2 *Drying oven*, maintained at 110 °C to 120 °C.

C.1.3 *Platinum dish*

C.1.4 *Gooch crucible*

## C.2 REAGENTS

C.2.1 *Hydrochloric acid, rel. den 1.12.*

C.2.2 *Sodium carbonate solution, saturated*

C.2.3 *Sodium hydroxide solution, 10 per cent (V/V).*

## C.3 PROCEDURE

Take 250 g of concentrate, puree or paste diluted to 8 per cent (m/m) soluble solids. Place the sample in a platinum dish, and ash in a muffle furnace (C.1.1). Wet the ash with about 10 ml of hydrochloric acid, (C.2.1) boil approximately for 2 minutes, evaporate to dryness on a water bath and heat for another 3 hours. To the residue, add 5 ml of hydrochloric acid and boil for 2 minutes. Add 50 ml of water, heat on a water bath for a few minutes and filter through a filter paper. Return the filtrate for determination of tin. Wash the residue on the filter paper into the platinum dish, add 20 ml of sodium carbonate solution (C.2.2), and boil for about 5 minutes. Add a few drops of sodium hydroxide solution and allow to settle. Decant the supernatant and filter through an ignited and weighed gooch crucible. To the residue in the dish, add 20 ml of sodium carbonate solution (C.2.2), boil, decant and filter as before. Repeat the process once more. Transfer the residue in the dish to the gooch crucible, wash with water and then with a little hydrochloric acid (C.2.1) and finally with hot water until free from chlorides. Save the combined filtrate.

Dry the gooch crucible, ignite at 500 °C to 550 °C. Cool and weigh to the nearest milligram. The difference in mass gives the sand content.

Acidify the combined alkaline filtrate obtained in the determination of sand with hydrochloric acid, (C.2.1) evaporate to dryness and heat in a drying oven at 110 °C to 120 °C for 2 hours. Moisten the residue with 5 ml to 10 ml of hydrochloric acid, boil for 2 minutes, add 50 ml of water, heat on a boiling water bath for 15 minutes and filter through an ashless filter paper or an ignited and tared gooch crucible.

Wash the residue with hot water, ignite at 500 °C to 550 °C, cool and weigh the residue to the nearest milligram as SiO<sub>2</sub>.

Add the filtrate and washings collected in the determination of SiO<sub>2</sub> to the previous ones and use for the metal estimation. Find the sum of sand and alkali soluble silicon dioxide and express the result as mg/kg of mineral impurities on the diluted product of 8 per cent soluble solids.



## **SLS CERTIFICATION MARK**

*The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI which includes surveillance inspection of the factory, testing of both factory and market samples.*

*Further particulars of the terms and conditions of the permit may be obtained from the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*



## **SRI LANKA STANDARDS INSTITUTION**

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.