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Indian Standard

SPECIFICATION FOR SHOE ADHESIVE, NATURAL RUBBER LATEX BASE

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SPECIFICATION FOR SHOE ADHESIVE, NATURAL RUBBER LATEX BASE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 8 May 1981, after the draft finalized by the Adhesives Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 All the adhesive operations in shoe production can be carried out with synthetic adhesives, but their high cost and import restrictions limit their use in our country. Hence, solvent cements and latex cements (based on natural rubber) which is indigenous and cheaper will continue to be used for a long time.

0.3 While different kinds of adhesives may be employed in shoe-making, this standard covers only those based on natural rubber latex. Latex cements are employed for a dozen bonding operations involving the various materials in shoe fabrication. They are used in folding, counter pasting, backing, lining insole tip cementing, channel closing, toe lasting, side lasting unishank cementing, sole laying, sock lining and covering, etc.

0.4 Viewing the importance and growing need of this type of adhesives in footwear manufacture, the Sectional Committee felt it necessary to formulate an Indian Standard on the subject. Its application is expected to improve the quality of the available adhesives and assist the footwear manufacturing industry in procuring the right type of adhesives.

0.5 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 analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard prescribes requirements, methods of sampling and test for natural rubber latex base adhesive, intended for use in sole manufacture.

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*Rules for rounding off numerical values (*revised*).

1.1.1 This standard does not include latex cement employed for stuck-on work which is already covered by IS : 4663-1968*.

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions given in IS : 3434-1965† shall apply.

3. REQUIREMENTS

3.1 Physico-Chemical Characteristics

3.1.1 *Consistency* — The adhesive shall be a homogeneous liquid dispersion, free from any coagulated particles of foreign matter. It shall have ease of application by brush at all temperatures between 5°C and 50°C.

3.1.2 *Odour* — A freshly prepared film of the adhesive shall not emit any trace of putrefactive odour.

3.1.3 *Colour* — The adhesive shall not stain or discolour or in any other way damage the leather or other shoe component materials on which it is applied.

3.1.4 *Build-Up Properties* — The adhesive coat shall dry quickly and be tacky enough so that the assembly formed shall have sufficient green strength to permit immediate handling.

3.1.5 *p*H — The *p*H value of the material, when tested in accordance with the method NRL: 11 of IS : 3708 (Part I)-1966‡, shall be between 9·0 and 10·0.

3.1.6 *Total Solids* — The total solids content of the material, when tested in accordance with the method NRL : 2 of IS : 3708 (Part I)-1966‡, shall be minimum 40 percent by mass.

3.1.7 *Mechanical Stability* — The material, when tested in accordance with the method NLR : 9 of IS : 3708 (Part I)-1966‡, shall be stable for minimum 10 minutes.

3.1.8 *Adhesion* — The adhesion strength of each of the joint using adhesive rubber latex base shall be as follows when tested in accordance with Appendix A.

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*Specification for permanent rubber-based adhesives for footwear industry.

†Glossary of terms for adhesives and pressure sensitive adhesive tapes.

‡Methods of test for natural rubber latex : Part I Dry rubber content, total solids, coagulum content, viscosity, sludge content, density, total alkalinity, KOH-number, mechanical stability, volatile fatty acid number, *p*H, total nitrogen, total copper, total iron, total manganese, and total ash.

a) Adhesion of dried specimens — 1·5 kg/cm, *Min*; and

b) Adhesion of aged specimens — 1·2 kg/cm, *Min*.

3.2 Keeping Quality — The adhesive shall not deteriorate in quality and shall remain completely usable when kept in sealed original container under normal atmospheric conditions for at least six months.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed in glass, polyethylene or bituminous-lined metal or wooden containers.

4.2 Marking — Each container shall be marked with the following:

a) Name of the material;

b) Name of the manufacturer and/or trade-mark, if any:

c) Volume of the material; and

d) Month and year of manufacture.

4.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 The method of drawing representative samples of the material and the criteria for conformity shall be as prescribed in Appendix B.

APPENDIX A

(*Clause* 3.1.8)

TEST FOR ADHESION STRENGTH OF JOINT

A-1. APPARATUS

A-1.1 Tensile Testing Machine — Any suitable motor-driven tensile strength testing machine may be used. The capacity of the machine shall be such that any reading taken during or on completion of the test shall fall within the loading range (loading range being the range within which the indicated load shown by calibration is correct within ± 1·5 percent). The speed of the moving head of the tensometer when running free shall be 250 ± 50 mm per minute.

A-1.2 Roller — A steel roller of 135 ± 2 mm diameter and 90 ± 1 mm width covered with rubber approximately 6 mm thick having a hardness of 80 ± 1. The mass of the roller, which applies pressure to the specimen, shall be 10 kg. It shall be so constructed that the mass of the handle is not added to the mass of the roller during use (*see* Fig. 1).

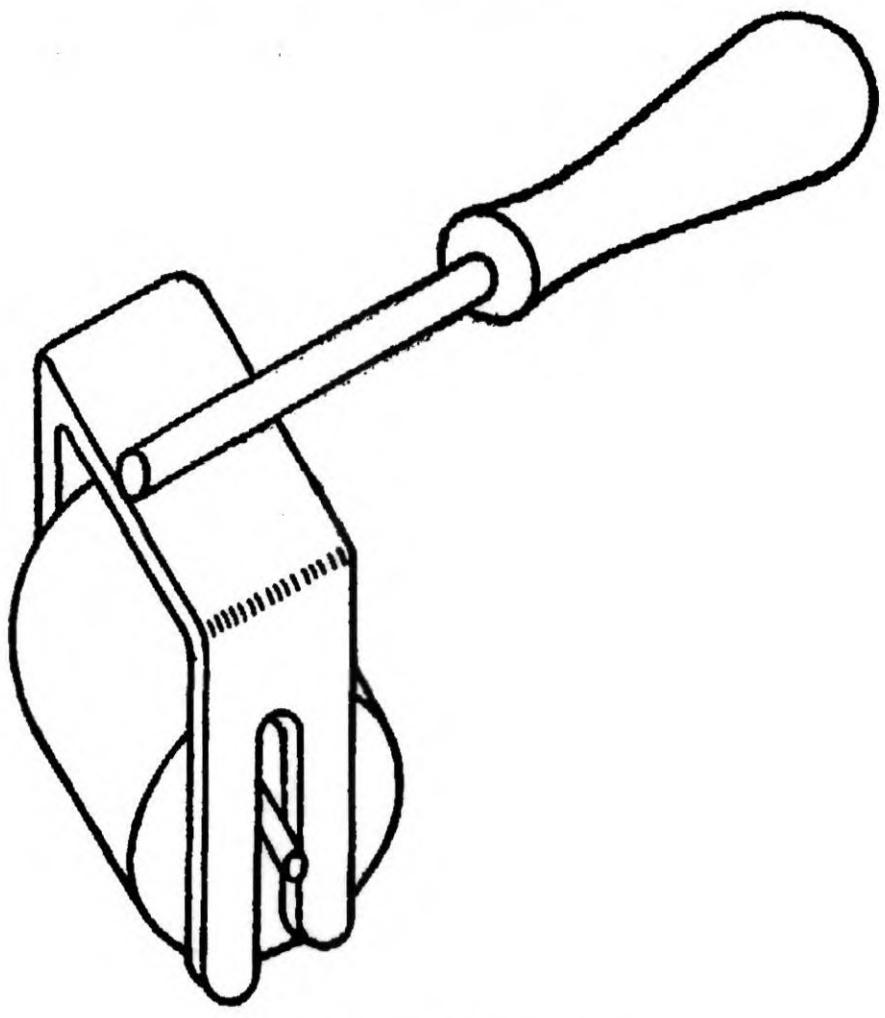


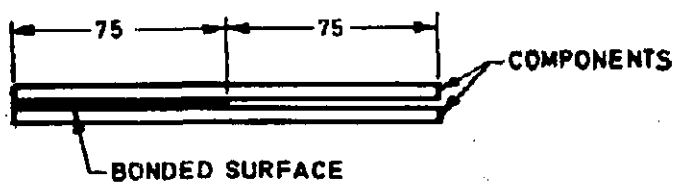
FIG. 1 ROLLER

A-2. NUMBER OF TEST SPECIMENS

A-2.1 Test shall be carried out on three test specimens.

A-3. PREPARATION OF TEST SPECIMENS

A-3.1 Leather to Leather Specimens — Take strips of each component of uniform thickness, measuring 150 × 25 mm. Buff the surface on the flesh side with emery coated abrasive paper No. 50 [*see* IS : 751 (Part I)-1976*] and then dust off with a flat 2·5 cm brush. Over an area measuring 75 × 25 mm at one end of buffed surface of each strip, apply sufficient quantity of the adhesive so that the pores, if any, are completely filled and there is a thin uniform layer of the adhesive formed. When the adhesive surface is dry, apply another coat of the adhesive in the same manner. When the second adhesive film is dry to a point when there is still an aggressive tackiness but not tendency for the film to lift when tested with a finger, align the coated surface of the two 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* Fig. 2). Move the roller on the assembled specimen five times. Allow the bonded specimen to dry under prevailing conditions of temperature and humidity for 24 hours.



All dimensions in millimetres.

FIG. 2 TEST SPECIMEN FOR ADHESION STRENGTH TEST

A-3.2 Leather to Rubber Specimens — Take a strip of leather component of uniform thickness, measuring 150 × 25 mm and prepare it for bonding as in **A-3.1** (applying two coats of the adhesive). For the rubber component, take a strip measuring 150 × 25 mm and thickness not more than 3 mm. Buff the rubber surface with emery coated abrasive paper No. 50 [*see* IS : 715 (Part I)-1976*] and then dust off with a flat 2·5 cm brush. Immediately after preparing the rubber surface, apply sufficient quantity of the adhesive so that the pores, if any, are completely filled and there is a thin uniform layer of the adhesive formed. When the adhesive film on the two strips is dry to a point when there is still an aggressive tackiness but no tendency for the film to lift when tested with a finger, align the coated surfaces of the two strips face to face and prepare the bond as in **A-3.1.**

*Specification for coated abrasives : Part I General application (*third revision*).

A-3.3 Rubber to Rubber Specimens — Take strips of each component of uniform thickness, measuring 150 × 25 mm. The thickness of each of the rubber components shall be not more than 3 mm. Prepare the surface for bonding and then the joint as in **A-3.2**.

A-4. CONDITIONING

A-4.1 Condition the test specimens for 48 h at a temperature of 27 ± 2°C and 65 ± 5 percent relative humidity.

A-5. PROCEDURE

A-5.1 Fix the two free ends of the test specimen in the two jaws of the testing machine. The pawls shall be disengaged so that the pendulum may move to and fro. Record the load required to separate the joint.

A-6. REPORT

A-6.1 Report the load in kg/cm, calculated from the load required to separate the joint and the width of the joint, for each test specimen and the mean of the three values.

APPENDIX B

(*Clause* 5.1)

SAMPLING OF SHOE ADHESIVES, NATURAL RUBBER LATEX BASE

B-1. GENERAL REQUIREMENTS OF SAMPLING

B-1.1 Samples shall not be taken in an exposed place.

B-1.2 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

B-1.3 Samples shall be placed in suitable, clean, dry and air-tight glass containers.

B-1.4 Each sample container after filling shall be sealed air-tight and marked with full identification particulars, such as sample number, the date of sampling, the batch of manufacture of material or Code No. and other important particulars of the consignment.

B-1.5 Samples shall be protected from excessive variation of temperature.

B-2. SCALE OF SAMPLING

B-2.1 Lot — All the containers of one size in a single consignment of the material, containing material of the same batch of manufacture, shall constitute a lot.

B-2.1.1 Samples shall be tested for each lot for ascertaining conformity of the material to the requirements for the specification.

B-2.2 The number of containers (n) to be selected from a lot shall depend on the size of the lot (N) and shall be in accordance with col 1 and 2 of Table 1.

TABLE 1 NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING

Lot Size	Number of Containers to be Selected
N (1)	n (2)
Up to 20	3
21 „ 40	4
41 „ 80	5
81 „ 120	6
121 „ 200	8
201 and above	10

Note — In the case of very small lots where the selection of three containers may be uneconomical, the number of containers to be selected and the criterion for judging the conformity of the lot to the specification shall be as agreed to between the purchaser and the supplier.

B-2.2.1 The containers shall be selected at random and in order to ensure the randomness of the selection, a random number table (*see* IS : 4905-1968*) shall be used. In case such a table is not available the following procedure may be adopted:

Starting from any container, count them in one order as 1, 2, 3, ..., up to r and so on, where r is the integral part of N/n (N being the lot size and n the number of containers to be selected). Every rth container thus counted shall be drawn to give samples for test.

*Methods for random sampling.

B-3. PREPARATION OF TEST SAMPLES AND REFEREE SAMPLE

B-3.1 To ensure that the sample taken from each container is representative of the contents, the contents shall be mixed thoroughly by shaking or by stirring or both.

B-3.2 After the contents are thoroughly mixed, a small representative portion of the material shall be drawn with the help of a suitable sampling instrument, from each of the containers selected according to **B-2.2** (the approximate quantity of material to be drawn from a container shall be thrice the quantity required for the tests indicated in 3).

B-3.3 In case thorough mixing by shaking or stirring cannot be attained, small representative portions of the material shall be drawn from different parts of the container with the help of a suitable sampling instrument so as to give representative sample for the container.

B-3.4 The material drawn from each container shall be divided into three equal parts, each forming an individual sample. One set of the individual samples representing *n* containers selected shall be marked for the purchaser, another for the supplier and the third as the referee sample.

B-3.5 All the samples shall be transferred to separate containers. These containers shall then be sealed air-tight and labelled with full identification particulars given in **B-1.4.**

B-3.6 The referee sample consisting of a set of *n* individual samples representing *n* containers selected shall bear the seals of both the purchaser and the supplier. It shall be kept at a place agreed between the purchaser and the supplier, and shall be used in case of a dispute between the two.

B-4. NUMBER OF TESTS

B-4.1 Tests for the determination of all the requirements of the specification given in 3 shall be performed on each of the individual samples separately.

B-5. CRITERIA FOR CONFORMITY

B-5.1 A lot shall be declared as conforming to the requirements of this specification if all the test results obtained meet the corresponding requirements given in this standard.