



Designated by Government  
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European Technical  
Approvals

## Product

• THIS CERTIFICATE RELATES TO PARAPHALT, A POLYMER-MODIFIED MASTIC ASPHALT FOR USE AS A WATERPROOFING LAYER ON FLAT ROOFS.

• The product is laid using the techniques for mastic asphalt described in BS 8218 : 1998.

• Advantages over traditional mastic asphalt include improved high-temperature stability and low-temperature flexibility.

• The product is marketed by Langley Waterproofing Systems Ltd.




## PARAPHALT

Revêtement d'étanchéité  
Dachabdichtungen

## Regulations

### 1 The Building Regulations 2000 (as amended) (England and Wales)

 The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of roof waterproofing membranes with the Building Regulations. In the opinion of the BBA, Paraphalt, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: B4(2)

External fire spread

Comment:

On flat roofs and with one of the supporting structures prescribed in Part V of Table A5 of the Approved Document the roof shall be deemed to be of designation AA. See sections 11.1 to 11.3 of this Certificate.

Requirement: C2(b)

Resistance to moisture

Comment:

Tests for water resistance on the product indicate that the material meets this Requirement. See section 8.1 of this Certificate.


Requirement: Regulation 7

Materials and workmanship

Comment:

The product is an acceptable material. See sections 13.1 and 13.2 of this Certificate.

### 2 The Building (Scotland) Regulations 2004

 In the opinion of the BBA, Paraphalt, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and Mandatory Standards as listed below.

Regulation: 8

Fitness and durability of materials and workmanship

Regulation: 8(1)

Fitness and durability of materials and workmanship

Comment:

The product can contribute to a construction meeting this Regulation. See sections 13.1 and 13.2 and the *Installation* part of this Certificate.

Regulation: 9

Building standards — construction

Standard: 2.8

Spread from neighbouring buildings

Comment:

In the opinion of the BBA, the product will have similar properties in relation to fire as the traditional grades of mastic asphalt described in BS 8218 : 1998 and therefore satisfies this Standard with reference to clauses 2.8.1<sup>(1)(2)</sup> and 2.8.2<sup>(1)(2)</sup>. See sections 11.1 and 11.3 of this Certificate.

Standard: 3.10

Precipitation

Comment:

Tests for water resistance indicate that the use of the product can enable a roof to satisfy the requirements of this Standard with reference to clause 3.10.1<sup>(1)(2)</sup>. See section 8.1 of this Certificate.

Regulation: 12

Building standards — conversions

Comment:

All comments given for this product under Regulation 9, also apply to this Regulation with reference to clause 0.12.1<sup>(1)(2)</sup> and Schedule 6<sup>(1)(2)</sup>.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

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## 3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Paraphalt, if used in accordance with the provisions of this Certificate, will satisfy the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is an acceptable material. See sections 13.1 and 13.2 of this Certificate.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		Tests for water resistance indicated that the use of the product can enable a roof to satisfy the requirements of this Regulation. See section 8.1 of this Certificate.
Regulation:	E5	External fire spread
Comment:		When used on flat roofs and protected by one of the supporting structures prescribed in Technical Booklet E, Table 4.6, Part III, the roof may be considered to be of designation AA. See sections 11.1 to 11.3 of this Certificate.

## 4 Construction (Design and Management) Regulations 1994 (as amended)

### Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See section: *6 Delivery and site handling (6.1).*

## Technical Specification

### 5 Description

5.1 Paraphalt is manufactured by mixing an asphaltic cement with limestone filler and limestone coarse aggregate using conventional techniques. The asphaltic cement consists of polymer-modified bitumen.

5.2 Quality control checks are performed on incoming materials, during production and on the final product. Quality control on the final product includes checks on hardness, soluble binder content, sieve grading and flow.

### 6 Delivery and site handling

6.1 The product is supplied in blocks (similar to traditional asphalt) with labels bearing the product name and the BBA identification mark incorporating the number of this Certificate. Alternatively, the product in molten form, may be delivered to site by purpose-built transporters. In such cases, the product information/identification is supplied on the relevant delivery notices.

6.2 Blocks should be stored in the same manner as traditional mastic asphalt.

## Design Data

### 7 General

7.1 Paraphalt is satisfactory for use as waterproofing layers on flat roofs, completely flat roofs, green roofs and roof gardens in accordance with the relevant clauses of BS 8218 : 1998 and, where appropriate, BS 8217 : 2005.

7.2 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, special precautions such as additional protection (eg by tiling or paving) to the product should be considered.

7.3 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Completely flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of less than 1:80.

7.4 When designing flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc.

7.5 Decks to which the product is to be applied must comply with the relevant requirements of BS 8218 : 1998, BS 6229 : 2003 the requirements of the Metal Roof Deck Association's *Code of Technical Requirements for Light Gauge Metal Roof Decks* and, where appropriate, NHBC Standards, Chapter 7.1, or the *Zurich Building Guarantee Technical Manual*, Section 4 *Superstructure*, Sub-section, *Flat roofs* (pages 259 and 260).

7.6 Structural decks, to which green roofs and roof gardens are to be applied, must be of concrete and suitable to transmit the dead and imposed loads calculated in accordance with BS 6399-1 : 1996 and BS 6399-3 : 1998, respectively.

7.7 Dead loads could also be dramatically increased if the drains become partially or completely blocked causing waterlogging of the drainage and soil layers.

7.8 Insulation materials used in conjunction with the product must be approved by the Certificate holder.

7.9 Normal good practice in respect of vapour barriers and/or ventilation of existing insulation must be followed to control interstitial condensation.

## 8 Weathertightness



8.1 Test data confirm that the product will adequately resist the passage of moisture to the inside of the building and so meet or comply with the relevant requirements of the National Building Regulations:

### *England and Wales*

Section 6 of Approved Document C2

### *Scotland*

Regulation 9, Mandatory Standard 3.10

### *Northern Ireland*

Regulation C4.

8.2 The product is impervious to water and, when used in the systems described, will give a weathertight roofing capable of accepting minor structural movements without damage.

## 9 Stability

The product will adequately resist the effects of wind suction and thermal shock likely to occur in practice.

## 10 Resistance to loading and foot traffic

The product can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance operations. Where access exceeding this is envisaged, this should be taken into account when determining the application thickness and surface protection.

## 11 Properties in relation to fire



11.1 In the opinion of the BBA, Paraphalt will have similar properties in relation to fire as the traditional grades of mastic asphalt described in BS 8218 : 1998.



11.2 When used for flat roofs with one of the supporting structures prescribed in the national Building Regulations, the roof is deemed or considered to be of designation AA:

### *England and Wales*

Approved Document B, Table A5, Part V

### *Northern Ireland*

Technical Booklet E, Table 4.6, Part III.



11.3 The designation of other specifications (eg on combustible substrates) should be confirmed by:

### *England and Wales*

test or assessment in accordance with Clause A1, Appendix A of Approved Document B

### *Scotland*

test to conform with Mandatory Standard 2.8

### *Northern Ireland*

test or assessment by a UKAS accredited laboratory, BRE or an independent consultant with appropriate experience.

## 12 Maintenance

12.1 A roof waterproofed with the product will not normally require maintenance. However, inspections should be carried out by persons knowledgeable in mastic asphalt work as recommended in BS 8218 : 1998, Section 11 *Maintenance and Repair*.

12.2 Should accidental damage occur, or alterations to the roof structure be required, then the recommendations of BS 8218 : 1998, Section 11.3 should be followed.

## 13 Durability



13.1 Test data indicate that Paraphalt has improved high-temperature stability and is more flexible at low temperatures than conventional mastic asphalt. Accelerated ageing tests indicate a satisfactory retention of properties. On the basis of available data, the product should have a life expectancy in excess of that of conventional grades of mastic asphalt used in roofing applications<sup>(1)</sup>.

(1) BRE Digest 144 states that 'Asphalt roofing properly designed and laid should be capable of lasting 50 to 60 years.'

13.2 When fully protected and subject to normal service conditions, it will provide an effective barrier to the transmission of liquid water and water vapour for the design life of the roof/substrate on which it is incorporated.

### 14 Procedure

14.1 When installing Paraphalt deck surfaces must be dry, clean and free from sharp projections such as nail heads, concrete nibs.

14.2 Installation should be carried out using the techniques for laying mastic asphalt described in the relevant clauses of BS 8218 : 1998 and in accordance with the manufacturer's instructions. Due to the improved high temperature stability of the product, remelt temperature may be 10°C higher than that quoted in the Code of Practice.

14.3 Where applicable, details are to be worked in accordance with traditional methods.

14.4 On completion of the roof, the final coat should be rubbed with coarse sharp sand using a wooden float. For solar protection, or for protection against foot traffic, Paraphalt should have one of the following surface finishes which are included in BS 8218 : 1998:

- stone chippings of limestone, granite, gravel, calcined flint, calcite, feldspar or similar, of 14 mm nominal size, free from dust, bedded in a suitable compound
- stone aggregate of 20 mm nominal size, loose-laid, but secured around outlets
- light-coloured pedestrian tiles bedded in a compound in accordance with the tile manufacturer's recommendations, particularly where continuous foot traffic is expected
- concrete paving slabs bedded in cement/sand mortar bed on a loose-laid isolating membrane
- solar reflective paint, applied and maintained in accordance with the Certificate holder and the paint manufacturer's recommendations

14.5 Before a solar protection is applied, the roof surface should be completely dry and free of dirt

14.6 Where continuous foot traffic is expected, surface finishes (c) and (d) are recommended.

## Technical Investigations

The following is a summary of the technical investigations carried out on Paraphalt.

### 15 Tests

15.1 The BBA obtained samples of the product from the manufacturer for testing. The results of these tests, which show typical values for the material, are summarised in Tables 1, 2 and 3.

15.2 As part of this assessment, a series of comparative tests were performed, examining Paraphalt and traditional grades of mastic asphalt conforming to BS 6925 : 1988. The results are summarised in Table 4.

15.3 Additional test data comparing the properties of Paraphalt and traditional grades of mastic asphalt at low temperatures, supplied from suitable test authority, were examined by the BBA. It was concluded that the product has improved flexibility at low temperatures.

Table 1 General characteristics — asphaltic cement

Test (units)	Method <sup>(1)</sup>	Mean result
Ash content (%)	BS 2000-223	0.18
Ring and ball softening point (°C)	BS 2000-58	54
Penetration (dmm)	BS 2000-49	52

(1) The test document is detailed in the *Bibliography*. Numbers in the table refer to parts of the document.

Table 2 General physical properties — Paraphalt

Test (units)	Method <sup>(1)</sup>	Mean result
Density (kgm <sup>-3</sup> )	Direct measurement	2230
Tensile strength (Nmm <sup>-2</sup> )	BS 2782-3.320E	
unaged		0.58
28 days heat aged at 70°C		0.74
180 days heat aged at 70°C		0.98
Elongation (%)	BS 2782-3.320E	
unaged		5.0
28 days heat aged at 70°C		4.3
180 days heat aged at 70°C		1.3
Dimensional stability (free) (%) (applied to Type 4A felt to BS 747)	MOAT 27, 5.1.6.1 (6 hours)	+0.61
Water vapour permeability <sup>(2)</sup> (gm <sup>-2</sup> day <sup>-1</sup> )	BS 3177 (75% RH/25°C)	zero <sup>(3)</sup>

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Test sample 15 mm thick, single coat.

(3) Reading below limits of apparatus.

Table 3 Service performance — Paraphalt

Test (units)	Method <sup>(1)</sup>	Mean result	
Ring and ball softening point (°C) <sup>(2)</sup> unaged	BS 2000-58		
5 cycles at 240°C <sup>(2)</sup>			125.5
6 hours held at 250°C			128.5
6 hours held at 270°C			126.0
6 hours held at 290°C			129.0
Hardness (% retention) <sup>(3)</sup>	BS 5284 (23°C/50% RH)		
180 days heat aged at 70°C			48
28 days water soak at 30°C			90
5 cycles at 240°C <sup>(4)</sup>			45
6 hours held at 250°C			86
6 hours held at 270°C			69
6 hours held at 290°C		55	
Resistance to water pressure (6 m)	MOAT 27 : 5.1.4	No penetration	
Flow resistance (60°)	ASTM D 3407 : 1978	No movement	
Static indentation concrete substrate	MOAT 27 : 5.1.9		L <sub>3</sub>
expanded polystyrene			L <sub>2</sub>
Hard body impact	<i>ad hoc</i> method <sup>(5)</sup>		
at -10°C			
drop height	— 400 mm	No damage	
	— 500 mm	Slight indentation	
	— 600 mm	Failure of sample	
at +21°C			
drop height	— 300 mm	No damage	
	— 400 mm	Slight indentation	
	— 1200 mm	Increased indentation	
	— 1300 mm	Failure of sample	

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Test carried out on final product for comparison purposes only.

(3) Original hardness 75 (dmm) – measured by manufacturer.

(4) One cycle = 6 hours heating, 18 hours cooling, and held at ambient.

(5) 1 kg steel balls on Paraphalt on type 4A felt to BS 747 : 1977.

Table 4 Comparative test results

Test (units)	Method <sup>(1)</sup>	Mean result		
		Paraphalt	988/B	988/T
Hardness	BS 5284			
unaged (dmm) <sup>(2)</sup>		75	54	62
180 days heat aged at 70°C (% retention)		48	39	37
Penetration (dmm)	BS 2000-49	52	39	37
Ring and ball softening point (°C) (asphaltic cement)	BS 2000-58	54.0	56.0	59.8

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Original hardness as measured by the manufacturer.

## 16 Investigations

16.1 Factory visits were performed to examine the manufacturing and quality control procedures at each production location.

16.2 Site visits were performed to examine the product's performance in use and practicability of installation.

## Additional Information

The management systems of the manufacturer have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2000 by the British Standards Institution Quality Assurance, Certificate No Q 5667.

## Bibliography

- BS 747 : 1977 *Specification for roofing felts*
- BS 2000-49 : 1983 *Methods of test for petroleum and its products — Determination of needle penetration of bituminous material*
- BS 2000-58 : 1988 *Methods of test for petroleum and its products — Determination of softening point of bitumen — Ring and ball method*
- BS 2000-223 : 1984 *Methods of test for petroleum and its products — Determination of ash of petroleum products containing mineral matter*
- BS 2782-3.320A to 320F : 1976 *Methods of testing plastics — Mechanical properties — Tensile strength, elongation and elastic modulus*
- BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*
- BS 5284 : 1976 *Methods. Sampling and testing mastic asphalt and pitchmastic used in building*
- BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*
- BS 6399-1 : 1996 *Loading for buildings — Code of practice for dead and imposed loads*
- BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*
- BS 6925 : 1988 *Specification for mastic asphalt for building and civil engineering (limestone aggregate)*
- BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*
- BS 8218 : 1998 *Code of practice for mastic asphalt roofing*
- BS EN ISO 9001 : 2000 *Quality management systems — Requirements*
- MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*
- ASTM D 3407 : 1978 *Methods of testing joint sealants, hot-poured, for concrete and asphalt pavements*

## Conditions of Certification

### 17 Conditions

17.1 This Certificate:

- (a) relates only to the product that is named, described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

17.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

17.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabrication including all related and relevant processes thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine; and

(c) are reviewed by the BBA as and when it considers appropriate.

17.4 In granting this Certificate, the BBA is not responsible for:

- (a) the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

17.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.



In the opinion of the British Board of Agrément, Permaphalt is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 05/4224 is accordingly awarded to Langley Waterproofing Systems Ltd.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'G. A. Cooper', is written over a light grey background.

Date of issue: 9th November 2005

Chief Executive

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**British Board of Agrément**

P O Box No 195, Bucknalls Lane  
Garston, Watford, Herts WD25 9BA  
Fax: 01923 665301

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e-mail: [mail@bba.star.co.uk](mailto:mail@bba.star.co.uk)  
website: [www.bbacerts.co.uk](http://www.bbacerts.co.uk)



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