SRI LANKA STANDARD 179 : 2012

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SPECIFICATION FOR
SWEETENED CONDENSED MILKS
(Second Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard

SPECIFICATION FOR SWEETENED CONDENSED MILKS
(Second Revision)

SLS 179 : 2012

(Attached Corrigendum No.1)

Gr.9

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Sri Lanka.

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

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

Sri Lanka Standard
SPECIFICATION FOR SWEETENED CONDENSED MILKS
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FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Agricultural and Food Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2012-01-27.

Sweetened condensed milks are produced by the vacuum evaporation of either whole, partially skimmed, skimmed or reconstituted or recombined milk with suitable adjustment of milk solids and with the addition of sucrose in the form of refined sugar. The removal of water in this way leads to the improved storage of the resulting products as the properties are unchanged for an appreciable length of time. The products are preserved by their high sucrose content.

In addition to its wide use by individual consumers in place of liquid milk, the products are also used in the manufacture of bakery products, confectionery, ice cream and other food products. The requirement for lactose is not stipulated as lactose would ensure good texture of the products and should not be considered from a health point of view.

This standard was first published in 1976 and revised in 1985 to incorporate a number of modifications due to technological developments in the field at that time. In this revision, compositional requirements have been updated, different types of sweetened condensed milks included and a new microbiological requirement introduced. Also, the references to the latest methods of test have been given.

This standard is subject to the restrictions imposed under the Sri Lanka Food Act No. 26 of 1980 and regulations framed thereunder, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard 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 **SLS 102**. The number of significant figures to be retained in the rounded off value shall be the same as that of the specified value in this specification.

While revising of this standard, the assistance derived from the Codex standard for sweetened condensed milks (CODEX STAN 282-1999 (2010) is gratefully acknowledged.

1 SCOPE

1.1 This standard prescribes the requirements, methods of sampling and testing for sweetened condensed milks, intended for direct consumption or further processing.

2 REFERENCES

SLS 102 Rules for rounding off numerical values.
SLS 143 Code of practice for general principles of food hygiene
SLS 181 Raw and processed milk
SLS 191 White sugar

SLS 428 Random sampling methods
SLS 467 Code of practice for labelling of prepackaged foods
SLS 516 Microbiological test methods
Part 1 General guidance for enumeration of microorganisms colony count technique
Part 2 Enumeration of yeasts and moulds
Part 3 Detection and enumeration of coliforms, faecal coliforms and *Escherichia coli*
Part 6 General guidance for enumeration of *Staphylococcus aureus*
SLS 614 Potable water
SLS 731 Milk Powder
SLS 735 Methods of test for milk and milk products
Part 1 Determination of fat content – Section 3
Part 2 Determination of titratable acidity
Part 7 Determination of protein
Part 8 Determination of total ash/acid insoluble ash
Part 12 Determination of sucrose content in Sweetened Condensed Milk-Polarimetric method
Part 13 Determination of total solids content in Sweetened Condensed Milk
SLS 872 Code of hygienic practice for dairy industries
SLS 883 Brown sugar
Official Methods of Analysis of the Association of official Analytical Chemists (AOAC), 18 th Edition, 2 nd Revision 2007.

3 PRODUCT DESCRIPTION

For the purpose of this standard, the following definition shall apply :

3.1 sweetened condensed milks: Milk products which can be obtained by the partial removal of water from milk with the addition of sugar, or by any other process which leads to a product of the same composition and characteristics. The fat and/or protein content of the milk may have been adjusted, only to comply with the compositional requirements as specified in this standard, by the addition and/or withdrawal of milk constituents in such a way as not to alter the whey protein to casein ratio of the milk being adjusted.

4 INGREDIENTS

All ingredients used shall comply with the requirements of the Food Act No. 26 of 1980 and regulations framed thereunder (as amended from time to time). The limits set for the use of ingredients by the regulations in the said Food Act shall be adhered to.
All ingredients used in the preparation of the product shall be clean, sound, of good quality and shall show no signs of decomposition or contamination. In addition, ingredients used shall not contain any substance in amounts that may present a hazard to human health.

4.1 Basic ingredients

4.1.1 *Milk,* see **SLS 181**
4.1.2 *Sugar*
White sugar, see **SLS 191**
Brown sugar, see **SLS 883**
4.1.3 *Potable water,* conforming to **SLS 614**
4.1.4 *Lactose* (also for seeding purposes)

4.2 Optional ingredients

In addition to the ingredients given in **4.1**, one or more of the following may be used.

4.2.1 *Skimmed milk powder,* see **SLS 731**

4.2.2 *Food additives*

Food additives listed in Annex **I** may be used within the limits specified for manufacturing of sweetened condensed milks.

5 TYPES

Sweetened condensed milks shall be of the following types, as classified according to **6.4.**

5.1 Sweetened condensed milk
5.2 Sweetened condensed skimmed milk
5.3 Sweetened condensed partly skimmed milk
5.4 Sweetened condensed high-fat milk

6 REQUIREMENTS

6.1 Hygiene

The product shall be manufactured, packaged, stored, transported and distributed under hygienic conditions as prescribed in **SLS 143** and **SLS 872**.

6.2 Appearance and consistency

The product shall be of a uniform texture and shall be whitish to cream in colour. It shall be free-flowing and free from lumps. It shall also be free from mould buttons.

6.3 Flavour and odour

The product shall have a characteristic flavour and shall be free from rancid or any other objectionable odours and flavours.

6.4 Compositional requirements

The product shall conform to the requirements given in Table **1,** when tested in accordance with the methods prescribed in Column **7** of the table.

TABLE 1 – Compositional requirements

Sl No.	**Characteristic**	**Requirement**				**Method of test**
		Sweetened condensed milk	**Sweetened condensed skimmed milk**	**Sweetened condensed partly skimmed milk**	**Sweetened condensed high-fat milk**	
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
i)	Milk fat, per cent by mass,	8.0 (min.)	1.0 (max.)	more than 1.0 and less than 8.0	16.0 (min.)	SLS735: Part1/ Section 3
ii)	Total milk solids,** per cent by mass, (min.)	28.0	24.0	21.0	NS*	Appendix **B**
iii)	Milk solids-not fat,** per cent by mass, (min.)	NS*	NS*	20	14	Appendix **C**
iv)	Milk protein in milk solids-not-fat, per cent by mass (min.)	34	34	34	34	Appendix **D**
v)	Sucrose, per cent by mass, (min.)	40	40	40	40	Appendix **E**
vi)	Titratable acidity, as lactic acid, per cent by mass, (max.)	0.3	0.3	0.3	0.3	SLS 735: Part 2
vii)	Total ash content, per cent by mass, (max.)	2.0	2.0	2.0	2.0	SLS 735: Part 8

NS* – Not specified

NOTE : ***The milk solids and milk solids-not-fat content include water of crystallization of the lactose*

6.5 Microbiological limits

The product shall conform to the microbiological limits given in Table **2**, when tested in accordance with the methods prescribed in column **7** of the table.

TABLE 2 - Microbiological limits

Sl No. (1)	Test Organism (2)	n (3)	c (4)	Limit per g		Method of test (7)
				m (5)	M (6)	
i)	Aerobic Plate Count	5	2	$1x10^2$	$1x10^3$	Appendix **F**
ii)	Coliform, MPN	5	2	0	1x10	
iii)	*E. coli,* MPN	5	0	0	-	
iv)	Yeast and mould count	5	0	1x10	-	
v)	*Staphylococcus aureus* (coagulase positive)	5	2	0	$1x10^2$	

where

n is the number of samples to be tested;
c is the maximum allowable number of samples yielding values between *m* and *M;*
m is the limit below which a count is acceptable for any sample; and
M is the limit above which a count is unacceptable for any sample.

6.6 Shelf life

The product, when tested for shelf life according to Appendix **G**, shall satisfy the requirements of the test.

6.7 Heavy Metals

The product shall also conform to the limits of heavy metals given in Table **3,** when tested in accordance with the methods prescribed in Column **4** of the table.

TABLE 3 – Limits for heavy metals

Sl No. (1)	Heavy Metal (2)	Limit (3)	Method of test (4)
i)	Cadmium, (as Cd), mg/kg, (max.)	0.1	Appendix **H**
ii)	Lead, (as Pb), mg/kg, (max.)	0.02	
iii)	Arsenic, (as As), mg/kg, (max.)	0.1	
iv)	Tin, (as Sn), mg/kg, (max.)	250	

7 PACKAGING

7.1 The product shall be packed in suitable containers free from rust and hermetically sealed. If the cans are lacquered, the lacquer used shall be non-toxic and shall be of such quality that it does not impart any foreign taste and smell to the contents of the cans and does not peel off during processing and storage of the product. The lacquer shall not be soluble in the contents.

7.2 Packages in which containers are packed shall be clean, neat and undamaged. Outer containers such as boxes or cases shall be suitable for the purpose of use, be of correct size to avoid damaging of containers by squeezing or loose movement of the containers inside the outer container. Containers shall not be packed in outer containers in positions prone to cause damaging such as packing containers on their sides.

7.3 Outer containers shall be strong enough to protect the finished final product during normal handling and transport.

7.4 Materials such as adhesives or glues used for attaching or applying labels, outer wrappers or outer cartons or closing of packages shall not be hygroscopic, or liable to deteriorate during storage after being applied or condusive to corrosion of the can or lid.

8 MARKING AND / OR LABELLING

8.1 The following shall be marked or labelled legibly and indelibly on each container destined to the final consumer:

a) The name of the product as, “Sweetened condensed milk” or “Sweetened full cream condensed milk” or “Sweetened condensed skimmed milk” or “Sweetened condensed partly skimmed milk” or “Sweetened condensed high-fat milk” according to the composition specified in **6.4**.

b) Brand name or trade mark, if any;
c) Net mass in ‘g’ or ‘kg’;
d) Food additive’s name or class and INS number, if added ;
e) Name and address of the manufacturer ;
f) Name and address of the packer or distributor in Sri Lanka;
g) Batch number or code number or a decipherable code marking;
h) Date of manufacture;
j) Date of expiry;
k) Complete list of ingredients, in descending order of their proportions;
l) Declaration of milk fat content:
The milk fat content shall be declared either as percentage by mass or volume, or in grams per serving as quantified in the label provided that the number of servings is stated.
m) Declaration of milk protein:
The milk protein content shall be declared either as percentage by mass or volume, or in grams per serving as quantified in the label provided that the number of servings is stated.
n) Country of origin, in case of imported products;
o) Storage instructions, if necessary;

p) Information for use; and
q) The words "*sweetened condensed milks shall not be used as a breast-milk substitute*".

8.2 The date of manufacture, date of expiry and batch/code number shall be embossed or printed on the container/can.

8.3 The marking and labeling shall also be in accordance with **SLS 467** and the regulations framed under the Sri Lanka Food Act No.26 of 1980.

9 SAMPLING

Representative samples of the product for ascertaining conformity to the requirements of this standard shall be drawn as prescribed in Appendix **A**.

10 METHODS OF TEST

Tests shall be carried out as prescribed in **Part 1/Section 3**, **Parts 2,7, 8, 12** and **13** of **SLS 735** and Appendices **B** to **H** of this standard.

10.1 Reagents

All reagents used shall be of recognized analytical quality and wherever water is mentioned, distilled or deionized water shall be used.

11 CRITERIA FOR CONFORMITY

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

11.1 Each package inspected as in **A-5.1** shall satisfy the packaging and marking requirements.

11.2 The samples tested as in **A-5.2** shall satisfy the requirements of the test for shelf life.

11.3 The samples tested as in **A-5.3** shall satisfy the microbiological requirements given in **6.5**.

11.4 Each package tested as in **A-5.4** shall satisfy the requirements given in **6.2** and **6.3**.

11.5 The test result on the composite sample when tested as in **A-5.5** shall satisfy the requirements given in **6.4** and **6.7**.

APPENDIX A
SAMPLING

A-1 LOT

In any consignment, all the containers/packages of the same size and containing same type of sweetened condensed milk belonging to one batch of manufacture shall constitute a lot.

A-2 GENERAL REQUIREMENTS OF SAMPLING

In drawing, preparing, storing and handling test samples, following precautions and directions, shall be observed.

A-2.1 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from extraneous contamination;

A-2.2 The sample containers shall be of such a size that sufficient head space is allowed for expansion at the top. This space shall not be too large as air exerts detrimental action. The samples shall be kept in a manner so that they do not deteriorate in composition before analysis;

A-2.3 Each container shall be sealed air-tight after filling and marked with necessary details of sampling;

A-2.4 Samples for shelf life and microbiological tests;
A-2.4.1 The sampling instruments shall be sterilized before use.
A-2.4.2 Samples shall be stored in a refrigerator (below 6 ^{o}C) till required for testing and the testing shall be done as soon as possible after sampling.

A-3 SCALE OF SAMPLING

A-3.1 For ascertaining the conformity of the product to the requirements of this standard, samples shall be tested from each lot separately.

A-3.2 The number of containers to be selected from a lot shall be in accordance with Table **4**.

A-3.3 These containers shall be selected at random from the lot. In order to ensure randomness of selection, tables of random numbers as given in **SLS 428** shall be used.

Table 4 : Scale of sampling

No. of containers in the lot (1)	**No. of containers to be selected (2)**
Up to 300	10
301 to 500	12
501 to 1 000	14
1 001 and above	17

NOTE : *If modification is desirable, the laboratory should be consulted regarding the selection of samples*.

A-4 TEST SAMPLES AND REFERENCE SAMPLE

A-4.1 On storage of condensed milk, separation of the constituents such as fat, lactose may occur. It is necessary to mix the contents of the container prior to analysis and for this purpose the procedure given in **A-4.1.1** is recommended.

A-4.1.1 Heat the container in a water–bath maintained at about 40 °C until the sample has nearly reached this temperature. Open the container of the edge of the lid. Reincorporate all the material adhering to the lid into the container. Mix the contents thoroughly by stirring with a spoon or spatula in such a way that the top layers as well as contents of the lower corners are moved and mixed. Repeat the stirring before drawing the sample for testing various characteristics (other than shelf-life and microbiological) in the standard.

A-4.2 Reference sample

If a reference sample is required, three containers shall be drawn from each case selected according to Column **2** of Table **4**. Each container shall be marked with necessary details of sampling. The containers so selected shall be divided into three equal parts. One of these parts shall be marked for the purchaser, one for the supplier and the third for the referee.

A-5 NUMBER OF TESTS

A-5.1 Each container selected as in **A-3.2** shall be inspected for packaging and marking requirements .

A-5.2 Two containers shall be drawn from the sample selected as in **A-3.2** and tested for shelf life given in **6.6.**

A-5.3 Five containers shall be drawn from the sample selected as in **A-3.2** and tested for microbiological requirements given in **6.5**.

A-5.4 The remaining containers of the sample shall be individually tested for the requirements given in **6.2** and **6.3**.

A-5.5 An equal quantity of material shall be drawn from each container after testing as described in **A-5.4** and mixed thoroughly to form a composite sample. The composite sample shall be transferred to a clean and dry container and shall be tested for requirements given in **6.4** and **6.7**.

APPENDIX B
DETERMINATION OF TOTAL MILK SOLIDS CONTENT

B.1 Determination of total solids content shall be carried out in accordance with the method described in **SLS 735** : **Part 13.**

B.2 CALCULATION

Total milk solids, per cent by mass = Total solids content, per cent by mass - S

where
S is the per cent by mass, of sucrose in the material (see Appendix E).

APPENDIX C
DETERMINATION OF MILK SOLIDS-NOT- FAT

Determination of milk solids-not-fat shall be calculated by the difference of total milk fat from total milk solids

C.1 *Milk solids-not-fat, per cent by mass = Total Milk solids, per cent by mass - Milk fat, per cent by mass*

APPENDIX D
DETERMINATION OF MILK PROTEIN IN MILK SOLIDS-NOT-FAT

D.1 Determination of milk protein shall be carried out in accordance with the method described in **SLS 735 :Part 7** – Section **1** and **2** or **AOAC 991.20**

D.2 Calculation

$$Milk\ protein\ in\ milk\ solids\ not-fat,\ per\ cent\ by\ mass = \frac{p}{100-f} x100$$

where
p is the estimated total protein content, per cent by mass
f is milk fat content, per cent by mass

APPENDIX E
DETERMINATION OF SUCROSE CONTENT

Determination of sucrose content shall be carried out in accordance with the method described in **SLS 735 :Part 12 .**

APPENDIX F
MICROBIOLOGICAL EXAMINATION

F.1 EXAMINATION OF CONTAINER

Immediately prior to opening the containers, examine them for signs of deterioration or defectiveness such as faulty seams or closures, leakage of contents and blowing of the containers.

F.2 PREPARATION OF SAMPLE FOR ANALYSIS

Heat the container in a water bath maintained at a temperature not exceeding 45 °C for not more than 15 minutes to ensure uniformity of the contents. Remove the label from the container and wash the container with soap and water. Rinse and dry. Flood the non-coded end of the container with 70 per cent alcohol, pour off the excess and ignite. Open the lid aseptically using a sterile can opener. Observe the surface of the lid for lumps and note any abnormality in viscosity. Immediately weigh 10 g of the material into a sterile wide mouthed bottle using a sterile glass tube of approximately 7 mm in diameter to remove the sample.

F.3 AEROBIC PLATE COUNT

Enumeration of Aerobic Plate Count shall be carried out according to the method described in **SLS 516 : Part 1** except that an incubation temperature of 30 °C ± 1°C and an incubation period of 72 ±3 h shall be used for the purpose of the test.

F.4 ENUMERATION OF COLIFORMS AND *E. coli*

Using a 1:10 dilution of the sample, determine the total coliform count and *E.coli* according to the MPN method described in **SLS 516 : Part 3,** subject to the conditions specified in **F.3.**

F.5 ENUMERATION OF YEAST AND MOULD COUNT

Enumeration of yeast and mould count shall be carried out according to the method described in **SLS 516 : Part 2.**

F.6 ENUMERATION OF *Staphylococcus aureus*

Enumeration of *Staphylococcus aureus* shall be carried out according to the method described in **SLS 516 : Part 6.**

APPENDIX G
METHOD OF TEST FOR SHELF LIFE

G-1 GENERAL

The purpose of this test is to determine the shelf life of the product. In order that the period of test is shortened, the possible existent micro-organisms and their spores are given the optimum temperature at which they thrive. If they do not show their presence even at the end of this test, the material passes the test.

G-2 PROCEDURE

G-2.1 Incubate the samples at a temperature of 37.5 ^{o}C ± 0.5°C for 14 days.

G-2.2 The samples shall pass the test if the following conditions are satisfied:

a) the cans do not show any bulge due to positive pressure within ; and
b) the product inside the can has not curdled or thinned and is free from any objectionable taste, odour, sliminess, etc.

APPENDIX H
DETERMINATION OF HEAVY METALS

Determination of heavy metals shall be carried out in accordance with the methods given in **AOAC** (Association of Official Analytical Chemist), 18th edition 2007, as given Table **5**.

Table 5 – Methods for analysis of heavy metals

SI No. (1)	Heavy metal (2)	Method of analysis (3)
i)	Cadmium	999.11
ii)	Lead	972.25
iii)	Arsenic	986.15
iv)	Tin	999.11

ANNEX I
(Clause 4.2.2)
FOOD ADDITIVES

The following additives are permitted in the preparation of sweetened condensed milks, with the restrictions given in Column **3** of the table, provided that all the food additives listed below shall comply with the Food Act No. 26 of 1980 and regulations framed thereunder.

4.2.2.1 Firming agents

INS Number (1)	Additive (2)	Maximum level (3)
508	Potassium chloride	2000 mg/kg singly or 3000 mg/kg in combination, expressed as anhydrous substances
509	Calcium chloride	

4.2.2.2 Stabilizers / Emulsifiers

INS Number (1)	Additive (2)	Maximum level (3)
331	Sodium citrate	2000 mg/kg singly or 3000 mg/kg in combination, expressed as anhydrous substances
332	Potassium citrate	
333	Calcium citrate	
407	Carrageenan	150 mg/kg
322	Lecithins	Limited by GMP

4.2.2.3 Acidity regulators

INS Number (1)	Additive (2)	Maximum level (3)
170	Calcium carbonates	2000 mg/kg singly or 3000 mg/kg in combination, expressed as anhydrous substances
339	Sodium phosphates	
340	Potassium phosphates	
341	Calcium phosphates	
450	Diphosphates	
451	Triphosphates	
452	Polyphosphates	
500	Sodium carbonates	
501	Potassium carbonates	

…….

CORRIGENDUM TO SLS 179 : 2012
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Appendix D

D.2 Calculation

Correct calculation as follows:

$$Milk\ protein\ in\ milk\ solids\ not\text{-}fat,\ per\ cent\ by\ mass = \frac{P}{(100 - m - f)} \times 100$$

where,
P = Estimated total protein content, per cent by mass
f = Milk fat content, per cent by mass
m = Moisture content, per cent by mass

SRI LANKA STANDARDS INSTITUTION

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