SRI LANKA STANDARD 816 : 1988

UDC 006.86:658.562.6

METHOD FOR

CHECKING NET CONTENTS OF PREPACKAGED GOODS

SRI LANKA STANDARDS INSTITUTION

- Blank Page -

METHOD FOR CHECKING NET CONTENTS OF PREPACKAGED GOODS

SLS 816:1988

Gr.9

SRI LANKA STANDARDS INSTITUTION
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka.

CONSTITUTION OF THE DRAFTING COMMITTEE

CHAIRMAN	*REPRESENTING*
Mr. B.S.P. Mendis	Sri Lanka Standards Institution
MEMBERS	
Prof. R.A. Dayananda	University of Sri Jayawardenepura
Mr. H.L.R.W. Madanayaka	Department of Internal Trade
Mr. Neville Ruwanpathirana	Lever Brothers Limited
Mr. D.A.T.A. Senaratyapa	Nestle Lanka Limited
Mr. K.K.K. Wijesundera	National Packaging Centre
Mr. D. Kodagoda	Sri Lanka Standards Institution
Mr. M.D. Paranavithana	Sri Lanka Standards Institution
Mr. D.M.M. Samarakoon	Sri Lanka Standards Institution
Mr. S.P.P.A. Wickramasooriya	Sri Lanka Standards Institution

TECHNICAL SECRETARIAT
SRI LANKA STANDARDS INSTITUTION

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

METHOD FOR CHECKING NET CONTENTS OF PREPACKAGED GOODS

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1988-04-19, after the draft was finalized and approved by the Drafting Committee on Net Contents of Prepackaged Goods.

This standard is based on the average quantity concept adopted by the European Economic Community (EEC) and recommended by the International Organization for Legal Metrology (OIML). The selection criteria and the methods of testing are in line with those adopted by the Measurement Standards and Services Division of the Department of Internal Trade for Control of prepackages and the Weights and Measures Ordinance. The criteria on which this system based are as follows:

a) The average value of the contents of prepackages in a lot is equal to or exceeds the value indicated on the label.

b) The variation of individual package contents from the value indicated on the label is not unreasonably large.

This standard provides detail guidance for checking the conformity of net contents of prepackaged goods to the requirements specified in average quantity concept by way of sampling. In order to control unavoidable individual package variation the concept of tolerable negative error is introduced. This standard also covers the basic procedures used to determine the net contents of prepackaged goods.

The declaration of mass or volume of the contents of prepackages on the label, which is known as *nominal quantity*, is required by the Weights and Measures Regulations in Sri Lanka. Sometimes it is observed that the contents of prepackages are declared as minimum net contents. In such cases the criteria for conformity to the requirements of this standard are given in Appendix D. However, this practice is not recommended and should be discouraged.

This standard provides useful guidance to the manufactures, Consumer Organizations and controlling bodies such as independent accredited test laboratories, on the procedures for checking on the conformity of net conten

with the declared quantity of prepackaged goods.

It is intended to prepare a standard as a guidance to the packers on practices to be adopted to meet the net content requirements.

When reporting the results of a test done according to this standard, the observed value 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 given in Table 1.

In the preparation of this standard the valuable assistance gained from the publications of the International Organization for Standardization (ISO), the International Organization for Legal Metrology (OIML), the European Economic Community (EEC) and the National Bureau of Standards of United States of America is gratefully acknowledged.

1 SCOPE

This standard specifies the requirements for statistical checking of net contents of prepackaged consumer goods. This standard is also applicable to prepackaged goods where drained mass is declared.

2 REFERENCES

SLS 428 Random sampling methods

CS 102 Presentation of numerical values

3 DEFINITIONS

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

3.1 prepackage : Commodities put up in packages in advance of being offered for sale.

3.2 nominal quantity (*D*) : The mass or volume indicated or declared on the package.

3.3 net quantity or net contents : The mass or volume of product contained in the prepackage.

3.4 gross mass : The mass of the prepackage including the contents (product), packaging materials, labels etc.

3.5 tare mass : The mass of all packaging materials (including labels, ties, gifts, coupons etc.) that can be separated from the packaged product (see Note).

NOTE - In cases where manufacturer claims that there is higher variation in mass of packaging materials among the prepackages in the same lot, then tare mass shall be defined as all packaging materials which are directly in contact with the product and that can be separated from the product.

3.6 drained mass : The mass of solid or semi solid product representing the contents of prepackages obtained after a prescribed method for removal of the liquid has been employed.

3.7 package error : The difference between the net contents of an individual prepackage as measured and the nominal quantity (declared net contents) on the package label.

i.e. package error = {measured net quantity of an individual prepackage} − {nominal quantity of the package label}

3.8 tolerable negative error *(T)* : Limiting value beyond which it is considered to be an unreasonable package error.

3.9 inspection lot : Collection of prepackages of the same product with the same label from the same packer available for inspection at one time (see 6).

3.10 container : Any receptacle which holds, restrains or encloses prepackages to be stored or transported.

4 METROLOGICAL REQUIREMENTS

4.1 Average quantity

The average net quantity covered by any lot of prepackaged consumer goods available for inspection shall be equal to or exceed the nominal quantity *(D)*.

4.2 Quantity in an individual prepackage

4.2.1 The declaration of net quantity of contents of an individual prepackage shall express an accurate statement of quantity of contents of the prepackage, subject to requirements set out in this standard.

4.2.2 Unavoidable deviations in good manufacturing practice shall be allowed up to the limit values (tolerable negative error) given in Table 1.

TABLE 1 - Acceptable individual variation

Nominal quantity (*D*) g or ml	Tolerable negative error (*T*)	
	Per cent of *D*	g or ml
5 to 50	9.0	-
51 to 100	-	4.5
101 to 200	4.5	-
201 to 300	-	9.0
301 to 500	3.0	-
501 to 1 000	-	15.0
1 001 to 10 000	1.5	-
10 001 to 15 000	-	150
15 001 to 25 000	1	-
25 001 to 50 000	-	250
above 50 000	0.5	-

Value of T should be rounded to the next one-tenth of a gram or a millilitre up to D = 1 000, and to the next whole gram or millilitre for D higher than 1 000.

4.2.3 Prepackages having negative package error greater than twice the tolerable negative error given in Table 1 shall be considered not acceptable in trade.

5 BASIC STEPS FOR CHECKING OF NET CONTENTS OF PREPACKAGES

5.1 Checking of net contents of prepackages shall be done on the sample of prepackages selected from the inspection lot (see Table 2).

5.2 The actual contents of prepackages shall be measured directly by means of weighing instruments or volumetric instruments or, in the case of liquids, indirectly, by weighing the prepacked product and measuring its density.

5.3 Statistical methods shall be applied to check the conformity of the prepackages with the metrological requirements on prepackages (see 4 and 9).

6 FORMATION OF INSPECTION LOT

6.1 Lots shall be checked at a point of production or handling when the goods are ready for use.

6.2 At the on-line of packing plant the inspection lot shall consist of prepackages from the same filling line and should not exceed one uninterrupted production run. Minimum of one hour's production run may be convenient for sampling purposes.

6.3 At the warehouse the inspection lot shall consist only of prepackages packed at the same place, at the sametime, under the same conditions.

6.4 At the retail store and wholesale shop the inspection lot shall consist of all prepackages available for inspection at one time.

6.5 If a lot defined as above shows to be larger than 10 000 units, it shall be divided into two or more equal or almost equal sub groups by reduction of the considered production time or sub division of the store. These sub divisions shall be considered as separate lots.

7 SCALE OF SAMPLING

7.1 Lot sizes of 150 or more

The number of prepackages to be selected from a lot shall be in accordance with Column 1 and Column 2 of Table 2.

TABLE 2 - Scale of sampling for lot sizes of 150 or more

No. of prepackages in the lot (1)	No. of prepackages to be selected (2)	Acceptance number (3)	Constant* K (4)
150 to 2 000	20	1	0.646
2 001 to 4 000	32	2	0.485
4 001 to 7 500	50	3	0.379
7 501 to 10 000	80	5	0.295

* *See* **10.1.3**

7.2 Lot sizes less than 150

A sample of five prepackages shall be selected.

7.3 Selection of sample from containers

7.3.1 When the inspection lot consists of prepackages packed in containers the number of containers to be selected shall be in accordance with Table 3.

TABLE 3 - Scale of sampling for containers

No. of containers in the lot (1)	No. of containers to be selected (2)
Up to 3	all
4 to 25	3
26 to 50	5
51 to 90	8
91 to 150	12
151 and above	20

7.3.2 The number of prepackages drawn from each container selected as in **7.3.1** to form the sample as required by **7.1** shall as far as possible be equal.

7.4 Randomness of selection

The prepackages and containers shall be selected at random. In order to ensure randomness of selection, random number tables given in **SLS 428** shall be used.

8 DETERMINATION OF NET CONTENTS OF PREPACKAGES

8.1 Accuracy of instruments

Weighing instruments having an accuracy of OIML Class III or above shall be used to measure the net contents of prepackaged goods and the tare mass. Measuring instruments having at least an accuracy of one-fifth of tolerable negative error shall be used to measure the net contents of prepackaged goods.

8.2 Prepackages labelled by mass

The net mass of an individual prepackage shall be determined by subtracting tare mass from gross mass. Since determination of tare mass involves destructive testing it is recommended to estimate the average tare mass of the sample. The net mass of an individual prepackage shall be obtained by subtracting estimated average tare mass from gross mass. The procedure for estimation of average tare mass shall be as given in Appendix **A**.

8.3 Prepackages labelled by volume

8.3.1 Three different methods are recommended to determine the net contents of prepackages labelled by volume. Anyone of the methods given below shall be used depending on the nature of the product.

8.3.1.1 Method 1 - Direct measurement of the volume

Measuring containers shall be used to determine the volume of each of the prepackages in the sample. Each prepackage of the sample shall be opened and the contents shall be poured into the measuring containers and volume shall be read directly.

8.3.1.2 Method 2 - Measurement by Templet

This method shall be used when destruction of the prepackages and/or any other methods of measuring the net contents are not possible. A templet and a measuring container shall be used in this method described in Appendix **B**.

8.3.1.3 Method 3 - Measurement by using density

This method shall be used to determine the volume of the net contents by measuring the mass of the product. The net mass of each prepackage in the sample shall be determined in accordance with **8.2**. The net mass thus determined shall be converted to net volume by using the density of the product.

For the calculation of density the methods recommended by OIML, indicated in Appendix **C** shall be used. The contents of prepackages used in determination of tare mass shall be taken to calculate the density. Then the net volume shall be calculated as follows:

$$\text{Net volume of the prepackage} = \frac{m - m_o}{d}$$

where,

d = The density of the product as measured;

m_o = Estimated tare mass (see Appendix **A**); and

m = Gross mass of the prepackage.

9 RECORDING OF RESULTS

Recommended formats for the recording of results are given in Appendices **E**, **F** and **G**.

10 CRITERIA FOR ACCEPTANCE

A lot shall be declared as conforming to the nominal net contents if the following conditions are satisfied. (See also Appendix D).

10.1 Lot sizes of 150 or more

10.1.1 The number of prepackages having net contents between the values $D - T$ and $D - 2T$ is less than or equal to the corresponding acceptance number given in Column 3 of Table 2 (see Note).

10.1.2 The number of prepackages having net contents less than $D - 2T$ is zero (see Note).

10.1.3 The value of the expression $(\bar{x} + Ks)$ is greater than or equal to D. (see Note).

NOTE

D = Declared nominal quantity

T = Tolerable negative error

$\bar{x}$ = Average net content of all prepackages in the sample

s = Standard deviation of net content of the prepackages in the sample

K = Constant given in Column 4 of Table 2.

10.2 Lot sizes less than 150

The number of prepackages having net contents less than $D - T$ is zero.

NOTE - If the net contents of one or more prepackages are found to be less than $D - T$, but no prepackage is found to contain less than $D - 2T$, then the results shall be kept and follow up inspections shall be conducted on larger lots (more than 150) or in other location. However if the net contents of one or more prepackages are found to be less than $D - 2T$, then the lot shall be rejected.

APPENDIX A

ESTIMATION OF TARE MASS

A.1 Take two prepackages from the sample and measure the tare mass. Calculate the average and the range from these two observations. If the average is less than or equal to $2T$ and the range is less than or equal to $0.1T$ use the average as an estimate for tare mass of the sample.

A.2 If the average and/or range do not satisfy the conditions given in A.1, take another six prepackages from the sample and measure the tare mass of these six prepackages. Calculate the standard deviation of the eight tare masses. If the standard deviation is less than or equal to $0.25T$ use the average of the eight tare masses as an estimate for the tare mass of the sample.

A.3 If the standard deviation is greater than $0.25T$ measure the net mass of each prepackage in the sample.

NOTE - T is tolerable negative error.

APPENDIX B

METHOD OF MEASURING THE VOLUMES OF PACKAGED PRODUCTS USING THE TEMPLET

B.1 APPARATUS

B.1.1 *Measuring cylinder*, in conforming to 8.1.

B.1.2 *Templet*, having the following characteristics

a) Constructed in one of the three forms indicated in Figures 1, 2 and 3;

b) Made of a sheet material of a stiffness sufficient to maintain its efficiency under normal conditions of use;

c) So constructed that it can give a measurement either by using it in relation to the naked brim of a container or its relation to a container provided with a closure; and

d) Legibly and clearly marked with a suitable scale (see Figures 4, 5 and 6).

B.2 PROCEDURE

B.2.1 Take two prepackages (bottles or containers) of the sample. Measure the liquid levels from the top by using the templet. Then open the seal or the stopper. Care being taken not to damage the bottle or the container during the process. Measure the liquid levels from the naked brim by using the templet.

Take the positive difference of the measurements for the two bottles or containers separately and take the average of the two differences.

B.2.2 Measure the liquid levels of each of the remaining bottles or the containers of the sample by using the templet. Subtract the average determined in B.2.1 from each of the readings and record the new readings.

B.2.3 New readings determined in B.2.2 are the calculated liquid levels of each bottle or container from the naked brim. To calculate the net volumes of each bottle or container in the sample, take one empty bottle or container used in B.2.1 and pour water up to the levels determined in B.2.2 and measure the net volume of each bottle or container in the sample.

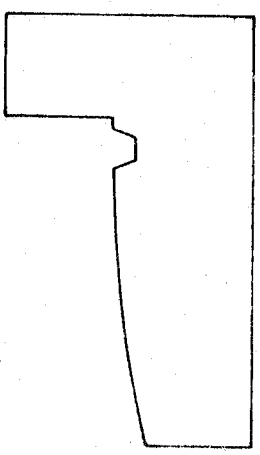

FIGURE 1 - Flat single-sided form

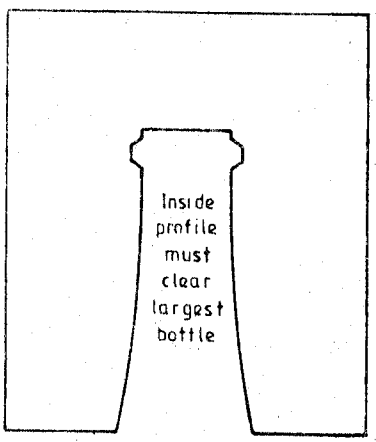

FIGURE 2 - Flat double-sided form

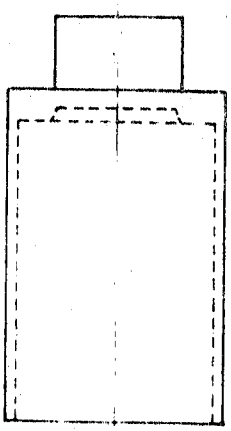

FIGURE 3 - Transparent hollow cylindrical form. Scale marks circumscribe the outside of the cylinder

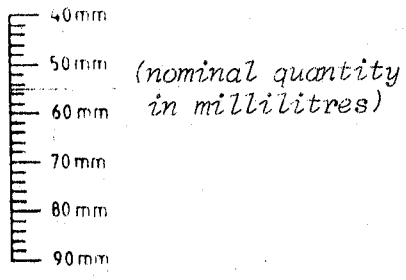

FIGURE 4 - Scale interval 2mm or 5mm. Continuous numbering

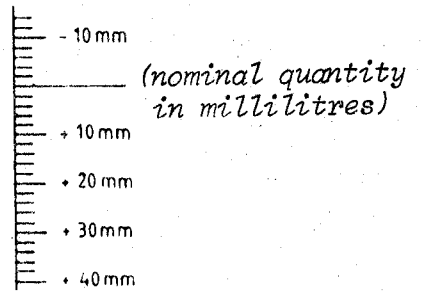

FIGURE 5 - Scale interval 2mm or 5mm. Plus-and-minus numbering

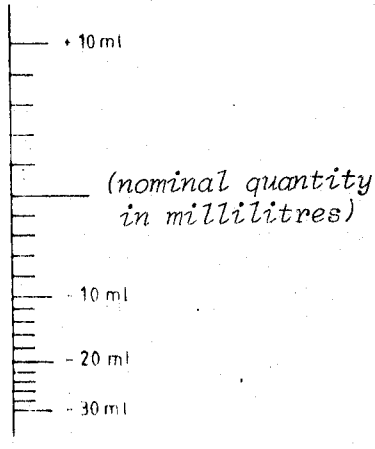

FIGURE 6 - Scale interval 1ml, 2ml or 5ml. Plus-and-minus numbering. Scale spacing not less than 2mm at the nominal quantity scale mark

APPENDIX C

METHODS RECOMMENDED BY THE INTERNATIONAL ORGANIZATION FOR LEGAL METROLOGY (OIML) FOR THE CALCULATION OF DENSITY

C.1 Pyknometer method.

C.2 Plunger (Camma Sphere) method.

C.3 Use of product container.

C.4 Hydrometer method.

C.5 Electronic portable densimeter method.

For details the document, Density measurement - Guidance for inspectors published by the OIML shall be consulted.

APPENDIX D

ACCEPTANCE CRITERIA FOR PREPACKAGES LABELLED BY MINIMUM QUANTITY

The number of prepackages in the sample having net contents less than the declared minimum quantity is zero.

APPENDIX E

RECORD SHEET

MEASUREMENT OF NET MASS

Date	Product identity	Container description

Place of inspection	Brand	Nominal quantity (D)	Tolerable negative error (T)

Lot size	Sample size	Acceptance no.	Constant (K)

Determination of net mass				Estimation of average tare mass			
Sample no.	Gross mass	Tare mass or estimated average tare mass	Net mass	Step 1		Step 2	
					Tare mass		Tare mass
				Prepackage 1 Prepackage 2		Prepackage 3 Prepackage 4 Prepackage 5 Prepackage 6 Prepackage 7 Prepackage 8	
				Average		Average of the 8 values	
				Range		Standard deviation of the 8 values	

Decision

☐ Go to step 2

☐ Take average as estimated tare mass

Decision

☐ Take average as estimated tare mass

☐ Measure net contents of each prepackage

Calculation

1 D - T ☐ 2 D-2T ☐

3 No. of prepackages with net contents

Less than D -2T ☐ Between D-2T&D - T ☐ More than D - T ☐

4 Average of net mass in the sample, $\bar{X}$ =

5 Standard deviation of the net mass in the sample, s =

6 $\bar{X}$ + Ks =

Decision - Accept/Reject

Remarks-

.....
Signature of Inspector

APPENDIX F

RECORD SHEET

DIRECT MEASUREMENT OF VOLUME

Date	Product identity	Container description

Place of inspection	Brand	Nominal quantity (D)	Tolerable negative error (T)

Lot size	Sample size	Acceptance no.	Constant (K)

Determination of net volume	
Sample number	Net volume

Calculation

1 D - 2T ☐ 2 D - T ☐

3 No. of prepackages with net contents

Less than D - 2T ☐ between D-2T&D-T ☐ More than D-T ☐

4 Average of net volumes in the sample, $\bar{x}$ =

5 Standard deviation of the net volumes in the sample, s =

6 $\bar{x}$ + Ks

Decision - Accept/Reject

Remarks-

.....
Signature of Inspector

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.

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.

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 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.

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.