SRI LANKA STANDARD 554 : 2016

UDC 668.18.3

SPECIFICATION FOR
LAUNDRY SOAP
(First Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
SPECIFICATION FOR LAUNDRY SOAP
(*First Revision*)

SLS 554 : 2016

Gr. 7

SRI LANKA STANDARDS INSTITUTION
17, Victoria Place
Elvitigala Mawatha
Colombo 08
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 LAUNDRY SOAP
(*First Revision*)

FOREWORD

This Standard was approved by the Sectoral Committee on Chemical and Polymer Technology and was authorized for adoption and publication as a Sri Lanka Standard has been approved by the Council of the Sri Lanka Standards Institution on 2016-06-23.

Sri Lanka Standard for laundry soap was first published in 1968 as **CS 33**. Subsequently **SLS 443** was issued in 1978 to cover laundry soaps made entirely from coconut oil. In 1982 these two specifications were merged and **SLS 554 : 1982** was issued to cover the requirements of Type 1 and Type 2 laundry soaps. Subsequently, Type 3 laundry soap was introduced by the Amendment No. 285 issued in 2001.

This First Revision is issued to cover three types ie, laundry soap bars or tablets without detergent, laundry soap bars or tablets with detergents and laundry soap bars or tablets entirely from coconut oil. In this First Revision, reference have been made to some of the International test methods (ISO). The requirement for pH, and the content of surface active agent have been specified whilst the content of total fatty matter and matter insoluble in ethanol in Type 3 laundry soap have been revised.

This standard is subject to the restrictions imposed by any applicable regulatory authority.

For the purpose of deciding whether a particular requirement of this specification 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 figures to be retained in the rounded off value shall be the same as that of the specified value in this specification.

In the preparation of this standard, the assistance obtained from the following publications is gratefully acknowledged :

IS 285 : 1992 Indian Standard Laundry Soaps - Specification

1 SCOPE

This Standard prescribes the requirements, methods of sampling and test for laundry soaps with or without detergents in the form of bar or tablet.

2 REFERENCES

ISO 456 Surface active agents – Analysis of soaps – Determination of free caustic alkali
ISO 457 Soaps – Determination of chloride content – Titrimetric method
ISO 673 Soaps – Determination of content of ethanol – Insoluble matter
ISO 684 Analysis of soaps – Determination of total free alkali

ISO 685 Analysis of soaps – Determination of total alkali content and total fatty matter content
ISO 1067 Analysis of soaps – Determination of unsaponifiable, unsaponified and unsaponified saponifiable matter
SLS 102 Rules for rounding off numerical values
SLS 428 Random sampling methods
SLS 1342 Hair Shampoo for babies
SLS 1348 Good manufacturing practices (GMP) for cleansing materials

3 TYPES

There shall be three types of laundry soaps, namely,

3.1 Laundry soap without detergent : Laundry soap free from detergents and substances commonly known as or intended to act as inert fillers

3.2 Laundry soap entirely from coconut oil : Laundry soap manufactured entirely from coconut oil, free from detergents and substances commonly known as or intended to act as inert fillers

3.3 Laundry soap with detergents

4 REQUIREMENTS

4.1 General requirements

4.1.1 Laundry soap shall be a well saponified product in the form of tablet or bar, uniform in colour, of firm and even texture, free from dirt and fragmentation. It shall be free from any objectionable odour and shall not develop any objectionable odours during storage within the declared shelf-life. It shall have good lathering and cleansing properties.

4.1.2 Laundry soap shall be manufactured by a process adhering to Good Manufacturing Practices (GMP) complying with **SLS 1348**.

4.1.3 The laundry soap shall meet performance and stability specifications based on in-vitro studies for the complete duration of the declared shelf life. The date of expiry / best before / shelf life of the finished product shall be determined and declared by the manufacturer on the results of stability.

4.2 Other Requirements

4.2.1 Laundry soaps shall also comply with the requirements given in Table **1**, when tested according to the relevant methods given in Column **(6)** and the results recalculated according to **8.1** for characteristics (ii) to (vi) of the Table **1**.

4.2.2 Mass of soap

Net mass of laundry soap indicated on the wrapper shall be complied with the recalculated mass of soap as given in **8.2**.

TABLE 1 – Requirements for laundry soap

Sl. No.	Characteristic	Requirement			Method of test
		Laundry soap without detergent (Type 1)	Laundry soap entirely from coconut oil without detergent (Type 2)	Laundry soap with detergents (Type 3)	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Total fatty matter, including rosin acids, per cent by mass, min.	59.0	59.0	45.0	ISO 685 (for Type 1 and Type 2) Appendix B (for Type 3)
ii)	Matter insoluble in ethanol, per cent by mass, max.	2.0	2.0	20.0	ISO 673
iii)	Free caustic alkali, as NaOH, per cent by mass, max.	0.1	0.1	0.1	ISO 456
iv)	Total free alkali, as NaOH, per cent by mass, max.	0.45	0.45	0.45	ISO 684
v)	Total unsaponified matter, per cent by mass, max.	2.0	4.0	4.0	ISO 1067
vi)	Chlorides, calculated as NaCl, per cent by mass, max.	1.0	1.6	1.6	ISO 457
vii)	Synthetic surface active agent content, per cent by mass, min.	-	-	2.0	Appendix B
viii)	pH at 27 ± 2 ^{0}C	6.5-10.0	6.5-10.0	6.5-10.0	Appendix C of SLS 1342 : 2008

5 PACKAGING AND MARKING

5.1 Every bar or tablet shall be well wrapped and the wrapper shall be marked legibly and indelibly with the following:

a) Name of the product as "laundry soap without detergent" or "laundry soap entirely from coconut oil" or "laundry soap with detergent" (see **3**);
b) Name and address of the manufacturer. In the case of imported products, name and address of the manufacturer and the distributor shall be marked including the country of origin;
c) Registered trade mark / brand name , if any;
d) Net mass of tablet or bar in grams at declared total fatty matter (TFM);
e) Batch identification number;
f) Date of manufacture and best before / shelf life;
g) Specific warning statement or cautionary labeling on skin irritation where applicable; and
h) List of ingredients.

5.2 Where tablets or bars are packed into containers, each container shall be marked legibly and indelibly with the following :

a)Name of the product as "laundry soap without detergent" or "laundry soap entirely from coconut oil " or "laundry soap with detergent" (see **3**);
b) Name and address of the manufacturer. In the case of imported products, name and address of the manufacturer and the distributor shall be marked including the country of origin;
c) Registered trade mark / brand name, if any;
d) Number of soap tablets / bars in each container; and
e) Batch identification number.

6 SAMPLING

Representative samples of soap for carrying out tests shall be drawn as specified in Appendix **A**.

7 METHODS OF TEST

7.1 Tests shall be carried out as per the methods given in Column **(6)** of Table **1**.

7.2 During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

8 CALCULATION OF RESULTS

8.1 The soaps to which this specification applies are liable to lose moisture on keeping. The results obtained by the specified methods of analysis shall therefore be recalculated in relation to the specified minimum total fatty matter by means of the equation:

$$\text{Recalculated result} = \text{Actual result} \times \frac{\text{Minimum specified total fatty matter}}{\text{Actual total fatty matter}}$$

8.1.1 In each of the characteristics (ii) to (vi) of Table **1**, the requirement of the characteristic will be met if the recalculated result obtained as above is within the specified range.

8.2 The mass of soap bars or tablets as agreed to between the purchaser and the supplier shall be recalculated from the equation:

$$\text{Recalculated mass of soap before drain} = \frac{\text{Actual mass of soap x Actual total fatty matter}}{\text{Declared total fatty matter}}$$

APPENDIX A
COMPLIANCE OF A LOT

The sampling scheme given in this Appendix should be applied where compliance of a lot to the requirements of this standard is to be assessed based on statistical sampling and inspection.

Where compliance with this standard, appropriate schemes of sampling and inspection shall be adopted based on manufacturer's control systems coupled with type tests, and testing procedures.

A.1 LOT

All bars or tablets of the same brand and size manufactured by one batch of ingredients and by the same organization under relatively similar conditions of manufacture shall be grouped together to form a lot.

A.2 SCALE OF SAMPLING

A.2.1 Samples shall be tested from each lot separately for ascertaining the conformity of the soap to the requirements of this specification.

A.2.2 The number of bars or tablets to be selected from the lot shall depend on the size of the lot and shall be in accordance with Columns **(1)** and **(2)** of Table **2**.

A.2.3 Where the soap is packed in containers, the number of containers to be selected for taking the required number of samples shall be half the number given in Column **(2)** of Table **2**. At least 2 bars or tablets shall be drawn from each container selected to form a sample.

A.2.4 The required number of containers, bars or tablets shall be chosen at random. A random number table as specified in **SLS 428** shall be used in order to ensure randomness of selection.

TABLE 2 – Scale of sampling

No. or bars or tablets in the lot (1)	No. of bars or tablets to be selected (2)	Acceptance No. (3)
Up to 100	04	0
101 to 500	08	0
501 to 1 000	12	1
1 000 to 5 000	16	1
5 000 and above	20	2

A.3 NUMBER OF TESTS

A.3.1 The wrapper of each bar or tablet selected as in **A.2.2** shall be inspected for marking and labeling.

A.3.2 Each container selected as in **A.2.3** shall be inspected for marking (see **5.1** and **5.2**).

A.3.3 The mass of each bar or tablet selected as in **A.2.2** shall be determined and recalculated as given in **8.2** (see **4.2.2**).

A.3.4 Each cake or tablet shall be cut into halves along their longer axes. One half of each cake or tablet shall be sliced finely and mixed together to form a composite sample.

A.3.4.1 Tests for the requirements given in **4.2.1** shall be carried out on this composite sample.

A.4 CRITERIA FOR CONFORMITY

A lot shall be considered to be in conformity with the requirements of this specification, if the following conditions are satisfied.

A.4.1 Each soap wrapper inspected as in **A.3.1** satisfies the marking and labeling requirements (see **5.1**).

A.4.2 Each soap container inspected as in **A.3.2** satisfies the marking and labeling requirements.

A.4.3 The number of defective bars or tablets is less than or equal to the corresponding acceptance number given in Column **(3)** of Table **2**.

NOTE :
A defective is a bar or tablet of which the recalculated mass determined for each observation as described in is less than the mass indicated on the wrapper.

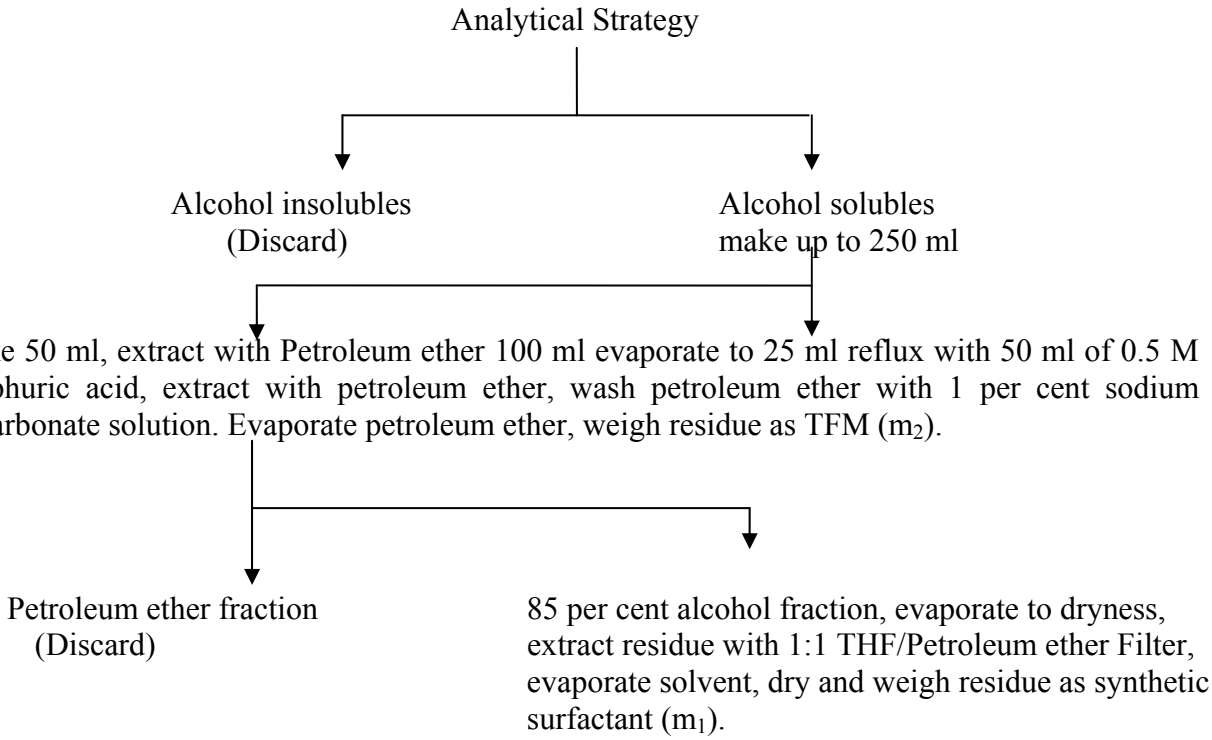
A.4.4 The composite sample tested as in **A.3.4.1** satisfies the relevant requirements.

APPENDIX B
DETERMINATION OF TOTAL FATTY MATTER AND SYNTHETIC SURFACE ACTIVE AGENTS

B.1 PRINCIPLE

The analytical strategy involves the extraction of all surfactants (soaps, non-ionics, anionics and amphoterics) in 85 per cent alcohol. An aliquot of 85 per cent alcohol soluble matter is extracted with petroleum ether to remove hydrophobic constituents (perfume, unsaponifiable matter etc.), and the 85 per cent alcohol fraction is evaporated to dryness.

The residue is extracted with 1:1 tetrahydro furan : petroleum ether mixture and filtered. The filtrate is evaporated and the residue weighed as synthetic surfactant. Another aliquot of the 85 per cent alcohol soluble portion is refluxed with 0.5 M sulphuric acid and extracted with petroleum ether. The residue obtained after evaporation of petroleum ether is the TFM comprising of free fatty acids, fatty matter from soap, as well as fatty matter associated with other surfactants.



B.2 REAGENTS

B.2.1 85 per cent Alcohol *(v/v)*

Ethyl alcohol or rectified spirit.

Mix 85 parts by volume of ethyl alcohol with 15 parts by volume of distilled water, mix well and neutralise with 0.1 M NaOH to phenolphthalein end point, (Note : *if rectified spirit is used, dilution should be accordingly made so as to obtain 85 per cent* v/v *concentration*).

B.2.2 Sulphuric acid 0.5 M (approximate**)**

Add 6 ml of concentrated sulphuric acid [LR] [Sp Gr 1.84] to 50 ml of cold distilled water (10°C approximate) with stirring and dilute with distilled water to 100 ml in a standard volumetric flask and mix well.

NOTE :
Wear *safety glasses and rubber gloves while handling concentrated sulphuric acid.*

B.2.3 Methyl orange indicator solution - (0.1 per cent aqueous solution)

Dissolve 0.1 g of the indicator in 100 ml distilled water.

B.2.4 Phenolphthalein indicator - (1.0 per cent *w/v* alcoholic solution)

Dissolve 1.00 g ± 0.05 g of the indicator in 100 ml of ethyl alcohol or rectified spirit and mix well.

B.2.5 Sodium hydroxide 0.1 M (approximate)

Dissolve *2* g AR grade sodium hydroxide in distilled water and make up to 500 ml with distilled water in a standard volumetric flask and mix well.

B.2.6 Petroleum ether (40°C -60°C boiling range)

Laboratory reagent grade

B.2.7 Aqueous ethyl alcohol (or rectified spirit)- Approximately 50 per cent *v/v*

Mix equal volumes of ethyl alcohol or rectified spirit and distilled water.

B.2.8 Sodium bicarbonate solution - 1 per cent *w/v* (approximate)

Dissolve 2.5 g AR grade $NaHC0_3$ in 125 ml of distilled water and make up to 250 ml in a volumetric flask.

B.2.9 Sodium hydroxide solution

1.0 per cent solution in 85 per cent alcohol (approximate). Dissolve 2.5 g of sodium hydroxide in 85 per cent alcohol and dilute to 250 ml in a volumetric flask.

B.2.10 Acetone (AR grade)

B.2.11 Tetrahydrofuran (THF) - AR grade

B.2.12 Solvent mixture

1:1 mixture of tetrahydrofuran and petroleum ether (*v/v*)

B.2.13 Rectified spirit

B.3 APPARATUS/GLASSWARE

B.3.1 Beakers

250 ml, 500 ml and 1 000 ml capacity

B.3.2 Measuring cylinder

10 ml, 25 ml and 50 ml capacity

B.3.3 Standard volumetric flask

10 ml, 250 ml, 500 ml and 1 000 ml capacity

B.3.4 Separating funnel

500 ml capacity

B.3.5 Round bottom flask with ground joint

250 ml capacity

B.3.6 Air condenser

length 1 m

B.3.7 Conical flask

500 ml capacity

B.3.8 Funnels

B.3.9 Glass rods

B.3.10 Flash rotary evaporator/ distillation set-up

B.5.11 Whatman filter paper No. 541

B.3.12 Air oven

B.3.13 Steam bath

B.4 PROCEDURE

B.4.1 Preparation of sample

B.4.1.1 Cut the bar into two halves. Grate approximately 2 g to 10 g from the centre of the each half of the bar. Homogenize the gratings from the two halves and use this for further analysis.

B.4.2 85 per cent alcohol extraction

B.4.2.1 Weigh accurately about 2.0 g to 3.0 g of sample into a 250-ml beaker (*m*).

B.4.2.2 Add 125 ml of 85 per cent alcohol, heat to about 60 °C with continuous stirring with a glass rod on a steam bath for 5 minutes (approximately) inside a fume cupboard. Transfer into a 250-ml volumetric flask using a funnel by decantation.

B.4.2.3 Add again 50 ml of 85 per cent alcohol into the same beaker (**B.4.2.1**), break the lumps, if any, with the glass rod, repeat the operation as in **B.4.2.2.**

B.4.2.4 Repeat the extraction twice with 25 ml of 85 per cent alcohol as in **B.4.2.2**.

B.4.2.5 Collect all the 85 per cent alcohol extracts in the 250-ml volumetric flask.

B.4.2.6 The combined extracts from **B.4.2.5** are made to 250 ml with 85 per cent alcohol and mixed well.

B.4.3 Estimation of synthetic surfactants

B.4.3.1 Transfer 50 ml of solution from **B.4.2.6** to a 250-ml beaker.

B.4.3.2 Add 0.5 ml of phenolphthalein indicator and add 1.0 per cent sodium hydroxide solution till the colour of the solution changes to pink. Add 1.0 ml excess beyond this point.

B.4.3.3 Transfer quantitatively into a 500 ml separating funnel, extract 3 times with 50 ml aliquots of petroleum ether. Preserve the lower alcohol/water portion.

B.4.3.4 Wash the combined petroleum ether extracts with 20 ml aliquots of 85 per cent alcohol solution 2 times. Collect the alcohol washings and transfer quantitatively to the alcohol extract from **B.4.3.3** and discard the petroleum ether extract.

B.4.3.5 Evaporate the alcoholic solution from **B.4.3.4** to dryness.

B.4.3.6 Add 20 ml of acetone to the residue, heat on water bath with continuous stirring to dryness, ensure complete removal of water (See Note 1).

NOTES:

1 *This is a very important step, any moisture present will form a stable gel with the solvent mixture, thus making extraction impossible.*

2 *Use only Filter paper No. 541 (Porosity of 20 µm -25 µm).*

B.4.3.7 Add 50 ml of solvent mixture **(B.2.12)** to the residue, heat to boiling (60° C -70 °C) on a water both with constant stirring for 2-3 minutes and filter through filter paper No. 541 (Whatman) collecting the filtrate into a tared 250-ml beaker/round bottom flask.

B.4.3.8 Repeat the extraction two more times as described in **(B.4.3.5),** collecting the filtrate into the same beaker. Wash the filter paper 3 times with 20 ml aliquot of the solvent mixture, collect the washings into the same beaker/round bottom flask.

B.4.3.9 Evaporate the solvent (beaker) on a water bath (inside a fume hood) or alternately distil off solvent (round bottom flask) using a rotary evaporator.

B.4.3.10 Dry the beaker/round bottom flask containing the residue in an air oven at 105°C for 1 hour, cool to room temperature inside a dessicator and weigh to constant weight m_1.

B.4.4 Estimation of TFM

B.4.4.1 Transfer quantitatively 100 ml of extract from **B.4.2.6** into a 250-ml beaker, evaporate on steam bath to about 25 ml, and transfer quantitatively into a 250-ml ground jointed round bottom flask.

B.4.4.2 Add 50 ml of 0.5 M sulphuric acid, and reflux on steam bath for 2 h after fitting with an air condenser.

B.4.4.3 Remove condenser and add 8 g sodium chloride and continue refluxing for further 1 hour and 30 minutes.

B.4.4.4 Cool to room temperature, add 20 ml of rectified spirit and quantitatively transfer to a 500-ml separating funnel.

B.4.4.5 Add 75 ml of petroleum ether, stopper, shake vigorously for 1 min, release pressure slowly, remove stopper, and allow the two immiscible phases to separate.

NOTE :
Use safety glasses during extraction.

B.4.4.6 Draw off the lower aqueous/alcoholic layer, into another separating funnel, add 75 ml petroleum ether, replace stopper, shake vigorously for 1 min, release pressure slowly, remove stopper and allow the two immiscible phases to separate. Draw off the lower alcoholic layer into the 250-ml beaker and transfer the petroleum ether extract to the first separating funnel.

B.4.4.7 Transfer the alcoholic layer to the second separating funnel and repeat the extraction with 75 ml of petroleum ether as given in **B.4.4.4.**

B.4.4.8 Wash the petroleum ether extract with 30 ml aliquots of 1 per cent *w/v* sodium bicarbonate solution, till it is free from mineral acidity. Two washings are sufficient (test with methyl orange indicator).

B.4.4.9 Transfer petroleum ether extract quantitatively to a tared 250-ml round bottom flask and evaporate petroleum ether on water bath by distillation inside a fume cupboard.

B.4.4.10 Dry the contents of the flask in an air oven at a temperature of 90 °C for 10 minutes. Remove it from over and blow with air for 15 seconds. Allow the flask to cool and weigh. Return the flask to the oven at 90 °C for another 10 minutes. Cool and reweigh. Repeat the procedure until constant weight (difference between weighings is less than 0.005 g) m_2.

B.5 CALCULATION

$$\text{Total synthetic surfactants, per cent} = \frac{m_1 \times 250 \times 100}{m \times 50}$$

where,

m_1 is the mass, in g, of residue **(B.4.3.10);** and

m is the mass, in g of sample taken for test **(B.4.2.1).**

$$\text{Per cent by mass, TFM} = \frac{m_2 \times 250}{m}$$

where,

m is the mass, in g, of sample taken for test **(B.4.2.1);** and

m_2 is the mass, in g, of residue **(B.4.4.10).**

……

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.*

Printed at SLSI (Printing Unit)

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 and Research.

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 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 return 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.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08