

Indian Standard

**CODE OF PRACTICE FOR
DAMP-PROOFING USING BITUMEN MASTIC**

(Second Reprint JULY 1995)

UDC 699'82 : 691'165 : 69'001'3

© Copyright 1974

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

Indian Standard

CODE OF PRACTICE FOR DAMP-PROOFING USING BITUMEN MASTIC

Waterproofing and Damp-proofing Sectional Committee, BDC 41

Chairman

SHRI L. G. SELVAM

Representing

Housing & Urban Development Corporation,
New Delhi

Members

SHRI A. K. DASGUPTA

Public Works Department, Government of West
Bengal

SHRI F. K. DAVAR

Buildings & Communications Department, Govern-
ment of Maharashtra

SHRI G. B. NAIK (*Alternate*)

DIVISIONAL ENGINEER, CHITTA-
RANJAN LOCOMOTIVE WORKS,
CHITTARANJAN

Ministry of Railways

ASSISTANT TOWN ENGINEER (*Alternate*)

EXECUTIVE ENGINEER (BUILDING
CENTRE DIVISION)

Public Works Department, Government of
Tamil Nadu

EXECUTIVE ENGINEER (SPE-
CIAL BUILDING DIVISION II) (*Alternate*)

SHRI D. S. GHUMMAN

Roofrite Private Ltd, New Delhi

SHRI K. K. LAL (*Alternate*)

SHRI M. R. MALYA

Burmah-Shell Oil Storage & Distributing Co of
India Ltd, Bombay

DR B. S. BASSI (*Alternate*)

SHRI Y. K. MEHTA

Associated Cement Companies Ltd, Bombay

SHRI S. RAMASWAMY (*Alternate*)

SHRI G. C. MOTWANI

Union Carbide India Ltd, Calcutta

SHRI S. H. CHICKARMANE (*Alternate*)

SHRI O. P. PARTI

Gladstone Lyall & Co Ltd, New Delhi

SHRI G. PHILLIP

Shalimar Tar Products (1935) Ltd, Calcutta

SHRI S. RAMAN (*Alternate*)

SHRI R. P. PUNJ

Lloyd Bitumen Products, Calcutta

SHRI M. M. MATHAI (*Alternate*)

SHRI S. G. PUTHLI

Jawaharlal Nehru University, New Delhi

SHRI K. D. BHATIA (*Alternate*)

SHRI R. D. RAJE

Hindustan Steel Limited, Ranchi

SHRI E. K. RAMACHANDRAN

National Test House, Calcutta

LALA G. C. DAS (*Alternate*)

(Continued on page 2)

© Copyright 1974

BUREAU OF INDIAN STANDARDS

This publication is protected under the *Indian Copyright Act (XIV of 1957)* and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

Members

SHRI J. S. SHARMA	Central Building Research Institute (CSIR), Roorkee
SHRI ARJUN DASS (<i>Alternate</i>)	
PROF M. S. SHETTY	Engineer-in-Chief's Branch, Army Headquarters
MAJ K. M. S. SAHASI (<i>Alternate</i>)	
SHRI K. N. SINHA	Engineers India Limited, New Delhi
SHRI K. S. SRINIVASAN	National Buildings Organization, New Delhi
SHRI J. P. SHARMA (<i>Alternate</i>)	
SUPERINTENDING SURVEYOR OF WORKS (NDZ)	Central Public Works Department, New Delhi
PROF C. G. SWAMINATHAN	Central Road Research Institute (CSIR), New Delhi
SHRI B. C. MAZUMDAR (<i>Alternate</i>)	
SHRI K. N. VADERA	The Empire Dyeing & Manufacturing Co Pvt Ltd (Garlick Engineering Division), Bombay
SHRI J. R. GUNGWANI (<i>Alternate</i>)	
SHRI D. AJITHA SIMHA, Director (Civ Engg)	Director General, ISI (<i>Ex-officio Member</i>)

Representing

Secretary

SHRI VINOD KUMAR
Deputy Director (Civ Engg), ISI

Indian Standard

CODE OF PRACTICE FOR DAMP-PROOFING USING BITUMEN MASTIC

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 8 February 1974, after the draft finalized by the Waterproofing and Damp-proofing Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Bitumen mastic has proved to be successful waterproofing and damp-proofing material and is being used extensively in buildings. This standard lays down method of providing protection by an impervious membrane to provide a continuous waterproof lining to walls, floors and foundations of structures below ground level or to prevent rising of moisture through capillary to walls and floors constructed above ground.

0.3 In the formulation 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 BSCP 102:1963 Protection of Buildings Against Water from the Ground published by British Standards Institution.

0.4 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.

1. SCOPE

1.1 This standard lays down the procedure for applying bitumen mastic for damp-proofing to:

- a) portion of buildings below ground in order to exclude visible penetration of water and provide a vapour seal against hydrostatic pressure, and
- b) walls and floors above ground level in order to prevent rising of water through capillary action.

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

1.2 The type of structure to which this type of treatment will be effective may be constructed of reinforced concrete, prestressed concrete, in special cases, plain concrete, dense concrete, blockwork, plastered brick or stone masonry or structural steel in conjunction with other materials.

2. NECESSARY INFORMATION FOR DESIGN AND CONSTRUCTION WORK FOR DAMP-PROOFING

2.1 For efficient design and construction, the design shall have all the basic information as prescribed in 2 of IS : 3067-1966*.

3. MATERIAL

3.1 Bitumen mastic shall conform to the requirement of IS : 5871-1970†.

4. ALLOWABLE LOADS

4.1 When bitumen mastic has not been properly compacted to prevent extrusion, the maximum design load should not exceed 6.5 kgf/cm² at maximum atmospheric temperature.

5. LOCATION OF DAMP-PROOFING TREATMENT

5.1 In case of building below ground level the damp-proofing shall be applied either externally or internally as required.

5.2 In case of walls and floors above ground level the damp-proof course shall be applied up to at least 150 mm above ground level.

6. PREPARATION OF SURFACE AND SITE FOR DAMP-PROOFING

6.1 In order to ensure that the structure provides a satisfactory base on which to lay bitumen mastic attention may be given to the aspects stated under 6.1.1 to 6.1.4.

6.1.1 General Considerations

6.1.1.1 Unless a screed is applied on the surface on which the mastic is to be laid, care shall be taken in laying the concrete base so that any undue ridges, indentations and irregularities are avoided to ensure uniformity in the membrane. In case the treatment to be applied on a masonry wall, a smooth coat of plaster shall be applied over it to prepare to receive the treatment.

6.1.1.2 The surface on which asphalt is to be laid shall be cleaned of dirt and dust to receive bitumen mastic.

*Code of practice for general design details and preparatory work for damp-proofing and waterproofing of buildings.

†Specification for bitumen mastic for tanking and damp-proofing.

6.1.1.3 Laying of the treatment shall not be started as long as percolation of water from any source is visible through the surface of the base.

6.1.1.4 The surface of the structure should permit the laying of bitumen mastic in complete continuity up to 150 mm above ground level.

6.1.1.5 In order to ensure continuity of the tanking, the provisions of openings for service or the pipes, cables, etc, in walls or floors which are to be tanked should be avoided wherever possible. Where, however, it is essential to provide such openings, special treatment shall be given as shown in Fig. 1 around the openings.

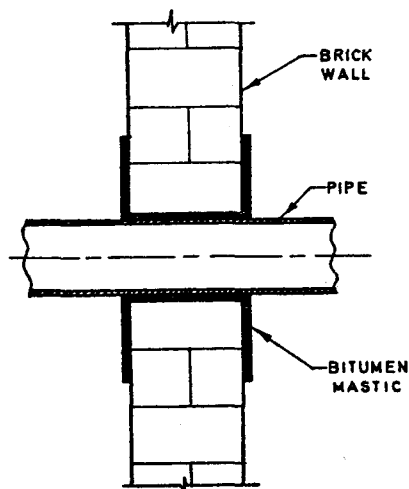


FIG. 1 TYPICAL ARRANGEMENT OF DAMP-PROOFING AROUND A PIPE THROUGH AN OPENING

6.1.1.6 The surface shall be kept dry while laying. All measures as laid down in IS: 3067-1966* shall be taken while laying the damp-proofing. Dewatering shall be continued while the layers of the bitumen mastic are in progress and until all these have hardened and the structure has developed sufficient strength to resist full hydrostatic pressure.

6.1.1.7 The surface on which the bitumen mastic has to be laid shall be first sprayed with bitumen primer conforming to IS: 3384-1965†.

*Code of practice for general design details and preparatory work for damp-proofing and waterproofing of buildings.

†Specification for bitumen primer for use in waterproofing and damp-proofing.

6.1.2 For Walls and Floors Above Ground — The damp-proofing treatment shall be laid across the full thickness of the walls excluding plaster or each of the base of the cavity walls and shall not be set back for pointing. The damp-proofing in the wall shall be continuous with the layer of bitumen mastic in the adjacent floors and where necessary, a vertical damp-proof course shall be provided on the inner surface of the wall as shown in Fig. 2.

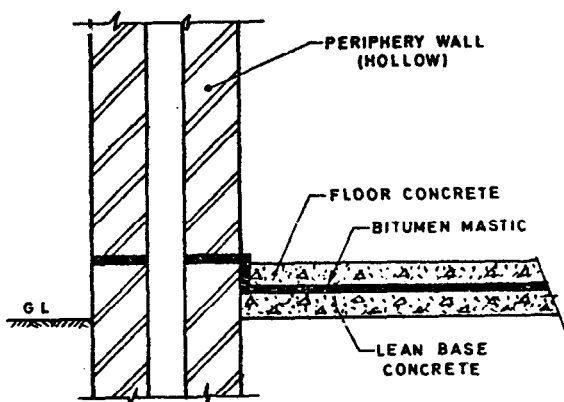


FIG. 2 TYPICAL ARRANGEMENT OF CONTINUOUS DAMP-PROOFING IN WALL AND ADJACENT FLOOR

6.1.3 Externally Applied Tanking — The following points shall be kept in view for externally applied tanking:

- The working space outside the walls may be not less than 0.6 m.
- A structurally sound base of at least 100 mm shall be provided with an even thickness. The base shall be extended at least 150 mm beyond the edges of the wall to permit the angle fillet to form between horizontal and vertical waterproofing (see Fig. 3).
- As soon as the laying of the horizontal mastic asphalt has been completed, it should be covered to prevent damage by a screed of cement and sand 50 mm in thickness. The horizontal loading coat of structural slab should be placed as quickly as possible. The 150 mm bitumen mastic set off provided for angle fillet should also be protected by application of 50 mm screed of cement and sand over building paper to be removed later on.
- Immediately after laying of vertical damp-proofing, the outside of the wall shall be protected against damage by the erection of a brick wall.

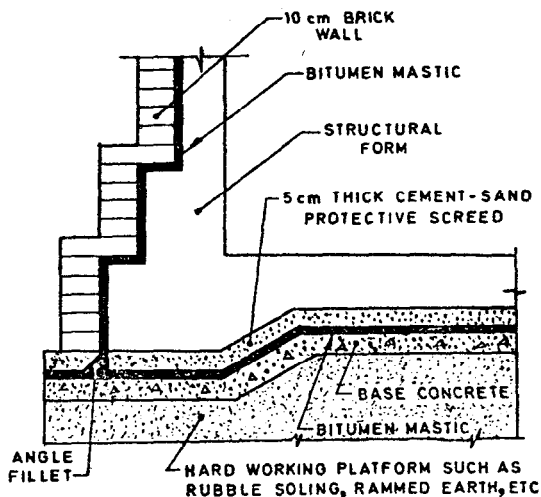


FIG. 3 EXTERNALLY APPLIED TANKING

6.1.4 Internally Applied Tanking — The following precautions shall be taken before applying bitumen mastic:

- A space of 300 mm outside the wall shall be provided as far as possible during excavation to keep the wall dry at the time of laying of bitumen mastic.
- The base slab shall be provided with an even surface to receive the damp-proofing course. Walls shall be built up to the full height of the tanking before the mastic asphalt coat is commenced.
- The outside wall shall be kept clear of earth. Earth shall not be filled until the three coats of vertical mastic have been applied and loading coats have been hardened as shown in Fig. 4.
- As soon as the horizontal mastic has been laid and the angle fillets completed, a protecting screed of cement and sand (mixed in the ratio of 1:4 respectively) of 50 mm thick to be applied to prevent damage to bitumen mastic. The protective screed shall be followed by the laying of structural floor and walls.

7. METHOD OF MIXING AND REMELTING

7.1 Method of Mixing — Method of mixing shall be same as specified in IS:5871-1970*.

*Specification for bitumen mastic for tanking and damp-proofing.

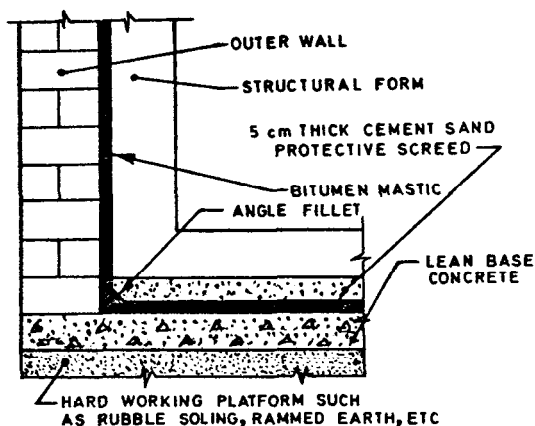


FIG. 4 INTERNALLY APPLIED TANKING

7.2 Method of Remelting — Remelting shall be carried out at the site of works in a mechanical mixer. The type of remelting plant selected for use shall be governed by the site conditions and the area to be covered. Blocks of bitumen mastic conforming to IS : 5871-1970* broken into pieces and then stocked in layers, first round the sides of the mixer and then inwards towards the centre. The charge in the mechanical mixer shall be gradually heated to about 200°C and when the bitumen mastic has attained a melted condition, it shall be agitated continuously to ensure a uniform consistency. During remelting the temperature of bitumen mastic shall not exceed 200°C. Whether the bitumen mastic is transferred to the site in a molten condition or remelted on site, the total duration of heating and the type of plant used shall be such that the properties of the bitumen mastic shall not be impaired.

8. THICKNESS AND METHOD OF LAYING

8.1 Thickness of Treatment — Bitumen mastic shall be applied in one or three coats as stated below to all surfaces, whether horizontal, sloping or vertical. The thickness shall be as follows:

- a) For walls and floors above ground level the bitumen mastic shall be laid in one coat minimum of 10 mm thickness.
- b) For vertical surfaces and surfaces steeper than 30° to the horizontal below the ground level the bitumen mastic shall be applied in three coats to a total thickness of not less than 20 mm.

*Specification for bitumen mastic for tanking and damp-proofing.

- c) For horizontal surfaces and sloping surfaces not steeper than 30° to the horizontal below the ground level, the bitumen mastic shall be applied in three coats to a total thickness of not less than 30 mm.

8.2 Method of Laying — Bitumen mastic when applied in three coats on vertical, horizontal or sloping surfaces, the first coat should be applied thinly such that it acts as an adhesive layer and also prevents blowing. While laying on the horizontal surface each coat should be spread with a float evenly and uniformly over the previously prepared surface to the recommended thickness. For laying on the vertical surface the first coat may be plastered with a metal trowel as evenly and uniformly as possible. The second and subsequent coats may be applied with a wooden float to a uniform thickness. The second and third coats of mastic asphalt shall be applied as soon as possible after the preceding coat as to prevent the accumulation of dust or dirt between layers which would impair the adhesion.

8.2.1 Blows in each coat formed by entrapped air or moisture during the laying shall be punctured and repaired while the asphalt is warm and before the next coat is applied.

8.2.2 Joints in successive coats of bitumen mastic shall be staggered at least 150 mm for horizontal and 75 mm for vertical work.

8.3 Chases — The top of the vertical bitumen mastic shall be turned into a chase not less than 25×25 mm unless it is being continued horizontally.

8.4 Angle Fillet — Angle fillet not less than 50 mm wide shall be applied in two coats at the junction of two planes forming an internal angle.

8.5 Construction Joints — Edges of the mastic already laid should be warmed with hot asphalt and then cut out with a metal trowel to remove any dust or dirt that may have collected. The fresh mastic is to be poured before the warmed up surface of the joint cools off.

BUREAU OF INDIAN STANDARDS

Headquarters;

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanatha
(Common to all offices)

Regional Offices:

	Telephones
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI-110002	[331 01 31 331 13 75
*Eastern : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Maniktola, CALCUTTA 700054	36 24 99
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	[2 18 43 3 16 41
Southern : C. I. T. Campus, MADRAS 600113	{ 41 24 42 41 25 19 41 29 16
†Western : Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95

Branch Offices:

'Pushpak' Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001	[2 63 48 2 63 49
†Peenya Industrial Area, 1st Stage, Bangalore Tumkur Road BANGALORE 560058	[38 49 55 38 49 56
Gangotri Complex, 5th Floor, Bhadbhada Road, T. T. Nagar, BHOPAL 462003	6 67 16
Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002	5 36 27
53/5, Ward No. 29, R. G. Barua Road, 5th Byelane, GUWAHATI 781003	3 31 77
5-8-56C L. N. Gupta Marg (Nampally Station Road), HYDERABAD 500001	23 10 83
R14 Yudhister Marg, C Scheme, JAIPUR 302005	[6 34 71 6 98 32
117/418 B Sarvodaya Nagar, KANPUR 208005	[21 68 76 21 82 92
Patliputra Industrial Estate, PATNA 800013	6 23 05
T.C. No. 14/1421, University P.O., Palayam TRIVANDRUM 695035	[6 21 04 6 21 17

Inspection Office (With Sale Point)

Pushpanjali, 1st Floor, 205-A West High Court Road, Shankar Nagar Square, NAGPUR 440010	2 51 71
Institution of Engineers (India) Building. 1332 Shivaji Nagar, PUNE 411005	5 24 35

*Sales Office in Calcutta is at 5 Chowringhee Approach, P.O. Princep Street, Calcutta 700072	27 68 06
†Sales Office in Bombay is at Novelty Chambers, Grant Road, Bombay 400007	89 65 28
‡Sales Office in Bangalore is at Unity Building, Narasimharaja Square Bangalore 560002	22 36 71