

SRI LANKA STANDARD 936 : 1991

UDC 665.93 : 678.4

Reaffirmed

2016

**SPECIFICATION FOR
RUBBER ADHESIVES**

SRI LANKA STANDARDS INSTITUTION

SPECIFICATION FOR RUBBER ADHESIVES

SLS 936:1991

(Attached AMD 188)

Gr. 7

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SRI LANKA STANDARDS INSTITUTION

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DRAFTING COMMITTEE ON RUBBER ADHESIVES

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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.

**AMENDMENT NO. 01 TO SLS 936 : 1991
SPECIFICATION FOR RUBBER ADHESIVES**

EXPLANATORY NOTE

It has been noted that it is difficult to design a metal roller to produce the specified pressure, while satisfying the given diameter. Therefore the dimensions and the material of the roller are specified in this amendment in order to achieve the required force.

**AMENDMENT NO. 01 APPROVED ON 1995-07-20
TO SLS 936 : 1991 SPECIFICATION FOR RUBBER ADHESIVES**

PAGE 8

Appendix A

Delete the text of Clause **A.1.2** and substitute the following:

“A steel roller, of 135 ± 2 mm diameter and 90 ± 1 mm width (The weight of the roller shall be approximately 10 kg). It shall be constructed such that the weight of the handle is not added to the weight of roller during use (see Figure 1).”

SRI LANKA STANDARD SPECIFICATION FOR RUBBER ADHESIVES

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1991 - 09 - 27, after the draft, finalized by the Drafting Committee on Rubber Adhesives, had been approved by the Chemicals Divisional Committee.

The types of rubber adhesives covered by this specification are used as general purpose adhesives to paste a variety of similar and dissimilar surfaces like rubber, fabric (including coated fabric), laminated plastic, wood, hardboard, leather, glass etc. These adhesives are quick drying under normal conditions.

In this specification provision has been made for working consistency of the product, open assembly time and packaging to be as agreed to between the purchaser and the manufacturer.

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 an 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 the specification.

In the preparation of this specification, the assistance derived from the publications of the Bureau of Indian Standards and the American Society for Testing and Materials is gratefully acknowledged.

1 SCOPE

This specification prescribes the requirements and methods of sampling and test for solvent based rubber adhesives used for general purposes.

2 REFERENCES

- CS 102 Presentation of numerical values.
- SLS 428 Random sampling methods.

3 DEFINITIONS

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

3.1 shear strength : The minimum force required to cause failure of the adhesive bond.

3.2 open assembly time : The time elapsing between the application of adhesive and the assembly of the components to the joint.

4 REQUIREMENTS

4.1 Appearance

The adhesive shall be a homogeneous solution free of sedimentation.

4.2 Consistency

The adhesive shall be uniform, smooth and free from coarse particles. It shall be of a consistency suitable for its mode of application as agreed to between the purchaser and the manufacturer.

4.3 Open assembly time

The open assembly time shall be as agreed to between the purchaser and the manufacturer depending on the application and shall not vary from batch to batch.

4.4 Peel strength

4.4.1 *Dry strength*

The joint prepared as in A.3 shall withstand the minimum load given in Column 3 of Table 1 when tested as prescribed in Appendix A.

4.4.2 *Wet strength*

The joint prepared as in A.3 immersed in water at room temperature for 24 hours shall withstand the minimum load given in Column 4 of Table 1 when tested as prescribed in Appendix A.

4.4.3 *Peel strength after heat ageing*

The joint prepared as in A.3 kept in an air oven at 70 ± 2 °C for 100 hours shall withstand the minimum load given in Column 5 of Table 1 when tested as prescribed in Appendix A.

TABLE 1 - Requirements for peel strength

Sl. No.	combination of components	Peel Strength KN/m, min.		
		Dry (3)	Wet (4)	Aged (5)
(1)	(2)			
(i)	Leather - Leather	4.0	2.5	3.5
(ii)	Leather - Rubber	4.0	2.5	4.0
(iii)	Rubber - Rubber	2.5	2.5	1.0

4.5 Shear strength

4.5.1 Dry strength

The joint prepared as in B.3 shall withstand a minimum load given in Column 3 of Table 2 when tested as prescribed in Appendix B,

4.5.2 Wet strength

The joint prepared as in B.3 immersed in water at room temperature for 24 hours shall withstand the minimum load given in Column 4 of Table 2 when tested as prescribed in Appendix B.

4.5.3 Shear strength after heat ageing

The joint prepared as in B.3 kept in an air oven at 70 ± 2 °C for 100 hours shall withstand the minimum load given in Column 5 of Table 2 when tested as prescribed in Appendix B.

TABLE 2 - Requirements for shear strength

Sl. No.	Combination of components	Shear strength, MPa, min.		
		Dry (3)	Wet (4)	Aged (5)
(1)	(2)			
(i)	Leather - Leather	1.60	1.25	1.60
(ii)	Leather - Rubber	1.80	1.80	1.15
(iii)	Rubber - Rubber	1.60	1.30	0.50
(iv)	Wood - Wood	1.50	1.40	1.30
(v)	Wood - Laminated Plastic	1.40	1.30	1.20

4.6 Storage stability

The adhesive shall comply with the requirements specified in 4.1 to 4.5 when stored in the original closed container according to the manufacturer's instructions for the declared shelf life.

5 PACKAGING AND MARKING

5.1 Packaging

The adhesive shall be packed in clean, dry containers as agreed to between the purchaser and the manufacturer. The containers shall be strong enough to withstand normal usage and shall be sealed to prevent leakage and contamination of the contents during transportation and handling.

5.2 Marking

Each container shall be legibly and indelibly marked or labelled with the following:

- a) Name of the product as "Rubber Adhesive";
- b) Name and address of the manufacturer including the country of origin;
- c) Brand name/trade mark, if any;
- d) Net content in millilitres or grams;
- e) Batch or code number;
- f) Date of manufacture and the shelf life;
- g) Directions for storage and use; and
- h) The words "Direct inhaling dangerous to health".
"Keep away from children".

NOTE

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

6 SAMPLING

6.1 Lot

In any consignment all containers of rubber adhesives of the same size belonging to one batch of manufacture or supply shall constitute a lot.

6.2 Scale of sampling

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

6.2.2 The number of containers to be selected from a lot shall be in accordance with Table 3.

TABLE 3 - Scale of sampling

No. of containers in the lot (1)	No. of containers to be selected (2)
Up to 151	3
151 to 300	4
301 to 500	5
501 to 1 200	6
1 201 and above	7

6.2.3 If the containers are packed in cartons select number of cartons according to Column 2 of Table 3 and draw one container from each of the selected cartons to obtain the required sample size.

6.2.4 The containers shall be selected at random. In order to ensure randomness of selection tables of random numbers as given in SLS 428 shall be used.

6.3 NUMBER OF TESTS

6.3.1 Each container selected as in 6.2.2 or 6.2.3 shall be inspected for the requirements given in 4.1, 5.1 and 5.2.

6.3.2 If necessary each container inspected as in 6.3.1 shall be tested for the requirements given in 4.2 and 4.3.

6.3.3 Sufficient quantities of material shall be drawn from each container tested as above, mixed together and transferred into a suitable container to form the composite sample. The composite sample thus prepared shall be tested for the requirements given in 4.4 and 4.5.

7 METHODS OF TEST

Tests shall be carried out in accordance with the methods given in Appendices A and B of this specification.

8 CRITERIA FOR CONFORMITY

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

8.1 Each container inspected as in 6.3.1 and 6.3.2 satisfies the relevant requirements.

8.2 The composite sample tested as in 6.3.3 satisfies the relevant requirements.

APPENDIX A DETERMINATION OF PEEL STRENGTH

A.1 APPARATUS

A.1.1 *Tensile testing machine*

A.1.2 Metal roller, of 25 ± 5 mm diameter which can apply an approximate pressure of 90 N on the test specimen, so constructed that the weight of the handle is not added to the weight of the roller during use (see Figure 1).

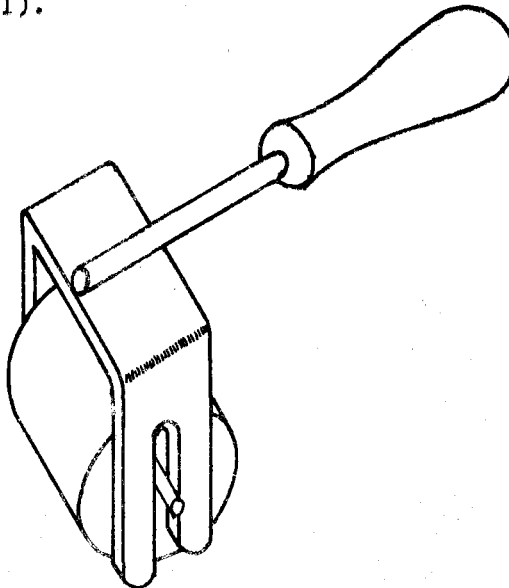


FIGURE 1 - Metal roller

A.2 COMPONENTS

A.2.1 Leather, chrome retan

A.2.2 Rubber, vulcanized natural rubber of IRHD hardness 60

A.3 PREPARATION OF TEST SPECIMENS

Cut strips of approximately 150 mm x 25 mm x 3 mm of each component (A.2). Buff the surfaces that are to be bonded using a wire brush, fine emery cloth or similar abrasive and dust off. Wash the surfaces with 1,1,1 trichloroethane to remove any dirt or oil. Allow the strips to dry well. Avoid touching after washing. Apply sufficient quantity of adhesive over an area of approximately 75 mm x 25 mm of the buffed surface of each strip so that the pores, if any, are completely filled and there is a thin, uniform layer of adhesive formed. When the surface is dry apply another coat (see Note). When the second adhesive film is dry to a point where there is still a tackiness but no tendency for the film to lift when tested with a finger, align the coated surface of the strips face to face carefully (without entrapping air) in such a way that the free ends of the strips lie in the same direction (see Figure 2). Move the roller (A.1.2) five times on the assembled specimen. Allow the bonded specimen to dry at room temperature for 24 hours.

Prepare the test specimens using following combinations of components.

- (a) Leather - Leather
- (b) Leather - Rubber
- (c) Rubber - Rubber

NOTE

For low viscous adhesives, it may be necessary to apply three coats, in which case adequate drying time to permit evaporation of the solvent should be allowed between coats.

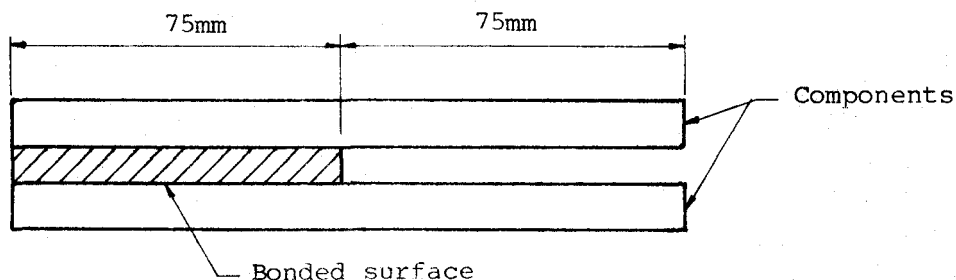


FIGURE 2 - Test specimen for determination of peel strength

A.4 PROCEDURE

Condition the test specimen at room temperature and 65 ± 5 relative humidity for 48 hours .

Fix the two free ends of the test specimen between the jaws of the tensile testing machine and pull at a constant crosshead speed of 25 mm/min. Record the load required to separate the joint.

A.5 CALCULATION

$$\text{Peel strength, KN/m} = \frac{W}{l}$$

where,

W is the load in KN, required to separate the joint; and
l is the length in m, of the joint.

Report the peel strength as the average of six values.

APPENDIX B DETERMINATION OF SHEAR STRENGTH

B.1 APPARATUS

B.1.1 *Tensile testing machine*

B.1.2 *Metal roller, as described in A.1.2.*

B.2 COMPONENTS

B.2.1 Wood, Ginisapu

B.2.2 Plastic, laminated, Formica

B.2.3 Leather, chrome retan

B.2.4 Rubber, vulcanized natural rubber of IRHD hardness 60

B.3 PREPARATION OF TEST SPECIMENS

Cut strips of size approximately 150 mm x 25 mm x 3 mm of each component (B.2). Buff the surfaces that are to be bonded using a wire brush, fine emery cloth or similar abrasive and dust off. Wash the surfaces with 1,1,1 trichloroethane to remove any dirt or oil. Allow the strips to dry well. Avoid touching after washing. Apply sufficient quantity of adhesive over an area of approximately 25 mm x 25 mm of the buffed surface of each strip so that the pores, if any, are completely filled and there is a thin uniform layer of adhesive formed. When the surface is dry apply another coat (see Note). When the second adhesive film is still tacky but no tendency for the film to lift when tested with a finger, align the coated surfaces of the two strips face to face carefully (without entrapping air) in such a way that the free ends of the strips lie in opposite directions (see Figure 3). Move the roller five times on the assembled specimen. Allow the bonded specimen to dry at room temperature for 24 hours

Prepare the test specimens using following combinations of components.

- (a) Wood - Wood
- (b) Wood - Laminated Plastic
- (c) Leather - Leather
- (d) Leather - Rubber
- (e) Rubber - Rubber

NOTE

For low viscous adhesives, it may be necessary to apply three coats. Adequate drying time to permit evaporation of the solvent should be allowed between coats.

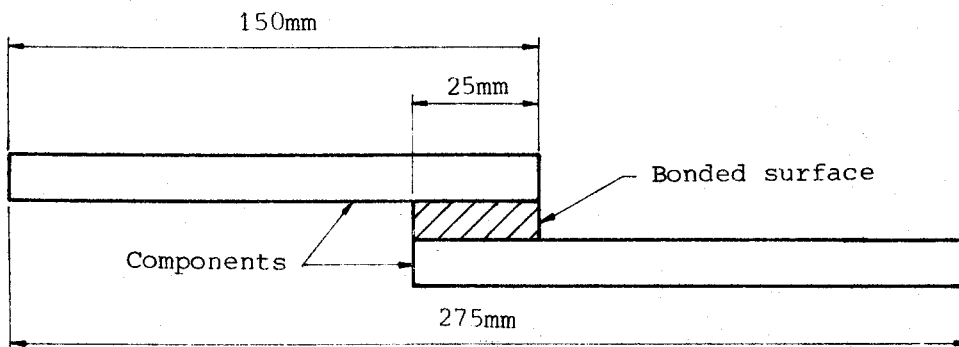


FIGURE 3 - Test specimen for determination of shear strength

B.4 PROCEDURE

Condition the test specimen as given in A.4. Fix the two free ends of the test specimen between the jaws of the tensile testing machine and pull at a constant crosshead speed of 50 mm/min. Record the load required to separate the components of the joint.

B.5 Calculation

$$\text{Shear strength, MPa} = \frac{W}{A}$$

where,

W is the load, in MN, required to separate the components of the joint; and

A is the area, m², of the joint

Report the shear strength as the average of six values.

Amendment No. 1 approved on 1995-07-20
to SLS 936 : 1991

SRI LANKA STANDARD SPECIFICATION FOR RUBBER ADHESIVES

PAGE 8

Appendix A

Delete the text of Clause A.1.2 and substitute the following:

"A steel roller, of 135 ± 2 mm diameter and 90 ± 1 mm width (The weight of the roller shall be approximately 10 kg). It shall be constructed such that the weight of the handle is not added to the weight of roller during use (see Figure 1)."

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.

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.

