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भारतीय मानक मसौदा

परीक्षण पद्धतियाँ — अमीनोप्लास्टिक मोल्डिंग सामग्री
(IS 2221 का पहला पुनरीक्षण)

Draft *Indian Standard*

METHODS OF TEST — AMINOPLASTIC MOULDING MATERIALS
(*First Revision of IS 2221*)

(ICS 83.140.20)

Methods of Sampling and Test for Plastics
Sectional Committee, PCD 27

Last date for receipt of comment is
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FOREWORD

(*Formal clauses to be added later*)

This standard was originally published in 1962. This revision has been brought out to update the test methods for different parameters as separate Indian Standards are already published for these parameters.

The commercially important aminoplastics are the urea-formaldehyde and melamine formaldehyde condensates. The applications of aminoplastic resins in paper manufacture, textiles, adhesives enamels and lacquers and in moulding has increased greatly in recent years.

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 IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

1 SCOPE

1.1 This standard prescribes the methods of test for aminoplastic moulding material. It prescribes the methods for determining apparent powder density, density of moulding and bulk factor, mould shrinkage, water absorption, boiling water absorption, degree of cure, tensile strength, impact strength, plastic yield, cross-breaking strength, electric strength at 90 °C, surface resistivity, volume resistivity, and resistance to tracking.

1.2 Should any inconsistency be found to exist between the methods prescribed in this standard and those in the standard for individual materials, the latter shall prevail.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 2828 and the following shall apply.

3.1 Aminoplastic — Plastics based on resins made by the condensation of amines, such as urea, thiourea, melamine or allied compounds (such as cyanimide polymers and diaminotriazines) with aldehydes, particularly formaldehyde.

3.2 Apparent Powder Density — The weight of a unit volume of the loose material under prescribed conditions.

3.3 Cross-Breaking Strength — The empirical maximum stress in a beam at failure in bend. It is numerically equal to maximum bending moment at failure divided by modulus of section, but the calculated value does not represent the true maximum surface stress because the method of calculation holds good only for an ideal elastic solid.

3.4 Curing Time (or Cure Time) — In the process of moulding, it is the interval of time between the instant of final cessation of relative movement between the moving parts of the mould and the instant the pressure is released.

3.5 Density of Moulding — The weight of a unit volume of the moulded material without inserts.

3.6 Electric Strength at 90 °C — The maximum voltage which the test specimen can withstand for a specified period of time without breakdown divided by the thickness of the specimen in millimetres.

3.7 Melamine Formaldehyde Resin — A synthetic resin derived from the reaction of melamine (2,4,6-triamino-1,3,5-triazine) with formaldehyde or its polymers.

3.8 Mould Shrinkage — The difference in dimensions, expressed in thousandths of millimetre per millimetre (or in mils per inch) between a moulding and the mould cavity in which it was moulded, both the mould and moulding being at normal room temperature when measured.

3.9 Plastic Yield — Non elastic deformation of a sample beam at a given temperature under given load.

3.10 Synthetic Resin Urea — A resin produced by the condensation of urea with aldehydes.

3.11 Thiourea-Formaldehyde Resin — A synthetic resin derived from the reaction of thiourea (thiocarbamide) with formaldehyde.

3.12 Urea-Formaldehyde Resin — A synthetic resin derived from the reaction of urea (carbamide) with formaldehyde or its polymers.

3.13 Volume Resistivity — The electrical resistance of a unit volume of one centimetre cube measured between the opposite faces.

4 SAMPLING

Sampling shall be carried out as prescribed in IS 4905.

5 TEST METHODS

For the measurement of properties given in col (2) of Table 1, the methods given in col (3) of Table 1 shall be used.

Table 1
(Clause 5)

Sl No.	Properties	Methods of Test, Ref to IS/Annex
(1)	(2)	(3)
i.	Apparent density	IS 13360 (Part 3/Sec 2)
ii.	Density of moulding	IS 13360 (Part 3/Sec 10)/IS 13360 (Part 3/Sec 11)/IS 13360 (Part 3/Sec 12)
iii.	Bulk factor	IS 13360 (Part 3/Sec 4)
iv.	Time of flow	IS 13360 (Part 4/Sec 2)
v.	Shrinkage of moulding	IS 13360 (Part 3/Sec 5)
vi.	Tensile strength	IS 13360 (Part 5/Sec 1)
vii.	Impact strength	IS 13360 (Part 5/Sec 4)
viii.	Degree of cure	Annex B
ix.	Water absorption and boiling water absorption	IS 13360 (Part 8/Sec 1)
x.	Acetone soluble matter before moulding	IS 13360 (Part 10/Sec 7)
xi.	Plastic yield	Annex C
xii.	Free phenols	IS 13360 (Part 10/Sec 5)
xiii.	Free ammonia and ammonium compounds	IS 13360 (Part 10/Sec 6)
xiv.	Temperature of deflection under load	IS 13360 (Part 6/Sec 3)
xv.	Cross-breaking strength	Annex D
xvi.	Electric strength, at 90 °C	Annex E

xvii.	Surface resistivity after immersion in water	Annex F
xviii.	Volume resistivity	Annex G
xix.	Resistance to tracking	Annex H

ANNEX A

(Clause 2)

LIST OF REFERRED STANDARDS

<i>IS No.</i>	<i>Title</i>
IS 2828 : 2019/ISO 472 : 2013	Plastics — Vocabulary (<i>second revision</i>)
IS 4905 : 2015/ISO 24153 : 2009	Random sampling and randomization procedures (<i>first revision</i>)
IS 13360 (Part 3/Sec 2) : 1997/ISO 60 : 1977	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 2 Determination of apparent density of material that can be poured from a specified funnel
IS 13360 (Part 3/Sec 4) : 1995	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 4 Determination of bulk factor of moulding materials
IS 13360 (Part 3/Sec 5) : 2013/ISO 2577 : 2007	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 5 Thermosetting moulding materials — Determination of shrinkage (<i>first revision</i>)
IS 13360 (Part 3/Sec 10) : 2021/ISO 1183-1 : 2019	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 10 Determination of density of non-cellular plastics — Immersion method, liquid pyknometer method and titration method (<i>first revision</i>)
IS 13360 (Part 3/Sec 11) : 2021/ISO 1183-2 : 2019	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 11 Determination of density of non-cellular plastics — Density gradient column method (<i>first revision</i>)
IS 13360 (Part 3/Sec 12) : 2016/ISO 1183-3 : 1999	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 12 Determination of density of non-cellular plastics — Gas pyknometer method
IS 13360 (Part 4/Sec 2) : 1999	Plastics — Methods of testing: Part 4 Rheological properties Section 2 Cup flow of phenolic and alkyd moulding materials
IS 13360 (Part 5/Sec 1) : 2021/ISO 527-1 : 2019	Plastics — Methods of testing: Part 5 Mechanical properties Section 1 Determination of tensile properties — General requirements (<i>second revision</i>)
IS 13360 (Part 5/Sec 4) : 2021/ISO 180 : 2019	Plastics — Methods of testing: Part 5 Mechanical properties Section 4 Determination of izod impact strength (<i>second revision</i>)
IS 13360 (Part 6/Sec 3) : 2022/ISO 75-1 : 2020	Plastics — Method of testing: Part 6 Thermal properties Section 3 Determination of temperature of deflection under load — General test method (<i>third revision</i>)
IS 13360 (Part 8/Sec 1) : 2022/ISO 62 : 2008	Plastics — Methods of testing: Part 8 Permanence/Chemical properties Section 1 Determination of water absorption (<i>first revision</i>)

- IS 13360 (Part 10/Sec 5) : Plastics — Methods of testing: Part 10 Resin (Thermosetting properties) Section 5 Phenol-formaldehyde mouldings — Determination of free phenols — Iodometric method
- IS 13360 (Part 10/Sec 6) : Plastics — Methods of testing: Part 10 Resin (Thermosetting properties) Section 6 Phenol-formaldehyde mouldings — Determination of free ammonia and ammonium compounds — Colorimetric comparison method
- IS 13360 (Part 10/Sec 7) : Plastics — Methods of testing: Part 10 Resin (Thermosetting properties) Section 7 Phenol-formaldehyde mouldings — Determination of acetone-soluble matter (Apparent resin content of material in the un moulded state)

ANNEX B

[Table 1, Sl No. (viii)]

DEGREE OF CURE

B-1 The method described in **B-2** is applicable to all types of aminoplastics, while the methods described in **B-3** provide a test for degree of cure for only melamine formaldehyde plastics and enable results to be interpreted easily.

B-2 FOR ALL TYPES OF AMINOPLASTIC MOULDINGS

B-2.1 Procedure

B-2.1.1 Saw the moulding to be tested through its thickest section and then immerse in boiling water for 10 min. Care shall be taken to see that the mouldings do not rest or lie with flat faces together during immersion; the whole surface of each moulding shall be freely exposed to the test water during the whole period of the test.

B-2.1.1.1 The moulding shall be deemed to be properly cured if the surface is not adversely affected in appearance and cannot be scratched anywhere with a finger nail immediately after the immersion.

B-3 FOR MELAMINE FORMALDEHYDE MOULDINGS ONLY

B-3.1 Sulphuric Acid Test

B-3.1.1 Reagent

- a) *Sulphuric acid* – one percent (w/v)

B-3.1.2 Procedure

Boil the moulding to be tested in sulphuric acid for 10 min. A cured moulding will not be affected by this treatment, whereas an uncured moulding will show localized patches of chalkiness.

B-3.2 Dye Test

B-3.2.1 Reagent

- a) *Rhodamine-B Solution* — 0.01 percent, freshly prepared

B-3.2.2 Procedure — Immerse the moulding to be tested for 10 min in boiling rhodamine-B solution. An improperly cured moulding will show intense staining by the dyestuff by this treatment, while a properly cured moulding will remain unchanged in colour except at the flash lines.

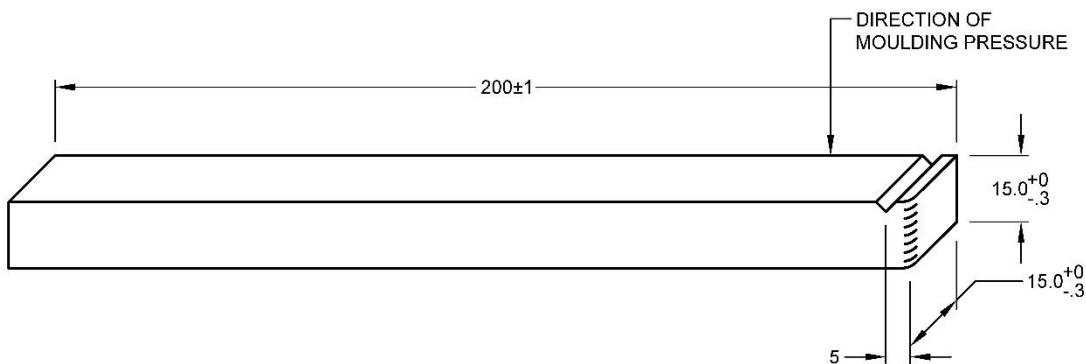
ANNEX C

[Table 1, Sl No. (xi)]

DETERMINATION OF PLASTIC YIELD

C-1 Carry out the determination on two test specimens prepared from the same test sample material.

C-2 PREPARATION OF TEST SPECIMENS — The test specimens shall conform to dimensions shown in Fig. 1.



All dimensions in millimetres

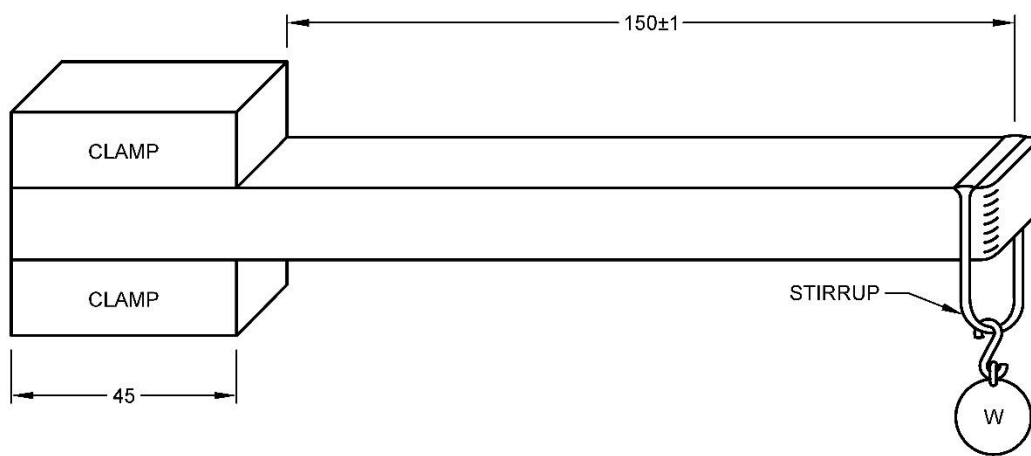
FIG. 1 SPECIMEN FOR PLASTIC YIELD TEST

C-2.1 Mould the specimens in a positive or a semi-positive mould, with a moulding pressure of 315 kg/cm² to 472 kg/cm² (or 2 ton/in² to 3 ton/in²) and mould temperature of 135 °C to 150 °C, the direction of moulding pressure being as shown in Fig. 1. If desired, pre-heat the powder before loading into the mould. The period of time elapsing between the filling of the mould and the commencement of the pressure increase shall be (15 ± 2) s. Do not allow the curing time to exceed 15 min; but less time may be used provided the specimen is properly cured. If found necessary,

chill the mould before ejection of the moulding. Cool the specimen to room temperature. Test the specimen within 24 h of moulding.

C-3 PROCEDURE

C-3.1 Carry out the test in an oven maintained within ± 2 °C of the temperature specified in the individual standard for moulding powder. Fix the specimen in a rigid manner in the oven by means of a clamp as shown in Fig. 2, and suspend a suitable stirrup with a rigid knife-edge, carrying an attachment for supporting the weight from the notch in the unsupported end of the specimen. Do not allow the weight of the stirrup and attachment to exceed 20 g.



All dimensions in millimetres

FIG. 2 ARRANGEMENT OF SPECIMEN FOR PLASTIC YIELD TEST

C-3.2 Fifteen minutes after placing the specimen in the oven, measure the height of the unsupported end of the specimen with reference to a suitable datum point in millimetres to an accuracy of 0.1 mm in such a manner that the temperature of the oven does not fall below the specified limit while the measurement is being taken. Then attach a weight to the stirrup so that the total load, including the stirrup, applied to the specimen is (450 ± 1) g. Maintain the specimen in the oven under these conditions for $6 \text{ h} \pm 10 \text{ min}$. At the end of this period, again measure the height of the unsupported end of the specimen with reference to the datum point, while the specimen is under the test conditions of load and temperature.

C-4 CALCULATION AND REPORT

Record the difference between the initial and final measurements expressed in millimetres. The mean of the two determinations shall be taken as the representative value of plastic yield for the test material.

ANNEX D

[Table 1, Sl No. (xv)]
CROSS-BREAKING STRENGTH

D-1 Carry out the determination on three test specimens prepared from the same test sample material.

D-2 PREPARATION OF TEST SPECIMENS

D-2.1 The specimens shall consist of moulded rectangular bars of length 114 mm (or 4.5 in) minimum, width (12.7 ± 0.2) mm [or (0.500 ± 0.010) in] and thickness (9.5 ± 0.2) mm [or (0.375 ± 0.010) in].

D-2.2 Mould the specimens in a positive or a semi-positive mould, with a moulding pressure of 315 kg/cm^2 to 472 kg/cm^2 (or 2 ton/in^2 to 3 ton/in^2) and mould temperature of $135 \text{ }^\circ\text{C}$ to $150 \text{ }^\circ\text{C}$. Apply the moulding pressure in a direction perpendicular to the largest face of the specimen. If desired, pre-heat the powder before loading into the mould. The period of time elapsing between the filling of the mould and the commencement of the pressure increase shall be (15 ± 2) s. Do not allow the curing time to exceed 8 min; but less time may be used provided the specimen is properly cured. If found necessary, chill the mould before ejection of the moulding. Cool the specimen to room temperature and test it within 24 h of moulding.

D-3 PROCEDURE

Determine the mean breadth and the mean thickness of the specimen. Place the specimen symmetrically across parallel V-shaped supports, the distance between the supporting edges being (101.6 ± 0.2) mm [or (4.000 ± 0.010) in]. Apply a load squarely across the breadth of the specimen by means of a third V-shaped block parallel to and midway between the supporting blocks. The contact edges of the supporting blocks and the block applying the load shall have a radius of approximately 1.6 mm (or $\frac{1}{16}$ in). Increase the load steadily so that the specimen fractures in 15 s to 45 s. Note the load in kilograms at failure.

D-4 CALCULATION

$$\text{Cross-breaking strength, kg/cm}^2 = \frac{1.5 WL}{BD^2}$$

where

W = load in kg at failure;
 L = distance in cm between supports;
 B = mean breadth in cm of specimen; and
 D = mean thickness in cm of specimen.

D-5 REPORT

The mean of the three determinations shall be taken as the representative value of cross-breaking strength for the test sample.

ANNEX E
[Table 1, Sl No. (xvi)]
ELECTRIC STRENGTH AT 90 °C

E-1 Carry out the determination on at least four test specimens prepared from the same test sample material. One of these specimens shall be used merely to provide a preliminary estimate of the probable value of the voltage at which other specimens are likely to fail.

E-2 PREPARATION OF TEST SPECIMENS

E-2.1 The specimens shall be moulded discs (100.0 ± 1.0) mm [or (4.00 ± 0.04) in] in diameter and (3.0 ± 0.2) mm [or (0.125 ± 0.010) in] thick. The specimens shall be flat.

E-2.2 Mould the specimens in a positive or semi-positive mould with a moulding pressure 315 kg/cm^2 to 472 kg/cm^2 (or 2 ton/in^2 to 3 ton/in^2) and mould temperature of 135 °C to 150 °C . If desired, pre-heat the powder before loading into the mould. The period of time elapsing between the filling of the mould and the commencement of the pressure increase shall be (15 ± 2) s. Do not allow the curing time to exceed 6 min; but less time may be used provided the specimen is properly cured. If found necessary, chill the mould before ejection of the moulding. Cool the specimen to room temperature and test it within 24 h of moulding.

E-3 CONDITIONING — Keep the specimens for at least 5 h in a desiccator over anhydrous calcium chloride at room temperature prior to testing.

E-4 APPARATUS

E-4.1 Electrodes

The bottom electrode shall consist of a solid cylinder of brass 80 mm (or 3 in) in diameter and 25 mm (or 1 in) in thickness. The upper electrode shall consist of a solid cylinder of brass 40 mm (or 1.5 in) in diameter and 40 mm (or 1.5 in) in thickness. The sharp edges of the electrodes shall be rounded to a radius not exceeding 0.8 mm (or 0.031 in). The test faces shall be kept smooth and polished and free from pitting. The electrodes shall be held truly coaxial while testing.

E-4.2 Testing Transformer

Alternating voltage, approximately of the sine-wave form and of 50 c/s frequency shall be used. The wave-form of the test voltage shall not vary by more than ± 5 percent from a pure sine-wave (that is, the crest factor shall be within 1.343 to 1.484). The rms value of the applied voltage shall be determined from the readings of a peak voltmeter suitably connected to the output side of the transformer. For this purpose, the wave-form shall be deemed to be sinusoidal. (The rms value may also be determined by an electrostatic voltmeter connected to the output side or even by an

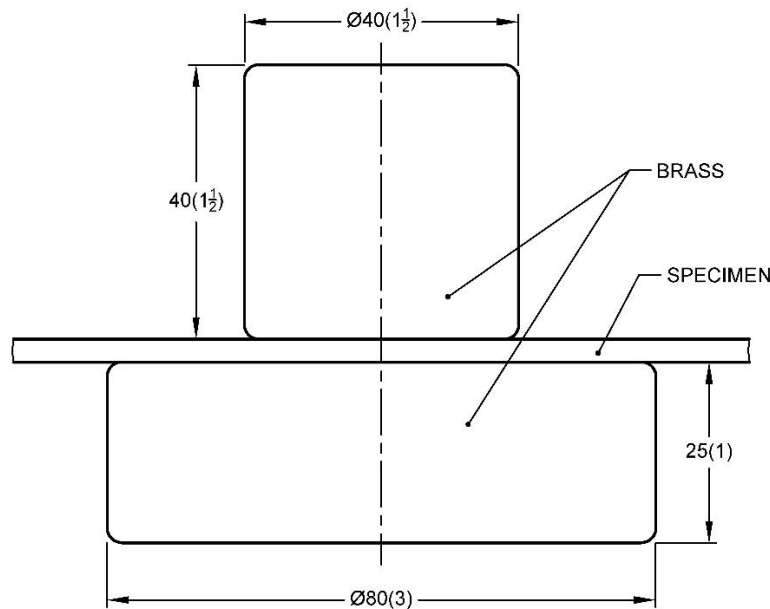
ordinary AC voltmeter connected to the input side or to a tertiary coil, provided that this voltmeter has been properly calibrated against a sphere gap connected to the output side). The capacity of the transformer shall be sufficient to maintain the full test voltage on the specimen for the maximum time required for the test. A rating of 2 kVA to 5 kVA depending upon the output voltage shall normally be considered sufficient. The transformer circuit should be protected from excessive current by a circuit-breaker on breakdown of the test specimen.

E-4.3 Voltage Control — Control of voltage may be secured by using one of the following devices:

- a) Variable ratio auto-transformer;
- b) Induction regulator;
- c) Generator field regulator (for separate alternator); and
- d) Resistance potential divider.

E-5 PROCEDURE

E-5.1 Immerse at least four specimens and the electrodes for 15 min to 25 min in a bath of insulating oil [conforming to IS 335] maintained at (90 ± 2) °C. At the end of this time, apply a voltage to one specimen mounted symmetrically between the electrodes as shown in Fig. 3 and increase it uniformly at about 30 kV per minute until breakdown occurs. Treat this as a preliminary estimate of the probable value of the voltage at which other specimens are likely to fail. Mount the remaining three specimens in turn between the electrodes and apply a voltage equal approximately to half the breakdown voltage of the first specimen and maintain for 20 s. If the specimen withstands this voltage without failure, raise the test voltage in steps of 1 kV up to 25 kV and thereafter in steps of 2 kV.



All dimensions in millimetres with inch equivalents in parentheses

FIG. 3 ARRANGEMENT OF ELECTRODES FOR ELECTRIC STRENGTH TEST

E-5.2 Maintain each test voltage for 20 s unless failure occurs. If the second or any subsequent specimens fail in less than 20 s at the commencement of the testing, disregard the test and repeat it on a fresh specimen, the initially applied voltage stress being approximately one-fourth of the breakdown, voltage of the first specimen in this case.

E-6 CALCULATION

The electric strength of the specimen shall be the maximum voltage which the specimen withstands for 20 s without breakdown, divided by the thickness of the specimen in millimeters measured near the point of breakdown.

E-7 REPORT

The mean of the determinations on three specimens (other than the first and the subsequent disregarded ones) shall be taken as the representative value of electric strength at 90 °C for the test sample.

ANNEX F

[Table 1, Sl No. (xvii)]

SURFACE RESISTIVITY AFTER IMMERSION IN WATER

F-1 Carry out the determination on at least two test specimens prepared from the same test sample material.

F-2 PREPARATION OF TEST SPECIMENS

F-2.1 The specimens shall be moulded discs (100.0 ± 1.0) mm [or (4.00 ± 0.04) in] in diameter and (3.0 ± 0.2) mm [or (0.125 ± 0.010) in] thick. The specimens shall be flat.

F-2.2 Mould the specimens in a positive or a semi-positive mould, with a moulding pressure of 315 kg/cm^2 to 472 kg/cm^2 (or 2 ton/in^2 to 3 ton/in^2) and mould temperature of $135 \text{ }^\circ\text{C}$ to $150 \text{ }^\circ\text{C}$. If desired, pre-heat the material before loading into the mould. The period of time elapsing between the filling of the mould and the commencement of the pressure increase shall be (15 ± 2) s. Do not allow the curing time to exceed 6 min; but less time may be used provided the specimen is properly cured. If found necessary, chill the mould before ejection of the moulding. Cool the specimen to room temperature and test it within 24 h of moulding.

F-3 CONDITIONING

Immerse the specimens for (24.0 ± 0.5) h in distilled water at a temperature of (27 ± 2) $^\circ\text{C}$. Take out the specimens from water and remove all surface moisture by pressing with dry blotting or filter paper.

F-4 APPARATUS — Electrodes as shown in Fig. 4 and the circuit as shown in Fig. 5 are suitable for measuring surface resistivity.

F-5 PROCEDURE

Measure the surface resistance of the specimen at (27 ± 5) $^\circ\text{C}$ in 10 min to 15 min from the time of its removal from water. The relative humidity of the laboratory atmosphere at the time of test shall not exceed 75 percent. The surface resistance between the electrodes shall be measured one minute after the application of electrical pressure at (500 ± 50) volts DC.

F-6 CALCULATION

$$\text{Surface resistivity, } \log_{10} \text{ ohms} = \log_{10} \left\{ \frac{2\pi S}{\log_e \frac{D}{d}} \right\}$$

where

S = surface resistance in ohms;

D = internal diameter in mm of upper outer electrode; and

d = internal diameter in mm of upper inner electrode.

NOTE — For the apparatus shown in Fig. 4, surface resistivity $\log_{10} \text{ ohms} = \log_{10} 18.7 S$.

F-7 REPORT

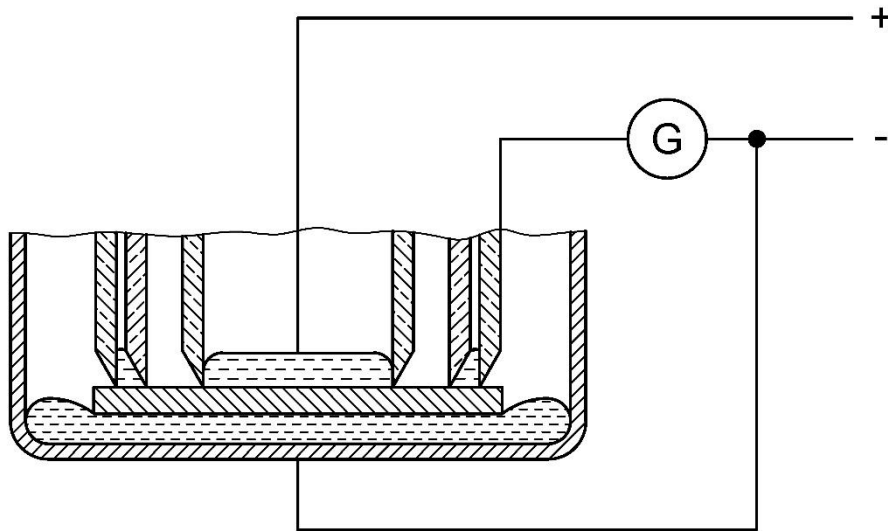


FIG. 5 CIRCUIT FOR SURFACE RESISTIVITY TEST

ANNEX G

[Table 1, Sl No. (xviii)]

VOLUME RESISTIVITY

G-1 Carry out the determination on at least two test specimens prepared from the same test sample material.

G-2 PREPARATION OF TEST SPECIMENS

G-2.1 The specimens shall be moulded discs (100.0 ± 1.0) mm [or (4.00 ± 0.04) in] in diameter and (3.0 ± 0.2) mm [or (0.125 ± 0.010) in] thick. The specimens shall be flat.

G-2.2 Mould the specimens in a positive or a semi-positive mould, with a moulding pressure of 315 kg/cm^2 to 472 kg/cm^2 (or 2 ton/in^2 to 3 ton/in^2) and mould temperature of $135 \text{ }^\circ\text{C}$ to $150 \text{ }^\circ\text{C}$. Do not pre-heat the material before putting into the mould and do not breathe the mould. The period of time elapsing between the filling of the mould and the commencement of the pressure increase shall be (15 ± 2) s. Do not allow the curing time exceed 6 min; but less time may be used provided the specimen is properly cured. If found necessary, chill the mould before ejection of the moulding. Cool to room temperature in a desiccator. Test the specimen within 24 h of moulding.

G-3 APPARATUS — Electrodes shown in Fig. 4 and the circuit shown in Fig. 6 are suitable for measuring volume resistivity.

G-4 PROCEDURE

Measure the volume resistivity of the specimen at $(27 \pm 5) ^\circ\text{C}$ between the electrodes one minute after the application of electrical pressure at a potential difference of (500 ± 50) volts DC.

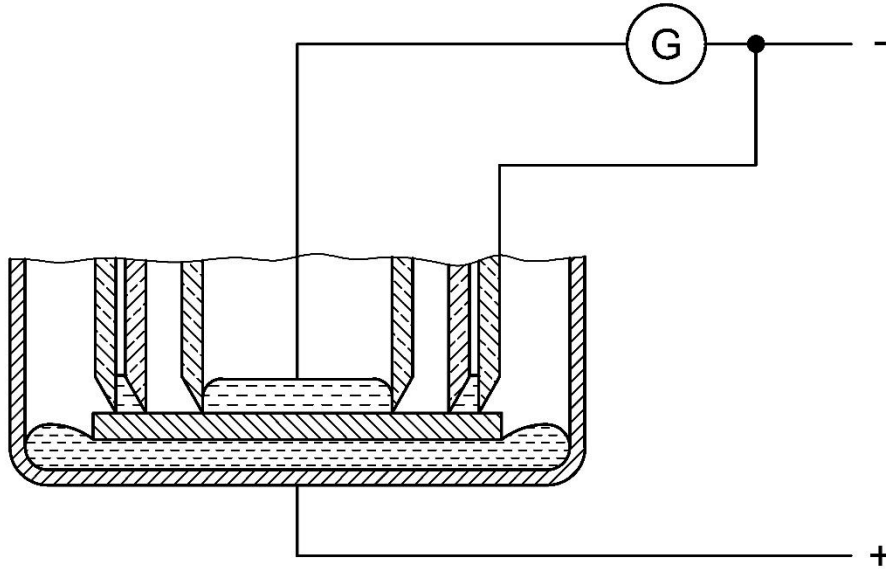


FIG. 6 CIRCUIT FOR VOLUME RESISTIVITY TEST

G-5 CALCULATION

$$\text{Volume resistivity (log}_{10} \text{ ohm.cm)} = \log_{10} \frac{AR}{t}$$

where

A = area in sq cm of upper electrode (19.6 sq cm in apparatus of Fig. 4);

R = resistance in ohms between the upper and the lower electrodes; and

t = thickness in cm of the specimen.

G-6 REPORT

The mean of the two determinations shall be taken as the representative value of volume resistivity for the test sample.

ANNEX H

[Table 1, Sl No. (xix)]

RESISTANCE TO TRACKING

H-1 PREPARATION OF TEST SPECIMEN

Prepare a flat moulding containing two metal inserts, a brass rod 5 mm (or $\frac{3}{16}$ in) in diameter being suitable for the purpose. The metal inserts may be moulded in, or inserted afterwards into holes drilled or moulded for the purpose. They shall be 32 mm (or 1.25 in) apart at the closest points.

H-2 PROCEDURE

Connect the metal electrodes to a 200 volts to 250 volts, 50 cycles supply capable of giving at least 8 amperes, a 15 ampere fuse being included in the circuit. Pour on to the moulding a 10 percent solution of sodium chloride to flood the space between the electrodes. Switch on the current and maintain for 30 min, adding fresh salt solution at 5 min intervals. Examine the specimen for the formation of a conducting carbon track. After completion of 30 min test, wash the specimen free from salt by soaking in several changes of water, wipe off the surface moisture and measure insulation resistance between electrodes.