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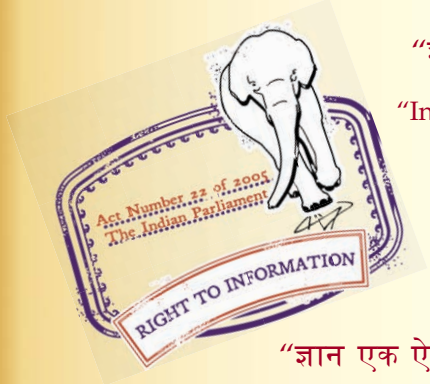
IS 809 (1992): Rubber Flooring Materials For General Purposes [CED 5: Flooring, Wall Finishing and Roofing]

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"Knowledge is such a treasure which cannot be stolen"

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IS 809 : 1992
( Reaffirmed 2001 )

भारतीय मानक

# सामान्य प्रयोजनों के लिए रबड़ फर्शबन्दी की सामग्री — विशिष्टि

( पहला पुनरीक्षण )

*Indian Standard*

# RUBBER FLOORING MATERIALS FOR GENERAL PURPOSES — SPECIFICATION

*( First Revision )*

UDC 69·025·356



BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

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## FOREWORD

This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards, after the draft finalized by the Flooring, Wall Finishing and Roofing Sectional Committee had been approved by the Civil Engineering Division Council.

The rubber floor coverings are used in the public and industrial buildings, buses and ships because of their fair wear-resistance quality, resiliency and reduction in noise. This standard was first published in 1957 and subsequently revised in 1970. The major changes made in the present revision are given below:

a) Thickness of rubber flooring from 3 to 6 mm have been covered and pressure limits while measuring thickness have been specified;

b) Methods of measuring tile size and squareness have been included;

c) Sheet widths up to 2·1 m are covered;

d) Maximum limit of hardness and permissible tolerances are included; and

e) Provision for measurement of resistance to abrasion ( if agreed to between the purchaser and supplier ) has been included.

In the fomulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from:

BS 1711 : 1975 Solid rubber flooring. British Standards Institution.

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 'Rules for rounding off numerical values ( *revised* )'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

# RUBBER FLOORING MATERIALS FOR GENERAL PURPOSES — SPECIFICATION

*( First Revision )*

## 1 SCOPE

This standard lays down the composition, minimum requirements, workmanship and prescribes tests for rubber flooring material suitable for covering floors of domestic and public buildings, cinemas, hospitals, large stores, ships, transport vehicles, etc. This standard does not cover the requirements for special types of rubber flooring used for electrical insulating purposes, conductive or anti-static flooring or rubber flooring having chemical and oil-resistant properties.

## 2 REFERENCES

The Indian Standard listed in Annex A are necessary adjuncts to this standard.

## 3 COMPOSITION

**3.1** The flooring shall be made from a compound of natural or synthetic rubber which may also contain reclaim rubber and suitable fillers. All colouring matter shall be of good quality, insoluble in water, resistant to alkalies and direct sunlight or artificial light.

**3.1.1** Suitable cotton sheeting shall be used as backing. The cotton sheeting shall be impregnated with a high grade rubber compound. The hessian used for the backing shall conform to Type II hessian as specified in IS 2818 ( Part 2 ) : 1971. The hessian shall be impregnated with a high grade rubber compound.

## 4 WORKMANSHIP

### 4.1 Appearance

The rubber flooring material shall be of first class workmanship, satisfactorily vulcanized, free from sulphur bloom and objectionable odour and blisters, cracks and embedded foreign matter to the extent that it complies with the intended design. There shall be no porosity on the surface or throughout the thickness of the sheet. The surface finish of the flooring shall be either glossy or mat. The base stratum may be of any colour. The underside of the floor covering shall be either furnished with a cloth impression or be buffed smooth. The edges and ends shall be cut true and square.

### 4.2 Colour

The colour of the flooring shall not be permanently affected by cleaning with water and a washing soap or by treatment with a suitable floor polish. The colour of the flooring shall not bleed into an adjacent piece of rubber.

## 5 DIMENSION

### 5.1 Thickness

The nominal thickness of the rubber flooring shall be one of the following:

3 mm
4 mm
5 mm
6 mm

**5.1.1** For all flooring the overall thickness when measured in the manner described in Annex B, shall not differ from the declared nominal value by more than 0·3 mm at any of the twenty measuring points.

**5.1.2** If cloth/hession marking is present, the thickness of the flooring shall also be measured, using the apparatus described in Annex B, at three measuring points taken at one end of the roll. The cloth/hession marked side shall then be buffed down until the work just disappears. After buffing, the thickness at any one of the three measuring points shall not differ from the original unbuffed thickness at the respective point by more than 0·6 mm.

### 5.2 Tile Sizes and Squareness

Rubber flooring, when supplied in the form of tiles, shall be of any thickness ( in the case of ribbed or fluted rubber flooring, the thickness refers to the thickness of the base ) specified in **5.1** and of the following sizes:

200 mm × 200 mm
300 mm × 300 mm
500 mm × 500 mm

**5.2.1** The length of side shall not vary from the nominal value by more than 0·15 percent when tested according to the method described in Annex C.

**5.2.2** There shall be no gap greater than 0·15 mm between any side of the tile and the arm of the jig when the tile is tested according to method described in Annex D.

### 5.3 Sheet Width

Sheet material shall have one of the following widths:

0·9 m
1·2 m
1·5 m
1·8 m
2·0 m
2·1 m

**5.3.1** The width of the sheet at any point shall not be less than the nominal value, and shall not exceed the nominal value by more than 6 mm.

**5.4** The sponge-backed rubber flooring shall have a wearing surface of solid rubber at least 3 mm thick on a sponge rubber base of 3 mm thickness.

## 6 PERFORMANCE REQUIREMENTS

### 6.1 Hardness

The hardness when tested in accordance with IS 3400 ( Part 2 ) : 1980 shall be neither less than 65 IRHD ( International Rubber Hardness Degree ) nor greater than 96 IRHD.

#### 6.1.1 Tolerances on Hardness

The tolerances on nominal hardness shall be as described in Table 1.

**Table 1 Tolerance in Hardness**

| Nominal Hardness IRHD | Tolerances on Hardness IRHD |
|---|---|
| 65 to 76 | ± 5 |
| Over 76 to 86 | ± 4 |
| Over 86 to 96 | ± 3 |

### 6.2 Water Absorption

The rubber sheets and tiles shall not absorb water by weight more than 0·5 percent of the original weight when tested in the manner described in Annex E.

### 6.3 Compression Set

The compression set shall not exceed 15 percent when test pieces in new condition and test pieces in new condition aged in accordance with Annex F are tested in the manner described in IS 3400 ( Part 10 ) : 1977, the duration and temperature for the test being $24^{+0}_{-2}$ hours and 27±1°C respectively.

**6.3.1** The test pieces shall show no signs of cracking after the test is conducted.

### 6.4 Resistance to Abrasion ( Optional )

When tested in accordance with IS 3400 ( Part 3 ) : 1987 the abrasion resistance shall be as agreed between the purchaser and the supplier.

## 7 PACKING AND MARKING

### 7.1 Packing

**7.1.1** Rubber flooring sheets shall be wrapped on spool of suitable dimensions with the back side of the sheet in contact with the barrel of the spool.

**7.1.2** Rubber tiles shall be wrapped in hessian cloth and packed in wooden crates. The extreme end tiles shall be faced back to avoid damage to the surface of the tile. The dimensions of wooden boxes shall be as given in Table 2.

**Table 2 Size of Wooden Boxes Containing Rubber Tiles**

| | | | |
|---|---|---|---|
| Size of rubber tiles | 500×500 mm | 300×300 mm | 200×200 mm |
| Inside dimensions of wooden box | 530×530 mm | 330×330 mm | 230×230 mm |

### 7.2 Marking

Unless otherwise specified, each sheet, roll or tile shall be legibly and indelibly marked with the following:

a) Indication of the source of manufacture;
b) Thickness, width and length of sheets and rolls, and thickness and size for tiles; and
c) Year of manufacture.

**7.2.1** The flooring sheets, rolls or tiles may also be marked with the Standard Mark.

## 8 SAMPLING AND CRITERIA FOR CONFORMITY

Representative samples for various tests shall be drawn according to the method and scale of sampling described in Annex G. The criteria for conformity for sheets and tiles shall be in accordance with Annex G.

# ANNEX A

( *Clause* 2 )

## LIST OF REFERRED INDIAN STANDARDS

| *IS No.* | *Title* |
|---|---|
| 180 : 1984 | Specification for cotton sheetings ( *second revision* ) |
| 2818 ( Part 2 ) : 1971 | Specification for Indian hession: Part 2 305 and 229 g/m² at 16 percent contact regain ( *first revision* ) |
| 3400 ( Part 2 ) : 1980 | Methods of test for vulcanized rubbers : Part 2 Hardness ( *first revision* ) |
| 3400 ( Part 3 ) : 1987 | Methods of test for vulcanized rubbers : Part 3 Abrasion resistance using a rotating cylindrical drum device ( *first revision* ). |
| 3400 ( Part 10 ) : 1977 | Methods of test for vulcanized rubbers : Part 10 Compression set at constant strain ( *first revision* ) |
| 4905 : 1968 | Methods of random sampling |

# ANNEX B

( *Clauses* 5.1.1 *and* 5.1.2 )

## MEASUREMENT OF THICKNESS

**B-1 APPARATUS**

Carry out thickness measurements by means of a dial micrometer gauge, capable of reading to the nearest 0·02 mm, the foot of which exerts a pressure of the rubber of not less than 0·01 N/mm² and not more than 0·021 N/mm².

**B-2 PROCEDURE**

**B-2.1** Proceed according to **B-2.1.1** or **B-2.1.2** as appropriate.

**B-2.1.1** For sheet, material measure the thickness at twenty scattered points along the edges and ends of the roll.

**B-2.1.2** For tiles, take the five tiles in the sample and for each tile measure the thickness at four scattered points.

# ANNEX C

( *Clause* 5.2.1 )

## MEASUREMENT OF SIZE OF TILES

**C-1** Carry out the measurement with an instrument capable of measuring to an accuracy of 0·02 mm. Measure each tile for length and width at three quarter points in each direction ( *see* Fig. 1 ). The average of the three measurements in each direction shall be regarded as the dimension of the tile in that direction.

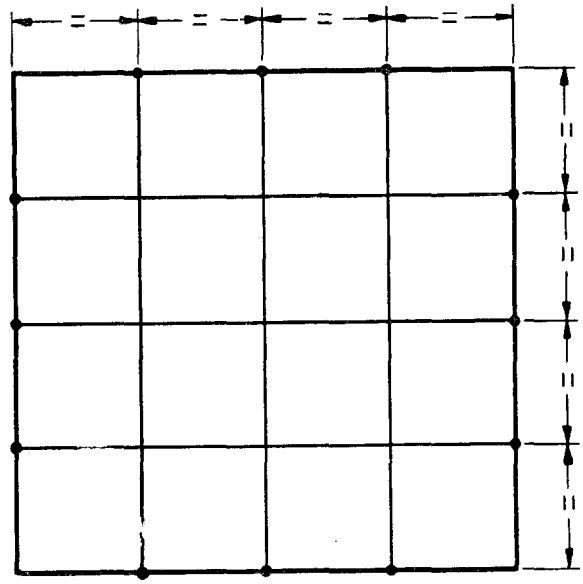

FIG. 1 MEASUREMENT OF SIZE OF TILE

## ANNEX D

( *Clause* 5.2.2 )

### MEASUREMENT OF SQUARENESS OF TILES

**D-1 APPARATUS**

The apparatus shall be an L-shaped metal jig compressing two arms each of length greater than the side of the tile to be tested and of approximately the same thickness, set in shape of a true right angle on a metal base plate ( *see* Fig. 2 ). This plate shall be perfectly flat and free from surface defects.

**D-2 NUMBER OF TEST PIECE**

Five tiles shall be used for the test.

**D-3 PROCEDURE**

Place the tiles against the jig, each corner in turn being inserted into the right angle and one side of the tile held against one side of the jig with light pressure.

Measure any gap between each side of the tile and the other metal arm with a feeler gauge or microscope.

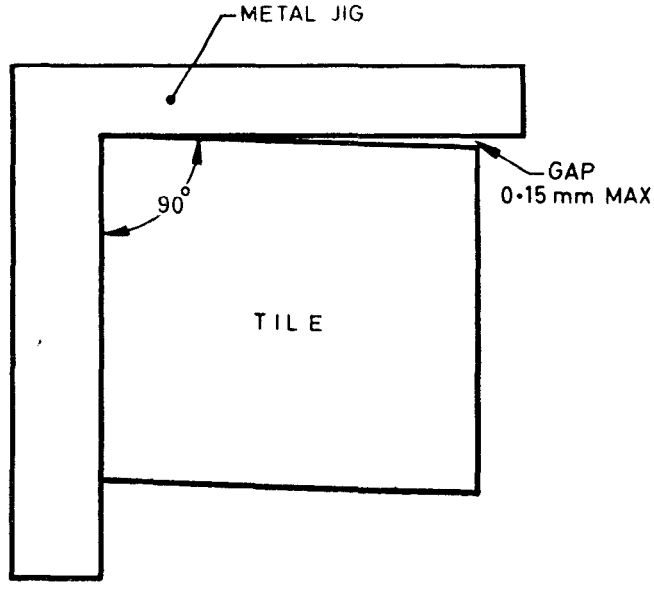


FIG. 2 METHOD OF CHECKING SQUARENESS OF TILE

# ANNEX E

( *Clause* 6.2 )

## DETERMINATION OF WATER ABSORPTION

### E-1 PROCEDURE

**E-1.1** The test specimen, 100 mm × 100 mm with clean cut edges, shall be weighed to the nearest mg ( $P_1$ ) and immersed in distilled water at a temperature of 27 ± 2°C for 24 hours. It shall then be removed, superficially dried with filter paper and immediately weighed ( $P_2$ ). The absorption of water expressed as percentage increase in weight shall be computed from the following formula:

$$\frac{(P_2 - P_1)}{P_1} \times 100$$

# ANNEX F

( *Clause* 6.3 )

## ACCELERATED AGEING

### F-1 PROCEDURE

**F-1.1** The test pieces shall be placed in a thermostatically controlled air oven maintained at a temperature of 70 ± 1°C. The specimens in the oven shall be stationary, free from strain, freely exposed to air on all side and not exposed to light. The total volume of specimens shall not exceed 10 percent of the air space of the oven. Air at 70 ± 1°C shall be passed into the oven at a uniform rate, which will ensure that the atmosphere in the oven is completely changed about three times in an hour.

**F-1.2** The specimen shall be aged in this manner for a continuous period of 240 hours and thereafter shall be kept for at least 24 hours at 27 ± 2°C in darkness before being tested.

NOTE — In view of the influence of exposure of samples to light in the course of accelerated ageing all such exposures should be as nearly indentical as possible in tests intended for comparison. The preferable practice in all tests is to protect samples as completely as possible from the earliest moment against exposure to light.

# ANNEX G

( *Clause* 8.1 )

## SAMPLING AND CRITERIA FOR CONFORMITY OF RUBBER FLOORING MATERIALS

### G-1 LOT

**G-1.1** All the sheets or tiles of the same type and thickness and from the same batch of manufacture shall be grouped together to constitute a lot.

**G-1.1.1** Each lot shall be tested separately for determining its conformity or otherwise to the requirements of the specification.

**G-1.2** Representative samples for various tests shall be drawn at random from a lot. The number of sheets or tiles to be selected for the samples shall be in accordance with Tables 3 and 4. For the randomness of selection of the sample the procedure as laid down in IS 4905 : 1968 shall be followed.

### G-1.3 Number of Tests and Criteria for Conformity for Sheets

**G-1.3.1** All the sheets selected in accordance with **G-1.2** and col 2 of Table 3 shall be inspected for appearance and dimensions,

according to **4.1** and **5** respectively. Any sheet found to be defective for any one or more of the requirements shall be considered as defective. The lot shall be considered having satisfied the requirements of the specification for appearance and dimensions if the number of sheets found defective in the sample is less than or equal to the permissible number of defective sheets given in col 3 of Table 3.

**G-1.3.2** The lot having been found conforming to the requirements of appearance and dimensions shall be tested for hardness, water absorption and compression set test. For this purpose a number of sheets in accordance with col 4 of Table 3 from among those which have been found conforming under **G-1.3.1** shall be selected at random. Number of specimens in accordance with relevant methods of tests shall be taken out from each of the sheets and tested for all these requirements. A sheet shall be considered as defective if the test specimens from the sheet fail to satisfy the requirements of any one or more of the tests. The lot shall be considered having satisfied the requirements of these tests if the number of defective sheets in the sample is less than or equal to the permissible number of defective given in col 5 of Table 3.

**G-1.4 Number of Sheets and Criteria for Conformity for Tiles**

**G-1.4.1** All the sheets selected in accordance with **G-1.2** and col 2 of Table 4 shall be inspected for appearance and dimensions according to **4.1** and **5**. Any tile found to be defective for any one or more of the requirements shall be considered as defective. The lot shall be considered having satisfied the requirements of the specification for appearance and dimensions if the number of tiles found defective in the sample is less than or equal to the permissible number of defective tiles given in col 3 of Table 4.

**G-1.4.2** The lot having been found conforming to the requirements of appearance and dimensions shall be tested for hardness, water absorption and compression set tests. For this purpose a number of tiles in accordance with col 4 of Table 4 from among those which have been found conforming under **G-1.4.1** shall be selected at random. Number of specimens in accordance with relevant methods of tests shall be taken out from each of the tiles in the sample and tested for all these requirements. A tile shall be considered as defective if the test specimens from the tiles fail to satisfy the requirements of any one or more of the tests. The lot shall be considered having satisfied the requirements of these tests if the number of defective tiles in the sample is less than or equal to the permissible number of defective given in col 5 of Table 4.

**Table 3 Sample Size and Permissible Number of Defective for Sheet**

| No. of Sheets in the Lot | For Appearance and Dimensions | | For Hardness, Water Absorption and Compression Set Tests | |
|---|---|---|---|---|
| | No. of Sheets to be Selected for the Sample | Permissible No. of Defectives | No. of Sheets to be Selected for the Sample | Permissible No. of Defectives |
| (1) | (2) | (3) | (4) | (5) |
| Up to 25 | 5 | 0 | 2 | 0 |
| 26 to 50 | 8 | 0 | 3 | 0 |
| 51 to 100 | 13 | 0 | 4 | 0 |
| 101 to 150 | 20 | 1 | 5 | 0 |
| 151 to 300 | 32 | 2 | 7 | 0 |
| 301 to 500 | 50 | 3 | 10 | 1 |

**Table 4 Sample Size and Permissible Number of Defectives for Tiles**

| No. of Sheets in the Lot | For Appearance and Dimensions | | For Hardness, Water Absorption and Compression Set Tests | |
|---|---|---|---|---|
| | No. of Tiles to be Selected for the Sample | Permissible No. of Defectives | No. of Tiles to be Selected for the Sample | Permissible No. of Defectives |
| (1) | (2) | (3) | (4) | (5) |
| Up to 100 | 13 | 0 | 2 | 0 |
| 101 to 300 | 20 | 1 | 3 | 0 |
| 301 to 500 | 32 | 2 | 5 | 0 |
| 501 to 1 000 | 50 | 3 | 8 | 0 |
| 1 001 to 3 000 | 80 | 5 | 13 | 0 |
| 3 001 to 10 000 | 125 | 7 | 20 | 1 |

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