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### भारतीय मानक

# जल सहकारक और सिन्ध प्रयोजनों के लिए बिट्मन — विशिष्टि

(दूसरा पुनरीक्षण)

Indian Standard

# BITUMINOUS COMPOUNDS FOR WATERPROOFING AND CAULKING PURPOSES — SPECIFICATION

(Second Revision)

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BUREAU OF INDIAN STANDARDS MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG NEW DELHI 110002

#### **FOREWORD**

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Waterproofing and Damp-Proofing Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published as specification for bitumen (plastic) for waterproofing purposes. In 1969 it was revised with a new title as specification for bituminous compounds for waterproofing and caulking purposes. Since then other uses of the compound have also been experienced which necessitated the need of second revision of the standard. In this revision, besides incorporating three amendments earlier issued, two grades of bituminous material based on consistencies have been specified.

Bituminous compound is suitable for cold application and has several uses. It may be used for stopping leaks and waterproofing porous masonry or as waterproofing compound to be applied on bolts head and overlapping joints in GI and asbestos sheets used for roofing. This also serves as caulking agent to be used for joints in drainpipes, asbestos and CI pipes for crevices, vertical joints between steel plates and fold sections, wood joints, precast concrete cladding block, plate joints of railway wagon and buses. A compound of this type with some alteration is also used for fixing rainguard of polyethelene sheets on rubber trees.

Since the materials conforming to this standard are required to meet widely different uses, the consistency has to be different. A material of thick consistency required for filling wide cracks of roofs and for capping bolt heads of GI and asbestos roof while of thin consistency for plate joints of wagons and buses and for fixing rainguards.

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

## BITUMINOUS COMPOUNDS FOR WATERPROOFING AND CAULKING PURPOSES — SPECIFICATION

## (Second Revision)

#### 1 SCOPE

This standard specifies requirements and methods of sampling and tests for bituminous compounds, applied cold and used for stopping leaks through cracks of roofs, floors, walls, etc; as sealant for plate joints of wagons, coaches and buses; as caulking agent for crevices and vertical joints between steel plates, folded sections, wood joints, precast concrete cladding, etc; and as adhesives for rainguards for rubber trees.

#### 2 REFERENCES

The Indian Standards listed below are necessary adjuncts to this standard:

| IS No.      | Title   |  |  |  |  |
|-------------|---|--|--|--|--|
| 334:1982    | Glossary of terms relating to bitumen and tar (second revision)   |  |  |  |  |
| 1201 : 1978 | Methods for testing tar and bituminous materials; sampling (first revision);  |  |  |  |  |
| 1209:1978   | Methods for testing tar and bituminous materials; Determination of flash point and fire point (first revision)                |  |  |  |  |
| 1211 : 1978 | Methods for testing tar and bituminous materials; Determination of water content ( Dean and Stark method ) ( first revision ) |  |  |  |  |
| 1217 : 1978 | Methods for testing tar and bituminous materials; Determination of mineral matter (ash) (first revision)                      |  |  |  |  |
| 4911:1986   | Glossary of terms relating to bituminous waterproofing and damp-proofing of buildings (first revision)                        |  |  |  |  |

#### 3 TERMINOLOGY

For the purpose of this standard definitions given in IS 334: 1982 and IS 4911: 1986 shall apply.

#### 4 REQUIREMENTS

#### 4.1 Grades

Materials shall be of two grades: namely, Grade 1 and Grade 2

- a) Grade 1 shall be semistiff, smooth and homogenous paste suitable for application by spreading with hand, trowel, spatula or gun.
- b) Grade 2 shall be of light consistency and homogenous paste suitable for application by putty knife.

#### 4.2 Composition

4.2.1 The material shall consist of bitumen and flux oils with or without addition of vegetable or resinous oils, cut back with volatile thinners and intimately mixed with non-gritty absorbent, inorganic fibrous material (with or without powder) in suitable proportions as to comply with the requirements of this standard.

**4.2.2** The material shall also comply with the requirements specified in Table 1.

#### 4.3 Keeping Quality

When stored under cover in a dry place in the original sealed container under normal temperature the material shall retain the specified properties for a period of not less than six months from the date of manufacture as declared on container.

#### 5 TESTS

Test shall be carried out by the methods specified in col 5 of Table 1.

#### 6 SAMPLING

The representative sample of the material shall be drawn as specified in IS 1201: 1978.

#### 7 PACKING

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

#### 8 MARKING

- 8.1 The containers shall be marked to give following informations:
  - a) Indication of the source of manufacture,
  - b) Name of material.

- c) Grade of material,
- d) Date of manufacture.

8.2 The containers may also be marked with the Standard Mark.

Table 1 Requirements for Bituminous Compounds

(Clauses 4.2.2 and 5)

| Sl No | . Characteristic                            | Requirements                  |                                |   | Method of Test' |
|-------|---|-------------------------------|--------------------------------|---|-----------------|
|       |   | Grade 1                       | Grade 2                        |   | Kei to          |
| (1)   | (2)   | (3)                           | (4)                            |   | (5)             |
| i)    | Water content, percent by mass, Max         | 0.2                           | 0.2                            |   | IS I211: 1978   |
| ii)   | Ash content, percent by mass, Max           | 40                            | 30                             |   | IS 1217: 1978   |
| iii)  | Flow  | Shall satisfy the requirement | Shall satisfy the requirement  |   | Annex A         |
| iv)   | Flash point C, Min                          | 35                            | 35                             |   | IS 1209: 1978   |
| v)    | Flexibility and adhesion                    | Shall satisfy the requirement | Shall satisfy1 the requirement |   | Annex B         |
| vi)   | Consistency                                 |                               |                                |   |                 |
|       | a) Before setting (test after 1 h) Min      | 100                           | 225                            | J | Annex C         |
|       | b) After setting ( test after 24 h ) Min    | 80                            | 200                            | 7 | Annex           |
| 1 H   | owever, the temperature for test shall be s | stringent and kept at         | 10°C.                          | • |                 |

#### ANNEX A

[ Table 1, Item (iii) ]

#### FLOW TEST

#### A-1 TEST SPECIMEN

Prepare a test film by applying the bitumen on  $150 \text{ mm} \times 100 \text{ mm} \times 0.3 \text{ mm}$  mild steel panel to a thickness of 3 mm.

#### A-2 NORMAL TEST

The film immediately after preparation as in A-1 shall not show any slip when the panel is kept in a vertical position indoor at a temperature of  $27 \pm 2^{\circ}C$  for 5 h.

#### A-3 HEAT TEST

The film shall not slip more than 6 mm when the panel is kept for 5 h in the vertical position in an air-dry oven maintained at  $60 \pm 1^{\circ}$ C.

#### A-4 COLD TEST

The film shall remain plastic and firmly adherent when the panel after treatment described in A-2 and A-3 is kept at 0°C for one hour.

#### ANNEX B

[ Table 1, Item (v) ]

#### FLEXIBILITY AND ADHESION TEST

#### **B-1 TEST SPECIMEN**

## The same test specimen that was used in the normal, heat and cold test, described in A-2, A-3 and A-4 shall be used for this test also.

#### **B-2 BEND TEST**

The film shall not crack or flake off when the panel, after being subjected to the treatments described in A-2, A-3 and A-4 is bent double over a 25 mm diameter rod, with the film on the outside, at  $27 \pm 2^{\circ}$ C.

#### ANNEX C

[ Table 1, Item (vi) ]

#### **CONSISTENCY TEST**

#### C-1 OUTLINE OF THE METHOD

The penetration using a standard penetrometer is determined under specified temperature conditions by means of a standard cone applied to the specimen for 5 s under load of 150 g.

#### **C-2 PENETROMETER**

Any suitable penetrometer (see Fig. 1) which

#### C-3 PENETRATION CONE

The cone shall consist of a conical body of brass or corrosion resistant steel with detachable hardened steel tip, constructed to conform to the dimensions and tolerances shown in Fig. 2. The total moving mass, namely, that of the cone and its movable attachments shall be 150 + 0.1 g. The attachments consist of rigid shaft having a suitable device at its lower end for engaging the

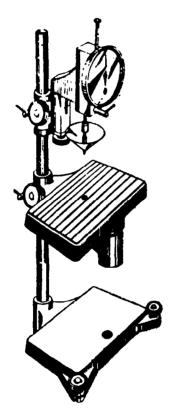
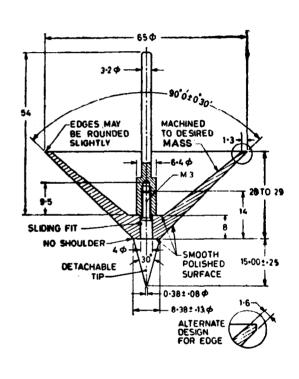


FIG. 1 PENETROMETER



All dimensions in millimetres.

FIG. 2 PENETROMETER CONE

permits the specified cone to drop vertically without appreciable friction for at least 40 mm and which indicates accurately the depth of penetration to the nearest 0.1 mm. The instrument shall have a table, to carry the test specimen which may be adjusted to the horizontal before making the test. A mechanism for releasing and clamping the loaded cone shall be provided. cone. The interior construction and dimensions may be modified to achieve the specified mass, provided the general contour and mass distribution are not altered. The outer surface should be polished to a very smooth finish.

#### C-4 MASS OF TEST SPECIMEN

At least 0.5 kg of the material shall be taken for test.

#### C-5 PROCEDURE

## C-5.1 For Consistency of the Sample Kept at 27±2°C for One Hour

Transfer the required quantity of the specimen to be tested into the penetration cup preferably in one lump and remove the entrapped air by gently tapping the sides of the cup. Fill the cup to the brim with specimen with least manipulation, without any air pockets. Immerse the cup with the specimen under water at  $27\pm2^{\circ}C$  and keep it for one hour.

After one hour, place the cup on the penetrometer table, and adjust the cone assembly such that the tip of the cone just touches the surface of the material. The cone assembly should weigh 150+0.1 g, Release the cone assembly and alow it to

penetrate the material for 5 s. Read the penetration on the penetrometer dial and express the consistency as penetration in tenths of mm.

## C-5.2 For Consistency of the Material Kept at 27+2°C for 24 h

The penetration of the test specimen and test procedure is exactly the same as given in C-5.1 except that the container filled with the specimen shall be kept under water at  $27\pm2^{\circ}$ C for 24 h.

#### C-5.3 Additional Testing

Average of three readings shall be taken on the same specimen if the consistency is less than 200, readings being observed at 120° apart. In case the consistency is more than 200, separate containers shall be filled with the material and tested.

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