SRI LANKA STANDARD 959 : 1992

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SPECIFICATION FOR

CHICKEN EGGS

SRI LANKA STANDARDS INSTITUTION

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SLS 959 : 1992

Gr. 9

SRI LANKA STANDARDS INSTITUTION
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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 CHICKEN EGGS

FOREWORD

This standard was finalized by the Sectoral Committee on Meat and Meat Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1992 - 07 - 29.

The development of the poultry industry in Sri Lanka, has led to an increased production of eggs. This standard provides information and guidance to the poultry industry, wholesale and retail market dealers and other related parties of a systematic grading system of eggs by mass.

In addition to the mass exterior factors such as shell condition and cleanliness and interior factors such as depth of air cell, egg white or albumen and yolk have also been considered.

Although the shell thickness is an important parameter assuring safety during transportation, it has not been covered in this standard due to the lack of information. This may be included in a future revision.

Guidelines for the determination of a compliance of a lot with the requirements of this standard based on statistical sampling and inspection is given in Appendix A.

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 standard.

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

(i) IS 6558 :1972 - Indian Standard Code of Practice for cold storage of shell eggs.
(ii) IS 9810 :1981 - Indian Standard Methods for evaluation of quality of chicken eggs.
(iii) MS 680 :1980 - Malaysian Standard Specification for chicken eggs.
(iv) ECE/AGRI/105 - UN/ECE Standard for Eggs-in shell.

1 SCOPE

This standard prescribes the requirements and methods of test for chicken eggs.

2 REFERENCES

SLS 102 Presentation of numerical values.
SLS 428 Random sampling methods.
SLS 467 Labelling of prepackaged foods.

3 DEFINITIONS

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

3.1 abnormal shape : A shell that may be misshapen or faulty in texture or strength or that may show pronounced thin spots, ridges, or rough areas.

3.2 air cell : Air space between the inner and outer shell membrane generally found at the larger end of the egg.

3.3 candling : The process of holding the egg before a beam of light in a such way that light rays penetrate and illuminate the interior of the egg for inspection .

3.4 **chalazae** : Two fibrous structures made up of egg white which extend in a spiral form from the yolk to each end of the egg, thus holding the yolk in position.

3.5 **check** : An egg which has a crack in the shell but intact with its shell membrane and its contents do not leak.

3.6 **clean** : An egg which is free from foreign material, stain or other visual discolouration.

3.7 **dirty** : An egg whose shell must be unbroken and has adhering dirt, and/or stains covering more than one-fourth of the shell surface.

3.8 **grading** : Grouping of eggs into lots having similar ranges of mass.

3.9 **egg white or albumen** : The jelly-like substance surrounding the yolk in the egg.

3.10 **leaker** : A crack or a break in the shell and shell membrane to the extent that the egg contents are exuding or free to exude through the shell. An egg which has a portion of the shell missing (in excess of an area 0.50 cm^2) is considered a leaker even though the shell membrane is intact.

3.11 **moderately stained** : A shell that is free from adhering dirt but having stains covering to a moderate degree and limited to one-fourth of the shell surface.

3.12 **slightly stained** : A shell surface almost free from adhering dirt, but having slight stains without appreciably detracting its appearance limited to one-sixteenth of the shell surface.

3.13 **smashed** : Shell is crushed or shattered allowing the contents to come out.

3.14 **sound shape** : An egg whose shell is unbroken, and whose internal qualities are fit for human consumption.

3.15 **yolk** : The yellowish spheroidal mass of food material surrounded by the white in the egg.

4 GRADES

Eggs shall be of the following grades :

a) Extra large (EL);
b) Large (L);
c) Medium (M); and
d) Small (S).

5 REQUIREMENTS

5.1 Eggs shall be graded (see Notes)prior to cold storage according to the mass of individual eggs as shown in Table 1.

NOTES

1. *Eggs should be kept in a cool place with ventilation, immediately after gathering.*
2. *Eggs should not be oiled.*

TABLE 1 - Grades of eggs

Sl No. (1)	Grades (2)	Mass of individual eggs, g (3)
i)	Extra large (EL)	60 and above
ii)	Large (L)	53 to 59
iii)	Medium (M)	45 to 52
iv)	Small (S)	38 to 44

NOTES

1. *For Grade EL, presence of 5 per cent of eggs belonging to Grade L is permitted.*
2. *For Grade L, presence of 5 per cent of eggs belonging to Grade EL and 5 per cent of eggs belonging to Grade M is permitted.*
3. *For Grade M, presence of 5 per cent of eggs belonging to Grade L and 5 per cent of eggs belonging to Grade S is permitted.*
4. *For Grade S, persence of 5 per cent of eggs belonging to Grade M and presence of 5 per cent of eggs having a mass less than 38 g is permitted.*

5.2 The shells of the eggs shall not be abnormal in shape, cracked, checked, leaker, smashed or broken.

5.3 Eggs shall be designated with respect to colour as follows :

a) White - Chalky white colour;
b) Brown - Brown, including the dark, cream brown, and any variation in the shade of brown egg shell; and
c) Tinted- A mixture of white and brown .

5.4 Eggs graded in accordance with Table 1 shall also comply with the requirements stipulated in column 3 of the Table 2 when tested by the methods prescribed in Column 4 of the table.

TABLE 2 - Requirements for individual eggs

Sl. No. (1)	Quality factor (2)	Desirable quality range (3)			Method of test (4)
		Desirable		Maximum tolerance	
i)	Shell	Clean, unbroken and sound shape and normal	to	Clean to moderately stained, sound and slightly abnormal	Clause 9
ii)	Air cell	4 mm in depth, practically regular or better	to	8 mm in depth, may be free and slightly bubbly	Appendix B.2
iii)	Egg white	Clear, reasonably firm. 72 Haugh units or higher	to	Clear may be slightly weak. Not less than 31 Haugh units	Appendix B.1 and C
iv)	Yolk	Fairly well centered practically free from defects, outline indistinct	to	May be slightly off-centered, outline slightly visible	Appendix B.1

6 STORAGE

The maximum duration of storage depending on storage temperature shall be as follows :

a) 30 days maximum - if kept below 15 ^{o}C;
b) 14 days maximum - if kept between 15 ^{o}C to 20 ^{o}C; and
c) 07 days maximum - at ambient temperature.

NOTE

When eggs stored at low temperatures are brought to ambient temperature, a rapid quality deterioration takes place.

7 PACKAGING

7.1 Eggs shall be packed with their small ends facing downwards as prescribed below. The packaging material shall not contain any substances that will impart any colour or flavour to the eggs.

7.1.1 *Inner packing*

The method of inner packing shall be as prescribed in 7.1.1.a) and 7.1.1.b).

7.1.1.a) Eggs shall be packed in standard plastic or paper cartons designed for packing of eggs.

7.1.1.b) Eggs shall be packed in moulded trays designed for packing of eggs or on thick layers of clean and dry straw.

7.1.2 *Outer packing*

Eggs packed as in 7.1.1, shall be packed in wooden boxes or fibre board boxes with adequate ventilation.

8 MARKING

8.1 The following shall be marked or labelled legibly and indelibly on each of the inner package as prescribed in 7.1.1.a).

a) Name of the product as "CHICKEN EGGS";
b) Brand name or trade mark, if any;
c) Grade;
d) Number of eggs; and
e) Date of expiry.

8.2 The following shall be marked or labelled legibly and indelibly on each outer package.

a) Name of the product as " CHICKEN EGGS " ;
b) Brand name or trade mark; if any;
c) Name and address of producer;
d) Date of collection;
e) Grade; and
f) Number of eggs.

8.3 General guidelines for marking and labelling as given in SLS 467 shall be followed.

8.4 Packages shall be marked, "EGGS HANDLE WITH CARE" in bold letters, with an arrow pointing to the top of the case. In addition, the container shall have the following words "THIS SIDE UP" in letters 25 mm high.

NOTE

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

9 METHODS OF TEST

9.1 The shells of the eggs shall be observed visually for the requirements prescribed in clause 5.2.

9.2 Tests shall be carried out as prescribed in Appendices B and C.

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 is to be assured based on manufacturer's control systems coupled with type testing and check tests or any other procedure, appropriate schemes of sampling and inspection should be adopted.

A.1 LOT : In any consignment all packages containing eggs of same grade and belonging to one batch of supply shall constitute a lot.

A.2 SCALE OF SAMPLING

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

A.2.2 The number of packages of eggs to be selected from a lot shall be in accordance with the Table 3.

TABLE 3 - Scale of sampling

No. of packages in the lot (1)	No. of packages to be selected (2)	Sub-sample size (3)
Up to 25	3	13
26 to 50	4	20
51 to 90	5	32
91 to 150	8	50
151 and above	13	80

A.2.3 The packages shall be selected at random. In order to ensure randomness of selection random numbers as given in SLS 428 shall be used.

A.2.4 In case of packages having eggs packed in cartons, from each package ten cartons shall be selected and from each carton 8 eggs selected to form a sample of 80 eggs.

A.2.5 In case of packages having eggs packed in moulded trays then 10 trays shall be selected from each package and from each tray 8 eggs selected to form a sample of 80 eggs.

A.2.6 In case of packages having eggs packed on layers then from each package 8 eggs shall be selected from each of different layers to form sample of 80 eggs.

A.3 NUMBER OF TESTS

A.3.1 The packages and cartons or trays selected as in A.2.2 and A.2.4 or A.2.5 shall be inspected for marking and packaging requirements.

A.3.2 Each egg in the sample of 80 eggs from each package selected as in A.2.4, A.2.5 or A.2.6 shall be tested for the requirements given as in 5.1 and requirements for shell quality, air cell and yolk given as in 5.4.

A.3.3 Each egg in the sub-sample size given as in column 3 of the table 3 selected from total eggs tested as in A.3.2 shall be tested for requirements of egg white given as in 5.4.

A.4 CRITERIA FOR CONFORMITY

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

A.4.1 Each package and carton/tray inspected as in A.3.1 conforms to marking and packaging requirements.

A.4.2 Each egg tested as in A.3.2 and A.3.3 satisfies the relevant requirements.

APPENDIX B
EXAMINATION OF QUALITY FACTORS

B.1 INTERIOR QUALITY (BY CANDLING)

B.1.1 **Apparatus**

B.1.1.1 *Bulb,* light beam of 60 watt and 100 watt fitted to a candling apparatus.

B.1.2 **Procedure**

Examine, eggs individually. Hold the eggs before a light beam of 60 watt (B.1.1.1) when examining white eggs and 100 watts for brown eggs in such a way that the light rays penetrate and illuminate the interior of the egg for inspection.

B.1.3 **Observations**

B.1.3.1 *Description of yolk shadow outline*

a) Outline slightly defined - A yolk outline which is distinctly visible and blends into the surrounding white as the egg is rotated in front of the candler.

b) Outline fairly well defined - A yolk outline which is discernible but cannot be outlined clearly when twirled in front of a candler.

c) Outline well defined - Outline of the yolk clearly visible as it casts a dark shadow when twirled in front of a candler.

B.1.3.2 *Description of egg white*

a) Clear - Egg white which is free from discolourations and presence of any free floating foreign bodies on it.

b) Firm - Egg white which is sufficiently thick or viscous and thus makes the outline of yolk slightly or indistinctly visible when twirled in front of a candler.

c) Reasonably firm - Egg white which is reasonably thick or viscous but enough to allow casting of the outline of the yolk when twirled and candled.

d) Weak and watery - Egg white which is thin and lacks in viscosity. It permits the yolk to approach the shell closely on candling making yolk outline clearly visible on twirling.

B.2 MEASURING DEPTH OF AIR CELL

B.2.1 Apparatus

B.2.1.1 *Gauge,* air cell gauge (See Fig 1).

B.2.2 Procedure

Examine eggs individually according to the procedure given in B.1.2. Measure the depth of air cell by means of air cell gauge while candling prior to breaking.

B.2.3 Observations

B.2.3.1 *Description of air cell*

a) Practically regular - An air cell which maintains practically a fixed position inside the egg and presents an even outline with not more than 6 mm movement in any direction when it is turned.

b) Free air cell - An air cell that moves freely towards the uppermost point inside the egg as it is rotated slowly. The shell membranes are intact allowing the air cell to move freely in any direction between them.

c) Bubbly air cell - A ruptured air cell consisting of one or more small separate air bubbles floating beneath the main air cell.

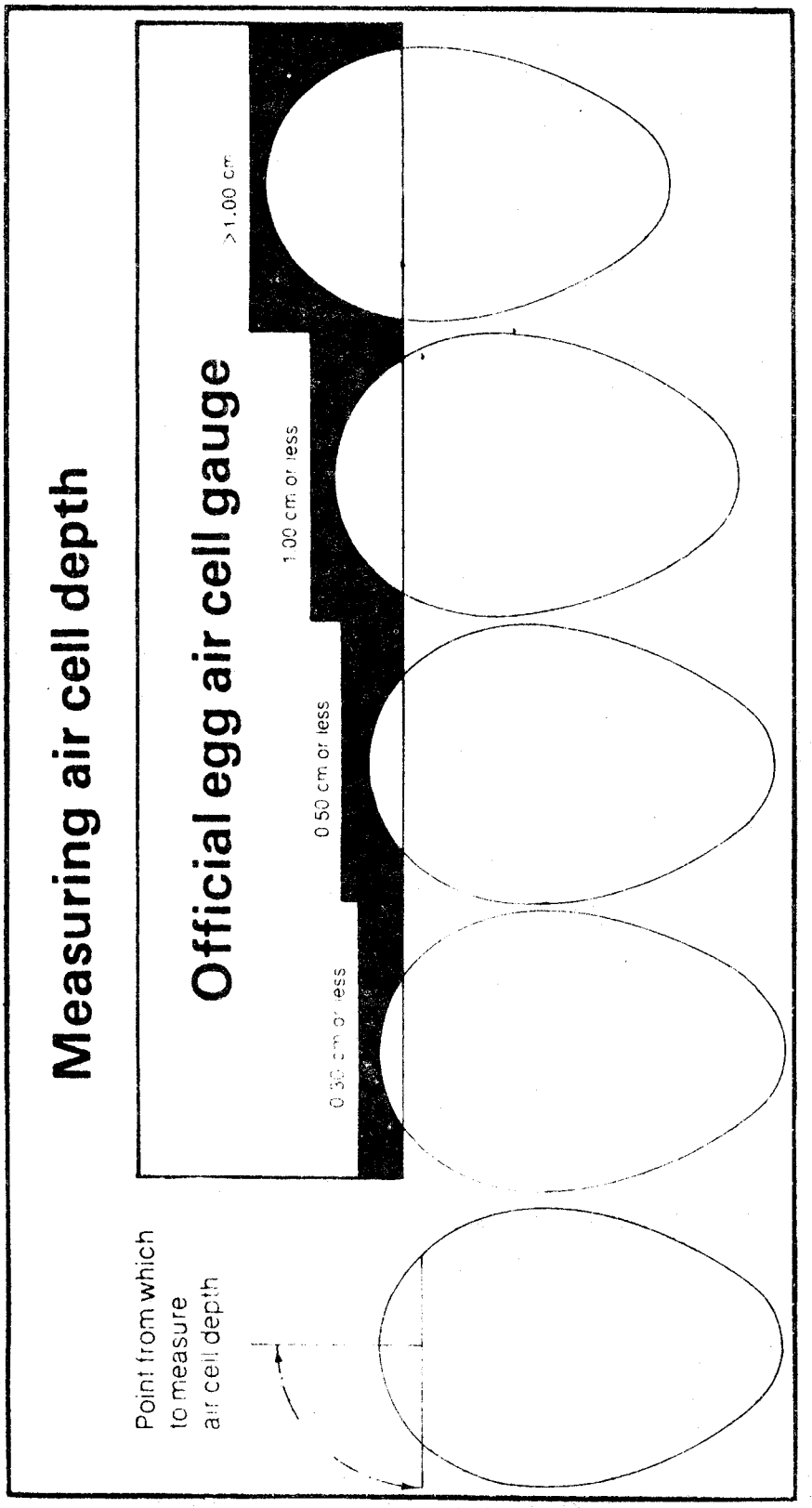

FIGURE 1 - Gauge for measuring depth of air cell

APPENDIX C
DETERMINATION OF ALBUMEN HEIGHT

C.1 APPARATUS AND MATERIALS

C.1.1 *Glass surface, flat,* approximately 30.5 cm x 45.7 cm or larger on a metal stand with adjustable legs for levelling and a mirror for observing the under side of the egg.

C.1.2 *Knife*

C.1.3 *Micrometer, spherometer or Haugh meter,* as shown in Figure 2.

C.1.4 *Alignment chart,* as shown in Figure 3.

C.1.5 *Squeegee*

C.1.6 *Container*

C.2 PROCEDURE

Set the micrometer, spherameter or Haughmeter (C.1.3) on the glass surface (C.1.1). Check the zero reading by lowering the measuring rod until the point touches the surface of the glass on which the broken-out egg will be placed. The pointer should be at zero. If not, slacken the clamp and turn the bezel so that the zero mark coincides with the pointer. Retract the point upwards to its full extent.

Weigh, the pre-cooled egg (see Note 1). Break the egg on to the flat glass surface (C.1.1) (see Notes 2, 3 and 4). Place the above micrometer over the egg and lower the point until just touches the albumen (see Note 5). Measure the albumen height that is indicated on the dial (see Note 6). Examine for the quality of egg white as given in B.1.3.2. Remove the broken-out egg from the glass surface into a container (C.1.6) by using a squeegee (C.1.5).

The measuring rod should be raised and cleaned before placing over the next egg.

Repeat the procedure for the next measurement.

NOTES

1. *Eggs removed from the refrigerator should be kept for three hours at temperature of 23 + 2 ^{o}C. The internal temperature of eggs should not be lower than 7 ^{o}C or higher than 15 ^{o}C at the time of performing the breakout test.*
2. *One egg at a time should be broken since it is important to measure the albumen height immediately after breaking. A delay of a few minutes can makes a difference in the Haugh unit reading.*

3. *Care should be exercised to see that the thick white is not punctured while breaking. Consistent results can best be obtained by using a breaking knife. Blunt edges, such as a table edge, may cause splintering of the shell with the possibility of puncturing the thick white. The egg should be held as near the glass as possible and the contents emptied very gently from the shell.*

4. *In some eggs the envelope of thick white is rather firmly attached to the shell membrane in the small end of the egg. When this is noted, rupture of the thick white can generally be prevented by slowly raising the half shell. Albumen heights should not be recorded of eggs when the thick white has been mechanically ruptured or when the yolk membrane in ruptured for any cause.*

5. *When determining albumen quality with a micrometer, select a flat area in the surface of the widest expanse of the thick white for measurement. Eggs with very high albumen will not have a flat surface and in such cases a point about halfway between the yolk and the edge of the widest expense of thick white should be selected.*

6. *Care should be taken to avoid measuring the albumen height in an area where there is an air bubble or chalaza.*

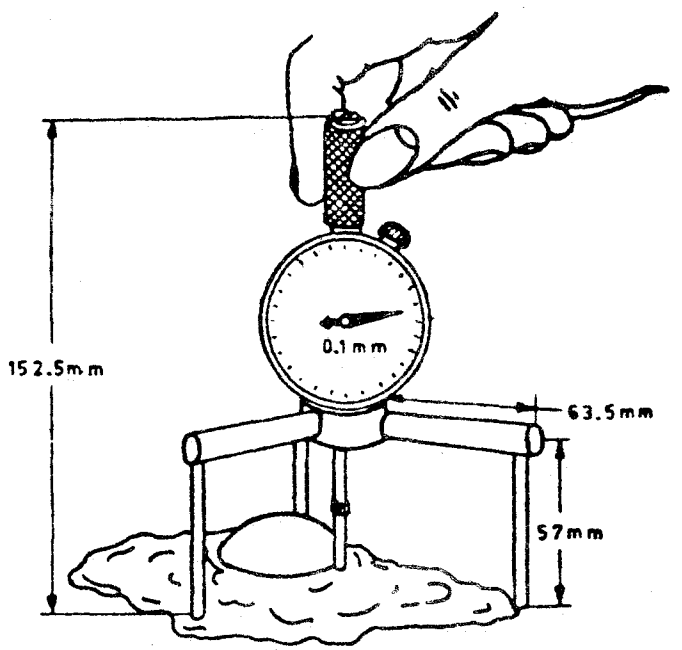

FIGURE 2 - Gauge for egg quality

C.3 CALCULATION

C.3.1 The Hauge Unit (HU) can be calculated from the following equation:

$$HU = 100 \log_{10}(H + 7.57 - 1.7\, M^{0.37})$$

where,

HU is the Haugh units of interior quality whose numerical value equals the quality value of the egg;
H is the height, in mm ; and
M is the mass, in g.

C.3.2 An alignment chart for finding Haugh units without having to make calculation is given in Figure 3.

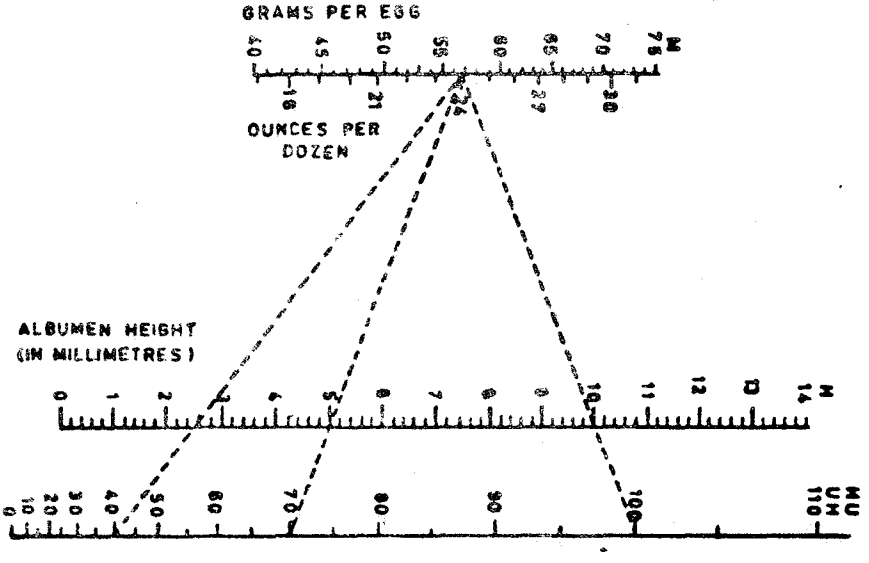

FIGURE 3 - Alignment chart

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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.*

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