

SRI LANKA STANDARD 628:1983

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**SPECIFICATION FOR
750-ml GLASS BOTTLES WITH 31.5-mm
STANDARD ROLL ON PILFERPROOF (ROPP)
FINISH FOR EDIBLE PRODUCTS**

BUREAU OF CEYLON STANDARDS

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STANDARD ROLL - ON - PILFERPROOF (ROPP) FINISH FOR
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This standard does not purport to include all the necessary provisions of a contract.

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FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Bureau of Ceylon Standards on 1983-12-20, after the draft, finalized by the Drafting Committee on Glass Products, had been approved by the Chemicals Divisional Committee.

All standard values in this specification are in SI units.

The type of bottle prescribed in this specification is not recommended for packing of pharmaceutical products.

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 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 assistance obtained from the publications of the Standard Association of Australia, British Standards Institution and the Indian Standards Institution is gratefully acknowledged.

1 SCOPE

This specification prescribes the requirements and methods of sampling and test for glass bottles with 31.5-mm ROPP finish having a nominal capacity of 750-ml, used for packing edible products, such as cordials, squashes and fruit syrups.

2 REFERENCES

- CS 102 Presentation of numerical values
- CS 124 Test sieves
- SLS 428 Random sampling methods
- SLS 601 Glass container finishes
 - Part 1 Threaded finishes

3 TERMINOLOGY

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

- 3.1 blisters: Large bubbles in glass.
- 3.2 bloom: A surface film on glass resulting from
 - a) atmospheric attack;
 - b) deposition of chemical vapours; or
 - c) formation of sulphites and sulphates during the annealing process.
- 3.3 bubbles: Gas filled cavities in glass.
- 3.4 brimful capacity: The volume of the contents of a bottle when filled to the brim with water at 27 ± 2 °C.
- 3.5 cords: Glassy inclusions of different composition particularly in the form of drawn out lines and possessing optical and other properties differing from those of the surrounding glass.
- 3.6 filling level: The distance from the top of the neck finish to the centre of the meniscus measured on the centre line of the bottle.
- 3.7 finish: The top part of the neck of a bottle made to suit the closure.
- 3.8 hair line: Fine cord on the surface of glass.
- 3.9 insweep: An inward curved or tapered portion of a bottle which joins the lower part of the sides to the base.
- 3.10 nominal capacity: The volume of the contents of a bottle when filled to the filling level with water at 27 ± 2 °C.
- 3.11 push-up: The bottom of the bottle shaped to form a concavity.
- 3.12 sealing surface: The portion of the finish which makes contact with the sealing gasket or liner of the closure.

3.13 seeds: Small bubbles in glass.

3.14 stones: Imperfections in glass resulting from inclusions from such sources as batch materials, refractories and blow pipes or resulting from devitrification of glass or from any other source.

3.15 verticality: The horizontal deviation of the centre of the bore entrance from a vertical line through the centre of the base when the bottle is standing upright on a horizontal surface.

3.16 wedged bottom (slugged bottom): Bottom of a bottle having thick glass on one side and thin glass on the other side.

4 REQUIREMENTS

4.1 Materials and workmanship

The bottles shall be well annealed, free from cords, bubbles, blisters, seeds, stones, hair line cracks, bloom and any other visible defects that may impair the strength, efficiency or appearance of the bottle.

The bottles shall be well formed with uniform distribution of glass all over the walls, the base and the neck, avoiding any wedged bottom and particularly any uneven thickness in the walls. There shall be no sharp edges inside the neck and the mould seam of the neck finish shall have no protruding edges. The sealing surface of the bottles shall be smooth.

The bottles shall have an insweep at the base of the body and the bottom of the bottles shall have the minimum amount of push-up necessary to obviate a bottle rocking on its base.

4.2 Colour

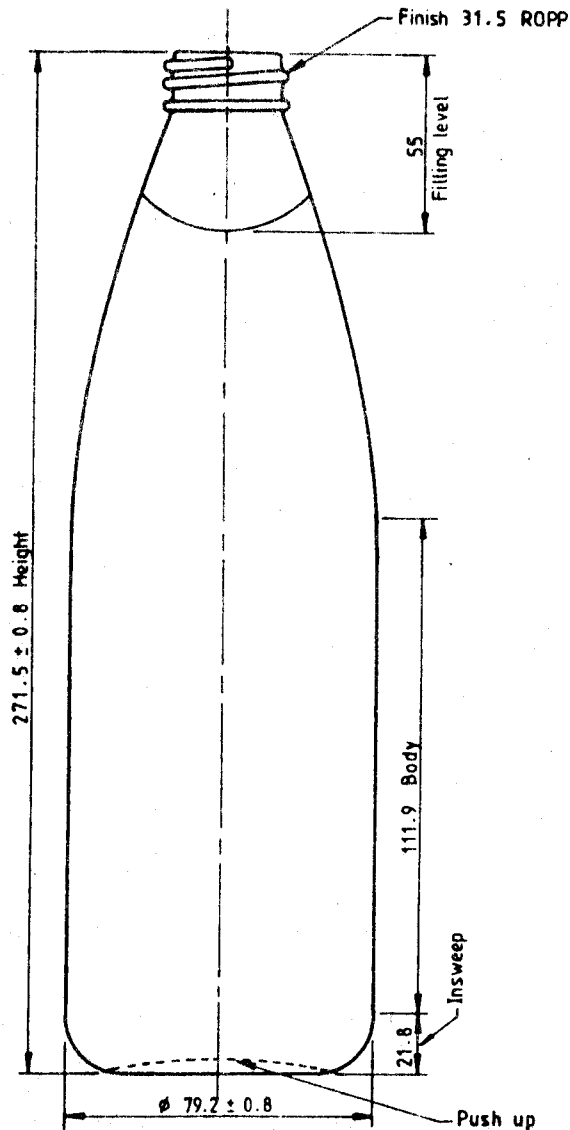
The colour of the bottles shall be uniform and shall be as agreed to between the manufacturer and the purchaser.

4.3 Design and dimensions

4.3.1 External body

The external design and dimensions of the bottles shall be as given in Figure 1. The body diameter shall be measured as prescribed in 8.1.1.

NOTE - Untoleranced dimensions given in Figure 1 are only for guidance in mould-making.



(All dimensions are in millimetres)

FIGURE 1 - Shapes and dimensions for bottles

4.3.2 Neck finish

The finish of the bottles shall conform to the 31.5-mm standard roll - on - thread - pilferproof (ROPP) finish specified in SLS 601:Part 1. The neck finish diameter and the bore dimensions shall be measured as prescribed in 8.1.2 and 8.1.3 respectively.

4.4 Capacity at filling level

The bottles when filled to a filling level of 55-mm shall have a capacity of $750 \begin{smallmatrix} + 7 \\ - 0 \end{smallmatrix}$ ml.

4.5 Brimful capacity

The brimful capacity of a bottle shall be $770 \begin{smallmatrix} + \\ - 7 \end{smallmatrix}$ ml.

4.6 Mass

The mass of a bottle shall be $500 \begin{smallmatrix} + \\ - 5 \end{smallmatrix}$ g.

4.7 Verticality

The maximum verticality of the bottles when tested in accordance with Appendix B shall be 3.0 mm.

4.8 Parallelism between the base and top sealing surface

The base of a bottle shall be parallel to the top sealing surface to within 0.75° when tested in accordance with Appendix C.

4.9 Alkalinity

The bottles shall comply with the requirements for alkalinity prescribed in D.5 when tested in accordance with Appendix D.

4.10 Resistance to impact

The resistance of a bottle to impact shall be such that when a bottle is tested in the manner described in Appendix E, it shall not break or crack under the impact stresses specified therein.

4.11 Resistance to thermal shock

The resistance of a bottle to sudden changes in temperature shall be such that a bottle will not be damaged when subjected to thermal shock in the manner described in Appendix F.

5 PACKAGING

The bottles shall be packed as agreed to between the purchaser and the supplier.

6 MARKING

6.1 The following shall be marked legibly and indelibly on the insweep of the bottle:

- a) Name and address of the manufacturer;
- b) Nominal capacity, in millilitres;
- c) The mould number; and
- d) Identification number.

6.2 The containers may also be marked with the Certification Mark of the Bureau of Ceylon Standards illustrated below on permission being granted for such marking by the Bureau of Ceylon Standards.



NOTE - The use of the Bureau of Ceylon Standards Certification Mark (SLS mark) is governed by the provisions of the Bureau of Ceylon Standards Act and the regulations framed thereunder. The SLS mark on products covered by a Sri Lanka Standard is an assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control, which is devised and supervised by the Bureau and operated by the producer. SLS marked products are also continuously checked by the Bureau for conformity to that standard as a further safeguard. Details of conditions under which a permit for the use of the Certification Mark may be granted to manufacturers or processors may be obtained from the Bureau of Ceylon Standards.

7 SAMPLING

The method of drawing representative samples of the material shall be as prescribed in Appendix A.

8 METHODS OF TEST

Tests shall be carried out as specified in 8.1 and in accordance with Appendices B to F.

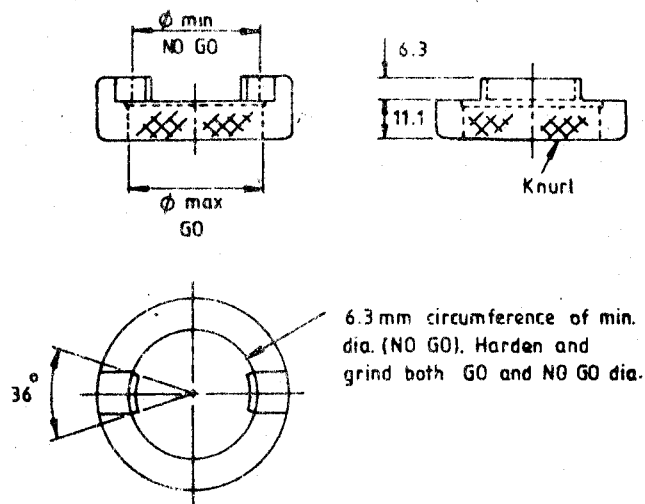
8.1 Measurement of bottle dimensions

8.1.1 Body diameter

The body diameter shall be measured by means of a GO, NO - GO gauge, using a ring gauge for the maximum diameter and a gap gauge with a 50-mm wide anvil for the minimum diameter.

8.1.2 Neck finish diameter

The diameter of the neck finish shall be measured using a Parnaby gauge as shown in Fig. 2, in which each engaging surface subtends an angle of 36° .



(All linear dimensions are in millimetres)

FIGURE 2 - Parnaby gauge

8.1.3 Bore dimensions

Bore dimensions shall be measured using a gauge that enters the neck vertically.

9 CONFORMITY TO STANDARD

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

9.1 The number of defectives in the first stage sample is less than or equal to the corresponding first stage acceptance number given in Column 5 of Table 1 or the number of defectives in the first stage and the second stage sample (cumulative sample) is less than or equal to the corresponding second stage acceptance number given in Column 5 of Table 1 (see A.4.1 and A.4.1.1).

9.2 Each bottle tested in accordance with A.4.2 satisfies the requirements of the impact test and thermal shock test separately.

9.3 Each bottle tested in accordance with A.4.3 satisfies the requirements of the alkalinity test.

APPENDIX A SAMPLING

A.1 LOT

In any consignment all the bottles produced in one day under the same conditions of manufacture shall constitute a lot.

A.2 DEFECTIVE BOTTLE

Any bottle not conforming to any one or more of the requirements given in this specification, other than those for impact resistance, thermal shock and alkalinity, shall be considered as a defective bottle.

A.3 SCALE OF SAMPLING

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

A.3.2 The number of bottles to be selected from the lot shall be in accordance with Table 1.

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

TABLE 1 - Scale of sampling

No. of bottles in the lot (1)	Stage of sample (2)	Sample size (3)	Cumulative sample size (4)	Accept- ance no. (5)	Rejec- tion no. (6)	Sub- sample size (7)
Up to 3 000	1st stage	20	20	0	3)	5
	2nd stage	20	40	3	4)	
3 001 to 10 000	1st stage	32	32	1	4)	8
	2nd stage	32	64	4	5)	
10 001 to 30 000	1st stage	50	50	2	5)	13
	2nd stage	50	100	6	7)	
30 001 and above	1st stage	80	80	3	7)	20
	2nd stage	80	160	8	9)	

A.4 NUMBER OF TESTS

A.4.1 The samples selected in one or two stages, as the case may be, shall be examined for requirements specified in 4.1 to 4.8.

A.4.1.1 The sample bottles selected as in the first stage shall be examined for the above requirements. If the number of defectives in the first stage lies between the acceptance number (Column 5 of Table 1) and rejection number (Column 6 of Table 1) a second stage sample of size given in Column 3 of Table 1 shall be drawn and examined for the said requirements.

A.4.2 If the lot has been found satisfactory with respect to the requirements specified in 4.1 to 4.8, a sub sample of size as given in Column 7 of Table 1 shall be drawn and tested for requirements specified in 4.10 and 4.11.

A.4.3 If the lot has been found satisfactory with respect to the requirements specified in 4.1 to 4.8 and 4.10 to 4.11, five bottles shall be drawn from the sub sample selected as in A.4.2 and shall be tested for the requirement specified in 4.9.

APPENDIX B

TEST FOR VERTICALITY

B.1 APPARATUS

An apparatus incorporating a V-block and dial gauge shall be used. For an example of a suitable apparatus, see Figure 3.

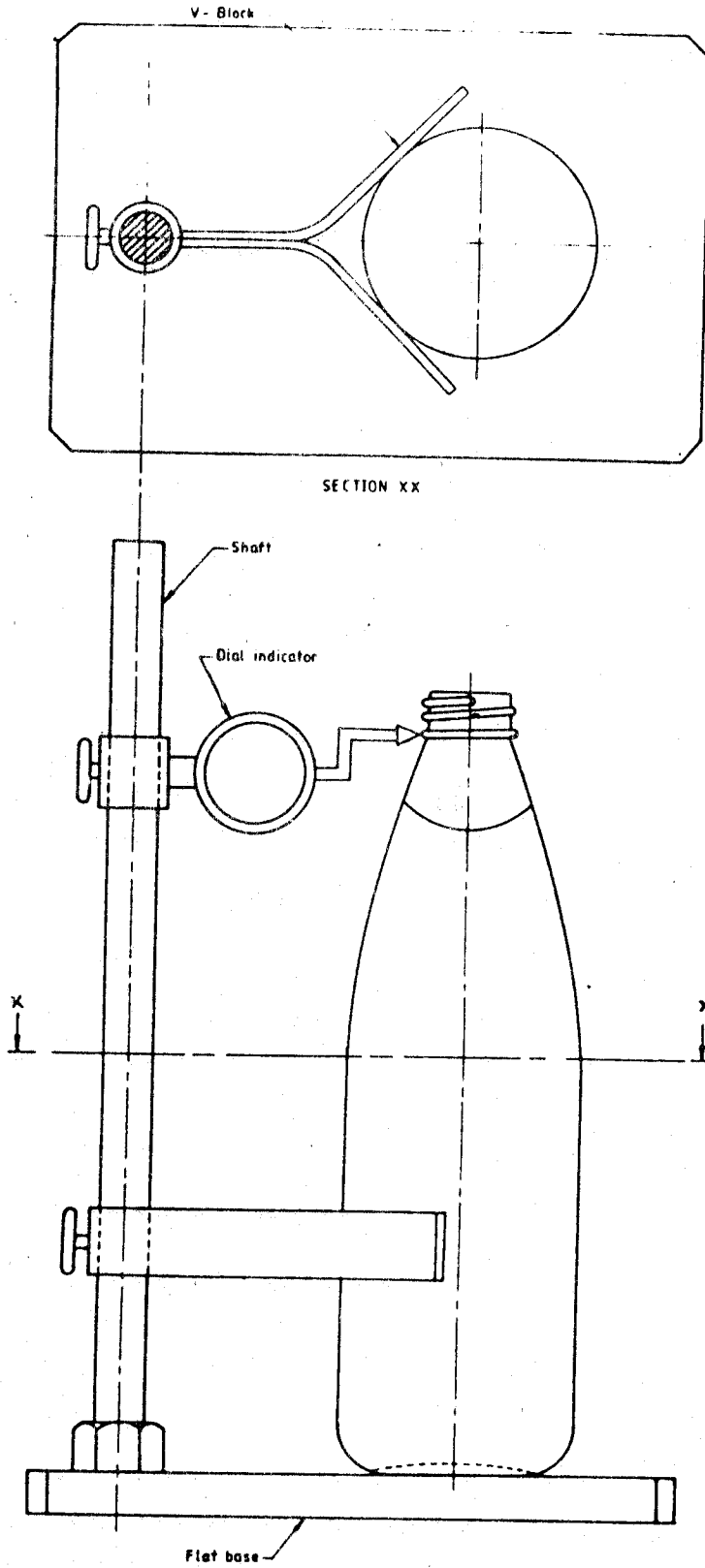


FIGURE 3 - Assembly for verticality test

B.2 PROCEDURE

Measure the verticality using apparatus incorporating a V-block and a dial gauge. Care shall be taken while turning the bottle in the V-block to compensate for any pressure exerted by the dial gauge. Such pressure exerted to overcome the dial gauge pressure shall be directed downward towards the V-block.

B.3 RESULT

The verticality is expressed as half the difference between the maximum and minimum readings of the dial gauge obtained during rotation of the bottle through 360°.

NOTE - The measurement obtained includes slight dimensional deviations that may occur in other parts of the bottle such as ring finish ovality, tilted finish and rocky bottoms. No correction is made.

APPENDIX C

TEST FOR DETERMINING PARALLELISM BETWEEN THE BASE AND THE TOP SEALING SURFACE

C.1 APPARATUS

Any acceptable apparatus suitable for determining whether the base of the bottle is parallel to the top sealing surface. Two optically flat plates and a spirit level calibrated to the accuracy required for the purpose may be used.

C.2 PROCEDURE

Test each bottle for compliance with the requirement specified in 4.8.

APPENDIX D

TEST FOR ALKALINITY

D.1 APPARATUS

D.1.1 *Erlenmeyer flask assembly*, of chemically resistant glass, preferably borosilicate, consisting of Erlenmeyer flask of 250 ml capacity with a suitable reflux condenser with ground glass joints.

D.1.2 *Graduated flask*, of chemically resistant glass, of known brand (preferably borosilicate), 250 ml capacity.

D.1.3 *Mortar*, a suitable mortar made of steel.

D.1.4 *Test sieves*, of aperture size 425 μm , and 600 μm conforming to CS 124.

D.2 REAGENTS

D.2.1 *Hydrochloric acid, standard solution*, 0.01 N.

D.2.2 *Ethyl alcohol*, 95 per cent by volume.

D.2.3 *Sodium hydroxide standard solution*, 0.05 N.

D.2.4 *Methyl red indicator*, dissolve 0.04 g of methyl red in 75 ml of ethyl alcohol or rectified spirit. Add 1.5 ml of standard sodium hydroxide solution or a quantity sufficient to ensure that the colour of the solution corresponds to pH 5.2, and then dilute to 100 ml with water.

D.2.5 *Test solution*, take 1.0 ml of standard hydrochloric acid and 1.0 ml of methyl red indicator in a previously tested Erlenmeyer flask and add 240 ml of water. Boil for five minutes. Cool quickly under running water and make up to 250 ml in the graduated flask.

D.3 TESTING OF ERLENMEYER FLASK ASSEMBLY

D.3.1 Transfer 100 ml of test solution to the Erlenmeyer flask to be tested. Place the flask quickly in a bath of boiling water so that the level of the solution in the flask is below the level of the water in the bath and attach a small reflux condenser. Continue boiling for one hour and at the end of this period observe the colour of the solution. Reject the flask if any change of colour of the test solution has taken place.

D.3.2 Erlenmeyer flask assemblies which have once passed the test for suitability may fail to do so after prolonged storage. In such a case, they may be re-used by washing with 5 per cent (m/v) solution of glacial acetic acid followed by washing with water until free from acid before use.

D.4 PROCEDURE

Use Erlenmeyer flasks as tested under D.3.1. Rinse the bottles selected for this test with distilled water, dry in a stream of dry air and crush them in the mortar such that the glass particles pass through a sieve of aperture size 600 μm but fail to pass through a sieve of aperture size 425 μm . The crushing and sieving should be done in three to four stages to avoid too much fines. Spread the

sieved particles weighing more than 5 g on a glazed paper and pass a magnet over them to remove any particles of iron which may have been introduced during crushing. Wash the sieved glass free from dust in an Erlenmeyer flask with four successive 30-ml portions of ethyl alcohol and dry the flask and contents at 100 ± 2 °C. Take two more Erlenmeyer flasks and transfer 5 ± 0.001 g of the sieved, clean, dry glass to one of the two flasks. Transfer a 100-ml portion of the freshly prepared test solution to both flasks. Place the flasks quickly in a bath of boiling water so that the levels of the contained solutions are below the level of the water in the bath and attach the previously tested reflux condensers. Keep the flasks in the boiling water bath for 30 minutes and then take them out and cool quickly under running water. From the first flask containing the powdered glass sample, decant out the test solution into a third Erlenmeyer flask. Add 4 ml of water to the powdered glass residue in the first flask, shake a little and decant out into the third flask, taking care to see that transference of the powdered glass is avoided as far as possible. Also add 4 ml of water to the second flask containing only the test solution (blank), titrate the solution in the third flask immediately with standard hydrochloric acid to the pink colour of the blank test solution in the second flask.

D.5 RESULT

The bottles shall be taken to have satisfied the test if not more than 3 ml of 0.01 N hydrochloric acid is required for the titration.

APPENDIX E

TEST FOR RESISTANCE TO IMPACT

E.1 PROCEDURE

The bottles shall be struck with a hardened spherical steel ball of mass 400 g falling from a height of 100 mm. The ball shall be made to strike once at the following points:

- a) four different points at a height of about 100 mm from the base;
- b) on both seams; and
- c) at the extremities of a diameter, at right angles to the joining seams.

E.2 RESULT

A bottle shall be deemed to have passed the test if there is no complete fracture, that is, a piece of glass falling from it, or no cracks develop in its body.

APPENDIX F

TEST FOR RESISTANCE TO THERMAL SHOCK

F.1 APPARATUS

The apparatus shall consist essentially of a basket for holding the bottles upright, two water-baths, one containing hot water and the other containing cold water. The temperature of the water baths shall be controlled within $\pm 2^{\circ}\text{C}$. Each water bath may also be provided with a stirrer to maintain a uniform temperature.

F.2 PROCEDURE

Adjust the cold water bath to a convenient temperature between 27°C and 35°C . The water in the hot water bath shall be maintained at a temperature of $42 \pm 2^{\circ}\text{C}$ above that of the cold water bath. Place the empty bottles in the basket vertically with the mouth upwards. When the baths have attained the prescribed temperatures, immerse immediately the basket containing the bottles in the hot water bath in such a manner that the bottles become completely filled with the hot water. Allow the containers to soak for 15 minutes. Transfer the basket with the bottles filled with hot water to the cold bath so that the bottles are immersed in water. Keep the bottles immersed for 5 minutes. Remove the basket from the cold bath. The process of transfer from the hot bath to the cold bath shall be completed in 15 ± 2 seconds. Take every precaution to protect the apparatus from draughts. Inspect each container for cracks or breaks.

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.

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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.

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