

**BRITISH STANDARD CODE OF PRACTICE
CP 144 : Part 4 : 1970**

69.024.158.8:691.167:665.45

ROOF COVERINGS

Part 4. Mastic asphalt. Metric units

**THE COUNCIL FOR CODES OF PRACTICE
BRITISH STANDARDS INSTITUTION**

BRITISH STANDARD CODE OF PRACTICE
CP 144 : Part 4 : 1970

ROOF COVERINGS

Part 4. Mastic asphalt. Metric units

Reprinted, incorporating AMD 6161, December 1990

THE COUNCIL FOR CODES OF PRACTICE
BRITISH STANDARDS INSTITUTION
2 PARK STREET, LONDON, W1A 2BS

CP 144 : Part 4 : 1970

This part of CP 144 has been prepared by a committee convened by the Codes of Practice Committee for Building. Having been endorsed by the Council for Codes of Practice, it was published under the authority of the Executive Board on 18 December, 1970.

© British Standards Institution, 1970.

First published (as CP 144.201), August, 1952.

First revision (as CP 144 : Part 2), July, 1966, Imperial Units

Published in metric form December, 1970.

SBN : 580 063259

This Code of Practice makes reference to the following British Standards:

- BS 410. Test sieves.
- BS 476. Fire tests on building materials and structures. Part 3. External fire exposure roof tests.
- BS 747. Roofing felts (bitumen and fluxed pitch). Part 2 Metric units.
- BS 988. Mastic asphalt for roofing (limestone aggregate).
- BS 1105. Unreinforced wood wool slabs up to 102 mm thick.
- BS 1142. Fibre building boards.
- BS 1162. Mastic asphalt for roofing (natural rock asphalt aggregate).
- BS 1178. Milled lead sheet and strip for building purposes.
- BS 1369. Metal lathing (steel) for plastering.
- BS 1470. Wrought aluminium and aluminium alloys, plate, sheet and strip.
- BS 1811. Methods of test for wood chipboards and other particle boards. Part 2. Metric units.
- BS 2717. Glossary of terms applicable to roof coverings.
- BS 2870. Rolled copper and copper alloys, sheet, strip and foil.
- BS 2989. Specification for continuously hot-dip zinc coated and iron-zinc alloy coated steel : wide strip, sheet/plate and slit wide strip.
- BS 3690. Bitumens for road purposes.
- BS 3717. Asbestos cement decking.
- PD 5686. The use of SI units.

As amended
December 1990

- CP 3. Code of basic data for the design of buildings.
Chapter IV, Precautions against fire.
Chapter V, Part 1. Dead and imposed loads.
- CP 112. The structural use of timber. Part 2. Metric units.
- CP 199. Roof deckings. Part 1. Asbestos cement.

British Standard Codes of Practice are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users ascertain that they are in possession of the latest amendments or editions.

The following BSI references relate to the work on this Code of Practice:
Committee reference BLC/57 Draft for comment 70/9365

CODE DRAFTING COMMITTEE BLCP/57
MASTIC ASPHALT ROOFING

Mr. A. W. Gittins (*Chairman*)

Mr. B. F. Kirby	<i>Institution of Municipal Engineers</i>
Mr. E. Casewell	<i>Mastic Asphalt Employers' Federation</i>
Mr. F. J. Prater	<i>Mastic Asphalt Council and Employers' Federation</i>
Mr. T. J. Harrison	
Mr. R. M. Edwards	
Mr. A. Woodward	<i>Ministry of Public Building and Works</i>
Mr. A. G. Day	<i>Ministry of Public Building and Works-Building Research Station</i>
Mr. A. W. Gittins	<i>National Association of Master Asphalters</i>
Mr. G. Bonner	<i>Royal Institute of British Architects</i>

CONTENTS

	Page
Foreword	8
1. GENERAL	
1.1 Scope	8
1.2 Definitions	9
1.3 Exchange of information	10
1.4 Time schedule	11
2. MATERIALS	
2.1 Mastic asphalt	11
2.2 Isolating membrane	11
2.3 Metal lathing	12
2.4 Sand for rubbing	12
2.5 Screeds	12
2.6 Insulating materials	12
2.7 Insulated roof decks	13
2.8 Vapour barrier	13
2.9 Solar reflective treatment	13
2.10 Bitumen-based bonding compound	14
2.11 Bitumen dressing compound	14
2.12 Flashings	14
2.13 Aluminium edgings	14
3. DESIGN CONSIDERATIONS	
3.1 General	15
3.2 Weather resistance	15
3.3 Fire protection	15
3.4 Thermal insulation	15
3.5 Ventilation of roofs	15
3.6 Base to receive asphalt	16
3.7 Isolating membrane	19
3.8 Number of coats and thickness	19
3.9 Details	21
3.10 Solar reflectivity	21
3.11 Surface finishes	21

4. METHOD OF LAYING AND WORKMANSHIP

	Page
4.1 Siting of plant	22
4.2 Protection and storage of materials	22
4.3 Co-operation by other trades	22
4.4 Setting out the work	23
4.5 Remelting	23
4.6 Technique of laying	24
4.7 Associated details	24

5. INSPECTION AND MAINTENANCE

5.1 Inspection	26
5.2 Maintenance	27

TABLES

1. Weights of metal flashings, etc.	14
-------------------------------------	----

FIGURES

1. Mastic asphalt laid on screeded roof and mastic asphalt skirting to brick wall	28
2. Mastic asphalt laid on screeded roof and mastic asphalt skirting to concrete wall	29
3. Mastic asphalt laid on screeded roof with mastic asphalt skirting and D.P.C. to wall	30
4. Mastic asphalt laid on timber roof and mastic asphalt skirting on free-standing kerb	31
5. Mastic asphalt laid on screeded roof with tiled finish	32
6. Mastic asphalt laid on organic insulating material with mastic asphalt skirting and D.P.C. to wall	33
7. Mastic asphalt finish at eaves in conjunction with metal flashing to gutter	34
8. Solid mastic asphalt water check and drip apron to verge of roof	35
9. Mastic asphalt finish at verges with aluminium edging trim	35

	Page
10. Mastic asphalt finish to concrete kerb for wood sill	36
11. Mastic asphalt finish to metal sill	37
12. Mastic asphalt lining to roof reservoir and kerb	38
13. Mastic asphalt finish to concrete kerb used as a water check	39
14. Mastic asphalt lined rainwater outlet through parapet wall	40
15. Expansion joint in flat roof twin kerb type	41
16. Outlet with welted lead slate and sleeve	42
17. Mastic asphalt finish to cast iron roof outlet	43
18. Mastic asphalt finish to C.I. pipe passing through a concrete roof	44
19. Mastic asphalt finish to metal standards	45
20. Ventilator for use with lightweight screeds	46

This Code of Practice represents a standard of good practice; compliance with it does not confer immunity from statutory and legal requirements.

BRITISH STANDARD CODE OF PRACTICE CP 144

ROOF COVERINGS

Part 4. Mastic asphalt. Metric units

FOREWORD

This metric edition of CP 144, which has been designated Part 4, is the metric, revision of Part 2 published in imperial units in July 1966.

Part 4 is not a technical revision of the Code, and has been prepared as part of the change to the metric system in the construction industry giving values in SI units. For further information on SI units, reference should be made to PD 5686*.

The Code of Practice was first published in 1952, revised in 1966 when information was included to cover mastic asphalt roofing designed to take traffic, and the types of isolating membranes to be used over lightweight concrete screeds to prevent entrapped water staining ceilings, and other associated problems. Ventilators to assist the drying out of roof structures, vapour barriers, and improved methods of laying mastic asphalt as roof covering, were at that time also included. Part 4 is virtually the same, but with metric values.

In this Code the word 'shall' indicates a requirement that is to be adopted in order to comply with the Code while the word 'should' indicates a recommended practice.

1. GENERAL

1.1 SCOPE

This Code of Practice deals with the use of mastic asphalt as a roof covering, including situations designed to carry traffic, such as a roof car park.

Mastic asphalt provides a jointless roofing, the principal function of which is to protect the structure from the weather.

The Code covers recommendations for the preparation of the base to which the mastic asphalt is applied and sets out the site practice. It includes recommendations concerning various accessory materials generally used in conjunction with mastic asphalt for roofing. Subsidiary functions are given in Section 3, including the use of mastic asphalt as a waterproof lining to a roof reservoir for the storage of water.

* PD 5686, 'The use of SI units'.

1.2 DEFINITIONS

For the purposes of this Code the definitions in BS 2717* together with the following apply:

Mastic asphalt. A type of asphalt composed of suitably graded mineral matter and asphalt cement in such proportions as to form a coherent, voidless, impermeable mass, solid or semi-solid under normal temperature conditions, but sufficiently fluid, when brought to a suitable temperature, to be spread by means of hand tools.

Base. That part of a roof structure forming a base for the roof covering, extending up to but not including the isolating membrane.

Bay. That part of a roof area to which mastic asphalt is applied in one continuous operation. The term is not applied to a part of a roof area laid in a narrow width.

Bitumen-based bonding compound. Bitumen for bonding vapour barrier to roof decks, for bonding insulation board and cork slabs to a vapour barrier, and for bonding asbestos or concrete roofing tiles to mastic asphalt.

Bitumen-based dressing compound. Bitumen-based compound for bedding mineral chippings on to mastic asphalt roofing.

Blocks. Mastic asphalt cast in moulds of various shapes, in sizes convenient for transport and handling.

Cauldron. A cylindrical steel vessel fitted with a fire-box and used at the site of works for the purpose of remelting mastic asphalt prior to laying. Generally applied to plant which is not mechanically agitated.

Coat. A single layer of mastic asphalt.

Float. A flat-faced wooden tool, with a handle, used for spreading and finishing the surface of mastic asphalt.

Gauges. Wood or metal strips of required thickness, temporarily fixed as boundaries to bays or elsewhere, to assist the spreader in laying the mastic asphalt.

Insulation. Material laid as part of the base to prevent heat loss from the building.

Isolating membrane. Material laid to separate mastic asphalt from movement of the base.

Mechanical mixer. A mobile container, fitted with heating and power units, to provide mechanical agitation, used for the purpose of remelting mastic asphalt.

Metal primer. A type of rubber bitumen used to coat metal work before the application of mastic asphalt.

Metal lathing. Bitumen-coated expanded metal lathing used for keying mastic asphalt to vertical or sloping timber surfaces.

*BS 2717, 'Glossary of terms applicable to roof coverings'.

Rubbing. The process by which the last coat of mastic asphalt is given a matt surface finish by the use of clean coarse sand.

Solar reflective treatment. A surface treatment to protect the mastic asphalt from the effects of solar heat.

Spreader. An operative (craftsman) skilled in the laying and finish of mastic asphalt.

Vapour barrier. An impermeable layer to prevent moisture penetration from within the building.

1.3 EXCHANGE OF INFORMATION

The following information should be exchanged to ensure co-operation between all concerned with the laying of mastic asphalt.

1.3.1 General

- (1) Postal address of site of work, to facilitate inspection of site and delivery of material
- (2) Specification and bill of quantities for the mastic asphalt
- (3) The name and address of person responsible for issuing directions concerning the work to asphalt contractor
- (4) Positions available for plant and materials
- (5) Height from ground level and particulars of access to each roof
- (6) Hoisting facilities available at site
- (7) When the mastic asphalt roofing has to be laid in stages, the approximate interval of time between stages
- (8) Any special or unusual features.

1.3.2 Details of construction

- (1) Drawings showing the areas of roofing to be covered and the associated details
- (2) Degree and direction of falls
- (3) Thickness of mastic asphalt and number of coats
- (4) Description of base over which the mastic asphalt is to be laid, e.g. concrete, hollow beams, hollow blocks, timber, laminated or particle board
- (5) Description of the type and thickness of any thermal insulating material
- (6) Particulars concerning unusual surfaces, e.g. metal and glazed surfaces, over or against which the mastic asphalt is to be laid

1.3.3 Keys. The form of key proposed on vertical and sloping work to support the mastic asphalt.

1.3.4 Loads and traffic—abnormal conditions

- (1) The nature of traffic, if any, on the roof
- (2) Particulars concerning any special or unusual process, material or conditions to which the mastic asphalt roofing will be subjected.

1.3.5 Special surface finishes. Description of any special type of surface finish, if any, to be laid over the mastic asphalt, e.g. solar reflective treatment, mastic asphalt paving, concrete or asbestos tiles or screeding cut into tile form.

1.4 TIME SCHEDULE

During the preparation of a time schedule for the building work, the asphalt contractor shall be given all relevant information from the schedule so that the periods of time to be allowed for various asphaltting operations are decided in agreement with him. This will ensure that the mastic asphalt contractor has reasonable notice of the approximate times when his services will be required at the site.

It is desirable that all work above roof level be completed before the mastic asphalt is laid. If, however, work has to be carried out on or above the mastic asphalt after laying provision shall be made for complete protection of the mastic asphalt by the main contractor (see 4.3).

2. MATERIALS

2.1 MASTIC ASPHALT

The material for mastic asphalt roofing shall comply with one of the following.

- (1) *For normal roofing and undercoats of roofing liable to traffic*
BS 1162, 'Mastic asphalt for roofing (natural rock asphalt aggregate)'.
BS 988, 'Mastic asphalt for roofing (limestone aggregate)'.
- (2) *For finishing coats or roofing liable to traffic conditions such as car parks*
BS 1446, 'Mastic asphalt (natural rock aggregate) for roads and footways'.
BS 1447, 'Mastic asphalt (limestone aggregate) for roads and footways'.

2.2 ISOLATING MEMBRANE

The isolating membrane shall be one of the following.

- (1) *Wet construction.* Impregnated flax felt conforming to the requirements of BS 747*, Type 4A(i), black sheathing felt (bitumen) and weighing not less than 17 kg per 25 m roll. It shall be laid over all types of lightweight or dense

* BS 747, 'Roofing felts (bitumen and fluxed pitch), Part 2; Metric units'.

concrete screeds or similar where water could be entrapped or be formed from condensation.

(2) *Dry construction.* Impregnated flax felt conforming to the requirements of BS 747*, Type 4A(i), black sheathing felt (pitch or bitumen), weighing not less than 17 kg per 25 m roll shall be laid on bases of dry construction such as compressed strawboard, particle board or timber and on all dry insulation such as fibre board or cork slabs. The isolating membrane shall be supplied by the mastic asphalt roofing contractor and laid by the spreader.

2.3 METAL LATHING

The key for mastic asphalt roofing shall be bitumen-coated 'plain expanded' metal lathing complying with BS 1369† (as shown in Fig. 1 of that standard) and not less than 10 mm short way of mesh and not lighter than 0.46 mm thickness, or galvanized expanded metal lathing manufactured from pregalvanized sheet complying with BS 2989§, steel grade Z1 to Z5 and zinc coating type G275 minimum, with a minimum nominal thickness of 0.40 mm. The metal lathing shall be supplied by the mastic asphalt contractor and fixed by the spreader.

2.4 SAND FOR RUBBING

The sand used for surface finishing of the mastic asphalt shall be clean coarse sand from natural deposits, mostly passing a 600 μm test sieve to BS 410‡ and retained on a 210 μm test sieve.

2.5 SCREEDS

Normally the mixture for screeds on which mastic asphalt is to be laid shall be one part of cement to four parts of clean coarse sand by volume. The screed shall not be laid continuously but in areas not exceeding 9 m² even if reinforced. The minimum thickness should be 25 mm except when laid as sand/cement topping over wood wool slabs or lightweight aggregates when the thickness shall be not less than 13 mm. When, however, wood wool slabs are used as structural decking, the screed shall comply with 3.6.6. The finish of the screeds shall be even and free from ridges and indentation and laid to falls as required.

2.6 INSULATING MATERIALS

Where thermal insulation is required under mastic asphalt roofing, it shall consist of one of the following.

(1) *Lightweight concrete.* Lightweight aggregate mixed with cement or aerated concrete laid to the manufacturer's instructions. The thermal insulation value will depend upon the thickness laid.

* BS 747, 'Roofing felts (bitumen and fluxed pitch)', Part 2, 'Metric units'.

† BS 1369, 'Metal lathing (steel) for plastering'.

‡ BS 410, 'Test sieves'.

§ BS 2989, 'Specification for continuously hot-dip zinc coated and iron-zinc alloy coated steel: wide strip, sheet/plate and slit wide strip'.

(2) *Granulated cork slabs.* The slabs shall consist of pure granulated cork, compressed into slab form, steam baked and held together by the natural cork gum. The thickness of cork slab will vary according to the thermal insulation required.

(3) *Fibre insulation board.* Fibre insulation board complying with BS 1142* bonded with hot bitumen compound to a coated felt vapour barrier, or a metal cored vapour barrier felt which is also bonded to the roof deck.

The thickness of the insulation board will vary according to the thermal insulation required.

2.7 INSULATED ROOF DECKS

Insulated roof decks may be constructed from one of the following.

(1) Asbestos cement decking complying with BS 3717†.

(2) Compressed straw slabs, roofing quality, fixed to manufacturer's instructions.

(3) Woodwool slabs complying with BS 1105‡ heavy duty type, fixed and screeded according to manufacturer's instructions.

2.8 VAPOUR BARRIER

A vapour barrier is used, where necessary, as an isolating layer between the roof deck and the insulating materials (e.g. cork or fibre insulation board) to protect the insulation against the absorption and the effects of moisture from below. The vapour barrier should consist of a coated roofing felt complying with BS 747§, Type 1C, or a metal-cored vapour barrier felt, both weighing not less than 13 kg per 10 m roll with laps of not less than 50 mm and bonded with a bitumen compound.

2.9 SOLAR REFLECTIVE TREATMENT

The surface finish to mastic asphalt may be one of the following.

(1) *Chippings.* A hard limestone having a low moisture absorption characteristic, granite, gravel or calcined flint, calcite or felspar retained on a 6 mm mesh sieve and passing 10 mm.

(2) *Aluminium based paints.* Aluminium paint free from material deleterious to mastic asphalt; it cannot be considered as a permanent treatment and will require periodical renewal in 'industrial areas'.

* BS 1142, 'Fibre building boards'.

† BS 3717, 'Asbestos cement decking'.

‡ BS 1105, 'Unreinforced wood wool slabs up to 102 mm thick'.

§ BS 747, 'Roofing felts (bitumen and fluxed pitch)', Part 2, 'Metric units'.