

Specification for

Pavement marking paints

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Committees responsible for this British Standard

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- British Resin Manufacturers Association
- Chemical Industries Association
- County Surveyor’s Society
- Department of Transport (Highways)
- Department of Transport (Transport and Road Research Laboratory)
- Glass Manufacturers’ Federation
- Institution of Highways and Transportation
- Paintmakers Association of Great Britain Ltd.
- Road Markings Manufacturers and Contractors Association
- Society of Chemical Industry

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Foreword

This revision of BS 6044 has been prepared under the direction of the Pigments, Paints and Varnishes Standards Committee. This revision supersedes BS 6044:1981 which is withdrawn.

The first edition of this standard was prepared as a replacement for BS 2086:1954 “*White line road paint*”. It was developed to be applicable to requirements for the marking of roads, airfield runways, parking bays and similar surfaces.

This first revision, like the first edition, is principally a performance specification in which both laboratory and in-service tests have equal prominence. Thus it is an essential feature that paints complying with the standard are required to give a satisfactory performance both in the laboratory tests and in the road trials. Only paints complying with **5.1** to **5.15** inclusive can be submitted to the road performance trials. Details of the road performance trials are given in clause **6** and Appendix L.

The Department of Transport has agreed that a test site on a major public highway may be used when conducting the road performance trials, but an important proviso is that the trials should inconvenience traffic for a minimum period. Because of this, it should be noted that the road performance trials are to be conducted *not more than once annually*, and that application of the paints submitted for trial is to be carried out at the date and time stipulated by the Department of Transport.

Moreover, in the road performance trials, the Department of Transport will only allow white paints to be applied to the highway. Clause **6** specifies the conditions in which a yellow or black paint will be deemed to comply with this standard.

Paints complying with this standard have to be capable of retaining a surface layer of reflectorizing glass beads (see **5.3**). It has not yet been possible to obtain suitable apparatus to assess reflectorization at the test site, but this aspect is being further investigated and a test, when thoroughly verified, may be introduced in a revised edition in due course.

To assist purchasers ordering paints complying with this standard, Appendix N summarizes the information required by a supplier.

Since the publication of the first edition of this standard, a number of paints submitted for assessment in the road performance trials (see Appendix L) were tested for skid resistance as required in that edition. However, such inconsistent skid resistance values were obtained that serious doubt was cast on the validity of the test. Hence it was decided that the skid resistance test should be excluded from the road performance trials, although this decision was not taken without reservations. It was believed that the variability of the data may have been due to the nature of the bituminous road surface at the test site and the timing of the tests after laying. Further work is being carried out to identify and specify the necessary conditions to reintroduce the test. It should be noted, nevertheless, that the requirement for the skid resistance of products to be determined under laboratory conditions, as added to the first edition by amendment, is retained in this revision.

Other changes from the first edition include the introduction of the test procedure for assessing sheen (Appendix D) because the relevant method, BS 3900-D3, has now been withdrawn. The stipulation regarding lead content (see **5.2**) has been aligned with current UK legislation. A requirement for photographic recording of the degree of erosion has been added.

This standard was confirmed in November 1995 on publication of amendment No. 2. The changes incorporated did not reflect a full review of the standard, but were those felt necessary to maintain its currency for the foreseeable future pending its withdrawal and supersession by European Standards currently in course of preparation.

Certification. It is strongly recommended that, in view of the nature of this specification, manufacturers should make use of the certification facilities described on the inside back cover of this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies requirements for paints, in containers, for use as markings on bituminous and concrete surfaces. These paints are capable of retaining a surface layer of reflectorizing glass beads to improve the visibility of the markings at night.

This standard is applicable to white, yellow and black paints (see foreword).

This standard is not applicable to compounds formulated to comply with BS 3262.

NOTE The titles of the publications referred to in this standard are listed on page 18.

2 Definitions

For the purposes of this standard, the definitions given in BS 2015 apply, together with the following.

2.1

luminance factor

the ratio of the luminance of a non-luminous body, under specified conditions of illumination and observation, to the luminance of a perfect reflecting diffuser¹⁾ receiving the same illumination

2.2

no pick-up time

the period, determined by the procedure described in Appendix E, between application of a paint and the moment when the paint just ceases to be removed by a simulated tyre of a vehicle passing over the painted surface

2.3

reflectorization

the application of small transparent glass beads on to a painted surface before it has dried, to enable incident light to be reflected back in the general direction of the source

3 Text deleted.

4 Sampling

A representative sample of the paint shall be taken as described in BS 3900-A1. The sample shall then be examined and prepared for testing by the appropriate methods described in BS 3900-A2.

5 Test and performance requirements

NOTE The test panels referred to in this clause together with those referred to in the appendices are described in Appendix A.

5.1 Condition of the paint

When the paint is first examined after delivery, it shall be free from skin, as assessed by visual examination. Any settlement, of pigment shall be readily redispersible by manual stirring as described in 5.2.4 or 5.2.5 of BS 3900-A2:1983.

5.2 Lead content

When tested as described in BS 3900-B3, the paint shall contain not more than 5 % (m/m) "soluble" lead, expressed as lead monoxide (PbO), on the extracted solid matter.

5.3 Retention of glass beads

When the paint is tested as described in Appendix B, the proportion of the initially retained glass beads removed in the scrubbing apparatus shall not exceed 10 % (m/m).

5.4 Colour

The paint colour shall be white, yellow or black.

NOTE While it is common for yellow paints used for pavement marking to be an approximate match to colour no. 355 *Lemon* of BS 381C, the Department of Transport permits the use of other yellows (e.g. colour nos. 310 *Primrose* and 353 *Deep cream*) in certain environmentally sensitive areas.

5.5 Luminance factor

The luminance factor of the paint, when measured as described in C.3.1, shall be not less than the value given in Table 1 for the appropriate colour.

Table 1 — Minimum luminance factors of paint

Colour	Luminance factor
	%
Yellow	58
White	83
Black	Not applicable

5.6 Sheen

When the paint is tested as described in Appendix D, the mean angle at which the reflected image of the comb is no longer visible shall be not greater than 12°.

5.7 Hiding power

When the paint is tested as described in BS 3900-D4, using a black and white card and a block applicator gap of 200 µm, the contrast ratios for a white and a yellow paint shall be not less than 90 % and 80 % respectively.

¹⁾ See Appendix C.

5.8 No pick-up time

When the paint is tested as described in Appendix E, both rings shall be free from adhering paint in either the first test or, if carried out, the repeat test.

5.9 Flexibility

When the paint, applied to a chromated soft aluminium test panel to give a dry film thickness of $50 \pm 5 \mu\text{m}$, is tested as described in BS 3900-E1 using a type 1 apparatus with a 12 mm diameter mandrel, the paint film shall show no signs of flaking or cracking.

5.10 Resistance to grit abrasion

When the paint is tested as described in Appendix F, the substrate shall not be visible at the area of grit impact.

5.11 Resistance to bleeding

When the paint is tested as described in Appendix G, the luminance factor of the paint applied to the bitumen shall not be reduced by more than 3 units below the percentage value of the paint applied to the transparent tape.

5.12 Resistance to diesel fuel

When the paint is tested as described in Appendix H:

- a) there shall be no penetration by the needle through the coating to the substrate; and
- b) after the further recovery period of 3 h, there shall be no signs of blistering in comparison with the non-immersed paint film, and the luminance factor shall not be reduced by more than 3 units from the percentage value for the paint as determined in 5.5.

5.13 Resistance to salt solution

When the paint is tested as described in Appendix J:

- a) there shall be no penetration by the needle through the coating to the substrate; and
- b) after the further recovery period of 3 h, there shall be no signs of blistering in comparison with the non-immersed paint film, and the luminance factor shall not be reduced by more than 3 units from the percentage value for the paint as determined in 5.5.

5.14 Resistance to artificial weathering

When the paint, applied to a chromated hard aluminium test panel, is tested for 500 h as described in BS 3900-F3, there shall be no signs of blistering, checking, cracking or flaking in comparison with the unexposed paint film, and the luminance factor for the appropriate colour shall be not lower than the value given in Table 2.

Table 2 — Minimum luminance factors after artificial weathering

Colour	Luminance factor
	%
Yellow	55
White	75
Black	Not applicable

5.15 Skid resistance

When the paint is tested as described in Appendix K, the mean results of both sets of three readings corrected to a temperature of 20 °C shall be not less than 45.

NOTE 1 At certain potentially hazardous locations where large areas of the road surface are to be painted, users may wish pavement marking paints to have a higher skid resistance than the minimum stipulated in this standard.

NOTE 2 The skid resistance of a pavement marking paint is not a fixed property for any given formulation. For a new marking it may vary considerably according to the conditions during which it is applied, and it will also vary throughout its life according to conditions such as traffic wear and weather.

The test specified in 5.15 is merely intended to establish whether or not it is possible to obtain an adequate initial value with a paint when applied under prescribed circumstances. Experience has shown that if such a value is obtained initially, values obtained subsequently tend to be higher once wear due to weathering and the passage of traffic has occurred.

As explained in the foreword, because of possible variability in results obtained on the road surface at the test site, this test is not specified in the road performance requirements given in 5.16. Nevertheless, further work is planned to establish the conditions necessary for the test to be reinstated in 5.16.

5.16 Road performance requirements

5.16.1 General. In addition to complying with the laboratory tests specified in 5.1 to 5.15, the paint shall comply with the appropriate performance requirements specified in 5.16.2 to 5.16.4.

The paint sample applied to the road surface for the purposes of 5.16.2 to 5.16.4 shall be in the same condition (e.g. not thinned) as the sample used for the laboratory tests specified in 5.1 to 5.15.

Details of the procedures for and control of road performance tests are given in Appendix L.

NOTE Clause 6 gives requirements for the conduct of the road performance trials and explains that the trials can only be carried out for white paints.

5.16.2 Luminance factor. When the paint, applied to the road surface as described in L.2.6 and examined as described in L.2.7, is tested as described in C.3.2, the luminance factor for the test area on each non-reflectorized stripe shall be not lower than 70 % on the day of application of the paint and not lower than 60 % at each of the regular inspection intervals thereafter.