

**Draft Sri Lanka Standard
SPECIFICATION FOR ICE CREAM
(Second Revision)**

SLS 223 :

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FOREWORD

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

Ice cream is a widely consumed frozen food. Ice cream of good quality can never be produced from raw materials which are initially of poor hygienic quality irrespective of the subsequent methods of treatment or handling. It is therefore important to exercise utmost care in obtaining ingredients of good hygienic quality which will satisfy the general, chemical and microbiological requirements specified in this standard for the finished product.

This standard was first published in 1973 and revised in 1989. To align with the current International Standards a revision of this standard was considered necessary. With technological advances in this industry, new varieties of ice cream are being manufactured and therefore this standard is being revised to incorporate these varieties and their requirements. The microbiological limits have also been revised.

This standard is subject to the Food Act No. 26 of 1980 and the regulations framed thereunder.

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

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

1 SCOPE

This standard prescribes the requirements, methods of sampling and testing for ice cream.

2 REFERENCES

- ISO 11290 Microbiology of food and animal feeding stuffs- Horizontal method for the detection and enumeration of *Listeria monocytogenes*
 - Part 1 Detection method
 - Part 2 Enumeration method
- SLS 79 Food grade salt
- SLS 102 Rules for rounding off numerical values
- SLS 143 Code of practice for general principles of food hygiene
- SLS 179 Sweetened condensed milks
- SLS 181 Raw and processed milk

SLS	191	White sugar
SLS	279	Butter
SLS	428	Random sampling methods
SLS	467	Code of practice for labelling of prepackaged foods
SLS	516	Methods of test for Microbiology of food and animal feeding stuffs
		Part 1 Horizontal method for the enumeration of microorganisms- Colony count at 30 °C
		Part 3 Horizontal method for the detection and enumeration of coliforms
		Part 5 Horizontal method for the detection of <i>Salmonella</i> spp
		Part 6 Horizontal method for the enumeration of coagulase-positive staphylococci
		Part 12 Horizontal method for the detection and enumeration of presumptive <i>Escherichia coli</i>
SLS	614	Potable water
SLS	731	Milk powder
SLS	735	Methods of test for milk and milk products
		Part 1 Determination of fat content
		Part 2 Determination of titratable acidity
		Part 5 Determination of total solids
		Part 6 Determination of sugars
SLS	872	Code of hygienic practice for dairy industry

3 DEFINITION

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

3.1 ice cream: A frozen sweetened product made from a heat treated mix consisting of edible fat and milk solids with or without other ingredients and permitted additives. The product is intended for storage, sale and consumption in the frozen state.

4 TYPES

Ice cream shall be of the following types:

4.1 Simple ice cream: A sweetened product made from a mix consisting of dairy fat and/vegetable fat and milk solids with colouring substances, flavouring substances, emulsifiers and stabilizers.

4.2 Complex ice cream: Simple ice cream with any one or more of the optional ingredients given in 5.2.

4.3 Novelties: Single serve packs of either simple or complex ice cream with an outer edible coating such as chocolate, nuts, biscuit etc.

5 INGREDIENTS

All ingredients used shall comply with the Food Act No. 26 of 1980 and the regulations framed thereunder.

5.1 Basic ingredients

5.1.1 *Milk solids*

Milk or Skim milk, conforming to **SLS 181**

Milk powder or Skim milk powder, conforming to **SLS 731**

Condensed milk, conforming to **SLS 179**

Whey powder

5.1.2 *Fat*

Cream

Butter, conforming to **SLS 279**

Vegetable fats and oils

5.1.3 *Sugar*, conforming to **SLS 191**

5.1.4 *Water*, conforming to **SLS 614**

5.2 Optional ingredients

In addition to the ingredients given in **5.1**, the product may contain one or more of the substances given below:

5.2.1 *Fruits and fruit products*

Mature fruits and fruit products, fresh or frozen

Canned fruits

Dried fruits

Fruit syrups

5.2.2 *Nuts*, free from damages, rancidity, moulds, insect and rodent infestations.

5.2.3 *Food ingredients*, intended to impart flavour, taste or texture for example: cocoa, chocolate, coffee, ginger, honey, treacle etc.

5.2.4 *Food grade Salt*, conforming to **SLS 79**

5.2.5 *Eggs*, fresh or pasteurized egg products

5.2.6 Food additives

5.2.6.1 Colouring substances, permitted natural or artificial colouring substances not exceeding 100 mg/kg in the final product

5.2.6.2 Emulsifiers and stabilizers – not exceeding 10g/kg singly or in combination

Gelatin

Pectins (INS 440)

Carageenan (INS 407)

Mono and diglycerides of fatty acids (INS 471)

Sodium carboxy methyl cellulose (INS 466)

Methyl cellulose (INS 461)

Polyoxyethylene derivatives of sorbitan monostearate (INS 435)

Polyoxyethylene derivatives of sorbitan tristearate (INS 436)

Polyoxyethylene derivatives of sorbitan mono-oleate (INS 433)

Gum Arabic (acacia gum) (INS 414)

Trgacanth gum (INS 413)

Xanthan gum (INS 415)

Guar gum (INS 412)

Locust (Carob) bean gum (INS 410)

Alginic acid and its sodium, potassium ammonium and calcium salts (INS 400, 401, 402,403,404)

Propylene glycol alginate (INS 405)

5.2.6.3 Acidity regulators - Limited by GMP

Citric acid (INS 330)

Lactic acid (INS 270)

5.2.6.4 Flavouring substances, natural, nature identical or artificial flavouring substances

5.2.6.5 Sweeteners (only for 'energy reduced' or 'no sugar added' products).

Polyols and isomalt - limited by GMP

Neotame - 32 mg/kg

Acesulfame K - 350 mg/kg

Aspartame -10000 mg/kg

Sucralose - 400 mg/kg

6 REQUIREMENTS

All types of ice cream given in Clause 4 shall conform to the following requirements:

6.1 General requirements

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

6.1.2 Ice cream shall be stored at a temperature below -18 °C. Products other than frozen desserts shall not be stored together with ice cream.

6.1.3 All ingredients used in the preparation of ice cream shall be clean and sound and fit for human consumption. Perishable ingredients not in immediate use shall be stored hygienically under refrigeration.

6.1.4 The product shall have a pleasant odour and flavour and shall be free from rancidity, insect infestation, filth, and any other foreign substances.

6.1.5 Ice cream shall be smooth in texture and uniform in consistency. It shall be free from ice crystals, lactose crystals or butter granules.

6.1.6 The product shall be free from animal fats or their derivatives (with the exception of milk fat).

6.2 Pasteurization requirements

6.2.1 Milk ingredients used in the ice cream shall be pasteurized or subjected to an equivalent heat treatment.

6.2.2 The whole mix of ice cream shall have undergone a suitable heat treatment and shall satisfy the phosphatase test described in Appendix **B**.

6.3 Compositional and chemical requirements

The product shall conform to the requirements given in Table 1, when tested according to the methods given in Columns 4 of the table.

TABLE 1 – Requirements for ice cream

SI. No. (1)	Characteristic (2)	Requirement (3)	Method of test (4)
i)	Total solids, per cent by mass, (min.)	32	SLS 735 Part 5
ii)	Fat, per cent by mass, (min.)	08	Appendix C
iii)	Sucrose, per cent by mass, (max.)*	15	SLS 735 Part 6
iv)	Milk solids, non fat, per cent by mass, (min.)	08	Appendix D
v)	Acidity as lactic acid, per cent by mass, (max.)*	0.25	SLS 735 Part 2
vi)	Mass in grams, per litre, (min.)	475	Appendix E

* This limit is not applicable to complex ice cream

6.4 Microbiological limits

Ice cream shall conform to the microbiological limits given in Table 2, when tested according to the methods given in Column 7 of the Table.

TABLE 2 – Microbiological limits

SI No. (1)	Test organism (2)	n (3)	c (4)	Limit		Method of Test (7)
				m (5)	M (6)	
i)	Aerobic plate count, per g	5	2	5×10^4	2×10^5	Appendix F
ii)	Coliforms, per g (MPN)	5	2	10	1×10^3	
iii)	<i>E.coli</i> , per g (MPN)	5	0	0	-	
iv)	<i>Staphylococcus aureus</i> , per g (coagulase positive)	5	1	10	1×10^2	
v)	<i>Salmonella</i> , per 25 g	5	0	0	-	
vi)	<i>Listeria monocytogenes</i> , per g	5	0	0	-	

where,

n is the number of sample units to be tested;

c is the maximum allowable number of sample units yielding values between m and M

m is the limit under which a count is acceptable for any sample unit; and
M is the limit above which a count is unacceptable for any sample unit.

7 PACKAGING

Ice cream shall be wrapped or packaged in a food grade material/container which is impermeable and non absorbent. It shall not impart any off flavour or odour and shall not contaminate the product. If the wrapper is printed, the printing dye shall not penetrate to the product.

8 MARKING AND/OR LABELLING

8.1 The following shall be marked or labelled legibly and indelibly on each package/container :

a) Name of the product as “ice cream” or “X ice cream”, where “X” stands for other foods or flavour;

NOTES

1. *Ice cream declared as fruit or fruit and nut ice cream should contain a minimum fruit or fruit and nut content of 5 per cent by mass.*

2. *Ice cream containing only milk fat may be declared as “dairy ice cream”*

- b) Brand name or trade mark, if any;
- c) Name and address of the manufacturer and packer/distributor in Sri Lanka;
- d) Net content, in milliliters, liters, grams or kilograms;
- e) Batch number or code number or a decipherable code marking;
- f) Complete list of ingredients, in descending order of their proportions;
- g) Food additive's name or INS number;
- h) Date of manufacture;
- j) Date of expiry;
- k) Instructions for storage ;
- m) Country of origin, in case of imported products; and
- n) When sugars are fully or partially replaced by sweeteners, an appropriate declaration shall be made.

8.2 The marking and labelling shall also be in accordance with **SLS 467**.

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

10.1 Tests shall be carried as specified in Parts **1, 3** and **5** of **SLS 516**, Parts **1, 2, 5** and **6** of **SLS 735**, Appendices **B** to **F** of this specification and **ISO 11290** Parts **1** and **2**.

10.2 Reagents

All reagents used shall be of recognized analytical quality and wherever water is mentioned distilled or de-ionized water shall be used.

11 CRITERIA FOR CONFORMITY

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

11.1 Each sample inspected as in **A.5.1** satisfies the packaging and marking requirements.

11.2 Each sample unit tested as in **A.5.2** satisfies the microbiological limits given in **6.4**.

11.3 The test results on the composite sample tested as in **A.5.4** satisfy the relevant requirements.

11.4 The unit tested as in **A.5.5** satisfies the relevant requirement.

**APPENDIX A
SAMPLING**

A.1 LOT

In any consignment all the units of ice cream of the same category and size and belonging to one batch of manufacture or supply shall constitute a lot.

A.2 General requirements of sampling

When drawing samples, the following precautions shall be taken:

A.2.1 Samples for microbiological analysis shall be drawn first.

A.2.2 The samples shall be protected against adventitious contamination.

A.2.3 The sampling instruments shall be clean and dry when used. When drawing samples for microbiological examination, the sampling instruments shall be sterilized.

A.2.4 The samples shall be kept in clean and dry suitable containers. The samples for microbiological examination shall be kept in sterilized containers.

A.2.5 The sample containers shall be sealed air-tight and marked with necessary details of sampling.

A.2.6 The samples shall be transported and stored at a temperature below the freezing point of ice cream in such a manner that there will be no deterioration of the quality of material.

A.3 SCALE OF SAMPLING

A.3.1 Samples shall be tested from each lot for ascertaining its conformity to the requirements of this specification.

A.3.2 The number of units to be selected from the lot shall be in accordance with Table 3.

TABLE 3 - Scale of sampling

No. of units in the lot (1)	No. of units to be selected (2)
Up to 300	11
301 to 500	12
501 to 1 200	13
1 201 to 3 000	15
3 001 to 10 000	18
10 001 and above	21

A.3.3 The units shall be selected at random. In order to ensure randomness of selection tables of random numbers as given in **SLS 428** shall be used.

A.4 Preparation of samples

A.4.1 Preparation of the samples for microbiological examination

A sub sample of five units shall be drawn from the units selected as in **A.3.2** Approximately equal quantities of about 100 g shall be drawn from each unit of the sub sample using an appropriate sterile sampling instrument and transferred to five sample containers.

NOTE

In the case of single serve packs where the mass is less than 100 g a sufficient number of unopened and undamaged packages shall be selected to obtain a sample of 100 g. The number of single serve packages so selected shall be treated as one sample unit.

A.4.2 Preparation of the composite sample

Approximately equal quantities shall be drawn from each unit selected as in **A.3.2** using an appropriate sampling instrument, mixed together and reduced to get a composite sample of sufficient size.

A.4.3 These samples are to be prepared at the place of inspection.

A.4.4 Preparation of the sample for chemical analysis

A.4.1 The samples should be analysed immediately after receipt. If this is not possible, the samples should be stored at a temperature below the freezing point of ice cream.

A.4.1.1 Simple ice cream

Allow the sample to soften at room temperature.(It is not advisable to soften the sample by heating on a water bath or over a flame). Mix thoroughly by stirring with a spoon or spatula.

A.4.1.2 Complex ice cream containing insoluble particles

Allow the sample to soften at room temperature. Blend 100 g to 200 g of the sample using a mixer (for about 10 minutes) until the insoluble particles are finely divided.

A.4.1.3 Novelties

The ice cream part should be separated from the coating in an appropriate way. Ice cream so separated shall be prepared for testing as given in **A.4.1.1** or **A.4.1.2** as appropriate.

A.5 Number of tests

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

A.5.2 Five sample units shall be selected from the sample units selected as in **A.4.1** and each of them shall, be tested for microbiological requirements.

A.5.4 The composite sample prepared in **A.4.2** shall be tested for the requirements given in **6.1.4**, **6.1.5** and **6.3** except for the requirements in (vi) of Table 1.

A.5.5 One unit shall be selected from the lot and tested for mass per liter. (This may be done at the place of inspection)

APPENDIX B PHOSPHATASE TEST

B.1 APPARATUS

B.1.1 *Lovibond all purposes comparator*, with stand and standard discs.

B.1.2 *Fused glass cells*, 25 mm.

B.1.3 *Test tubes*, with ring at 10 ml fitted with rubber stoppers.

B.2 REAGENTS

B.2.1 *Buffer solution*, 3.5 g of sodium carbonate analytical reagent grade and 1.5 g of sodium bicarbonate analytical reagent grade dissolved in one litre of water.

B.2.2 *Substrate*, disodium p-nitrophenylphosphate not less than 95 per cent pure.

B.2.3 *Buffer substrate*, transfer 0.15 g of the substrate into a 100-ml measuring cylinder or stoppered graduated flask and make up to the mark with the buffer solution. The solution should not be stored for long periods but may normally be kept in refrigerator for up to one week. The solution is practically colourless ; when viewed through a 25 mm cell in the comparator, it should give a reading of less than 10 on the disc.

B.3 PROCEDURE

Fill 10 ml (5 ml may be used) quantities of the buffer substrate solution into test tubes marked at 10 ml and bring to 37° C to 38° C in a water bath. Add 2 ml (1 ml if 5 ml of buffer substrate are used) of the milk to be tested, close the tubes with rubber stoppers and invert to mix. Prepare in the same way a control tube using a portion of the whole mix of ice cream (see **6.2.2**) under test

which has been boiled and cooled. Incubate all the tubes at 37° C to 38° C. Read the yellow colour after 30 min, return to the bath, and take a second reading after incubation for a further 90 min. The yellow colour is read in a Lovibond all purposes comparator on a resazurin stand, fitted with the disc calibrated in microgram p-nitrophenol. The blank is placed on the left of the stand and the sample on the right. Readings are taken by looking down the two apertures with the comparator facing a good source of daylight; the disc is revolved until the colours are matched. Readings falling between two standards are recorded to the nearest reading.

B.4 INTERPRETATION

Sample showing a disc reading of 0 after 30 min and 0 to 10 after 2 h shall be deemed to have satisfied the test.

APPENDIX C DETERMINATION OF FAT

C.1 ROSE-GOTLIEB METHOD

Carry out the determination as prescribed in **SLS 735: Part 1/Section 2**.

C.2 MODIFIED WERNER - SCHMID METHOD

This method is suitable for custard ices and those which contain stabilizers and emulsifiers.

C.2.1 Apparatus

Siphon type fat extraction tube.

C.2.2 Reagents

C.2.2.1 Hydrochloric acid, concentrated, rel. den. = 1.18.

C.2.2.2 Ethyl alcohol, 95 to 96 per cent (V/V).

C.2.2.3 Diethyl ether, rel. den. = 0.720 and peroxide free.

C.2.3 Procedure

Weigh, to the nearest milligram, about 4 g to 5 g of the prepared sample into the extraction tube. Add 3 ml of hot water and mix. Add 10 ml of hydrochloric acid (**C.2.2.1**) and mix. Place the tube in a water bath maintained at 50 + 2 °C for 30 minutes swirling gently during the first 5 minutes. Cool, add 10 ml of ethyl alcohol (**C.2.2.2**) and mix.

Add 25 ml of diethyl ether (C.2.2.3) and proceed as described in SLS 735 : Part 1/Section 2.

APPENDIX D APPENDIX D DETERMINATION OF MILK SOLIDS NON FAT

D.1 REAGENTS

D.1.1 *Phenolphthalein indicator solution.*

D.1.2 *Sodium hydroxide, C(NaOH)= 0.100 mol/l.*

D.1.3 *Formaldehyde, 40 per cent (V/V).*

D.2 PROCEDURE

D.2.1 Weigh, to the nearest milligram about 10 g of the prepared sample in to a porcelain dish. Add 1 ml of phenolphthalein (D.1.1) and titrate with sodium hydroxide (D.1.2) until a faint pink colour is obtained.

Add 3.00 ml of formaldehyde solution (D.1.3) to the neutralised ice cream, mix with a glass rod and titrate with the sodium hydroxide using phenolphthalein as the indicator.

D.2.2 Carry out a blank titration.

D.3 CALCULATION

$$\text{Milk solids non fat per cent by mass} = 5.67 (V_1 - V_2)$$

Where,

V_1 = is the volume, in ml, of the sodium hydroxide solution used in D. 2 .1 ; and

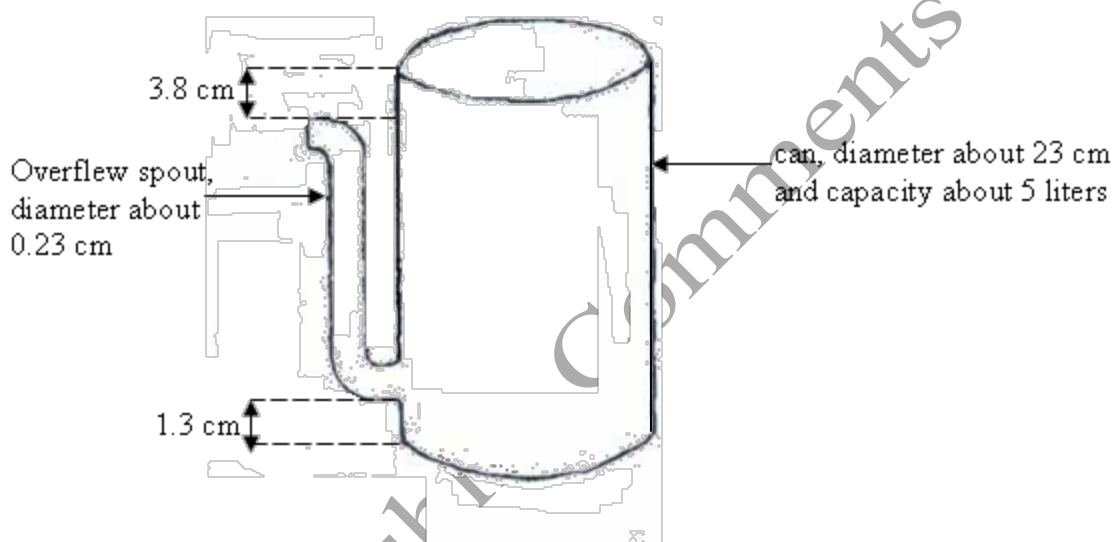
V_2 = is the volume, in ml, of the sodium hydroxide solution used in D.2.2.

APPENDIX E DETERMINATION OF MASS PER LITRE

E.1 This determination should be carried out immediately after the sample is obtained from the cold room/freezing compartment. If the sample is transported to a laboratory, it should be done in an insulated container with solid carbon dioxide surrounding the package.

E.2 APPARATUS

Overflow can, as shown in the figure.



E.3 PROCEDURE

E.3.1 Place the overflow can on a level surface and fill with cooled kerosene until it overflows through the spout. When overflow ceases, place a weighed graduated cylinder/ beaker under the spout.

E.3.2 Quickly remove the sample from the carton and weigh to the nearest gram. Slowly immerse the sample in kerosene, submerging completely by holding with a spatula. When the overflow ceases, weigh the cylinder/beaker with the displaced kerosene.

E.3.3 If it is difficult to remove the carton, weigh the sample with the carton. Open the ends or sides of the carton enough to avoid formation of entrapped air bubbles and submerge as given in **E.3.2** and weigh the displaced kerosene.

Remove the contents from the carton. Dry the empty carton and weigh. Roll up the dried carton and slip it in to a graduated cylinder filled with kerosene avoiding entrapment of air. Measure the increase in volume when the carton is completely immersed.

E.4 CALCULATION

E.4.1 Calculate the net mass of the kerosene displaced by the sample. Divide the calculated volume by the specific gravity of kerosene to obtain the volume displaced.

NOTE

Volume reading in the graduated cylinder/beaker may be used to check the calculated volume.

E.4.2 Using the mass of the sample (corrected for the mass of the carton) and the volume as determined in **E.4.1** (corrected for the volume of the carton), calculate the in grams of one litre of the sample.

APPENDIX F MICROBIOLOGICAL EXAMINATION

The samples shall be stored at a temperature below the freezing point of ice cream. They shall be examined within 7 days of receipt.

F.1 PREPARATION OF TEST SAMPLE

F.1.1 *Preliminary treatment*

F.1.1.1 Clean and disinfectant exterior of the unopened package with 70 per cent V/V ethanol without burning.

F.1.1.2 Where wrapping completely encloses the stick of a confection, cut wrapping with a scalpel to expose stick and aseptically remove it. Cut the stick as close as possible to confection and transfer confection to a wide mouth container with a screw cap.

F.1.1.3 In case of single serve packs, place the entire contents in a wide mouth container with a screw cap, using aseptic techniques.

F.1.1.4 In the case of large packages, weigh at least 50 g of the sample under aseptic conditions using sterile instruments (bores, spoon, broad bladed spatula) in to a container.

F.1.2 *Preparation of primary dilution*

Melt the sample prepared as in **F.1.1** in the container by placing in a water bath at 45 ± 1 °C for 15 minutes. Shake the container at intervals.

Thoroughly mix the melted sample and weigh 10 g using a pipette into a flask containing a tablespoon of glass beads and 90 ml of 0.1 per cent peptone diluents at 45 ± 1 °C.

A spoon or pipette can be used for weighing depending on the consistency of the sample.

Close the flask and shake by inverting 25 times for 12 seconds over 300 mm arc.

Prepare further decimal dilutions as necessary.

F.2 AEROBIC PLATE COUNT

Enumeration of Aerobic Plate Count shall be carried out according to the method given in **SLS 516 Part 1**.

F.2 ENUMERATION OF COLIFORMS

Enumeration of Coliforms shall be carried out according to the method given in **SLS 516 Part 3/ Section 1**.

F.3 ENUMERATION OF *Escherichia coli*

Enumeration of *Escherichia coli* shall be carried out according to the method given in **SLS 516 Part 12**.

F.4 ENUMERATION OF *Staphylococcus aureus*

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

F.5 DETECTION OF *Salmonella*

F.5.1 Pre-enrichment

Weigh 25 g of melted sample (**F.1.2**) using a pipette into a flask containing 225 ml of buffered peptone water and mix.

Incubate at 37 °C for 16 to 20 hours.

F.5.2 Proceed as in **SLS 516 Part 5**. Incubate tetrathionate medium at 43 ± 0.5 °C in a water bath and selenite cytine medium at 37 °C in an incubator or water bath.

F.6 ENUMERATION OF *Listeria monocytogenes*

Enumeration of *Listeria monocytogenes* shall be carried out according to the method given in **ISO 11290 Parts 1 and 2**.
