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SRI LANKA STANDARD 292 : 1974

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SPECIFICATION FOR MICROCELLULAR RUBBER SHEETS FOR SOLES AND HEELS

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BUREAU OF CEYLON STANDARDS

SPECIFICATION FOR MICROCELLULAR RUBBER SHEETS FOR SOLES AND HEELS

S. L. S. 292 : 1974

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BUREAU OF CEYLON STANDARDS
53, DHARMAPALA MAWATHA,
COLOMBO 3.

Ceylon 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.

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SRI LANKA STANDARD SPECIFICATION FOR MICROCELLULAR RUBBER SHEETS FOR SOLES AND HEELS

FOREWORD

This Sri Lanka Standard has been prepared by the Drafting Committee on Footwear. It was approved by the Agricultural and Chemicals Divisional Committee of the Bureau of Ceylon Standards, and was authorised for adoption and publication by the Council of the Bureau on 31st October 1974.

In this standard, the requirements for microcellular rubber sheets which are intended for the manufacture as well as repair of soles of shoes and slippers have been specified. The design aspect of the sheet and the composition of the rubber mix have been kept out of the scope of this standard, prescribing only the essential physical requirements.

All values given in this Standard are in metric units. In reporting the result of a test or analysis made in accordance with this standard if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with CS 102.* The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

In the preparation of this standard, valuable assistance derived from the publications of the Indian Standards Institution is acknowledged.

1. SCOPE

This Sri Lanka Standard prescribes the requirements, methods of sampling and test for microcellular sheet produced by moulding process from general purpose elastomers and intended for use in footwear.

2. TYPES

This standard shall cover two types of microcellular sheet according to their quality.

2.1 **Type 1** — Microcellular rubber of maximum relative density 0.5

2.2 **Type 2** — Microcellular rubber of maximum relative density 0.7

* CS 102: Presentation of numerical values.

3. REQUIREMENTS

3.1 **Material** — The rubber used shall be compounded from natural or synthetic rubbers or their blend.

3.1.1 The rubber shall be vulcanized. The vulcanized rubber shall have a fine and uniform cell structure. It shall be free from pores and sulphur blooms. The surface shall be free from blisters or cavities or blemishes.

NOTE : The sheet shall be composed mostly of closed cells, but a few small open cells may be allowed unless it forms a cavity.

3.1.2 The raw material used shall not contain any material that does not allow the glueing of sole or heel.

TABLE 1 — PHYSICAL REQUIREMENTS FOR MICROCELLULAR RUBBER SHEETS

Characteristic	Requirements		Method of test according to
	Type 1	**Type 2**	
1) Relative density, max.	0.5	0.7	SLS 297* Part 1
2) Hardness (IRHD), min.	25	40	SLS 297* Part 4
3) Tensile strength, kgf/cm^2 (both directions), min.	20	28	SLS 297* Part 2
4) Elongation at break, % (both directions), min.	200	175	SLS 297* Part 2
5) Compression set, max.	50	50	Appendix A-1
6) Split tear strength kgf (both directions)	5min	2 - 4	Appendix A-2
7) Heat shrinkage			
a) at 40°C, max.	3	3	Appendix A-3
b) at 100°C, max.	6	6	

*SLS 297 Methods of Testing Vulcanized Rubber

Part - 1 Determination of Relative density and density

Part - 2 Determination of Tensile stress strain properties

Part - 4 Determination of Hardness

3.1.3 The colour and design on the surfaces of the sheets shall be as agreed to between the purchaser and supplier.

3.1.4 The material shall comply with the physical requirements given in table 1.

3.2 Size and Thickness

3.2.1 The size of the sheet shall be as agreed to between the purchaser and supplier. The allowed tolerance for the size is ± 5 per cent on the area of the agreed value.

3.2.2 The thickness of the sheet shall be as agreed to between the purchaser and supplier. The thickness shall be measured according to Appendix B.

4. MARKING

Sheets shall be indelibly marked or labelled with the manufacturer's identification as agreed to between the purchaser and the supplier.

5. PACKING

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

6. SAMPLING AND CRITERIA FOR CONFORMITY

For the purpose of ascertaining the conformity of the material to this standard the scale of sampling and criteria for conformity shall be as prescribed in Appendix C.

7. TEST METHODS

7.1 Unless otherwise agreed to between the purchaser and supplier, all tests shall be carried out within three months from the date of receipt of the material by the purchaser.

7.2 Samples shall be conditioned at an atmosphere of 27 ± 2°C for at least 24 hours and tests shall be carried out at this temperature unless otherwise stated.

7.3 All test specimens shall be buffed to uniform thickness as required for each particular test. Buffing shall preferably be carried out on a horizontal grinding machine or other equipment which

will give a fine nap surface. Any pattern or skin originally present on the sample shall be removed first in the buffing operation, and adjustment of thickness completed by buffing on the opposite surface. In the case of small soles and heels, suitable sheets of the material of the same composition vulcanized under identical condition as the article shall be provided by the supplier.

7.4 All physical tests shall be carried out as specified in col. 4 of Table 1.

APPENDIX A
(See Clause 3.1.4)

TEST METHODS FOR PHYSICAL REQUIREMENTS

A-1. COMPRESSION SET

A-1.1 **Apparatus**—The compression apparatus shall consist of parallel plates between which the test pieces may be compressed and the means of applying slowly a load of 140±1 kg. to the plates and maintaining the load for a period of at least 24 hours. Alternatively, the single loading spring may be replaced by a set of, three equivalent springs placed symmetrically around the central axis.

A-1.2 **Test piece** — Cut three discs of diameter 30±0.2 mm and thickness 9.5±0.2 mm. Alternatively 6 discs of the same diameter and half of the thickness, superimposed in pairs to give the same thickness may be used.

A-1.3 **Procedure** — Condition the test pieces at 27±2°C and 65±5 per cent relative humidity for 24 hours. Measure the initial thickness of each test piece at the centre using the gauge with part-spherical contact. Note the arithmetic mean of the three readings as the initial thickness. Place the three test pieces symmetrically between the parallel plates of the compression apparatus and subject to a compression load of 140±1 kg. for 24 hours. Then release the load; remove the test pieces and allow to recover. After 60 minutes remeasure the thickness and note the arithmetic mean as the final thickness.

A-1.4 **Expression of results**—The compression set is the difference between the original thickness of the test piece and that after recovery expressed as a percentage of the initial thickness.

$$\text{Compression set} = \frac{t_0 - t_1}{t_0} \times 100$$

Where t_0 = initial thickness, in mm.
t_1 = final thickness, in mm.

A-2 SPLIT TEAR STRENGTH

A-2.1 **Apparatus**

A.2.1.1 **Tensile testing machine**— With rate of tranverse of 75 mm per minute.

A-2.2 **Test pieces**—Cut four test pieces of 25 mm x 100 mm and thickness 7 ± 0.2 mm along and across the direction of the sheet. Prepare each test piece by splitting it mid-way between the top and the bottom surface for a distance of 30 mm from one end and thus form two tongues at the end.

A-2.3 **Procedure**—Clamp the tongues of the test piece in the jaws of the tensile testing machine and allow the jaws to separate at a constant rate of 75 mm per minute. Note the maximum load and record the arithmetic average of four tests in kgf as the split tear strength.

A-3 HEAT SHRINKAGE

A-3.1 **Test pieces**—Cut four test pieces of 25 mm x 150 mm and of thickness 4.8 ± 0.2 mm along and across the direction of the sheet. The test pieces cut across the soles shall be as long as possible, from the full width of the soles, and in any case not less than 75 mm in length.

On each test piece, mark the centre line along the length on one surface, and make two small cuts across it, 20 mm from the ends (5 mm in the case of the shorter test pieces cut across soles).

A-3.2 **Procedure**—The distance between the cross cut marks shall be measured on each specimen, to an accuracy of 0.1 mm.

100°C test—One "along" and one "across" test pieces shall be placed in an oven maintained at 100 ± 1°C and left for 60 minutes. They are then removed, allowed to recover and cool for 30 minutes, and immediately re-measured between the cut marks.

40°C test—One "along" one "across" test pieces shall be placed in an oven maintained at 40±1°C and left for 168 hours. They are then removed, allowed to recover and cool for 30 minutes, and immediately re-measured between the cut marks.

A-3.3 **Expression of results** —

$$\text{Shrinkage, percentage} = \frac{l_1 - l_0}{l_0} \times 100$$

where

l_0 = initial length, in mm

l_1 = final length, in mm

APPENDIX B

(See Clause 3.2.2)

MEASUREMENT OF THICKNESS

The thickness of the sheet is measured at 5 or more points to an accuracy of 0.5 mm; the arithmetic mean of the thickness measured shall be deemed to be the thickness of the sheet.

APPENDIX C

(See Clause 6)

C.1 SCALE OF SAMPLING

C-1.1 **Lot**—In any consignment, all microcellular rubber sheets belonging to the same size, pattern, type and batch of manufacture shall constitute a lot.

C-1.2 The number of microcellular rubber sheets to be selected from any lot depends on the size of the lot. For visual and dimensional characteristics all the sheets of the lot shall be inspected. The number of sheets to be selected for physical tests shall be in accordance with col. 3 of Table 2.

C-1.3 The sheets shall be selected at random from the lot.

TABLE 2

Scale of sampling and permissible number of defectives

No. of Sheets in the lot	Visual and dimensional characteristics Permissible No. of defectives	Physical characteristics Number of sheets to be selected for the test sample
(1)	(2)	(3)
up to 25	0	1
26 to 50	1	1
51 to 100	1	2
101 to 200	2	2
201 to 300	2	3

C-2 CRITERIA FOR CONFORMITY

C-2.1 **Visual and dimensional characteristics**—All the sheets drawn under Clause C-1.2 shall be subjected to visual examination for the material (Clauses 3.1.1 and 3.1.3) and for dimensional characteristics (Clause 3.2). Any sheet found to be defective for one or more of the requirements shall be considered as defective. The lot shall be considered having satisfied the requirements of the specification for visual and dimensional characteristics if the sheet found defective in the lot is less than or equal to the permissible number of defectives sheets given in col. 2 of Table 2.

C-2.2 **Physical Characteristics**—Only if the lot passes the requirements for the visual and dimensional characteristics under Clause C-2.1 it shall be tested for physical characteristics. For this purpose a number of sheets in accordance with col. 3 of Table 2 from those which have been found conforming under C-2.1 shall be selected at random. A sheet shall be considered as defective if the test specimens from the sheet fail to satisfy the corresponding requirements prescribed in Table 1. The lot shall be considered having satisfied the requirements for physical characteristics if there are no defective sheets in the test sample.

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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

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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.

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