SRI LANKA STANDARD 705 : 1985

UDC 621 . 646 . 5/.6 : 696 . 117

SPECIFICATION FOR

MATERIALS FOR BIB - TAP AND STOP VALVE SEAT WASHERS

SRI LANKA STANDARDS INSTITUTION

SPECIFICATION FOR MATERIALS FOR BIB-TAP AND STOP VALVE SEAT WASHERS

SLS 705:1985

Gr. 6

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

CONSTITUTION OF THE DRAFTING COMMITTEE

CHAIRMAN	*REPRESENTING*
Mr. S.D.M. Mahindaratna	Ceylon Government Railway
MEMBERS	
Mr. C. Buwaneswaran	National Water Supply & Drainage Board
Mr. T.M. Jayasekera	Hayleys Ltd.
Mr. M.C.M.W. Jayawardena	Government Factory
Miss M.R. Narangoda	Ceylon Leather Products Corporation
Mr. Justin Seneviratne	Industrial Development Board
Mr. K.J. Wanasinghe (alternate member)	Industrial Development Board

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

SPECIFICATION FOR MATERIALS FOR BIB-TAP AND STOP VALVE SEAT WASHERS

FOREWORD

This Sri Lanka Standard was authorised for adoption and publication by the Council of the Sri Lanka Standards Institution on 1985-10-11, after the draft, finalised by the Drafting Committee on Specifications for Materials for Bib-tap and Stopvalve Seat Washers has been approved by the Mechanical Engineering Divisional Committee.

The materials specified in this standard are for the manufacture of washers to be used in bib-taps and stopvalves covered in **SLS 596** : Sri Lanka Standard Specification for bib-taps and stopvalves for water services.

All values in this standard have been given in metric units.

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 observations shall be rounded off in accordance with CS 102. Number of figures to be retained in the rounded off values shall be the same as that of the specified value in this standard.

The assistance derived from the publications of the British Standards Institution and Indian Standards Institution in the preparation of this standard is gratefully acknowledged.

1 SCOPE

This specification covers requirements for materials used for seat washers for the supply of cold and hot water by bib-taps and stopvalves.

2 REFERENCES

ISO 815 Vulcanized Rubber - Determination of compression not under constant deflection at normal and high temperatures.

ISO 1817 Vulcanized Rubber - Resistance to liquids -Methods of test.

BS 3964 Flexible vulcanized fibre sheets.

CS 102 Presentation of numerical values.

SLS 297 Methods of testing vulcanized rubber.

SLS 402 Leather - Sampling - Number of items for a gross sample.

SLS 403 Leather - Laboratory samples location and identification.

SLS 404 Leather - Physical testing.

SLS 428 Random sampling methods.

SLS 537 Method for chemical testing of leather.

SLS 596 Bib-taps and stopvalves for water services.

SLS 614 Potable water

3 DEFINITIONS

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

3.1 cold water : Water at a temperature not exceeding 37 ^{o}C.

3.2 seat washer : The disc of material fitted to the washer plate of a bib-tap or stopvalve in such a manner that, on closing the bib-tap or stopvalve, it is brought into contact with the seat and closes the orifice against further flow.

3.3 hot water : Water at a temperature above 37 ^{o}C and not exceeding 100 ^{o}C.

3.4 vulcanized fibre : Material consisting of super-imposed layers of specially prepared paper, chemically treated so that the laminae are virtually destroyed with the production of a homogeneous mass of converted cellulose.

3.5 water-soluble matter : Substances which, under certain conditions described in this, are dissolved out of the leather by water. These substances are principally organic tannins, non-organic tannins, and mineral salts.

3.6 water soluble inorganic matter : The sulphated ash of the water soluble matter prepared in accordance with this standard.

3.7 water-soluble organic matter : The difference between total water-soluble matter and water-soluble inorganic matter.

4 REQUIREMENTS

4.1 Material

Material for washers shall be as shown below for different types of applications. They shall comply with the relevant requirements specified in **4.2**.

4.1.1 *Hot or cold water*

Synthetic or natural vulcanized rubber.

4.1.2 *Cold water*

Vegetable tanned hydraulic leather.

4.1.3 *Hot water*

Vulcanized fibre.

4.2 Properties of seat washer materials

4.2.1 *General properties*

4.2.1.1 Effect on water

a) Material used for seat washers shall be immersed for a period of 24 hours in a glass containing 0.25 litre of normal potable water at 27 ± 2 °C having a residual chlorine content not exceeding 0.2 mg/l. This first portion of water shall be rejected and replaced by a second similar portion. Immersion for 24 hours of the same sample of material in this second portion of water shall neither impart any appreciable or objectionable taste to the water, nor produce any toxic effect, nor foster the growth of bacteria, nor impart colour discernible to the unaided eye.

NOTE - For verification of these requirements the relevant clauses of **SLS 614** *shall apply.*

b) To assess the compliance of the material with the above requirements one seat washer having the following dimensions shall be used:

Outside diameter	-	60 mm min.
Inside diameter	-	10 mm max.
Thickness (when new)	-	6 mm min.

Alternatively, a number of smaller washers of total equivalent surface area may be used.

4.2.1.2 Effect on metal

The material of the washer shall not corrode the metal seat or the washer plate sufficiently to impair the performance and life of a tap or stopvalve.

4.2.2 *Rubber for seat washers for hot or cold water*

Rubber for washers to be used with hot or cold water shall be either vulcanized synthetic or vulcanized natural rubber conforming with the following requirements:

a) It shall have hardness of between 81 $^{\circ}$ and 95 $^{\circ}$ IRHD when tested in accordance with the requirements of Method H in Part 4 of **SLS 297**.

b) When aged for 14 days at 70 $^{\circ}$C by Method B specified in Part 5 of **SLS 297** the hardness shall not have altered by more than 3 $^{\circ}$ IRHD and shall remain within the range given in **4.3.2** a) when tested after the ageing period.

c) When subjected to the constant strain test by the method specified in **ISO 815**, for a period of 24 hours at 100 ± 1 $^{\circ}$C, the compression set shall be not greater than 20%.

d) When subjected to the tensile stress-strain test specified in Part 2 of **SLS 297** the minimum tensile strength shall be 8 HP.

e) When subjected to the tensile stress-strain test specified in Part 2 of **SLS 297** the minimum elongation at break shall be 150 per cent.

f) When subjected to the water absorption test specified in **8.3** in **ISO 1817:1975** for a period of 168 hours at 27 ± 2 $^{\circ}$C and using the standard test piece, the absorption of water shall not exceed 2% by volume.

4.2.3 *Leather for seat washers for cold water only*

4.2.3.1 Leather complying with the requirements of this Sri Lanka Standard shall be used for the manufacture of washers intended for cold water only.

4.2.3.2 Leather for washers shall be vegetable tanned hydraulic leather as specified in **4.2.3.3**.

4.2.3.3 The leather shall be from good quality hides such as buffalo, ox, or cow having good substance, and satisfy the following requirements:

a) Water soluble matter shall not exceed 18 per cent, when tested as specified in **5.1.1**.

b) The pH value of a water extract shall be not less than 3.5 when tested as specified in **SLS 537:Part 2**.

c) Oil and fat content of the leather shall be not less than 10 per cent and not more than 15 per cent when tested as specified in **SLS 537:Part 4**.

d) The leather shall have an ultimate tensile strength of not less than 20 MN/m^2 when tested as specified in SLS 404:**Part 6**.

4.2.4 *Flexible vulcanized fibre for washers for hot water only*

4.2.4.1 Flexible vulcanized fibre complying with the requirements of this Sri Lanka Standard as given in **4.2.4.2** shall be used for the manufacture of washers intended for hot water only.

4.2.4.2 Flexible vulcanized fibre sheets used for seat washers shall satisfy the following requirements:

a) When tested for flexibility in accordance with Appendix B of **BS 3964** the specimen shall show no sign of splitting along the edge of cracking.

b) When tested in accordance with Appendix C of **BS 3964** the specimen shall have a compression strain of not less than 20 per cent and not more than 30 per cent.

c) When tested in accordance with Appendix D of **BS 3964** the material shall contain not more than 0.05 per cent by weight of chlorides calculated as Cl.

d) When tested in accordance with Appendix D of **BS 3964** material shall contain not more than 0.05 per cent by weight of sulphates calculated as SO_4.

5 METHODS OF TEST

5.1 Tests for leather for cold water

5.1.1 *Determination of water soluble organic matter*

5.1.1.1 Principle

Aqueous extraction, under specified conditions, of a prepared sample is followed by determination of the water-soluble matter in the extract by evaporation and drying at 102 ± 2 °C. Sulphating and ashing of the residue at 800 °C yield the water-soluble inorganic matter and the water-soluble organic matter is derived by difference.

5.1.1.2 Reagents

The following reagent is required.

Sulphuric acid reagent solution, approximately 2N.

5.1.1.3 Apparatus

Usual laboratory apparatus is required and, in particular, the following.

a) Flasks, capacity 650 to 750 ml, with a wide neck and a close fitting glass or rubber stopper,

b) Graduated measuring cylinder, capacity 500 ml,

c) Pipette, capacity 50 ml,

d) Evaporating basin, quartz, platinum, or porcelain, with flat bottom, and with a working capacity of at least 50 ml,

e) Appropriate shaker apparatus operating at 50 ± 10 cycles per minute,

f) Thermometer of range 0 - 50 °C in 1 °C graduations,

g) Fluted filter paper,

h) Boiling water or steam bath,

i) Oven, capable of being maintained at 102 ± 2 °C,

j) Muffle furnace, capable of being maintained at a temperature close to, but not exceeding 800 °C (See note 4).

5.1.1.4 Procedure

Sample in accordance with **SLS 403** and prepare the samples in accordance with **SLS 537:Part 1.** Extract the leather in accordance with **SLS 537:Part 4.** Into a flask of 650 - 750 ml capacity transfer an amount of ground, dischloromethane-extracted leather equivalent to 10 g of the sample prior to extraction with dichloromethane. Add 500 ml of water at 22.5 ± 2.5 °C, stopper securely and shake mechanically at 50 ± 10 cycles per minute for 2 hours at 22.5 ± 2.5 °C (See note 1).

Filter the contents of the flask through a fluted filter paper until the filtrate is clear. Discard the first 50 ml. Determine the water-soluble organic matter and inorganic matter in subsequent 50.0 ml aliquot portions of the filtrate (See notes 2 and 3).

a) **Water-soluble matter** - Pipette 50.0 ml of filtrate into a basin which has previously been prepared by heating at 800 °C cooling in a desiccator and accurate weighing. Evaporate the filtrate over the water bath and dry the residue at 102 ± 2 °C for approximately 2 hours. Cool in a desiccator using only one dish at a time in a small desiccator, and not more than two in a large desiccator. Weigh quickly and repeat the drying, cooling and weighing procedure either until the further reduction in mass does not exceed 2 mg, or the total drying time equals 8 hours. Record the final mass.

b) **Water-soluble inorganic matter** - Thoroughly wet the residue obtained in **5.1.1.4** (a). (See note 2) in the dish with just sufficient 2N sulphuric acid, and heat gently over a low flame until no more sulphur trioxide fumes are visible. Heat more strongly until the basin approaches red heat. Transfer to the muffle furnace at 800 °C for 15 minutes (See note 4). Cool in the desiccator and weigh as quickly as possible. Repeat the addition of acid, heating, cooling and weighing until the mass of the residue is constant.

NOTES

1 If the prescribed extraction temperature of 22.5 ± 2.5 °C cannot be maintained in the test room it is advisable to use a vacuum flask of 650 - 750 ml capacity. The range of values is likely to differ by about 0.5 % over the permitted temperature range.

2 The water-soluble matter and the water-soluble inorganic matter can each be determined separately. Water-soluble matter can be determined by evaporating 50 ml portions of the filtrate in previously dried platinum, quartz, silver, porcelain or glass dishes at 102 ± 2 °C, in accordance with **5.1.1.4** *(a). Water soluble inorganic matter can be determined by evaporating separate 50 ml portions in previously heated quartz, platinum or glazed porcelain dishes in accordance with* **5.1.1.4** *(b).*

3 If the mass of water-soluble inorganic matter is likely to be less than 2.0% of the leather mass, it is recommended that a 100 ml or 200 ml aliquot portion should be used. In cases where the result is likely to be less than 1.0%, a 100 ml or 200 ml portion should always be used.

4 At temperatures above 800 °C some loss of mass from the residue, owing to volatilization of certain inorganic salts, is possible. For this reason close control is essential to prevent the maximum furnace temperature from exceeding 800 °C.

5.1.1.5 Expression of results

Calculate the following percentages.

$$\text{Total water-soluble matter, percentage by mass} = \frac{1\ 000\ M_1}{M_o}$$

where M_1 is the mass of dry residue and M_o is the mass of original sample of leather,

$$\text{Water-soluble inorganic matter, percentage by mass} = \frac{1\ 000\ M_2}{M_o}$$

where M_2 is the mass of sulphated residue from ignition and M_o is the mass of the original sample of leather.

To obtain the percentage water-soluble organic matter, calculate the difference between the percentage total water-soluble matter and the percentage water-soluble inorganic matter.

5.1.1.6 Repeatability

The results of duplicate determination should not differ by more than 0.2%, calculated on the original mass of leather.

5.1.1.7 Test report

The report shall include:

a) the results obtained, to 1 decimal place;

b) a reference to this standard;

c) details of any special circumstances which may have affected the results;

d) identification details of the sample.

6 SAMPLING

6.1 Leather

6.1.1 *Lot*

A definite quantity of leather manufactured or produced under conditions which are presumed uniform.

6.1.2 *Scale of sampling*

The method of drawing representative samples of skins or hides from a lot shall be in relevant clauses of **SLS 402.**

6.1.3 *Sampling location*

The location for taking test pieces from individual skins or hides shall be as in **SLS 403.**

6.1.4 *Number of tests*

Each test piece in the sample shall be tested for all relevant requirements of this specification.

6.2 Rubber and fibre sheets

6.2.1 *Lot*

A definite quantity of rubber or fibre sheets manufactured under conditions which are presumed uniform.

6.2.2 *Scale of sampling*

6.2.2.1 The number of sheets to be selected from a lot shall be in accordance with Table 1.

TABLE 1 - Scale of sampling

Number of sheets in the lot	Number of sheets to be selected
Up to 15	3
16 to 25	5
26 to 100	8
101 to 150	13

6.2.2.2 The sheets shall be selected at random. In order to ensure randomness of selection random number tables as given in **SLS 428** shall be used.

6.2.3 *Number of tests*

Each sheet selected as in **6.2.2.1** shall be subjected to all relevant requirements given in this specification.

6.2.4 *Preparation of test pieces*

Preparation of test pieces shall be done according to the relevant test methods or standards given in this specification.

7 CONFORMITY TO STANDARD

The lot shall be declared as conforming to this specification if each test piece tested as in **6.1.4** or **6.2.3** as applicable, satisfies the relevant requirements.

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.